

**MX180000A**  
**Signal Quality Analyzer**  
**Control Software**  
**Operation Manual**  
**Remote Control**

**23rd Edition**


- For safety and warning information, please read this manual before attempting to use the equipment.
- Additional safety and warning information is provided in the MP1800A Signal Quality Analyzer Installation Guide, the MT1810A 4 Slot Chassis Installation Guide, and MX180000A Signal Quality Analyzer Control Software Operation Manual. Please also refer to one of these documents before using the equipment.
- Keep this manual with the equipment.


**ANRITSU CORPORATION**


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This indicates a note. The contents are described in the box.



These indicate that the marked part should be recycled.

MX180000A

Signal Quality Analyzer Control Software

Operation Manual Remote Control

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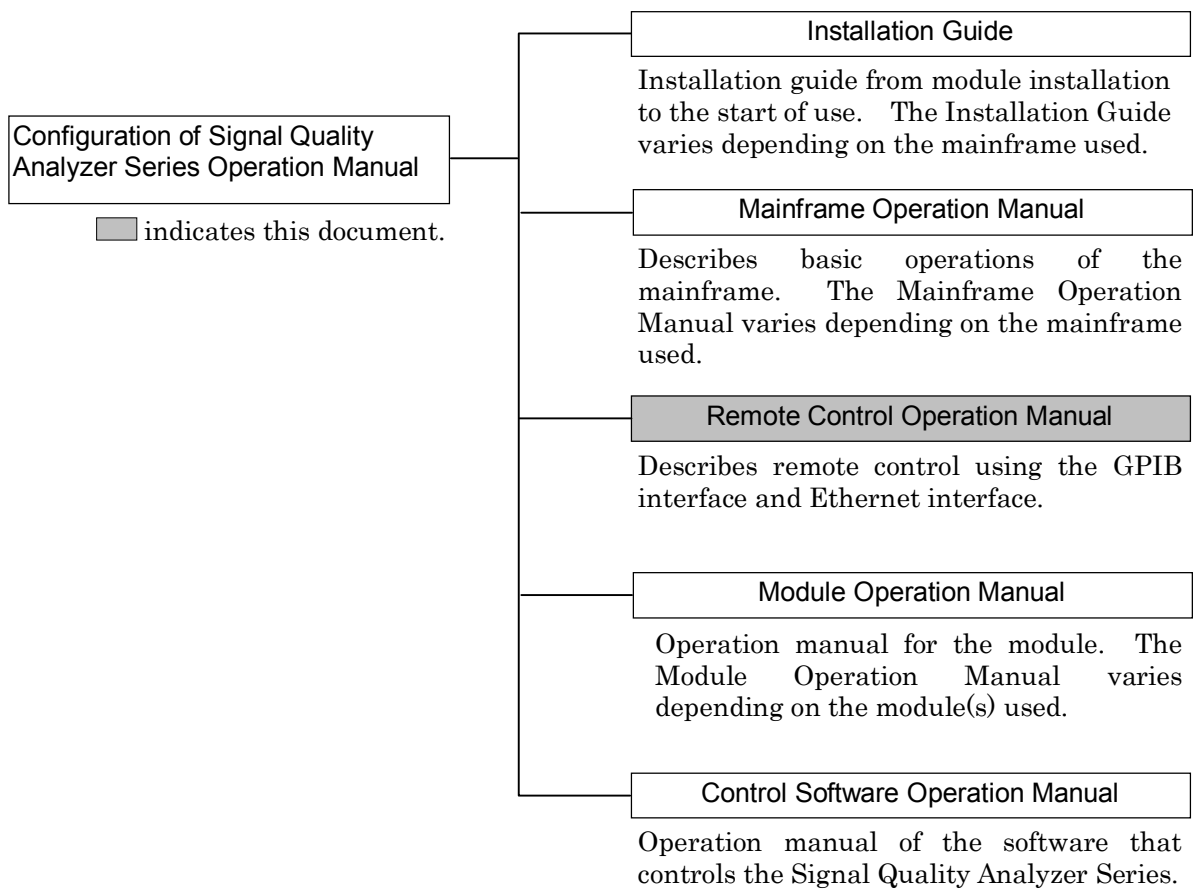
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## About This Manual

A testing system combining an MP1800A Signal Quality Analyzer or MT1810A 4-Slot Chassis mainframe, module(s), and control software is called a Signal Quality Analyzer Series. The operation manuals of the Signal Quality Analyzer Series consist of separate documents for the installation guide, the mainframe, remote control operation, module(s), and control software, as shown below.



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# *Chapter 1 Overview*

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This chapter provides an overview of remote control by the MX180000A Signal Quality Analyzer Control Software (hereinafter, referred to as "MX180000A").

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## 1.1 Overview

The MP1800A Signal Quality Analyzer (hereinafter, referred to as "MP1800A") and the MT1810A 4-Slot Chassis (hereinafter, referred to as "MT1810A") that are controlled by the MX180000A are capable of performing automatic measurements when connected to an external controller. Either the GPIB or Ethernet interface may be used for connection. In addition, the SCPI standard, which is becoming the global standard, is used for the remote control commands. Refer to *SCPI 1999.0 (SCPI Consortium)* for details on SCPI.

The general conditions for using the SCPI standard are described below:

- Commands for GPIB and Ethernet are standardized.
- These commands are not applied for functions executed within the Setup Utility (setting of GPIB/Ethernet, self-test, etc.).
- The above conditions can all be read by the command.

The GPIB/Ethernet commands of the MP1800A/MT1810A can also use some of the command definitions (Native) that are used with Anritsu's Pulse Pattern Generators and/or Error Detectors (BERTS), as well as SCPI. This means that these commands can be executed with a single character string, differing from the tree structure of the SCPI commands.

## *Chapter 2 Connections*

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This chapter describes the connections of the equipment for using the remote control function and the settings for using the GPIB and Ethernet interfaces, which are MP1800A options.

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## 2.1 Connections

This chapter describes the connections for using the remote control function for the MP1800A, which does not require a control PC for basic operations, and the MT1810A, which requires a control PC for basic operations.

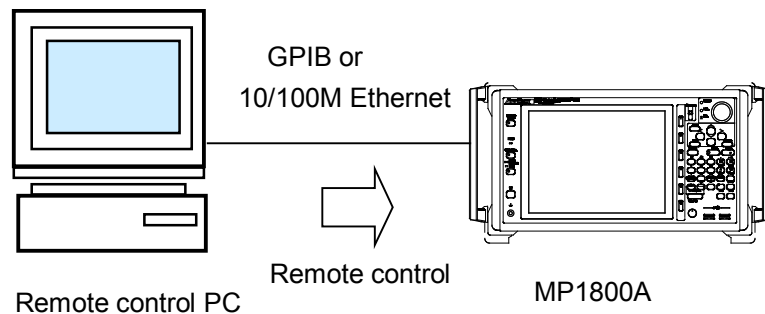
### 2.1.1 Connecting MP1800A

The remote control function of the MP1800A is implemented by remotely controlling the MP1800A from a PC for remote control (remote control PC).

Use the GPIB or the 10/100 M Ethernet interface to connect the MP1800A and a remote control PC. An example is shown below.

**Notes:**

- Be sure to use the 100M full-duplex mode for the Ethernet connection.
- Direct connection without using hub is recommended for the Ethernet connection. Use a crossover cable for direct connection.



**Figure 2.1.1-1 Configuration for remote control of MP1800A from the remote control PC**

## 2.1.2 Connecting MT1810A

Two types of configurations are available for using the remote control function of the MT1810A: remote control of the MX180000A from the remote control PC, and remote control of the MX180000A within the same PC.

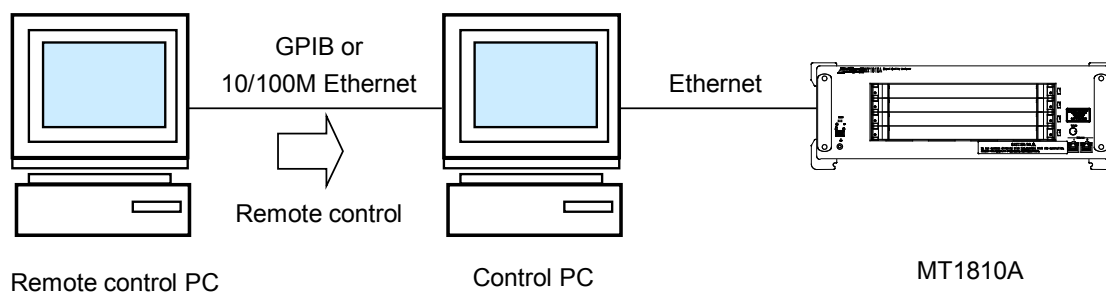
### [1] Remote control of the MX180000A from the remote control PC

Remote control of the MX180000A can be achieved by using an Ethernet connection between the control PC and the remote control PC.

Use an Ethernet to connect the MT1810A and control PC, and use the GPIB or 10/100 M Ethernet interface to connect the remote control PC and the control PC. An example is shown below.

#### Notes:

- Use the 100M full duplex mode for the Ethernet connection.
- Direct connection without using any hub is recommended for the Ethernet connection. Use a crossover cable for direct connection.



**Figure 2.1.2-1 Configuration for remote control of the MX180000A from the remote control PC**

[2] Remote control of the MX180000A within the same PC

Remote control of the MX180000A can be done within the control PC. An example is shown below.

**Note:**

For remote control within the same PC, set the destination IP address of the remote control application to 127.0.0.1 (PC loopback address).

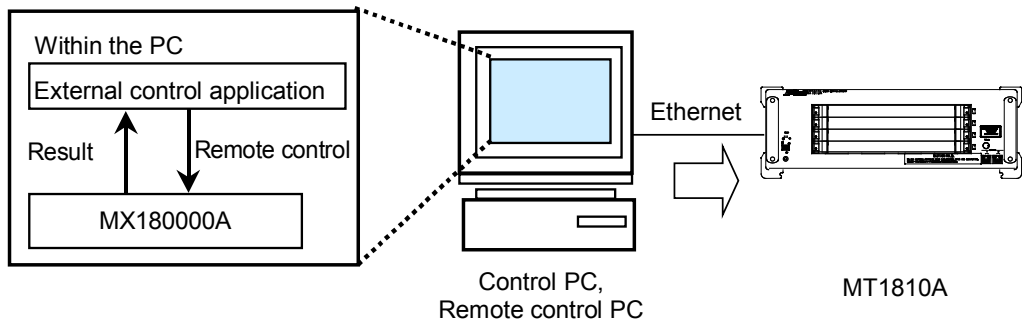


Figure 2.1.2-2 Configuration for remote control of MX180000A within the same PC

## 2.2 GPIB Interface

This chapter describes the GPIB interface functions and settings for using the GPIB interface of the MP1800A-001.

### 2.2.1 GPIB interface function

The MP1800A has device functions but no controller function. Therefore, its interface functions are as shown in the following table according to the IEEE488.2 standard.

**Table 2.2.1-1 Interface functions**

Code	Interface Function	IEEE488.2 Standard
SH1	All functions for source handshake	All functions are standardly equipped
AH1	All functions for acceptor handshake	All functions are standardly equipped
T5	Basic talker functions Talk only mode functions Talker reset functions via MLA	The device must have a subset T5, T6, TE5, or TE6.
L4	Basic listener functions No listen-only mode function Listener reset functions via MLA	The device must have a subset L3, L4, LE3, or LE4.
SR1	All functions for service request	All functions are standardly equipped
RL1	All functions for remote/local	All remote/local functions of RL0 (no function) or RL1 (all functions)
PP0	No parallel poll function	PP0 (no function) or PP1 (all functions)
DC1	All functions for device clear	All functions are standardly equipped
DT1	All functions for device trigger	DT1 (all functions)
C1* <sub>1</sub> C2* <sub>2</sub> C3* <sub>3</sub> C4* <sub>4</sub> C7* <sub>5</sub>	Controller functions except parallel poll	C0 (no function), C4 and C5, or any of C7, C9, or C11

\*1: System controller

\*2: IFC transmission, controller in charge

\*3: REN transmission

\*4: Response to SRQ

\*5: Interface message transmission, reception and passing of the control, and passing of the control to itself

## 2.2.2 Device message list

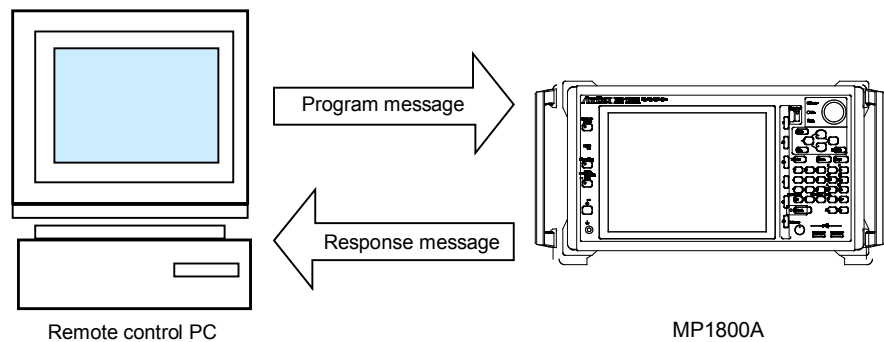
Device messages are data messages that are transmitted and received between the remote control PC and the MP1800A via the system interface when the bus mode is the data mode (when the ATN line is "H"). Device messages consist of program messages and response messages.

Program messages are ASCII data messages transferred from the controller to the device. Response messages are data messages transferred from the device to the controller.

Program messages and response messages have the following types.

**Table 2.2.2-1 Device message**

<b>Program Message (See Section 3.1.2)</b>	<b>Response Message (See Section 3.2.2)</b>
Program instruction <ul style="list-style-type: none"> <li>• Device-unique command (See Chapters 7 and 8.)</li> <li>• IEEE488.2 common command (See Chapter 5.)</li> </ul>	Program query <ul style="list-style-type: none"> <li>• Status message (See Chapter 6.)</li> <li>• Response message</li> </ul>



**Figure 2.2.2-1 Device messages**

The messages are exchanged via the I/O buffer of the device. The table below briefly describes the I/O buffer.

**Table 2.2.2-2 I/O buffer**

<b>Input Buffer</b>	<b>Output Queue</b>
FIFO (First in First out) type memory area that temporarily stores DABs (program messages and query messages) before syntax analysis. The input buffer size of the MP1800A is 1 Kbytes.	FIFO type queue memory area. All the DABs (response messages) outputted from the device to the controller are stored in this memory until the controller finishes reading them.



### 2.2.3 Bus commands

Bus commands are used for internal communications of the interface transmitted while the bus mode is the command mode (when the ATN line is "L").

The table below lists the bus commands.

**Table 2.2.3-1 Bus commands**

<b>Bus Command</b>	<b>Operation</b>
DCL (Device Clear)	Initializes message exchange of all devices connected to the GPIB bus.
SDC (Selected Device Clear)	Initializes message exchange of the addressed MP1800A. The operation is the same as the DCL.
IFC (Interface Clear)	Initializes the interface.

## 2.2.4 Connecting GPIB cable

Connect the GPIB cable to the GPIB connector on rear back panel of the MP1800A.

Systems using GPIB have the following restrictions:

Number of connectable devices  $\leq 15$  units

Total cable length  $\leq 2 \text{ m} \times \text{Number of devices}$   
(20 m, max.)

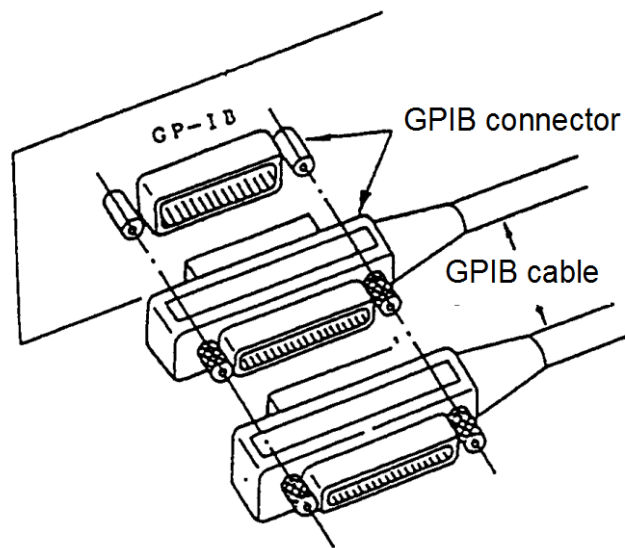


Figure 2.2.4-1 GPIB cable connection

## 2.2.5 Setting GPIB

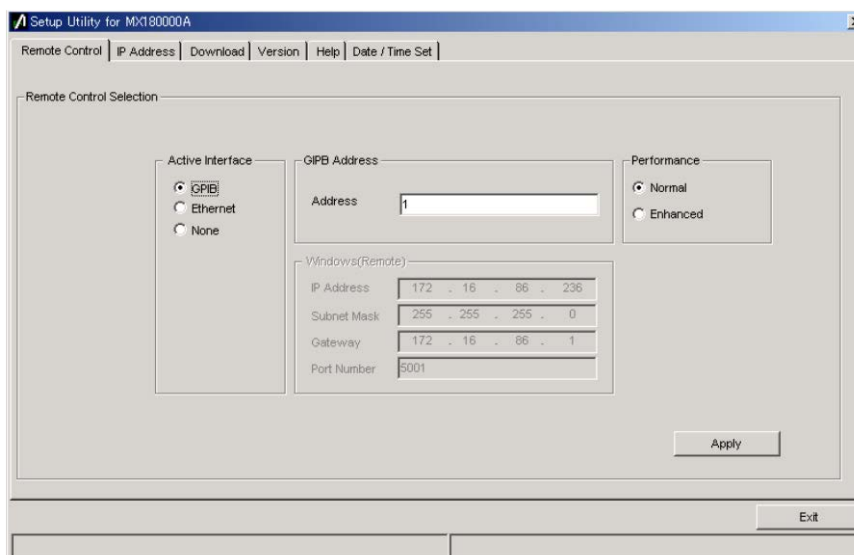
To use the GPIB as a remote interface, set the device to Local, and use the keys to perform the following settings in the Remote Control tab window on the Setup Utility main window.

**Table 2.2.5-1 Setting GPIB**

Setting Detail	Setting Item	Setting Value
Selection of the interface used for remote control	Active Interface	GPIB: Uses the GPIB interface for remote control.
Address setting	Address	0 to 30
Command processing mode	Performance	Normal/Enhanced

Setting procedure:

1. Start the Setup Utility, and click the Remote Control tab to open the Remote Control tab window.
2. Select the GPIB in the Active Interface field (click a radio button).
3. Enter the GPIB address into the text box, and then click the [Apply] button.



**Figure 2.2.5-1 Setup Utility: Remote Control tab window – GPIB setting**

See the *MP1800A Signal Quality Analyzer Installation Guide* for setting details.

## 2.2.6 System initialization

IEEE488.2 defines system initialization in three levels: bus initialization, message initialization, and device initialization.

**Table 2.2.6-1 Device initialization**

Level	Initialization Type	Description
1	Bus initialization	Initializes all interface functions connected to the bus with IFC message from the controller.
2	Message initialization	Disables function to report completion of initialization of message exchange or operation of all devices on the GPIB with the GPIB bus command DCL or the device specified with the bus command SDC, to the controller.
3	Device initialization	Recovers the known state that is specific to the device with the *RST command regardless of the past use conditions.

### 2.2.6.1 Bus initialization

**IFC**                      Initializes the bus with IFC statement.

**Function**              Activates the IFC line for about 100  $\mu$ s to initialize interface functions of all devices connected to the GPIB bus line. Only the system controller can transmit IFC.

### 2.2.6.2 Message initialization

**DCL, SDC**              Message exchange initialization using the DCL/SDC bus command

**DCL:** Initializes message exchange for all devices on the GPIB.

**SDC:** Initializes message exchange for the specified device.

**Function**              Initializes message exchange for all devices on the GPIB or only the specified device. Initialize message exchange when change of the panel setting state is not required, but if the parts related to message exchange inside the device are in a state that is not suitable for control from the controller due to execution of other programs. When message exchange is initialized, new instructions can be transmitted from the controller.

### 2.2.6.3 Device initialization

*RST	Initializes the device with the *RST command.
Function	Resets the device-unique function to a known state, regardless of the past use history. For the MP1800A, the factory-shipped settings are restored.

### 2.2.6.4 Device state upon application startup

When the application of the MP1800A starts up, it enters the following state:

- The state in which the application was terminated is set.
- The input buffer and output queue are cleared.
- The syntax analyzer, execution controller, and response creator are reset.
- Messages can be transmitted and received only when the application is running.

## 2.3 Ethernet Interface

This chapter describes the settings for using the Ethernet interface of the MT1810A, MP1800A-002.

### 2.3.1 Device message list

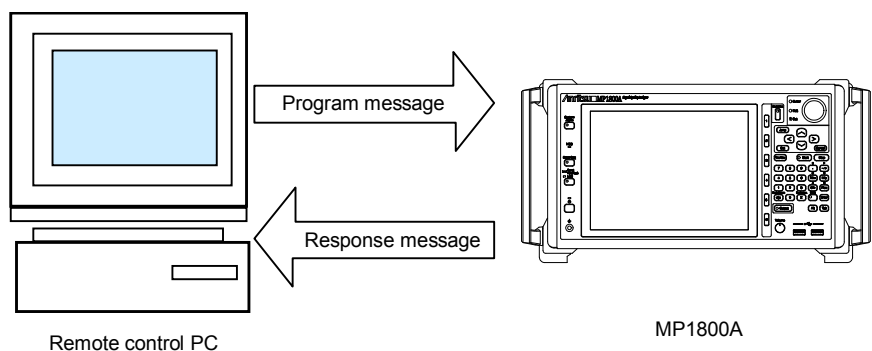
Device messages are data messages that are transmitted and received between the controller and device via the system interface. Device messages consist of program messages and response messages.

Program messages are ASCII data messages transferred from the controller to the device. Response messages are data messages transferred from the device to the controller.

Program messages and response messages have the following types.

**Table 2.3.1-1 Device message**

Program message (See Section 3.1.2)	Response message (See Section 3.2.2)
Program instruction <ul style="list-style-type: none"> <li>• Device-unique command (See Chapters 7 through 8.)</li> <li>• IEEE488.2 common command (See Chapter 5.)</li> </ul>	Program query <ul style="list-style-type: none"> <li>• Status message (See Chapter 6.)</li> <li>• Response message</li> </ul>



**Figure 2.3.1-1 Device messages**

The messages are exchanged via the I/O buffer of the device. The table below briefly describes the I/O buffer.

**Table 2.3.1-2 I/O buffer**

<b>Input Buffer</b>	<b>Output Queue</b>
FIFO (First in First out) type memory area that temporarily stores DABs (program messages and query messages) before syntax analysis. The input buffer size of the MP1800A is 1 Kbytes.	FIFO type queue memory area. All the DABs (response messages) outputted from the device to the controller are stored in this memory until the controller finishes reading them.

The MP1800A or MT1810A main unit must be connected to the TCP/IP network, for the Ethernet interface to be used. In this instance, the MP1800A or MT1810A works as the server.

### 2.3.2 Setting Ethernet board

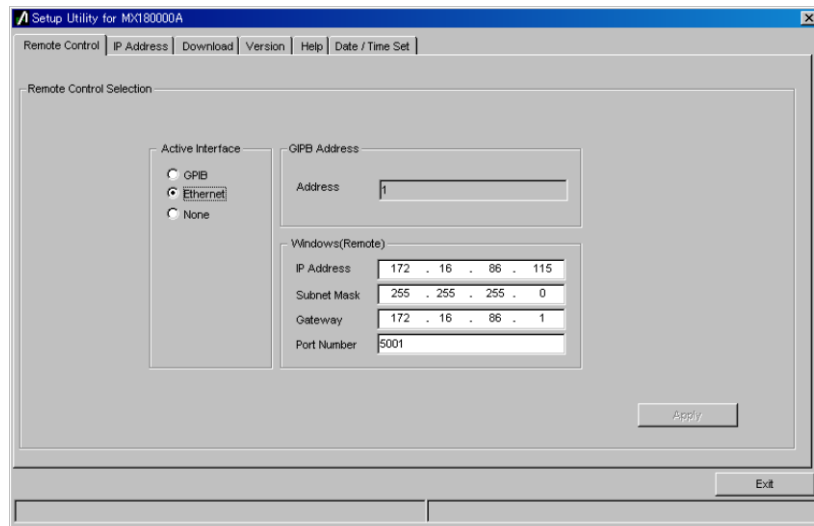
To use the Ethernet as a remote interface, set the device to Local, and use the keys to perform the following settings in the Remote Control tab window on the Setup Utility main window.

**Table 2.3.2-1 Ethernet board setting**

Window	Setting Detail	Setting Item	Setting Value
Remote Control tab window	Selection of the interface used for remote control	Active Interface	Ethernet: Uses the Ethernet interface for remote control.
	Port number setting	Port Number	1024 to 5001
Network setting, property setting	IP address	IP Address	0.0.0.0 to 255.255.255.255
	Subnet mask	Sub Net Mask	0.0.0.0 to 255.255.255.255
	Gateway	GateWay	0.0.0.0 to 255.255.255.255

Setting procedure:

1. Start the Setup Utility, and click the Remote Control tab to open the Remote Control tab window.
2. Select the Ethernet in the Active Interface field (click a radio button).
3. Enter the IP Address, Subnet Mask, Gateway, and Port Number, and then click the [Apply] button.



**Figure 2.3.2-1 Setup Utility: Remote Control tab window – Ethernet setting**



**Notes:**

- For the IP address of the remote interface, set the address other than “192.168.1.xxx”. The “192.168.1.xxx” address is used for the module address. If this address is set, the module may not operate properly.
- For the network settings to be used for the remote interface, use “Setup Utility” of the MX180000A. If the IP address is set from the control panel of the operating system (Windows), the module may not operate properly.

- **IP address**

In a network using TCP/IP, devices connected to the network are identified by IP addresses. An IP address must therefore be assigned to each device. An IP address is a 32-bit number, and expressed as four 8-bit portions separated by dots (called dot notation).

IP addresses include network information in addition to the device (host) information. The data lengths of the network part and host part of an IP address is defined depending on the network class. Class C has 24-bit network part and 8-bit host part, and up to 254 hosts can be connected. Classes A through E are available; however, only Classes A through C are normally used.

**Table 2.3.2-2 IP address**

<b>Class</b>	<b>Network part length</b>	<b>Host part length</b>	<b>Number of hosts that can be assigned</b>
A	8 bits	24 bits	16,777,214 units
B	16 bits	16 bits	65,534 units
C	24 bits	8 bits	254 units

- **Subnet mask**

The subnet mask is used to indicate the network part in the IP address when the network is divided into subnets. The network part of the IP address above (including the extended subnet part) is indicated by "1", and the host part is defined by "0". If this setting is wrong, IP packets cannot be transmitted or received correctly to or from the connected network that uses subnets.

- **Gateway**

A device called a gateway is used to connect networks. Gateways include dedicated devices such as routers. In a TCP/IP network, IP packets can be directly exchanged within the same network. To exchange IP packets among different networks (i.e., terminals that have IP addresses with different network parts), however, communication with a device connecting to other network connected to the gateway via the gateway is required.

### 2.3.3 Network connection and data flow

Connect the Ethernet cable to the MP1800A/MT1810A main unit to connect to the network. The communication with MP1800A/MT1810A is data communication via the TCP connection. For communication, creating a communication program (socket client) at the remote control PC side is required.

For the socket interface used for communication, see the operation manuals of the remote control PC, the network interface board installed, and the driver software.

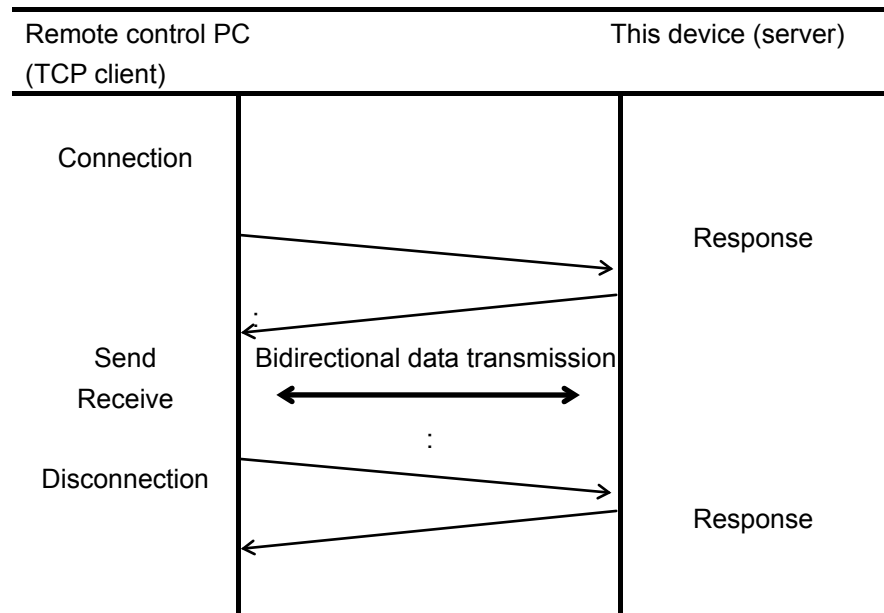


Figure 2.3.3-1 Data flow

#### Data communication

The data from the client is saved in the reception buffer. Flow control of TCP occurs when the internal buffer is full, and no command-level response may return to the client. Some applications may be abnormally terminated due to timeout. In this case, the connection with the client is not disconnected. In some cases, you need to protect application operations by re-transmission.



## *Chapter 3 SCPI Format*

---

This chapter describes the SCPI command system.

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### 3.1 SCPI Listener Input Format

This chapter describes the format of program messages received by the listener (MP1800A/MT1810A) from the talker (remote control PC).

The device-unique commands of the MP1800A/MT1810A comply with the SCPI, so the SCPI commands are used in the examples in this chapter.

#### 3.1.1 SCPI listener input program message format

The following figure shows a sample program message, which sets the data output to ON and sets the test pattern to PRBS.

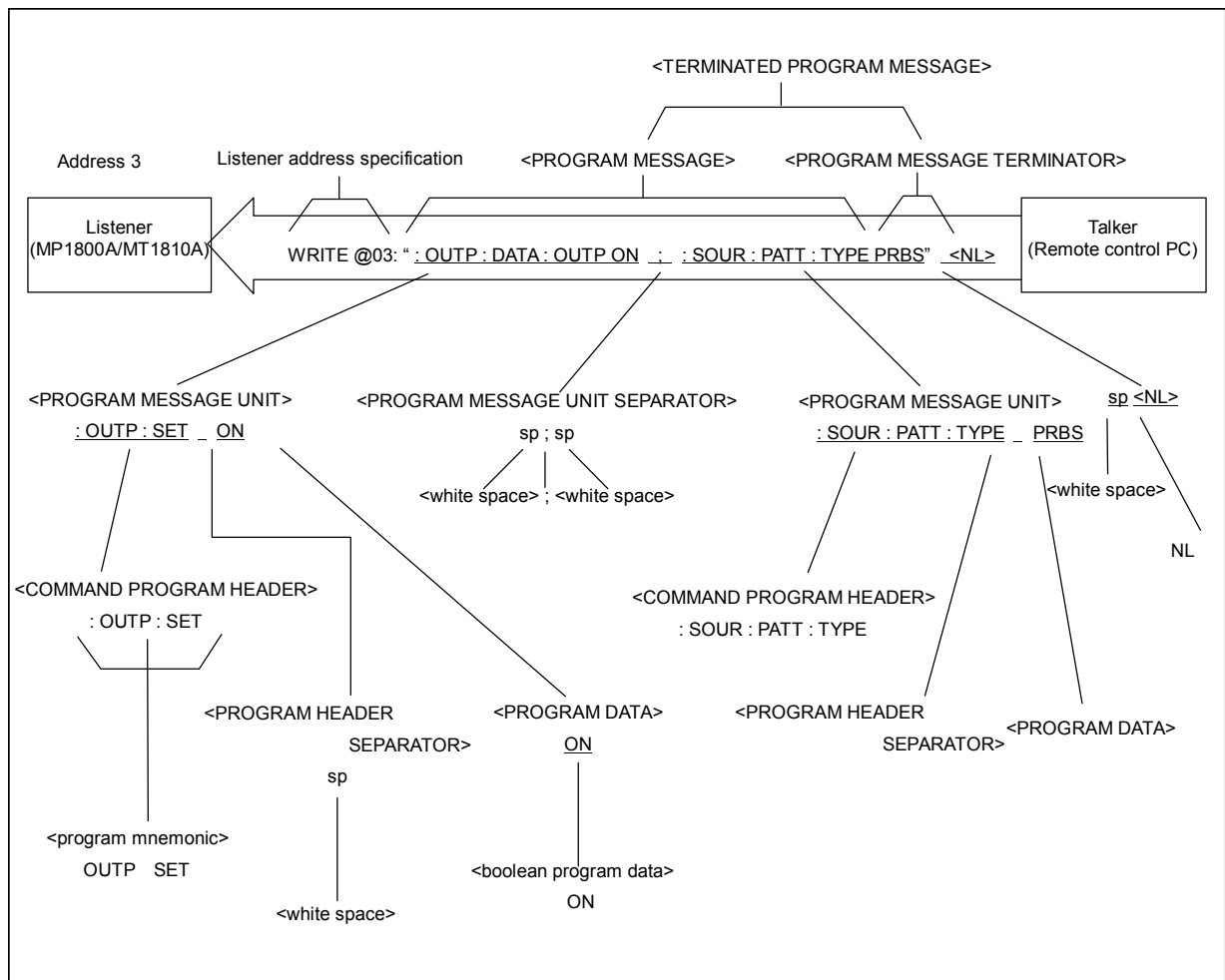


Figure 3.1.1-1 SCPI listener input program message

The program message format consists of a sequence of functional elements, which are the minimum level units to indicate a function. In the figure above, the words written in uppercase alphabetical characters enclosed within brackets (< >) indicate examples of functional elements. A functional element is further divided into coding elements. In the figure above, the words written in lowercase alphabetical characters enclosed within brackets indicate examples of coding elements.

The WRITE and READ commands have the following formats.

WRITE @

Outputs data to the MP1800A/MT1810A.

★ Format \_\_\_\_\_

WRITE @Device number: Data

Data →	Mathematical expression
	String expression

**Example: The same as the previous page**

WRITE @

Outputs the data to the device.

★ Format \_\_\_\_\_

WRITE @Device number: Data

Data →	Mathematical expression
	String expression

Example: The same as the example on the previous page

WRITE @03: " : OUTP : DATA : OUTP ON ; : SOUR : PATT : TYPE PRBS"

— Listener address (when the GPIB address of MP1800A/MT1810A is 3)

READ @

Substitutes the data inputted from the device into the variable.

★ Format \_\_\_\_\_

READ @Device number: variable

\_\_\_\_\_

The data input from the device (input connector setting) to the variable A\$.

WRITE @03: ":OUTP: DATA : OUTP?" ← Queries the input connector setting.

READ @03: A\$

↙ Listener address (when the GPIB address of MP1800A/MT1810A is 3)



3.1.2 Functional elements of program messages

The MP1800A/MT1810A receives a program message by detecting the terminator at the end of the program message. The functional elements of program messages are described below.

3.1.2.1 <TERMINATED PROGRAM MESSAGE>

The following figure shows a <TERMINATED PROGRAM MESSAGE> that transmits two instructions.

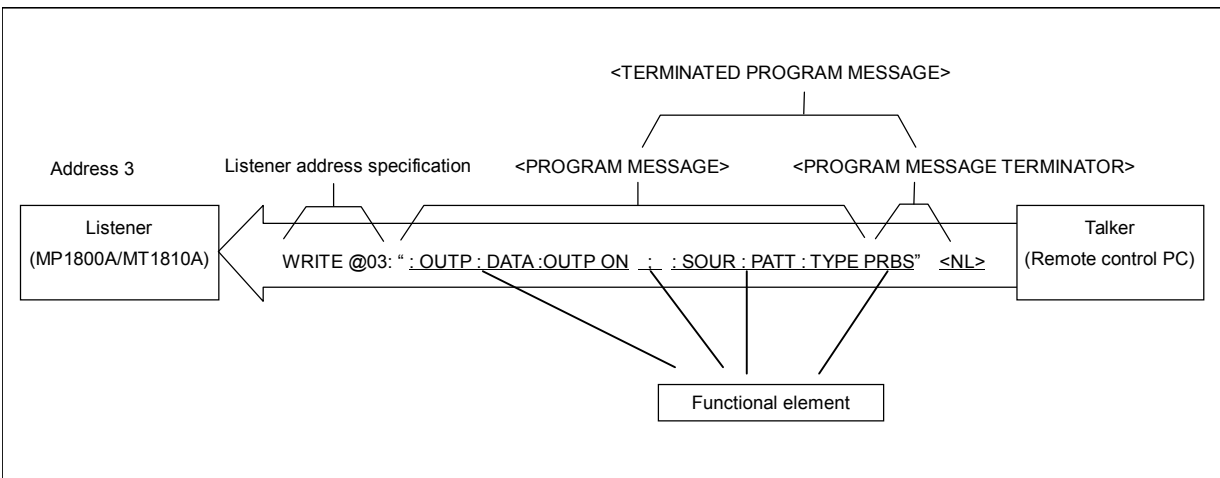
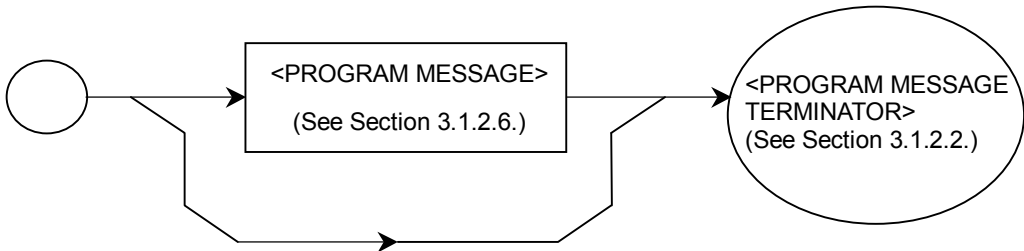


Figure 3.1.2.1-1 <TERMINATED PROGRAM MESSAGE>

Definition

<TERMINATED PROGRAM MESSAGE> is defined as follows:

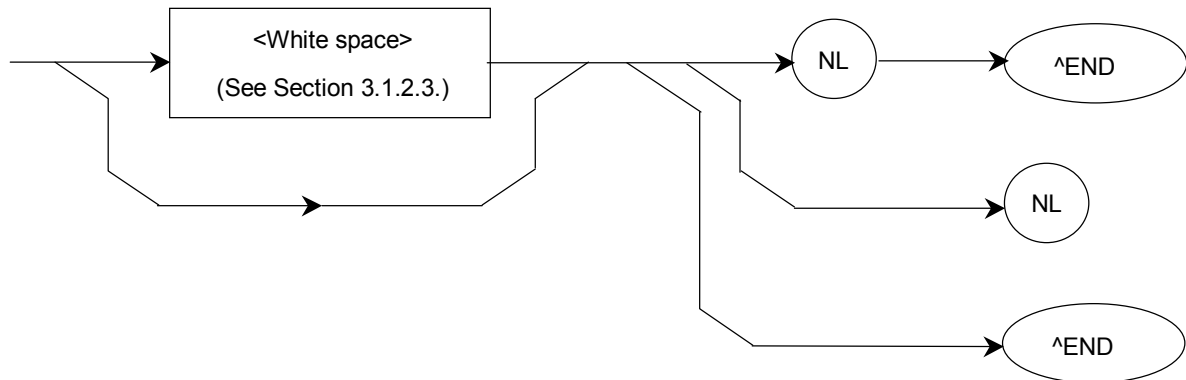


<TERMINATED PROGRAM MESSAGE> is a data message containing all the functional elements required for transmitting the message from the remote control PC to the MP1800A/MT1810A. A <PROGRAM MESSAGE TERMINATOR> is added to the end of a <PROGRAM MESSAGE> to complete transmission of the <PROGRAM MESSAGE>.

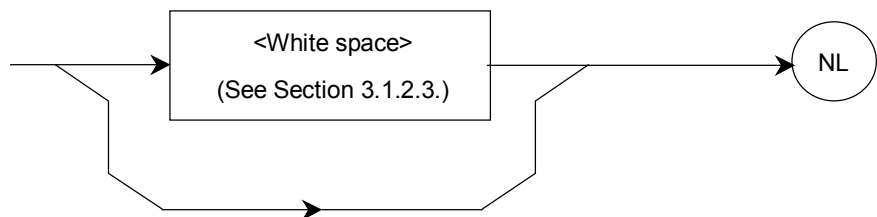
### 3.1.2.2 <PROGRAM MESSAGE TERMINATOR>

<PROGRAM MESSAGE TERMINATOR> is placed to terminate a sequence of one or more <PROGRAM MESSAGE UNIT> elements. The definition of the <PROGRAM MESSAGE TERMINATOR> differs according to the used interface.

(1) For GPIB interface:



(2) For Ethernet interface:



**NL** Defined as a single ASCII code byte 0A (decimal number 10), i.e. the ASCII control character LF (Line Feed) that performs the carriage return operation bringing the print position to the same character position in the next line. It is also called NL (New Line) because it starts from a new line.

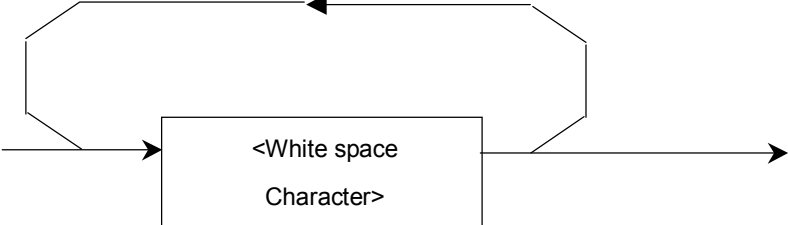
For line feed, the CR+LF code may be used instead of the LF code.

If the remote control PC runs on MS-DOS or Windows, line feed is done with "CR+LF", while it is done with only "LF" for UNIX.

**END** Generates an EOI signal by setting the EOI (End-or-Identify) line of the GPIB control bus to TRUE (low level). The EOI ON and OFF statements are used to control EOI lines.

3.1.2.3 <white space>

<white space> is defined as follows:



<white space Character> is defined as a single ASCII code byte within the range of the ASCII code bytes 00 to 09 and 0B to 20 (decimal numbers 0 to 9 and 11 to 32). The range includes the ASCII control symbols and space signals except New Line. The MP1800A/MT1810A processes these ASCII symbols simply as spaces or just ignores them, instead of interpreting them as ASCII control symbols.

### 3.1.2.4 <PROGRAM MESSAGE>

The following figure shows a setting example, which activates the alarm when an error occurs and sets the test pattern to PRBS.

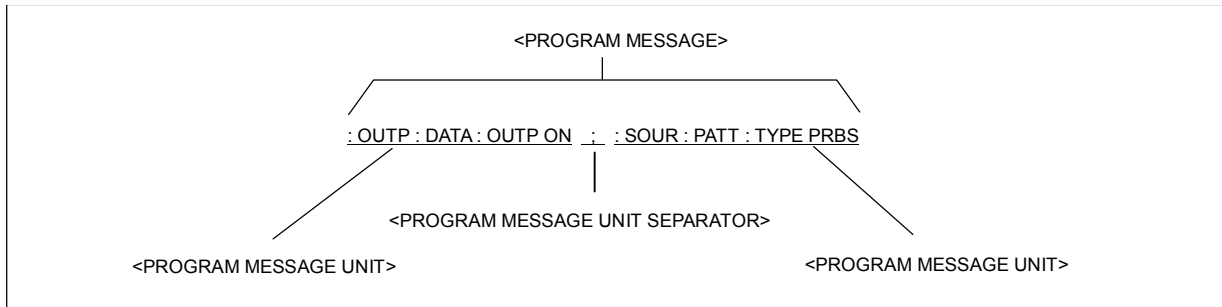
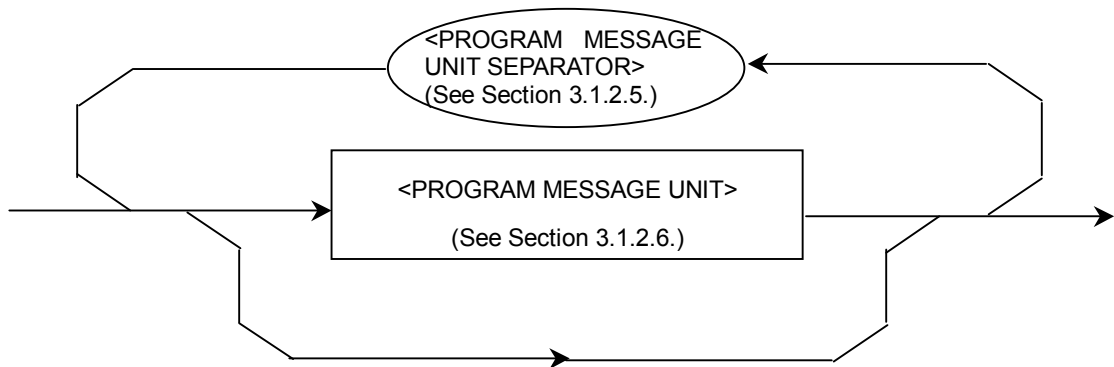


Figure 3.1.2.4-1 <PROGRAM MESSAGE>

#### Definition

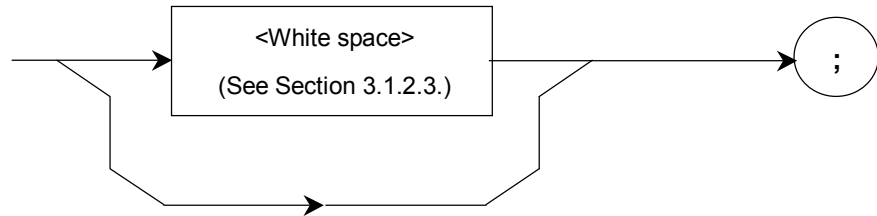
<PROGRAM MESSAGE> is defined as follows:



<PROGRAM MESSAGE> is a sequence of zero, one or more <PROGRAM MESSAGE UNIT> elements. The <PROGRAM MESSAGE UNIT> element indicates a programming instruction or data to be sent from the remote control PC to the MP1800A/MT1810A. <PROGRAM MESSAGE UNIT SEPARATOR> is used to separate two or more <PROGRAM MESSAGE UNIT> elements.

3.1.2.5 <PROGRAM MESSAGE UNIT SEPARATOR>

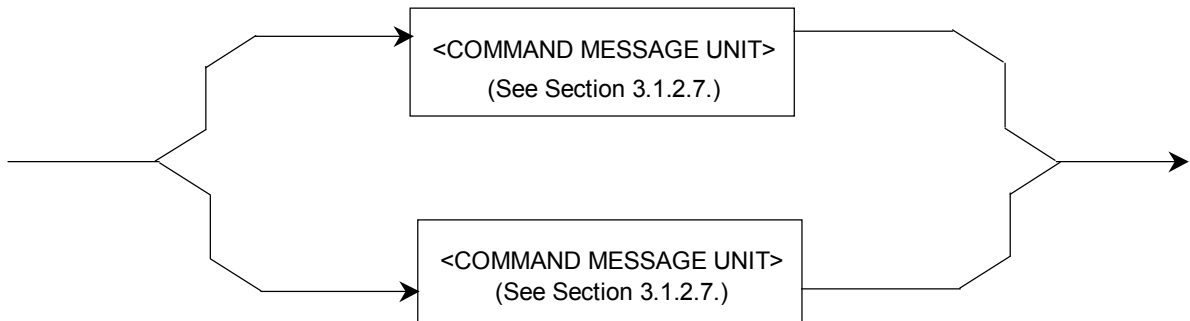
<PROGRAM MESSAGE UNIT SEPARATOR> is defined as follows:



<PROGRAM MESSAGE UNIT SEPARATOR> separates a sequence of two or more <PROGRAM MESSAGE UNIT> elements into <PROGRAM MESSAGE> elements. The MP1800A/MT1810A interprets a semicolon (;) as the separator of the <PROGRAM MESSAGE UNIT>. The <white space character> elements before and after the semicolon are therefore ignored. The <white space character> is useful, however, to make the program readable.

3.1.2.6 <PROGRAM MESSAGE UNIT>

<PROGRAM MESSAGE UNIT> is defined as follows:



<PROGRAM MESSAGE UNIT> consists of <COMMAND MESSAGE UNIT>, a single command message received by the MP1800A/MT1810A, or <QUERY MESSAGE UNIT>, a single query message. Setting and query can be performed for the MP1800A/MT1810A in units of <PROGRAM MESSAGE UNIT>.

3.1.2.7 <COMMAND MESSAGE UNIT> and <QUERY MESSAGE UNIT>

(1) <COMMAND MESSAGE UNIT>

Example: The following shows a date setting command.

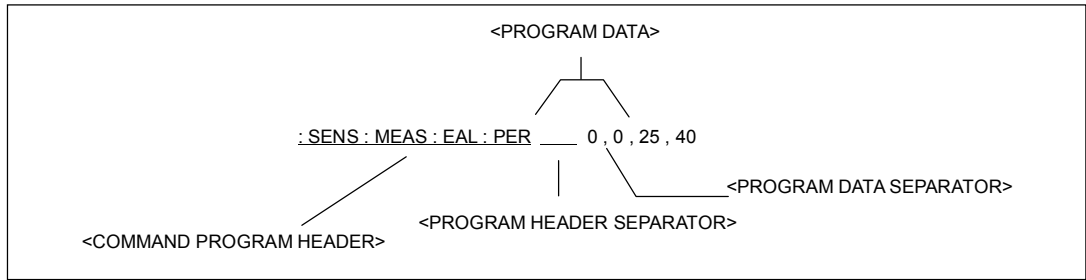
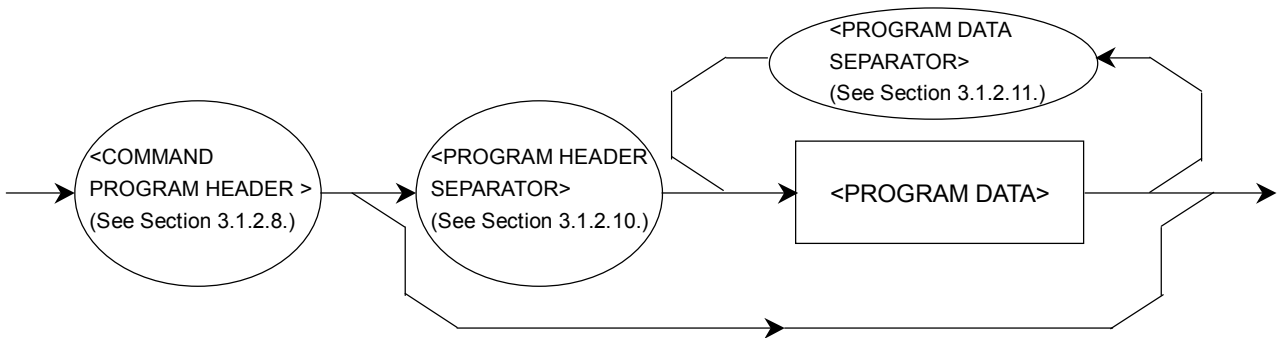


Figure 3.1.2.7-1 <COMMAND MESSAGE UNIT>

<COMMAND MESSAGE UNIT> is defined as follows:



(2) <QUERY MESSAGE UNIT>

Example: The following shows a query that queries the area to add a bit error.

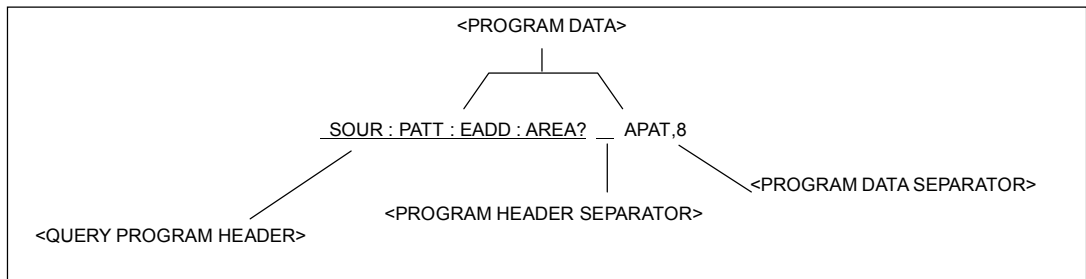
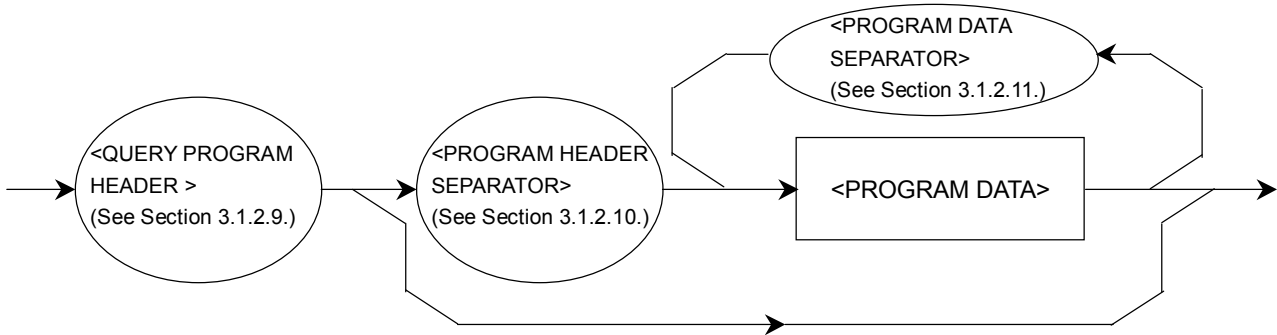


Figure 3.1.2.7-2 <QUERY MESSAGE UNIT>

<QUERY MESSAGE UNIT> is defined as follows:

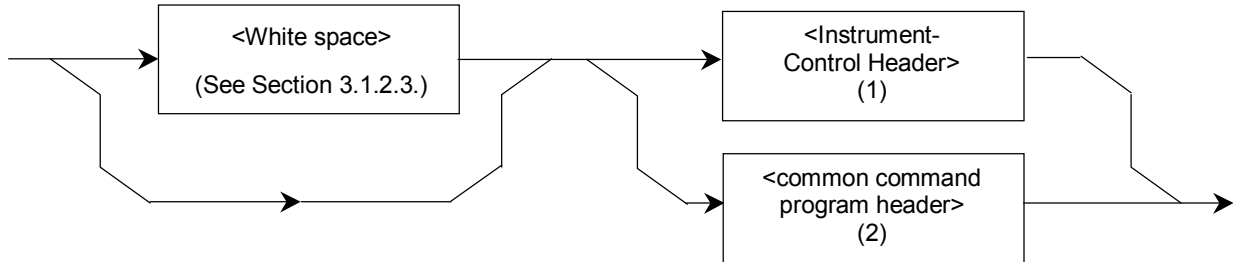


For both <COMMAND MESSAGE UNIT> and <QUERY MESSAGE UNIT>, when program data follows the program header, one space must be inserted as a separator between them. The program header identifies the application, function, and operation of the program. If no program data is added, the header alone indicates the application, function, and operation for the MP1800A/MT1810A.

Among program headers, <COMMAND PROGRAM HEADER> is a command used to control the MP1800A/MT1810A from the remote control PC. <QUERY PROGRAM HEADER> is a query command to be transmitted from the remote control PC to the MP1800A/MT1810A in advance for the remote control PC to receive response messages from the MP1800A/MT1810A. A query indicator (?) is added to the end of the header.

### 3.1.2.8 <COMMAND PROGRAM HEADER>

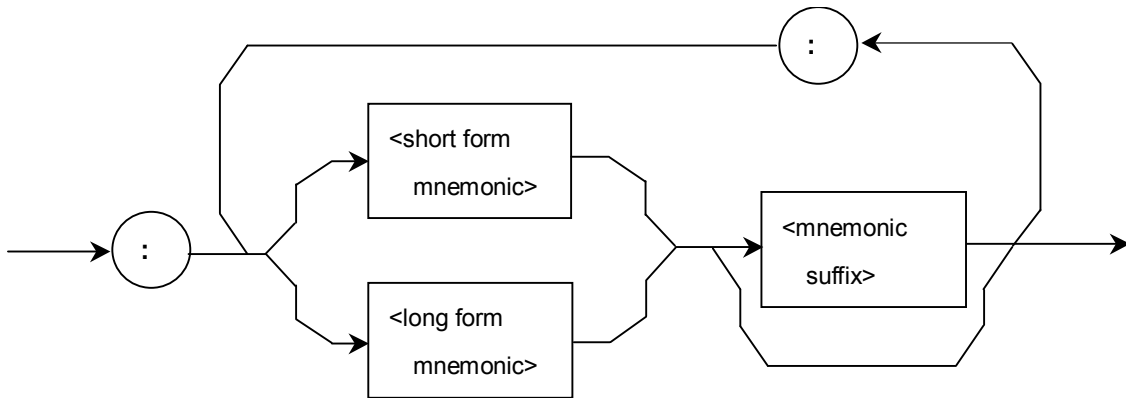
<COMMAND PROGRAM HEADER> is defined as follows:  
 A <white space> can be inserted in front of each header.



■ <COMMAND PROGRAM HEADER>

Indicates the application, function, and operation of the program data executed by the MP1800A/MT1810A. If no program data is added, the header alone indicates the application, function, and operation for the MP1800A/MT1810A. <program mnemonic> expresses the meaning in ASCII code characters, and is generally just called a "mnemonic".

(1) <Instrument-Control Headers> is defined as follows:



■ <Instrument-Control Headers>

<Instrument-Control Header> is defined in the SCPI. The device-unique commands of the MP1800A/MT1810A comply with the SCPI, so the command format conforms to the SCPI.

● <short form mnemonic>/<long form mnemonic>

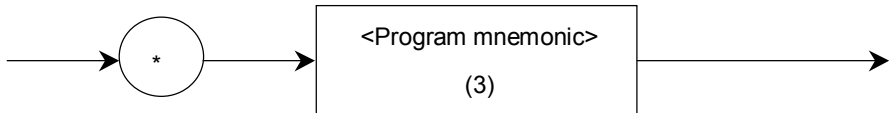
Correspond to the short form and long form of the SCPI commands, respectively. For the specifications of mnemonics, the specifications of <program mnemonic> described earlier are applied as they are.



● <numeric suffix>

Defined as a single ASCII code byte, within the range of the ASCII code bytes 30 to 39 (decimal numbers 48 to 57 = numerical values 0 to 9).

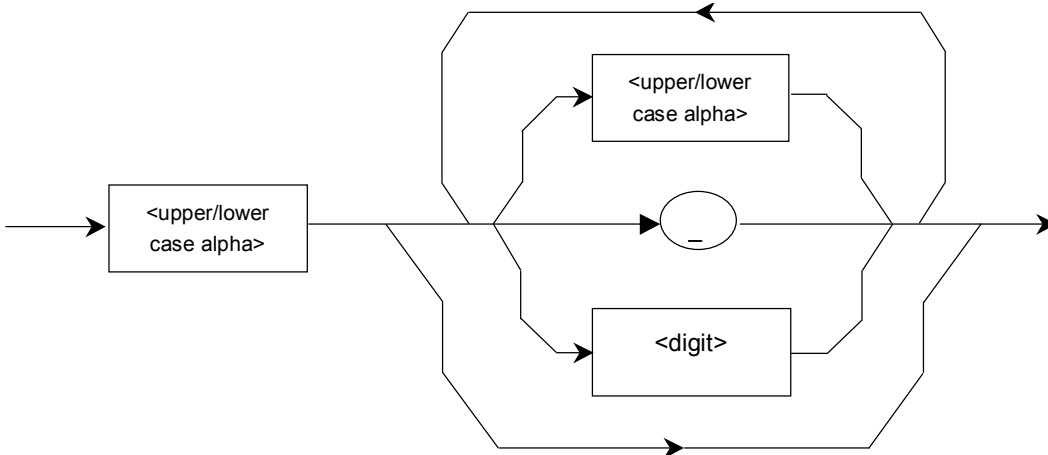
(2) <common command program header> is defined as follows:



■ <common command program header>

For <common command program header>, an asterisk (\*) must be added before the <program mnemonic> (refer to Chapter 5 "IEEE488.2 Common Commands" for details).

(3) <Program mnemonic> is defined as follows:



■ <program mnemonic>

A mnemonic must start with an uppercase or lowercase alphabetic character, followed by any combination of uppercase alphabetic characters ("A" to "Z"), lowercase alphabetic characters ("a" to "z"), underbar (\_), and numbers ("0" to "9"). The maximum length of a mnemonic is twelve characters. Space must not be inserted between characters.

● <upper/lower case alpha>

Defined as a single ASCII code byte, within the range of the ASCII code bytes 41 to 5A and 61 to 7A (decimal numbers 65 to 90, 97 to 122 = uppercase alphabetic characters A to Z, lowercase alphabetic characters a to z).

- <digit>

Defined as a single ASCII code byte, within the range of the ASCII code bytes 30 to 39 (decimal numbers 48 to 57 = numerical values 0 to 9).

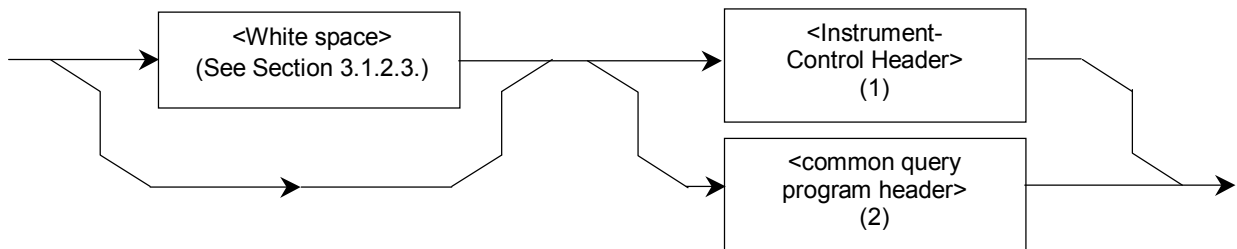
- ( )

Indicates the ASCII code byte 5F (decimal number 95 = underbar). It is defined as a single ASCII code byte.

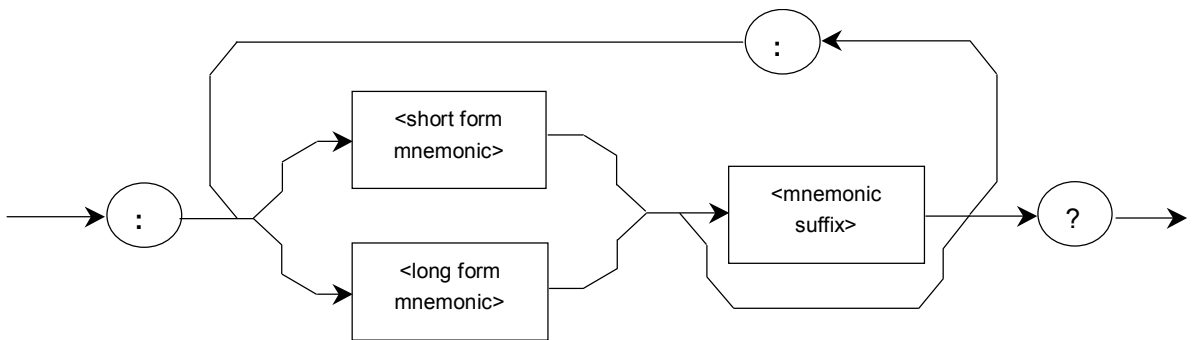
Example: :SYSTem (The subsequent part is omitted.)

### 3.1.2.9 <QUERY PROGRAM HEADER>

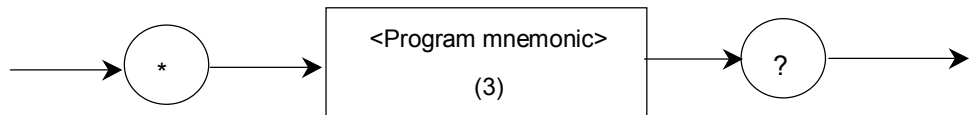
<QUERY PROGRAM HEADER> is defined as follows. A <white space> can be inserted in front of each header.



(1) <Instrument-Control Headers> is defined as follows:



(2) <common query program header> is defined as follows:



■ <QUERY PROGRAM HEADER>

<QUERY PROGRAM HEADER> is a query command transmitted from the remote control PC to the MP1800A/MT1810A in advance for the remote control PC to receive response messages from the MP1800A/MT1810A. A query indicator (?) must be added to the end of the header.

Example: :SYSTem:DATE?

The format of <QUERY PROGRAM HEADER> above is the same as <COMMAND PROGRAM HEADER> except that the query indicator (?) is added to the end of the header. For details, refer to Section 3.1.2.8 "<COMMAND PROGRAM HEADER>."

3.1.2.10 <PROGRAM HEADER SEPARATOR>

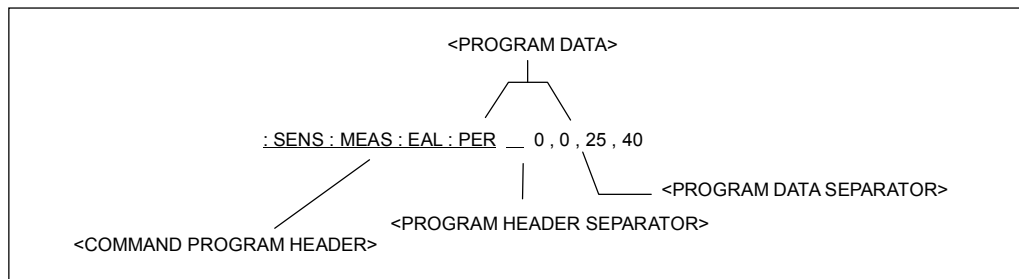
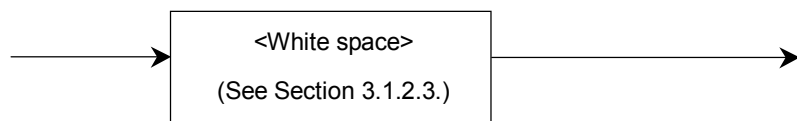


Figure 3.1.2.10-1 <PROGRAM HEADER SEPARATOR>

Definition

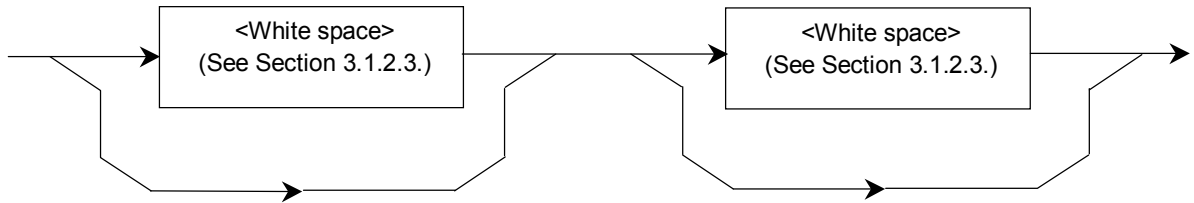
<PROGRAM HEADER SEPARATOR> is defined as follows:



<PROGRAM HEADER SEPARATOR> is used as a separator between <COMMAND PROGRAM HEADER> or <QUERY PROGRAM HEADER> and <PROGRAM DATA>. If there are two or more <white space character> elements between the program header and program data, only the first <white space character> is interpreted as a separator, and the others are ignored. The <white space character> is useful, however, to make the program readable. That is, only one header separator must exist between the header and data, which indicates the end of the program as well as the beginning of the program data.

### 3.2.1.11 <PROGRAM DATA SEPARATOR>

<PROGRAM DATA SEPARATOR> is defined as follows:



If <COMMAND PROGRAM HEADER> or <QUERY PROGRAM HEADER> has many parameters, <PROGRAM DATA SEPARATOR> is used to separate them. Using this data separator requires commas, but no <white space character>. <white space character> before and after the comma are ignored. The <white space character> is useful, however, to make the program readable.

3.1.3 Program data format

Among the terminated program message formats described above, this chapter presents an example of the format of <PROGRAM DATA> shown in the functional grammar diagram in Section 3.1.2.

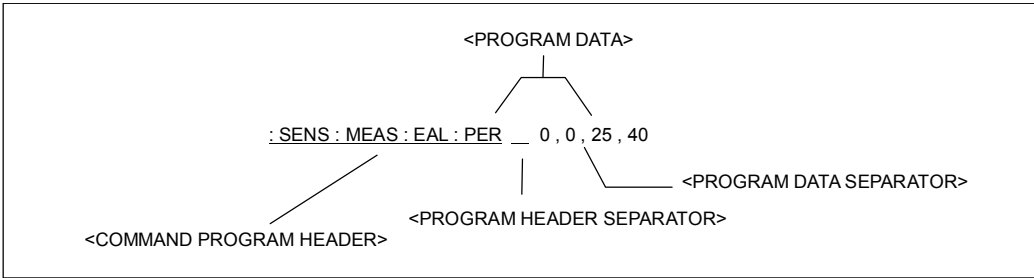


Figure 3.1.3-1 <PROGRAM DATA>

The functional elements of <PROGRAM DATA> are used to transmit the parameters of the type related to the program header. The following table lists the program data used by the MP1800A/MT1810A.

Table 3.1.3-1 Program data format

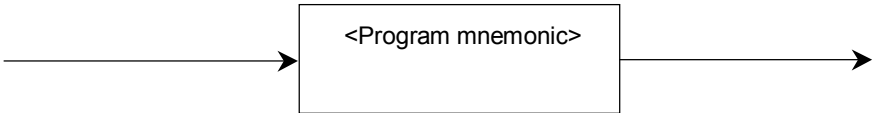
<PROGRAM DATA>	Type
<CHARACTER PROGRAM DATA>	Indicates short alphabetic or alphanumeric data.
<DECIMAL NUMERIC PROGRAM DATA>	Indicates a decimal numerical constant.
<NON-DECIMAL NUMERIC PROGRAM DATA>	Indicates an alphanumeric character other than a decimal.
<BOOLEAN PROGRAM DATA>	Indicates a theoretical value (defined in SCPI).
<STRING PROGRAM DATA>	Indicates a string enclosed within double quotation marks ( " ") or single quotation marks ( ' ' ).

3.1.3.1 <CHARACTER PROGRAM DATA>

<CHARACTER PROGRAM DATA> indicates short alphabetic or alphanumeric data.

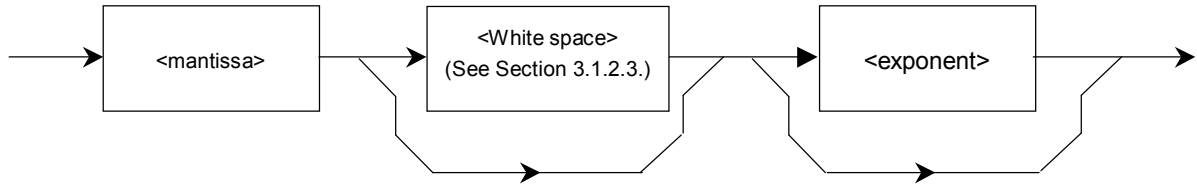
Example:                   : SENSE : PATtern : TYPE PRBS (Mnemonic data indicating PRBS)  
                               : SENSE : MEASure : EALarm : UNIT CLOCK  
                               (Mnemonic data indicating the measurement cycle in Clock Count units.)

The character data is the same as those described "<program mnemonic>" in Section 3.1.2.8 (3).

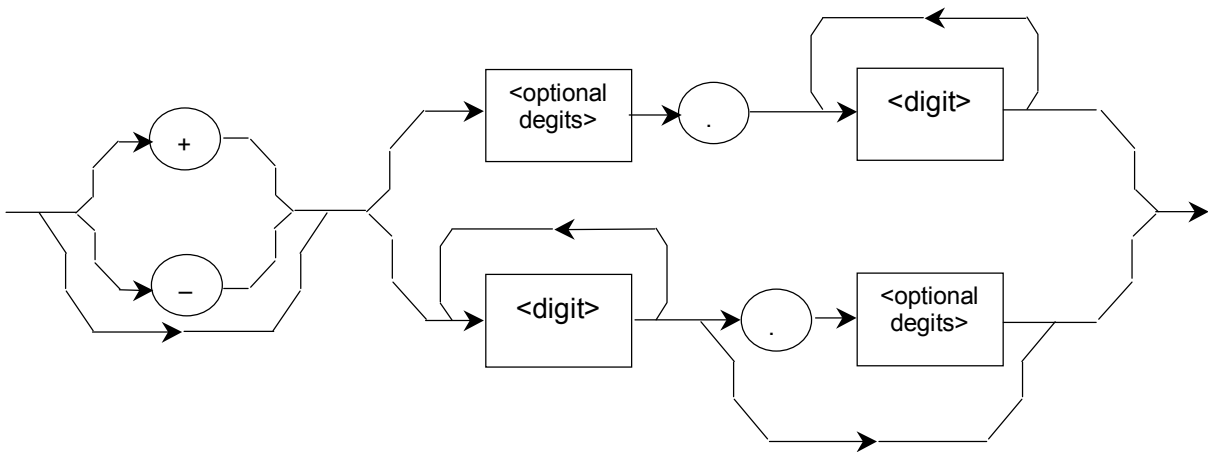


3.1.3.2 <DECIMAL NUMERIC PROGRAM DATA>

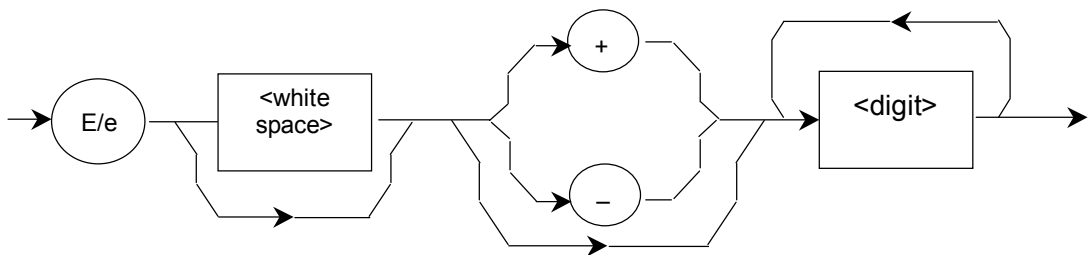
<DECIMAL NUMERIC PROGRAM DATA> indicates a decimal numerical value, and is defined as follows:



<mantissa> is defined as follows:



<exponent> is defined as follows:



The MP1800A/MT1810A uses the decimal integer format.

■ Integer format

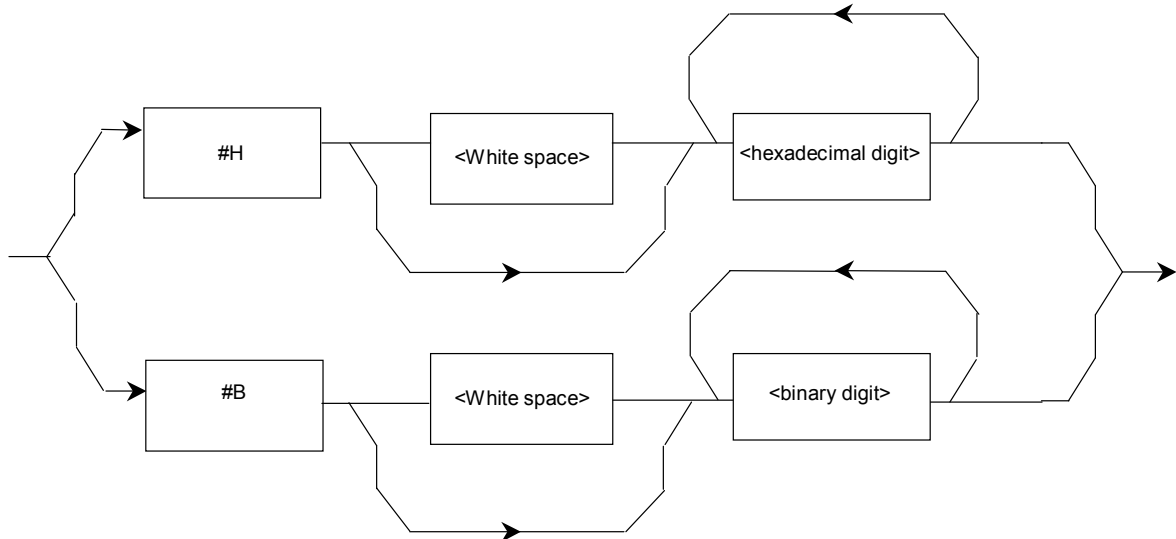
Δ represents a space.

- Indicates a decimal integer value.
- Zeros can be entered in the beginning. → 005
- No space can be inserted between the sign and the numerical value.  
→ +5 (applicable), +Δ5 (not applicable)
- Spaces can be inserted after the numerical value. → +5ΔΔ
- Positive sign (+) may be omitted. → +5, 5
- Commas cannot be used for separating digits. →1,234 (not applicable)

Example: : SOURce : PATtern : PRBS : LENGth 7

3.1.3.3 <NON-DECIMAL NUMERIC PROGRAM DATA>

<NON-DECIMAL NUMERIC PROGRAM DATA> indicates a numerical value other than a decimal (e.g., binary, hexadecimal), and is defined as follows:



■ <hexadecimal digit>: Hexadecimal format

The hexadecimal format consists of #H and the subsequent numbers (0 to 9) and/or alphabetic characters (A to F). Δ represents a space.

- Spaces can be inserted following #H.  
 #H1234 → #HΔ1234  
 #H00AF → #HΔΔΔ00AF
- Zeros can be omitted.  
 #H00FF → #HFF  
 #H0000 → #H0

Example: : SOURce : PATtern : DREVerse : ADDRess #H0,#H1F

■ <binary digit>: Binary format

The binary format consists of #B and the subsequent 0s and/or 1s. Δ represents a space.

- Spaces can be inserted following #B.  
 #B11011011 → #BΔ11011011  
 #B00100100 → #BΔΔΔ00100100

#### 3.1.3.4 <BOOLEAN PROGRAM DATA>

<BOOLEAN PROGRAM DATA> is the program data that is defined in the SCPI, and indicates a theoretical value. As the values corresponding to True and False, ON and OFF of <CHARACTER PROGRAM DATA> and 1 and 0 of <DECIMAL NUMREIC PROGRAM DATA> are defined.

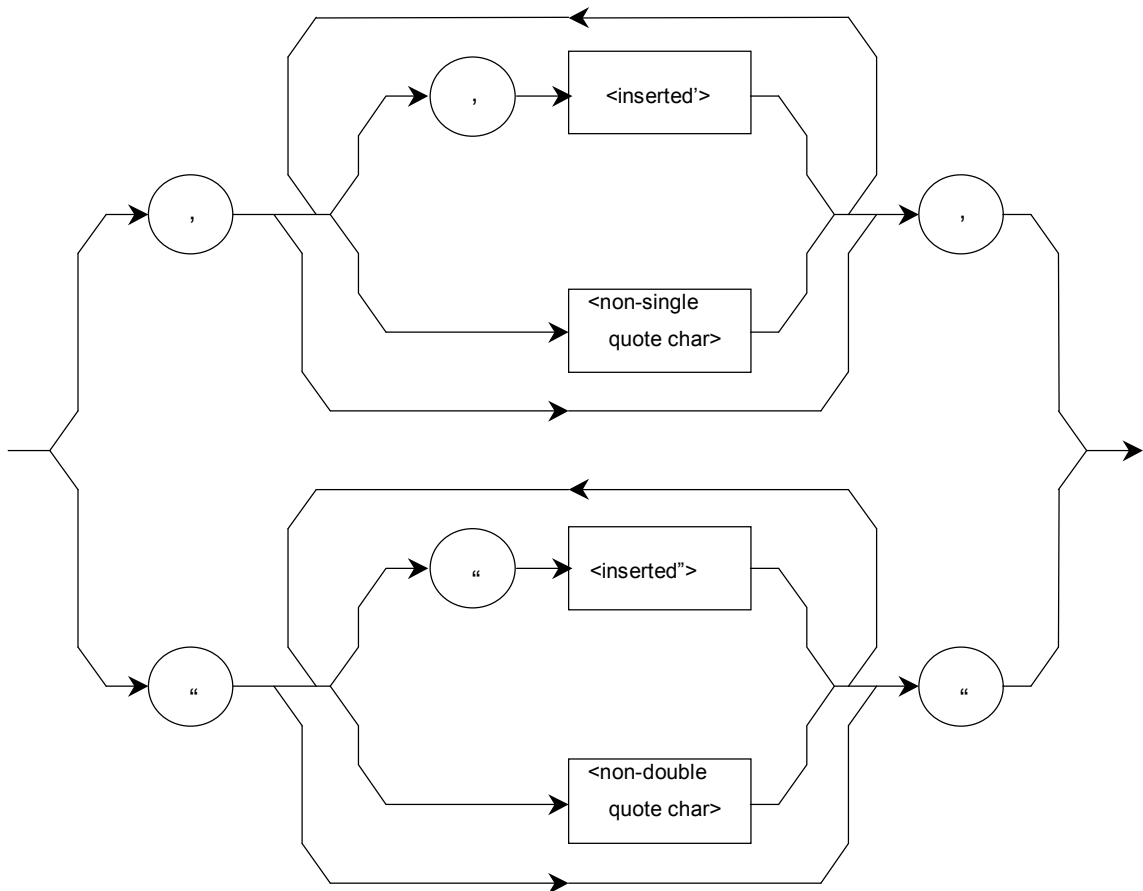
Example: :SOURce : PATTern : EADDition : SET ON : SOURce : PATTern : EADDition : SET 1
---



## 3.1.3.5 &lt;STRING PROGRAM DATA&gt;

<STRING PROGRAM DATA> is character string data, enclosed within double quotation marks ( " ") or single quotation marks ( ' '). If the character string includes a double ( " ") or single quotation mark ( ' '), the same type of quotation mark must be described to enclose the string.

It is defined as follows:



- (1) <inserted'\> is defined as a single ASCII symbol of a value 27 (decimal number, 39 = ').
- (2) <non-single quote char> is defined as a single ASCII symbol of a value other than 27 (decimal number, 39 = ').
- (3) <inserted\"> is defined as a single ASCII symbol of a value 22 (decimal number, 34 = ").
- (4) <non-double quote char> is defined as a single ASCII symbol of a value other than 22 (decimal number, 34 = ").

<Example of description>

The following show description examples.

When a character string is enclosed within single quotation marks (' '):

'calculate'

'remote"control' (The double quotation mark (") between single quotation marks is regarded as a string.)

"Jan. " "Feb. " ' (The double quotation marks (" ") between single quotation marks are regarded as a string.)

'remote"control' (The double quotation mark (") between single quotation marks is regarded as a string.)

When a character string is enclosed within double quotation marks (" "):

"calculate"

"It's a nice day. " (The single quotation mark (') between double quotation marks is regarded as a string.)

" 'Mar. "Apr. ' " ' (The single quotation marks (' ') and the double quotation mark (") between outer double quotation marks are regarded as a string.)

"program" "data" (The double quotation marks (" ") between outer double quotation marks are regarded as a string.)

As shown above, use the same type of quotation marks for enclosing a character string.

Actual commands are described as follows:

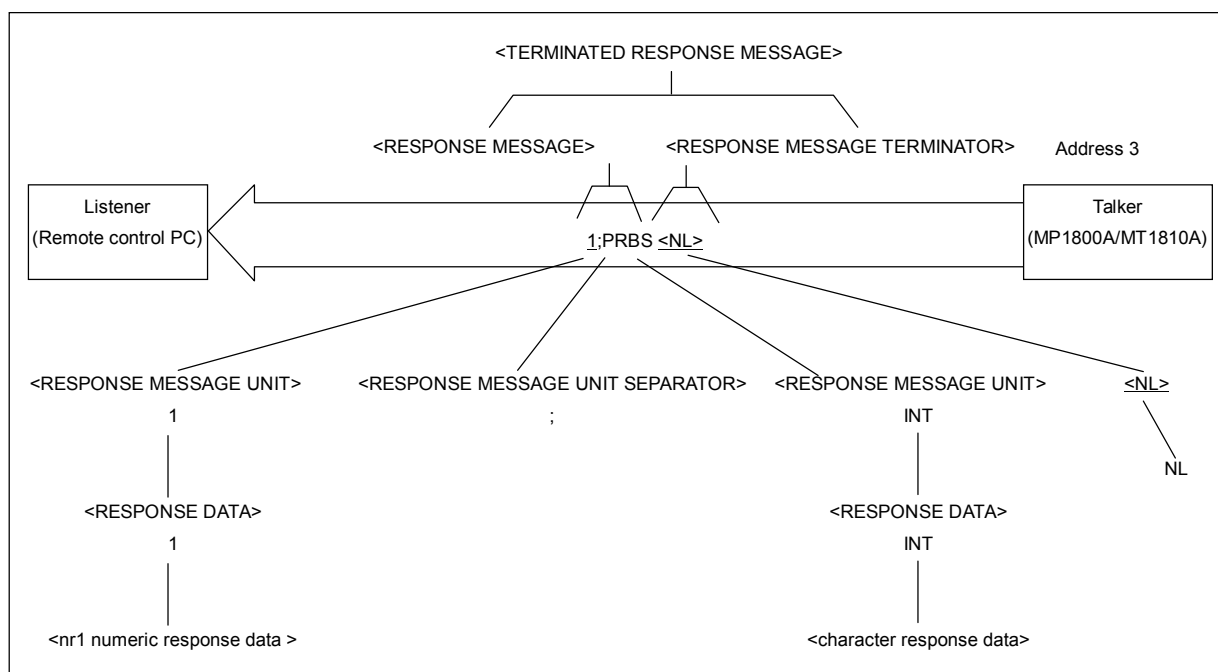
Examples: :DISP:CUST:BUTT:ADD "EADDition" (String indicating the Error ADDition function button) :CALC:OPTical:STATus? "TX:LASer" (String indicating whether optical output of the Module is normal)
---

## 3.2 SCPI Talker Output Format

This section describes the format of response messages returned from the talker (transmitter) to the listener (receiver).

### 3.2.1 SCPI talker output response message format

The following figure shows the response to a data output query command :OUTP:DATA:OUTP?, and test pattern selection query commands :SOUR:PATT:TYPE? and :OUTPut:RClock:SeLect?. The SCPI response has no header, so the response contains only data.



**Figure 3.2.1-1 <TERMINATED RESPONS MESSAGE>**

As in the case of program messages, the format of response messages consists of a sequence of functional elements, which are the minimum level units to indicate a function. In the figure above, the words written in uppercase alphabetical characters enclosed within brackets (< >) indicate examples of functional elements. A functional element is further divided into coding elements. In this figure, the words written in lowercase alphabetical characters enclosed within brackets (< >) indicate examples of coding elements. Syntax notations are therefore the same for both the talker and listener.

### 3.2.2 Functional elements of response messages

#### 3.2.2.1 <TERMINATED RESPONSE MESSAGE>

The following figure shows a <TERMINATED RESPONSE MESSAGE> with two message units linked.

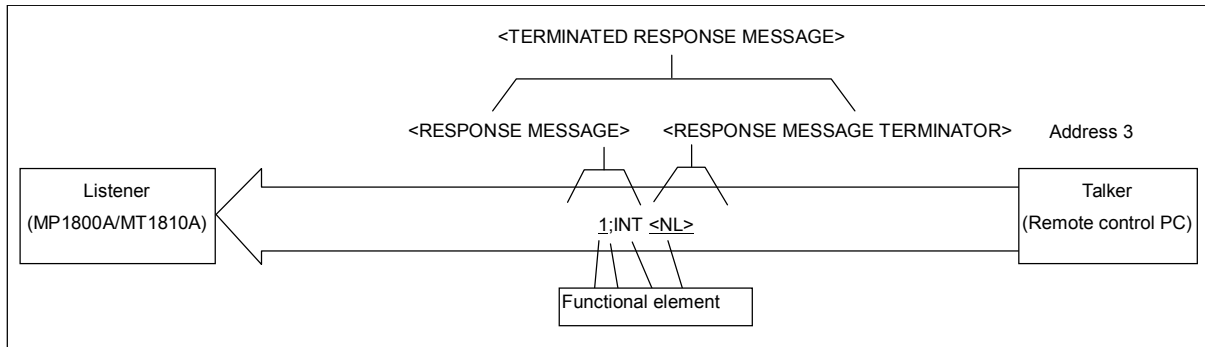
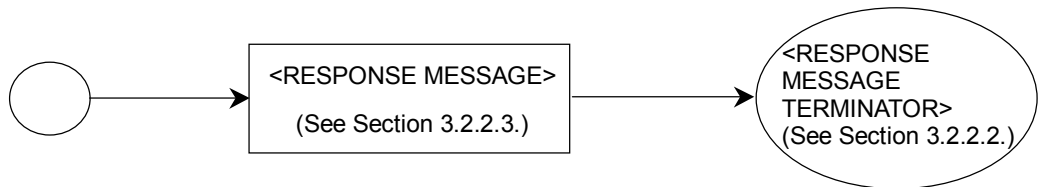


Figure 3.2.2.1-1 <TERMINATED RESPONSE MESSAGE>

#### Definition

<TERMINATED RESPONSE MESSAGE> is defined as follows:

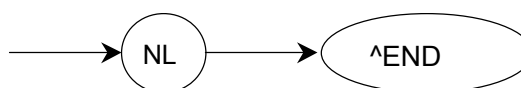


<TERMINATED RESPONSE MESSAGE> is a data message containing all the functional elements required for transmitting the message from the talker (MP1800A/MT1810A) to the remote control PC. A <RESPONSE MESSAGE TERMINATOR> is added to the end of a <RESPONSE MESSAGE> to complete transmission of <RESPONSE MESSAGE>.

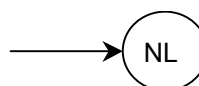
## 3.2.2.2 &lt;RESPONSE MESSAGE TERMINATOR&gt;

<RESPONSE MESSAGE TERMINATOR> is placed after the last <RESPONSE MESSAGE UNIT> to terminate a sequence of one or more <RESPONSE MESSAGE UNIT> elements. The definition of <RESPONSE MESSAGE TERMINATOR> differs according to the used interface.

(1) For GPIB interface:



(2) For Ethernet interface:



**NL** Defined as a single ASCII code byte 0A (decimal number 10), i.e. the ASCII control character LF (Line Feed) that performs the carriage return operation bringing the print position to the same character position in the next line. It is also called NL (New Line) because it starts from a new line.

For line feed, the CR+LF code may be used instead of the LF code.

If the remote control PC runs on MS-DOS or Windows, line feed is done with "CR+LF", while it is done with only "LF" for UNIX.

**END** Generates an EOI signal by setting the EOI (End-or-Identify) line of the GPIB control bus to TRUE (low level). The EOI ON and OFF statements are used to control EOI lines.

Example: A typical program that reads the state of the Synthesizer reference signal currently set is shown below.

```

10 WRITE @03:"OUTP:RCL:SEL?"
20 READ @03:A$
30 PRINT A$
40 END

```

### 3.2.2.3 <RESPONSE MESSAGE>

The following figure shows an example of a response to a query command that queries the selected input connector and a query command that queries the bit rate set for reception signals.

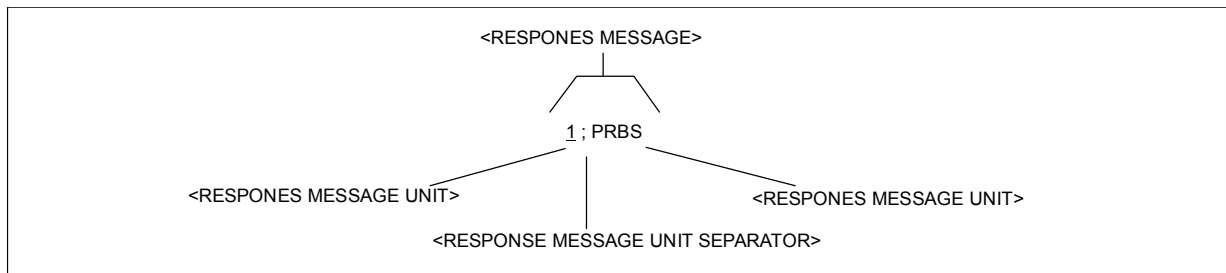
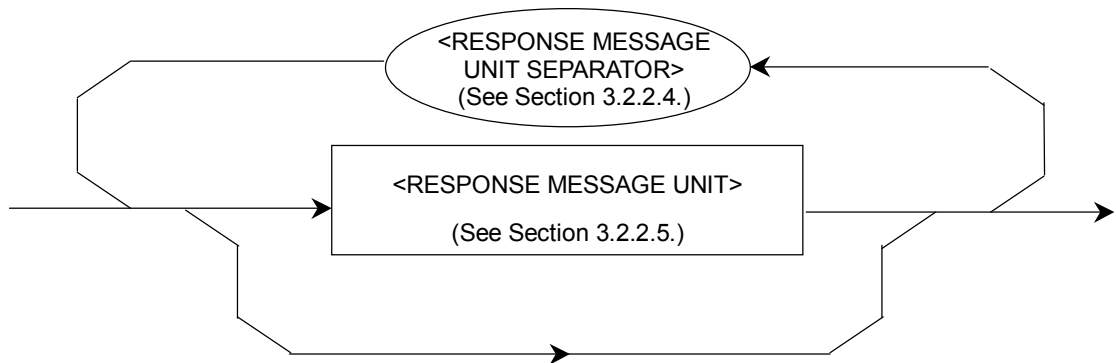


Figure 3.2.2.3-1 <RESPONSE MESSAGE>

#### Definition

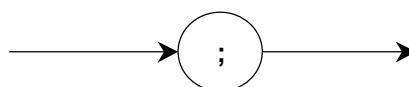
<RESPONSE MESSAGE> is defined as follows:



<RESPONSE MESSAGE> is a sequence of one or more <RESPONSE MESSAGE UNIT> elements. The <RESPONSE MESSAGE UNIT> element indicates a single message to be sent from the MP1800A/MT1810A to the remote control PC. The <RESPONSE MESSAGE UNIT SEPARATOR> element is used to separate two or more <RESPONSE MESSAGE UNIT> elements.

### 3.2.2.4 <RESPONSE MESSAGE UNIT SEPARATOR>

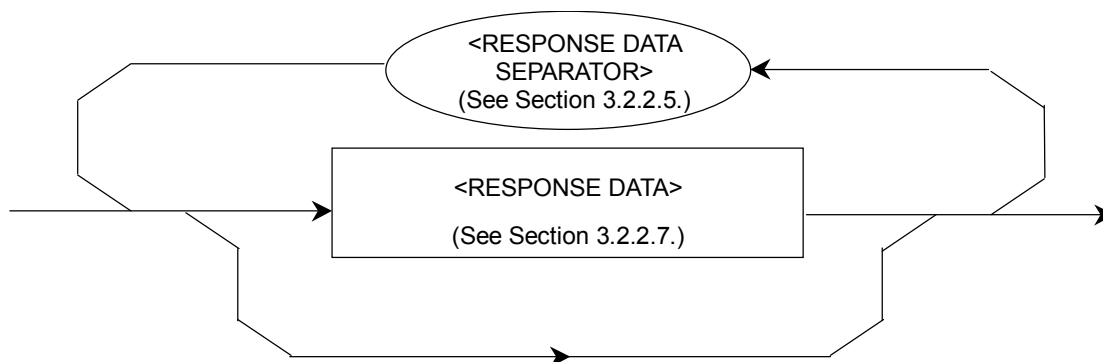
<RESPONSE MESSAGE UNIT SEPARATOR> is defined as follows:



<RESPONSE MESSAGE SEPARATOR> separates two or more <RESPONSE MESSAGE UNIT> elements with the <UNIT SEPARATOR> semicolon (;) when a sequence of them is output in one <RESPONSE MESSAGE>.

### 3.2.2.5 <RESPONSE MESSAGE UNIT>

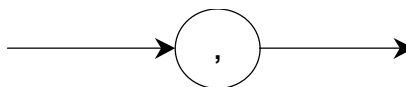
<RESPONSE MESSAGE UNIT> of the MP1800A/MT1810A is a response message unit with no header, and returns only the measurement result data. <RESPONSE MESSAGE UNIT> is defined as follows:



### 3.2.2.6 <RESPONSE DATA SEPARATOR>

<RESPONSE DATA SEPARATOR> is used to separate data when two or more <RESPONSE DATA> elements are output.

<RESPONSE DATA SEPARATOR> is defined as follows:



### 3.2.2.7 <RESPONSE DATA>

The <RESPONSE DATA> elements used in the MP1800A/MT1810A are described below. The response data to be returned depends on the query message.

**Table 3.2.2.7-1 Response data**

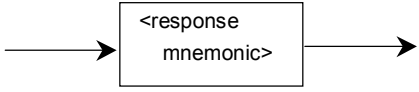
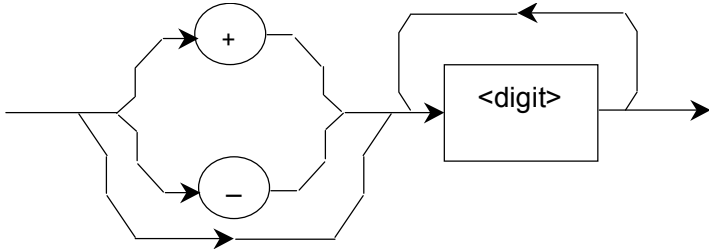
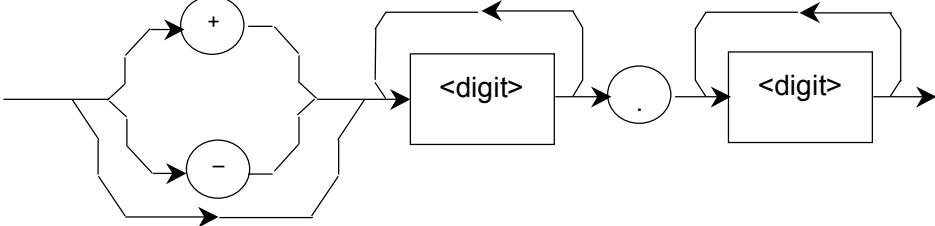
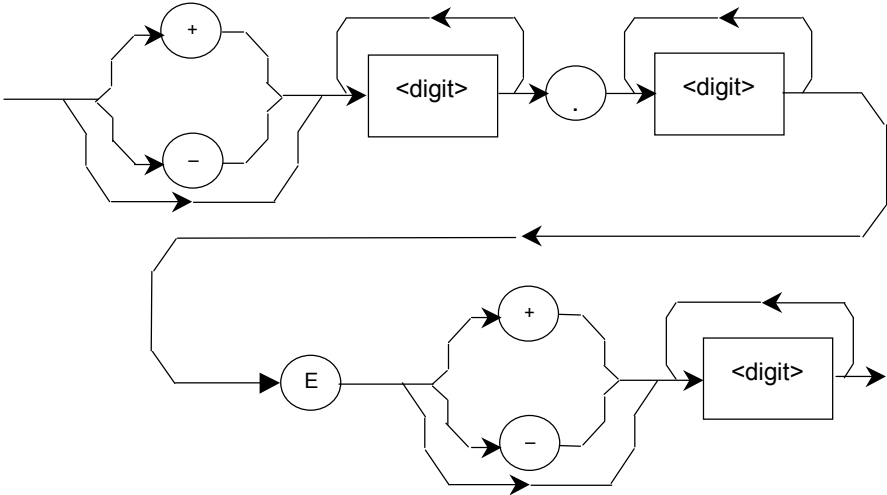
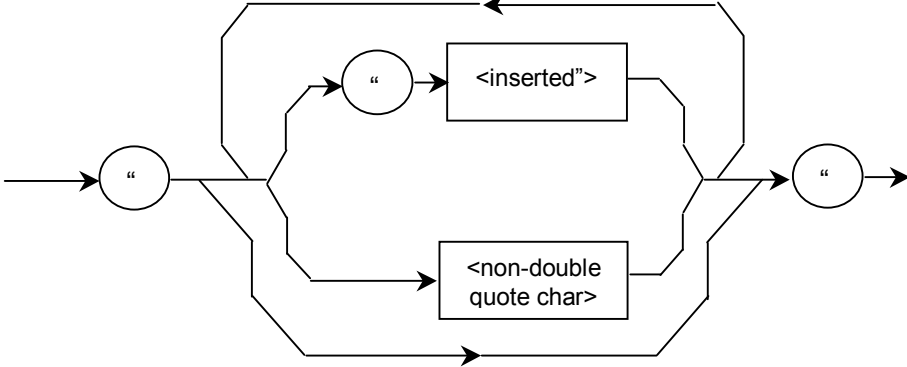
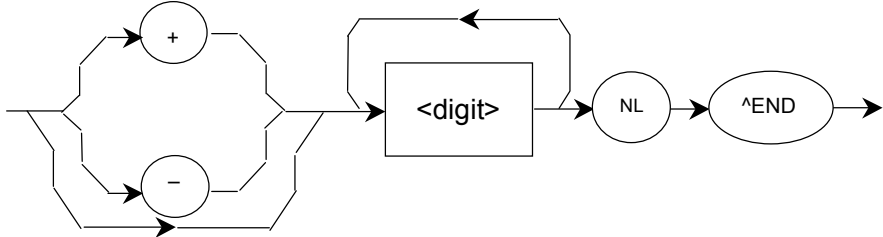
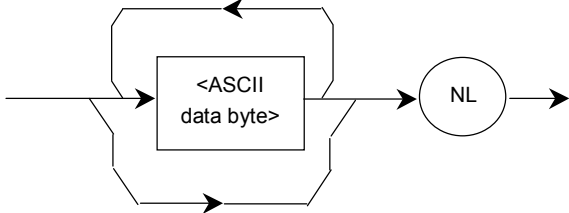
Element	Function
(1) CHARACTER RESPONSE DATA Example: ABC DEFG	Indicates short mnemonic data. 
(2) NR1 NUMERIC RESPONSE DATA Example: 123 +123 -1234	Indicates a decimal integer. 
(3) NR2 NUMERIC RESPONSE DATA Example: 12.3 +12.34 -12.345	Indicates a fixed-point numerical value. 
(4) NR3 NUMERIC RESPONSE DATA Example: 1.23E+45 -12.3E+45	Indicates a real decimal number with an exponent. 



Table 3.2.2.7-1 Response data (Cont'd)

Element	Function
<p>(5) STRING RESPONSE DATA                      Example:                      "1234"                      "ABCD"                      "1234.5"</p>	<p>Indicates a character string enclosed within double quotation marks(" ").</p> 
<p>(6) ARBITRARY ASCII RESPONSE DATA                      Example:                      &lt;ASCII Byte&gt;&lt;ASCII Byte&gt;NL^END</p>	<p>Transmits an ASCII data byte without separation, excluding NL characters. The message is terminated without exit as NL^END (or NL only) is inserted next to the last data.</p> <p>1) For GPIB interface:</p>  <p>2) For Ethernet interface:</p> 

### 3.2.2.8 Syntax differences between listener input format and talker output format

The differences in syntax between the listener input format and the talker output format are as follows:

- **Listener input format**  
 A listener input message possesses flexibility so that the MP1800A/MT1810A can easily receive program messages from the remote control PC.  
 Easy-to-read programs can be created since uppercase and lowercase alphabetical are not identified (non case sensitive), and any <white spaces> can be added as desired to the separator or terminator in this format.
- **Talker output format**  
 A talker output message is, on the other hand, transmitted strictly according to the syntax so that the remote control PC can easily accept response messages output from the MP1800A/MT1810A.  
 There is only one response message for one function.

**Table 3.2.2.8-1 Syntax differences**

Item	Listener Input Program Message	Talker Output Program Message
Characteristics	Flexible	Strict
Alphabetic characters	Uppercase and lowercase characters have the same meanings (non case sensitive).	Uppercase characters only
Before and after the NR3 exponent part E	$\Delta + E, e + \Delta$ ( $\Delta$ is 0 or more)	Uppercase E only
Positive sign (+) of the NR3 exponent part	Can be omitted	Cannot be omitted
<white space> (: $\Delta$ )* <sup>1</sup>	Two or more <white space> can be added before and after the separator and before the terminator.	Not used
Unit separator	$\Delta +$ semicolon ( $\Delta$ is 0 or more)	Semicolon only
Blank before header	$\Delta +$ header ( $\Delta$ is 0 or more)	Header only
Header separator	Header + $\Delta$ ( $\Delta$ is 1 or more)	Header + one \$20* <sup>2</sup>
Data separator	$\Delta +$ comma + $\Delta$ ( $\Delta$ is 0 or more)	Comma only
Terminator	$\Delta + \{NL, EOI, \text{ or } NL+EOI\}$ ( $\Delta$ is 0 or more)	NL+EOI* <sup>3</sup>

\*1:  $\Delta$  indicates <white space>.

\*2: ASCII code byte 20 (decimal number 32 = ASCII character SP, space)

\*3: "NL+EOI" and "CR+NL+EOI" can be switched by the SYSTem:TERMination command. CR is defined as the ASCII code 0D.

### 3.3 Command Configuration

The SCPI commands have a hierarchic structure. The SCPI are grouped by the related functions, and each group forms a hierarchic structure called a subsystem. In this document, subsystems are expressed in a command tree, as shown below.

**Table 3.3-1 Example of SCPI command tree**

<b>:INPut</b>	<b>:CLOCK</b>	<b>:SELection</b>	<b>&lt;clock&gt;</b>
		:SELection?	
		:RECOvery	<string>
		:RECOvery?	

The same headers can exist in an SCPI command tree, and the position where the header exists corresponds to its function. Thus, a command must be described in full path to the header used.

## 3.4 Command Syntax

**Table 3.4-1 Examples of SCPI commands**

:INPut:CLOCK:SElection <clock>
:INPut:CLOCK:SElection?
:INPut:CLOCK:RECovery <string>
:INPut:CLOCK:RECovery?

The SCPI command tree shown in Section 3.3 contains the SCPI commands above. The following describes rules on SCPI command description.

**<Command format>**

A command always starts with a colon (:). A command consists of headers connected by colons (:).

**<Abbreviated format for headers>**

The headers are classified into short and long forms. The short form is an abbreviated form of the long form. The command is interpreted as the identical command, regardless whether it is described in the short form or in the long form. Short and long forms can also be used in combination. Although uppercase and lowercase characters are used to distinguish between the short and long forms (uppercase characters indicate the short form) in this document, they are not case sensitive when actually used.

Example:

Long form > :INPUT:CLOCK:SELECTION RECOVERED

Short form > :INP:CLOC:SEL REC

Long + short form > :Inp:CLOC:SELECTION REC

**<Optional node>**

Square brackets ([ ]) indicate optional nodes.

A header enclosed within square brackets can be omitted; it is interpreted as being the same command, regardless of whether it is omitted.

Example:

:STATus:OPERation:[EVENT]?

When a header is not omitted > :STATus:OPERation:EVENT?

When a header is omitted > :STATus:OPERation?

**<Header separator>**

At least one space must be inserted between a command and parameter. Two or more parameters must be separated by commas (,).

## 3.5 Command Combinations

Commands can be combined using a semicolon (;), as shown in the examples below. The second command is referred to as the same level as the lowest hierarchy of the first command. Thus, the second command can be described in full path, as shown in Example 1, or described omitting the higher-level headers than "SELECTION", as shown in Example 2.

Example 1: >:INPut:CLOCK:SELECTION

RECOVERed;:INPut:CLOCK:RECOVERy "OC\_3"

Example 2: > :INPut:CLOCK:SELECTION RECOVERed;RECOVERy "OC\_3"

**Note:**

Commands that handle some kind of binary data cannot be combined.

Example:

:SOURce:PATTern:BDATA:WHOLE  
WRT, RED?

## 3.6 Parameters

The following table shows the parameter types used in the MP1800A/MT1810A. In this document, parameter types are indicated by the lowercase alphabetical characters within brackets (< >). The corresponding <PROGRAM DATA> types as defined in IEEE488.2 (or SCPI) are indicated by uppercase alphabetical.

**Table 3.6-1 Description of parameter types**

Parameter Type	Description
<numeric> <DECIMAL NUMERIC PROGRAM DATA>	Indicates a decimal integer.
<numeric> <NON-DECIMAL NUMERIC PROGRAM DATA>	Indicates a numeric value other than a decimal (binary, octal, etc.).
<boolean> <BOOLEAN PROGRAM DATA>	Indicates a logical value. OFF or 0 corresponds to False, and ON or 1 corresponds to True. Either 0/1 or OFF/ON can be used for setting, but responses to a query use 0/1.
<string>,<display>...etc <STRING PROGRAM DATA>	Indicates a character string. It is an ASCII character string enclosed within single quotation marks ( ' ') or double quotation marks ( " "). Example: 'SES_3:DM_6' or "SES_3:DM_6"
<brate>,<type>...etc <CHARACTER PROGRAM DATA>	Indicates character data. It is expressed as a short string corresponding to the setting details.
<bdata>...etc <ARBITRARY BLOCK PROGRAM DATA>	Used to transmit 8-bit binary data.

## 3.7 Responses

The following table shows the response types used in the MP1800A/MT1810A. In this document, response types are indicated by the lowercase alphabetical characters enclosed within brackets (< >). The corresponding <RESPONSE DATA> types as defined in IEEE488.2 (or SCPI) are indicated by uppercase alphabetical.

**Table 3.7-1 Description of response types**

Response Type	Description
<numeric> <NR1 NUMERIC RESPONSE DATA>	The number of digits of the response is variable, and the maximum number of digits of the numerical value range is the maximum number of digits of the response. No space must be inserted between the sign and numerical value. > :SYSTem:DATE? < 2006,7,14
<numeric> <NR2 NUMERIC RESPONSE DATA>	The number of digits of the response is variable, and the maximum number of digits of the numerical value (including decimal numbers) range is the maximum number of digits of the response. A space must not be inserted between the sign and numerical value. > :OUTPut:DATA:AMPLitude? < 1.000
<brate>,<type>...etc <CHARACTER RESPONSE DATA>	Returns the short form of the character. > :SOURce:SYNThesizer:JITTer:MODulation:SElect? < INT
<string>,<display>...etc <STRING RESPONSE DATA>	Returns a string enclosed within double quotation marks (" "). If there are short and long forms for the string of the corresponding program command, the short form is returned. > :DISPlay:CUSTomize:BUtTon:NOW? < 1, "EADD" (The short form of "EADdition")
<ARBITRARY ASCII RESPONSE DATA>	Returns 7-bit ASCII text data without separation. The last data byte is terminated by NL^END or NL only. > *OPT? < OPT301,OPT302,MU181000A,OPT101,...





## *Chapter 4 Native Format*

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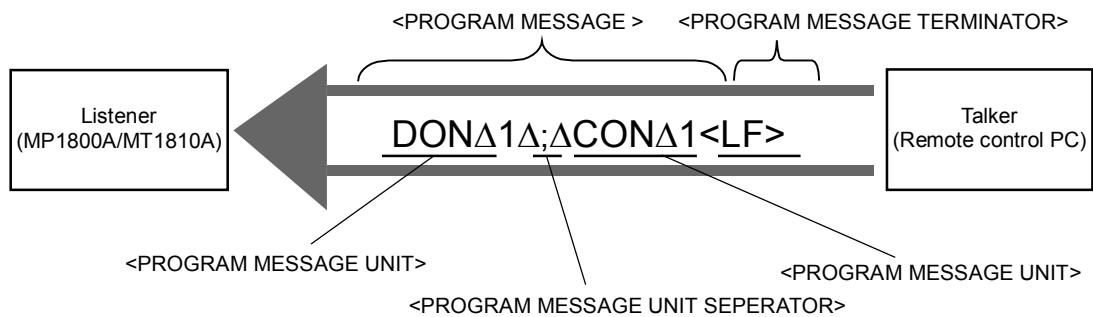
This chapter describes the Native command system.

4.1	Native Listener Input Format .....	4-2
4.2	Native Talker Output Format .....	4-6
4.3	Command Combinations .....	4-10
4.4	Parameters .....	4-10
4.5	Responses .....	4-11

## 4.1 Native Listener Input Format

A program message consists of a sequence of program message units. Each unit is a program instruction (command) or program query.

In the following figure, two program message units "DONΔ1" and "CONΔ1" are connected with the program message unit separator, and transmitted as one program message from the remote control PC to the MP1800A/MT1810A to set data output and clock output to ON.



IEEE488.2 defines program messages as sequences of functional elements. A functional element is the minimum level unit to indicate a function. In the figure above, the uppercase alphabetical characters enclosed within brackets (< >) indicate some examples.

Functional elements can be roughly classified into four types: separators, terminators, program headers, and program data. This section describes the command formats of the MP1800A/MT1810A for each of the four types (triangles (Δ) indicate spaces).

■ Separator

Separators have the three functional elements shown in the table below.

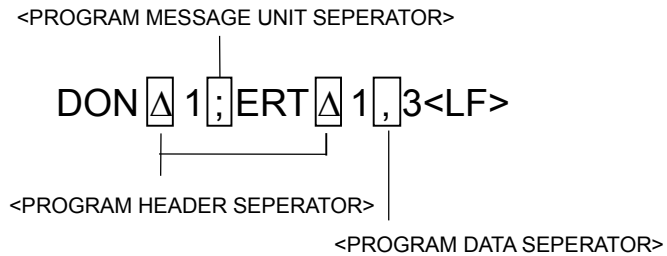


Table 4.1-1 Separator functional elements

Functional Element	Description
<PROGRAM MESSAGE UNIT SEPARATOR>	Separates two or more <PROGRAM MESSAGE UNIT> elements. It is indicated as 0 or more spaces + one semicolon.
<PROGRAM DATA SEPARATOR>	Separates two or more <PROGRAM DATA> elements. It is indicated as 0 or more spaces + one comma + 0 or more spaces.
<PROGRAM HEADER SEPARATOR>	Separates a program header and <PROGRAM DATA> element. It is indicated as one or more spaces.

■ Terminator

Terminators have the functional element shown in the table below.

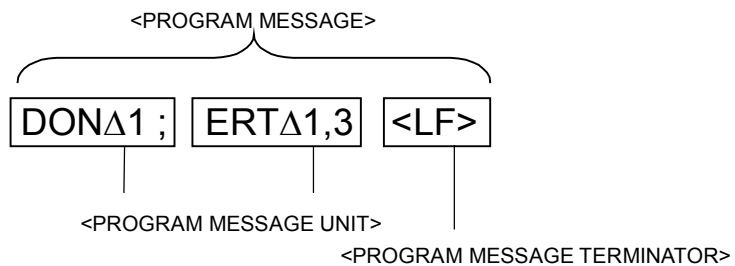
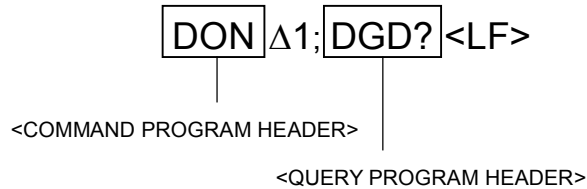


Table 4.1-2 Terminator functional element

Functional Element	Description
<PROGRAM MESSAGE TERMINATOR>	Added at the end of <PROGRAM MESSAGE> to terminate a sequence with one or more <PROGRAM MESSAGE UNIT> elements. It is indicated as 0 or more spaces + (CR+LF or LF). For the GPIB, EOI may or may not be asserted at the same time as the transmission of LF.

■ Program header

Program headers have the two functional elements shown in the table below.



**Table 4.1-3 Program header functional elements**

Functional Element	Description
<COMMAND PROGRAM HEADER>	This is a command used by the remote control PC to control the MP1800A/MT1810A. The <COMMAND PROGRAM HEADER> of the MP1800A/MT1810A uses <simple command program header> as a coding syntax. <simple command program header> The device-unique commands use this syntax. Example: DGDΔ1
<QUERY PROGRAM HEADER>	This is a query command to be transmitted in advance to the MP1800A/MT1810A so that the remote control PC receives a response message from the MP1800A/MT1810A. The query indicator "?" is always added to the end of the header. The <QUERY PROGRAM HEADER> of the MP1800A/MT1810A uses <simple query program header> as a coding syntax. <simple query program header> The device-unique query commands use this syntax. Example: DGD?

■ Program data

The program data of the MP1800A/MT1810A has the three functional elements shown in the table below.

In detailed description of the commands, the types of program data defined in IEEE488.2 corresponding to the device-unique parameter types are described.

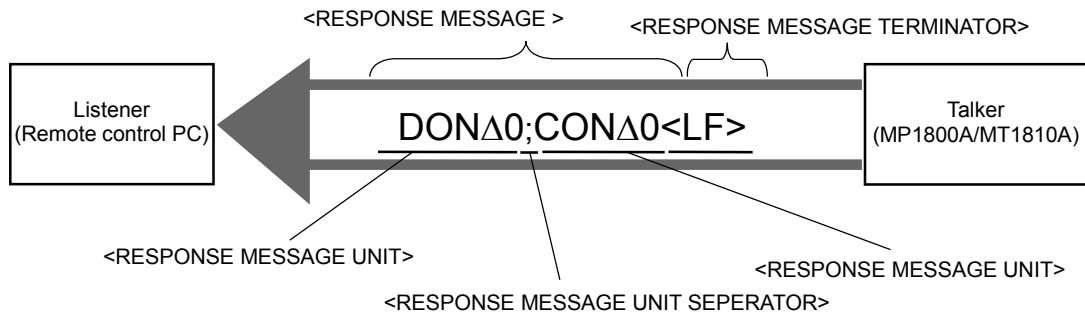
**Table 4.1-4 Program data functional elements**

Functional Element	Description
<DECIMAL NUMERIC PROGRAM DATA>	Indicates a decimal integer/real number. Integers and fixed-point values are used in the MP1800A/MT1810A. Example: Integers 005, +5, 5, +5Δ Fixed-point values 12.345, 05, +0.05, 12.
<NON-DECIMAL NUMERIC PROGRAM DATA>	Indicates a numeric value other than a decimal. Hexadecimal and binary values are used in the MP1800A/MT1810A. Hexadecimal values are indicated as #H + {A to F, a to f, 0 to 9}. Binary values are indicated as #B + 0/1. Example: #HABC, #H123 #B101010
<ARBITRARY BLOCK PROGRAM DATA>	Used to transmit binary data of the specified number of bytes. Example: #11A

## 4.2 Native Talker Output Format

Typical response messages include measurement results, setting states, and status information. Two types of response messages are provided: response messages returned with a header and those returned with no header.

In the following figure, in response to the data output query message unit "DON?" and clock output query message unit "CON?", the corresponding response messages are transmitted from the MP1800A/MT1810A to the remote control PC as ASCII strings with a header.



As in the case of program messages, response messages are defined as sequences of functional elements. Functional elements can be roughly classified into four types: separators, terminators, response headers, and response data. This section describes the command formats of the MP1800A/MT1810A for each of the four types (triangles (Δ) indicate spaces). The major differences in the syntax between the input format of the listener device and the output format of the talker device are as follows:

- Listener input format  
A listener input message possesses flexibility so that the MP1800A/MT1810A can easily receive program messages from the remote control PC. Therefore, any differences in a program message description can be compensated to some degree. For example, any <white spaces> can be added as desired to the separator or terminator in this format, enabling to create easy-to-read programs.
- Talker output format  
A talker output message is, on the other hand, transmitted strictly according to the syntax so that the remote control PC can easily accept response messages output from the MP1800A/MT1810A. There is only one response message for one function.

Table 4.2-1 summarizes the differences between the listener input format and talker output format.

**Table 4.2-1 Syntax differences**

Item	Listener Input Program Message	Talker Output Response Message
Characteristics	Flexible	Strict
Alphabetic characters	Not case-sensitive except for the header Only uppercase characters for the header	Uppercase characters only
Before and after the NR3 exponent part E	Uppercase E only	Uppercase E only
Positive sign (+) of the NR3 exponent part	+ can be omitted	Cannot be omitted.
Space	Spaces can be added before and after the separator and after the terminator	Not used
Message unit	[1] Header with program data [2] Header with no program data	[1] Data with a header [2] Data with no header
Unit separator	0 or more spaces + semicolon	Semicolon only
Blank before header	0 or more spaces + header	Header only
Header separator	Header + one or more spaces	Header + one \$20*1
Data separator	0 or more spaces + comma + 0 or more spaces	Not used
Terminator	0 or more spaces + any one of the following: $\left. \begin{array}{l} \text{LF} \\ \text{CR+LF} \\ \text{LF+EOI} \\ \text{CR+LF+EOI} \end{array} \right\}$	Either LF+EOI or CR+LF+EOI*2

\*1: ASCII code byte 20 (decimal 32 = ASCII character SP, space)

\*2: Can be switched by using the TRM command.

■ Separator

Separators have the three functional elements shown in the table below.

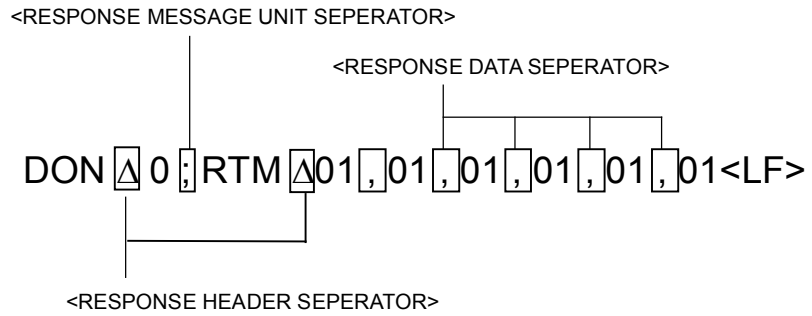


Table 4.2-2 Separator functional elements

Functional element	Description
<RESPONSE MESSAGE UNIT SEPERATOR>	Separates two or more <RESPONSE MESSAGE UNIT> elements. It is indicated as a semicolon.
<RESPONSE HEADER SEPERATOR>	Separates <RESPONSE HEADER> and <RESPONSE DATA> elements. It is indicated as one space.
<RESPONSE DATA SEPARATOR>	Separates two or more <RESPONSE DATA> elements. It is indicated as a comma.

■ Terminator

Terminators have the functional element shown in the table below.

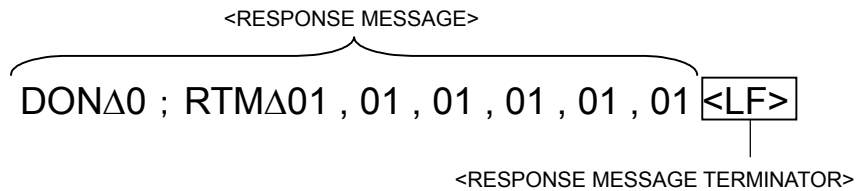


Table 4.2-3 Terminator functional element

Functional Element	Description
<RESPONSE MESSAGE TERMINATOR>	Added at the end of <RESPONSE MESSAGE> to terminate message transfer. It is indicated as LF or CR+LF (For the GPIB, EOI is asserted at the same time as the transmission of LF).



■ Response header

Response headers have the functional element shown in the table below.

**Table 4.2-4 Response header functional element**

Functional Element	Description
<RESPONSE HEADER>	Up to 12 uppercase alphanumeric characters or asterisks that indicate the function of the response data starting with an uppercase character. Example: DONΔ0

■ Response data

The response data of the MP1800A/MT1810A has the six functional elements shown in the table below.

In the detailed description of the commands, the types of response data as defined in IEEE488.2 corresponding to the device-unique response types are described.

**Table 4.2-5 Response data functional elements**

Functional Element	Description
<NR1 NUMERIC RESPONSE DATA>	Indicates a decimal integer.
<NR2 NUMERIC RESPONSE DATA>	Indicates a decimal fixed-point value.
<NR3 NUMERIC RESPONSE DATA>	Indicates a decimal exponent.
<HEXADECIMAL NUMERIC RESPONSE DATA>	Indicates a hexadecimal numeric value. Hexadecimal values are indicated as #H + {A to F, a to f, 0 to 9}.
<STRING RESPONSE DATA>	Indicated as a character string enclosed within double quotation marks.
<DEFINITE LENGTH ARBITRARY BLOCK RESPONSE DATA>	Indicates 8-bit binary data of a known length.

### 4.3 Command Combinations

Commands can be combined by using a semicolon (;) as shown in the example below.

Example:        > DON 1;CON 1

### 4.4 Parameters

The following table shows the parameter types used in the MP1800A/MT1810A. In this document, parameter types are indicated by the lowercase alphabetical characters enclosed within brackets (< >). The corresponding <PROGRAM DATA> types as defined in IEEE488.2 are indicated in uppercase characters.

**Table 4.4-1 Description of parameter types**

Parameter Type	Description
<numeric> <DECIMAL NUMERIC PROGRAM DATA>	Indicates a decimal integer/real number. Integers, fixed-point values, and exponents are used in the MP1800A/MT1810A.
<numeric> <NON-DECIMAL NUMERIC PROGRAM DATA>	Indicates a numeric value other than a decimal. Hexadecimal and binary values are used in the MP1800A/MT1810A. Hexadecimal values are indicated as #H + {A to F, a to f, 0 to 9}. Binary values are indicated as #B + 0/1.
<bdata>...etc. <ARBITRARY BLOCK PROGRAM DATA>	Used to transmit 8-bit binary data.

## 4.5 Responses

The following table shows the response types used in the MP1800A/MT1810A. In this document, response types are indicated by the lowercase alphanumeric characters enclosed within brackets (< >). The corresponding <RESPONSE DATA> types as defined in IEEE488.2 are indicated in uppercase characters.

**Table 4.5-1 Description of response types**

Response Type	Description
<numeric> <NR1 NUMERIC RESPONSE DATA>	Indicates a decimal integer.
<numeric> <NR2 NUMERIC RESPONSE DATA>	Indicates a decimal fixed-point value.
<numeric> <NR3 NUMERIC RESPONSE DATA>	Indicates a decimal exponent.
<numeric> <HEXADECIMAL NUMERIC RESPONSE DATA>	Indicates a hexadecimal numeric value.
<string> <STRING RESPONSE DATA>	Indicated as a character string enclosed within double quotation marks.
<bdata>...etc. <DEFINITE LENGTH ARBITRARY BLOCK RESPONSE DATA>	Indicates 8-bit binary data of a known length.



# *Chapter 5 IEEE488.2 Common Commands*

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This chapter describes IEEE488.2 Common Commands support to MP1800A and MT1810A.

5.1	IEEE488.2 Common Commands.....	5-2
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## 5.1 IEEE488.2 Common Commands

Common commands can be used commonly on any of the GPIB interface and Ethernet interface.

All common commands supported by the MP1800A and MT1810A are sequential commands.

Table 5.1-1 below lists the IEEE488.2 common commands supported by the MP1800A and MT1810A.

**Table 5.1-1 IEEE488.2 Common Commands List**

<b>Mnemonic</b>	<b>Command's full spell</b>
*IDN?	Identification Query
*RST	Reset Command
*OPC	Operation Complete Command
*OPC?	Operation Complete Query
*WAI	Wait Continue Command
*CLS	Clear Status Command
*ESE	Standard Event Status Enable Command
*ESE?	Standard Event Status Enable Query
*ESR?	Standard Event Status Register Query
*SRE	Service Request Enable Command
*SRE?	Service Request Enable Query
*STB?	Read Status Byte Query
*TRG	Trigger Command
*OPT?	Option Identification Query

<b>*IDN? Identification Query</b>	
Parameter	None
Response	<Manufacturer>, <Model>, <Serial No.> <Manufacturer>, <Model> = <CHARACTER RESPONSE DATA> MT1800A, MT1810A <Serial No.> = <NR1 NUMERIC RESPONSE DATA> 0000000000 to 9999999999 Main frame Serial number
Function	Reports manufacture name, model, etc.
Example	> *IDN? < ANRITSU,MP1800A,0123456789
<b>*RST Reset Command</b>	
Parameter	None
Function	Initializes entire system. Cancels the measurement and clear the contents. To reset to the factory default, perform SCPI command :SYSTem:MEMory:INITialize
Example	> *RST
<b>*OPC Operation Complete Command</b>	
Parameter	None
Function	Sets bit 0 (operation complete bit) of standard event status register and sets SRQ to ON, when execution of preceding command is completed.
Example	> *OPC
<b>*OPC? Operation Complete Query</b>	
Parameter	None
Response	<NR1 NUMERIC RESPONSE DATA> 1
Function	Returns 1 when preceding command is completed.
Example	> *OPC? < OPC 1

**\*WAI**                                  **Wait to Continue Command**

---

Parameter	None
Function	Waits to execute the succeeding command until execution of preceding command is completed. (Executes overlapped commands as sequential commands.) This function is enabled only for preceding command.
Example	> *WAI

**\*CLS**                                  **Clear Status Command**

---

Parameter	None
Function	Clear all event registers and queues, except output queue and MAV summary message. Reset of enable registers and transition filters for the device unique status registers is executed using the SCPI command :STATus:PRESet. Both output queue and MAV bits are also cleared when an *CLS is sent immediately after <PROGRAM MESSAGE TERMINATOR> and before <QUERY MESSAGE UNIT> element. Execution of succeeding commands is set to wait until execution of the preceding command is completed.
Example	> *CLS



<b>*ESE</b>	<b>Standard Event Status Enable Command</b>
Parameter	<p>&lt;DECIMAL NUMERIC PROGRAM DATA&gt;</p> <p>An integer between 0 and 255</p> <p>The parameter represents the total of bit digit values when bits to be enabled are selected from bits of standard event enable register.</p> <p>The digit value for bit to be disabled is set to 0.</p> <p>For the MP1800A and MT1810A, register settings are as listed below:</p> <p>Bit 7 (<math>2^7 = 128</math>) Power On</p> <p>Bit 5 (<math>2^5 = 32</math>) Command error</p> <p>Bit 4 (<math>2^4 = 16</math>) Execution error</p> <p>Bit 3 (<math>2^3 = 8</math>) Errors other than command, query and execution errors</p> <p>Bit 0 (<math>2^0 = 1</math>) Completion of operation</p>
Function	Sets or clears standard event status enable register.
Example	<p>To set bits 3 (= 8) and 4 (= 16) of enable register:</p> <pre>&gt; *ESE 24</pre>

<b>*ESE?</b>	<b>Standard Event Status Enable Query</b>
Parameter	None
Response	<p>&lt;NR1 NUMERIC RESPONSE DATA&gt;</p> <p>0 to 255: Total of digit values of standard event status enable register bits.</p> <p><b>Note:</b></p> <p>For bit settings of standard status register, refer to the *ESE command.</p>
Function	Queries current value of standard event status enable register.
Example	<pre>&gt; *ESE? &lt; ESE 24</pre>

<b>*ESR?</b>	<b>Standard Event Status Register Query</b>
Parameter	None
Response	<p>&lt;NR1 NUMERIC RESPONSE DATA&gt;</p> <p>0 to 255: Total of digit values of standard event status register bits.</p> <p>Note: For bit settings of standard status register, refer to the *ESE command.</p>
Function	Queries current value of standard event status register.
Example	<p>When a command error exists:</p> <pre>&gt; *ESR? &lt; ESR 32</pre>

<b>*SRE</b>	<b>Service Request Enable Command</b>
Parameter	<DECIMAL NUMERIC PROGRAM DATA> An integer between 0 and 255 Parameter represents the total of bit digit values when bits to be enabled are selected from bits of service request enable register. The digit value for a bit to be disabled is set to 0. For the MP1810A and MT1810A, register settings are as listed below: Bit 7 ( $2^7 = 128$ ) Operation status register summary Bit 5 ( $2^5 = 32$ ) Event status register summary Bit 4 ( $2^4 = 16$ ) Indicates that the output queue is not empty. Bit 3 ( $2^3 = 8$ ) Questionable status register summary Bit 2 ( $2^2 = 4$ ) Indicates that the error and event queues are not empty.
Function	Sets bits of service request enable register.
Example	To set bit 4 (= 16) of enable register: > *SRE 16

<b>*SRE?</b>	<b>Service Request Enable Query</b>
Parameter	None
Response	<NR1 NUMERIC RESPONSE DATA> 0 to 255: Total of digit values of service request enable register bits. Note: For bit settings of service request enable register bits, refer to the *SRE command. Function Queries current value of service request enable register.
Example	> *SRE? < SRE 16

<b>*STB?</b>	<b>Read Status Byte Query</b>
Parameter	None
Response	<NR1 NUMERIC RESPONSE DATA> Bit 7 ( $2^7 = 128$ ) Operation status register summary Bit 6 ( $2^6 = 64$ ) MSS (Master Summary Status) summary message Bit 5 ( $2^5 = 32$ ) Event status register summary Bit 4 ( $2^4 = 16$ ) Indicates that output queue is not empty. Bit 3 ( $2^3 = 8$ ) Questionable status register summary Bit 2 ( $2^2 = 4$ ) Indicates that error and event queues are not empty.
Function	Queries current value of status byte including MSS (Master Summary Status) bit.
Example	When the event status register summary is true: > *STB? < STB 32

**\*TRG Trigger Command**

Parameter	None
Function	Operates the same as that of IEEE488.1 GET (Group Execute Trigger bus command). It starts or restarts measurement when the MP1810A and MT1810A receive the *TRG command. This command is valid only for measurements in the Error and Alarm mode.
Example	> *TRG

**\*OPT? Option Identification Query**

Parameter	None
Response	<ARBITRARY ASCII RESPONSE DATA> Characters (refer to Table below) corresponding to the name of an option or module installed.
Function	Reports a list of the installed options/modules (see Table 5.1-2). All installed options and modules are reported, separated by commas (,).
Example	> *OPT? < OPT 301, OPT 302

**Table 5.1-2 Option Character List(MP1800A/MT1810A)**

Main Frame / Module Name	Option No.	Option Name
MP1800A Signal Quality Analyzer	OPTx01	GPIB
	OPTx02	LAN
	OPT014	2-Slot for PPG and/or ED
	OPT015	4-Slot for PPG and/or ED
	OPT016	6-Slot for PPG and/or ED
MT1810A 4 slot Chassis	OPT014	2-Slot for PPG and/or ED
	OPT015	4-Slot for PPG and/or ED
MX180000A Signal Quality Analyzer Control Software	–	–
MU181000A 12.5GHz Synthesizer	OPTx01	Jitter Modulation
MU181000B 12.5GHz 4port Synthesizer	OPTx01	Jitter Modulation
MU181020A 12.5Gbit/s PPG	OPT001	9.8 to 12.5 Gbit/s
	OPT002	0.1 to 12.5 Gbit/s
	OPTx10	Variable Data Output (0.05 to 0.8 Vp-p)
	OPTx11	Variable Data Output (0.25 to 2.5 Vp-p)
	OPTx12	High Performance Data Output (0.05 to 2.0 Vp-p)
	OPTx13	Variable Data Output (0.5 to 3.5 Vp-p)

Table 5.1-2 Option Character List(MP1800A/MT1810A) (Cont'd)

Main Frame / Module Name	Option No.	Option Name
MU181020A 12.5Gbit/s PPG (Cont'd)	OPTx21	Differential Clock Output (0.1 to 2.0 Vp-p)
	OPTx30	Variable Data Delay
MU181040A 12.5Gbit/s ED	OPT001	9.8 to 12.5 Gbit/s
	OPT002	0.1 to 12.5 Gbit/s
	OPTx20	Clock Recovery
	OPTx30	Variable Clock Delay
MU181600A Optical Transceiver (XFP)	-	-
MU181601A Optical Transceiver (SFP)	-	-
MU181620A Stressed Eye Transmitter	OPTx01	1310nm Reference
	OPTx02	1550nm Reference
	OPTx03	1310nm/1550nm Reference
	OPTx11	1310nm Stressed Eye
	OPTx12	1550nm Stressed Eye
	OPTx13	1310nm/1550nm Stressed Eye
MU181640A Optical Receiver	OPTx04	Band Width 8.5GHz
MU181800A 12.5GHz Clock Distributor	-	-
MU181020B 14Gbit/s PPG	OPT002	0.1 to 14Gbit/s
	OPTx11	Variable Data Output (0.25 to 2.5 Vp-p)
	OPTx12	High Performance Data Output (0.05 to 2.0 Vp-p)
	OPTx13	Variable Data Output (0.5 to 3.5 Vp-p)
	OPTx21	Differential Clock Output (0.1 to 2.0 Vp-p)
	OPTx30	Variable Data Delay
MU181040B 14Gbit/s ED	OPT002	0.1 to 14 Gbit/s
	OPTx20	Clock Recovery
	OPTx30	Variable Clock Delay
MU182020A 25Gbit/s 1ch MUX MU182021A 25Gbit/s 2ch MUX	OPTx01	28Gbit/s Extension
	OPTx02	Clock Input Band Switch
	OPTx10	Variable Data Output (0.25 to 1.75Vp-p)
	OPTx11	Variable Data Output (0.5 to 2.5Vp-p)
	OPTx12	Variable Data Output (0.5 to 2.0Vp-p)
	OPTx13	Variable Data Output (0.5 to 3.5Vp-p)
	OPTx21	Differential Clock Output (0.5 to 2.0Vp-p)
	OPTx30	25Gbit/s Variable Data Delay
	OPTx31	28Gbit/s Variable Data Delay
MU182040A 25Gbit/s 1ch DEMUX MU182041A 25Gbit/s 2ch DEMUX	OPTx01	28Gbit/s Extension
	OPTx02	Clock Input Band Switch
	OPTx30	25GHz Variable Clock Delay
	OPTx31	28GHz Variable Clock Delay

## Chapter 6 Status Report

---

This chapter describes Status Register configuration and bit definition of Status Register. For the MP1800A and MT1810A, installed Status Register is as below:

IEEE488.2 Regulated Register	..... Standard Event Register Status Byte Register
SCPI Regulated Register	..... OPERational Status Register
Device-unique Status Registers	..... Device-Unique Status Register (However, separated from Regulated Register)

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## 6.1 Overview

For MP1800A and MT1810A, Status Register Configuration is as below.

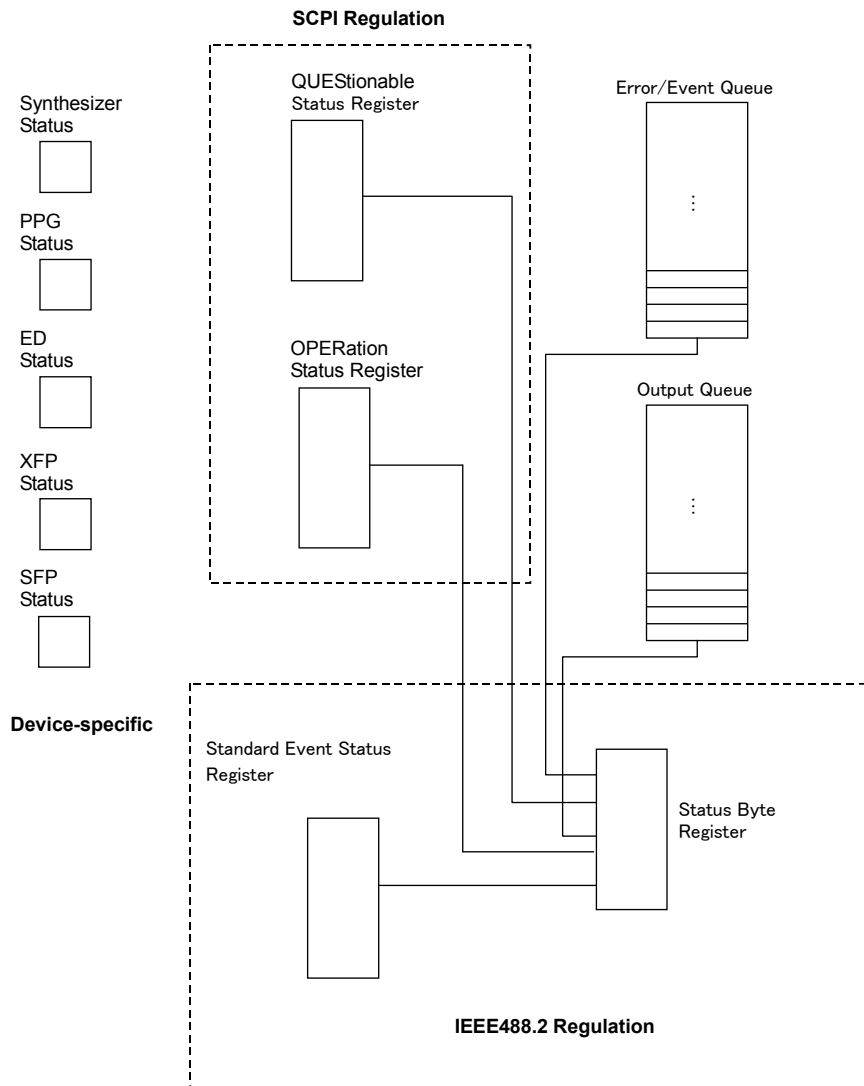


Figure 6.1-1 Status Register Configuration

## 6.2 IEEE488.2 Regulated Register

The bits of the following two IEEE488.2 regulated registers are defined as follows.

**Table 6.2-1 IEEE488.2 Regulated Register**

Name	Description
Status byte register	This register can set RQS and 7 summary message bits. It is used as a pair with the service request enable register. When OR of both registers is not 0, SRQ turns ON. RQS is programmed in bit 6. This bit is used to report to the remote control PC that a service request is given.
Standard event status register	Stores 8 events which the device encounters as the standard events. The logical OR output bit is summarized and displayed in bit 5 of the status byte register as an ESB (Event Status Bit) summary message.

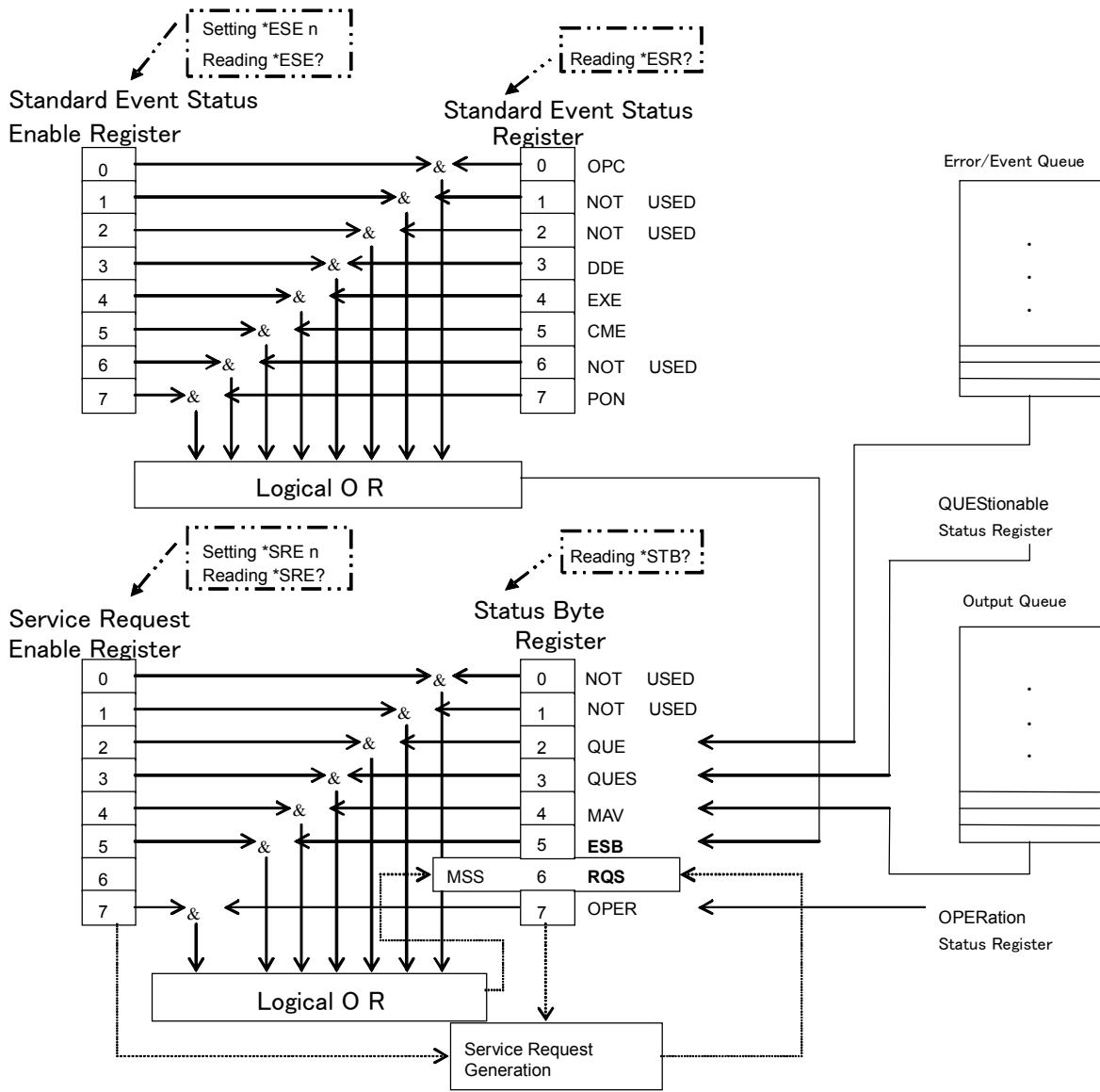


Figure 6.2-1 IEEE488.2 Status Register



Table 6.2-2 Status Byte Register Bit Definition

Bit	Mnemonic	Description
DB2	QUE (error/event QUEue)	Indicates that the error and event queues not empty.
DB3	QUES (QUESTionable status register summary)	QUESTionable status register summary.
DB4	MAV (Message AVailable)	Indicates that the output queue is not empty. When the device is ready to receive the response message send-out request from the controller, the MAV summary message bit is set to 1 (TRUE). This message can be used to allow the controller to send the queue command to the device and wait until MAV turns TRUE.
DB5	ESB (Event Summary Bit)	Standard event status register summary
DB6	RQS (ReQuest Service)  MSS (Master Summary Status)	RQS Returns a 7-bit status byte and this RQS to the controller in the serial pole mode.  MSS Indicates that the MP1800A/MT1810A has reason to request at least one service. When inquiring the status byte by the *STB? command, this MSS summary message appears in bit 6 in place of the RQS message.
DB7	OPER (OPERation status register summary)	OPERation status register summary

Table 6.2-3 Standard Event Status Register Bit Definition

Bit	Mnemonic	Description
DB0	OPC (OPERation Complete)	Indicates that all the specified operations are completed.
DB3	DDE (Device-Dependent Error)	Indicates that an error other than command error, query error or execution error occurs.
DB4	EXE (EXecution Error)	Indicates that an execution error occurs.
DB5	CME (CoMmand Error)	Indicates that a command error occurs.
DB7	PON (Power ON)	Indicates that the power supply turns from OFF to ON.

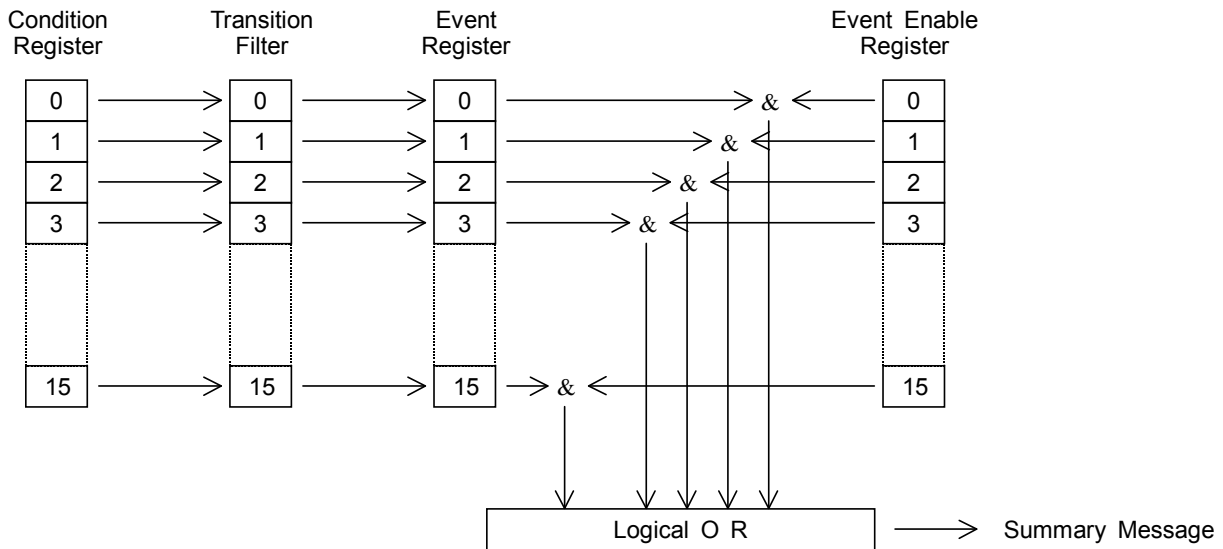
See Chapter 5 "IEEE488.2 Common Commands" for the setting and query commands for the Status Byte Register and Standard Event Status Registers.

## 6.3 SCPI-Regulated Status Register

SCPI regulates that the Instrument should contain the following registers in addition to those regulated in IEEE488.2.

**Table 6.3-1 SCPI-regulated Status Registers**

Name	Description
QUEStionable Status register	Reports a signal status such as a measurement result. This register is used to send a service request to an external controller when an error occurs. Note that the MP1800A and MT1810A do not use this register.
OPERation Status register	Reports some MP1800A/MT1810A statuses.



**Figure 6.3-1 OPERATION Status Register**

**Table 6.3-2 OPERATION Status Register Bit Definition**

Bit	Mnemonic	Description
DB3	BAT (BAThtub measuring)	Indicates that the Instrument is measuring Bathtub.
DB4	MEAS (MEASuring)	Indicates that the Instrument is measuring when any port is in execution.*
DB5	ISI (ISI)	Indicates that the Instrument is measuring ISI.
DB6	QAN (Q ANALysis)	Indicates that the Instrument is measuring Q Analysis
DB7	AAD (Auto ADjust)	Indicates that the Instrument is in Auto Adjust.
DB8	ASE (Auto SEarching)	Indicates that the Instrument is in Auto Search.
DB9	EMM (Eye Margin Measuring)	Indicates that the Instrument is measuring eye margin.

**Table 6.3-2 OPERation Status Register Bit Definition (Cont'd)**

<b>Bit</b>	<b>Mnemonic</b>	<b>Description</b>
DB10	EDI (Eye Diagram)	Indicates that the Instrument is measuring eye diagram.
DB11	PSET (Pattern SETing)	Indicates that the Instrument is setting pattern.
DB12	INI (INIitialize)	Indicates that the Instrument is in initialization.

\*: When remeasurement is performed during measurement, DB4 becomes OFF and then ON again. DB4 bit becomes on at the same time when measurement is started.

## 6.4 How to Read and Write Status Register

This section describes how to read and write the status register data.

**Table 6.4-1 Reading and Writing the Status Register**

Register	Reading	Writing
Status byte register	Read the register bits using the serial pole. A 7-bit status byte and a RQS message bit are returned. The status byte value does not change. *STB? Common query A numeric value composed of the status byte register value and the MSS summary message is returned. The Status register does not change at this time.	Disabled
Service request Enable register	*SRE? common query The register bits do not change.	*SRE common command
Standard status register	*ESR? common query The register bits are cleared after being read.	Disabled
Standard event status enable register	*ESE? common query The register bits do not change.	*ESE common command
SCPI event register	:STATus:...:EVENT? Device-unique command The register bits are cleared.	Disabled
SCPI enable register	:STATus:...:ENABLE? The contents of the register do not change.	:STATus:...:ENABLE
SCPI Transition filter	:STATus:...:PTRansition? :STATus:...:NTRansition? Device-unique command The contents of register bits do not change.	Device-unique command :STATus:...:PTRansition :STATus:...:NTRansition
Error/event queue	Device-unique command :SYSTem:ERRor?	Disabled

**Note:**

The SCPI event register, SCPI enable register, and SCPI Transition filter listed above indicate the SCPI-regulated status registers and an event or a transition filter in a device-unique status.

## 6.5 How to Clear and Reset Status Register

This section describes how to clear and reset the status registers.

**Table 6.5-1 Clearing and Resetting the Status Registers**

Register	*RST	*CLS	Power ON	STATUS: PRESet	Other method to clear register
Status byte register	No change	Clear	Clear	No change	
Service request enable register	No change	No change	Clear	No change	Executing *SRE 0
Standard event status register	No change	Clear	Clear*2	No change	Cleared when an event is read by *ESR?
Standard event status enable register	No change	No change	Clear*1	No change	Executing *ESE 0
SCPI event register	No change	Clear	Clear*1	No change	Cleared when an event is read by :STATUS:...:EVENT?
SCPI enable register	No change	No change	Reset*1	Reset	Executing :STATUS:...:ENABLE 0
SCPI Transition filter	No change	Reset	Reset*1	Reset	Executing :STATUS:...:PTRansition 0 and :STATUS:...:NTRansition 0
Error/event queue	No change	Clear	Clear	No change	Reading all events by :SYSTEM:ERROR?

\*1: When power on as PSC (Power-ON Status Clear) flag is true, it will be cleared (or reset).

\*2: To be 128 bits.

**Note:**

The SCPI event register, SCPI enable register, and SCPI Transition filter listed above indicate the SCPI-regulated status registers.

The following shows the reset values of the registers influenced by the :STATus:PRESet command.

**Table 6.5-2 Values Reset by the :STATus:PRESet Command**

<b>Register</b>	<b>Enable/filter</b>	<b>Reset value</b>
OPERational status register	Enable register	All 0
	PTRansition filter	All 1
	NTRansition filter	All 0

## 6.6 Device-Unique Status

Signal Quality Analyzer series instruments support each module status as device-unique status. Device-unique Status Configuration is as below.

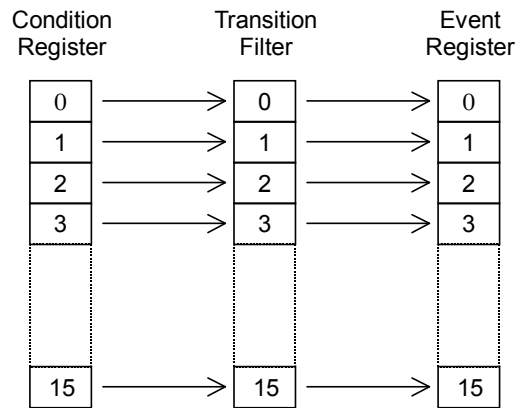


Figure 6.6-1 Each Status Configuration

- Condition Register      Monitors the device status and changes real time in response to the device status. Thus, this register does not memorize the status.
- Transition Filter      Sets the Condition Register data in the Event Register. The following three types of transition filters are available depending on which change of the Condition Register is to be evaluated.
  - Positive direction change:  
The event becomes true only when the corresponding condition changes from false to true.
  - Negative direction change:  
The event becomes true only when the corresponding condition changes from true to false.
  - Bi-directional change:  
The event becomes true when a change arise either in the positive or negative direction.
- Event Register      Memorizes output from Transition Filter.



The following show module status bit definition.

**Table 6.6-1 Module Status**

Status	Contents
Synthesizer Status	Reports MU181000A 12.5GHz Synthesizer status and MU181000B 12.5GHz 4port Synthesizer status.
PPG Status	Reports MU181020A 12.5Gbit/s PPG status and MU181020B 14Gbit/s PPG status.
ED Status	Reports MU181040A 12.5Gbit/s ED status and MU181040B 14Gbit/s ED status.
Optical Transceiver (XFP) Status	Reports MU181600A Optical Transceiver (XFP) status.
Optical Transceiver (SFP) Status	Reports MU181601A Optical Transceiver (SFP) status.
MUX Status	MU182020A 25 Gbit/s 1Ch MUX/ MU182021A 25 Gbit/s 2Ch MUX Status Report
DEMUX Status	MU182040A 25Gbit/s 1Ch DEMUX/ MU182041A 25Gbit/s 2Ch DEMUX Status Report

**Table 6.6-2 Synthesizer Status Bit Definition**

BIT	Contents
DB0	Indicates PLL Unlock occurred.

**Table 6.6-3 ED Status Bit Definition**

BIT	Contents
DB0	Indicates Insertion Error was detected.
DB1	Indicates Omission Error was detected.
DB2	Indicates Total Error was detected.
DB4	Indicates Pattern Sync Loss occurred.
DB5	Indicates Clock Loss occurred.
DB6	Indicates Delay Busy occurred.
DB8	Indicates Transition Error was detected.
DB9	Indicates Non Transition Error was detected.
DB10	Indicates CR Unlock occurred.
DB11	Indicates Delay Calibration Require occurred.

**Table 6.6-4 PPG Status Bit Definition**

BIT	Contents
DB1	Indicates CMU-MUX Unlock occurred.
DB2	Indicates Delay Busy occurred.
DB4	Indicates Delay Calibration Require occurred.

**Table 6.6-5 Optical Transceiver (XFP) Status Bit Definition**

BIT	Contents
DB0	Indicates Ready status.
DB1	Indicates Laser Fault occurred.
DB2	Indicates Unlock occurred.
DB3	Indicates LOS occurred.
DB4	Indicates CDR Unlock occurred.

**Table 6.6-6 Optical Transceiver (SFP) Status Bit Definition**

BIT	Contents
DB0	Indicates Ready status.
DB2	Indicates LOS occurred.

**Table 6.6-7 DEMUX Status Bit Definition**

BIT	Contents
DB6	Displays Delay Busy occurrences at Data1
DB7	Displays Delay Busy occurrences at Data2
DB11	Displays Delay Calibration Require occurrences at Data1
DB12	Displays Delay Calibration Require occurrences at Data2

**Table 6.6-8 MUX Status Bit Definition**

BIT	Contents
DB2	Displays Delay Busy occurrences at Data1
DB3	Displays Delay Busy occurrences at Data2
DB4	Displays Delay Calibration Require occurrences at Data1
DB5	Displays Delay Calibration Require occurrences at Data2

## 6.7 Status Commands

This section explains about OPERational Status Register and each module-unique status commands.

When reading and writing each module-unique status, the following three commands must be transmitted before transmitting a status command.

1. :UENTry:ID <unit\_number>
2. :MODule:ID <module\_number>
3. :PORT:ID <port\_number>

These three commands identify the operating module, and any commands sent/received after them operate for the identified module. However, :PORT:ID <port\_number> can be omitted.

### 6.7.1 Status Preset

The following command initializes the Enable Register and filter of the OPERational Status Register.

#### **:STATus:PRESet**

---

Function	Initializes the event status register and filter.
Example	> :STATus:PRESet

### 6.7.2 Operation Status Register

The Operation Status Register is used to indicate an operation status such as "measurement in progress".

#### **:STATus:OPERation[:EVENT]?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 to 8184 Available bit	Sum total of the bit of event register (DECIMAL)
	8 (Bit 3)	Bathtub measurement in progress
	16 (Bit 4)	Measurement in progress
	32 (Bit 5)	ISI measurement in progress
	64 (Bit 6)	Q Analysis measurement in progress
	128 (Bit 7)	Auto Adjust in progress
	256 (Bit 8)	Auto Search in progress
	512 (Bit 9)	Eye Margin measurement in progress
	1024 (Bit 10)	Eye Diagram measurement in progress
	2048 (Bit 11)	Pattern loading in progress
	4096 (Bit 12)	Initialization in progress
Function	Queries event register at OPERation Status Register.	
Example	> :STATus:OPERation:EVENT? or > :STATus:OPERation? < 16	

**:STATus:OPERation:CONDition?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 to 8184	Sum total of the bit of condition register (DECIMAL)
	Available bit	
	8 (Bit 3)	Bathtub measurement in progress
	16 (Bit 4)	Measurement in progress
	32 (Bit 5)	ISI measurement in progress
	64 (Bit 6)	Q Analysis measurement in progress
	128 (Bit 7)	Auto Adjust in progress
	256 (Bit 8)	Auto Search in progress
	512 (Bit 9)	Eye Margin measurement in progress
	1024 (Bit 10)	Eye Diagram measurement in progress
	2048 (Bit 11)	Pattern loading in progress
	4096 (Bit 12)	Initialization in progress
Function	Queries condition register at OPERation Status Register.	
Example	> :STATus:OPERation:CONDition? < 16	

**:STATus:OPERation:ENABle <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0 to 8184	Sum total of the bit of event enable register (DECIMAL)
	Available bit	
	8 (Bit 3)	Bathtub measurement in progress
	16 (Bit 4)	Measurement in progress
	32 (Bit 5)	ISI measurement in progress
	64 (Bit 6)	Q Analysis measurement in progress
	128 (Bit 7)	Auto Adjust in progress
	256 (Bit 8)	Auto Search in progress
	512 (Bit 9)	Eye Margin measurement in progress
	1024 (Bit 10)	Eye Diagram measurement in progress
	2048 (Bit 11)	Pattern load in progress
	4096 (Bit 12)	Initialization in progress
	Sets parameter to 0, masks of all bits.	
Function	Sets mask value of event enable register at OPERation status register	
Example	To set event enable register to 16 at OPERation status register. > :STATus:OPERation:ENABle 16	

### **:STATus:OPERation:ENABLE?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 to 8184	Sum total of the bit of event enable register (DECIMAL)
Function	Queries enable register at OPERation status register.	
Example	> :STATus:OPERation:ENABle? < 16	

### **:STATus:OPERation:PTRansition <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0 to 8184	Sum total of the bit of transition filter (DECIMAL)
	Available bit	
	8 (Bit 3)	Bathtub measurement in progress
	16 (Bit 4)	Measurement in progress
	32 (Bit 5)	ISI measurement in progress
	64 (Bit 6)	Q Analysis measurement in progress
	128 (Bit 7)	Auto Adjust in progress
	256 (Bit 8)	Auto Search in progress
	512 (Bit 9)	Eye Margin measurement in progress
	1024 (Bit 10)	Eye Diagram measurement in progress
	2048 (Bit 11)	Pattern load in progress
	4096 (Bit 12)	Initialization in progress
Function	Sets the transition filter (positive direction change) of the OPERation status register.	
Example	To set the transition filter (positive direction change) of the OPERation status register to 16. > :STATus:OPERation:PTRansition 16	

### **:STATus:OPERation:PTRansition?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 to 8184	Sum total of the bit of transition filter (DECIMAL)
Function	Queries the transition filter (positive direction change) of the OPERation status register.	
Example	> :STATus:OPERation:PTRansition? < 16	

**:STATus:OPERation:NTRansition <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0 to 8184	Sum total of the bit of transition filter (DECIMAL)
	Available bit	
	8 (Bit 3)	Bathtub measurement in progress
	16 (Bit 4)	Measurement in progress
	32 (Bit 5)	ISI measurement in progress
	64 (Bit 6)	Q Analysis measurement in progress
	128 (Bit 7)	Auto Adjust in progress
	256 (Bit 8)	Auto Search in progress
	512 (Bit 9)	Eye Margin measurement in progress
	1024 (Bit 10)	Eye Diagram measurement in progress
	2048 (Bit 11)	Pattern load in progress
	4096 (Bit 12)	Initialization in progress
Function	Sets the transition filter (negative direction change) of the OPERATION status register.	
Example	To set the transition filter (negative direction change) of the OPERATION status register to 16. > :STATus:OPERation:NTRansition 16	

**:STATus:OPERation:NTRansition?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 to 8184	Sum total of the bit of transition filter (DECIMAL)
Function	Queries the transition filter (negative direction change) of the OPERATION status register.	
Example	> :STATus:OPERation:NTRansition? < 16	

### 6.7.3 Synthesizer Status

Synthesizer Status displays faults at the MU181000A 12.5 GHz Synthesizer and MU181000B 12.5 GHz 4 Port Synthesizer.

#### **:INSTrument:SYG125[:EVENT]?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 to 1 Sum total of the event bit (DECIMAL) Available bit 1 (Bit 0) PLL Unlock occurs
Function	Queries event at 12.5 GHz Synthesizer.
Example	> :INSTrument:SYG125:EVENT?  or > :INSTrument:SYG125? < 1

#### **:INSTrument:SYG125:CONDition?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 to 1 Sum total of the condition bit (DECIMAL) Available bit 1 (Bit 0) PLL Unlock occurs
Function	Queries condition at 12.5 GHz Synthesizer.
Example	> :INSTrument:SYG125:CONDition? < 1

#### **:INSTrument:SYG125:PTRansition <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0 to 1 Sum total of the bit of transition filter (DECIMAL) Available bit 1 (Bit 0) PLL Unlock occurs
Function	Sets the transition filter (positive direction change) of the 12.5 GHz Synthesizer Status.
Example	To set the transition filter (positive direction change) of the 12.5 GHz Synthesizer Status to 1. > :INSTrument:SYG125:PTRansition 1



**:INSTrument:SYG125:PTRansition?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 to 1	Sum total of the bit of transition filter (DECIMAL)
Function	Queries the transition filter (positive direction change) of the 12.5 GHz Synthesizer Status.	
Example	<pre>&gt; :INSTrument:SYG125:PTRansition? &lt; 1</pre>	

**:INSTrument:SYG125:NTRansition <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0 to 1	Sum total of the bit of transition filter (DECIMAL)
	Available bit 1 (Bit 0)	PLL Unlock occurs
Function	Sets the transition filter (negative direction change) of the 12.5 GHz Synthesizer Status.	
Example	To set the transition filter (negative direction change) of the 12.5 GHz Synthesizer Status to 1. <pre>&gt; :INSTrument:SYG125:NTRansition 1</pre>	

**:INSTrument:SYG125:NTRansition?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 to 1	Sum total of the bit of transition filter (DECIMAL)
Function	Queries the transition filter (negative direction change) of the 12.5 GHz Synthesizer Status.	
Example	<pre>&gt; :INSTrument:SYG125:NTRansition? &lt; 1</pre>	

**:INSTrument:SYG125:RESet**


---

Function	Initializes event at 12.5 GHz Synthesizer.
Example	<pre>&gt; :INSTrument:SYG125:RESet</pre>

### 6.7.4 ED Status

The ED Status is used to indicate an alarm and error of the MU181040A 12.5 Gbit/s ED and MU181040B 14 Gbit/s ED.

#### **:INSTRument:EDG125[:EVENT]?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	0 to 3959                      Sum total of the event bit (DECIMAL)
	Available bit
	1 (Bit 0)                      Insertion Error occurs
	2 (Bit 1)                      Omission Error occurs
	4 (Bit 2)                      Total Error occurs
	16 (Bit 4)                     Pattern Sync Loss occurs
	32 (Bit 5)                     Clock Loss occurs
	64 (Bit 6)                     Delay Busy occurs
	256 (Bit 8)                    Transition Error occurs
	512 (Bit 9)                    Non Transition Error occurs
	1024 (Bit 10)                 CR Unlock occurs
	2048 (Bit 11)                 Delay Calibration Require occurs
Function	Queries event at 12.5 Gbit/s ED status.
Example	> :INSTRument:EDG125:EVENT?
	or
	> :INSTRument:EDG125?
	< 1

**:INSTrument:EDG125:CONDition?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>	
	0 to 3959	Sum total of the condition bit (DECIMAL)
	Available bit	
	1 (Bit 0)	Insertion Error occurs
	2 (Bit 1)	Omission Error occurs
	4 (Bit 2)	Total Error occurs
	16 (Bit 4)	Pattern Sync Loss occurs
	32 (Bit 5)	Clock Loss occurs
	64 (Bit 6)	Delay Busy occurs
	256 (Bit 8)	Transition Error occurs
	512 (Bit 9)	Non Transition Error occurs
	1024 (Bit 10)	CR Unlock occurs
	2048 (Bit 11)	Delay Calibration Require occurs
Function	Queries condition at 12.5 Gbit/s ED status.	
Example	<pre>&gt; :INSTrument:EDG125:CONDition? &lt; 1</pre>	

**:INSTrument:EDG125:PTRansition <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA>	
	0 to 3959	Sum total of the bit of transition filter (DECIMAL)
	Available bit	
	1 (Bit 0)	Insertion Error occurs
	2 (Bit 1)	Omission Error occurs
	4 (Bit 2)	Total Error occurs
	16 (Bit 4)	Pattern Sync Loss occurs
	32 (Bit 5)	Clock Loss occurs
	64 (Bit 6)	Delay Busy occurs
	256 (Bit 8)	Transition Error occurs
	512 (Bit 9)	Non Transition Error occurs
	1024 (Bit 10)	CR Unlock occurs
	2048 (Bit 11)	Delay Calibration Require occurs
Function	Sets the transition filter (positive direction change) of the 12.5 Gbit/s ED Status.	
Example	<pre>To set the transition filter (positive direction change) of the 12.5 Gbit/s ED Status to 1. &gt; :INSTrument:EDG125:PTRansition 1</pre>	

### **:INSTrument:EDG125:PTRansition?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 to 3959	Sum total of the bit of transition filter (DECIMAL)
Function	Queries the transition filter (positive direction change) of the 12.5 Gbit/s ED Status.	
Example	> :INSTrument:EDG125:PTRansition? < 1	

### **:INSTrument:EDG125:NTRansition <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0 to 3959	Sum total of the bit of transition filter (DECIMAL)
	Available bit	
	1 (Bit 0)	Insertion Error occurs
	2 (Bit 1)	Omission Error occurs
	4 (Bit 2)	Total Error occurs
	16 (Bit 4)	Pattern Sync Loss occurs
	32 (Bit 5)	Clock Loss occurs
	64 (Bit 6)	Delay Busy occurs
	256 (Bit 8)	Transition Error occurs
	512 (Bit 9)	Non Transition Error occurs
	1024 (Bit 10)	CR Unlock occurs
	2048 (Bit 11)	Delay Calibration Require occurs
Function	Sets the transition filter (negative direction change) of the 12.5 Gbit/s ED Status.	
Example	To set the transition filter (negative direction change) of the 12.5 Gbit/s ED Status to 1. > :INSTrument:EDG125:NTRansition 1	

**:INSTRument:EDG125:NTRansition?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 to 3959                      Sum total of the bit transition filter (DECIMAL)
Function	Queries the transition filter (negative direction change) of the 12.5 Gbit/s ED Status.
Example	> :INSTRument:EDG125:NTRansition? < 1

**:INSTRument:EDG125:RESet**

---

Function	Initializes event at 12.5 Gbit/s ED status.
Example	> :INSTRument:EDG125:RESet

### 6.7.5 PPG Status

The PPG Status is used to indicate an alarm and error of the MU181020A 12.5 Gbit/s PPG and MU181020B 14 Gbit/s PPG.

#### **:INSTrument:PPGG125[:EVENT]?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 to 22                      Sum total of the event bit (DECIMAL) Available bit
	2 (Bit 1)                      CMU-MUX Unlock occurs
	4 (Bit 2)                      Delay Busy occurs
	16 (Bit 4)                     Delay Calibration Require occurs
Function	Queries event at 12.5 Gbit/s PPG status.
Example	> :INSTrument:PPGG125:EVENT? or > :INSTrument:PPGG125? < 1

#### **:INSTrument:PPGG125:CONDition?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 to 22                      Sum total of the condition bit (DECIMAL) Available bit
	2 (Bit 1)                      CMU-MUX Unlock occurs
	4 (Bit 2)                      Delay Busy occurs
	16 (Bit 4)                     Delay Calibration Require occurs
Function	Queries condition at 12.5 Gbit/s PPG status.
Example	> :INSTrument:PPGG125:CONDition? < 1

**:INSTrument:PPGG125:PTRansition <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0 to 22	Sum total of the bit of transition filter (DECIMAL)
	Available bit	
	2 (Bit 1)	CMU-MUX Unlock occurs
	4 (Bit 2)	Delay Busy occurs
	16 (Bit 4)	Delay Calibration Require occurs
Function	Sets the transition filter (positive direction change) of the 12.5 Gbit/s PPG Status.	
Example	To set the transition filter (positive direction change) of the 12.5 Gbit/s PPG Status to 1. > :INSTrument:PPGG125:PTRansition 1	

**:INSTrument:PPGG125:PTRansition?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 to 22	Sum total of the bit of transition filter (DECIMAL)
Function	Queries the transition filter (positive direction change) of the 12.5 Gbit/s PPG Status.	
Example	> :INSTrument:PPGG125:PTRansition? < 1	

**:INSTrument:PPGG125:NTRansition <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0 to 22	Sum total of the bit of transition (DECIMAL)
	Available bit	
	2 (Bit 1)	CMU-MUX Unlock occurs
	4 (Bit 2)	Delay Busy occurs
	16 (Bit 4)	Delay Calibration Require occurs
Function	Sets the transition filter (negative direction change) of the 12.5 Gbit/s PPG Status.	
Example	To set the transition filter (negative direction change) of the 12.5 Gbit/s PPG Status to 1. > :INSTrument:PPGG125:NTRansition 1	

### **:INSTrument:PPGG125:NTRansition?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 to 22                      Sum total of the bit of transition filter (DECIMAL)
Function	Queries the transition filter (negative direction change) of the 12.5 Gbit/s PPG Status.
Example	> :INSTrument:PPGG125:NTRansition? < 1

### **:INSTrument:PPGG125:RESet**

---

Function	Initializes event at 12.5 Gbit/s PPG status.
Example	> :INSTrument:PPGG125:RESet



### 6.7.6 Optical Transceiver (XFP) Status

The Optical Transceiver (XFP) Status is used to indicate an alarm and error of the MU181600A Optical Transceiver (XFP).

#### **:INSTRument:XFP[:EVENT]?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	0 to 31                      Sum total of the event bit (DECIMAL)
	Available bit
	1 (Bit 0)                      Ready
	2 (Bit 1)                      Laser Fault occurs
	4 (Bit 2)                      Unlock occurs
	8 (Bit 3)                      LOS occurs
	16 (Bit 4)                     CDR Unlock occurs
Function	Queries event at Optical Transceiver (XFP) status.
Example	> :INSTRument:XFP:EVENT?
	or
	> :INSTRument:XFP?
	< 1

#### **:INSTRument:XFP:CONDition?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	0 to 31                      Sum total of the condition bit (DECIMAL)
	Available bit
	1 (Bit 0)                      Ready
	2 (Bit 1)                      Laser Fault occurs
	4 (Bit 2)                      Unlock occurs
	8 (Bit 3)                      LOS occurs
	16 (Bit 4)                     CDR Unlock occurs
Function	Queries condition at Optical Transceiver (XFP) status.
Example	> :INSTRument:XFP:CONDition?
	< 1

### **:INSTrument:XFP:PTRansition <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0 to 31	Sum total of the bit of transition filter (DECIMAL)
	Available bit	
	1 (Bit 0)	Ready
	2 (Bit 1)	Laser Fault occurs
	4 (Bit 2)	Unlock occurs
	8 (Bit 3)	LOS occurs
	16 (Bit 4)	CDR Unlock occurs
Function	Sets the transition filter (positive direction change) of the Optical Transceiver (XFP) Status.	
Example	To set the transition filter (positive direction change) of the Optical Transceiver (XFP) Status to 1. > :INSTrument:XFP:PTRansition 1	

### **:INSTrument:XFP:PTRansition?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 to 31	Sum total of the bit of transition filter (DECIMAL)
Function	Queries the transition filter (positive direction change) of the Optical Transceiver (XFP) Status.	
Example	> :INSTrument:XFP:PTRansition? < 1	

### **:INSTrument:XFP:NTRansition <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0 to 31	Sum total of the bit transition filter (DECIMAL)
	Available bit	
	1 (Bit 0)	Ready
	2 (Bit 1)	Laser Fault occurs
	4 (Bit 2)	Unlock occurs
	8 (Bit 3)	LOS occurs
	16 (Bit 4)	CDR Unlock occurs
Function	Sets the transition filter (negative direction change) of the Optical Transceiver (XFP) Status.	
Example	To set the transition filter (negative direction change) of the Optical Transceiver (XFP) Status to 1. > :INSTrument:XFP:NTRansition 1	

**:INSTRument:XFP:NTRansition?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 to 31                      Sum total of the bit of transition filter (DECIMAL)
Function	Queries the transition filter (negative direction change) of the Optical Transceiver (XFP) Status.
Example	> :INSTRument:XFP:NTRansition? < 1

**:INSTRument:XFP:RESet**

---

Function	Initializes event at Optical Transceiver (XFP) status.
Example	> :INSTRument:XFP:RESet

### 6.7.7 Optical Transceiver (SFP) Status

The Optical Transceiver (SFP) Status is used to indicate an alarm and error of the MU181601A Optical Transceiver (SFP).

#### **:INSTrument:SFP[:EVENT]?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 to 5 Sum total of the event bit (DECIMAL) Available bit 1 (Bit 0) Ready 4 (Bit 2) LOS occurs
Function	Queries event at Optical Transceiver (SFP) status.
Example	> :INSTrument:SFP:EVENT? or > :INSTrument:SFP? < 1

#### **:INSTrument:SFP:CONDition?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 to 5 Sum total of the condition bit (DECIMAL) Available bit 1 (Bit 0) Ready 4 (Bit 2) LOS occurs
Function	Queries condition at Optical Transceiver (SFP) status.
Example	> :INSTrument:SFP:CONDition? < 1

#### **:INSTrument:SFP:PTRansition <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0 to 5 Sum total of the bit of transition filter (DECIMAL) Available bit 1 (Bit 0) Ready 4 (Bit 2) LOS occurs
Function	Sets the transition filter (positive direction change) of the Optical Transceiver (SFP) Status.
Example	To set the transition filter (positive direction change) of the Optical Transceiver (SFP) Status to 1. > :INSTrument:SFP:PTRansition 1

**:INSTRument:SFP:PTRansition?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 to 5	Sum total of the bit of transition filter (DECIMAL)
Function	Queries the transition filter (positive direction change) of the Optical Transceiver (SFP) Status.	
Example	> :INSTRument:SFP:PTRansition? < 1	

**:INSTRument:SFP:NTRansition <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0 to 5	Sum total of the bit transition filter (DECIMAL)
	Available bit	
	1 (Bit 0)	Ready
	4 (Bit 2)	LOS occurs
Function	Sets the transition filter (negative direction change) of the Optical Transceiver (SFP) Status.	
Example	To set the transition filter (negative direction change) of the Optical Transceiver (SFP) Status to 1. > :INSTRument:SFP:NTRansition 1	

**:INSTRument:SFP:NTRansition?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 to 5	Sum total of the bit of transition filter (DECIMAL)
Function	Queries the transition filter (negative direction change) of the Optical Transceiver (SFP) Status.	
Example	> :INSTRument:SFP:NTRansition? < 1	

**:INSTRument:SFP:RESet**


---

Function	Initializes event at Optical Transceiver (SFP) status.
Example	> :INSTRument:SFP:RESet

### 6.7.8 DEMUX Status

DEMUX Status displays errors and alarms occurring at the MU182040A 25 Gbit/s 1Ch DEMUX, and MU182041A 25 Gbit/s 2 Ch DEMUX.

#### **:INSTRument:DMUX[:EVENT]?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 to 6336 Sum total of the event bit (DECIMAL) Available bit 64 (Bit6) Delay Busy Occurrence (Data1) 128 (Bit7) Delay Busy Occurrence (Data2) 2048 (Bit11) Delay Calibration Require Occurrence (Data1) 4096 (Bit12) Delay Calibration Require Occurrence (Data2)
Function	Queries event at 25Gbit/s DEMUX status.
Example	> :INSTRument:DMUX:EVENT? or > :INSTRument:DMUX? < 64

#### **:INSTRument:DMUX:CONDition?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 to 6336 Sum total of the condition bit (DECIMAL) Available bit 64 (Bit6) Delay Busy Occurrence (Data1) 128 (Bit7) Delay Busy Occurrence (Data2) 2048 (Bit11) Delay Calibration Require Occurrence (Data1) 4096 (Bit12) Delay Calibration Require Occurrence (Data2)
Function	Queries condition at 25Gbit/s DEMUX status.
Example	> :INSTRument:DMUX:CONDition? < 64

**:INSTrument:DMUX:PTRansition <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0 to 6336	Sum total of the bit of transition filter (DECIMAL)
	Available bit	
	64 (Bit6)	Delay Busy Occurrence (Data1)
	128 (Bit7)	Delay Busy Occurrence (Data2)
	2048 (Bit11)	Delay Calibration Require Occurrence (Data1)
	4096 (Bit12)	Delay Calibration Require Occurrence (Data2)
Function	Sets the transition filter (positive direction change) of the 25Gbit/s DEMUX Status.	
Example	To set the transition filter (positive direction change) of the 25Gbit/s DEMUX Status to 1. > :INSTrument:DMUX:PTRansition 64	

**:INSTrument:DMUX:PTRansition?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 to 6336	Sum total of the bit of transition filter (DECIMAL)
Function	Queries the transition filter (positive direction change) of the 25Gbit/s DEMUX Status.	
Example	> :INSTrument:DMUX:PTRansition? < 64	

**:INSTrument:DMUX:NTRansition <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0 to 6336	Sum total of the bit of transition filter (DECIMAL)
	Available bit	
	64 (Bit6)	Delay Busy Occurrence (Data1)
	128 (Bit7)	Delay Busy Occurrence (Data2)
	2048 (Bit11)	Delay Calibration Require Occurrence (Data1)
	4096 (Bit12)	Delay Calibration Require Occurrence (Data2)
Function	Sets the transition filter (negative direction change) of the 25Gbit/s DEMUX Status.	
Example	To set the transition filter (negative direction change) of the 25Gbit/s DEMUX Status to 1. > :INSTrument:DMUX:NTRansition 64	

### **:INSTRument:DMUX:NTRansition?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 to 6336	Sum total of the bit of transition filter (DECIMAL)
Function	Queries the transition filter (negative direction change) of the 25Gbit/s DEMUX Status.	
Example	> :INSTRument:DMUX:NTRansition? < 64	

### **:INSTRument:DMUX:RESet**

---

Function	Initializes event at 25Gbit/s DEMUX status.
Example	> :INSTRument:DMUX:RESet



### 6.7.9 MUX Status

MUX Status displays errors and alarms occurring at the MU182020A 25 Gbit/s 1Ch MUX, and MU182021A 25 Gbit/s 2 Ch MUX.

#### **:INSTrument:MUX[:EVENT]?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	0 to 60                      Sum total of the event bit (DECIMAL)
	Available bit
	4 (Bit2)                      Delay Busy Occurrence (Data1)
	8 (Bit3)                      Delay Busy Occurrence (Data2)
	16 (Bit4)                     Delay Calibration Require Occurrence (Data1)
	32 (Bit5)                     Delay Calibration Require Occurrence (Data2)
Function	Queries event at 25Gbit/s MUX status.
Example	> :INSTrument:MUX:EVENT?
	or
	> :INSTrument:MUX?
	< 4

#### **:INSTrument:MUX:CONDition?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	0 to 60                      Sum total of the condition bit (DECIMAL)
	Available bit
	4 (Bit2)                      Delay Busy Occurrence (Data1)
	8 (Bit3)                      Delay Busy Occurrence (Data2)
	16 (Bit4)                     Delay Calibration Require Occurrence (Data1)
	32 (Bit5)                     Delay Calibration Require Occurrence (Data2)
Function	Queries condition at 25Gbit/s MUX status.
Example	> :INSTrument:MUX:CONDition?
	< 4

### **:INSTRument:MUX:PTRansition <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0 to 60	Sum total of the bit of transition filter (DECIMAL)
	Available bit	
	4 (Bit2)	Delay Busy Occurrence (Data1)
	8 (Bit3)	Delay Busy Occurrence (Data2)
	16 (Bit4)	Delay Calibration Require Occurrence (Data1)
	32 (Bit5)	Delay Calibration Require Occurrence (Data2)
Function	Sets the transition filter (positive direction change) of the 25Gbit/s MUX Status.	
Example	To set the transition filter (positive direction change) of the 25Gbit/s MUX Status to 1. > :INSTRument:MUX:PTRansition 4	

### **:INSTRument:MUX:PTRansition?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 to 60	Sum total of the bit of transition filter (DECIMAL)
Function	Queries the transition filter (positive direction change) of the 25Gbit/s MUX Status.	
Example	> :INSTRument:MUX:PTRansition? < 4	

### **:INSTRument:MUX:NTRansition <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0 to 60	Sum total of the bit of transition filter (DECIMAL)
	Available bit	
	4 (Bit2)	Delay Busy Occurrence (Data1)
	8 (Bit3)	Delay Busy Occurrence (Data2)
	16 (Bit4)	Delay Calibration Require Occurrence (Data1)
	32 (Bit5)	Delay Calibration Require Occurrence (Data2)
Function	Sets the transition filter (negative direction change) of the 25Gbit/s MUX Status.	
Example	To set the transition filter (negative direction change) of the 25Gbit/s MUX Status to 1. > :INSTRument:MUX:NTRansition 4	

---

**:INSTRument:MUX:NTRansition?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 to 60	Sum total of the bit of transition filter (DECIMAL)
Function	Queries the transition filter (negative direction change) of the 25Gbit/s MUX Status.	
Example	> :INSTRument:MUX:NTRansition? < 4	

---

**:INSTRument:MUX:RESet**

---

Function	Initializes event at 25Gbit/s MUX status.
Example	> :INSTRument:MUX:RESet



# Chapter 7 SCPI Commands

---

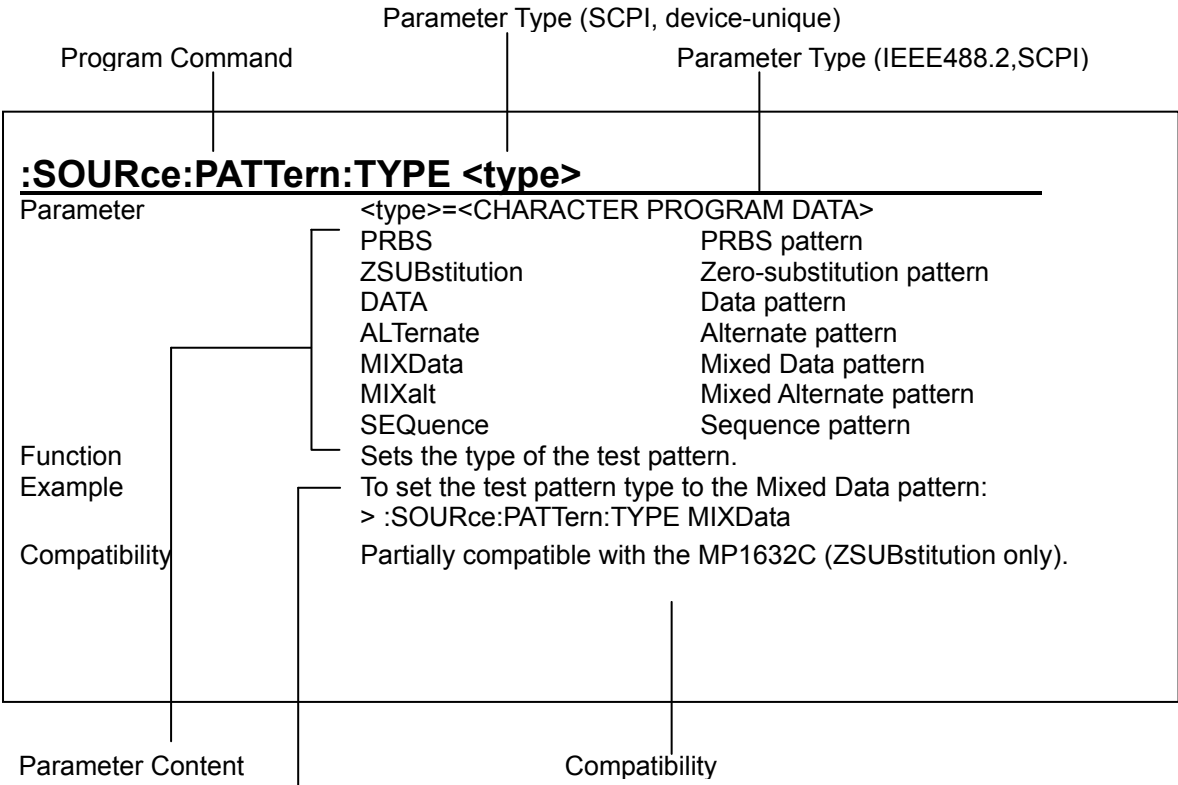
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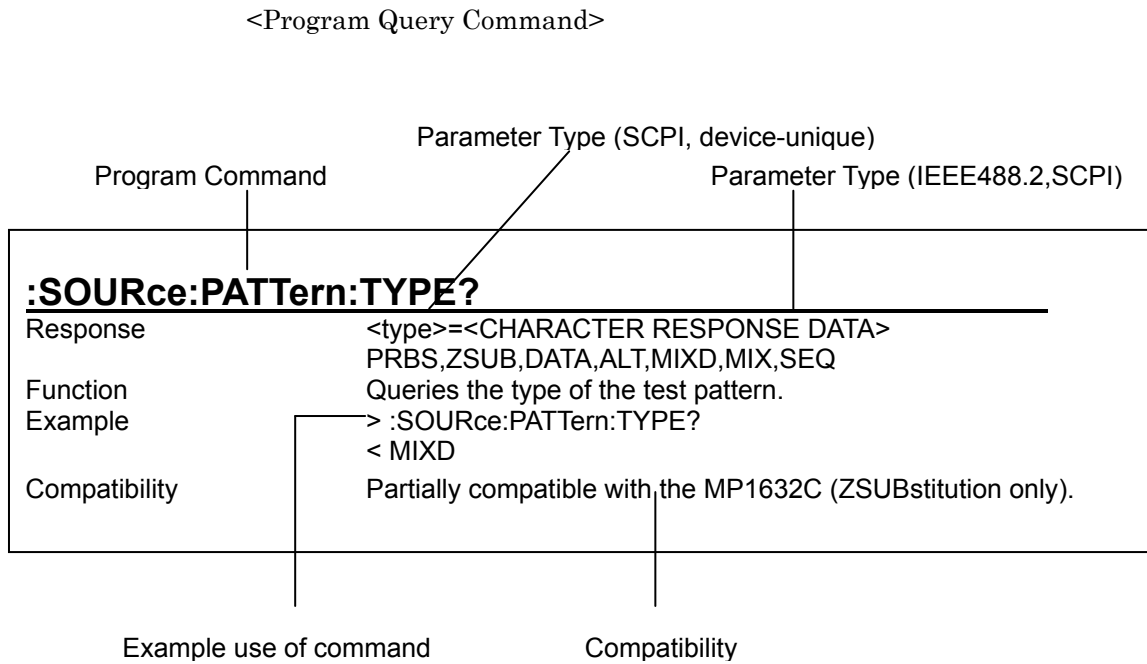
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Examples of command expression are shown below.

<Program Command>



Example use of command



Meanings of < and > at the beginning are:  
 > for Program message  
 < for Response

**Notes:**

- All the Instrument commands are sequential commands.
- If a command affects other settings, the command may have restriction. For setting parameters subject to be affected and command conditions to be restricted, see the *MX180000A Signal Quality Analyzer Control Software Operation Manual* and operation manual of each module.
- The parameters of a query command may be omitted when they are the same as those of the corresponding program command.



## 7.1 Common Commands

This chapter describes the commands related to common settings and functions of the control software.

### 7.1.1 Commands for common settings

Table 7.1.1-1 Common setting commands

Setting Items	Commands
Number of the unit to be operated	:UENTry:ID
	:UENTry:ID?
Number of the module to be operated (slot position)	:MODule:ID
	:MODule:ID?
Number of the port to be operated (port position)	:PORT:ID
	:PORT:ID?
Automatic measurement function to be performed	:SYSTem:CFUNction
	:SYSTem:CFUNction?
Query for error message	:SYSTem:ERRor?
Query for SCPI version	:SYSTem:VERSion?
Query for software status	:SYSTem:CONDition?
Query for hardware system configuration	:SYSTem:ORGanization:HARDware?
Query for system error	:SYSTem:INFormation:ERRor?
Terminator type	:SYSTem:TERMination
	:SYSTem:TERMination?
Query for model name of mainframe and module	:SYSTem:CONDition:UNITs?
Query for mainframe information	:SYSTem:UNIT?
Query for module information	:SYSTem:MODule?
Measured Results Screen Drawing Settings	:SYSTem:DISPlay:RESult
	:SYSTem:DISPlay:RESult?
Module screen display	:DISPlay:ACTive

### **:UENTry:ID <unit\_number>**

---

Parameter	<unit_number> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4            Unit number
Function	Sets the number of the unit to be operated.
Example	To set the number of the unit to be operated to 2: > :UENTry:ID 2
Compatibility	Incompatible with existing models.

### **:UENTry:ID?**

---

Response	<unit_number> = <NR1 NUMERIC RESPONSE DATA> 1 to 4
Function	Queries the number of the unit being operated.
Example	> :UENTry:ID? < 2
Compatibility	Incompatible with existing models.

### **:MODule:ID <module\_number>**

---

Parameter	<module_number> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 6            Module number
Function	Sets the number of the module to be operated (slot position).
Example	To set the number of the module to be operated (slot position) to 6: > :MODule:ID 6
Compatibility	Incompatible with existing models.

### **:MODule:ID?**

---

Response	<module_number> = <NR1 NUMERIC RESPONSE DATA> 1 to 6
Function	Queries the number of the module being operated (slot position).
Example	> :MODule:ID? < 6
Compatibility	Incompatible with existing models.

**:PORT:ID <port\_number>**


---

Parameter	<port_number> = <DECIMAL NUMERIC PROGRAM DATA> Identifier for the port to be operated. Indicates the physical position number of the port assigned to a module.
Function	Sets the number of the port to be operated (port position).
Example	To set the number of the port to be operated (port position) to 1: > :PORT:ID 1
Compatibility	Incompatible with existing models.

**:PORT:ID?**


---

Response	<port_number> = <NR1 NUMERIC RESPONSE DATA> Identifier for the port to be operated. Indicates the physical position number of the port assigned to a module.
Function	Queries the number of the port being operated (port position).
Example	> :PORT:ID? < 1
Compatibility	Incompatible with existing models.

**:SYSTEM:CFUNCTION <function>**


---

Parameter	<function> = <CHARACTER PROGRAM DATA>
	ASE            Auto Search
	ISI            ISI measurement
	EMAR          Eye Margin measurement
	EDI            Eye Diagram measurement
	QAN            Q measurement
	BTUB          Bathtub measurement
	AADJ          Auto Adjust
	OFF            OFF
	<b>Note:</b>
	When "OFF" is set, the operation returns to the port operation previously performed.
Function	Sets the automatic measurement function to be performed.
Example	To set the common function to be performed to Auto Search: > :SYSTEM:CFUNCTION ASE
Compatibility	Incompatible with existing models.

## **:SYSTEM:CFUNCTION?**

---

Response	<function> = <CHARACTER RESPONSE DATA> ASE            Auto Search ISI            ISI measurement EMAR          Eye Margin measurement EDI            Eye Diagram measurement QAN            Q measurement BTUB          Bathtub measurement AADJ          Auto Adjust OFF            OFF
Function	Queries the automatic measurement function being performed.
Example	> :SYSTEM:CFUNCTION? < ASE
Compatibility	Incompatible with existing models.

## **:SYSTEM:ERROR?**

---

Response	<error/event_number>,"<error/event_description>" <error/event_number> = <NR1 NUMERIC RESPONSE DATA> -32768 to 32767 "0" indicates that no errors and events have occurred. Other values return a general error reserved by SCPI or a device-unique error. <error/event_description> = <STRING RESPONSE DATA> This is an error message corresponding to <error/event_number>. The maximum character-string length is 255 characters.
Function	Queries the error message in the error/event queue. Refer to Chapters 8 and 9 for details on the error messages.
Example	> :SYSTEM:ERROR? < 0, "No error"
Compatibility	Compatible with the MP1632C Digital Data Analyzer (hereinafter, referred to as "MP1632C") and MP1776A Error Detector (hereinafter, referred to as "MP1776A").

## **:SYSTEM:VERSION?**

---

Response	<version> = <NR2 NUMERIC RESPONSE DATA> YYYY.V                      YYYY:    Year V:        Revision number
Function	Queries the SCPI version to which the MP1800A/MT1810A conforms.
Example	> :SYSTEM:VERSION? < 1999.0
Compatibility	Compatible with the MP1632C and MP1776A.

---

**:SYSTem:CONDition?**

Response	<p>&lt;mainframe&gt;,&lt;slot1&gt;,...,&lt;slot64&gt;</p> <p>&lt;mainframe&gt; = &lt;serial&gt;,&lt;mver&gt;,&lt;hver&gt;,&lt;opt1&gt;,&lt;sbver&gt;,&lt;saver&gt;,&lt;opt2&gt;</p> <p>&lt;serial&gt; = &lt;STRING RESPONSE DATA&gt;</p> <p>XXXXXXXXXX            0000000000 to 9999999999</p> <p>                         Mainframe serial number</p> <p><b>Note:</b></p> <p>    Alphabetic characters may be included.</p> <p>&lt;mver&gt; = &lt;STRING RESPONSE DATA&gt;</p> <p>XXXX.XX.XX            1.00.00 to 9999.99.99</p> <p>                         Main application software version</p> <p>&lt;hver&gt; = &lt;STRING RESPONSE DATA&gt;</p> <p>XXXX.XX.XX            1.00.00 to 9999.99.99</p> <p>                         Mainframe hardware version</p> <p>&lt;opt1&gt; = &lt;STRING RESPONSE DATA&gt;</p> <p>OPTXXX                Option number (MP1800A/MT1810A)</p> <p>                         See Table 7.1.1-2 "Option character correspondence table".</p> <p><b>Note:</b></p> <p>    Outputs the numbers for all installed options.</p> <p>    NONE is output if no option is installed.</p> <p>&lt;sbver&gt; = &lt;STRING RESPONSE DATA&gt;</p> <p>XXXX.XX.XX            1.00.00 to 9999.99.99</p> <p>                         Sub application software version (Boot part)</p> <p>&lt;saver&gt; = &lt;STRING RESPONSE DATA&gt;</p> <p>XXXX.XX.XX            1.00.00 to 9999.99.99</p> <p>                         Sub application software version (Application part)</p> <p>&lt;opt2&gt; = &lt;STRING RESPONSE DATA&gt;</p> <p>&lt;slot x&gt; = &lt;module&gt;,&lt;serial&gt;,&lt;fpga1&gt;[,&lt;fpga2&gt;],&lt;boot&gt;,&lt;application&gt;,&lt;opt&gt;</p> <p>x indicates a slot number. The slot number varies depending on the unit number as follows.</p> <table border="0"> <tr> <td style="vertical-align: top;">Unit 1: 1 to 16</td> <td>For the MP1800A, numbers from 1 to 6 correspond to actual slots. For the MT1810A, numbers from 1 to 4 correspond to actual slots.</td> </tr> <tr> <td style="vertical-align: top;">Unit 2: 17 to 32</td> <td>For the MT1810A, numbers from 17 to 20 correspond to actual slots.</td> </tr> <tr> <td style="vertical-align: top;">Unit 3: 33 to 48</td> <td>For the MT1810A, numbers from 33 to 36 correspond to actual slots.</td> </tr> <tr> <td style="vertical-align: top;">Unit 4: 49 to 64</td> <td>For the MT1810A, numbers from 49 to 52 correspond to actual slots.</td> </tr> </table>	Unit 1: 1 to 16	For the MP1800A, numbers from 1 to 6 correspond to actual slots. For the MT1810A, numbers from 1 to 4 correspond to actual slots.	Unit 2: 17 to 32	For the MT1810A, numbers from 17 to 20 correspond to actual slots.	Unit 3: 33 to 48	For the MT1810A, numbers from 33 to 36 correspond to actual slots.	Unit 4: 49 to 64	For the MT1810A, numbers from 49 to 52 correspond to actual slots.
Unit 1: 1 to 16	For the MP1800A, numbers from 1 to 6 correspond to actual slots. For the MT1810A, numbers from 1 to 4 correspond to actual slots.								
Unit 2: 17 to 32	For the MT1810A, numbers from 17 to 20 correspond to actual slots.								
Unit 3: 33 to 48	For the MT1810A, numbers from 33 to 36 correspond to actual slots.								
Unit 4: 49 to 64	For the MT1810A, numbers from 49 to 52 correspond to actual slots.								

<module> = <STRING RESPONSE DATA>  
XXXXXXXXXX           Module name (e.g.: MU181020A)  
                          See Table 7.1.1-2 "Option character  
                          correspondence table".

**Note:**

NONE is output if no module is installed.  
For a module that uses two slots, only the slot with the greater number is valid.

<serial> = <STRING RESPONSE DATA>  
XXXXXXXXXXXX           0000000000 to 9999999999  
                          Serial number

**Note:**

"-----" is output if no module is installed.  
For a module that uses two slots, only the slot with the greater number is valid.

<fpga1>[,<fpga2>,.....] = <STRING RESPONSE DATA>  
XXXX.XX.XX            1.00.00 to 9999.99.99  
                          FPGA version

<boot> = <STRING RESPONSE DATA>  
XXXX.XX.XX            1.00.00 to 9999.99.99  
                          Logic Boot version

**Note:**

"-----" is output if Logic boot is not installed.  
For a module that uses two slots, only the slot with the greater number is valid.

<application> = <STRING RESPONSE DATA>  
XXXX.XX.XX            1.00.00 to 9999.99.99  
                          Logic Application version

**Note:**

"-----" is output if Logic Application is not installed.  
For a module that uses two slots, only the slot with the greater number is valid.

<opt> = <STRING RESPONSE DATA>  
XXXXXX/XXXXX           Option number  
                          OPTXXX: For MP1800A/MT1810A

**Note:**

Outputs the numbers for all installed options.  
For a module that uses two slots, only the slot with the greater number is valid.  
The option names of the MU181020B-003 and MU181040B-003 are not output.

Function	Queries the software status of the MP1800A/MT1810A.
Example	<pre>&gt; :SYSTem:CONDition? &lt; 6201234567,1.00.00,1.00.20,OPT302,1.00.00,1.00.00,OPT12, OPT14, MU181000A,6201234568,1.00.00,1.00.00,1.00.00,OPT101, MU181020A,6201234569,1.00.00,1.00.00,1.00.00,OPT001,OPT2 20, MU181040A,6201234571,1.00.00,1.00.00,1.00.00,OPT002,OPT2 20</pre>
Compatibility	Incompatible with existing models.

Table 7.1.1-2 Option character correspondence table

Model/Name	Option Number	Option Name
MP1800A Signal Quality Analyzer	OPT014	2-Slot PPG/ED
	OPT015	4-Slot PPG/ED
	OPT016	6-Slot PPG/ED
MT1810A 4 Slot Chassis	OPT014	2-Slot PPG/ED
	OPT015	4-Slot PPG/ED
MX180000A Signal Quality Analyzer Control Software	–	–
MU181000A 12.5GHz Synthesizer	OPTx01	Jitter Modulation
MU181000B 12.5GHz 4port Synthesizer	OPTx01	Jitter Modulation
MU181020A 12.5Gbit/s PPG	OPT001	9.9 to 12.5 Gbit/s
	OPT002	0.1 to 12.5 Gbit/s
	OPTx10	Variable Data Output (0.05 to 0.8 Vp-p)
	OPTx11	Variable Data Output (0.25 to 2.5 Vp-p)
	OPTx12	High Performance Data Output (0.05 to 2.0 Vp-p)
	OPTx13	Variable Data Output (0.5 to 3.5 Vp-p)
	OPTx21	Differential Clock Output (0.1 to 2.0 Vp-p)
	OPTx30	Variable Data Delay
MU181040A 12.5Gbit/s ED	OPT001	9.8 to 12.5 Gbit/s
	OPT002	0.1 to 12.5 Gbit/s
	OPTx20	Clock Recovery
	OPTx30	Variable Clock Delay
MU181600A Optical Transceiver (XFP)	–	–
MU181601A Optical Transceiver (SFP)	–	–
MU181620A Stressed Eye Transmitter	OPTx01	1310nm Reference
	OPTx02	1550nm Reference
	OPTx03	1310nm/1550nm Reference
	OPTx11	1310nm Stressed Eye
	OPTx12	1550nm Stressed Eye
	OPTx13	1310nm/1550nm Stressed Eye
MU181640A Optical Receiver	OPTx04	Band Width 8.5GHz
MU181800A 12.5GHz Clock Distributor	–	–
MU181020B 14Gbit/s PPG	OPT002	0.1 to 14 Gbit/s
	OPTx11	Variable Data Output (0.25 to 2.5 Vp-p)
	OPTx12	High Performance Data Output (0.05 to 2.0 Vp-p)
	OPTx13	Variable Data Output (0.5 to 3.5 Vp-p)
	OPTx21	Differential Clock Output (0.1 to 2.0 Vp-p)
	OPTx30	Variable Data Delay



Table 7.1.1-2 Option character correspondence table (Cont'd)

Model/Name	Option Number	Option Name
MU181040B 14Gbit/s ED	OPT002	0.1 to 14 Gbit/s
	OPTx20	Clock Recovery
	OPTx30	Variable Clock Delay
MU182020A 25Gbit/s 1ch MUX MU182021A 25Gbit/s 2ch MUX	OPTx01	28Gbit/s Extension
	OPTx02	Clock Input Band Switch
	OPTx10	Variable Data Output (0.25 to 1.75Vp-p)
	OPTx11	Variable Data Output (0.5 to 2.5Vp-p)
	OPTx12	Variable Data Output (0.5 to 2.0Vp-p)
	OPTx13	Variable Data Output (0.5 to 3.5Vp-p)
	OPTx21	Differential Clock Output (0.5 to 2.0Vp-p)
	OPTx30	25Gbit/s Variable Data Delay
	OPTx31	28Gbit/s Variable Data Delay
MU182040A 25Gbit/s 1ch DEMUX MU182041A 25Gbit/s 2ch DEMUX	OPTx01	28Gbit/s Extension
	OPTx02	Clock Input Band Switch
	OPTx30	25GHz Variable Clock Delay
	OPTx31	28GHz Variable Clock Delay

**Note:**

The option names of the MU181020B-003 and MU181040B-003 are not output.

## :SYSTem:ORGAnization:HARDware?

Response <slot1>,...,<slot64>  
 <slotx> =  
 <module>,<serial>,<fpga1>[,<fpga2>],<boot>,<application>,<opt>  
 x indicates a slot number. The slot number varies depending on the unit number as follows.

Unit 1: 1 to 16	For the MP1800A, numbers from 1 to 6 correspond to actual slots.
	For the MT1810A, numbers from 1 to 4 correspond to actual slots.
Unit 2: 17 to 32	For the MT1810A, numbers from 17 to 20 correspond to actual slots.
Unit 3: 33 to 48	For the MT1810A, numbers from 33 to 36 correspond to actual slots.
Unit 4: 49 to 64	For the MT1810A, numbers from 49 to 52 correspond to actual slots.

<module> = <STRING RESPONSE DATA>  
 XXXXXXXXXX Module name (e.g.,: MU181020A)  
 See Table 7.1.1-2 "Option character correspondence table".

**Note:**

NONE is output if no module is installed.  
 For a module that uses two slots, only the slot with the greater number is valid.

<serial> = <STRING RESPONSE DATA>  
 XXXXXXXXXX 0000000000 to 9999999999  
 Serial number

**Note:**

"-----" is output if no module is installed.  
 For a module that uses two slots, only the slot with the greater number is valid.

<fpga1>[,<fpga2>,...] = <STRING RESPONSE DATA>  
 XXXX.XX.XX 1.00.00 to 9999.99.99  
 FPGA version

<boot> = <STRING RESPONSE DATA>  
 XXXX.XX.XX 1.00.00 to 9999.99.99  
 Logic Boot version

**Note:**

"-----" is output if Logic Boot is not installed.  
 For a module that uses two slots, only the slot with the greater number is valid.

<application> = <STRING RESPONSE DATA>  
 XXXX.XX.XX            1.00.00 to 9999.99.99  
                          Logic Application version

**Note:**

"-----" is output if Logic Application is not installed.  
 For a module that uses two slots, only the slot with the greater number is valid.

<opt> = <STRING RESPONSE DATA>  
 XXXXXX/XXXXX        Option number  
                          OPTXXX: For MP1800A/MT1810A  
                          Outputs the numbers for all installed options.

**Note:**

NONE is output if no module is installed.  
 For a module that uses two slots, only the slot with the greater number is valid.  
 The option names of the MU181020B-003 and MU181040B-003 are not output.

Function  
 Example

Queries the hardware system configuration of the MP1800A  
 > :SYSTem:ORGanization:HARDware?  
 < MU181000A, 6201234568, 1.00.00, 1.00.00, 1.00.00, OPT101,  
 MU181020A, 6201234569, 1.00.00, 1.00.00, 1.00.00, OPT001, OPT2  
 20,  
 MU181040A, 6201234571, 1.00.00, 1.00.00, 1.00.00, OPT002, OPT2  
 20

Compatibility

Partially compatible with the MP1632C and MP1776A.

### **:SYSTem:INFormation:ERRor? <unit>**

---

Parameter	<unit> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4:1 to 4, in single steps
Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 NONE 1 PLL Unlock 2 Temperature 3 Fan  All the system errors that have currently occurred are displayed, delimited with a comma (,).
Function	Queries the System Error contents.
Example	To query the System Error contents: > :SYSTem:INFormation:ERRor? 3 < 1,2,3 (when a system error has occurred for PLL Unlock, Temperature, or Fan) < 0 (when no system error has occurred)
Compatibility	Incompatible with existing models.

### **:SYSTem:TERMination <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0 LF+EOI 1 CR+LF+EOI
Function	Sets the terminator type of the response data.
Example	To set the terminator type to LF+EOI: > :SYSTem:TERMination 0
Compatibility	Compatible with the MP1632C.

### **:SYSTem:TERMination?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 LF+EOI 1 CR+LF+EOI
Function	Queries the terminator type of the response data.
Example	> :SYSTem:TERMination? < 0
Compatibility	Compatible with the MP1632C.

**:SYSTem:CONDition:UNITs?**

Response	<pre>&lt;unit1&gt;,...,&lt;unit4&gt;,&lt;slot1&gt;,...,&lt;slot6&gt; =&lt;mainframe1&gt;,...,&lt;mainframe4&gt;,&lt;module1&gt;,...,&lt;module6&gt;" &lt;mainframe1&gt; to &lt;mainframe4&gt; = &lt;STRING RESPONSE DATA&gt; XXXXXXXXXX      Mainframe name (e.g.,: MP1800A)                   See Table 7.1.1-2 "Option character                   correspondence table".</pre> <p><b>Note:</b></p> <p>NONE is output for mainframe2 to mainframe4, if no mainframe is connected.</p> <pre>&lt;module1&gt; to &lt;module6&gt; = &lt;STRING RESPONSE DATA&gt; XXXXXXXXXX      Module name (e.g.,: MU181020A)                   See Table 7.1.1-2 "Option character                   correspondence table".</pre> <p><b>Note:</b></p> <p>NONE is output if no module is installed.</p> <p>For a module that uses two slots, only the slot with the greater number is valid.</p>
Function	Queries the model name of the mainframe and module.
Example	<pre>&gt; :SYSTem:CONDition:UNITs? &lt; MT1810A,MT1810A,MT1810A,NONE,MU181000A,NONE,MU181020A, MU181040A,NONE,...,MU181600A,MU181601A,MU181620A,NONE, MU181640A,NONE,...,NONE</pre>
Example	<p>To query the model name of the mainframe and module for the MP1800A (1-box type):</p> <pre>&gt; :SYSTem:CONDition:UNITs? &lt; MP1800A,NONE,NONE,NONE,MU181000A,NONE,MU181020A, MU181040A,NONE,MU181600A,NONE,...,NONE</pre>
Compatibility	Incompatible with existing models.

**:SYSTem:UNIT? <numeric>**

Parameter	<numeric> = <NR1 NUMERIC PROGRAM DATA> 1 to 4 Mainframe number "1" for the MP1800A, "1 to 4" for the MT1810A.
Response	"<mainframe>", <mainframe> = <unit>,<serial>,<mver>,<hver>,<opt1>,<sbver>,<saver>,<opt2> <unit> = <STRING RESPONSE DATA> XXXXXXXXXX Mainframe name (e.g., : MP1800A/MT1810A) See Table 7.1.1-2 "Option character correspondence table".

**Note:**

NONE is output if no module is installed.  
For a unit that uses two slots, only the slot with the lower number is valid.

<serial> = <STRING RESPONSE DATA> XXXXXXXXXX	0000000000 to 9999999999 Mainframe serial number
---	---

**Note:**

Alphabetic characters may be included.

<mver> = <STRING RESPONSE DATA> XXXX.XX.XX	1.00.00 to 9999.99.99 Main application software version
---	--

<hver> = <STRING RESPONSE DATA> XXXX.XX.XX	1.00.00 to 9999.99.99 Mainframe hardware version
---	---

<opt1> = <STRING RESPONSE DATA> OPTXXX	Option number (MP1800A/MT1810A) See Table 7.1.1-2 "Option character correspondence table".
---	--

**Note:**

Outputs the numbers for all installed options.  
NONE is output if no option is installed.

<sbver> = <STRING RESPONSE DATA> XXXX.XX.XX	1.00.00 to 9999.99.99 Sub application software version (Boot part)
--	---

<saver> = <STRING RESPONSE DATA> XXXX.XX.XX	1.00.00 to 9999.99.99 Sub application software version (Application part)
--	---

Function	<opt2> = <STRING RESPONSE DATA> Queries the mainframe information including model and serial number.
Example	> :SYSTem:UNIT?1 < MP1800A, 6201234568, 1.00.00, 1.00.00, OPT301, 1.00.00, 1.00.00 0
Compatibility	Incompatible with existing models.

### :SYSTem:MODule? <numeric>

Parameter	<numeric> = <NR1 NUMERIC PROGRAM DATA> 1 to 6 Slot
Response	1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A "<slot>" = <module>, <serial>, <fpga1>, <fpga2>, <boot>, <application>, <opt> <module> = <STRING RESPONSE DATA> XXXXXXXXXX Module name (e.g.,: MU181020A) See Table 7.1.1-2 "Option character correspondence table".
	<b>Note:</b> NONE is output if no module is installed. For a module that uses two slots, only the slot with the greater number is valid.
	<serial> = <STRING RESPONSE DATA> XXXXXXXXXX 0000000000 to 9999999999 Serial number
	<b>Note:</b> "-----" is output if no module is installed. For a module that uses two slots, only the slot with the greater number is valid.
	<fpga1>, <fpga2> = <STRING RESPONSE DATA> XXXX.XX.XX 1.00.00 to 9999.99.99 FPGA version
	<boot> = <STRING RESPONSE DATA> XXXX.XX.XX 1.00.00 to 9999.99.99 Logic Boot version
	<b>Note:</b> "-----" is output if Logic Boot is not installed. For a module that uses two slots, only the slot with the greater number is valid.

<application> = <STRING RESPONSE DATA>  
 XXXX.XX.XX            1.00.00 to 9999.99.99  
                          Logic Application version

**Note:**

"-----" is output if Logic Application is not installed.  
 For a module that uses two slots, only the slot with the greater number is valid.

<opt> = <STRING RESPONSE DATA>  
 XXXXXX/XXXXX        Option number  
                          OPTXXX: For MP1800A/MT1810A

**Note:**

Outputs the numbers for all installed options.  
 NONE is output if no option is installed.  
 For a module that uses two slots, only the slot with the greater number is valid.  
 The option names of the MU181020B-003 and MU181040B-003 are not output.

Function	Queries the module information on the specified slot.
Example	To query the module information on Slot 3: > :SYSTem:MODUle? 3 < MU181020A, 6201234568, 1.00.00, -----, 1.00.00, 1.00.00, OPT002, OPT211, OPT220,
Compatibility	Incompatible with existing models.

**:SYSTem:DISPlay:RESult <boolean>**

---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> OFF or 0        Drawing Processing OFF ON or 1        Drawing Processing ON (default)
Function	Sets measured results drawing processing ON/OFF
Example	Set measured results drawing processing to OFF > :SYSTem:DISPlay:RESult OFF
Compatibility	Incompatible with existing models.
Remarks	When measured results drawing processing is set to OFF, a dialog indicating drawing processing is stopped is displayed. Issue the command to set drawing processing to ON or press the Remote button to restart measured results drawing processing.



**:SYSTem:DISPlay:RESult?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 Drawing Processing OFF 1 Drawing Processing ON (default)
Function	Sets drawing processing ON/OFF
Example	> :SYSTem:DISPlay:RESult? < 0
Compatibility	Incompatible with existing models.

**:DISPlay:ACTive <unit>,<slot>[,<tab>]**

Parameter	<unit> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4 Mainframe No.1 to 4 When installing the MT1810A, the mainframe No. is specified. When using the MP1800A, No.1 is fixed. <slot> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 6 Slot No.1 to 6 When using the MP1800A, the slot No. is 1 to 6. When using the MT1810A, the slot No. is 1 to 4. [<tab>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to X Tab IDNo.1 to X When [,<tab>] is omitted, 1 is specified. Tab ID is set to No.1 at the left side dialog, and then the tab ID No. is set to 2, 3, 4...toward the right side. The maximum number (X) of the tab ID varies depending on the module options.
Function	Displays the specified module screen to the front. <b>Note:</b> When the screen processing for measurement result is Off, this function cannot be used. If using this function, set the screen processing to On using the :SYSTem:DISPlay:RESult .
Example	To display the Pattern tab of the MU181020A module: (when installing the MU181020A in the unit1 slot1) > :DISPlay:ACTive 1,1,2
Compatibility	Incompatible with existing models.

## 7.1.2 Command related to File menu

**Table 7.1.2-1 File menu setting commands**

Setting Items	Commands
Quick Open	:SYSTem:MMEMory:QRECall
Quick Save	:SYSTem:MMEMory:QSTore
Open	:SYSTem:MMEMory:RECall
Save	:SYSTem:MMEMory:STORe
Screen Copy Execute	:SYSTem:PRINt:COPIY
Screen Copy Setup	:SYSTem:PRINt:COPIYsetup:SET
	:SYSTem:PRINt:COPIYsetup:SET?
Print	:SYSTem:PRINt:EALarm
Printer Setup	:SYSTem:PRINt:PRINter:SET
	:SYSTem:PRINt:PRINter:SET?
Combination Setting	:SYSTem:CONDition:COMBination?
	:COMBination:OPERation:SETTing
	:COMBination:OPERation:SETTing?
	:COMBination:OPERation:ABILity:CHSYnc?
	:COMBination:OPERation:CHSetting
	:COMBination:OPERation:ABILity:MUXChsync?
	:COMBination:OPERation:MUXChsync
	:COMBination:OPERation:MUXChsync?
	:COMBination:OPERation:ABILity:COMBination?
	:COMBination:OPERation:USYNcout
:COMBination:OPERation:USYNcout?	
Initialize	:SYSTem:MEMory:INITialize

**:SYSTem:MMEMory:QRECall <file\_name>**


---

Parameter	<file_name> = <STRING PROGRAM DATA> "<drv>:\[<dir>]<file>" <drv> = C,D,E,F <dir> = <dir1>\<dir2>\... (Omitted for the root directory) <file> = File name
Function	Opens all setting data.
Example	To read all setting files from the specified save destination. <pre>&gt; :SYSTem:MMEMory:QRECall "C:\Test\example"</pre>
Compatibility	Commands are compatible with the MP1632C. Parameters are incompatible.

**:SYSTem:MMEMory:QSTore <file\_name>,<comment>**


---

Parameter	<file_name> = <STRING PROGRAM DATA> "<drv>:\[<dir>]<file>" <drv> = C,D,E,F <dir> = <dir1>\<dir2>\...(Omitted for the root directory) <file> = File name <comment> = <STRING PROGRAM DATA> "XXXXXX..." Specify a comment of a character string within 60 characters into the file.
Function	Executes "Quick Save". <b>Note:</b> The settings will not be read from the saved file if the file name is changed.
Example	To specify save destination for all setting files and save them with a comment and measurement result data: <pre>&gt; :SYSTem:MMEMory:QSTore "C:\Test\example", "setup all"</pre>
Compatibility	Commands are compatible with the MP1632C. Parameters are incompatible.

**:SYSTem:MMEMory:RECall <file\_name>,<module>,<data\_type>**

---

Parameter	<p>&lt;file_name&gt; = &lt;STRING PROGRAM DATA&gt;                  "&lt;drv&gt;:\[&lt;dir&gt;]&lt;file&gt;"                  &lt;drv&gt; = C, D, E, F                  &lt;dir&gt; = &lt;dir1&gt;\&lt;dir2&gt;\... (Omitted for the root directory)                  &lt;file&gt; = File name (Extension: ".CND")                  &lt;module&gt; = &lt;STRING PROGRAM DATA&gt;                  "&lt;unit&gt;:&lt;slot&gt;:&lt;port&gt;:&lt;module&gt;"                  &lt;unit&gt; = 1, 2, 3, 4                  &lt;slot&gt; = 1, 2, 3, 4, ..., 6                  &lt;port&gt; = 1                  &lt;module&gt; = Module model name                  &lt;data_type&gt; = &lt;CHARACTER PROGRAM DATA&gt;</p> <table border="0"> <tr><td>PPG</td><td>PPG Setup</td></tr> <tr><td>ED</td><td>ED Setup</td></tr> <tr><td>SYN</td><td>Synthesizer Setup</td></tr> <tr><td>XFP</td><td>XFP Setup</td></tr> <tr><td>SFP</td><td>SFP Setup</td></tr> <tr><td>CAP</td><td>Capture Result</td></tr> <tr><td>OTX</td><td>Transmitter Setup</td></tr> <tr><td>MX1</td><td>MUX Setup</td></tr> <tr><td>MX2</td><td>MUX Setup</td></tr> <tr><td>DX1</td><td>DEMUX Setup</td></tr> <tr><td>DX2</td><td>DEMUX Setup</td></tr> </table>	PPG	PPG Setup	ED	ED Setup	SYN	Synthesizer Setup	XFP	XFP Setup	SFP	SFP Setup	CAP	Capture Result	OTX	Transmitter Setup	MX1	MUX Setup	MX2	MUX Setup	DX1	DEMUX Setup	DX2	DEMUX Setup
PPG	PPG Setup																						
ED	ED Setup																						
SYN	Synthesizer Setup																						
XFP	XFP Setup																						
SFP	SFP Setup																						
CAP	Capture Result																						
OTX	Transmitter Setup																						
MX1	MUX Setup																						
MX2	MUX Setup																						
DX1	DEMUX Setup																						
DX2	DEMUX Setup																						
Function	Opens module settings and result data.																						
Example	To read a file for the ED module: > :SYSTem:MMEMory:RECall "C:\Test\example", "1:3:1 MU181040A",ED																						
Compatibility	Compatible with the MP1632C1 and MP1776A commands Parameters are incompatible.																						

## :SYSTem:MMEMory:STORe <file\_name>,<module>,<data\_type>,<file\_type>

Parameter	<p>&lt;file_name&gt; = &lt;STRING PROGRAM DATA&gt;  "&lt;drv&gt;:\[&lt;dir&gt;]&lt;file&gt;"  &lt;drv&gt; = C, D, E, F  &lt;dir&gt; = &lt;dir1&gt;\&lt;dir2&gt;\... (Omitted for the root directory)  &lt;file&gt; = File name  &lt;module&gt; = &lt;STRING PROGRAM DATA&gt;  "&lt;unit&gt;:&lt;slot&gt;:&lt;port&gt;:&lt;module&gt;"  &lt;unit&gt; = 1, 2, 3, 4  &lt;slot&gt; = 1, 2, 3, 4, ..., 6  &lt;port&gt; = 1  &lt;module&gt; = Module model name  &lt;data_type&gt; = &lt;CHARACTER PROGRAM DATA&gt;</p> <table border="0"> <tr><td>PPG</td><td>PPG Setup</td></tr> <tr><td>ED</td><td>ED Setup</td></tr> <tr><td>SYN</td><td>Synthesizer Setup</td></tr> <tr><td>XFP</td><td>XFP Setup</td></tr> <tr><td>SFP</td><td>SFP Setup</td></tr> <tr><td>ERA</td><td>Error/Alarm Result</td></tr> <tr><td>HST</td><td>Histogram Result</td></tr> <tr><td>CAP</td><td>Capture Result</td></tr> <tr><td>LOG</td><td>Logging Result</td></tr> <tr><td>OTX</td><td>Transmitter Setup</td></tr> <tr><td>MX1</td><td>MUX Setup</td></tr> <tr><td>MX2</td><td>MUX Setup</td></tr> <tr><td>DX1</td><td>DEMUX Setup</td></tr> <tr><td>DX2</td><td>DEMUX Setup</td></tr> <tr><td>DER</td><td>DEMUX Error/Alarm Result</td></tr> </table> <p>&lt;file_type&gt; = &lt;CHARACTER PROGRAM DATA&gt;</p> <table border="0"> <tr><td>BIN</td><td>Binary File</td></tr> <tr><td>CSV</td><td>CSV File</td></tr> <tr><td>TXT</td><td>Text File</td></tr> </table>	PPG	PPG Setup	ED	ED Setup	SYN	Synthesizer Setup	XFP	XFP Setup	SFP	SFP Setup	ERA	Error/Alarm Result	HST	Histogram Result	CAP	Capture Result	LOG	Logging Result	OTX	Transmitter Setup	MX1	MUX Setup	MX2	MUX Setup	DX1	DEMUX Setup	DX2	DEMUX Setup	DER	DEMUX Error/Alarm Result	BIN	Binary File	CSV	CSV File	TXT	Text File
PPG	PPG Setup																																				
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XFP	XFP Setup																																				
SFP	SFP Setup																																				
ERA	Error/Alarm Result																																				
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CAP	Capture Result																																				
LOG	Logging Result																																				
OTX	Transmitter Setup																																				
MX1	MUX Setup																																				
MX2	MUX Setup																																				
DX1	DEMUX Setup																																				
DX2	DEMUX Setup																																				
DER	DEMUX Error/Alarm Result																																				
BIN	Binary File																																				
CSV	CSV File																																				
TXT	Text File																																				
Function	<p>Saves the setting and measurement result data for a specified module.</p> <p><b>Note:</b></p> <p style="padding-left: 40px;">The settings will not be read from the saved file if the file name is changed.</p>																																				
Example	<p>To save the setting file for the ED module:</p> <pre>&gt; :SYSTem:MMEMory:STORe "C:\Test\example", "1:3:1 MU181040A",ED,BIN</pre> <p>To save the capture result file:</p> <pre>&gt; :SYSTem:MMEMory:STORe "C:\Test\example", "1:3:1 MU181040A",CAP,BIN</pre>																																				

Compatibility                      Compatible with the MP1632C and MP1776A commands.  
Parameters are incompatible.

### **:SYSTem:PRINT:COPY**

---

Function                            Takes a screen shot.  
Example                             > :SYSTem:PRINT:COPY  
Compatibility                      Compatible with the MP1632C and MP1776A.

### **:SYSTem:PRINT:COPYsetup:SET <save\_type>,<output>,<save\_to>**

---

Parameter                         <save\_type> = <CHARACTER PROGRAM DATA>  
BMP                                Bitmap format  
PNG                                PNG format  
JPG                                JPG format  
<output> = <CHARACTER PROGRAM DATA>  
FILE                                Output to a file.  
PRINter                            Output to the printer.  
<save\_to> = <STRING PROGRAM DATA>  
"<drv>:\[<dir>]"  
<drv> = C,D,E,F  
<dir> = <dir1>\<dir2>\...(Omitted for the root directory)  
Function                            Sets the extension, output destination, and save destination of the screen  
shot.  
Example                             To output the screen shot to the specified file in the bitmap format:  
> :SYSTem:PRINT:COPYsetup:SET BMP,FILE, "C:\Test\example"  
Compatibility                      Incompatible with existing models.

**:SYSTem:PRINT:COPYsetup:SET?**

Response	<pre> &lt;save_type&gt; = &lt;CHARACTER RESPONSE DATA&gt; BMP          Bitmap format PNG          PNG format JPG          JPG format &lt;output&gt; = &lt;CHARACTER RESPONSE DATA&gt; FILE          Output to a file. PRINter      Output to the printer. &lt;save_to&gt; = &lt;STRING RESPONSE DATA&gt; "&lt;drv&gt;:\[&lt;dir&gt;]" &lt;drv&gt; = C,D,E,F &lt;dir&gt; = &lt;dir1&gt;\&lt;dir2&gt;\...(Omitted for the root directory) </pre>
Function	Queries the extension, output destination, and save destination settings of the screen shot.
Example	<pre> &gt; :SYSTem:PRINT:COPYsetup:SET? &lt; BMP, FILE, "C:\Test\example" </pre>
Compatibility	Incompatible with existing models.

**:SYSTem:PRINT:EALarm <list>,<module>**

Response	<pre> &lt;list&gt; = &lt;CHARACTER PROGRAM DATA&gt; EAR          Error/Alarm Result HST          Histogram Result LOG          Logging Result &lt;module&gt; = &lt;STRING PROGRAM DATA&gt; "&lt;unit&gt;:&lt;slot&gt;:&lt;port&gt;:&lt;module&gt;" &lt;unit&gt; = 1, 2, 3, 4 &lt;slot&gt; = 1, 2, 3, 4, ..., 6 &lt;port&gt; = 1, 2, ... &lt;module&gt; = Module model name </pre>
Function	Prints the Error/Alarm, histogram, or logging measurement results. The printing range for the histogram and logging measurement results can be specified by the time.
Example	<pre> To print the histogram measurement result in the specified range: &gt; :SYSTem:PRINT:EALarm HST </pre>
Compatibility	Compatible with the MP1632C and MP1776A commands. Parameters are incompatible.

**:SYSTem:PRINT:PRINter:SET <printer>,<direction>**

---

Parameter	<printer> = <STRING PROGRAM DATA> "XXXXXXX..." Printer name <direction> = <CHARACTER PROGRAM DATA> VER Vertical HOR Horizontal
Function	Sets the printer and print direction.
Example	> :SYSTem:PRINT:PRINter:SET "printer",VER
Compatibility	Incompatible with existing models.

**:SYSTem:PRINT:PRINter:SET?**

---

Response	<printer> = <STRING RESPONSE DATA> "XXXXXXX..." Printer name <direction> = <CHARACTER RESPONSE DATA> VER Vertical HOR Horizontal
Function	Queries the default printer and print direction.
Example	> :SYSTem:PRINT:PRINter:SET? < "printer",VER
Compatibility	Incompatible with existing models.



**:SYSTem:CONDition:COMBination?**

Parameter	<p>"&lt;slot&gt;,&lt;module&gt;,&lt;status&gt;" = &lt;STRING RESPONSE DATA&gt;          &lt;slot&gt; = &lt;STRING RESPONSE DATA&gt;          1 to 6 Slot number          XX-XX Slot numbers for which combined modules are inserted          Example: 1-4: 4-CH combination          &lt;module&gt; = &lt;STRING RESPONSE DATA&gt;          XXXXXXXXX Module model name Example: MU181020A          &lt;status&gt; = &lt;STRING RESPONSE DATA&gt;          1 Independent          2 2-CH combination          4 4-CH combination          0 Invalid PPG or ED module</p>
Function	<p>Queries the combination status of the modules inserted into the mainframe slots and the valid/invalid status of a specified PPG or ED module.</p>
Example	<p>To query the combination status of the modules inserted into the MP1800A, in the configuration where six PPG modules are inserted and 4-CH combination is configured:</p> <pre>&gt; :SYSTem:CONDition:COMBination? &lt;"1-4,MU181020A,4", "5,MU181020A,0", "6,MU181020A,0"</pre> <p>To query the combination status of the modules inserted into the MP1800A, in the configuration where three PPG modules are inserted:</p> <pre>&gt; :SYSTem:CONDition:COMBination? &lt;"1,MU181020A,1", "5,MU181020A,1", "6,MU181020A,1"</pre>
Compatibility	<p>Incompatible with existing models.</p>

**:COMBination:OPERation:SETTing <configuration>[,<unit>]**

---

Parameter	<configuration> = <NR1 NUMERIC RESPONSE DATA>
	0 Independent
	21 2 Ch PPG Combination
	22 2 Ch ED Combination
	23 2 Ch PPG/ED Combination
	41 4 Ch PPG Combination
	42 4 Ch ED Combination
	71 25G x 2 Ch PPG Combination
	72 25G x 2 Ch ED Combination
	[<unit>] = <DECIMAL NUMERIC PROGRAM DATA>
	1 to 4 Mainframe Nos. 1 to 4
	When using two or more MT1810A units in serial connection, specify the mainframe number.
	Can be omitted. Mainframe No. 1 is specified when omitted.
Function	Sets the combination setting for the specified unit, from Combination or Independent.
Example	To set the combination setting of Unit 3 to 4-ch PPG combination: > :COMBination:OPERation:SETTing 41,3
Compatibility	Incompatible with existing models.

**:COMBination:OPERation:SETTing? <slot>[,<unit>]**

Parameter	<p>&lt;slot&gt; = &lt;CHARACTER PROGRAM DATA&gt;  SLOT1 to SLOT6      Slot No.1 to 6  ALL All modules (units)  When using the MP1800A: 1 to 6, when using the MT1810A: 1 to 4</p> <p>[&lt;unit&gt;] = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;  1 to 4                      Mainframe Nos. 1 to 4  When using two or more MT1810A units in serial connection, specify the mainframe number.  Can be omitted. Mainframe No. 1 is specified when omitted.</p>																		
Response	<p>&lt;numeric&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;</p> <table border="0"> <tr><td>0</td><td>Independent</td></tr> <tr><td>1</td><td>Channel Synchronization</td></tr> <tr><td>21</td><td>2 Ch PPG Combination</td></tr> <tr><td>22</td><td>2 Ch ED Combination</td></tr> <tr><td>23</td><td>2 Ch PPG/ED Combination</td></tr> <tr><td>41</td><td>4 Ch PPG Combination</td></tr> <tr><td>42</td><td>4 Ch ED Combination</td></tr> <tr><td>71</td><td>25G x 2 Ch PPG Combination</td></tr> <tr><td>72</td><td>25G x 2 Ch ED Combination</td></tr> </table>	0	Independent	1	Channel Synchronization	21	2 Ch PPG Combination	22	2 Ch ED Combination	23	2 Ch PPG/ED Combination	41	4 Ch PPG Combination	42	4 Ch ED Combination	71	25G x 2 Ch PPG Combination	72	25G x 2 Ch ED Combination
0	Independent																		
1	Channel Synchronization																		
21	2 Ch PPG Combination																		
22	2 Ch ED Combination																		
23	2 Ch PPG/ED Combination																		
41	4 Ch PPG Combination																		
42	4 Ch ED Combination																		
71	25G x 2 Ch PPG Combination																		
72	25G x 2 Ch ED Combination																		
Function	Queries the combination setting of the specified slot.																		
Example	<p>To query the combination setting of Unit 1:  &gt; :COMBination:OPERation:SETTing? ALL  &lt; 0</p> <p>To query the combination setting of Slot 3 in Unit 2:  &gt; :COMBination:OPERation:SETTing? SLOT3,2  &lt; 41</p> <p>To query the combination setting of Unit 3:  &gt; :COMBination:OPERation:SETTing? ALL,3  &lt; 0</p>																		
Compatibility	Incompatible with existing models.																		

**:COMBination:OPERation:ABILity:CHSYnc? [<unit>]**

---

Parameter	[<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4 Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number. Can be omitted. Mainframe No. 1 is specified when omitted.
Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 to 64 Total number of PPGs that can configure channel synchronization (decimal) Available bits: 0 No PPG that can configure channel synchronization 1 (Bit 0) PPG in Slot 1 2 (Bit 1) PPG in Slot 2 4 (Bit 2) PPG in Slot 3 8 (Bit 3) PPG in Slot 4 16 (Bit 4) PPG in Slot 5 32 (Bit 5) PPG in Slot 6
Function	Queries the slot where PPG that can configure channel synchronization combination is inserted.
Example	To query the slot in Unit 3 where PPG that can configure channel synchronization is inserted: > :COMBination:OPERation:ABILity:CHSYnc? 3 < 7
Compatibility	Incompatible with existing models.

**:COMBination:OPERation:CHSetting <configuration>[,<unit>]**

Parameter	<p>&lt;configuration&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;  0 to 64 Total number of PPGs that can configure channel synchronization (decimal)  Available bits:  2 (Bit 1) PPG in Slot 2  4 (Bit 2) PPG in Slot 3  8 (Bit 3) PPG in Slot 4  16 (Bit 4) PPG in Slot 5  32 (Bit 5) PPG in Slot 6  &lt;unit&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;  1 to 4 Mainframe Nos. 1 to 4  When using two or more MT1810A units in serial connection, specify the mainframe number.  Can be omitted. Mainframe No. 1 is specified when omitted.</p>
Function	Specify the slot where the PPG for which channel synchronization is to be set is inserted.
Example	To set channel synchronization for the PPGs in Slots 1 through 4 of Unit 3: > :COMBination:OPERation:CHSetting 14
Compatibility	Incompatible with existing models.

**:COMBination:OPERation:ABILity:MUXChsync?**

Response	<p>&lt;numeric&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;  0 25G Channel Synchronization disabled  1 25G Channel Synchronization enabled</p>
Function	Queries whether 25G Channel Synchronization setting supported
Example	> :COMBination:OPERation:ABILity:MUXChsync? < 1
Compatibility	Incompatible with existing models.

**:COMBination:OPERation:MUXChsync**

Function	Sets 25G Channel Synchronization
Example	> :COMBination:OPERation:MUXChsync
Compatibility	Incompatible with existing models.

### **:COMBination:OPERation:MUXChsync?**

---

Response	<boolean> = <NR1 NUMERIC RESPONSE DATA> 1                   25G Channel Synchronization 0                   Non-25G Channel Synchronization
Function	Queries whether 25G Channel Synchronization configured
Example	> :COMBination:OPERation:MUXChsync? < 1
Compatibility	Incompatible with existing models.

### **:COMBination:OPERation:ABILity:COMBination? [<unit>]**

---

Parameter	[<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4           Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number. Can be omitted. Mainframe No. 1 is specified when omitted.
Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0                   Independent 21                  2 Ch PPG Combination 22                  2 Ch ED Combination 23                  2 Ch PPG/ED Combination 41                  4 Ch PPG Combination 42                  4 Ch ED Combination 71                  25G x 2 Ch PPG Combination 72                  25G x 2 Ch ED Combination
Function	Queries the available combination configuration.
Example	To query the combination configuration available for Unit 1: > :COMBination:OPERation:ABILity:COMBination? < 41
Compatibility	Incompatible with existing models.

### **:COMBination:OPERation:USYNcout <boolean>**

---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> 0                   Unit Sync OFF 1                   Unit Sync ON
Function	Sets the Unit Sync On/Off
Example	To set the Unit Sync to On > :COMBination:OPERation:USYNcout 1
Compatibility	Incompatible with existing models.

**:COMBination:OPERation:USYNcout?**

---

Parameter	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	0 Unit Sync OFF
	1 Unit Sync ON
Function	To query the Unit Sync On/Off
Example	> :COMBination:OPERation:USYNcout? < 1
Compatibility	Incompatible with existing models.

**:SYSTem:MEMory:INITialize**

---

Function	Initializes the internal setting data to the initial settings at factory shipment.
Example	> :SYSTem:MEMory:INITialize
Compatibility	Compatible with the MP1632C and MP1776A.

### 7.1.3 Common function button



Figure 7.1.3-1 Common function button

Table 7.1.3-1 Common function button setting commands

Setting Items	Commands
Output ON/OFF	:SOURce:OUTPut:ASET
	:SOURce:OUTPut:ASET?
Error Addition ON/OFF	:SOURce:PATtern:EADdition:ASET
	:SOURce:PATtern:EADdition:ASET?
Single Error Addition	:SOURce:PATtern:EADdition:ASingle
Meas. Start	:SENSe:MEASure:ASTRt
Meas. Stop	:SENSe:MEASure:ASTP
(Query for measurement status)	:SENSe:MEASure:ASTate?
Open	Refer to Chapter 7.1.2 "Command related to File menu."
Save	Refer to Chapter 7.1.2 "Command related to File menu."
Print	Refer to Chapter 7.1.2 "Command related to File menu."
Error ON/OFF	:SYSTem:BEEPer:ERRor:SET
	:SYSTem:BEEPer:ERRor:SET?
Alarm ON/OFF	:SYSTem:BEEPer:ALARm:SET
	:SYSTem:BEEPer:ALARm:SET?
System Error ON/OFF	:SYSTem:BEEPer:SYSTem:SET
	:SYSTem:BEEPer:SYSTem:SET?
System Error	:SYSTem:BEEPer:SYSTem:TYPE
	:SYSTem:BEEPer:SYSTem:TYPE?
Combination Setting	Refer to Chapter 7.1.2 "Command related to File menu."
Unit Sync Output	:SOURce:PATtern:USYNcout

#### **:SOURce:OUTPut:ASET <boolean>**

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> OFF or 0      Output OFF ON or 1      Output ON
Function	Sets Data and Clock outputs of optical output and PPG ON or OFF.
Example	To set Data and Clock outputs of PPG to ON: > :SOURce:OUTPut:ASET ON
Compatibility	Incompatible with existing models.



**:SOURce:OUTPut:ASET?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0            Output OFF 1            Output ON
Function	Queries the ON/OFF state for Data and Clock outputs of optical output and PPG.
Example	> :SOURce:OUTPut:ASET? < 1
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:EADDITION:ASET <boolean>**


---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> OFF or 0     Error addition OFF ON or 1     Error addition ON
Function	Sets error addition for all valid modules ON/OFF.
Example	To set error addition for all valid modules to ON: > :SOURce:PATtern:EADDITION:ASET ON
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:EADDITION:ASET?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0            Error addition OFF 1            Error addition ON
Function	Queries the error addition ON/OFF state for all valid modules.
Example	> :SOURce:PATtern:EADDITION:ASET? < 1
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:EADDITION:ASINgle**


---

Function	Adds a single error for all valid modules.
Example	> :SOURce:PATtern:EADDITION:ASINgle
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:ASTRt**


---

Function	Starts measurement for all modules.
Example	> :SENSe:MEASure:ASTRt
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:ASTP**

---

Function	Stops measurement for all modules.
Example	> :SENSe:MEASure:ASTP
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:AState?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 Measurement stops for all modules. 1 During measurement <b>Note:</b> If any module is being measured, "1 (During measurement)" is returned.
Function	Queries the measurement state for all modules.
Example	> :SENSe:MEASure:AState? < 0
Compatibility	Incompatible with existing models.

### **:SYSTem:BEEPer:ERRor:SET <boolean>**

---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> OFF or 0 Buzzer OFF ON or 1 Buzzer ON
Function	Sets buzzer at error occurrence ON/OFF.
Example	To set buzzer at error occurrence ON: > :SYSTem:BEEPer:ERRor:SET ON
Compatibility	Compatible with the MP1632C and MP1776A.

### **:SYSTem:BEEPer:ERRor:SET?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 Buzzer OFF 1 Buzzer ON
Function	Queries the buzzer ON/OFF state at error occurrence.
Example	To query the buzzer ON/OFF state at error occurrence: > :SYSTem:BEEPer:ERRor:SET? < 1
Compatibility	Compatible with the MP1632C and MP1776A.

**:SYSTem:BEEPer:ALARm:SET <boolean>**


---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> OFF or 0      Buzzer OFF ON or 1      Buzzer ON
Function	Sets buzzer at alarm occurrence ON/OFF.
Example	To set buzzer at alarm occurrence OFF: > :SYSTem:BEEPer:ALARm:SET OFF
Compatibility	Compatible with the MP1632C and MP1776A.

**:SYSTem:BEEPer:ALARm:SET?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0              Buzzer OFF 1              Buzzer ON
Function	Queries the buzzer ON/OFF state at alarm occurrence.
Example	> :SYSTem:BEEPer:ALARm:SET? < 0
Compatibility	Compatible with the MP1632C and MP1776A.

**:SYSTem:BEEPer:SYSTem:SET <boolean>**


---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> OFF or 0      Buzzer OFF ON or 1      Buzzer ON
Function	Sets buzzer at system error occurrence ON/OFF.
Example	To set buzzer at system error occurrence ON: > :SYSTem:BEEPer:SYSTem:SET ON
Compatibility	Compatible with the MP1632C and MP1776A.

**:SYSTem:BEEPer:SYSTem:SET?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0              Buzzer OFF 1              Buzzer ON
Function	Queries the buzzer ON/OFF state at system error occurrence.
Example	> :SYSTem:BEEPer:SYSTem:SET? < 1
Compatibility	Compatible with the MP1632C and MP1776A.

**:SYSTem:BEEPer:SYSTem:TYPE <type>,<boolean>**

---

Parameter	<type> = <CHARACTER PROGRAM DATA> PUNLock PLL unlock FAN FAN TEMPerature Temperature ALL Selects all system errors <boolean> = <BOOLEAN PROGRAM DATA> OFF or 0 ON or 1
Function	Sets system error buzzer for the target item ON/OFF.
Example	To set system error buzzer for "Temperature" ON: > :SYSTem:BEEPer:SYSTem:TYPE TEMPerature,ON
Compatibility	Partially compatible with the MP1632C.

**:SYSTem:BEEPer:SYSTem:TYPE?**

---

Response	<type> = <CHARACTER RESPONSE DATA> PUNL, FAN, TEMP, ALL XXX,XXX, Errors for which buzzer is set to ON are delimited with commas (,) and returned. NONE Buzzer is set to OFF for all items.
Function	Queries the ON/OFF state of system error buzzer for target items.
Example	To query the ON/OFF state of system error buzzer for target items: > :SYSTem:BEEPer:SYSTem:TYPE? < PUNL, TEMP
Compatibility	Compatible with the MP1632C.

**:SOURce:PATtern:USYNcout**

---

Parameter	None
Function	Outputs the timing signal to synchronize the pattern between multiple devices.
Example	> :SOURce:PATtern:USYNcout
Compatibility	Incompatible with existing models.

### 7.1.4 Auto Search

This chapter describes the commands that are used after Auto Search is set by the :SYSTEM:CFUNCTION command.

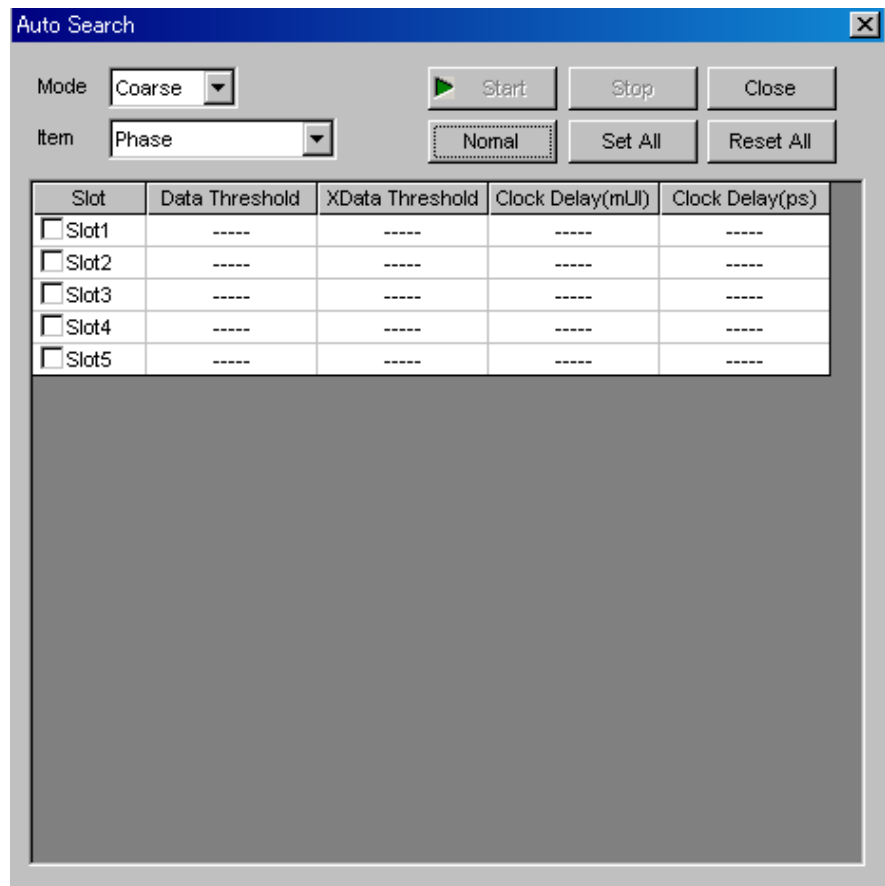


Figure 7.1.4-1 Auto Search setting screen

Table 7.1.4-1 Auto Search setting commands

Setting Items	Commands
Mode	:SENSE:MEASURE:ASEARCH:SMODE
	:SENSE:MEASURE:ASEARCH:SMODE?
Item	:SENSE:MEASURE:ASEARCH:MODE
	:SENSE:MEASURE:ASEARCH:MODE?
Start	:SENSE:MEASURE:ASEARCH:START
Stop	:SENSE:MEASURE:ASEARCH:STOP
No label (Query for function state)	:SENSE:MEASURE:ASEARCH:STATE?
Set All	:SENSE:MEASURE:ASEARCH:SLASET
Reset All	:SENSE:MEASURE:ASEARCH:SLARESET
Slot Select	:SENSE:MEASURE:ASEARCH:SEL SLOT
	:SENSE:MEASURE:ASEARCH:SEL SLOT?
No label (Query for slot state)	:SENSE:MEASURE:ASEARCH:SLOT?
No label (Query for Auto Search result)	:CALCULATE:DATA:ASEARCH?

**:SENSe:MEASure:ASEarch:SMODE <mode>**

---

Parameter	<mode> = <CHARACTER PROGRAM DATA> FINE            Fine mode COARSe        Coarse mode
Function	Sets the Auto Search mode.
Example	To set the Fine mode: > :SENSe:MEASure:ASEarch:SMODE FINE
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:ASEarch:SMODE?**

---

Response	<mode> = <CHARACTER RESPONSE DATA> FINE, COAR
Function	Queries the Auto Search mode.
Example	> :SENSe:MEASure:ASEarch:SMODE? < FINE
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:ASEarch:MODE <mode>**

---

Parameter	<mode> = <CHARACTER PROGRAM DATA> PTHReshold    Phase & Threshold THReshold     Threshold PHASe          Phase
Function	Sets the execution item of Auto Search.
Example	To set the execution item of Auto Search to Phase & Threshold: > :SENSe:MEASure:ASEarch:MODE PTHReshold
Compatibility	Compatible with the MP1632C.

**:SENSe:MEASure:ASEarch:MODE?**

---

Response	<mode> = <CHARACTER RESPONSE DATA> PTHR            Phase & Threshold THR             Threshold PHAS            Phase
Function	Queries the execution item of Auto Search.
Example	> :SENSe:MEASure:ASEarch:MODE? < PTHR
Compatibility	Compatible with the MP1632C.

**:SENSe:MEASure:ASEarch:START**


---

Function	Starts the Auto Search function
Example	> :SENSe:MEASure:ASEarch:START
Compatibility	Compatible with the MP1632C.

**:SENSe:MEASure:ASEarch:STOP**


---

Function	Stops the Auto Search function.
Example	> :SENSe:MEASure:ASEarch:STOP
Compatibility	Compatible with the MP1632C.

**:SENSe:MEASure:ASEarch:STATE?**


---

Response	<boolean> = <NR1 NUMERIC RESPONSE DATA> 1 Started 0 Stopped -1 Auto Search failure (when any slot has failed)
Function	Queries the Auto Search function state.
Example	> :SENSe:MEASure:ASEarch:STATE? < 1
Compatibility	Compatible with the MP1632C.

**:SENSe:MEASure:ASEarch:SLASet**


---

Function	Sets Auto Search execution for all slots to ON.
Example	> :SENSe:MEASure:ASEarch:SLASet
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:ASEarch:SLAReset**


---

Function	Sets Auto Search execution for all slots to OFF.
Example	> :SENSe:MEASure:ASEarch:SLAReset
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:ASEarch:SELSlot <slot>,<boolean>[,<unit>]**

---

Parameter	<slot> = <CHARACTER PROGRAM DATA> SLOT1 to SLOT6      Slot Nos.1 to 6 When using the MP1800A: 1 to 6, when using the MT1810A: 1 to 4 <boolean> = <BOOLEAN PROGRAM DATA> ON, 1                      Auto Search ON OFF, 0                      Auto Search OFF [<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number. Can be omitted. Mainframe No. 1 is specified when omitted.
Function	Selects the slot for execution of Auto Search.
Example	To set Auto Search for Slot No.1 to ON: > :SENSe:MEASure:ASEarch:SELSlot SLOT1,ON
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:ASEarch:SELSlot? <slot>[,<unit>]**

---

Parameter	<slot> = <CHARACTER PROGRAM DATA> SLOT1 to SLOT6      Slot Nos.1 to 6 When using the MP1800A: 1 to 6, when using the MT1810A: 1 to 4 [<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number. Can be omitted. Mainframe No. 1 is specified when omitted.
Response	<boolean> = <NR1 NUMERIC RESPONSE DATA> 1                              ON 0                              OFF
Function	Queries the ON/OFF state of Auto Search for each slot.
Example	To query the ON/OFF state of Auto Search for Slot No.1: > :SENSe:MEASure:ASEarch:SELSlot? SLOT1 < 1
Compatibility	Incompatible with existing models.



**:SENSe:MEASure:ASEarch:SLOT? [<unit>]**

Parameter	<p>[&lt;unit&gt;] = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;  1 to 4                      Mainframe Nos. 1 to 4  When using two or more MT1810A units in serial connection, specify the mainframe number.  Can be omitted. Mainframe No. 1 is specified when omitted.</p>
Response	<p>&lt;slot&gt; = &lt;CHARACTER RESPONSE DATA&gt;  SLOT1 to SLOT6              Slot Nos.1 to 6  When using the MP1800A: 1 to 6, when using the MT1810A: 1 to 4  <b>Note:</b>     The above response returns all slots for which Auto Search can be executed by delimiting with commas (,).</p>
Function	Queries the slot for which Auto Search can be executed.
Example	<pre>&gt; :SENSe:MEASure:ASEarch:SLOT? &lt; SLOT1, SLOT2, SLOT6</pre>
Compatibility	Incompatible with existing models.

**:CALCulate:DATA:ASEarch? <slot>[,<unit>]**

Parameter	<p>&lt;slot&gt; = &lt;CHARACTER PROGRAM DATA&gt;                  SLOT1 to SLOT6      Slot Nos.1 to 6                  When using the MP1800A: 1 to 6, when using the MT1810A: 1 to 4</p> <p>[&lt;unit&gt;] = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  1 to 4                      Mainframe Nos. 1 to 4                  When using two or more MT1810A units in serial connection, specify the mainframe number.</p>
Response	<p>Can be omitted. Mainframe No. 1 is specified when omitted.</p> <p>&lt;data&gt;,&lt;xdata&gt;,&lt;delay&gt;,&lt;numeric1&gt;,&lt;numeric2&gt;,&lt;numeric3&gt;,&lt;numeric4&gt;                  &lt;data&gt;,&lt;xdata&gt;,&lt;delay&gt;, = &lt;STRING RESPONSE DATA&gt;                  "Done"                      Normal termination                  "Fail"                      Abnormal termination                  "----"                      Not executed</p> <p>&lt;numeric1&gt;,&lt;numeric2&gt; = &lt;NR2 NUMERIC RESPONSE DATA&gt;                  -3.500 to 3.300              -3.500 to 3.300 V/Step 0.001 V                  "----"                      Not executed                  "----"                      Abnormal termination</p> <p>&lt;numeric3&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;                  -1000 to 1000              -1000 to 1000 mUI/Step 1 mUI                  "----"                      Not executed                  "----"                      Abnormal termination</p> <p>&lt;numeric4&gt; = &lt;NR2 NUMERIC RESPONSE DATA&gt;                  -xxx.xx to xxx.xx              ps (converted from mUI)                  "----"                      Not executed                  "----"                      Abnormal termination</p>
Function	Queries the Auto Search execution result.
Example	<pre>&gt; :CALCulate:DATA:ASEarch? SLOT1 &lt; "Done", "Done", "Done", 1.000, 1.100, -500, 50.00 &lt; "Done", "Done", "----", 1.000, 1.100, 0, 0.00 (When not executed in the Phase direction)</pre>
Compatibility	Incompatible with existing models.

### 7.1.5 Auto Adjust

This chapter describes the commands that are used after Auto Adjust is set by the :SYSTem:CFUNction command.

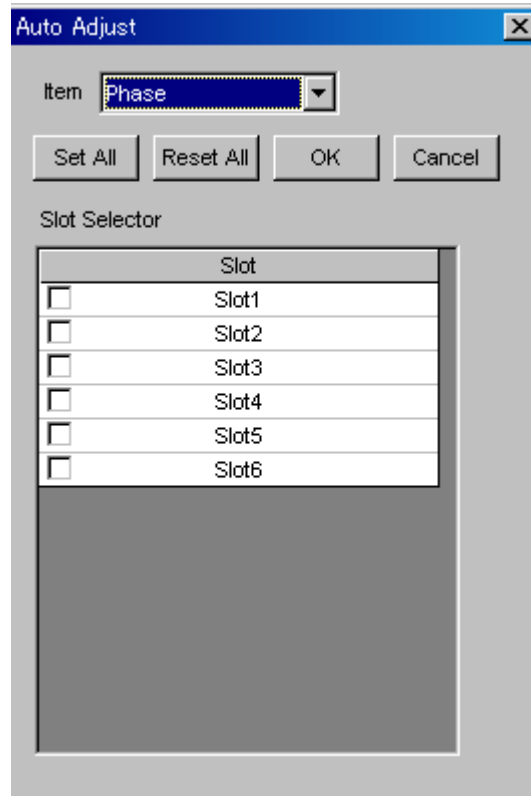


Figure 7.1.5-1 Auto Adjust setting screen

Table 7.1.5-1 Auto Adjust setting commands

Setting Items	Commands
Item	:SENSe:MEASure:AADJust:ITEM
	:SENSe:MEASure:AADJust:ITEM?
Start	:SENSe:MEASure:AADJust:STARt
Stop	:SENSe:MEASure:AADJust:STOP
No label (Query for function state)	:SENSe:MEASure:AADJust:STATe?
Slot Select	:SENSe:MEASure:AADJust:SELSlot
	:SENSe:MEASure:AADJust:SELSlot?
No label (Query for slot state)	:SENSe:MEASure:AADJust:SLOT?
Set All	:SENSe:MEASure:AADJust:SLASet
Reset All	:SENSe:MEASure:AADJust:SLAReset

### **:SENSe:MEASure:AADJust:ITEM <item>**

---

Parameter	<item> = <CHARACTER PROGRAM DATA>
	PTHReshold    Phase & Threshold:    Auto tracking in the voltage and phase directions
	THReshold    Threshold:    Auto tracking in the voltage direction
	PHASe    Phase:    Auto tracking in the phase direction
Function	Sets the execution item of Auto Adjust.
Example	To set the execution item of Auto Adjust to Phase & Threshold: > :SENSe:MEASure:AADJust:ITEM PTHReshold
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:AADJust:ITEM?**

---

Response	<item> = <CHARACTER RESPONSE DATA>
	PTHR    Phase & Threshold
	THR    Threshold
	PHAS    Phase
Function	Queries the execution item of Auto Adjust.
Example	> :SENSe:MEASure:AADJust:ITEM? < PTHR
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:AADJust:START**

---

Function	Starts the Auto Adjust function.
Example	> :SENSe:MEASure:AADJust:START
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:AADJust:STOP**

---

Function	Stops the Auto Adjust function.
Example	> :SENSe:MEASure:AADJust:STOP
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:AADJust:STATe?**

Response	<boolean> = <NR1 NUMERIC RESPONSE DATA> 1 Start 0 Stop
Function	Queries the Auto Adjust function state.
Example	> :SENSe:MEASure:AADJust:STATe? < 1
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:AADJust:SELSlot <slot>,<boolean>[,<unit>]**

Parameter	<slot> = <CHARACTER PROGRAM DATA> SLOT1 to SLOT6 Slot Nos.1 to 6 When using the MP1800A: 1 to 6, when using the MT1810A: 1 to 4 <boolean> = <BOOLEAN PROGRAM DATA> ON, 1 Auto Adjust ON OFF, 0 Auto Adjust OFF [<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4 Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number. Can be omitted. Mainframe No. 1 is specified when omitted.
Function	Selects the slot for which Auto Adjust is executed.
Example	To set Slot No.1 to Auto Adjust ON: > :SENSe:MEASure:AADJust:SELSlot SLOT1,ON
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:AADJust:SELSlot? <slot>[,<unit>]**

Parameter	<slot> = <CHARACTER PROGRAM DATA> SLOT1 to SLOT6 Slot Nos.1 to 6 When using the MP1800A: 1 to 6, when using the MT1810A: 1 to 4 [<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4 Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number. Can be omitted. Mainframe No. 1 is specified when omitted.
Response	<boolean> = <NR1 NUMERIC RESPONSE DATA> 1 ON 0 OFF
Function	Queries the Auto Adjust ON/OFF state for each slot.
Example	To query the Auto Adjust ON/OFF state for Slot No.1: > :SENSe:MEASure:AADJust:SELSlot? SLOT1

< 1

Compatibility Incompatible with existing models.

### **:SENSe:MEASure:AADJust:SLOT? [<unit>]**

---

Parameter	[<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4 Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number. Can be omitted. Mainframe No. 1 is specified when omitted.
Response	<slot> = <CHARACTER RESPONSE DATA> SLOT1 to SLOT6 Slot No.1 to 6 When using the MP1800A: 1 to 6, when using the MT1810A: 1 to 4 <b>Note:</b> The above response returns all slots for which Auto Adjust can be executed by delimiting with commas (,).
Function	Queries the slot for which Mainframe No.3 Auto Adjust can be executed.
Example	To query the slot for which Auto Adjust can be executed: > :SENSe:MEASure:AADJust:SLOT? 3 < SLOT1, SLOT2, SLOT6
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:AADJust:SLASet**

---

Function	Select all slots for Auto Adjust execution.
Example	> :SENSe:MEASure:AADJust:SLASet
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:AADJust:SLAReset**

---

Function	Deselect all slots for Auto Adjust execution.
Example	> :SENSe:MEASure:AADJust:SLAReset
Compatibility	Incompatible with existing models.

## 7.1.6 ED ALL

Table 7.1.6-1 ED ALL setting commands

Setting Items	Commands
Measurement result query in the case of Combination	:CALCulate:ADATa:EALarm?
Logging ON/OFF	:DISPlay:AREsult:LOGGing:ONOFF
	:DISPlay:AREsult:LOGGing:ONOFF?
Clear	:DISPlay:AREsult:LOGGing:CLEar
Condition	:DISPlay:AREsult:LOGGing:CONDition:ITEM
	:DISPlay:AREsult:LOGGing:CONDition:ITEM?
Set All/Reset All	:DISPlay:AREsult:LOGGing:CONDition:ALLSet
1 Second data	:DISPlay:AREsult:LOGGing:CONDition:PERiod
	:DISPlay:AREsult:LOGGing:CONDition:PERiod?
Error Threshold	:DISPlay:AREsult:LOGGing:CONDition:THReshold
	:DISPlay:AREsult:LOGGing:CONDition:THReshold?
Squelch	:DISPlay:AREsult:LOGGing:CONDition:SQUelch
	:DISPlay:AREsult:LOGGing:CONDition:SQUelch?
Save	:SYSTem:MMEMory:EDAL:STORe
Print	:SYSTem:PRINt:EDAL

**:CALCulate:ADATa:EALarm?<slot>,<string>**

Parameter	<slot> = <STRING PROGRAM DATA>
	"X-Y" X: 1 to 4 Mainframe No.
	Y: Comb1 to 8 Combination No.
	<string> = <STRING PROGRAM DATA>
	"CURRent:<result>" Current data
	"LAST:<result>" Measurement end data
	"INTermediate:<result>" Measurement intermediate data
	See Table 7.1.6-3 for details on <result>.
Response	<string> = <STRING RESPONSE DATA>

**Table 7.1.6-2 Response formats**

Type	Format	Description
Form1 Integer type	"XXXXXXXX"	For 0 to 9999999
	"X.XXXXXXX"	For 1.0000E07 to 9.9999E16
	"-----"	When no data corresponds to the query
Form2 Fraction type	"X.XXXXXE-XX"	For 0.0000E16 to 1.0000E-00
	"-----"	When no data corresponds to the query
Form3 % type	"XXX.XXXXX"	For 0.0000 to 100.0000
	"-----"	When no data corresponds to the query
Form4 Frequency type	"XXXXXXXXXX"	For 0 to MAX (Hz)
	"-----"	When no data corresponds to the query
Form5 Voltage type	"X.XXX"	For -4.000 to +4.000
	"-----"	When no data corresponds to the query

Function

Queries the measurement data at Combination that corresponds to the parameter.

**Table 7.1.6-3 Parameters**

Item		<result>	Format
Error Rate	Total	ER:TOTAL	Form2
	INS	ER:INSertion	
	OMI	ER:OMISsion	
Error Count	Total	EC:TOTAL	Form1
	INS	EC:INSertion	
	OMI	EC:OMISsion	
Error Rate	Transition	ER:TRANsition	Form2
	Non Transition	ER:NONTransition	
Error Count	Transition	EC:TRANsition	Form1
	Non Transition	EC:NONTransition	
%EFI	Total	EFI:TOTAL	Form3
EI	Total	EI:TOTAL	Form1
Frequency (kHz)		FREQuency	Form4
Clock Count		CC:TOTAL	Form1
Clock Loss		AINterval:CLOSS	Form1
Sync Loss		AINterval:PSLoss	Form1
Data Threshold		THReshold	Form5
Data Phase		PHASe	Form1
Threshold EI	>1.0E-3	THReshold:EI:TOTAL:E_3	Form1
	>1.0E-4	THReshold:EI:TOTAL:E_4	
	>1.0E-5	THReshold:EI:TOTAL:E_5	
	>1.0E-6	THReshold:EI:TOTAL:E_6	
	>1.0E-7	THReshold:EI:TOTAL:E_7	
	>1.0E-8	THReshold:EI:TOTAL:E_8	
	≤1.0E-8	THReshold:EI:TOTAL:UE_8	



Table 7.1.6-3 Parameters (Cont'd)

Item		<result>	Format
Threshold %EFI	>1.0E-3	THReshold:EFI:TOTal:E_3	Form3
	>1.0E-4	THReshold:EFI:TOTal:E_4	
	>1.0E-5	THReshold:EFI:TOTal:E_5	
	>1.0E-6	THReshold:EFI:TOTal:E_6	
	>1.0E-7	THReshold:EFI:TOTal:E_7	
	>1.0E-8	THReshold:EFI:TOTal:E_8	
	≤1.0E-8	THReshold:EFI:TOTal:UE_8	
G.821	ES	G821:ES2:TOTal	Form1
	EFS	G821:EFS2:TOTal	
	SES	G821:SES2:TOTal	
	DM	G821:DM2:TOTal	
	US	G821:US2:TOTal	
	%ES	G821:ES:TOTal	Form3
	%EFS	G821:EFS:TOTal	
	%SES	G821:SES:TOTal	
	%DM	G821:DM:TOTal	
	%US	G821:US:TOTal	

Example To query the total error rate measurement data for the current data:  
 > :CALCulate:ADATa:EALarm? "1-1", "CURRENT:ER:TOTAL"  
 < "0.0000E-16"

Compatibility Incompatible with existing models.

### **:DISPlay:AREsult:LOGGing:ONOFF <boolean>**

Parameter <boolean> = <BOOLEAN PROGRAM DATA>

0 or OFF Logging OFF

1 or ON Logging ON

Function Sets logging execution for all ED modules ON/OFF.

Example To set logging execution for all ED modules ON:

> :DISPlay:AREsult:LOGGing:ONOFF ON

Compatibility Incompatible with existing models.

### **:DISPlay:ARESt:LOGGing:ONOFF?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 OFF 1 ON
Function	Queries the logging execution ON/OFF state for all ED modules.
Example	To query the logging execution ON/OFF state for all ED modules: > :DISPlay:ARESt:LOGGing:ONOFF? < 1
Compatibility	Incompatible with existing models.

### **:DISPlay:ARESt:LOGGing:CLEAr**

Function	Clears the logging results for all ED modules.
Example	> :DISPlay:ARESt:LOGGing:CLEAr
Compatibility	Incompatible with existing models.

### **:DISPlay:ARESt:LOGGing:CONDition:ITEM <item>,<boolean>**

Parameter	<item> = <CHARACTER PROGRAM DATA> SLOTinfo Slot information TPATtern Test pattern type STARt Measurement start time END Measurement end time ERATe Error rate and error count EI Error interval (EI) and error free interval rate (%EFI) FREQuency Frequency CCOunt Clock count AOCCur Alarm occurrence (Alarm Occur) and recovery time (Recover) AINTerval Alarm interval DTHReshold Adds the data input threshold setting value to the logging item. CDELay Adds the clock phase setting value to the logging item. Disabled when Variable Clock Delay (MU181040A-x30) is not installed. SDATa Average data for one second <boolean> = <BOOLEAN PROGRAM DATA> 0 or OFF Measurement item OFF 1 or ON Measurement item ON
Function	Sets the logging measurement item for all ED modules ON/OFF.
Example	To set the logging slot information for all ED modules ON: > :DISPlay:ARESt:LOGGing:CONDition:ITEM SLOTinfo,ON
Compatibility	Incompatible with existing models.

**:DISPlay:ARESt:LOGGing:CONDition:ITEM? <item>**


---

Parameter	<item> = <CHARACTER PROGRAM DATA> SLOTinfo,TPATtern,START,END,ERATe,El,FREQuency,CCOunt,AOCCu r,AINTerval,DTHReshold,CDELeY,SDATa
Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0            OFF 1            ON
Function	Queries the logging measurement item ON/OFF state for all ED modules.
Example	> :DISPlay:ARESt:LOGGing:CONDition:ITEM? SLOTinfo < 1
Compatibility	Incompatible with existing models.

**:DISPlay:ARESt:LOGGing:CONDition:ALLSet <boolean>**


---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> 0 or OFF      Reset 1 or ON       All Set
Function	Selects or resets all logging measurement items for all ED modules.
Example	To select all logging measurement items for all ED modules: > :DISPlay:ARESt:LOGGing:CONDition:ALLSet ON
Compatibility	Incompatible with existing models.

**:DISPlay:ARESt:LOGGing:CONDition:PERiod <period>**


---

Parameter	<period> = <CHARACTER PROGRAM DATA> S10            10 seconds S30            30 seconds M1             1 minute M10            10 minutes M30            30 minutes H1             1 hour
Function	Sets the logging result capturing period for all ED modules.
Example	To set the logging result capturing period for all ED modules to 10 seconds: > :DISPlay:ARESt:LOGGing:CONDition:PERiod S10
Compatibility	Incompatible with existing models.

### **:DISPlay:ARESt:LOGGing:CONDition:PERiod?**

---

Response	<period> = <CHARACTER RESPONSE DATA> S10            10 seconds S30            30 seconds M1             1 minute M10            10 minutes M30            30 minutes H1             1 hour
Function	Queries the logging result capturing period for all ED modules.
Example	> :DISPlay:ARESt:LOGGing:CONDition:PERiod? < S10
Compatibility	Incompatible with existing models.

### **:DISPlay:ARESt:LOGGing:CONDition:THReshold <thre>**

---

Parameter	<thre> = <CHARACTER PROGRAM DATA> E_0            <>0 E_3            >1E-3 E_4            >1E-4 E_5            >1E-5 E_6            >1E-6 E_7            >1E-7 E_8            >1E-8 E_9            >1E-9
Function	Sets the logging error rate threshold value for all ED modules.
Example	To set the logging error rate threshold value for all ED modules to 0: > :DISPlay:ARESt:LOGGing:CONDition:THReshold E_0
Compatibility	Incompatible with existing models.

### **:DISPlay:ARESt:LOGGing:CONDition:THReshold?**

---

Response	<thre> = <CHARACTER RESPONSE DATA>
Function	Queries the logging error rate threshold value for all ED modules.
Example	> :DISPlay:ARESt:LOGGing:CONDition:THReshold? < E_0
Compatibility	Incompatible with existing models.

**:DISPlay:AREsult:LOGGing:CONDition:SQUelch <boolean>**

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> 0 or OFF      Memory squelch function ON 1 or ON      Memory squelch function OFF
Function	Sets the logging memory squelch function for all ED modules ON/OFF.
Example	To set the logging memory squelch function for all ED modules ON: > :DISPlay:AREsult:LOGGing:CONDition:SQUelch ON
Compatibility	Incompatible with existing models.

**:DISPlay:AREsult:LOGGing:CONDition:SQUelch?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0      Memory squelch function OFF 1      Memory squelch function ON
Function	Queries the logging memory squelch function ON/OFF state for all ED modules.
Example	> :DISPlay:AREsult:LOGGing:CONDition:SQUelch? < 1
Compatibility	Incompatible with existing models.

**:SYSTem:MMEMory:EDAL:STORe <file\_name>,<data\_type>,<file\_type>**

Parameter	<file_name> = <STRING PROGRAM DATA> "<drv>:\[<dir>]<file>" <drv> = C, D, E, F <dir> = <dir1>\<dir2>\...(Omitted for the root directory) <file> = File name <data_type> = <CHARACTER PROGRAM DATA> AERA      Error/Alarm Result ALL ALOG      Logging Result ALL <file_type> = <CHARACTER PROGRAM DATA> CSV      CSV File TXT      Text File Only TXT can be specified for <file_type> when ALOG is set for <data_type>.
Function	Saves the ED Result All measurement result data.
Example	To save the ED Result All measurement result data to the specified destination in the specified file format: > :SYSTem:MMEMory:EDAL:STORe "C:\Test\example",AERA,CSV
Compatibility	Incompatible with existing models.

**:SYSTem:PRINt:EDAL <list>**

---

Parameter	<list> = <CHARACTER PROGRAM DATA> AERA           Error/Alarm Result All ALOG           Logging Result All
Function	Prints the ED Result All measurement result data.
Example	To print the Error/Alarm ED Result All measurement result: > :SYSTem:PRINt:EDAL AERA
Compatibility	Incompatible with existing models.

### 7.1.7 Pattern Editor

This chapter describes the pattern file save/read commands for the PPG and the ED. Before executing a setting/query command for the MU181020A/MU181040A, specify the slot number of the module to be remotely controlled, by using the :MODULE:ID command. Refer to Chapter 7.1 "Common Commands" and 9.1 "Basic Operation of Device Messages" for how to specify a slot number with the :MODULE:ID command.

**Table 7.1.7-1 Pattern Editor setting commands**

Setting Items	Commands
Open	:SYSTEM:MMEMORY:PATTERN:RECALL
Save	:SYSTEM:MMEMORY:PATTERN:STORE

#### **:SYSTEM:MMEMORY:PATTERN:RECALL <file\_name>,<file\_type>**

Parameter	<file_name> = <STRING PROGRAM DATA> "<drv>:\[<dir>]<file>" <drv> = C, D, E, F <dir> = <dir1>\<dir2>\... (Omitted for the root directory) <file> = File name <file_type> = <CHARACTER PROGRAM DATA> BIN            Binary file TXT            Text file
Function	Opens a pattern file.
Example	To open a pattern file in the specified file format from the specified destination: > :SYSTEM:MMEMORY:PATTERN:RECALL "C:\Test\example",BIN
Compatibility	Incompatible with existing models.

**:SYSTem:MMEMory:PATtern:STORE <file\_name>,<file\_type>,**

---

Parameter	<file_name> = <STRING PROGRAM DATA> "<drv>:\[<dir>]<file>" <drv> = C, D, E, F <dir> = <dir1>\<dir2>\... (Omitted for the root directory) <file> = File name <file_type> = <CHARACTER PROGRAM DATA> BIN            Binary file TXT            Text file
Function	Saves a pattern file. <b>Note:</b> The settings will not be read from the saved file if the file name is changed.
Example	To save a pattern file to the specified destination in the specified file format: > :SYSTem:MMEMory:PATtern:STORE "C:\Test\example",TXT
Compatibility	Incompatible with existing models.



## 7.2 Synthesizer Commands

This section describes MU181000A 12.5 GHz Synthesizer and MU181000B 12.5 GHz 4 port Synthesizer (hereinafter referred to as Synthesizer) commands.

Before executing a setting/query command for the Synthesizer, specify the slot number of the module to be remotely controlled, by using the :MODule:ID command. Refer to Section 7.1 "Common Commands" and 9.1 "Basic Operation of Device Messages" for how to specify a slot number with the :MODule:ID command.

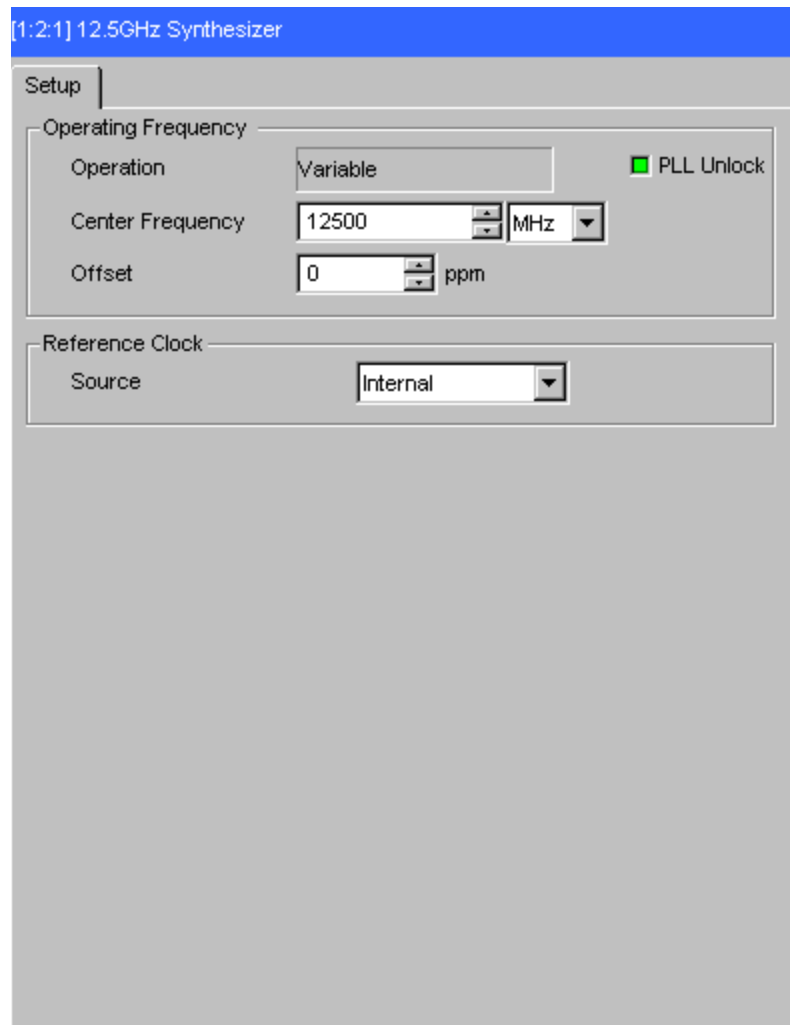


Figure 7.2-1 12.5GHz Synthesizer Window

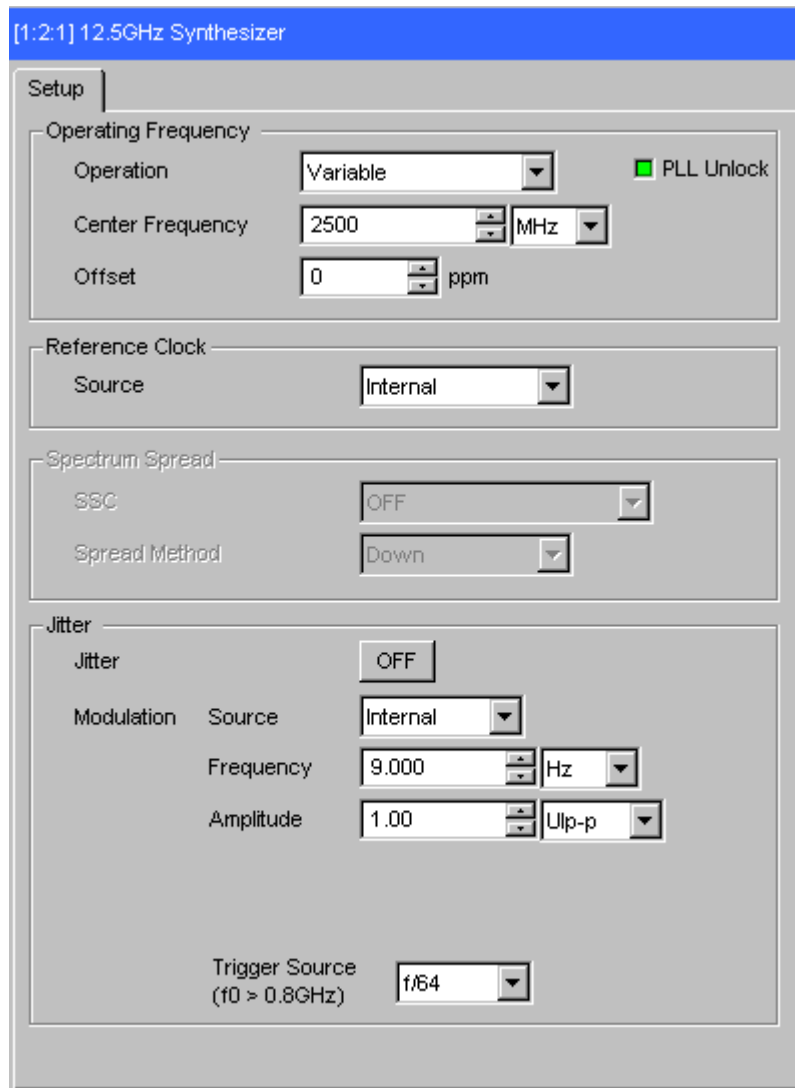


Figure 7.2-2 12.5 GHz Synthesizer Window (Option x01)

### 7.2.1 Operation frequency Setting field

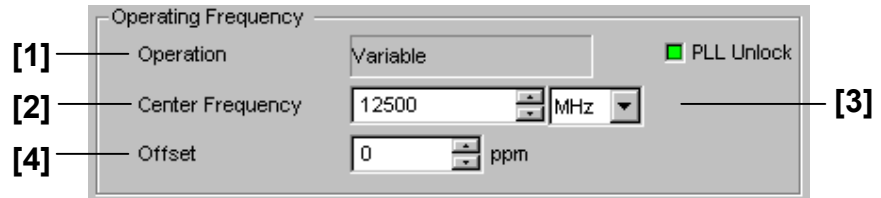


Figure 7.2.1-1 Operation Frequency Setting

Table 7.2.1-1 Operation Frequency setting Commands

No.	Setting Items	Commands
[1]	Operation	:OUTPut:CLOCK:OPERation
		:OUTPut:CLOCK:OPERation?
[2]	Center Frequency	:OUTPut:CLOCK:FREQuency
		:OUTPut:CLOCK:FREQuency?
[3]	Center Frequency Unit	:OUTPut:CLOCK:FUNit
		:OUTPut:CLOCK:FUNit?
[4]	Offset	:OUTPut:CLOCK:OFFSet:PPM
		:OUTPut:CLOCK:OFFSet:PPM?

#### :OUTPut:CLOCK:OPERation <operation>

Parameter	<operation> = <CHARACTER PROGRAM DATA>
	VARIABLE Variable (Variable frequency 0.1 to 12.5 GHz)
	PCIexpress1 PCIe-Gen I (2.5 GHz)
	PCIexpress2 PCIe-Gen II (5 GHz)
	SERialata Serial-ATA (6 GHz)
Function	Sets Operating of Synthesizer.
Example	Sets Operating of Synthesizer to Variable. > :OUTPut:CLOCK:OPERation VARIABLE
Compatibility	Incompatible with existing models.

### **:OUTPut:CLOCK:OPERation?**

---

Response	<operation> = <CHARACTER RESPONSE DATA> VAR, PCI1, PCI2, SER
Function	Queries Operating of Synthesizer.
Example	> :OUTPut:CLOCK:OPERation? <PCI2
Compatibility	Incompatible with existing models. <b>Note:</b> The :OUTPut:CLOCK:OPERation and :OUTPut:CLOCK:OPERation? commands can be executed only when MU181000A-x01 or MU181000B-x01 is installed.

### **:OUTPut:CLOCK:FREQuency <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> In case of Operating frequency resolution unit is kHz 100000 to 12500000 in 1 kHz step In case of Operating frequency resolution unit is MHz 100 to 12500/Step 1 MHz
Function	Sets operating frequency of Synthesizer.
Example	Sets operating frequency of Synthesizer to 12500 MHz. > :OUTPut:CLOCK:FREQuency 12500
Compatibility	Compatible with MP1632C.

### **:OUTPut:CLOCK:FREQuency?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> In case of Operating frequency resolution unit is kHz 100000 to 12500000 in 1 kHz step In case of Operating frequency resolution unit is MHz 100 to 12500/Step 1 MHz
Function	Queries operating frequency of Synthesizer.
Example	> :OUTPut:CLOCK:FREQuency? < 12500
Compatibility	Compatible with MP1632C.

**:OUTPut:CLOCK:FUNit <resolution>**


---

Parameter	<resolution> = <CHARACTER PROGRAM DATA> KHZ                      kHz MHZ                      MHz
Function	Sets operating frequency resolution of Synthesizer.
Example	Sets operating frequency resolution of Synthesizer to MHz. > :OUTPut:CLOCK:FUNit MHz
Compatibility	Incompatible with existing models.

**:OUTPut:CLOCK:FUNit?**


---

Response	<resolution> = <CHARACTER RESPONSE DATA> KHZ, MHZ
Function	Queries operating frequency resolution of Synthesizer.
Example	> :OUTPut:CLOCK:FUNit? < MHz
Compatibility	Incompatible with existing models.

**:OUTPut:CLOCK:OFFSet:PPM <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> -1000 to 1000            -1,000 to 1,000 in 1 ppm step
Function	Sets offset value (ppm) from current operating frequency.
Example	Sets offset value (ppm) to 0 ppm. > :OUTPut:CLOCK:OFFSet:PPM 0
Compatibility	Incompatible with existing models.

**:OUTPut:CLOCK:OFFSet:PPM?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> -1000 to 1000            -1,000 to 1,000 in 1 ppm step
Function	Queries offset value (ppm) from current operating frequency.
Example	> :OUTPut:CLOCK:OFFSet:PPM? < 0
Compatibility	Incompatible with existing models.

## 7.2.2 Reference Clock Setting field

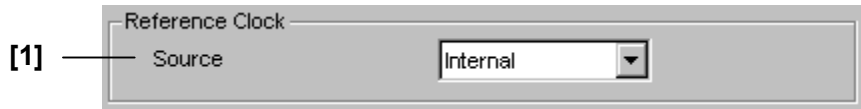


Figure 7.2.2-1 Reference Clock Setting

Table 7.2.2-1 Reference Clock Setting Commands

No.	Setting Items	Commands
[1]	Source	:OUTPut:RCLock:SElect :OUTPut:RCLock:SElect?

### :OUTPut:RCLock:SElect <clock>

Parameter	<clock> = <CHARACTER PROGRAM DATA> INTernal                      Internal 10 MHz reference signal EXTernal10                    External 10 MHz reference signal
Function	Selects Internal of External 10 MHz reference signal.
Example	Sets External 10 MHz reference signal. > :OUTPut:RCLock:SElect EXT10
Compatibility	Partially compatible with MP1632C.

### :OUTPut:RCLock:SElect?

Response	<clock> = <CHARACTER RESPONSE DATA> INT, EXT10
Function	Queries the 10 MHz reference signal setting (Internal or External).
Example	> :OUTPut:RCLock:SElect? < EXT10
Compatibility	Partially compatible with MP1632C.

### 7.2.3 Spectrum Spread setting commands

The following commands are enabled only when the Option MU181000A-x01 or MU181000B-x01 is available.

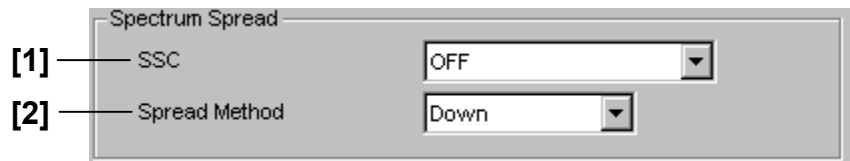


Figure 7.2.3-1 Spectrum Spread setting

Table 7.2.3-1 Spectrum Spread setting commands

No.	Setting Items	Commands
[1]	SSC	:OUTPut:RCLock:SSC:SET
		:OUTPut:RCLock:SSC:SET?
[2]	Spread Method	:OUTPut:RCLock:SSC:METHOD
		:OUTPut:RCLock:SSC:METHOD?

#### :OUTPut:RCLock:SSC:SET <SSC>

Parameter	<SSC> = <CHARACTER PROGRAM DATA>
	OFF                      SSC function off
	INTernal                SSC function on (using internal reference signal)
	EXTernal10            SSC function on (using external 10 MHz reference signal)
	EXTernal100          SSC function on (using external 100 MHz reference signal)
Function	Sets whether to use the SSC (Spread Spectrum Clocking) function of the synthesizer and the reference signal to be used.
Example	Sets the SSC function to on using external 100 MHz reference signal of the synthesizer. > :OUTPut:RCLock:SSC:SET EXTernal 100
Compatibility	Incompatible with existing models.

### **:OUTPut:RCLock:SSC:SET?**

---

Response	<SSC> = <CHARACTER RESPONSE DATA> OFF                   SSC function off INT                   SSC function on (using internal reference signal) EXT10                 SSC function on (using external 10 MHz reference signal) EXT100                SSC function on (using external 100 MHz reference signal)
Function	Queries setting of SSC (Spread Spectrum Clocking) function of the synthesizer.
Example	> :OUTPut:RCLock:SSC:SET? < EXT100
Compatibility	Incompatible with existing models.

### **:OUTPut:RCLock:SSC:METHod <spread>**

---

Parameter	<spread> = <CHARACTER PROGRAM DATA> DOWN                Changes frequency within the range from 0 to -0.5% CENTer              Changes frequency within the range of $\pm 0.25\%$
Function	Sets spectrum spreading method for SSC (Spread Spectrum Clocking) using 100 MHz reference signal.
Example	Sets spectrum spreading method for SSC using 100 MHz reference signal to DOWN. > :OUTPut:RCLock:SSC:METHod DOWN
Compatibility	Incompatible with existing models.

### **:OUTPut:RCLock:SSC:METHod?**

---

Response	<spread> = <CHARACTER RESPONSE DATA> DOWN, CENT
Function	Queries spectrum spreading method for SSC (Spread Spectrum Clocking) using 100 MHz reference signal.
Example	> :OUTPut:RCLock:SSC:METHod? < DOWN
Compatibility	Incompatible with existing models.



### 7.2.4 Jitter setting commands

The following commands are enabled only when the Option MU181000A-x01 or MU181000B-x01 is available.

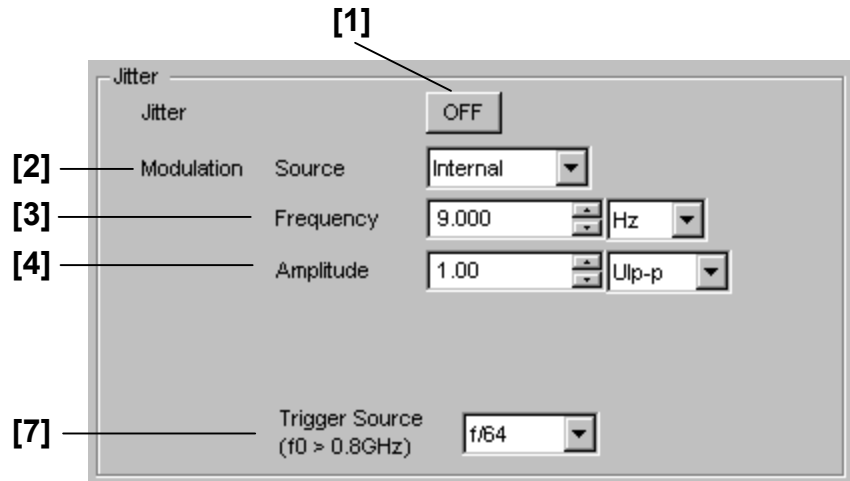


Figure 7.2.4-1 Jitter setting (Modulation Source: Internal)

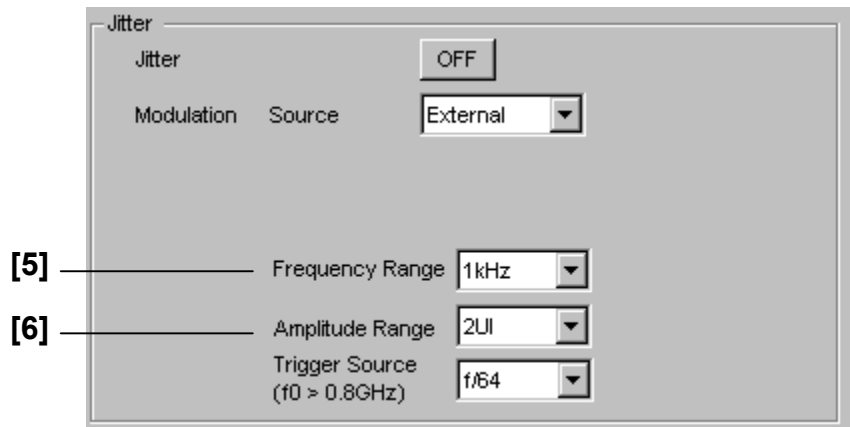


Figure 7.2.4-2 Jitter setting (Modulation Source: External)

**Table 7.2.4-1 Jitter setting commands**

No.	Setting Items	Commands
[1]	Jitter ON/OFF	:SOURce:SYNThesizer:JITTer:OUTPut:SET
		:SOURce:SYNThesizer:JITTer:OUTPut:SET?
[2]	Modulation Source	:SOURce:SYNThesizer:JITTer:MODulation:SElect
		:SOURce:SYNThesizer:JITTer:MODulation:SElect?
[3]	Frequency	:SOURce:SYNThesizer:JITTer:MODulation:FREQuency
		:SOURce:SYNThesizer:JITTer:MODulation:FREQuency?
[4]	Amplitude	:SOURce:SYNThesizer:JITTer:MODulation:AMPLitude
		:SOURce:SYNThesizer:JITTer:MODulation:AMPLitude?
[5]	Frequency Range	:SOURce:SYNThesizer:JITTer:MODulation:FREQuency:RANGe
		:SOURce:SYNThesizer:JITTer:MODulation:FREQuency:RANGe?
[6]	Amplitude Range	:SOURce:SYNThesizer:JITTer:MODulation:AMPLitude:RANGe
		:SOURce:SYNThesizer:JITTer:MODulation:AMPLitude:RANGe?
[7]	Trigger Source	:SOURce:SYNThesizer:JITTer:TRGSource
		:SOURce:SYNThesizer:JITTer:TRGSource?

**:SOURce:SYNThesizer:JITTer:OUTPut:SET <boolean>**

Parameter	<boolean> = <BOOLEAN PROGRAM DATA>
	OFF or 0                      Jitter modulation off
	ON or 1                        Jitter modulation on
Function	Sets on/off of Jitter output.
Example	Sets Jitter output to off. > :SOURce:SYNThesizer:JITTer:OUTPut:SET OFF
Compatibility	Incompatible with existing models.

**:SOURce:SYNThesizer:JITTer:OUTPut:SET?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	0                                Jitter modulation off
	1                                Jitter modulation on
Function	Queries on/off of Jitter output.
Example	> :SOURce:SYNThesizer:JITTer:OUTPut:SET? < 0
Compatibility	Incompatible with existing models.

**:SOURce:SYNThesizer:JITTer:MODulation:SElect <clock>**


---

Parameter	<clock> = <CHARACTER PROGRAM DATA> INTernal                    Internal modulation source EXTernal                    External modulation source IQEXternal                 External modulation source (IQ)
Function	Sets modulation signal source.
Example	Sets modulation signal source to internal modulation source. > :SOURce:SYNThesizer:JITTer:MODulation:SElect INTernal
Compatibility	Incompatible with existing models.

**:SOURce:SYNThesizer:JITTer:MODulation:SElect?**


---

Response	<clock> = <CHARACTER RESPONSE DATA> INT, EXT, IQEX
Function	Queries modulation signal source.
Example	> :SOURce:SYNThesizer:JITTer:MODulation:SElect? < INT
Compatibility	Incompatible with existing models.

**:SOURce:SYNThesizer:JITTer:MODulation:FREQuency  
<numeric>,<resolution>**

Parameter	<p>&lt;numeric&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;</p> <p>When Hz is selected for &lt;resolution&gt;</p> <p>9.000 to 1000.0      9.000 to 1000.0 Hz</p> <p>Setting steps</p> <p>9.000[Hz] ≤ fmod ≤ 10.000 [Hz]: In 0.001-Hz steps</p> <p>10.01[Hz] ≤ fmod ≤ 100.00 [Hz]: In 0.01-Hz steps</p> <p>100.1[Hz] ≤ fmod ≤ 1000.0 [Hz]: In 0.1-Hz steps</p> <p>When kHz is selected for &lt;resolution&gt;</p> <p>1.001 to 1000.0      1.00 to 1000.0 kHz</p> <p>Setting steps</p> <p>1.001[kHz] ≤ fmod ≤ 10.000 [kHz]: In 0.001-kHz steps</p> <p>10.01[kHz] ≤ fmod ≤ 100.00 [kHz]: In 0.01-kHz steps</p> <p>100.1[kHz] ≤ fmod ≤ 1000.0 [kHz]: In 0.1-kHz steps</p> <p>When MHz is selected for &lt;resolution&gt;</p> <p>1.001 to 80.00      1.00 to 80 MHz</p> <p>Setting steps</p> <p>1.001[MHz] ≤ fmod ≤ 10.000 [MHz]: In 0.001-MHz step</p> <p>10.01[MHz] ≤ fmod ≤ 80.00 [MHz]: In 0.01-MHz steps</p> <p>&lt;resolution&gt; = &lt;CHARACTER PROGRAM DATA&gt;</p> <p>HZ                      Hz units</p> <p>KHZ                     kHz units</p> <p>MHZ                     MHz units</p>
Function	Sets internal modulation frequency and units.
Example	<p>Sets internal modulation frequency to 10 kHz.</p> <pre>&gt; :SOURce:SYNThesizer:JITTer:MODulation:FREQuency 10.00,KHZ</pre>
Compatibility	Incompatible with existing models.

**:SOURce:SYNThesizer:JITTer:MODulation:FREQuency?**

Response	<numeric> = <NR2 NUMERIC RESPONSE DATA> 9.000 to 1000.0      9.000 to 1000.0 Hz (When Hz is selected for resolution) 1.001 to 1000.0      1.00 to 1000.0 kHz (When kHz is selected for resolution) 1.001 to 80.00      1.00 to 80 MHz (When MHz is selected for resolution) <resolution> = <CHARACTER RESPONSE DATA> HZ, KHZ, MHZ
Function	Queries internal modulation frequency and units.
Example	> :SOURce:SYNThesizer:JITTer:MODulation:FREQuency? < 10.000, KHZ
Compatibility	Incompatible with existing models.

**:SOURce:SYNThesizer:JITTer:MODulation:AMPLitude  
<numeric>, <resolution>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0 to 999      0 to 999 mUIp-p, in 1-mUp-p steps 1.00 to 32.00      1.00 to 32.00 UIp-p, in 0.01-UIp-p steps 32.1 to 256.0      32.1 to 256.0 UIp-p, in 0.1-UIp-p steps 257 to 2049      257 to 2049 UIp-p, in 1-UIp-p steps 2050 to 4000      2050 to 4000 UIp-p, in 10-UIp-p steps <resolution> = <CHARACTER PROGRAM DATA> MUI      mUIp-p units UI      UIp-p units
Function	Sets internal modulation amplitude and units.
Example	Sets internal modulation amplitude to 1.10 UIp-p. > :SOURce:SYNThesizer:JITTer:MODulation:AMPLitude 1.10, UI
Compatibility	Incompatible with existing models.

## **:SOURce:SYNThesizer:JITTer:MODulation:AMPLitude?**

---

Response	<numeric> = <NR2 NUMERIC RESPONSE DATA> 0 to 999                    0 to 999 mUIp-p 1.00 to 32.00            1.00 to 32.00 UIp-p 32.1 to 256.0            32.1 to 256.0 UIp-p 257 to 2049              257 to 2049 UIp-p 2050 to 4000             2050 to 4000 UIp-p <resolution> = <CHARACTER RESPONSE DATA> MUI                        mUIp-p units UI                          UIp-p units
Function	Queries internal modulation amplitude and units.
Example	> :SOURce:SYNThesizer:JITTer:MODulation:AMPLitude? < 1.10,UI
Compatibility	Incompatible with existing models.

**:SOURce:SYNThesizer:JITTer:MODUlation:FREQuency:RANGe <range>**

Parameter	<range> = <CHARACTER PROGRAM DATA>
	H_275                    275 Hz
	H_550                    550 Hz
	K_1                        1 kHz
	K_1_1                    1.1 kHz
	K_2_2                    2.2 kHz
	K_2_75                   2.75 kHz
	K_4_4                    4.4 kHz
	K_5_5                    5.5 kHz
	K_11                     11 kHz
	K_22                     22 kHz
	K_27_5                   27.5 kHz
	K_44                     44 kHz
	K_55                     55 kHz
	K_100                    100 kHz
	K_110                    110 kHz
	K_220                    220 kHz
	K_250                    250 kHz
	K_440                    440 kHz
	K_500                    500 kHz
	M_1                      1 MHz
	M_2                      2 MHz
	M_4                      4 MHz
	M_80                     80 MHz
	M_500                    500 MHz
	G_1                      1 GHz
	FULL                     All range
Function	Sets external modulation frequency range.
Example	Sets external modulation frequency range to 100 kHz. > :SOURce:SYNThesizer:JITTer:MODUlation:FREQuency:RANGe K_100
Compatibility	Incompatible with existing models.

**:SOURce:SYNThesizer:JITTer:MODUlation:FREQuency:RANGe?**

Response	<range> = <CHARACTER RESPONSE DATA>
Function	Queries external modulation frequency range.
Example	> :SOURce:SYNThesizer:JITTer:MODUlation:FREQuency:RANGe? < K_100
Compatibility	Incompatible with existing models.

**:SOURce:SYNThesizer:JITTer:MODulation:AMPLitude:RANGe<range>**

Parameter	<range> = <CHARACTER PROGRAM DATA>
	R_0_22                    0.22 UI
	R_2_0                     2.00 UI
	R_20                      20 UI
	R_200                    200 UI
	R_4000                   4,000 UI
Function	Sets external modulation amplitude.
Example	Sets external modulation amplitude to 0.22 UI. > :SOURce:SYNThesizer:JITTer:MODulation:AMPLitude:RANGe R_0_22
Compatibility	Incompatible with existing models.

**:SOURce:SYNThesizer:JITTer:MODulation:AMPLitude:RANGe?**

Response	<range> = <CHARACTER RESPONSE DATA>
	R_0_22                    0.22 UI
	R_2_0                     2.00 UI
	R_20                      20 UI
	R_200                    200 UI
	R_4000                   4,000 UI
Function	Queries external modulation amplitude.
Example	> :SOURce:SYNThesizer:JITTer:MODulation:AMPLitude:RANGe? < R_0_22
Compatibility	Incompatible with existing models.

**:SOURce:SYNThesizer:JITTer:TRGSource<range>**

Parameter	<range> = <CHARACTER PROGRAM DATA>
	F_1                        f/1
	F_64                      f/64
Function	Selects trigger output division ratio.
Example	Sets trigger output division ratio to f/1. > :SOURce:SYNThesizer:JITTer:TRGSource F_1
Compatibility	Incompatible with existing models.



---

**:SOURce:SYNThesizer:JITTer:TRGSource?**

---

Response	<range> = <CHARACTER RESPONSE DATA> F_1                    f/1 F_64                   f/64
Function	Queries trigger output division ratio.
Example	> :SOURce:SYNThesizer:JITTer:TRGSource? < F_1
Compatibility	Incompatible with existing models.

## 7.3 PPG Commands

This section describes the setting and query commands for the MU181020A 12.5 Gbit/s PPG and MU181020B 14 Gbit/s PPG, based on a tab window. Before executing a setting/query command for the MU181020A, specify the slot number of the module to be remotely controlled, by using the :MODULE:ID command. Refer to Section 7.1 "Common Commands" and 9.1 "Basic Operation of Device Messages" for how to specify a slot number with the :MODULE:ID command.

However, unless there is a special item, see the MU181020A.

### 7.3.1 Commands related to Output tab window

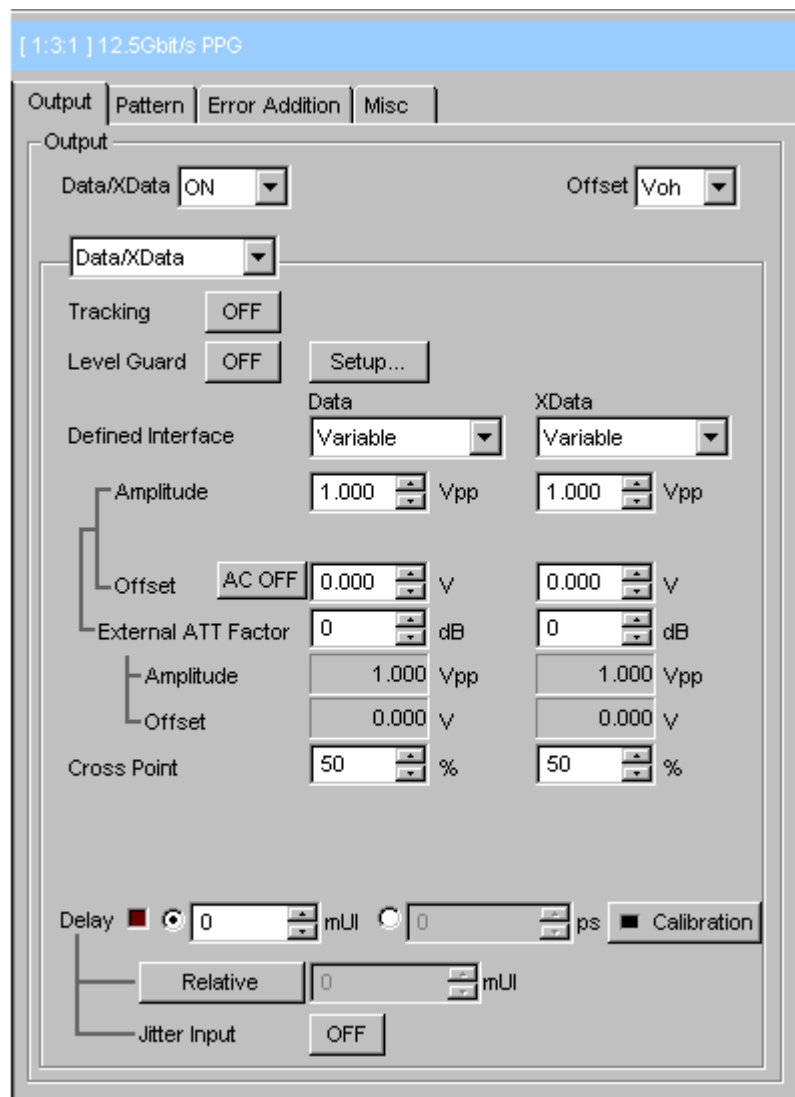


Figure 7.3.1-1 Output tab window

## 7.3.1.1 Output setting commands

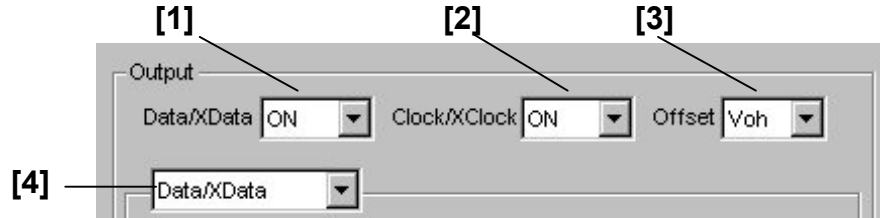


Figure 7.3.1.1-1 Output setting field

Table 7.3.1.1-1 Output setting commands

No.	Setting Items	Commands
[1]	Data/XData	:OUTPut:DATA:OUTPut
		:OUTPut:DATA:OUTPut?
[2]	Clock/XClock	:OUTPut:CLOCK:OUTPut
		:OUTPut:CLOCK:OUTPut?
[3]	Offset	:OUTPut:OFFSet
		:OUTPut:OFFSet?
[4]	No label (Setting item selection)	:OUTPut:SET
		:OUTPut:SET?

**:OUTPut:DATA:OUTPut <boolean>**

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> OFF or 0                      Output OFF ON or 1                        Output ON
Function	Sets data output ON or OFF. The setting commonly applies to Data and XData.
Example	To set data output ON: > :OUTPut:DATA:OUTPut ON
Compatibility	Incompatible with the MP1632C.

**:OUTPut:DATA:OUTPut?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0                                Output OFF 1                                Output ON
Function	Queries the data output ON/OFF.
Example	> :OUTPut:DATA:OUTPut? < 1
Compatibility	Incompatible with the MP1632C.

**:OUTPut:CLOCK:OUTPut <boolean>**

---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> OFF or 0                      Output OFF ON or 1                        Output ON
Function	Sets clock output ON or OFF. The setting commonly applies to Clock and XClock.
Example	To set clock output ON: > :OUTPut:CLOCK:OUTPut ON
Compatibility	Incompatible with existing models.

**:OUTPut:CLOCK:OUTPut?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0                                Output OFF 1                                Output ON
Function	Queries the clock output ON/OFF state.
Example	> :OUTPut:CLOCK:OUTPut? < 1
Compatibility	Incompatible with existing models.

**:OUTPut:OFFSet <offset>**

---

Parameter	<offset> = <CHARACTER PROGRAM DATA> VOH                            Based on the high level VTH                            Based on the center level VOL                             Based on the low level
Function	Sets the offset reference value for data and clock output.
Example	To set the offset reference to Voh: > :OUTPut:OFFSet VOH
Compatibility	Incompatible with existing models.

**:OUTPut:OFFSet?**

---

Response	<offset> = <CHARACTER RESPONSE DATA> VOH, VTH, VOL
Function	Queries the offset reference value for data and clock outputs.
Example	> :OUTPut:OFFSet? < VOH
Compatibility	Incompatible with existing models.

**:OUTPut:SET <item>**


---

Parameter	<item> = <CHARACTER PROGRAM DATA> DATA                      Sets Data/XData. CLOCK                     Sets Clock/XClock. CMU                        Sets CMU Bitrate.
Function	Selects the data output, clock output, or CMU setting screen.
Example	To select the data output setting screen: > :OUTPut:SET DATA
Compatibility	Incompatible with existing models.

**:OUTPut:SET?**


---

Response	<item> = <CHARACTER RESPONSE DATA> DATA, CLOC, CMU
Function	Queries the selected setting screen.
Example	> :OUTPut:SET? < DATA
Compatibility	Incompatible with existing models.

7.3.1.2 Data/XData setting commands

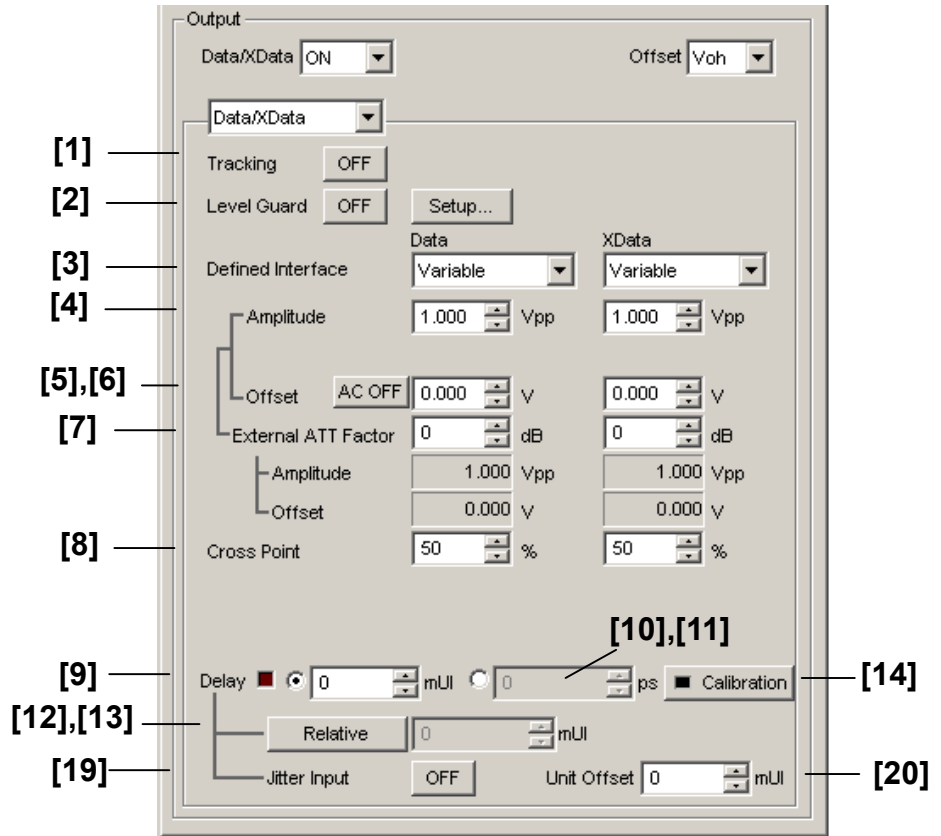


Figure 7.3.1.2-1 Data/XData setting field

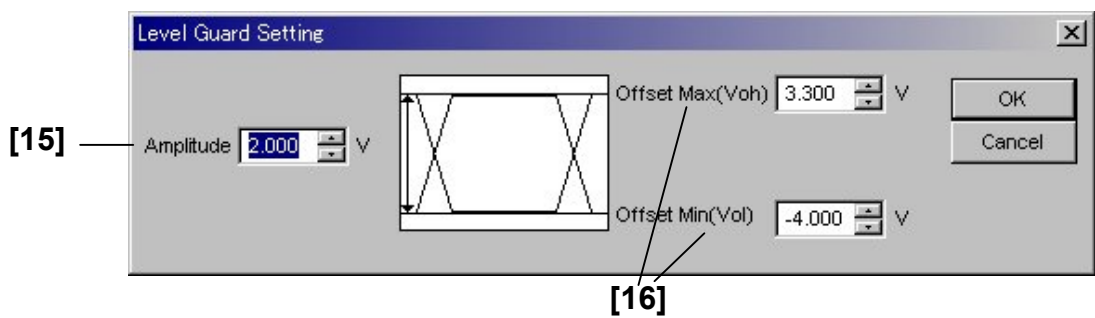


Figure 7.3.1.2-2 Level Guard Setting dialog box

Table 7.3.1.2-1 Data/XData setting commands

No.	Setting Items	Commands
[1]	Tracking	:OUTPut:DATA:TRACking
		:OUTPut:DATA:TRACking?
[2]	Level Guard	:OUTPut:DATA:LEVGuard
		:OUTPut:DATA:LEVGuard?
[3]	Defined Interface	:OUTPut:DATA:LEVel
		:OUTPut:DATA:LEVel?
[4]	Amplitude	:OUTPut:DATA:AMPLitude
		:OUTPut:DATA:AMPLitude?
[5]	AC ON/OFF	:OUTPut:DATA:AOFFset
		:OUTPut:DATA:AOFFset?
[6]	Offset	:OUTPut:DATA:OFFSet
		:OUTPut:DATA:OFFSet?
[7]	External ATT Factor	:OUTPut:DATA:ATTFactor
		:OUTPut:DATA:ATTFactor?
[8]	Cross Point	:OUTPut:DATA:CPOint
		:OUTPut:DATA:CPOint?
[9]	Delay (mUI setting)	:OUTPut:DATA:UIPadjust
		:OUTPut:DATA:UIPadjust?
[10]	Delay (ps setting)	:OUTPut:DATA:PADJust
		:OUTPut:DATA:PADJust?
[11]	Delay (ps setting)	:OUTPut:CLOCK:DELay
		:OUTPut:CLOCK:DELay?
[12]	Relative	:OUTPut:DATA:RELative
		:OUTPut:DATA:RELative?
[13]	No label (Relative value setting)	:OUTPut:DATA:RDELay
		:OUTPut:DATA:RDELay?
[14]	Calibration	:OUTPut:DATA:PCALibration
[15]	Amplitude max	:OUTPut:DATA:LIMitter:AMPLitude
		:OUTPut:DATA:LIMitter:AMPLitude?
[16]	Offset max/min	:OUTPut:DATA:LIMitter:OFFSet
		:OUTPut:DATA:LIMitter:OFFSet?
[17]	No label (Query for status)	:CALCulate:DATA:MONitor?
[18]	No label (Query for data/clock output setting completion status)	:OUTPut:CHANge:CState?
[19]	Jitter Input	:OUTPut:DATA:JINPut
		:OUTPut:DATA:JINPut?
[20]	Unit Offset	:OUTPut:DATA:UDELay:OFFSet
		:OUTPut:DATA:UDELay:OFFSet?

### **:OUTPut:DATA:TRACking <boolean>**

---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> OFF or 0                      Common setting OFF ON or 1                        Common setting ON
Function	Sets the common setting for the Data and XData output ON or OFF.
Example	To set the common setting ON: > :OUTPut:DATA:TRACking ON
Compatibility	Incompatible with existing models.

### **:OUTPut:DATA:TRACking?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0                                Common setting OFF 1                                Common setting ON
Function	Queries the common setting for the Data and XData outputs ON/OFF state.
Example	> :OUTPut:DATA:TRACking? < 1
Compatibility	Incompatible with existing models.

### **:OUTPut:DATA:LEVGuard <boolean>**

---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> OFF or 0                      Output range limitation OFF ON or 1                        Output range limitation ON
Function	Sets the data output range limitation ON or OFF.
Example	To set the data output range limitation ON: > :OUTPut:DATA:LEVGuard ON
Compatibility	Incompatible with existing models.

### **:OUTPut:DATA:LEVGuard?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0                                Output range limitation OFF 1                                Output range limitation ON
Function	Queries the data output range limitation ON/OFF state.
Example	> :OUTPut:DATA:LEVGuard? < 1
Compatibility	Incompatible with existing models.



**:OUTPut:DATA:LEVel <port>,<level>**


---

Parameter	<port> = <CHARACTER PROGRAM DATA> DATA                   Data output XDATA                   XData output <level> = <CHARACTER PROGRAM DATA> VARiable               Variable NECL                    NECL level PCML                    PCML level NCML                    NCML level SCFL                    SCFL level LVPecl                  LVPECL level LVDS200                 LVDS200 mV LVDS400                 LVDS400 mV
Function	Sets the level of the fixed interface for the data output.
Example	To set the level of the XData output to the NECL level: > :OUTPut:DATA:LEVel XDATA,NECL
Compatibility	Compatible with the MP1632C.

**:OUTPut:DATA:LEVel? <port>**


---

Parameter	<port> = <CHARACTER PROGRAM DATA> DATA, XDATA
Response	<level> = <CHARACTER RESPONSE DATA> VAR, PCML, NCML, SCFL, NECL, LVP, LVDS200, LVDS400
Function	Queries the level of the fixed interface for the data output.
Example	To query the level of the XData output: > :OUTPut:DATA:LEVel? XDATA < NECL
Compatibility	Compatible with the MP1632C.

### **:OUTPut:DATA:AMPLitude <port>,<numeric>**

Parameter	<port> = <CHARACTER PROGRAM DATA> DATA DATA output XDATA XData output
	<numeric> = <DECIMAL NUMERIC PROGRAM DATA>
	0.050 to 0.800 0.050 to 0.800 V, in 0.002 V steps (MU181020A-x10)
	0.250 to 2.500 0.250 to 2.500 V, in 0.002 V steps (MU181020A-x11, MU181020B-x11)
	0.050 to 2.000 0.050 to 2.000 V, in 0.002 V steps (MU181020A-x12, MU181020B-x12)
	0.500 to 3.500 0.500 to 3.500 V, in 0.002 V steps (MU181020A-x13, MU181020B-x13)
Function	Sets the amplitude of the data output.
Example	To set the amplitude of the Data output to 1.000 V: > :OUTPut:DATA:AMPLitude DATA,1.000
Compatibility	Compatible with the MP1632C.

### **:OUTPut:DATA:AMPLitude? <port>**

Parameter	<port> = <CHARACTER PROGRAM DATA> DATA, XDATA
Response	<numeric> = <NR2 NUMERIC RESPONSE DATA> 0.050 to 3.500 0.050 to 3.500 V
Function	Queries the amplitude of the data output.
Example	To query the amplitude of the Data output: > :OUTPut:DATA:AMPLitude? DATA < 1.000
Compatibility	Compatible with the MP1632C.

### **:OUTPut:DATA:AOFFset <boolean>**

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> OFF or 0 Offset OFF (DC output) ON or 1 Offset ON (AC output)
Function	Sets the data output offset ON or OFF
Example	To set the data output offset ON: > :OUTPut:DATA:AOFFset ON
Compatibility	Incompatible with existing models.

**:OUTPut:DATA:AOFFset?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	0                      Offset OFF
	1                      Offset ON
Function	Queries the data output offset ON/OFF state.
Example	> :OUTPut:DATA:AOFFset? < 1
Compatibility	Incompatible with existing models.

**:OUTPut:DATA:OFFSet <port>, <numeric>**

Parameter	<port> = <CHARACTER PROGRAM DATA>
	DATA                      Data output
	XDATA                      XData output
	<numeric> = <DECIMAL NUMERIC PROGRAM DATA>
	-2.000 to 3.300              -2.000 to 3.300 Voh (MU181020A-x10, x11, x12, x13, MU181020B-x11, x12, x13)
	-2.500 to 3.225              -2.500 to 3.225 Vth (MU181020A-x10)
	-3.250 to 3.175              -3.250 to 3.175 Vth (MU181020A-x11, MU181020B-x11)
	-3.000 to 3.275              -3.000 to 3.275 Vth (MU181020A-x12, MU181020B-x12)
	-3.000 to 3.050              -3.000 to 3.050 Vth (MU181020A-x13, MU181020B-x13)
	-3.000 to 3.250              -3.000 to 3.250 Vol (MU181020A-x10)
	-4.500 to 3.050              -4.500 to 3.050 Vol (MU181020A-x11, MU181020B-x11)
	-4.000 to 3.250-              4.000 to 3.250 Vol (MU181020A-x12, MU181020B-x12)
	-4.000 to 2.800              -4.000 to 2.800 Vol (MU181020A-x13, MU181020B-x13) In 0.001 V steps
Function	Sets the data output offset. The setting range varies depending on the offset reference setting.
Example	To set the XData output offset to 1.000 V (Voh): > :OUTPut:DATA:OFFSet XDATA,1.000
Compatibility	Compatible with the MP1632C.

**:OUTPut:DATA:OFFSet? <port>**

Parameter	<port> = <CHARACTER PROGRAM DATA> DATA, XDATA	
Response	<numeric> = <NR2 NUMERIC RESPONSE DATA>	
	-2.000 to 3.300	-2.000 to 3.300 Voh (MU181020A-x10, x11, x12 x13, MU181020B-x11, x12 x13)
	-2.500 to 3.225	-2.500 to 3.225 Vth (MU181020A-x10)
	-3.250 to 3.175	-3.250 to 3.175 Vth (MU181020A-x11, MU181020B-x11)
	-3.000 to 3.275	-3.000 to 3.275 Vth (MU181020A-x12, MU181020B-x12)
	-3.000 to 3.050	-3.000 to 3.050 Vth (MU181020A-x13, MU181020B-x13)
	-3.000 to 3.250	-3.000 to 3.250 Vol (MU181020A-x10)
	-4.500 to 3.050	-4.500 to 3.050 Vol (MU181020A-x11, MU181020B-x11)
	-4.000 to 3.250	-4.000 to 3.250 Vol (MU181020A-x12, MU181020B-x12)
	-4.000 to 2.800	-4.000 to 2.800 Vol (MU181020A-x13, MU181020B-x13)
Function	Queries the data output offset.	
Example	To query the XData output offset: > :OUTPut:DATA:OFFSet? XDATA < 1.000	
Compatibility	Compatible with the MP1632C.	

**:OUTPut:DATA:ATTFactor <port>,<numeric>**

Parameter	<port> = <CHARACTER PROGRAM DATA> DATA                      Data output XDATA                      XData output	
	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0 to 40                      0 to 40 dB, in 1 dB steps	
Function	Sets the External ATT Factor of the data output.	
Example	To set the External ATT Factor of the Data output to 20 dB: > :OUTPut:DATA:ATTFactor DATA, 20	
Compatibility	Incompatible with existing models.	

**:OUTPut:DATA:ATTFactor? <port>**

---

Parameter	<code>&lt;port&gt;</code> = <CHARACTER PROGRAM DATA> DATA, XDATA
Response	<code>&lt;numeric&gt;</code> = <NR1 NUMERIC RESPONSE DATA> 0 to 40                                0 to 40 dB, in 1 dB steps
Function	Queries the External ATT Factor of the Data output.
Example	<code>&gt; :OUTPut:DATA:ATTFactor? DATA</code> <code>&lt; 20</code>
Compatibility	Incompatible with existing models.

**:OUTPut:DATA:CPOint <port>, <numeric>**

---

Parameter	<code>&lt;port&gt;</code> = <CHARACTER PROGRAM DATA> DATA                                Data output XDATA                                XData output <code>&lt;numeric&gt;</code> = <DECIMAL NUMERIC PROGRAM DATA> 30 to 70                                30 to 70%, in 1% steps (MU181020A-x10, x11, MU181020B-x11) 20 to 80                                20 to 80%, in 1% steps (MU181020A-x12, MU181020B-x12) 20.0 to 90.0                            20.0 to 90.0%, in 0.1% steps (MU181020A-x13, MU181020B-x13)
Function	Sets the data output crosspoint.
Example	To set the crosspoint of the XData output to 60%: <code>&gt; :OUTPut:DATA:CPOint XDATA, 60</code>
Compatibility	Compatible with some parameters of the MP1632C (25 to 75%, in 1% steps).

### **:OUTPut:DATA:CPoint? <port>**

---

Parameter	<port> = <CHARACTER PROGRAM DATA> DATA, XDATA
Response	<numeric> = <NR2 NUMERIC RESPONSE DATA> 20 to 80                    20 to 80%, in 1% steps (MU181020A-x10, x11, x12, MU181020B-x11, x12)  <numeric> = <NR2 NUMERIC RESPONSE DATA> 20.0 to 90.0                20.0 to 90.0%, in 0.1% steps (MU181020A-x13, MU181020B-x13)
Function	Queries the data output crosspoint.
Example	To query the crosspoint of the XData output: > :OUTPut:DATA:CPoint? XDATA < 60
Compatibility	Compatible with some parameters of the MP1632C (25 to 75%, in 1% steps).

### **:OUTPut:DATA:UIPadjust <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> -1000 to 1000                -1000 to 1000 mUI, in 1 mUI steps -64000 to 64000              -64000 to 64000 mUI, in 1 mUI steps (In the case of Combination)
Function	Sets the common phase for the Data and XData outputs in mUI units.
Example	To set the common phase to 500 mUI: > :OUTPut:DATA:UIPadjust 500
Compatibility	Incompatible with existing models.

### **:OUTPut:DATA:UIPadjust?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> -1000 to 1000                -1000 to 1000 mUI, in 1 mUI steps -64000 to 64000              -64000 to 64000 mUI, in 1 mUI steps (In the case of Combination)
Function	Queries the common phase for the Data and XData outputs in mUI units.
Example	To query the common phase in mUI units: > :OUTPut:DATA:UIPadjust? < 500
Compatibility	Incompatible with existing models.

**:OUTPut:DATA:PADJust <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> -10000 to 10000      -10000 to 10000 ps, in 10 ps steps (at 0.1 GHz) -80 to 80              -80 to 80 ps, in 0.08 ps steps (at 12.5 GHz) Converted from the calculated frequency value, based on the setting resolution of mUI.
Function	Sets the common phase for the Data and XData outputs in ps units. The specified value may not be exactly set as is, due to the limitation of the setting resolution. In this event, the value is adjusted to the most approximate value and set.
Example	To set the common phase to 100 ps: > :OUTPut:DATA:PADJust 100
Compatibility	Incompatible with existing models.

**:OUTPut:DATA:PADJust?**


---

Response	<numeric> = <NR2 NUMERIC RESPONSE DATA> -10000 to 10000      -10000 to 10000 ps, in 10 ps steps (at 0.1 GHz) -80 to 80              -80 to 80 ps, in 0.08ps steps (at 12.5 GHz) Converted from the calculated frequency value, based on the setting resolution of mUI.
Function	Queries the common phase for the Data and XData outputs in ps units.
Example	To query the common phase in ps units: > :OUTPut:DATA:PADJust? < 100
Compatibility	Incompatible with existing models.

**:OUTPut:CLOCK:DELAy <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> -10000 to 10000      -10000 to 10000 ps, in 10 ps steps (at 0.1 GHz) -80 to 80              -80 to 80 ps, in 0.08 ps steps (at 12.5 GHz) Converted from the calculated frequency value, based on the setting resolution of mUI.
Function	Sets the data output delay in ps units. The specified value may not be exactly set as is, due to the limitation of the setting resolution. In this event, the value is adjusted to the most approximate value and set.
Example	To set the data output delay to 100 ps: > :OUTPut:CLOCK:DELAy 100
Compatibility	Compatible with the MP1632C.

---

### **:OUTPut:CLOCK:DELAy?**

Response	<p>&lt;numeric&gt; = &lt;NR2 NUMERIC RESPONSE DATA&gt;</p> <p>-10000 to 10000      -10000 to 10000 ps, in 10 ps steps (at 0.1 GHz)</p> <p>-80 to 80              -80 to 80 ps, in 0.08 ps steps (at 12.5 GHz)</p> <p>Converted from the calculated frequency value, based on the setting resolution of mUI.</p>
Function	Queries the data output delay in ps units.
Example	<p>To query the data output delay in ps units:</p> <p>&gt; :OUTPut:CLOCK:DELAy?</p> <p>&lt; 100</p>
Compatibility	Compatible with the MP1632C.

### **:OUTPut:DATA:RELative <boolean>**

Parameter	<p>&lt;boolean&gt; = &lt;BOOLEAN PROGRAM DATA&gt;</p> <p>0 or OFF              Reference OFF</p> <p>1 or ON                Reference ON</p>
Function	Sets the data output delay reference ON or OFF.
Example	<p>To set the data output delay reference ON:</p> <p>&gt; :OUTPut:DATA:RELative ON</p>
Compatibility	Incompatible with existing models.

### **:OUTPut:DATA:RELative?**

Response	<p>&lt;numeric&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;</p> <p>0                        Reference OFF</p> <p>1                        Reference ON</p>
Function	Queries the data output delay reference setting (ON/OFF).
Example	<p>To query the data output delay reference setting:</p> <p>&gt; :OUTPut:DATA:RELative?</p> <p>&lt; 1</p>
Compatibility	Incompatible with existing models.



**:OUTPut:DATA:RDElay <numeric>[,<unit>]**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> -2000 to 2000            -2000 to 2000 mUI, in 1 mUI steps XXXXX.XX                Converted from the calculated frequency value, based on the setting resolution of mUI.  [<unit>] = <CHARACTER PROGRAM DATA> UI                        mUI units PS                        ps units The ps unit is selected when [<unit>] is omitted.
Function	Sets the value and unit of the data output delay reference. Set a value using a difference from the reference value. The specified value may not be exactly set as is when the ps unit is set, due to the limitation of the setting resolution. The value is adjusted to the most approximate value and set in this event.
Example	To set the value for the data output delay reference to -1000 mUI: > :OUTPut:DATA:RDElay -1000,UI
Compatibility	Incompatible with existing models.

**:OUTPut:DATA:RDElay? [<unit>]**

Parameter	[<unit>] = <CHARACTER PROGRAM DATA> UI                        mUI units PS                        ps units The ps unit is selected when [<unit>] is omitted.
Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> -2000 to 2000            -2000 to 2000 mUI, in 1 mUI steps XXXXX.XX                Converted from the calculated frequency value, based on the setting resolution of mUI.
Function	Queries the value and unit of the data output delay reference.
Example	To query the value of the data output delay reference in UI units: > :OUTPut:DATA:RDElay? UI < -1000
Compatibility	Incompatible with existing models.

**:OUTPut:DATA:PCALibration**

Function	Executes calibration for Data and XData output phases.
Example	> :OUTPut:DATA:PCALibration
Compatibility	Incompatible with existing models.

**:OUTPut:DATA:LIMitter:AMPLitude <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0.050 to 0.800            0.050 to 0.800 V (MU181020A-x10) 0.250 to 2.500            0.250 to 2.500 V (MU181020A-x11, MU181020B-x11) 0.050 to 2.000            0.050 to 2.000 V (MU181020A-x12, MU181020B-x12) 0.500 to 3.500            0.500 to 3.500 V (MU181020A-x13, MU181020B-x13) In 0.002 V steps
Function	Sets the limitation value for the data output amplitude.
Example	To set the limitation value for the data output amplitude to 2.000 V: > :OUTPut:DATA:LIMitter:AMPLitude 2.000
Compatibility	Incompatible with existing models.

**:OUTPut:DATA:LIMitter:AMPLitude?**

---

Response	<numeric> = <NR2 NUMERIC RESPONSE DATA> 0.050 to 0.800            0.050 to 0.800 V (MU181020A-x10) 0.250 to 2.500            0.250 to 2.500 V (MU181020A-x11, MU181020B-x11) 0.050 to 2.000            0.050 to 2.000 V (MU181020A-x12, MU181020B-x12) 0.500 to 3.500            0.500 to 3.500 V (MU181020A-x13, MU181020B-x13) In 0.002 V steps
Function	Queries the limitation value for the data output amplitude.
Example	> :OUTPut:DATA:LIMitter:AMPLitude? < 2.000
Compatibility	Incompatible with existing models.

**:OUTPut:DATA:LIMitter:OFFSet <max>,<min>**

Parameter	<max> = <DECIMAL NUMERIC PROGRAM DATA> -2.000 to 3.300            -2.000 to 3.300 Voh (MU181020A-x10, x11, x12, x13, MU181020B-x11, x12, x13) In 0.001 V steps  <min> = <DECIMAL NUMERIC PROGRAM DATA> -2.800 to 3.250            -2.800 to 3.250 Vol (MU181020A-x10) -4.500 to 3.050            -4.500 to 3.050 Vol (MU181020A-x11, MU181020B-x11) -4.000 to 3.250            -4.000 to 3.250 Vol (MU181020A-x12, MU181020B-x12) -4.000 to 2.800            -4.000 to 2.800 Vol (MU181020A-x13, MU181020B-x13) In 0.001 V steps
Function	Sets the limitation value for the data output offset.
Example	To set the limitation value for the data output offset to 3.000 Voh max., -2.000 Vol min.: > :OUTPut:DATA:LIMitter:OFFSet 3.000, -2.000
Compatibility	Incompatible with existing models.

**:OUTPut:DATA:LIMitter:OFFSet?**

Response	<max> = <NR2 NUMERIC RESPONSE DATA> -2.000 to 3.300            -2.000 to 3.300 Voh (MU181020A-x10, x11, x12, x13, MU181020B-x11, x12, x13) In 0.001 V steps  <min> = <NR2 NUMERIC RESPONSE DATA> -2.800 to 3.250            -2.800 to 3.250 Vol (MU181020A-x10) -4.500 to 3.050            -4.500 to 3.050 Vol (MU181020A-x11, MU181020B-x11) -4.000 to 3.250            -4.000 to 3.250 Vol (MU181020A-x12, MU181020B-x12) -4.000 to 2.800            -4.000 to 2.800 Vol (MU181020A-x13, MU181020B-x13) In 0.001 V steps
Function	Queries the limitation value for the data output offset.
Example	> :OUTPut:DATA:LIMitter:OFFSet? < 3.000,-2.000
Compatibility	Incompatible with existing models.

**:CALCulate:DATA:MONitor? <item>**

Parameter	<item> = <STRING RESPONSE DATA>
	"DBS"                      Delay busy
	"CAL"                      Required Calibration
Response	<string> = <STRING RESPONSE DATA>

**Table 7.3.1.2-2 Response**

Form	Format	Description
Form1	"Occur"	When an alarm occurs
	"Not occur"	When no alarm occurs
	"-----"	When no data corresponds to the query

Function	Queries the alarm occurrence state for the monitoring item corresponding to the parameter.
Example	To query the Delay Error occurrence state: > :CALCulate:DATA:MONitor? "DBS" < "Occur"
Compatibility	Incompatible with existing models.

**:OUTPut:CHANge:CSTate?**

Response	<state> = <NR1 NUMERIC RESPONSE DATA>
	0                              Amplitude and Offset settings of Data/Xdata and Clock/Xclock have been changed completely.
	1                              Amplitude or Offset setting of Data/Xdata or Clock/Xclock is being changed.
Function	Queries the completion status of changing of data output and clock output settings.
Example	> :OUTPut:CHANge:CSTate? < 1
Compatibility	Incompatible with existing models.

**:OUTPut:DATA:JINPut <boolean>**

Parameter	<boolean> = <BOOLEAN PROGRAM DATA>
	0 or OFF                      Jitter input OFF setting
	1 or ON                        Jitter input ON setting
Function	When a jitter is added to the input signal, the Feedback process for Delay must be set to OFF. When a jitter is added, set the Jitter Input button to ON, using this command. When a jitter is not added, set the Jitter Input button to OFF.
Example	To set the Jitter Input button to ON when a jitter is added: > :OUTPut:DATA:JINPut ON
Compatibility	Incompatible with existing models.

**:OUTPut:DATA:JINPut?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0                                   Jitter input OFF setting 1                                   Jitter input ON setting
Function	Queries the Jitter Input button setting.
Example	> :OUTPut:DATA:JINPut? < 1
Compatibility	Incompatible with existing models.

**:OUTPut:DATA:UDELay:OFFSet <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> -64000 to 64000                   -64000 to 64000 mUI/1 mUI Step
Function	Sets the unit of the Delay offset value.
Example	To set the Delay offset to 500 mUI. > :OUTPut:DATA:UDELay:OFFSet 500
Compatibility	Incompatible with existing models.

**:OUTPut:DATA:UDELay:OFFSet?**


---

Response	<numeric> = <NR2 NUMERIC RESPONSE DATA> -64000 to 64000                   -64000 to 64000 mUI/1 mUI Step
Function	Queries the Delay offset value
Example	> :OUTPut:DATA:UDELay:OFFSet? < 500
Compatibility	Incompatible with existing models.

### 7.3.1.3 Clock/XClock setting commands

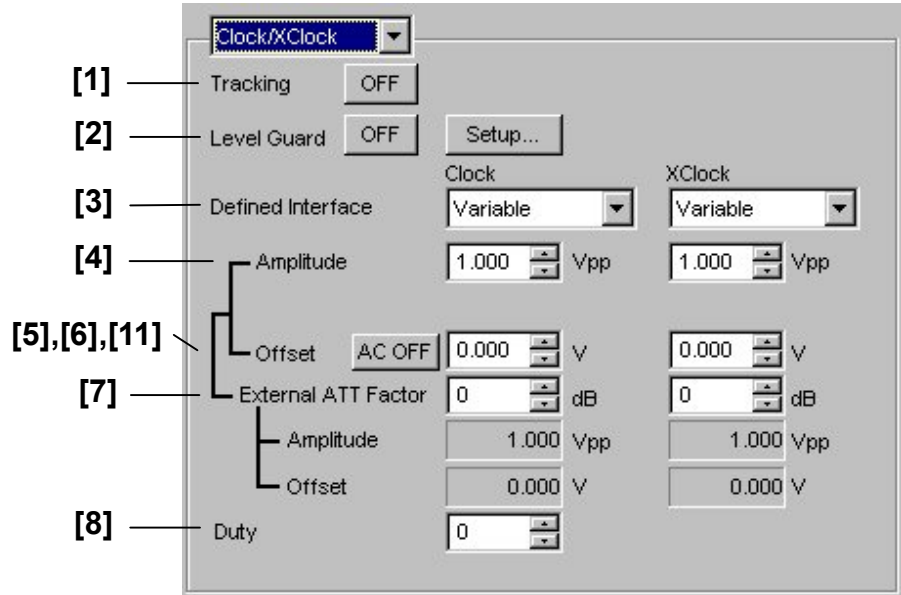


Figure 7.3.1.3-1 Clock/XClock setting field

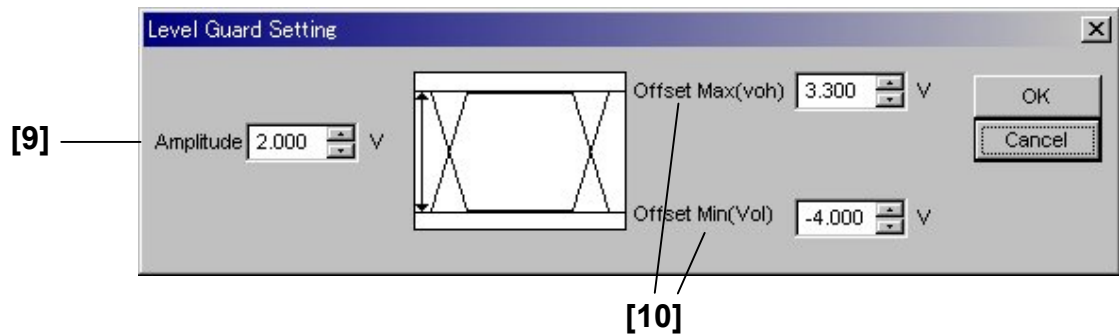


Figure 7.3.1.3-2 Level Guard setting dialog box

Table 7.3.1.3-1 Clock/XClock setting commands

No.	Setting Items	Commands
[1]	Tracking	:OUTPut:CLOCK:TRACking
		:OUTPut:CLOCK:TRACking?
[2]	Level Guard	:OUTPut:CLOCK:LEVGuard
		:OUTPut:CLOCK:LEVGuard?
[3]	Defined Interface	:OUTPut:CLOCK:LEVel
		:OUTPut:CLOCK:LEVel?
[4]	Amplitude	:OUTPut:CLOCK:AMPLitude
		:OUTPut:CLOCK:AMPLitude?
[5]	AC ON/OFF	:OUTPut:CLOCK:AOFFset
		:OUTPut:CLOCK:AOFFset?
[6]	Offset	:OUTPut:CLOCK:OFFSet
		:OUTPut:CLOCK:OFFSet?
[7]	External ATT Factor	:OUTPut:CLOCK:ATTFactor
		:OUTPut:CLOCK:ATTFactor?
[8]	Duty	:OUTPut:CLOCK:DUTY
		:OUTPut:CLOCK:DUTY?
[9]	Amplitude	:OUTPut:CLOCK:LIMitter:AMPLitude
		:OUTPut:CLOCK:LIMitter:AMPLitude?
[10]	Offset Max/Min	:OUTPut:CLOCK:LIMitter:OFFSet
		:OUTPut:CLOCK:LIMitter:OFFSet?
[11]	No label (Query for data/clock output setting completion status)	:OUTPut:CHANge:CSTate? Refer to Section 7.3.1.2 "Data/XData setting commands" for details on this command.

### **:OUTPut:CLOCK:TRACking <boolean>**

---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> OFF or 0                      Common setting OFF ON or 1                        Common setting ON
Function	Sets the common setting for the Clock and XClock output ON or OFF.
Example	To set the common setting ON: > :OUTPut:CLOCK:TRACking ON
Compatibility	Incompatible with existing models.

### **:OUTPut:CLOCK:TRACking?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0                                Common setting OFF 1                                Common setting ON
Function	Queries the common setting for the Clock and XClock outputs ON/OFF state.
Example	> :OUTPut:CLOCK:TRACking? < 1
Compatibility	Incompatible with existing models.

### **:OUTPut:CLOCK:LEVGuard <boolean>**

---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> OFF or 0                      Output range limitation OFF ON or 1                        Output range limitation ON
Function	Sets the click output range limitation ON or OFF.
Example	To set the clock output range limitation ON: > :OUTPut:CLOCK:LEVGuard ON
Compatibility	Incompatible with existing models.

### **:OUTPut:CLOCK:LEVGuard?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0                                Output range limitation OFF 1                                Output range limitation ON
Function	Queries the clock output range limitation ON/OFF state.
Example	> :OUTPut:CLOCK:LEVGuard? < 1
Compatibility	Incompatible with existing models.



**:OUTPut:CLOCK:LEVel <port>,<level>**


---

Parameter	<port> = <CHARACTER PROGRAM DATA> CLOCK                      Clock output XCLOCK                    XCLOCK output <level> = <CHARACTER PROGRAM DATA> VARIABLE                  Variable NECL                       NECL level PCML                       PCML level NCML                       NCML level SCFL                       SCFL level LVPECL                    LVPECL level LVDS200                   LVDS200 mV LVDS400                   LVDS400 mV
Function	Sets the level of the fixed interface for the clock output.
Example	To set the level of the Clock output to the NECL level: > :OUTPut:CLOCK:LEVel CLOCK,NECL
Compatibility	Compatible with the MP1632C.

**:OUTPut:CLOCK:LEVel? <port>**


---

Parameter	<port> = <CHARACTER PROGRAM DATA> CLOCK, XCLOCK
Response	<level> = <CHARACTER RESPONSE DATA> VAR,NECL,PCML,NCML,SCFL,LVP,LVDS200,LVDS400
Function	Queries the level of the fixed interface for the clock output.
Example	> :OUTPut:CLOCK:LEVel? CLOCK < NECL
Compatibility	Incompatible with existing models.

**:OUTPut:CLOCK:AMPLitude <port>,<numeric>**


---

Parameter	<port> = <CHARACTER PROGRAM DATA> CLOCK                      Clock output XCLOCK                    XCLOCK output <numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0.100 to 2.000            0.100 to 2.000 V, in 0.002 V steps (MU181020A-x21, MU181020B-x21)
Function	Sets the amplitude of the clock output.
Example	To set the amplitude of the Clock output to 1.000 V: > :OUTPut:CLOCK:AMPLitude CLOCK,1.000
Compatibility	Compatible with the MP1632C.

---

### **:OUTPut:CLOCK:AMPLitude? <port>**

---

Parameter	<code>&lt;port&gt;</code> = <CHARACTER PROGRAM DATA> CLOCK, XCLock	
Response	<code>&lt;numeric&gt;</code> = <NR2 NUMERIC RESPONSE DATA> 0.100 to 2.000                 0.100 to 2.000 V, in 0.002 V steps (MU181020A-x21, MU181020B-x21)	
Function	Queries the amplitude of the clock output.	
Example	To query the amplitude of the Clock output: > :OUTPut:CLock:AMPLitude? CLock < 1.000	
Compatibility	Compatible with the MP1632C.	

---

### **:OUTPut:CLOCK:AOFFset <boolean>**

---

Parameter	<code>&lt;boolean&gt;</code> = <BOOLEAN PROGRAM DATA> OFF or 0                     Offset OFF (DC output) ON or 1                     Offset ON (AC output)	
Function	Sets the clock output offset ON or OFF	
Example	To set the clock output offset ON: > :OUTPut:CLock:AOFFset ON	
Compatibility	Incompatible with existing models.	

---

### **:OUTPut:CLOCK:AOFFset?**

---

Response	<code>&lt;numeric&gt;</code> = <NR1 NUMERIC RESPONSE DATA> 0                     Offset OFF 1                     Offset ON	
Function	Queries the clock output offset ON/OFF state.	
Example	> :OUTPut:CLock:AOFFset? < 1	
Compatibility	Incompatible with existing models.	

**:OUTPut:CLOCK:OFFSet <port>,<numeric>**


---

Parameter	<port> = <CHARACTER PROGRAM DATA> CLOCK                      Clock output XCLock                     XClock output <numeric> = <DECIMAL NUMERIC PROGRAM DATA> -2.000 to 3.300           -2.000 to 3.300 Voh, in 0.001 V steps -3.000 to 3.250           -3.000 to 3.250 Vth, in 0.001 V steps -4.000 to 3.200           -4.000 to 3.200 Vol, in 0.001 V steps
Function	Sets the Clock output offset (for MU181020A-x21, MU181020B-x21only).
Example	To set the XCLock output offset to -1.000 V (Voh): > :OUTPut:CLOCK:OFFSet XCLock,-1.000
Compatibility	Partially compatible with the MP1632C.

**:OUTPut:CLOCK:OFFSet? <port>**


---

Parameter	<port> = <CHARACTER PROGRAM DATA> CLOCK, XCLock
Response	<numeric> = <NR2 NUMERIC RESPONSE DATA> -2.000 to 3.300           -2.000 to 3.300 Voh -3.000 to 3.250           -3.000 to 3.250 Vth -4.000 to 3.200           -4.000 to 3.200 Vol
Function	Queries the Clock output offset.
Example	To query the XCLock output offset: > :OUTPut:CLOCK:OFFSet? XCLock < -1.000
Compatibility	Partially compatible with the MP1632C.

**:OUTPut:CLOCK:ATTFactor <port>,<numeric>**


---

Parameter	<port> = <CHARACTER PROGRAM DATA> CLOCK                      Clock output XCLock                     XClock output <numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0 to 40                    0 to 40 dB, in 1 dB steps
Function	Sets the External ATT factor of the Clock output.
Example	To set the External ATT factor of the Clock output to 20 dB: > :OUTPut:CLOCK:ATTFactor CLOCK,20
Compatibility	Incompatible with existing models.



**:OUTPut:ClOCK:LIMitter:AMPLitude?**

Response	<numeric> = <NR2 NUMERIC RESPONSE DATA> 0.100 to 2.000            0.100 to 2.000 V (MU181020A-x21, MU181020B-x21)
Function	Queries the limitation value for the clock output amplitude.
Example	> :OUTPut:ClOCK:LIMitter:AMPLitude? < 2.000
Compatibility	Incompatible with existing models.

**:OUTPut:ClOCK:LIMitter:OFFSet <max>,<min>**

Parameter	<max> = <DECIMAL NUMERIC PROGRAM DATA> -2.000 to 3.300            -2.000 to 3.300 V, in 0.001 V steps <min> = <DECIMAL NUMERIC PROGRAM DATA> -4.000 to 3.200            -4.000 to 3.200 V, in 0.001 V steps
Function	Sets the limitation value for the clock output offset (for MU181020A-x21, MU181020B-x21 only).
Example	To set the limitation value for the clock output offset to 3.000 V max., -4.000 V min.: > :OUTPut:ClOCK:LIMitter:OFFSet 3.000, -4.000
Compatibility	Incompatible with existing models.

**:OUTPut:ClOCK:LIMitter:OFFSet?**

Response	<max> = <NR2 NUMERIC RESPONSE DATA> -2.000 to 3.300            -2.000 to 3.300 V <min> = <NR2 NUMERIC RESPONSE DATA> -4.000 to 3.200            -4.000 to 3.200 V
Function	Queries the limitation value for the clock output offset.
Example	> :OUTPut:ClOCK:LIMitter:OFFSet? < 3.000,-4.000
Compatibility	Incompatible with existing models.

7.3.1.4 CMU Bit Rate setting commands

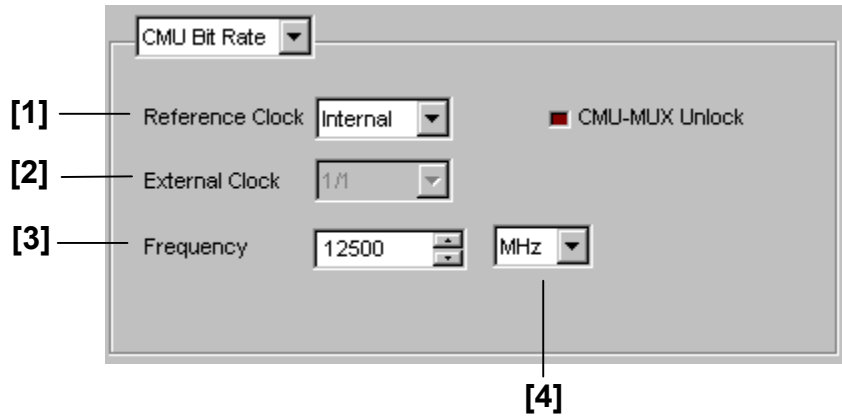


Figure 7.3.1.4-1 CMU Bit Rate setting field (when Reference Clock is set to Internal)

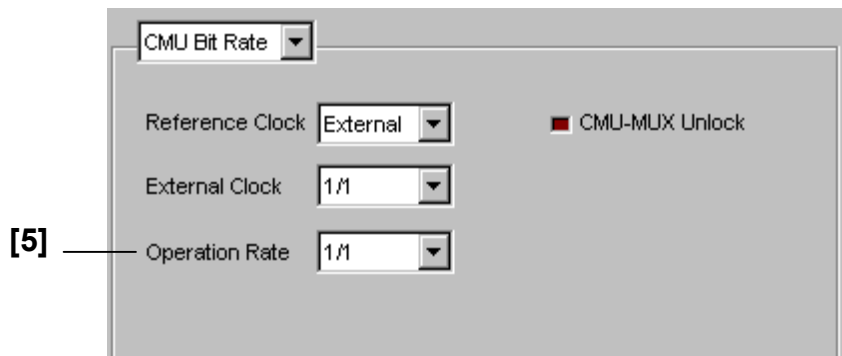


Figure 7.3.1.4-2 CMU Bit Rate setting field (when Reference Clock is set to External)

Table 7.3.1.4-1 CMU Bit Rate setting commands

No.	Setting Items	Commands
[1]	Reference Clock	:OUTPut:CMU:REFClock
		:OUTPut:CMU:REFClock?
[2]	External Clock	:OUTPut:CMU:EXTClock
		:OUTPut:CMU:EXTClock?
[3]	Frequency	:OUTPut:CMU:FREQuency
		:OUTPut:CMU:FREQuency?
[4]	No label (Unit setting)	:OUTPut:CMU:RESolution
		:OUTPut:CMU:RESolution?
[5]	Operation Rate	:OUTPut:CMU:OPERation
		:OUTPut:CMU:OPERation?

**:OUTPut:CMU:REFClock <mode>**


---

Parameter	<mode> = <CHARACTER PROGRAM DATA> INTernal                      Uses the internal reference signal. EXTernal                      Uses the external reference signal.
Function	Selects whether to use the internal reference signal or the external reference signal for the clock reference signal.
Example	To select the internal reference signal (Internal) for the clock reference signal: > :OUTPut:CMU:REFClock INTernal
Compatibility	Incompatible with existing models.

**:OUTPut:CMU:REFClock?**


---

Response	<mode> = <CHARACTER RESPONSE DATA> INT, EXT
Function	Queries the clock reference signal.
Example	> :OUTPut:CMU:REFClock? < INT
Compatibility	Incompatible with existing models.

**:OUTPut:CMU:EXTClock <source>**


---

Parameter	<source> = <CHARACTER PROGRAM DATA> 1_1                              1/1 clock 1_64                              1/64 clocks
Function	Sets the division cycle when the external reference signal is used.
Example	To set the division cycle to 1/1 clock: > :OUTPut:CMU:EXTClock 1_1
Compatibility	Incompatible with existing models.

**:OUTPut:CMU:EXTClock?**


---

Response	<source> = <CHARACTER RESPONSE DATA> 1_1, 1_64
Function	Queries the division cycle when the external reference signal is used.
Example	> :OUTPut:CMU:EXTClock? < 1_1
Compatibility	Incompatible with existing models.

**:OUTPut:CMU:FREQuency <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> When the operation frequency setting resolution is MHz: 1225 to 1562            1225 to 1562 MHz, in 1 MHz steps 2450 to 3125            2450 to 3125 MHz, in 1 MHz steps 4900 to 6250            4900 to 6250 MHz, in 1 MHz steps 9800 to 12500           9800 to 12500 MHz, in 1 MHz steps When the operation frequency setting resolution is kHz: 1225000 to 1562000    1225000 to 1562000 kHz, in 1 kHz steps 2450000 to 3125000    2450000 to 3125000 kHz, in 1 kHz steps 4900000 to 6250000    4900000 to 6250000 kHz, in 1 kHz steps 9800000 to 12500000   9800000 to 12500000 kHz, in 1 kHz steps The default value is 12500000 kHz.
Function	Sets the operation frequency of the internal synthesizer.
Example	To set the operation frequency of the internal synthesizer to 1225 MHz: > :OUTPut:CMU:FREQuency 1225
Compatibility	Incompatible with existing models.

**:OUTPut:CMU:FREQuency?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> When the operation frequency setting resolution is MHz: 1225 to 1562            1225 to 1562 MHz 2450 to 3125            2450 to 3125 MHz 4900 to 6250            4900 to 6250 MHz 9800 to 12500           9800 to 12500 MHz When the operation frequency setting resolution is kHz: 1225000 to 1562000    1225000 to 1562000 kHz 2450000 to 3125000    2450000 to 3125000 kHz 4900000 to 6250000    4900000 to 6250000 kHz 9800000 to 12500000   9800000 to 12500000 kHz
Function	Queries the operating frequency of the internal synthesizer.
Example	> :OUTPut:CMU:FREQuency? < 1225
Compatibility	Incompatible with existing models.



**:OUTPut:CMU:RESolution <unit>**


---

Parameter	<unit> = <CHARACTER PROGRAM DATA> KHZ                      Sets the kHz unit. MHZ                      Sets the MHz unit.
Function	Selects the resolution for setting the operating frequency of the internal synthesizer.
Example	To set the resolution for setting the operating frequency of the internal synthesizer to kHz: > :OUTPut:CMU:RESolution KHZ
Compatibility	Incompatible with existing models.

**:OUTPut:CMU:RESolution?**


---

Response	<unit> = <CHARACTER RESPONSE DATA> KHZ, MHZ
Function	Queries the resolution for setting the operating frequency of the internal synthesizer.
Example	> :OUTPut:CMU:RESolution? < KHZ
Compatibility	Incompatible with existing models.

**:OUTPut:CMU:OPERation <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 1      Operates with 1/1 of external reference signal (12.5 to 9.8 GHz) 2      Operates with 1/2 of external reference signal (6.25 to 4.9 GHz) 4      Operates with 1/4 of external reference signal (3.125 to 2.45 GHz) 8      Operates with 1/8 of external reference signal (1.5625 to 1.225 GHz)
Function	Sets the operating frequency rate when the external reference signal is used for the reference clock.
Example	To set the operating frequency rate of the internal synthesizer to 1/4 (3.125 to 2.45 GHz): > :OUTPut:CMU:OPERation 4
Compatibility	Incompatible with existing models.

## **:OUTPut:CMU:OPERation?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1 Operates with 1/1 of external reference signal (12.5 to 9.8 GHz) 2 Operates with 1/2 of external reference signal (6.25 to 4.9 GHz) 4 Operates with 1/4 of external reference signal (3.125 to 2.45 GHz) 8 Operates with 1/8 of external reference signal (1.5625 to 1.225 GHz)
Function	Queries the operating frequency rate setting when the external reference signal is used for the reference clock.
Example	> :OUTPut:CMU:OPERation? < 4
Compatibility	Incompatible with existing models.

## 7.3.2 Commands related to Pattern tab window

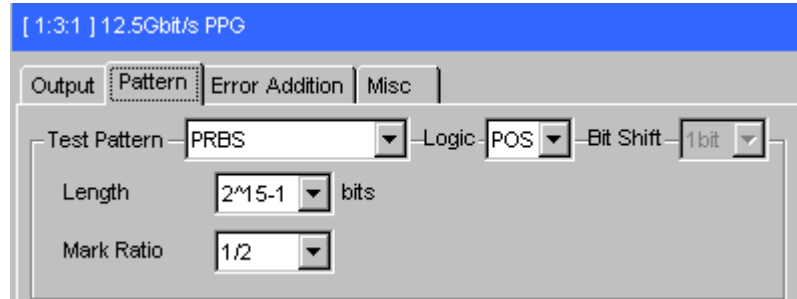


Figure 7.3.2-1 Pattern tab window

### 7.3.2.1 Test Pattern setting commands



Figure 7.3.2.1-1 Test Pattern setting field

Table 7.3.2.1-1 Test Pattern setting commands

No.	Setting Items	Commands
[1]	Test Pattern	:SOURce:PATtern:TYPE
		:SOURce:PATtern:TYPE?
[2]	Logic	:SOURce:PATtern:LOGic
		:SOURce:PATtern:LOGic?

### **:SOURce:PATtern:TYPE <type>**

---

Parameter	<type> = <CHARACTER PROGRAM DATA> PRBS                      PRBS pattern ZSUBstitution            Zero-substitution pattern DATA                     Data pattern ALternate                Alternate pattern MIXData                  Mixed Data pattern MIXalt                    Mixed Alternate pattern SEQuence                 Sequence pattern
Function	Sets the type of the test pattern.
Example	To set the test pattern type to the Mixed Data pattern: > :SOURce:PATtern:TYPE MIXData
Compatibility	Partially compatible with the MP1632C (ZSUBstitution only).

### **:SOURce:PATtern:TYPE?**

---

Response	<type> = <CHARACTER RESPONSE DATA> PRBS, ZSUB, DATA, ALT, MIXD, MIX, SEQ
Function	Queries the type of the test pattern.
Example	> :SOURce:PATtern:TYPE? < MIXD
Compatibility	Partially compatible with the MP1632C (ZSUBstitution only).

### **:SOURce:PATtern:LOGic <logic>**

---

Parameter	<logic> = <CHARACTER PROGRAM DATA> POSitive                  Positive logic NEGative                 Negative logic
Function	Sets the logic (positive or negative) of the test pattern.
Example	To set the logic of the test pattern to the negative logic (NEGative): > :SOURce:PATtern:LOGic NEGative
Compatibility	Incompatible with existing models.

### **:SOURce:PATtern:LOGic?**

---

Response	<logic> = <CHARACTER RESPONSE DATA> POS, NEG
Function	Queries the logic of the test pattern.
Example	> :SOURce:PATtern:LOGic? < NEG
Compatibility	Incompatible with existing models.

## 7.3.2.2 PRBS pattern setting commands

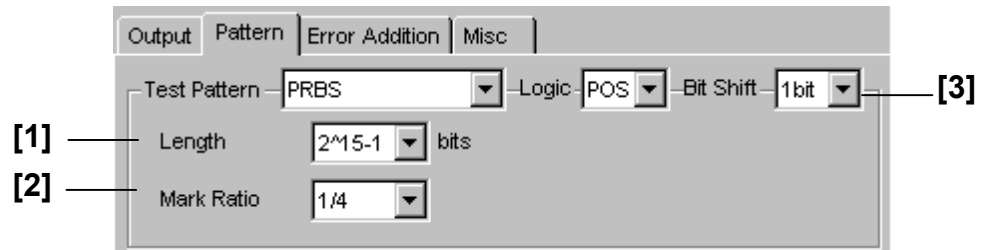


Figure 7.3.2.2-1 PRBS pattern setting

Table 7.3.2.2-1 PRBS pattern setting commands

No.	Setting Items	Commands
[1]	Length	:SOURce:PATTern:PRBS:LENGth
		:SOURce:PATTern:PRBS:LENGth?
[2]	Mark Ratio	:SOURce:PATTern:PRBS:MRATio
		:SOURce:PATTern:PRBS:MRATio?
[3]	Bit Shift	:SOURce:PATTern:PRBS:BSHift
		:SOURce:PATTern:PRBS:BSHift?

**:SOURce:PATtern:PRBS:LENGth <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA>
	7 $2^n - 1$ (n = 7)
	9 $2^n - 1$ (n = 9)
	10 $2^n - 1$ (n = 10)
	11 $2^n - 1$ (n = 11)
	15 $2^n - 1$ (n = 15)
	20 $2^n - 1$ (n = 20)
	23 $2^n - 1$ (n = 23)
	31 $2^n - 1$ (n = 31)
Function	Sets the number of stages ( $2^n - 1$ (n = 7, 9, 10, 11, 15, 20, 23, or 31)) during PRBS pattern generation.
Example	To set PRBS15: > :SOURce:PATtern:PRBS:LENGth 15
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:PRBS:LENGth?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 7, 9, 10, 11, 15, 20, 23, 31
Function	Queries the number of stages during PRBS pattern generation.
Example	> :SOURce:PATtern:PRBS:LENGth? < 15
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:PRBS:MRATio <mratio>**

Parameter	<mratio> = <CHARACTER PROGRAM DATA>
	M1_2                        1/2
	M1_4                        1/4
	M1_8                        1/8
	M0_8                        0/8
	I1_2                        1/2INVT
	M3_4                        3/4
	M7_8                        7/8
	M8_8                        8/8
Function	Sets the mark ratio during PRBS pattern generation.
Example	To set the mark ratio to 1/8: > :SOURce:PATtern:PRBS:MRATio M1_8
Compatibility	Compatible with the MP1632C.

**:SOURce:PATtern:PRBS:MRATio?**


---

Response	<mratio> = <CHARACTER RESPONSE DATA> M1_2, M1_4, M1_8, M0_8, I1_2, M3_4, M7_8, M8_8
Function	Queries the mark ratio during PRBS pattern generation.
Example	> :SOURce:PATtern:PRBS:MRATio? < M1_8
Compatibility	Compatible with the MP1632C.

**:SOURce:PATtern:PRBS:BSHift <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 1                                    1 bit 3                                    3 bits
Function	Sets the bit shift during PRBS pattern generation.
Example	To set the bit shift to 1 bit: > :SOURce:PATtern:PRBS:BSHift 1
Compatibility	Compatible with the MP1632C.

**:SOURce:PATtern:PRBS:BSHift?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1, 3
Function	Queries the bit shift number during PRBS pattern generation.
Example	> :SOURce:PATtern:PRBS:BSHift? < 1
Compatibility	Compatible with the MP1632C.

7.3.2.3 Zero-Substitution pattern setting commands

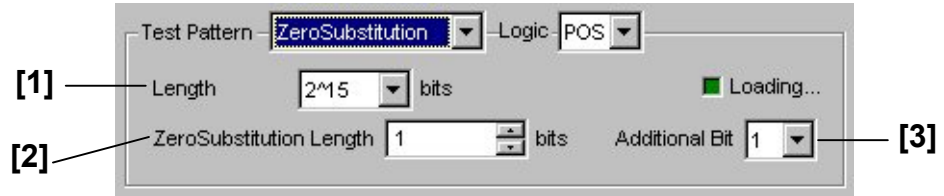


Figure 7.3.2.3-1 Zero-Substitution pattern setting

Table 7.3.2.3-1 Zero-Substitution pattern setting commands

No.	Setting Items	Commands
[1]	Length	:SOURce:PATtern:ZSUBstitute:LENGth
		:SOURce:PATtern:ZSUBstitute:LENGth?
[2]	Zero Substitution Length	:SOURce:PATtern:ZSUBstitute:ZLENGth
		:SOURce:PATtern:ZSUBstitute:ZLENGth?
[3]	Additional Bit	:SOURce:PATtern:ZSUBstitute:ADDBit
		:SOURce:PATtern:ZSUBstitute:ADDBit?

**:SOURce:PATtern:ZSUBstitute:LENGth <length>**

Parameter	<length> = <DECIMAL NUMERIC PROGRAM DATA>	
	7	2 <sup>n</sup> (n = 7)
	9	2 <sup>n</sup> (n = 9)
	10	2 <sup>n</sup> (n = 10)
	11	2 <sup>n</sup> (n = 11)
	15	2 <sup>n</sup> (n = 15)
	20	2 <sup>n</sup> (n = 20)
	23	2 <sup>n</sup> (n = 23)
	-7	2 <sup>n</sup> - 1 (n = 7)
	-9	2 <sup>n</sup> - 1 (n = 9)
	-10	2 <sup>n</sup> - 1 (n = 10)
	-11	2 <sup>n</sup> - 1 (n = 11)
	-15	2 <sup>n</sup> - 1 (n = 15)
	-20	2 <sup>n</sup> - 1 (n = 20)
	-23	2 <sup>n</sup> - 1 (n = 23)
Function	Sets the pattern length during Zero-Substitution pattern generation.	
Example	To set the pattern length to 215: > :SOURce:PATtern:ZSUBstitute:LENGth 15	
Compatibility	Compatible with the MP1632C.	



**:SOURce:PATtern:ZSUBstitute:LENGth?**


---

Response	<length> = <NR1 NUMERIC RESPONSE DATA> 7, 9, 10, 11, 15, 20, 23, -7, -9, -10, -11, -15, -20, -23
Function	Queries the pattern length during Zero-Substitution pattern generation.
Example	> :SOURce:PATtern:ZSUBstitute:LENGth? < 15
Compatibility	Compatible with the MP1632C.

**:SOURce:PATtern:ZSUBstitute:ZLENGth <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> When ZSUBlength, 2 <sup>n</sup> is set: 1 to 2 <sup>n</sup> - 1                      1 to 2 <sup>n</sup> - 1, in 1-bit steps When ZSUBlength, 2 <sup>n</sup> - 1 is set: 1 to 2 <sup>n</sup> - 2                      1 to 2 <sup>n</sup> - 2, in 1-bit steps n = 7, 9, 11, 15, 20, 23
Function	Sets the number of bits to which "0" is inserted (zero-insertion bit count) during Zero-Substitution pattern generation. Available parameters vary depending on the setting conditions.
Example	To set the zero-insertion bit count to 10 bits: > :SOURce:PATtern:ZSUBstitute:ZLENGth 10
Compatibility	Compatible with the MP1632C.

**:SOURce:PATtern:ZSUBstitute:ZLENGth?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1 to 2 <sup>n</sup> - 1, in 1-bit steps n = 7, 9, 11, 15, 20, 23
Function	Queries the zero-insertion bit count during Zero-Substitution pattern generation.
Example	> :SOURce:PATtern:ZSUBstitute:ZLENGth? < 10
Compatibility	Compatible with the MP1632C.

### **:SOURce:PATtern:ZSUBstitute:ADDBit <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA>
	0 Adds one bit of "0" next to the last of zero-inserted bits.
	1 Adds one bit of "1" next to the last of zero-inserted bits (same as existing models).
Function	Sets whether to add one bit of "0" or "1" next to the last of zero-inserted bits.
Example	To set one bit of "1" next to the last of zero-inserted bits: > :SOURce:PATtern:ZSUBstitute:ADDBit 1
Compatibility	Incompatible with existing models.

### **:SOURce:PATtern:ZSUBstitute:ADDBit?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	0 Adds one bit of "0" next to the last of zero-inserted bits.
	1 Adds one bit of "1" next to the last of zero-inserted bits (same as existing models).
Function	Queries whether to add one bit of "0" or "1" next to the last of zero-inserted bits.
Example	> :SOURce:PATtern:ZSUBstitute:ADDBit? < 1
Compatibility	Incompatible with existing models.

7.3.2.4 Data pattern setting commands

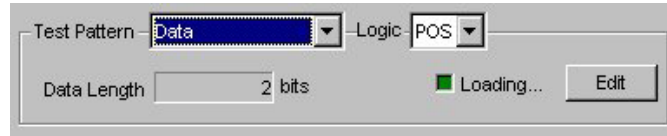


Figure 7.3.2.4-1 Data pattern setting

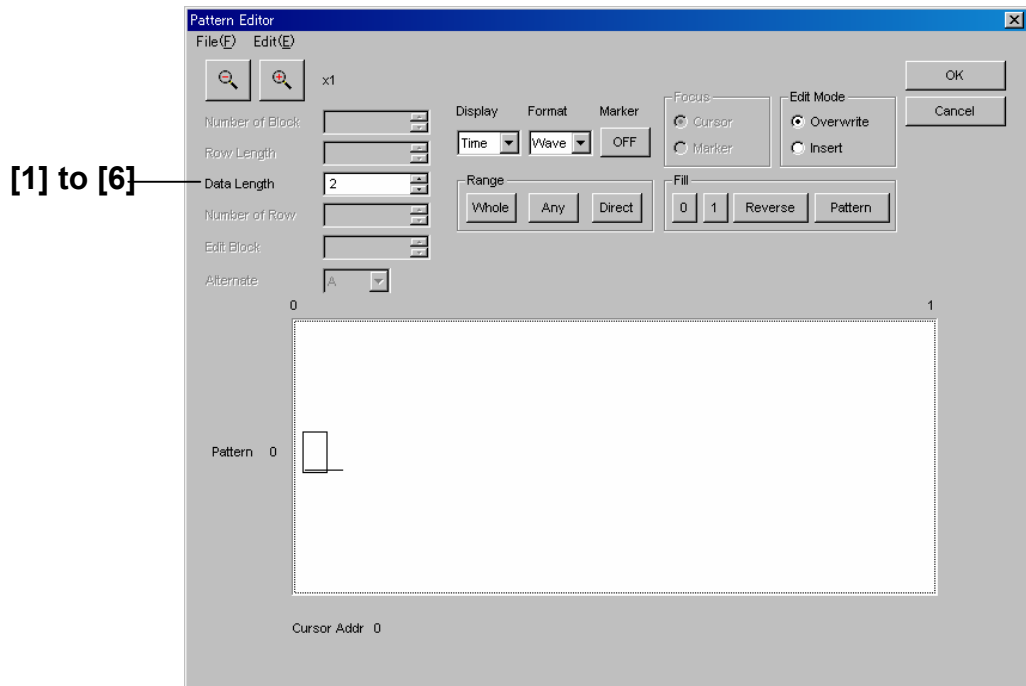


Figure 7.3.2.4-2 Data pattern setting (Pattern Editor screen)

Table 7.3.2.4-1 Data pattern setting commands

No.	Setting Items	Commands
[1]	Data Length	:SOURCE:PATTERN:DATA:LENGTH
		:SOURCE:PATTERN:DATA:LENGTH?
[2]	No label (Pattern setting)	:SOURCE:PATTERN:DATA:WHOLE
		:SOURCE:PATTERN:DATA:WHOLE?
[3]	No label (Pattern setting)	:SOURCE:PATTERN:BDATA:WHOLE
		:SOURCE:PATTERN:BDATA:WHOLE?
[4]	No label (Data inversion)	:SOURCE:PATTERN:DREVERSE:ADDRESS
[5]	No label (Data inversion)	:SOURCE:PATTERN:DREVERSE:DELTA
[6]	No label (All 0 or All 1)	:SOURCE:PATTERN:DATA:FILL

### **:SOURce:PATtern:DATA:LENGth <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 2 to 134217728                      2 to 134,217,728 bits, in 1-bit steps
	<b>Note:</b> At 2 ch Combination, the setting range and Step are doubled. At 4 ch Combination, the setting range and Step are quadrupled.
Function	Sets the pattern length during Data pattern generation.
Example	To set the pattern length to 100 bits: > :SOURce:PATtern:DATA:LENGth 100
Compatibility	Incompatible with existing models.

### **:SOURce:PATtern:DATA:LENGth?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries the pattern length during Data pattern generation.
Example	> :SOURce:PATtern:DATA:LENGth? < 100
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:DATA:WHOLe <start>,<end>,<data>**

Parameter	<p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;  #H0 to #H7FFFFFFF                    0 to 7FFFFFFF bits, in 1-bit steps  (Specify in hexadecimal)</p> <p>&lt;end&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;  #H0 to #H7FFFFFFF                    0 to 7FFFFFFF bits, in 1-bit steps  (Specify in hexadecimal)</p> <p><b>Note:</b></p> <p>The maximum setting is the pattern length.  At 2 ch Combination, the setting range and Step are doubled.  At 4 ch Combination, the setting range and Step are quadrupled.</p> <p>&lt;data&gt; = &lt;STRING PROGRAM DATA&gt;  "H****"                    Specify pattern data in hexadecimal format.  1 to 400 characters (pattern data of 400 × 4 bits)  Specify a character string consisting of 0 to 9  and A to F.  If the last character string of the pattern data is  short of a hexadecimal unit (4 bits), add 0(s) up  to the last bit to make a hexadecimal string.  "B****"                    Specify pattern data in binary format.  1 to 400 characters (pattern data of 400 bits)  Specify a character string consisting of 0 and 1.</p>
Function	Sets the pattern data from the <start> to <end> addresses during Data pattern generation.
Example	<p>The set data overwrites the specified range.</p> <p>To set the addresses 0 to 1F of the pattern data to 5A:  &gt; :SOURce:PATtern:DATA:WHOLe #H0,#H1F, "H5A"</p>
Compatibility	Compatible with the MP1632C.

**Note:**

When the number of data bits specified in <data> is smaller than the range specified by <start> and <end>, set <data> repeatedly up to the specified range.

## &lt;Example&gt;

- <start> = #H0, <end> = #H1F, <data> = "HABC"  
Setting data: ABCABCAB
- <start> = #H0, <end> = #H7, <data> = "B011"  
Setting data: 01101101

When the number of data bits specified in <data> is greater than the range specified by <start> and <end>, cut off the part of <data> out of the specified range.

<Example>

- <start> = #H0, <end> = #HF, <data> = #HABCDEF  
Setting data: ABCD
- <start> = #H0, <end> = #H3, <data> = #B01100110  
Setting data: 0110

**:SOURce:PATtern:DATA:WHOLe? <start>**

---

Parameter	<start> = <NON-DECIMAL PROGRAM DATA> #H0 to #H7FFFFFFF      0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal)
	<b>Note:</b> The maximum setting is the pattern length. At 2 ch Combination, the setting range is doubled. At 4 ch Combination, the setting range is quadrupled.
Response	<data> = <STRING RESPONSE DATA> "H***"      Returns the pattern data in hexadecimal format. Within 400 characters (pattern data of 400 × 4 bits)
Function	Queries the pattern data of 400 × 4 bits from the <start> address during Data pattern generation.
Example	To query the pattern data from address 0: > :SOURce:PATtern:DATA:WHOLe? #H0 < "H5A"
Compatibility	Compatible with the MP1632C.

**:SOURce:PATtern:BDATa:WHOLe <start>,<end>,<bdata>**

Parameter	<p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;          #H0 to #H7FFFFFFF            0 to 7FFFFFFF bits, in 1-bit steps              (Specify in hexadecimal)</p> <p>&lt;end&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;          #H0 to #H7FFFFFFF            0 to 7FFFFFFF bits, in 1-bit steps              (Specify in hexadecimal)</p> <p><b>Note:</b>              The maximum setting is the pattern length.              At 2 ch Combination, the setting range is doubled.              At 4 ch Combination, the setting range is quadrupled.</p> <p>&lt;bdata&gt; = &lt;ARBITRARY BLOCK PROGRAM DATA&gt;          #XYYY&lt;binary&gt;            X:        Number of YYY digits              YYY:     Number of bytes of &lt;binary&gt;              1 to 16,777,216 bytes              &lt;binary&gt;: Binary data up to 16,777,216 bytes</p> <p><b>Note:</b>              The maximum setting value is the pattern length.</p>
Function	<p>Sets binary data of the pattern data from &lt;start&gt; to &lt;end&gt; addresses during Data pattern generation.</p> <p>The set data overwrites the specified range.</p>
Example	<p>To set the addresses 0 to 1F of the pattern data to 41:          &gt; :SOURce:PATtern:BDATa:WHOLe #H0, #H1F, #11A(A=41)</p>
Compatibility	Compatible with the MP1632C.

**:SOURce:PATtern:BDATA:WHOLe? <start>[,<size>]**

Parameter	<p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;                  #H0 to #H7FFFFFFF                      0 to 7FFFFFFF bits, in 1-bit steps                  (Specify in hexadecimal)</p> <p><b>Note:</b>                  The maximum setting is the pattern length.                  At 2 ch Combination, the setting range is doubled.                  At 4 ch Combination, the setting range is quadrupled.</p> <p>[&lt;size&gt;] = &lt;NR1 NUMERIC PROGRAM DATA&gt;                  1 to 16777216                      1 to 1,6777,216 bytes, in 1-byte steps</p> <p>Binary data of the setting pattern is queried when [&lt;size&gt;] is omitted.</p>
Response	<p>&lt;bdata&gt; = &lt;DEFINITE LENGTH ARBITRARY BLOCK RESPONSE DATA&gt;                  #XYYY&lt;binary&gt;                      X:          Number of YYY digits                  YYY:      Number of bytes of &lt;binary&gt;                  1 to 16,777,216 bytes                  &lt;binary&gt;: Binary data of up to 16,777,216 bytes</p>
Function	<p>Queries binary data of bytes specified by &lt;size&gt; from &lt;start&gt; address of the pattern data during Data pattern generation.</p>
Example	<p>To query binary data of the setting pattern from the &lt;start&gt; address of the pattern data during Data pattern generation:</p> <pre>&gt; :SOURce:PATtern:BDATA:WHOLe? #H0 &lt; #516000AA●●●</pre> <p>To query binary data of 2 bytes from the &lt;start&gt; address of the pattern data during Data pattern generation:</p> <pre>&gt; :SOURce:PATtern:BDATA:WHOLe? #H0,2 &lt; #12AA</pre>
Compatibility	<p>Compatible with the MP1632C.</p>



**:SOURce:PATtern:DREVerse:ADDRESS <start>,<end>**

Parameter	<p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;  #H0 to #H7FFFFFFF                      0 to 7FFFFFFF bits, in 1-bit steps  (Specify in hexadecimal)</p> <p>&lt;end&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;  #H0 to #H7FFFFFFF                      0 to 7FFFFFFF bits, in 1-bit steps  (Specify in hexadecimal)</p> <p><b>Note:</b>  The maximum setting is the pattern length.  At 2 ch Combination, the setting range is doubled.  At 4 ch Combination, the setting range is quadrupled.</p>
Function	Inverts the data in the program during Data pattern generation. Specify the inversion range by the <start> and <end> addresses.
Example	To invert addresses 0 to 4F of the pattern data: > :SOURce:PATtern:DREVerse:ADDRESS #H0,#H4F
Compatibility	Compatible with the MP1632C.

**:SOURce:PATtern:DREVerse:DELTA <start>,<delta>**

Parameter	<p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;  #H0 to #H7FFFFFFF                      0 to 7FFFFFFF bits, in 1-bit steps  (Specify in hexadecimal)</p> <p>&lt;delta&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;  1 to 134217728                      1 to 134,217,728 bits, in 1-bit steps</p> <p><b>Note:</b>  The maximum setting is the pattern length.  At 2 ch Combination, the setting range is doubled.  At 4 ch Combination, the setting range is quadrupled.</p>
Function	Inverts the data in the program during Data pattern generation. Specify the inversion range by the number of bits from the <start> address (relative specification).
Example	To invert 128 bits of the pattern data from address 0: > :SOURce:PATtern:DREVerse:DELTA #H0,128
Compatibility	Compatible with the MP1632C.

**:SOURce:PATtern:DATA:FILL <range>,<page>,<data>**

---

Parameter	<range> = <CHARACTER PROGRAM DATA> PAGE Specifies a page. (One page is defined as 128 bits.) ALL Specifies all data. <page> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 1048576 1 to 1,048,576 (Max.) pages, in 1-page steps Max = Pattern Length / 128 (rounding up fractions) Specify "0" when <range> is set to ALL. <data> = <DECIMAL NUMERIC PROGRAM DATA> 0 Fills the specified range with 0s. 1 Fills the specified range with 1s.
Function	Sets 0s or 1s for the specified page or all data in the program during Data pattern generation.
Example	To set 1s for the second page (from 129th to 256th bits) of the pattern data: > :SOURce:PATtern:DATA:FILL PAGE,2,1
Compatibility	Incompatible with existing models.

7.3.2.5 Alternate pattern setting commands

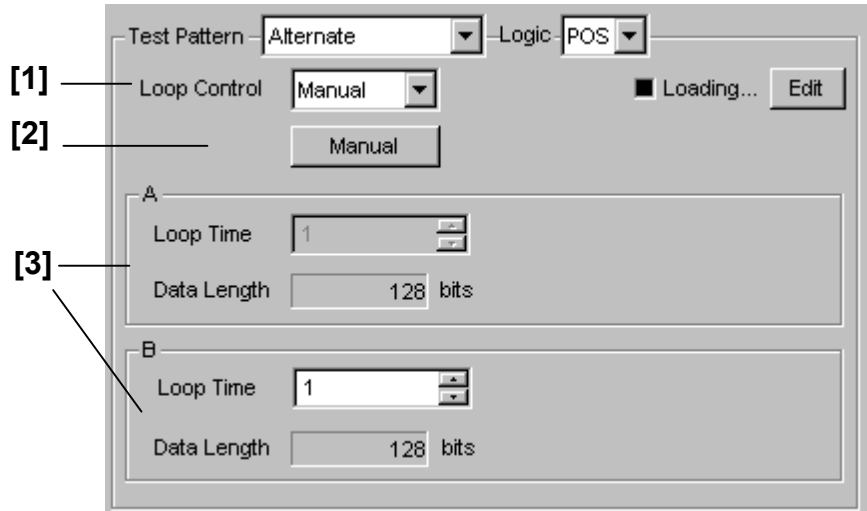


Figure 7.3.2.5-1 Alternate pattern setting

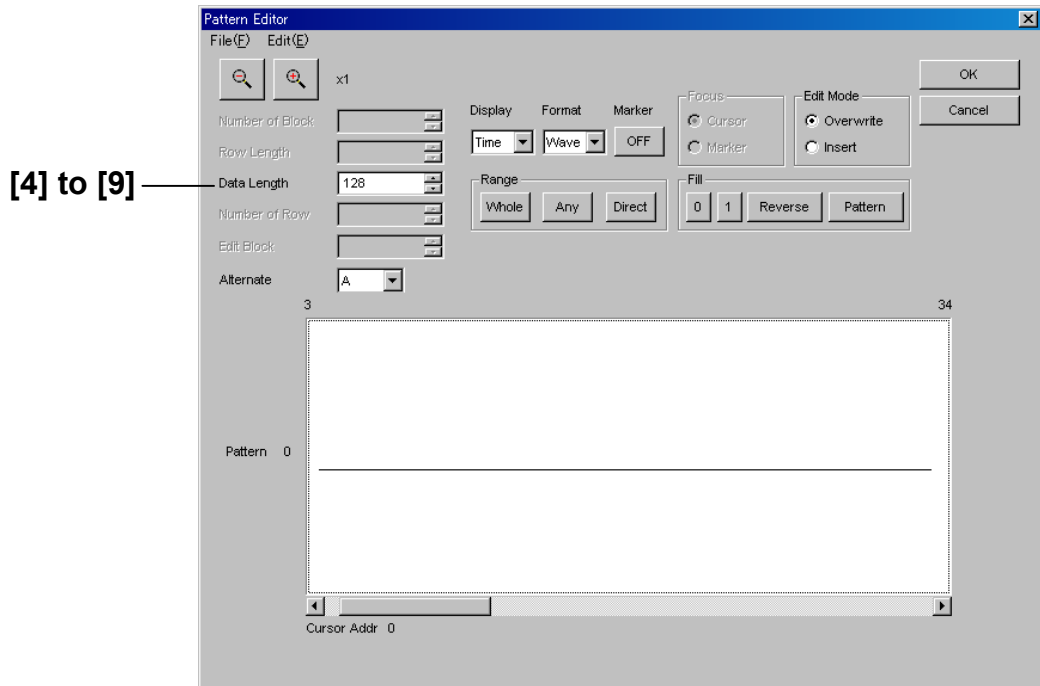


Figure 7.3.2.5-2 Alternate pattern setting (Pattern Editor screen)

Table 7.3.2.5-1 Alternate pattern setting commands

No.	Setting Items	Commands
[1]	Loop Control	:SOURce:PATTern:ALTErnate:LOOPcont
		:SOURce:PATTern:ALTErnate:LOOPcont?
[2]	Manual	:SOURce:PATTern:ALTErnate:MANual
[3]	A/B LoopTime	:SOURce:PATTern:ALTErnate:LTIME
		:SOURce:PATTern:ALTErnate:LTIME?
[4]	Data Length	:SOURce:PATTern:ALTErnate:LENGth
		:SOURce:PATTern:ALTErnate:LENGth?
[5]	No label (Pattern setting)	:SOURce:PATTern:ALTErnate:DATA:WHOLe
		:SOURce:PATTern:ALTErnate:DATA:WHOLe?
[6]	No label (Pattern setting)	:SOURce:PATTern:ALTErnate:BDATa:WHOLe
		:SOURce:PATTern:ALTErnate:BDATa:WHOLe?
[7]	No label (Data inversion)	:SOURce:PATTern:ALTErnate:DREVerse:ADDRess
[8]	No label (Data inversion)	:SOURce:PATTern:ALTErnate:DREVerse:DELTA
[9]	No label (All 0 or All 1)	:SOURce:PATTern:ALTErnate:DATA:FILL

### **:SOURce:PATTern:ALTErnate:LOOPcont <loop>**

Parameter	<loop> = <CHARACTER PROGRAM DATA> INTernal                      Switching control using internal signal EXTernal                      Switching control using external signal MANual                         Manual switching control
Function	Sets the Alternate pattern A/B switching control method.
Example	To set the switching control using internal signal for the Alternate pattern A/B switching: > :SOURce:PATTern:ALTErnate:LOOPcont INTernal
Compatibility	Incompatible with existing models.

### **:SOURce:PATTern:ALTErnate:LOOPcont?**

Response	<loop> = <CHARACTER RESPONSE DATA> INT, EXT, MAN
Function	Queries the Alternate pattern A/B switching control method.
Example	> :SOURce:PATTern:ALTErnate:LOOPcont? < INT
Compatibility	Incompatible with existing models.

### **:SOURce:PATTern:ALTErnate:MANual**

Function	Switches the Alternate pattern A/B manually.
Example	> :SOURce:PATTern:ALTErnate:MANual
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:ALternate:LTIME <content>,<numeric>**


---

Parameter	<content> = <CHARACTER PROGRAM DATA> APAT                      Pattern A BPAT                      Pattern B <numeric> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 511                      1 to 511 times, in 1-time steps
Function	Sets the number of generation times of the Alternate pattern A or B.
Example	To set the number of pattern B generation times to 20: > :SOURce:PATtern:ALternate:LTIME BPAT,20
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:ALternate:LTIME? <content>**


---

Parameter	<content> = <CHARACTER PROGRAM DATA> APAT, BPAT
Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1 to 511                      1 to 511 times, in 1-time steps
Function	Queries the number of generation times of the Alternate pattern A or B.
Example	> :SOURce:PATtern:ALternate:LTIME? BPAT < 20
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:ALternate:LENGth <content>,<numeric>**


---

Parameter	<content> = <CHARACTER PROGRAM DATA> APAT                      Pattern A BPAT                      Pattern B <numeric> = <DECIMAL NUMERIC PROGRAM DATA> 128 to 67108864                      128 to 67,108,864 bits, in 128-bit steps
Function	Sets the pattern length of the Alternate pattern A or B.
Example	To set the pattern length of the pattern B to 128 bits: > :SOURce:PATtern:ALternate:LENGth BPAT,128
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:ALternate:LENGth? <content>**

Parameter	<content> = <CHARACTER PROGRAM DATA> APAT, BPAT
Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 128 to 67108864          128 to 67,108,864 bits, in 128-bit steps
Function	Queries the pattern length of the Alternate pattern A or B.
Example	To query the pattern length of the Alternate pattern B: > :SOURce:PATtern:ALternate:LENGth? BPAT < 128
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:ALternate:DATA:WHOLE <content>, <start>, <end>, <data>**

Parameter	<content> = <CHARACTER PROGRAM DATA> APAT    Pattern A BPAT    Pattern B <start> = <NON-DECIMAL PROGRAM DATA> #H0 to #H3FFFFFF    0 to 3FFFFFF bits, in 1-bit steps (Specify in hexadecimal) <end> = <NON-DECIMAL PROGRAM DATA> #H0 to #H3FFFFFF    0 to 3FFFFFF bits, in 1-bit steps (Specify in hexadecimal)
	<b>Note:</b> The maximum setting value is the pattern length.
	<data> = <STRING PROGRAM DATA> "H****"    Specify pattern data in hexadecimal format. 1 to 400 characters (pattern data of 400 × 4 bits) Specify a character string consisting of 0 to 9 and A to F. If the last character string of the pattern data is short of a hexadecimal unit (4 bits), add 0(s) up to the last bit to make a hexadecimal string. "B****"    Specify pattern data in binary format. 1 to 400 characters (pattern data of 400 bits) Specify a character string consisting of 0 and 1.
Function	Sets the pattern data from the <start> to <end> addresses during Alternate pattern generation.
Example	The set data overwrites the specified range. To set the addresses 0 to 1F of the pattern A to AA: > :SOURce:PATtern:ALternate:DATA:WHOLE APAT, #H0, #H1F, "HAA"
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:ALternate:DATA:WHOLe? <content>,<start>**

Parameter	<p>&lt;content&gt; = &lt;CHARACTER PROGRAM DATA&gt;</p> <p>APAT                      Pattern A</p> <p>BPAT                      Pattern B</p> <p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;</p> <p>#H0 to #H3FFFFFF              0 to 3FFFFFF bits, in 1-bit steps (Specify in hexadecimal)</p> <p><b>Note:</b></p> <p style="padding-left: 40px;">The maximum setting value is the pattern length.</p>
Response	<p>&lt;data&gt; = &lt;STRING RESPONSE DATA&gt;</p> <p>"H***"                      Returns the pattern data in hexadecimal format. Within 400 characters (pattern data of 400 × 4 bits)</p>
Function	Queries the pattern data of 400 × 4 bits from the <start> address during Alternate pattern generation.
Example	<p>To query the pattern A data from address 0:</p> <pre>&gt; :SOURce:PATtern:ALternate:DATA:WHOLe? APAT,H0 &lt; "HAA"</pre>
Compatibility	Incompatible with existing models.





**:SOURce:PATtern:ALternate:BDATA:WHOLe?  
<content>,<start>[,<size>]**

Parameter	<p>&lt;content&gt; = &lt;CHARACTER PROGRAM DATA&gt;            APAT                      Pattern A            BPAT                      Pattern B</p> <p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;            #H0 to #H3FFFFFF              0 to 3FFFFFF bits, in 1-bit steps                                                (Specify in hexadecimal)</p> <p><b>Note:</b>                The maximum setting value is the pattern length.</p> <p>[&lt;size&gt;] = &lt;NR1 NUMERIC PROGRAM DATA&gt;            1 to 8388608                  1 to 8,388,608 bytes, in 1-byte steps</p>
Response	<p>&lt;bdata&gt; = &lt;DEFINITE LENGTH ARBITRARY BLOCK RESPONSE            DATA&gt;            #XXXX&lt;binary&gt;              X:        Number of YYY digits                                                YYY:     Number of bytes of &lt;binary&gt;                1 to 8,388,608 bytes                                                &lt;binary&gt;: Binary data up to 8,388,608 bytes</p> <p>Binary data of the setting pattern is queried when [&lt;size&gt;] is omitted.</p>
Function	<p>Queries binary data of bytes specified by &lt;size&gt; from the &lt;start&gt; address of the pattern data during Alternate pattern generation.</p>
Example	<p>To query binary data of 2 bytes from address 0 of the pattern A data:            &gt; :SOURce:PATtern:ALternate:BDATA:WHOLe? APAT, #H0, 2            &lt; #12AA</p> <p>To query binary data of the setting pattern from address 0 of the pattern A data:            &gt; :SOURce:PATtern:ALternate:BDATA:WHOLe? APAT, #H0            &lt; #516000AA●●●</p>
Compatibility	<p>Incompatible with existing models.</p>

### :SOURce:PATtern:ALternate:DREVerse:ADDRESS <content>, <start>, <end>

Parameter	<content> = <CHARACTER PROGRAM DATA> APAT                      Pattern A BPAT                      Pattern B <start> = <NON-DECIMAL PROGRAM DATA> #H0 to #H3FFFFFF            0 to 3FFFFFF bits, in 1-bit steps (Specify in hexadecimal) <end> = <NON-DECIMAL PROGRAM DATA> #H0 to #H3FFFFFF            0 to 3FFFFFF bits, in 1-bit steps (Specify in hexadecimal)
	<b>Note:</b> The maximum setting value is the pattern length.
Function	Inverts the data in the program during Alternate pattern generation. Specify the inversion range by the <start> and <end> addresses.
Example	To invert addresses 0 to 1F of the pattern A: > :SOURce:PATtern:ALternate:DREVerse:ADDRESS APAT, #H0, #H1F
Compatibility	Incompatible with existing models.

### :SOURce:PATtern:ALternate:DREVerse:DELTA <content>, <start>, <delta>

Parameter	<content> = <CHARACTER PROGRAM DATA> APAT                      Pattern A BPAT                      Pattern B <start> = <NON-DECIMAL PROGRAM DATA> #H0 to #H3FFFFFF            0 to 3FFFFFF bits, in 1-bit steps (Specify in hexadecimal) <delta> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 67108864                1 to 67,108,864 bits, in 1-bit steps
	<b>Note:</b> The maximum setting value is the pattern length.
Function	Inverts the data in the program during Alternate pattern generation. Specify the inversion range by the number of bits from the <start> address (relative specification).
Example	To invert 64 bits of the pattern A from address 0: > :SOURce:PATtern:ALternate:DREVerse:DELTA APAT, #H0, 64
Compatibility	Incompatible with existing models.

---

**:SOURce:PATtern:ALternate:DATA:FILL**  
**<content>,<range>,<page>,<data>**


---

Parameter	<content> = <CHARACTER PROGRAM DATA> APAT                      Pattern A BPAT                      Pattern B <range> = <CHARACTER PROGRAM DATA> PAGE                      Specifies a page. (One page is defined as 128 bits.) ALL                        Specifies all data. <page> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 524288                1 to 524,288 (Max.) pages, in 1-page steps Max = Pattern Length / 128 (rounding up fractions) Specify "0" when <range> is set to ALL. <data> = <NUMERIC PROGRAM DATA> 0                            Fills the specified range with 0s. 1                            Fills the specified range with 1s.
Function	Sets 0s or 1s for the specified page or all data in the program during Alternate pattern generation.
Example	To set 0s for the second page of the pattern A: > :SOURce:PATtern:ALternate:DATA:FILL APAT,PAGE,2,0
Compatibility	Incompatible with existing models.

7.3.2.6 Mixed Data pattern setting commands

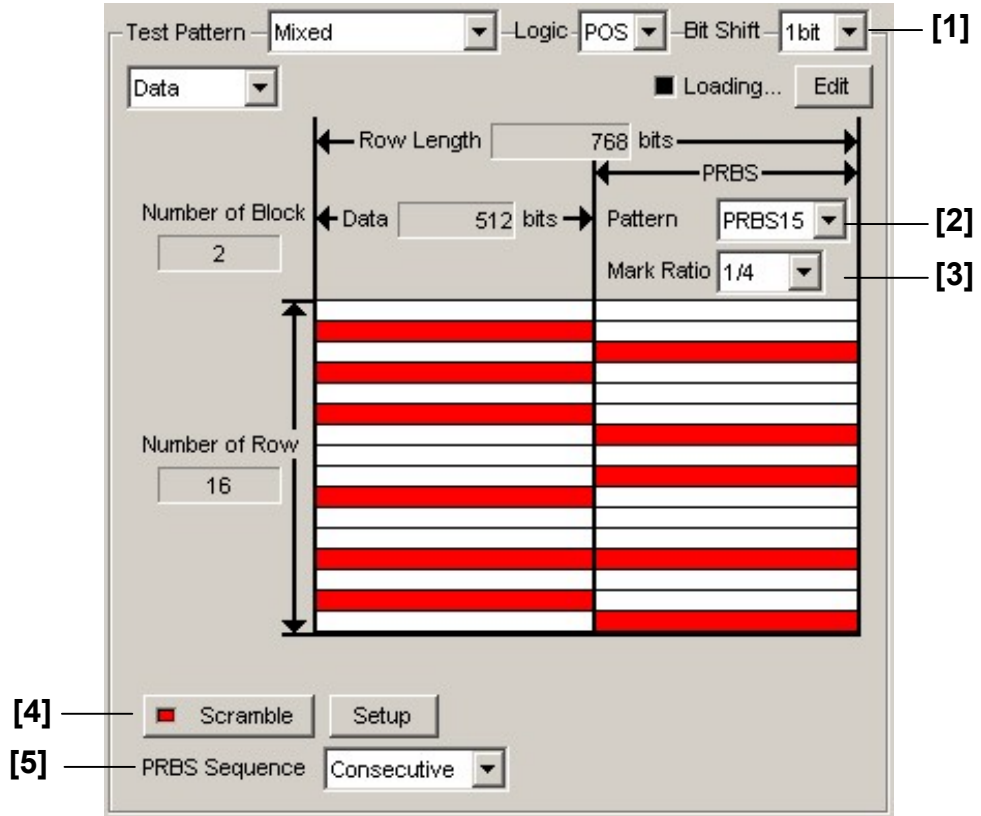


Figure 7.3.2.6-1 Mixed Data pattern setting

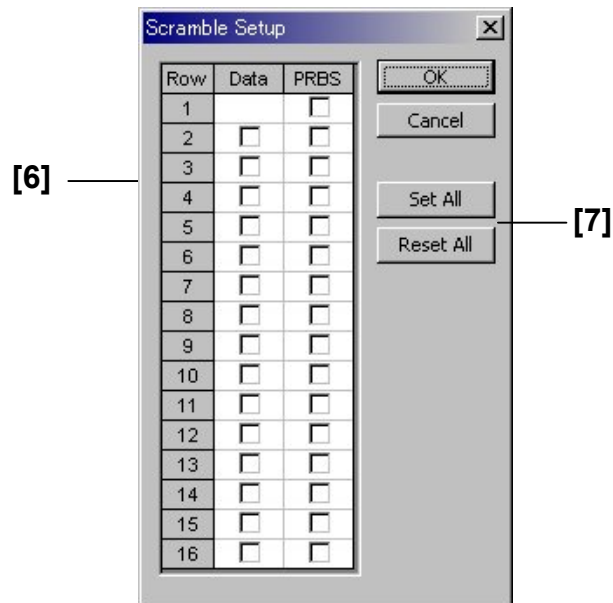


Figure 7.3.2.6-2 Scramble Setup dialog box

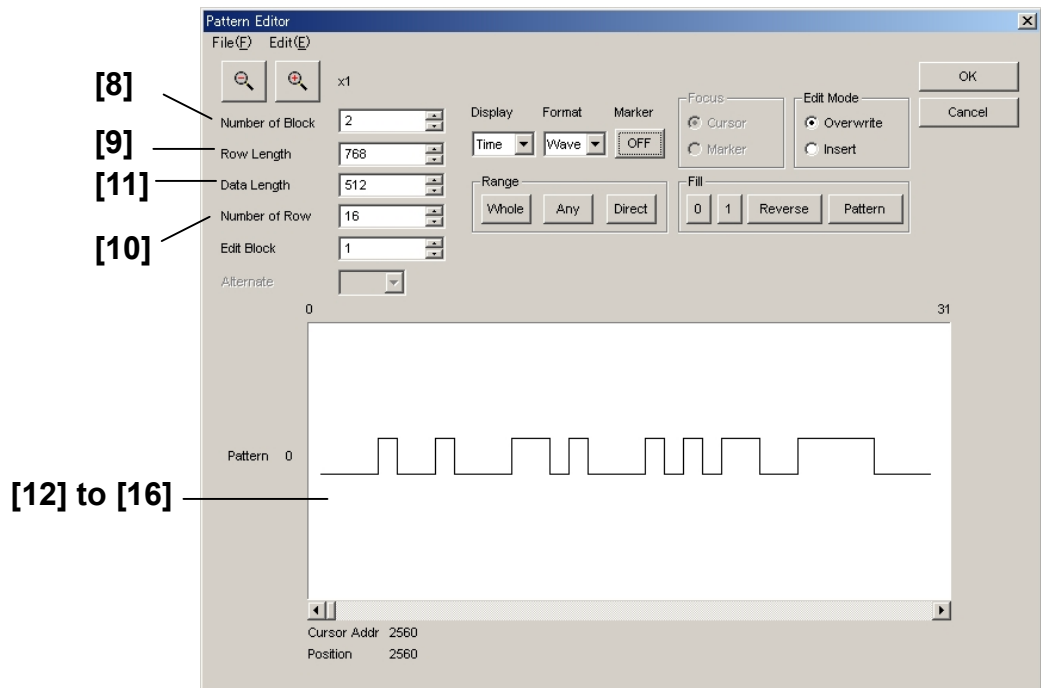


Figure 7.3.2.6-3 Mixed Data pattern setting (Pattern Editor screen)

Table 7.3.2.6-1 Mixed Data pattern setting (Pattern Editor screen)

No.	Setting Items	Commands
[1]	Bit Shift	:SOURce:PATTern:MIXData:PRBS:BITShift
		:SOURce:PATTern:MIXData:PRBS:BITShift?
[2]	Pattern	:SOURce:PATTern:MIXData:PRBS:LENGth
		:SOURce:PATTern:MIXData:PRBS:LENGth?
[3]	Mark Ratio	:SOURce:PATTern:MIXData:PRBS:MRATio
		:SOURce:PATTern:MIXData:PRBS:MRATio?
[4]	Scramble	:SOURce:PATTern:MIXData:SCRamble
		:SOURce:PATTern:MIXData:SCRamble?
[5]	PRBS Sequence	:SOURce:PATTern:MIXData:PRBS:SEQuence
		:SOURce:PATTern:MIXData:PRBS:SEQuence?
[6]	Setup	:SOURce:PATTern:MIXData:SRSetting
		:SOURce:PATTern:MIXData:SRSetting?
[7]	Set All/Reset All	:SOURce:PATTern:MIXData:SCRamble:ALLSet
[8]	Number of Block	:SOURce:PATTern:MIXData:BLOCK
		:SOURce:PATTern:MIXData:BLOCK?
[9]	Row Length	:SOURce:PATTern:MIXData:RLENGth
		:SOURce:PATTern:MIXData:RLENGth?
[10]	Number of Row	:SOURce:PATTern:MIXData:ROW
		:SOURce:PATTern:MIXData:ROW?
[11]	Data Length	:SOURce:PATTern:MIXData:DATA:LENGth
		:SOURce:PATTern:MIXData:DATA:LENGth?

**Table 7.3.2.6-1 Mixed Data pattern setting (Pattern Editor screen) (Cont'd)**

No.	Setting Items	Commands
[12]	No label (Pattern setting)	:SOURce:PATTern:MIXData:DATA:WHOLe
		:SOURce:PATTern:MIXData:DATA:WHOLe?
[13]	No label (Pattern setting)	:SOURce:PATTern:MIXData:BDATa:WHOLe
		:SOURce:PATTern:MIXData:BDATa:WHOLe?
[14]	No label (Data inversion)	:SOURce:PATTern:MIXData:DREVerse:ADDReSS
[15]	No label (Data inversion)	:SOURce:PATTern:MIXData:DREVerse:DELTA
[16]	No label (All 0 or All 1)	:SOURce:PATTern:MIXData:DATA:FILL

**:SOURce:PATTern:MIXData:PRBS:BITShift <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA>
	1                      1 bit
	3                      3 bits
Function	Sets the bit shift for the PRBS pattern during Mixed Data pattern generation.
Example	To set the bit shift to 3-bit shift: > :SOURce:PATTern:MIXData:PRBS:BITShift 3
Compatibility	Incompatible with existing models.

**:SOURce:PATTern:MIXData:PRBS:BITShift?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	1                      1 bit
	3                      3 bits
Function	Queries the bit shift for the PRBS pattern during Mixed Data pattern generation.
Example	> :SOURce:PATTern:MIXData:PRBS:BITShift? < 3
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:MIXData:PRBS:LENGth <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA>
	7 $2^n - 1$ (n = 7)
	9 $2^n - 1$ (n = 9)
	10 $2^n - 1$ (n = 10)
	11 $2^n - 1$ (n = 11)
	15 $2^n - 1$ (n = 15)
	20 $2^n - 1$ (n = 20)
	23 $2^n - 1$ (n = 23)
	31 $2^n - 1$ (n = 31)
Function	Sets the number of stages of the PRBS pattern during Mixed Data pattern generation.
Example	To set the number of stages of the PRBS pattern to 15: > :SOURce:PATtern:MIXData:PRBS:LENGth 15
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:MIXData:PRBS:LENGth?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 7, 9, 10, 11, 15, 20, 23, 31
Function	Queries the number of stages of the PRBS pattern during Mixed Data pattern generation.
Example	> :SOURce:PATtern:MIXData:PRBS:LENGth? < 15
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:MIXData:PRBS:MRATio <mratio>**

Parameter	<mratio> = <CHARACTER PROGRAM DATA>
	M1_2                                1/2
	M1_4                                1/4
	M1_8                                1/8
	M0_8                                0/8
	I1_2                                1/2INVT
	M3_4                                3/4
	M7_8                                7/8
	M8_8                                8/8
Function	Sets the mark ratio for the PRBS pattern during Mixed Data pattern generation.
Example	To set the mark ratio for the PRBS pattern to 1/4: > :SOURce:PATtern:MIXData:PRBS:MRATio M1_4
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:MIXData:PRBS:MRATio?**

---

Response	<mratio> = <CHARACTER RESPONSE DATA> M1_2, M1_4, M1_8, M0_8, I1_2, M3_4, M7_8, M8_8
Function	Queries the mark ratio for the PRBS pattern during Mixed Data pattern generation.
Example	> :SOURce:PATtern:MIXData:PRBS:MRATio? < M1_4
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:MIXData:SCRamble <boolean>**

---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> 0 or OFF                      Scramble OFF 1 or ON                        Scramble ON
Function	Sets scramble ON/OFF of the PRBS7 stage during pattern reception.
Example	To set scramble ON of the PRBS7 stage during pattern reception: > :SOURce:PATtern:MIXData:SCRamble 1
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:MIXData:SCRamble?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0                                Scramble OFF 1                                Scramble ON
Function	Queries the scramble ON/OFF state of the PRBS7 stage during pattern reception.
Example	> :SOURce:PATtern:MIXData:SCRamble? < 1
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:MIXData:PRBS:SEQuence <sequence>**

---

Parameter	<sequence> = <CHARACTER PROGRAM DATA> REStart                        PRBS patterns are not continuous. CONSEcutive                  PRBS patterns are continuous.
Function	Sets the PRBS pattern sequence during Mixed Data pattern generation.
Example	To set the PRBS pattern sequence to Restart: > :SOURce:PATtern:MIXData:PRBS:SEQuence REStart
Compatibility	Incompatible with existing models.



**:SOURce:PATtern:MIXData:PRBS:SEquence?**


---

Response	<sequence> = <CHARACTER RESPONSE DATA> REST, CONS
Function	Queries the PRBS pattern sequence during Mixed Data pattern generation.
Example	> :SOURce:PATtern:MIXData:PRBS:SEquence? < REST
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:MIXData:SRSetting <row>,<data>,<prbs>**


---

Parameter	<row> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 16                      1 to 16 Rows, in 1-row steps <data> = <BOOLEAN PROGRAM DATA> 0 or OFF                      Scramble OFF 1 or ON                        Scramble ON Note, however, that Data of 1 Row Scramble is fixed to Scramble OFF. <prbs> = <BOOLEAN PROGRAM DATA> 0 or OFF                      Scramble OFF 1 or ON                        Scramble ON
Function	Sets Scramble ON or OFF for the Data and PRBS of the specified Row.
Example	To set the Scramble settings for 2 Row to Data ON, PRBS OFF: > :SOURce:PATtern:MIXData:SRSetting 2,1,0
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:MIXData:SRSetting? <row>**


---

Parameter	<row> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 16                      1 to 16 Rows, in 1-row steps
Response	<data>,<prbs> = <NR1 NUMERIC RESPONSE DATA> 0                                Scramble OFF 1                                Scramble ON
Function	Queries the scramble setting (ON/OFF) for the Data and PRBS of the specified Row.
Example	To query the Scramble setting for 2 Row: > :SOURce:PATtern:MIXData:SRSetting? 2 < 1,0
Compatibility	Incompatible with existing models.

### **:SOURce:PATtern:MIXData:SCRamble:ALLSet <numeric>**

---

Parameter	<numeric> = <NUMERIC PROGRAM DATA> 0 All Reset 1 All Set
Function	Sets or resets all scramble.
Example	To select all scramble: > :SOURce:PATtern:MIXData:SCRamble:ALLSet 1
Compatibility	Incompatible with existing models.

### **:SOURce:PATtern:MIXData:BLOCK <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 511 1 to 511 blocks, in 1-block steps
Function	Sets the number of blocks during Mixed Data pattern generation.
Example	To set the number of blocks to 30: > :SOURce:PATtern:MIXData:BLOCK 30
Compatibility	Incompatible with existing models.

### **:SOURce:PATtern:MIXData:BLOCK?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1 to 511 1 to 511 blocks, in 1-block steps
Function	Queries the number of blocks during Mixed Data pattern generation.
Example	> :SOURce:PATtern:MIXData:BLOCK? < 30
Compatibility	Incompatible with existing models.

### **:SOURce:PATtern:MIXData:RLENGth <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 768 to 2281701376 768 to 2,281,701,376 bits, in 128-bit steps
	<b>Note:</b> At 2 ch Combination, the setting range and Step are doubled. At 4 ch Combination, the setting range and Step are quadrupled.
Function	Sets the pattern length of 1 Row that is edited during Mixed Data pattern generation.
Example	To set the pattern length to 768 bits: > :SOURce:PATtern:MIXData:RLENGth 768
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:MIXData:RLENgth?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 768 to 2281701376      768 to 2,281,701,376 bits, in 128-bit steps
Function	Queries the pattern length of 1 Row that is edited during Mixed Data pattern generation.
Example	> :SOURce:PATtern:MIXData:RLENgth? < 768
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:MIXData:ROW <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 16      1 to 16 Rows, in 1-row steps
Function	Sets the number of rows within one block that are edited during Mixed Data pattern generation.
Example	To set the number of rows within one block to 16: > :SOURce:PATtern:MIXData:ROW 16
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:MIXData:ROW?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1 to 16      1 to 16 Rows, in 1-row steps
Function	Queries the number of rows within one block that are edited during Mixed Data pattern generation.
Example	> :SOURce:PATtern:MIXData:ROW? < 16
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:MIXData:DATA:LENGth <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 512 to 134217728      512 to 134,217,728 bits, in 1-bit steps
	<b>Note:</b> The maximum setting is the pattern length. At 2 ch Combination, the setting range and Step are doubled. The maximum setting is restricted to Row Length – 64 bits At 4 ch Combination, the setting range and Step are quadrupled. The maximum setting is restricted to Row Length – 128 bits
Function	Sets the pattern length on the pattern data side that is edited during Mixed Data pattern generation.
Example	To set the pattern length to 512 bits. > :SOURce:PATtern:MIXData:DATA:LENGth 512
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:MIXData:DATA:LENGth?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 512 to 134217728      512 to 134,217,728 bits, in 1-bit steps
Function	Queries the pattern length on the pattern data side that is edited during Mixed Data pattern generation.
Example	> :SOURce:PATtern:MIXData:DATA:LENGth? < 512
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:MIXData:DATA:WHOLE <block>,<start>,<end>,<data>**

Parameter	<p>&lt;block&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;  1 to 511                            1 to 511 blocks, in 1-block steps</p> <p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;  #H0 to #H7FFFFFFF                    0 to 7FFFFFFF bits, in 1-bit steps  (Specify in hexadecimal)</p> <p>&lt;end&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;  #H0 to #H7FFFFFFF                    0 to 7FFFFFFF bits, in 1-bit steps  (Specify in hexadecimal)</p> <p><b>Note:</b></p> <p style="padding-left: 2em;">The maximum setting is the pattern length.  At 2 ch Combination, the setting range is doubled.  At 4 ch Combination, the setting range is quadrupled.</p> <p>&lt;data&gt; = &lt;STRING PROGRAM DATA&gt;  "H***"                                Specify pattern data in hexadecimal format.  1 to 400 characters (pattern data of 400 × 4 bits)  Specify a character string consisting of 0 to 9  and A to F.  If the last character string of the pattern data is  short of a hexadecimal unit (4 bits), add 0(s) up  to the last bit to make a hexadecimal string.</p> <p>"B***"                                Specify pattern data in binary format.  1 to 400 characters (pattern data of 400 bits)  Specify a character string consisting of 0 and 1.</p>
Function	<p>Sets the pattern data from the &lt;start&gt; to &lt;end&gt; addresses during Mixed Data pattern generation.</p> <p>The set data overwrites the specified range.</p>
Example	<p>To set the addresses 0 to 1F of the block 1 pattern data to 11:  &gt; :SOURce:PATtern:MIXData:DATA:WHOLE 1,#H0,#H1F, "H11"</p>
Compatibility	<p>Incompatible with existing models.</p>

**:SOURce:PATtern:MIXData:DATA:WHOLe? <block>,<start>**

---

Parameter	<p>&lt;block&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  1 to 511                                    1 to 511 blocks, in 1-block steps</p> <p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;                  #H0 to #H7FFFFFFF                        0 to 7FFFFFFF bits, in 1-bit steps                  (Specify in hexadecimal)</p> <p><b>Note:</b></p> <p style="padding-left: 40px;">The maximum setting is the pattern length.                  At 2 ch Combination, the setting range is doubled.                  At 4 ch Combination, the setting range is quadrupled.</p>
Response	<p>&lt;data&gt; = &lt;STRING RESPONSE DATA&gt;                  "H***"                                    Returns the pattern data in hexadecimal format.                  Within 400 characters (pattern data of 400 × 4 bits)</p>
Function	<p>Queries the pattern data of 400 × 4 bits from the &lt;start&gt; address during Mixed Data pattern generation.</p>
Example	<p>To query the block 1 pattern data from address 0:                  &gt; :SOURce:PATtern:MIXData:DATA:WHOLe? 1, #H0                  &lt; "H11"</p>
Compatibility	<p>Incompatible with existing models.</p>

---

**:SOURce:PATtern:MIXData:BDATa:WHOLe**  
**<block>,<start>,<end>,<bdata>**


---

Parameter	<p>&lt;block&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;  1 to 511                            1 to 511 blocks, in 1-block steps</p> <p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;  #H0 to #H7FFFFFFF                    0 to 7FFFFFFF bits, in 1-bit steps    (Specify in hexadecimal)</p> <p>&lt;end&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;  #H0 to #H7FFFFFFF                    0 to 7FFFFFFF bits, in 1-bit steps    (Specify in hexadecimal)</p> <p><b>Note:</b>    The maximum setting is the pattern length.    At 2 ch Combination, the setting range is doubled.    At 4 ch Combination, the setting range is quadrupled.</p> <p>&lt;bdata&gt; = &lt;ARBITRARY BLOCK PROGRAM DATA&gt;  #XYYY&lt;binary&gt;                    X:        Number of YYY digits    YYY:     Number of bytes of &lt;binary&gt;    1 to 16,777,216 bytes    &lt;binary&gt;: Binary data up to 16,777,216 bytes</p>
Function	<p>Sets the binary data from &lt;start&gt; to &lt;end&gt; addresses of the pattern data during Mixed Data pattern generation.</p> <p>The set data overwrites the specified range.</p>
Example	<p>To set the addresses 0 to 1F of the block 2 pattern data to 43:</p> <pre>&gt; :SOURce:PATtern:MIXData:BDATa:WHOLe 2, #H0, #H1F, #11C (C=43)</pre>
Compatibility	<p>Incompatible with existing models.</p>

---

**:SOURce:PATtern:MIXData:BDATa:WHOLe? <block>,<start>[,<size>]**

---

Parameter	<block> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 511                        1 to 511 blocks, in 1-block steps <start> = <NON-DECIMAL PROGRAM DATA> #H0 to #H7FFFFFFF                        0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal)
	<p><b>Note:</b></p> <p>The maximum setting is the pattern length.                  At 2 ch Combination, the setting range is doubled.                  At 4 ch Combination, the setting range is quadrupled.</p>
	[<size>] = <NR1 NUMERIC PROGRAM DATA> 1 to 16777216                        1 to 16,777,216 bytes, in 1-byte steps
Response	<bdata> = <DEFINITE LENGTH ARBITRARY BLOCK RESPONSE DATA> #XXXX<binary>                        X:        Number of YYY digits YYY:     Number of bytes of <binary> 1 to 16,777,216 bytes <binary>: Binary data up to 16,777,216 bytes
Function	Binary data of the setting pattern is queried when [<size>] is omitted. Queries binary data of bytes specified by <size> from the <start> address of the pattern data during Mixed Data pattern generation.
Example	To query binary data of the block 1 pattern data starting from address 0: > :SOURce:PATtern:MIXData:BDATa:WHOLe? 1, #H0 < #11C
Compatibility	Incompatible with existing models.



**:SOURce:PATtern:MIXData:DREVerse:ADDRESS <block>,<start>,<end>**

Parameter	<block> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 511                      1 to 511 blocks, in 1-block steps <start> = <NON-DECIMAL PROGRAM DATA> #H0 to #H7FFFFFFF              0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal) <end> = <NON-DECIMAL PROGRAM DATA> #H0 to #H7FFFFFFF              0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal)
	<p><b>Note:</b></p> <p>The maximum setting is the pattern length.          At 2 ch Combination, the setting range is doubled.          At 4 ch Combination, the setting range is quadrupled.</p>
Function	Inverts the data in the program during Mixed Data pattern generation. Specify the inversion range by the <start> and <end> addresses.
Example	To invert addresses 0 to 4F of the block 3 pattern data: > :SOURce:PATtern:MIXData:DREVerse:ADDRESS 3, #H0, #H4F
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:MIXData:DREVerse:DELTA <block>,<start>,<delta>**

Parameter	<block> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 511                      1 to 511 blocks, in 1-block steps <start> = <NON-DECIMAL PROGRAM DATA> #H0 to #H7FFFFFFF              0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal) <delta> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 134217728              1 to 134,217,728 bits, in 1-bit steps
	<p><b>Note:</b></p> <p>The maximum setting is the pattern length.          At 2 ch Combination, the setting range is doubled.          At 4 ch Combination, the setting range is quadrupled.</p>
Function	Inverts the data in the program during Mixed Data pattern generation. Specify the inversion range by the number of bits from the <start> address (relative specification).
Example	To invert 256 bits of the block 3 pattern data from address 0: > :SOURce:PATtern:MIXData:DREVerse:DELTA 3, #H0, 256
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:MIXData:DATA:FILL <block>,<range>,<page>,<data>**

---

Parameter	<p>&lt;block&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  1 to 511                      1 to 511 blocks, in 1-block steps</p> <p>&lt;range&gt; = &lt;CHARACTER PROGRAM DATA&gt;                  PAGE                              Specifies a page.                                                      (One page is defined as 128 bits.)</p> <p>ALL                                      Specifies all data.</p> <p>&lt;page&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  1 to 1048576                      1 to 1,048,576 (Max.) pages, in 1-page steps                  Max = Pattern Length / 128 (rounding up fractions)                  Specify "0" when &lt;range&gt; is set to ALL.</p> <p>&lt;data&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  0                                      Fills the specified range with 0s.                  1                                      Fills the specified range with 1s.</p>
Function	<p>Sets 0s or 1s for the specified page or all data in the program during Mixed Data pattern generation.</p>
Example	<p>To set 0s for the third page of the block 511 pattern data:                  &gt; :SOURce:PATtern:MIXData:DATA:FILL 511,PAGE,3,0</p>
Compatibility	<p>Incompatible with existing models.</p>

7.3.2.7 Mixed Alternate pattern setting commands

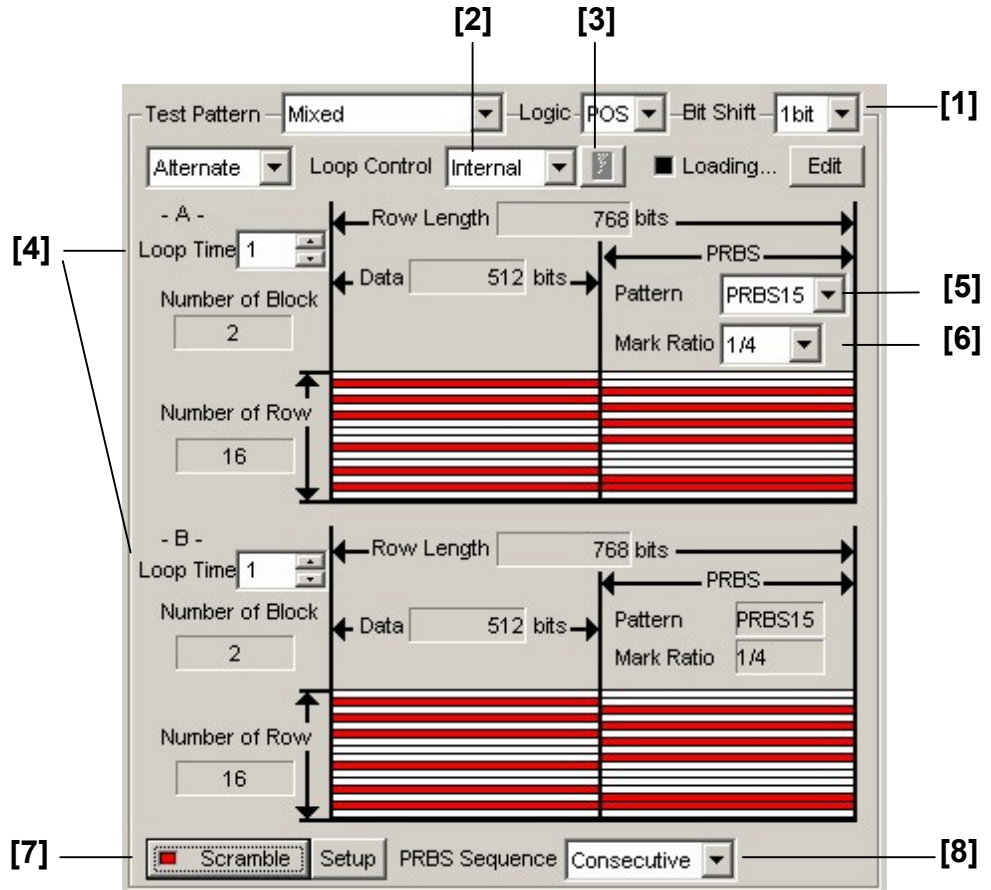


Figure 7.3.2.7-1 Mixed Alternate pattern setting

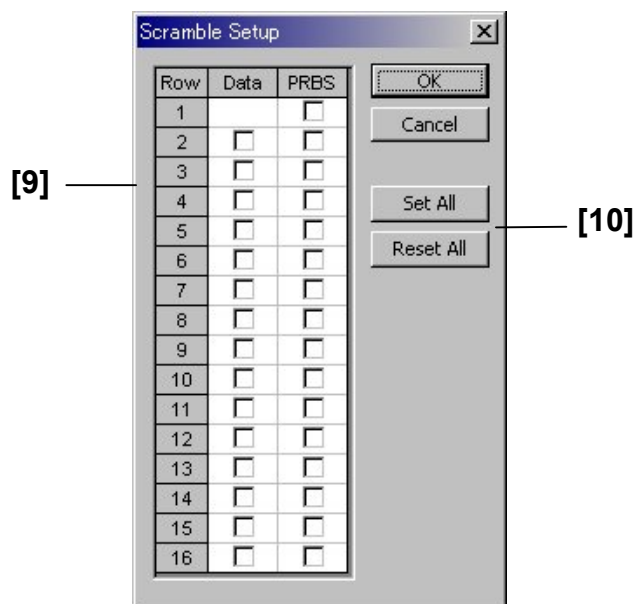


Figure 7.3.2.7-2 Scramble Setup dialog box

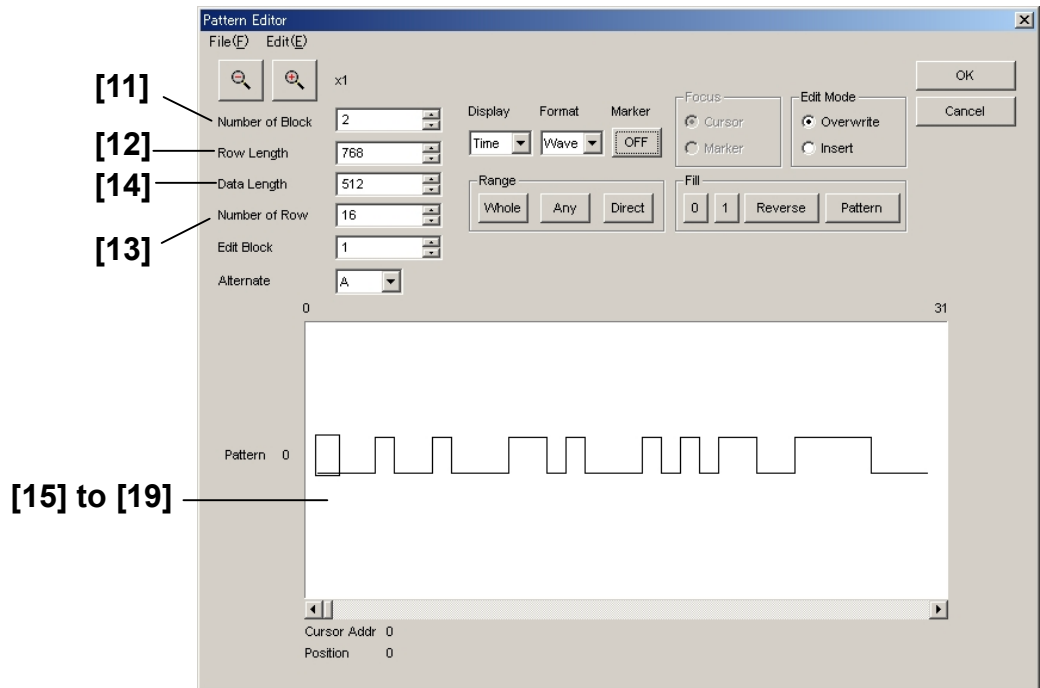


Figure 7.3.2.7-3 Mixed Alternate pattern setting (Pattern Editor screen)

Table 7.3.2.7-1 Mixed Alternate pattern setting commands

No.	Setting Items	Commands
[1]	Bit Shift	:SOURce:PATTern:MIXalt:PRBS:BITShift
		:SOURce:PATTern:MIXalt:PRBS:BITShift?
[2]	Loop Control	:SOURce:PATTern:MIXalt:LOOPcont
		:SOURce:PATTern:MIXalt:LOOPcont?
[3]	Manual button	:SOURce:PATTern:MIXalt:MANual
[4]	Loop Time	:SOURce:PATTern:MIXalt:LTIME?
		:SOURce:PATTern:MIXalt:LTIME?
[5]	Pattern	:SOURce:PATTern:MIXalt:PRBS:LENGth
		:SOURce:PATTern:MIXalt:PRBS:LENGth?
[6]	Mark Ratio	:SOURce:PATTern:MIXalt:PRBS:MRATio
		:SOURce:PATTern:MIXalt:PRBS:MRATio?
[7]	Scramble	:SOURce:PATTern:MIXalt:SCRamble
		:SOURce:PATTern:MIXalt:SCRamble?
[8]	PRBS Sequence	:SOURce:PATTern:MIXalt:PRBS:SEQUence
		:SOURce:PATTern:MIXalt:PRBS:SEQUence?
[9]	Scramble Setup	:SOURce:PATTern:MIXalt:SRSetting
		:SOURce:PATTern:MIXalt:SRSetting?
[10]	Set All/Reset All	:SOURce:PATTern:MIXalt:SCRamble:ALLSet
[11]	Number of Block	:SOURce:PATTern:MIXalt:BLOCK
		:SOURce:PATTern:MIXalt:BLOCK?

Table 7.3.2.7-1 Mixed Alternate pattern setting commands (Cont'd)

No.	Setting Items	Commands
[12]	Row Length	:SOURce:PATtern:MIXalt:RLENgth
		:SOURce:PATtern:MIXalt:RLENgth?
[13]	Number of Row	:SOURce:PATtern:MIXalt:ROW
		:SOURce:PATtern:MIXalt:ROW?
[14]	Data Length	:SOURce:PATtern:MIXalt:DATA:LENgth
		:SOURce:PATtern:MIXalt:DATA:LENgth?
[15]	No label (Pattern setting)	:SOURce:PATtern:MIXalt:DATA:WHOLe
		:SOURce:PATtern:MIXalt:DATA:WHOLe?
[16]	No label (Pattern setting)	:SOURce:PATtern:MIXalt:BDATa:WHOLe
		:SOURce:PATtern:MIXalt:BDATa:WHOLe?
[17]	No label (Data inversion)	:SOURce:PATtern:MIXalt:DREVerse:ADDReSS
[18]	No label (Data inversion)	:SOURce:PATtern:MIXalt:DREVerse:DELTA
[19]	No label (All 0 or All 1)	:SOURce:PATtern:MIXalt:DATA:FILL

### **:SOURce:PATtern:MIXalt:PRBS:BITShift <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA>
	1                      1 bit
	3                      3 bits
Function	Sets the bit shift for the PRBS pattern during Mixed Alternate pattern generation.
Example	To set the bit shift to 3-bit shift: > :SOURce:PATtern:MIXalt:PRBS:BITShift 3
Compatibility	Incompatible with existing models.

### **:SOURce:PATtern:MIXalt:PRBS:BITShift?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	1, 3
Function	Queries the bit shift for the PRBS pattern during Mixed Alternate pattern generation.
Example	> :SOURce:PATtern:MIXalt:PRBS:BITShift? < 3
Compatibility	Incompatible with existing models.

### **:SOURce:PATtern:MIXalt:LOOPcont <loop>**

Parameter	<loop> = <CHARACTER PROGRAM DATA> INTernal                      Switching control using internal signal EXTernal                      Switching control using external signal MANual                         Manual switching control
Function	Sets the pattern A/B switching control method during Mixed Alternate pattern generation.
Example	To set the manual control for the pattern A/B switching: > :SOURce:PATtern:MIXalt:LOOPcont MANual
Compatibility	Incompatible with existing models.

### **:SOURce:PATtern:MIXalt:LOOPcont?**

Response	<loop> = <CHARACTER RESPONSE DATA> INT, EXT, MAN
Function	Queries the pattern A/B switching control method during Mixed Alternate pattern generation.
Example	> :SOURce:PATtern:MIXalt:LOOPcont? < MAN
Compatibility	Incompatible with existing models.

### **:SOURce:PATtern:MIXalt:MANual**

Function	Generates the pattern B for the specified number of Loop times during Mixed Alternate pattern generation.
Example	> :SOURce:PATtern:MIXalt:MANual
Compatibility	Incompatible with existing models.

### **:SOURce:PATtern:MIXalt:LTIME <content>, <numeric>**

Parameter	<content>=<CHARACTER PROGRAM DATA> APAT                            Pattern A BPAT                            Pattern B <numeric> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 511                        1 to 511 times, in 1-time steps
Function	Sets the number of generation times of the Alternate pattern A or B.
Example	To set the number of pattern B generation times to 20: > :SOURce:PATtern:MIXalt:LTIME BPAT, 20
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:MIXalt:LTIME? <content>**

Parameter	<content> = <CHARACTER PROGRAM DATA> APAT, BPAT
Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1 to 511                      1 to 511 times, in 1-time steps
Function	Queries the number of generation times of the Alternate pattern A or B.
Example	To query the number of pattern B generation times: > :SOURce:PATtern:MIXalt:LTIME? BPAT < 20
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:MIXalt:PRBS:LENGth <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 7 $2^n - 1$ (n = 7) 9 $2^n - 1$ (n = 9) 10 $2^n - 1$ (n = 10) 11 $2^n - 1$ (n = 11) 15 $2^n - 1$ (n = 15) 20 $2^n - 1$ (n = 20) 23 $2^n - 1$ (n = 23) 31 $2^n - 1$ (n = 31)
Function	Sets the number of stages of the PRBS pattern during Mixed Alternate pattern generation.
Example	To set the number of stages of the PRBS pattern to 7: > :SOURce:PATtern:MIXalt:PRBS:LENGth 7
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:MIXalt:PRBS:LENGth?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 7, 9, 10, 11, 15, 20, 23, 31
Function	Queries the number of stages of the PRBS pattern during Mixed Alternate pattern generation.
Example	> :SOURce:PATtern:MIXalt:PRBS:LENGth? < 7
Compatibility	Incompatible with existing models.

### **:SOURce:PATtern:MIXalt:PRBS:MRATio <mratio>**

---

Parameter	<mratio> = <CHARACTER PROGRAM DATA>
	M1_2                    1/2
	M1_4                    1/4
	M1_8                    1/8
	M0_8                    0/8
	I1_2                    1/2INVT
	M3_4                    3/4
	M7_8                    7/8
	M8_8                    8/8
Function	Sets the mark ratio for the PRBS pattern during Mixed Alternate pattern generation.
Example	To set the mark ratio for the PRBS pattern to 1/8: > :SOURce:PATtern:MIXalt:PRBS:MRATio M1_8
Compatibility	Incompatible with existing models.

### **:SOURce:PATtern:MIXalt:PRBS:MRATio?**

---

Response	<mratio> = <CHARACTER RESPONSE DATA> M1_2, M1_4, M1_8, M0_8, I1_2, M3_4, M7_8, M8_8
Function	Queries the mark ratio for the PRBS pattern during Mixed Alternate pattern generation.
Example	> :SOURce:PATtern:MIXalt:PRBS:MRATio? < M1_8
Compatibility	Incompatible with existing models.

### **:SOURce:PATtern:MIXalt:SCRamble <boolean>**

---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA>
	0                        Scramble OFF
	1                        Scramble ON
Function	Sets scramble ON/OFF of the PRBS7 stage during pattern reception.
Example	To set scramble ON of the PRBS7 stage during pattern reception: > :SOURce:PATtern:MIXalt:SCRamble 1
Compatibility	Incompatible with existing models.



**:SOURce:PATtern:MIXalt:SCRamble?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 Scramble OFF 1 Scramble ON
Function	Queries the scramble ON/OFF state of the PRBS7 stage during pattern reception.
Example	> :SOURce:PATtern:MIXalt:SCRamble? < 1
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:MIXalt:PRBS:SEquence <sequence>**


---

Parameter	<sequence> = <CHARACTER PROGRAM DATA> REStart PRBS patterns are not continuous. CONSecutive PRBS patterns are continuous.
Function	Sets the PRBS pattern sequence during Mixed Alternate pattern generation.
Example	To set the PRBS pattern sequence to Restart: > :SOURce:PATtern:MIXalt:PRBS:SEquence REStart
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:MIXalt:PRBS:SEquence?**


---

Response	<sequence> = <CHARACTER RESPONSE DATA> REST, CONS
Function	Queries the PRBS pattern sequence during Mixed Alternate pattern generation.
Example	> :SOURce:PATtern:MIXalt:PRBS:SEquence? < REST
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:MIXalt:SRSetting <row>,<data>,<prbs>**

---

Parameter	<row> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 16                      1 to 16 Rows, in 1-row steps
	<data> = <BOOLEAN PROGRAM DATA> 0 or OFF                      Scramble OFF 1 or ON                        Scramble ON
	Note, however, that Scramble ON/OFF cannot be set for Data of 1 Row.
	<prbs> = <BOOLEAN PROGRAM DATA> 0 or OFF                      Scramble OFF 1 or ON                        Scramble ON
Function	Sets Scramble ON or OFF for the Data and PRBS of the specified Row.
Example	To set the Scramble settings for 3 Row to Data ON, PRBS OFF: > :SOURce:PATtern:MIXalt:SRSetting 3,1,0
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:MIXalt:SRSetting? <row>**

---

Parameter	<row> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 16                      1 to 16 Rows, in 1-row steps
Response	<data>,<prbs> = <NR1 NUMERIC RESPONSE DATA> 0                                Scramble OFF 1                                Scramble ON
Function	Queries the scramble setting (ON/OFF) for the Data and PRBS of the specified Row.
Example	To query the Scramble setting for 3 Row: > :SOURce:PATtern:MIXalt:SRSetting? 3 < 1,0
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:MIXalt:SCRamble:ALLSet <numeric>**

---

Parameter	<numeric> = <NUMERIC PROGRAM DATA> 0                                All Reset 1                                All Set
Function	Sets or resets all scramble.
Example	To select all scramble: > :SOURce:PATtern:MIXalt:SCRamble:ALLSet 1
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:MIXalt:BLOCK,<numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 511                      1 to 511 blocks, in 1-block steps
Function	Sets the number of blocks during Mixed Alternate pattern generation.
Example	To set the number of blocks to 12: > :SOURce:PATtern:MIXalt:BLOCK, 12
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:MIXalt:BLOCK? <content>**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1 to 511                      1 to 511 blocks, in 1-block steps
Function	Queries the number of blocks during Mixed Alternate pattern generation.
Example	> :SOURce:PATtern:MIXalt:BLOCK? < 12
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:MIXalt:RLENgth,<numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 768 to 2214592512      768 to 2,214,592,512 bits, in 128-bit steps
Function	Sets the pattern length of 1 Row that is edited during Mixed Alternate pattern generation.
Example	To set the pattern length of 1 Row to 768 bits: > :SOURce:PATtern:MIXalt:RLENgth 768
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:MIXalt:RLENgth?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 768 to 2214592512      768 to 2,214,592,512 bits, in 128-bit steps
Function	Queries the pattern length of 1 Row that is edited during Mixed Alternate pattern generation.
Example	> :SOURce:PATtern:MIXalt:RLENgth? < 768
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:MIXalt:ROW,<numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 16                                      1 to 16 Rows, in 1-row steps
Function	Sets the number of rows within one block that are edited during Mixed Alternate pattern generation.
Example	To set the number of rows within one block to 8: > :SOURce:PATtern:MIXalt:ROW,8
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:MIXalt:ROW?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1 to 16                                      1 to 16 Rows, in 1-row steps
Function	Queries the number of rows within one block that are edited during Mixed Alternate pattern generation.
Example	> :SOURce:PATtern:MIXalt:ROW? < 8
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:MIXalt:DATA:LENGth,<numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 512 to 67108864                      512 to 67,108,864 bits, in 128-bit steps (Row count × Block count)
Function	Sets the pattern length on the pattern data side that is edited during Mixed Alternate pattern generation.
Example	To set the pattern length on the pattern data side to 12800 bits: > :SOURce:PATtern:MIXalt:DATA:LENGth 12800
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:MIXalt:DATA:LENGth?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 512 to 67108864                      512 to 67,108,864 bits, in 128-bit steps
Function	Queries the pattern length on the pattern data side that is edited during Mixed Alternate pattern generation.
Example	> :SOURce:PATtern:MIXalt:DATA:LENGth? < 12800
Compatibility	Incompatible with existing models.

---

**:SOURce:PATtern:MIXalt:DATA:WHOLe**  
**<block>,<content>,<start>,<end>,<data>**


---

Parameter	<block> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 511 1 to 511 blocks, in 1-block steps
	<content> = <CHARACTER PROGRAM DATA>
	APAT Pattern A
	BPAT Pattern B
	<start> = <NON-DECIMAL PROGRAM DATA>
	#H0 to #H3FFFFFF 0 to 3FFFFFF bits, in 1-bit steps (Specify in hexadecimal)
	<end> = <NON-DECIMAL PROGRAM DATA>
	#H0 to #H3FFFFFF 0 to 3FFFFFF bits, in 1-bit steps (Specify in hexadecimal)
	<b>Note:</b> The maximum setting value is the pattern length.
	<data> = <STRING PROGRAM DATA>
	"H***" Specify pattern data in hexadecimal format. 1 to 400 characters (pattern data of 400 × 4 bits) Specify a character string consisting of 0 to 9 and A to F. If the last character string of the pattern data is short of a hexadecimal unit (4 bits), add 0(s) up to the last bit to make a hexadecimal string.
	"B***" Specify pattern data in binary format. 1 to 400 characters (pattern data of 400 bits) Specify a character string consisting of 0 and 1.
Function	Sets the pattern data from the <start> to <end> addresses during Mixed Alternate pattern generation.
	The set data overwrites the specified range.
Example	To set the addresses 0 to 1F of the block 1 pattern A data to AA: > :SOURce:PATtern:MIXalt:DATA:WHOLe 1,APAT,#H0,#H1F, "HAA"
Compatibility	Incompatible with existing models.



---

**:SOURce:PATtern:MIXalt:BDATa:WHOLe**  
**<content>,<start>,<end>,<bdata>**


---

Parameter	<p>&lt;block&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;  1 to 511                      1 to 511 blocks, in 1-block steps</p> <p>&lt;content&gt; = &lt;CHARACTER PROGRAM DATA&gt;  APAT                          Pattern A  BPAT                          Pattern B</p> <p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;  #H0 to #H3FFFFFF              0 to 3FFFFFF bits, in 1-bit steps                                      (Specify in hexadecimal)</p> <p>&lt;end&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;  #H0 to #H3FFFFFF              0 to 3FFFFFF bits, in 1-bit steps                                      (Specify in hexadecimal)</p> <p><b>Note:</b>                                      The maximum setting value is the pattern length.</p> <p>&lt;bdata&gt; = &lt;ARBITRARY BLOCK PROGRAM DATA&gt;  #XYYY&lt;binary&gt;              X:              Number of YYY digits                                      YYY:          Number of bytes of &lt;binary&gt;      1 to 8,388,608 bytes                                      &lt;binary&gt;: Binary data up to 8,388,608 bytes</p>
Function	<p>Sets binary data of the pattern data from &lt;start&gt; to &lt;end&gt; addresses during Mixed Alternate pattern generation.  The set data overwrites the specified range.</p>
Example	<p>To set the addresses 0 to 1F of the block 3 pattern A data to 42:  &gt; :SOURce:PATtern:MIXalt:BDATa:WHOLe  3,APAT,#H0,#H1F,#11B(B=42)</p>
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:MIXalt:BDATa:WHOLe?  
<block>,<content>,<start>[,<size>]**

---

Parameter	<block> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 511                                    1 to 511 blocks, in 1-block steps	
	<content> = <CHARACTER PROGRAM DATA> APAT                                        Pattern A BPAT                                        Pattern B	
	<start> = <NON-DECIMAL PROGRAM DATA> #H0 to #H3FFFFFF                        0 to 3FFFFFF bits, in 1-bit steps (Specify in hexadecimal)	
	<b>Note:</b> The maximum setting value is the pattern length.	
	[<size>] = <NR1 NUMERIC PROGRAM DATA> 1 to 8388608                                1 to 8,388,608 bytes, in 1-byte steps	
	Binary data of the setting pattern is queried when [<size>] is omitted.	
Response	<bdata> = <DEFINITE LENGTH ARBITRARY BLOCK RESPONSE DATA> #XYYY<binary>                            X:            Number of YYY digits YYY:        Number of bytes of <binary> 1 to 8,388,608 bytes <binary>: Binary data up to 8,388,608 bytes	
Function	Queries binary data of bytes specified by <size> from <start> address of the pattern data during Mixed Alternate pattern generation.	
Example	To query binary data of the block 3 pattern A data starting from address 0: > :SOURce:PATtern:MIXalt:BDATa:WHOLe? 3,APAT,#H0 < #11B (B=42)	
Compatibility	Incompatible with existing models.	



---

**:SOURce:PATtern:MIXalt:DREVerse:ADDRes**  
**<block>,<content>,<start>,<end>**


---

Parameter	<block> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 511                      1 to 511 blocks, in 1-block steps <content> = <CHARACTER PROGRAM DATA> APAT                          Pattern A BPAT                          Pattern B <start> = <NON-DECIMAL PROGRAM DATA> #H0 to #H3FFFFFF              0 to 3FFFFFF bits, in 1-bit steps (Specify in hexadecimal) <end> = <NON-DECIMAL PROGRAM DATA> #H0 to #H3FFFFFF              0 to 3FFFFFF bits, in 1-bit steps (Specify in hexadecimal)
	<b>Note:</b> The maximum setting value is the pattern length.
Function	Inverts the data in the program during Mixed Alternate pattern generation. Specify the inversion range by the <start> and <end> addresses.
Example	To invert addresses 0 to 1F of the block 3 pattern A data: > :SOURce:PATtern:MIXalt:DREVerse:ADDRes 3,APAT,#H0,#H1F
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:MIXalt:DREVerse:DELTa**  
**<block>,<content>,<start>,<delta>**


---

Parameter	<block> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 511                      1 to 511 blocks, in 1-block steps <content> = <CHARACTER PROGRAM DATA> APAT                          Pattern A BPAT                          Pattern B <start> = <NON-DECIMAL PROGRAM DATA> #H0 to #H3FFFFFF              0 to 3FFFFFF bits, in 1-bit steps (Specify in hexadecimal) <delta> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 67108864                  1 to 67,108,864 bits, in 1-bit steps
	<b>Note:</b> The maximum setting value is the pattern length.
Function	Inverts the data in the program during Mixed Alternate pattern generation. Specify the inversion range by the number of bits from the <start> address (relative specification).
Example	To invert 64 bits of the block 3 pattern A data from address 0: > :SOURce:PATtern:MIXalt:DREVerse:DELTa 3,APAT,#H0,64
Compatibility	Incompatible with existing models.

---

**:SOURce:PATtern:MIXalt:DATA:FILL  
<block>,<content>,<range>,<page>,<data>**

---

Parameter	<p>&lt;block&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  1 to 511                      1 to 511 blocks, in 1-block steps</p> <p>&lt;content&gt; = &lt;CHARACTER PROGRAM DATA&gt;                  APAT                              Pattern A                  BPAT                              Pattern B</p> <p>&lt;range&gt; = &lt;CHARACTER PROGRAM DATA&gt;                  PAGE                              Specifies a page.                                                      (One page is defined as 128 bits.)</p> <p>ALL                                  Specifies all data.</p> <p>&lt;page&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  1 to 524288                      1 to 524,288 (Max.) pages, in 1-page steps                  Max = Pattern Length / 128 (rounding up fractions)                  Specify "0" when &lt;range&gt; is set to ALL.</p> <p>&lt;data&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  0                                      Fills the specified range with 0s.                  1                                      Fills the specified range with 1s.</p>
Function	<p>Sets 0s or 1s for the specified page or all data in the program during Mixed Alternate pattern generation.</p>
Example	<p>To set 1s for all the data of the block 3 pattern A data:                  &gt; :SOURce:PATtern:MIXalt:DATA:FILL 3,APAT,ALL,0,1</p>
Compatibility	<p>Incompatible with existing models.</p>

### 7.3.2.8 Sequence pattern setting commands

Test Pattern: Sequence | -Logic: POS

[1] — Pair ED: [dropdown] | Condition: [button] |  Loading...

[2] — Manual: [button] |  Transmit

[3] —

Block No.	Loop	Length	Ext.	Manual	A	B

Figure 7.3.2.8-1 Sequence pattern setting

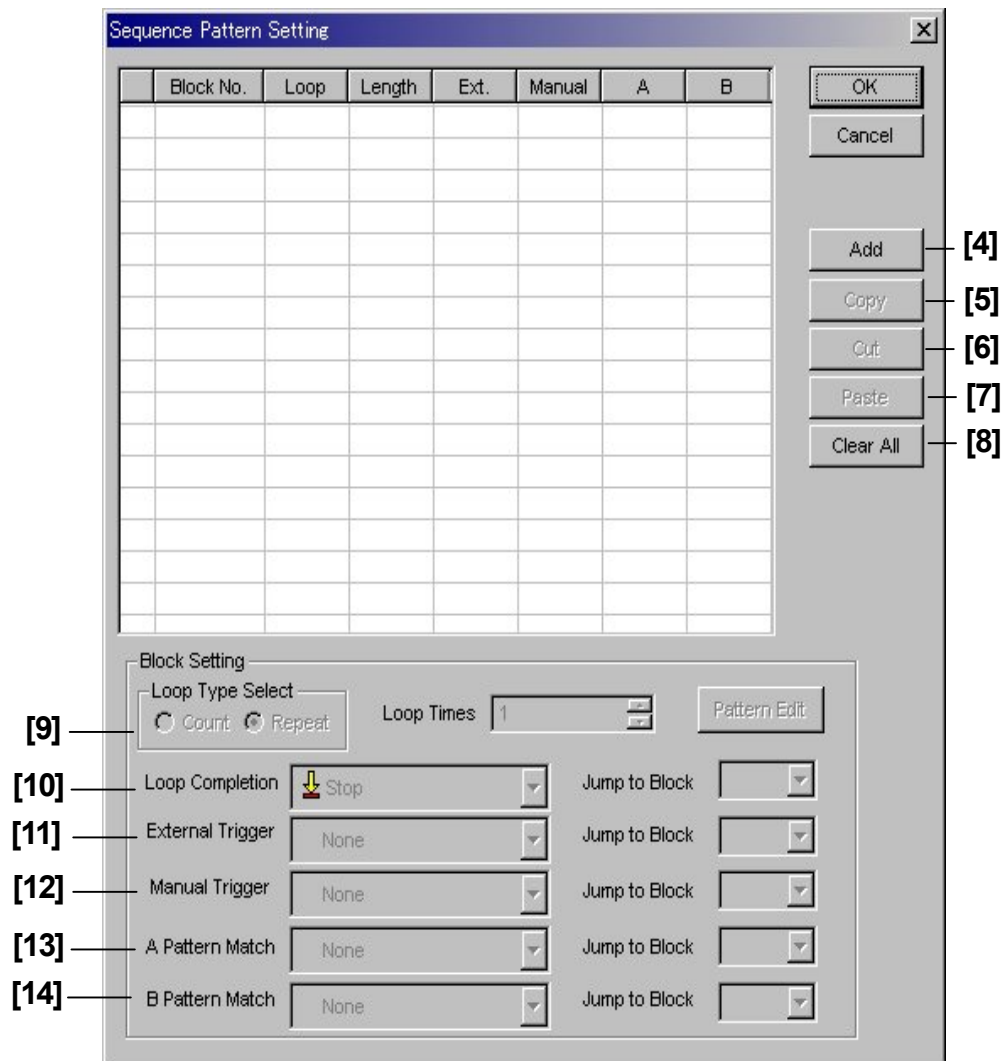


Figure 7.3.2.8-2 Sequence Pattern Setting screen

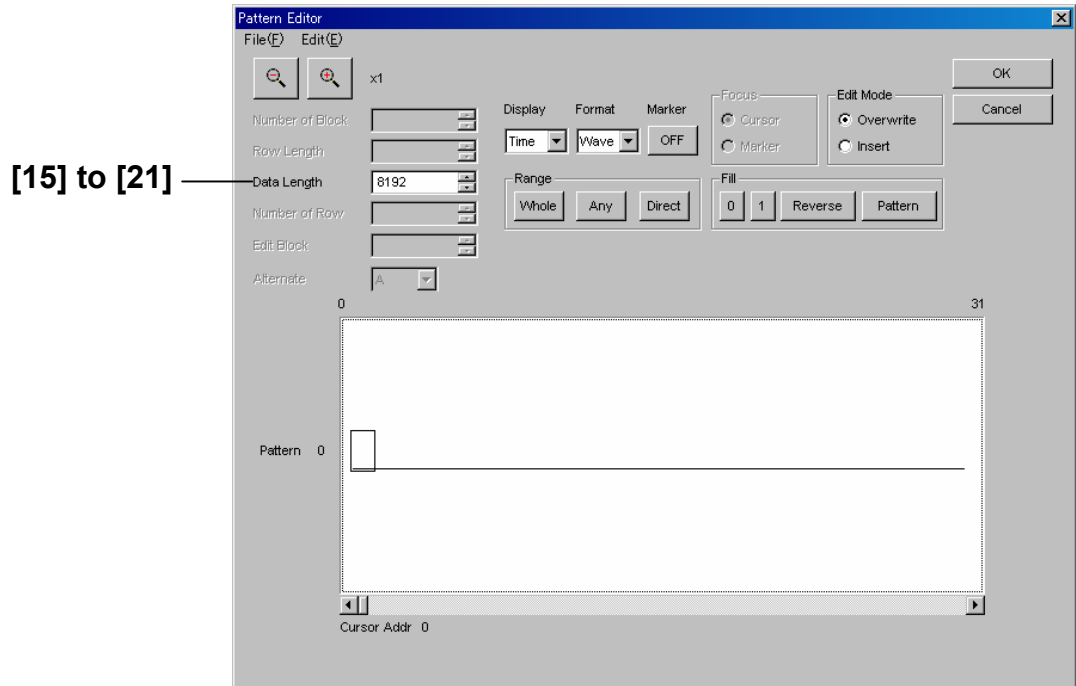


Figure 7.3.2.8-3 Sequence pattern setting (Pattern Editor screen)

Table 7.3.2.8-1 Sequence pattern setting commands

No.	Setting Items	Commands
[1]	Pair ED	:SOURce:PATTern:SEQuence:PAIR
		:SOURce:PATTern:SEQuence:PAIR?
[2]	Manual	:SOURce:PATTern:SEQuence:MANUal
[3]	Restarting	:SOURce:PATTern:SEQuence:TRANsmit
[4]	Add	:SOURce:PATTern:SEQuence:CONDition:ADD
		:SOURce:PATTern:SEQuence:CONDition:ADD?
[5]	Copy	:SOURce:PATTern:SEQuence:COPY
[6]	Cut	:SOURce:PATTern:SEQuence:CUT
[7]	Paste	:SOURce:PATTern:SEQuence:PASTE
[8]	Clear All	:SOURce:PATTern:SEQuence:CLEar
[9]	Loop times	:SOURce:PATTern:SEQuence:LOOPtime
		:SOURce:PATTern:SEQuence:LOOPtime?
[10]	Loop Completion	:SOURce:PATTern:SEQuence:CONDition:LOPC
		:SOURce:PATTern:SEQuence:CONDition:LOPC?
[11]	External Trigger	:SOURce:PATTern:SEQuence:CONDition:EXTernal
		:SOURce:PATTern:SEQuence:CONDition:EXTernal?
[12]	Manual Trigger	:SOURce:PATTern:SEQuence:CONDition:MANUal
		:SOURce:PATTern:SEQuence:CONDition:MANUal?
[13]	A Pattern Match	:SOURce:PATTern:SEQuence:CONDition:AMATch
		:SOURce:PATTern:SEQuence:CONDition:AMATch?

**Table 7.3.2.8-1 Sequence pattern setting commands (Cont'd)**

No.	Setting Items	Commands
[14]	B Pattern Match	:SOURce:PATTern:SEQuence:CONDition:BMATCh
		:SOURce:PATTern:SEQuence:CONDition:BMATCh?
[15]	Data Length	:SOURce:PATTern:SEQuence:LENGTh
		:SOURce:PATTern:SEQuence:LENGTh?
[16]	No label (Pattern setting)	:SOURce:PATTern:SEQuence:DATA:WHOLe
		:SOURce:PATTern:SEQuence:DATA:WHOLe?
[17]	No label (Pattern setting)	:SOURce:PATTern:SEQuence:BDATa:WHOLe
		:SOURce:PATTern:SEQuence:BDATa:WHOLe?
[18]	No label (Data inversion)	:SOURce:PATTern:SEQuence:DREVerse:ADDResS
[19]	No label (Data inversion)	:SOURce:PATTern:SEQuence:DREVerse:DELTa
[20]	No label (Data inversion)	:SOURce:PATTern:SEQuence:DATA:FILL

**:SOURce:PATTern:SEQuence:PAIR <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0 to 6    0 to 6 slots The maximum number of slots is 6 for the MP1800A, and 4 for the MT1810A.
Function	Sets Slot for paired MU181040A and MU181040B at Sequence pattern occurrence
Example	Set slot for paired MU181040A and MU181040B to 2 > :SOURce:PATTern:SEQuence:PAIR 2
Compatibility	Incompatible with existing models.

**:SOURce:PATTern:SEQuence:PAIR?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 to 6    0 to 6 slots
Function	Queries the slot of the MU181040A and MU181040B that is paired during Sequence pattern generation.
Example	> :SOURce:PATTern:SEQuence:PAIR? < 2
Compatibility	Incompatible with existing models.

**:SOURce:PATTern:SEQuence:MANual**

---

Function	Generates a Sequence pattern that is set manually.
Example	> :SOURce:PATTern:SEQuence:MANual
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:SEQuence:TRANsmit**


---

Function	Restarts the Sequence pattern generation.
Example	> :SOURce:PATtern:SEQuence:TRANsmit
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:SEQuence:CONDition:ADD <block>**


---

Parameter	<block> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 blocks, in 1-block steps
Function	Sets the number of blocks that are edited during Sequence pattern generation.
Example	To set the number of blocks that are edited to 10: > :SOURce:PATtern:SEQuence:CONDition:ADD 10
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:SEQuence:CONDition:ADD?**


---

Parameter	<block> = <NR1 NUMERIC RESPONSE DATA> 1 to 128                      1 to 128 blocks, in 1-block steps
Function	Queries the number of blocks that are edited during Sequence pattern generation.
Example	> :SOURce:PATtern:SEQuence:CONDition:ADD? < 10
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:SEQuence:COPY <block>**


---

Parameter	<block> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 blocks, in 1-block steps
Function	Copies the settings in the specified block during Sequence pattern generation.
Example	To copy the settings in block 12: > :SOURce:PATtern:SEQuence:COPY 12
Compatibility	Incompatible with existing models.

### **:SOURce:PATtern:SEQuence:CUT <block>**

---

Parameter	<block> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 blocks, in 1-block steps
Function	Cuts (copies and removes) the settings in the specified block during Sequence pattern generation.
Example	To cut the settings in block 15: > :SOURce:PATtern:SEQuence:CUT 15
Compatibility	Incompatible with existing models.

### **:SOURce:PATtern:SEQuence:PASTe <block>**

---

Parameter	<block> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 blocks, in 1-block steps
Function	Pastes the settings to the specified block during Sequence pattern generation. A block is added to the specified block number.
Example	To paste the settings to block 20: > :SOURce:PATtern:SEQuence:PASTe 20
Compatibility	Incompatible with existing models.

### **:SOURce:PATtern:SEQuence:CLEAr**

---

Function	Clears all the setting conditions during Sequence pattern generation.
Example	> :SOURce:PATtern:SEQuence:CLEAr
Compatibility	Incompatible with existing models.

### **:SOURce:PATtern:SEQuence:LOOptime <block>, <type>[,<numeric>]**

---

Parameter	<block> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 blocks, in 1-block steps <type> = <CHARACTER PROGRAM DATA> COUNT                      Specifies the number of repetition times REPeat                      Does not specify the number of repetition times. [<numeric>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 1024                      1 to 1024 loops, in 1-loop steps
	<b>Note:</b> <numeric> can be omitted when <type> is set to REPeat. Also, the setting in <numeric> is ignored when <type> is set to REPeat.
Function	Sets the number of loops for the specified block during Sequence pattern generation.
Example	To set the number of loops for block 1 to 150: > :SOURce:PATtern:SEQuence:LOOptime 1COUNT,150
Compatibility	Incompatible with existing models.



**:SOURce:PATtern:SEquence:LOOPtime? <block>**

Parameter	<block> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 blocks, in 1-block steps
Response	<type> = <CHARACTER RESPONSE DATA> COUN, REP [<numeric>] = <NR1 NUMERIC RESPONSE DATA> 1 to 1024                      1 to 1024 loops, in 1-loop steps <b>Note:</b> When <type> is set to REPeat, <numeric> is omitted.
Function	Queries the number of loops for the specified block during Sequence pattern generation.
Example	To query the number of loops for block 1: > :SOURce:PATtern:SEquence:LOOPtime? 1 < COUN,150
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:SEquence:CONDition:LOPC <block>,<loop>[,<destination>]**

Parameter	<block> = <DECIMAL NUMERIC PROGRAM DATA> (Block No) 1 to 128                      1 to 128 blocks, in 1-block steps <loop> = <CHARACTER PROGRAM DATA> (Loop Completion) STOP, JUMP, NEXT [<destination>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 blocks, in 1-block steps When selecting JUMP, specify the jump destination block number n from 1 to 128. [<destination>] can be omitted when JUMP is not selected.
Function	Sets the loop completion condition of each block during Sequence pattern generation.
Example	To set NEXT for the loop completion condition of block 3: > :SOURce:PATtern:SEquence:CONDition:LOPC 3,NEXT
Compatibility	Incompatible with existing models.

### **:SOURce:PATtern:SEquence:CONDition:LOPC? <block>**

---

Parameter	<block> = <DECIMAL NUMERIC PROGRAM DATA> (Block No) 1 to 128                      1 to 128 blocks, in 1-block steps
Response	<loop> = <CHARACTER RESPONSE DATA> (Loop Completion) STOP, JUMP, NEXT [<destination>] = <NR1 NUMERIC RESPONSE DATA> 1 to 128                      1 to 128 blocks, in 1-block steps When JUMP is selected, the jump destination block number n from 1 to 128 is returned. Omitted when Jump is not specified.
Function	Queries the loop completion condition of each block during Sequence pattern generation.
Example	To query the loop completion condition of block 3: > :SOURce:PATtern:SEquence:CONDition:LOPC? 3 < NEXT
Compatibility	Incompatible with existing models.

### **:SOURce:PATtern:SEquence:CONDition:EXTernal <block>,<ext>[,<destination>]**

---

Parameter	<block> = <DECIMAL NUMERIC PROGRAM DATA> (Block No) 1 to 128                      1 to 128 blocks, in 1-block steps <ext> = <CHARACTER PROGRAM DATA> (Ext Trigger) STOP, JUMP, NEXT, NONE [<destination>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 blocks, in 1-block steps When selecting JUMP, specify the jump destination block number n from 1 to 128. [<destination>] can be omitted when JUMP is not selected.
Function	Sets the external trigger condition of each block during Sequence pattern generation.
Example	To set STOP for the external trigger condition of block 5: > :SOURce:PATtern:SEquence:CONDition:EXTernal 5,STOP
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:SEquence:CONDition:EXTernal? <block>**

Parameter	<block> = <DECIMAL NUMERIC PROGRAM DATA> (Block No) 1 to 128                      1 to 128 blocks, in 1-block steps
Response	<ext> = <CHARACTER RESPONSE DATA> (Ext Trigger) STOP, JUMP, NEXT, NONE [<destination>] = <NR1 NUMERIC RESPONSE DATA> 1 to 128                      1 to 128 blocks, in 1-block steps When JUMP is selected, the jump destination block number n from 1 to 128 is returned. Omitted when Jump is not specified.
Function	Queries the external trigger condition of each block during Sequence pattern generation.
Example	To query the external trigger condition of block 5: > :SOURce:PATtern:SEquence:CONDition:EXTernal? 5 < STOP
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:SEquence:CONDition:MANual <block>,<man>[,<destination>]**

Parameter	<block> = <DECIMAL NUMERIC PROGRAM DATA> (Block No) 1 to 128                      1 to 128 blocks, in 1-block steps <man> = <CHARACTER PROGRAM DATA> (Manual Trigger) STOP, JUMP, NEXT, NONE [<destination>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 blocks, in 1-block steps When selecting JUMP, specify the jump destination block number n from 1 to 128. [<destination>] can be omitted when JUMP is not selected.
Function	Sets the manual trigger condition of each block during Sequence pattern generation.
Example	To set the manual trigger condition of block 2 to "Jump to block 5". > :SOURce:PATtern:SEquence:CONDition:MANual 2, JUMP5
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:SEquence:CONDition:MANual? <block>**

---

Parameter	<block> = <DECIMAL NUMERIC PROGRAM DATA> (Block No) 1 to 128                      1 to 128 blocks, in 1-block steps
Response	<man> = <CHARACTER RESPONSE DATA> (Manual Trigger) STOP, JUMP, NEXT, NONE [<destination>] = <NR1 NUMERIC RESPONSE DATA> 1 to 128                      1 to 128 blocks, in 1-block steps When JUMP is selected, the jump destination block number n from 1 to 128 is returned. Omitted when Jump is not specified.
Function	Queries the manual trigger condition of each block during Sequence pattern generation.
Example	To query the manual trigger condition of block 2: > :SOURce:PATtern:SEquence:CONDition:MANual? 2 < JUMP5
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:SEquence:CONDition:AMATch <block>,<a>[,<destination>]**

---

Parameter	<block> = <DECIMAL NUMERIC PROGRAM DATA> (Block No) 1 to 128                      1 to 128 blocks, in 1-block steps <a> = <CHARACTER PROGRAM DATA> (A Pattern Match) STOP, JUMP, NEXT, NONE [<destination>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 blocks, in 1-block steps When selecting JUMP, specify the jump destination block number n from 1 to 128. [<destination>] can be omitted when JUMP is not selected.
Function	Sets the pattern A match condition of each block during Sequence pattern generation.
Example	To set NONE for the pattern A match condition of block 3: > :SOURce:PATtern:SEquence:CONDition:AMATch 3,NONE
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:SEQuence:CONDition:AMATch? <block>**

Parameter	<block> = <DECIMAL NUMERIC PROGRAM DATA> (Block No) 1 to 128                      1 to 128 blocks, in 1-block steps
Response	<a> = <CHARACTER RESPONSE DATA> (A Pattern Match) STOP, JUMP, NEXT, NONE [<destination>] = <NR1 NUMERIC RESPONSE DATA> 1 to 128                      1 to 128 blocks, in 1-block steps When JUMP is selected, the jump destination block number n from 1 to 128 is returned. Omitted when Jump is not specified.
Function	Queries the pattern A match condition of each block during Sequence pattern generation.
Example	To query the pattern A match condition of block 3: > :SOURce:PATtern:SEQuence:CONDition:AMATch? 3 < NONE
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:SEQuence:CONDition:BMATch  
<block>,<b>[,<destination>]**

Parameter	<block> = <DECIMAL NUMERIC PROGRAM DATA> (Block No) 1 to 128                      1 to 128 blocks, in 1-block steps <b> = <CHARACTER PROGRAM DATA> (B Pattern Match) STOP, JUMP, NEXT, NONE [<destination>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 blocks, in 1-block steps When selecting JUMP, specify the jump destination block number n from 1 to 128. [<destination>] can be omitted when JUMP is not selected.
Function	Sets the pattern B match condition of each block during Sequence pattern generation.
Example	To set NEXT for the pattern B match condition of block 7: > :SOURce:PATtern:SEQuence:CONDition:BMATch 7,NEXT
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:SEQuence:CONDition:BMATch? <block>**

---

Parameter	<block> = <DECIMAL NUMERIC PROGRAM DATA> (Block No) 1 to 128                            1 to 128 blocks, in 1-block steps
Response	<b> = <CHARACTER RESPONSE DATA> (B Pattern Match) STOP, JUMP, NEXT, NONE [<destination>] = <NR1 NUMERIC RESPONSE DATA> 1 to 128                            1 to 128 blocks, in 1-block steps When JUMP is selected, the jump destination block number n from 1 to 128 is returned. Omitted when Jump is not specified.
Function	Queries the pattern B match condition of each block during Sequence pattern generation.
Example	To query the pattern B match condition of block 7: > :SOURce:PATtern:SEQuence:CONDition:BMATch? 7 < NEXT
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:SEQuence:LENGth <block>,<numeric>**

---

Parameter	<block> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 128                            1 to 128 blocks, in 1-block steps <numeric> = <DECIMAL NUMERIC PROGRAM DATA> 8192 to 1048576                8192 to 1,048,576 bits, in 128-bit steps Be sure to set a value so that the following condition is satisfied. Number of blocks × Block length ≤ 128 Mbits
Function	Sets the pattern length of the specified block during Sequence pattern generation.
Example	To set the pattern length of block 3 to 8192 bits: > :SOURce:PATtern:SEQuence:LENGth 3,8192
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:SEQuence:LENGth? <block>**

---

Parameter	<block> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 128                            1 to 128 blocks, in 1-block steps
Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 8192 to 1048576                8192 to 1,048,576 bits, in 128-bit steps
Function	Queries the pattern length of the specified block during Sequence pattern generation.
Example	To query the pattern length of block 3: > :SOURce:PATtern:SEQuence:LENGth? 3 < 8192
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:SEquence:DATA:WHOLe  
<block>,<start>,<end>,<data>**

---

Parameter	<p>&lt;block&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt; 1 to 128                            1 to 128 blocks, in 1-block steps</p> <p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt; #H0 to #HFFFFFF                    0 to FFFFF bits, in 1-bit steps   (Specify in hexadecimal)</p> <p>&lt;end&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt; #H0 to #HFFFFFF                    0 to FFFFF bits, in 1-bit steps   (Specify in hexadecimal)</p> <p><b>Note:</b> The maximum setting value is the pattern length.</p> <p>&lt;data&gt; = &lt;STRING PROGRAM DATA&gt; "H***"                            Specify pattern data in hexadecimal format.   1 to 400 characters (pattern data of 400 × 4 bits)   Specify a character string consisting of 0 to 9   and A to F.   If the last character string of the pattern data is   short of a hexadecimal unit (4 bits), add 0(s) up   to the last bit to make a hexadecimal string.</p> <p>"B***"                            Specify pattern data in binary format.   1 to 400 characters (pattern data of 400 bits)   Specify a character string consisting of 0 and 1.</p>
Function	<p>Sets the pattern data from the &lt;start&gt; to &lt;end&gt; addresses during Sequence pattern generation.</p> <p>The set data overwrites the specified range.</p>
Example	<p>To set the addresses 0 to FF of the block 1 data to 5A: &gt; :SOURce:PATtern:SEquence:DATA:WHOLe 1,#H0,#HFF, "H5A"</p>
Compatibility	<p>Incompatible with existing models.</p>





**:SOURce:PATtern:SEquence:BDATa:WHOLe? <block>,<start>[,<size>]**

Parameter	<p>&lt;block&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt; 1 to 128                      1 to 128 blocks, in 1-block steps &lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt; #H0 to #HFFFFFF              0 to FFFFF bits, in 1-bit steps                                     (Specify in hexadecimal)</p> <p><b>Note:</b> The maximum setting value is the pattern length.</p>
Response	<p>[&lt;size&gt;] = &lt;NR1 NUMERIC PROGRAM DATA&gt; 1 to 131072      1 to 131,072 bytes, in 1-byte steps Binary data of the setting pattern is queried when [&lt;size&gt;] is omitted.</p> <p>&lt;bdata&gt; = &lt;DEFINITE LENGTH ARBITRARY BLOCK RESPONSE DATA&gt; #XYYY&lt;binary&gt;              X:      Number of YYY digits                                     YYY:    Number of bytes of &lt;binary&gt;   1 to 131,072 bytes                                     &lt;binary&gt;:Binary data up to 131,072 bytes</p>
Function	Queries binary data of bytes specified by <size> from <start> address of the pattern data during Sequence pattern generation.
Example	To query binary data of the block 1 data starting from address 0: > :SOURce: PATtern: SEquence: BDATa: WHOLe? 1, #H0 < #11D
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:SEquence:DREVerse:ADDReSS  
<block>,<start>,<end>**

Parameter	<p>&lt;block&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt; 1 to 128                      1 to 128 blocks, in 1-block steps &lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt; #H0 to #HFFFFFF              0 to FFFFF bits, in 1-bit steps                                     (Specify in hexadecimal) &lt;end&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt; #H0 to #HFFFFFF              0 to FFFFF bits, in 1-bit steps                                     (Specify in hexadecimal)</p> <p><b>Note:</b> The maximum setting value is the pattern length.</p>
Function	Inverts the data in the program during Sequence pattern generation. Specify the inversion range by the <start> and <end> addresses.
Example	To invert addresses 0 to FF of the block 3 data: > :SOURce: PATtern: SEquence: DREVerse: ADDReSS 3, #H0, #HFF
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:SEquence:DREVerse:DELTA <block>,<start>,<delta>**

Parameter	<p>&lt;block&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  1 to 128                      1 to 128 blocks, in 1-block steps</p> <p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;                  #H0 to #HFFFFFF                      0 to FFFFF bits, in 1-bit steps                  (Specify in hexadecimal)</p> <p>&lt;delta&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  1 to 1048576                      1 to 1,048,576 bits, in 1-bit steps</p> <p><b>Note:</b>                  The maximum setting value is the pattern length.</p>
Function	Inverts the data in the program during Sequence pattern generation. Specify the inversion range by the number of bits from the <start> address (relative specification).
Example	To invert 128 bits of the block 5 data from address 0: > :SOURce:PATtern:SEquence:DREVerse:DELTA 5, #H0, 128
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:SEquence:DATA:FILL <block>,<range>,<page>,<data>**

Parameter	<p>&lt;block&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  1 to 128                      1 to 128 blocks, in 1-block steps</p> <p>&lt;range&gt; = &lt;CHARACTER PROGRAM DATA&gt;                  PAGE                      Specifies a page.                  (One page is defined as 128 bits.)</p> <p>ALL                      Specifies all data.</p> <p>&lt;page&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  1 to 8192                      1 to 8,192 pages, in 1-page steps                  Max = Pattern Length/128 (rounding up fractions)                  Specify "0" when &lt;range&gt; is set to ALL.</p> <p>&lt;data&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  0                      Fills the specified range with 0s.                  1                      Fills the specified range with 1s.</p>
Function	Sets 0s or 1s for the specified page or all data in the program during Sequence pattern generation.
Example	To set 1s for all the data of the block 8: > :SOURce:PATtern:SEquence:DATA:FILL 8, ALL, 0, 1
Compatibility	Incompatible with existing models.

7.3.3 Commands related to Error Addition tab window

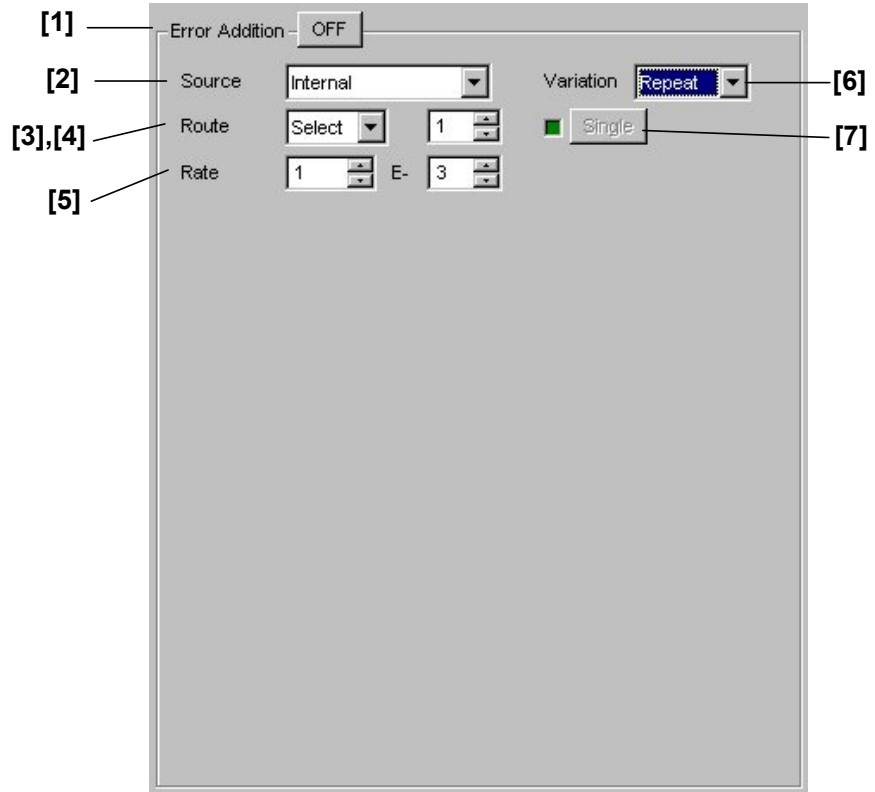


Figure 7.3.3-1 Error Addition tab window  
(For PRBS, Zero-Substitution, Data patterns)

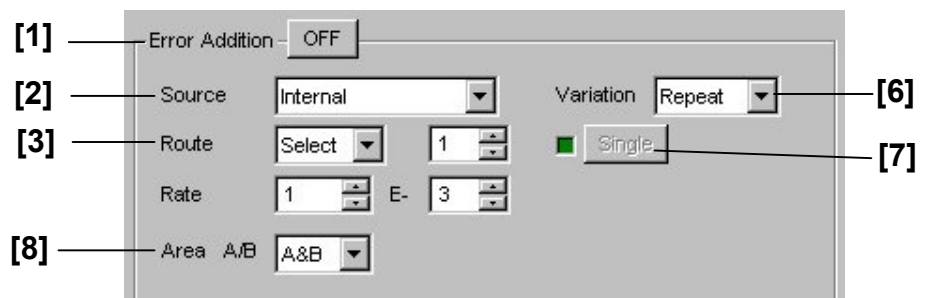


Figure 7.3.3-2 Error Addition tab window (For Alternate pattern)

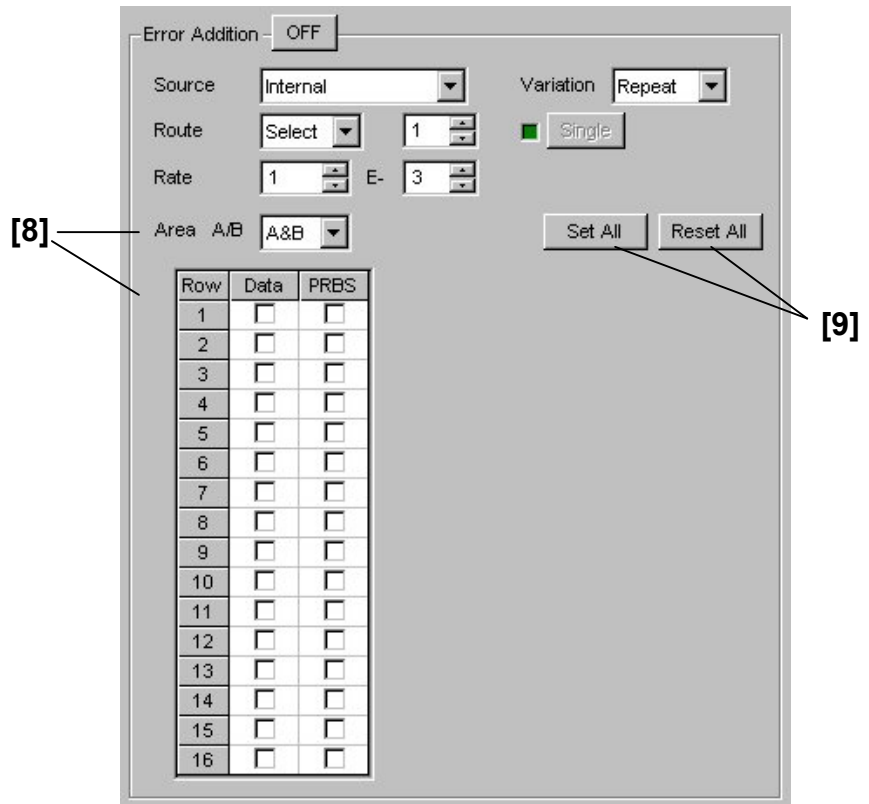


Figure 7.3.3-3 Error Addition tab window (For Mixed pattern)

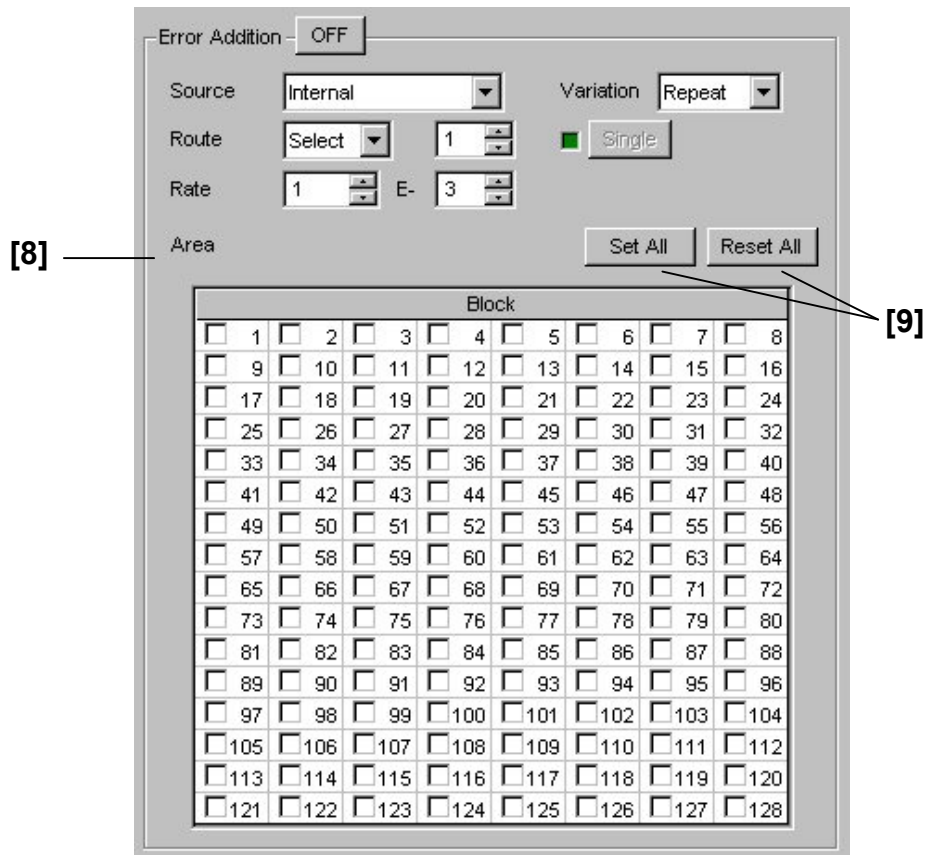


Figure 7.3.3-4 Error Addition tab window (For Sequence pattern)

Table 7.3.3-1 Error Addition setting commands

No.	Setting Items	Commands
[1]	Error Addition ON/OFF	:SOURce:PATtern:EADDition:SET :SOURce:PATtern:EADDition:SET?
[2]	Source	:SOURce:PATtern:EADDition:SOURce :SOURce:PATtern:EADDition:SOURce?
[3]	Route	:SOURce:PATtern:EADDition:SElect :SOURce:PATtern:EADDition:SElect?
[4]	Error Addition Route setting	:SOURce:PATtern:EADDition:ROUte :SOURce:PATtern:EADDition:ROUte?
[5]	Rate	:SOURce:PATtern:EADDition:RATE :SOURce:PATtern:EADDition:RATE?
[6]	Variation	:SOURce:PATtern:EADDition:VARiation :SOURce:PATtern:EADDition:VARiation?
[7]	Single	:SOURce:PATtern:EADDition:SINGLE
[8]	Area A/B, Row, Block	:SOURce:PATtern:EADDition:AREA :SOURce:PATtern:EADDition:AREA?
[9]	Set All/Reset All	:SOURce:PATtern:EADDition:ALLSet

**:SOURce:PATtern:EADDITION:SET <boolean>**

---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> OFF or 0                      Output OFF ON or 1                        Output ON
Function	Sets whether to add a bit error to the test pattern.
Example	To set bit error addition ON: > :SOURce:PATtern:EADDITION:SET ON
Compatibility	Compatible with the MP1632C.

**:SOURce:PATtern:EADDITION:SET?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1                                Error addition OFF 0                                Error addition ON
Function	Queries the bit error addition ON/OFF state to the test pattern.
Example	> :SOURce:PATtern:EADDITION:SET? < 1
Compatibility	Compatible with the MP1632C.

**:SOURce:PATtern:EADDITION:SOURce <source>**

---

Parameter	<source> = <CHARACTER PROGRAM DATA> INTernal                      Internal signal EXTTrig                        Rising of external signal trigger EXTDisable                    Disables external signal
Function	Sets the reference signal source for bit error addition to the test pattern.
Example	To set the reference signal source for bit error addition to Internal: > :SOURce:PATtern:EADDITION:SOURce INTernal
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:EADDITION:SOURce?**

---

Response	<source> = <CHARACTER RESPONSE DATA> INT, EXTT, EXTD
Function	Queries the reference signal source for bit error addition to the test pattern.
Example	> :SOURce:PATtern:EADDITION:SOURce? < INT
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:EADDITION:SElect <select>**


---

Parameter	<select> = <CHARACTER PROGRAM DATA> SCAN SElect	Changes the route for which 32 Demux is performed every time when an error is added. Adds an error to the specified route.
Function	Sets the route setting method for bit error addition.	
Example	To set the route setting method to SCAN: > :SOURce:PATtern:EADDITION:SElect SCAN	
Compatibility	Incompatible with existing models.	

**:SOURce:PATtern:EADDITION:SElect?**


---

Response	<select> = <CHARACTER RESPONSE DATA> SCAN, SEL	
Function	Queries the route setting method for bit error addition.	
Example	> :SOURce:PATtern:EADDITION:SElect? < SCAN	
Compatibility	Incompatible with existing models.	

**:SOURce:PATtern:EADDITION:ROUTE <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 32	1 to 32, in single steps
Function	Sets the route to add a bit error.	
Example	To set Route 2 as the route to add a bit error: > :SOURce:PATtern:EADDITION:ROUTE 2	
Compatibility	Compatible with the MP1632C (1 to 8, in single steps).	

**:SOURce:PATtern:EADDITION:ROUTE?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1 to 32	1 to 32, in single steps
Function	Queries the route to add a bit error.	
Example	> :SOURce:PATtern:EADDITION:ROUTE? < 2	
Compatibility	Compatible with the MP1632C (1 to 8, in single steps).	

### **:SOURce:PATtern:EADDITION:RATE <rate>[,<numeric>]**

---

Parameter	<p>&lt;rate&gt; = &lt;CHARACTER PROGRAM DATA&gt;  E_2 to E_12                    E-2 to E-12, in E-1 steps  In Combination (for 2 and 4 channels)  E_3 to E_12                    E-3 to E-12, in E-1 steps  &lt;numeric&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;  x: 1 to 9                        x: 1 to 9, in single steps  Set a value in the format of "xE-n". If x is omitted, 1 is set.</p>
Function	Sets the rate of bit errors to be added.
Example	<p>To set the rate of bit errors to be added to 5E-9:  &gt; :SOURce:PATtern:EADDITION:RATE E_9,5</p>
Compatibility	Partially compatible with the MP1632C (only when x is omitted).

### **:SOURce:PATtern:EADDITION:RATE?**

---

Response	<p>&lt;rate&gt; = &lt;CHARACTER RESPONSE DATA&gt;  E_2 to E_12                    E-2 to E-12  In Combination (for 2 and 4 channels)  E_3 to E_12                    E-3 to E-12  &lt;numeric&gt; = &lt;NR2 NUMERIC RESPONSE DATA&gt;  x: 1 to 9                        x: 1 to 9, in single steps</p>
Function	Queries the rate of bit errors to be added.
Example	<p>&gt; :SOURce:PATtern:EADDITION:RATE?  &lt; E_9,5</p>
Compatibility	Partially compatible with the MP1632C (only when x is omitted).

### **:SOURce:PATtern:EADDITION:VARIation <var>**

---

Parameter	<p>&lt;var&gt; = &lt;CHARACTER PROGRAM DATA&gt;  REPeat                        Errors are continuously inserted.  SINGLE                         An error is inserted by each click.</p>
Function	Sets the bit error addition method for the test pattern (when Internal is selected).
Example	<p>To set the bit error addition method to Repeat:  &gt; :SOURce:PATtern:EADDITION:VARIation REPeat</p>
Compatibility	Incompatible with existing models.



**:SOURce:PATtern:EADdition:VARiation?**

Response	<var> = <CHARACTER RESPONSE DATA> REP, SING
Function	Queries the bit error addition method (when Internal is selected) to the test pattern.
Example	> :SOURce:PATtern:EADdition:VARiation? < REP
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:EADdition:SINGLE**

Function	Adds a single error to the test pattern.
Example	> :SOURce:PATtern:EADdition:SINGLE
Compatibility	Compatible with the MP1632C.

**:SOURce:PATtern:EADdition:AREA <contents>,<row>,<data>[,<prbs>]**

Parameter	<contents> = <CHARACTER PROGRAM DATA> APAT                      Pattern A BPAT                      Pattern B ABPat                     Patterns A and B NONe                     (For Mixed Data and Sequence patterns) <row> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 16                    (Specify the row number for Mixed Data patterns) 1 to 128                  (Specify the block number for Sequence patterns) 0                          (Other than the above patterns) <data> = <BOOLEAN PROGRAM DATA> OFF or 0, ON or 1        OFF or 0 for Alternate patterns [<prbs>] = <BOOLEAN PROGRAM DATA> OFF or 0, ON or 1 (For Mixed patterns only) OFF or 0 for Alternate and Sequence patterns
Function	Sets an area to add a bit error for Alternate, Mixed, and Sequence patterns.
Example	To set an area to add a bit error to "Pattern A, 1 Row, Data ON, PRBS ON": > :SOURce:PATtern:EADdition:AREA APAT,1,1,1
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:EADdition:AREA? <contents>,<row>**

Parameter	<contents> = <CHARACTER PROGRAM DATA> APAT                    Pattern A BPAT                    Pattern B ABPat                   Patterns A and B NONE                    (For Mixed Data and Sequence patterns) <row> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 16                   (Specify the row number for Mixed Data patterns) 1 to 128                  (Specify the block number for Sequence patterns) 0                          (For Alternate patterns)
Response	<data>[,<prbs>] = <NR1 NUMERIC RESPONSE DATA> 0                          OFF 1                          ON <prbs> is returned for Mixed patterns only.
Function	Queries an area to add a bit error.
Example	To query an error addition area of Pattern A, 1 Row: > :SOURce:PATtern:EADdition:AREA? APAT,1 < 1,1 To query an error addition area for Alternate pattern: > :SOURce:PATtern:EADdition:AREA? APAT,0 < 1
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:EADdition:ALLSet <numeric>**

Parameter	<numeric> = <NUMERIC PROGRAM DATA> 0                          All Reset 1                          All Set
Function	Selects (set) or unselects (reset) all areas to add a bit error for Mixed and Sequence patterns.
Example	To select all areas to add a bit error: > :SOURce:PATtern:EADdition:ALLSet 1
Compatibility	Incompatible with existing models.

### 7.3.4 Commands related to Misc tab window

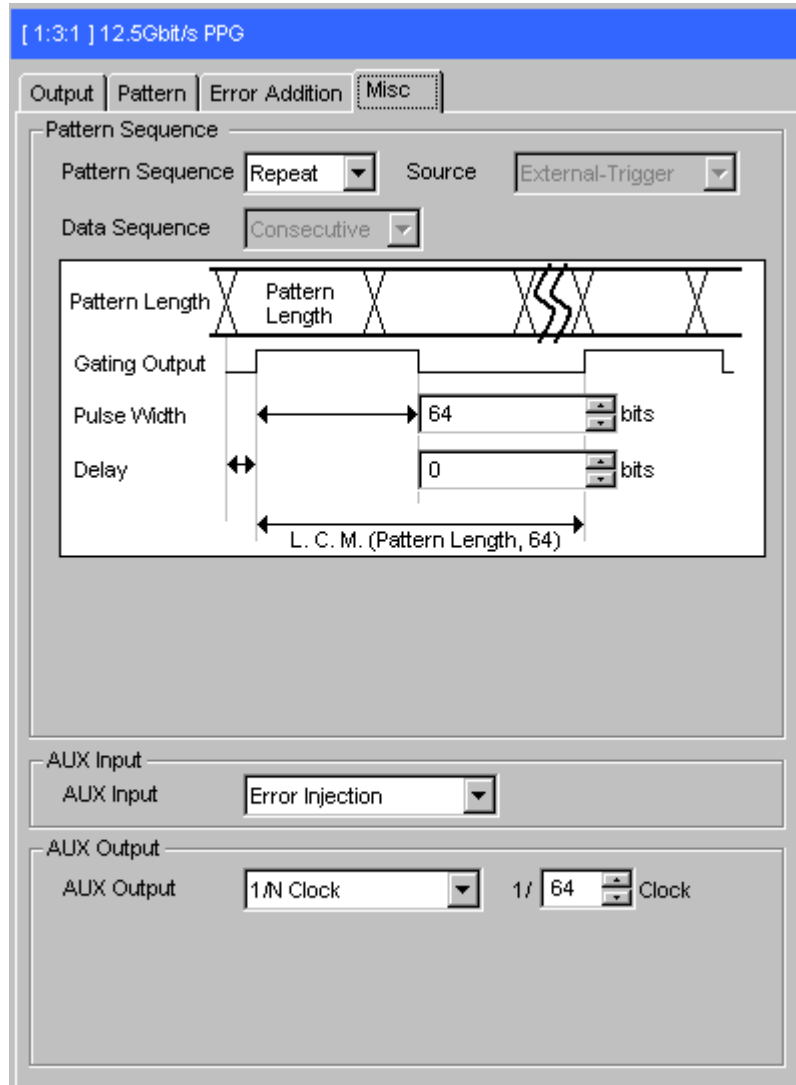


Figure 7.3.4-1 Misc tab window

7.3.4.1 Pattern Generation setting commands

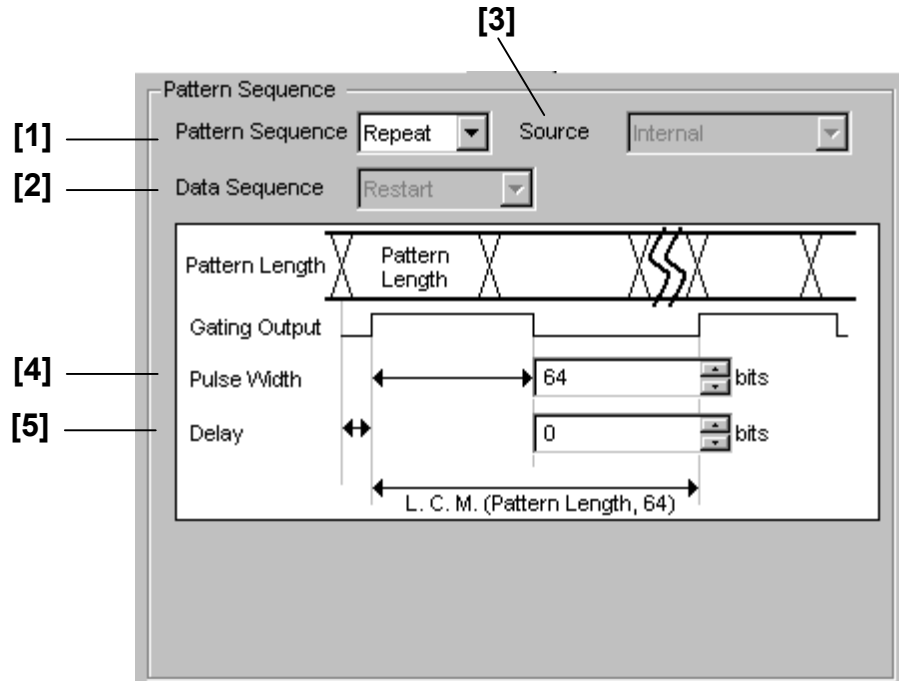


Figure 7.3.4.1-1 Pattern Generation setting field (for Repeat signal generation)

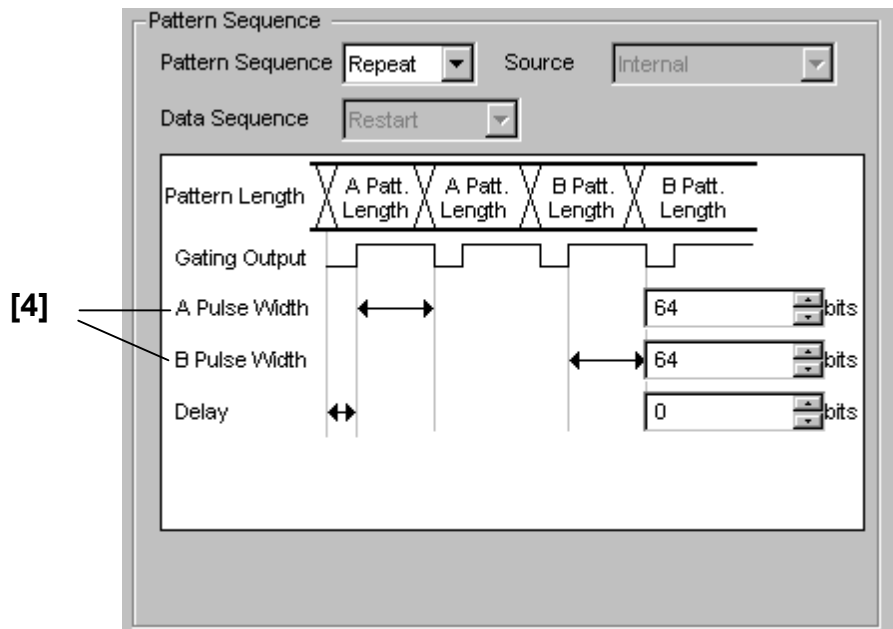


Figure 7.3.4.1-2 Pattern Generation setting field (for Repeat signal generation)

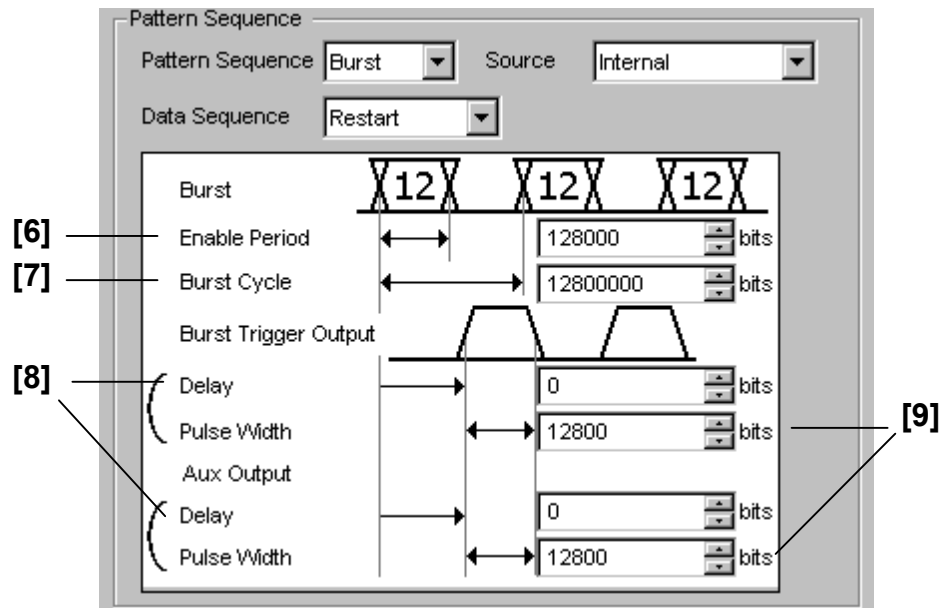


Figure 7.3.4.1-3 Pattern Generation setting field (for Burst signal generation)

Table 7.3.4.1-1 Pattern Generation setting commands

No.	Setting Items	Commands
[1]	Pattern Sequence	:SOURce:PATTern:OMODE
		:SOURce:PATTern:OMODE?
[2]	Data Sequence	:SOURce:PATTern:BURSt:SEQuence
		:SOURce:PATTern:BURSt:SEQuence?
[3]	Source	:SOURce:PATTern:BURSt:MODE
		:SOURce:PATTern:BURSt:MODE?
[4]	Pulse Width	:SOURce:PATTern:REPeat:PULSewidth
		:SOURce:PATTern:REPeat:PULSewidth?
[5]	Delay (for Repeat)	:SOURce:PATTern:REPeat:TRIGdelay
		:SOURce:PATTern:REPeat:TRIGdelay?
[6]	Enable Period	:SOURce:PATTern:BURSt:ELENgth
		:SOURce:PATTern:BURSt:ELENgth?
[7]	Burst Cycle	:SOURce:PATTern:BURSt:CYCLE
		:SOURce:PATTern:BURSt:CYCLE?
[8]	Delay (for Burst)	:SOURce:PATTern:BURSt:TRIGdelay
		:SOURce:PATTern:BURSt:TRIGdelay?
[9]	Enable Pulse Width	:SOURce:PATTern:BURSt:PULSewidth
		:SOURce:PATTern:BURSt:PULSewidth?

### **:SOURce:PATtern:OMODE <mode>**

---

Parameter	<mode> = <CHARACTER PROGRAM DATA> REPeat                      Repeat signal BURSt                        Burst signal
Function	Sets the signal generation method from Repeat (consecutive) signal or Burst signal.
Example	To set the signal generation method to Burst signal: > :SOURce:PATtern:OMODE BURSt
Compatibility	Compatible with the MP1632C.

### **:SOURce:PATtern:OMODE?**

---

Response	<mode> = <CHARACTER RESPONSE DATA> REP, BURSt
Function	Queries the signal generation method.
Example	> :SOURce:PATtern:OMODE? < BURSt
Compatibility	Compatible with the MP1632C.

### **:SOURce:PATtern:BURSt:SEQuence <mode>**

---

Parameter	<mode> = <CHARACTER PROGRAM DATA> REStArt                      Restart from the beginning CONSeCutive                Consecutive output in the Burst interval CONTInuous                 Consecutive output regardless of Burst interval
Function	Sets the data output sequence for the Burst data signal.
Example	To set the output sequence to Restart: > :SOURce:PATtern:BURSt:SEQuence REStArt
Compatibility	Incompatible with existing models.

### **:SOURce:PATtern:BURSt:SEQuence?**

---

Response	<mode> = <CHARACTER RESPONSE DATA> RESt, CONS, CONT
Function	Queries the data output sequence for the Burst data signal.
Example	> :SOURce:PATtern:BURSt:SEQuence? < RESt
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:BURSt:MODE <mode>**

Parameter	<mode> = <CHARACTER PROGRAM DATA> INTERNAL Generates based on internal reference signal EXTTrig Generates based on external signal trigger edge EXTERNAL Generates during the high level interval of external signal trigger input
Function	Sets the Burst signal generation sequence from internal trigger, external trigger, or enable.
Example	To set the Burst signal generation sequence to Internal: > :SOURce:PATtern:BURSt:MODE INTERNAL
Compatibility	Compatible with the MP1632C.

**:SOURce:PATtern:BURSt:MODE?**

Response	<mode> = <CHARACTER RESPONSE DATA> INT, EXTT, EXT
Function	Queries the Burst signal generation sequence.
Example	> :SOURce:PATtern:BURSt:MODE? < INT
Compatibility	Compatible with the MP1632C.

**:SOURce:PATtern:REPeat:PULSewidth <numeric>[,<contents>]**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0 to 68719476672 0 to 68,719,476,672 bits, in 16-bit steps The setting range is from 0 to 64 if the pattern length is 64 or less. <b>Note:</b> At 2 ch Combination, the setting range and Step are doubled. At 4 ch Combination, the setting range and Step are quadrupled. [<contents>] = <CHARACTER PROGRAM DATA> APAT Specify to indicate the pulse width of Alternate pattern A. BPAT Specify to indicate the pulse width of Alternate pattern B. <b>Note:</b> For patterns other than the Alternate pattern, [<contents>] cannot be set and should be omitted.
Function	Sets the pulse width of the timing signal to be output during the timing signal period.
Example	To set the pulse width of the timing signal to 128 bits: > :SOURce:PATtern:REPeat:PULSewidth 128 To set the pulse width of the timing signal for Alternate pattern A to 256 bits: > :SOURce:PATtern:REPeat:PULSewidth 256,APAT
Compatibility	Incompatible with existing models.

### **:SOURce:PATtern:REPeat:PULSewidth? [<contents>]**

Parameter	[<contents>] = <CHARACTER PROGRAM DATA> APAT Specify to indicate the pulse width of Alternate pattern A. BPAT Specify to indicate the pulse width of Alternate pattern B. <b>Note:</b> For patterns other than the Alternate pattern, [<contents>] cannot be set and should be omitted.
Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries the pulse width of the timing signal to be output during the timing signal period.
Example	To query the pulse width of the timing signal: > :SOURce:PATtern:REPeat:PULSewidth? < 128 To query the pulse width of the timing signal of Alternate pattern A: > :SOURce:PATtern:REPeat:PULSewidth? APAT < 256
Compatibility	Incompatible with existing models.

### **:SOURce:PATtern:REPeat:TRIGdelay <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0 to 68719476672 0 to 68,719,476,672 bits, in 16-bit steps The settable value is 0 if the pattern length is 79 bits or less. <b>Note:</b> At 2 ch Combination, the setting range and Step are doubled. At 4 ch Combination, the setting range and Step are quadrupled.
Function	Sets the delay value for the timing signal pulse to be output during the timing signal period.
Example	To set the timing signal pulse delay to 256 bits: > :SOURce:PATtern:REPeat:TRIGdelay 256
Compatibility	Incompatible with existing models.

### **:SOURce:PATtern:REPeat:TRIGdelay?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries the delay value for the timing signal pulse to be output during the timing signal period.
Example	> :SOURce:PATtern:REPeat:TRIGdelay? < 256
Compatibility	Incompatible with existing models.



**:SOURce:PATtern:BURSt:ELENgth <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 640 to 2147483648      640 to 2,147,483,648 bits, in 128-bit steps
	<b>Note:</b> In the case of Internal, a Disable period of at least 512 bits is required between Burst Cycle and Enable Period. In the case of Combination, the setting range, resolution, steps, and Disable period are multiplied by 4. The setting range, Step, and Disable period at Combination are doubled at 2 ch Combination and quadrupled at 4 ch Combination.
Function	Sets the data signal generation interval for Burst signal generation.
Example	To set the data signal generation interval to 12,800 bits: > :SOURce:PATtern:BURSt:ELENgth 12800
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:BURSt:ELENgth?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 640 to 2147483648      640 to 2,147,483,648 bits
Function	Queries the data signal generation interval for Burst signal generation.
Example	> :SOURce:PATtern:BURSt:ELENgth? < 12800
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:BURSt:CYCLE <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 1280 to 2147483648      1,280 to 2,147,483,648 bits, in 128-bit steps
	<b>Note:</b> At 2 ch Combination, the setting range and Step are doubled. At 4 ch Combination, the setting range and Step are quadrupled.
Function	Sets an addition value of the data signal generation interval and the data stop interval for Burst signal generation (Burst generation cycle).
Example	To set the Burst generation cycle to 25,600 bits: > :SOURce:PATtern:BURSt:CYCLE 25600
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:BURSt:CYCLe?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1280 to 2147483648      1,280 to 2,147,483,648 bits
Function	Queries an addition value of the data signal generation interval and the data stop interval for Burst signal generation (Burst generation cycle).
Example	> :SOURce:PATtern:BURSt:CYCLe? < 25600
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:BURSt:TRIGdelay <port>,<numeric>**

---

Parameter	<port> = <CHARACTER PROGRAM DATA> BURStout1              Burst Output BURStout2              Burst Output2 Valid only when AUX Output is set to Burst Output2. <numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0 to 2147483648          0 to 2,147,483,648 bits, in 16-bit steps
	<b>Note:</b> The maximum setting is the pattern length. At 2 ch Combination, the setting range and Step are doubled. At 4 ch Combination, the setting range and Step are quadrupled.
Function	Sets the Burst output trigger signal generation timing (delay) to adjust the phase on the DUT side.
Example	To set the Burst output trigger generation timing (delay) to 128 bits: > :SOURce:PATtern:BURSt:TRIGdelay BURStout1,128
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:BURSt:TRIGdelay? <port>**

---

Parameter	<port> = <CHARACTER PROGRAM DATA> BURStout1              Burst Output BURStout2              Burst Output2 Valid only when AUX Output is set to Burst Output2.
Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 to 2147483648          0 to 2,147,483,648 bits
Function	Queries the Burst output trigger signal generation timing (delay).
Example	> :SOURce:PATtern:BURSt:TRIGdelay? BURStout1 < 128
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:BURSt:PULSewidth <port>,<numeric>**

Parameter	<p>&lt;port&gt; = &lt;CHARACTER PROGRAM DATA&gt;</p> <p>BURStout1            Burst Output</p> <p>BURStout2            Burst Output2</p> <p>Valid only when AUX Output is set to Burst Output2.</p> <p>&lt;numeric&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;</p> <p>0 to 2147483648        0 to 2,147,483,648 bits, in 16-bit steps</p> <p><b>Note:</b></p> <p style="padding-left: 40px;">The maximum setting is the pattern length.</p> <p style="padding-left: 40px;">At 2 ch Combination, the setting range and Step are doubled.</p> <p style="padding-left: 40px;">At 4 ch Combination, the setting range and Step are quadrupled.</p>
Function	Sets the Burst output trigger signal generation interval width to adjust the phase on the DUT side.
Example	<p>To set the Burst output trigger signal generation interval width to 1,024 bits:</p> <pre>&gt; :SOURce:PATtern:BURSt:PULSewidth BURStout1,1024</pre>
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:BURSt:PULSewidth? <port>**

Parameter	<p>&lt;port&gt; = &lt;CHARACTER PROGRAM DATA&gt;</p> <p>BURStout1            Burst Output</p> <p>BURStout2            Burst Output2</p> <p>Valid only when AUX Output is set to Burst Output2.</p>
Response	<p>&lt;numeric&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;</p> <p>0 to 2147483648        0 to 2,147,483,648 bits</p>
Function	Queries the Burst output trigger signal generation interval width.
Example	<p>To query the Burst output trigger signal generation interval width:</p> <pre>&gt;: SOURce:PATtern:BURSt:PULSewidth? BURSt1 &lt; 1024</pre>
Compatibility	Incompatible with existing models.

### 7.3.4.2 AUX Input setting commands



Figure 7.3.4.2-1 AUX Input setting field

Table 7.3.4.2-1 AUX Input setting commands

No.	Setting Items	Commands
[1]	AUX Input	:INPut:INPut:FUNcTion
		:INPut:INPut:FUNcTion?

#### :INPut:INPut:FUNcTion <function>

Parameter	<function> = <CHARACTER PROGRAM DATA>
	BURSt Burst
	ERRor Error Injection
	SEQuence Sequence Control
	ALTErnate Alternate Control
	Set ERRor (error injection) in the case of Repeat.
Function	Sets the function of AUX Input.
Example	To set the function of AUX Input to Error Injection. > :INPut:INPut:FUNcTion ERRor
Compatibility	Incompatible with existing models.

#### :INPut:INPut:FUNcTion?

Response	<function> = <CHARACTER RESPONSE DATA>
	BURS, ERR, SEQ, ALT
Function	Queries the function of Auxiliary Input.
Example	> :INPut:INPut:FUNcTion? < ERR
Compatibility	Incompatible with existing models.

7.3.4.3 AUX Output setting commands



Figure 7.3.4.3-1 AUX Output setting field

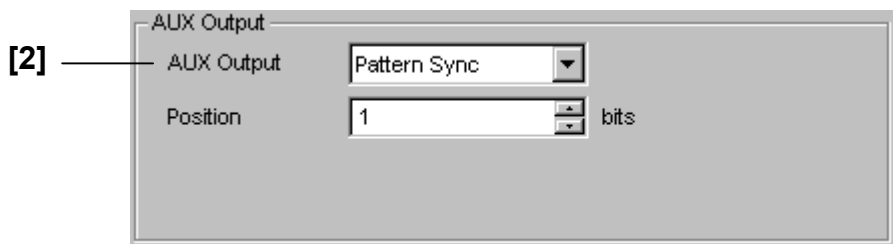


Figure 7.3.4.3-2 AUX Output setting field (for PRBS, Zero-Substitution, and Data patterns)

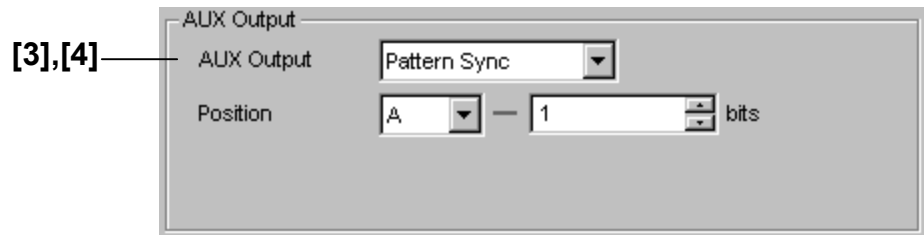


Figure 7.3.4.3-3 AUX Output setting field (For Alternate pattern)

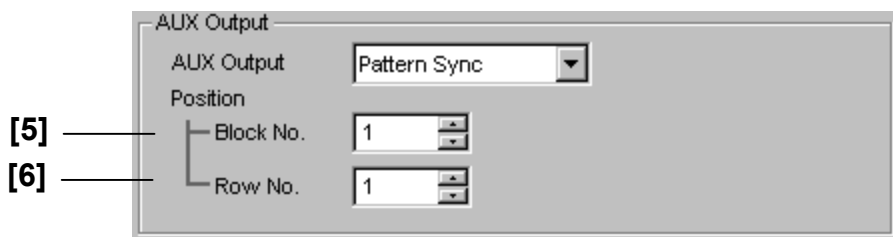


Figure 7.3.4.3-4 AUX Output setting field (For Mixed Data pattern)

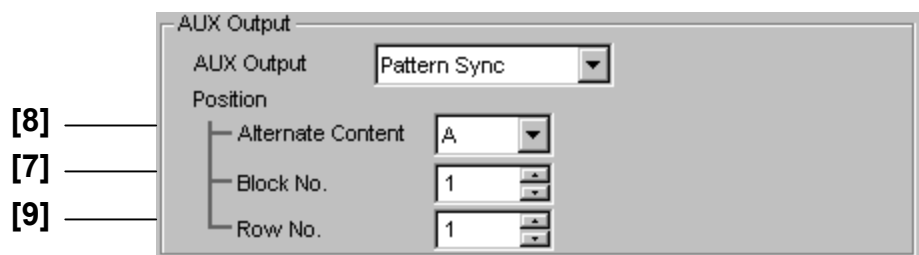


Figure 7.3.4.3-5 AUX Output setting field (For Mixed Alternate pattern)

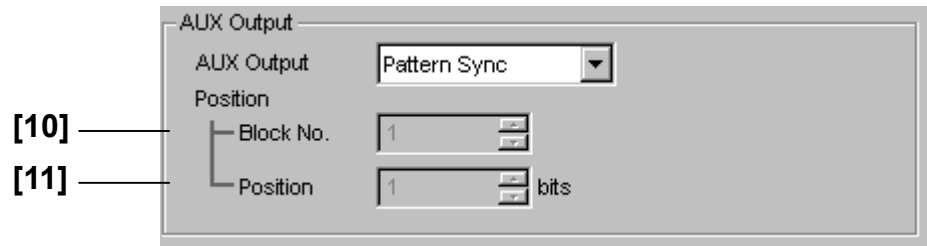


Figure 7.3.4.3-6 AUX Output setting field (For Sequence pattern)

Table 7.3.4.3-1 AUX Output setting commands

No.	Setting Items	Commands
[1]	AUX Output	:OUTPut:SYNC:SOURce
		:OUTPut:SYNC:SOURce?
[2]	Position (PRBS, Zero-Substitution, Data)	:OUTPut:SYNC:POSition
		:OUTPut:SYNC:POSition?
[3]	A/B switching (Alternate)	:OUTPut:SYNC:ALTerNate:CONTents
		:OUTPut:SYNC:ALTerNate:CONTents?
[4]	Position (Alternate)	:OUTPut:SYNC:ALTerNate:POSition
		:OUTPut:SYNC:ALTerNate:POSition?
[5]	Block No. (Mixed-Data)	:OUTPut:SYNC:MIXData:BLOCK
		:OUTPut:SYNC:MIXData:BLOCK?
[6]	Row No. (Mixed-Data)	:OUTPut:SYNC:MIXData:ROW
		:OUTPut:SYNC:MIXData:ROW?
[7]	Block No. (Mixed-Alternate)	:OUTPut:SYNC:MIXalt:BLOCK
		:OUTPut:SYNC:MIXalt:BLOCK?
[8]	Alternate Contents (Mixed-Alternate)	:OUTPut:SYNC:MIXalt:CONTents
		:OUTPut:SYNC:MIXalt:CONTents?
[9]	Row No. (Mixed-Alternate)	:OUTPut:SYNC:MIXalt:ROW
		:OUTPut:SYNC:MIXalt:ROW?
[10]	Block No. (Sequence)	:OUTPut:SYNC:SEQuence:BLOCK
		:OUTPut:SYNC:SEQuence:BLOCK?
[11]	Position (Sequence)	:OUTPut:SYNC:SEQuence:POSition
		:OUTPut:SYNC:SEQuence:POSition?

**:OUTPut:SYNC:SOURce <source>[,<numeric>]**

Parameter	<source> = <CHARACTER PROGRAM DATA> CLOCk8                    1/8 clocks CLOCk16                  1/16 clocks CLOCk32                  1/32 clocks CLOCk64                  1/64 clocks PATTern                  Pattern Sync (Variable) BURSt                    Burst Output2 NCLock                    1/n clocks [<numeric>] = <DECIMAL NUMERIC PROGRAM DATA> 2, 4, 8 to 511            2, 4, 8 to 511, in single steps Omit <numeric> when NCLock (1/n clocks) is not selected. Valid only for MU181020A-001, and the setting upper limit varies as follows: 1/2 mode: 1, 2, 4, 8, 9 to 255, in single steps 1/4 mode: 1, 2, 4, 8, 9 to 127, in single steps 1/8 mode: 1, 2, 4, 8, 9 to 63, in single steps
Function	Sets the output signal for synchronization output.
Example	To set the output signal for synchronization output to 1/32 clocks: > :OUTPut:SYNC:SOURce CLOCk32  To set the output signal for synchronization output to 1/511 clocks: > :OUTPut:SYNC:SOURce NCLock, 511
Compatibility	Compatible with the MP1632C.

**:OUTPut:SYNC:SOURce?**

Response	<source> = <CHARACTER RESPONSE DATA> CLOC8, CLOC16, CLOC32, CLOC64, PATT,BURS, NCL [<numeric>] = <DECIMAL NUMERIC RESPONSE DATA> Omit <numeric> for other than NCL (1/n clocks). 2, 4, 8 to 511, in single steps
Function	Queries the output signal for synchronization output.
Example	> :OUTPut:SYNC:SOURce? < CLOC32 > :OUTPut:SYNC:SOURce? < NCL, 511
Compatibility	Compatible with the MP1632C.

### **:OUTPut:SYNC:POStion <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 68719476657      1 to 68,719,476,657 bits, in 16-bit steps In the case of Combination 1 to 274877906625      1 to 274,877,906,625 bits, 64-bit steps
Function	Sets the output position for synchronization output for Data, PRBS, and Zero-Substitution patterns.
Example	To set the synchronization output position to bit 17: > :OUTPut:SYNC:POStion 17
Compatibility	Partially compatible with the MP1632C. Note that the resolution (step) is incompatible.

### **:OUTPut:SYNC:POStion?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1 to 274877906625      1 to 274,877,906,625bits The maximum setting value is the value set in Pattern Length.
Function	Queries the output position for synchronization output for Data, PRBS, and Zero-Substitution patterns.
Example	> :OUTPut:SYNC:POStion? < 17
Compatibility	Compatible with the MP1632C.

### **:OUTPut:SYNC:ALTErnate:CONTEnts <contents>**

---

Parameter	<contents> = <CHARACTER PROGRAM DATA> APAT      Outputs synchronization signal for Pattern A. BPAT      Outputs synchronization signal for Pattern B.
Function	Sets the output pattern for synchronization output for Alternate pattern.
Example	To set the output pattern for synchronization output to Pattern A: > :OUTPut:SYNC:ALTErnate:CONTEnts APAT
Compatibility	Incompatible with existing models.

### **:OUTPut:SYNC:ALTErnate:CONTEnts?**

---

Response	<contents> = <CHARACTER RESPONSE DATA> APAT      Outputs synchronization signal for Pattern A. BPAT      Outputs synchronization signal for Pattern B.
Function	Queries the output pattern for synchronization output for Alternate pattern.
Example	> :OUTPut:SYNC:ALTErnate:CONTEnts? < APAT
Compatibility	Incompatible with existing models.

---



**:OUTPut:SYNC:ALternate:POStion <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 67108785                      1 to 67,108,785 bits, in 16-bit steps
Function	Sets the output position for synchronization output for Alternate pattern.
Example	To set the synchronization output position to 33 bits: > :OUTPut:SYNC:ALternate:POStion 33
Compatibility	Incompatible with existing models.

**:OUTPut:SYNC:ALternate:POStion?**


---

Response	<numeric> = <DECIMAL NUMERIC RESPONSE DATA> 1 to 67108785                      1 to 67,108,785 bits The maximum setting value is the value set in Pattern Length.
Function	Queries the output position for synchronization output for Alternate pattern.
Example	> :OUTPut:SYNC:ALternate:POStion? < 33
Compatibility	Incompatible with existing models.

**:OUTPut:SYNC:MIXData:BLOCK <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 511                                      1 to 511 blocks, in 1-block steps The maximum setting value is the set number of blocks.
Function	Sets the output block position for synchronization output for Mixed Data pattern.
Example	To set the synchronization output block to block 10: > :OUTPut:SYNC:MIXData:BLOCK 10
Compatibility	Incompatible with existing models.

**:OUTPut:SYNC:MIXData:BLOCK?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1 to 511                                      1 to 511 blocks The maximum setting value is the set number of blocks.
Function	Queries the output block position for synchronization output for Mixed Data pattern.
Example	> :OUTPut:SYNC:MIXData:BLOCK? < 10
Compatibility	Incompatible with existing models.

### **:OUTPut:SYNC:MIXData:ROW <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 16                      1 to 16 Rows, in 1-row steps The maximum setting value is the set number of Rows.
Function	Sets the output Row position for synchronization output for Mixed Data pattern.
Example	To set the synchronization output Row to 1 Row. > :OUTPut:SYNC:MIXData:ROW 1
Compatibility	Incompatible with existing models.

### **:OUTPut:SYNC:MIXData:ROW?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1 to 16                      1 to 16 rows, in 1-row steps The maximum setting value is the set number of Rows.
Function	Queries the output Row position for synchronization output for Mixed Data pattern.
Example	> :OUTPut:SYNC:MIXData:ROW? < 1
Compatibility	Incompatible with existing models.

### **:OUTPut:SYNC:MIXalt:BLOCK <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 511                      1 to 511 blocks, in 1-block steps The maximum setting value is the set number of blocks.
Function	Sets the output block position for synchronization output for Mixed Alternate pattern.
Example	To set the synchronization output block to block 10: > :OUTPut:SYNC:MIXalt:BLOCK 10
Compatibility	Incompatible with existing models.

### **:OUTPut:SYNC:MIXalt:BLOCK?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1 to 511                      1 to 511 blocks The maximum setting value is the set number of blocks.
Function	Queries the output block position for synchronization output for Mixed Alternate pattern.
Example	> :OUTPut:SYNC:MIXalt:BLOCK? < 10
Compatibility	Incompatible with existing models.

**:OUTPut:SYNC:MIXalt:CONTents <contents>**


---

Parameter	<contents> = <CHARACTER PROGRAM DATA> APAT                      Outputs synchronization signal for Pattern A. BPAT                      Outputs synchronization signal for Pattern B.
Function	Sets the output pattern for synchronization output for Mixed Alternate pattern.
Example	To set the synchronization output position to Pattern A: > :OUTPut:SYNC:MIXalt:CONTents APAT
Compatibility	Incompatible with existing models.

**:OUTPut:SYNC:MIXalt:CONTents?**


---

Response	<contents> = <CHARACTER RESPONSE DATA> APAT                      Outputs synchronization signal for Pattern A. BPAT                      Outputs synchronization signal for Pattern B.
Function	Queries the output pattern for synchronization output for Mixed Alternate pattern.
Example	> :OUTPut:SYNC:MIXalt:CONTents? < APAT
Compatibility	Incompatible with existing models.

**:OUTPut:SYNC:MIXalt:ROW <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 16                      1 to 16 Rows, in 1-row steps The maximum setting value is the set number of Rows.
Function	Sets the output Row position for synchronization output for Mixed Alternate pattern.
Example	To set the synchronization output row to 2 Row: > :OUTPut:SYNC:MIXalt:ROW 2
Compatibility	Incompatible with existing models.

**:OUTPut:SYNC:MIXalt:ROW?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1 to 16                      1 to 16 rows The maximum setting value is the set number of Rows.
Function	Queries the output Row position for synchronization output for Mixed Alternate pattern.
Example	> :OUTPut:SYNC:MIXalt:ROW? < 2
Compatibility	Incompatible with existing models.

### **:OUTPut:SYNC:SEQuence:BLOCK <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 blocks, in 1-block steps The maximum setting value is the set number of blocks.
Function	Sets the output block position for synchronization output for Sequence pattern.
Example	To set the synchronization output block to block 128: > :OUTPut:SYNC:SEQuence:BLOCK 128
Compatibility	Incompatible with existing models.

### **:OUTPut:SYNC:SEQuence:BLOCK?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1 to 128                      1 to 128 blocks The maximum setting value is the set number of blocks.
Function	Queries the output block position for synchronization output for Sequence pattern.
Example	> :OUTPut:SYNC:SEQuence:BLOCK? < 128
Compatibility	Incompatible with existing models.

### **:OUTPut:SYNC:SEQuence:POSition <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 1048497                      1 to 1,048,497 bits, in 16-bit steps
Function	Sets the output position for synchronization output for Sequence pattern.
Example	To set the synchronization output position to 1,048,497: > :OUTPut:SYNC:SEQuence:POSition 1048497
Compatibility	Incompatible with existing models.

### **:OUTPut:SYNC:SEQuence:POSition?**

---

Response	<numeric> = <DECIMAL NUMERIC RESPONSE DATA> 1 to 1048497                      1 to 1,048,497 bits
Function	Queries the output position for synchronization output for Sequence pattern.
Example	> :OUTPut:SYNC:SEQuence:POSition? < 1048497
Compatibility	Incompatible with existing models.

## 7.4 ED Commands

This section describes the commands for the MU181040A 12.5 Gbit/s ED and the MU181040B 14 Gbit/s ED. Before executing a setting/query command for the MU181040A, specify the slot number of the module to be remotely controlled, by using the :MODule:ID command. Refer to Section 7.1 “Common Commands” and 9.1 “Basic Operation of Device Messages” for how to specify a slot number with the :MODule:ID command.

However, unless there is a special item, see the MU181040A.

### 7.4.1 Commands related to Result tab window

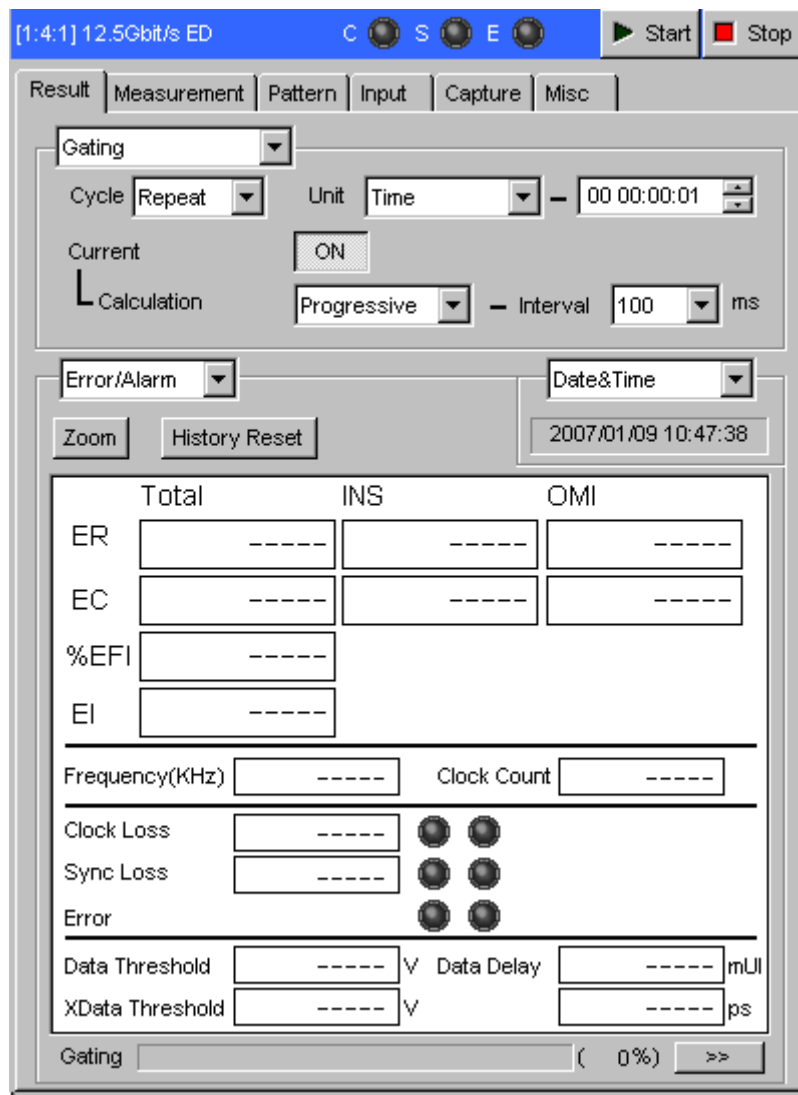


Figure 7.4.1-1 Result tab window

7.4.1.1 Result setting field

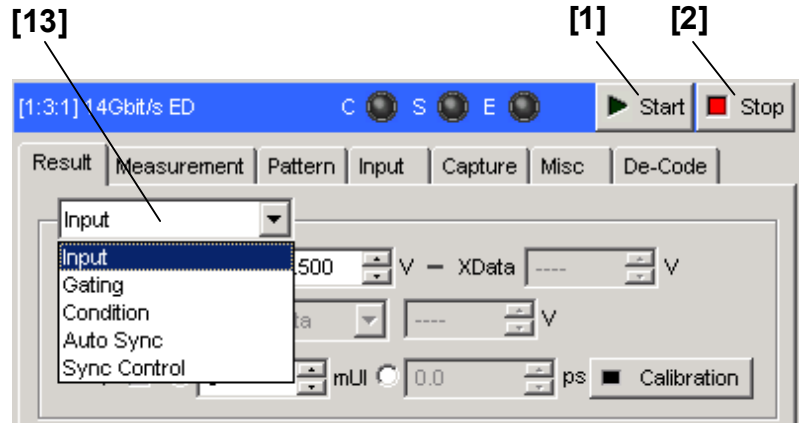


Figure 7.4.1.1-1 Start/Stop buttons



Figure 7.4.1.1-2 Result setting field

Table 7.4.1.1-1 Result setting commands

No.	Setting Items	Commands
[1]	Start	:SENSE:MEASure:STARt
[2]	Stop	:SENSE:MEASure:STOP
[3]	Measurement state query	:SENSE:MEASure:EALarm:STATe?
[4]	Display result setting	:DISPlay:RESult:SETTing :DISPlay:RESult:SETTing?
[5]	Display time setting	:DISPlay:RESult:TIME :DISPlay:RESult:TIME?
[6]	Query for measurement start time	:SENSE:MEASure:EALarm:STARt?
[7]	Query for measurement stop time	:SENSE:MEASure:EALarm:STOP?
[8]	Query for measurement elapsed time	:SENSE:MEASure:EALarm:ELAPsed?
[9]	Query for measurement remaining time	:SENSE:MEASure:EALarm:TIMed?
[10]	Query for intermediate data creation time	:SENSE:MEASure:EALarm:ITIME?
[11]	Query for alarm occurrence time	:SENSE:MEASure:EALarm:AOCcUr?
[12]	Query for alarm recovery time	:SENSE:MEASure:EALarm:ARECover?
[13]	Display measurement items	:SENSE:DISPlay:SETTing

**:SENSe:MEASure:START**


---

Function	Starts BER measurement for the specified module. If this command is issued during measurement, the BER measurement is restarted.
Example	> :SENSe:MEASure:START
Compatibility	Compatible with the MP1632C and MP1776A.

**:SENSe:MEASure:STOP**


---

Function	Stops the BER measurement of the specified module.
Example	> :SENSe:MEASure:STOP
Compatibility	Compatible with the MP1632C and MP1776A.

**:SENSe:MEASure:EALarm:STATe?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 Measurement stops 1 During measurement
Function	Queries the measurement processing state during bit error alarm measurement.
Example	> :SENSe:MEASure:EALarm:STATe? < 0
Compatibility	Compatible with the MP1632C and MP1776A.

**:DISPlay:RESult:SETTing <setting>**


---

Parameter	<setting> = <CHARACTER PROGRAM DATA> EALarm Bit error alarm measurement result LOGGing Logging measurement result HISTogram Histogram measurement result
Function	Sets the display item on the BER measurement result screen.
Example	To set the display item on the BER measurement result screen to the bit error alarm measurement results: > :DISPlay:RESult:SETTing EALarm
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:SETTing?**


---

Response	<setting> = <CHARACTER RESPONSE DATA> EAL, LOGG, HIST
Function	Queries the display item on the BER measurement result screen.
Example	> :DISPlay:RESult:SETTing? < EAL
Compatibility	Incompatible with existing models.

---

### **:DISPlay:RESult:TIME <time>**

---

Parameter	<time> = <CHARACTER PROGRAM DATA>
	DTIME                      Displays the current date and time.
	STARt                      Displays the measurement start time.
	ELAPsed                    Displays the elapsed time based on the measurement period.
	TIMed                      Displays the remaining time based on the measurement period.
Function	Sets the measurement time display type.
Example	To set the measurement time display type to DTIME (current date and time): > :DISPlay:RESult:TIME DTIME
Compatibility	Compatible with the MP1632C and MP1776A.

### **:DISPlay:RESult:TIME?**

---

Response	<time> = <CHARACTER RESPONSE DATA> DTIM, STAR, ELAP, TIM
Function	Queries the measurement time display type.
Example	> :DISPlay:RESult:TIME? < DTIM
Compatibility	Compatible with the MP1632C and MP1776A.

### **:SENSE:MEASure:EALarm:STARt?**

---

Response	<year>,<month>,<day>,<hour>,<min>,<second> = <NR1 NUMERIC RESPONSE DATA>
	<year>                    0, 2000 to 2036      2000 to 2036
	<month>                  0, 1 to 12            January to December
	<day>                     0, 1 to 31            1st to 31st
	<hour>                    0 to 23                0 to 23 hours
	<min>                     0 to 59                0 to 59 minutes
	<second>                  0 to 59                0 to 59 seconds
	"0,0,0,0,0,0" is returned if there is no measurement start time data.
Function	Queries the measurement start time during bit error alarm measurement.
Example	> :SENSE:MEASure:EALarm:STARt? < 2006,1,1,23,59,59
Compatibility	Compatible with the MP1632C and MP1776A.



**:SENSe:MEASure:EALarm:STOP?**

Response	<code>&lt;year&gt;,&lt;month&gt;,&lt;day&gt;,&lt;hour&gt;,&lt;min&gt;,&lt;second&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;</code>	
	<code>&lt;year&gt;</code>	0, 2000 to 2036      2000 to 2036
	<code>&lt;month&gt;</code>	0, 1 to 12            January to December
	<code>&lt;day&gt;</code>	0, 1 to 31            1st to 31st
	<code>&lt;hour&gt;</code>	0 to 23                0 to 23 hours
	<code>&lt;min&gt;</code>	0 to 59                0 to 59 minutes
	<code>&lt;second&gt;</code>	0 to 59                0 to 59 seconds
	"0,0,0,0,0,0" is returned if there is no measurement stop time data.	
Function	Queries the measurement end time during bit error alarm measurement.	
Example	<pre>&gt; :SENSe:MEASure:EALarm:STOP? &lt; 0,0,0,0,0,0</pre>	
Compatibility	Compatible with the MP1632C and MP1776A.	

**:SENSe:MEASure:EALarm:ELAPsed?**

Response	<code>&lt;day&gt;,&lt;hour&gt;,&lt;min&gt;,&lt;second&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;</code>	
	<code>&lt;day&gt;</code>	0 to 31                0 to 31 days
	<code>&lt;hour&gt;</code>	0 to 23                0 to 23 hours
	<code>&lt;min&gt;</code>	0 to 59                0 to 59 minutes
	<code>&lt;second&gt;</code>	0 to 59                0 to 59 seconds
Function	Queries the measurement elapsed time during bit error alarm measurement.	
Example	<pre>&gt; :SENSe:MEASure:EALarm:ELAPsed? &lt; 0,1,0,0</pre>	
Compatibility	Compatible with the MP1632C and MP1776A.	

**:SENSe:MEASure:EALarm:TIMed?**

Response	<code>&lt;day&gt;,&lt;hour&gt;,&lt;min&gt;,&lt;second&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;</code>	
	<code>&lt;day&gt;</code>	0 to 31                0 to 31 days
	<code>&lt;hour&gt;</code>	0 to 23                0 to 23 hours
	<code>&lt;min&gt;</code>	0 to 59                0 to 59 minutes
	<code>&lt;second&gt;</code>	0 to 59                0 to 59 seconds
	"0,0,0,0" is returned when the measurement is finished.	
	When measurement is not performed, the measurement period set at that time is returned.	
Function	Queries the measurement remaining time during bit error alarm measurement.	
Example	<pre>&gt; :SENSe:MEASure:EALarm:TIMed? &lt; 0,0,0,1</pre>	
Compatibility	Compatible with the MP1632C and MP1776A.	

### **:SENSe:MEASure:EALarm:ITIME?**

Response	<year>,<month>,<day>,<hour>,<min>,<second> = <NR1 NUMERIC RESPONSE DATA> <year>            0, 2000 to 2036    2000 to 2036 <month>           0, 1 to 12            January to December <day>              0, 1 to 31            1st to 31st <hour>             0 to 23               0 to 23 hours <min>              0 to 59               0 to 59 minutes <second>           0 to 59               0 to 59 seconds "0,0,0,0,0,0" is returned if there is no measurement intermediate data.
Function	Queries the measurement intermediate data creation time during bit error alarm measurement.
Example	> :SENSe:MEASure:EALarm:ITIME? < 0,0,0,0,0,0
Compatibility	Compatible with the MP1632C and MP1776A.

### **:SENSe:MEASure:EALarm:AOCCur? <alarm>**

Parameter	<alarm> = <CHARACTER PROGRAM DATA> CLOS            Clock Loss PSL             Pattern Sync Loss CRU             CR Unlock
Response	<year>,<month>,<day>,<hour>,<min>,<second> = <NR1 NUMERIC RESPONSE DATA> <year>            0, 2000 to 2036    2000 to 2036 <month>           0, 1 to 12            January to December <day>              0, 1 to 31            1st to 31st <hour>             0 to 23               0 to 23 hours <min>              0 to 59               0 to 59 minutes <second>           0 to 59               0 to 59 seconds
Function	Queries the last time when a specified alarm has occurred during bit error alarm measurement. "0,0,0,0,0,0" is returned if no alarm has occurred.
Example	To query the time when the last clock loss has occurred during bit error alarm measurement: > :SENSe:MEASure:EALarm:AOCCur? CLOS < 0,0,0,1,0,0
Compatibility	Partially compatible with the MP1632C (only the clock loss and pattern sync loss are compatible).

**:SENSe:MEASure:EALarm:ARECover? <alarm>**

Parameter	<alarm>=<CHARACTER PROGRAM DATA>	
	CLOS	Clock Loss
	PSL	Pattern Sync Loss
	CRU	CR Unlock
Response	<year>,<month>,<day>,<hour>,<min>,<second> = <NR1 NUMERIC RESPONSE DATA>	
	<year>	0, 2000 to 2036      2000 to 2036
	<month>	0, 1 to 12            January to December
	<day>	0, 1 to 31            1st to 31st
	<hour>	0 to 23                0 to 23 ours
	<min>	0 to 59                0 to 59 minutes
	<second>	0 to 59                0 to 59 seconds
Function	Queries the time when a specified alarm has recovered during bit error alarm measurement.	
	"0, 0, 0, 0, 0, 0" is returned if no alarm has been recovered (occurred).	
Example	To query the time when the clock loss has been recovered during bit error alarm measurement:	
	<pre>&gt; :SENSe:MEASure:EALarm:ARECover? CLOS &lt; 0,0,0,1,0,0</pre>	
Compatibility	Partially compatible with the MP1632C (only the clock loss and pattern sync loss are compatible).	

**:SENSe:DISPlay:SETTing <setting>**

Parameter	<setting> = <CHARACTER PROGRAM DATA>	
	INPut	Displays Input items
	GATing	Displays Gating items
	CONDition	Displays Condition items
	AUTosync	Displays AutoSync items
	SYNCcontrol	Displays SyncControl items
Function	Sets display items in the Result tab	
Example	To display the Input items:	
	<pre>&gt; :SENSe:DISPlay:SETTing INPut</pre>	
Compatibility	Incompatible with existing models.	

7.4.1.2 Error/Alarm setting commands

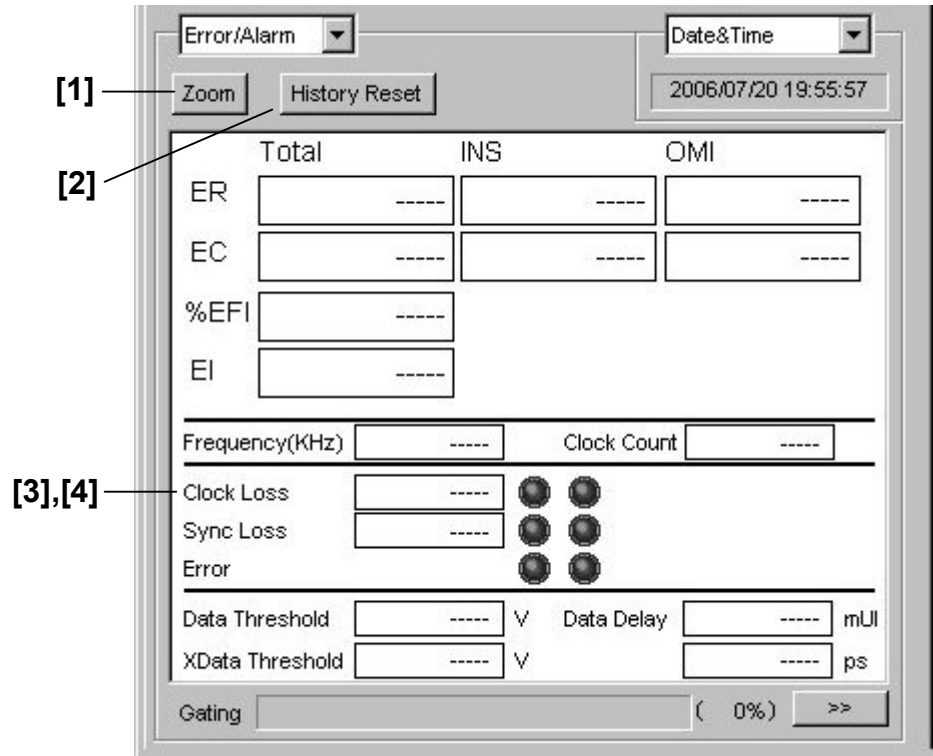


Figure 7.4.1.2-1 Error/Alarm result display screen

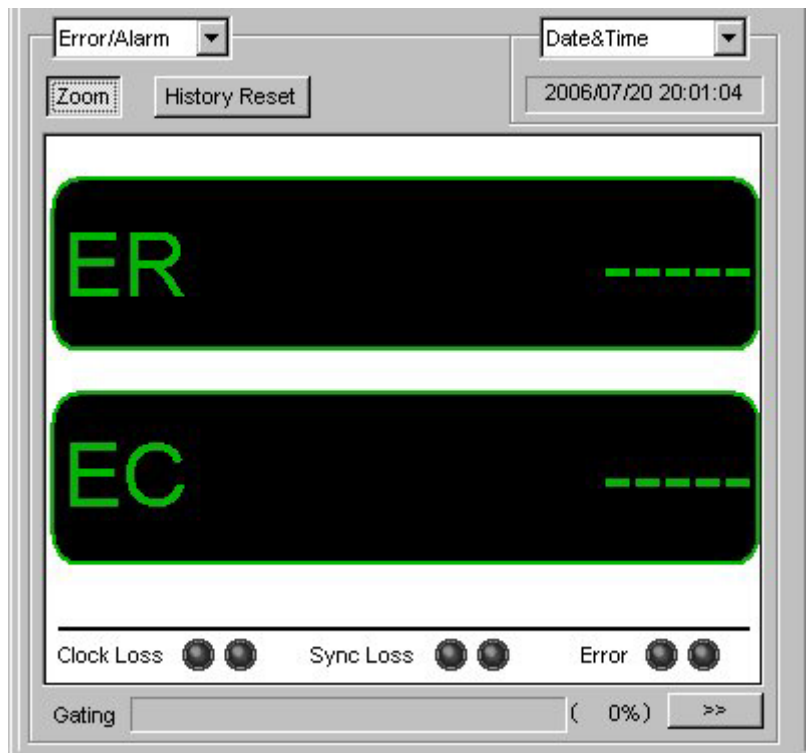


Figure 7.4.1.2-2 Error/Alarm result display screen (when Zoom is selected)

Table 7.4.1.2-1 Error/Alarm setting commands

No.	Setting Items	Commands
[1]	Zoom	:DISPlay:RESult:ZOOM :DISPlay:RESult:ZOOM?
[2]	History Reset	:DISPlay:RESult:EALarm:HRESet
[3]	No label (Query for error alarm measurement data)	:CALCulate:DATA:EALarm?
[4]	No label (Query for monitoring item)	:CALCulate:DATA:MONitor?

**:DISPlay:RESult:ZOOM <boolean>**

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> 0 or OFF                      Display enlargement OFF 1 or ON                        Display enlargement ON
Function	Sets display enlargement for the measurement result display screen ON/OFF.
Example	To set enlargement for the measurement result display screen ON: > :DISPlay:RESult:ZOOM ON
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:ZOOM?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0                                Display enlargement OFF 1                                Display enlargement ON
Function	Queries the display enlargement for the measurement result display screen ON/OFF state.
Example	> :DISPlay:RESult:ZOOM? < 1
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:EALarm:HRESet**

Function	Resets the histories on the measurement result display screen.
Example	> :DISPlay:RESult:EALarm:HRESet
Compatibility	Compatible with the MP1632C and MP1776A.

**:CALCulate:DATA:EALarm? <string>**

Parameter	<string> = <STRING PROGRAM DATA> "CURRent:<result>"                      Current data "LAST:<result>"                              Measurement end data "INTermediate:<result>"                    Measurement intermediate data See Table 7.4.1-2-2 for details on <result>.
Response	<string> = <STRING RESPONSE DATA>

**Table 7.4.1.2-2 Response format**

Form	Format	Description
Form1 Integer type	"XXXXXXXX"	For 0 to 9999999
	"X.XXXXEXX"	For 1.0000E07 to 9.9999E17
	"-----"	When no data corresponds to the query
Form2 Fraction type	"X.XXXxE-XX"	For 0.0001E-18 to 1.0000E00
	"-----"	When no data corresponds to the query
Form3 % type	"XXX.XXXXX"	For 0.0000 to 100.0000
	"-----"	When no data corresponds to the query
Form4 Frequency type	"XXXXXXXXXX"	For 0 to MAX (Hz)
	"-----"	When no data corresponds to the query
Form5 Voltage type	"X.XXX,XX.XXX"	For -4.000 to +4.000
	"-----"	When no data corresponds to the query
Form6 Phase type	"XXXX,XXXX"	For -1000 to +1000, -10000 to +10000
	"-----"	When no data corresponds to the query

Function                                      Queries the measurement data that corresponds to the parameter.

**Table 7.4.1.2-3 Parameters**

Items		<result>	Form
Error Rate	Total	ER:TOTal	Form2
	INS	ER:INSertion	
	OMI	ER:OMISsion	
	Transition	ER:TRANsition	
	Non Transition	ER:NONTransition	
Error Count	Total	EC:TOTal	Form1
	INS	EC:INSertion	
	OMI	EC:OMISsion	
	Transition	EC:TRANsition	
	Non Transition	EC:NONTransition	
%EFI	Total	EFI:TOTal	Form3
EI	Total	EI:TOTal	Form1
Frequency (kHz)		FREQuency	Form4
Clock Count		CC:TOTal	Form1
Clock Loss		AINTerval:CLOSs	Form1

Table 7.4.1.2-3 Parameters (Cont'd)

Items		<result>	Form
CR Unlock		AINterval:CRUNlock	Form1
Sync Loss		AINterval:PSLoss	Form1
Data Threshold		THReshold	Form5
Data Phase		PHASe	Form6
Threshold EI	>1.0E-3	THReshold:EI:TOTal:E_3	Form1
	>1.0E-4	THReshold:EI:TOTal:E_4	
	>1.0E-5	THReshold:EI:TOTal:E_5	
	>1.0E-6	THReshold:EI:TOTal:E_6	
	>1.0E-7	THReshold:EI:TOTal:E_7	
	>1.0E-8	THReshold:EI:TOTal:E_8	
	≤1.0E-8	THReshold:EI:TOTal:UE_8	
Threshold%EFI	>1.0E-3	THReshold:EFI:TOTal:E_3	Form3
	>1.0E-4	THReshold:EFI:TOTal:E_4	
	>1.0E-5	THReshold:EFI:TOTal:E_5	
	>1.0E-6	THReshold:EFI:TOTal:E_6	
	>1.0E-7	THReshold:EFI:TOTal:E_7	
	>1.0E-8	THReshold:EFI:TOTal:E_8	
	≤1.0E-8	THReshold:EFI:TOTal:UE_8	
G.821	ES	G821:ES2:TOTal	Form1
	EFS	G821:EFS2:TOTal	
	SES	G821:SES2:TOTal	
	DM	G821:DM2:TOTal	
	US	G821:US2:TOTal	
	%ES	G821:ES:TOTal	Form3
	%EFS	G821:EFS:TOTal	
	%SES	G821:SES:TOTal	
	%DM	G821:DM:TOTal	
	%US	G821:US:TOTal	

## Example

To query the total error rate measurement data for the current data:

```
> :CALCulate:DATA:EALarm? "CURRent:ER:TOTal"
< "0.0000E-16"
```

## Compatibility

Incompatible with existing models.

**:CALCulate:DATA:MONitor? <item>**

Parameter	<item> = <STRING PROGRAM DATA>	
	"BIT:TOTal"	Bit Error (Total Error)
	"CLOSs"	Clock Loss
	"PSLoss"	Pattern Sync Loss
	"CRUNlock"	CR Unlock
Response	<string> = <STRING RESPONSE DATA>	

**Table 7.4.1.2-4 Response**

Form	Format	Description
Form1	"Occur"	When an alarm occurs
	"Not Occur"	When no alarm occurs
	"-----"	When no data corresponds to the query

**Function**                      Queries the real-time occurrence status of the monitoring item corresponding to the parameter.

**Example**                      To query the bit error occurrence status.  
 > :CALCulate:DATA:MONitor? "BIT:TOTal"  
 < "Occur"

**Compatibility**                Partially compatible with the MP1776A (only the sync loss and pattern sync loss are compatible).



### 7.4.1.3 Logging setting commands

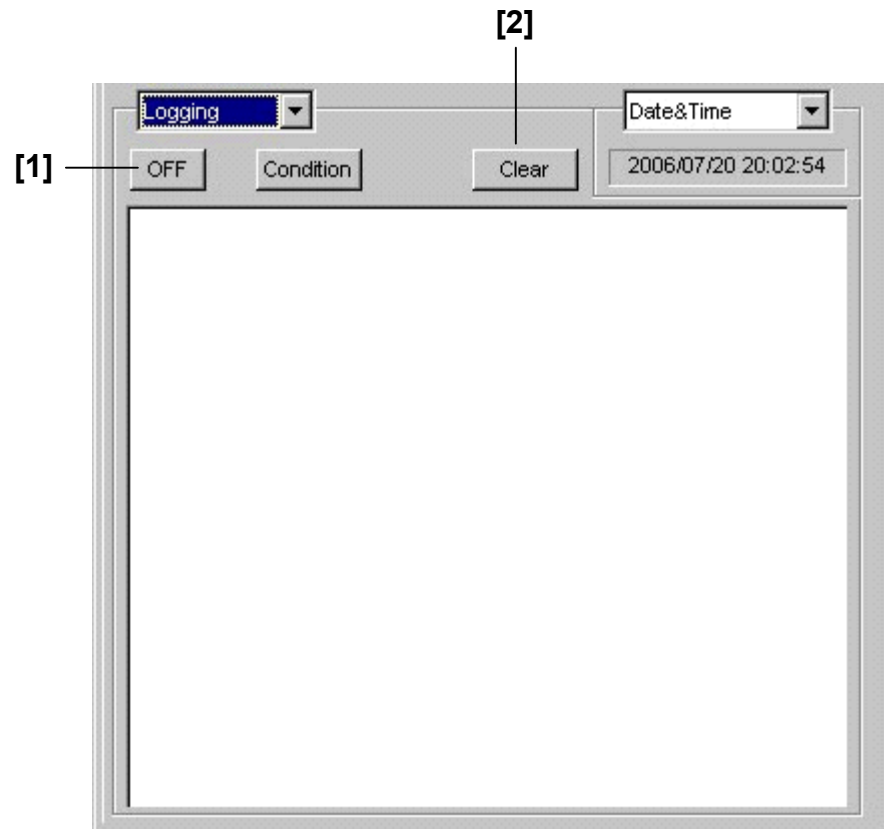


Figure 7.4.1.3-1 Logging setting field

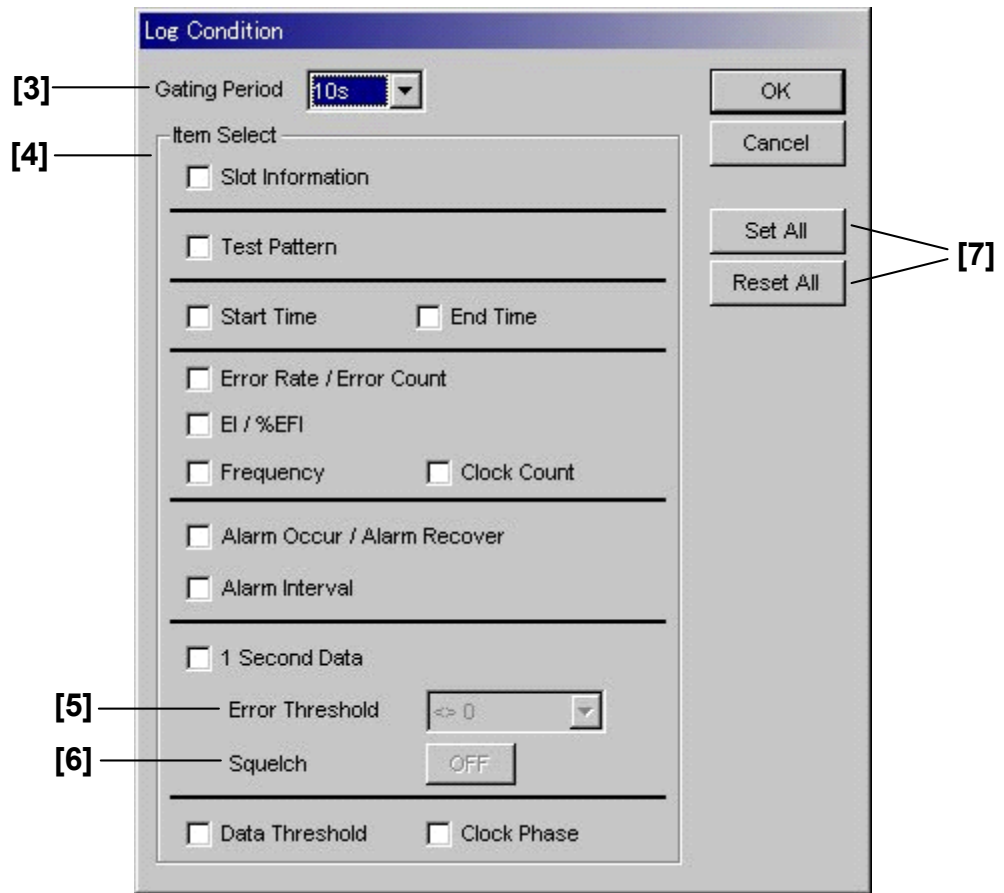


Figure 7.4.1.3-2 Log Condition dialog box

Table 7.4.1.3-1 Logging setting commands

No.	Setting Items	Commands
[1]	Logging ON/OFF	:DISPlay:RESult:LOGGing:ONOff
		:DISPlay:RESult:LOGGing:ONOff?
[2]	Clear	:DISPlay:RESult:LOGGing:CLEar
[3]	Gating Period	:DISPlay:RESult:LOGGing:CONDition:PERiod
		:DISPlay:RESult:LOGGing:CONDition:PERiod?
[4]	Item Select	:DISPlay:RESult:LOGGing:CONDition:ITEM
		:DISPlay:RESult:LOGGing:CONDition:ITEM?
[5]	Error Threshold	:DISPlay:RESult:LOGGing:CONDition:THReshold
		:DISPlay:RESult:LOGGing:CONDition:THReshold?
[6]	Squelch	:DISPlay:RESult:LOGGing:CONDition:SQUelch
		:DISPlay:RESult:LOGGing:CONDition:SQUelch?
[7]	Set All/Reset All	:DISPlay:RESult:LOGGing:CONDition:ALLSet

**:DISPlay:RESult:LOGGing:ONOff <boolean>**


---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA>
	0 or OFF                      OFF
	1 or ON                        ON
Function	Sets logging execution ON/OFF.
Example	To set logging execution ON: > :DISPlay:RESult:LOGGing:ONOff ON
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:LOGGing:ONOff?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	0                                OFF
	1                                ON
Function	Queries the logging execution ON/OFF state.
Example	> :DISPlay:RESult:LOGGing:ONOff? < 1
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:LOGGing:CLEar**


---

Function	Clears the logging results.
Example	> :DISPlay:RESult:LOGGing:CLEar
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:LOGGing:CONDition:PERiod <period>**


---

Parameter	<period> = <CHARACTER PROGRAM DATA>
	S10                              10 s
	S30                              30 s
	M1                               1 min
	M10                             10 min
	M30                             30 min
	H1                               1 hour
Function	Sets the logging result capturing period.
Example	To set the logging result capturing period to 10 seconds: > :DISPlay:RESult:LOGGing:CONDition:PERiod S10
Compatibility	Incompatible with existing models.

### **:DISPlay:RESult:LOGGing:CONDition:PERiod?**

Response	<period> = <CHARACTER RESPONSE DATA> S10, S30, M1, M10, M30, H1
Function	Queries the logging result capturing period.
Example	> :DISPlay:RESult:LOGGing:CONDition:PERiod? < S10
Compatibility	Incompatible with existing models.

### **:DISPlay:RESult:LOGGing:CONDition:ITEM <item>,<boolean>**

Parameter	<item> = <CHARACTER PROGRAM DATA>		
	SLOTinfo	Slot Information:	Slot information
	TPATtern	Test Pattern:	Test pattern type
	START	Start Time:	Measurement start time
	END	End Time:	Measurement end time
	ERATe	Error Rate/Count:	Error rate and error count
	EI	EI/%EFI:	Error interval and error free interval rate
	FREQuency	Frequency:	Frequency
	CCount	Clock Count:	Clock count
	AOCCur	Alarm Occur/Recover:	Alarm occurrence and recovery time
	AINTerval	Alarm Interval:	Alarm interval
	DTHReshold	Adds the data input threshold setting value to the logging item.	
	CDELay	Adds the clock phase setting value to the logging item.	
	SDATa	1 second Data:	Average data for 1 second
	<boolean> = <BOOLEAN PROGRAM DATA>		
	0 or OFF	Measurement item OFF	
	1 or ON	Measurement item ON	
Function	Sets the specified logging measurement item ON/OFF.		
Example	To set the logging slot information ON: > :DISPlay:RESult:LOGGing:CONDition:ITEM SLOTinfo,ON		
Compatibility	Incompatible with existing models.		

**:DISPlay:RESult:LOGGing:CONDition:ITEM? <item>**

Parameter	<item> = <CHARACTER PROGRAM DATA> SLOTinfo, TPATtern, START, END, ERATe, EI, FREQuency, CCOunt, AOCCur, AINTerval, DTHReshold, CDELay, SDATa
Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 Measurement item OFF 1 Measurement item ON
Function	Queries the specified logging measurement item ON/OFF state.
Example	> :DISPlay:RESult:LOGGing:CONDition:ITEM? SLOT < 1
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:LOGGing:CONDition:THReshold <thre>**

Parameter	<thre> = <CHARACTER PROGRAM DATA> E_0 <>0 E_3 >1E-3 E_4 >1E-4 E_5 >1E-5 E_6 >1E-6 E_7 >1E-7 E_8 >1E-8 E_9 >1E-9
Function	Sets the logging error rate threshold value.
Example	To set the logging error rate threshold value to 0. > :DISPlay:RESult:LOGGing:CONDition:THReshold E_0
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:LOGGing:CONDition:THReshold?**

Response	<thre> = <CHARACTER RESPONSE DATA> E_0, E_3, E_4, E_5, E_6, E_7, E_8, E_9
Function	Queries the logging error rate threshold value.
Example	> :DISPlay:RESult:LOGGing:CONDition:THReshold? < E_0
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:LOGGing:CONDition:SQUelch <boolean>**

---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA>
	0 or OFF                      Logging memory squelch function OFF
	1 or ON                        Logging memory squelch function ON
Function	Sets the logging memory squelch function ON/OFF.
Example	To set the logging memory squelch function ON: > :DISPlay:RESult:LOGGing:CONDition:SQUelch ON
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:LOGGing:CONDition:SQUelch?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	0                                Logging memory squelch function OFF
	1                                Logging memory squelch function ON
Function	Queries the logging memory squelch function ON/OFF state.
Example	> :DISPlay:RESult:LOGGing:CONDition:SQUelch? < 1
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:LOGGing:CONDition:ALLSet <boolean>**

---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA>
	0 or OFF                      All reset
	1 or ON                        All Set
Function	Selects or resets all logging measurement items.
Example	Selects all logging measurement items. > :DISPlay:RESult:LOGGing:CONDition:ALLSet ON
Compatibility	Incompatible with existing models.

## 7.4.1.4 Histogram setting commands

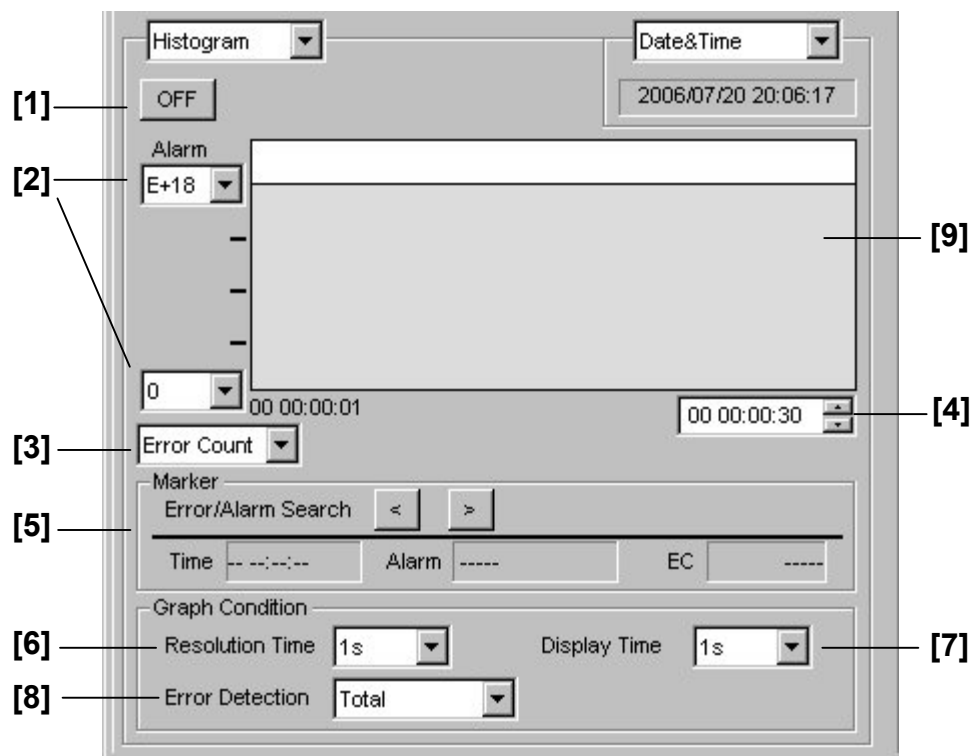


Figure 7.4.1.4-1 Histogram setting field

Table 7.4.1.4-1 Histogram setting commands

No.	Setting Items	Commands
[1]	Histogram ON/OFF	:DISPlay:RESult:HISTogram:ONOFF
		:DISPlay:RESult:HISTogram:ONOFF?
[2]	Scale setting	:DISPlay:RESult:HISTogram:SCALE
		:DISPlay:RESult:HISTogram:SCALE?
[3]	Measurement item setting	:DISPlay:RESult:HISTogram:TYPE
		:DISPlay:RESult:HISTogram:TYPE?
[4]	Display time setting	:DISPlay:RESult:HISTogram:TIMescale
		:DISPlay:RESult:HISTogram:TIMescale?
[5]	Marker	:DISPlay:RESult:HISTogram:MARKer
		:DISPlay:RESult:HISTogram:MARKer?
[6]	Resolution Time	:DISPlay:RESult:HISTogram:RESolution
		:DISPlay:RESult:HISTogram:RESolution?
[7]	Display Time	:DISPlay:RESult:HISTogram:DISPtime
		:DISPlay:RESult:HISTogram:DISPtime?
[8]	Error Detection	:DISPlay:RESult:HISTogram:EDETECT
		:DISPlay:RESult:HISTogram:EDETECT?
[9]	Query for measurement result	:CALCulate:DATA:HISTogram?

**:DISPlay:RESult:HISTogram:ONOff <boolean>**

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> 0 or OFF                      Histogram execution OFF 1 or ON                        Histogram execution ON
Function	Sets histogram execution ON/OFF.
Example	To set histogram execution ON: > :DISPlay:RESult:HISTogram:ONOff ON
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:HISTogram:ONOff?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0                                Histogram execution OFF 1                                Histogram execution ON
Function	Queries the histogram execution ON/OFF state.
Example	> :DISPlay:RESult:HISTogram:ONOff? < 1
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:HISTogram:SCALe <top>,<bottom>**

Parameter	<top> = <CHARACTER PROGRAM DATA> When the measurement item is Error Rate: E_17 to E_0                    E-17 to E+0, in single steps When the measurement item is Error Count/EI: E_1 to E_18                    E+1 to E+18, in single steps <bottom> = <CHARACTER PROGRAM DATA> When the measurement item is Error Rate: E_18 to E_1                    E-18 to E-1, in single steps However, <top> must be greater than <bottom>. When the measurement item is Error Count, EI: E_0 to E_17                    E+0 to E+17, in single steps However, <top> must be greater than <bottom>.
Function	Sets the vertical axis scale of the histogram.
Example	To set the vertical axis scale of the histogram for Error Rate as top: E-3 and bottom: E-4: > :DISPlay:RESult:HISTogram:SCALe E_3.E_4
Compatibility	Incompatible with existing models.



**:DISPlay:RESult:HISTogram:SCALE?**


---

Response	<top> = <CHARACTER RESPONSE DATA> <bottom> = <CHARACTER RESPONSE DATA>
Function	Queries the vertical axis scale of the histogram.
Example	> :DISPlay:RESult:HISTogram:SCALE? < E_3.E_4
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:HISTogram:TYPE <type>**


---

Parameter	<type> = <CHARACTER PROGRAM DATA> ECOut        Counts errors. ERATe       Counts error rate. EI            Counts error interval.
Function	Sets the measurement item counting type displayed in the histogram.
Example	To set the measurement item counting type displayed in the histogram to ECOut (counting errors). > :DISPlay:RESult:HISTogram:TYPE ECOut
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:HISTogram:TYPE?**


---

Response	<type> = <CHARACTER RESPONSE DATA> ECO, ERAT, EI
Function	Queries the measurement item counting type displayed in the histogram.
Example	> :DISPlay:RESult:HISTogram:TYPE? < ECO
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:HISTogram:TIMescale <day>,<hour>,<min>,<second>**

Parameter	<day> = <DECIMAL NUMERIC PROGRAM DATA> 0 to 99                      0 to 99 days, in 1-day steps <hour> = <DECIMAL NUMERIC PROGRAM DATA> 0 to 23                      0 to 23 hours, in 1-hour step <min> = <DECIMAL NUMERIC PROGRAM DATA> 0 to 59                      0 to 59 minutes, in 1-minute step <second> = <DECIMAL NUMERIC PROGRAM DATA> 0 to 59                      0 to 59 seconds, in 1-second step The minimum setting value is 0, 0, 0, 30.
Function	Sets the histogram display time scale.
Example	To set the histogram display time scale to "0 days, 1 hour, 0 minutes, 0 seconds": > :DISPlay:RESult:HISTogram:TIMescale 0,1,0,0
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:HISTogram:TIMescale?**

Response	<day> = <NR1 NUMERIC RESPONSE DATA> 0 to 99                      0 to 99 days <hour> = <NR1 NUMERIC RESPONSE DATA> 0 to 23                      0 to 23 hours <min> = <NR1 NUMERIC RESPONSE DATA> 0 to 59                      0 to 59 minutes <second> = <NR1 NUMERIC RESPONSE DATA> 0 to 59                      0 to 59 seconds
Function	Queries the histogram display time scale.
Example	> :DISPlay:RESult:HISTogram:TIMescale? < 0,1,0,0
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:HISTogram:MARKer <position>**

Parameter	<position> = <CHARACTER PROGRAM DATA> PRE                          Searches for error alarms before the current marker position. POST                         Searches for error alarms after the current marker position.
Function	Searches for error alarms before/after the current marker position.
Example	To search for error alarms before the current marker position: > :DISPlay:RESult:HISTogram:MARKer PRE
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:HISTogram:MARKer?**

Response	<p>&lt;day&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;  0 to 99                            0 to 99 days</p> <p>&lt;hour&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;  0 to 23                            0 to 23 hours</p> <p>&lt;min&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;  0 to 59                            0 to 59 minutes</p> <p>&lt;second&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;  0 to 59                            0 to 59 seconds</p> <p>"-" is displayed if there is no alarm and error.</p> <p>&lt;alarm&gt; = &lt;CHARACTER RESPONSE DATA&gt;</p> <p>CLOS                            Clock LOS has occurred.  SLOS                            Sync LOS has occurred.  CRUN                            CR Unlock has occurred.  NONE                            No alarm has occurred.</p> <p>&lt;result&gt; = &lt;STRING RESPONSE DATA&gt;</p> <p>When the measurement item is Error Count or Error Interval, the response is returned in Form1.</p> <p>When the measurement item is Error Rate, the response is returned in Form2.</p>
----------	---

**Table 7.4.1.4-2 Response Format**

Form	Format	Description
Form1 Integer type	"XXXXXXXX"	For 0 to 9999999
	"X.XXXXEXX"	For 0.0000E07 to 9.9999E17
	"-----"	When no data corresponds to the query
Form2 Fraction type	"X.XXXxE-XX"	For 0.0001E-18 to 1.0000E00
	"-----"	When no data corresponds to the query

Function	Queries the marker setting time, alarm, and measurement results.
Example	<pre>&gt; :DISPlay:RESult:HISTogram:MARKer? &lt; 0,0,1,0,CLOS, "0"</pre>
Compatibility	Incompatible with existing models.

### **:DISPlay:RESult:HISTogram:RESolution <resolution>**

---

Parameter	<resolution> = <CHARACTER PROGRAM DATA>
	S1                    1 s
	S10                   10 s
	S30                   30 s
	M1                    1 min
	M10                   10 min
	M30                   30 min
	H1                    1 hour
Function	Sets the histogram calculation resolution.
Example	To set the histogram calculation resolution to 1 second: > :DISPlay:RESult:HISTogram:RESolution S1
Compatibility	Incompatible with existing models.

### **:DISPlay:RESult:HISTogram:RESolution?**

---

Response	<resolution> = <CHARACTER RESPONSE DATA> S1, S10, S30, M1, M10, M30, H1
Function	Queries the histogram calculation resolution.
Example	> :DISPlay:RESult:HISTogram:RESolution? < S1
Compatibility	Incompatible with existing models.

### **:DISPlay:RESult:HISTogram:DISPtime <time>**

---

Parameter	<time> = <CHARACTER PROGRAM DATA>
Parameter	<resolution> = <CHARACTER PROGRAM DATA>
	S1                    1 s
	S10                   10 s
	S30                   30 s
	M1                    1 min
	M10                   10 min
	M30                   30 min
	H1                    1 hour
Function	Sets the histogram display resolution.
Example	To set the histogram display resolution to 1 second: > :DISPlay:RESult:HISTogram:DISPtime S1
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:HISTogram:DISPtime?**


---

Response	<time> = <CHARACTER RESPONSE DATA> S1, S10, S30, M1, M10, M30, H1
Function	Queries the histogram display resolution.
Example	> :DISPlay:RESult:HISTogram:DISPtime? < S1
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:HISTogram:EDETect <mode>**


---

Parameter	<mode> = <CHARACTER PROGRAM DATA> <table> <tr> <td>TOTAL</td> <td>Total Error</td> </tr> <tr> <td>INS</td> <td>Insertion Error</td> </tr> <tr> <td>OMI</td> <td>Omission Error</td> </tr> <tr> <td>TRANSition</td> <td>Transition Error</td> </tr> <tr> <td>NONTransition</td> <td>Non Transition Error</td> </tr> </table>	TOTAL	Total Error	INS	Insertion Error	OMI	Omission Error	TRANSition	Transition Error	NONTransition	Non Transition Error
TOTAL	Total Error										
INS	Insertion Error										
OMI	Omission Error										
TRANSition	Transition Error										
NONTransition	Non Transition Error										
Function	Sets the bit error alarm measurement method and error detection method for histogram calculation.										
Example	To set the bit error alarm measurement method and error detection method for histogram calculation to Total Error: > :DISPlay:RESult:HISTogram:EDETect TOTAL										
Compatibility	Incompatible with existing models.										

**:DISPlay:RESult:HISTogram:EDETect?**


---

Response	<mode> = <CHARACTER RESPONSE DATA> TOT, INS, OMI, TRAN, NONT
Function	Queries the bit error alarm measurement method and error detection method for histogram calculation.
Example	> :DISPlay:RESult:HISTogram:EDETect? < TOT
Compatibility	Incompatible with existing models.

**:CALCulate:DATA:HISTogram? <day>,<hour>,<min>,<second>**

Parameter	<day> = <DECIMAL NUMERIC PROGRAM DATA> 0 to 99                                    0 to 99 days, in 1-day steps
	<hour> = <DECIMAL NUMERIC PROGRAM DATA> 0 to 23                                    0 to 23 hours, in 1-hour steps
	<min> = <DECIMAL NUMERIC PROGRAM DATA> 0 to 59                                    0 to 59 minutes, in 1-minute steps
	<second> = <DECIMAL NUMERIC PROGRAM DATA> 0 to 59                                    0 to 59 seconds, in 1-second steps
Response	<alarm> = <CHARACTER RESPONSE DATA> CLOS                                    Clock LOS has occurred. SLOS                                    Sync LOS has occurred. CRUN                                    CR Unlock has occurred. NONE                                    No alarm has occurred.
	<count> = <STRING RESPONSE DATA>
	<rate> = <STRING RESPONSE DATA>

**Table 7.4.1.4-3 Response Format**

	Format	Description
<count>	"XXXXXXXX"	For 0 to 9999999
	"X.XXXXEXX"	For 1.0000E07 to 9.9999E17
	"-----"	When no data corresponds to the query
<rate>	"X.XXXxE-XX"	For 0.0001E-18 to 1.0000E00
	"-----"	When no data corresponds to the query

Function	Queries the measurement item on the histogram corresponding to the parameter.
Example	> :CALCulate:DATA:HISTogram? 0,1,0,0 < CLOS, "0", "0.0001E-18"
Compatibility	Incompatible with existing models.

## 7.4.2 Commands related to Measurement tab window

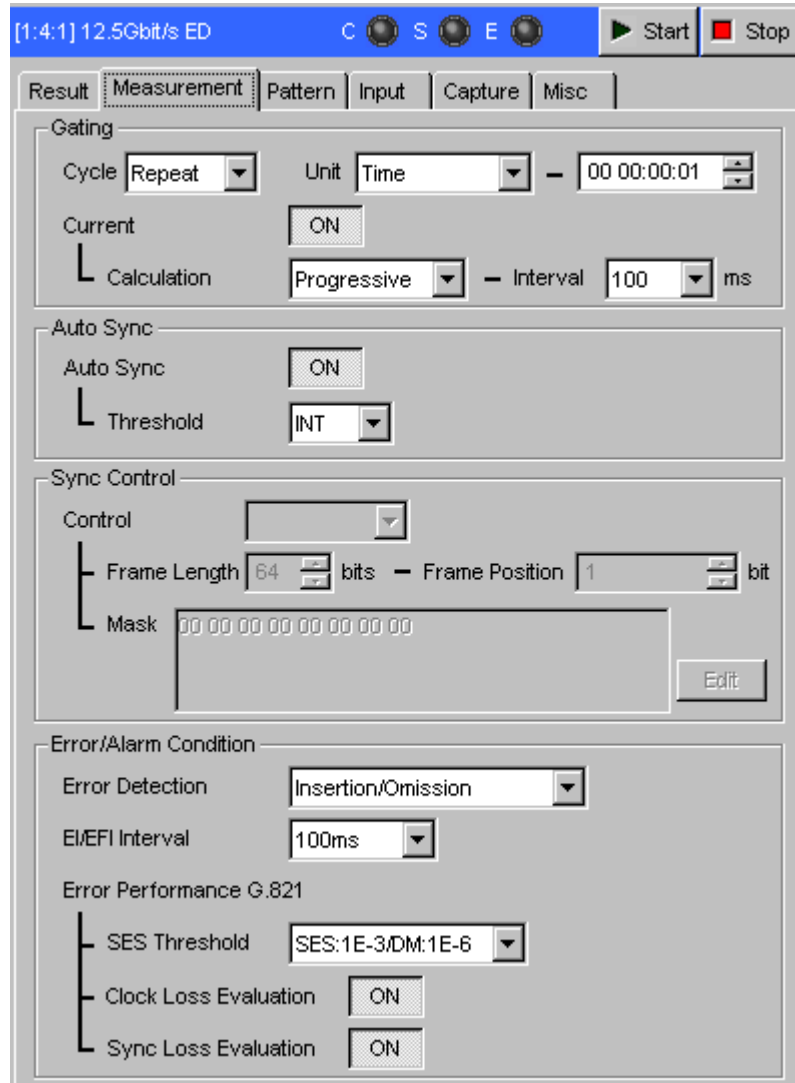


Figure 7.4.2-1 Measurement tab window

### 7.4.2.1 Gating setting commands

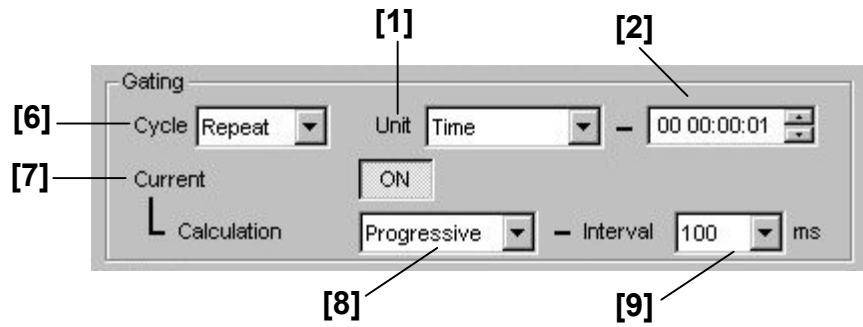


Figure 7.4.2.1-1 Gating setting (Time)

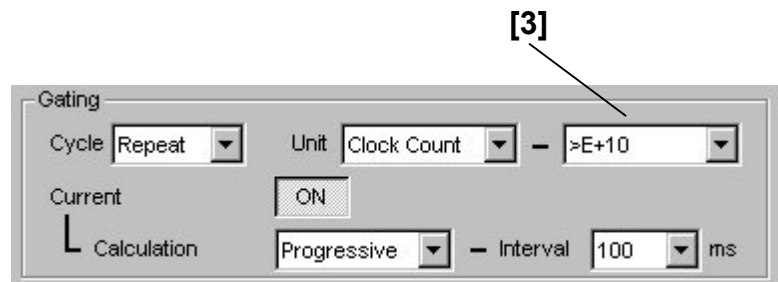


Figure 7.4.2.1-2 Gating setting (Clock Count)

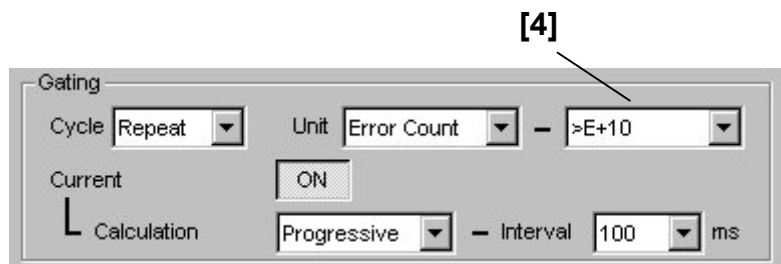


Figure 7.4.2.1-3 Gating setting (Error Count)

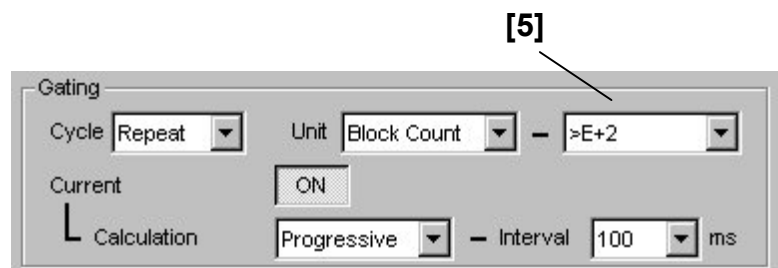


Figure 7.4.2.1-4 Gating setting (Block Count)



Table 7.4.2.1-1 Gating setting commands

No.	Setting Items	Commands
[1]	Unit	:SENSe:MEASure:EALarm:UNIT
		:SENSe:MEASure:EALarm:UNIT?
[2]	No label (Measurement time setting)	:SENSe:MEASure:EALarm:PERiod
		:SENSe:MEASure:EALarm:PERiod?
[3]	No label (Clock count setting)	:SENSe:MEASure:EALarm:CLOCKcnt
		:SENSe:MEASure:EALarm:CLOCKcnt?
[4]	No label (Error count setting)	:SENSe:MEASure:EALarm:ERRorcnt
		:SENSe:MEASure:EALarm:ERRorcnt?
[5]	No label (Block count setting)	:SENSe:MEASure:EALarm:BLOCKcnt
		:SENSe:MEASure:EALarm:BLOCKcnt?
[6]	Cycle	:SENSe:MEASure:EALarm:MODE
		:SENSe:MEASure:EALarm:MODE?
[7]	Current	:DISPlay:RESult:EALarm:MODE
		:DISPlay:RESult:EALarm:MODE?
[8]	Calculation	:DISPlay:RESult:EALarm:CALCuration
		:DISPlay:RESult:EALarm:CALCuration?
[9]	Interval	:DISPlay:RESult:EALarm:INTerval
		:DISPlay:RESult:EALarm:INTerval?

### :SENSe:MEASure:EALarm:UNIT <unit>

Parameter	<unit> = <CHARACTER PROGRAM DATA>
	TIME                      Time
	CLOCK                    Clock Count
	ERRor                    Error Count
	BLOCK                    Block Count
Function	Sets the measurement period unit.
Example	To set the measurement period unit to Time. > :SENSe:MEASure:EALarm:UNIT TIME
Compatibility	Incompatible with existing models.

### :SENSe:MEASure:EALarm:UNIT?

Response	<unit> = <CHARACTER RESPONSE DATA>
	TIME, CLOC, ERR, BLOC
Function	Queries the measurement period unit.
Example	> :SENSe:MEASure:EALarm:UNIT? < TIME
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:EALarm:PERiod <day>,<hour>,<min>,<second>**

Parameter	<day>,<hour>,<min>,<second> = <DECIMAL NUMERIC PROGRAM DATA>		
	<day>	0 to 99	0 to 99 days, in 1-day steps
	<hour>	0 to 23	0 to 23 hours, in 1-hour steps
	<min>	0 to 59	0 to 59 minutes, in 1-minute steps
	<second>	0 to 59	0 to 59 seconds, in 1-second steps
Function	Sets the measurement time when the measurement period is set to Time.		
Example	To set the measurement time when the measurement period is set to Time, to "0 days, 0 hours, 1 minute, 0 seconds": > :SENSe:MEASure:EALarm:PERiod 0,0,1,0		
Compatibility	Compatible with the MP1632C and MP1776A.		

**:SENSe:MEASure:EALarm:PERiod?**

Response	<day>,<hour>,<min>,<second> = <NR1 NUMERIC RESPONSE DATA>		
	<day>	0 to 99	0 to 99 days
	<hour>	0 to 23	0 to 23 hours
	<min>	0 to 59	0 to 59 minutes
	<second>	0 to 59	0 to 59 seconds
Function	Queries the measurement time when the measurement period is set to Time.		
Example	> :SENSe:MEASure:EALarm:PERiod? < 0,0,1,0		
Compatibility	Compatible with the MP1632C and MP1776A.		

**:SENSe:MEASure:EALarm:CLOCKcnt <count>**

Parameter	<count> = <CHARACTER PROGRAM DATA>
	E_4 >1E+4
	E_5 >1E+5
	E_6 >1E+6
	E_7 >1E+7
	E_8 >1E+8
	E_9 >1E+9
	E_10 >1E+10
	E_11 >1E+11
	E_12 >1E+12
	E_13 >1E+13
	E_14 >1E+14
	E_15 >1E+15
	E_16 >1E+16
Function	Sets the clock count threshold when the measurement period is set to Clock Count.
Example	To set the clock count threshold when the measurement period is set to Clock Count to 1E+4: > :SENSe:MEASure:EALarm:CLOCKcnt E_4
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:EALarm:CLOCKcnt?**

Response	<count> = <CHARACTER RESPONSE DATA> E_4,E_5,E_6,E_7,E_8,E_9,E_10,E_11,E_12,E_13,E_14,E_15,E_16
Function	Queries the clock count threshold when the measurement period is set to Clock Count.
Example	> :SENSe:MEASure:EALarm:CLOCKcnt? < E_4
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:EALarm:ERRorcnt <count>**

---

Parameter	<count> = <CHARACTER PROGRAM DATA>
	E_4 >1E+4
	E_5 >1E+5
	E_6 >1E+6
	E_7 >1E+7
	E_8 >1E+8
	E_9 >1E+9
	E_10 >1E+10
	E_11 >1E+11
	E_12 >1E+12
	E_13 >1E+13
	E_14 >1E+14
	E_15 >1E+15
	E_16 >1E+16
Function	Sets the error count threshold when the measurement period is set to Error Count.
Example	To set the error count threshold when the measurement period is set to Error Count to 1E+4: > :SENSe:MEASure:EALarm:ERRorcnt E_4
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:EALarm:ERRorcnt?**

---

Response	<count> = <CHARACTER RESPONSE DATA> E_4,E_5,E_6,E_7,E_8,E_9,E_10,E_11,E_12,E_13,E_14,E_15,E_16
Function	Queries the error count threshold when the measurement period is set to Error Count.
Example	> :SENSe:MEASure:EALarm:ERRorcnt? < E_4
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:EALarm:BLOCKcnt <count>**

Parameter	<count> = <CHARACTER PROGRAM DATA>
	E_2 >1E+2
	E_3 >1E+3
	E_4 >1E+4
	E_5 >1E+5
	E_6 >1E+6
	E_7 >1E+7
	E_8 >1E+8
	E_9 >1E+9
	E_10 >1E+10
	E_11 >1E+11
	E_12 >1E+12
	E_13 >1E+13
	E_14 >1E+14
Function	Sets the block count threshold when the measurement period is set to Block Count.
Example	To set the block count threshold when the measurement period is set to Block Count to 1E+4: > :SENSe:MEASure:EALarm:BLOCKcnt E_4
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:EALarm:BLOCKcnt?**

Response	<count> = <CHARACTER RESPONSE DATA> E_2, E_3, E_4, E_5, E_6, E_7, E_8, E_9, E_10, E_11, E_12, E_13, E_14
Function	Queries the block count threshold when the measurement period is set to Block Count.
Example	> :SENSe:MEASure:EALarm:BLOCKcnt? < E_4
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:EALarm:MODE <mode>**

---

Parameter	<mode> = <CHARACTER PROGRAM DATA> REPeat                      Performs measurement repeatedly. SINGle                      Performs measurement once. UNTimed                    Continues measurement until the measurement end is instructed.
Function	Sets the bit error alarm measurement processing mode.
Example	To set the bit error alarm measurement processing mode to REPeat (performing measurement repeatedly): > :SENSe:MEASure:EALarm:MODE REPeat
Compatibility	Compatible with the MP1632C and MP1776A.

### **:SENSe:MEASure:EALarm:MODE?**

---

Response	<mode> = <CHARACTER RESPONSE DATA> REP, SING, UNT
Function	Queries the bit error alarm measurement processing mode.
Example	> :SENSe:MEASure:EALarm:MODE? < REP
Compatibility	Compatible with the MP1632C and MP1776A.

### **:DISPlay:RESult:EALarm:MODE <boolean>**

---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> 0 or OFF                  Measurement result data display immediate update OFF 1 or ON                    Measurement result data display immediate update ON
Function	Sets measurement result data display immediate update ON/OFF.
Example	To set measurement result data display immediate update ON: > :DISPlay:RESult:EALarm:MODE ON
Compatibility	Incompatible with existing models.

### **:DISPlay:RESult:EALarm:MODE?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0                              OFF 1                              ON
Function	Queries the measurement result data display immediate update ON/OFF state.
Example	> :DISPlay:RESult:EALarm:MODE? < 1
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:EALarm:CALCuration <mode>**


---

Parameter	<mode> = <CHARACTER PROGRAM DATA> PROGressive            Progressive accumulation IMMEDIATE            Immediate processing
Function	Sets the immediate data calculation method.
Example	To set the immediate data calculation method to progressive accumulation: > :DISPlay:RESult:EALarm:CALCuration PROGressive
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:EALarm:CALCuration?**


---

Response	<mode> = <CHARACTER RESPONSE DATA> PROG, IMM
Function	Queries the immediate data calculation method.
Example	> :DISPlay:RESult:EALarm:CALCuration? < PROG
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:EALarm:INTerval <interval>**


---

Parameter	<interval> = <CHARACTER PROGRAM DATA> I100                    Updates display in 100-ms period. I200                    Updates display in 200-ms period.
Function	Sets the immediate data display update period.
Example	To set the immediate data display update period to 100 ms: > :DISPlay:RESult:EALarm:INTerval I100
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:EALarm:INTerval?**


---

Response	<interval> = <CHARACTER RESPONSE DATA> I100, I200
Function	Queries the immediate data display update period.
Example	> :DISPlay:RESult:EALarm:INTerval? < I100
Compatibility	Incompatible with existing models.

### 7.4.2.2 Auto Sync setting commands



Figure 7.4.2.2-1 Auto Sync setting field

Table 7.4.2.2-1 Auto Sync setting commands

No.	Setting Items	Commands
[1]	Auto Sync	:SENSe:PATtern:SYnc:ASYNc
		:SENSe:PATtern:SYnc:ASYNc?
[2]	Threshold	:SENSe:PATtern:SYnc:THReshold
		:SENSe:PATtern:SYnc:THReshold?

#### :SENSe:PATtern:SYnc:ASYNc <boolean>

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> 0 or OFF                      Auto Sync OFF 1 or ON                         Auto Sync ON
Function	Sets whether to automatically perform resynchronization (Auto Sync) when the synchronization threshold is exceeded.
Example	To enable automatic resynchronization (Auto Sync ON): > :SENSe:PATtern:SYnc:ASYNc ON
Compatibility	Compatible with the MP1632C and MP1776A.

#### :SENSe:PATtern:SYnc:ASYNc?

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0                                      Auto Sync OFF 1                                      Auto Sync ON
Function	Queries whether to automatically perform resynchronization (Auto Sync) when the synchronization threshold is exceeded.
Example	> :SENSe:PATtern:SYnc:ASYNc? < 1
Compatibility	Compatible with the MP1632C and MP1776A.



**:SENSe:PATtern:SYNC:THReshold <thre>**

Parameter	<thre> = <CHARACTER PROGRAM DATA>
	INT                      Internal
	E_2                      E-2
	E_3                      E-3
	E_4                      E-4
	E_5                      E-5
	E_6                      E-6
	E_7                      E-7
	E_8                      E-8
Function	Sets the synchronization detection threshold for resynchronization.
Example	To set the synchronization detection threshold for resynchronization to Internal: > :SENSe:PATtern:SYNC:THReshold INT
Compatibility	Compatible with the MP1776A.

**:SENSe:PATtern:SYNC:THReshold?**

Response	<thre> = <CHARACTER RESPONSE DATA> INT, E_2, E_3, E_4, E_5, E_6, E_7, E_8
Function	Queries the synchronization detection threshold for resynchronization.
Example	> :SENSe:PATtern:SYNC:THReshold? < INT
Compatibility	Compatible with the MP1776A.

### 7.4.2.3 Sync Control setting commands

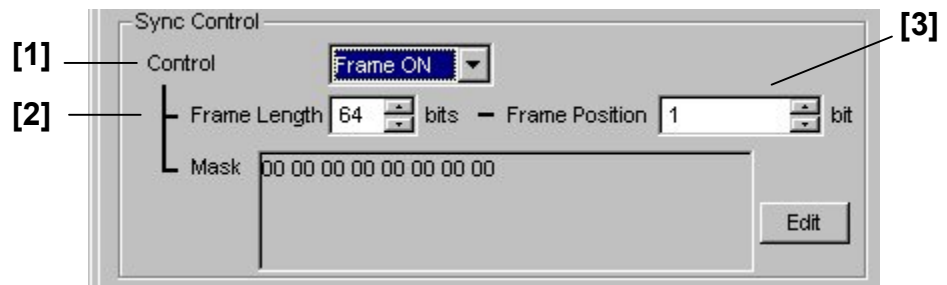


Figure 7.4.2.3-1 Sync Control setting field

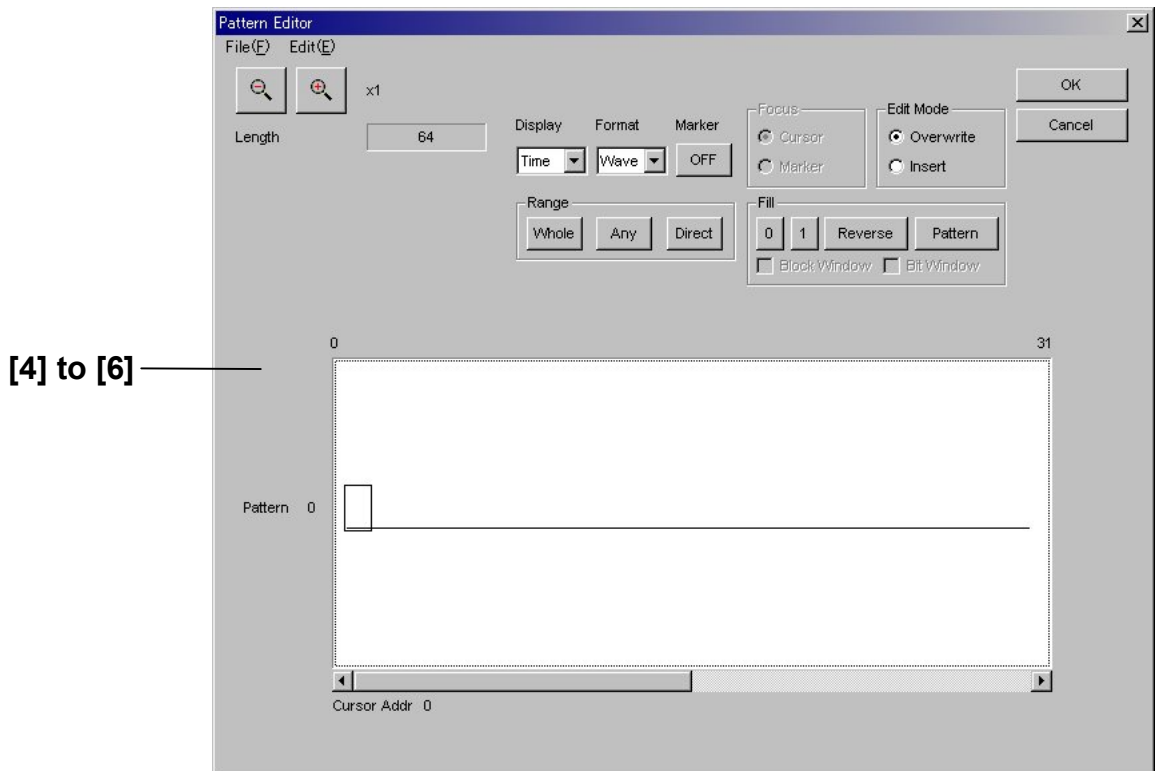


Figure 7.4.2.3-2 Sync Control setting (Pattern Editor screen)

Table 7.4.2.3-1 Sync Control setting commands

No	Setting Items	Commands
[1]	Control	:SENSe:PATtern:SYNC:PSMode
		:SENSe:PATtern:SYNC:PSMode?
[2]	Frame Length	:SENSe:PATtern:SYNC:FLENgth
		:SENSe:PATtern:SYNC:FLENgth?
[3]	Frame Position	:SENSe:PATtern:SYNC:FPOStion
		:SENSe:PATtern:SYNC:FPOStion?
[4]	Mask (Setting of mask pattern)	:SENSe:PATtern:SYNC:DATA:WHOLe
		:SENSe:PATtern:SYNC:DATA:WHOLe?
[5]	No label (Data inversion)	:SENSe:PATtern:SYNC:DREVerse:ADDReSS
[6]	No label (All 0 or 1)	:SENSe:PATtern:SYNC:PROGram:FILL

### :SENSe:PATtern:SYNC:PSMode <mode>

Parameter	<mode> = <CHARACTER PROGRAM DATA>
	FRAMe                      Frame detection ON
	NORMAl                    Frame detection OFF
	QUICk                     Quick synchronizing mode
	FAST                      Fast synchronizing mode
Function	Sets the synchronization mode for the test pattern.
Example	To set the synchronization mode for the test pattern to frame detection ON: > :SENSe:PATtern:SYNC:PSMode FRAMe
Compatibility	Compatible with the MP1632C and MP1776A.

### :SENSe:PATtern:SYNC:PSMode?

Response	<mode> = <CHARACTER RESPONSE DATA> FRAM, NORM, QUIC, FAST
Function	Queries the synchronization mode for the test pattern.
Example	> :SENSe:PATtern:SYNC:PSMode? < FRAM
Compatibility	Compatible with the MP1632C and MP1776A.

### **:SENSe:PATtern:SYNC:FLENgth <length>**

Parameter	<length> = <DECIMAL NUMERIC PROGRAM DATA> 4 to 64                                      4 to 64 bits, in 4-bit steps
Function	Sets the unique pattern length when the synchronization mode is set to FRAME (frame detection ON).
Example	To set the unique pattern length when the synchronization mode is set to FRAME (frame detection ON) to 4 bits: > :SENSe:PATtern:SYNC:FLENgth 4
Compatibility	Compatible with the MP1632C and the MP1776A.

### **:SENSe:PATtern:SYNC:FLENgth?**

Response	<length> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries the unique pattern length when the synchronization mode is set to FRAME (frame detection ON).
Example	> :SENSe:PATtern:SYNC:FLENgth? < 4
Compatibility	Compatible with the MP1632C and the MP1776A.

### **:SENSe:PATtern:SYNC:FPOStion <length>**

Parameter	<length> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 134217725                              1 to 134,217,725 bits, in 1-bit steps The maximum setting value is "Pattern length – Frame length + 1" bits. <b>Note:</b> In the case of Combination, the setting range and resolution (steps) are multiplied by 4.
Function	Sets the frame synchronization start position when the synchronization mode is set to FRAME (frame detection ON).
Example	To set the frame synchronization start position when the synchronization mode is set to FRAME (frame detection ON) to bit 65: > :SENSe:PATtern:SYNC:FPOStion 65
Compatibility	Incompatible with existing models.

### **:SENSe:PATtern:SYNC:FPOStion?**

Response	<length> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries the frame synchronization start position when the synchronization mode is set to FRAME (frame detection ON).
Example	> :SENSe:PATtern:SYNC:FPOStion? < 17
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:SYnc:DATA:WHOLe <data>**

Parameter	<data> = <STRING PROGRAM DATA> "H***...*"                    1 to 16 characters (Specify pattern data in hexadecimal format) "B***...*"                    1 to 64 characters (Specify pattern data in binary format)
Function	Edits the mask pattern when the synchronization mode is set to FRAME (frame detection ON). Up to 64-bit data can be edited in hexadecimal or binary format.
Example	To set the mask pattern when the synchronization mode is set to FRAME (frame detection ON) to one hexadecimal character: > :SENSe:PATtern:SYnc:DATA:WHOLe "H001"
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:SYnc:DATA:WHOLe?**

Response	<data> = <STRING RESPONSE DATA> "H***...*"                    1 to 16 characters (Specify pattern data in hexadecimal format) Hexadecimal data of up to 64 bits is returned.
Function	Queries the mask pattern when the synchronization mode is set to FRAME (frame detection ON).
Example	> :SENSe:PATtern:SYnc:DATA:WHOLe? < "H001"
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:SYnc:DREVerse:ADDReSS <start>,<end>**

Parameter	<start> = <NON-DECIMAL PROGRAM DATA> #H0 to #H3F                    0 to 3F bits, in 1-bit steps (Specify in hexadecimal) <end> = <NON-DECIMAL PROGRAM DATA> #H0 to #H3F                    0 to 3F bits, in 1-bit steps (Specify in hexadecimal)
Function	Inverts the mask pattern data when the synchronization mode is set to FRAME (frame detection ON). Specify the inversion range by the <start> and <end> addresses.
Example	To invert addresses from bit 1 to bit 17 of the mask pattern data when the synchronization mode is set to FRAME (frame detection ON): > :SENSe:PATtern:SYnc:DREVerse:ADDReSS #H001,#H011
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:SYNC:PROGram:FILL <start>,<end>,<data>**

---

Parameter	<p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt; #H0 to #H3F                      0 to 3F bits, in 1-bit steps   (Specify in hexadecimal)</p> <p>&lt;end&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt; #H0 to #H3F                      0 to 3F bits, in 1-bit steps   (Specify in hexadecimal)</p> <p>&lt;data&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt; 0                                      Fills the specified range with 0s. 1                                      Fills the specified range with 1s.</p>
Function	<p>Sets 0s or 1s for the specified range of the mask pattern data when the synchronization mode is set to FRAME (frame detection ON). Specify the range with the &lt;start&gt; and &lt;end&gt; addresses.</p>
Example	<p>To set 0s for bit 1 to bit 17 of the mask pattern when the synchronization mode is set to FRAME (frame detection ON): &gt; :SENSe:PATtern:SYNC:PROGram:FILL #H001, #H011,0</p>
Compatibility	<p>Incompatible with existing models.</p>

## 7.4.2.4 Error/Alarm Condition setting commands

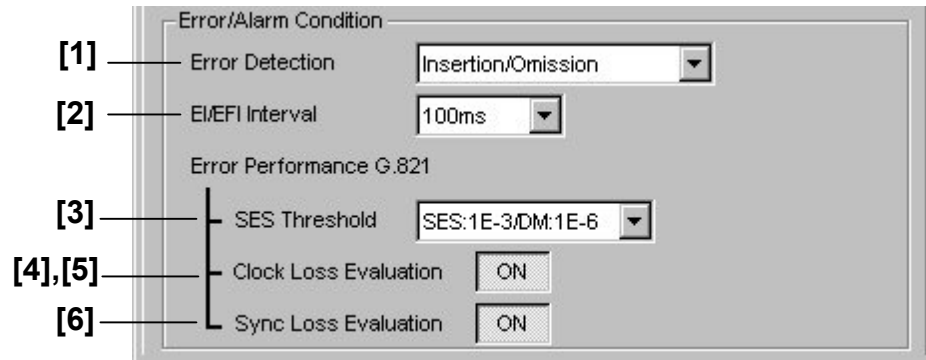


Figure 7.4.2.4-1 Error/Alarm Condition setting field

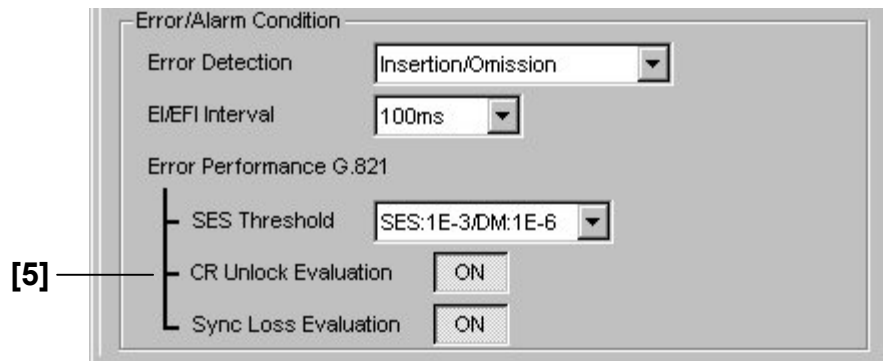
Figure 7.4.2.4-2 Error/Alarm Condition setting field  
(For Recovered Clock)

Table 7.4.2.4-1 Error/Alarm Condition setting commands

No.	Setting Items	Commands
[1]	Error Detection	:CALCulate:EALarm:ERRor:EDETect
		:CALCulate:EALarm:ERRor:EDETect?
[2]	EI/EFI Interval	:CALCulate:EALarm:ERRor:INTerval
		:CALCulate:EALarm:ERRor:INTerval?
[3]	SES Threshold	:CALCulate:EALarm:PERFormance:THReshold
		:CALCulate:EALarm:PERFormance:THReshold?
[4]	Clock Loss Evaluation	:CALCulate:EALarm:CLEvaluation
		:CALCulate:EALarm:CLEvaluation?
[5]	CR Unlock Evaluation	:CALCulate:EALarm:CRUNlock
		:CALCulate:EALarm:CRUNlock?
[6]	Sync Loss Evaluation	:CALCulate:EALarm:SLEvaluation
		:CALCulate:EALarm:SLEvaluation?

**:CALCulate:EALarm:ERRor:EDETect <mode>**

---

Parameter	<mode> = <CHARACTER PROGRAM DATA> INSomi                      Detects INS/OMI error. TRANSition                 Detects Transition/Non Transition error.
Function	Sets the error detection method during bit error alarm measurement.
Example	To set the error detection method during bit error alarm measurement to INS/OMI error detection: > :CALCulate:EALarm:ERRor:EDETect INSomI
Compatibility	Incompatible with existing models.

**:CALCulate:EALarm:ERRor:EDETect?**

---

Response	<mode> = <CHARACTER RESPONSE DATA> INS, TRAN
Function	Queries the error detection method during bit error alarm measurement
Example	> :CALCulate:EALarm:ERRor:EDETect? < INS
Compatibility	Incompatible with existing models.

**:CALCulate:EALarm:ERRor:INTerval <numeric>, <suffix>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 1                              Sets the measurement time to 1. 10                             Sets the measurement time to 10. 100                            Sets the measurement time to 100. <suffix> = <CHARACTER PROGRAM DATA> ms                             Sets the measurement time unit to millisecond. s                                Sets the measurement time unit to second.
Function	Sets the interval for EI and %EFI measurement. 1 ms, 10 ms, 100 ms, or 1s can be set.
Example	To set the interval for EI and %EFI measurement to 1 ms: > :CALCulate:EALarm:ERRor:INTerval 1,ms
Compatibility	Compatible with the MP1632C and MP1776A.



**:CALCulate:EALarm:ERRor:INTerval?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1, 10, 100 <suffix> = <CHARACTER RESPONSE DATA> ms, s
Function	Queries the interval for EI and %EFI measurement.
Example	> :CALCulate:EALarm:ERRor:INTerval? < 1,ms
Compatibility	Compatible with the MP1632C and MP1776A.

**:CALCulate:EALarm:PERFormance:THReshold <thre>**

Parameter	<thre> = <STRING PROGRAM DATA> "SES_3:DM_6"            SES:1E-3, DM:1E-6 "SES_4:DM_8"            SES:1E-4, DM:1E-8
Function	Sets the thresholds for SES and DM calculations during performance measurement.
Example	To set the thresholds for SES and DM calculations during performance measurement to SES: 1E-3, DM: 1E-6: > :CALCulate:EALarm:PERFormance:THReshold "SES_3:DM_6"
Compatibility	Compatible with the MP1632C and MP1776A.

**:CALCulate:EALarm:PERFormance:THReshold?**

Response	<thre> = <STRING RESPONSE DATA> "SES_3:DM_6", "SES_4:DM_8"
Function	Queries the thresholds for SES and DM calculations during performance measurement.
Example	> :CALCulate:EALarm:PERFormance:THReshold? < "SES_3:DM_6"
Compatibility	Compatible with the MP1632C and MP1776A.

**:CALCulate:EALarm:CLEValuation <boolean>**

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> 0 or OFF            Does not set to the evaluation target. 1 or ON             Sets to the evaluation target.
Function	Sets whether to include the Clock Loss occurrence period to the measurement evaluation target.
Example	To include the Clock Loss occurrence period to the measurement evaluation target: > :CALCulate:EALarm:CLEValuation ON
Compatibility	Compatible with the MP1632C and MP1776A.

### **:CALCulate:EALarm:CLEvaluation?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 Out of evaluation target 1 Evaluation target
Function	Queries whether the Clock Loss occurrence period is included to the measurement evaluation target.
Example	> :CALCulate:EALarm:CLEvaluation? < 1
Compatibility	Compatible with the MP1632C and MP1776A.

### **:CALCulate:EALarm:CRUNlock <boolean>**

---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> 0 or OFF Does not set to the evaluation target. 1 or ON Sets to the evaluation target.
Function	Sets whether to include the CR Unlock occurrence period to the measurement evaluation target.
Example	To include the CR Unlock occurrence period to the measurement evaluation target: > :CALCulate:EALarm:CRUNlock ON
Compatibility	Incompatible with existing models.

### **:CALCulate:EALarm:CRUNlock?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 Out of evaluation target 1 Evaluation target
Function	Queries whether the CR Unlock occurrence period is included to the measurement evaluation target.
Example	> :CALCulate:EALarm:CRUNlock? < 1
Compatibility	Incompatible with existing models.

**:CALCulate:EALarm:SLEvaluation <boolean>**


---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> 0 or OFF                      Does not set to the evaluation target. 1 or ON                        Sets to the evaluation target.
Function	Sets whether to include the Sync Loss occurrence period to the measurement evaluation target.
Example	To include the Sync Loss occurrence period to the measurement evaluation target: > :CALCulate:EALarm:SLEvaluation ON
Compatibility	Compatible with the MP1632C and MP1776A.

**:CALCulate:EALarm:SLEvaluation?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0                                Out of evaluation target 1                                Evaluation target
Function	Queries whether the Sync Loss occurrence period is included to the measurement evaluation target.
Example	> :CALCulate:EALarm:SLEvaluation? < 1
Compatibility	Compatible with the MP1632C and MP1776A.

### 7.4.3 Commands related to Pattern tab window

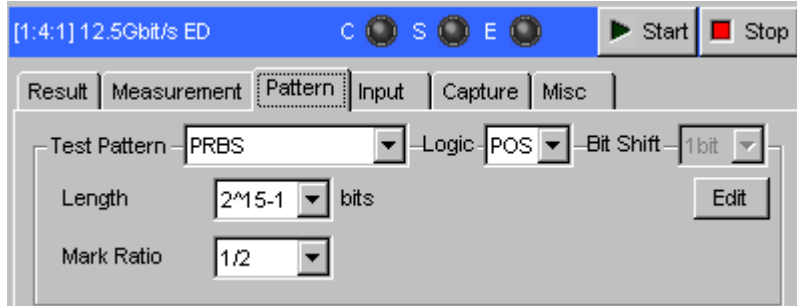


Figure 7.4.3-1 Pattern tab window

#### 7.4.3.1 Test Pattern setting commands

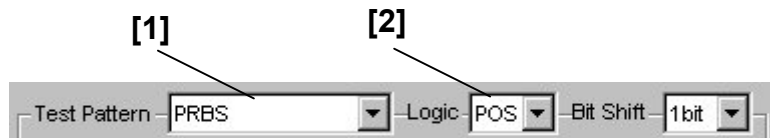


Figure 7.4.3.1-1 Test Pattern setting field

Table 7.4.3.1-1 Test Pattern setting commands

No.	Setting Items	Commands
[1]	Test Pattern	:SENSE:PATTERN:TYPE
		:SENSE:PATTERN:TYPE?
[2]	Logic	:SENSE:PATTERN:LOGIC
		:SENSE:PATTERN:LOGIC?

**:SENSe:PATtern:TYPE <type>**


---

Parameter	<type> = <CHARACTER PROGRAM DATA> PRBS                      PRBS pattern ZSUBstitution              Zero Substitution pattern DATA                        Data pattern MIXData                    Mixed Data pattern SEQuence                    Sequence pattern
Function	Sets the type of the test pattern.
Example	To set the test pattern type to the PRBS pattern: > :SENSe:PATtern:TYPE PRBS
Compatibility	Partially compatible with the MP1632C and MP1776A (for ZSUBstitution only).

**:SENSe:PATtern:TYPE?**


---

Response	<type> = <CHARACTER RESPONSE DATA> PRBS, ZSUB, DATA, MIXD, SEQ
Function	Queries the type of the test pattern.
Example	> :SENSe:PATtern:TYPE? < PRBS
Compatibility	Partially compatible with the MP1632C and MP1776A (for ZSUB only).

**:SENSe:PATtern:LOGic <logic>**


---

Parameter	<logic> = <CHARACTER PROGRAM DATA> POSitive                    Positive logic NEGative                    Negative logic
Function	Sets the logic (positive or negative) of the test pattern.
Example	To set the logic of the test pattern to the positive logic (POSitive): > :SENSe:PATtern:LOGic POSitive
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:LOGic?**


---

Response	<logic> = <CHARACTER RESPONSE DATA> POS, NEG
Function	Queries the logic of the test pattern.
Example	> :SENSe:PATtern:LOGic? < POS
Compatibility	Incompatible with existing models.

### 7.4.3.2 PRBS pattern setting commands

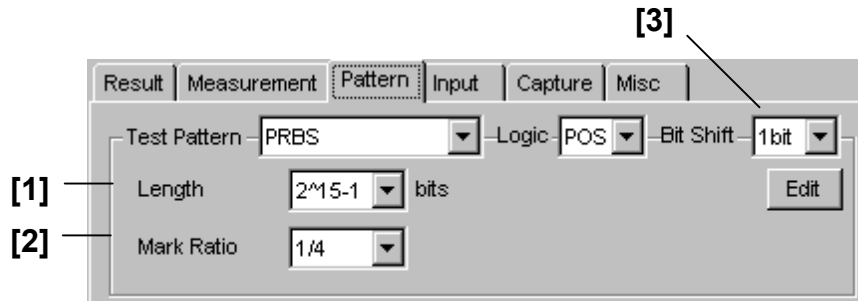


Figure 7.4.3.2-1 PRBS setting

Table 7.4.3.2-1 PRBS pattern setting commands

No.	Setting Items	Commands
[1]	Length	:SENSe:PATtern:PRBS:LENGth
		:SENSe:PATtern:PRBS:LENGth?
[2]	Mark Ratio	:SENSe:PATtern:PRBS:MRATio
		:SENSe:PATtern:PRBS:MRATio?
[3]	Bit Shift	:SENSe:PATtern:PRBS:BSHift
		:SENSe:PATtern:PRBS:BSHift?

#### :SENSe:PATtern:PRBS:LENGth <numeric>

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA>
	7 $2^n - 1$ (n = 7)
	9 $2^n - 1$ (n = 9)
	10 $2^n - 1$ (n = 10)
	11 $2^n - 1$ (n = 11)
	15 $2^n - 1$ (n = 15)
	20 $2^n - 1$ (n = 20)
	23 $2^n - 1$ (n = 23)
	31 $2^n - 1$ (n = 31)
Function	Sets the number of stages ( $2^n - 1$ (n = 7, 9, 10, 11, 15, 20, 23, or 31)) during PRBS pattern reception.
Example	To set the number of stages during PRBS pattern reception to $2^7 - 1$ : > :SENSe:PATtern:PRBS:LENGth 7
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:PRBS:LENGth?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 7, 9, 10, 11, 15, 20, 23, 31
Function	Queries the number of stages during PRBS pattern reception.
Example	> :SENSe:PATtern:PRBS:LENGth? < 7
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:PRBS:MRATio <mratio>**

Parameter	<mratio> = <CHARACTER PROGRAM DATA> M1_2                    1/2 M1_4                    1/4 M1_8                    1/8 M0_8                    0/8 I1_2                    1/2INVT M3_4                    3/4 M7_8                    7/8 M8_8                    8/8
Function	Sets the mark ratio during PRBS pattern reception.
Example	To set the mark ratio during PRBS pattern reception to 1/2: > :SENSe:PATtern:PRBS:MRATio M1_2
Compatibility	Compatible with the MP1632C.

**:SENSe:PATtern:PRBS:MRATio?**

Response	<mratio> = <CHARACTER RESPONSE DATA> M1_2, M1_4, M1_8, M0_8, I1_2, M3_4, M7_8, M8_8
Function	Queries the mark ratio during PRBS pattern reception.
Example	> :SENSe:PATtern:PRBS:MRATio? < M1_2
Compatibility	Compatible with the MP1632C.

**:SENSe:PATtern:PRBS:BSHift <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 1                        1 bit 3                        3 bits
Function	Sets the bit shift during PRBS pattern reception.
Example	To set the bit shift during PRBS pattern reception to 1 bit: > :SENSe:PATtern:PRBS:BSHift 1
Compatibility	Compatible with the MP1632C.

### **:SENSe:PATtern:PRBS:BSHift?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1, 3
Function	Queries the bit shift during PRBS pattern reception.
Example	> :SENSe:PATtern:PRBS:BSHift? < 1
Compatibility	Compatible with the MP1632C.



## 7.4.3.3 Zero Substitution pattern setting commands

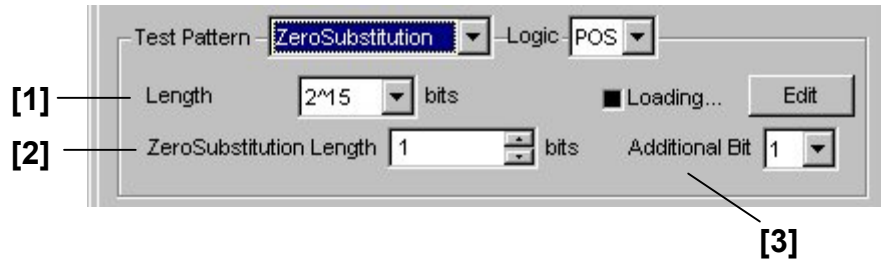


Figure 7.4.3.3-1 Zero Substitution pattern setting

Table 7.4.3.3-1 Zero Substitution pattern setting commands

No	Setting Items	Commands
[1]	Length	:SENSE:PATtern:ZSUBstitute:LENGth
		:SENSE:PATtern:ZSUBstitute:LENGth?
[2]	Zero Substitution Length	:SENSE:PATtern:ZSUBstitute:ZLENGth
		:SENSE:PATtern:ZSUBstitute:ZLENGth?
[3]	Additional Bit	:SENSE:PATtern:ZSUBstitute:ADDBit
		:SENSE:PATtern:ZSUBstitute:ADDBit?

**:SENSE:PATtern:ZSUBstitute:LENGth <length>**

Parameter	<length> = <DECIMAL NUMERIC PROGRAM DATA>	
	7	$2^n$ (n = 7)
	9	$2^n$ (n = 9)
	10	$2^n$ (n = 10)
	11	$2^n$ (n = 11)
	15	$2^n$ (n = 15)
	20	$2^n$ (n = 20)
	23	$2^n$ (n = 23)
	-7	$2^n - 1$ (n = 7)
	-9	$2^n - 1$ (n = 9)
	-10	$2^n - 1$ (n = 10)
	-11	$2^n - 1$ (n = 11)
	-15	$2^n - 1$ (n = 15)
	-20	$2^n - 1$ (n = 20)
	-23	$2^n - 1$ (n = 23)
Function	Sets the pattern length during Zero Substitution pattern reception.	
Example	To set the pattern length during Zero Substitution pattern reception to $2^7$ :	
	> :SENSE:PATtern:ZSUBstitute:LENGth 7	
Compatibility	Compatible with the MP1632C and MP1776A.	

### **:SENSe:PATtern:ZSUBstitute:LENGth?**

Response	<length> = <NR1 NUMERIC RESPONSE DATA> 7, 9, 10, 11, 15, 20, 23, -7, -9, -10, -11, -15, -20, -23
Function	Queries the pattern length during Zero Substitution pattern reception.
Example	> :SENSe:PATtern:ZSUBstitute:LENGth? < 7
Compatibility	Compatible with the MP1632C and MP1776A.

### **:SENSe:PATtern:ZSUBstitute:ZLENGth <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> When ZSUBlength, 2 <sup>n</sup> is set: 1 to 2 <sup>n</sup> - 1                      1 to 2 <sup>n</sup> - 1, in 1-bit steps When ZSUBlength, 2 <sup>n</sup> - 1 is set: 1 to 2 <sup>n</sup> - 2                      1 to 2 <sup>n</sup> - 2, in 1-bit steps n = 7, 9, 11, 15, 20, 23
Function	Sets the number of bits to which "0" is inserted (zero-insertion bit count) during Zero Substitution pattern reception.
Example	Available parameters vary depending on the setting conditions. To set the zero-insertion bit count during Zero Substitution pattern reception to 10 bits: > :SENSe:PATtern:ZSUBstitute:ZLENGth 10
Compatibility	Partially compatible with the MP1632C and MP1776A.

### **:SENSe:PATtern:ZSUBstitute:ZLENGth?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1 to 2 <sup>n</sup> - 1 n = 7, 9, 11, 15, 20, 23
Function	Queries the zero-insertion bit count during Zero Substitution pattern reception.
Example	> :SENSe:PATtern:ZSUBstitute:ZLENGth? < 10
Compatibility	Partially compatible with the MP1632C and MP1776A.

**:SENSe:PATtern:ZSUBstitute:ADDBit <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA>
	0 Adds one bit of "0" next to the last of zero-inserted bits.
	1 Adds one bit of "1" next to the last of zero-inserted bits (same as existing models).
Function	Sets whether to add one bit of "0" or "1" next to the last of zero-inserted bits during Zero Substitution pattern reception.
Example	To add one bit of "0" next to the last of zero-inserted bits during Zero Substitution pattern reception: > :SENSe:PATtern:ZSUBstitute:ADDBit 0
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:ZSUBstitute:ADDBit?**


---

Response	<numeric> = <DECIMAL NUMERIC RESPONSE DATA>
	0 One bit of "0" is added next to the last of zero-inserted bits.
	1 One bit of "1" is added next to the last of zero-inserted bits (same as existing models).
Function	Queries whether one bit of "0" or "1" is added next to the last of zero-inserted bits during Zero Substitution pattern reception.
Example	> :SENSe:PATtern:ZSUBstitute:ADDBit? < 0
Compatibility	Incompatible with existing models.

7.4.3.4 Date pattern setting commands

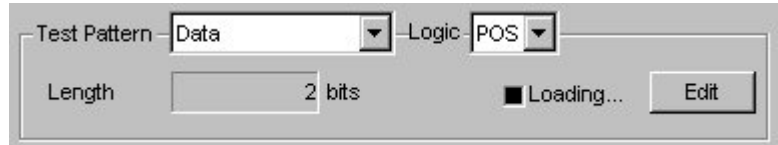


Figure 7.4.3.4-1 Data pattern setting

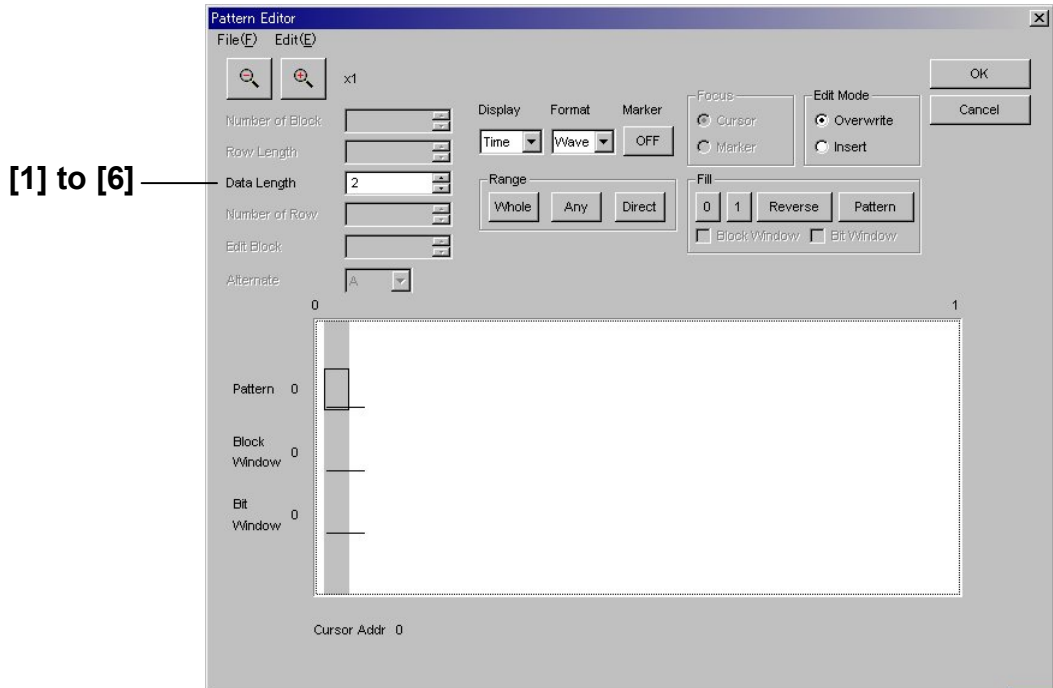


Figure 7.4.3.4-2 Data pattern setting (Pattern Editor screen)

Table 7.4.3.4-1 Data pattern setting commands

No.	Setting Items	Commands
[1]	Data Length	:SENSe:PATtern:DATA:LENGth :SENSe:PATtern:DATA:LENGth?
[2]	No label (Pattern setting)	:SENSe:PATtern:DATA:WHOLE :SENSe:PATtern:DATA:WHOLE?
[3]	No label (Pattern setting)	:SENSe:PATtern:BDATA:WHOLE :SENSe:PATtern:BDATA:WHOLE?
[4]	No label (Data inversion)	:SENSe:PATtern:DREVerse:ADDReSS
[5]	No label (Data inversion)	:SENSe:PATtern:DREVerse:DELTA
[6]	No label (All 0 or 1)	:SENSe:PATtern:DATA:FILL

**:SENSe:PATtern:DATA:LENGth <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 2 to 134217728                      2 to 134,217,728 bits, in 1-bit steps
	<b>Note:</b> At 2 ch Combination, the setting range and Step are doubled. At 4 ch Combination, the setting range and Step are quadrupled.
Function	Sets the pattern length during Data pattern reception.
Example	To set the pattern length during Data pattern reception to 2 bits: > :SENSe:PATtern:DATA:LENGth 2
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:DATA:LENGth?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries the pattern length during Data pattern reception.
Example	To query the pattern length during Data pattern reception: > :SENSe:PATtern:DATA:LENGth? < 2
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:DATA:WHOLe <start>,<end>,<data>**

Parameter	<start> = <NON-DECIMAL PROGRAM DATA> #H0 to #H7FFFFFFF                      0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal)
	<end> = <NON-DECIMAL PROGRAM DATA> #H0 to #H7FFFFFFF                      0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal)
	<b>Note:</b> The maximum setting is the pattern length. At 2 ch Combination, the setting range is doubled. At 4 ch Combination, the setting range is quadrupled.
	<data> = <STRING PROGRAM DATA> "H***...*"                      Specify pattern data in hexadecimal format. 1 to 400 characters (pattern data of 400 × 4 bits) Specify a character string consisting of 0 to 9 and A to F. If the last character string of the pattern data is short of a hexadecimal unit (4 bits), add 0(s) up to the last bit to make a hexadecimal string.
	"B***...*"                      Specify pattern data in binary format. 1 to 400 characters (pattern data of 400 bits) Specify a character string consisting of 0 and 1.

Function	Sets the pattern data from the <start> to <end> addresses during Data pattern reception.
Example	The set data overwrites the specified range. To set the addresses from bit 0 to bit 7FFFFFFF of the pattern data in hexadecimal format: > :SENSe:PATtern:DATA:WHOLe #H0,#H7FFFFFFF, "H001"
Compatibility	Compatible with the MP1632C and MP1776A.

**Note:**

When the number of data bits specified in <data> is smaller than the range specified by <start> and <end>, set <data> repeatedly up to the specified range.

<Example>

- <start> = #H0, <end> = #H1F, <data> = "HABC"  
Setting data: ABCABCAB
- <start> = #H0, <end> = #H7, <data> = "B011"  
Setting data: 01101101

When the number of data bits specified in <data> is greater than the range specified by <start> and <end>, cut off the part of <data> out of the specified range.

<Example>

- <start> = #H0, <end> = #HF, <data> = #HABCDEF  
Setting data: ABCD
- <start> = #H0, <end> = #H3, <data> = #B01100110  
Setting data: 0110



### **:SENSe:PATtern:BDATa:WHOLe? <start>[,size]**

Parameter	<p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;                  #H0 to #H7FFFFFFF                    0 to 7FFFFFFF bits, in 1-bit steps                  (Specify in hexadecimal)</p> <p>[&lt;size&gt;] = &lt;NR1 NUMERIC PROGRAM DATA&gt;                  1 to 16777216                    1 to 16,777,216 bytes, in 1-byte steps                  Binary data of the setting pattern is queried when [&lt;size&gt;] is omitted.</p> <p><b>Note:</b>                  The maximum setting is the pattern length.                  At 2 ch Combination, the setting range is doubled.                  At 4 ch Combination, the setting range is quadrupled.</p>
Response	<p>&lt;bdata&gt; = &lt;DEFINITE LENGTH ARBITRARY BLOCK RESPONSE DATA&gt;                  #XYYY&lt;binary&gt;                    X:        Number of YYY digits                  YYY:     Number of bytes of &lt;binary&gt;                  1 to 16,777,216 bytes                  &lt;binary&gt;: Binary data of up to 16,777,216 bytes</p>
Function	Queries binary data of bytes specified by <size> from <start> address of the pattern data during Data pattern reception.
Example	<p>To query binary data of 16,777,216 bytes from bit 0 address of the pattern data during Data pattern reception:</p> <pre>&gt; :SENSe:PATtern:BDATa:WHOLe? #H0 &lt; #10011</pre>
Compatibility	Compatible with the MP1632C and MP1776A.

### **:SENSe:PATtern:DREVerse:ADDRess <start>,<end>**

Parameter	<p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;                  #H0 to #H7FFFFFFF                    0 to 7FFFFFFF bits, in 1-bit steps                  (Specify in hexadecimal)</p> <p>&lt;end&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;                  #H0 to #H7FFFFFFF                    0 to 7FFFFFFF bits, in 1-bit steps                  (Specify in hexadecimal)</p> <p><b>Note:</b>                  The maximum setting is the pattern length.                  At 2 ch Combination, the setting range is doubled.                  At 4 ch Combination, the setting range is quadrupled.</p>
Function	Inverts the data in the program during Data pattern reception. Specify the inversion range by the <start> and <end> addresses.
Example	<p>To invert addresses from bit 0 to bit 7FFFFFFF in the program during Data pattern reception:</p> <pre>&gt; :SENSe:PATtern:DREVerse:ADDRess #H0,#H7FFFFFFF</pre>
Compatibility	Compatible with the MP1632C.



**:SENSE:PATtern:DREVerse:DELTA <start>,<delta>**

Parameter	<start> = <NON-DECIMAL PROGRAM DATA> #H0 to #H7FFFFFFF                0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal) <delta> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 134217728                1 to 134,217,728 bits, in 1-bit steps
	<b>Note:</b> The maximum setting is the pattern length. At 2 ch Combination, the setting range is doubled. At 4 ch Combination, the setting range is quadrupled.
Function	Inverts the data in the program during Data pattern reception. Specify the inversion range by the number of bits from the <start> address (relative specification).
Example	To invert 1 bit of the pattern data from address 0 in the program during Data pattern reception: > :SENSE:PATtern:DREVerse:DELTA #H0,1
Compatibility	Compatible with the MP1632C.

**:SENSE:PATtern:DATA:FILL <range>,<page>,<data>**

Parameter	<range> = <CHARACTER PROGRAM DATA> PAGE                Specifies a page. (One page is defined as 128 bits.) ALL                Specifies all data.
	<page> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 1048576                1 to 1,048,576 (Max.) pages, in 1-page steps Max = Pattern Length/128 (rounding up fractions) Specify "0" when <range> is set to ALL.
	<data> = <DECIMAL NUMERIC PROGRAM DATA> 0                Fills the specified range with 0s. 1                Fills the specified range with 1s.
Function	Sets 0s or 1s for the specified page or all data in the program during Data pattern reception.
Example	To set 0s for the first page of the program during Data pattern reception: > :SENSE:PATtern:DATA:FILL PAGE,1,0
Compatibility	Incompatible with existing models.

7.4.3.5 Mixed Data pattern setting commands

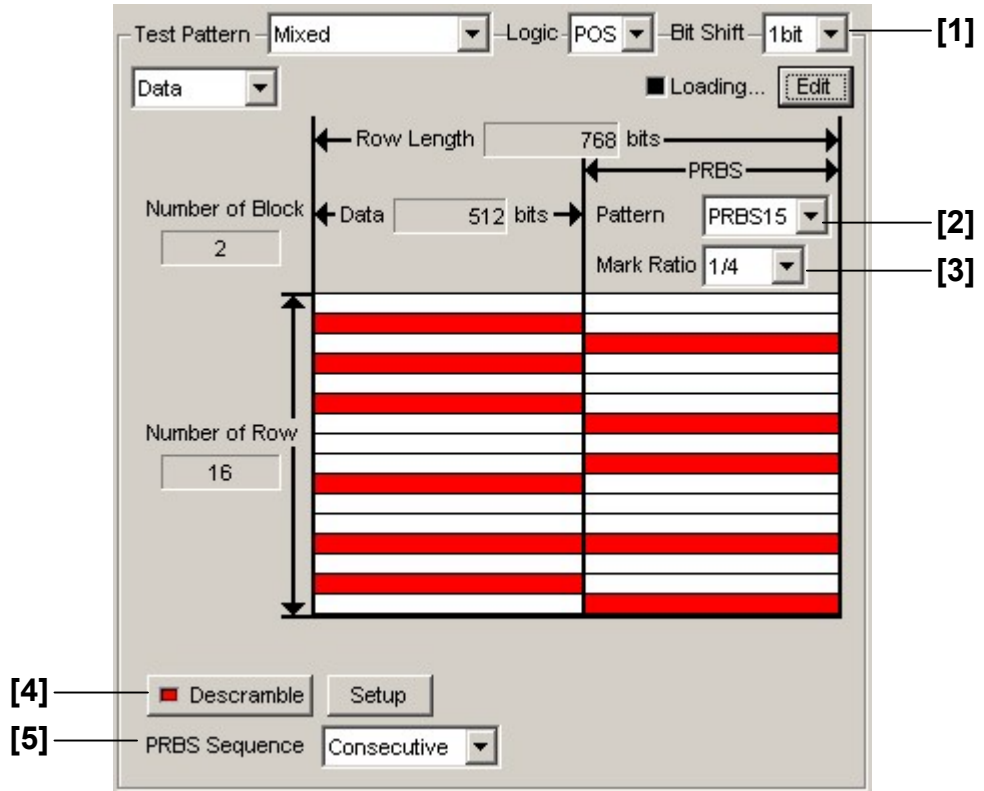


Figure 7.4.3.5-1 Mixed Data pattern setting

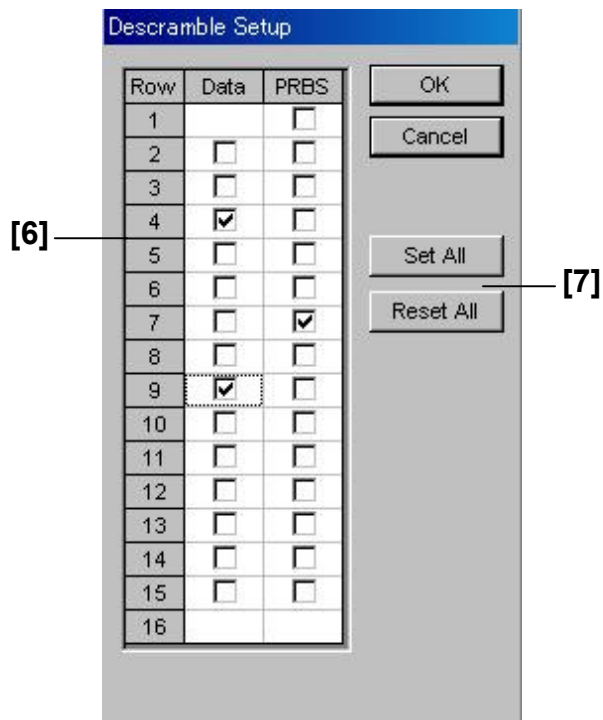


Figure 7.4.3.5-2 Descramble Setup dialog box

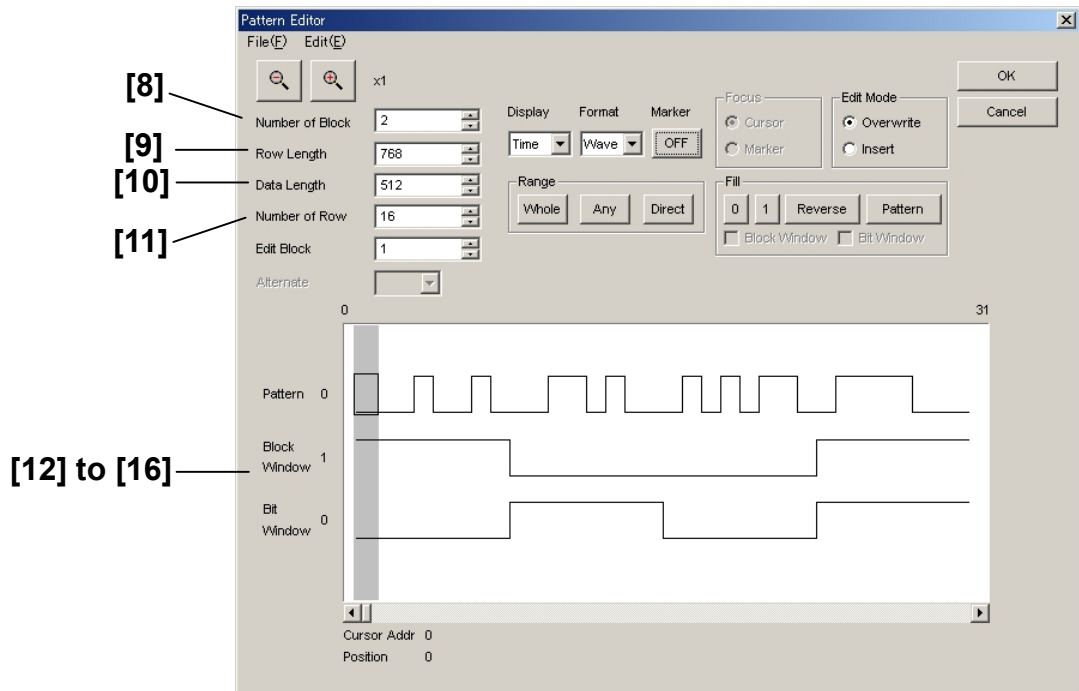


Figure 7.4.3.5-3 Mixed Data pattern setting (Pattern Editor screen)

Table 7.4.3.5-1 Mixed Data pattern setting commands

No	Setting Items	Commands
[1]	Bit Shift	:SENSe:PATtern:MIXData:PRBS:BITShift :SENSe:PATtern:MIXData:PRBS:BITShift?
[2]	PRBS Pattern	:SENSe:PATtern:MIXData:PRBS:LENGth :SENSe:PATtern:MIXData:PRBS:LENGth?
[3]	PRBS Mark Ratio	:SENSe:PATtern:MIXData:PRBS:MRATio :SENSe:PATtern:MIXData:PRBS:MRATio?
[4]	Descramble	:SENSe:PATtern:MIXData:DESCramble :SENSe:PATtern:MIXData:DESCramble?
[5]	PRBS Sequence	:SENSe:PATtern:MIXData:PRBS:SEQuence :SENSe:PATtern:MIXData:PRBS:SEQuence?
[6]	Setup	:SENSe:PATtern:MIXData:SRSetting :SENSe:PATtern:MIXData:SRSetting?
[7]	Set All/Reset All	:SENSe:PATtern:MIXData:DESCramble:ALLSet
[8]	Number of Block	:SENSe:PATtern:MIXData:BLOCK :SENSe:PATtern:MIXData:BLOCK?
[9]	Row Length	:SENSe:PATtern:MIXData:RLENGth :SENSe:PATtern:MIXData:RLENGth?
[10]	Data Length	:SENSe:PATtern:MIXData:DATA:LENGth :SENSe:PATtern:MIXData:DATA:LENGth?
[11]	Number of Row	:SENSe:PATtern:MIXData:ROW :SENSe:PATtern:MIXData:ROW?

**Table 7.4.3.5-1 Mixed Data pattern setting commands (Cont'd)**

No	Setting Items	Commands
[12]	No label (Pattern setting)	:SENSe:PATtern:MIXData:DATA:WHOLe
		:SENSe:PATtern:MIXData:DATA:WHOLe?
[13]	No label (Pattern setting)	:SENSe:PATtern:MIXData:BDATa:WHOLe
		:SENSe:PATtern:MIXData:BDATa:WHOLe?
[14]	No label (Data inversion)	:SENSe:PATtern:MIXData:DREVerse:ADDReSS
[15]	No label (Data inversion)	:SENSe:PATtern:MIXData:DREVerse:DELTA
[16]	No label (Data inversion)	:SENSe:PATtern:MIXData:DATA:FILL

**:SENSe:PATtern:MIXData:PRBS:BITShift <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA>
	1                      1 bit
	3                      3 bits
Function	Sets the bit shift for the PRBS pattern during Mixed Data pattern reception.
Example	To set the bit shift for the PRBS pattern during Mixed Data pattern reception to 1-bit shift: > :SENSe:PATtern:MIXData:PRBS:BITShift 1
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:MIXData:PRBS:BITShift?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	1                      1 bit
	3                      3 bits
Function	Queries the bit shift for the PRBS pattern during Mixed Data pattern reception.
Example	> :SENSe:PATtern:MIXData:PRBS:BITShift? < 1
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:MIXData:PRBS:LENGth <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA>
	7 $2^n - 1$ (n = 7)
	9 $2^n - 1$ (n = 9)
	10 $2^n - 1$ (n = 10)
	11 $2^n - 1$ (n = 11)
	15 $2^n - 1$ (n = 15)
	20 $2^n - 1$ (n = 20)
	23 $2^n - 1$ (n = 23)
	31 $2^n - 1$ (n = 31)
Function	Sets the number of stages of the PRBS pattern during Mixed Data pattern reception.
Example	To set the number of stages of the PRBS pattern during Mixed Data pattern reception to $2^7 - 1$ : > :SENSe:PATtern:MIXData:PRBS:LENGth 7
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:MIXData:PRBS:LENGth?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 7, 9, 10, 11, 15, 20, 23, 31
Function	Queries the number of stages of the PRBS pattern during Mixed Data pattern reception.
Example	To query the number of stages of the PRBS pattern during Mixed Data pattern reception: > :SENSe:PATtern:MIXData:PRBS:LENGth? < 7
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:MIXData:PRBS:MRATio <mratio>**

Parameter	<mratio> = <CHARACTER PROGRAM DATA>
	M1_2                    1/2
	M1_4                    1/4
	M1_8                    1/8
	M0_8                    0/8
	I1_2                    1/2INVT
	M3_4                    3/4
	M7_8                    7/8
	M8_8                    8/8
Function	Sets the mark ratio for the PRBS pattern during Mixed Data pattern reception.
Example	To set the mark ratio for the PRBS pattern during Mixed Data pattern reception to 1/2: > :SENSe:PATtern:MIXData:PRBS:MRATio M1_2
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:MIXData:PRBS:MRATio?**

Response	<mratio>=<CHARACTER RESPONSE DATA> M1_2, M1_4, M1_8, M0_8, I1_2, M3_4, M7_8, M8_8
Function	Queries the mark ratio for the PRBS pattern during Mixed Data pattern reception.
Example	> :SENSe:PATtern:MIXData:PRBS:MRATio? < M1_2
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:MIXData:DESCramble <boolean>**

Parameter	<boolean> = <BOOLEAN PROGRAM DATA>
	0 or OFF                    Descramble OFF
	1 or ON                    Descramble ON
Function	Sets Descramble ON/OFF of the PRBS7 stage during pattern reception.
Example	To set Descramble ON of the PRBS7 stage during pattern reception: > :SENSe:PATtern:MIXData:DESCramble ON
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:MIXData:DESCramble?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 or OFF                      Descramble OFF 1 or ON                         Descramble ON
Function	Queries the Descramble ON/OFF state of the PRBS7 stage during pattern reception.
Example	> :SENSe:PATtern:MIXData:DESCramble? < 1
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:MIXData:PRBS:SEquence <sequence>**


---

Parameter	<sequence> = <CHARACTER PROGRAM DATA> REStart                         Discontinuous PRBS pattern CONSeCutive                    Continuous PRBS pattern
Function	Sets the PRBS pattern sequence during Mixed Data pattern reception.
Example	To set the PRBS pattern sequence during Mixed Data pattern reception to Restart: > :SENSe:PATtern:MIXData:PRBS:SEquence REStart
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:MIXData:PRBS:SEquence?**


---

Response	<sequence> = <CHARACTER RESPONSE DATA> REST, CONS
Function	Queries the PRBS pattern sequence during Mixed Data pattern reception.
Example	To query the PRBS pattern sequence during Mixed Data pattern reception: > :SENSe:PATtern:MIXData:PRBS:SEquence? < REST
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:MIXData:SRSetting <row>,<data>,<prbs>**

---

Parameter	<row> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 16                      1 to 16 Rows, in 1-row steps
	<data> = <BOOLEAN PROGRAM DATA> 0 or OFF                      Descramble OFF 1 or ON                        Descramble ON
	Note, however, that Descramble OFF is fixed for Data of 1 Row.
	<prbs> = <BOOLEAN PROGRAM DATA> 0 or OFF                      Descramble OFF 1 or ON                        Descramble ON
Function	Sets Descramble ON or OFF for the Data and PRBS of the specified Row.
Example	To set the descrambling range as "1 Row, Data ON, PRBS ON": > :SENSe:PATtern:MIXData:SRSetting 1,ON,ON
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:MIXData:SRSetting? <row>**

---

Parameter	<row> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 16                      1 to 16 Rows, in 1-row steps
Response	<data>,<prbs> = <NR1 NUMERIC RESPONSE DATA> 0                                Descramble OFF 1                                Descramble ON
Function	Queries the Descramble setting (ON/OFF) for the Data and PRBS of the specified Row.
Example	> :SENSe:PATtern:MIXData:SRSetting? 1 < 1,1
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:MIXData:DESCramble:ALLSet <numeric>**

---

Parameter	<numeric> = <NUMERIC PROGRAM DATA> 0                                All Reset 1                                All Set
Function	Selects or deselects all descramble.
Example	To select all descramble: > :SENSe:PATtern:MIXData:DESCramble:ALLSet 1
Compatibility	Incompatible with existing models.



**:SENSe:PATtern:MIXData:BLOCK <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 511                      1 to 511 blocks, in 1-block steps
Function	Sets the number of blocks during Mixed Data pattern reception.
Example	To set the number of blocks during Mixed Data pattern reception to 1: > :SENSe:PATtern:MIXData:BLOCK 1
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:MIXData:BLOCK?**


---

Response	<numeric> = < NR1 NUMERIC RESPONSE DATA> 1 to 511                      1 to 511 blocks
Function	Queries the number of blocks during Mixed Data pattern reception.
Example	> :SENSe:PATtern:MIXData:BLOCK? < 1
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:MIXData:RLENgth <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 768 to 2281701376        768 to 2,281,701,376 bits, in 128-bit steps
	<b>Note:</b> At 2 ch Combination, the setting range and Step are doubled. At 4 ch Combination, the setting range and Step are quadrupled.
Function	Sets the pattern length of 1 Row that is edited during Mixed Data pattern reception.
Example	To set the pattern length of 1 Row that is edited during Mixed Data pattern reception to 768 bits: > :SENSe:PATtern:MIXData:RLENgth 768
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:MIXData:RLENgth?**


---

Response	<numeric> = < NR1 NUMERIC RESPONSE DATA>
Function	Queries the pattern length of 1 Row that is edited during Mixed Data pattern reception.
Example	> :SENSe:PATtern:MIXData:RLENgth? < 768
Compatibility	Incompatible with existing models.

### **:SENSe:PATtern:MIXData:DATA:LENGth <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 512 to 134217728      512 to 134,217,728 bits, in 1-bit steps
	<b>Note:</b> At 2 ch Combination, the setting range and Step are doubled. At 4 ch Combination, the setting range and Step are quadrupled.
Function	Sets the pattern length on the pattern data side that is edited during Mixed Data pattern reception.
Example	To set the pattern length on the pattern data side that is edited during Mixed Data pattern reception to 16 bits: > :SENSe:PATtern:MIXData:DATA:LENGth 16
Compatibility	Incompatible with existing models.

### **:SENSe:PATtern:MIXData:DATA:LENGth?**

Response	<numeric> = < NR1 NUMERIC RESPONSE DATA>
Function	Queries the pattern length on the pattern data side that is edited during Mixed Data pattern reception.
Example	> :SENSe:PATtern:MIXData:DATA:LENGth? < 16
Compatibility	Incompatible with existing models.

### **:SENSe:PATtern:MIXData:ROW <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 16      1 to 16 Rows, in 1-row steps
Function	Sets the number of rows within one block that are edited during Mixed Data pattern reception.
Example	To set the number of rows within one block that are edited during Mixed Data pattern reception to 1: > :SENSe:PATtern:MIXData:ROW 1
Compatibility	Incompatible with existing models.

### **:SENSe:PATtern:MIXData:ROW?**

Response	<numeric> = < NR1 NUMERIC RESPONSE DATA> 1 to 16      1 to 16 Rows
Function	Queries the number of rows within one block that are edited during Mixed Data pattern reception.
Example	> :SENSe:PATtern:MIXData:ROW? < 1
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:MIXData:DATA:WHOLe <block>,<start>,<end>,<data>**

Parameter	<p>&lt;block&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;  1 to 511                            1 to 511 blocks, in 1-block steps</p> <p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;  #H0 to #H7FFFFFFF                    0 to 7FFFFFFF bits, in 1-bit steps  (Specify in hexadecimal)</p> <p>&lt;end&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;  #H0 to #H7FFFFFFF                    0 to 7FFFFFFF bits, in 1-bit steps  (Specify in hexadecimal)</p> <p><b>Note:</b></p> <p style="padding-left: 2em;">The maximum setting is the pattern length.  At 2 ch Combination, the setting range is doubled.  At 4 ch Combination, the setting range is quadrupled.</p> <p>&lt;data&gt; = &lt;STRING PROGRAM DATA&gt;  "H***...*"                            Specify pattern data in hexadecimal format.  1 to 400 characters (pattern data of 400 × 4 bits)  Specify a character string consisting of 0 to 9  and A to F.  If the last character string of the pattern data is  short of a hexadecimal unit (4 bits), add 0(s) up  to the last bit to make a hexadecimal string.</p> <p>"B***...*"                            Specify pattern data in binary format.  1 to 400 characters (pattern data of 400 bits)  Specify a character string consisting of 0 and 1.</p>
Function	<p>Sets the pattern data in a block from the &lt;start&gt; to &lt;end&gt; addresses during Mixed Data pattern reception.</p> <p>The set data overwrites the specified range.</p>
Example	<p>To set the addresses from bit 0 to bit 7FFFFFFF of the pattern data in block 3 during Mixed Data pattern reception in hexadecimal:</p> <pre>&gt; :SENSe:PATtern:MIXData:DATA:WHOLe 3, #H0, #H7FFFFFFF, "H001"</pre>
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:MIXData:DATA:WHOLe? <block>,<start>**

---

Parameter	<p>&lt;block&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  1 to 511                                    1 to 511 blocks, in 1-block steps</p> <p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;                  #H0 to #H7FFFFFFF                        0 to 7FFFFFFF bits, in 1-bit steps                  (Specify in hexadecimal)</p> <p><b>Note:</b></p> <p style="padding-left: 40px;">The maximum setting is the pattern length.                  At 2 ch Combination, the setting range is doubled.                  At 4 ch Combination, the setting range is quadrupled.</p>
Response	<p>&lt;data&gt; = &lt;STRING RESPONSE DATA&gt;                  "H***...*"                                Returns the pattern data in hexadecimal format.                  Within 400 characters (pattern data of 400 × 4 bits)</p>
Function	<p>Queries the pattern data of 400 × 4 bits in a block from the &lt;start&gt; address during Mixed Data pattern reception.</p>
Example	<p>To query the pattern data of 400 × 4 bits in block 3 from the bit 0 address during Mixed Data pattern reception.</p> <pre>&gt; :SENSe:PATtern:MIXData:DATA:WHOLe? 3,#H0 &lt; "H001"</pre>
Compatibility	<p>Incompatible with existing models.</p>

---

**:SENSe:PATtern:MIXData:BDATa:WHOLe**  
**<block>,<start>,<end>,<bdata>**


---

Parameter	<block> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 511                          1 to 511 blocks, in 1-block steps <start> = <NON-DECIMAL PROGRAM DATA> #H0 to #H7FFFFFFF                0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal) <end> = <NON-DECIMAL PROGRAM DATA> #H0 to #H7FFFFFFF                0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal)
	<p><b>Note:</b></p> <p style="padding-left: 40px;">The maximum setting is the pattern length.          At 2 ch Combination, the setting range is doubled.          At 4 ch Combination, the setting range is quadrupled.</p>
	<bdata> = <ARBITRARY BLOCK PROGRAM DATA> #XYYY<binary>                    X:        Number of YYY digits YYY:     Number of bytes of <binary> 1 to 16,777,216 bytes <binary>: Binary data up to 16,777,216 bytes
Function	Sets binary data of the pattern data in each block from <start> to <end> addresses during Mixed Data pattern reception.
Example	The set data overwrites the specified range. To set binary data of the pattern data in block 3 from bit 0 to bit 7FFFFFFF addresses during Mixed Data pattern reception. > :SENSe:PATtern:MIXData:BDATa:WHOLe 3, #H0, #H7FFFFFFF, #10011
Compatibility	Incompatible with existing models.

---

**:SENSe:PATtern:MIXData:BDATa:WHOLe? <block>,<start>[,<size>]**

---

Parameter	<block> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 511                      1 to 511 blocks, in 1-block steps <start> = <NON-DECIMAL PROGRAM DATA> #H0 to #H7FFFFFFF                  0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal)
	<p><b>Note:</b></p> The maximum setting is the pattern length. At 2 ch Combination, the setting range is doubled. At 4 ch Combination, the setting range is quadrupled.
	[<size>] = <NR1 NUMERIC PROGRAM DATA> 1 to 16777216                  1 to 16777216 bytes, in 1-byte steps
Response	<bdata> = <DEFINITE LENGTH ARBITRARY BLOCK RESPONSE DATA> #XXXX<binary>              X:          Number of YYY digits YYY:        Number of bytes of <binary> 1 to 16,777,216 bytes <binary>: Binary data up to 16,777,216 bytes Binary data of the setting pattern bytes is queried when [<size>] is omitted.
Function	Queries binary data of bytes specified by <size> from the <start> address of the pattern data in each block during Mixed Data pattern reception.
Example	To query binary data of up to the setting pattern from the <Start> address of the pattern data in block 3 during Mixed Data pattern reception: > :SENSe:PATtern:MIXData:BDATa:WHOLe? 3, #H0 < #10011
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:MIXData:DREVerse:ADDReSS <block>,<start>,<end>**

Parameter	<block> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 511                                  1 to 511 blocks, in 1-block steps <start> = <NON-DECIMAL PROGRAM DATA> #H0 to #H7FFFFFFF                        0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal) <end> = <NON-DECIMAL PROGRAM DATA> #H0 to #H7FFFFFFF                        0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal)  <b>Note:</b> The maximum setting is the pattern length. At 2 ch Combination, the setting range is doubled. At 4 ch Combination, the setting range is quadrupled.
Function	Inverts the data in the program part in a block during Mixed Data pattern reception. Specify the inversion range by the <start> and <end> addresses.
Example	To invert the data in the program part in block 3 from bit 0 to bit 7FFFFFFF addresses during Mixed Data pattern reception: > :SENSe:PATtern:MIXData:DREVerse:ADDReSS 3, #H0, #H7FFFFFFF
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:MIXData:DREVerse:DELTA <start>,<delta>**

Parameter	<block> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 511                                  1 to 511 blocks, in 1-block steps <start> = <NON-DECIMAL PROGRAM DATA> #H0 to #H7FFFFFFF                        0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal) <delta> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 134217728                             1 to 134,217,728 bits, in 1-bit steps  <b>Note:</b> The maximum setting is the pattern length. At 2 ch Combination, the setting range is doubled. At 4 ch Combination, the setting range is quadrupled.
Function	Inverts the data in the program part in a block during Mixed Data pattern reception. Specify the inversion range by the number of bits from the <start> address (relative specification).
Example	To invert 1 bit of the pattern data from address 0 in the program part in block 3 during Mixed Data pattern reception: > :SENSe:PATtern:MIXData:DREVerse:DELTA 3, #H0, 1
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:MIXData:DATA:FILL <block>,<range>,<page>,<data>**

---

Parameter	<p>&lt;block&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  1 to 511                      1 to 511 blocks, in 1-block steps</p> <p>&lt;range&gt; = &lt;CHARACTER PROGRAM DATA&gt;                  PAGE                              Specifies a page.                                                      (One page is defined as 128 bits.)</p> <p>ALL Specifies all data.</p> <p>&lt;page&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  1 to 1048576                      1 to 1,048,576 (Max.) pages, in 1-page steps                  Max = Pattern Length/128 (rounding up fractions)                  Specify "0" when &lt;range&gt; is set to ALL.</p> <p>&lt;data&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  0                                      Fills the specified range with 0s.                  1                                      Fills the specified range with 1s.</p>
Function	Sets 0s or 1s for the specified page or all data in the program part in a block during Mixed Data pattern reception.
Example	To set 0s for the first page of the program part in block 3 during Mixed Data pattern reception: > :SENSe:PATtern:MIXData:DATA:FILL 3,PAGE,1,0
Compatibility	Incompatible with existing models.



7.4.3.6 Sequence pattern setting commands

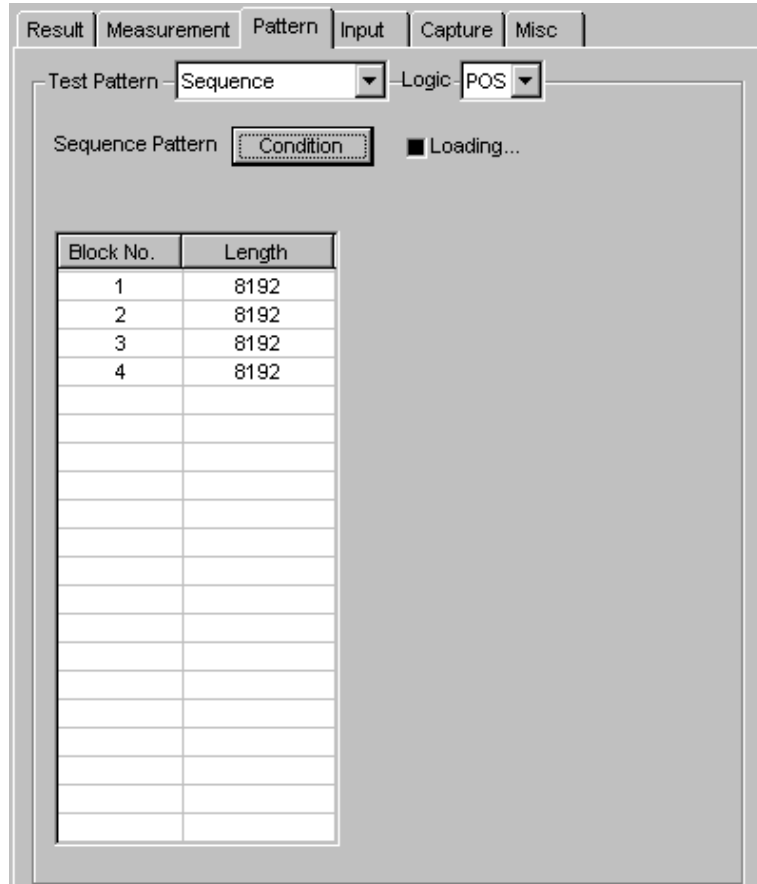


Figure 7.4.3.6-1 Sequence pattern setting

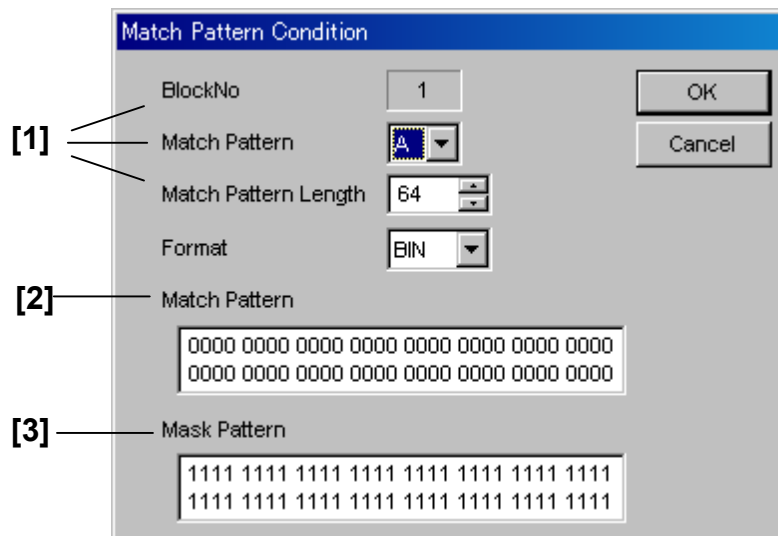


Figure 7.4.3.6-2 Match Pattern setting

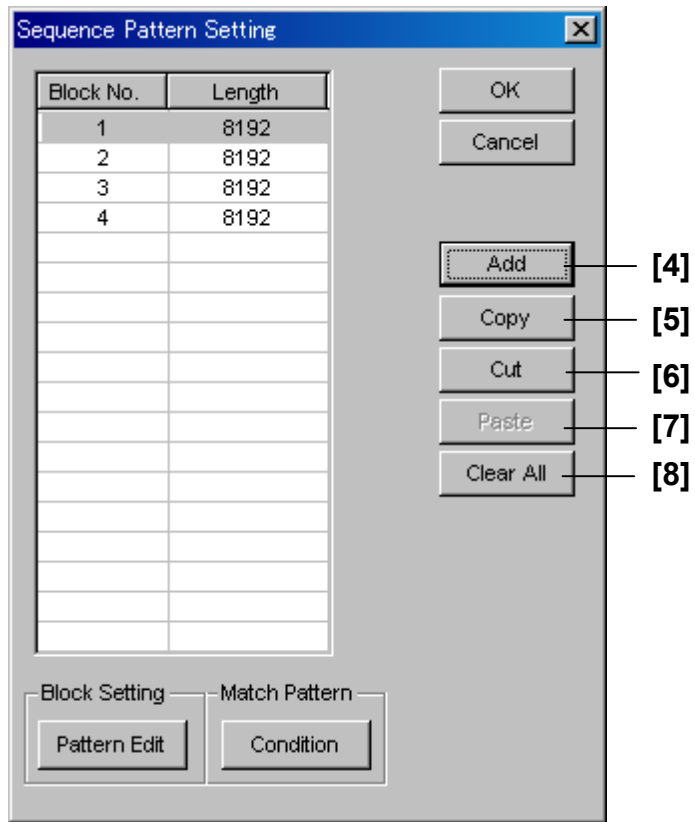


Figure 7.4.3.6-3 Sequence Pattern setting

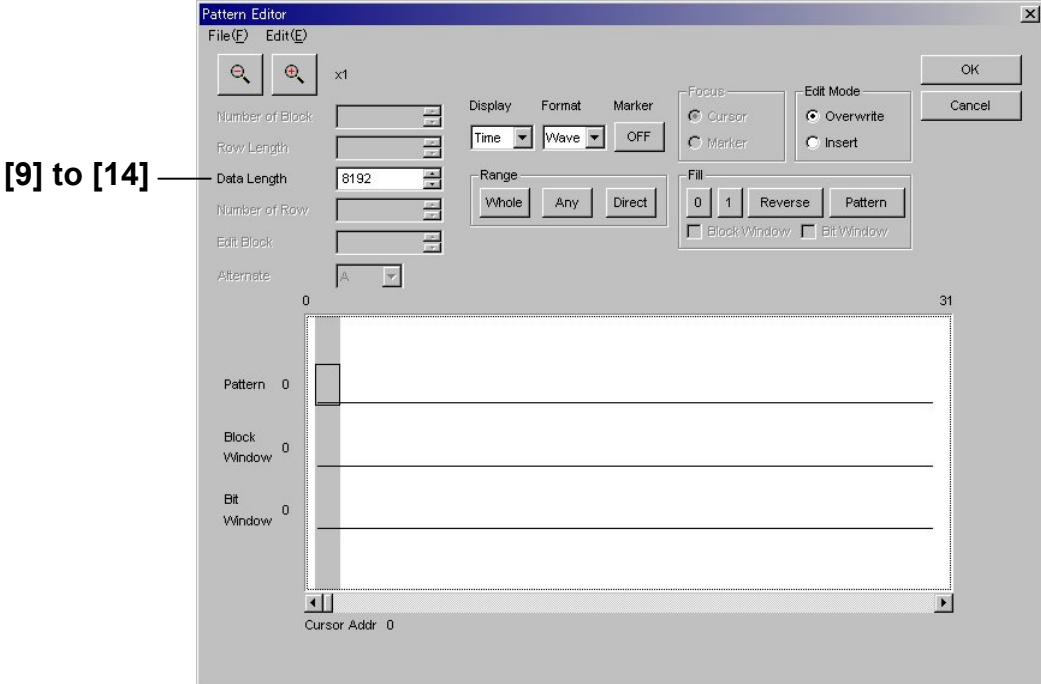


Figure 7.4.3.6-4 Sequence pattern setting (Pattern Editor screen)

Table 7.4.3.6-1 Sequence pattern setting commands

No.	Setting Items	Commands
[1]	Match Pattern Length	:SENSe:PATtern:SEQuence:MATCh:LENGth
		:SENSe:PATtern:SEQuence:MATCh:LENGth?
[2]	Match Pattern	:SENSe:PATtern:SEQuence:MATCh:EDIT
		:SENSe:PATtern:SEQuence:MATCh:EDIT?
[3]	Mask Pattern	:SENSe:PATtern:SEQuence:MATCh:MASK
		:SENSe:PATtern:SEQuence:MATCh:MASK?
[4]	Add	:SENSe:PATtern:SEQuence:CONDition:ADD
		:SENSe:PATtern:SEQuence:CONDition:ADD?
[5]	Copy	:SENSe:PATtern:SEQuence:COpy
[6]	Cut	:SENSe:PATtern:SEQuence:CUt
[7]	Paste	:SENSe:PATtern:SEQuence:PAStE
[8]	Clear All	:SENSe:PATtern:SEQuence:CLear
[9]	Data Length	:SENSe:PATtern:SEQuence:LENGth
		:SENSe:PATtern:SEQuence:LENGth?
[10]	No label (Pattern setting)	:SENSe:PATtern:SEQuence:DATA:WHOLe
		:SENSe:PATtern:SEQuence:DATA:WHOLe?
[11]	No label (Pattern setting)	:SENSe:PATtern:SEQuence:BDATa:WHOLe
		:SENSe:PATtern:SEQuence:BDATa:WHOLe?
[12]	No label (Data inversion)	:SENSe:PATtern:SEQuence:DREVerse:ADDReSS
[13]	No label (Data inversion)	:SENSe:PATtern:SEQuence:DREVerse:DELTA
[14]	No label (All 0 or All 1)	:SENSe:PATtern:SEQuence:DATA:FILL

### **:SENSe:PATtern:SEQuence:MATCh:LENGth <block>,<content>,<length>**

Parameter	<block> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 blocks, in 1-block steps <content> = <CHARACTER PROGRAM DATA> APAT                              Pattern A BPAT                              Pattern B <length> = <DECIMAL NUMERIC PROGRAM DATA> 4 to 64                            4 to 64 bits, in 4-bit steps
Function	Sets the pattern length of the Match pattern in a block during Sequence pattern setting.
Example	To set the pattern length of the Match pattern A in block 3 to 4 bits during Sequence pattern setting: > :SENSe:PATtern:SEQuence:MATCh:LENGth 3,APAT,4
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:SEQuence:MATCh:LENGth? <block>,<content>**

---

Parameter	<block> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 blocks, in 1-block steps <content> = <CHARACTER PROGRAM DATA> APAT                              Pattern A BPAT                              Pattern B
Response	<length> = <NR1 NUMERIC RESPONSE DATA> 4 to 64
Function	Queries the pattern length of the Match pattern in a block during Sequence pattern setting.
Example	To query the pattern length of the Match pattern A in block 3 during Sequence pattern setting: > :SENSe:PATtern:SEQuence:MATCh:LENGth? 3,APAT < "4"
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:SEQuence:MATCh:EDIT  
<block>,<content>,<form>,<data>**

---

Parameter	<block> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 blocks, in 1-block steps <content> = <CHARACTER PROGRAM DATA> APAT                              Pattern A BPAT                              Pattern B <form> = <CHARACTER PROGRAM DATA> BIN                                Binary HEX                                Hexadecimal <data> = <STRING PROGRAM DATA> When form = BIN:            1 to 64 characters (64-bit data) When form = HEX:           1 to 16 characters (64-bit data) The editable data length depends on
Function	Edits the Match pattern in a block during Sequence pattern setting.
Example	To edit one binary character of the Match pattern A in block 3 during Sequence pattern setting: > :SENSe:PATtern:SEQuence:MATCh:EDIT 3,APAT,BIN, "1010"
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:SEQuence:MATCh:EDIT? <block>,<content>,<form>**

Parameter	<block> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 blocks, in 1-block steps <content> = <CHARACTER PROGRAM DATA> APAT, BPAT <form> = <CHARACTER PROGRAM DATA> BIN,HEX
Response	<data> = <STRING RESPONSE DATA> When form = BIN:        Returns the pattern data in binary format. When form = HEX:       Returns the pattern data in hexadecimal format.
Function	Queries the Match pattern in a block that is set during Sequence pattern setting.
Example	To query the Match pattern A in block 3 that is set during Sequence pattern setting: > :SENSe:PATtern:SEQuence:MATCh:EDIT? 3,APAT,BIN < "1010"
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:SEQuence:MATCh:MASK <block>,<content>,<form>,<data>**

Parameter	<block> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 blocks, in 1-block steps <content> = <CHARACTER PROGRAM DATA> APAT                              Pattern A BPAT                              Pattern B <form> = <CHARACTER PROGRAM DATA> BIN                                Binary HEX                                Hexadecimal <data> = <STRING PROGRAM DATA> When form = BIN:        1 to 64 characters (64-bit data) When form = HEX:        1 to 16 characters (64-bit data) The editable data length depends on the pattern length of Match Pattern.
Function	Edits the Mask pattern in a block during Sequence pattern setting.
Example	To set two bytes of the Mask Pattern A in block 3 in binary to "1010" during Sequence pattern setting: > :SENSe:PATtern:SEQuence:MATCh:MASK 3,APAT,BIN, "1010"
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:SEQuence:MATCh:MASK? <block>,<content>,<form>**

---

Parameter	<block> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 blocks, in 1-block steps <content> = <CHARACTER PROGRAM DATA> APAT                              Pattern A BPAT                              Pattern B <form> = <CHARACTER PROGRAM DATA> BIN,HEX
Response	<data> = <STRING RESPONSE DATA> When form = BIN:              Returns the pattern data in binary format. When form = HEX:              Returns the pattern data in hexadecimal format.
Function	Queries the Mask pattern in a block that is set during Sequence pattern setting.
Example	To query the Mask pattern A in block 3 that is set during Sequence pattern setting: > :SENSe:PATtern:SEQuence:MATCh:MASK? 3,APAT,BIN < "1010"
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:SEQuence:CONDition:ADD <block>**

---

Parameter	<block> = <DECIMAL NUMERIC PROGRAM DATA> (Block No) 1 to 128                      1 to 128 blocks, in 1-block steps
Function	Sets the number of blocks that are edited during Sequence pattern reception.
Example	To set the number of blocks that are edited to 10: > :SENSe:PATtern:SEQuence:CONDition:ADD 10
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:SEQuence:CONDition:ADD?**

---

Response	<block> = < NR1 NUMERIC RESPONSE DATA> (Block No) 1 to 128                      1 to 128 block
Function	Queries the number of blocks that are edited during Sequence pattern reception.
Example	> :SENSe:PATtern:SEQuence:CONDition:ADD? < 10
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:SEquence:COpy <block>**


---

Parameter	<block> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 blocks, in 1-block steps
Function	Copies the setting conditions in the specified block during Sequence pattern reception.
Example	To copy the setting conditions in block 12: > :SENSe:PATtern:SEquence:COpy 12
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:SEquence:CUt <block>**


---

Parameter	<block> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 blocks, in 1-block steps
Function	Cuts (copies and removes) the setting conditions in the specified block during Sequence pattern reception.
Example	To cut the setting conditions in block 15: > :SENSe:PATtern:SEquence:CUt 15
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:SEquence:PAStE <block>**


---

Parameter	<block> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 blocks, in 1-block steps
Function	Pastes the setting conditions to the specified block during Sequence pattern reception.
Example	To paste the setting conditions to block 20: > :SENSe:PATtern:SEquence:PAStE 20
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:SEquence:CLear**


---

Function	Clears all the setting conditions during Sequence pattern reception.
Example	To clear all the setting conditions during Sequence pattern reception: > :SENSe:PATtern:SEquence:CLear
Compatibility	Incompatible with existing models.

### **:SENSe:PATtern:SEQuence:LENGth <block>,<numeric>**

---

Parameter	<block> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 blocks, in 1-block steps <numeric> = <DECIMAL NUMERIC PROGRAM DATA> 8192 to 1048576              8192 to 1,048,576 bits, in 128-bit steps Be sure to set a value so that the following condition is satisfied. Number of blocks × Block length ≤ 128 Mbits
Function	Sets the length of the specified block during Sequence pattern reception.
Example	To set the length of block 1 to 1 bit during Sequence pattern reception: > :SENSe:PATtern:SEQuence:LENGth 1, 1
Compatibility	Incompatible with existing models.

### **:SENSe:PATtern:SEQuence:LENGth? <block>**

---

Parameter	<block> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 blocks, in 1-block steps
Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 8192 to 1048576              8192 to 1,048,576 bits, in 128-bit steps
Function	Queries the length of the specified block during Sequence pattern reception.
Example	To query the length of block 1 during Sequence pattern reception: > :SENSe:PATtern:SEQuence:LENGth? 1 < 1
Compatibility	Incompatible with existing models.



## :SENSe:PATtern:SEQuence:DATA:WHOLe <block>,<start>,<end>,<data>

Parameter	<p>&lt;block&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt; 1 to 128                            1 to 128 blocks, in 1-block steps</p> <p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt; #H0 to #HFFFFFF                    0 to FFFFFF bits, in 1-bit steps (Specify in hexadecimal)</p> <p>&lt;end&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt; #H0 to #HFFFFFF                    0 to FFFFFF bits, in 1-bit steps (Specify in hexadecimal)</p> <p><b>Note:</b> The maximum setting value is the pattern length.</p> <p>&lt;data&gt; = &lt;STRING PROGRAM DATA&gt; "H***...*"                            Specify pattern data in hexadecimal format. 1 to 400 characters (pattern data of 400 × 4 bits) Specify a character string consisting of 0 to 9 and A to F. If the last character string of the pattern data is short of a hexadecimal unit (4 bits), add 0(s) up to the last bit to make a hexadecimal string.</p> <p>"B***...*"                            Specify pattern data in binary format. 1 to 400 characters (pattern data of 400 bits) Specify a character string consisting of 0 and 1.</p>
Function	<p>Sets the pattern data from the &lt;start&gt; to &lt;end&gt; addresses during Sequence pattern reception.</p> <p>The set data overwrites the specified range.</p>
Example	<p>To set the addresses from bit 0 to bit FFFFF of the block 1 pattern data in hexadecimal format during Sequence pattern reception:</p> <p>&gt; :SENSe:PATtern:SEQuence:DATA:WHOLe 1, #H0, #HFFFFFF, "H001"</p>
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:SEQuence:DATA:WHOLe? <block>,<start>**

---

Parameter	<p>&lt;block&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  1 to 128                              1 to 128 blocks, in 1-block steps</p> <p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;                  #H0 to #HFFFFFF                      0 to FFFFF bits, in 1-bit steps                  (Specify in hexadecimal)</p> <p><b>Note:</b>                  The maximum setting value is the pattern length.</p>
Response	<p>&lt;data&gt; = &lt;STRING RESPONSE DATA&gt;                  "H***...*"                              Returns the pattern data in hexadecimal format.                  Within 400 characters (pattern data of 400 × 4 bits)</p>
Function	<p>Queries the pattern data of 400 × 4 bits from the &lt;start&gt;address during Sequence pattern reception.</p>
Example	<p>To query the block 1 pattern data of 400 × 4 bits from bit 0 address during Sequence pattern reception:</p> <pre>&gt; :SENSe:PATtern:SEQuence:DATA:WHOLe? 1, #H0 &lt; "H001001001001001001001001001001●●●"</pre>
Compatibility	<p>Incompatible with existing models.</p>

## **:SENSe:PATtern:SEQuence:BDATa:WHOLe** **<block>,<start>,<end>,<bdata>**

Parameter	<p>&lt;block&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt; 1 to 128                            1 to 128 blocks, in 1-block steps</p> <p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt; #H0 to #HFFFFFF                    0 to FFFFF bits, in 1-bit steps (Specify in hexadecimal)</p> <p>&lt;end&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt; #H0 to #HFFFFFF                    0 to FFFFF bits, in 1-bit steps (Specify in hexadecimal)</p> <p><b>Note:</b> The maximum setting value is the pattern length.</p> <p>&lt;bdata&gt; = &lt;ARBITRARY BLOCK PROGRAM DATA&gt; #XYYY&lt;binary&gt;                    X:        Number of YYY digits     YYY:     Number of bytes of &lt;binary&gt;     1 to 131,072 bytes     &lt;binary&gt;: Binary data up to 131,072 bytes</p> <p>Binary data of 16,000 bytes is queried when [&lt;size&gt;] is omitted.</p>
Function	<p>Sets the binary data from &lt;start&gt; to &lt;end&gt; addresses of the pattern data during Sequence pattern reception.</p> <p>The set data overwrites the specified range.</p>
Example	<p>To set the binary data from bit 0 to bit 7FFFFFFF addresses of the block 1 pattern data during Sequence pattern reception:</p> <pre>&gt; :SENSe:PATtern:SEQuence:BDATa:WHOLe 1, #H0, #H7FFFFFFF, #10011</pre>
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:SEQuence:BDATa:WHOLe? <block>,<start>[,<size>]**

Parameter	<p>&lt;block&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;  1 to 128                            1 to 128 blocks, in 1-block steps</p> <p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;  #H0 to #HFFFFFF                    0 to FFFFF bits, in 1-bit steps  (Specify in hexadecimal)</p> <p><b>Note:</b>  The maximum setting value is the pattern length.</p> <p>[&lt;size&gt;] = &lt;NR1 NUMERIC PROGRAM DATA&gt;  1 to 131072                    1 to 131,072 bytes, in 1-byte steps</p>
Response	<p>&lt;bdata&gt; = &lt;DEFINITE LENGTH ARBITRARY BLOCK RESPONSE DATA&gt;  #XYYY&lt;binary&gt;                    X:        Number of YYY digits      YYY:     Number of bytes of &lt;binary&gt;      1 to 131,072 bytes      &lt;binary&gt;: Binary data up to 131,072 bytes</p> <p>Binary data of the setting pattern is queried when [&lt;size&gt;] is omitted.</p>
Function	Queries binary data of bytes specified by <size> from the <start> address of the pattern data during Sequence pattern reception.
Example	<p>To query binary data of 16000 bytes of the block 1 pattern data starting from address bit 0 during Sequence pattern reception:</p> <pre>&gt; :SENSe:PATtern:SEQuence:BDATa:WHOLe? 1, #H0, 16000 &lt; #10011</pre>
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:SEQuence:DREVerse:ADDRess <block>,<start>,<end>**

Parameter	<p>&lt;block&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;  1 to 128                            1 to 128 blocks, in 1-block steps</p> <p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;  #H0 to #HFFFFFF                    0 to FFFFF bits, in 1-bit steps  (Specify in hexadecimal)</p> <p>&lt;end&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;  #H0 to #HFFFFFF                    0 to FFFFF bits, in 1-bit steps  (Specify in hexadecimal)</p> <p><b>Note:</b>  The maximum setting value is the pattern length.</p>
Function	Inverts the data in the program during Sequence pattern reception. Specify the inversion range by the <start> and <end> addresses.
Example	<p>To invert the data in the program of block 1 from bit 0 to bit FFFFF addresses during Sequence pattern reception:</p> <pre>&gt; :SENSe:PATtern:SEQuence:DREVerse:ADDRess 1, #H0, #HFFFFFF</pre>
Compatibility	Incompatible with existing models.



7.4.3.7 Commands related to Mask

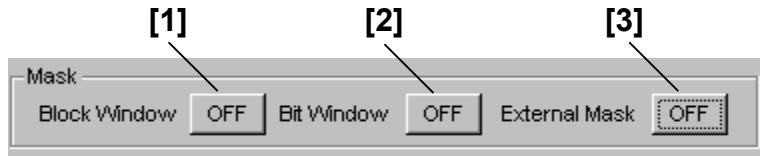


Figure 7.4.3.7-1 Mask ON/OFF setting

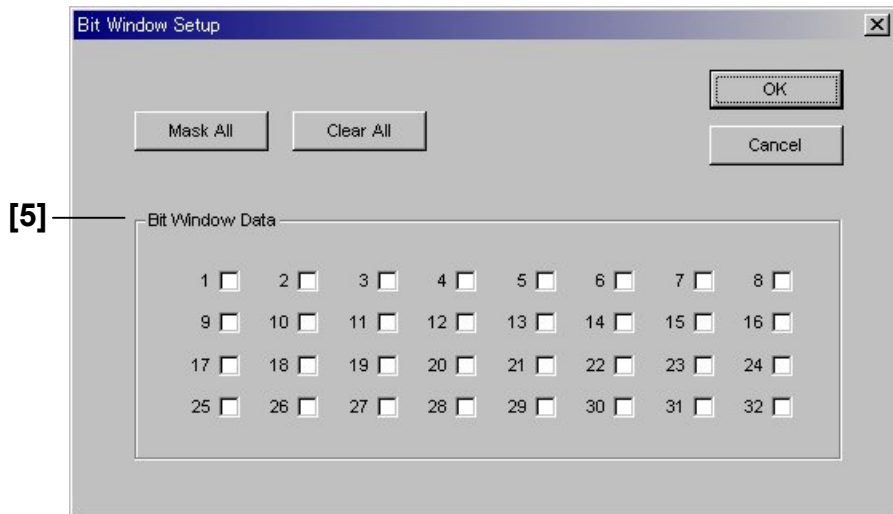


Figure 7.4.3.7-2 Bit Window Setup dialog box (for PRBS pattern)

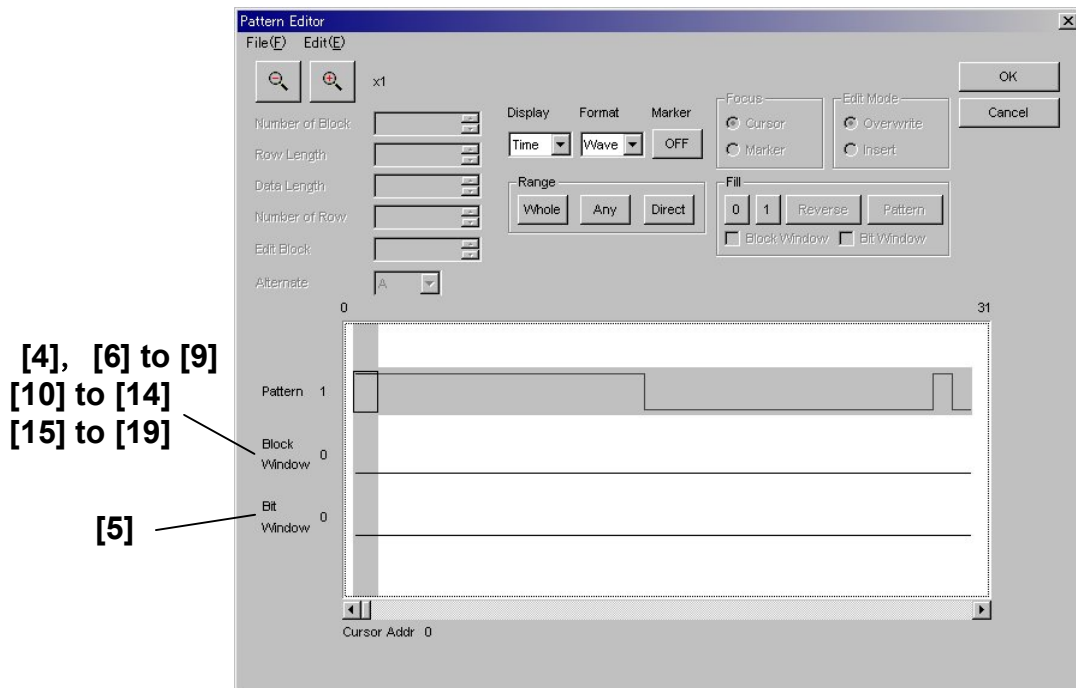


Figure 7.4.3.7-3 Bit Window and Block Window settings in Pattern Editor screen (for Zero Substitution, Data, Mixed Data, and Sequence patterns)

Table 7.4.3.7-1 Mask setting commands

No.	Setting Items	Commands
[1]	Block Window ON/OFF	:SENSe:PATtern:MASK:BLOCK
		:SENSe:PATtern:MASK:BLOCK?
[2]	Bit Window ON/OFF	:SENSe:PATtern:MASK:BIT
		:SENSe:PATtern:MASK:BIT?
[3]	External Mask ON/OFF	:SENSe:PATtern:MASK:EXternal
		:SENSe:PATtern:MASK:EXternal?
[4]	Block Window (Zero-Substitution, Data)	:SENSe:PATtern:MASK:BLKWindow
		:SENSe:PATtern:MASK:BLKWindow?
[5]	Block Window	:SENSe:PATtern:MASK:BTWindow
		:SENSe:PATtern:MASK:BTWindow?
[6]	Block Window (Pattern setting)	:SENSe:PATtern:MASK:BDATa:WHOLe
		:SENSe:PATtern:MASK:BDATa:WHOLe?
[7]	Block Window (Data inversion)	:SENSe:PATtern:MASK:DREVerse:ADDReSS
[8]	Block Window (Data inversion)	:SENSe:PATtern:MASK:DREVerse:DELTA
[9]	Block Window (All 0 or All 1)	:SENSe:PATtern:MASK:DATA:FILL
[10]	Block Window (Mixed Data)	:SENSe:PATtern:MASK:MIXData:BLKWindow
		:SENSe:PATtern:MASK:MIXData:BLKWindow?
[11]	Block Window (Pattern setting)	:SENSe:PATtern:MASK:MIXData:BDATa:WHOLe
		:SENSe:PATtern:MASK:MIXData:BDATa:WHOLe?
[12]	Block Window (Data inversion)	:SENSe:PATtern:MASK:MIXData:DREVerse:ADDReSS
[13]	Block Window (Data inversion)	:SENSe:PATtern:MASK:MIXData:DREVerse:DELTA
[14]	Block Window (All 0 or All 1)	:SENSe:PATtern:MASK:MIXData:DATA:FILL
[15]	Block Window (Sequence)	:SENSe:PATtern:MASK:SEQuence:BLKWindow
		:SENSe:PATtern:MASK:SEQuence:BLKWindow?
[16]	Block Window (Pattern setting)	:SENSe:PATtern:MASK:SEQuence:BDATa:WHOLe
		:SENSe:PATtern:MASK:SEQuence:BDATa:WHOLe?
[17]	Block Window (Data inversion)	:SENSe:PATtern:MASK:SEQuence:DREVerse:ADDReSS
[18]	Block Window (Data inversion)	:SENSe:PATtern:MASK:SEQuence:DREVerse:DELTA
[19]	Block Window (All 0 or All 1)	:SENSe:PATtern:MASK:SEQuence:DATA:FILL

**:SENSe:PATtern:MASK:BLOCK <boolean>**

Parameter	<boolean> = <BOOLEAN PROGRAM DATA>
	0 or OFF                      Block Window OFF
	1 or ON                        Block Window ON
Function	Sets Block Window ON/OFF to the received pattern.
Example	To set Block Window ON to the received pattern: > :SENSe:PATtern:MASK:BLOCK ON
Compatibility	Incompatible with existing models.

### **:SENSe:PATtern:MASK:BLOCK?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	0                      Block Window OFF
	1                      Block Window ON
Function	Queries the Block Window ON/OFF state of the received pattern.
Example	> :SENSe:PATtern:MASK:BLOCK? < 1
Compatibility	Incompatible with existing models.

### **:SENSe:PATtern:MASK:BIT <boolean>**

---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA>
	0 or OFF              Bit Window OFF
	1 or ON               Bit Window ON
Function	Sets Bit Window ON/OFF to the received pattern.
Example	To set Bit Window ON to the received pattern: > :SENSe:PATtern:MASK:BIT ON
Compatibility	Incompatible with existing models.

### **:SENSe:PATtern:MASK:BIT?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	0                      Bit Window OFF
	1                      Bit Window ON
Function	Queries the Bit Window ON/OFF state of the received pattern.
Example	To query the Bit Window ON/OFF state of the received pattern. > :SENSe:PATtern:MASK:BIT? < 1
Compatibility	Incompatible with existing models.

### **:SENSe:PATtern:MASK:EXternal <boolean>**

---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA>
	0 or OFF              External Mask OFF
	1 or ON               External Mask ON
Function	Sets External Mask ON/OFF to the received pattern.
Example	To set External Mask ON to the received pattern: > :SENSe:PATtern:MASK:EXternal ON
Compatibility	Incompatible with existing models.



**:SENSe:PATtern:MASK:EXternal?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 External Mask OFF 1 External Mask ON
Function	Queries the External Mask ON/OFF state of the received pattern.
Example	> :SENSe:PATtern:MASK:EXternal? < 1
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:MASK:BLKWindow <start>,<end>,<data>**

Parameter	<start> = <NON-DECIMAL PROGRAM DATA> #H0 to #H7FFFFFFF 0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal) <end>=<NON-DECIMAL PROGRAM DATA> #H0 to #H7FFFFFFF 0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal)
	<b>Note:</b> The maximum setting is the pattern length. At 2 ch Combination, the setting range is doubled. At 4 ch Combination, the setting range is quadrupled.
	<data>=<STRING PROGRAM DATA> "H***...*" Specify pattern data in hexadecimal format. 1 to 400 characters (pattern data of 400 × 4 bits) Specify a character string consisting of 0 to 9 and A to F. "B***...*" Specify pattern data in binary format. 1 to 400 characters (pattern data of 400 bits) Specify a character string consisting of 0 and 1.
Function	Sets the mask pattern data from the <Start> to <end> addresses during Block Window setting.
Example	The set data overwrites the specified range. To set the mask pattern data from bit 0 to bit 7FFFFFFF addresses in hexadecimal format during Block Window setting: > :SENSe:PATtern:MASK:BLKWindow #H0,#H7FFFFFFF, "H001"
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:MASK:BLKWindow? <start>**

Parameter	<p>&lt;start&gt;=&lt;NON-DECIMAL PROGRAM DATA&gt;                  #H0 to #H7FFFFFFF                      0 to 7FFFFFFF bits, in 1-bit steps                  (Specify in hexadecimal)</p> <p><b>Note:</b>                  The maximum setting is the pattern length.                  At 2 ch Combination, the setting range is doubled.                  At 4 ch Combination, the setting range is quadrupled.</p>
Response	<p>&lt;data&gt; = &lt;STRING RESPONSE DATA&gt;                  "H***...*"                      Returns the pattern data in hexadecimal format.                  Within 400 characters (pattern data of 400 × 4 bits)</p>
Function	<p>Queries the mask pattern data of 400 × 4 bits from the &lt;Start&gt; address during Block Window setting.</p>
Example	<p>To query the mask pattern data of 400 × 4 bits from bit 0 address during Block Window setting:</p> <pre>&gt; :SENSe:PATtern:MASK:BLKWindow? #H0 &lt; "H001"</pre>
Compatibility	<p>Incompatible with existing models.</p>

**:SENSe:PATtern:MASK:BTWindow <data>**

Parameter	<p>&lt;data&gt; = &lt;STRING PROGRAM DATA&gt;                  "H***...*"                      Specify pattern data in hexadecimal format.                  1 to 8 characters (pattern data of 32 bits)                  Specify a character string consisting of 0 to 9 and A to F.                  "B***...*"                      Specify pattern data in binary format.                  1 to 32 characters (pattern data of 32 bits)                  Specify a character string consisting of 0 and 1.</p>
Function	<p>Sets the mask pattern data during Bit Window setting.</p>
Example	<p>To set the mask pattern data in hexadecimal format during Bit Window setting:</p> <pre>&gt; :SENSe:PATtern:MASK:BTWindow "H001"</pre>
Compatibility	<p>Incompatible with existing models.</p>

**:SENSe:PATtern:MASK:BTWindow?**

Response	<data> = <STRING RESPONSE DATA> "H***...*" Returns the pattern data in hexadecimal format. Within 8 characters (pattern data of 32 bits) Specify a character string consisting of 0 to 9 and A to F.
Function	Queries the mask pattern data during Bit Window setting.
Example	To query the mask pattern data during Bit Window setting: > :SENSe:PATtern:MASK:BTWindow? < "H00100100"
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:MASK:BDATa:WHOLe <start>,<end>,<bdata>**

Parameter	<start> = <NON-DECIMAL PROGRAM DATA > #H0 to #H7FFFFFFF 0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal)  <end> = <NON-DECIMAL PROGRAM DATA > #H0 to #H7FFFFFFF 0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal)  <b>Note:</b> The maximum setting is the pattern length. At 2 ch Combination, the setting range is doubled. At 4 ch Combination, the setting range is quadrupled.  <bdata> = <ARBITRARY BLOCK PROGRAM DATA > #YYYY<binary> X: Number of YYY digits YYY: Number of bytes of <binary> 1 to 16,777,216 bytes  <binary>: Binary data up to 16,777,216 bytes
Function	Sets binary data of the mask pattern data from <start> to <end> addresses during Block Window setting.
Example	The set data overwrites the specified range. To set binary data of the mask pattern data from bit 0 to bit 7FFFFFFF addresses during Block Window setting: > :SENSe:PATtern:MASK:BDATa:WHOLe #H0,#H7FFFFFFF,#11A
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:MASK:BDATa:WHOLe? <start>[,<size>]**

Parameter	<p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;                  #H0 to #H7FFFFFFF                      0 to 7FFFFFFF bits, in 1-bit steps                  (Specify in hexadecimal)</p> <p>[&lt;size&gt;] = &lt;NR1 NUMERIC PROGRAM DATA&gt;                  1 to 1677216                      1 to 1677216 bytes, in 1-byte steps</p> <p><b>Note:</b></p> <p style="padding-left: 40px;">The maximum setting is the pattern length.                  At 2 ch Combination, the setting range is doubled.                  At 4 ch Combination, the setting range is quadrupled.</p>
Response	<p>&lt;bdata&gt; = &lt;DEFINITE LENGTH ARBITRARY BLOCK RESPONSE DATA&gt;                  #XXXX&lt;binary&gt;                      X:            Number of YYY digits                  YYY:            Number of bytes of &lt;binary&gt;                  1 to 16,777,216 bytes                  &lt;binary&gt;: Binary data of up to 16,777,216 bytes</p> <p>Binary data of the setting pattern is queried when [&lt;size&gt;] is omitted.</p>
Function	<p>Queries binary data of bytes specified by &lt;size&gt; from the &lt;start&gt; address of the mask pattern data during Block Window setting.</p>
Example	<p>To query binary data of 2 bytes from bit 0 address of the pattern data during Block Window setting:</p> <pre>&gt; :SENSe:PATtern:MASK:BDATa:WHOLe? #H0,2 &lt;#12AA</pre> <p>To query binary data of the setting pattern from bit 0 address of the pattern data during Block Window setting (in the case of [&lt;size&gt;] is omitted):</p> <pre>&gt; :SENSe:PATtern:MASK:BDATa:WHOLe? #H0 &lt; #516000AAAAAA●●●●● (binary data of 16,000 bytes)</pre>
Compatibility	<p>Incompatible with existing models.</p>

**:SENSe:PATtern:MASK:DREVerse:ADDRes <start>,<end>**

Parameter	<p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;  #H0 to #H7FFFFFFF                    0 to 7FFFFFFF bits, in 1-bit steps  (Specify in hexadecimal)</p> <p>&lt;end&gt; = &lt;NON-DECIMAL PROGRAM DATA &gt;  #H0 to #H7FFFFFFF                    0 to 7FFFFFFF bits, in 1-bit steps  (Specify in hexadecimal)</p> <p><b>Note:</b>  The maximum setting is the pattern length.  At 2 ch Combination, the setting range is doubled.  At 4 ch Combination, the setting range is quadrupled.</p>
Function	Inverts the mask pattern data during Block Window setting. Specify the inversion range by the <start> and <end> addresses.
Example	To invert addresses from bit 0 to bit 7FFFFFFF during Block Window setting: <pre>&gt; :SENSe:PATtern:MASK:DREVerse:ADDRes #H0,#H7FFFFFFF</pre>
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:MASK:DREVerse:DELTA <start>,<delta>**

Parameter	<p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;  #H0 to #H7FFFFFFF                    0 to 7FFFFFFF bits, in 1-bit steps  (Specify in hexadecimal)</p> <p>&lt;delta&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA &gt;  1 to 134217728                    1 to 134,217,728 bits, in 1-bit steps</p> <p><b>Note:</b>  The maximum setting is the pattern length.  At 2 ch Combination, the setting range is doubled.  At 4 ch Combination, the setting range is quadrupled.</p>
Function	Inverts the mask pattern data during Block Window setting. Specify the inversion range by the number of bits from the <start> address (relative specification).
Example	To invert 1 bit of the mask pattern data from address 0 during Block Window setting: <pre>&gt; :SENSe:PATtern:MASK:DREVerse:DELTA #H0,1</pre>
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:MASK:DATA:FILL <range>,<page>,<data>**

---

Parameter	<p>&lt;range&gt; = &lt;CHARACTER PROGRAM DATA&gt;</p> <p>0                                Specifies a page.                                       (One page is defined as 128 bits.)</p> <p>1                                Specifies all data.</p> <p>&lt;page&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;</p> <p>1 to 1048576                    1 to 1,048,576 (Max.) pages, in 1-page steps</p> <p>Max = Pattern Length/128 (rounding up fractions)</p> <p>Specify "0" when &lt;range&gt; is set to ALL.</p> <p>&lt;data&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;</p> <p>0                                Fills the specified range with 0s.</p> <p>1                                Fills the specified range with 1s.</p>
Function	<p>Sets 0s or 1s for the specified page or all data in mask pattern data during Block Window setting.</p>
Example	<p>To set 0s for the first page of the mask pattern data during Block Window</p> <pre>&gt; :SENSe:PATtern:MASK:DATA:FILL PAGE,1,0</pre>
Compatibility	<p>Incompatible with existing models.</p>

---

**:SENSe:PATtern:MASK:MIXData:BLKWindow  
<block>,<start>,<end>,<data>**


---

Parameter	<p>&lt;block&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt; 1 to 511                      1 to 511 blocks, in 1-block steps</p> <p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA &gt; #H0 to #H7FFFFFFF              0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal)</p> <p>&lt;end&gt; = &lt;NON-DECIMAL PROGRAM DATA &gt; #H0 to #H7FFFFFFF              0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal)</p> <p><b>Note:</b></p> <p>The maximum setting is the pattern length. At 2 ch Combination, the setting range is doubled. At 4 ch Combination, the setting range is quadrupled.</p> <p>&lt;data&gt; = &lt;STRING PROGRAM DATA&gt; "H***...*"                      Specify pattern data in hexadecimal format. 1 to 400 characters (pattern data of 400 × 4 bits) Specify a character string consisting of 0 to 9 and A to F. If the last character string of the pattern data is short of a hexadecimal unit (4 bits), add 0(s) up to the last bit to make a hexadecimal string.</p> <p>"B***...*"                      Specify pattern data in binary format. 1 to 400 characters (pattern data of 400 bits) Specify a character string consisting of 0 and 1.</p>
Function	<p>Sets the mask pattern data in a block from the &lt;start&gt; to &lt;end&gt; addresses during Mixed Data pattern setting or Block Window setting. The set data overwrites the specified range.</p>
Example	<p>To set the addresses from bit 0 to bit 7FFFFFFF of the mask pattern data in block 3 during Mixed Data pattern setting in hexadecimal:</p> <pre>&gt; :SENSe:PATtern:MASK:MIXData:BLKWindow3,#H0,#H7FFFFFFF, "H001"</pre>
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:MASK:MIXData:BLKWindow? <block>,<start>**

---

Parameter	<p>&lt;block&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  1 to 511                                    1 to 511 blocks, in 1-block steps</p> <p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA &gt;                  #H0 to #H7FFFFFFF                        0 to 7FFFFFFF bits, in 1-bit steps                  (Specify in hexadecimal)</p> <p><b>Note:</b>                  The maximum setting is the pattern length.                  At 2 ch Combination, the setting range is doubled.                  At 4 ch Combination, the setting range is quadrupled.</p>
Response	<p>&lt;data&gt; = &lt;STRING RESPONSE DATA&gt;                  "H***...*"                                Returns the pattern data in hexadecimal format.                  Within 400 characters (pattern data of 400 × 4                  bits)</p>
Function	<p>Queries the mask pattern data of 400 × 4 bits in a block from the &lt;start&gt; address during Mixed Data pattern setting or Block Window setting.</p>
Example	<p>To query the mask pattern data of 400 × 4 bits in block 3 from the bit 0 address.</p> <pre>&gt; :SENSe:PATtern:MASK:MIXData:BLKWindow? 3,#H0 &lt;"H001001001001001001001001●●●●"</pre>
Compatibility	<p>Incompatible with existing models.</p>



---

**:SENSe:PATtern:MASK:MIXData:BDATa:WHOLe  
<block>,<start>,<end>,<bdata>**


---

Parameter	<p>&lt;block&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt; 1 to 511                      1 to 511 blocks, in 1-block steps</p> <p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA &gt; #H0 to #H7FFFFFFF              0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal)</p> <p>&lt;end&gt; = &lt;NON-DECIMAL PROGRAM DATA &gt; #H0 to #H7FFFFFFF              0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal)</p> <p><b>Note:</b></p> <p>    The maximum setting is the pattern length.     At 2 ch Combination, the setting range is doubled.     At 4 ch Combination, the setting range is quadrupled.</p> <p>&lt;bdata&gt; = &lt;ARBITRARY BLOCK PROGRAM DATA&gt; #XYYY&lt;binary&gt;              X:        Number of YYY digits                                       YYY:      Number of bytes of &lt;binary&gt;   1 to 16,777,216 bytes                                       &lt;binary&gt;: Binary data up to 16,777,216 bytes</p>
Function	<p>Sets binary data of the Block Window mask pattern data &lt;start&gt; to &lt;end&gt; addresses during Mixed Data pattern setting.</p> <p>The set data overwrites the specified range.</p>
Example	<p>To set binary data of the Block Window mask pattern data from bit 0 to bit 7FFFFFFF addresses during Mixed Data pattern setting or Block Window setting.</p> <p>&gt;:SENSe:PATtern:MASK:MIXData:BDATa:WHOLe 1, #H0, #H7FFFFFFF, #11A</p>
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:MASK:MIXData:BDATa:WHOLe?**  
**<block>,<start>[,<size>]**

Parameter	<p>&lt;block&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  1 to 511                              1 to 511 blocks, in 1-block steps                  &lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA &gt;                  #H0 to #H7FFFFFFF                      0 to 7FFFFFFF bits, in 1-bit steps                  (Specify in hexadecimal)</p> <p><b>Note:</b>                  The maximum setting is the pattern length.                  At 2 ch Combination, the setting range is doubled.                  At 4 ch Combination, the setting range is quadrupled.</p> <p>[&lt;size&gt;] = &lt;NR1 NUMERIC PROGRAM DATA&gt;                  1 to 1677216                      1 to 1,677,216 bytes/1 byte Step</p>
Response	<p>&lt;bdata&gt; = &lt;DEFINITE LENGTH ARBITRARY BLOCK RESPONSE DATA&gt;                  #XYYY&lt;binary&gt;                      X:            Number of YYY digits                  YYY:            Number of bytes of &lt;binary&gt;                  1 to 16,777,216bytes                  &lt;binary&gt;: Binary data up to 16,777,216bytes</p>
Function	<p>Binary data of the setting pattern is queried when [&lt;size&gt;] is omitted.                  Queries binary data of bytes specified by &lt;size&gt; from the &lt;start&gt; address of the Block Window mask pattern data during Mixed Data pattern setting.</p>
Example	<p>To query binary data of up to 2 bytes from bit 0 address of the Block Window mask pattern data during Mixed Data pattern setting:</p> <pre>&gt; :SENSe:PATtern:MASK:MIXData:BDATa:WHOLe? 1, #H0, 2 &lt; #12AA</pre> <p>To query binary data of the setting pattern from bit 0 address of the Block Window mask pattern data during Mix Data pattern setting or Block Window setting (in the case of [&lt;size&gt;] is omitted):</p> <pre>&gt; :SENSe:PATtern:MASK:BDATa:WHOLe? 1, #H0 &lt; #516000AAAAAA●●●●●● (binary data of 16,000 bytes)</pre>
Compatibility	<p>Incompatible with existing models.</p>

**:SENSe:PATtern:MASK:MIXData:DREVerse:ADdRess**  
**<block>,<start>,<end>**

Parameter	<b>&lt;block&gt;</b> = <DECIMAL NUMERIC PROGRAM DATA>
	1 to 511                      1 to 511 blocks, in 1-block steps
	<b>&lt;start&gt;</b> = <NON-DECIMAL PROGRAM DATA >
	#H0 to #H7FFFFFFF              0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal)
<b>&lt;end&gt;</b> = <NON-DECIMAL PROGRAM DATA >	#H0 to #H7FFFFFFF              0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal)

**Note:**

The maximum setting is the pattern length.

At 2 ch Combination, the setting range is doubled.

At 4 ch Combination, the setting range is quadrupled.

Function	Inverts the Block Window mask pattern data in during Mixed Data pattern setting. Specify the inversion range by the <start> and <end> addresses.
Example	To invert the Block Window mask pattern data from bit 0 to bit 7FFFFFFF addresses during Mixed Data pattern setting: >:SENSe:PATtern:MASK:MIXData:DREVerse:ADdRess 1,#H0,#H7FFFFFFF
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:MASK:MIXData:DREVerse:DELTA**  
**<block>,<start>,<delta>**

Parameter	<b>&lt;block&gt;</b> = <DECIMAL NUMERIC PROGRAM DATA>
	1 to 511                      1 to 511 blocks, in 1-block steps
	<b>&lt;start&gt;</b> = <NON-DECIMAL PROGRAM DATA >
	#H0 to #H7FFFFFFF              0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal)
<b>&lt;delta&gt;</b> = <DECIMAL NUMERIC PROGRAM DATA >	1 to 134217728              1 to 134,217,728 bits, in 1-bit steps

**Note:**

The maximum setting is the pattern length.

At 2 ch Combination, the setting range is doubled.

At 4 ch Combination, the setting range is quadrupled.

Function	Inverts the Block Window mask pattern data during Mixed Data pattern setting. Specify the inversion range by the number of bits from the <start> address (relative specification).
Example	To invert 1 bit of the Block Window mask pattern data from address 0 during Mixed Data pattern setting: > :SENSe:PATtern:MASK:MIXData:DREVerse:DELTA 1,#H0,1
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:MASK:MIXData:DATA:FILL  
<block>,<range>,<page>,<data>**

---

Parameter	<p>&lt;block&gt;&lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  1 to 511                      1 to 511 blocks, in 1-block steps</p> <p>&lt;range&gt;= &lt;CHARACTER PROGRAM DATA&gt;                  PAGE                              Specifies a page.                                                      (One page is defined as 128 bits.)</p> <p>ALL                                      Specifies all data.</p> <p>&lt;page&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  1 to 1048576                      1 to 1,048,576 (Max.) pages, in 1-page steps                  Max = Pattern Length/128 (rounding up fractions)                  Specify "0" when &lt;range&gt; is set to ALL.</p> <p>&lt;data&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  0                                      Fills the specified range with 0s.                  1                                      Fills the specified range with 1s.</p>
Function	Sets 0s or 1s for the specified page or all data in the Block Window mask pattern data during Mixed Data pattern setting.
Example	To set 0s for the first page of the Block Window mask pattern data during > :SENSe:PATtern:MASK:MIXData:DATA:FILL 1,PAGE,1,0
Compatibility	Incompatible with existing models.

## :SENSe:PATtern:MASK:SEquence:BLKWindow <block>,<start>,<end>,<data>

Parameter	<block> = <CHARACTER PROGRAM DATA> 1 to 128                      1 to 128 blocks, in 1-block steps
	<start> = <NON-DECIMAL PROGRAM DATA > #H0 to #HFFFFFF                      0 to FFFFF bits, in 1-bit steps (Specify in hexadecimal)
	<end> = <NON-DECIMAL PROGRAM DATA > #H0 to #HFFFFFF                      0 to FFFFF bits, in 1-bit steps (Specify in hexadecimal)
	<b>Note:</b> The maximum setting value is the pattern length.
	<data> = <STRING PROGRAM DATA > "H***...*"                      Specify pattern data in hexadecimal format. 1 to 400 characters (pattern data of 400 × 4 bits) Specify a character string consisting of 0 to 9 and A to F.
	"B***...*"                      Specify pattern data in binary format. 1 to 400 characters (pattern data of 400 bits) Specify a character string consisting of 0 and 1.
Function	Sets the mask pattern data in a Block from the <start> to <end> addresses during Sequence pattern setting or Block Window setting. The set data overwrites the specified range.
Example	To set the addresses from bit 0 to bit FFFFF of the mask pattern data in block 3 during Block Window setting in hexadecimal: > :SENSe:PATtern:MASK:SEquence:BLKWindow 3,#H0,#HFFFFFF, "H001"
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:MASK:SEquence:BLKWindow? <block>,<start>**

---

Parameter	<p>&lt;block&gt; = &lt;CHARACTER PROGRAM DATA&gt;                  1 to 128                      1 to 128 blocks, in 1-block steps</p> <p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA &gt;                  #H0 to #FFFFFF                      0 to FFFFF bits, in 1-bit steps                  (Specify in hexadecimal)</p> <p><b>Note:</b>                  The maximum setting value is the pattern length.</p>
Response	<p>&lt;data&gt; = &lt;STRING RESPONSE DATA&gt;                  "H***...*"                      Returns the pattern data in hexadecimal format.                  Within 400 characters (pattern data of 400 × 4 bits)</p>
Function	<p>Queries the mask pattern data of 400 × 4 bits in a block from the &lt;start&gt; address during Sequence pattern setting or Block Window setting.</p>
Example	<p>To query the mask pattern data of 400 × 4 bits in block 3 from the bit 0 address during Block Window setting.</p> <pre>&gt; :SENSe:PATtern:MASK:SEquence:BLKWindow? 3, #H0 &lt; "H001....."</pre>
Compatibility	<p>Incompatible with existing models.</p>



**:SENSe:PATtern:MASK:SEquence:BDATa:WHOLe?  
<block>,<start>[,<size>]**

Parameter	<block> = < DECIMAL NUMERIC PROGRAM DATA > 1 to 128                              1 to 128 Blocks, in 1-block steps <start> = <NON-DECIMAL PROGRAM DATA > #H0 to #FFFFFF                        0 to FFFFF bits, in 1-bit steps (Specify in hexadecimal)
	<b>Note:</b> The maximum setting value is the pattern length.
	[<size>] = <NR1 NUMERIC PROGRAM DATA > 1 to 131072                            1 to 131,072 bytes/1 byte Step
Response	<bdata> = <DEFINITE LENGTH ARBITRARY BLOCK RESPONSE DATA > #XYYY<binary>                        X:          Number of YYY digits YYY:        Number of bytes of <binary> 1 to 131,072 bytes <binary>: Binary data up to 131,072 bytes
Function	Binary data of the setting pattern is queried when [<size>] is omitted. Queries binary data of bytes specified by <size> from the <start> address of the Block Window mask pattern data during Sequence pattern setting.
Example	To query binary data of up to 2 bytes from bit 0 the <Start> address of the Block Window mask pattern data during Sequence pattern setting. > :SENSe:PATtern:MASK:SEquence:BDATa:WHOLe? 1, #H0, 2 < #12AA  To query binary data of the setting pattern from bit 0 address of the Block Window mask pattern data during Sequence pattern setting (in the case of [<size>] is omitted): > :SENSe:PATtern:MASK:SEquence:BDATa:WHOLe? 1, #H0 < #516000AAAAAA●●●●●● (binary data of 16,000 bytes)
Compatibility	Incompatible with existing models.



### **:SENSe:PATtern:MASK:SEquence:DREVerse:ADDRESS <block>,<start>,<end>**

---

Parameter	<block> = < DECIMAL NUMERIC PROGRAM DATA > 1 to 128                      1 to 128 blocks, in 1-block steps <start> = <NON-DECIMAL PROGRAM DATA > #H0 to #HFFFFFF                  0 to FFFFFFF bits, in 1-bit steps (Specify in hexadecimal) <end> = <NON-DECIMAL PROGRAM DATA > #H0 to #HFFFFFF                  0 to FFFFFFF bits, in 1-bit steps (Specify in hexadecimal)
-----------	---

**Note:**

The maximum setting value is the pattern length.

Function	Inverts the Block Window mask pattern data during Sequence pattern setting. Specify the inversion range by the <start> and <end> addresses.
Example	To invert the Block Window mask pattern from bit 0 to bit FFFFF addresses during Sequence pattern setting: > :SENSe:PATtern:MASK:SEquence:DREVerse:ADDRESS 1, #H0, #HFFFFFF
Compatibility	Incompatible with existing models.

### **:SENSe:PATtern:MASK:SEquence:DREVerse:DELTA <block>,<start>,<delta>**

---

Parameter	<block> = < DECIMAL NUMERIC PROGRAM DATA > 1 to 128                      1 to 128 Blocks, in 1-block steps <start> = <NON-DECIMAL PROGRAM DATA > #H0 to #HFFFFFF                  0 to FFFFFFF bits, in 1-bit steps (Specify in hexadecimal) <delta> = <DECIMAL NUMERIC PROGRAM DATA > 1 to 1048576                      1 to 1,048,576 bits, in 1-bit steps
-----------	--

**Note:**

The maximum setting value is the pattern length.

Function	Inverts the Block Window mask pattern data during Mixed Data pattern setting. Specify the inversion range by the number of bits from the <start> address (relative specification).
Example	To invert 1 bit of the Block Window mask pattern data from address 0 during Sequence pattern setting: > :SENSe:PATtern:MASK:SEquence:DREVerse:DELTA 1, #H0, 1
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:MASK:SEquence:DATA:FILL  
<block>,<range>,<page>,<data>**

---

Parameter	<block> = < DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 Blocks, in 1-block steps <range> = <CHARACTER PROGRAM DATA> PAGE                              Specifies a page. (One page is defined as 128 bits.) ALL                                Specifies all data. <page> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 8192                      1 to 8192 (Max.) pages, in 1-page steps Max=Pattern Length/128 (rounding up fractions) Specify "0" when <range> is set to ALL. <data>=<DECIMAL NUMERIC PROGRAM DATA> 0                                    Fills the specified range with 0s. 1                                    Fills the specified range with 1s.
Function	Sets 0s or 1s for the specified page or all data in Block Window mask pattern data during Sequence pattern setting.
Example	To set 0s for the first page of the Block Window mask pattern data during Sequence pattern setting: > :SENSe:PATtern:MASK:SEquence:DATA:FILL 1,PAGE,1,0
Compatibility	Incompatible with existing models.

### 7.4.4 Commands related to Input tab window

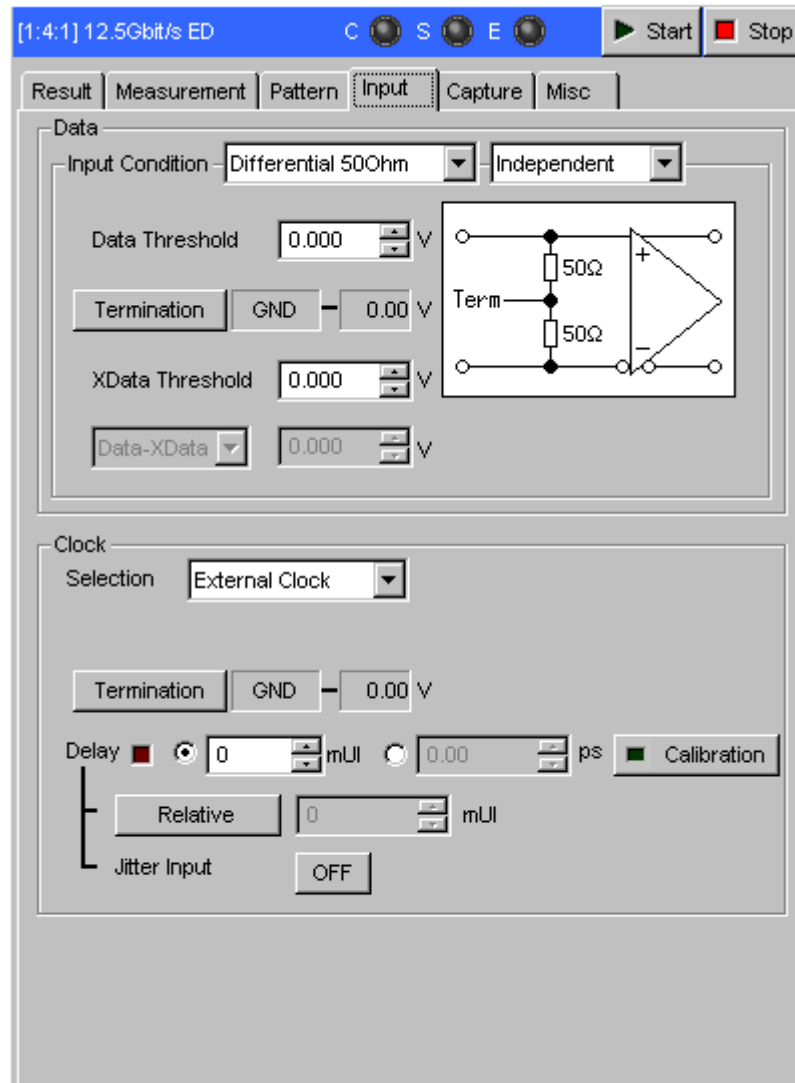


Figure 7.4.4-1 Input tab window

### 7.4.4.1 Data Input setting commands

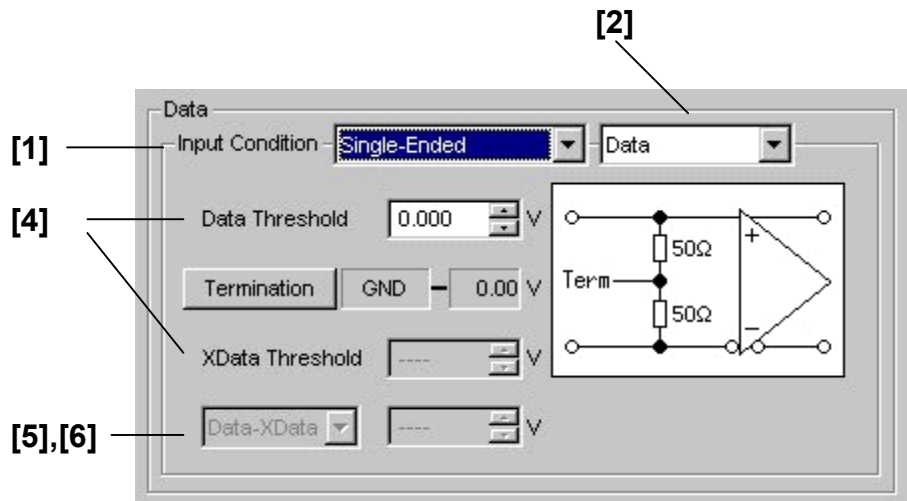


Figure 7.4.4.1-1 Single-End Data setting

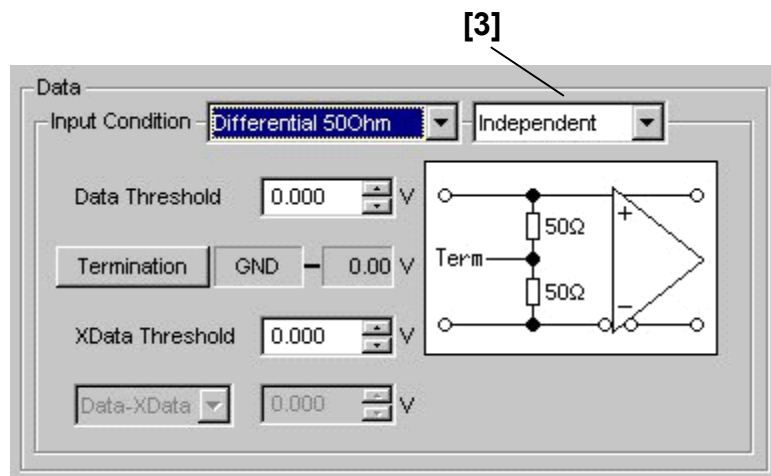


Figure 7.4.4.1-2 Differential 50 Ohm setting

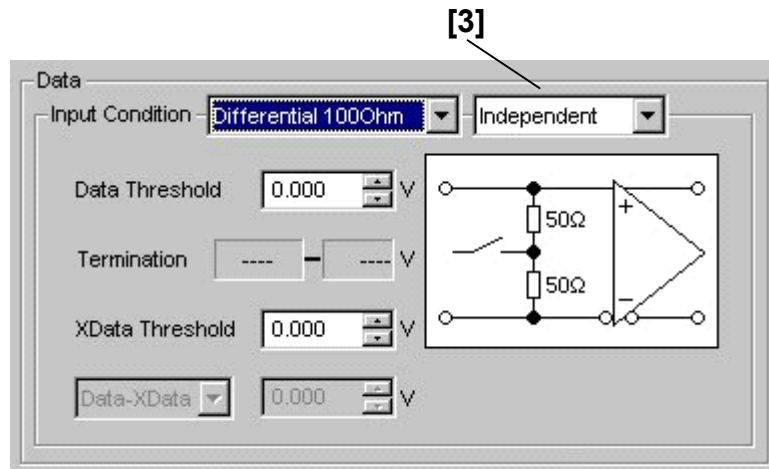


Figure 7.4.4.1-3 Differential 100 Ohm setting



Figure 7.4.4.1-4 Termination Setting dialog box

Table 7.4.4.1-1 Data Input setting commands

No.	Setting Items	Commands
[1]	Input Condition	:INPut:DATA:INTerface :INPut:DATA:INTerface?
[2]	No label (Set the data input port.)	:INPut:DATA:SINgle :INPut:DATA:SINgle?
[3]	No label (Set the differential type.)	:INPut:DATA:DIFferential :INPut:DATA:DIFferential?
[4]	Data Threshold XData Threshold	:INPut:DATA:THReshold :INPut:DATA:THReshold?
[5]	No label (Set the differential reference signal.)	:INPut:DATA:DIFferential:BASis :INPut:DATA:DIFferential:BASis?
[6]	No label (Set the threshold for differential data input.)	:INPut:DATA:DIFferential:THReshold :INPut:DATA:DIFferential:THReshold?
[7]	Termination	:INPut:DATA:TERMination :INPut:DATA:TERMination?
[8]	No label (Termination voltage setting)	:INPut:DATA:TLEVel :INPut:DATA:TLEVel?

### **:INPut:DATA:INTerface <interface>**

---

Parameter	<interface> = <CHARACTER PROGRAM DATA> SINGle                      Single Ended DIF50ohm                    Differential 50 Ω DIF100ohm                  Differential 100 Ω
Function	Sets the data input interface.
Example	To set the data input interface to Single Ended: > :INPut:DATA:INTerface SINGle
Compatibility	Incompatible with existing models.

### **:INPut:DATA:INTerface?**

---

Response	<interface> = <CHARACTER RESPONSE DATA> SING, DIF50, DIF100
Function	Queries the data input interface.
Example	> :INPut:DATA:INTerface? < SING
Compatibility	Incompatible with existing models.

### **:INPut:DATA:DIFFerential <item>**

---

Parameter	<item> = <CHARACTER PROGRAM DATA> INDeendent                  Data/Xdata independent setting TRACking                    Data/Xdata common setting ALTeRNate                  Data/Xdata differential setting
Function	Sets the differential type when the data input interface is differential.
Example	To set the differential type to Data/Xdata independent setting: > :INPut:DATA:DIFFerential INDeendent
Compatibility	Incompatible with existing models.

### **:INPut:DATA:DIFFerential?**

---

Response	<item> = <CHARACTER RESPONSE DATA> IND, TRAC, ALT
Function	Queries the differential type when the data input interface is set to Differential.
Example	> :INPut:DATA:DIFFerential? < IND
Compatibility	Incompatible with existing models.

**:INPut:DATA:THReshold <port>,<numeric>**

Parameter	<p>&lt;port&gt; = &lt;CHARACTER PROGRAM DATA&gt;          DATA Selects Data.          XDATA Selects Xdata.          Be sure to input the selected port when Single is selected.</p> <p>&lt;numeric&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;          -3.500 to 3.300 -3.500 to 3.300 V, in 0.001 V steps (When MU181040A-002 and MU181040B-002 are installed)          -0.350 to 0.350 -0.350 to 0.350 V, in 0.001 V steps (when MU181040A-001 is installed)</p>
Function	Sets the data input threshold value for the specified input port.
Example	To set the data input threshold value for the Data port to -3.000 V: > :INPut:DATA:THReshold DATA, -3.000
Compatibility	Partially compatible with the MP1632C and MP1776A (parameters are incompatible). (The <port> setting is not provided.)

**:INPut:DATA:THReshold? <port>**

Parameter	<p>&lt;port&gt; = &lt;CHARACTER PROGRAM DATA&gt;          DATA Selects Data.          XDATA Selects Xdata.</p>
Response	<p>&lt;numeric&gt; = &lt;NR2 NUMERIC RESPONSE DATA&gt;          -3.500 to 3.300 -3.500 to 3.300 V (When MU181040A-002 and MU181040B-002 are installed)          -0.350 to 0.350 -0.350 to 0.350 V (when MU181040A-001 is installed)</p>
Function	Queries the data input threshold value for the specified input port.
Example	To query the data input threshold value for the Data port: > :INPut:DATA:THReshold? DATA < -3.000
Compatibility	Partially compatible with the MP1632C and MP1776A (parameters are incompatible). (The <port> setting is not provided.)

**:INPut:DATA:SINgLe <item>**

Parameter	<p>&lt;item&gt; = &lt;CHARACTER PROGRAM DATA&gt;          DATA Selects Data.          XDATA Selects Xdata.</p>
Function	Sets the input port when the data input interface is set to Single.
Example	To set the input port to Data: > :INPut:DATA:SINgLe DATA
Compatibility	Incompatible with existing models.

### **:INPut:DATA:SINgLe?**

Response	<item> = <CHARACTER RESPONSE DATA> DATA, XDAT
Function	Queries the input port when the data input interface is set to Single.
Example	> :INPut:DATA:SINgLe? < DATA
Compatibility	Incompatible with existing models.

### **:INPut:DATA:DIFFerential:BASis <basis>**

Parameter	<basis> = <CHARACTER PROGRAM DATA> DATA                      Sets the differential reference signal to Data. XDATA                     Sets the differential reference signal to XData.
Function	Sets the differential reference signal for the data input threshold value.
Example	To set the differential reference signal for the data input threshold value to DATA: > :INPut:DATA:DIFFerential:BASis DATA
Compatibility	Incompatible with existing models.

### **:INPut:DATA:DIFFerential:BASis?**

Response	<basis> = <CHARACTER RESPONSE DATA> DATA, XDAT
Function	Queries the differential reference signal for the data input threshold value.
Example	> :INPut:DATA:DIFFerential:BASis? < DATA
Compatibility	Incompatible with existing models.

### **:INPut:DATA:DIFFerential:THReshold <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> -3.000 to 3.000            -3.000 to 3.000 V, in 0.001 V steps (when MU181040A-002 and MU181040B-002 are installed) -0.700 to 0.700           -0.700 to 0.700 V, in 0.001 V steps (when MU181040A-001 is installed)
Function	Sets the data input threshold value for differential input.
Example	To set the data input threshold value to -3.000 V: > :INPut:DATA:DIFFerential:THReshold -3.000
Compatibility	Incompatible with existing models.



**:INPut:DATA:DIFFerential:THReshold?**


---

Response	<numeric> = <NR2 NUMERIC RESPONSE DATA>
Function	Queries the data input threshold value for differential input.
Example	> :INPut:DATA:DIFFerential:THReshold? < -3.000
Compatibility	Incompatible with existing models.

**:INPut:DATA:TERMination <term>**


---

Parameter	<term> = <CHARACTER PROGRAM DATA>
	GND                    50 $\Omega$ to GND
	NECL                    50 $\Omega$ to -2 V
	LVPecl                 50 $\Omega$ to 1.3 V
	PCML                    50 $\Omega$ to 3.3 V
	VARIable                50 $\Omega$ to Variable Voltage
Function	Sets the data input termination condition.
Example	To set the data input termination condition to GND: > :INPut:DATA:TERMination GND
Compatibility	Incompatible with existing models.

**:INPut:DATA:TERMination?**


---

Response	<term> = <CHARACTER RESPONSE DATA>
Function	Queries the data input termination condition.
Example	> :INPut:DATA:TERMination? < GND
Compatibility	Incompatible with existing models.

**:INPut:DATA:TLEVel <numeric>**


---

Parameter	<numeric> = <DICIMAL NUMERIC PROGRAM DATA>
	-2.50 to 3.50            -2.50 to 3.50 V, in 0.01 V steps
Function	Sets the termination voltage when the input termination condition is set to Variable.
	The setting is invalid when the data input interface is Differential 100 $\Omega$ .
Example	To set the termination voltage when the input termination condition is set to Variable to -2.00 V: > :INPut:DATA:TLEVel -2.00
Compatibility	Incompatible with existing models.

**:INPut:DATA:TLEVel?**

---

Response	<numeric> = <NR2 NUMERIC RESPONSE DATA> -2.50 to 3.50                      -2.50 to 3.50 V
Function	Queries the termination voltage when the input termination condition is set to Variable.
Example	> :INPut:DATA:TLEVel? < -2.00
Compatibility	Incompatible with existing models.

7.4.4.2 Clock Input setting commands

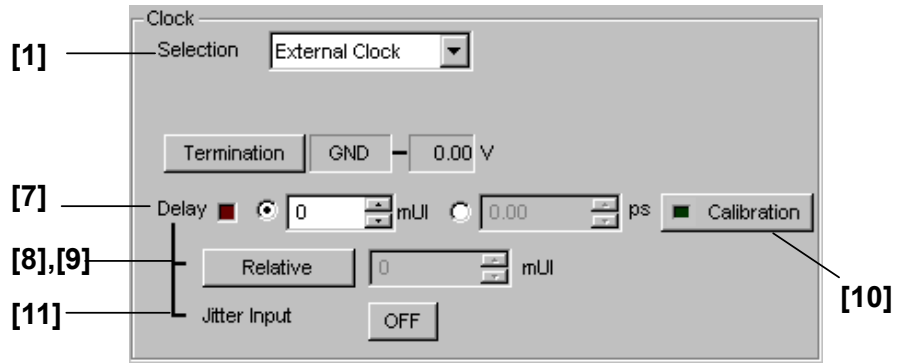


Figure 7.4.4.2-1 Clock Input setting (For External Clock)

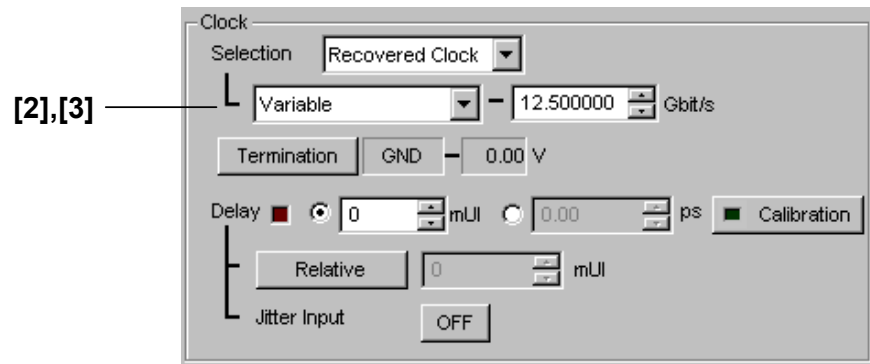


Figure 7.4.4.2-2 Clock Input setting (For Recovered Clock)

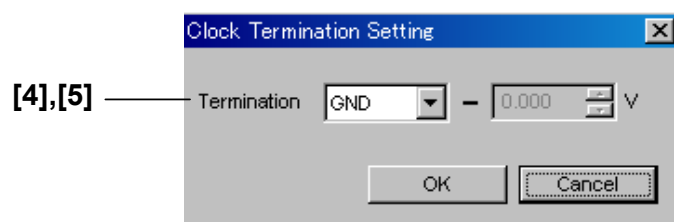


Figure 7.4.4.2-3 Clock Termination Setting dialog box

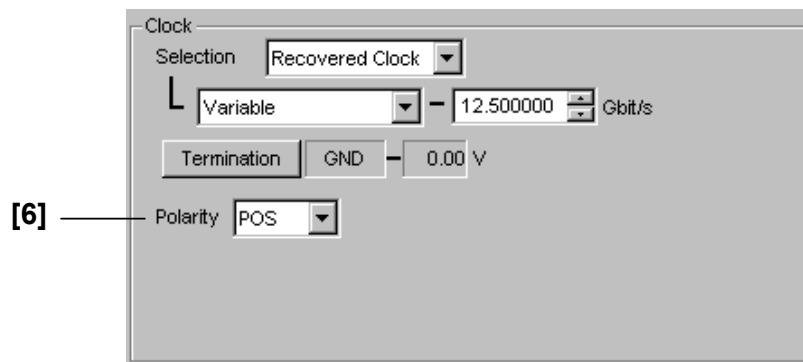


Figure 7.4.4.2-4 Clock Input setting (For no delay option)

Table 7.4.4.2-1 Clock Input setting commands

No.	Setting Items	Commands
[1]	Selection	:INPut:CLOCK:SELECTION
		:INPut:CLOCK:SELECTION?
[2]	Setting for specified frequency of Clock Recovery	:INPut:CLOCK:RECOVery
		:INPut:CLOCK:RECOVery?
[3]	Setting for frequency of Clock Recovery	:INPut:CLOCK:CRFReq
		:INPut:CLOCK:CRFReq?
[4]	Termination	:INPut:CLOCK:TERMination
		:INPut:CLOCK:TERMination?
[5]	No label (Termination voltage setting)	:INPut:CLOCK:TLEVel
		:INPut:CLOCK:TLEVel?
[6]	Polarity	:INPut:CLOCK:RECLOCK
		:INPut:CLOCK:RECLOCK?
[7]	Delay	:INPut:CLOCK:DELAy
		:INPut:CLOCK:DELAy?
[8]	Relative	:INPut:CLOCK:RELAtive
		:INPut:CLOCK:RELAtive?
[9]	No label (Setting of the Relative value)	:INPut:CLOCK:RDELAy
		:INPut:CLOCK:RDELAy?
[10]	Calibration	:INPut:CLOCK:CALibration
[11]	Jitter Input	:INPut:CLOCK:JINPut
		:INPut:CLOCK:JINPut?

### :INPut:CLOCK:SELECTION <sel>

Parameter	<sel> = <CHARACTER PROGRAM DATA> RECOVered                  Recovered Clock EXTernal                  External Clock
Function	Sets the clock input type.
Example	To set the clock input type to the Recovered Clock: > :INPut:CLOCK:SELECTION RECOVered
Compatibility	Incompatible with existing models.

### :INPut:CLOCK:SELECTION?

Response	<sel> = <CHARACTER RESPONSE DATA> REC                          Recovered Clock EXT                          External Clock
Function	Queries the clock input type.
Example	> :INPut:CLOCK:SELECTION? < REC
Compatibility	Incompatible with existing models.

**:INPut:CLOCK:RECovery <freq>**

Parameter	<freq> = <STRING PROGRAM DATA>		
	"OC_3"	OC3/STM1	:0.155520 Gbit/s
	"OC_12"	OC12/STM4	:0.622080 Gbit/s
	"FC"	1GFC	:1.062500 Gbit/s
	"GbE"	GbE	:1.250000 Gbit/s
	"SATA1_5"	SATA1.5Gb/s	:1.500000 Gbit/s
	"2G_FC"	2GFC	:2.125000 Gbit/s
	"OC_48"	OC48/STM16	:2.488320 Gbit/s
	"PCI_EX1"	PCI Express I	:2.500000 Gbit/s
	"OC_48_G709"	OTU1	:2.666060 Gbit/s
	"SATA3"	SATA 3Gb/s	:3.000000 Gbit/s
	"XAUI"	XAUI	:3.125000 Gbit/s
	"4G_FC"	4GFC	:4.250000 Gbit/s
	"PCI_EX2"	PCI Express II	:5.000000 Gbit/s
	"SATA6"	SATA 6Gb/s	:6.000000 Gbit/s
	"OC_192"	OC192/STM64	:9.953280 Gbit/s
	"10GbE"	10GbE	:10.312500 Gbit/s
	"10G_FC"	10GFC	:10.518750 Gbit/s
	"OC_192_G975"	G975 FEC	:10.664228 Gbit/s
	"OC_192_G709"	OTU2	:10.709225 Gbit/s
	"10GbE_G709"	10GbE over FEC	:11.095700 Gbit/s
	"10G_FC_G709"	10GFC over FEC	:11.316800 Gbit/s
	"Variable"	Variable	:Variable
Function	Sets the rated frequency when the clock input type is the recovery clock.		
Example	To set the rated frequency to "OC3": > :INPut:CLOCK:RECovery "OC_3"		
Compatibility	Incompatible with existing models.		

**:INPut:CLOCK:RECovery?**

Response	<freq> = <STRING RESPONSE DATA> "OC_3", "OC_12", "FC", "GbE", "SATA1_5", "2G_FC", "OC_48", "PCI_EX1", "OC_48_G709", "SATA3", "XAUI", "4G_FC", "PCI_EX2", "SATA6", "OC_192", "10GbE", "10G_FC", "OC_192_G975", "OC_192_G709", "10GbE_G709", "10G_FC_G709", "Variable"		
Function	Queries the rated frequency when the clock input type is the recovery clock.		
Example	> :INPut:CLOCK:RECovery? < "OC_3"		
Compatibility	Incompatible with existing models.		

### **:INPut:CLOCk:CRFReq <numeric>**

Parameter	<p>&lt;numeric&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  0.100000, 0.125000, 0.140600, 0.155520, 0.156300, 0.171900,                  0.187500, 0.200000, 0.250000, 0.281300, 0.312500, 0.343800,                  0.375000, 0.400000, 0.500000, 0.562500, 0.622080, 0.625000,                  0.687500, 0.750000, 0.800000, 1.000000, 1.062500, 1.125000,                  1.250000, 1.375000, 1.500000, 1.600000, 2.000000, 2.125000,                  2.488320, 2.250000, 2.500000, 2.666060, 2.750000, 3.000000,                  3.125000, 3.200000, 4.250000</p> <p>Unit is Gbit/s</p> <p>4.900000 to 6.250000     4.900000 to 6.250000 Gbit/s /1 kbit/s Step                  9.800000 to 12.500000     9.800000 to 12.500000 Gbit/s /1 kbit/s Step</p> <p>Note, however:</p> <p>When MU181040A-001 is installed:     9.8 to 12.5 Gbit/s                  When MU181040A/B-002 or MU181040A/B-x20 is installed: 0.1 to 12.5                  Gbit/s</p>
Function	Sets the rated frequency for the clock recovery.
Example	<p>To set the rated frequency for the clock recovery to 0.100000 Gbit/s (when                  MU181040A-x20, MU181040B-x20 is installed):</p> <pre>&gt; :INPut:CLOCk:CRFReq 0.100000</pre> <p>To set the rated frequency for the clock recovery to 9.953280 Gbit/s (when                  MU181040A-001 is installed):</p> <pre>&gt; :INPut:CLOCk:CRFReq 9.953280</pre>
Compatibility	Incompatible with existing models.

### **:INPut:CLOCk:CRFReq?**

Response	<p>&lt;numeric&gt; = &lt;NR2 NUMERIC RESPONSE DATA&gt;                  0.100000, 0.125000, 0.140600, 0.155520, 0.156300, 0.171900,                  0.187500, 0.200000, 0.250000, 0.281300, 0.312500, 0.343800,                  0.375000, 0.400000, 0.500000, 0.562500, 0.622080, 0.625000,                  0.687500, 0.750000, 0.800000, 1.000000, 1.062500, 1.125000,                  1.250000, 1.375000, 1.500000, 1.600000, 2.000000, 2.125000,                  2.488320, 2.250000, 2.500000, 2.666060, 2.750000, 3.000000,                  3.125000, 3.200000, 4.250000</p> <p>Unit is Gbit/s.</p> <p>4.900000 to 6.250000     4.900000 to 6.250000 Gbit/s                  9.800000 to 12.500000     9.800000 to 12.500000 Gbit/s</p>
Function	Queries the rated frequency for the clock recovery.
Example	<pre>&gt; :INPut:CLOCk:CRFReq?</pre> <pre>&lt; 0.100000</pre>
Compatibility	Incompatible with existing models.

**:INPut:CLOCK:TERMination <term>**


---

Parameter	<term> = <CHARACTER PROGRAM DATA>
	GND                      50 $\Omega$ to GND
	NECL                      50 $\Omega$ to -2 V
	LVPecl                    50 $\Omega$ to 1.3 V
	PCML                      50 $\Omega$ to 3.3 V
	VARiable                 50 $\Omega$ to Variable Voltage
Function	Sets the clock input termination condition.
Example	To set the clock input termination condition to GND: > :INPut:CLOCK:TERMination GND
Compatibility	Incompatible with existing models.

**:INPut:CLOCK:TERMination?**


---

Response	<term> = <CHARACTER RESPONSE DATA>
	GND, NECL, LVP, PCML, VAR
Function	Queries the clock input termination condition.
Example	> :INPut:CLOCK:TERMination? < GND
Compatibility	Incompatible with existing models.

**:INPut:CLOCK:TLEVel <numeric>**


---

Parameter	<numeric> = <NR2 NUMERIC PROGRAM DATA>
	-2.50 to 3.50                 -2.50 to 3.50 V, in 0.01 V steps
Function	Sets the termination voltage when the input termination condition is set to Variable.
Example	To set the termination voltage when the input termination condition is set to Variable to -2 V: > :INPut:CLOCK:TLEVel -2.00
Compatibility	Incompatible with existing models.

**:INPut:CLOCK:TLEVel?**


---

Response	<numeric> = <NR2 NUMERIC RESPONSE DATA>
	-2.50 to 3.50                 -2.50 to 3.50 V
Function	Queries the termination voltage when the input termination condition is set to Variable.
Example	> :INPut:CLOCK:TLEVel? < -2.00
Compatibility	Incompatible with existing models.

### **:INPut:CLOCK:RECLOCK <logic>**

Parameter	<logic> = <CHARACTER PROGRAM DATA> POSitive                      Positive logic NEGative                      Negative logic
Function	Selects the phase unit for the clock recovery clock.
Example	To set the phase unit for the clock recovery clock to POSitive: > :INPut:CLOCK:RECLOCK POSitive
Compatibility	Incompatible with existing models.

### **:INPut:CLOCK:RECLOCK?**

Response	<logic> = <CHARACTER RESPONSE DATA> POS, NEG
Function	Queries the phase unit for the clock recovery clock.
Example	> :INPut:CLOCK:RECLOCK? < : POS
Compatibility	Incompatible with existing models.

### **:INPut:CLOCK:DELay <numeric>[,<unit>]**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> In mUI units:                      -1000 to 1000                      -1000 to 1000 mUI, in 1 mUI steps In ps units:                              Converted from the calculated frequency value, based on the setting resolution of mUI. <unit> = <CHARACTER PROGRAM DATA> UI    mUI unit PS    ps unit The ps unit is selected when <unit> is omitted.
Function	Sets the value and unit of the clock input phase variable. The specified value may not be exactly set as is when the ps unit is set, due to the limitation of the setting resolution. The value is adjusted to the most approximate value and set in this event.
Example	To set the clock input phase variable to -1000 mUI: > :INPut:CLOCK:DELay -1000,UI
Compatibility	Compatible with the MP1632C and MP1776A.





### **:INPut:CLOCK:RDElay <numeric>[,<unit>]**

Parameter	<p>&lt;numeric&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;</p> <p>In mUI units:            -1000 to 1000      -1000 to 1000 mUI, in 1 mUI steps</p> <p>In ps units:              Converted from the calculated frequency value, based on the setting resolution of mUI.</p> <p>[&lt;unit&gt;] = &lt;CHARACTER PROGRAM DATA&gt;</p> <p>UI                          mUI unit</p> <p>PS                          ps unit</p> <p>The ps unit is selected when &lt;unit&gt; is omitted.</p>
Function	<p>Sets the value of the clock input phase variable reference.</p> <p>Set a value using a difference from the reference value.</p> <p>The specified value may not be exactly set as is when the ps unit is set, due to the limitation of the setting resolution. The value is adjusted to the most approximate value and set in this event.</p>
Example	<p>To set the clock phase variable reference to -1000 mUI:</p> <pre>&gt; :INPut:CLOCK:RDElay -1000,UI</pre>
Compatibility	Incompatible with existing models.

### **:INPut:CLOCK:RDElay? [<unit>]**

Parameter	<p>[&lt;unit&gt;] = &lt;CHARACTER PROGRAM DATA&gt;</p> <p>UI                          mUI units</p> <p>PS                          ps units</p> <p>The ps unit is selected when &lt;unit&gt; is omitted.</p>
Response	<p>&lt;numeric&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;</p> <p>In mUI units:            -1000 to 1000      -1000 to 1000 mUI</p> <p>In ps units:              Converted from the calculated frequency value, based on the setting resolution of mUI.</p>
Function	Queries the value of the clock input phase variable reference.
Example	<p>To query the value of the clock input phase variable reference in mUI units.</p> <pre>:INPut:CLOCK:RDElay? UI &lt; -1000</pre>
Compatibility	Incompatible with existing models.

### **:INPut:CLOCK:CALibration**

Function	Calibrates the input clock phase setting value.
Example	<pre>&gt; :INPut:CLOCK:CALibration</pre>
Compatibility	Incompatible with existing models.

**:INPut:CLOCK:JINPut <boolean>**


---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> 0 or OFF                      Jitter input OFF setting 1 or ON                         Jitter input ON setting
Function	When a jitter is added to the input signal, the Feedback process for Delay must be set to OFF. When a jitter is added, set the Jitter Input button to ON, using this command. When a jitter is not added, set the Jitter Input button to OFF.
Example	To set the Jitter Input button to ON when a jitter is added: > :INPut:CLOCK:JINPut ON
Compatibility	Incompatible with existing models.

**:INPut:CLOCK:JINPut?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0                                 Jitter input OFF setting 1                                 Jitter input ON setting
Function	Queries the Jitter Input button setting.
Example	> :INPut:CLOCK:JINPut? < 1
Compatibility	Incompatible with existing models.

### 7.4.5 Commands related to Capture tab window

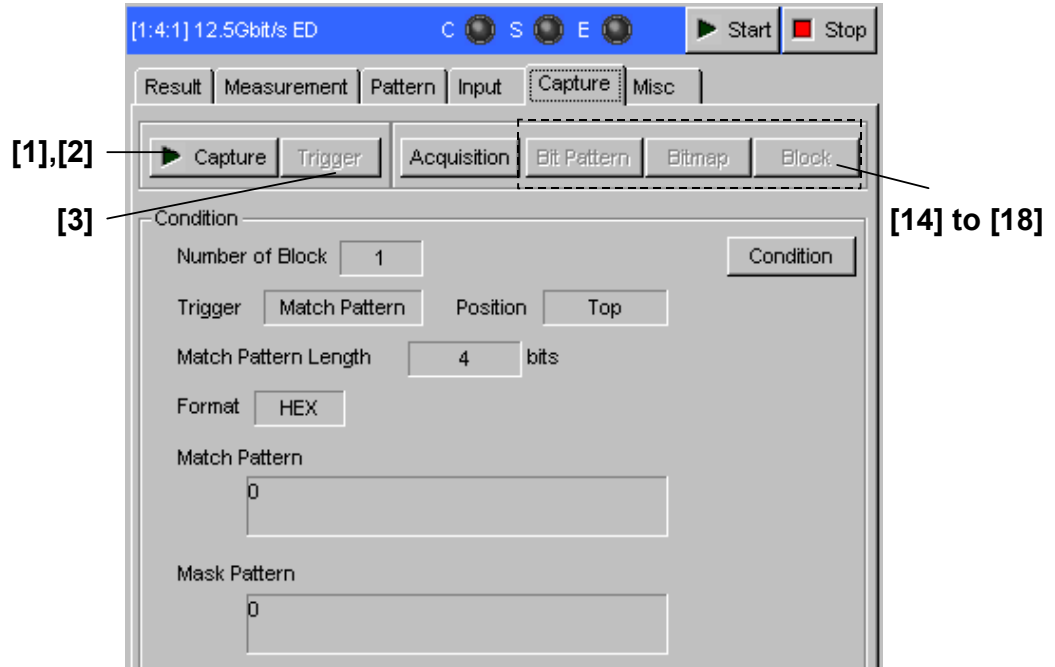


Figure 7.4.5-1 Capture tab window (initial state)

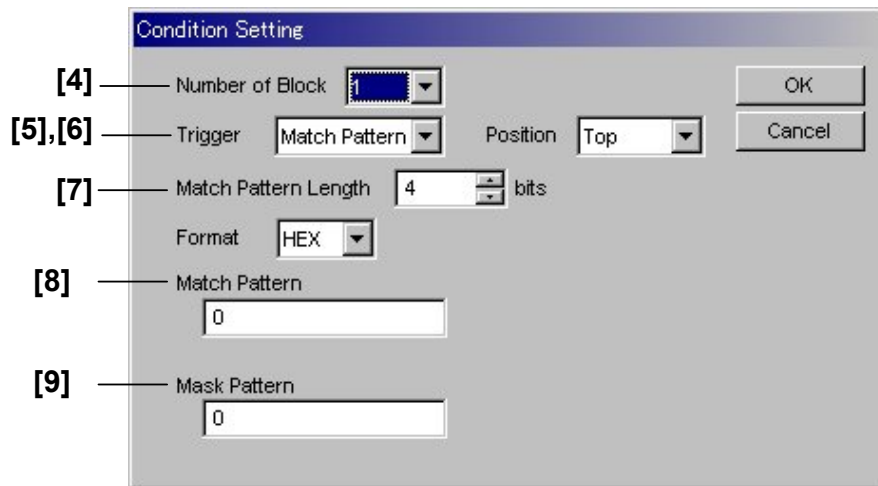


Figure 7.4.5-2 Condition Setting

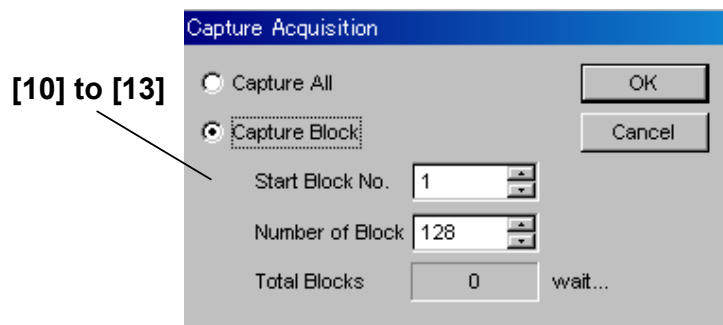


Figure 7.4.5-3 Capture Acquisition dialog box

Table 7.4.5-1 Capture tab setting commands

No.	Setting Items	Commands
[1]	Capture Start	:SENSE:CAPTURE:START
[2]	Capture Stop	:SENSE:CAPTURE:STOP
[3]	Trigger	:SENSE:CAPTURE:TRIGGER
[4]	Number of Block	:SENSE:CAPTURE:CONDITION:BLOCK
		:SENSE:CAPTURE:CONDITION:BLOCK?
[5]	Trigger	:SENSE:CAPTURE:CONDITION:TRIGGER
		:SENSE:CAPTURE:CONDITION:TRIGGER?
[6]	Position	:SENSE:CAPTURE:CONDITION:POSITION
		:SENSE:CAPTURE:CONDITION:POSITION?
[7]	Match Pattern Length	:SENSE:CAPTURE:CONDITION:MPLENGTH
		:SENSE:CAPTURE:CONDITION:MPLENGTH?
[8]	Match Pattern	:SENSE:CAPTURE:CONDITION:MPEDIT
		:SENSE:CAPTURE:CONDITION:MPEDIT?
[9]	Mask Pattern	:SENSE:CAPTURE:CONDITION:MASKEDIT
		:SENSE:CAPTURE:CONDITION:MASKEDIT?
[10]	Query for capture data block count	:SENSE:CAPTURE:ACQUISITION:BNUMBER?
[11]	Start of capture data acquisition	:SENSE:CAPTURE:ACQUISITION:START
[12]	Query for capture data acquisition state	:SENSE:CAPTURE:ACQUISITION:STATE?
[13]	Cancel of capture data acquisition	:SENSE:CAPTURE:ACQUISITION:CANCEL
[14]	Query for capture data length per block	:SENSE:CAPTURE:BPATTERN:LENGTH?
[15]	Query for capture result data	:SENSE:CAPTURE:BPATTERN:DATA:WHOLE?
[16]	Query for capture result data	:SENSE:CAPTURE:BPATTERN:BDATA:WHOLE?
[17]	Query for capture result error position	:SENSE:CAPTURE:BPATTERN:ERROR:WHOLE?
[18]	Query for capture result error position	:SENSE:CAPTURE:BPATTERN:BERROR:WHOLE?

**:SENSE:CAPTURE:START**

Function	Starts capture result acquisition.
Example	> :SENSE:CAPTURE:START
Compatibility	Incompatible with existing models.

**:SENSE:CAPTURE:STOP**

Function	Stops capture result acquisition.
Example	> :SENSE:CAPTURE:STOP
Compatibility	Incompatible with existing models.

**:SENSE:CAPTURE:TRIGGER**

Function	Generates a capture manual trigger.
Example	> :SENSE:CAPTURE:TRIGGER
Compatibility	Incompatible with existing models.

**:SENSe:CAPTure:CONDition:BLOCK <block>**

---

Parameter	<block> = <CHARACTER PROGRAM DATA>	
	B1	1 block
	B2	2 blocks
	B4	4 blocks
	B8	8 blocks
	B16	16 blocks
	B32	32 blocks
	B64	64 blocks
	B128	128 blocks
Function	Sets the capture block division number.	
Example	To set the capture block division number to 8 blocks: > :SENSe:CAPTure:CONDition:BLOCK B8	
Compatibility	Incompatible with existing models.	

**:SENSe:CAPTure:CONDition:BLOCK?**

---

Response	<block> = <CHARACTER RESPONSE DATA>	
	B1	1 block
	B2	2 blocks
	B4	4 blocks
	B8	8 blocks
	B16	16 blocks
	B32	32 blocks
	B64	64 blocks
	B128	128 blocks
Function	Queries the capture block division number.	
Example	> :SENSe:CAPTure:CONDition:BLOCK? < B8	
Compatibility	Incompatible with existing models.	

**:SENSe:CAPTure:CONDition:TRIGger <trigger>**

---

Parameter	<trigger> = <CHARACTER PROGRAM DATA>	
	EDETECT	Error Detect: When an error is detected
	PATtern	When matches the match pattern
	MANual	When a manual trigger is generated
	EXTernal	When external trigger is selected
Function	Sets the trigger to store the data to memory for the capture function.	
Example	To set the manual trigger: > :SENSe:CAPTure:CONDition:TRIGger MANual	
Compatibility	Incompatible with existing models.	

**:SENSe:CAPTure:CONDition:TRIGger?**


---

Response	<trigger> = <CHARACTER RESPONSE DATA> EDET, PATT, MAN, EXT
Function	Queries the trigger to store the data to memory for the capture function.
Example	> :SENSe:CAPTure:CONDition:TRIGger? < MAN
Compatibility	Incompatible with existing models.

**:SENSe:CAPTure:CONDition:POSition <pos>**


---

Parameter	<pos> = <CHARACTER PROGRAM DATA> TOP                      Store the data to the top of the memory. MIDDLE                 Store the data in the middle of the memory. BOTTOm                 Store the data to the last of the memory.
Function	Sets the data storage memory position for the capture function.
Example	To set the data storage memory position to TOP: > :SENSe:CAPTure:CONDition:POSition TOP
Compatibility	Incompatible with existing models.

**:SENSe:CAPTure:CONDition:POSition?**


---

Response	<pos> = <CHARACTER RESPONSE DATA> TOP, MIDD, BOTT
Function	Queries the data storage memory position for the capture function.
Example	> :SENSe:CAPTure:CONDition:POSition? < TOP
Compatibility	Incompatible with existing models.

**:SENSe:CAPTure:CONDition:MPLength <length>**


---

Parameter	<length> = <DECIMAL NUMERIC PROGRAM DATA> 4 to 64                      4 to 64 bits, in 4-bit steps
Function	Sets the capture trigger match pattern length.
Example	To set the capture trigger match pattern length to 12 bits: > :SENSe:CAPTure:CONDition:MPLength 12
Compatibility	Incompatible with existing models.

### **:SENSe:CAPTure:CONDition:MPLength?**

---

Response	<length> = <NR1 NUMERIC RESPONSE DATA> 4 to 64                                      4 to 64 bits
Function	Queries the capture trigger match pattern length.
Example	> :SENSe:CAPTure:CONDition:MPLength? < 12
Compatibility	Incompatible with existing models.

### **:SENSe:CAPTure:CONDition:MPEDit <data>**

---

Parameter	<data> = <STRING PROGRAM DATA> "***...*"                                      Edits the pattern data in hexadecimal format. Specify a 1- to 16-character string, consisting of 0 to 9 and A to F.
Function	Edits the capture trigger match pattern.
Example	To set the capture trigger match pattern to 1010: > :SENSe:CAPTure:CONDition:MPEDit "1010"
Compatibility	Incompatible with existing models.

### **:SENSe:CAPTure:CONDition:MPEDit?**

---

Response	<data> = <STRING RESPONSE DATA> "***...*"                                      Returns the pattern data in hexadecimal format. A 1- to 16-character string, consisting of 0 to 9 and A to F.
Function	Queries the capture trigger match pattern.
Example	> :SENSe:CAPTure:CONDition:MPEDit? < "1010"
Compatibility	Incompatible with existing models.

### **:SENSe:CAPTure:CONDition:MASKedit <data>**

---

Parameter	<data> = <STRING PROGRAM DATA> "***...*"                                      Edits the pattern data in hexadecimal format. Specify a 1- to 16-character string, consisting of 0 to 9 and A to F.
Function	Edits the capture trigger mask pattern.
Example	To set the capture trigger mask pattern to FFFF: > :SENSe:CAPTure:CONDition:MASKedit "FFFF"
Compatibility	Incompatible with existing models.



**:SENSe:CAPTure:CONDition:MASKedit?**

Response	<data> = <STRING RESPONSE DATA> ***...*	Returns the pattern data in hexadecimal format. A 1- to 16-character string, consisting of 0 to 9 and A to F.
Function	Queries the capture trigger mask pattern.	
Example	> :SENSe:CAPTure:CONDition:MASKedit? < "FFFF"	
Compatibility	Incompatible with existing models.	

**:SENSe:CAPTure:ACQquisition:BNUMber?**

Response	<block> = <NR1 NUMERIC RESPONSE DATA> 0 to 128	0 to 128 blocks, in 1-block steps, number of valid capture data blocks
Function	Queries the number of valid capture data blocks.	
Example	> :SENSe:CAPTure:ACQquisition:BNUMber? < 128	
Compatibility	Incompatible with existing models.	

**:SENSe:CAPTure:ACQquisition:STARt <range>[,<start>,<number>]**

Parameter	<range> = <CHARACTER PROGRAM DATA> ALL SElect	Acquires all capture data. Acquires capture data of the specified blocks.
	[<start>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 128	1 to 128 blocks, in 1-block steps, acquisition start block
	[<number>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 128	1 to 128 blocks, in 1-block steps, number of blocks to be acquired

**Note:**

The maximum setting value of <start> and <number> is the maximum value of valid data. <start> and <number> are omitted when <range> = All.

Function	Acquires capture data.	
Example	To acquire all capture data: > :SENSe:CAPTure:ACQquisition:STARt ALL To acquire capture data of Blocks 1 to 64: > :SENSe:CAPTure:ACQquisition:STARt SElect,1,64	
Compatibility	Incompatible with existing models.	

### **:SENSe:CAPTure:ACQuisition:STATe?**

---

Response	<state> = <NR1 NUMERIC RESPONSE DATA> 0 Capture data acquisition is not performed. 1 Capture data acquisition is being performed.
Function	Queries capture data acquisition status.
Example	> :SENSe:CAPTure:ACQuisition:STATe? < 1
Compatibility	Incompatible with existing models.

### **:SENSe:CAPTure:ACQuisition:CANCEl**

---

Function	Cancels capture data acquisition.
Example	> :SENSe:CAPTure:ACQuisition:CANCEl
Compatibility	Incompatible with existing models.

### **:SENSe:CAPTure:BPATtern:LENGth?**

---

Response	<length> = <NR1 NUMERIC RESPONSE DATA> Maximum capture data ÷ 1 to Maximum capture data ÷ n [bits] (n = 1, 2, 4, 8, 16, 32, 64, 128) Capture data length per block <b>Note:</b> At 2 ch Combination, the length of capture data is doubled. At 4 ch Combination, the length of capture date is quadrupled.
Function	Queries the capture data length per block.
Example	> :SENSe:CAPTure:BPATtern:LENGth? < 4194304
Compatibility	Incompatible with existing models.

**:SENSe:CAPTure:BPATtern:DATA:WHOLe? <block>,<start>**

Parameter	<p>&lt;block&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;  1 to 128                            1 to 128 blocks, in 1-block steps</p> <p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;  #H0 to #H7FFFFFFF                    0 to 7FFFFFFF bits, in 1-bit steps  (Specify in hexadecimal)</p> <p><b>Note:</b>  The maximum setting is the pattern length.  At 2 ch Combination, the setting range is doubled.  At 4 ch Combination, the setting range is quadrupled.</p>
Response	<p>&lt;data&gt; = &lt;STRING PROGRAM DATA&gt;  "H***...*"                            Returns the pattern data in hexadecimal format.  Within 400 characters (pattern data of 400 × 4 bits)</p>
Function	<p>Queries the capture data in the specified block, in 400 × 4 bits starting from the &lt;start&gt; address. Data whose error bit positions are inverted from those in the ED reference data can be obtained.</p>
Example	<p>To query the capture data in block 3, in 400 × 4 bits from the bit 0 address:</p> <pre>&gt; :SENSe:CAPTure:BPATtern:DATA:WHOLe? 3, #H0 &lt; "H001"</pre>
Compatibility	<p>Incompatible with existing models.</p>

**:SENSe:CAPTure:BPATtern:BDATA:WHOLe? <block>,<start>[,<size>]**

Parameter	<p>&lt;block&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  1 to 128                                      1 to 128 blocks, in 1-block steps</p> <p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;                  #H0 to #H7FFFFFFF                              0 to 7FFFFFFF bits, in 1-bit steps                  (Specify in hexadecimal)</p> <p>[&lt;size&gt;] = &lt;NR1 NUMERIC PROGRAM DATA&gt;                  1 to 16777216                                      1 to 16,777,216 bytes, in 1-byte steps</p> <p><b>Note:</b></p> <p style="padding-left: 40px;">The maximum setting is the pattern length.                  At 2 ch Combination, the setting range is doubled.                  At 4 ch Combination, the setting range is quadrupled.</p>
Response	<p>&lt;bdata&gt; = &lt;DEFINITE LENGTH ARBITRARY BLOCK RESPONSE DATA&gt;                  #XYYY&lt;binary&gt;                              X:            Number of YYY digits                  YYY:            Number of bytes of &lt;binary&gt;                  1 to 16,777,216 bytes</p> <p style="padding-left: 40px;">&lt;binary&gt;: Binary data of up to 16,777,216 bytes</p>
Function	<p>Queries the capture data in the specified block, in 16,777,216-byte binary data starting from the &lt;start&gt; address. Data whose error bit positions are inverted from those in the ED reference data can be obtained.</p>
Example	<p>To query the capture data in block 3, in 16,777,216-byte binary data from the bit 0 address:</p> <pre>&gt; :SENSe:CAPTure:BPATtern:BDATA:WHOLe? 3, #H0 &lt; #10011</pre>
Compatibility	<p>Incompatible with existing models.</p>

**:SENSe:CAPTure:BPATtern:ERRor:WHOLe? <block>,<start>**

Parameter	<p>&lt;block&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;  1 to 128                      1 to 128 blocks, in 1-block steps</p> <p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;  #H0 to #H7FFFFFFF                      0 to 7FFFFFFF bits, in 1-bit steps  (Specify in hexadecimal)</p> <p><b>Note:</b>  The maximum setting is the pattern length.  At 2 ch Combination, the setting range is doubled.  At 4 ch Combination, the setting range is quadrupled.</p>
Response	<p>&lt;data&gt; = &lt;STRING PROGRAM DATA&gt;  "H***...*"                      Returns the pattern data in hexadecimal format.  Within 400 characters (pattern data of 400 × 4 bits)</p>
Function	<p>Queries the capture error positions in the specified block, in 400 × 4 bits starting from the &lt;start&gt; address.</p>
Example	<p>To query the capture error positions in block 3, in 400 × 4 bits from the bit 0 address:</p> <pre>&gt; :SENSe:CAPTure:BPATtern:ERRor:WHOLe? 3,#H0 &lt; "H001"</pre>
Compatibility	<p>Incompatible with existing models.</p>

**:SENSe:CAPTure:BPATtern:BErRor:WHOLe? <block>,<start>[,<size>]**

Parameter	<p>&lt;block&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  1 to 128                            1 to 128 blocks, in 1-block steps</p> <p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;                  #H0 to #H7FFFFFFF                    0 to 7FFFFFFF bits, in 1-bit steps                  (Specify in hexadecimal)</p> <p>[&lt;size&gt;] = &lt;NR1 NUMERIC PROGRAM DATA&gt;                  1 to 16777216                    1 to 16,777,216 bytes, in 1-byte steps</p> <p><b>Note:</b></p> <p style="padding-left: 40px;">The maximum setting is the pattern length.                  At 2 ch Combination, the setting range is doubled.                  At 4 ch Combination, the setting range is quadrupled.</p>
Response	<p>&lt;bdata&gt; = &lt;DEFINITE LENGTH ARBITRARY BLOCK RESPONSE DATA&gt;</p> <p>#XYYY&lt;binary&gt;                    X:        Number of YYY digits                  YYY:     Number of bytes of &lt;binary&gt;                  1 to 16,777,216 bytes</p> <p style="padding-left: 40px;">&lt;binary&gt;: Binary data of up to 16,777,216 bytes</p>
Function	<p>Queries the capture error positions in the specified block, in 16,777,216-byte binary data starting from the &lt;start&gt; address.</p>
Example	<p>To query the capture error positions in block 3, in 16,777,216-byte binary data from the bit 0 address:</p> <pre>&gt; :SENSe:CAPTure:BPATtern:BErRor:WHOLe? 3,#H0 &lt; #10011</pre>
Compatibility	<p>Incompatible with existing models.</p>

## 7.4.6 Commands related to Misc tab window



Figure 7.4.6-1 Misc tab window

7.4.6.1 Pattern Sequence setting commands

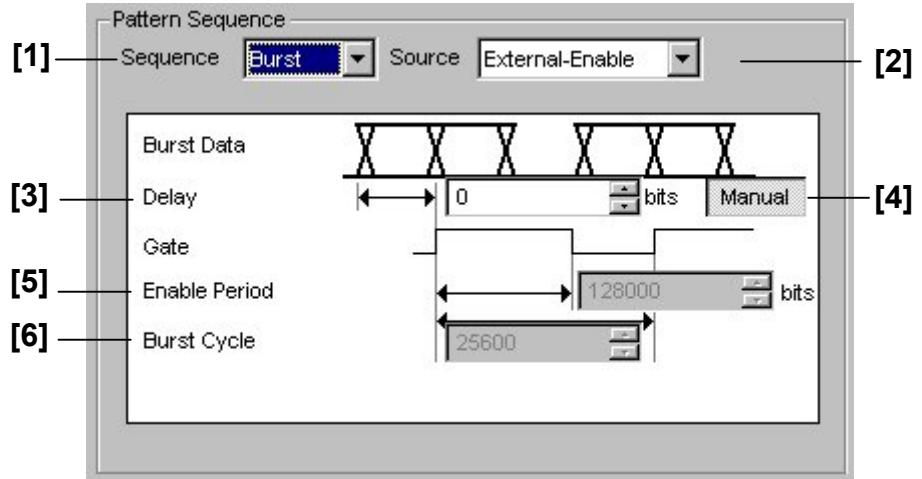


Figure 7.4.6.1-1 Pattern Sequence setting field

Table 7.4.6.1-1 Pattern Sequence setting commands

No.	Setting Items	Commands
[1]	Sequence	:SENSe:PATTern:IMODE
		:SENSe:PATTern:IMODE?
[2]	Source	:SENSe:PATTern:BURSt:MODE
		:SENSe:PATTern:BURSt:MODE?
[3]	Delay	:SENSe:PATTern:BURSt:DELAY
		:SENSe:PATTern:BURSt:DELAY?
[4]	Delay Manual/Auto	:SENSe:PATTern:BURSt:ADJust
[5]	Enable Period	:SENSe:PATTern:BURSt:ELENgth
		:SENSe:PATTern:BURSt:ELENgth?
[6]	Burst Cycle	:SENSe:PATTern:BURSt:CYCLE
		:SENSe:PATTern:BURSt:CYCLE?



**:SENSe:PATtern:IMODE <mode>**


---

Parameter	<mode> = <CHARACTER PROGRAM DATA> REPeat                    Repeat signal BURSt                    Burst signal
Function	Sets the signal reception method from Repeat (consecutive) signal or Burst signal.
Example	To set the signal reception method to Repeat signal: > :SENSe:PATtern:IMODE REPeat
Compatibility	Compatible with the MP1632C and MP1776A.

**:SENSe:PATtern:IMODE?**


---

Response	<mode> = <CHARACTER RESPONSE DATA> REP, BURS
Function	Queries the signal reception method.
Example	> :SENSe:PATtern:IMODE? < REP
Compatibility	Compatible with the MP1632C and MP1776A.

**:SENSe:PATtern:BURSt:MODE <mode>**


---

Parameter	<mode> = <CHARACTER PROGRAM DATA> INTernal                Internal EXTTrig                External Trigger EXTenable              External Enable
Function	Sets the Burst signal reception sequence.
Example	To set the Burst signal reception sequence to Internal: > :SENSe:PATtern:BURSt:MODE INTernal
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:BURSt:MODE?**


---

Response	<mode> = <CHARACTER RESPONSE DATA> INT, EXTT, EXT
Function	Queries the Burst signal reception sequence.
Example	> :SENSe:PATtern:BURSt:MODE? < INT
Compatibility	Incompatible with existing models.

### **:SENSe:PATtern:BURSt:DELay <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0 to 2147483648      0 to 2,147,483,648 bits, in 16-bit steps The maximum setting value is the Burst Cycle set value. Up to 2,147,483,584 bits can be set for <numeric> when the Burst Cycle is invalid. <b>Note:</b> At 2 ch Combination, the setting range and Step are doubled. At 4 ch Combination, the setting range and Step are quadrupled.
Function	Sets the delay value for the Burst signal.
Example	To set the delay value for the Burst signal to 0 bits: > :SENSe:PATtern:BURSt:DELay 0
Compatibility	Incompatible with existing models.

### **:SENSe:PATtern:BURSt:DELay?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries the delay value for the Burst signal.
Example	> :SENSe:PATtern:BURSt:DELay? < 0
Compatibility	Incompatible with existing models.

### **:SENSe:PATtern:BURSt:ADJust <adjust>**

---

Parameter	<adjust> = <CHARACTER PROGRAM DATA> AUTO                      Executes automatic adjustment. MANual                     Does not execute automatic adjustment
Function	Sets whether to execute automatic adjustment of Burst Trigger Delay.
Example	> :SENSe:PATtern:BURSt:ADJust AUTO
Compatibility	Incompatible with existing models.

### **:SENSe:PATtern:BURSt:ADJust?**

---

Response	<adjust> = <CHARACTER PROGRAM DATA>
Function	Queries the Burst Trigger Delay adjustment method.
Example	> :SENSe:PATtern:BURSt:ADJust? < AUTO
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:BURSt:ELENgth <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 12800 to 2147483520    12,800 to 2,147,483,520 bits, in 128-bit steps
	<b>Note:</b> At 2 ch Combination, the setting range and Step are doubled. At 4 ch Combination, the setting range and Step are quadrupled.
Function	Sets the data signal reception interval for Burst signal reception.
Example	To set the Burst signal reception interval to 12,800 bits: > :SENSe:PATtern:BURSt:ELENgth 12800
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:BURSt:ELENgth?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries the data signal reception interval for Burst signal reception.
Example	> :SENSe:PATtern:BURSt:ELENgth? < 12800
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:BURSt:CYCLe <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 25600 to 2147483648    25,600 to 2,147,483,648 bits, in 128-bit steps
	<b>Note:</b> At 2 ch Combination, the setting range and Step are doubled. At 4 ch Combination, the setting range and Step are quadrupled.
Function	Sets the Burst signal generation cycle.
Example	To set the Burst signal generation cycle to 25,600 bits: > :SENSe:PATtern:BURSt:CYCLe 25600
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:BURSt:CYCLe?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries the Burst signal generation cycle.
Example	> :SENSe:PATtern:BURSt:CYCLe? < 25600
Compatibility	Incompatible with existing models.

### 7.4.6.2 AUX Output setting commands

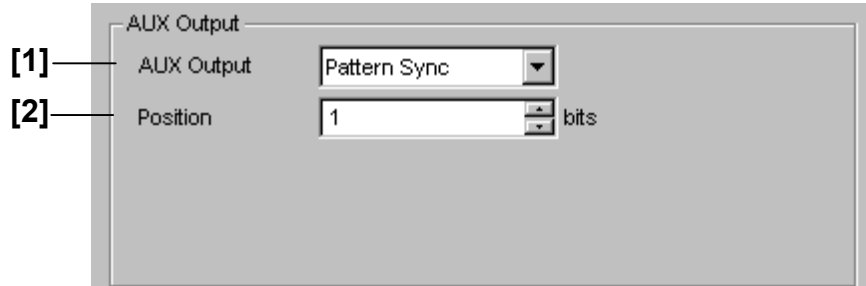


Figure 7.4.6.2-1 Pattern Sync setting  
(For PRBS, Zero Substitution, and Data patterns)

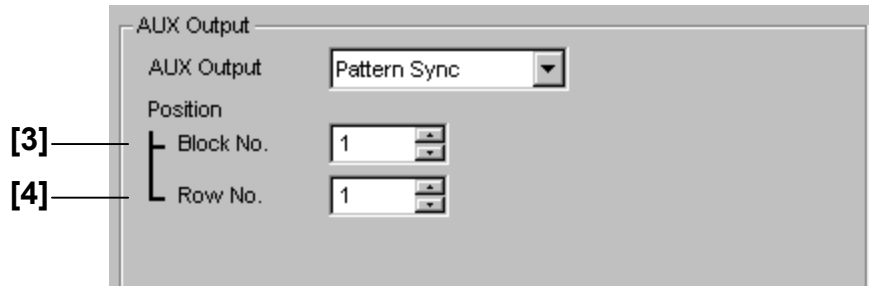


Figure 7.4.6.2-2 Pattern Sync setting (For Mixed pattern)

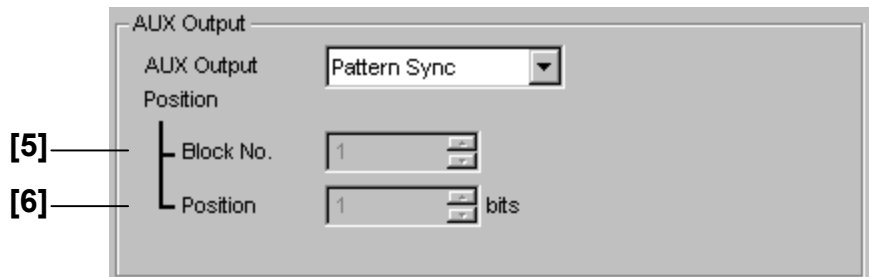


Figure 7.4.6.2-3 Pattern Sync setting (For Sequence pattern)

Table 7.4.6.2-1 AUX Output setting commands

No.	Setting Items	Commands
[1]	AUX Output	:OUTPut:SYNC:SOURce
		:OUTPut:SYNC:SOURce?
[2]	Position (PRBS, Zero Substitution, Data)	:OUTPut:SYNC:POSItion
		:OUTPut:SYNC:POSItion?
[3]	Block No. (Mixed Data)	:OUTPut:SYNC:MIXData:BLOCK
		:OUTPut:SYNC:MIXData:BLOCK?
[4]	Row No. (Mixed Data)	:OUTPut:SYNC:MIXData:ROW
		:OUTPut:SYNC:MIXData:ROW?
[5]	Block No. (Sequence)	:OUTPut:SYNC:SEQuence:BLOCK
		:OUTPut:SYNC:SEQuence:BLOCK?
[6]	Position (Sequence)	:OUTPut:SYNC:SEQuence:POSItion
		:OUTPut:SYNC:SEQuence:POSItion?

### :OUTPut:SYNC:SOURce <source>[,<numeric>]

Parameter	<source> = <CHARACTER PROGRAM DATA>	
	CLOCK8	1/8 clocks (for MU181040A-002, MU181040B-002)
	CLOCK16	1/16 clocks
	CLOCK32	1/32 clocks
	CLOCK64	1/64 clocks
	PATtern	Pattern Sync (Variable)
	SGain	Sync Gain
	ERRorout	Error Output
	FRAM	Frame
	NCLock	1/n clocks
	[<numeric>] = <DECIMAL NUMERIC PROGRAM DATA>	
	Omits <numeric> when NCLock (1/n clocks) is not selected.	
	16, 32, 64	16, 32, 64 (for MU181040A-001)
	8 to 511	8 to 511, in single step (for MU181040A-002, MU181040B-002)
Function	Sets the output signal for synchronization output.	
Example	To set the output signal for synchronization output to 1/8 clocks: > :OUTPut:SYNC:SOURce CLOCK8  To set the output signal for synchronization output to 1/511 clocks: > :OUTPut:SYNC:SOURce NCLockn, 511	
Compatibility	Compatible with the MP1632C. Partially compatible with the MP1776A.	

### **:OUTPut:SYNC:SOURce?**

---

Response	<p>&lt;source&gt; = &lt;CHARACTER RESPONSE DATA&gt;                  CLOC8, CLOC16, CLOC32, CLOC64, PATT, SGA, ERR, NCL                  [&lt;numeric&gt;] = &lt;DECIMAL NUMERIC RESPONSE DATA&gt;                  Omits &lt;numeric&gt; for other than NCL (1/n clocks).                  8 to 511</p>
Function	Queries the output signal for synchronization output.
Example	<pre>&gt; :OUTPut:SYNC:SOURce? &lt; CLOC4 &gt; :OUTPut:SYNC:SOURce? &lt; NCL,511</pre>
Compatibility	<p>Compatible with the MP1632C.                  Partially compatible with the MP1776A.</p>

### **:OUTPut:SYNC:POSition <numeric>**

---

Parameter	<p>&lt;numeric&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  1 to 68719476657      1 to 68,719,476,657 bits, in 16-bit steps</p> <p><b>Note:</b>                  At 2 ch Combination, the setting range and Step are doubled.                  At 4 ch Combination, the setting range and Step are quadrupled.</p>
Function	Sets the output position for synchronization output for Data, PRBS, and Zero Substitution patterns.
Example	<p>To set the synchronization output position to bit 1:</p> <pre>&gt; :OUTPut:SYNC:POSition 1</pre>
Compatibility	Incompatible with existing models.

### **:OUTPut:SYNC:POSition?**

---

Response	<p>&lt;numeric&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;                  1 to 274877906625      1 to 274,877,906,625 bits</p>
Function	Queries the output position for synchronization output for Data, PRBS, and Zero Substitution patterns.
Example	<pre>&gt; :OUTPut:SYNC:POSition? &lt; 1</pre>
Compatibility	Incompatible with existing models.

**:OUTPut:SYNC:MIXData:BLOCK <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 511                      1 to 511 blocks, 1-block steps The maximum setting value is the value set in Block No.
Function	Sets the output block for synchronization output for Mixed Data pattern.
Example	To set the output block for synchronization output to block 1: > :OUTPut:SYNC:MIXData:BLOCK 1
Compatibility	Incompatible with existing models.

**:OUTPut:SYNC:MIXData:BLOCK?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries the output block for synchronization output for Mixed Data pattern.
Example	> :OUTPut:SYNC:MIXData:BLOCK? < 1
Compatibility	Incompatible with existing models.

**:OUTPut:SYNC:MIXData:ROW <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 16                      1 to 16 Rows, in 1-row steps The maximum setting value is the value set in Row No.
Function	Sets the output Row position for synchronization output for Mixed Data pattern.
Example	To set the synchronization output Row to 1 Row. > :OUTPut:SYNC:MIXData:ROW 1
Compatibility	Incompatible with existing models.

**:OUTPut:SYNC:MIXData:ROW?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1 to 16                      1 to 16 Rows
Function	Queries the output Row position for synchronization output for Mixed Data pattern.
Example	> :OUTPut:SYNC:MIXData:ROW? < 1
Compatibility	Incompatible with existing models.

### **:OUTPut:SYNC:SEQuence:BLOCK <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 blocks, 1-block steps The maximum setting value is the value set in Block No.
Function	Sets the output block for synchronization output for Sequence pattern.
Example	To set the output block for synchronization output to block 128: > :OUTPut:SYNC:SEQuence:BLOCK 128
Compatibility	Incompatible with existing models.

### **:OUTPut:SYNC:SEQuence:BLOCK?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries the output block for synchronization output for Sequence pattern.
Example	> :OUTPut:SYNC:SEQuence:BLOCK? < 128
Compatibility	Incompatible with existing models.

### **:OUTPut:SYNC:SEQuence:POSItion <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 1048497                      1 to 1,048,497 bits, in 16-bit steps
Function	Sets the output position for synchronization output for Sequence pattern.
Example	To set the synchronization output position to bit 1: > :OUTPut:SYNC:SEQuence:POSItion 1
Compatibility	Incompatible with existing models.

### **:OUTPut:SYNC:SEQuence:POSItion?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1 to 1048497                      1 to 1,048,497 bits
Function	Queries the output position for synchronization output for Sequence pattern.
Example	> :OUTPut:SYNC:SEQuence:POSItion? < 1
Compatibility	Incompatible with existing models.



### 7.4.6.3 AUX Input setting commands

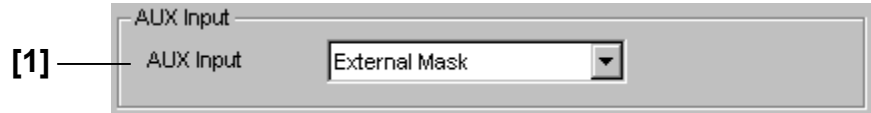


Figure 7.4.6.3-1 Auto Input setting field

Table 7.4.6.3-1 Auto Input setting commands

No.	Setting Item	Commands
[1]	AUX Input	:INPut:AUX:USAGe
		:INPut:AUX:USAGe?

#### :INPut:AUX:USAGe <usage>

Parameter	<usage> = <CHARACTER PROGRAM DATA> BURSt Burst Source MASK External Mask CAPTure Capture External Trigger
Function	Sets the usage of the common connector input.
Example	To set the usage of the common connector input to Burst Source: > :INPut:AUX:USAGe BURSt
Compatibility	Incompatible with existing models.

#### :INPut:AUX:USAGe?

Response	<usage> = <CHARACTER RESPONSE DATA> BURS, MASK, CAPT
Function	Queries the usage of the common connector input.
Example	> :INPut:AUX:USAGe? < BURS
Compatibility	Incompatible with existing models.

#### 7.4.6.4 Measurement Restart setting commands



Figure 7.4.6.4-1 Measurement Restart setting field

Table 7.4.6.4-1 Measurement Restart setting commands

No.	Setting Item	Commands
[1]	Measurement Restart	:SENSe:MEASure:MRStart :SENSe:MEASure:MRStart?

#### :SENSe:MEASure:MRStart <data>,<clock>

Parameter	<data> = <BOOLEAN PROGRAM DATA> 0 or OFF 1 or ON <clock> = <BOOLEAN PROGRAM DATA> 0 or OFF 1 or ON	Does not restart measurement when the data threshold is changed (Measurement restart at data threshold change OFF). Restarts measurement when the data threshold is changed (Measurement restart at data threshold change ON). Does not restart measurement when the clock delay is changed (Measurement restart at clock delay change OFF). Restarts measurement when the clock delay is changed (Measurement restart at clock delay change ON).
Function	Sets the measurement restart condition.	
Example	To set the measurement restart condition to "Measurement restart at data threshold change ON, Measurement restart at clock delay change ON". > :SENSe:MEASure:MRStart 1,1	
Compatibility	Incompatible with existing models.	

#### :SENSe:MEASure:MRStart?

Response	<data>,<clock> = <NR1 NUMERIC RESPONSE DATA> 0 1	Measurement restart OFF Measurement restart ON
Function	Queries the measurement restart condition.	
Example	> :SENSe:MEASure:MRStart? < 1,1	
Compatibility	Incompatible with existing models.	

## 7.5 Optical Module Commands

This section describes the optical module commands. The target modules are as follows:

Before executing a setting/query command for the MU181600A or the MU181601A, specify the slot number of the module to be remotely controlled, by using the :MODULE:ID command. Refer to Section 7.1 "Common Commands" and 9.1 "Basic Operation of Device Messages" for how to specify a slot number with the :MODULE:ID command.

MU181600A Optical Transceiver (XFP)

MU181601A Optical Transceiver (SFP)

### 7.5.1 XFP/SFP module

This section describes the setting commands for the MU181600A Optical Transceiver (XFP) and the MU181601A Optical transceiver (SFP).

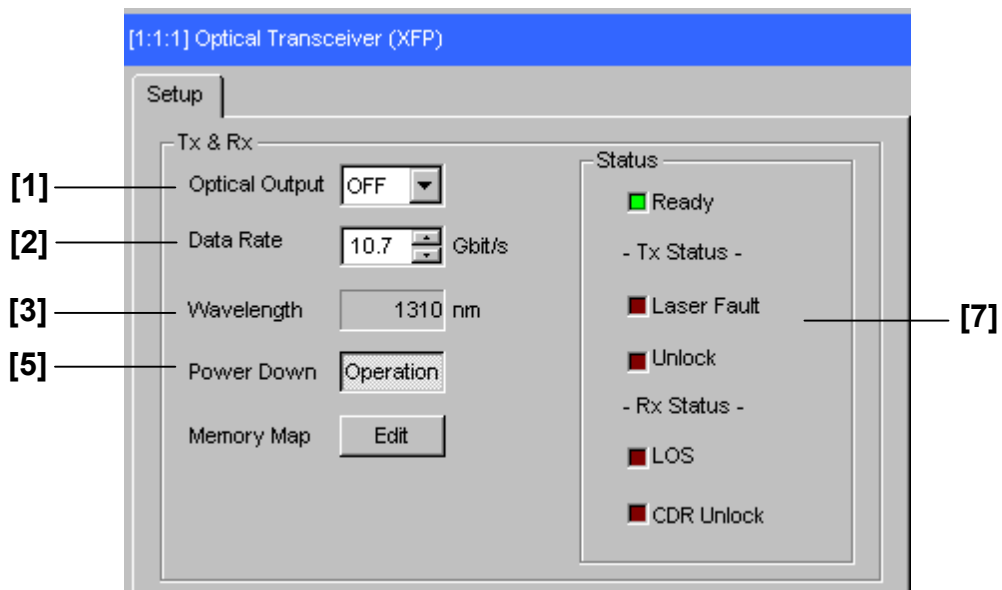


Figure 7.5.1-1 XFP screen

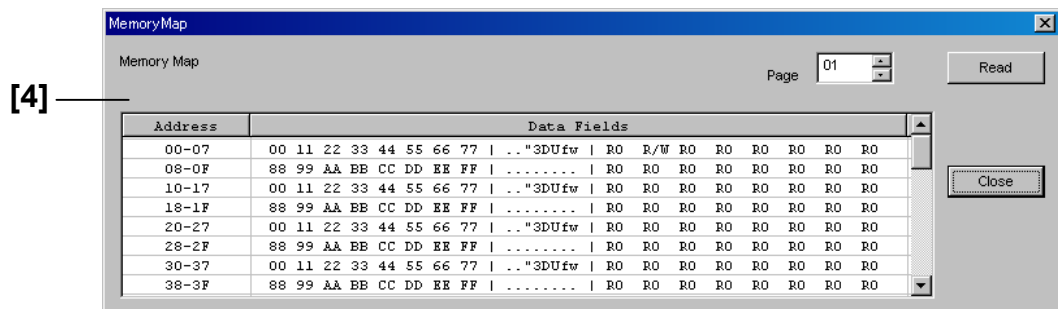


Figure 7.5.1-2 Memory Map setting (XFP)

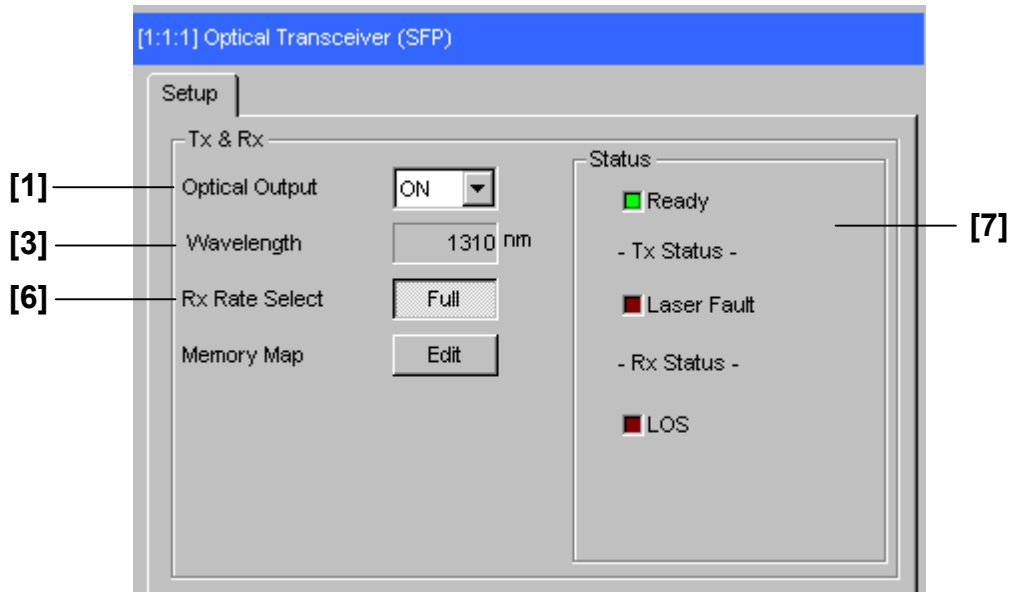


Figure 7.5.1-3 SFP screen

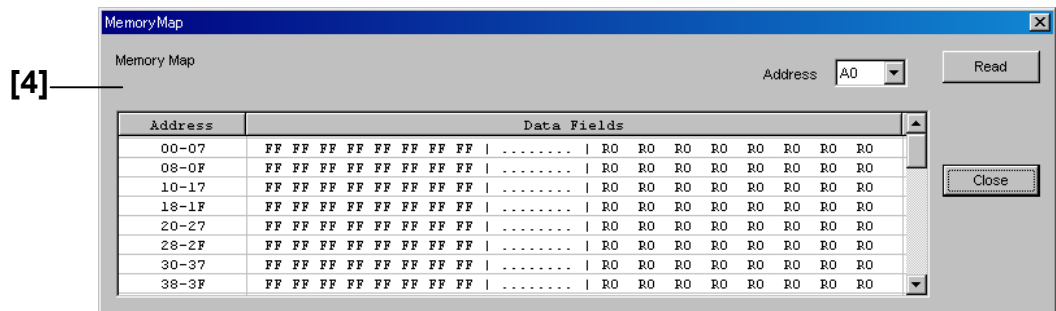


Figure 7.5.1-4 Memory Map setting (SFP)

Table 7.5.1-1 XFP/SFP module

No.	Setting Items	Commands
[1]	Optical Output	:SOURce:OPTical:SIGNal:OUTPut
		:SOURce:OPTical:SIGNal:OUTPut?
[2]	Data Rate	:SOURce:OPTical:SIGNal:DRATe
		:SOURce:OPTical:SIGNal:DRATe?
[3]	Wavelength	:SOURce:OPTical:SIGNal:WLENgth?
[4]	Memory Map	:SENSE:OPTical:SIGNal:MEMory:DATA
		:SENSE:OPTical:SIGNal:MEMory:ASCii?
		:SENSE:OPTical:SIGNal:MEMory:HEX?
[5]	Power Down	:SENSE:OPTical:POWERdown
		:SENSE:OPTical:POWERdown?
[6]	RX Rate Select	:SENSE:OPTical:RATeselect
		:SENSE:OPTical:RATeselect?
[7]	Status	:CALCulate:OPTical:STATus?

**:SOURce:OPTical:SIGNal:OUTPut <boolean>**


---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> OFF or 0                      Optical output OFF ON or 1                        Optical output ON
Function	Sets optical output ON/OFF.
Example	To set optical output ON: > :SOURce:OPTical:SIGNal:OUTPut ON
Compatibility	Incompatible with existing models.

**:SOURce:OPTical:SIGNal:OUTPut?**


---

Response	<boolean> = <NR1 NUMRIC RESPONSE DATA> 0                                Optical output OFF 1                                Optical output ON <b>Note:</b> "----" is returned when no XFP/SFP module is inserted.
Function	Queries the ON/OFF state of optical output.
Example	To query the ON/OFF state of optical output: > :SOURce:OPTical:SIGNal:OUTPut? < 1 < ---- (when no XFP/SFP module is inserted)
Compatibility	Incompatible with existing models.

**:SOURce:OPTical:SIGNal:DRATe <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> For the recommended 850 nm XFP module: 9.9 to 11.1                    9.9 to 11.1 Gbit/s, in 0.2-Gbit/s steps Invalid for the recommended 1310 nm and 1550 nm XFP modules. For XFP modules other than recommended ones: 9.5 to 12.5                    9.5 to 12.5 Gbit/s, in 0.2-Gbit/s steps
Function	Sets the optical I/O interface data rate of the XFP module. Enable/disable state and operating range vary depending on the recommended module.
Example	To set the I/O interface data rate of the XFP module to 9.9 Gbit/s: > :SOURce:OPTical:SIGNal:DRATe 9.9
Compatibility	Incompatible with existing models.

### **:SOURce:OPTical:SIGNal:DRATE?**

---

Response	<numeric> = <NR1 NUMRIC RESPONSE DATA> 9.5 to 12.5                      9.5 to 12.5 Gbit/s "----" is returned for an invalid value. <b>Note:</b> "----" is returned when no XFP/SFP module is inserted.
Function	Queries the optical I/O interface data rate of the XFP module.
Example	To query the optical I/O interface data rate of the XFP module: > :SOURce:OPTical:SIGNal:DRATE? < 9.9 < ---- (when no XFP/SFP module is inserted)
Compatibility	Incompatible with existing models.

### **:SOURce:OPTical:SIGNal:WLENgth?**

---

Response	<string> = <STRING RESPONSE DATA> "XXXX"            Display            XXXX (Up to four digits, right-aligned) "----"            Disabled            ---- (Four characters)
Function	Queries the optical wavelength used at the optical I/O interface.
Example	To query the optical wavelength used at the optical I/O interface: > :SOURce:OPTical:SIGNal:WLENgth? < "850" < "---- " (when no XFP/SFP module is inserted)
Compatibility	Incompatible with existing models.

**:SENSe:OPTical:SIGNal:MEMory:DATA <page>,<address>,<data>**

Parameter	<p>&lt;page&gt; = &lt;NON-DECIMAL NUMERIC PROGRAM DATA&gt;</p> <p>For the XFP module:  P00 to PFF                    00 to FF (Hexadecimal)</p> <p>For SFP module:  A0/A2</p> <p>&lt;address&gt; = &lt;CHARACTER PROGRAM DATA&gt;</p> <p>A00 to AFF                    00 to FF</p> <p>&lt;data&gt; = &lt;STRING PROGRAM DATA&gt;</p> <p>"00" to "FF"                    00 to FF</p> <p>Each byte is delimited with a comma (,) (up to 32 bytes).</p> <p><b>Note:</b></p> <p style="padding-left: 40px;">Data written outside the address range is invalid.</p>
Function	Sets the module register.
Example	<p>To set data "FF,FF,FF,FF" from Address 00 on Page 00 in the register of the XFP module:</p> <p>&gt; :SENSe:OPTical:SIGNal:MEMory:DATA P00,A00, "FF,FF,FF,FF"</p>
Compatibility	Incompatible with existing models.

**:SENSe:OPTical:SIGNal:MEMory:AScii? <page>,<address>,<size>**

---

Parameter	<p>&lt;page&gt; = &lt;CHARACTER PROGRAM DATA&gt;          For the XFP module:          P00 to PFF                    00 to FF (Hexadecimal)          For the SFP module:          A0/A2          &lt;address&gt; = &lt;CHARACTER PROGRAM DATA&gt;          A00 to AFF                    00 to FF          &lt;size&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;          0 to 32                        0 to 32 byte In 1 step</p>
Response	<p>&lt;data&gt; = &lt;STRING RESPONSE DATA&gt;          A character string other than 0x20-0x7e is output replaced by '?.'          Each byte is delimited with a comma (.).  <b>Note:</b>              When the size exceeding the address range is specified, data within the address range is returned.              "----" is returned when no XFP/SFP module is inserted.</p>
Function	<p>Queries the data in the register on the module in ASCII characters.</p>
Example	<p>To query the 4-byte data from Address 00 on Page 00 in the register of the XFP module in ASCII character:          &gt; :SENSe:OPTical:SIGNal:MEMory:AScii? P00,A00,4          &lt; "? , a , b , ?"          &lt; "- , - , - , -" (non-display area)</p>
Compatibility	<p>Incompatible with existing models.</p>



**:SENSe:OPTical:SIGNal:MEMory:HEX? <page>,<address>,<size>**

Parameter	<p>&lt;page&gt; = &lt;CHARACTER PROGRAM DATA&gt;  For the XFP module  P00 to PFF                    00 to FF (Hexadecimal)  For the SFP module  A0/A2  &lt;address&gt; = &lt;CHARACTER PROGRAM DATA&gt;  A00 to AFF                    00 to FF  &lt;size&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;  0 to 32                        0 to 32 byte In 1 step</p>
Response	<p>&lt;data&gt; = &lt;STRING RESPONSE DATA&gt;  "00" to "FF"                    00 to FF  Each byte is delimited with a comma (.).  <b>Note:</b>  When the size exceeding the address range is specified, data within the address range is returned.  "----" is returned when no XFP/SFP module is inserted.</p>
Function	Queries the data in the register on the module in hexadecimal format.
Example	<p>To query the 4-byte data from Address 00 on Page 00 in the register of the XFP module in hexadecimal format:  &gt; :SENSe:OPTical:SIGNal:MEMory:HEX? P00,A00,4  &lt; "FF,FF,FF,FF"</p>
Compatibility	Incompatible with existing models.

**:CALCulate:OPTical:STATus? <string>**

Parameter <string> = <STRING PROGRAM DATA>  
 "REAdy" Ready  
 "TX:LASer" Tx: Laser  
 "TX:UNLock" Tx: Unlock (Cannot be set for the SFP module (MU181601A).)  
 "RX:LOS" Rx: LOS  
 "RX:CDR" Rx: CDR unlock (Cannot be set for the SFP module (MU181601A).)  
 Response <string> = <STRING RESPONSE DATA>

**Table 7.5.1-2 Response format**

Type	Format	Description
Form1	"Occur"	When the specified status occurs.
	"None"	When the specified status does not occur.
	"-----"	When no data corresponds to the query

Function Queries the status.  
 Example To query whether optical output of the module is normal:  
 > :CALCulate:OPTical:STATus? "TX:LASer"  
 < "None"  
 Compatibility Incompatible with existing models.

**:SOURce:OPTical:POWerdown <power>**

Parameter <power> = <CHARACTER PROGRAM DATA>  
 STANdbY Standby mode  
 OPERation Normal operation mode  
 Function Sets the XFP module to the standby mode.  
 Example To set the XFP module to the standby mode:  
 > :SOURce:OPTical:POWerdown STANdbY  
 Compatibility Incompatible with existing models.

**:SOURce:OPTical:POWerdown?**


---

Response	<power> = <CHARACTER RESPONSE DATA> STAN, OPER <b>Note:</b> "----" is returned when no XFP module is inserted.
Function	Queries the standby mode setting state of the XFP module.
Example	> :SOURce:OPTical:POWerdown? < STANdby < "----" (when no XFP module is inserted)
Compatibility	Incompatible with existing models.

**:SOURce:OPTical:RATeselect <ratesel>**


---

Parameter	<ratesel> = <CHARACTER PROGRAM DATA> REDuced                      Enables band restriction FULL                            Disables band restriction
Function	Enables/disables band restriction for the SFP module.
Example	To enable band restriction for the SFP module: > :SOURce:OPTical:RATeselect REDuced
Compatibility	Incompatible with existing models.

**:SOURce:OPTical:RATeselect?**


---

Response	<ratesel> = <CHARACTER RESPONSE DATA> RED, FULL <b>Note:</b> "----" is returned when no SFP module is inserted.
Function	Queries the band restriction setting state for the SFP module.
Example	> :SOURce:OPTical:RATeselect? < "----" (when no SFP module is inserted) < FULL
Compatibility	Incompatible with existing models.

## 7.6 Automatic Measurement Commands

This section describes the commands for the measurement application. Before starting to use the automatic measurement commands, specify the automatic measurement function to be operated by using the ":SYSTem:CFUNction" command. Refer to Section 7.1 "Common Commands" and 9.1 "Basic Operation of Device Messages" for how to specify a slot number with the :SYSTem:CFUNction.

### 7.6.1 ISI measurement

This section describes the commands for ISI measurement.

#### 7.6.1.1 Measurement setting commands

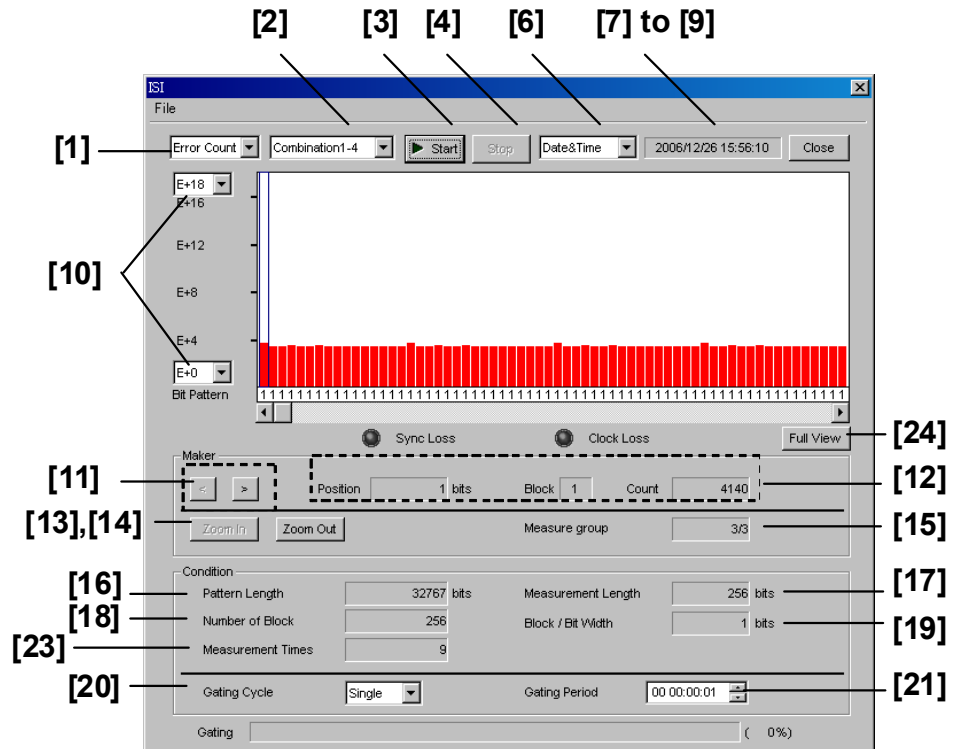


Figure 7.6.1.1-1 ISI measurement window

Table 7.6.1.1-1 ISI measurement setting commands

No.	Setting Items/Read Items	Commands
[1]	Setting item selection	:DISPlay:RESult:ISI:ITEM :DISPlay:RESult:ISI:ITEM?
[2]	Slot selection	:SENSe:MEASure:ISI:SELSlot :SENSe:MEASure:ISI:SELSlot?
[3]	Start	:SENSe:MEASure:START
[4]	Stop	:SENSe:MEASure:ISI:STOP
[5]	No label (Query for measurement state)	:SENSe:MEASure:ISI:STATE?

Table 7.6.1.1-1 ISI measurement setting commands (Cont'd)

No.	Setting Items/Read Items	Commands
[6]	Measurement time display selection	:DISPlay:RESult:ISI:TIME
		:DISPlay:RESult:ISI:TIME?
[7]	Query for Date&Time	:SENSe:MEASure:ISI:DTIME?
[8]	Query for measurement start time	:SENSe:MEASure:ISI:STARt?
[9]	Query for measurement elapsed time	:SENSe:MEASure:ISI:ELAPsed?
[10]	Scale setting	:DISPlay:RESult:ISI:SCALE
		:DISPlay:RESult:ISI:SCALE?
[11]	Marker movement	:DISPlay:RESult:ISI:MMOve
[12]	Query for marker position	:DISPlay:RESult:ISI:MARKer?
[13]	Zoom In	:DISPlay:RESult:ISI:ZIN
[14]	Zoom Out	:DISPlay:RESult:ISI:ZOUT
[15]	Query for measurement layer	:DISPlay:RESult:ISI:DEPTh?
[16]	Pattern Length	:DISPlay:RESult:ISI:PLENght?
[17]	Measurement Length	:DISPlay:RESult:ISI:MLENght?
[18]	Number of Block	:DISPlay:RESult:ISI:BLOCK?
[19]	Block/Bit Width	:DISPlay:RESult:ISI:BWIDth?
[20]	Gating Cycle	:SENSe:MEASure:ISI:MODE
		:SENSe:MEASure:ISI:MODE?
[21]	Gating Period	:SENSe:MEASure:ISI:PERiod
		:SENSe:MEASure:ISI:PERiod?
[22]	No label (Query for measurement result)	:CALCulate:DATA:ISI?
[23]	Measurement Times	:DISPlay:RESult:ISI:MTIMes?
[24]	Full View	:DISPlay:RESult:ISI:FVIEw
		:DISPlay:RESult:ISI:FVIEw?

**:DISPlay:RESult:ISI:ITEM <mode>**

Parameter	<mode> = <CHARACTER PROGRAM DATA>
	COUNT                      Error Count
	RATE                        Error Rate
Function	Selects the measurement items displayed during ISI measurement.
Example	To set the measurement items displayed during ISI measurement to Error Count: > :DISPlay:RESult:ISI:ITEM COUNT
Compatibility	Incompatible with existing models.

### **:DISPlay:RESult:ISI:ITEM?**

Response	<mode> = <CHARACTER RESPONSE DATA> COUN, RATE
Function	Queries the measurement items displayed during ISI measurement.
Example	> :DISPlay:RESult:ISI:ITEM? < COUN
Compatibility	Incompatible with existing models.

### **:SENSE:MEASure:ISI:SELSlot <slot>[,<unit>]**

Parameter	<slot> = <CHARACTER PROGRAM DATA> SLOT1 to SLOT6          Slots No. 1 to No. 6 1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A Any of 1 through 4 can be selected when the target slot constitutes a 1- to 4-CH combination. [<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number. Can be omitted. Mainframe No. 1 is specified when omitted.
Function	Selects the slot and combination group for which to perform ISI measurement.
Example	To set Slot1 to perform ISI measurement: > :SENSE:MEASure:ISI:SELSlot SLOT1
Compatibility	Incompatible with existing models.

### **:SENSE:MEASure:ISI:SELSlot? [<unit>]**

Parameter	[<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number. Can be omitted. Mainframe No. 1 is specified when omitted.
Response	<slot> = <CHARACTER RESPONSE DATA> SLOT1 to SLOT6          Slots No. 1 to No. 6 The first slot number is returned if the target slot constitutes a combination. 1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A
Function	Queries the slot and combination group for which to perform ISI measurement.
Example	> :SENSE:MEASure:ISI:SELSlot? < SLOT1
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:START**


---

Function	Stats ISI measurement.
Example	> :SENSe:MEASure:START
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:ISI:STOP**


---

Function	Stops ISI measurement
Example	> :SENSe:MEASure:ISI:STOP
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:ISI:STATe?**


---

Response	<boolean> = <NR1 NUMERIC RESPONSE DATA> 1 ISI measurement has been started. 0 ISI measurement has been stopped.
Function	Queries the ISI measurement processing state.
Example	> :SENSe:MEASure:ISI:STATe? < 1
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:ISI:TIME <type>**


---

Parameter	<type> = <CHARACTER PROGRAM DATA> DTIME Displays the current date and time. START Displays the measurement start time. ELAPsed Displays the elapsed time based on the measurement period.
Function	Selects the ISI measurement time display type.
Example	To set the ISI measurement time display type to measurement start time (Start Time): > :DISPlay:RESult:ISI:TIME START
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:ISI:TIME?**


---

Response	<type> = <CHARACTER RESPONSE DATA> DTIM, STAR, ELAP
Function	Queries the ISI measurement time display type.
Example	> :DESPlay:RESult:ISI:TIME? < STAR
Compatibility	Incompatible with existing models.

### :SENSe:MEASure:ISI:DTIME?

---

Response	<pre> &lt;year&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 2000 to 2036          2000 to 2036 year &lt;month&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 1 to 12              January to December &lt;day&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 1 to 31              1st to 31st &lt;hour&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0 to 23              0 to 23 hours &lt;minute&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0 to 59              0 to 59 minutes &lt;second&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0 to 59              0 to 59 seconds                     </pre>
Function	Queries the current date and time during ISI measurement.
Example	<pre> &gt; :SENSe:MEASure:ISI:DTIME? &lt; 2006,4,1,23,59,59                     </pre>
Compatibility	Incompatible with existing models.

### :SENSe:MEASure:ISI:START?

---

Response	<pre> &lt;year&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0, 2000 to 2036      2000 to 2036 year &lt;month&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0, 1 to 12           January to December &lt;day&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0, 1 to 31           1st to 31st &lt;hour&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0 to 23              0 to 23 hours &lt;minute&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0 to 59              0 to 59 minutes &lt;second&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0 to 59              0 to 59 seconds                     </pre> <p><b>Note:</b></p> <p>The following is output when no measurement is performed:</p> <pre> &lt; 0,0,0,0,0,0                     </pre>
Function	Queries the ISI measurement start time.
Example	<pre> &gt; :SENSe:MEASure:ISI:START? &lt; 2006,4,1,23,59,59                     </pre>
Compatibility	Incompatible with existing models.



**:SENSe:MEASure:ISI:ELAPsed?**

Response	<pre>&lt;day&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0 to 99                0 to 99 days &lt;hour&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0 to 23                0 to 23 hours &lt;minute&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0 to 59                0 to 59 minutes &lt;second&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0 to 59                0 to 59 seconds</pre> <p><b>Note:</b> The following is output when no measurement is performed: &lt; 0,0,0,0</p>
Function	Queries the ISI measurement elapsed time.
Example	<pre>&gt; :SENSe:MEASure:ISI:ELAPsed? &lt; 99, 23, 59, 59</pre>
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:ISI:SCALE <top>,<bottom>**

Parameter	<pre>&lt;top&gt; = &lt;CHARACTER PROGRAM DATA&gt; E_3 to E_14          E-3 to E-14, in single steps (When the                     measurement item is Rate) E_2 to E_18          E+2 to E+18, in single steps (When the                     measurement item is Count) &lt;bottom&gt; = &lt;CHARACTER PROGRAM DATA&gt; E_6 to E_18          E-6 to E-18, in single steps (When the                     measurement item is Rate) E_0 to E_14          E+0 to E+14, in single steps (When the                     measurement item is Count)</pre> <p>The &lt;bottom&gt; value must be greater than the &lt;top&gt; value when set to Rate, and the &lt;top&gt; value must be greater than the &lt;bottom&gt; value when set to Count).</p>
Function	Sets the ISI measurement vertical scale.
Example	<p>To set the ISI measurement vertical scale as top: E-3 and bottom: E-5 when the measurement item is Rate:</p> <pre>&gt; :DISPlay:RESult:ISI:SCALE E_3,E_5</pre>
Compatibility	Incompatible with existing models.

### **:DISPlay:RESult:ISI:SCALE?**

---

Response	<code>&lt;top&gt;,&lt;bottom&gt; = &lt;CHARACTER RESPONSE DATA&gt;</code> <code>E_18 to E_0</code> E-18 to E+0, in single steps (When the measurement item is Rate) <code>E_0 to E_18</code> E+0 to E+18, in single steps (When the measurement item is Count)
Function	Queries the ISI measurement vertical scale when the measurement item is Rate.
Example	<code>&gt; :DISPlay:RESult:ISI:SCALE?</code> <code>&lt; E_3,E_5</code>
Compatibility	Incompatible with existing models.

### **:DISPlay:RESult:ISI:MMOVE <move>**

---

Parameter	<code>&lt;move&gt; = &lt;CHARACTER PROGRAM DATA&gt;</code> <code>LEFT</code> Moves to the left <code>RIGHT</code> Moves to the right
Function	Sets the ISI measurement marker moving direction.
Example	To move the ISI measurement marker to the left: <code>&gt; :DISPlay:RESult:ISI:MMOVE LEFT</code>
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:ISI:MARKer?**

Response <pos> = <NR1 NUMERIC RESPONSE DATA>  
 1 to 2275483648 1 to 2,275,483,648 bits  
 Maximum value: Maximum length of Mixed Data pattern  
 Multiplied by 2 or 4 in the case of Combination.  
 <block> = <NR1 NUMERIC RESPONSE DATA>  
 1 to 256 1 to 256 blocks  
 <count> = <STRING RESPONSE DATA>  
 Form1  
 <rate> = <STRING RESPONSE DATA>  
 Form2

**Table 7.6.1.1-2 Response Format**

Form	Format	Description
Form1	"XXXXXXXX"	When 0 to 9999999
Integer type	"X.XXXXEXX"	When 1.0000E07 to 9.9999E17
	"-----"	When no data corresponds to the query.
Form2	"X.XXXXE-XX"	When 0.0001E-18 to 1.0000E00
Fraction type	"-----"	When no data corresponds to the query.

Function Queries the error count and error rate at the marker position.  
 Example > :DISPlay:RESult:ISI:MARKer?  
 < 134217728,64, " 0", "0.0001E-18"  
 Compatibility Incompatible with existing models.

**:DISPlay:RESult:ISI:ZIN**

Function Specifies the Bit Width of the Pattern Position indicated by the ISI measurement marker to be the Measurement Length of the measurement to be performed next.  
 Example > :DISPlay:RESult:ISI:ZIN  
 Compatibility Incompatible with existing models.

**:DISPlay:RESult:ISI:ZOUT**

Function Changes the result display from the current ISI measurement result to the result of a higher layer.  
 Example > :DISPlay:RESult:ISI:ZOUT  
 Compatibility Incompatible with existing models.

### **:DISPlay:RESult:ISI:DEPTH?**

---

Response	<code>&lt;depth1&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;</code> 1 to 6                      The layer displaying the measurement result <code>&lt;depth2&gt; = &lt;NR2 NUMERIC RESPONSE DATA&gt;</code> 1 to 6                      All layers <b>Note:</b> <code>&lt;depth1&gt;</code> and <code>&lt;depth2&gt;</code> correspond to the displayed layer and all layers, respectively.
Function	Queries the ISI measurement layer.
Example	<code>&gt; :DISPlay:RESult:ISI:DEPTH?</code> <code>&lt; 2,5</code>
Compatibility	Incompatible with existing models.

### **:DISPlay:RESult:ISI:PLENgtH?**

---

Response	<code>&lt;length&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;</code> 2 to 2281701376            2 to 2,281,701,376 bits Maximum value: Maximum length of Mixed Data pattern Multiplied by 4 in the case of Combination.
Function	Queries the ISI measurement Pattern Length.
Example	<code>&gt; :DISPlay:RESult:ISI:PLENgtH?</code> <code>&lt; 134217728</code>
Compatibility	Incompatible with existing models.

### **:DISPlay:RESult:ISI:MLENgtH?**

---

Response	<code>&lt;length&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;</code> 2 to 2281701376            2 to 2,281,701,376 bits Maximum value: Maximum length of Mixed Data pattern Multiplied by 4 in the case of Combination.
Function	Queries the ISI Measurement Length.
Example	<code>&gt; :DISPlay:RESult:ISI:MLENgtH?</code> <code>&lt; 134217728</code>
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:ISI:BLOCK?**


---

Response	<block> = <NR1 NUMERIC RESPONSE DATA> 2 to 256                            2 to 256 blocks
Function	Queries the ISI measurement block division number.
Example	> :DISPlay:RESult:ISI:BLOCK? < 64
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:ISI:BWIDth?**


---

Response	<width> = <NR1 NUMERIC RESPONSE DATA> 1 to 285212672                    1 to 285,212,672 bits Maximum value: Maximum length of Mixed Data pattern/64 Multiplied by 2 or 4 in the case of Combination.
Function	Queries the number of bits within one block in ISI measurement.
Example	> :DISPlay:RESult:ISI:BWIDth? < 2097152
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:ISI:MODE <mode>**


---

Parameter	<mode> = <CHARACTER PROGRAM DATA> SINGle                                Single measurement UNTimed                               Untimed measurement
Function	Selects the measurement processing mode.
Example	To set the measurement processing mode to Single measurement: > :SENSe:MEASure:ISI:MODE SINGle
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:ISI:MODE?**


---

Response	<mode> = <CHARACTER RESPONSE DATA> SING, UNT
Function	Queries the synchronization output type.
Example	> :SENSe:MEASure:ISI:MODE? < SING
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:ISI:PERiod <day>,<hour>,<min>,<second>**

Parameter	<day>,<hour>,<min>,<second> = <DECIMAL NUMERIC PROGRAM DATA>	
	<day> 00 to 99	0 to 99 days, in 1-day steps
	<hour> 00 to 23	0 to 23 hours, in 1-hour steps
	<min> 00 to 59	0 to 59 minutes, in 1-minute steps
	<second> 00 to 59	0 to 59 seconds, in 1-second steps
Function	Sets the ISI measurement time.	
Example	To set the ISI measurement time to 99 days, 23 hours, 59 minutes, 59 seconds: > :SENSe:MEASure:ISI:PERiod 99,23,59,59	
Compatibility	Incompatible with existing models.	

### **:SENSe:MEASure:ISI:PERiod?**

Response	<day>,<hour>,<min>,<second> = <NR1 NUMERIC RESPONSE DATA>	
	<day> 0 to 99	0 to 99 days
	<hour> 00 to 23	0 to 23 hours
	<min> 00 to 59	0 to 59 minutes
	<second> 00 to 59	0 to 59 seconds
	<b>Note:</b> Each response consists of two digits (for example, 01,01,01,01).	
Function	Queries the ISI measurement time.	
Example	> :SENSe:MEASure:ISI:PERiod? < 99,23,59,59	
Compatibility	Incompatible with existing models.	

**:CALCulate:DATA:ISI? <pos>**

Parameter	<pos> = <DECIMAL NUMERIC PROGRAM DATA> 2 to 2281701376            2 to 2,281,701,376 bits Maximum value: Maximum length of Mixed Data pattern Multiplied by 4 in the case of Combination.
Response	<count> = <STRING RESPONSE DATA> Form1 <rate> = <STRING RESPONSE DATA> Form2

**Table 7.6.1.1-3 Response Format**

Form	Format	Description
Form1	"XXXXXXXX"	When 0 to 9999999
Integer type	"X.XXXXEXX"	When 1.0000E07 to 9.9999E17
	"-----"	When no data corresponds to the query.
Form2	"X.XXXxE-XX"	When 0.0001E-18 to 1.0000E00
Fraction type	"-----"	When no data corresponds to the query.

Function	Queries the error count and error rate of the block including the specified position.
Example	> :CALCulate:DATA:ISI? 134217728 < "        0", "0.0001E-18"
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:ISI:MTIMes?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1 to 26367187500000            1 to 26,367,187,500,000 times
Function	Queries the number of pattern repetition times for ISI measurement.
Example	> :DISPlay:RESult:ISI:MTIMes? < 1
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:ISI:FVlew <boolean>**

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> ON or 1                            Full View mode OFF or 0                            Normal view mode
Function	This command is valid for the lower-most layer during ISI measurement, when Combination is configured. Used to set the graph display mode.
Example	To set Full View mode for the graph display mode during ISI measurement when Combination is configured: > :DISPlay:RESult:ISI:FVlew ON
Compatibility	Incompatible with existing models.

## **:DISPlay:RESult:ISI:FVlew?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1 Full View mode. 0 Normal view mode.
Function	Queries the graph display mode during ISI measurement.
Example	> :DISPlay:RESult:ISI:FVlew? < 1
Compatibility	Incompatible with existing models.



## 7.6.1.2 File menu setting commands

Table 7.6.1.2-1 File menu setting commands

No.	Setting Items	Commands
[1]	Open	:SYSTem:MMEMory:ISI:RECall
[2]	Save	:SYSTem:MMEMory:ISI:STORe
[3]	Print	:SYSTem:PRINt:ISI

**:SYSTem:MMEMory:ISI:RECall <file\_name>**

Parameter	<file_name> = <STRING PROGRAM DATA> "<drv>:\[<dir>]<file>" <drv> = C,D,E,F <dir> = <dir1>\<dir2>\... (Omitted when root directory) <file> = File name
Function	Opens the ISI measurement result data.
Example	> :SYSTem:MMEMory:ISI:RECall "C:\Test\example"
Compatibility	Incompatible with existing models.

**:SYSTem:MMEMory:ISI:STORe <file\_name>,<file\_type>**

Parameter	<file_name> = <STRING PROGRAM DATA> "<drv>:\[<dir>]<file>" <drv> = C,D,E,F <dir> = <dir1>\<dir2>\... (Omitted when root directory) <file> = File name <file_type> = <CHARACTER PROGRAM DATA> BIN                      Binary file CSV                        CSV file TXT                        Text file
Function	Saves the ISI measurement result data. <b>Note:</b> The settings will not be read from the saved file if the file name is changed.
Example	To save the ISI measurement result data by specifying the save destination, file name, and file format: > :SYSTem:MMEMory:ISI:STORe "C:\Test\example",TXT
Compatibility	Incompatible with existing models.

**:SYSTem:PRINt:ISI <list>**

---

Parameter	<list> = <CHARACTER PROGRAM DATA>
	ISI                                    ISI Result
Function	Prints the ISI measurement result data.
Example	> :SYSTem:PRINt:ISI ISI
Compatibility	Incompatible with existing models.

## 7.6.2 Eye Margin measurement

This section describes the commands for Eye Margin measurement.

### 7.6.2.1 Eye Margin measurement setting commands

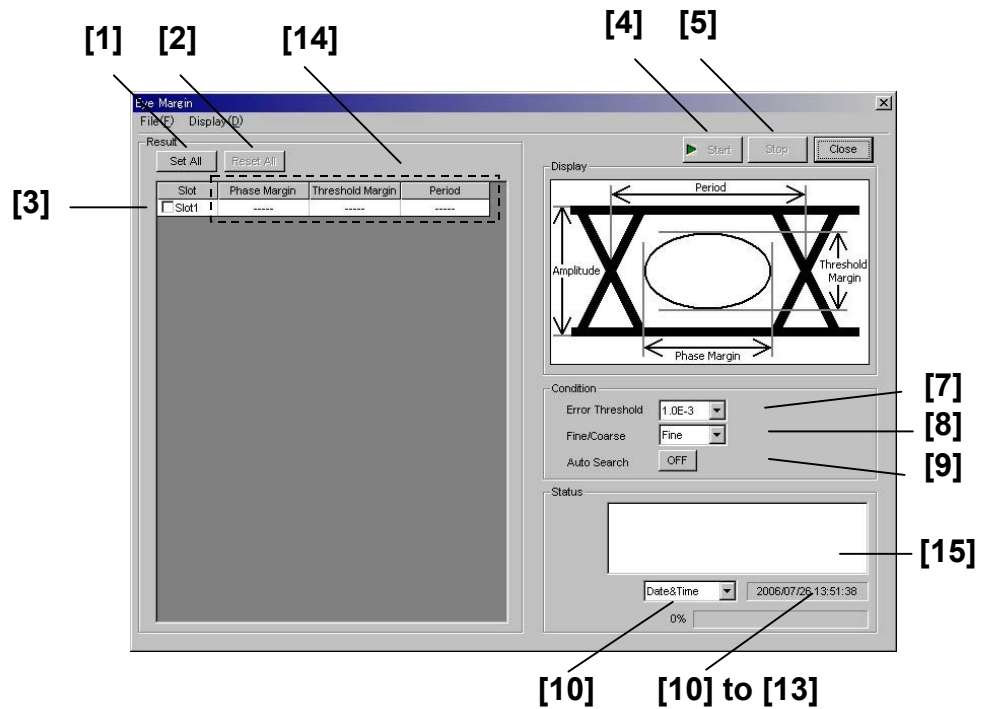


Figure 7.6.2.1-1 Eye Margin measurement screen

Table 7.6.2.1-1 Eye Margin measurement setting commands

No.	Setting Items	Commands
[1]	Set All	:SENSe:MEASure:EMARgin:MARGin:ASLot
[2]	Reset All	:SENSe:MEASure:EMARgin:MARGin:RSLot
[3]	Slot	:SENSe:MEASure:EMARgin:MARGin:SLOT
		:SENSe:MEASure:EMARgin:MARGin:SLOT?
[4]	Start	:SENSe:MEASure:START
[5]	Stop	:SENSe:MEASure:STOP
[6]	No label (Query for measurement state)	:SENSe:MEASure:EMARgin:STATe?
[7]	Error Threshold	:SENSe:MEASure:EMARgin:MARGin:THReshold
		:SENSe:MEASure:EMARgin:MARGin:THReshold?
[8]	Fine/Coarse	:SENSe:MEASure:EMARgin:MARGin:RESolution
		:SENSe:MEASure:EMARgin:MARGin:RESolution?
[9]	Auto Search	:SENSe:MEASure:EMARgin:MARGin:ASEarch
		:SENSe:MEASure:EMARgin:MARGin:ASEarch?
[10]	Selection of measurement time display	:SENSe:MEASure:EMARgin:TIME
		:SENSe:MEASure:EMARgin:TIME?
[11]	Query for date and time	:SENSe:MEASure:EMARgin:DTIME?

**Table 7.6.2.1-1 Eye Margin measurement setting commands (Cont'd)**

No.	Setting Items	Commands
[12]	Query for measurement start time	:SENSE:MEASure:EMARgin:STARt?
[13]	Query for measurement elapsed time	:SENSE:MEASure:EMARgin:ELAPsed?
[14]	Query for measurement result	:CALCulate:DATA:EMARgin?
[15]	No label (Query for measurement status)	:CALCulate:DATA:EMARgin:STATus?

**:SENSE:MEASure:EMARgin:MARGIN:ASLot**

Function                      Selects all Eye Margin measurement slots to be set to ON.  
 Example                      > :SENSE:MEASure:EMARgin:MARGIN:ASLot  
 Compatibility                Incompatible with existing models.

**:SENSE:MEASure:EMARgin:MARGIN:RSLot**

Function                      Selects all Eye Margin measurement slots to be set to OFF.  
 Example                      > :SENSE:MEASure:EMARgin:MARGIN:RSLot  
 Compatibility                Incompatible with existing models.

**:SENSE:MEASure:EMARgin:MARGIN:SLOT <slot>,<boolean>[,<unit>]**

Parameter                    <slot> = <CHARACTER PROGRAM DATA>  
                                  SLOT1 to SLOT6            Slots No. 1 to No. 6  
                                  1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A  
                                  <boolean> = <BOOLEAN PROGRAM DATA>  
                                  ON or 1                      ON  
                                  OFF or 0                    OFF  
                                  [<unit>] = <DECIMAL NUMERIC PROGRAM DATA>  
                                  1 to 4                        Mainframe Nos. 1 to 4  
                                  When using two or more MT1810A units in serial connection, specify the  
                                  mainframe number.  
                                  Can be omitted. Mainframe No. 1 is specified when omitted.  
 Function                    Selects the Eye Margin measurement slot.  
 Example                    To select Eye Margin measurement Slot 1 to be ON:  
                                  > :SENSE:MEASure:EMARgin:MARGIN:SLOT SLOT1,ON  
 Compatibility                Incompatible with existing models.

**:SENSe:MEASure:EMARgin:MARGin:SLOT? <slot>[,<unit>]**

Parameter	<p>&lt;slot&gt; = &lt;CHARACTER PROGRAM DATA&gt;  SLOT1 to SLOT6      Slots No. 1 to No. 6  1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A  [&lt;unit&gt;] = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;  1 to 4                      Mainframe Nos. 1 to 4  When using two or more MT1810A units in serial connection, specify the mainframe number.  Can be omitted. Mainframe No. 1 is specified when omitted.</p>
Response	<p>&lt;boolean&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;  1                              ON  0                              OFF</p>
Function	Queries whether the specified slot is targeted for the Eye Margin measurement.
Example	<p>To query whether the slot 1 is targeted for the Eye Margin measurement:  &gt; :SENSe:MEASure:EMARgin:MARGin:SLOT? SLOT1  &lt; 1</p>
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:START**

Function	Starts the Eye Margin measurement.
Example	> :SENSe:MEASure:START
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:STOP**

Function	Stops the Eye Margin measurement.
Example	> :SENSe:MEASure:STOP
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:EMARgin:STATe?**

Response	<p>&lt;boolean&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;  1                              Starts measurement  0                              Stops measurement  -1                             Measurement failure</p>
Function	Queries the Eye Margin measurement state.
Example	<p>&gt; :SENSe:MEASure:EMARgin:STATe?  &lt; 1</p>
Compatibility	Compatible with the MP1632C.

### **:SENSe:MEASure:EMARgin:MARGin:THReshold <thre>**

---

Parameter	<thre> = <CHARACTER PROGRAM DATA> E_3 to E_12                    1E-3 to 1E-12, in single steps
Function	Sets the threshold value that is to be the boundary of the Eye Margin measurement margin.
Example	To set the threshold value that is to be the Eye Margin measurement margin to 1E-4: > :SENSe:MEASure:EMARgin:MARGin:THReshold E_4
Compatibility	Compatible with the MP1632C.

### **:SENSe:MEASure:EMARgin:MARGin:THReshold?**

---

Response	<thre> = <CHARACTER RESPONSE DATA> E_3 to E_12                    1E-3 to 1E-12
Function	Queries the threshold value that is to be the boundary of the Eye Margin measurement margin.
Example	> :SENSe:MEASure:EMARgin:MARGin:THReshold? < E_4
Compatibility	Compatible with the MP1632C.

### **:SENSe:MEASure:EMARgin:MARGin:RESolution <type>**

---

Parameter	<type> = <CHARACTER PROGRAM DATA> FINE                            Fine mode COARse                        Coarse mode
Function	Sets the error rate resolution of the Eye Margin measurement.
Example	To set the error rate resolution of the Eye Margin measurement to Fine mode: > :SENSe:MEASure:EMARgin:MARGin:RESolution FINE
Compatibility	Compatible with the MP1632C.

### **:SENSe:MEASure:EMARgin:MARGin:RESolution?**

---

Response	<type> = <CHARACTER RESPONSE DATA> FINE, COAR
Function	Queries the error rate resolution of the Eye Margin measurement.
Example	> :SENSe:MEASure:EMARgin:MARGin:RESolution? < FINE
Compatibility	Compatible with the MP1632C.

**:SENSe:MEASure:EMARgin:MARGin:ASEarch <boolean>[,<mode>]**

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> ON or 1                    Auto Search ON OFF or 0                   Auto Search OFF <mode> = <DECIMAL NUMERIC PROGRAM DATA> 1                            Coarse 2                            Fine <b>Note:</b> <mode> can be omitted. Coarse is specified when omitted.
Function	Selects whether to perform Auto Search upon start of the Eye Margin measurement.
Example	To set Auto Search upon start of the Eye Margin measurement to ON: > :SENSe:MEASure:EMARgin:MARGin:ASEarch ON
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:EMARgin:MARGin:ASEarch?**

Response	<boolean> = <NR1 NUMERIC RESPONSE DATA> 1                            ON (Coarse) 0                            OFF 2                            ON (Fine)
Function	Queries whether to perform Auto Search upon start of the Eye Margin measurement.
Example	> :SENSe:MEASure:EMARgin:MARGin:ASEarch? < 1
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:EMARgin:TIME <type>**

Parameter	<type> = <CHARACTER PROGRAM DATA> DTIME                      Displays the current date and time. START                       Displays the measurement start time. ELAPsed                    Displays the elapsed time based on the measurement period.
Function	Selects the Eye Margin measurement time display type.
Example	To set the Eye Margin measurement time display type to measurement start time (Start Time): > :SENSe:MEASure:EMARgin:TIME START
Compatibility	Compatible with the MP1632C.

### **:SENSe:MEASure:EMARgin:TIME?**

---

Response	<p>&lt;type&gt; = &lt;CHARACTER RESPONSE DATA&gt;</p> <p>DTIM                      Displays the current date and time.</p> <p>STAR                      Displays the measurement start time.</p> <p>ELAP                      Displays the elapsed time based on the measurement period.</p>
Function	Queries the Eye Margin measurement time display type.
Example	<pre>&gt; :SENSe:MEASure:EMARgin:TIME? &lt; STAR</pre>
Compatibility	Compatible with the MP1632C.

### **:SENSe:MEASure:EMARgin:DTIME?**

---

Response	<p>&lt;year&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;</p> <p>2000 to 2036              2000 to 2036 year</p> <p>&lt;month&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;</p> <p>1 to 12                      January to December</p> <p>&lt;day&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;</p> <p>1 to 31                      1st to 31st</p> <p>&lt;hour&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;</p> <p>0 to 23                      0 to 23 hours</p> <p>&lt;minute&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;</p> <p>0 to 59                      0 to 59 minutes</p> <p>&lt;second&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;</p> <p>0 to 59                      0 to 59 seconds</p>
Function	Queries the current date and time during Eye Margin measurement.
Example	<pre>&gt; :SENSe:MEASure:EMARgin:DTIME? &lt; 2006,4,1,23,59,59</pre>
Compatibility	Incompatible with existing models.



**:SENSe:MEASure:EMARgin:START?**


---

Response	<pre>&lt;year&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0, 2000 to 2036      2000 to 2036 year &lt;month&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0 to 12             January to December &lt;day&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0 to 31             1st to 31st &lt;hour&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0 to 23             0 to 23 hours &lt;minute&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0 to 59             0 to 59 minutes &lt;second&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0 to 59             0 to 59 seconds</pre>
----------	---

**Note:**

The following is output when no measurement is performed:

```
< 0,0,0,0,0,0
```

Function	Queries the Eye Margin measurement start time.
Example	<pre>&gt; :SENSe:MEASure:EMARgin:START? &lt; 2006,4,1,23,59,59</pre>
Compatibility	Compatible with the MP1632C.

**:SENSe:MEASure:EMARgin:ELAPsed?**


---

Response	<pre>&lt;day&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0 to 99             0 to 99 days &lt;hour&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0 to 23             0 to 23 hours &lt;minute&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0 to 59             0 to 59 minutes &lt;second&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0 to 59             0 to 59 seconds</pre>
----------	--

**Note:**

The following is output when no measurement is performed:

```
< 0,0,0,0
```

Function	Queries the Eye Margin measurement elapsed time.
Example	<pre>&gt; :SENSe:MEASure:EMARgin:ELAPsed? &lt; 99,23,59,59</pre>
Compatibility	Compatible with the MP1632C.

**:CALCulate:DATA:EMARgin? <slot>,<string>[,<unit>]**

**Parameter**                    <slot> = <CHARACTER PROGRAM DATA>  
                                   SLOT1 to SLOT6            Slots No. 1 to No. 6  
                                   <string> = <STRING PROGRAM DATA>  
                                   See Table 7.6.2.1-2 for the <string> contents.  
                                   [<unit>] = <DECIMAL NUMERIC PROGRAM DATA>  
                                   1 to 4                        Mainframe Nos. 1 to 4  
                                   When using two or more MT1810A units in serial connection, specify the  
                                   mainframe number.  
                                   Can be omitted. Mainframe No. 1 is specified when omitted.

**Table 7.6.2.1-2 Eye Margin measurement items <string>**

Items	<string>	Response form
Phase margin	"PHASe"	Form1
Threshold margin	"THReshold"	Form2
Period	"PERiod"	Form1

**Response**                    <result> = <STRING RESPONSE DATA>  
                                   For the contents of the <result> measurement data see Table 7.6.2.1-3.

**Table 7.6.2.1-3 Eye Margin measurement results <result>**

Form	Format	Description
Form1 Phase type	" XXXX"	For 0 to MAX (mUI/ps) Displays in the selected unit.
	"Failed"	For measurement failure
	"-----"	When no data corresponds to the query.
Form2 Threshold type	" XXXX"	0 to MAX (mVpp)
	"Failed"	For measurement failure
	"-----"	When no data corresponds to the query.

**Function**                    Queries the Eye Margin measurement result.

**Example**                    > :CALCulate:DATA:EMARgin? SLOT1, "THReshold"  
                                   < "        0"

**Compatibility**            Incompatible with existing models.

**:CALCulate:DATA:EMARgin:STATus?**

Response	<p>&lt;string&gt; = &lt;STRING RESPONSE DATA&gt;</p> <p>"" When no alarm exists</p> <p>"Sync Loss" Sync. Loss</p> <p>"Clock Loss" Clock Loss</p> <p>"CR Unlock" CR Unlock</p> <p>"Out of range" Out of range</p> <p>"Frequency NG" Frequency NG</p> <p>"Illegal Error" Illegal Error</p> <p><b>Note:</b></p> <p>When two or more alarms have occurred, they are displayed in the following order:</p> <p>Illegal Error &gt; Frequency NG &gt; Clock Loss (CR Unlock) &gt; Sync Loss &gt; Out or range</p>
Function	Queries the Eye Margin measurement status.
Example	<pre>&gt; :CALCulate:DATA:EMARgin:STATus? &lt; "Sync Loss"</pre>
Compatibility	Incompatible with existing models.

### 7.6.2.2 File menu setting commands

Table 7.6.2.2-1 File menu setting commands

No.	Setting Items	Commands
[1]	Open	:SYSTem:MMEMory:MARGin:RECall
[2]	Save	:SYSTem:MMEMory:MARGin:STORe
[3]	Print	:SYSTem:PRINt:MARGin

#### **:SYSTem:MMEMory:MARGin:RECall <file\_name>**

Parameter	<file_name> = <STRING PROGRAM DATA> "<drv>:\[<dir>]<file>" <drv> = C,D,E,F <dir> = <dir1>\<dir2>\... (Omitted when root directory) <file> = File name
Function	Opens the Eye Margin measurement result data.
Example	> :SYSTem:MMEMory:MARGin:RECall "C:\Test\example"
Compatibility	Incompatible with existing models.

#### **:SYSTem:MMEMory:MARGin:STORe <file\_name>,<file\_type>**

Parameter	<file_name> = <STRING PROGRAM DATA> "<drv>:\[<dir>]<file>" <drv> = C,D,E,F <dir> = <dir1>\<dir2>\... (Omitted when root directory) <file> = File name <file_type> = <CHARACTER PROGRAM DATA> BIN            Binary file CSV            CSV file TXT            Text file
Function	Saves the Eye Margin measurement result data. <b>Note:</b> The settings will not be read from the saved file if the file name is changed.
Example	To save the Eye Margin measurement result data by specifying the save destination, file name, and file format: > :SYSTem:MMEMory:MARGin:STORe "C:\Test\example",TXT
Compatibility	Incompatible with existing models.

#### **:SYSTem:PRINt:MARGin <list>**

Parameter	<list> = <CHARACTER PROGRAM DATA> EMG            Eye Margin Result
Function	Prints the Eye Margin measurement result data.
Example	> :SYSTem:PRINt:MARGin EMG
Compatibility	Incompatible with existing models.

### 7.6.3 Eye Diagram measurement

This section describes the commands for Eye Diagram measurement. Commands are described for each tab window.

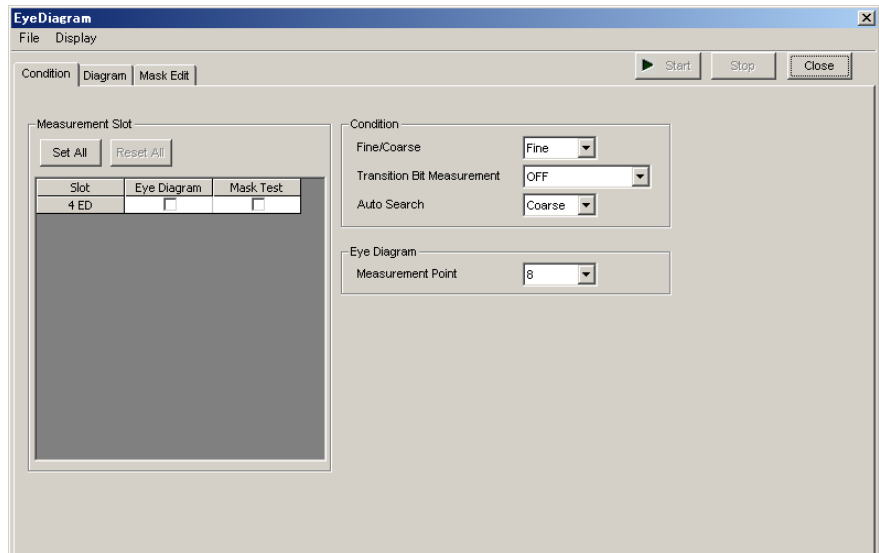


Figure 7.6.3-1 Eye Diagram measurement screen

#### 7.6.3.1 Condition tab window

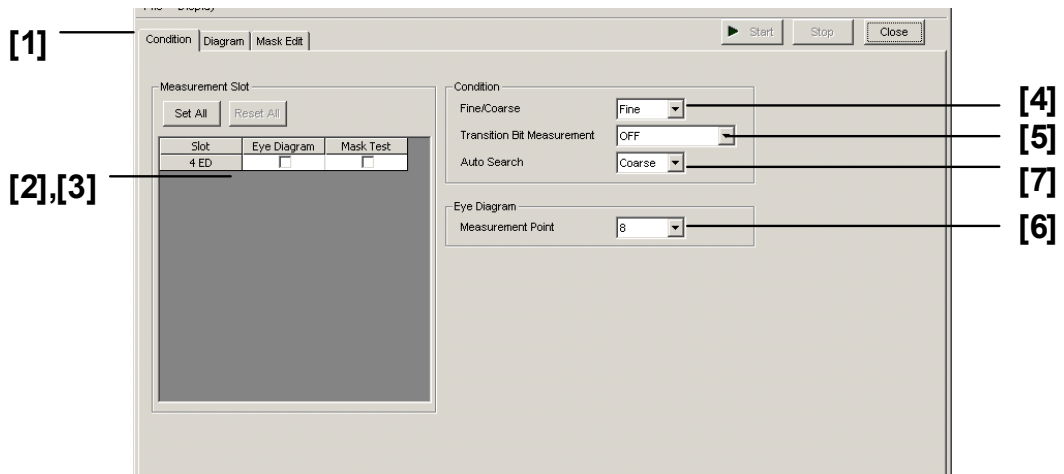


Figure 7.6.3.1-1 Condition tab window

Table 7.6.3.1-1 Condition tab window setting commands

No.	Setting items	Commands
[1]	Tab Selection	:DISPlay:RESult:EDIagram:TABSelect
		:DISPlay:RESult:EDIagram:TABSelect?
[2]	Slot Eye Diagram	:SENSe:MEASure:EDIagram:DIAGram:SLOT
		:SENSe:MEASure:EDIagram:DIAGram:SLOT?
[3]	Slot Mask Test	:SENSe:MEASure:EDIagram:MTEST:SLOT
		:SENSe:MEASure:EDIagram:MTEST:SLOT?

Table 7.6.3.1-1 Condition tab window setting commands (Cont'd)

No.	Setting items	Commands
[4]	Fine/Coarse	:SENSe:MEASure:EDIagram:DIAGram:RESolution
		:SENSe:MEASure:EDIagram:DIAGram:RESolution?
[5]	Transition Bit Measurement	:SENSe:MEASure:EDIagram:DIAGram:TRANSition
		:SENSe:MEASure:EDIagram:DIAGram:TRANSition?
[6]	Measurement Point	:SENSe:MEASure:EDIagram:DIAGram:TYPE
		:SENSe:MEASure:EDIagram:DIAGram:TYPE?
[7]	Auto Search	:SENSe:MEASure:EDIagram:DIAGram:ASEarch
		:SENSe:MEASure:EDIagram:DIAGram:ASEarch?

### **:DISPlay:RESult:EDIagram:TABSelect <tab>**

Parameter	<tab> = <CHARACTER PROGRAM DATA> CONDition                      Condition tab DIAGram                         Diagram tab MASKedit                        Mask Edit tab
Function	Switches the Eye Diagram measurement tab display.
Example	To display the Eye Diagram measurement Condition tab: > :DISPlay:RESult:EDIagram:TABSelect CONDition
Compatibility	Incompatible with existing models.

### **:DISPlay:RESult:EDIagram:TABSelect?**

Response	<tab> = <CHARACTER RESPONSE DATA> COND, DIAG, MASK
Function	Queries the Eye Diagram measurement tab display.
Example	> :DISPlay:RESult:EDIagram:TABSelect? < COND
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:EDIagram:DIAGram:SLOT <slot>,<boolean>[,<unit>]**

Parameter	<p>&lt;slot&gt; = &lt;CHARACTER PROGRAM DATA&gt;  SLOT1 to SLOT6      Slots No. 1 to No. 6  1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A</p> <p>&lt;boolean&gt; = &lt;BOOLEAN PROGRAM DATA&gt;  ON or 1              Eye Diagram measurement ON  OFF or 0             Eye Diagram measurement OFF</p> <p>[&lt;unit&gt;] = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;  1 to 4                Mainframe Nos. 1 to 4  When using two or more MT1810A units in serial connection, specify the mainframe number.  Can be omitted. Mainframe No. 1 is specified when omitted.</p>
Function	Selects the Eye Diagram measurement slot.
Example	<p>To set Eye Diagram measurement Slot 1 to ON:</p> <pre>&gt; :SENSe:MEASure:EDIagram:DIAGram:SLOT SLOT1,ON</pre>
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:EDIagram:DIAGram:SLOT? <slot>[,<unit>]**

Parameter	<p>&lt;slot&gt; = &lt;CHARACTER PROGRAM DATA&gt;  SLOT1 to SLOT6      Slots No. 1 to No. 6  1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A</p> <p>[&lt;unit&gt;] = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;  1 to 4                Mainframe Nos. 1 to 4  When using two or more MT1810A units in serial connection, specify the mainframe number.  Can be omitted. Mainframe No. 1 is specified when omitted.</p>
Response	<p>&lt;boolean&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;  1                      Eye Diagram measurement ON  0                      Eye Diagram measurement OFF</p>
Function	Queries whether the specified slot is targeted for the Eye Diagram measurement.
Example	<p>To query whether the slot 1 is targeted for the Eye Diagram measurement:</p> <pre>&gt; :SENSe:MEASure:EDIagram:DIAGram:SLOT? SLOT1 &lt; 1</pre>
Compatibility	Incompatible with existing models.

---

### **:SENSe:MEASure:EDIagram:MTESt:SLOT <slot>,<boolean>[,<unit>]**

---

Parameter	<p>&lt;slot&gt; = &lt;CHARACTER PROGRAM DATA&gt;                  SLOT1 to SLOT6      Slots No. 1 to No. 6                  1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A</p> <p>&lt;boolean&gt; = &lt;BOOLEAN PROGRAM DATA&gt;                  ON or 1                      Mask Test measurement ON                  OFF or 0                      Mask Test measurement OFF</p> <p>[&lt;unit&gt;] = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  1 to 4                      Mainframe Nos. 1 to 4</p> <p>When using two or more MT1810A units in serial connection, specify the mainframe number.</p> <p>Can be omitted. Mainframe No. 1 is specified when omitted.</p>
Function	Selects the Mask Test measurement slot.
Example	<p>To set Mask Test measurement Slot 1 to be ON:</p> <pre>&gt; :SENSe:MEASure:EDIagram:MTESt:SLOT SLOT1,ON</pre>
Compatibility	Incompatible with existing models.

---

### **:SENSe:MEASure:EDIagram:MTESt:SLOT? <slot>[,<unit>]**

---

Parameter	<p>&lt;slot&gt; = &lt;CHARACTER PROGRAM DATA&gt;                  SLOT1 to SLOT6      Slots No. 1 to No. 6                  1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A</p> <p>[&lt;unit&gt;] = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  1 to 4                      Mainframe Nos. 1 to 4</p> <p>When using two or more MT1810A units in serial connection, specify the mainframe number.</p> <p>Can be omitted. Mainframe No. 1 is specified when omitted.</p>
Response	<p>&lt;boolean&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;                  1                              ON                  0                              OFF</p>
Function	Queries whether the specified slot is targeted for the Mask Test measurement.
Example	<p>To query whether the slot 1 is targeted for the Mask Test measurement:</p> <pre>&gt; :SENSe:MEASure:EDIagram:MTESt:SLOT? SLOT1 &lt; 1</pre>
Compatibility	Incompatible with existing models.



**:SENSe:MEASure:EDIagram:DIAGram:RESolution <type>**


---

Parameter	<type> = <CHARACTER PROGRAM DATA> FINE                      Fine mode COARse                    Coarse mode
Function	Sets the error boundary point search resolution.
Example	To set the error boundary point search resolution to Fine mode: > :SENSe:MEASure:EDIagram:DIAGram:RESolution FINE
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:EDIagram:DIAGram:RESolution?**


---

Response	<type> = <CHARACTER RESPONSE DATA> FINE, COAR
Function	Queries the error boundary point search resolution.
Example	> :SENSe:MEASure:EDIagram:DIAGram:RESolution? < FINE
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:EDIagram:DIAGram:TRANSition <type>**


---

Parameter	<type> = <CHARACTER PROGRAM DATA> OFF                        OFF TRANSition                Transition NONTran                    Non Transition
Function	Sets Transition/Non Transition error detection.
Example	To set to Transition error detection: > :SENSe:MEASure:EDIagram:DIAGram:TRANSition TRANSition
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:EDIagram:DIAGram:TRANSition?**


---

Response	<type> = <CHARACTER RESPONSE DATA> OFF, TRAN, NONT
Function	Queries the Transition/Non Transition error detection setting state.
Example	> :SENSe:MEASure:EDIagram:DIAGram:TRANSition? < TRAN
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:EDIagram:DIAGram:TYPE <type>**

Parameter	<type> = <CHARACTER PROGRAM DATA> POINT8                    8 points POINT16                   16 points POINT32                   32 points POINT64                   64 points POINT132                  132 points
Function	Sets the number of measurement points during Eye Diagram measurement.
Example	To set the number of measurement points during Eye Diagram measurement to 8 points: > :SENSe:MEASure:EDIagram:DIAGram:TYPE POINT8
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:EDIagram:DIAGram:TYPE?**

Response	<type> = <CHARACTER RESPONSE DATA> POIN8, POIN16, POIN32, POIN64, POIN132
Function	Queries the number of measurement points during Eye Diagram measurement.
Example	> :SENSe:MEASure:EDIagram:DIAGram:TYPE? < POIN8
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:EDIagram:DIAGram:ASearch <setting>[,<mode>]**

Parameter	<setting> = <BOOLEAN PROGRAM DATA> ON or 1                    Auto Search ON OFF or 0                   Auto Search OFF <mode> = <DECIMAL NUMERIC PROGRAM DATA> 1                            Coarse 2                            Fine
	<b>Note:</b> <mode> can be omitted. Coarse is specified when omitted.
Function	Selects whether to execute Auto Search when starting the Eye Diagram Measurement.
Example	To set Auto Search to On when starting the the Eye Diagram Measurement. > :SENSe:MEASure:EDIagram:DIAGram:ASearch ON,2
Compatibility	Incompatible with existing models.

---

**:SENSe:MEASure:EDIagram:DIAGram:ASEarch?**

---

Response	<setting> = <NR1 NUMERIC RESPONSE DATA> 2 ON (Fine) 1 ON (Coarse) 0 OFF
Function	Queries whether to execute Auto Search when starting the Eye Diagram Measurement.
Example	> :SENSe:MEASure:EDIagram:DIAGram:ASEarch? < 2
Compatibility	Incompatible with existing models.

### 7.6.3.2 Diagram tab window

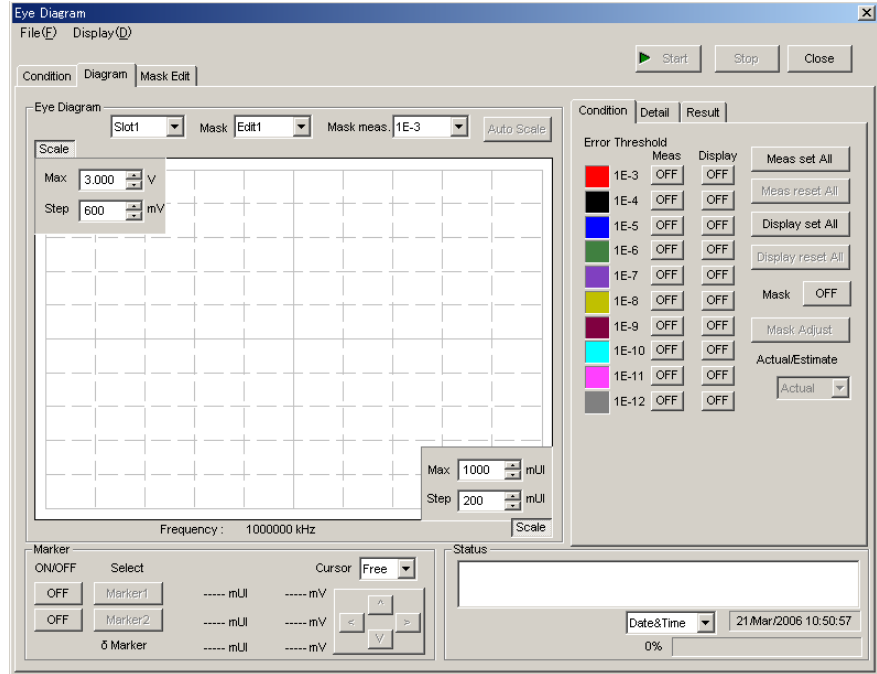


Figure 7.6.3.2-1 Diagram tab window

#### 7.6.3.2.1 Graph display setting commands

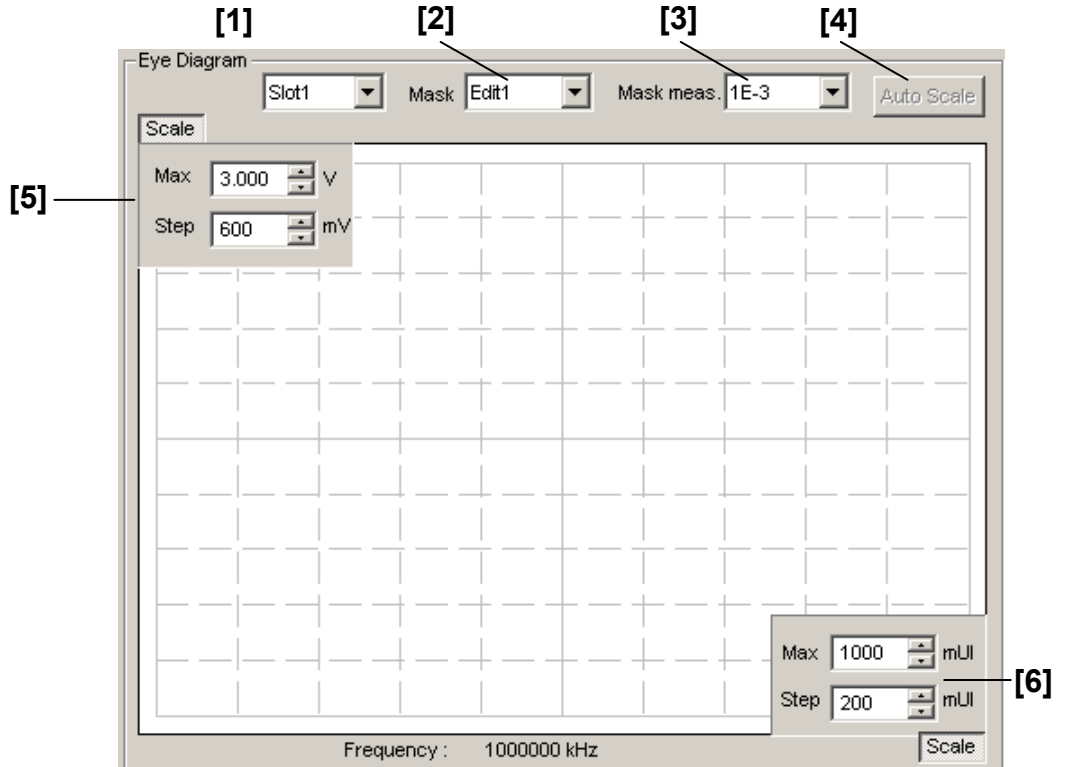


Figure 7.6.3.2.1-1 Graph display field

Table 7.6.3.2.1-1 Graph display setting commands

No.	Setting Items	Commands
[1]	No label (Result display slot setting)	:DISPlay:RESult:EDIagram:SLOT
		:DISPlay:RESult:EDIagram:SLOT?
[2]	Mask	:DISPlay:RESult:EDIagram:TEMPlate:SElect
		:DISPlay:RESult:EDIagram:TEMPlate:SElect?
[3]	Mask meas.	:DISPlay:RESult:EDIagram:TEMPlate:THReshold
		:DISPlay:RESult:EDIagram:TEMPlate:THReshold?
[4]	Auto Search	:DISPlay:RESult:EDIagram:SCALE:ASCale
[5]	Max/Step	:DISPlay:RESult:EDIagram:SCALE:VOLTage
		:DISPlay:RESult:EDIagram:SCALE:VOLTage?
[6]	Max/Step	:DISPlay:RESult:EDIagram:SCALE:PHASe
		:DISPlay:RESult:EDIagram:SCALE:PHASe?

### :DISPlay:RESult:EDIagram:SLOT <slot>[,<unit>]

Parameter	<slot> = <CHARACTER PROGRAM DATA> SLOT1 to SLOT6          Slots No. 1 to No. 6 1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A [<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number. Can be omitted. Mainframe No. 1 is specified when omitted.
Function	Selects the Eye Diagram result display target slot.
Example	To set the Eye Diagram result display target slot to slot No. 1: > :DISPlay:RESult:EDIagram:SLOT SLOT1
Compatibility	Incompatible with existing models.

### :DISPlay:RESult:EDIagram:SLOT? [<unit>]

Parameter	[<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number. Can be omitted. Mainframe No. 1 is specified when omitted.
Response	<slot> = <CHARACTER RESPONSE DATA> SLOT1 to SLOT6          Slots No. 1 to No. 6
Function	Queries the Eye Diagram result display target slot.
Example	> :DISPlay:RESult:EDIagram:SLOT? < SLOT1
Compatibility	Incompatible with existing models.

### **:DISPlay:RESult:EDIagram:TEMPlate:SElect <type>**

---

Parameter	<type> = <CHARACTER PROGRAM DATA> E1                      Edit1 E2                      Edit2 E3                      Edit3 E4                      Edit4
Function	Sets the mask pattern for performing the Eye Diagram mask test.
Example	To set the mask pattern for performing the Eye Diagram mask test to Edit2:  > :DISPlay:RESult:EDIagram:TEMPlate:SElect E2
Compatibility	Incompatible with existing models.

### **:DISPlay:RESult:EDIagram:TEMPlate:SElect?**

---

Response	<type> = <CHARACTER RESPONSE DATA> E1, E2, E3, E4
Function	Queries the mask pattern for performing the Eye Diagram mask test.
Example	> :DISPlay:RESult:EDIagram:TEMPlate:SElect? < E2
Compatibility	Incompatible with existing models.

### **:DISPlay:RESult:EDIagram:TEMPlate:THReshold <thre>**

---

Parameter	<thre> = <CHARACTER PROGRAM DATA> E_3 to E_12              1E-3 to 1E-12, in single steps
Function	Sets the Error Threshold for performing the Eye Diagram mask test.
Example	To set the Error Threshold for performing the Eye Diagram mask test to E-3:  > :DISPlay:RESult:EDIagram:TEMPlate:THReshold E_3
Compatibility	Incompatible with existing models.

### **:DISPlay:RESult:EDIagram:TEMPlate:THReshold?**

---

Response	<thre> = <CHARACTER RESPONSE DATA>
Function	Queries the Error Threshold for performing the Eye Diagram mask test.
Example	> :DISPlay:RESult:EDIagram:TEMPlate:THReshold? < E_3
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:EDIagram:SCALE:AScale**

Function	Automatically adjusts the Eye Diagram measurement graph scale.
Example	> :DISPlay:RESult:EDIagram:SCALE:AScale
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:EDIagram:SCALE:VOLTage <max>,<step>**

Parameter	<max> = <DECIMAL NUMERIC PROGRAM DATA> -3.990 to 4.000            -3.990 to 4.000 V, in 0.001-V steps <step> = <DECIMAL NUMERIC PROGRAM DATA> 0.001 to 0.800            0.001 to 0.800 V, in 0.001-V steps The range varies depending on the option status and input interface setting.
Function	Sets the maximum value in the direction of the Threshold of the Eye Diagram graph, and the grid resolution.
Example	To set the maximum value in the direction of the Threshold of the Eye Diagram graph to 4.000 V, and the grid resolution to 0.800 V: > :DISPlay:RESult:EDIagram:SCALE:VOLTage 4.000,0.800
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:EDIagram:SCALE:VOLTage?**

Response	<max> = <NR2 NUMERIC RESPONSE DATA> -3.990 to 4.000            -3.990 to 4.000 V <step> = <NR2 NUMERIC RESPONSE DATA> 0.001 to 0.800            0.001 to 0.800 V
Function	Queries the maximum value in the direction of the Threshold of the Eye Diagram graph, and the grid resolution.
Example	> :DISPlay:RESult:EDIagram:SCALE:VOLTage? < 4.000,0.800
Compatibility	Incompatible with existing models.

### **:DISPlay:RESult:EDIagram:SCALE:PHASe <max>,<step>**

---

Parameter	<max> = <DECIMAL NUMERIC PROGRAM DATA> -990 to 1000                      -990 to 1000 mUI, in 1-mUI steps <step> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 200                              1 to 200 mUI, in 1-mUI steps
Function	Sets the maximum value in the direction of the Phase of the Eye Diagram graph, and the grid resolution.
Example	To set the maximum value in the direction of the Phase of the Eye Diagram graph to 1000, and the grid resolution to 10 mUI: > :DISPlay:RESult:EDIagram:SCALE:PHASe 1000,10
Compatibility	Incompatible with existing models.

### **:DISPlay:RESult:EDIagram:SCALE:PHASe?**

---

Response	<max> = <NR2 NUMERIC RESPONSE DATA> <step> = <NR2 NUMERIC RESPONSE DATA>
Function	Queries the maximum value in the direction of the Phase of the Eye Diagram graph, and the grid resolution.
Example	> :DISPlay:RESult:EDIagram:SCALE:PHASe? < 1000,10
Compatibility	Incompatible with existing models.



7.6.3.2.2 Condition setting commands

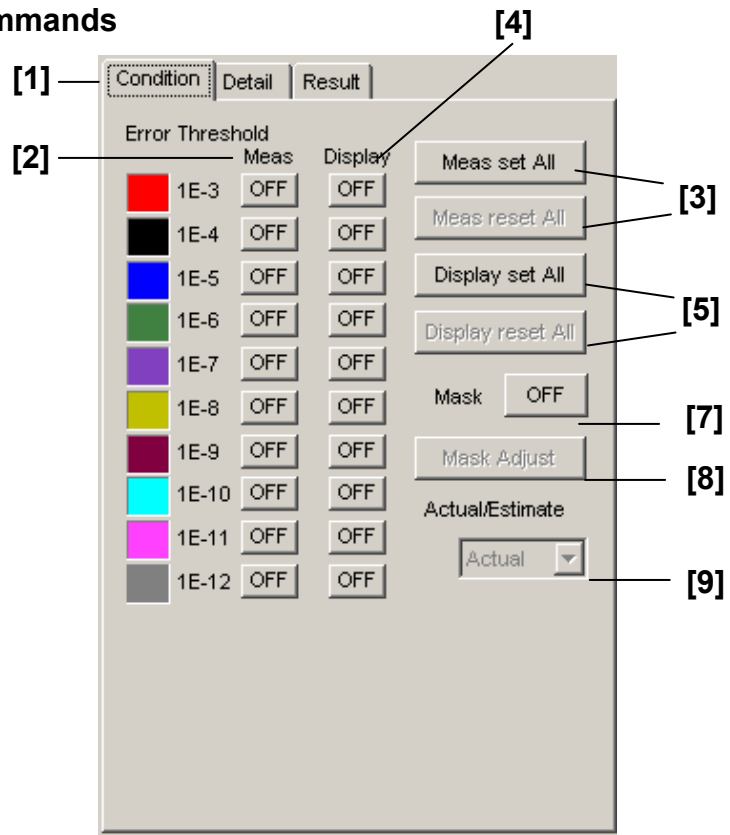


Figure 7.6.3.2.2-1 Condition setting screen (Actual)

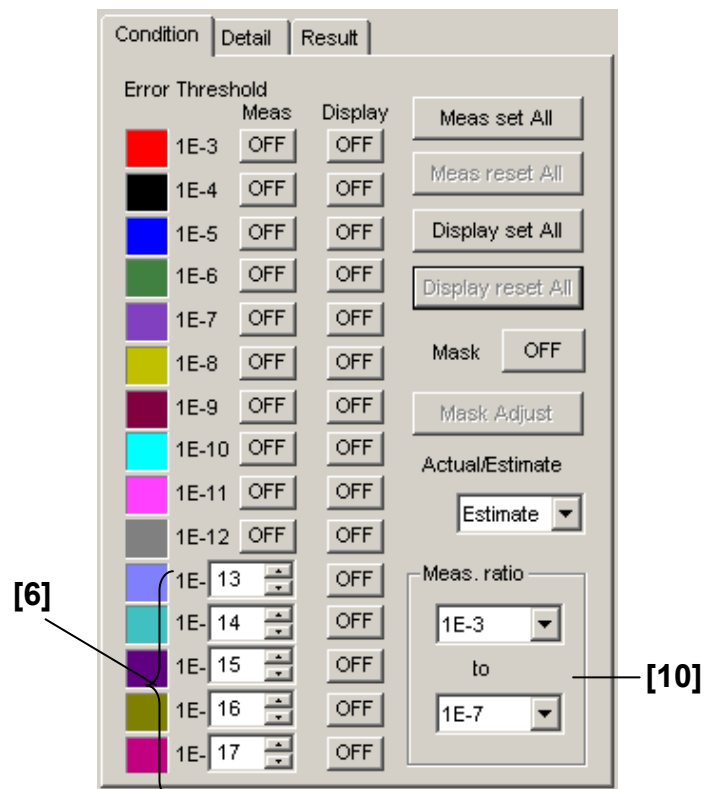


Figure 7.6.3.2.2-2 Condition setting screen (Estimate)

Table 7.6.3.2.2-1 Graph display setting commands

No.	Setting Items	Commands
[1]	Condition Detail Result	:DISPlay:RESult:EDIagram:DIAGram:TABSelect :DISPlay:RESult:EDIagram:DIAGram:TABSelect?
[2]	Meas	:SENSe:MEASure:EDIagram:DIAGram:THReshold :SENSe:MEASure:EDIagram:DIAGram:THReshold?
[3]	Meas set All Meas reset All	:SENSe:MEASure:EDIagram:DIAGram:ATHReshold
[4]	Display	:DISPlay:RESult:EDIagram:ERATe :DISPlay:RESult:EDIagram:ERATe?
[5]	Display set All Display reset All	:DISPlay:RESult:EDIagram:AERate
[6]	Setting of error rate for Estimate measurement	DISPlay:RESult:EDIagram:EERate DISPlay:RESult:EDIagram:EERate?
[7]	Mask	:DISPlay:RESult:EDIagram:DISPlay:MASK :DISPlay:RESult:EDIagram:DISPlay:MASK?
[8]	Mask Adjust	:DISPlay:RESult:EDIagram:ADJJust
[9]	Actual/Estimate	:DISPlay:RESult:EDIagram:ESTimate :DISPlay:RESult:EDIagram:ESTimate?
[10]	Meas.ratio	:SENSe:MEASure:EDIagram:DIAGram:BTHReshold :SENSe:MEASure:EDIagram:DIAGram:BTHReshold?
[11]	Query for measurement point	:SENSe:MEASure:EDIagram:DIAGram:POINT?
[12]	Query for measurement result	:CALCulate:DATA:DIAGram?

**:DISPlay:RESult:EDIagram:DIAGram:TABSelect <tab>**

Parameter                    <tab> = <CHARACTER PROGRAM DATA>  
                                   CONDition                    Condition tab  
                                   DETail                        Detail tab  
                                   RESult                        Result tab

Function                     Switches the tab display within the Diagram tab.

Example                      To display the Result tab within the Diagram tab:  
                                   > :DISPlay:RESult:EDIagram:DIAGram:TABSelect RESult

Compatibility                Incompatible with existing models.

**:DISPlay:RESult:EDIagram:DIAGram:TABSelect?**

Response                    <tab> = <CHARACTER RESPONSE DATA>  
                                   COND, DET, RES

Function                     Queries the tab selected in the Diagram tab window.

Example                      > :DISPlay:RESult:EDIagram:TABSelect?  
                                   < COND

Compatibility                Incompatible with existing models.

**:SENSe:MEASure:EDIagram:DIAGram:THReshold <thre>,<boolean>**

Parameter	<type> = <CHARACTER PROGRAM DATA> E_3 to E_12            1E-3 to 1E-12, in single steps <boolean> = <BOOLEAN PROGRAM DATA> ON or 1                Selects ON OFF or 0               Selects OFF
Function	Sets the Eye Diagram measurement target error rate.
Example	To set the Eye Diagram measurement target error rate to 1E-12: > :SENSe:MEASure:EDIagram:DIAGram:THReshold E_12,ON
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:EDIagram:DIAGram:THReshold?**

Response	<type> = <CHARACTER RESPONSE DATA> E_3 to E_12            1E-3 to 1E-12 NONE                    When all OFF The selected threshold is delimited with a comma (,) and returned.
Function	Queries the Eye Diagram measurement target error rate.
Example	> :SENSe:MEASure:EDIagram:DIAGram:THReshold? < E_3,E_10,E_12
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:EDIagram:ERATe <thre>,<boolean>**

Parameter	<type> = <CHARACTER PROGRAM DATA> E_3 to E_17            1E-3 to 1E-17, in single steps <boolean> = <BOOLEAN PROGRAM DATA> ON or 1                Display select ON OFF or 0               Display select OFF
Function	Sets the target error rate of the Eye Diagram measurement result display.
Example	To set the target error rate of the Eye Diagram measurement result display to 1E-12: > :DISPlay:RESult:EDIagram:ERATe E_12,1
Compatibility	Incompatible with existing models.

### **:DISPlay:RESult:EDIagram:ERATe?**

---

Response	<type> = <CHARACTER RESPONSE DATA> E_3 to E_17                    1E-3 to 1E-17 NONE                            When all OFF The selected threshold is delimited with a comma (,) and returned.
Function	Queries the target error rate of the Eye Diagram measurement result display
Example	> :DISPlay:RESult:EDIagram:ERATe? < NONE
Compatibility	Incompatible with existing models.

### **:SENSE:MEASure:EDIagram:DIAGram:ATHReshold <boolean>**

---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> ON or 1                        Sets all ON OFF or 0                       Sets all OFF
Function	Sets all Eye Diagram measurement target error rates to be ON or OFF.
Example	To set all Eye Diagram measurement target error rates to be ON: > :SENSE:MEASure:EDIagram:DIAGram:ATHReshold ON
Compatibility	Incompatible with existing models.

### **:DISPlay:RESult:EDIagram:AERate <boolean>**

---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> ON or 1                        Sets all ON OFF or 0                       Sets all OFF
Function	Sets all target error rates of the Eye Diagram measurement result display to be ON or OFF.
Example	To set all target error rates of the Eye Diagram measurement result display to be ON: > :DISPlay:RESult:EDIagram:AERate 1
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:EDIagram:EERate <numeric>**

Parameter	<numeric> = <DECIMAL PROGRAM DATA> 13 to 199                      1E-13 to 1E-199, in single steps
Function	Up to five parameters can be set, delimited with a comma (.). Sets the result display error rate in Estimate measurement from E-13 to E-199.
Example	To display the result display error rate in Estimate measurement for 1E-15, 1E-100, 1E-150, 1E-199, and 1E-180: >:DISPlay:RESult:EDIagram:EERate 15,100,150,199,180
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:EDIagram:EERate?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 13 to 199                      1E-13 to 1E-199
Function	Returns five responses, delimited with a comma (.). Queries the result display error rate setting in Estimate measurement from E-13 to E-199.
Example	>:DISPlay:RESult:EDIagram:EERate? <15,100,150,199,180
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:EDIagram:DISPlay:MASK <boolean>**

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> ON or 1                      Display OFF or 0                      Clear
Function	Selects between displaying and clearing the mask test result during Eye Diagram measurement.
Example	To display the mask test result during Eye Diagram measurement: > :DISPlay:RESult:EDIagram:DISPlay:MASK ON
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:EDIagram:DISPlay:MASK?**

Response	<boolean> = <NR1 NUMERIC RESPONSE DATA> 1                                  Display 0                                  Clear
Function	Queries the setting whether to display or clear the mask test result during Eye Diagram measurement.
Example	> :DISPlay:RESult:EDIagram:DISPlay:MASK? < 1
Compatibility	Incompatible with existing models.

### **:DISPlay:RESult:EDIagram:ADJust**

---

Function	Automatically adjusts the mask pattern during Eye Diagram measurement.
Example	> :DISPlay:RESult:EDIagram:ADJust
Compatibility	Incompatible with existing models.

### **:DISPlay:RESult:EDIagram:ESTimate <type>**

---

Parameter	<type> = <CHARACTER PROGRAM DATA> ACTual                      Actual measurement ESTimate                    Estimate measurement
	<b>Note:</b> The Estimate measurement cannot be selected when the number of measurement points is set to 8.
Function	Selects between Actual and Estimate measurement during Eye Diagram measurement.
Example	To set Actual measurement during Eye Diagram measurement: > :DISPlay:RESult:EDIagram:ESTimate ACTual
Compatibility	Incompatible with existing models.

### **:DISPlay:RESult:EDIagram:ESTimate?**

---

Response	<type> = <CHARACTER RESPONSE DATA> ACT                          Actual EST                          Estimate
Function	Queries the Actual/Estimate measurement state during Eye Diagram measurement.
Example	> :DISPlay:RESult:EDIagram:ESTimate? < ACT
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:EDIagram:DIAGram:BTHReshold <upper>,<lower>**

Parameter	<upper> = <CHARACTER PROGRAM DATA> E_3 to E_7                    1E-3 to 1E-7, in single step <lower> = <CHARACTER PROGRAM DATA> E_7 to E_12                    1E-7 to E-12, in single step
	<b>Note:</b> The difference between the <upper> and <lower> value must be at least 3.
Function	Sets the reference error rate during Eye Diagram Estimate.
Example	To set the reference error rate during Eye Diagram Estimate to E-3 and E-12: > :SENSe:MEASure:EDIagram:DIAGram:BTHReshold E_3,E_12
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:EDIagram:DIAGram:BTHReshold?**

Response	<upper> = <CHARACTER RESPONSE DATA> E_3 to E_7                    1E-3 to 1E-7 <lower> = <CHARACTER RESPONSE DATA> E_7 to E_12                    1E-7 to E-12
Function	Queries the reference error rate during Eye Diagram Estimate.
Example	> :SENSe:MEASure:EDIagram:DIAGram:BTHReshold? < E_3,E_12
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:EDIagram:DIAGram:POINT? <slot>,<thre>[,<unit>]**

---

Parameter	<p>&lt;slot&gt; = &lt;CHARACTER PROGRAM DATA&gt;                  SLOT1 to SLOT6      Slots No. 1 to No. 6                  &lt;thre&gt; = &lt;CHARACTER PROGRAM DATA&gt;                  E_3 to E_12          1E-3 to 1E-12                  [&lt;unit&gt;] = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  1 to 4                  Mainframe Nos. 1 to 4                  When using two or more MT1810A units in serial connection, specify the mainframe number.                  Can be omitted. Mainframe No. 1 is specified when omitted.</p>
Response	<p>&lt;numeric&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;                  1 to 132                Returns a valid point.                  0                        Returns 0 when all points are invalid.                  Multiple valid points are delimited with a comma (,) and returned.</p>
Function	<p>Queries the valid points in each threshold during the Eye Diagram measurement for a specific slot.</p>
Example	<p>To query the valid points in slot No. 1 during measurement with threshold E-3:                  &gt; :SENSe:MEASure:EDIagram:DIAGram:POINT? SLOT1,E_3                  &lt; 1,2,3,4,132</p>
Compatibility	<p>Incompatible with existing models.</p>



**:CALCulate:DATA:DIAGram? <slot>,<string>[,<unit>]**

Parameter	<slot> = <CHARACTER PROGRAM DATA> SLOT1 to SLOT6      Slots No. 1 to No. 6 <string> = <STRING PROGRAM DATA> <result>              Measurement data See Table 7.6.3.2.2-3 for the <result> contents. [<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                  Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number. Can be omitted. Mainframe No. 1 is specified when omitted.
Response	<string> = <STRING RESPONSE DATA>

**Table 7.6.3.2.2-2 Response format**

Form	Format	Description
Form1 Eye Map type	"XXXXX,YYYYY"	XXXXX: Phase (mUI) XXXXX: Phase (ps) (Displays in the selected unit.) YYYYY: Threshold (mV)
	"-----,--.--"	When no data corresponds to the query.

Function                      Queries the Eye Diagram measurement result of a specific slot and point.

**Table 7.6.3.2.2-3 Eye Diagram measurement item results**

Items		<Result>	Response Format
Eye Map type	1E-3	"MAP:E_3:POINT1",...,"MAP:E_3:POINT132"	Form1
	1E-4	"MAP:E_4:POINT1",...,"MAP:E_4:POINT132"	
	1E-11	"MAP:E_11:POINT1",...,"MAP:E_11:POINT132"	
	1E-12	"MAP:E_12:POINT1",...,"MAP:E_12:POINT132"	

Example                      To query the Eye Diagram measurement result at slot No. 1, E–3, point 1:  
 >:CALCulate:DATA:DIAGram? SLOT1, "MAP:E\_3:POINT1"  
 <" 100, 1.000"

Compatibility                Incompatible with existing models.

7.6.3.2.3 Detail setting commands

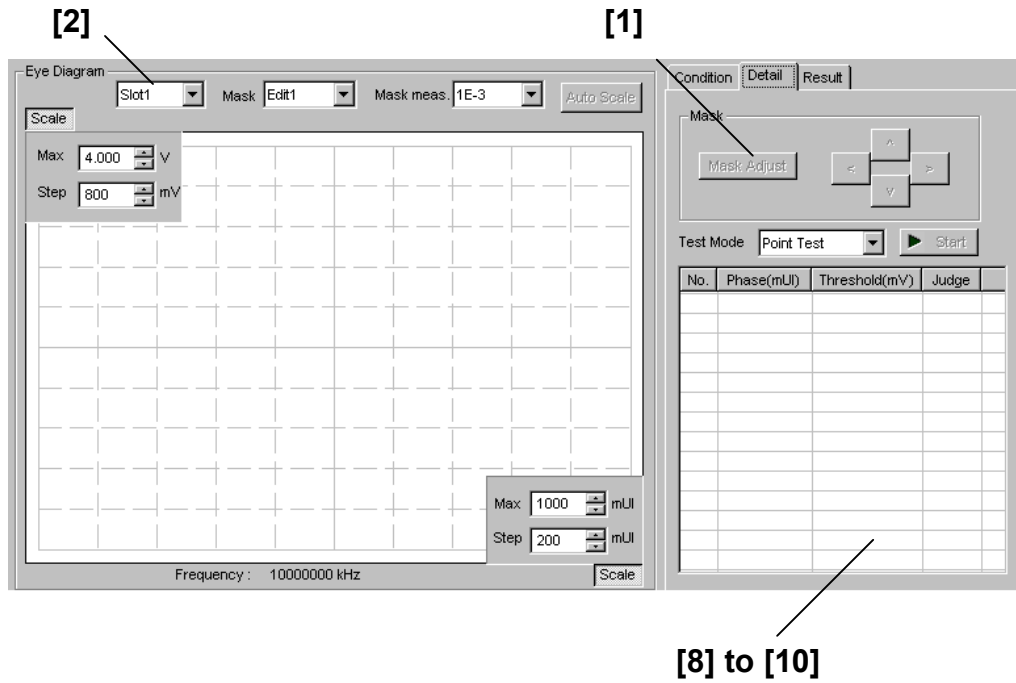


Figure 7.6.3.2.3-1 Detail Mask Point Test screen

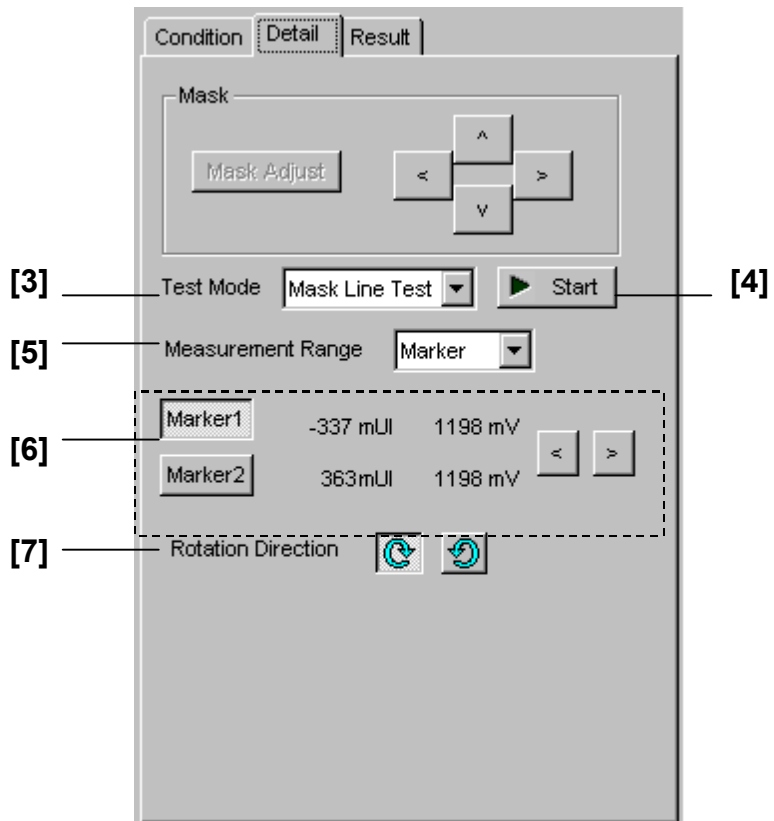


Figure 7.6.3.2.3-2 Detail Mask Line Test screen

Table 7.6.3.2.3-1 Detail setting commands

No.	Setting Items	Commands
[1]	Mask Adjust	:SENSE:MEASure:EDIagram:DETail:MASK
[2]	Slot selection	:SENSE:MEASure:EDIagram:DETail:SLOT
		:SENSE:MEASure:EDIagram:DETail:SLOT?
[3]	Test Mode	:SENSE:MEASure:EDIagram:DETail:MODE
		:SENSE:MEASure:EDIagram:DETail:MODE?
[4]	Start/Stop	:SENSE:MEASure:EDIagram:DETail:START
		:SENSE:MEASure:EDIagram:DETail:STOP
		:SENSE:MEASure:EDIagram:DETail:STATE?
[5]	Measurement Range	:SENSE:MEASure:EDIagram:DETail:LINE:RANGe
		:SENSE:MEASure:EDIagram:DETail:LINE:RANGe?
[6]	Marker1 Marker2	:DISPlay:RESult:EDIagram:DETail:MARKer
		:DISPlay:RESult:EDIagram:DETail:MARKer?
[7]	Rotation Direction	:SENSE:MEASure:EDIagram:DETail:LINE:ROTation
		:SENSE:MEASure:EDIagram:DETail:LINE:ROTation?
[8]	Query for measurement point	:CALCulate:DATA:EDIagram:DETail:PNUMber?
[9]	Query for Point test result	:CALCulate:DATA:EDIagram:DETail:POINT?
[10]	Query for Line test result	:CALCulate:DATA:EDIagram:DETail:LINE?

### **:SENSE:MEASure:EDIagram:DETail:MASK**

Function	Performs automatic mask adjustment during Eye Diagram Detail measurement.
Example	> :SENSE:MEASure:EDIagram:DETail:MASK
Compatibility	Incompatible with existing models.

### **:SENSE:MEASure:EDIagram:DETail:SLOT <slot>[,<unit>]**

Parameter	<slot> = <CHARACTER PROGRAM DATA> SLOT1 to SLOT6      Slots No. 1 to No. 6 1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A [<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number. Can be omitted. Mainframe No. 1 is specified when omitted.
Function	Selects the Mask pass/fail measurement target slot during Eye Diagram measurement.
Example	To set the Mask pass/fail measurement target slot during Eye Diagram measurement to Slot1: > :SENSE:MEASure:EDIagram:DETail:SLOT SLOT1
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:EDIagram:DETail:SLOT? [<unit>]**

---

Response	<slot> = <CHARACTER RESPONSE DATA> SLOT1 to SLOT6            Slots No. 1 to No. 6 1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A [<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number. Can be omitted. Mainframe No. 1 is specified when omitted.
Function	Queries the Mask pass/fail measurement target slot during Eye Diagram measurement.
Example	> :SENSe:MEASure:EDIagram:DETail:SLOT? < SLOT1
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:EDIagram:DETail:MODE <mode>**

---

Parameter	<mode> = <CHARACTER PROGRAM DATA> POINT                      Point Test MASK                        Mask Line Test
Function	Selects the measurement mode during Eye Diagram Detail measurement.
Example	To set the measurement mode during Eye Diagram Detail measurement to Point Test mode: > :SENSe:MEASure:EDIagram:DETail:MODE POINT
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:EDIagram:DETail:MODE?**

---

Response	<mode> = <CHARACTER RESPONSE DATA> POIN, MASK
Function	Queries the measurement mode during Eye Diagram Detail measurement.
Example	> :SENSe:MEASure:EDIagram:DETail:MODE? < POIN
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:EDIagram:DETail:START**

---

Function	Starts the Mask pass/fail judgment during Eye Diagram Detail measurement.
Example	> :SENSe:MEASure:EDIagram:DETail:START
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:EDiagram:DETail:STOP**


---

Function	Stops the Mask pass/fail judgment during Eye Diagram Detail measurement.
Example	> :SENSe:MEASure:EDiagram:DETail:STOP
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:EDiagram:DETail:STATE?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1 Start 0 Stop
Function	Queries the Mask pass/fail judgment status during Eye Diagram Detail measurement.
Example	> :SENSe:MEASure:EDiagram:DETail:STATE? < 1
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:EDiagram:DETail:LINE:RANGe <range>**


---

Parameter	<range> = <CHARACTER PROGRAM DATA> ALL Whole range MARKer Marked range only
Function	Selects the measurement range during Eye Diagram Detail Line measurement.
Example	To set the measurement range during Eye Diagram Detail Line measurement to the marked range: > :SENSe:MEASure:EDiagram:DETail:LINE:RANGe MARKer
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:EDiagram:DETail:LINE:RANGe?**


---

Response	<range> = <CHARACTER RESPONSE DATA> ALL, MARK
Function	Queries the measurement range during Eye Diagram Detail Line measurement.
Example	> :SENSe:MEASure:EDiagram:DETail:LINE:RANGe? < MARK
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:EDIagram:DETail:MARKer <marker>,<phase>,<voltage>**

Parameter	<marker> = <DECIMAL NUMERIC PROGRAM DATA> 1 Marker 1 2 Marker 2 <phase> = <DECIMAL NUMERIC PROGRAM DATA> -1000 to 1000 -1000 to 1000 mUI, in 1-mUI steps (horizontal direction) <voltage> = <DECIMAL NUMERIC PROGRAM DATA> -4000 to 4000 -4000 to 4000mV, in 1-mV step (vertical direction)
	<b>Note:</b> The value of Marker 2 must be equal to or greater than that of marker 1 in the phase direction. The marker is moved onto the mask line closest to the set point.
Function	Sets the positions for measurement range selection markers 1 and 2 during Eye Diagram Detail Line measurement.
Example	To set the position for marker 1 (100 mUI, 2000 mV): >:DISPlay:RESult:EDIagram:DETail:MARKer 1,100,2000
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:EDIagram:DETail:MARKer? <marker>**

Parameter	<marker> = <DECIMAL NUMERIC PROGRAM DATA> 1 Marker 1 2 Marker 2
Response	<phase>,<voltage> <phase> = <NR2 NUMERIC RESPONSE DATA> -1000 to 1000 -1000 to 1000 mUI (horizontal direction) XXXXX XXXXX ps <b>Note:</b> The converted value from mUI <voltage> = <NR2 NUMERIC RESPONSE DATA> -4000 to 4000 -4000 to 4000 mV (vertical direction)
Function	Queries the positions for the measurement range selection markers 1 and 2 during Eye Diagram Detail Line measurement.
Example	To query the set value for marker 1 (1,000 V, 100 mUI): > :DISPlay:RESult:EDIagram:DETail:MARKer? 1 < 100,1000
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:EDIagram:DETail:LINE:ROtation <type>**


---

Parameter	<type> = <CHARACTER PROGRAM DATA> LEFT                      Counterclockwise RIGHT                     Clockwise Selects the Mask pass/fail judgment direction during Eye Diagram Detail Line measurement.
Example	To set the Mask pass/fail judgment direction during Eye Diagram Detail Line measurement to be clockwise. > :SENSe:MEASure:EDIagram:DETail:LINE:ROtation RIGHT
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:EDIagram:DETail:LINE:ROtation?**


---

Response	<type> = <CHARACTER RESPONSE DATA> LEFT, RIGH
Function	Queries the Mask pass/fail judgment direction during Eye Diagram Detail Line measurement.
Example	> :SENSe:MEASure:EDIagram:DETail:LINE:ROtation? < RIGH
Compatibility	Incompatible with existing models.

**:CALCulate:DATA:EDIagram:DETail:PNUMber?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1 to 20000                Number of Detail measurement point
Function	Queries the number of measurement points during Detail measurement.
Example	> :CALCulate:DATA:EDIagram:DETail:PNUMber? < 1000
Compatibility	Incompatible with existing models.

**:CALCulate:DATA:EDIagram:DETail:POINT? <string>**

Parameter <string> = <STRING PROGRAM DATA>  
 <result> Measurement data  
 See Table 7.6.3.2.3-3 for the <result> contents.  
 Response <string> = <STRING RESPONSE DATA>

**Table 7.6.3.2.3-2 Response format**

Form	Format	Description
Form1 Eye Map type	"XXXXX,YYYYY,ZZ"	XXXXX: Phase (mUI) XXXXX: Phase (ps) <b>Note:</b> Displays in the specified units. YY.YYY: Threshold (mV) ZZ: OK, NG
	"-----,-.-,-,-"	When no data corresponds to the query.

Function Queries the measurement results of the Eye Diagram Detail Point Test.

**Table 7.6.3.2.3-3 Eye Diagram Detail Point Test setting items <result>**

Items	<result>	Response Format
Judgment type	"JDG:POINT1"	Form1
Point1	"JDG:POINT2"	
Point2		
Point31	"JDG:POINT31"	
Point32	"JDG:POINT32"	

Queries the measurement result of the Eye Diagram Detail Point Test at the measurement point.

Example To query the measurement result of the Eye Diagram Detail Point Test at measurement point 1:

```
> :CALCulate:DATA:EDIagram:DETail:POINT? "JDG:POINT1"
< " 0, 4000,OK"
```

Compatibility Incompatible with existing models.



**:CALCulate:DATA:EDIagram:DETail:LINE? <string>**

Parameter	<string> = <STRING PROGRAM DATA> <result> Measurement data See Table 7.6.3.2.3-5 for the <result> contents.
Response	<string> = <STRING RESPONSE DATA>

**Table 7.6.3.2.3-4 Response format**

Form	Format	Description
Form1 Eye Map type	"XXXXX,YYYYY,ZZ"	XXXXX: Phase (mUI) XXXXX: Phase (ps) <b>Note:</b> Displays in the specified units. YYYYY: Threshold (mV) ZZ: OK, NG
	"-----,---,---,---"	When no data corresponds to the query.

Function	Queries the measurement result of the Eye Diagram Detail Mask Line Test.
----------	--

**Table 7.6.3.2.3-5 Eye Diagram Detail Mask Line Test measurement items <result>**

Items		<Result>	Response Format
Judgment type	Point1	"JDG:POINT1"	Form1
	Point2	"JDG:POINT2"	
	Point19999	"JDG:POINT19999"	
	Point20000	"JDG:POINT20000"	

Example	To query the measurement result of the Eye Diagram Detail Mask Line Test at measurement point 1:
---------	--

```
>:CALCulate:DATA:EDIagram:DETail:LINE? "JDG:POINT1"  
<" 0, 4000,OK"
```

Compatibility	Incompatible with existing models.
---------------	------------------------------------



**:CALCulate:DATA:EDIagram:MASK? <string>[,<unit>]**

Parameter	<string> = <STRING PROGRAM DATA> <result> Measurement data See Table 7.6.3.2.4-3: for the <result> contents. [<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4 Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number. Can be omitted. Mainframe No. 1 is specified when omitted.
Response	<string> = <STRING RESPONSE DATA>

**Table 7.6.3.2.4-2 Response format**

Form	Format	Description
Form1 EyeResult type	"XX,Y,Y,Y...Y"	XX: OK, NG Y: 1 to 32 (NG mask point) <b>Note:</b> Multiple NGs are delimited with a comma (,) and returned for the corresponding number of NGs.
	"--,--"	When no data corresponds to the query.

Function Queries the measurement result of the Eye Diagram Mask Test.

**Table 7.6.3.2.4-3 Eye Diagram Result setting items and results**

Items		<Result>	Response Format
Judgment type	Slot1	"SLT1"	Form1
	Slot2	"SLT2"	
	Slot6	"SLT6"	

Example To query the Mask Test result of Mainframe No.3 Slot1:  
 >:CALCulate:DATA:EDIagram:MASK? "SLT1"3  
 <"NG,1,2,3,4,32"  
 <"OK"

Compatibility Incompatible with existing models.

7.6.3.2.5 Diagram tab window (Status) setting commands

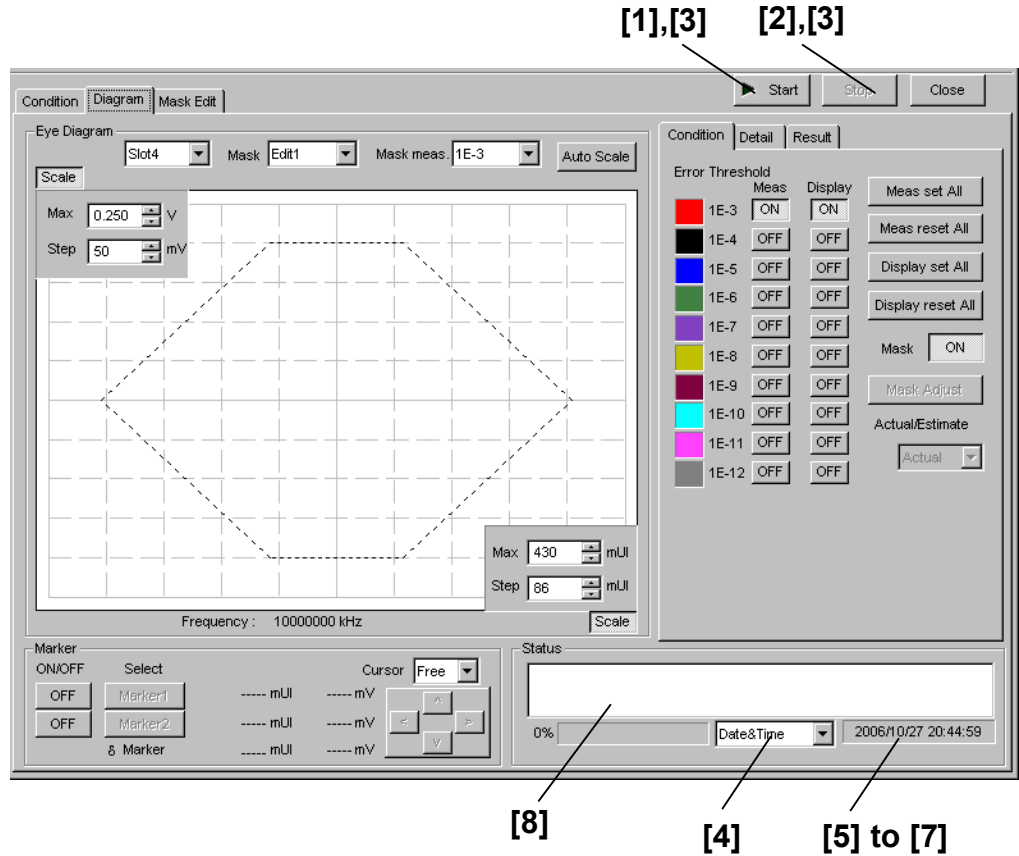


Figure 7.6.3.2.5-1 Diagram tab window Start/Stop buttons and Status field

Table 7.6.3.2.5-1 Diagram tab window (Status) setting commands

No.	Setting Items	Commands
[1]	Start	:SENSE:MEASure:EDIagram:DIAGram:START
[2]	Stop	:SENSE:MEASure:EDIagram:DIAGram:STOP
[3]	Query for measurement state	:SENSE:MEASure:EDIagram:STATe?
[4]	No label (Setting of time display)	:SENSE:MEASure:EDIagram:TIME :SENSE:MEASure:EDIagram:TIME?
[5]	Query for current time	:SENSE:MEASure:EDIagram:DTIME?
[6]	Query for measurement start time	:SENSE:MEASure:EDIagram:START?
[7]	Query for measurement elapsed time	:SENSE:MEASure:EDIagram:ELAPsed?
[8]	Query for measurement status	:CALCulate:DATA:EDIagram:STATus?

**:SENSE:MEASure:EDIagram:DIAGram:START**

Function Starts the Eye Diagram measurement.  
 Example > :SENSE:MEASure:EDIagram:DIAGram:START  
 Compatibility Incompatible with existing models.

**:SENSe:MEASure:EDIagram:DIAGram:STOP**


---

Function	Stops the Eye Diagram measurement.
Example	> :SENSe:MEASure:EDIagram:DIAGram:STOP
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:EDIagram:STATe?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	1 Measurement has been started.
	0 Measurement has been stopped
	-1 Measurement has failed.
Function	Queries the Eye Diagram measurement status.
Example	> :SENSe:MEASure:EDIagram:STATe? < 1
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:EDIagram:TIME <type>**


---

Parameter	<type> = <CHARACTER PROGRAM DATA>
	DTIME Displays the current date and time.
	START Displays the measurement start time.
	ELAPsed Displays the elapsed time based on the measurement period.
Function	Selects the Eye Diagram measurement time display type.
Example	To set the Eye Diagram measurement time display type to measurement start time (Start Time): > :SENSe:MEASure:EDIagram:TIME START
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:EDIagram:TIME?**


---

Response	<type> = <CHARACTER RESPONSE DATA>
	DTIM Displays the current date and time.
	STAR Displays the measurement start time.
	ELAP Displays the elapsed time based on the measurement period.
Function	Queries the Eye Diagram measurement time display type.
Example	> :SENSe:MEASure:EDIagram:TIME? < STAR
Compatibility	Incompatible with existing models.

## :SENSe:MEASure:EDIagram:DTIME?

---

Response	<p>&lt;year&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;                  2000 to 2036                      2000 to 2036 year</p> <p>&lt;month&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;                  1 to 12                              January to December</p> <p>&lt;day&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;                  1 to 31                                1st to 31st</p> <p>&lt;hour&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;                  0 to 23                                0 to 23 hours</p> <p>&lt;minute&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;                  0 to 59                                0 to 59 minutes</p> <p>&lt;second&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;                  0 to 59                                0 to 59 seconds</p>
Function	Queries the current date and time during Eye Diagram measurement.
Example	<p>&gt; :SENSe:MEASure:EDIagram:DTIME?</p> <p>&lt; 2006,4,1,23,59,59</p>
Compatibility	Incompatible with existing models.

## :SENSe:MEASure:EDIagram:START?

---

Response	<p>&lt;year&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;                  0, 2000 to 2036                      2000 to 2036 year</p> <p>&lt;month&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;                  0, 1 to 12                              January to December</p> <p>&lt;day&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;                  0, 1 to 31                                1st to 31st</p> <p>&lt;hour&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;                  0 to 23                                0 to 23 hours</p> <p>&lt;minute&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;                  0 to 59                                0 to 59 minutes</p> <p>&lt;second&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;                  0 to 59                                0 to 59 seconds</p> <p><b>Note:</b>                  The following is output when no measurement is performed:                  &lt; 0,0,0,0,0,0</p>
Function	Queries the Eye Diagram measurement start time (Start Time).
Example	<p>&gt; :SENSe:MEASure:EDIagram:START?</p> <p>&lt; 2006,4,1,23,59,59</p>
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:EDIagram:ELAPsed?**

Response	<pre>&lt;day&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0, 1 to 99          1 to 99 days &lt;hour&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0 to 23            0 to 23 hours &lt;minute&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0 to 59           0 to 59 minutes &lt;second&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0 to 59           0 to 59 seconds</pre> <p><b>Note:</b> The following is output when no measurement is performed: &lt; 0,0,0,0</p>
Function	Queries the Eye Diagram measurement elapsed time (Elapsed Time).
Example	<pre>&gt; :SENSe:MEASure:EDIagram:ELAPsed? &lt; 99, 23, 59, 59</pre>
Compatibility	Incompatible with existing models.

**:CALCulate:DATA:EDIagram:STATus?**

Response	<pre>&lt;string&gt; = &lt;STRING RESPONSE DATA&gt; "      "      When no alarm exists "Sync Loss"   Sync Loss "Clock Loss"  Clock Loss "CR Unlock"   CR Unlock "Out of range" Out of range "Frequency NG" Frequency NG "Illegal Error" Illegal Error</pre> <p><b>Note:</b> When two or more alarms have occurred, they are displayed in the following order: Illegal Error &gt; Frequency NG &gt; Clock Loss (CR Unlock) &gt; Sync Loss &gt; Out or range</p>
Function	Queries the status condition during Eye Diagram measurement.
Example	<pre>&gt; :CALCulate:DATA:EDIagram:STATus? &lt; "Sync Loss"</pre>
Compatibility	Incompatible with existing models.

7.6.3.2.6 Mask Edit tab window

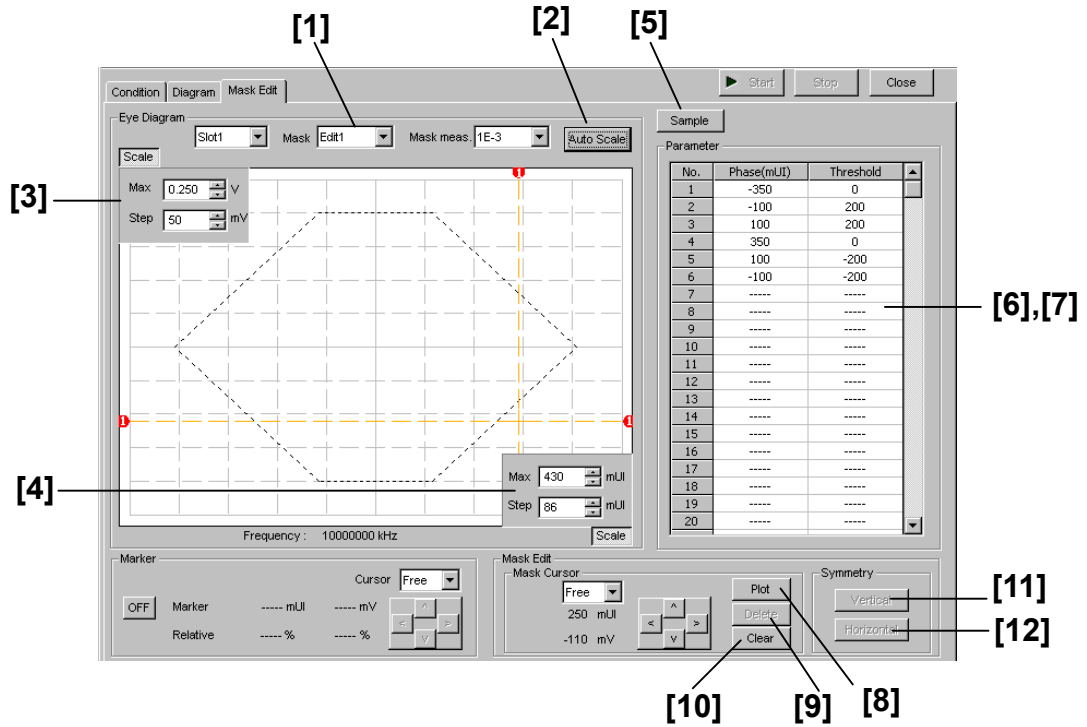


Figure 7.6.3.2.6-1 Mask Edit tab window

Table 7.6.3.2.6-1 Mask Edit tab window setting commands

No.	Setting Items	Commands
[1]	Mask	:DISPlay:RESult:EDIagram:TEMPlate:PATtern :DISPlay:RESult:EDIagram:TEMPlate:PATtern?
[2]	Auto Scale	:DISPlay:RESult:EDIagram:TEMPlate:ASCale
[3]	Max Step	:DISPlay:RESult:EDIagram:TEMPlate:SCAle :DISPlay:RESult:EDIagram:TEMPlate:SCAle?
[4]	Max Step	:DISPlay:RESult:EDIagram:TEMPlate:PSCale :DISPlay:RESult:EDIagram:TEMPlate:PSCale?
[5]	Sample	:DISPlay:RESult:EDIagram:TEMPlate:SAMPle
[6]	Query for mask point count	:DISPlay:RESult:EDIagram:TEMPlate:PNUMber?
[7]	Phase (mUI) Threshold	:DISPlay:RESult:EDIagram:TEMPlate:EDIT :DISPlay:RESult:EDIagram:TEMPlate:EDIT?
[8]	Plot	:DISPlay:RESult:EDIagram:TEMPlate:PLOT
[9]	Delete	:DISPlay:RESult:EDIagram:TEMPlate:DELeTe
[10]	Clear	:DISPlay:RESult:EDIagram:TEMPlate:CLear
[11]	Vertical	:DISPlay:RESult:EDIagram:TEMPlate:VERTical
[12]	Horizontal	:DISPlay:RESult:EDIagram:TEMPlate:HORIZontal



**:DISPlay:RESult:EDIagram:TEMPlate:PATtern <type>**

Parameter	<type> = <CHARACTER PROGRAM DATA> E1 Edit1 E2 Edit2 E3 Edit3 E4 Edit4
Function	Sets the pattern to be edited during Eye Diagram measurement.
Example	To set the pattern to be edited during Eye Diagram measurement to Edit4: > :DISPlay:RESult:EDIagram:TEMPlate:PATtern E4
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:EDIagram:TEMPlate:PATtern?**

Response	<type> = <CHARACTER RESPONSE DATA> E1, E2, E3, E4
Function	Queries the pattern that was edited during Eye Diagram measurement.
Example	> :DISPlay:RESult:EDIagram:TEMPlate:PATtern? < E4
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:EDIagram:TEMPlate:AScale**

Function	Executes automatic adjustment of the Mask Edit measurement graph scale.
Example	> :DISPlay:RESult:EDIagram:TEMPlate:AScale
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:EDIagram:TEMPlate:SCALE<max>,<step>**

Parameter	<max> = <DECIMAL NUMERIC PROGRAM DATA> -3.990 to 4.000      -3.990 to 4.000 V, in 0.001 V steps <step> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 800      1 to 800 mV, in 1 mV steps
Function	Sets the maximum value and the grid resolution in the direction of the Threshold of the Mask Edit graph.
Example	To set the maximum value and the grid resolution in the direction of the Threshold of the Mask Edit graph to 4.000 V and 800 mV, respectively: >:DISPlay:RESult:EDIagram:TEMPlate:SCALE 4.000,800
Compatibility	Incompatible with existing models.

### **:DISPlay:RESult:EDIagram:TEMPlate:SCALE?**

Response	<max> = <NR2 NUMERIC RESPONSE DATA> <step> = <NR2 NUMERIC RESPONSE DATA>
Function	Queries the maximum value and the grid resolution in the direction of the Threshold of the Mask Edit graph.
Example	> :DISPlay:RESult:EDIagram:TEMPlate:SCALE? < 4000,800
Compatibility	Incompatible with existing models.

### **:DISPlay:RESult:EDIagram:TEMPlate:PSCale <max>,<step>**

Parameter	<max> = <DECIMAL NUMERIC PROGRAM DATA> -990 to 1000                      -990 to 1000 mUI, in 1 mUI steps <step> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 200                              1 to 200 mUI, in 1 mUI steps
Function	Sets the maximum value and the grid resolution in the direction of the Phase of the Mask Edit graph.
Example	To set the maximum value and the grid resolution in the direction of the Phase of the Mask Edit graph to 1000 and 10 mUI, respectively: > :DISPlay:RESult:EDIagram:TEMPlate:PSCale 1000,10
Compatibility	Incompatible with existing models.

### **:DISPlay:RESult:EDIagram:TEMPlate:PSCale?**

Response	<max> = <NR2 NUMERIC RESPONSE DATA> <step> = <NR2 NUMERIC RESPONSE DATA>
Function	Queries the maximum value and the grid resolution in the direction of the Phase of the Mask Edit graph.
Example	> :DISPlay:RESult:EDIagram:TEMPlate:PSCale? < 1000,10
Compatibility	Incompatible with existing models.

### **:DISPlay:RESult:EDIagram:TEMPlate:SAMPLE <string>**

Parameter	<string> = <STRING PROGRAM DATA> "<drv>:\[<dir>]<file>" <drv> = C,D,E,F <dir> = <dir1>\<dir2>\... (Omitted when root directory) <file> = File name
Function	Expands the selected sample pattern to the Edit Pattern.
Example	> :DISPlay:RESult:EDIagram:TEMPlate:SAMPLE "C:\...\sample.MSK"
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:EDIagram:TEMPlate:PNUMber?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 to 32                      0 to 32 points, in 1-point steps
Function	Queries the number of Mask points.
Example	> :DISPlay:RESult:EDIagram:TEMPlate:PNUMber? < 0
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:EDIagram:TEMPlate:EDIT<point>,<phase>,<voltage>**

Parameter	<point> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 32                      1 to 32 points, in 1-point steps <phase> = <DECIMAL NUMERIC PROGRAM DATA> -1000 to 1000              -1000 to 1000 mUI, in 1-mUI steps <voltage> = <DECIMAL NUMERIC PROGRAM DATA> -4.000 to 4.000            -4.000 to 4.000 V, in 0.001-V steps
Function	Sets a Mask point position.
Example	To set a Mask point position (1 point, 1000 mUI, 4.000 V): > :DISPlay:RESult:EDIagram:TEMPlate:EDIT 1,1000,4.000
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:EDIagram:TEMPlate:EDIT? <point>**

Parameter	<point> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 32                      1 to 32 points
Response	<phase> = <NR1 NUMERIC RESPONSE DATA> <voltage> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries a Mask point position.
Example	To query the position of point 1: > :DISPlay:RESult:EDIagram:TEMPlate:EDIT? 1 < 1000,4.000
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:EDIagram:TEMPlate:PLOT <phase>,<voltage>**

Parameter	<phase> = <DECIMAL NUMERIC PROGRAM DATA> -1000 to 1000              -1000 to 1000 mUI, in 1-mUI steps <voltage> = <DECIMAL NUMERIC PROGRAM DATA> -4000 to 4000              -4000 to 4000 mV, in 1-mV steps
Function	Sets a Mask point position.
Example	To set a Mask point position to 1000 mUI (phase), 4000 mV (voltage): > :DISPlay:RESult:EDIagram:TEMPlate:PLOT 1000,4000
Compatibility	Incompatible with existing models.

### **:DISPlay:RESult:EDIagram:TEMPlate:DELeTe <pos>**

---

Parameter	<pos> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 32                            1 to 32 points, in 1-point steps
Function	Deletes the selected Mask point.
Example	To delete Mask point 3: > :DISPlay:RESult:EDIagram:TEMPlate:DELeTe 3
Compatibility	Incompatible with existing models.

### **:DISPlay:RESult:EDIagram:TEMPlate:CLEAr**

---

Function	Clears the selected Mask pattern.
Example	> :DISPlay:RESult:EDIagram:TEMPlate:CLEAr
Compatibility	Incompatible with existing models.

### **:DISPlay:RESult:EDIagram:TEMPlate:VERTical**

---

Function	Plots a Mask pattern onto the vertically-symmetric position.
Example	> :DISPlay:RESult:EDIagram:TEMPlate:VERTical
Compatibility	Incompatible with existing models.

### **:DISPlay:RESult:EDIagram:TEMPlate:HORizontal**

---

Function	Plots a Mask pattern onto the horizontally-symmetric position.
Example	> :DISPlay:RESult:EDIagram:TEMPlate:HORizontal
Compatibility	Incompatible with existing models.

## 7.6.3.2.7 File menu setting commands

Table 7.6.3.2.7-1 File menu setting commands

No.	Setting Items	Commands
[1]	Open	:SYSTem:MMEMory:DIAGram:RECall
[2]	Save	:SYSTem:MMEMory:DIAGram:STORe
[3]	Print	:SYSTem:PRINt:DIAGram

**:SYSTem:MMEMory:DIAGram:RECall <file\_name>,<file\_type>**

Parameter	<file_name> = <STRING PROGRAM DATA> "<drv>:\[<dir>]<file>" <drv> = C,D,E,F <dir> = <dir1>\<dir2>\... (Omitted when root directory) <file> = File name <file_type> = <CHARACTER PROGRAM DATA> BIN            Binary file TXT            Text (UMP) file
Function	Opens the Eye Diagram measurement result data.
Example	> :SYSTem:MMEMory:DIAGram:RECall "C:\Test\example",TXT
Compatibility	Incompatible with existing models.

## **:SYSTem:MMEMory:DIAGram:STORe <file\_name>,<data\_type>,<file\_type>**

---

Parameter	<p>&lt;file_name&gt; = &lt;STRING PROGRAM DATA&gt;                  "&lt;drv&gt;:\[&lt;dir&gt;]&lt;file&gt;"                  &lt;drv&gt; = C,D,E,F                  &lt;dir&gt; = &lt;dir1&gt;\&lt;dir2&gt;\... (Omitted when root directory)                  &lt;file&gt; = File name                  &lt;data_type&gt; = &lt;CHARACTER PROGRAM DATA&gt;                  EDG            Eye Diagram Result                  EMP            Eye Mask Point Result                  EMD            Eye Mask Detail Result                  UMP            Eye Mask Template File                  &lt;file_type&gt; = &lt;CHARACTER PROGRAM DATA&gt;                  BIN            Binary file                  CSV            CSV file                  TXT            Text file</p> <p>When BIN is selected for &lt;file_type&gt;, the Eye Diagram measurement settings and results are saved, regardless of the setting of &lt;data_type&gt;.                  When UMP is selected for &lt;data_type&gt;, select TXT for &lt;file_type&gt;.</p>
Function	<p>Saves the Eye Diagram measurement result data.</p> <p><b>Note:</b>                  The settings will not be read from the saved file if the file name is changed.</p>
Example	<p>To save the Eye Mask Detail measurement results of the Eye Diagram measurement, by specifying the file format, file name, and save destination:</p> <pre>&gt; :SYSTem:MMEMory:DIAGram:STORe "C:\Test\example.txt",EMD,TXT</pre>
Compatibility	Incompatible with existing models.

## **:SYSTem:PRINt:DIAGram <list>**

---

Parameter	<p>&lt;list&gt; = &lt;CHARACTER PROGRAM DATA&gt;                  EDG            Eye Diagram Result                  EMP            Eye Mask Point Result                  EMD            Eye Mask Detail Result</p>
Function	Prints the Eye Diagram measurement result data.
Example	<p>Prints the Eye Diagram measurement result data of the Eye Diagram measurement.</p> <pre>&gt; :SYSTem:PRINt:DIAGram EDG</pre>
Compatibility	Incompatible with existing models.

### 7.6.4 Q measurement

This section describes the commands for Q measurement.

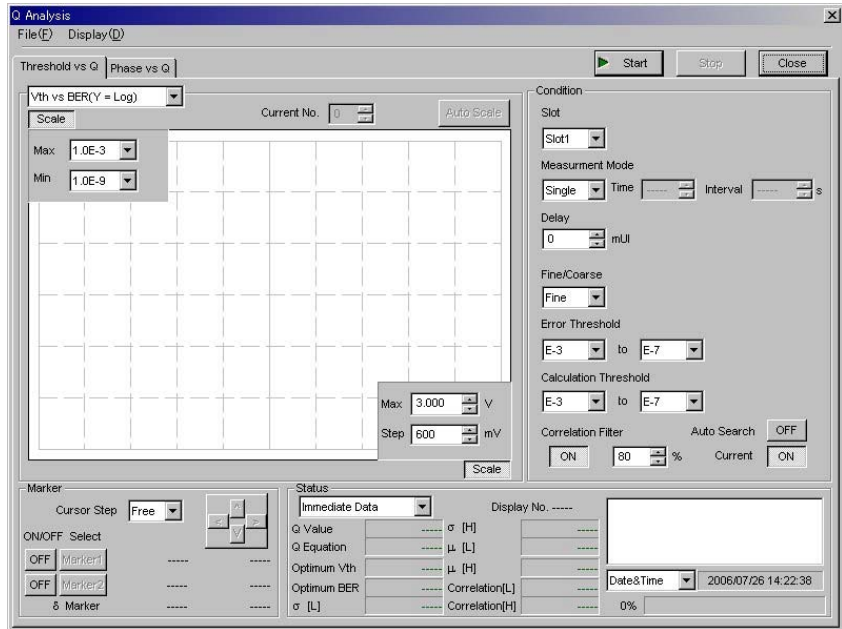


Figure 7.6.4-1 Q measurement screen

#### 7.6.4.1 Graph display setting commands

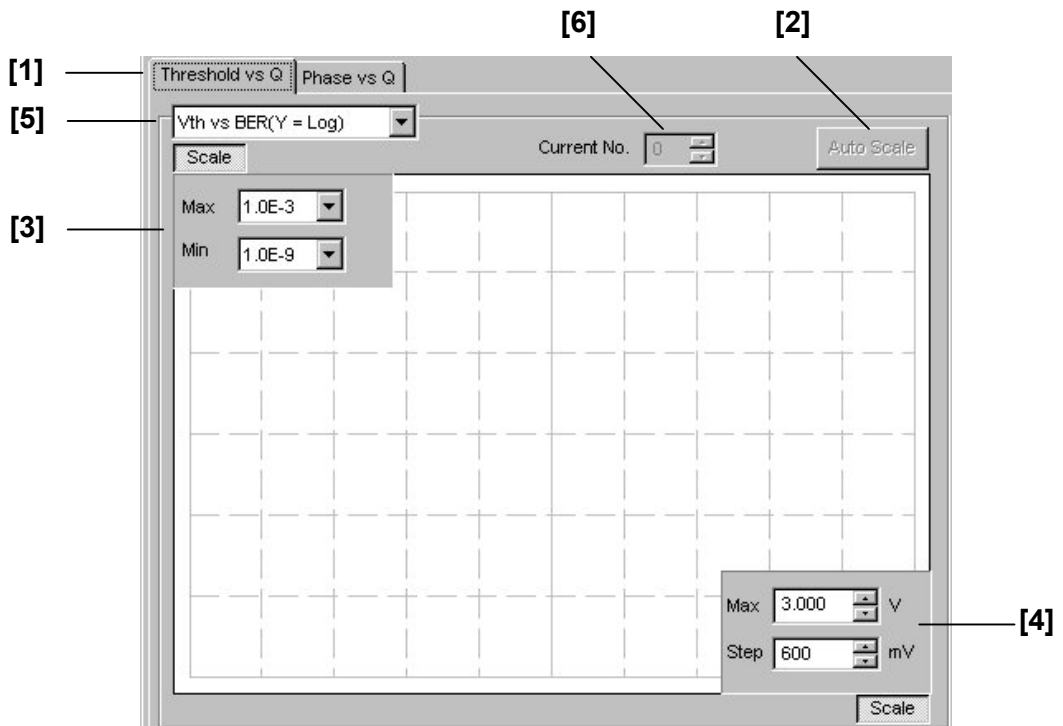


Figure 7.6.4.1-1 Graph display screen (Threshold vs Q tab window)

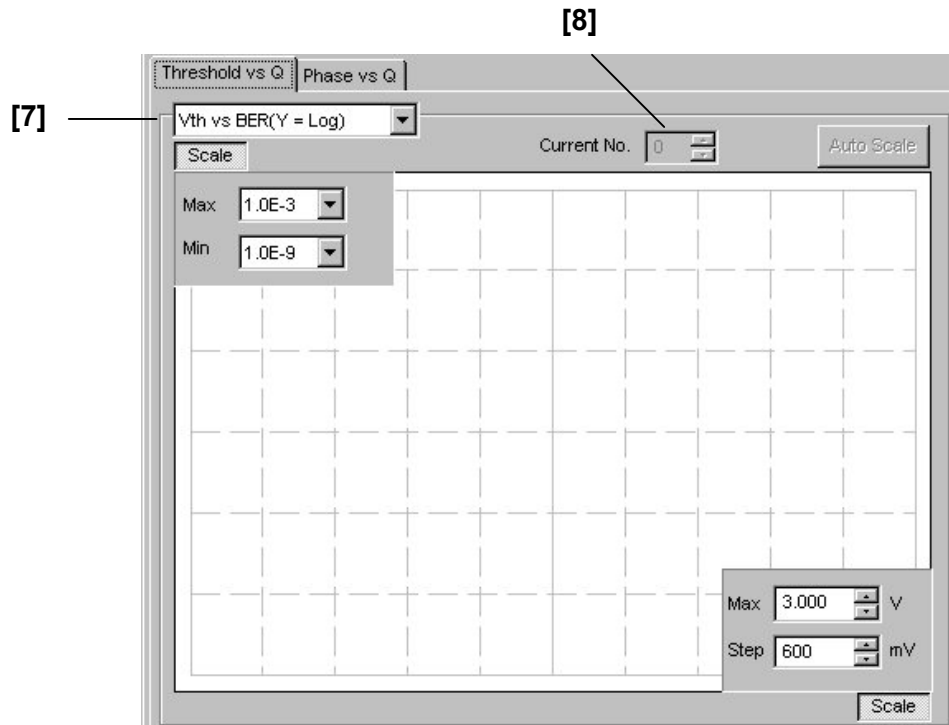


Figure 7.6.4.1-2 Graph display screen (Phase vs Q tab)

Table 7.6.4.1-1 Graph display setting commands

No.	Setting Items	Commands
[1]	Measurement mode switching	:DISPlay:RESult:QANalysis:MODE :DISPlay:RESult:QANalysis:MODE?
[2]	Auto Scale	:DISPlay:RESult:QANalysis:SCALe:ASCale
[3]	Max Min	:DISPlay:RESult:QANalysis:SCALe:VERTical :DISPlay:RESult:QANalysis:SCALe:VERTical?
[4]	Max Step	:DISPlay:RESult:QANalysis:SCALe:HORizontal :DISPlay:RESult:QANalysis:SCALe:HORizontal?
[5]	Threshold vs. Q Display graph selection	:DISPlay:RESult:QANalysis:THReshold:ITEM :DISPlay:RESult:QANalysis:THReshold:ITEM?
[6]	Threshold vs. Q Current No.	:DISPlay:RESult:QANalysis:THReshold:MNUMber :DISPlay:RESult:QANalysis:THReshold:MNUMber?
[7]	Phase vs. Q Display graph selection	:DISPlay:RESult:QANalysis:PHASe:ITEM :DISPlay:RESult:QANalysis:PHASe:ITEM?
[8]	Phase vs. Q Current No.	:DISPlay:RESult:QANalysis:PHASe:MNUMber :DISPlay:RESult:QANalysis:PHASe:MNUMber?



**:DISPlay:RESult:QANalysis:MODE <mode>**


---

Parameter	<mode> = <CHARACTER PROGRAM DATA> THREshold                    Vth vs. Q measurement PHASe                        Phase vs. Q measurement
Function	Sets the graph display item from Vth vs. Q measurement or Phase vs. Q measurement. The settings for the display scale and the marker correspond to this setting.
Example	To set to Vth vs. Q measurement: > :DISPlay:RESult:QANalysis:MODE THREshold
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:QANalysis:MODE?**


---

Response	<mode> = <CHARACTER RESPONSE DATA> THRE, PHAS
Function	Queries the item to be displayed in the graph during Vth vs. Q measurement.
Example	> :DISPlay:RESult:QANalysis:MODE? < THRE
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:QANalysis:SCALE:AScale**


---

Function	Automatically adjusts the graph display in Q measurement.
Example	> :DISPlay:RESult:QANalysis:SCALE:AScale
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:QANalysis:SCALE:VERTical <max>,[<step>]**

Parameter <max>,[<step>] = <DECIMAL NUMERIC PROGRAM DATA>

**Table 7.6.4.1-2 Parameters for Threshold vs. Q tab window**

Format	<max>	<step>	Remarks
Vth vs BER(Y = Log)	2 to 7 (E-2 to E-7), in single steps	Inputs the minimum value. 8 to 14 (E-8 to E-14), in single steps	A difference between <max> and <step> must be 7 or greater even number.
Vth vs BER(Y = Log(-Ln))	2 to 7 (E-2 to E-7), in single steps	Inputs the minimum value. 8 to 14 (E-8 to E-14), in single steps	A difference between <max> and <step> must be 7 or greater even number.
Vth vs Q	10 to 1000, in 10 steps	1 to 100, in single steps	When Linear
	-40 to 60, in 10 steps	1 to 11, in single steps	When Log
Times vs Q	10 to 1000, in 10 steps	1 to 100, in single steps	When Linear
	-40 to 60, in 10 steps	1 to 11, in single steps	When Log
Histogram	50 to 1000, in 50 steps	Omitted	

**Table 7.6.4.1-3 Parameters for Phase vs. Q tab window**

Format	<max>	<step>	Remarks
Vth vs BER(Y = Log)	2 to 7 (E-2 to E-7), in single steps	Inputs the minimum value. 8 to 14 (E-8 to E-14), in single steps	A difference between <max> and <step> must be 7 or greater even number.
Vth vs BER(Y = Log(-Ln))	2 to 7 (E-2 to E-7), in single steps	Inputs the minimum value. 8 to 14 (E-8 to E-14), in single steps	A difference between <max> and <step> must be 7 or greater even number.
Vth vs Q	10 to 1000, in 10 steps	1 to 100, in single steps	When Linear
	-40 to 60, in 10 steps	1 to 11, in single steps	When Log
Phase vs Q	10 to 1000, in 10 steps	1 to 100, in single steps	When Linear
	-40 to 60, in 10 steps	1 to 11, in single steps	When Log
Phase vs $\sigma$	0.0010 to 1.0000, in 0.0010 steps	0.001 to 0.1000, 0.0001 steps	
Phase vs $\mu$	-3.990 to 4.000 (V), in 0.010 V steps	0.001 to 0.800 (V), in 0.001 V steps	
Phase vs Opt BER	10 to 1 (E-10 to E-1), in single steps	Inputs the minimum value. 199 to 20 (E-199 to E-20), in single steps	
Phase vs Opt Threshold	-3.990 to 4.000 (V), in 0.010 V steps	0.001 to 0.800 (V), in 0.001 V steps	
Phase vs Correlation	10 to 100 (%), in 10 % steps	0 to 90 (%), in 10 % steps	A difference between <max> and <step> must be 10 or greater

**Note:**

Settings vary, depending on the status of the installed options for each slot, and the data input interface settings.

Function	Sets the vertical scale of the graph display during Q measurement. Inputs the minimum value instead of the step width, only when the vertical axis displays the error rate.
Example	To set the vertical scale during QLog display to maximum 10 dB, in 1-dB steps: <pre>&gt; :DISPlay:RESult:QANalysis:SCALE:VERTical 10,1</pre>
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:QANalysis:SCALE:VERTical?**

Response	<max>,<step> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries the vertical scale of the graph display during Q measurement.
Example	To query the vertical graph scale during QLog display: <pre>&gt; :DISPlay:RESult:QANalysis:SCALE:VERTical? &lt; 10,1</pre>
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:QANalysis:SCALE:HORizontal <max>,<step>**

Parameter <max>,<step> = <DECIMAL NUMERIC PROGRAM DATA>

**Table 7.6.4.1-4 Parameters for Threshold vs. Q tab window**

Format	<max>	<step>	Remarks
Vth vs BER(Y = Log)	-3.990 to 4.000 (V), in 0.010 V steps	0.001 to 0.800 (V), in 0.001 V steps	
Vth vs BER(Y = Log(-Ln))	-3.990 to 4.000 (V), in 0.010 V steps	0.001 to 0.800 (V), in 0.001 V steps	
Vth vs Q	-3.990 to 4.000 (V), in 0.010 V steps	0.001 to 0.800 (V), in 0.001 V steps	
Times vs Q	100 to 1000, in 50 steps	10 (fixed)	
Histogram	0.16 to 1000.00, in 0.01 steps	16/32/64/128/256	When Linear <max> must be greater than <step>.
	-49.84 to 60.00 (dB), in 0.01 steps	16/32/64	When Log

**Table 7.6.4.1-5 Parameters for Phase vs. Q tab window**

Format	<max>	<step>	Remarks
Vth vs BER(Y = Log)	-3.990 to 4.000 (V), in 0.010 V steps	0.001 to 0.800 (V), in 0.001 V steps	
Vth vs BER(Y = Log(-Ln))	-3.990 to 4.000 (V), in 0.010 V steps	0.001 to 0.800 (V), in 0.001 V steps	
Vth vs Q	-3.990 to 4.000 (V), in 0.010 V steps	0.001 to 0.800 (V), in 0.001 V steps	
Phase vs Q	-900 to 1000 (mUI), in 100 mUI steps	10 to 200 (mUI), in 10 mUI steps	
Phase vs $\sigma$	-900 to 1000 (mUI), in 100 mUI steps	10 to 200 (mUI), in 10 mUI steps	
Phase vs $\mu$	-900 to 1000 (mUI), in 100 mUI steps	10 to 200 (mUI), in 10 mUI steps	
Phase vs Opt BER	-900 to 1000 (mUI), in 100 mUI steps	10 to 200 (mUI), in 10 mUI steps	
Phase vs Opt Threshold	-900 to 1000 (mUI), in 100 mUI steps	10 to 200 (mUI), in 10 mUI steps	
Phase vs Correlation	-900 to 1000 (mUI), in 100 mUI steps	10 to 200 (mUI), in 10 mUI steps	

**Note:**

Settings vary, depending on the status of the installed options for each slot, and the data input interface settings.

Function Sets the horizontal scale of the graph display during Q measurements. The format varies depending on the graph type.

Example To set the horizontal scale during Vth display to maximum -1.000 V, in 0.100 steps:

Compatibility `> :DISPlay:RESult:QANalysis:SCALE:HORizontal -1.000,0.100`  
 Incompatible with existing models.

### **:DISPlay:RESult:QANalysis:SCALE:HORizontal?**

Response `<max>,<step> = <NR1 NUMERIC RESPONSE DATA>`  
 Function Queries the horizontal scale of the graph display during Q measurement.  
 Example To query the horizontal graph scale during Vth display:  
`> :DISPlay:RESult:QANalysis:SCALE:HORizontal?`  
`< -1.000,0.100`  
 Compatibility Incompatible with existing models.

### **:DISPlay:RESult:QANalysis:THReshold:ITEM <mode>**

Parameter `<mode> = <CHARACTER PROGRAM DATA>`  
 LBER Vth vs. BER (Y axis Log)  
 LNBER Vth vs. BER (Y axis Log (-Ln))  
 VTHQ Vth vs. Q  
 TIMQ Times vs. Q  
 HISTogram Histogram  
 Function Sets the item to be displayed in the graph during Vth vs. Q measurement.  
 Example To set the item to be displayed to Vth vs. Q:  
`> :DISPlay:RESult:QANalysis:THReshold:ITEM VTHQ`  
 Compatibility Incompatible with existing models.

### **:DISPlay:RESult:QANalysis:THReshold:ITEM?**

Response `<mode> = <CHARACTER RESPONSE DATA>`  
 LBER, LNB, VTHQ, TIMQ, HIST  
 Function Queries the item to be displayed in the graph during Vth vs. Q measurement.  
 Example `> :DISPlay:RESult:QANalysis:THReshold:ITEM?`  
`< VTHQ`  
 Compatibility Incompatible with existing models.

**:DISPlay:RESult:QANalysis:THReshold:MNUMber <numeric>**

---

Parameter	<numeric> = <DECIMAL PROGRAM DATA> 1 to 1000	Measurement number (number of measurements during repeat measurement)
Function	Sets the measurement number for which the Vth vs. Q measurement result is displayed in a graph.	
Example	To set the measurement number for graph display to 100: > :DISPlay:RESult:QANalysis:THReshold:MNUMber 100	
Compatibility	Incompatible with existing models.	

**:DISPlay:RESult:QANalysis:THReshold:MNUMber?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>	
Function	Queries the measurement number for which the Vth vs. Q measurement result is displayed in a graph.	
Example	> :DISPlay:RESult:QANalysis:THReshold:MNUMber? < 100	
Compatibility	Incompatible with existing models.	

**:DISPlay:RESult:QANalysis:PHASe:ITEM <mode>**

---

Parameter	<mode> = <CHARACTER PROGRAM DATA>	
	LBER	Vth vs. BER (Y axis Log)
	LNber	Vth vs. BER (Y axis Log (-Ln))
	VTHQ	Vth vs. Q
	PHAQ	Phase vs. Q
	PHASigma	Phase vs. $\sigma$
	PHAMu	Phase vs. $\mu$
	PHABer	Phase vs. Optimum BER
	PHAVth	Phase vs. Optimum Vth
	PHACorre	Phase vs. Correlation coefficient
Function	Sets the item to be displayed in the graph during Phase vs. Q measurement.	
Example	To set the item to be displayed in the graph to Phase vs. Q: > :DISPlay:RESult:QANalysis:PHASe:ITEM PHAQ	
Compatibility	Incompatible with existing models.	



7.6.4.2 Vth vs. Q measurement commands

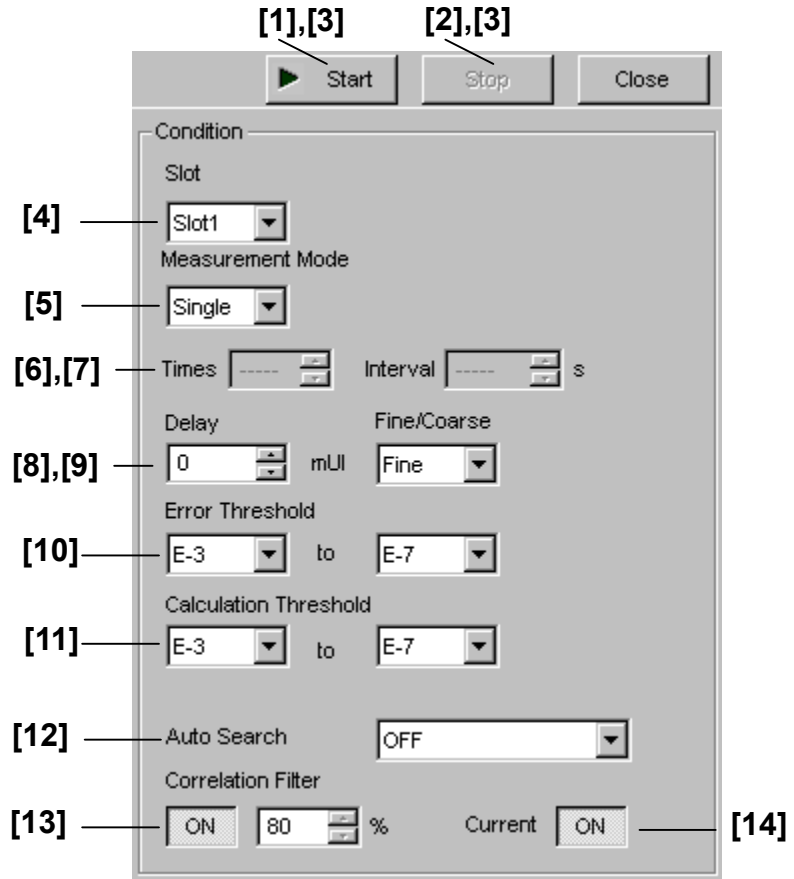


Figure 7.6.4.2-1 Vth vs. Q measurement setting field

Table 7.6.4.2-1 Vth vs. Q measurement setting commands

No.	Setting Items	Commands
[1]	Start	:SENSe:MEASure:QANalysis:THReshold:STARt
[2]	Stop	:SENSe:MEASure:QANalysis:THReshold:STOP
[3]	Query for measurement progress state	:SENSe:MEASure:QANalysis:STATe?
[4]	Slot	:SENSe:MEASure:QANalysis:THReshold:SLOT :SENSe:MEASure:QANalysis:THReshold:SLOT?
[5]	Meas Mode	:SENSe:MEASure:QANalysis:THReshold:MODE :SENSe:MEASure:QANalysis:THReshold:MODE?
[6]	Times	:SENSe:MEASure:QANalysis:THReshold:TIMEs :SENSe:MEASure:QANalysis:THReshold:TIMEs?
[7]	Interval	:SENSe:MEASure:QANalysis:THReshold:INTerval :SENSe:MEASure:QANalysis:THReshold:INTerval?
[8]	Delay	:SENSe:MEASure:QANalysis:THReshold:DELay :SENSe:MEASure:QANalysis:THReshold:DELay?
[9]	Fine/Coarse	:SENSe:MEASure:QANalysis:THReshold:RESolution :SENSe:MEASure:QANalysis:THReshold:RESolution?



Table 7.6.4.2-1 Vth vs. Q measurement setting commands (Cont'd)

No.	Setting Items	Commands
[10]	Error Threshold	:SENSe:MEASure:QANalysis:THReshold:ERANge
		:SENSe:MEASure:QANalysis:THReshold:ERANge?
[11]	Calculation Threshold	:SENSe:MEASure:QANalysis:THReshold:CALRange
		:SENSe:MEASure:QANalysis:THReshold:CALRange?
[12]	Auto Search	:SENSe:MEASure:QANalysis:THReshold:ASEarch
		:SENSe:MEASure:QANalysis:THReshold:ASEarch?
[13]	Correlation Filter	:SENSe:MEASure:QANalysis:THReshold:CFILter
		:SENSe:MEASure:QANalysis:THReshold:CFILter?
[14]	Current	:SENSe:MEASure:QANalysis:THReshold:CURRent
		:SENSe:MEASure:QANalysis:THReshold:CURRent?

**:SENSe:MEASure:QANalysis:THReshold:START**

Function	Starts Vth vs. Q measurement.
Example	> :SENSe:MEASure:QANalysis:THReshold:START
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:THReshold:STOP**

Function	Stops Vth vs. Q measurement.
Example	> :SENSe:MEASure:QANalysis:THReshold:STOP
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:STATe?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	0 Measurement has been stopped.
	1 During measurement
Function	Queries the Q measurement processing state.
Example	> :SENSe:MEASure:QANalysis:STATe? < 1
Compatibility	Incompatible with existing models.



**:SENSe:MEASure:QANalysis:THReshold:MODE?**

Response	<mode> = <CHARACTER RESPONSE DATA> SING, REP, UNT
Function	Queries the measurement processing mode during Vth vs. Q measurement.
Example	> :SENSe:MEASure:QANalysis:THReshold:MODE? < SING
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:THReshold:TIMes <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 2 to 1000                      2 to 1000 times, in 1-time steps
Function	Sets the number of measurements during Vth vs. Q measurement.
Example	To set the number of measurements to 100 times: > :SENSe:MEASure:QANalysis:THReshold:TIMes 100
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:THReshold:TIMes?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries the number of measurements during Vth vs. Q measurement.
Example	> :SENSe:MEASure:QANalysis:THReshold:TIMes? < 100
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:THReshold:INTerval <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0 to 9999                      0 to 9999 s., in 1-s steps
Function	Sets the measurement interval time during Vth vs. Q measurement.
Example	To set the measurement interval time to 50 sec.: > :SENSe:MEASure:QANalysis:THReshold:INTerval 50
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:THReshold:INTerval?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries the measurement interval time during Vth vs. Q measurement.
Example	> :SENSe:MEASure:QANalysis:THReshold:INTerval? < 50
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:QANalysis:THReshold:DElay <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> -1000 to 1000                    -1000 to 1000 mUI, in 1-mUI steps
Function	Sets the measurement start delay position during Vth vs. Q measurement.
Example	To set the measurement start delay position to 100 mUI: > :SENSe:MEASure:QANalysis:THReshold:DElay 100
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:QANalysis:THReshold:DElay?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries the measurement start delay position during Vth vs. Q measurement.
Example	> :SENSe:MEASure:QANalysis:THReshold:DElay? < 100
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:QANalysis:THReshold:RESolution <mode>**

---

Parameter	<mode> = <CHARACTER PROGRAM DATA> FINE                                    Fine mode COARse                                Coarse mode
Function	Sets the measurement resolution (Fine/Coarse mode) during Vth vs. Q measurement.
Example	To set the measurement resolution to Fine mode: > :SENSe:MEASure:QANalysis:THReshold:RESolution FINE
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:QANalysis:THReshold:RESolution?**

---

Response	<mode> = <CHARACTER RESPONSE DATA> FINE, COAR
Function	Queries the measurement resolution (Fine/Coarse mode) during Vth vs. Q measurement.
Example	> :SENSe:MEASure:QANalysis:THReshold:RESolution? < FINE
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:THReshold:ERANge <upper>,<lower>**

Parameter	<upper> = <CHARACTER PROGRAM DATA> E_3 to E_5                    E-3 to E-5, in single steps <lower> = <CHARACTER PROGRAM DATA> E_7 to E_12                    E-7 to E-12, in single steps
Function	Sets the measurement error threshold range during Vth vs. Q measurement.
Example	To set the measurement error threshold range to E-3 to E-12: > :SENSe:MEASure:QANalysis:THReshold:ERANge E_3,E_12
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:THReshold:ERANge?**

Response	<upper> = <CHARACTER RESPONSE DATA> <lower> = <CHARACTER PROGRAM DATA>
Function	Queries the measurement error threshold range during Vth vs. Q measurement.
Example	> :SENSe:MEASure:QANalysis:THReshold:ERANge? < E_3,E_12
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:THReshold:CALRange <upper>,<lower>**

Parameter	<upper> = <CHARACTER PROGRAM DATA> E_3 to E_5                    E-3 to E-5, in single steps <lower> = <CHARACTER PROGRAM DATA> E_7 to E_12                    E-7 to E-12, in single steps
Function	Sets the error threshold range during Vth vs. Q measurement recalculation.
Example	To set the error threshold range during recalculation to E-5 to E-10: > :SENSe:MEASure:QANalysis:THReshold:CALRange E_5,E_10
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:THReshold:CALRange?**

Response	<upper> = <CHARACTER RESPONSE DATA> <lower> = <CHARACTER RESPONSE DATA>
Function	Queries the error threshold range during Vth vs. Q measurement recalculation.
Example	> :SENSe:MEASure:QANalysis:THReshold:CALRange? < E_5,E_10
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:QANalysis:THReshold:ASEarch <item>**

---

Parameter	<item> = <CHARACTER PROGRAM DATA> OFF                                      Auto search OFF THReshold                                Threshold auto search PTHReshold                                Phase & threshold auto search
PTHreshold	Phase & Threshold auto search (Fine) Function Sets whether to execute auto search during Vth vs. Q measurement.
Example	To set the threshold auto search ON: > :SENSe:MEASure:QANalysis:THReshold:ASEarch THReshold
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:QANalysis:THReshold:ASEarch?**

---

Response	<item> = <CHARACTER RESPONSE DATA> OFF, THR, PTHR
Function	Queries whether to execute auto search during Vth vs. Q measurement.
Example	> :SENSe:MEASure:QANalysis:THReshold:ASEarch? < THR
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:QANalysis:THReshold:CFILter <boolean>,[<numeric>]**

---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> 0 or OFF                                      Filter ON 1 or ON                                         Filter OFF [<numeric>] = <DECIMAL NUMERIC PROGRAM DATA> 80 to 100                                      80 to 100%, in 1% steps When <boolean> is set to "0" or "OFF", <numeric> can be omitted.
Function	Sets the minimum correlation coefficient with which the Q value is recognized to be valid during Vth vs. Q measurement.
Example	To set the minimum correlation coefficient to 90%: > :SENSe:MEASure:QANalysis:THReshold:CFILter 1,90
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:THReshold:CFILter?**


---

Response	<boolean> = <NR1 NUMERIC RESPONSE DATA> 0 OFF 1 ON <numeric> = <NR1 NUMERIC RESPONSE DATA> 80 to 100 When <boolean> is 0, <numeric> is omitted.
Function	Queries the minimum correlation coefficient with which the Q value is recognized to be valid during Vth vs. Q measurement.
Example	> :SENSe:MEASure:QANalysis:THReshold:CFILter? < 1, 90
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:THReshold:CURRent <boolean>**


---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> 0 or OFF OFF: Updates at measurement termination 1 or ON ON: Updates every second
Function	Sets the graph display update period during Vth vs. Q measurement.
Example	To set the graph display update timing to every second: > :SENSe:MEASure:QANalysis:THReshold:CURRent 1
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:THReshold:CURRent?**


---

Response	<boolean> = <NR1 NUMERIC RESPONSE DATA> 0 OFF 1 ON
Function	Queries the graph display update period during Vth vs. Q measurement.
Example	> :SENSe:MEASure:QANalysis:THReshold:CURRent? < 1
Compatibility	Incompatible with existing models.

7.6.4.3 Phase vs. Q measurement setting commands

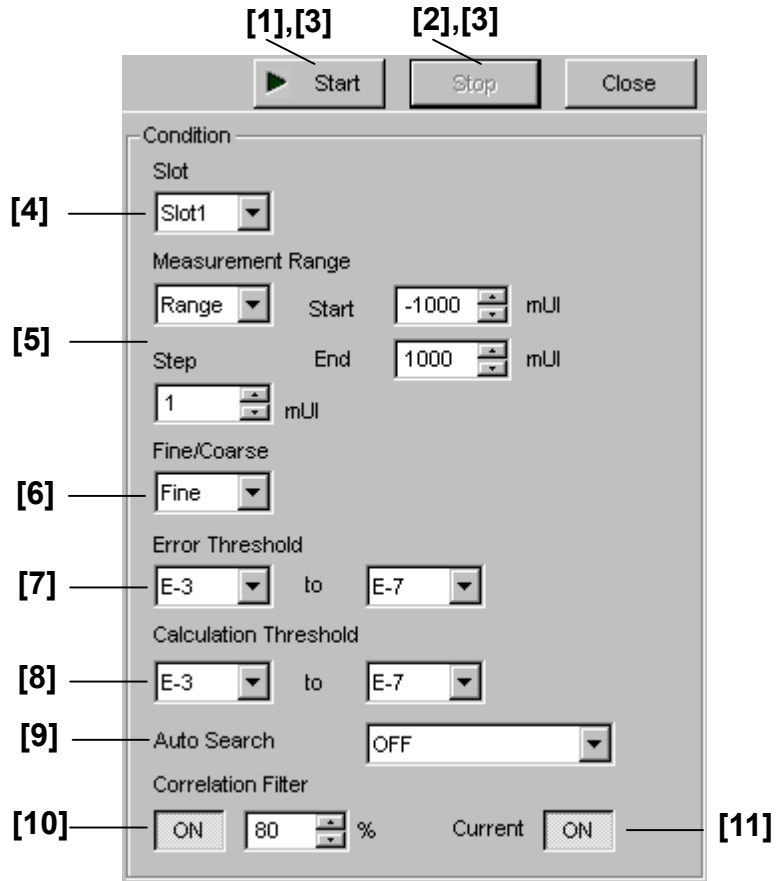


Figure 7.6.4.3-1 Phase vs. Q measurement setting field

Table 7.6.4.3-1 Phase vs. Q measurement setting commands

No.	Setting Items	Commands	
[1]	Start	:SENSe:MEASure:QANalysis:PHASe:START	
[2]	Stop	:SENSe:MEASure:QANalysis:PHASe:STOP	
[3]	Query for measurement state	:SENSe:MEASure:QANalysis:STATe?	
[4]	Slot	:SENSe:MEASure:QANalysis:PHASe:SLOT :SENSe:MEASure:QANalysis:PHASe:SLOT?	
[5]	Measurement Range	Start	:SENSe:MEASure:QANalysis:PHASe:RANGe
		End	:SENSe:MEASure:QANalysis:PHASe:RANGe?
		Center	:SENSe:MEASure:QANalysis:PHASe:WIDTh
		Span	:SENSe:MEASure:QANalysis:PHASe:WIDTh?
[6]	Fine/Coarse	:SENSe:MEASure:QANalysis:PHASe:RESolution	
		:SENSe:MEASure:QANalysis:PHASe:RESolution?	
[7]	Error Threshold	:SENSe:MEASure:QANalysis:PHASe:ERANGe	
		:SENSe:MEASure:QANalysis:PHASe:ERANGe?	
[8]	Calculation Threshold	:SENSe:MEASure:QANalysis:PHASe:CALRange	
		:SENSe:MEASure:QANalysis:PHASe:CALRange?	



Table 7.6.4.3-1 Phase vs. Q measurement setting commands (Cont'd)

No.	Setting Items	Commands
[9]	Auto Search	:SENSe:MEASure:QANalysis:PHASe:ASEarch
		:SENSe:MEASure:QANalysis:PHASe:ASEarch?
[10]	Correlation Filter	:SENSe:MEASure:QANalysis:PHASe:CFILter
		:SENSe:MEASure:QANalysis:PHASe:CFILter?
[11]	Current	:SENSe:MEASure:QANalysis:PHASe:CURRent
		:SENSe:MEASure:QANalysis:PHASe:CURRent?

**:SENSe:MEASure:QANalysis:PHASe:START**

Function	Starts Phase vs. Q measurement.
Example	> :SENSe:MEASure:QANalysis:PHASe:START
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:PHASe:STOP**

Function	Stops Phase vs. Q measurement.
Example	> :SENSe:MEASure:QANalysis:PHASe:STOP
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:STATe?**

Response	numeric> = <NR1 NUMERIC RESPONSE DATA>
	0                      During measurement stop
	1                      During measurement
Function	Queries the measurement processing state during Q measurement.
Example	> :SENSe:MEASure:QANalysis:STATe? < 1
Compatibility	Incompatible with existing models.

---

### **:SENSe:MEASure:QANalysis:PHASe:SLOT <numeric>[,<unit>]**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 6                                      Slots No. 1 to No. 6 1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A [<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                                      Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number. Can be omitted. Mainframe No. 1 is specified when omitted.
Function	Selects the Phase vs. Q measurement target slot.
Example	To set the target slot to Slot2: > :SENSe:MEASure:QANalysis:PHASe:SLOT 2
Compatibility	Incompatible with existing models.

---

### **:SENSe:MEASure:QANalysis:PHASe:SLOT? [<unit>]**

---

Parameter	[<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                                      Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number. Can be omitted. Mainframe No. 1 is specified when omitted.
Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1 to 6                                      Slots No. 1 to No. 6
Function	Queries the Phase vs. Q measurement target slot.
Example	> :SENSe:MEASure:QANalysis:PHASe:SLOT? < 2
Compatibility	Incompatible with existing models.

---

### **:SENSe:MEASure:QANalysis:PHASe:RANGe <start>,<end>,<step>**

---

Parameter	<start> = <DECIMAL NUMERIC PROGRAM DATA> -1000 to 1000                              -1000 to 1000 mUI, in 1-mUI steps <end> = <DECIMAL NUMERIC PROGRAM DATA> -1000 to 1000                              -1000 to 1000 mUI, in 1-mUI steps <step> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 200                                      1 to 200 mUI, in 1-mUI steps
Function	Sets the measurement range and measurement step during Phase vs. Q measurement.
Example	To set the measurement range to -200 to 300 mUI and measurement step to 10 mUI: > :SENSe:MEASure:QANalysis:PHASe:RANGe -200,300,10
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:PHASe:RANGe?**


---

Response	<start> = <NR1 NUMERIC RESPONSE DATA> <end> = <NR1 NUMERIC RESPONSE DATA> <step> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries the measurement range during Phase vs. Q measurement.
Example	> :SENSe:MEASure:QANalysis:PHASe:RANGe? < -200,300,10
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:PHASe:WIDTh <center>,<span>,<step>**


---

Parameter	<center> = <DECIMAL NUMERIC PROGRAM DATA> -1000 to 1000                      -1000 to 1000 mUI, in 1-mUI steps <span> = <DECIMAL NUMERIC PROGRAM DATA> 0 to 2000                              0 to 2000 mUI, in 1-mUI steps <step> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 200                                  1 to 200 mUI, in 1-mUI steps
Function	Sets the measurement range and measurement step during Phase vs. Q measurement.
Example	To set the measurement range to 100 mUI, centered at 200 mUI, in 10-mUI steps: > :SENSe:MEASure:QANalysis:PHASe:WIDTh 100,200,10
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:PHASe:WIDTh?**


---

Response	<center> = <NR1 NUMERIC RESPONSE DATA> <span> = <NR1 NUMERIC RESPONSE DATA> <step> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries the measurement range during Phase vs. Q measurement.
Example	> :SENSe:MEASure:QANalysis:PHASe:WIDTh? < 100,200,10
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:QANalysis:PHASe:RESolution <mode>**

---

Parameter	<mode> = <CHARACTER PROGRAM DATA> FINE                      Fine mode COARSe                    Coarse mode
Function	Sets the measurement resolution (Fine/Coarse mode) during Phase vs. Q measurement.
Example	To set the measurement resolution to Fine mode: > :SENSe:MEASure:QANalysis:PHASe:RESolution FINE
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:QANalysis:PHASe:RESolution?**

---

Response	<mode> = <CHARACTER RESPONSE DATA> FINE, COAR
Function	Queries the measurement resolution (Fine/Coarse mode) during Phase vs. Q measurement.
Example	> :SENSe:MEASure:QANalysis:PHASe:RESolution? < FINE
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:QANalysis:PHASe:ERANge <upper>,<lower>**

---

Parameter	<upper> = <CHARACTER PROGRAM DATA> E_3 to E_5                E-3 to E-5, in single steps <lower> = <CHARACTER PROGRAM DATA> E_7 to E_12              E-7 to E-12, in single steps
Function	Sets the measurement error threshold range during Phase vs. Q measurement.
Example	To set the measurement error threshold range to E-3 to E-12: > :SENSe:MEASure:QANalysis:PHASe:ERANge E_3,E_12
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:QANalysis:PHASe:ERANge?**

---

Response	<upper> = <CHARACTER RESPONSE DATA> <lower> = <CHARACTER RESPONSE DATA>
Function	Queries the measurement error threshold range during Phase vs. Q measurement.
Example	> :SENSe:MEASure:QANalysis:PHASe:ERANge? < E_3,E_12
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:PHASe:CALRange <upper>,<lower>**


---

Parameter	<upper> = <CHARACTER PROGRAM DATA> E_3 to E_5                    E-3 to E-5, in single steps <lower> = <CHARACTER PROGRAM DATA> E_7 to E_12                    E-7 to E-12, in single steps
Function	Sets the error threshold range during Phase vs. Q measurement recalculation.
Example	To set the error threshold range during recalculation to E-5 to E-10: > :SENSe:MEASure:QANalysis:PHASe:CALRange E_5,E_10
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:PHASe:CALRange?**


---

Response	<upper> = <CHARACTER RESPONSE DATA> <lower> = <CHARACTER RESPONSE DATA>
Function	Queries the error threshold range during Phase vs. Q measurement recalculation.
Example	> :SENSe:MEASure:QANalysis:PHASe:CALRange? < E_5,E_10
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:PHASe:ASEarch <item>**


---

Parameter	<item> = <CHARACTER PROGRAM DATA> OFF                                    Auto search OFF THReshold                            Threshold auto search
Function	Sets execution of auto search during Phase vs. Q measurement.
Example	To set the threshold auto search ON: > :SENSe:MEASure:QANalysis:PHASe:ASEarch THReshold
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:PHASe:ASEarch?**


---

Response	<item> = <CHARACTER RESPONSE DATA> OFF, THR
Function	Queries the execution of auto search during Phase vs. Q measurement.
Example	> :SENSe:MEASure:QANalysis:PHASe:ASEarch? < THR
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:QANalysis:PHASe:CFILter <boolean>[,<numeric>]**

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> 0 or OFF                      Filter OFF 1 or ON                         Filter ON <numeric> = <DECIMAL NUMERIC PROGRAM DATA> 80 to 100                      80 to 100%, in 1% steps Omitted when <boolean> is "0" or "OFF".
Function	Sets the minimum correlation coefficient with which the Q value is recognized to be valid during Phase vs. Q measurement.
Example	To set the minimum correlation coefficient to 90%: > :SENSe:MEASure:QANalysis:PHASe:CFILter 1,90
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:QANalysis:PHASe:CFILter?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0                                      OFF 1                                      ON <numeric> = <NR1 NUMERIC RESPONSE DATA> 80 to 100                      80 to 100%
Function	Queries the minimum correlation coefficient with which the Q value is recognized to be valid during Phase vs. Q measurement.
Example	> :SENSe:MEASure:QANalysis:PHASe:CFILter? < 1,90
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:QANalysis:PHASe:CURRent <boolean>**

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> 0 or OFF                      OFF: Updates at measurement termination 1 or ON                         ON: Updates every second
Function	Sets the graph display update period during Phase vs. Q measurement.
Example	To set the graph display update timing to every second: > :SENSe:MEASure:QANalysis:PHASe:CURRent 1
Compatibility	Incompatible with existing models.

---

**:SENSe:MEASure:QANalysis:PHASe:CURRent?**

---

Response	<boolean> = <NR1 NUMERIC RESPONSE DATA> 0 OFF 1 ON
Function	Queries the graph display update period during Phase vs. Q measurement.
Example	> :SENSe:MEASure:QANalysis:PHASe:CURRent? < 1
Compatibility	Incompatible with existing models.

7.6.4.4 Measurement results and status query commands

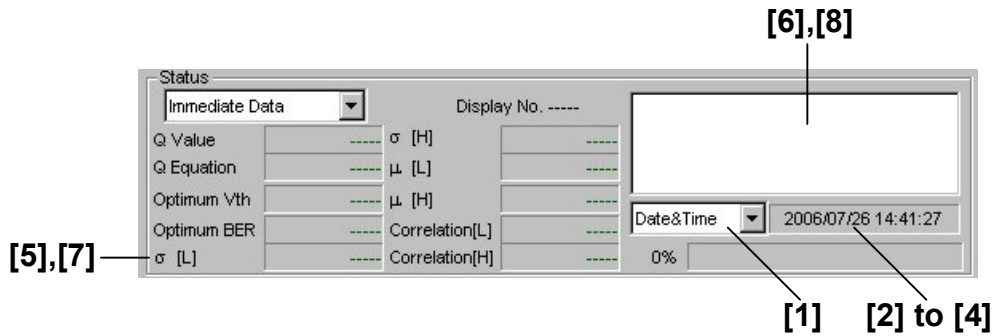


Figure 7.6.4.4-1 Measurement results and status display field

Table 7.6.4.4-1 Measurement results and status query commands

No.	Setting Items	Commands
[1]	No label (Setting of time display)	:SENSe:MEASure:QANalysis:TIME :SENSe:MEASure:QANalysis:TIME?
[2]	Query for current time	:SENSe:MEASure:QANalysis:DTIME?
[3]	Query for measurement start time	:SENSe:MEASure:QANalysis:STArT?
[4]	Query for measurement elapsed time	:SENSe:MEASure:QANalysis:ELAPsed?
[5]	Query for Vth vs. Q measurement result	:CALCulate:DATA:QANalysis:THReshold?
[6]	Query for Vth vs. Q measurement status	:CALCulate:DATA:QANalysis:TSTatus?
[7]	Query for Phase vs. Q measurement result	:CALCulate:DATA:QANalysis:PHASe?
[8]	Query for Phase vs. Q measurement status	:CALCulate:DATA:QANalysis:PSTatus?

**:SENSe:MEASure:QANalysis:TIME <type>**

Parameter	<type> = <CHARACTER PROGRAM DATA>
	DTIME Displays the current date and time.
	STArT Displays the measurement start time.
	ELAPsed Displays the elapsed time based on the measurement period.
Function	Selects the Q measurement time display type.
Example	To set the Q measurement time display type to measurement start time (Start Time): > :SENSe:MEASure:QANalysis:TIME STArT
Compatibility	Incompatible with existing models.



**:SENSe:MEASure:QANalysis:TIME?**


---

Response	<type> = <CHARACTER RESPONSE DATA> DTIM, STAR, ELAP
Function	Queries the Q measurement time display type.
Example	> :SENSe:MEASure:QANalysis:TIME? < STAR
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:DTIME?**


---

Response	<year>,<month>,<day>,<hour>,<min>,<sec> <year> = <NR1 NUMERIC RESPONSE DATA> 2000 to 2036                      2000 to 2036 year <month> = <NR1 NUMERIC RESPONSE DATA> 1 to 12                              January to December <day> = <NR1 NUMERIC RESPONSE DATA> 1 to 31                                1st to 31st <hour> = <NR1 NUMERIC RESPONSE DATA> 0 to 23                                0 to 23 hours <minute> = <NR1 NUMERIC RESPONSE DATA> 0 to 59                                0 to 59 minutes <second> = <NR1 NUMERIC RESPONSE DATA> 0 to 59                                0 to 59 seconds
Function	Queries the current date and time during Q measurement.
Example	> :SENSe:MEASure:QANalysis:DTIME? < 2005,12,31,23,59,59
Compatibility	Incompatible with existing models.

## **:SENSe:MEASure:QANalysis:START?**

---

Response	<year> = <NR1 NUMERIC RESPONSE DATA> 0, 2000 to 2036            2000 to 2036 year <month> = <NR1 NUMERIC RESPONSE DATA> 0, 1 to 12                 January to December <day> = <NR1 NUMERIC RESPONSE DATA> 0, 1 to 31                 1st to 31st <hour> = <NR1 NUMERIC RESPONSE DATA> 0 to 23                    0 to 23 hours <minute> = <NR1 NUMERIC RESPONSE DATA> 0 to 59                    0 to 59 minutes <second> = <NR1 NUMERIC RESPONSE DATA> 0 to 59                    0 to 59 seconds "0,0,0,0,0" is returned if there is no measurement start time data.
Function	Queries the measurement start time (Start Time) during Q measurement.
Example	> :SENSe:MEASure:QANalysis:START? < 2005,12,31,23,59,59
Compatibility	Incompatible with existing models.

## **:SENSe:MEASure:QANalysis:ELAPsed?**

---

Response	<day> = <NR1 NUMERIC RESPONSE DATA> 0 to 99                    0 to 99 days <hour> = <NR1 NUMERIC RESPONSE DATA> 0 to 23                    0 to 23 hours <minute> = <NR1 NUMERIC RESPONSE DATA> 0 to 59                    0 to 59 minutes <second> = <NR1 NUMERIC RESPONSE DATA> 0 to 59                    0 to 59 seconds "0,0,0,0" is returned if there is no measurement elapsed time data.
Function	Queries the measurement elapsed time (Elapsed time) during Q measurement.
Example	> :SENSe:MEASure:QANalysis:ELAPsed? < 31,23,59,59
Compatibility	Incompatible with existing models.

**:CALCulate:DATA:QANalysis:THReshold? <string>**

Parameter	<string> = <STRING PROGRAM DATA>
	<result1> For the contents of measurement data <result1> see Table 7.6.4.4-2.
	<result2> For the contents of immediate data <result2> see Table 7.6.4.4-3.
	<result3> For the contents of statistic data <result3> see Table 7.6.4.4-4.

**Table 7.6.4.4-2 Vth vs. Q measurement result <result1>**

Items		<result1>	Response Format
Top side Vth/Error Rate	Number of measurements 1 to 1000	"VTHQ:TOP,1"... "VTHQ:TOP,1000"	Form 1
Bottom side Vth/Error Rate	Number of measurements 1 to 1000	"VTHQ:BTM,1"... "VTHQ:BTM,1000"	Form 1

The measurement result for each Vth is delimited with a comma (,) and returned.

**Table 7.6.4.4-3 Vth vs. Q immediate data <result2>**

Items		<result2>	Response Format
Q value	Number of measurements 1 to 1000	"QVALue:1"... "QVALue:1000"	Form2
Optimum BER		"OPTBer:1"... "OPTBer:1000"	Form3
Optimum Vth		"OPTVth:1"... "OPTVth:1000"	Form4
Correlation bottom		"CORBtm:1"... "CORBtm:1000"	Form2
Correlation top		"CORTop:1"... "CORTop:1000"	Form2
$\sigma$ bottom		"SGMBtm:1"... "SGMBtm:1000"	Form2
$\sigma$ top		"SGMTop:1"... "SGMTop:1000"	Form2
$\mu$ bottom		"MUBtm:1"... "MUBtm:1000"	Form4
$\mu$ top		"MUTop:1"... "MUTop:1000"	Form4
Q Equation		"QEQ:1"... "QEQ:1000"	Form2

**Table 7.6.4.4-4 Vth vs. Q measurement statistic data <result3>**

Items	<Result3>	Response Format
Total Data	"TOTAl"	Form5
Valid Data	"VALid"	Form5
Q Max	"QMAX"	Form2
Q Min	"QMIN"	Form2
Q Mean	"QMEan"	Form2
Q $\sigma$	"QSGM"	Form2
Q $\cdot 5 \sigma$	"QSGM5"	Form2

Response <string> = <STRING RESPONSE DATA>

Table 7.6.4.4-5 Response format

Form	Format	Description
Form1 Vth-Q type	"XX.XXX,Y.YYYYE-YYY "	XX.XXX: Threshold (V) Y.YYYYE-YYY: Error Rate
	"-----,-----"	When no data corresponds to the query.
Form2 %type (dB type)	"XXX.XX"	When 0.00 to 100.00
	"-----"	When no data corresponds to the query.
Form3 Fraction type	"X.XXXxE-XXX"	When 0.0000E-016 to 1.0000E000
	"-----"	When no data corresponds to the query.
	"< 1.0E-199"	When E-199 or less
Form4 Voltage type	"XX.XXXX"	When -4.0000 to 4.0000
	"-----"	When no data corresponds to the query.
Form5 Integer type	"XXXX"	When 0 to 9999
	"----"	When no data corresponds to the query.

Function Queries the Vth vs. Q measurement result.  
 Example To query the measurement result of the 10th time, on the top side:  
 > :CALCulate:DATA:QANalysis:THReshold? "VTHQ:TOP,10"  
 < "1.000,1.2345E-003", "1.100,1.2345E-004",  
 "1.200,1.2345E-005",  
 "1.300,1.2345E-006"  
 Compatibility Incompatible with existing models.

**:CALCulate:DATA:QANalysis:TStatus?**

Response <string> = <STRING RESPONSE DATA>  
 "" When no alarm exists  
 "Sync Loss" Sync. Loss  
 "Clock Loss" Clock Loss  
 "CR Unlock" CR Unlock  
 "Out of range" Out of range  
 "Frequency NG" Frequency NG  
 "Illegal Error" Illegal Error

**Note:**

Displays any one of the alarms.  
 When two or more alarms have occurred, they are displayed in the following order:  
 Illegal Error > Frequency NG > Clock Loss(CR Unlock) > Sync Loss > Out of range

Function Queries the Vth vs. Q measurement status.  
 Example > :CALCulate:DATA:QANalysis:TStatus?  
 < "Sync Loss"  
 Compatibility Incompatible with existing models.

**:CALCulate:DATA:QANalysis:PHASe? <string>**

Parameter	<string> = <STRING PROGRAM DATA>
	<result1> For the contents of measurement data <result1>, see Table 7.6.4.4-6.
	<result2> For the contents of immediate data <result2>, see Table 7.6.4.4-7.

**Table 7.6.4.4-6 Phase vs. Q measurement result <result1>**

Items		<result1>	Response Format
Top side Vth-Error Rate	Phase –1000 to 1000 mUI	"VTHQ:TOP,XXXXX"	Form1
Bottom side Vth-Error Rate	Phase –1000 to 1000 mUI	"VTHQ:BTM,XXXXX"	Form1

**Table 7.6.4.4-7 Phase vs. Q immediate data <result2>**

Items		<result2>	Response Format
Q value	Phase	"QVALue:–1000"... "QVALue:1000"	Form2
Optimum BER	–1000 to 1000	"OPTBer:–1000"... "OPTBer:1000"	Form3
Optimum Vth		"OPTVth:–1000"... "OPTVth:1000"	Form4
Correlation bottom		"CORBtm:–1000"... "CORBtm:1000"	Form2
Correlation top		"CORTop:–1000"... "CORTop:1000"	Form2
Σ bottom		"SGMBtm:–1000"... "SGMBtm:1000"	Form2
Σ top		"SGMTop:–1000"... "SGMTop:1000"	Form2
M bottom		"MUBtm:–1000"... "MUBtm:1000"	Form4
M top		"MUTop:–1000"... "MUTop:1000"	Form4
Q equation		"QEQ:–1000"... "QEQ:1000"	Form2

Response <string> = <STRING RESPONSE DATA>

**Table 7.6.4.4-8 Response format**

Form	Format	Description
Form1 Vth-ER type	"XX.XXX,Y.YYYYE-YYY"	XX.XXX: Threshold (V) Y.YYYYE-YYY: Error Rate
	"-,-,-,-,-,-,-,-,-,-"	When no data corresponds to the query.
Form2 %type (dB type)	"XXX.XX"	When 0.00 to 100.00
	"-,-,-,-,-,-,-"	When no data corresponds to the query.
Form3 Fraction type	"X.XXXXE-XXX"	When 0.0000E-016 to 1.0000E000
	"-,-,-,-,-,-,-"	When no data corresponds to the query.
	"< 1.0E-199"	When E-199 or less
Form4 Voltage type	"XX.XXXX"	When –4.0000 to 4.0000
	"-,-,-,-,-,-,-"	When no data corresponds to the query.

Function Queries the Phase vs. Q measurement result.

Example To query the TOP side measurement result:

```
> :CALCulate:DATA:QANalysis:PHase? "VTHQ:TOP,100"
< "10,1.000,1.2345E-003", "10,1.100,1.2345E-004",
"10,1.200,1.2345E-005"
```

Compatibility                      Incompatible with existing models.

## **:CALCulate:DATA:QANalysis:PStatus?**

---

Response	<string> = <STRING RESPONSE DATA>
	""                                      When no alarm exists
	"Sync Loss"                          Sync. Loss
	"Clock Loss"                        Clock Loss
	"CR Unlock"                         CR Unlock
	"Out of range"                      Out of range
	"Frequency NG"                      Frequency NG
	"Illegal Error"                      Illegal Error

**Note:**

Displays any one of the alarms.

When two or more alarms have occurred, they are displayed in the following order:

Illegal Error > Frequency NG > Clock Loss (CR Unlock) > Sync Loss > Out of range

Function                              Queries the Phase vs. Q measurement status.

Example                                > :CALCulate:DATA:QANalysis:PStatus?  
 < "Sync Loss"

## 7.6.4.5 File menu setting commands

Table 7.6.4.5-1 File menu setting commands

No.	Setting Items	Commands
[1]	Open	:SYSTem:MMEMory:QANalysis:RECall
[2]	Save	:SYSTem:MMEMory:QANalysis:STORe
[3]	Print	:SYSTem:PRINt:QANalysis
[4]	Q Unit	:SENSe:MEASure:QANalysis:THReshold:LSCale
		:SENSe:MEASure:QANalysis:THReshold:LSCale?
		:SENSe:MEASure:QANalysis:PHASe:LSCale
		:SENSe:MEASure:QANalysis:PHASe:LSCale?

**:SYSTem:MMEMory:QANalysis:RECall <file\_name>**

Parameter	<file_name> = <STRING PROGRAM DATA> "<drv>:\[<dir>]<file>" <drv> = C,D,E,F <dir> = <dir1>\<dir2>\... (Omitted when root directory) <file> = File name
Function	Opens the Q measurement result data.
Example	> :SYSTem:MMEMory:QANalysis:RECall "C:\Test\example"
Compatibility	Incompatible with existing models.

**:SYSTem:MMEMory:QANalysis:STORE  
<file\_name>,<data\_type>,<file\_type>**

---

Parameter	<file_name> = <STRING PROGRAM DATA> "<drv>:\[<dir>]<file>" <drv> = C,D,E,F <dir> = <dir1>\<dir2>\... (Omitted when root directory) <file> = File name <data_type> = <CHARACTER PROGRAM DATA> VTQ            Vth vs. Q Result PSQ            Phase vs. Q Result <file_type> = <CHARACTER PROGRAM DATA> BIN            Binary file CSV            CSV file TXT            Text file
Function	Saves the Q measurement result data. <b>Note:</b> The settings will not be read from the saved file if the file name is changed.
Example	Saves the Vth vs. Q measurement result data of Q measurement by specifying the save destination, file name, and file format. > :SYSTem:MMEMory:QANalysis:STORE "C:\Test\example",VTQ,CSV
Compatibility	Incompatible with existing models.

**:SYSTem:PRINT:QANalysis <list>**

---

Parameter	<list> = <CHARACTER PROGRAM DATA> VTQ            Prints Vth vs. Q measurement results. PSQ            Prints Phase vs. Q measurement results.
Function	Prints the Q measurement result data.
Example	To print the Vth vs. Q measurement results: :SYSTem:PRINT:QANalysis VTQ
Compatibility	Incompatible with existing models.



**:SENSe:MEASure:QANalysis:THReshold:LSCale <scale>**


---

Parameter	<scale> = <CHARACTER PROGRAM DATA> LINear                    Linear display LOG                        Log display
Function	Sets the Q value display scale during Vth vs. Q measurement to Linear or Log display.
Example	To set the display scale to Log display: > :SENSe:MEASure:QANalysis:THReshold:LSCale LOG
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:THReshold:LSCale?**


---

Response	<scale> = <CHARACTER RESPONSE DATA> LIN, LOG
Function	Queries whether the Q value display scale during Vth vs. Q measurement is set to Linear or Log display.
Example	> :SENSe:MEASure:QANalysis:THReshold:LSCale? < LOG
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:PHASe:LSCale <scale>**


---

Parameter	<scale> = <CHARACTER PROGRAM DATA> LINear                    Linear display LOG                        Log display
Function	Sets the Q value display scale during Phase vs. Q measurement to Linear or Log display.
Example	To set the display scale to Log display: > :SENSe:MEASure:QANalysis:PHASe:LSCale LOG
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:PHASe:LSCale?**


---

Response	<scale> = <CHARACTER RESPONSE DATA> LIN, LOG
Function	Queries whether the Q value display scale during Phase vs. Q measurement is set to Linear or Log display.
Example	> :SENSe:MEASure:QANalysis:PHASe:LSCale? < LOG
Compatibility	Incompatible with existing models.

### 7.6.5 Bathtub measurement

This section describes the commands for Bathtub measurement.

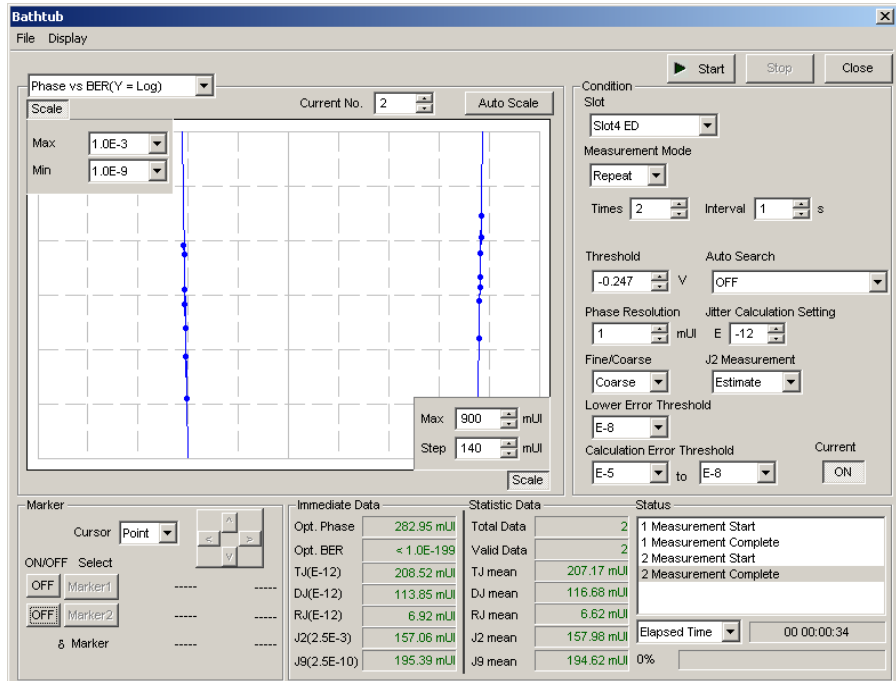


Figure 7.6.5-1 Bathtub measurement screen

#### 7.6.5.1 Measurement setting commands

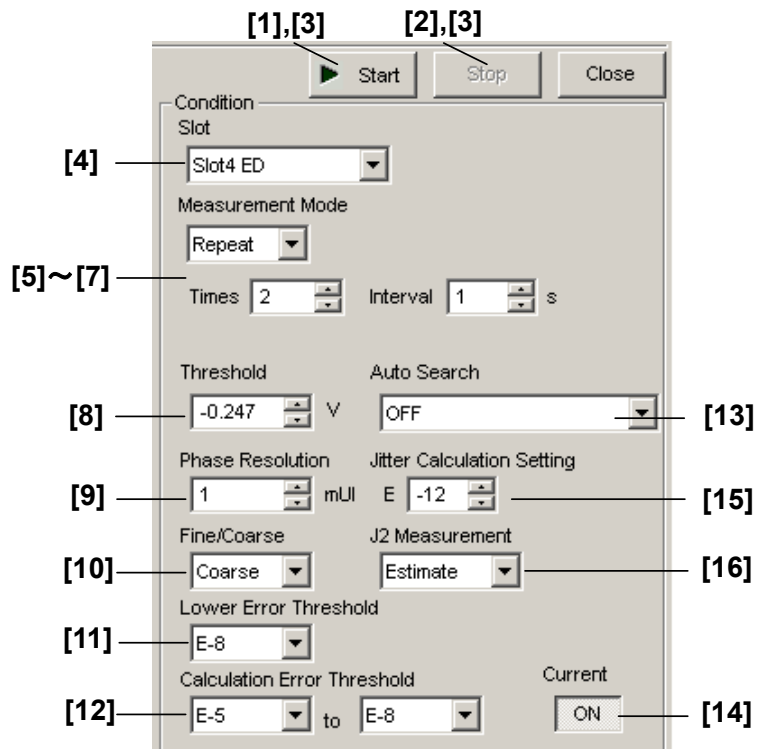


Figure 7.6.5.1-1 Measurement setting field

Table 7.6.5.1-1 Measurement setting commands

No.	Setting Items	Commands
[1]	Start	:SENSE:MEASure:BATHtub:START
[2]	Stop	:SENSE:MEASure:BATHtub:STOP
[3]	Query for measurement status	:SENSE:MEASure:BATHtub:STATe?
[4]	Slot	:SENSE:MEASure:BATHtub:SLOT
		:SENSE:MEASure:BATHtub:SLOT?
[5]	Measurement Mode	:SENSE:MEASure:BATHtub:MODE
		:SENSE:MEASure:BATHtub:MODE?
[6]	Time	:SENSE:MEASure:BATHtub:TIME
		:SENSE:MEASure:BATHtub:TIME?
[7]	Interval	:SENSE:MEASure:BATHtub:INTerval
		:SENSE:MEASure:BATHtub:INTerval?
[8]	Threshold	:SENSE:MEASure:BATHtub:DATA
		:SENSE:MEASure:BATHtub:DATA?
[9]	Phase Resolution	:SENSE:MEASure:BATHtub:RESolution:MUI
		:SENSE:MEASure:BATHtub:RESolution:MUI?
[10]	Fine/Coarse	:SENSE:MEASure:BATHtub:ECOUNT
		:SENSE:MEASure:BATHtub:ECOUNT?
[11]	Lower Error Threshold	:SENSE:MEASure:BATHtub:RANGE
		:SENSE:MEASure:BATHtub:RANGE?
[12]	Calculation Error Threshold	:SENSE:MEASure:BATHtub:CALRange
		:SENSE:MEASure:BATHtub:CALRange?
[13]	Auto Search	:SENSE:MEASure:BATHtub:ASEarch
		:SENSE:MEASure:BATHtub:ASEarch?
[14]	Current	:SENSE:MEASure:BATHtub:CURRENT
		:SENSE:MEASure:BATHtub:CURRENT?
[15]	Jitter Calculation Setting	:SENSE:MEASure:BATHtub:JCALculation
		:SENSE:MEASure:BATHtub:JCALculation?
[16]	J2 Measurement	:SENSE:MEASure:BATHtub:J2Meas
		:SENSE:MEASure:BATHtub:J2Meas?

**:SENSE:MEASure:BATHtub:START**

Function	Starts Bath tub measurement.
Example	> :SENSE:MEASure:BATHtub:START
Compatibility	Incompatible with existing models.

**:SENSE:MEASure:BATHtub:STOP**

Function	Stops Bath tub measurement.
Example	> :SENSE:MEASure:BATHtub:STOP
Compatibility	Incompatible with existing models.



**:SENSe:MEASure:BATHtub:MODE <mode>**

Parameter	<mode> = <CHARACTER PROGRAM DATA> SINGle                      Executes measurement once. REPeat                     Repeats measurement for the specified number of times. UNTimed                    Repeats measurement until measurement is stopped.
Function	Sets the measurement processing mode during Bathtub measurement.
Example	To set the measurement processing mode to Single mode. > :SENSe:MEASure:BATHtub:MODE SINGle
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:BATHtub:MODE?**

Response	<mode> = <CHARACTER RESPONSE DATA> SING, REP, UNT
Function	Queries the measurement processing mode during Bathtub measurement.
Example	> :SENSe:MEASure:BATHtub:MODE? < SING
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:BATHtub:TIMes <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 2 to 1000                    2 to 1000 times, in 1-time steps
Function	Sets the number of measurements during Bathtub measurement.
Example	To set the number of measurements to 100 times: > :SENSe:MEASure:BATHtub:TIMes 100
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:BATHtub:TIMes?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries the number of measurements during Bathtub measurement.
Example	> :SENSe:MEASure:BATHtub:TIMes? < 100
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:BATHtub:INTerval <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0 to 9999                      0 to 9999 s., in 1-s steps
Function	Sets the measurement interval time during Bathtub measurement.
Example	To set the measurement interval time to 50 s.: > :SENSe:MEASure:BATHtub:INTerval 50
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:BATHtub:INTerval?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 to 9999                      0 to 9999 s
Function	Queries the measurement interval time during Bathtub measurement.
Example	> :SENSe:MEASure:BATHtub:INTerval? < 50
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:BATHtub:DATA <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> -3.500 to 3.300              -3.500 to 3.300 V, in 0.001-V steps
Function	The range varies according to the option and input interface settings. Sets the measurement voltage threshold position during Bathtub measurement.
Example	To set the measurement voltage threshold position to 0.5 V: > :SENSe:MEASure:BATHtub:DATA 0.5
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:BATHtub:DATA?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries the measurement voltage threshold position during Bathtub measurement.
Example	> :SENSe:MEASure:BATHtub:DATA? < 0.505
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:BATHtub:RESolution:MUI <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 100                      1 to 100 mUI, in 1-mUI steps
Function	Sets the Bathtub measurement phase resolution (mUI).
Example	To set the phase resolution to 10 mUI: > :SENSe:MEASure:BATHtub:RESolution:MUI 10
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:BATHtub:RESolution:MUI?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries the Bathtub measurement phase resolution (mUI).
Example	> :SENSe:MEASure:BATHtub:RESolution:MUI? < 10
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:BATHtub:ECOut <mode>**


---

Parameter	<mode> = <CHARACTER PROGRAM DATA> FINE                      Fine (Number of error counts: 100) COARse                      Coarse (Number of error counts: 1)
Function	Sets the minimum number of error counts during Bathtub measurement.
Example	To set the number of error counts to 100: > :SENSe:MEASure:BATHtub:ECOut FINE
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:BATHtub:ECOut?**


---

Response	<numeric> = <CHARACTER RESPONSE DATA> FINE, COAR
Function	Queries the minimum number of error counts during Bathtub measurement.
Example	> :SENSe:MEASure:BATHtub:ECOut? < FINE
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:BATHtub:RANGe <range>**

---

Parameter	<range> = <CHARACTER PROGRAM DATA> E_7 to E_14                    E-7 to E-14
Function	Sets the lower limit value of measurement error threshold during Bathtub measurement.
Example	To set the lower limit value of measurement error threshold to E-12: > :SENSe:MEASure:BATHtub:RANGe E_12
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:BATHtub:RANGe?**

---

Response	<range> = <CHARACTER RESPONSE DATA>
Function	Queries the lower limit value of measurement error threshold during Bathtub measurement.
Example	> :SENSe:MEASure:BATHtub:RANGe? < E_12
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:BATHtub:CALRange <upper>,<lower>**

---

Parameter	<upper> = <CHARACTER PROGRAM DATA> E_3 to E_5                    E-3 to E-5 <lower> = <CHARACTER PROGRAM DATA> E_7 to E_14                    E-7 to E-14
Function	Sets the error threshold range during Bathtub measurement recalculation.
Example	To set the error threshold range during recalculation to E-5 to E-10: > :SENSe:MEASure:BATHtub:CALRange E_5,E_10
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:BATHtub:CALRange?**

---

Response	<upper>,<lower> = <CHARACTER RESONSE DATA>
Function	Queries the error threshold range during Bathtub measurement recalculation.
Example	> :SENSe:MEASure:BATHtub:CALRange? < E_5,E_10
Compatibility	Incompatible with existing models.



**:SENSe:MEASure:BATHtub:ASEarch**


---

Parameter	<item> = <CHARACTER PROGRAM DATA> OFF Auto search OFF PHASe Phase auto search (Coarse) PTHReshold Phase & threshold auto search (Coarse) FPHase Phase auto search (Fine) FPTHreshold Phase & Threshold auto search (Fine)
Function	Sets execution of auto search during Bathtub measurement.
Example	To set the phase auto search ON: > :SENSe:MEASure:BATHtub:ASEarch PHASe
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:BATHtub:ASEarch?**


---

Response	<item> = <CHARACTER RESPONSE DATA> OFF, PHAS, PTHR, FPH, FPTH
Function	Queries the execution of auto search during Bathtub measurement.
Example	> :SENSe:MEASure:BATHtub:ASEarch? < PHAS
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:BATHtub:CURRent <boolean>**


---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> 0 or OFF OFF: Updates at measurement termination. 1 or ON ON: Updates every second.
Function	Sets the graph display update period during Bathtub measurement.
Example	To set the graph display update timing to every second: > :SENSe:MEASure:BATHtub:CURRent 1
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:BATHtub:CURRent?**


---

Response	<boolean> = <NR1 NUMERIC RESPONSE DATA> 0, 1
Function	Queries the graph display update period during Bathtub measurement.
Example	> :SENSe:MEASure:BATHtub:CURRent? < 1
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:BATHtub:JCALculation <setting>**

---

Parameter	<setting> = <DECIMAL NUMERIC PROGRAM DATA> 7 to 20                            E-7 to E-20 Specified as E-n where n: 7 to 20/step
Function	Sets the error rate used to calculate jitter at Bathtub measurement
Example	To set jitter calculation error rate to E-14 > :SENSe:MEASure:BATHtub:JCALculation 14
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:BATHtub:JCALculation?**

---

Response	<setting> = <NR1 NUMERIC RESPONSE DATA> 7 to 20
Function	Queries the error rate used to calculate jitter at Bathtub measurement
Example	> :SENSe:MEASure:BATHtub:JCALculation? < 14
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:BATHtub:J2Meas**

---

Parameter	<mode> = <DECIMAL NUMERIC PROGRAM DATA> ACTual                            Calculates J2 from BER measurement point. ESTimate                          Calculates J2 from Best Fit Line.
Function	Selects J2 calculation method.
Example	To set J2 calculation method to Actual > :SENSe:MEASure:BATHtub:J2Meas ACTual
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:BATHtub:J2Meas?**

---

Response	<mode> = <NR1 NUMERIC RESPONSE DATA> ACT, EST
Function	Queries J2 calculation method.
Example	> :SENSe:MEASure:BATHtub:J2Meas? < ACT
Compatibility	Incompatible with existing models.

## 7.6.5.2 Graph display setting commands

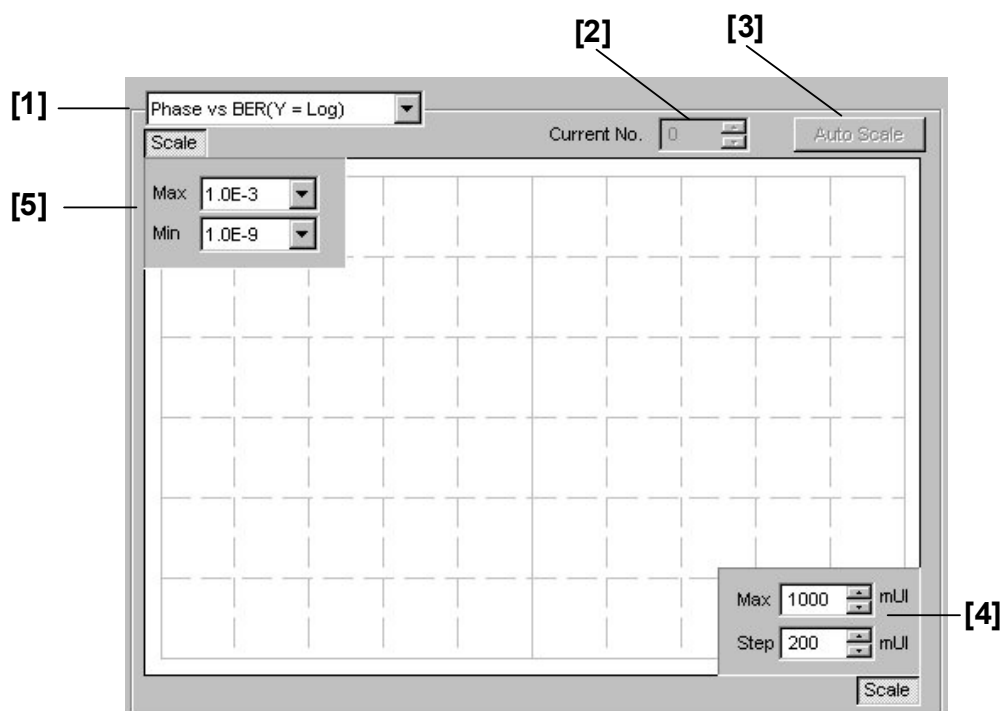


Figure 7.6.5.2-1 Graph display screen

Table 7.6.5.2-1 Graph display setting commands

No.	Setting Items	Commands
[1]	Display graph selection	:DISPlay:RESult:BATHtub:ITEM :DISPlay:RESult:BATHtub:ITEM?
[2]	Current No.	:DISPlay:RESult:BATHtub:MNUMber :DISPlay:RESult:BATHtub:MNUMber?
[3]	Auto Scale	:DISPlay:RESult:BATHtub:SCALE:AScale
[4]	Horizontal axis scale setting	:DISPlay:RESult:BATHtub:SCALE:HORizontal :DISPlay:RESult:BATHtub:SCALE:HORizontal?
[5]	Vertical axis scale setting	:DISPlay:RESult:BATHtub:SCALE:VERTical :DISPlay:RESult:BATHtub:SCALE:VERTical?

**:DISPlay:RESult:BATHtub:ITEM <mode>**

Parameter	<mode> = <CHARACTER PROGRAM DATA> PBER Phase vs. BER (Y axis Log) PLNber Phase vs. BER (Y axis Log (-Ln)) HISTogram Histogram
Function	Sets the item to be displayed in the graph during Bathtub measurement.
Example	To set the display item to Histogram: > :DISPlay:RESult:BATHtub:ITEM HISTogram
Compatibility	Incompatible with existing models.

### **:DISPlay:RESult:BATHtub:ITEM?**

---

Response	<mode> = <CHARACTER RESPONSE DATA> PBER, PLNB, HIST
Function	Queries the item to be displayed in the graph during Bathtub measurement.
Example	> :DISPlay:RESult:BATHtub:ITEM? < HIST
Compatibility	Incompatible with existing models.

### **:DISPlay:RESult:BATHtub:MNUMber <numeric>**

---

Parameter	<numeric> = <DECIMAL PROGRAM DATA> 1 to 1000                      Measurement number 1 to 1000 (number of measurements during repeat measurement)
Function	Selects the measurement number for which the Bathtub measurement result is displayed in a graph.
Example	To select the measurement number 100 to display the graph: > :DISPlay:RESult:BATHtub:MNUMber 100
Compatibility	Incompatible with existing models.

### **:DISPlay:RESult:BATHtub:MNUMber?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries the measurement number for which the Bathtub measurement result is displayed in a graph.
Example	> :DISPlay:RESult:BATHtub:MNUMber? < 100
Compatibility	Incompatible with existing models.

### **:DISPlay:RESult:BATHtub:SCALE:AScale**

---

Function	Automatically adjusts the graph display during Bathtub measurement
Example	> :DISPlay:RESult:BATHtub:SCALE:AScale
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:BATHtub:SCALE:HORizontal <max>[,<step>]**

Parameter &lt;max&gt;,&lt;step&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;

Table 7.6.5.2-2 Parameter

Form	<max>	<step>
Phase type	–900 to 1000 (mUI), in 100-mUI steps	10 to 200 (mUI), in 10-mUI steps
Histogram type	16,32,64,128,256	Omitted

Function Sets the horizontal scale of the graph display during Bathtub measurement.

In case of a histogram, <step> is omitted.

Example To set the scale to maximum 800 mUI, in 100-mUI steps:  
> :DISPlay:RESult:BATHtub:SCALE:HORizontal 800,100

Compatibility Incompatible with existing models.

**:DISPlay:RESult:BATHtub:SCALE:HORizontal?**

Response <max>,<step> = <NR2 NUMERIC RESPONSE DATA>  
Same as the :DISPlay:RESult:BATHtub:SCALE:HORizontal command parameter.

Function Queries the horizontal scale of the graph display during Bathtub measurement.

Example > :DISPlay:RESult:BATHtub:SCALE:HORizontal?  
< 800,100

Compatibility Incompatible with existing models.

**:DISPlay:RESult:BATHtub:SCALE:VERTical <max>,<min>**

Parameter &lt;max&gt;,&lt;min&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;

Table 7.6.5.2-3 Parameter

Form	<max>	<min>
Histogram type	6 to 14 (E+6 to E+14)	Input 0
Error Rate type	2 to 7 (E–2 to E–7)	8 to 15 (E–8 to E–15)

**Note:**

In case of the Error Rate type, the difference between the maximum and minimum value must be at least 6, and the value must be an even number.

Function Sets the vertical scale of the graph display during Bathtub measurement.

Example To set the scale during Error Rate type display to maximum E–4 and minimum E–10:  
> :DISPlay:RESult:BATHtub:SCALE:VERTical 4,10

Compatibility Incompatible with existing models.

## **:DISPlay:RESult:BATHtub:SCALE:VERTical?**

---

Response	<min>,<max> = <NR2 NUMERIC RESPONSE DATA> Same as the :DISPlay:RESult:BATHtub:SCALE:VERTical command parameter.
Function	Queries the vertical scale of the graph display during Bathtub measurement.
Example	> :DISPlay:RESult:BATHtub:SCALE:VERTical? < 4,10
Compatibility	Incompatible with existing models.

## 7.6.5.3 Measurement result and status query commands

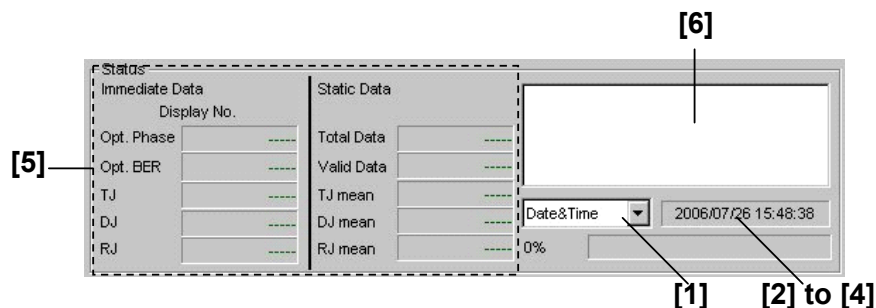


Figure 7.6.5.3-1 Measurement result and status display

Table 7.6.5.3-1 Measurement result and status query commands

No.	Setting Items	Commands
[1]	Display time selection	:SENSe:MEASure:BATHtub:DTIME :SENSe:MEASure:BATHtub:DTIME?
[2]	Query for current time	:SENSe:MEASure:BATHtub:TIME:DTIME?
[3]	Query for measurement start time	:SENSe:MEASure:BATHtub:TIME:START?
[4]	Query for measurement elapsed time	:SENSe:MEASure:BATHtub:TIME:ELAPsed?
[5]	Query for result	:CALCulate:DATA:BATHtub?
[6]	Query for status	:CALCulate:DATA:BATHtub:STATus?

**:SENSe:MEASure:BATHtub:DTIME <type>**

Parameter	<type> = <CHARACTER PROGRAM DATA> DTIME Displays the current date and time. START Displays the measurement start time. ELAPsed Displays the elapsed time based on the measurement period.
Function	Selects the Bathtub measurement time display type.
Example	To set the Bathtub measurement time display type to measurement start time (Start Time): > :SENSe:MEASure:BATHtub:DTIME START
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:BATHtub:DTIME?**

Response	<type> = <CHARACTER RESPONSE DATA> DTIM, STAR, ELAP
Function	Queries the Bathtub measurement time display type.
Example	> :SENSe:MEASure:BATHtub:DTIME? < STAR
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:BATHtub:TIME:DTIME?**

---

Response	<year> = <NR1 NUMERIC RESPONSE DATA> 2000 to 2036                      2000 to 2036 year <month> = <NR1 NUMERIC RESPONSE DATA> 1 to 12                              January to December <day> = <NR1 NUMERIC RESPONSE DATA> 1 to 31                                1st to 31st <hour> = <NR1 NUMERIC RESPONSE DATA> 0 to 23                                0 to 23 hours <minute> = <NR1 NUMERIC RESPONSE DATA> 0 to 59                                0 to 59 minutes <second> = <NR1 NUMERIC RESPONSE DATA> 0 to 59                                0 to 59 seconds
Function	Queries the current date and time during the Bathtub measurement.
Example	> :SENSe:MEASure:BATHtub:TIME:DTIME? < 2005,12,31,23,59,59
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:BATHtub:TIME:START?**

---

Response	<year> = <NR1 NUMERIC RESPONSE DATA> 0, 2000 to 2036                      2000 to 2036 year <month> = <NR1 NUMERIC RESPONSE DATA> 0, 1 to 12                              January to December <day> = <NR1 NUMERIC RESPONSE DATA> 0, 1 to 31                                1st to 31st <hour> = <NR1 NUMERIC RESPONSE DATA> 0 to 23                                0 to 23 hours <minute> = <NR1 NUMERIC RESPONSE DATA> 0 to 59                                0 to 59 minutes <second> = <NR1 NUMERIC RESPONSE DATA> 0 to 59                                0 to 59 seconds "0,0,0,0,0,0" is returned if there is no measurement start time data.
Function	Queries the measurement start time during Bathtub measurement.
Example	> :SENSe:MEASure:BATHtub:TIME:START? < 2005,12,31,23,59,59
Compatibility	Incompatible with existing models.



---

**:SENSe:MEASure:BATHtub:TIME:ELAPsed?**

---

Response	<day> = <NR1 NUMERIC RESPONSE DATA> 0 to 99                      0 to 99 days <hour> = <NR1 NUMERIC RESPONSE DATA> 0 to 23                      0 to 23 hours <minute> = <NR1 NUMERIC RESPONSE DATA> 0 to 59                      0 to 59 minutes <second> = <NR1 NUMERIC RESPONSE DATA> 0 to 59                      0 to 59 seconds "0,0,0,0" is returned if there is no measurement elapsed time data.
Function	Queries the measurement elapsed time during Bathtub measurement.
Example	> :SENSe:MEASure:BATHtub:TIME:ELAPsed? < 31, 23, 59, 59
Compatibility	Incompatible with existing models.

**:CALCulate:DATA:BATHtub? <string>**

Parameter	<string> = <STRING PROGRAM DATA>
	<result1> For the contents of measurement data <result1>, see Table 7.6.5.3-2.
	<result2> For the contents of immediate data <result2>, see Table 7.6.5.3-3.
	<result3> For the contents of statistic data <result3>, see Table 7.6.5.3-4.

**Table 7.6.5.3-2 Phase vs. BER measurement result <result1>**

Items		<result1>	Response Format
Phase vs. BER (Phase/Error Rate)	Number of measurements 1 to 1000	"BATH:1"... "BATH:1000"	Form1
Histogram (Phase/Error Count)		"HIST:1"... "HIST:1000"	Form2

The measurement result for each Phase is delimited by a comma (,) and returned

**Table 7.6.5.3-3 Phase vs. BER immediate data <result2>**

Items		<result2>	Response Format
Optimum BER	Number of measurements 1 to 1000	"OPTBer:1"... "OPTBer:1000"	Form3
Optimum Phase		"OPTPh:1"... "OPTPh:1000"	Form4
Total Jitter		"TJ:1"... "TJ:1000"	Form4
Deterministic Jitter		"DJ:1"... "DJ:1000"	Form4
Random Jitter		"RJ:1"... "RJ:1000"	Form4
J2		"J2:1"... "J2:1000"	Form4
J9		"J9:1"... "J9:1000"	Form4

**Table 7.6.5.3-4 Phase vs. BER measurement statistic data <result3>**

Items	<result3>	Response Format
Total Data	"TOTal"	Form5
Valid Data	"VALid"	Form5
Total Jitter Mean	"TJMean"	Form4
Deterministic Jitter Mean	"DJMean"	Form4
Random Jitter Mean	"RJMean"	Form4
J2 Mean	"J2Mean"	Form4
J9 Mean	"J9Mean"	Form4

Response <string> = <STRING RESPONSE DATA>

**Table 7.6.5.3-5 Response format**

Form	Format	Description
Form1 Phase-BER type	"XXXX.XX, Y.YYYYYE-YYY"	XXXX.XX: Phase (mUI or PS) Y.YYYYYE-YYY: Error Rate
	"-----,-----"	When no data corresponds to the query.
Form2 Histogram type	"XXXX.XX, Y.YYYYYE-YYY"	XXXX.XX: Phase (mUI or PS) Y.YYYYYE-YYY: Error Count
	"-----,-----"	When no data corresponds to the query.
Form3 Fraction type 1	"X.XXXXXE-XXX"	When 0.0000E-016 to 1.0000E000
	"-----"	When no data corresponds to the query.
	"< 1.0E-199"	When E-199 or less
Form4 Fraction type 2	"XXXX.XX"	When -9999.99 to 9999.99
	"-----"	When no data corresponds to the query.
Form5 Integer type	"XXXX"	When 0 to 9999
	"----"	When no data corresponds to the query.

Function Queries the Phase vs. BER measurement result.

Example To query the Phase vs. BER the measurement result for the 10th time:  
 > :CALCulate:DATA:BATHtub? "BATH:10"  
 < "0,1.2345E-003", "20,1.2345E-004", "40,1.2345E-005",  
 "60,1.2345E-006"

Compatibility Incompatible with existing models.

### **:CALCulate:DATA:BATHtub:STATus?**

Response <string> = <STRING RESPONSE DATA>

""	When no alarm exists
"Sync Loss"	Sync. Loss
"Clock Loss"	Clock Loss
"CR Unlock"	CR Unlock
"Out of range"	Out of range
"Frequency NG"	Frequency NG
"Illegal Error"	Illegal Error

**Note:**

Displays any one of the alarms.  
 Illegal Error > Frequency NG > Clock Loss(CR Unlock) > Sync  
 Loss > Out or range

Function Queries the Q measurement status

Example > :CALCulate:DATA:BATHtub:STATus?  
 < "Sync Loss"

### 7.6.5.4 File menu setting commands

Table 7.6.5.4-1 File menu setting commands

No.	Setting Items	Commands
[1]	Open	:SYSTem:MMEMory:BATHtub:RECall
[2]	Save	:SYSTem:MMEMory:BATHtub:STORe
[3]	Print	:SYSTem:PRINt:BATHtub

#### **:SYSTem:MMEMory:BATHtub:RECall <file\_name>**

Parameter	<file_name> = <STRING PROGRAM DATA> "<drv>:\[<dir>]<file>" <drv> = C,D,E,F <dir> = <dir1>\<dir2>\... (Omitted when root directory) <file> = File name
Function	Opens the Bathtub measurement result data.
Example	> :SYSTem:MMEMory:BATHtub:RECall "C:\ Test\example"
Compatibility	Incompatible with existing models.

#### **:SYSTem:MMEMory:BATHtub:STORe <file\_name>,<data\_type>,<file\_type>**

Parameter	<file_name> = <STRING PROGRAM DATA> "<drv>:\[<dir>]<file>" <drv> = C,D,E,F <dir> = <dir1>\<dir2>\... (Omitted when root directory) <file> = File name <data_type> = <CHARACTER RESPONSE DATA> PSB           Phase vs. BER Result <file_type> = <CHARACTER RESPONSE DATA> BIN           Binary file CSV           CSV file TXT           Text file
Function	Saves the Bathtub measurement result data. <b>Note:</b> The settings will not be read from the saved file if the file name is changed.
Example	To save the Bathtub measurement result data by specifying the save destination (C:\Test), file name (example), and file format (CSV): > :SYSTem:MMEMory:BATHtub:STORe "C:\ Test \example", PSB, CSV
Compatibility	Incompatible with existing models.

---

**:SYSTem:PRINT:BATHtub <list>**

---

Parameter	<list> = <CHARACTER PROGRAM DATA>
	PSB                                      Phase vs. BER Result
Function	Prints the Bathtub measurement result data.
Example	> :SYSTem:PRINT:BATHtub
Compatibility	Incompatible with existing models.

## 7.7 Stressed Eye Transmitter Commands

This section describes the MU181620A Stressed Eye Transmitter (hereinafter referred to as Transmitter) commands.

Before executing a setting/query command for the Transmitter, specify the slot number of the module to be remotely controlled, by using the :MODule:ID command. Refer to Section 7.1 "Common Commands" and 9.1 "Basic Operation of Device Messages" for how to specify a slot number with the :MODule:ID command.

### 7.7.1 Commands related to Optical tab window

#### 7.7.1.1 Optical Output setting commands

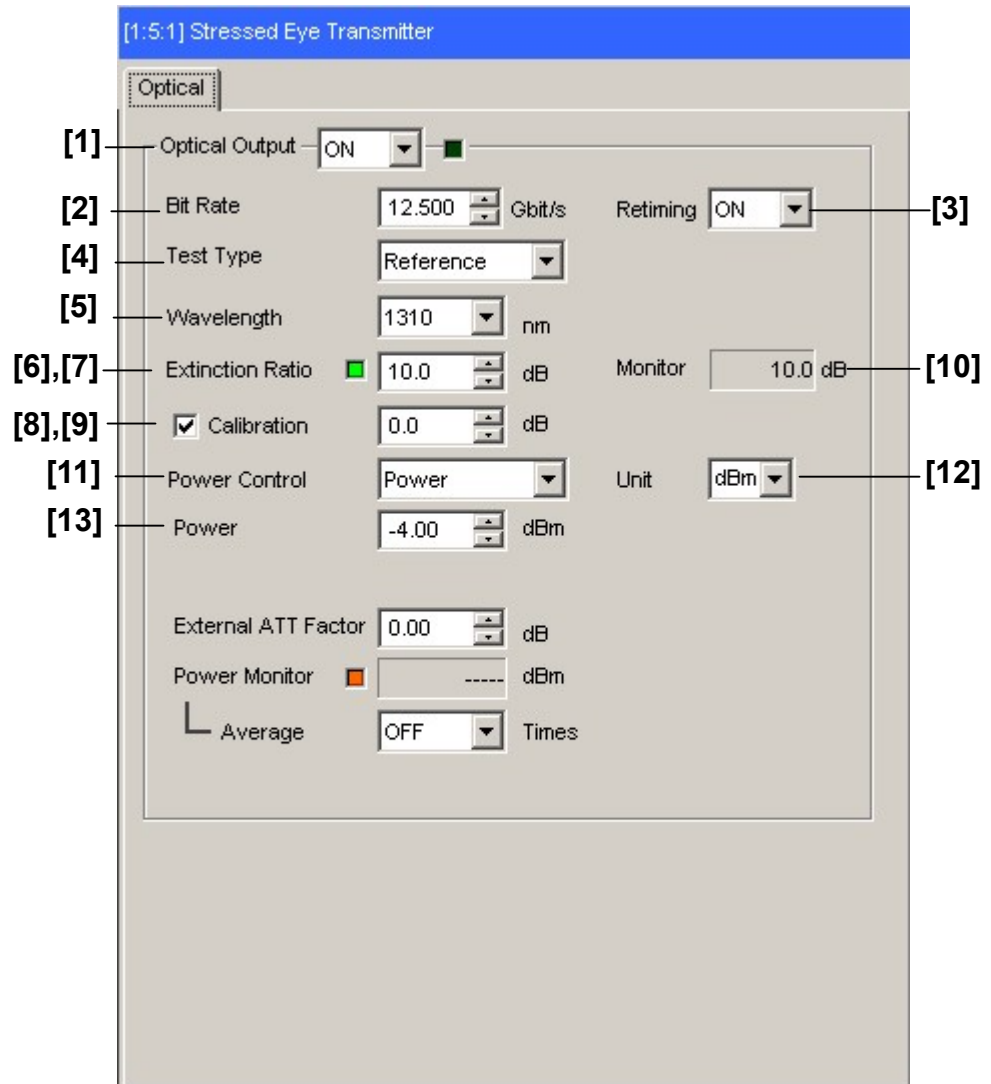


Figure 7.7.1.1-1 Optical Output setting(when Power Control is set to Power)

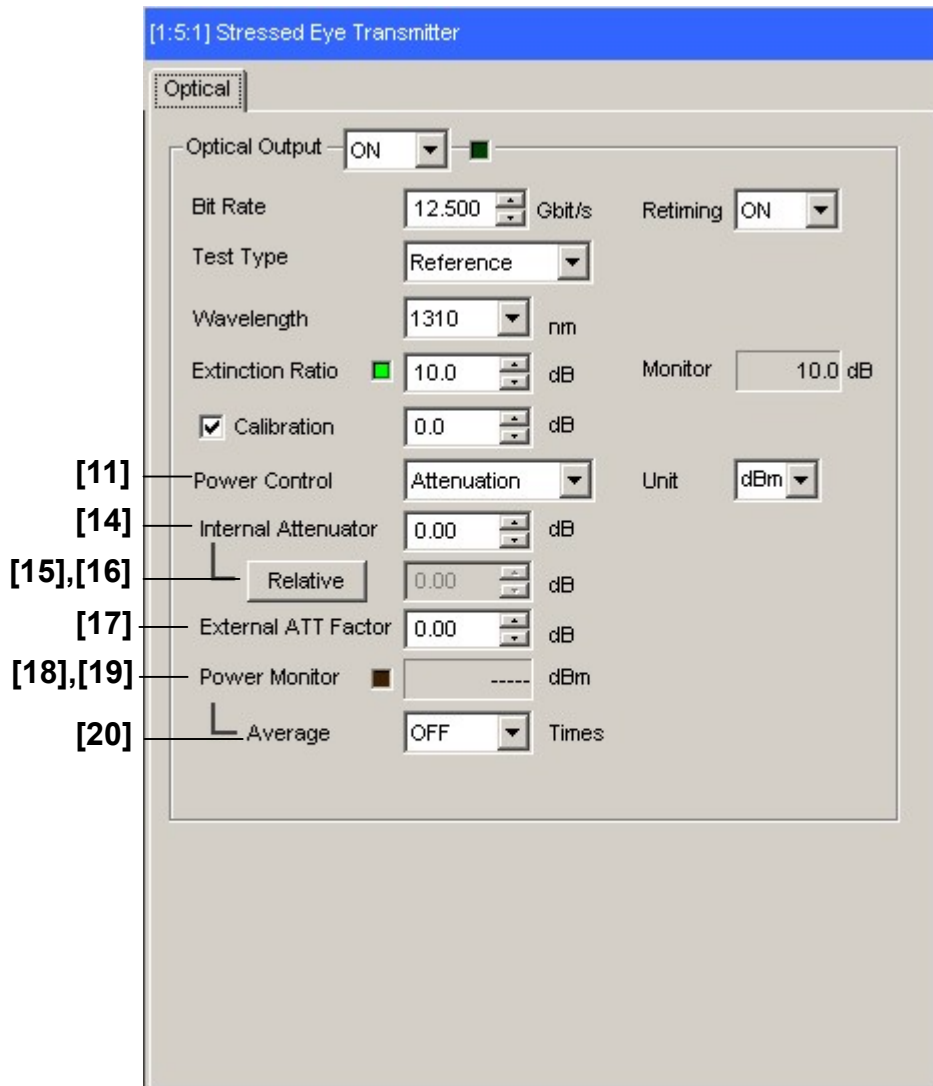


Figure 7.7.1.1-2 Optical Output setting (when Power Control is set to Attenuation)

Table 7.7.1.1-1 Optical Output setting commands

No.	Setting Items	Commands
[1]	Optical Output	:TRANsmitter:OPTical:OUTPut
		:TRANsmitter:OPTical:OUTPut?
[2]	Bit Rate	:TRANsmitter:OPTical:OUTPut:BITRate
		:TRANsmitter:OPTical:OUTPut:BITRate?
[3]	Retiming	:TRANsmitter:OPTical:OUTPut:RETiming
		:TRANsmitter:OPTical:OUTPut:RETiming?
[4]	Test Type	:TRANsmitter:OPTical:OUTPut:TESTtype
		:TRANsmitter:OPTical:OUTPut:TESTtype?
[5]	Wavelength	:TRANsmitter:OPTical:OUTPut:WAVelength
		:TRANsmitter:OPTical:OUTPut:WAVelength?

**Table 7.7.1.1-1 Optical Output setting commands (Cont'd)**

No.	Setting Items	Commands
[6]	Extinction Ratio LED display	:TRANsmitter:OPTical:OUTPut:EXTinction:OVERrange?
[7]	Extinction Ratio	:TRANsmitter:OPTical:OUTPut:EXTinction:RATio :TRANsmitter:OPTical:OUTPut:EXTinction:RATio?
[8]	Calibration check box	:TRANsmitter:OPTical:OUTPut:EXTinction:OCALibration :TRANsmitter:OPTical:OUTPut:EXTinction:OCALibration?
[9]	Calibration	:TRANsmitter:OPTical:OUTPut:EXTinction:CALibration :TRANsmitter:OPTical:OUTPut:EXTinction:CALibration?
[10]	Monitor	:TRANsmitter:OPTical:OUTPut:EXTinction:MONitor?
[11]	Power Control	:TRANsmitter:OPTical:OUTPut:CONTRol :TRANsmitter:OPTical:OUTPut:CONTRol?
[12]	Unit	:TRANsmitter:OPTical:OUTPut:CONTRol:UNIT :TRANsmitter:OPTical:OUTPut:CONTRol:UNIT?
[13]	Power	:TRANsmitter:OPTical:OUTPut:POWER :TRANsmitter:OPTical:OUTPut:POWER?
[14]	Internal Attenuator	:TRANsmitter:OPTical:OUTPut:ATTenuator :TRANsmitter:OPTical:OUTPut:ATTenuator?
[15]	Relative	:TRANsmitter:OPTical:OUTPut:RELative :TRANsmitter:OPTical:OUTPut:RELative?
[16]	Relative display value	:TRANsmitter:OPTical:OUTPut:RATTenuator :TRANsmitter:OPTical:OUTPut:RATTenuator?
[17]	External ATT Factor	:TRANsmitter:OPTical:OUTPut:ATTFactor :TRANsmitter:OPTical:OUTPut:ATTFactor?
[18]	Power Monitor LED display	:TRANsmitter:OPTical:OUTPut:PMONitor:CALCulation?
[19]	Power Monitor	:TRANsmitter:OPTical:OUTPut:PMONitor?
[20]	Average	:TRANsmitter:OPTical:OUTPut:AVERage :TRANsmitter:OPTical:OUTPut:AVERage?

**:TRANsmitter:OPTical:OUTPut <boolean>**

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> OFF or 0                      Optical output OFF ON or 1                        Optical output ON
Function	Sets optical output ON/OFF. Even when set to ON, the optical output is still Off, however, when the common mainframe output (:SOURce:OUTPut:ASET) is set to OFF.
Example	Sets optical output ON/OFF. > :TRANsmitter:OPTical:OUTPut ON
Compatibility	Incompatible with existing models.



**:TRANsmitter:OPTical:OUTPut?**


---

Response	<boolean> = <NR1 NUMERIC RESPONSE DATA>
	0                      Optical output OFF
	1                      Optical output ON
Function	Queries the ON/OFF state of optical output.
Example	> :TRANsmitter:OPTical:OUTPut? < 1
Compatibility	Incompatible with existing models.

**:TRANsmitter:OPTical:OUTPut:BITRate <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA>
	0.100 to 12.500              0.100 to 12.500 Gbit/s / 0.001 Gbit/s Step
Function	Sets the input bit rate at Data Input.
Example	To set the bit rate to 10.205 Gbit/s: > :TRANsmitter:OPTical:OUTPut:BITRate 10.205
Compatibility	Incompatible with existing models.

**:TRANsmitter:OPTical:OUTPut:BITRate?**


---

Response	<numeric> = <NR2 NUMERIC RESPONSE DATA>
	0.100 to 12.500              0.100 to 12.500 Gbit/s
Function	Queries the input bit rate at Data Input.
Example	> :TRANsmitter:OPTical:OUTPut:BITRate? < 10.205
Compatibility	Incompatible with existing models.

**:TRANsmitter:OPTical:OUTPut:RETiming <boolean>**


---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA>
	OFF or 0                      Use of internal D-FF OFF (when used with bit rate = 0.1 to 1 Gbit/s)
	ON or 1                      Use of internal D-FF ON (when used with bit rate = 1 to 12.5 Gbit/s)
Function	Sets use of internal D-FF ON/OFF.
Example	To set use of internal D-FF ON: > :TRANsmitter:OPTical:OUTPut:RETiming ON
Compatibility	Incompatible with existing models.

### **:TRANsmitter:OPTical:OUTPut:RETiming?**

---

Response	<boolean> = <NR1 NUMERIC RESPONSE DATA>
	0 Use of internal D-FF is OFF
	1 Use of internal D-FF is ON
Function	Queries ON/OFF state of use of internal D-FF.
Example	> :TRANsmitter:OPTical:OUTPut:RETiming? < 1
Compatibility	Incompatible with existing models.

### **:TRANsmitter:OPTical:OUTPut:TESTtype <route>**

---

Parameter	<route> = <CHARACTER PROGRAM DATA>
	REFERENCE Reference
	STRessedeye StressedEye (when any of MU181620A-x11, -12, and -13 is installed.)
Function	Sets the optical output route.
Example	To set the optical output route to Reference: > :TRANsmitter:OPTical:OUTPut:TESTtype REFERENCE
Compatibility	Incompatible with existing models.

### **:TRANsmitter:OPTical:OUTPut:TESTtype?**

---

Response	<route> = <CHARACTER RESPONSE DATA>
	REF, STR
Function	Queries the optical output route.
Example	> :TRANsmitter:OPTical:OUTPut:TESTtype? < REF
Compatibility	Incompatible with existing models.

### **:TRANsmitter:OPTical:OUTPut:WAVelength <length>**

---

Parameter	<length> = <CHARACTER PROGRAM DATA>
	W_1310 1310 nm (when MU181620A-x01, x03, x11, or x13 is installed.)
	W_1550 1550 nm (when MU181620A-x02, x03, x11, or x13 is installed.)
Function	Sets the optical output wavelength.
Example	To set the optical output wavelength to 1310 nm: > :TRANsmitter:OPTical:OUTPut:WAVelength W_1310
Compatibility	Incompatible with existing models.

**:TRANsmitter:OPTical:OUTPut:WAVelength?**

Response <length> = <CHARACTER RESPONSE DATA>  
W\_1310, W\_1550

Function Queries the optical output wavelength.

Example > :TRANsmitter:OPTical:OUTPut:WAVelength?  
< W\_1310

Compatibility Incompatible with existing models.

**:TRANsmitter:OPTical:OUTPut:EXTinction:OVERrange?**

Response <numeric> = <NR1 NUMERIC RESPONSE DATA>

0 Within specifications (LED: green)

1 Beyond specifications (LED: red)

**Table 7.7.1.1-2 Specification Conformance**

Wavelength[nm]	Test Type	Extinction Ratio[dB]	Specification Conformance
1310	Reference	4.0 to 10.0	0: Within specifications
		2.0 to 3.9, 10.1 to 11.0	1: Beyond specifications
1310	Stressed Eye	2.0 to 6.0	0: Within specifications
		1.0 to 1.9, 6.1 to 7.0	1: Beyond specifications
1550	Reference	6.0 to 10.0	0: Within specifications
		2.0 to 5.9, 10.1 to 11.0	1: Beyond specifications
1550	Stressed Eye	2.0 to 5.0	0: Within specifications
		1.0 to 1.9, 5.1 to 7.0	1: Beyond specifications

Function Queries whether the current extinction ratio of the optical output is within or beyond specifications.

Example > :TRANsmitter:OPTical:OUTPut:EXTinction:OVERrange?  
< 1

Compatibility Incompatible with existing models.

**:TRANsmitter:OPTical:OUTPut:EXTinction:RATio <numeric>**

Parameter <numeric> = <DECIMAL NUMERIC PROGRAM DATA>

When Test Type is set to Reference:  
2.0 to 11.0 2.0 to 11.0 dB / 0.1 dB Step

When Test Type is set to Stressed Eye:  
1.0 to 7.0 1.0 to 7.0 dB / 0.1 dB Step

Function Sets the extinction ratio of optical output.

Example To set the extinction ratio of optical output to 5.5 dB:  
> :TRANsmitter:OPTical:OUTPut:EXTinction:RATio 5.5

Compatibility Incompatible with existing models.

### **:TRANsmitter:OPTical:OUTPut:EXTinction:RATio?**

---

Response	<numeric> = <NR2 NUMERIC RESPONSE DATA> 1.0 to 11.0                      1.0 to 11.0 dB
Function	Queries the extinction ratio of optical output.
Example	> :TRANsmitter:OPTical:OUTPut:EXTinction:RATio? < 5.5
Compatibility	Incompatible with existing models.

### **:TRANsmitter:OPTical:OUTPut:EXTinction:OCALibration <boolean>**

---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> OFF or 0                      Offset OFF ON or 1                      Offset ON
Function	Sets whether to enable the offset value such that the monitored value display of the optical output extinction ratio matches the display value on the sampling oscilloscope.
Example	To set the monitored value offset of optical output extinction ratio to ON: > :TRANsmitter:OPTical:OUTPut:EXTinction:OCALibration ON
Compatibility	Incompatible with existing models.

### **:TRANsmitter:OPTical:OUTPut:EXTinction:OCALibration?**

---

Response	<boolean> = <NR1 NUMERIC RESPONSE DATA> 0                      Offset OFF 1                      Offset ON
Function	Queries whether the monitored value offset of optical output extinction ratio is enabled.
Example	> :TRANsmitter:OPTical:OUTPut:EXTinction:OCALibration? < 1
Compatibility	Incompatible with existing models.

**:TRANsmitter:OPTical:OUTPut:EXTinction:CALibration <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> -3.0 to 3.0                      -3.0 to 3.0 dB / 0.1 dB Step wherein, Extinction Ratio + Calibration (offset) ≥ 0.1 Valid only when the monitored value offset of extinction ratio is set to ON.
Function	Sets the monitored value offset of the optical output extinction ratio. Cannot be set when offset is set to OFF.
Example	To set the monitored value offset of optical output extinction ratio to -0.5 dB: > :TRANsmitter:OPTical:OUTPut:EXTinction:CALibration -0.5
Compatibility	Incompatible with existing models.

**:TRANsmitter:OPTical:OUTPut:EXTinction:CALibration?**

Response	<numeric> = < NR2 NUMERIC RESPONSE DATA > -3.0 to 3.0                      -3.0 to 3.0 dB
Function	Queries the monitored value offset of the optical output extinction ratio. Valid only when the monitored value offset of extinction ratio is set to ON.
Example	> :TRANsmitter:OPTical:OUTPut:EXTinction:CALibration? < -0.5
Compatibility	Incompatible with existing models.

**:TRANsmitter:OPTical:OUTPut:EXTinction:MONitor?**

Response                      <string> = <STRING RESPONSE DATA>

**Table 7.7.1.1-3 Response**

Format	Description
"XX.X"	0.1 to 14.0 dB / 0.1 dB Step
"-----"	When no data corresponds to the query

Function	Queries the extinction ratio monitor value obtained by adding the offset value to the optical output extinction ratio.
Example	> :TRANsmitter:OPTical:OUTPut:EXTinction:MONitor? < "5.0"
Compatibility	Incompatible with existing models.

### **:TRANsmitter:OPTical:OUTPut:CONTRol <power>**

---

Parameter	<power> = <CHARACTER PROGRAM DATA> OFF                      OFF POWer                    Power ATTenuation             Attenuation
Function	Sets the control method for optical output power.
Example	To set the control method for optical output power to Power: > :TRANsmitter:OPTical:OUTPut:CONTRol Power
Compatibility	Incompatible with existing models.

### **:TRANsmitter:OPTical:OUTPut:CONTRol?**

---

Response	<power> = <CHARACTER RESPONSE DATA> OFF, POW, ATT
Function	Queries the control method for optical output power.
Example	> :TRANsmitter:OPTical:OUTPut:CONTRol? < POW
Compatibility	Incompatible with existing models.

### **:TRANsmitter:OPTical:OUTPut:CONTRol:UNIT <unit>**

---

Parameter	<unit> = <CHARACTER PROGRAM DATA> DBM                      Unit: dBm UW                        Unit: $\mu$ W
Function	Sets display unit for optical output power.
Example	To set display unit for optical output power to dBm: > :TRANsmitter:OPTical:OUTPut:CONTRol:UNIT DBM
Compatibility	Incompatible with existing models.

### **:TRANsmitter:OPTical:OUTPut:CONTRol:UNIT?**

---

Response	<unit> = <CHARACTER RESPONSE DATA> DBM, UW
Function	Queries display unit for optical output power.
Example	> :TRANsmitter:OPTical:OUTPut:CONTRol:UNIT? < DBM
Compatibility	Incompatible with existing models.

**:TRANsmitter:OPTical:OUTPut:POWer <numeric>**

Parameter	<p>&lt;numeric&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;</p> <p>When Wavelength is set to 1310 nm while Unit is set to dBm:          -20.00 to -4.00            -20.00 to -4.00 dBm / 0.01 dBm Step</p> <p>When Wavelength is set to 1310 nm while Unit is set to <math>\mu</math>W:          10 to 398                    10 to 398 <math>\mu</math>W / 1 <math>\mu</math>W Step</p> <p>When Wavelength is set to 1550 nm while Unit is set to dBm:          -20.00 to -2.00            -20.00 to -2.00 dBm / 0.01 dBm Step</p> <p>When Wavelength is set to 1550 nm while Unit is set to <math>\mu</math>W:          10 to 630                    10 to 630 <math>\mu</math>W / 1 <math>\mu</math>W Step</p>
Function	<p>Sets the optical output power.</p> <p>Valid only when the control method of optical output power is set to Power.</p>
Example	<p>To set the optical output power to -3.27 dBm:</p> <pre>&gt; :TRANsmitter:OPTical:OUTPut:POWer -3.27</pre>
Compatibility	Incompatible with existing models.

**:TRANsmitter:OPTical:OUTPut:POWer?**

Response	<p>&lt;numeric&gt; = &lt;NR2 NUMERIC RESPONSE DATA&gt;</p> <p>When Unit is set to dBm:          -20.00 to -2.00            -20.00 to -2.00 dBm</p> <p>When Unit is set to <math>\mu</math>W:          10 to 630                    10 to 630 <math>\mu</math>W</p>
Function	<p>Queries the optical output power.</p> <p>Valid only when the control method of optical output power is set to Power.</p>
Example	<pre>&gt; :TRANsmitter:OPTical:OUTPut:POWer? &lt; -3.27</pre>
Compatibility	Incompatible with existing models.

### **:TRANsmitter:OPTical:OUTPut:ATTenuator <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> When Wavelength is set to 1310 nm: 0.00 to 16.00                      0.00 to 16.00 dB / 0.01 dB Step When Wavelength is set to 1550 nm: 0.00 to 18.00                      0.00 to 18.00 dB / 0.01 dB Step
Function	Sets the optical output attenuation. Valid only when the control method of optical output power is set to At- tenuation.
Example	To set the optical output attenuation to 12.34 dB: > :TRANsmitter:OPTical:OUTPut:ATTenuator 12.34
Compatibility	Incompatible with existing models.

### **:TRANsmitter:OPTical:OUTPut:ATTenuator?**

---

Response	<numeric> = <NR2 NUMERIC RESPONSE DATA> 0.00 to 18.00                      0.00 to 18.00 dB
Function	Queries the optical output attenuation. Valid only when the control method of optical output power is set to At- tenuation.
Example	> :TRANsmitter:OPTical:OUTPut:ATTenuator? < 12.34
Compatibility	Incompatible with existing models.

### **:TRANsmitter:OPTical:OUTPut:RELative <boolean>**

---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> OFF or 0                              Attenuation reference OFF ON or 1                                 Attenuation reference ON Function                                Sets optical output attenuation reference ON/OFF. Setting to ON enables attenuation reference settings. Valid only when the control method of optical output power is set to At- tenuation.
Example	To set optical output attenuation reference to ON: > :TRANsmitter:OPTical:OUTPut:RELative ON
Compatibility	Incompatible with existing models.



**:TRANsmitter:OPTical:OUTPut:RELative?**

Response	<boolean> = <NR1 NUMERIC RESPONSE DATA> 0 Attenuation reference OFF 1 Attenuation reference ON
Function	Queries ON/OFF state of optical output attenuation reference. Valid only when the control method of optical output power is set to Attenuation.
Example	> :TRANsmitter:OPTical:OUTPut:RELative? < 1
Compatibility	Incompatible with existing models.

**:TRANsmitter:OPTical:OUTPut:RATTenuator <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> When Wavelength is set to 1310 nm: -16.00 to 16.00 -16.00 to 16.00 dB / 0.01 dB Step When Wavelength is set to 1550 nm: -18.00 to 18.00 -18.00 to 18.00 dB / 0.01 dB Step
Function	Sets the optical output attenuation reference value. Valid only when the control method of optical output power is set to Attenuation.
Example	To set the optical output attenuation reference to 7.66 dB: > :TRANsmitter:OPTical:OUTPut:RATTenuator 7.66
Compatibility	Incompatible with existing models.

**:TRANsmitter:OPTical:OUTPut:RATTenuator?**

Response	<numeric> = <NR2 NUMERIC RESPONSE DATA> -18.00 to 18.00 -18.00 to 18.00 dB
Function	Queries the optical output attenuation reference value. Valid only when the control method of optical output power is set to Attenuation.
Example	> :TRANsmitter:OPTical:OUTPut:RATTenuator? < 7.66
Compatibility	Incompatible with existing models.

### **:TRANsmitter:OPTical:OUTPut:ATTFactor <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0.00 to 40.00                      0.00 to 40.00 dB / 0.01 dB Step
Function	Sets the attenuation when an optical output signal passes through an external attenuator.
Example	To set the attenuation of the external attenuator to 21.16 dB: > :TRANsmitter:OPTical:OUTPut:ATTFactor 21.16
Compatibility	Incompatible with existing models.

### **:TRANsmitter:OPTical:OUTPut:ATTFactor?**

---

Response	<numeric> = <NR2 NUMERIC RESPONSE DATA> 0.00 to 40.00                      0.00 to 40.00 dB
Function	Queries the attenuation of the external attenuator.
Example	> :TRANsmitter:OPTical:OUTPut:ATTFactor? < 21.16
Compatibility	Incompatible with existing models.

### **:TRANsmitter:OPTical:OUTPut:PMONitor:CALCulation?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0                                      Average value calculation is not being performed (LED off) 1                                      Average value is being calculated (LED on)
Function	Queries whether the Power Monitor value is being averaged.
Example	> :TRANsmitter:OPTical:OUTPut:PMONitor:CALCulation? < 1
Compatibility	Incompatible with existing models.

**:TRANsmitter:OPTical:OUTPut:PMONitor?**

Response &lt;string&gt; = &lt;STRING RESPONSE DATA&gt;

**Table 7.7.1.1-4 Response**

Format	Description
"XXX.XX"	XXX.XX dBm
"XXX"	XXX $\mu$ W
"0>"	When Unit is set to dBm while the value is larger than 0.0 dBm
"<-18"	When Unit is set to dBm while the value is less than -18.0 dBm
"<15"	When Unit is set to $\mu$ W while the value is less than 15 $\mu$ W
"1000>"	When Unit is set to $\mu$ W while the value is larger than 1000 $\mu$ W
"-----"	When no data corresponds to the query

Response data unit is set

by :TRANsmitter:OPTical:OUTPut:CONTRol:UNIT.

An optical power value including the attenuation of the external attenuator that is set by TRANsmitter:OPTical:OUTPut:ATTFactor is returned.

Function Queries the optical output power value at the optical output connector.

Example &gt; :TRANsmitter:OPTical:OUTPut:PMONitor?

&lt; "-11.11"

Compatibility Incompatible with existing models.

**:TRANsmitter:OPTical:OUTPut:AVERAge <average>**

Parameter &lt;average&gt; = &lt;CHARACTER PROGRAM DATA&gt;

OFF	No averaging
A_2	Averages data of 2 times of output.
A_5	Averages data of 5 times of output.
A_10	Averages data of 10 times of output.
A_20	Averages data of 20 times of output.
A_50	Averages data of 50 times of output.
A_100	Averages data of 100 times of output.

Function Sets the number of averaging times for optical output power.

Example To set the number of averaging times for optical output power to 100:

&gt; :TRANsmitter:OPTical:OUTPut:AVERAge A\_100

Compatibility Incompatible with existing models.

**:TRANsmitter:OPTical:OUTPut:AVERAge?**

Response &lt;average&gt; = &lt;CHARACTER RESPONSE DATA&gt;

OFF, A\_2, A\_5, A\_10, A\_20, A\_50, A\_100

Function Queries the number of averaging times for optical output power.

Example &gt; :TRANsmitter:OPTical:OUTPut:AVERAge?

&lt; A\_100

Compatibility Incompatible with existing models.

## 7.8 MUX Commands

This section explains the setting and query commands for the MU182020A 25 Gbit/s 1ch MUX, and MU182021A 25 Gbit/s 2ch MUX.

The commands in each tab are explained below.

Before executing a setting/query command for the MU181040A, specify the slot number of the module to be remotely controlled, by using the :MODULE:ID command. Refer to Section 7.1 "Common Commands" and 9.1 "Basic Operation of Device Messages" for how to specify a slot number with the :MODULE:ID command.

However, unless there is a special item, see the MU181021A.

### 7.8.1 Commands related to Data Interface tab window

#### 7.8.1.1 Data Interface setting field

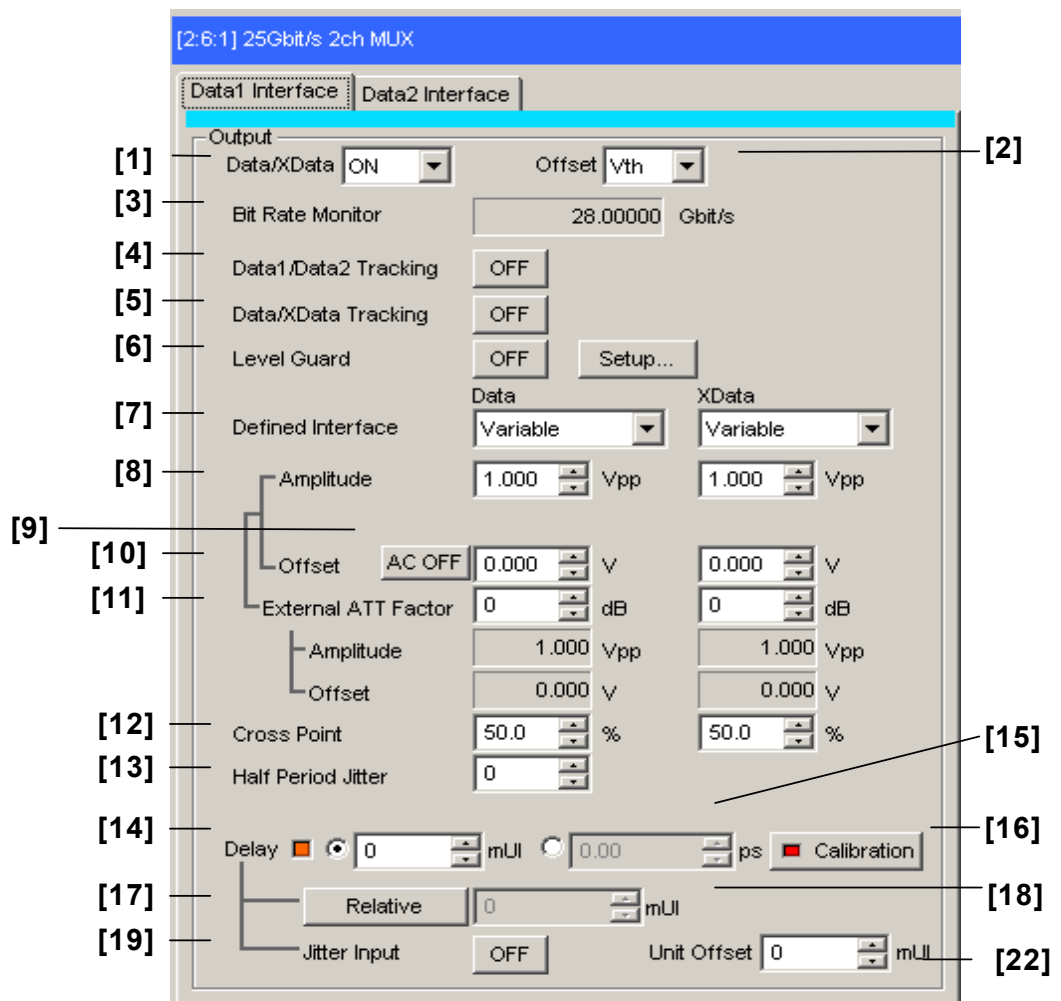


Figure 7.8.1.1-1 Data Interface setting field

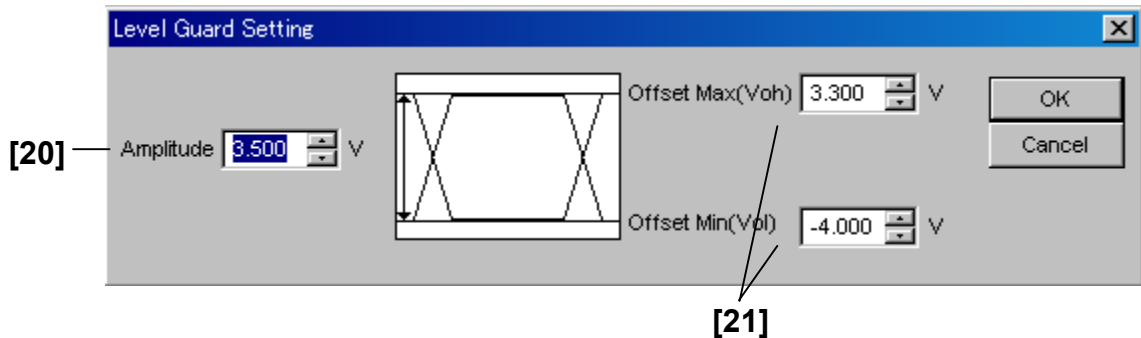


Figure 7.8.1.1-2 Level Guard setting field

Table 7.8.1.1-1 Data Interface setting commands

No.	Setting Items	Commands
[1]	Data/Xdata ON/OFF	:MUX:DATA:OUTPut :MUX:DATA:OUTPut?
[2]	Offset	:MUX:OUTPut:OFFSet :MUX:OUTPut:OFFSet?
[3]	Bit Rate Monitor	:MUX:OUTPut:BMONitor?
[4]	Data1/Data2 Tracking	:MUX:DATA:INTerface:TRACking :MUX:DATA:INTerface:TRACking?
[5]	Data/XData Tracking	:MUX:DATA:TRACking :MUX:DATA:TRACking?
[6]	Level Guard	:MUX:DATA:LEVGuard :MUX:DATA:LEVGuard?
[7]	Defined Interface	:MUX:DATA:LEVel :MUX:DATA:LEVel?
[8]	Amplitude	:MUX:DATA:AMPLitude :MUX:DATA:AMPLitude?
[9]	AC ON/OFF	:MUX:DATA:AOFFset :MUX:DATA:AOFFset?
[10]	Offset	:MUX:DATA:OFFSet :MUX:DATA:OFFSet?
[11]	External ATT Factor	:MUX:DATA:ATTFactor :MUX:DATA:ATTFactor?
[12]	Cross Point	:MUX:DATA:CPOint :MUX:DATA:CPOint?
[13]	Half Period Jitter	:MUX:DATA:HPJitter :MUX:DATA:HPJitter?
[14]	Delay (mUI settings)	:MUX:DATA:UIPadjust :MUX:DATA:UIPadjust?
[15]	Delay (ps settings)	:MUX:DATA:PADJust :MUX:DATA:PADJust?
[16]	Calibration	:MUX:DATA:PCALibration



**:MUX:OUTPut:OFFSet <offset>**

Parameter	<offset> = <CHARACTER PROGRAM DATA> VOH High level VTH High level and Low level center value VOL Low level
Function	Sets offset reference value for Data/XData and Clock/XClock outputs
Example	Set offset reference value for Data/XData and Clock/XClock outputs to VOH > :MUX:OUTPut:OFFSet VOH
Compatibility	Not backwards compatible

**:MUX:OUTPut:OFFSet?**

Response	<offset> = <CHARACTER RESPONSE DATA> VOH, VTH, VOL
Function	Queries offset reference value for Data/XData
Example	Query offset reference value for Data/XData for Data1Interface > :MUX:OUTPut:OFFSet? < VOH
Compatibility	Not backwards compatible

**:MUX:OUTPut:BMONitor? [<interface>]**

Parameter	<interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2 Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Response	<string> = <STRING RESPONSE DATA>

**Table 7.8.1.1-2 Response format**

Format	Description
"XX.XXXXX"	XX.XXXXX Gbit/s
"-----"	When no data corresponds to the query

Function	Queries BitRate
Example	Query BitRate of Data1Interface > :MUX:OUTPut:BMONitor? 1 < "28.00000"
Compatibility	Not backwards compatible

### **:MUX:DATA:INterface:TRACking <boolean>**

---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> OFF or 0, ON or 1
Function	Sets shared settings for Data Interface ON/OFF
Example	Set shared settings for Data Interface to ON > :MUX:DATA:INterface:TRACking ON
Compatibility	Not backwards compatible

### **:MUX:DATA:INterface:TRACking?**

---

Response	<boolean> = <NR1 NUMERIC RESPONSE DATA> 0 Shared settings for Data Interface are OFF 1 Shared settings for Data Interface are ON
Function	Queries shared ON/OFF settings for Data Interface
Example	Query shared ON/OFF settings for Data Interface > :MUX:DATA:INterface:TRACking? < 1
Compatibility	Not backwards compatible

### **:MUX:DATA:TRACking <boolean>[,<interface>]**

---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> OFF or 0, ON or 1 <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2 Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Function	Sets shared settings for Data/XData output ON or OFF
Example	Set shared settings for Data/XData of Data1Interface to ON > :MUX:DATA:TRACking ON,1
Compatibility	Not backwards compatible



**:MUX:DATA:TRACking? [<interface>]**

Parameter	<interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2 Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 Shared settings for Data/XData output are OFF 1 Shared settings for Data/XData output are ON
Function	Queries shared settings for Data/XData output
Example	Query shared settings for Data/XData output for Data1Interface > :MUX:DATA:TRACking? 1 < 1
Compatibility	Not backwards compatible

**:MUX:DATA:LEVGuard <boolean>[,<interface>]**

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> OFF or 0, ON or 1 <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2 Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Function	Sets Data/XData output range limit ON/OFF
Example	Set range limit for Data/XData output of Data1Interface to ON > :MUX:DATA:LEVGuard ON,1
Compatibility	Not backwards compatible

**:MUX:DATA:LEVGuard? [<interface>]**

Parameter	<interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2 Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 Data/XData output range limit is OFF 1 Data/XData output range limit is ON
Function	Queries Data/XData output range limit
Example	Query Data/XData output range limit for Data1Interface > :MUX:DATA:LEVGuard? 1 < 1
Compatibility	Not backwards compatible

**:MUX:DATA:LEVel <port>,<level>[,<interface>]**

Parameter	<port> = <CHARACTER PROGRAM DATA> DATA, XDATA <level> = <CHARACTER PROGRAM DATA> VARIable                    Variable (MU182020A-x10, x11, x12, x13, MU182021A-x10, x11, x12, x13) PCML                            PCML level (MU182020A-x10, x11, x12, x13, MU182021A-x10, x11, x12, x13) NCML                            NCML level (MU182020A-x10, x11, x12, x13, MU182021A-x10, x11, x12, x13) SCFL                            SCFL level (MU182020A-x10, x11, x12, x13, MU182021A-x10, x11, x12, x13) NECL                            NECL level (MU182020A-x10, x11, x12, x13, MU182021A-x10, x11, x12, x13) LVPecl                           LVPECL level (MU182020A-x10, x11, x12, x13, MU182021A-x10, x11, x12, x13) LVDS400                        LVDS 400Mv (MU182020A-x10, MU182021A-x10) <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2                            Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Function	Sets data output level for specific port
Example	Set data output level for XData of Data1Interface to NECL level > :MUX:DATA:LEVel XDATA,NECL,1
Compatibility	Not backwards compatible

**:MUX:DATA:LEVel? <port>[,<interface>]**

Parameter	<port> = <CHARACTER PROGRAM DATA> DATA, XDATA <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2                      Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Response	<level> = <CHARACTER RESPONSE DATA> VAR, PCML, NCML, SCFL, NECL, LVP, LVDS400
Function	Queries data output level for specific port
Example	Query data output level for XData of Data1Interface > :MUX:DATA:LEVel? XDATA, 1 < NECL
Compatibility	Not backwards compatible

**:MUX:DATA:AMPLitude <port>,<numeric>[,<interface>]**

Parameter	<port> = <CHARACTER PROGRAM DATA> DATA, XDATA <numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0.250 to 1.750              0.250 to 1.750 V/0.002 V step (MU182020A-x10, MU182021A-x10) 0.500 to 2.500              0.500 to 2.500 V/0.002 V step (MU182020A-x11, MU182021A-x11) 0.500 to 2.000              0.500 to 2.000 V/0.002 V step (MU182020A-x12, MU182021A-x12) 0.500 to 3.500              0.500 to 3.500 V/0.002 V step (MU182020A-x13, MU182021A-x13) <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2                      Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Function	Sets data output amplitude for specific port
Example	Set output amplitude for Data of Data1Interface to 1.000 V > :MUX:DATA:AMPLitude DATA, 1.000, 1
Compatibility	Not backwards compatible

**:MUX:DATA:AMPLitude? <port>[,<interface>]**

---

Parameter	<port> = <CHARACTER PROGRAM DATA> DATA, XDATA <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2                      Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Response	<numeric> = <NR2 NUMERIC RESPONSE DATA>
Function	Queries data output amplitude for specific port
Example	Query data output amplitude for Data of Data1Interface > :MUX:DATA:AMPLitude? DATA,1 < 1.000
Compatibility	Not backwards compatible

**:MUX:DATA:AOffset <boolean>[,<interface>]**

---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> OFF or 0                      Offset OFF (DC output) ON or 1                        Offset ON (AC output) <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2                        Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Function	Sets Data output offset ON/OFF
Example	Set Data output offset for Data1Interface to ON > :MUX:DATA:AOffset ON,1
Compatibility	Not backwards compatible

**:MUX:DATA:AOffset? [<interface>]**

---

Parameter	<interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2                        Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0                                Offset OFF 1                                Offset ON
Function	Queries whether Data output offset ON or OFF
Example	Query Data output offset for Data1Interface > :MUX:DATA:AOffset? 1 < 1
Compatibility	Not backwards compatible

**:MUX:DATA:OFFSet <port>,<numeric>[,<interface>]**

Parameter	<p>&lt;port&gt; = &lt;CHARACTER PROGRAM DATA&gt; DATA, XDATA</p> <p>&lt;numeric&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;          -2.000 to 3.300            -2.000 to 3.300 Voh/0.001V step                                            (MU182020A-x10, x11, x12, x13,                                            MU182021A-x10, x11, x12, x13)</p> <p>-2.875 to 3.175            -2.875 to 3.175 Vth/0.001V step                                            (MU182020A-x10, MU182021A-x10)</p> <p>-3.000 to 3.050            -3.000 to 3.050 Vth/0.001V step                                            (MU182020A-x11, MU182021A-x11)</p> <p>-3.000 to 3.050            -3.000 to 3.050 Vth/0.001V step                                            (MU182020A-x12, MU182021A-x12)</p> <p>-3.000 to 3.050            -3.000 to 3.050 Vth/0.001V step                                            (MU182020A-x13, MU182021A-x13)</p> <p>-3.750 to 3.050            -3.750 to 3.050 Vol/0.001V step                                            (MU182020A-x10, MU182021A-x10)</p> <p>-4.000 to 2.800            -4.000 to 2.800 Vol/0.001V step                                            (MU182020A-x11, x12, x13,                                            MU182021A-x11, x12, x13)</p> <p>&lt;interface&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;          1 to 2                        Data Interface for Data1, and Data2                                            If [&lt;Interface&gt;] is omitted, the default is 1.</p>
Function	Sets data output offset for specific port
Example	<p>Set data output offset for Data of Data1Interface to 1.000 Voh</p> <pre>&gt; :MUX:DATA:OFFSet DATA,1.000,1</pre>
Compatibility	Not backwards compatible

**:MUX:DATA:OFFSet? <port>[,<interface>]**

Parameter	<p>&lt;port&gt; = &lt;CHARACTER PROGRAM DATA&gt; DATA, XDATA</p> <p>&lt;interface&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;          1 to 2                        Data Interface for Data1, and Data2                                            If [&lt;Interface&gt;] is omitted, the default is 1.</p>
Response	<numeric> = <NR2 NUMERIC RESPONSE DATA>
Function	Queries data output offset for specific port
Example	<p>Query data output offset for Data of Data1Interface</p> <pre>&gt; :MUX:DATA:OFFSet? DATA,1</pre> <pre>&lt; 1.000</pre>
Compatibility	Not backwards compatible



**:MUX:DATA:CPOint? <port>[,<interface>]**


---

Parameter	<port> = <CHARACTER PROGRAM DATA> DATA, XDATA <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2                      Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Response	<numeric> = <NR2 NUMERIC RESPONSE DATA>
Function	Queries data output crosspoint for specific port
Example	Query data output crosspoint for XData of Data1Interface > :MUX:DATA:CPOint? XDATA,1 < 60.0
Compatibility	Not backwards compatible

**:MUX:DATA:HPJitter <numeric>[,<interface>]**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> -20 to 20                      -20 to 20/1 Step <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2                      Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Function	Sets Half Period Jitter for specific port
Example	Set Half Period Jitter for Data1Interface to 10 > :MUX:DATA:HPJitter 10,1
Compatibility	Not backwards compatible

**:MUX:DATA:HPJitter? [<interface>]**


---

Parameter	<interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2                      Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Response	<numeric> = <NR2 NUMERIC RESPONSE DATA>
Function	Queries data output crosspoint for specific port
Example	Query Half Period Jitter of Data1Interface > :MUX:DATA:HPJitter? 1 < 10
Compatibility	Not backwards compatible

**:MUX:DATA:UIPadjust <numeric>[,<interface>]**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> -64000 to 64000      -64000 to 64000 mUI/2 mUI Step <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2      Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Function	Sets shared settings for Data and Xdata output in mUI units
Example	Set Data output shared settings for Data1Interface to 500 mUI > :MUX:DATA:UIPadjust 500,1
Compatibility	Not backwards compatible

**:MUX:DATA:UIPadjust? [<interface>]**

---

Parameter	<interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2      Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries shared settings for Data and Xdata output in mUI units
Example	Query shared settings for Data output of Data1Interface > :MUX:DATA:UIPadjust? 1 < 500
Compatibility	Not backwards compatible

**:MUX:DATA:PADJust <numeric>[,<interface>]**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> -2560 to 2560      -2560 to 2560 ps/0.08 ps Steps (25 GHz) (Converts mUI setting resolution from calculated frequency value to reference) <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2      Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Function	Sets shared settings for Data and Xdata output in ps units Sometimes, the value cannot be set, depending on the setting resolution. In this case, set the nearest approximation.
Example	Set Data output shared settings for Data1Interface to 1000 ps > :MUX:DATA:PADjust 1000,1
Compatibility	Not backwards compatible



**:MUX:DATA:PADJust? [<interface>]**


---

Parameter	<interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2 Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Response	<numeric> = <NR2 NUMERIC RESPONSE DATA>
Function	Queries shared settings for Data and Xdata output in ps units
Example	Query shared settings for Data output of Data1Interface > :MUX:DATA:UIPadjust? 1 < 1000
Compatibility	Not backwards compatible

**:MUX:DATA:PCALibration [<interface>]**


---

Parameter	<interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2 Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Function	Calibrates Data and XData output phase
Example	Calibrate Data and XData output phase for Data1Interface > :MUX:DATA:PCALibration 1
Compatibility	Not backwards compatible

**:MUX:DATA:RELative <boolean>[,<interface>]**


---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> OFF or 0 Reference OFF (AC output) ON or 1 Reference ON (DC output) <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2 Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Function	Sets Data output delay reference ON or OFF
Example	Set Data output delay reference for Data1Interface to ON > :MUX:DATA:RELative ON,1
Compatibility	Not backwards compatible

**:MUX:DATA:RELative? [<interface>]**

Parameter	<interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2 Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 Reference OFF 1 Reference ON
Function	Queries whether Data output delay reference ON or OFF
Example	Query Data output delay reference for Data1Interface > :MUX:DATA:RELative? 1 < 1
Compatibility	Not backwards compatible

**:MUX:DATA:RDELay <numeric>,<unit>[,<interface>]**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> (mUI units) -128000 to 128000 -128000 to 128000 mUI/2 mUI Step (ps units) Converted from the calculated frequency value, based on the setting resolution of mUI. <unit> = <CHARACTER PROGRAM DATA> UI mUI units PS ps units (If <unit> is not specified, ps is set by default.) <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2 Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Function	Sets value and units for data output delay reference The setting is performed as an increment from the reference value. Sometimes at PS setting, some values cannot be set depending on the setting resolution. In this case, set the closest approximation.
Example	Set Data output delay reference for Data1Interface to -1000 mUI > :MUX:DATA:RDELay -1000,UI,1
Compatibility	Not backwards compatible

**:MUX:DATA:RDElay? [<unit>][,<interface>]**


---

Parameter	<unit> = <CHARACTER PROGRAM DATA> UI                            mUI units PS                            ps units (If <unit> is not specified, ps is set by default.) <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2                        Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Response	<numeric> = <NR2 NUMERIC RESPONSE DATA>
Function	Queries data output delay reference value
Example	Query data output delay reference value for Data1Interface in mUi units > :MUX:DATA:RDElay? UI,1 < -1000
Compatibility	Not backwards compatible

**:MUX:DATA:JINPut <boolean>[,<interface>]**


---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> OFF or 0                        Jitter Input OFF ON or 1                         Jitter Input ON <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2                         Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Function	Sets Jitter Input addition status
Example	Set Jitter Input addition status for Data1Interface to ON > :MUX:DATA:JINPut ON,1
Compatibility	Not backwards compatible

**:MUX:DATA:JINPut? [<interface>]**


---

Parameter	<interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2                         Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Response	<numeric> = <NR2 NUMERIC RESPONSE DATA>
Function	Queries Jitter Input addition status
Example	Query Jitter Input addition status of Data1Interface > :MUX:DATA:JINPut? 1 < ON
Compatibility	Not backwards compatible



**:MUX:DATA:LIMitter:OFFSet <max>,<min>[,<interface>]**

Parameter	<max>,<min> = <DECIMAL NUMERIC PROGRAM DATA> -2.000 to 3.300      -2.000 to 3.300 Voh/0.001V step (MU182020A-x10, x11, x12, x13, MU182021A-x10, x11, x12, x13) -3.750 to 3.050      -3.750 to 3.050 Vol/0.001V step (MU182020A-x10, MU182021A-x10) -4.000 to 2.800      -4.000 to 2.800 Vol/0.001V step (MU182020A-x11, x12, x13, MU182021A-x11, x12, x13) <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2      Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Function	Sets Data/XData output offset limit
Example	Set Data/XData output offset limit for Data1Interface to max 3.000 Voh, min -2.000 Voh > :MUX:DATA:LIMitter:OFFSet 3.000,-2.000,1
Compatibility	Not backwards compatible

**:MUX:DATA:LIMitter:OFFSet? [<interface>]**

Parameter	<interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2      Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Response	<max> = <NR2 NUMERIC RESPONSE DATA> <min> = <NR2 NUMERIC RESPONSE DATA>
Function	Queries Data/XData output offset limit
Example	Query Data/XData output offset limit of Data1Interface > :MUX:DATA:LIMitter:OFFSet? 1 < 3.000, -2.000
Compatibility	Not backwards compatible

### **:MUX:DATA:UDElay:OFFSet <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> -64000 to 64000      -64000 to 64000 mUI/2 mUI Step
Function	Sets the unit of the Delay offset value.
Example	To set the Delay offset to 500 mUI. > :MUX:DATA:UDElay:OFFSet 500
Compatibility	Not backwards compatible

### **:MUX:DATA:UDElay:OFFSet?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
Function	To query the Delay offset value.
Example	> :MUX:DATA:UDElay:OFFSet? < 500
Compatibility	Not backwards compatible

## 7.8.2 Commands related to Clock Interface tab window

### 7.8.2.1 Clock Output setting field

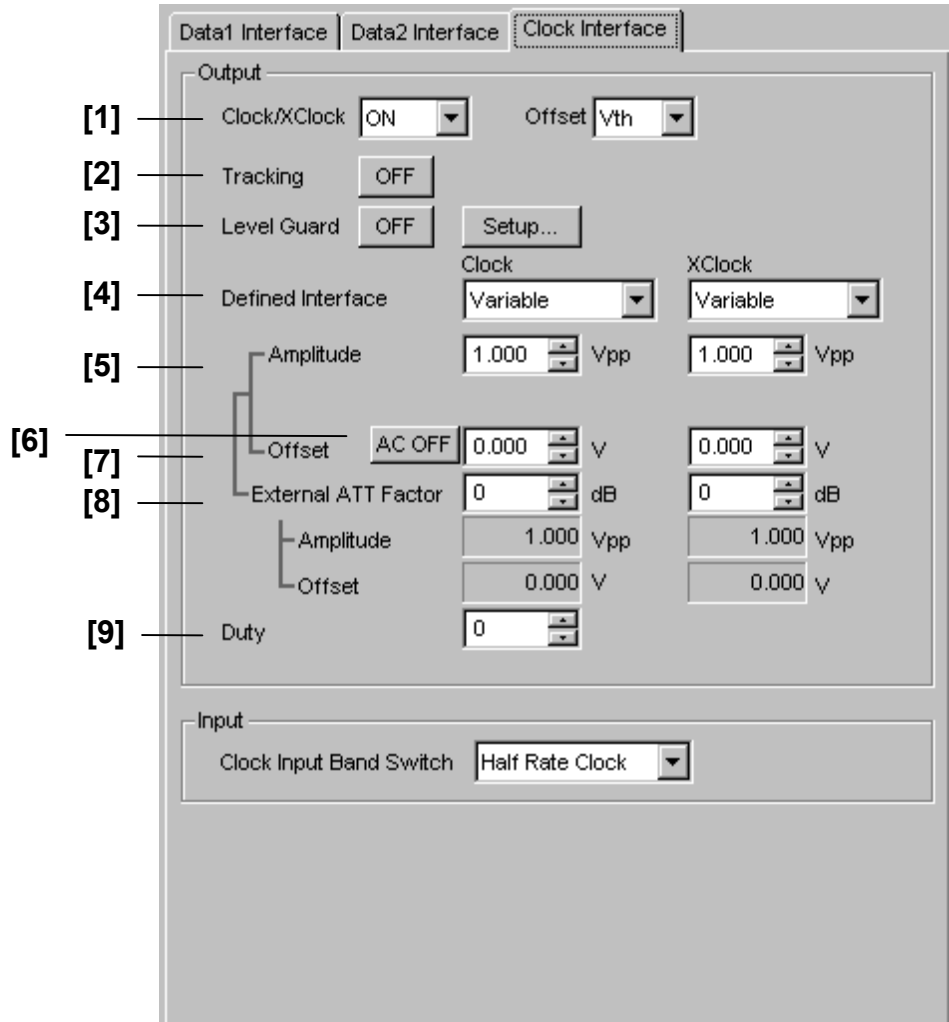


Figure 7.8.2.1-1 Clock Interface setting field

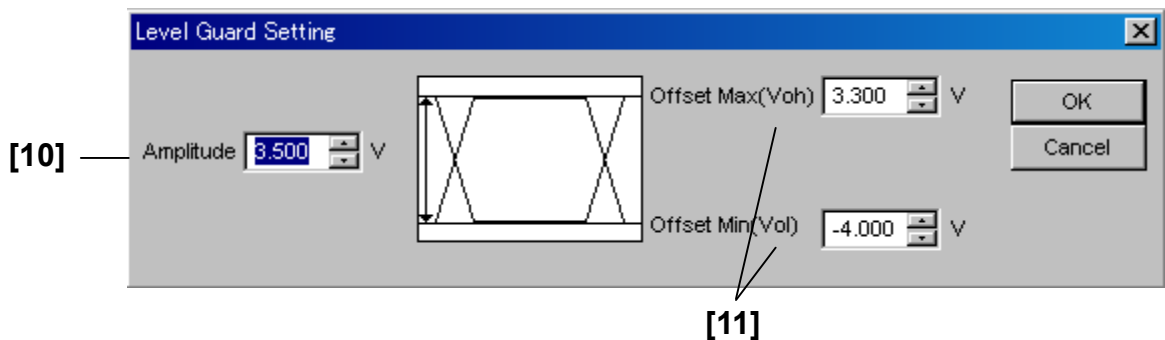


Figure 7.8.2.1-2 Level Guard setting field

**Table 7.8.2.1-1 Clock Interface setting commands**

No.	Setting Items	Commands
[1]	Clock/Xclock ON/OFF	:MUX:CLOCK:OUTPut
		:MUX:CLOCK:OUTPut?
[2]	Tracking	:MUX:CLOCK:TRACking
		:MUX:CLOCK:TRACking?
[3]	Level Guard	:MUX:CLOCK:LEVGuard
		:MUX:CLOCK:LEVGuard?
[4]	Defined Interface	:MUX:CLOCK:LEVel
		:MUX:CLOCK:LEVel?
[5]	Amplitude	:MUX:CLOCK:AMPLitude
		:MUX:CLOCK:AMPLitude?
[6]	AC ON·OFF	:MUX:CLOCK:AOFFset
		:MUX:CLOCK:AOFFset?
[7]	Offset (Specific Port)	:MUX:CLOCK:OFFSet
		:MUX:CLOCK:OFFSet?
[8]	External ATT Factor	:MUX:CLOCK:ATTFactor
		:MUX:CLOCK:ATTFactor?
[9]	Duty	:MUX:CLOCK:DUTY
		:MUX:CLOCK:DUTY?
[10]	Amplitude	:MUX:CLOCK:LIMitter:AMPLitude
		:MUX:CLOCK:LIMitter:AMPLitude?
[11]	Offset Max/Min	:MUX:CLOCK:LIMitter:OFFSet
		:MUX:CLOCK:LIMitter:OFFSet?

**:MUX:CLOCK:OUTPut <boolean>**

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> OFF or 0, ON or 1
Function	Sets Clock/XClock output (XClock only MU182021A) ON/OFF
Example	Set Clock/XClock output to ON > :MUX:CLOCK:OUTPut ON
Compatibility	Not backwards compatible



**:MUX:CLOCK:OUTPut?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 Clock/XClock output is OFF 1 Clock/XClock output is ON
Function	Queries whether Clock/XClock (XClock only MU182021A) output ON or OFF
Example	Query whether Clock/XClock output ON or OFF > :MUX:CLOCK:OUTPut? < 1
Compatibility	Not backwards compatible

**:MUX:CLOCK:TRACkING <boolean>**


---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> OFF or 0, ON or 1
Function	Sets shared settings for Clock/XClock ON/OFF
Example	Set shared settings for Clock/XClock of Clock Interface to ON > :MUX:CLOCK:TRACkING ON
Compatibility	Not backwards compatible

**:MUX:CLOCK:TRACkING?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 Shared settings for Clock/XClock output OFF 1 Shared settings for Clock/XClock output ON
Function	Queries shared settings for Clock/XClock output
Example	Query shared settings for Clock/XClock output of Clock Interface > :MUX:CLOCK:TRACkING? < 1
Compatibility	Not backwards compatible

**:MUX:CLOCK:LEVGuard <boolean>**


---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> OFF or 0, ON or 1
Function	Sets Clock/XClock output range limit ON/OFF
Example	Set Clock/XClock output range limit for Clock Interface to ON > :MUX:CLOCK:LEVGuard ON
Compatibility	Not backwards compatible

### **:MUX:CLOCK:LEVGuard?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 Clock/XClock output range limit OFF 1 Clock/XClock output range limit ON
Function	Queries Clock/XClock output range limit
Example	Query Clock/XClock output range limit of Clock Interface > :MUX:CLOCK:LEVGuard? < 1
Compatibility	Not backwards compatible

### **:MUX:CLOCK:LEVel <port>,<level>**

Parameter	<port> = <CHARACTER PROGRAM DATA> CLOCK, XCLock <level> = <CHARACTER PROGRAM DATA> VARIABLE Variable PCML PCML level NCML NCML level SCFL SCFL level NECL NECL level LVPEcl LVPECL level
Function	Sets clock output level for specific port
Example	Set clock output level for XCLock of Clock Interface to NEC level > :MUX:CLOCK:LEVel XCLock,NECL
Compatibility	Not backwards compatible

### **:MUX:CLOCK:LEVel? <port>**

Parameter	<port> = <CHARACTER PROGRAM DATA> CLOCK, XCLock
Response	<level> = <CHARACTER RESPONSE DATA> VAR, PCML, NCML, SCFL, NECL, LVP
Function	Queries clock output level for specific port
Example	Query clock output level for XCLock of Clock Interface > :MUX:CLOCK:LEVel? XCLock < NECL
Compatibility	Not backwards compatible

**:MUX:CLOCK:AMPLitude <port>,<numeric>**


---

Parameter	<port> = <CHARACTER PROGRAM DATA> CLOCK, XCLock <numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0.500 to 2.000                    0.500 to 2.000 V/0.002 V step
Function	Sets clock output amplitude for specific port
Example	Set clock output amplitude for Clock of Clock Interface to 1.000 V > :MUX:CLOCK:AMPLitude CLOCK,1.000
Compatibility	Not backwards compatible

**:MUX:CLOCK:AMPLitude? <port>**


---

Parameter	<port> = <CHARACTER PROGRAM DATA> CLOCK, XCLock
Response	<numeric> = <NR2 NUMERIC RESPONSE DATA>
Function	Queries clock output amplitude for specific port
Example	Query clock output amplitude for Clock of Clock Interface > :MUX:CLOCK:AMPLitude? CLOCK < 1.000
Compatibility	Not backwards compatible

**:MUX:CLOCK:AOFFSET <boolean>**


---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> OFF or 0                    Offset OFF (DC output) ON or 1                    Offset ON (AC output)
Function	Sets clock output offset ON/OFF
Example	Set output offset for Clock of Clock Interface to ON > :MUX:CLOCK:AOFFSET ON
Compatibility	Not backwards compatible

**:MUX:CLOCK:AOFFSET?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0                    Offset OFF 1                    Offset ON
Function	Queries clock output offset ON/OFF
Example	Query clock output offset of Clock Interface > :MUX:CLOCK:AOFFSET? < 1
Compatibility	Not backwards compatible

**:MUX:CLOCK:OFFSet <port>,<numeric>**

---

Parameter	<port> = <CHARACTER PROGRAM DATA> CLOCK, XCLock <numeric> = <DECIMAL NUMERIC PROGRAM DATA> -2.000 to 3.300                    -2.000 to 3.300 Voh/0.001 V step -3.000 to 3.050                    -3.000 to 3.050Vth/0.001 V step -4.000 to 2.800                    -4.000 to 2.800Vol/0.001 V step
Function	Sets clock output offset for specific port
Example	Set output offset for Clock of Clock Interface to -1.000 Voh > :MUX:CLOCK:OFFSet CLOCK,-1.000
Compatibility	Not backwards compatible

**:MUX:CLOCK:OFFSet? <port>**

---

Parameter	<port> = <CHARACTER PROGRAM DATA> CLOCK, XCLock
Response	<numeric> = <NR2 NUMERIC RESPONSE DATA>
Function	Queries clock output offset for specific port
Example	Query clock output offset for Clock of Clock Interface > :MUX:CLOCK:OFFSet? CLOCK < -1.000
Compatibility	Not backwards compatible

**:MUX:CLOCK:ATTFactor <port>,<numeric>**

---

Parameter	<port> = <CHARACTER PROGRAM DATA> CLOCK, XCLock <numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0 to 40                                    0 to 40 dB/1 dB Step
Function	Sets clock output ATT factor for specific port
Example	Set clock output ATT Factor for Clock of Clock Interface to 20 dB > :MUX:CLOCK:ATTFactor CLOCK,20
Compatibility	Not backwards compatible

**:MUX:CLOCK:ATTFactor? <port>**


---

Parameter	<port> = <CHARACTER PROGRAM DATA> CLOCK, XCLock
Response	<numeric> = <NR2 NUMERIC RESPONSE DATA>
Function	Queries clock output ATT factor for specific port
Example	Query clock output ATT Factor for Clock of Clock Interface > :MUX:CLOCK:ATTFactor? CLOCK < 20
Compatibility	Not backwards compatible

**:MUX:CLOCK:DUTY <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> -25 to 25                      -25 to 25/1 step
Function	Sets Duty
Example	Set Duty for Clock Interface to 25 > :MUX:CLOCK:DUTY 25
Compatibility	Not backwards compatible

**:MUX:CLOCK:DUTY?**


---

Response	<numeric> = <NR2 NUMERIC RESPONSE DATA>
Function	Queries Duty
Example	Queries Duty of Clock Interface > :MUX:CLOCK:DUTY? < 25
Compatibility	Not backwards compatible

**:MUX:CLOCK:LIMitter:AMPLitude <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0.500 to 2.000                      0.500 to 2.000 V/0.002 V step
Function	Sets limit for Clock/XClock output amplitude
Example	Set limit for Clock/XClock output amplitude of Clock Interface to 2.000 > :MUX:CLOCK:LIMitter:AMPLitude 2.000
Compatibility	Not backwards compatible

### **:MUX:CLOCK:LIMitter:AMPLitude?**

---

Response	<numeric> = <NR2 NUMERIC RESPONSE DATA>
Function	Queries limit for Clock/XClock output amplitude
Example	Query limit for Clock/XClock output amplitude of Clock Interface > :MUX:CLOCK:LIMitter:AMPLitude? < 2.000
Compatibility	Not backwards compatible

### **:MUX:CLOCK:LIMitter:OFFSet <max>,<min>**

---

Parameter	<max>,<min> = <DECIMAL NUMERIC PROGRAM DATA> -2.000 to 3.300                    -2.000 to 3.300 Voh/0.001 V step -4.000 to 2.800                    -4.000 to 2.800 Vol/0.001 V step
Function	Sets limit for Clock/XClock output offset
Example	Set limit for Clock/XClock output offset of Clock Interface to max 3.000 Voh and min -2.000 Voh > :MUX:CLOCK:LIMitter:OFFSet 3.000, -2.000
Compatibility	Not backwards compatible

### **:MUX:CLOCK:LIMitter:OFFSet?**

---

Response	<max> = <NR2 NUMERIC RESPONSE DATA> <min> = <NR2 NUMERIC RESPONSE DATA>
Function	Queries limit for Clock/XClock output offset
Example	Query limit for Clock/XClock output offset of Clock Interface > :MUX:CLOCK:LIMitter:OFFSet? < 3.000,-2.000
Compatibility	Not backwards compatible

## 7.8.2.2 Clock Input setting field

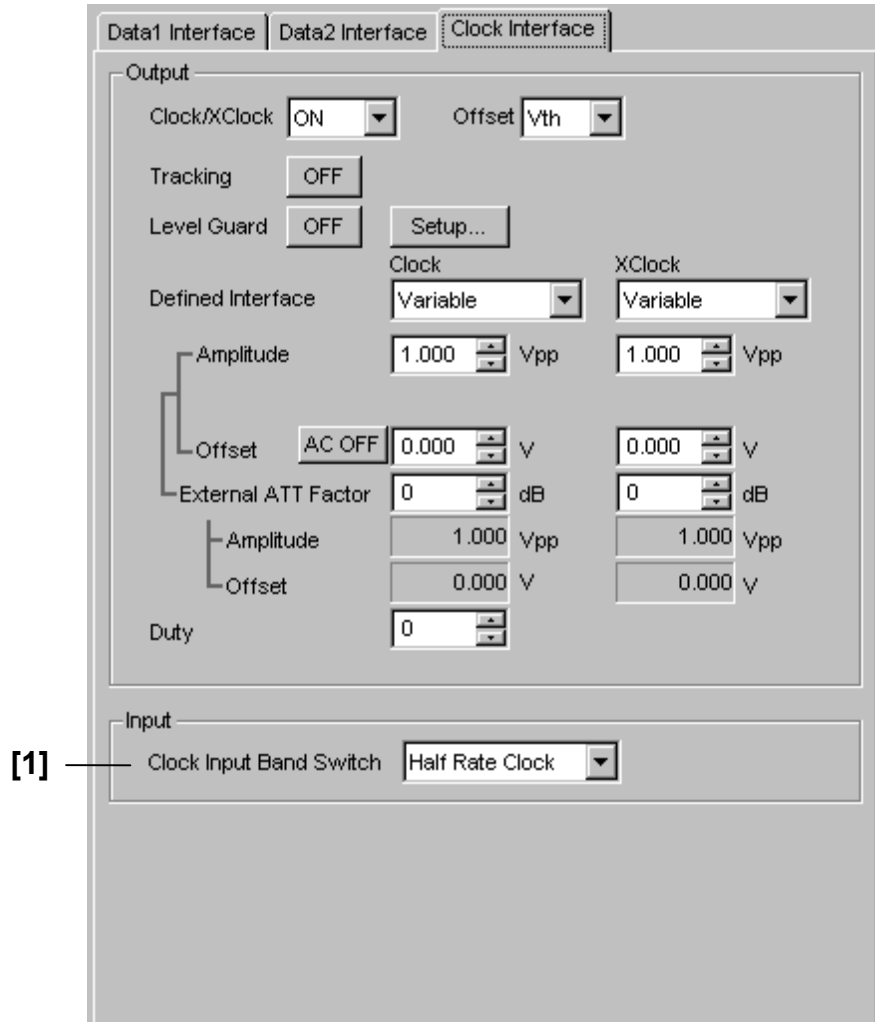


Figure 7.8.2.2-1 Clock Input setting field

Table 7.8.2.2-1 Clock Input setting commands

No.	Setting Items	Commands
[1]	Clock Input Band Switch	:MUX:CLOCK:BAND
		:MUX:CLOCK:BAND?

### **:MUX:CLOCK:BAND <sw>**

---

Parameter	<sw> = <CHARACTER PROGRAM DATA> HALFrate, FULLrate
Function	Sets input rate switching for external clock source
Example	Set input rate switching for external clock source to Half Rate > :MUX:CLOCK:BAND HALF
Compatibility	Not backwards compatible

### **:MUX:CLOCK:BAND?**

---

Response	<sw> = <CHARACTER RESPONSE DATA> HALF, FULL
Function	Queries input rate switching for external clock source
Example	> :MUX:CLOCK:BAND? < HALF
Compatibility	Not backwards compatible



### 7.8.3 Commands related to Emphasis tab window

#### 7.8.3.1 Emphasis setting field

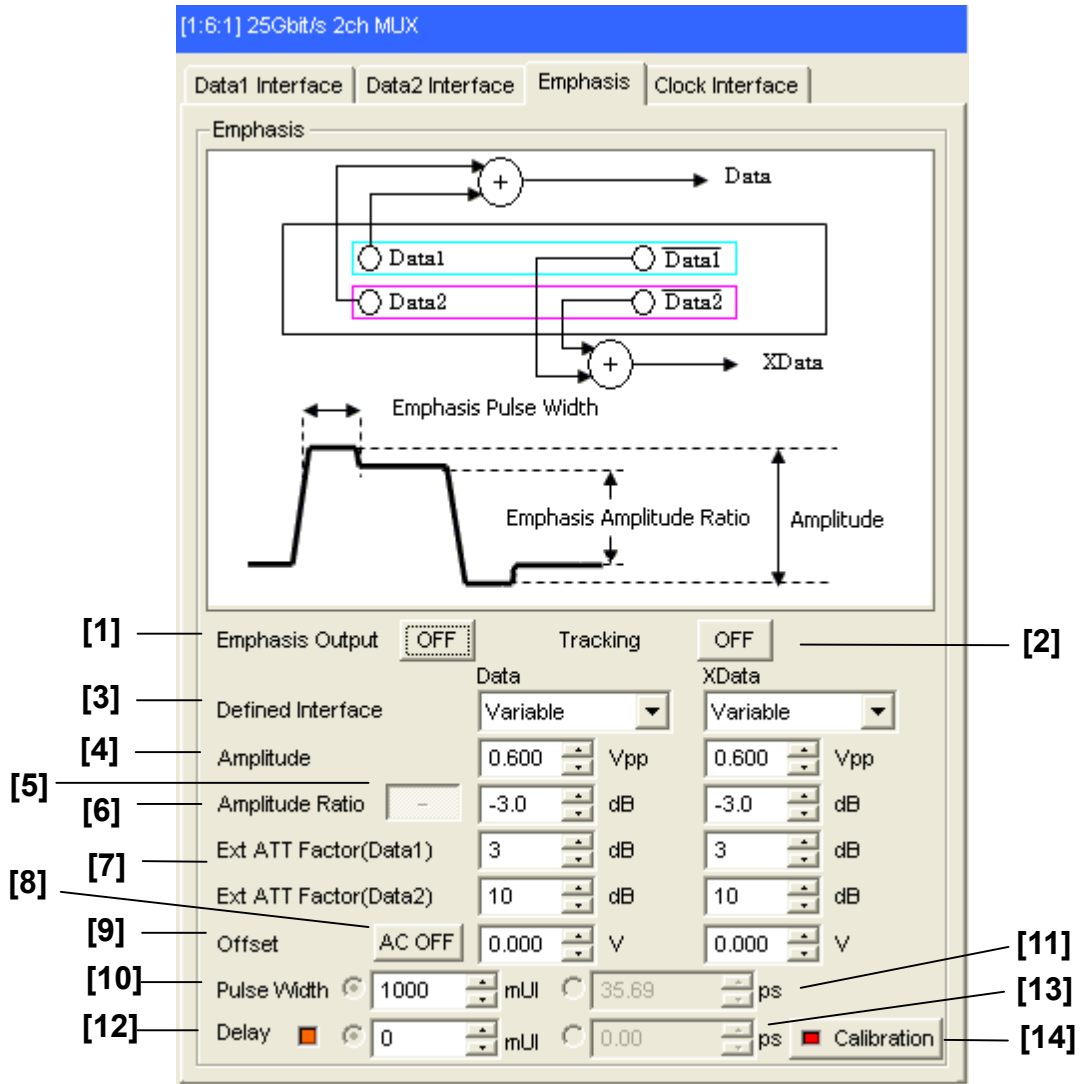


Figure 7.8.3.1-1 Emphasis setting

Table 7.8.3.1-1 Emphasis setting commands

No.	Setting Items	Commands
[1]	Emphasis output ON/OFF	:MUX:EMPHasis:SET :MUX:EMPHasis:SET?
[2]	Tracking	:MUX:EMPHasis:TRACking :MUX:EMPHasis:TRACking?
[3]	Defined Interface	:MUX:EMPHasis:LEVel :MUX:EMPHasis:LEVel?
[4]	Amplitude	:MUX:EMPHasis:AMPLitude :MUX:EMPHasis:AMPLitude?

**Table 7.8.3.1-1 Emphasis setting commands (Cont'd)**

No.	Setting Items	Commands
[5]	Amplitude Ratio ± setting button	:MUX:EMPHasis:RATio:SIGN
		:MUX:EMPHasis:RATio:SIGN?
[6]	Amplitude Ratio	:MUX:EMPHasis:AMPLitude:RATio
		:MUX:EMPHasis:AMPLitude:RATio?
[7]	External ATT Factor (Data1/Data2)	:MUX:EMPHasis:ATTFactor
		:MUX:EMPHasis:ATTFactor?
[8]	AC ON/OFF	:MUX:EMPHasis:AOFFset
		:MUX:EMPHasis:AOFFset?
[9]	Offset	:MUX:EMPHasis:OFFSet
		:MUX:EMPHasis:OFFSet?
[10]	Pulse Width (mUI setting)	:MUX:EMPHasis:PULSewidth:UIPadjust
		:MUX:EMPHasis:PULSewidth:UIPadjust?
[11]	Pulse Width (ps setting)	:MUX:EMPHasis:PULSewidth:PADJust
		:MUX:EMPHasis:PULSewidth:PADJust?
[12]	Delay (mUI setting)	:MUX:EMPHasis:UIPadjust
		:MUX:EMPHasis:UIPadjust?
[13]	Delay (ps setting)	:MUX:EMPHasis:PADJust
		:MUX:EMPHasis:PADJust?
[14]	Calibration	:MUX:EMPHasis:PCALibration

**:MUX:EMPHasis:SET <boolean>**

Parameter	<boolean> = <BOOLEAN PROGRAM DATA>
	OFF or 0                      Emphasis signal OFF
	ON or 1                        Emphasis signal ON
Function	Sets Emphasis signal ON/OFF
Example	Set Emphasis signal to ON > :MUX:EMPHasis:SET ON
Compatibility	Not backwards compatible

**:MUX:EMPHasis:SET?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	0                                Emphasis signal OFF
	1                                Emphasis signal ON
Function	Queries Emphasis signal ON/OFF
Example	Query Emphasis signal ON/OFF > :MUX:EMPHasis:SET? < 1
Compatibility	Not backwards compatible

**:MUX:EMPHasis:TRACking <boolean>**


---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> OFF or 0                      Emphasis Tracking OFF ON or 1                        Emphasis Tracking ON
Function	Sets Emphasis Tracking ON/OFF
Example	Set Emphasis Tracking to ON > :MUX:EMPHasis:TRACking ON
Compatibility	Not backwards compatible

**:MUX:EMPHasis:TRACking?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0                                Emphasis Tracking OFF 1                                Emphasis Tracking ON
Function	Queries Emphasis Tracking ON/OFF
Example	Query Emphasis Tracking ON/OFF > :MUX:EMPHasis:TRACking? < 1
Compatibility	Not backwards compatible

**:MUX:EMPHasis:LEVel <port>,<level>**


---

Parameter	<port> = <CHARACTER PROGRAM DATA> DATA, XDATA <level> = <CHARACTER PROGRAM DATA> VARiable                      Variable
Function	Sets output level for specific port
Example	Set Emphasis XData output level to Variable > :MUX:EMPHasis:LEVel XDATA,VARiable
Compatibility	Not backwards compatible

**:MUX:EMPHasis:LEVel? <port>**


---

Parameter	<port> = <CHARACTER PROGRAM DATA> DATA, XDATA
Response	<level> = <CHARACTER RESPONSE DATA> VAR
Function	Queries output level for specific port
Example	Query Emphasis XData output level > :MUX:EMPHasis:LEVel? XDATA < VAR
Compatibility	Not backwards compatible

### **:MUX:EMPHasis:AMPLitude <port>,<numeric>**

---

Parameter	<port> = <CHARACTER PROGRAM DATA> DATA, XDATA <numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0.002 to 2.582                    0.002 to 2.582 V/0.002 V step
Function	Sets output amplitude for specific port
Example	Set Emphasis Data output amplitude to 1.000 V > :MUX:EMPHasis:AMPLitude DATA,1.000
Compatibility	Not backwards compatible

### **:MUX:EMPHasis:AMPLitude? <port>**

---

Parameter	<port> = <CHARACTER PROGRAM DATA> DATA, XDATA
Response	<numeric> = <NR2 NUMERIC RESPONSE DATA>
Function	Queries output amplitude for specific port
Example	Query Emphasis Data output amplitude > :MUX:EMPHasis:AMPLitude? DATA < 1.000
Compatibility	Not backwards compatible

### **:MUX:EMPHasis:RATio:SIGN <sign>**

---

Parameter	<sign> = <CHARACTER PROGRAM DATA> PLUS                                Set Amplitude Ratio to PLUS (+) MINus                                Set Amplitude Ratio to MINUS (-)
Function	Switches Amplitude Ratio sign
Example	Set Emphasis Amplitude Ratio to PLUS (+) > :MUX:EMPHasis:RATio:SIGN PLUS
Compatibility	Not backwards compatible

### **:MUX:EMPHasis:RATio:SIGN?**

---

Response	<sign> = <CHARACTER RESPONSE DATA> PLUS, MIN
Function	Queries Amplitude Ratio sign
Example	> :MUX:EMPHasis:RATio:SIGN? < PLUS
Compatibility	Not backwards compatible

**:MUX:EMPHasis:AMPLitude:RATio <port>,<numeric>**


---

Parameter	<port> = <CHARACTER PROGRAM DATA> DATA, XDATA <numeric> = <DECIMAL NUMERIC PROGRAM DATA> -9.0 to 9.0                      -9.0 to 9.0 dB/0.1 dB step
Function	Sets Emphasis value for specific port
Example	Set Data Emphasis to 2.5 dB > :MUX:EMPHasis:AMPLitude:RATio DATA,2.5
Compatibility	Not backwards compatible

**:MUX:EMPHasis:AMPLitude:RATio? <port>**


---

Parameter	<port> = <CHARACTER PROGRAM DATA> DATA, XDATA
Response	<numeric> = <NR2 NUMERIC RESPONSE DATA>
Function	Queries Emphasis value for specific port
Example	Queries Emphasis value for Emphasis Data > :MUX:EMPHasis:AMPLitude:RATio? DATA < 2.5
Compatibility	Not backwards compatible

**:MUX:EMPHasis:ATTFactor <port>,<numeric>[,<interface>]**


---

Parameter	<port> = <CHARACTER PROGRAM DATA> DATA, XDATA <numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0 to 40                              0 to 40 dB/1 dB Step <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2                                  Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Function	Sets data output ATT factor for specific port
Example	Set data output ATT Factor for Data of Data1Interface to 20 dB > :MUX:EMPHasis:ATTFactor DATA,20,1
Compatibility	Not backwards compatible

### **:MUX:EMPHasis:ATTFactor? <port>[,<interface>]**

---

Parameter	<port> = <CHARACTER PROGRAM DATA> DATA, XDATA <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2                      Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Response	<numeric> = <NR2 NUMERIC RESPONSE DATA>
Function	Queries data output ATT factor for specific port
Example	Query data output ATT factor for Data of Data1Interface > :MUX:EMPHasis:ATTFactor? DATA,1 < 20
Compatibility	Not backwards compatible

### **:MUX:EMPHasis:AOFFset <boolean>**

---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> OFF or 0                      Offset OFF (DC output) ON or 1                        Offset ON (AC output)
Function	Sets Emphasis Data output offset ON/OFF
Example	Set Emphasis Data output offset to ON > :MUX:EMPHasis:AOFFset ON
Compatibility	Not backwards compatible

### **:MUX:EMPHasis:AOFFset?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0                                Offset OFF 1                                Offset ON
Function	Queries Emphasis Data output offset ON/OFF
Example	Query Emphasis Data output offset > :MUX:EMPHasis:AOFFset? ON < 1
Compatibility	Not backwards compatible

**:MUX:EMPHasis:OFFSet <port>,<numeric>**


---

Parameter	<port> = <CHARACTER PROGRAM DATA> DATA, XDATA <numeric> = <DECIMAL NUMERIC PROGRAM DATA> -3.000 to 3.175            -3.000 to 3.175 Vth/0.001 V step
Function	Sets output offset for specific port
Example	Set Emphasis Data output offset to 1.000 Vth > :MUX:EMPHasis:OFFSet DATA,1.000
Compatibility	Not backwards compatible

**:MUX:EMPHasis:OFFSet? <port>**


---

Parameter	<port> = <CHARACTER PROGRAM DATA> DATA, XDATA
Response	<numeric> = <NR2 NUMERIC RESPONSE DATA>
Function	Queries output offset for specific port
Example	Query output offset for Emphasis Data > :MUX:EMPHasis:OFFSet? DATA < 1.000
Compatibility	Not backwards compatible

**:MUX:EMPHasis:PULSewidth:UIAdjust <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> -500 to 1500            -500 to 1500 mUI/2 mUI Step
Function	Sets Emphasis phase in mUI Sets the Emphasis Pulse Width value in mUI units.
Example	Set Emphasis phase to 500 mUI Sets the Emphasis Pulse Width value to 500 mUI > :MUX:EMPHasis:PULSewidth:UIAdjust 500
Compatibility	Not backwards compatible

**:MUX:EMPHasis:PULSewidth:UIAdjust?**


---

Response	<numeric> = <NR2 NUMERIC RESPONSE DATA>
Function	Queries Emphasis phase in mUI units Sets the Emphasis Pulse Width value in mUI units.
Example	> :MUX:EMPHasis:PULSewidth:UIAdjust? < 500
Compatibility	Not backwards compatible

### **:MUX:EMPHasis:PULSewidth:PADJust <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> -20 to 60                      -20 to 60 ps/0.08 ps Steps (at 25 GHz) (Converted from the calculated frequency value, based on the setting resolution of mUI.)
Function	Sets Emphasis phase in ps units Sets the Emphasis Pulse Width in ps units The specified value may not be exactly set as is, due to the limitation of the setting resolution. In this event, the value is adjusted to the most approximate value and set.
Example	Set Emphasis phase to 30 ps Sets the Emphasis Pulse Width value to 30 ps. > :MUX:EMPHasis:PULSewidth:PADJust 30
Compatibility	Not backwards compatible

### **:MUX:EMPHasis:PULSewidth:PADJust?**

Response	<numeric> = <NR2 NUMERIC RESPONSE DATA>
Function	Queries Emphasis phase in ps units Queries the Emphasis Pulse Width value in ps units.
Example	> :MUX:EMPHasis:PULSewidth:PADJust? < 30
Compatibility	Not backwards compatible

### **:MUX:EMPHasis:UIPadjust <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> -2000 to 2000                      -2000 to 2000 mUI/2 mUI Step
Function	Sets Emphasis output phase in mUI units
Example	Set Emphasis output phase to 500 mUI > :MUX:EMPHasis:UIPadjust 500
Compatibility	Not backwards compatible

### **:MUX:EMPHasis:UIPadjust?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries Emphasis output phase
Example	> :MUX:EMPHasis:UIPadjust? < 500
Compatibility	Not backwards compatible



**:MUX:EMPHasis:PADJust <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> -80 to 80                      -80 to 80 ps/0.08 ps Step (at 25 GHz) Converted from the calculated frequency value, based on the setting resolution of mUI.
Function	Sets Emphasis output phase in ps units The specified value may not be exactly set as is, due to the limitation of the setting resolution. In this event, the value is adjusted to the most approximate value and set.
Example	Set Emphasis output phase to 80 ps > :MUX:EMPHasis:PADjust 80
Compatibility	Not backwards compatible

**:MUX:EMPHasis:PADJust?**


---

Response	<numeric> = <NR2 NUMERIC RESPONSE DATA>
Function	Queries Emphasis output phase in ps units
Example	> :MUX:EMPHasis:UIPadjust? < 80
Compatibility	Not backwards compatible

**:MUX:EMPHasis:PCALibration**


---

Parameter	None
Function	Calibrates Emphasis Delay
Example	> :MUX:EMPHasis:PCALibration
Compatibility	Not backwards compatible

## 7.9 DEMUX Commands

This section explains the setting and query commands for the MU182040A 25 Gbit/s 1ch DEMUX, and MU182041A 25 Gbit/s 2ch DEMUX.

The commands in each tab are explained below.

Before executing a setting/query command for the MU182040A, specify the slot number of the module to be remotely controlled, by using the :MODULE:ID command. Refer to Chapter 7.1 "Common Commands" and 9.1 "Basic Operation of Device Messages" for how to specify a slot number with the :MODULE:ID command.

However, unless there is a special item, see the MU182041A.

### 7.9.1 Commands related to Data Interface tab window

#### 7.9.1.1 Data Interface setting field

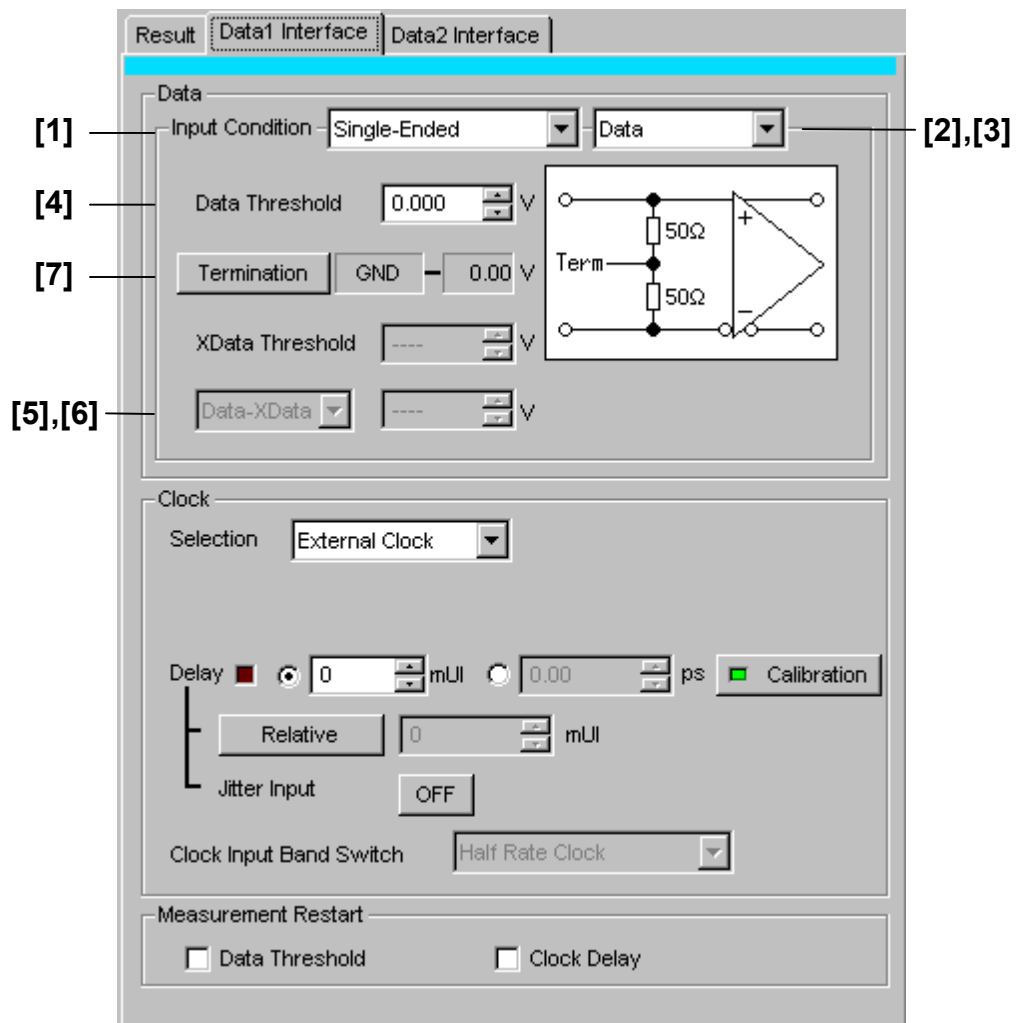


Figure 7.9.1.1-1 Data Interface setting field

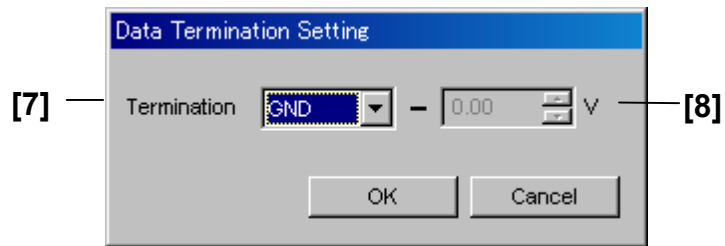


Figure 7.9.1.1-2 Termination Setting

Table 7.9.1.1-1 Data Interface setting commands

No.	Setting Items	Commands
[1]	Input Condition	:DEMUX:DATA:INTERface :DEMUX:DATA:INTERface?
[2]	No label (Differential setting)	:DEMUX:DATA:DIFFerential :DEMUX:DATA:DIFFerential?
[3]	No label (Differential reference signal setting)	:DEMUX:DATA:SINGLE :DEMUX:DATA:SINGLE?
[4]	Data Threshold X Data Threshold	:DEMUX:DATA:THRESHold :DEMUX:DATA:THRESHold?
[5]	No label (Differential reference signal setting)	:DEMUX:DATA:DIFFerential:BASis :DEMUX:DATA:DIFFerential:BASis?
[6]	No label (Differential data threshold setting)	:DEMUX:DATA:DIFFerential:THRESHold :DEMUX:DATA:DIFFerential:THRESHold?
[7]	Termination	:DEMUX:DATA:TERMination :DEMUX:DATA:TERMination?
[8]	No label (Termination voltage setting)	:DEMUX:DATA:TLEVEL :DEMUX:DATA:TLEVEL?

### :DEMUX:DATA:INTERface <input>[,<interface>]

Parameter	<input> = <CHARACTER PROGRAM DATA> SINGLE Single Ended DIF50ohm Differential 50 Ω DIF100ohm Differential 100 Ω <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2 Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Function	Sets data input interface
Example	Set Data1Interface interface to single connection > :DEMUX:DATA:INTERface SINGLE,1
Compatibility	Not backwards compatible

**:DEMux:DATA:INTERface? [<interface>]**

---

Parameter	<interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2 Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Response	<interface> = <CHARACTER RESPONSE DATA> SING, DIF50, DIF100
Function	Queries data input interface
Example	Query Data1Interface interface > :DEMux:DATA:INTERface? 1 < SING
Compatibility	Not backwards compatible

**:DEMux:DATA:DIFFerential <item>[,<interface>]**

---

Parameter	<item> = <CHARACTER PROGRAM DATA> INdependent Data/XData independent settings TRACKing Data/XData shared settings ALTErnate Data/XData alternate settings <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2 Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Function	Sets differential type for Differential input data
Example	Set Differential Independent for Data1Interface > :DEMux:DATA:DIFFerential INdependent,1
Compatibility	Not backwards compatible

**:DEMux:DATA:DIFFerential? [<interface>]**

---

Parameter	<interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2 Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Response	<item> = <CHARACTER RESPONSE DATA> IND, TRAC, ALT
Function	Queries differential type for Differential input data
Example	Query differential type for Data1Interface > :DEMux:DATA:DIFFerential? 1 < IND
Compatibility	Not backwards compatible

**:DEMUX:DATA:SINGLE <item>[,<interface>]**

Parameter	<item> = <CHARACTER PROGRAM DATA> DATA                   Data is selected XDATA                   XData is selected <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2                   Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Function	Sets input port for Single data input
Example	Set Data1Interface input port to data > :DEMUX:DATA:SINGLE DATA, 1
Compatibility	Not backwards compatible

**:DEMUX:DATA:SINGLE? [<interface>]**

Parameter	<interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2                   Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Response	<item> = <CHARACTER RESPONSE DATA> DATA                   Data is selected XDAT                    XData is selected
Function	Queries input port for Single data input
Example	Queries Data1Interface input port > :DEMUX:DATA:SINGLE? 1 < DATA
Compatibility	Not backwards compatible

**:DEMUX:DATA:THRESHOLD <port>,<numeric>[,<interface>]**

Parameter	<port> = <CHARACTER PROGRAM DATA> DATA, XDATA (At Single, input the selected port.) <numeric> = <DECIMAL NUMERIC PROGRAM DATA> -3.500 to 3.300        -3.500 to 3.300 V/0.001 V Step <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2                   Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Function	Sets date input threshold value for specific port
Example	Set threshold value for Data1Interface input port to -3 V > :DEMUX:DATA:THRESHOLD DATA, -3, 1
Compatibility	Not backwards compatible

**:DEMUX:DATA:THRESHOLD? <port>[,<interface>]**

---

Parameter	<port> = <CHARACTER PROGRAM DATA> DATA, XDATA (At Single, input the selected port.) <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2                      Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Response	<numeric> = <NR2 NUMERIC RESPONSE DATA>
Function	Queries data input threshold value for specific port
Example	Query threshold value for Data1Interface input port > :DEMUX:DATA:THRESHOLD? DATA,1 < -3.000
Compatibility	Not backwards compatible

**:DEMUX:DATA:DIFFERENTIAL:BASIS <basis>[,<interface>]**

---

Parameter	<basis> = <CHARACTER PROGRAM DATA> DATA                      Data set as reference XDATA                      XData set as reference <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2                      Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Function	Sets differential signal for data input threshold value
Example	Set differential reference signal for Data1Interface threshold value to Data > :DEMUX:DATA:DIFFERENTIAL:BASIS DATA,1
Compatibility	Not backwards compatible

**:DEMUX:DATA:DIFFERENTIAL:BASIS? [<interface>]**

---

Parameter	<interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2                      Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Response	<basis> = <CHARACTER RESPONSE DATA> DATA                      Data set as reference XDATA                      XData set as reference
Function	Queries differential signal for data input threshold value
Example	Query differential reference signal for Data1Interface threshold value > :DEMUX:DATA:DIFFERENTIAL:BASIS? 1 < DATA
Compatibility	Not backwards compatible

**:DEMux:DATA:DIFFerential:THReshold <numeric>[,<interface>]**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> -1.500 to 1.500            -1.500 to 1.500 V/0.001 V Step <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2                      Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Function	Sets data input threshold value at differential input
Example	Set Data1Interface differential data input value to -1 V > :DEMux:DATA:DIFFerential:THReshold -1,1
Compatibility	Not backwards compatible

**:DEMux:DATA:DIFFerential:THReshold? [<interface>]**

Parameter	<interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2                      Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Response	<numeric> = <NR2 NUMERIC RESPONSE DATA>
Function	Queries data input threshold value at differential input
Example	Query Data1Interface differential data input value > :DEMux:DATA:DIFFerential:THReshold? 1 < -2.000
Compatibility	Not backwards compatible

**:DEMux:DATA:TERMination <term>[,<interface>]**

Parameter	<term> = <CHARACTER PROGRAM DATA> GND                          50 $\Omega$ to GND VARIable                    50 $\Omega$ to Variable Voltage <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2                      Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Function	Sets date input termination conditions
Example	Set Data1Interface termination conditions to GND > :DEMux:DATA:TERMination GND,1
Compatibility	Not backwards compatible

**:DEMux:DATA:TERMination? [<interface>]**

---

Parameter	<interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2 Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Response	<term> = <CHARACTER RESPONSE DATA> GND, VAR
Function	Queries data input termination conditions
Example	Query Data1Interface termination conditions > :DEMux:DATA:TERMination? 1 < GND
Compatibility	Not backwards compatible

**:DEMux:DATA:TLEVel <numeric>[,<interface>]**

---

Parameter	<numeric> = <DICIMAL NUMERIC PROGRAM DATA> -2.50 to 3.50                    -2.50 to 3.50 V/0.01 V Step <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2 Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Function	Sets termination voltage at Variable input termination condition
Example	Set Data1Interface variable termination voltage to -2.5 > :DEMux:DATA:TLEVel -2.5, 1
Compatibility	Not backwards compatible

**:DEMux:DATA:TLEVel? [<interface>]**

---

Parameter	<interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2 Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Response	<numeric> = <NR2 NUMERIC RESPONSE DATA>
Function	Queries termination voltage at Variable input termination condition
Example	Query Data1Interface variable termination voltage > :DEMux:DATA:TLEVel? 1 < -2.50
Compatibility	Not backwards compatible



## 7.9.2 Commands related to Clock Interface tab window

### 7.9.2.1 Clock Interface setting field

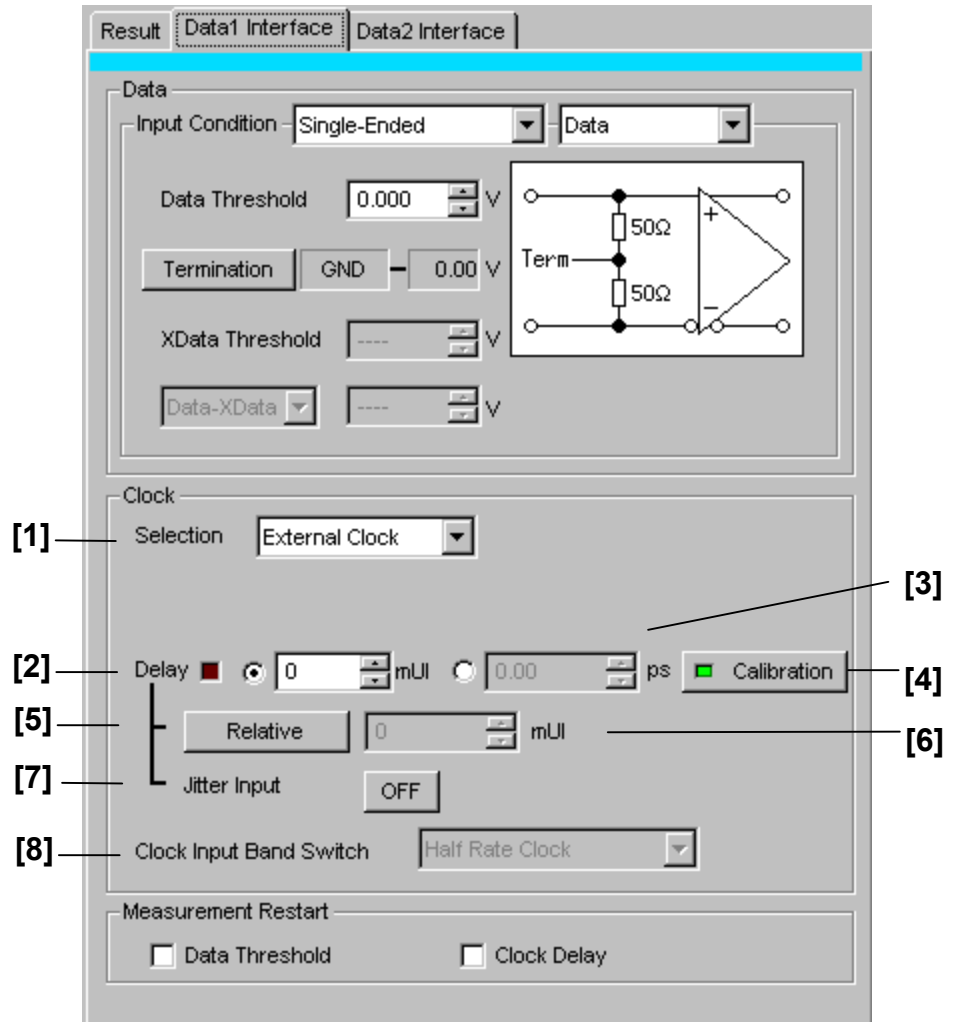


Figure 7.9.2.1-1 Clock Interface setting field

Table 7.9.2.1-1 Clock Interface setting commands

No.	Setting Items	Commands
[1]	Selection	:DEMUX:CLOCK:SELECTION
		:DEMUX:CLOCK:SELECTION?
[2]	Delay (mUI units)	:DEMUX:CLOCK:UIDELAY
		:DEMUX:CLOCK:UIDELAY?
[3]	Delay (ps units)	:DEMUX:CLOCK:PDELAY
		:DEMUX:CLOCK:PDELAY?
[4]	Calibration	:DEMUX:CLOCK:CALIBRATION
[5]	Relative	:DEMUX:CLOCK:RELATIVE
		:DEMUX:CLOCK:RELATIVE?

Table 7.9.2.1-1 Clock Interface setting commands (Cont'd)

No.	Setting Items	Commands
[6]	No label (Settings of relative values)	:DEMuX:CLOCK:RDElay
		:DEMuX:CLOCK:RDElay?
[7]	Jitter Input	:DEMuX:CLOCK:JINPut
		:DEMuX:CLOCK:JINPut?
[8]	Clock Input Band Switch	:DEMuX:CLOCK:BAND
		:DEMuX:CLOCK:BAND?

**:DEMuX:CLOCK:SElection <sel>**

Parameter	<sel> = <CHARACTER PROGRAM DATA> EXTernal                      External Clock
Function	Sets clock input type
Example	Set Data1Interface clock input type to external clock > :DEMuX:CLOCK:SElection EXTernal
Compatibility	Not backwards compatible

**:DEMuX:CLOCK:SElection?**

Response	<sel> = <CHARACTER RESPONSE DATA> EXT                              External Clock
Example	Query Data1Interface clock input type > :DEMuX:CLOCK:SElection? < EXT
Compatibility	Not backwards compatible

**:DEMuX:CLOCK:UIDelay<numeric>[,<interface>]**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> -2000 to 2000                      -2000 to 2000mUI/2mUI Step <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2                              Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Function	Sets clock input phase variation in mUI units
Example	Set Data1Interface clock phase variation to -1000 mUI > :DEMuX:CLOCK:UIDelay -1000,1
Compatibility	Not backwards compatible

**:DEMUX:CLOCK:UIDelay? [<interface>]**

Parameter	<interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2 Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries clock input phase variation in mUI units
Example	Queries Data1Interface clock phase variation in mUI units > :DEMUX:CLOCK:DElay? 1 < -1000
Compatibility	Not backwards compatible

**:DEMUX:CLOCK:PDElay<numeric>[,<interface>]**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> -80 to 80 -80 to 80 ps/0.8ps Steps(at 25 GHz) Converted from the calculated frequency value, based on the setting resolution of mUI. <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2 Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Function	Sets clock input phase variation in ps units The specified value may not be exactly set as is when the ps unit is set, due to the limitation of the setting resolution. The value is adjusted to the most approximate value and set in this event.
Example	Set Data1Interface clock face variation to -40 ps > :DEMUX:CLOCK:PDElay -40,1
Compatibility	Not backwards compatible

**:DEMUX:CLOCK:PDElay? [<interface>]**

Parameter	<interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2 Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries clock input phase variation and units
Example	Query Data1Interface clock phase variation in ps units > :DEMUX:CLOCK:PDElay? 1 < -40
Compatibility	Not backwards compatible

**:DEMUX:CLOCK:CALibration [<interface>]**

---

Parameter	<interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2 Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Function	Calibrates input a clock phase setting
Example	Configure Data1Interface input clock phase setting > :DEMUX:CLOCK:CALibration 1
Compatibility	Not backwards compatible

**:DEMUX:CLOCK:RELative <boolean>[,<interface>]**

---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> 0 or OFF Reference OFF 1 or ON Reference ON <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2 Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Function	Sets clock input phase variation reference ON/OFF
Example	Set Data1Interface clock input phase variation reference to ON > :DEMUX:CLOCK:RELative ON,1
Compatibility	Not backwards compatible

**:DEMUX:CLOCK:RELative? [<interface>]**

---

Parameter	<interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2 Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Response	<boolean> = <NR1 NUMERIC RESPONSE DATA> 0 Reference OFF 1 Reference ON
Function	Queries clock input phase variation reference setting
Example	Query Data1Interface clock input phase variation reference > :DEMUX:CLOCK:RELative? 1 < 1
Compatibility	Not backwards compatible

**:DEMUX:CLOCK:RDElay<numeric>[,<unit>][,<interface>]**

Parameter	<p>&lt;numeric&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;  (mUI units)–4000 to 4000      –4000 to 4000 mUI/2 mUI Step  (ps units) Converted from the calculated frequency value, based on the setting resolution of mUI.</p> <p>&lt;unit&gt; = &lt; CHARACTER PROGRAM DATA&gt;  UI                                  mUI units  PS                                  ps units (The ps unit is selected when &lt;unit&gt; is omitted.)</p> <p>&lt;interface&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;  1 to 2                              Data Interface for Data1, and Data2  If [&lt;Interface&gt;] is omitted, the default is 1.</p>
Function	<p>Sets clock input phase variation reference value and units  Setting is performed as an increment from the reference value.  The specified value may not be exactly set as is when the ps unit is set, due to the limitation of the setting resolution. The value is adjusted to the most approximate value and set in this event.</p>
Example	<p>Set Data1Interface clock phase variation reference to –1000 mUI  &gt; :DEMUX:CLOCK:RDElay -1000, UI, 1</p>
Compatibility	Not backwards compatible

**:DEMUX:CLOCK:RDElay? [<unit>][,<interface>]**

Parameter	<p>&lt;unit&gt; = &lt;CHARACTER PROGRAM DATA&gt;  UI                                  mUI units  PS                                  ps units (The ps unit is selected when &lt;unit&gt; is omitted.)</p> <p>&lt;interface&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;  1 to 2                              Data Interface for Data1, and Data2  If [&lt;Interface&gt;] is omitted, the default is 1.</p>
Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries clock input phase variation reference value and units
Example	<p>Query Data1Interface clock phase variation reference UI units  &gt; :DEMUX:CLOCK:RDElay? UI 1  &lt; -1000</p>
Compatibility	Not backwards compatible

**:DEMUX:CLOCK:JINPut <boolean>[,<interface>]**

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> 0 or OFF                      Jitter Input OFF 1 or ON                         Jitter Input ON <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2                          Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Function	Sets Jitter Input ON/OFF
Example	Set Data1Interface JitterInput to ON > :DEMUX:Clock:JINPut ON,1
Compatibility	Not backwards compatible

**:DEMUX:CLOCK:JINPut? [<interface>]**

Parameter	<interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2                          Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0                                 Jitter InputOFF 1                                 Jitter InputON
Function	Queries Jitter Input ON/OFF
Example	Query Data1Interface Jitter Input ON/OFF > :DEMUX:CLOCK:JINPut? 1 < 1
Compatibility	Not backwards compatible

**:DEMUX:CLOCK:BAND <sw>**

Parameter	<sw> = <CHARACTER PROGRAM DATA> HALFrRate                      Selects Half Clock Rate FULLRate                        Selects Full Clock Rate
Function	Switches Clock Input Band Switch
Example	Switches Clock Input Band Switch to Half > :DEMUX:Clock:BAND HALF
Compatibility	Not backwards compatible

---

**:DEMUX:CLOCK:BAND?**

---

Response	<sw> = <CHARACTER RESPONSE DATA> HALFrate               Selects Half Clock Rate FULLrate               Selects Full Clock Rate
Function	Queries Clock Input Band Switch
Example	Queries Clock Input Band Switch > :DEMUX:CLOCK:BAND? < HALF
Compatibility	Not backwards compatible

### 7.9.2.2 Measurement Restart setting field

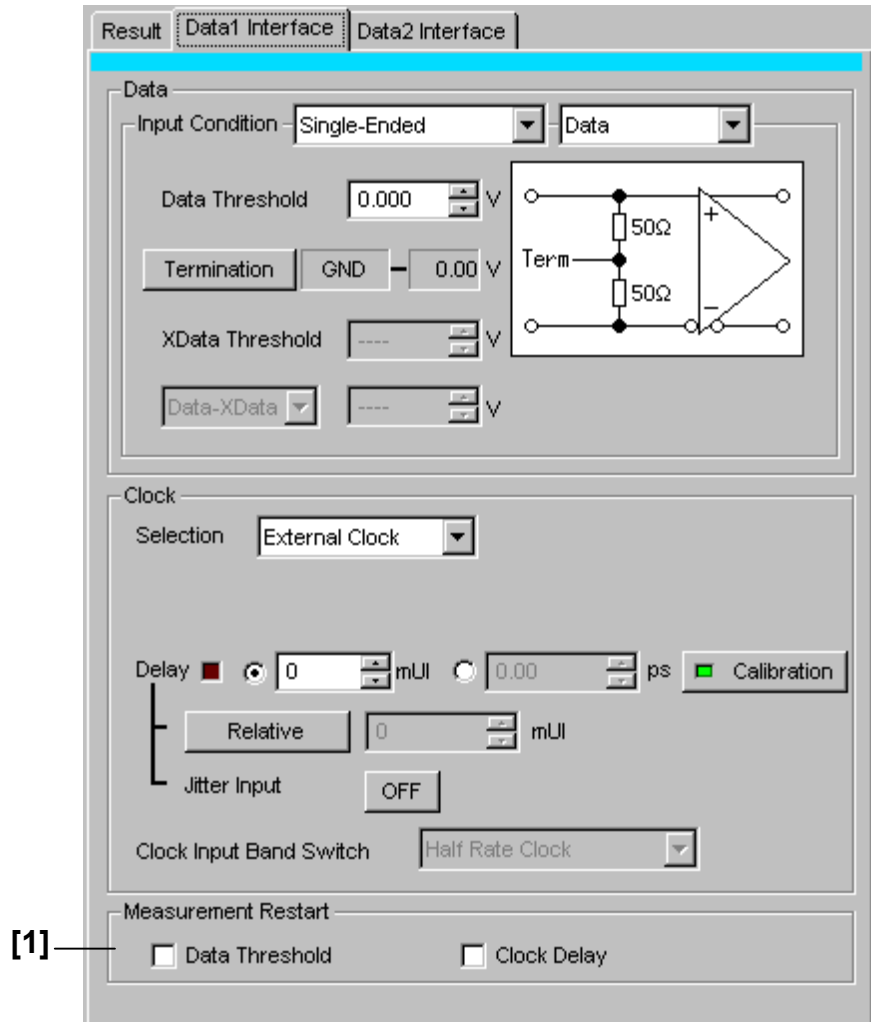


Figure 7.9.2.2-1 Measurement Restart setting field

Table 7.9.2.2-1 Measurement Restart setting commands

No.	Setting Items	Commands
[1]	Measurement Restart	:DEMux:MEASure:MREStart
		:DEMux:MEASure:MREStart?



**:DEMUX:MEASURE:MREStart <data>,<clock> [,<interface>]**

Parameter	<data> = < BOOLEAN PROGRAM DATA > 0 or OFF                      Set measurement restart at Data Threshold change to OFF 1 or ON                        Set measurement restart at Data Threshold change to ON <clock> = < BOOLEAN PROGRAM DATA > 0 or OFF                      Set measurement restart at Clock Delay change to OFF 1 or ON                        Set measurement restart at Clock Delay change to ON <interface> = < DECIMAL NUMERIC PROGRAM DATA > 1 to 2                         Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Function	Sets measurement restart conditions
Example	Set Data1Interface measurement restart conditions > :DEMUX:MEASURE:MREStart 0,0,1
Compatibility	Not backwards compatible

**:DEMUX:MEASURE:MREStart? [<interface>]**

Parameter	<interface> = < DECIMAL NUMERIC PROGRAM DATA > 1 to 2                         Data Interface for Data1, and Data2 If [<Interface>] is omitted, the default is 1.
Response	<data> = < NR1 NUMERIC RESPONSE DATA > <clock> = < NR1 NUMERIC RESPONSE DATA > 0                                Measurement restart OFF 1                                Measurement restart ON
Function	Queries measurement restart conditions
Example	Query Data1Interface measurement restart conditions > :DEMUX:MEASURE:MREStart? < 0,0
Compatibility	Not backwards compatible

### 7.9.3 Commands related to Result tab window

#### 7.9.3.1 Result setting field

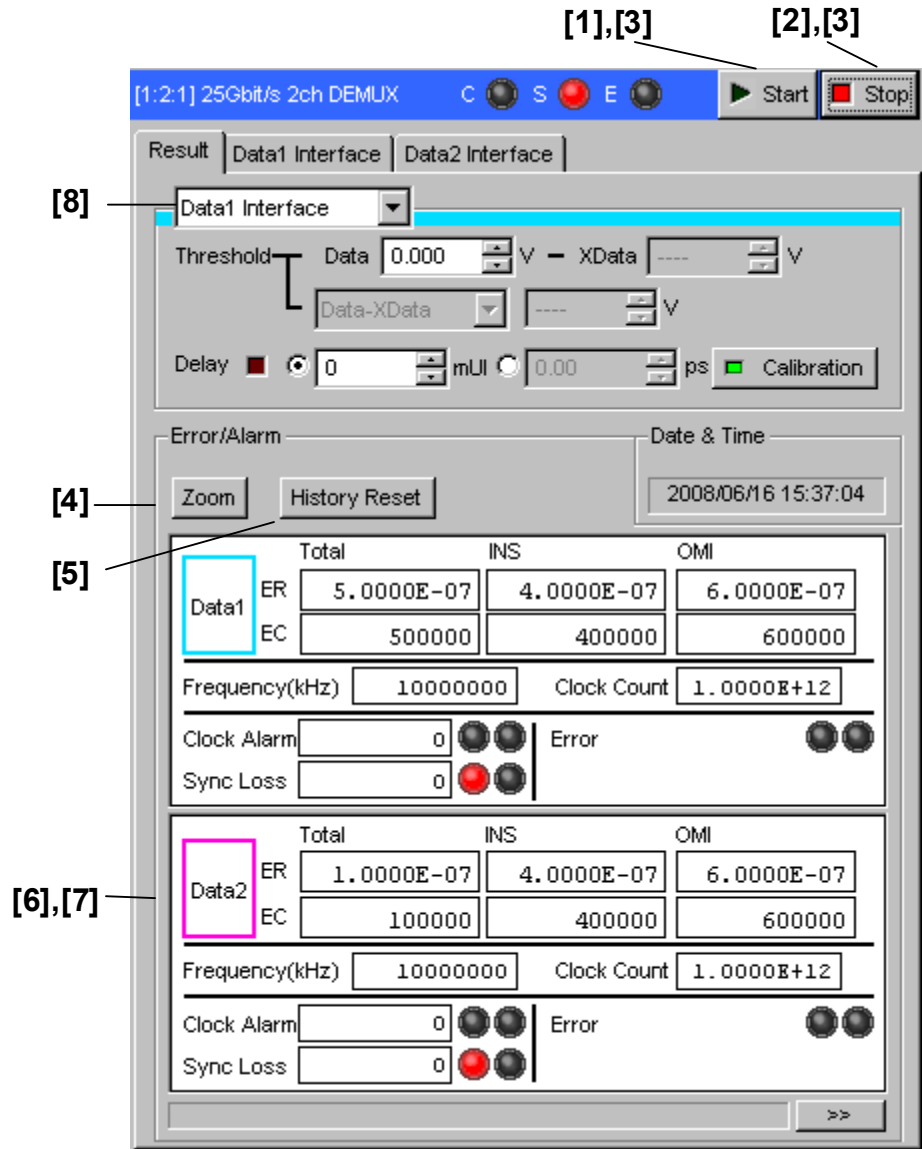


Figure 7.9.3.1-1 Result tab window

Table 7.9.3.1-1 Result setting commands

No.	Setting Items	Commands
[1]	Start	:DEMUX:MEASURE:START
[2]	Stop	:DEMUX:MEASURE:STOP
[3]	Query measurement conditions	:DEMUX:MEASURE:EALARM:STATE?
[4]	Zoom	:DEMUX:RESULT:ZOOM
		:DEMUX:RESULT:ZOOM?
[5]	History Reset	:DEMUX:RESULT:EALARM:HRESET
[6]	No label (Query measurement data of error alarm)	:DEMUX:CALCULATE:DATA:EALARM?
[7]	No label (Query window items)	:DEMUX:CALCULATE:DATA:MONITOR?
[8]	Display measurement items	:DEMUX:DISPLAY:SETTING

**:DEMUX:MEASURE:START**

Function	Starts MU181040A BER measurement in same unit and restarts during measurement
Example	Starts MU181040A BER measurement in same unit > :DEMUX:MEASURE:START
Compatibility	Not backwards compatible

**:DEMUX:MEASURE:STOP**

Function	Stops MU181040A BER measurement in same unit
Example	Stops MU181040A BER measurement in same unit > :DEMUX:MEASURE:STOP
Compatibility	Not backwards compatible

**:DEMUX:MEASURE:EALARM:STATE?**

Response	<numeric> = < NR1 NUMERIC RESPONSE DATA > 0 Stopped 1 Measuring
Function	Queries measurement progress at MU181040A bit error or alarm in same unit
Example	Queries measurement progress at MU181040A bit error or alarm in same unit > :DEMUX:MEASURE:EALARM:STATE? < 0
Compatibility	Not backwards compatible

### **:DEMUX:RESult:ZOOM <boolean>**

---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> 0 or OFF                      Zoom out display 1 or ON                         Zoom in display
Function	Sets zooming for measured results display ON/OFF
Example	Set zooming for measured results display to ON > :DEMUX:RESult:ZOOM ON
Compatibility	Not backwards compatible

### **:DEMUX:RESult:ZOOM?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0                                 Zoom out display 1                                 Zoom in display
Function	Queries zooming for measured results display ON/OFF
Example	Query zooming for measured results display to ON/OFF > :DEMUX:RESult:ZOOM? < 1
Compatibility	Not backwards compatible

### **:DEMUX:RESult:EALarm:HRESet**

---

Function	Resets measured results display history
Example	Resets measured results display history > :DEMUX:RESult:EALarm:HRESet
Compatibility	Not backwards compatible

**:DEMUX:CALCulate:DATA:EALarm? <string>[,<interface>]**

Parameter	<string> = <STRING PROGRAM DATA> "CURRENT:<result>" Current data "LAST:<result>" Measurement end data Refer to the parameter table for the <result> contents. <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 Measured results for Data1 2 Measured results for Data2 3 Measured results for 25Gx2chTotal If [<Interface>] is omitted, 1 is set by default. 3 is disabled at settings other than 25G x 2 ch Combination. If there is no Result screen due to restrictions, the command itself is disabled.
-----------	---

Response <string> = <STRING RESPONSE DATA>

**Table 7.9.3.1-2 Response format**

Form	Format	Description
Form1 Integer type	"XXXXXXXX"	For 0 to 9999999
	"X.XXXEEXX"	For 1.0000E07 to 9.9999E16
	"-----"	When no data corresponds to the query
Form2 Fraction type	"X.XXXE-XX"	For 0.0000E-16 to 1.0000E00
	"-----"	When no data corresponds to the query
Form3 % type	"XXX.XXXXX"	For 0.0000 to 100.0000
	"-----"	When no data corresponds to the query
Form4 Frequency type	"XXXXXXXXXX"	For 0 to MAX(Hz)
	"-----"	When no data corresponds to the query
Form5 Voltage type	"XX.XXX,XX.XXX"	For -4.000 to +4.000(V)
	"----,-----"	When no data corresponds to the query
Form6 Phase type	"xxxxx,xxx.xx"	mUI units, ps units
	"----,-----"	When no data corresponds to the query

Function	Queries measured data for parameter
Example	Query Data Interface1 current measured data total error rate > :DEMUX:CALCulate:DATA:EALarm? "CURRENT:ER:TOTAL",1 < : "0.0000E-16"  Query 25G x 2 chTotal current data Threshold measured data > :DEMUX:CALCulate:DATA:EALarm? "CURRENT:THRESHOLD",3 < "-4.000,-----" (in case of Single-end)
Compatibility	Not backwards compatible

Table 7.9.3.1-3 Parameter

Form		<result>	Format
Error Rate	Total INS OMI	ER:TOTAl ER:INSertion ER:OMISsion	Form2
Error Count	Total INS OMI	EC:TOTAl EC:INSertion EC:OMISsion	Form1
Error Rate	Transition Non Transition	ER:TRANSition ER:NONTranSition	Form2
Error Count	Transition Non Transition	EC:TRANSition EC:NONTranSition	Form1
%EFI	Total	EFI:TOTAl	Form3
EI	Total	EI:TOTAl	Form1
Frequency(kHz)		FREQUency	Form4
Clock Count		CC:TOTAl	Form1
Clock Alarm		AINTerval:CALarm	Form1
Sync Loss		AINTerval:PSLoss	Form1
Data Threshold		THReshold	Form5
Data Phase		PHASe	Form6
Threshold EI	>1.0E-3	THReshold:EI:TOTAl:E_3	Form1
	>1.0E-4	THReshold:EI:TOTAl:E_4	
	>1.0E-5	THReshold:EI:TOTAl:E_5	
	>1.0E-6	THReshold:EI:TOTAl:E_6	
	>1.0E-7	THReshold:EI:TOTAl:E_7	
	>1.0E-8	THReshold:EI:TOTAl:E_8	
	≤1.0E-8	THReshold:EI:TOTAl:UE_8	
Threshold %EFI	>1.0E-3	THReshold:EFI:TOTAl:E_3	Form3
	>1.0E-4	THReshold:EFI:TOTAl:E_4	
	>1.0E-5	THReshold:EFI:TOTAl:E_5	
	>1.0E-6	THReshold:EFI:TOTAl:E_6	
	>1.0E-7	THReshold:EFI:TOTAl:E_7	
	>1.0E-8	THReshold:EFI:TOTAl:E_8	
	≤1.0E-8	THReshold:EFI:TOTAl:UE_8	
G.821	ES	G821:ES2:TOTAl	Form1
	EFS	G821:EFS2:TOTAl	
	SES	G821:SES2:TOTAl	
	DM	G821:DM2:TOTAl	
	US	G821:US2:TOTAl	
	%ES	G821:ES:TOTAl	Form3
	%EFS	G821:EFS:TOTAl	
	%SES	G821:SES:TOTAl	
	%DM	G821:DM:TOTAl	
	%US	G821:US:TOTAl	

**:DEMUX:DISPLAY:SETTING <setting>**

Parameter	<setting> = <CHARACTER PROGRAM DATA> DATA1                    Display Data1 Interface items DATA2                    Display Data2 Interface items AUToadjust                Display AutoAdjust items
Function	Sets displayed items in the Result tab
Example	To display the Data1 Interface Items: > :DEMUX:DISPLAY:SETTING DATA1
Compatibility	Not backwards compatible

**:DEMUX:CALCULATE:DATA:MONITOR? <item>**

Parameter	<item> = <STRING PROGRAM DATA> "BIT:TOTAL"                Bit Error(Total Error) "PSLoss"                    Pattern Sync Loss "CALarm"                    Clock Alarm
Response	<string> = <STRING RESPONSE DATA>

**Table 7.9.3.1-4 Response format**

Form	Format	Description
Form1	"Occur"	When an alarm occurs
	"Not Occur"	When no alarm occurs
	"-----"	When no data corresponds to the query

Function	Queries real-time occurrence status of monitor items specified by parameters
Example	Query Bit Error occurrence status > :DEMUX:CALCULATE:DATA:MONITOR? "BIT TOTAL" < "Occur"
Compatibility	Not backwards compatible

## 7.10 Jitter Commands

This section describes the setting and query commands for the MU181500B Jitter Modulation Source.

Before executing a setting/query command for the MU181500B, specify the slot number of the module to be remotely controlled, by using the :MODULE:ID command. Refer to Section 7.1 "Common Commands" and 9.1 "Basic Operation of Device Messages" for how to specify a slot number with the :MODULE:ID command.

### 7.10.1 List of commands

Table 7.10.1-1 MU181500B Command List

No.	Command Header 1	Command Header 2	Command Header 3	Command Header 4	Command/Query	Remarks	
1	:OUTPut	:AUX	:JCONdition		Q		
2			:REFClock		C/Q		
3				:MONitor		Q	
4			:SElect		C/Q		
5			:SUBRateclock		C/Q		
6				:AMPLitude		C/Q	
7				:MONitor		Q	
8		:CLOCK	:FREQuency		C/Q	Synthesizer compatible	
9			:OFFset	:PPM	C/Q	Synthesizer compatible	
10		:RCLock	:SElect		C/Q	Synthesizer compatible	
11	:SOURce	:JITTer	:BUJ	:AMPLitude	C/Q		
12				:BITRate	C/Q		
13				:ENABle	C/Q		
14				:LPFilter	C/Q		
15				:PRBS	C/Q		
16			:EXTJitter	:ENABle	C/Q		
17			:RJ	:AMPLitude	C/Q		
18				:DEFault	C		
19				:ENABle	C/Q		
20				:FILTer	C/Q		
21				:HFAMplitude	C/Q		
22				:HPFilter	C/Q		
23				:LFAMplitude	C/Q		
24				:LPFilter	C/Q		
25				:MONitor	Q		



Table 7.10.1-1 MU181500B Command List (Cont'd)

No.	Command Header 1	Command Header 2	Command Header 3	Command Header 4	Command/Query	Remarks	
26	:SOURce	:JITTer	:SJ[2]	:AMPLitude	C/Q		
27				:ENABle	C/Q		
28				:FREQuency	C/Q		
29			:SSC	:DEViation	C/Q		
30				:ENABle	C/Q		
31				:FREQuency	C/Q		
32				:TYPE	C/Q		
33		:OUTPut	:PATA	:JOVerload	Q		
34				:MONitor	Q		
35				:SElect	C/Q		
36		:SYSTem	:INPut	:CSElect		C/Q	
37						:MODule	Q
38			:MMEMory	:RECall		C	
39	:STORe				C		

### 7.10.2 Clock Source Settings Commands

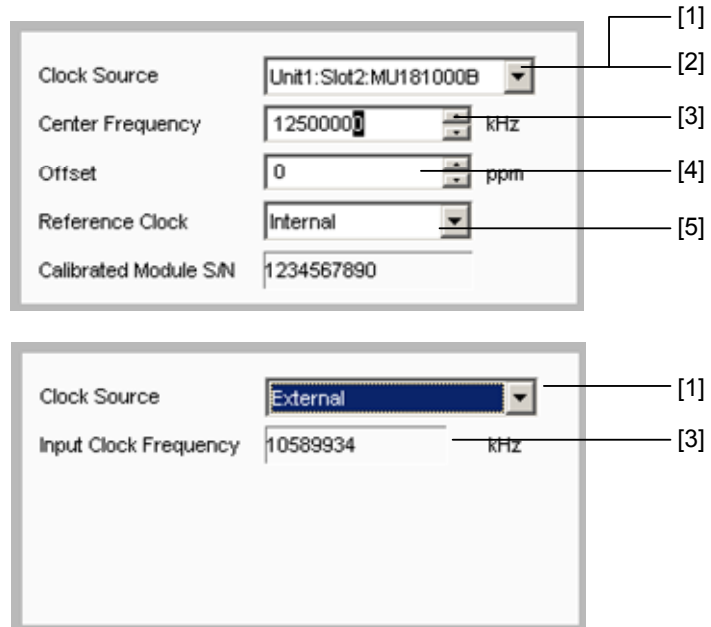


Figure 7.10.2-1 Clock Source Settings

Table 7.10.2-1 Clock Source Settings Commands

No.	Setting item	Command
[1]	Clock Source	:SYSTem:INPut:CSElect
		:SYSTem:INPut:CSElect?
[2]	Queries system built-in synthesizer	:SYSTem:INPut:CSElect:MODule?
[3]	Center Frequency/Input Clock Frequency	:OUTPut:CLOCK:FREQuency
		:OUTPut:CLOCK:FREQuency?
[4]	Offset	:OUTPut:CLOCK:OFFSet:PPM
		:OUTPut:CLOCK:OFFSet:PPM?
[5]	Reference Clock	:OUTPut:RCLOCK:SElect
		:OUTPut:RCLOCK:SElect?

**:SYSTem:INPut:CSElect <input>**


---

Parameter	<input> = <CHARACTER PROGRAM DATA> EXTernal                    External synthesizer INTernal [1 to 7]        Internal synthesizer
	<b>Note:</b> INTernal [1 to 7] specifies the unit and slot numbers from the smallest as 1 to 7 when there is more than one built-in synthesizer. If [1 to 7] is omitted, 1 is assumed.
Function	Selects synthesizer for clock input source.
Example	To choose #2 built-in synthesizer as clock input source. > :SYSTem:INPut:CSElect INT2
Compatibility	Incompatible with existing models.

**:SYSTem:INPut:CSElect?**


---

Response	<numeric> = <CHARACTER RESPONSE DATA> EXT, INT1 to 7 <info> = <STRING RESPONSE DATA> "X:Y Z" X:Unit                    No. 1 to 4 Y:Slot                    No. 1 to 6 Z:Module name        MU181000A or MU181000B
Function	Queries synthesizer for clock input source.
Example	> :SYSTem:INPut:CSElect? < INT2, "1:4 MU181000A"
Compatibility	Incompatible with existing models.

**:SYSTem:INPut:CSElect:MODule?**


---

Response	<info>,<info1>,<info2>,...,<info7> = <STRING RESPONSE DATA> <info> = "X:Y Z" X:Unit                    No. 1 to 4 Y:Slot                    No. 1 to 6 Z:Module name        MU181000A or MU181000B
Function	Queries system built-in synthesizer.
Example	> :SYSTem:INPut:CSElect:MODule? < "1:2 MU181000A", "1:4 MU181000A"
Compatibility	Incompatible with existing models.

---

### :OUTPut:CLOCK:FREQuency <numeric>

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 12800002 to 15000000      12,800,002 to 15,000,000 kHz/2 kHz step 6400001 to 12500000      6,400,001 to 12,500,000 kHz/1 kHz step 3200001 to 6250000      3,200,001 to 6,250,000 kHz/1 kHz step 1600001 to 3125000      1,600,001 to 3,125,000 kHz/1 kHz step 800001 to 1562500      800,000 to 1,562,500 kHz/1 kHz step
	<b>Note:</b> The settings steps are in accordance with the screen control.
Function	Sets operation frequency of tracking built-in synthesizer (MU181000A/B).
Example	To set operation frequency of tracking built-in synthesizer (MU181000A/B) to 12,500,000 kHz. > :OUTPut:CLOCK:FREQuency 12500000
Compatibility	Compatible with MU181000A/B

### :OUTPut:CLOCK:FREQuency?

Response	When ClockSource is not External. <numeric> = <NR1 NUMERIC RESPONSE DATA> 800001 to 15000000      800,001 to 15,000,000 kHz When ClockSource is External. <string> = <STRING RESPONSE DATA>						
	<table border="1"> <thead> <tr> <th>Format</th> <th>Explanation</th> </tr> </thead> <tbody> <tr> <td>"XX.XXXXX"</td> <td>100000 to 15000000    100,000 to 15,000,000 kHz</td> </tr> <tr> <td>"-----"</td> <td>When no data corresponds to the query (Out of range)</td> </tr> </tbody> </table>	Format	Explanation	"XX.XXXXX"	100000 to 15000000    100,000 to 15,000,000 kHz	"-----"	When no data corresponds to the query (Out of range)
Format	Explanation						
"XX.XXXXX"	100000 to 15000000    100,000 to 15,000,000 kHz						
"-----"	When no data corresponds to the query (Out of range)						
Function	Queries operation frequency of tracking built-in synthesizer.						
Example	> :OUTPut:CLOCK:FREQuency? < 12500000						
Compatibility	Compatible with MU181000A/B						

### :OUTPut:CLOCK:OFFSet:PPM <numeric>

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> -1000 to 1000      -1,000 to +1,000 ppm/Step 1 ppm
Function	Sets offset of frequency (ppm) currently output from tracking built-in synthesizer.
Example	To set offset of currently output frequency to 0 ppm. > :OUTPut:CLOCK:OFFSet:PPM 0
Compatibility	Compatible with MU181000A/B

**:OUTPut:CLOCK:OFFSet:PPM?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> -1000 to 1000            -1,000 to +1,000 ppm
Function	Queries offset (ppm) of frequency currently output from tracking built-in synthesizer.
Example	> :OUTPut:CLOCK:OFFSet:PPM? < 0
Compatibility	Compatible with MU181000A/B

**:OUTPut:RClock:SElect <clock>**


---

Parameter	<clock> = <CHARACTER PROGRAM DATA> INTernal                    Internal reference signal 10 MHz EXTernal10                External reference signal 10 MHz
Function	Selects either built-in or external input for 10 MHz reference signal of tracking built-in synthesizer.
Example	To set 10 MHz reference signal to external input. > :OUTPut:RClock:SElect EXT10
Compatibility	Compatible with MU181000A/B

**:OUTPut:RClock:SElect?**


---

Response	<clock> = <CHARACTER RESPONSE DATA> INT, EXT10
Function	Queries setting for 10 MHz reference signal of tracking built-in synthesizer.
Example	> :OUTPut:RClock:SElect? < EXT10
Compatibility	Compatible with MU181000A/B

### 7.10.3 Jitter Setting Commands

#### 7.10.3.1 SJ/SJ2 Setting

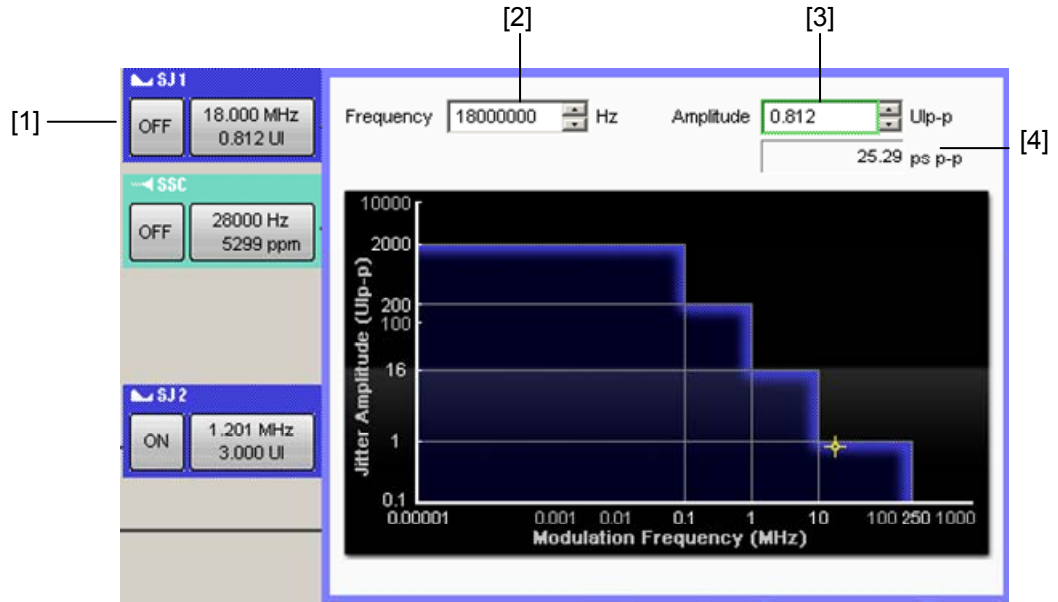


Figure 7.10.3.1-1 SJ/SJ2 Settings

Table 7.10.3.1-1 SJ/SJ2 Setting Commands

No.	Setting item	Command
[1]	SJ/SJ2	:SOURce:JITTer:SJ[2]:ENABle
	ON/OFF	:SOURce:JITTer:SJ[2]:ENABle?
[2]	SJ/SJ2	:SOURce:JITTer:SJ[2]:FREQuency
	Modulation Frequency	:SOURce:JITTer:SJ[2]:FREQuency?
[3]	SJ/SJ2	:SOURce:JITTer:SJ[2]:AMPLitude
	Jitter Amplitude	:SOURce:JITTer:SJ[2]:AMPLitude?
[4]	SJ/SJ2	:SOURce:JITTer:SJ[2]:PSAMPLitude?
	Jitter Amplitude Query	

**:SOURce:JITTer:SJ[2]:ENABle <boolean>**


---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> OFF or 0                    SJ/SJ2 OFF ON or 1                    SJ/SJ2 ON
Function	Sets SJ or SJ2 ON/OFF. <b>Note:</b> :If [2] of SJ[2] is omitted, SJ setting is assumed.
Example	To set SJ setting to ON. > :SOURce:JITTer:SJ:ENABle ON
Compatibility	Incompatible with existing models.

**:SOURce:JITTer:SJ[2]:ENABle?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0                    SJ/SJ2 OFF 1                    SJ/SJ2 ON
Function	Queries SJ or SJ2 ON/OFF setting.
Example	To query SJ ON/OFF setting. > :SOURce:JITTer:SJ:ENABle? < 1
Compatibility	Incompatible with existing models.

**:SOURce:JITTer:SJ[2]:FREQuency <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 10 to 250000000                    10 to 250,000,000 Hz
	Setting Step
	10[Hz]≤fmod≤10[kHz]                    1 Hz Step
	10[kHz]≤fmod≤100[kHz]                    10 Hz Step
	100[kHz]≤fmod≤1[MHz]                    100 Hz Step
	1[MHz]≤fmod≤10[MHz]                    1 kHz Step
	10[MHz]≤fmod≤100[MHz]                    10 kHz Step
	100[MHz]≤fmod≤250[MHz]                    100 kHz Step
Function	Sets SJ or SJ2 modulation frequency and units.
Example	To set SJ2 modulation frequency to 10 kHz. > :SOURce:JITTer:SJ2:FREQuency 10000
Compatibility	Incompatible with existing models.

### :SOURce:JITTer:SJ[2]:FREQuency?

Response	<numeric> = <NR2 NUMERIC RESPONSE DATA> 10 to 250000000      10 to 250,000,000 Hz
Function	Queries SJ or SJ2 modulation frequency.
Example	To query SJ2 modulation frequency. > :SOURce:JITTer:SJ2:FREQuency? < 10000
Compatibility	Incompatible with existing models.

### :SOURce:JITTer:SJ[2]:AMPLitude <numeric>

Parameter                      <numeric> = <DECIMAL NUMERIC PROGRAM DATA>

Data Generation Modulation Frequency	Half-rate(MUX)		Full-rate(PPG), Full-rate(MUX)		Quarter-rate (MUX)	
	Setting Range (UIp-p)	Step (UI)	Setting Range (UIp-p)	Step (UI)	Setting Range (UIp-p)	Step (UI)
10 Hz to 1 MHz	0 to 50.000	0.002	0 to 40.000	0.001	0 to 50.000	0.004
1.001 MHz to 10 MHz	0 to 10.000	0.002	0 to 8.000	0.001	0 to 10.000	0.004
10.01 MHz to 250 MHz	0 to 0.550	0.002	0 to 0.500	0.001	0 to 0.548	0.004

Data Generation Modulation Frequency	32G PPG		64G MUX	
	Setting Range (UIp-p)	Setting Range (UIp-p)	Setting Range (UIp-p)	Setting Range (UIp-p)
10 Hz to 100 kHz	0 to 2000.000	0.002	0 to 2000.000	0.002
100.1 kHz to 1 MHz	0 to 200.000	0.002	0 to 200.000	0.002
1.001 MHz to 10 MHz	0 to 16.000	0.002	0 to 16.000	0.002
10.01 MHz to 250 MHz	0 to 1.0	0.002	0 to 1.0	0.002

**Note:**

The setting step varies according to the Data Generator setting. For details on setting ranges and steps, refer to 1.3.2 “Jitter Modulation Performance” in *MU181500B Jitter Modulation Source Operation Manual*.

Function	Sets SJ or SJ2 modulation amount.
Example	To set SJ modulation amount to 1.10 UIp-p. > :SOURce:JITTer:SJ:AMPLitude 1.10
Compatibility	Incompatible with existing models.



---

**:SOURce:JITTer:SJ[2]:AMPLitude?**

---

Response	<numeric> = <NR2 NUMERIC RESPONSE DATA> 0 to 2000.000            0 to 2000.000 UI
Function	Queries SJ or SJ2 modulation amount.
Example	To query SJ modulation amount. > :SOURce:JITTer:SJ:AMPLitude? < 1.10
Compatibility	Incompatible with existing models.

---

**:SOURce:JITTer:SJ[2]:PSAMplitude?**

---

Response	<numeric> = <NR2 NUMERIC RESPONSE DATA> 0 to xx.xxx            0 to xx.xxx ps p-p
Function	Queries modulation amount (ps p-p) of SJ or SJ2.
Example	To query SJ's modulation amount (ps p-p). > :SOURce:JITTer:SJ:PSAMplitude? < 1.10
Compatibility	Incompatible with existing models.

### 7.10.3.2 SSC Settings

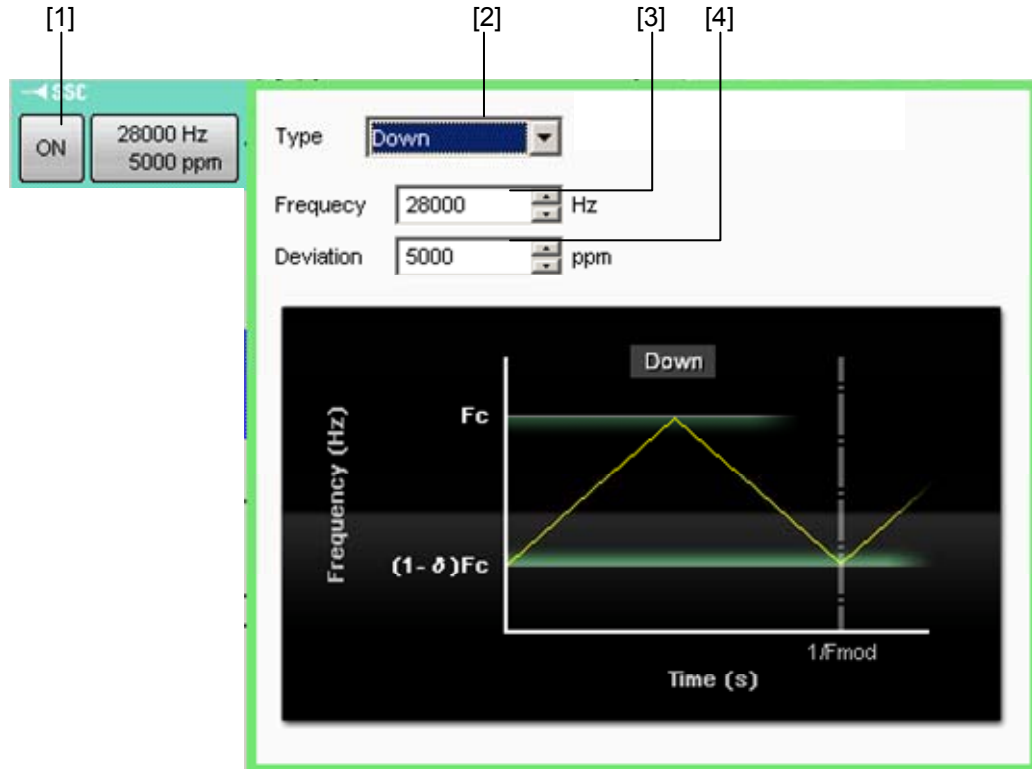


Figure 7.10.3.2-1 SSC Settings

Table 7.10.3.2-1 SSC Setting Commands

No.	Setting item	Command
[1]	SSC ON/OFF	:SOURce:JITTer:SSC:ENABLE
		:SOURce:JITTer:SSC:ENABLE?
[2]	SSC Type	:SOURce:JITTer:SSC:TYPE
		:SOURce:JITTer:SSC:TYPE?
[3]	SSC Frequency	:SOURce:JITTer:SSC:FREQuency
		:SOURce:JITTer:SSC:FREQuency?
[4]	SSC Deviation	:SOURce:JITTer:SSC:DEVIation
		:SOURce:JITTer:SSC:DEVIation?

**:SOURce:JITTer:SSC:ENABLE <boolean>**


---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> OFF or 0                   SSC OFF ON or 1                    SSC ON
Function	Sets SSC ON/OFF.
Example	To set SSC to ON. > :SOURce:JITTer:SSC:ENABLE ON
Compatibility	Incompatible with existing models.

**:SOURce:JITTer:SSC:ENABLE?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0                            SSC OFF 1                            SSC ON
Function	Queries SSC ON/OFF status.
Example	> :SOURce:JITTer:SSC:ENABLE? < 1
Compatibility	Incompatible with existing models.

**:SOURce:JITTer:SSC:TYPE <type>**


---

Parameter	<type> = <CHARACTER PROGRAM DATA> DOWN CENTer UP
Function	Selects SSC impression type.
Example	To set SSC impression type to DOWN. > :SOURce:JITTer:SSC:TYPE DOWN
Compatibility	Incompatible with existing models.

**:SOURce:JITTer:SSC:TYPE?**


---

Response	<type> = <CHARACTER RESPONSE DATA> DOWN, CENT, UP
Function	Queries SSC impression type.
Example	> :SOURce:JITTer:SSC:TYPE? < DOWN
Compatibility	Incompatible with existing models.

### **:SOURce:JITTer:SSC:FREQuency <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 28000 to 37000          28000 to 37000 Hz/1 Hz step
Function	Sets SSC modulation frequency.
Example	To set SSC modulation frequency to 30 kHz. > :SOURce:JITTer:SSC:FREQuency 30000
Compatibility	Incompatible with existing models.

### **:SOURce:JITTer:SSC:FREQuency?**

---

Response	<numeric> = <NR2 NUMERIC RESPONSE DATA> 28000 to 37000          28000 to 37000 Hz
Function	Queries SSC modulation frequency.
Example	> :SOURce:JITTer:SSC:FREQuency? < 30000
Compatibility	Incompatible with existing models.

### **:SOURce:JITTer:SSC:DEVIation <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0 to 5300                  0 to 5300 ppm/1 ppm Step
Function	Sets SSC frequency deviation.
Example	To set SSC frequency deviation to 2000 ppm. > :SOURce:JITTer:SSC:DEVIation 2000
Compatibility	Incompatible with existing models.

### **:SOURce:JITTer:SSC:DEVIation?**

---

Response	<numeric> = <NR2 NUMERIC RESPONSE DATA> 0 to 5300                  0 to 5300 ppm
Function	Queries SSC frequency deviation.
Example	> :SOURce:JITTer:SSC:DEVIation? < 2000
Compatibility	Incompatible with existing models.

7.10.3.3 RJ Settings

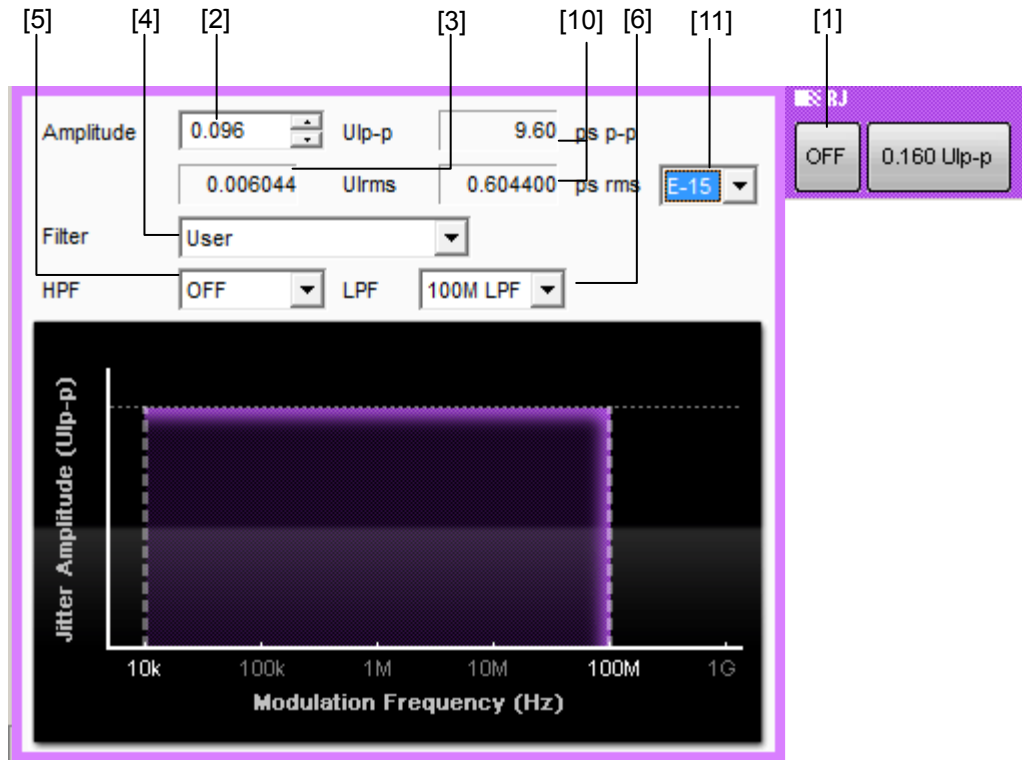


Figure 7.10.3.3-1 RJ Settings

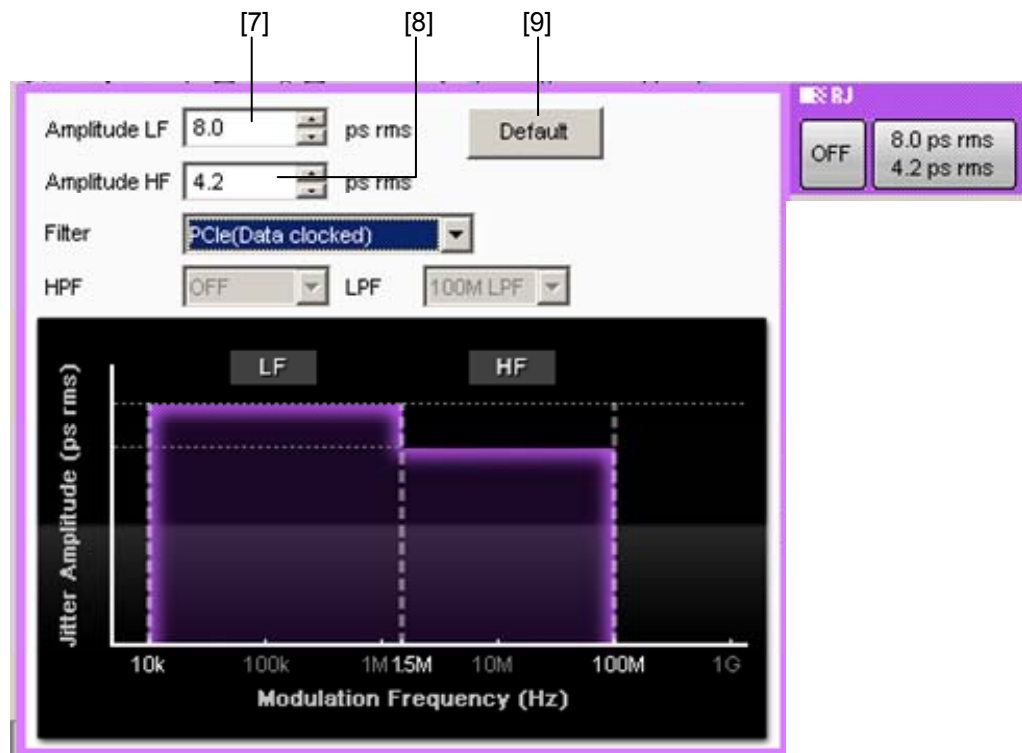


Figure 7.10.3.3-2 RJ Settings (2)

Table 7.10.3.3-1 RJ Setting Commands

No.	Setting item	Command
[1]	RJ ON/OFF	:SOURce:JITTer:RJ:ENABle
		:SOURce:JITTer:RJ:ENABle?
[2]	RJ Jitter Amplitude (UIp-p)	:SOURce:JITTer:RJ:AMPLitude
		:SOURce:JITTer:RJ:AMPLitude?
[3]	RJ Jitter Amplitude (UIrms)	:SOURce:JITTer:RJ:MONitor?
[4]	RJ Filter	:SOURce:JITTer:RJ:FILTer
		:SOURce:JITTer:RJ:FILTer?
[5]	RJ High Pass Filter	:SOURce:JITTer:RJ:HPFilter
		:SOURce:JITTer:RJ:HPFilter?
[6]	RJ Low Pass Filter	:SOURce:JITTer:RJ:LPFilter
		:SOURce:JITTer:RJ:LPFilter?
[7]	RJ Jitter Amplitude LF (ps rms)	:SOURce:JITTer:RJ:LFAMplitude
		:SOURce:JITTer:RJ:LFAMplitude?
[8]	RJ Jitter Amplitude HF (ps rms)	:SOURce:JITTer:RJ:HFAMplitude
		:SOURce:JITTer:RJ:HFAMplitude?
[9]	Amplitude LF/HF Default	:SOURce:JITTer:RJ:DEFault
[10]	RJ Jitter Amplitude Query	:SOURce:JITTer:RJ:PSAMplitude?
[11]	RJ p-p/rms Conversion Coefficient	:SOURce:JITTer:RJ:RMSConvert
		:SOURce:JITTer:RJ:RMSConvert?

**:SOURce:JITTer:RJ:ENABle <boolean>**

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> OFF or 0                      RJ OFF ON or 1                        RJ ON
Function	Sets RJ ON/OFF.
Example	To set RJ setting to ON. > :SOURce:JITTer:RJ:ENABle ON
Compatibility	Incompatible with existing models.

**:SOURce:JITTer:RJ:ENABle?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0                                RJ OFF 1                                RJ ON
Function	Queries RJ ON/OFF status.
Example	> :SOURce:JITTer:RJ:ENABle? < 1
Compatibility	Incompatible with existing models.

**:SOURce:JITTer:RJ:AMPLitude <numeric>**

Parameter		<numeric> = <DECIMAL NUMERIC PROGRAM DATA>				
Data Generator  Clock Frequency	Half-rate(MUX)		Full-rate(PPG), Full-rate(MUX)		Quarter-rate(MUX)	
	Setting Range (UIp-p)	Step (UI)	Setting Range (UIp-p)	Step (UI)	Setting Range (UIp-p)	Step (UI)
< 2.5 GHz	0 to 0.2f	0.004	0 to 0.2f	0.002	0 to 0.2f	0.008
≥ 2.5 GHz	0 to 0.500	0.004	0 to 0.500	0.002	0 to 0.496	0.008

f: Clock Frequency

When F = 1 GHz, the upper limit is 0.2 UIp-p.

When F = 100 MHz, the upper limit is 0.02 UIp-p .

**Note:**

The setting step varies according to the Data Generator setting.

For details on setting ranges and steps, refer to 1.3.2 “Jitter

Modulation Performance” in *MU181500B Jitter Modulation Source Operation Manual*.

Function	Sets RJ amplitude amount.
Example	To set RJ amplitude amount to 0.5 UI. > :SOURce:JITTer:RJ:AMPLitude 0.5
Compatibility	Incompatible with existing models.

**:SOURce:JITTer:RJ:AMPLitude?**

Response	<numeric> = <NR2 NUMERIC RESPONSE DATA> 0 to 0.500                      0 to 0.500 UIp-p
Function	Queries RJ amplitude amount.
Example	> :SOURce:JITTer:RJ:AMPLitude? < 0.500
Compatibility	Incompatible with existing models.

**:SOURce:JITTer:RJ:MONitor?**

Response	<numeric> = <NR2 NUMERIC RESPONSE DATA> 0 to X.XXXX                      0 to 0.500 UIp-p RMS conversion value
Function	Queries RJ amplitude amount as RMS value.
Example	> :SOURce:JITTer:RJ:MONitor? < 0.0300
Compatibility	Incompatible with existing models.

### **:SOURce:JITTer:RJ:FILTer <type>**

---

Parameter	<type> = <CHARACTER PROGRAM DATA> USER                      User settings PCIexpress1                PCI-express Data clocked settings PCIexpress2                PCI-express Common Ref.clock settings
Function	Selects RJ filter standard.
Example	To set RJ filter standard user setting. > :SOURce:JITTer:RJ:FILTer USER
Compatibility	Incompatible with existing models.

### **:SOURce:JITTer:RJ:FILTer?**

---

Response	<type> = <CHARACTER RESPONSE DATA> USER, PCI1, PCI2
Function	Queries RJ filter standard.
Example	> :SOURce:JITTer:RJ:FILTer? < USER
Compatibility	Incompatible with existing models.

### **:SOURce:JITTer:RJ:HPFilter <setting>**

---

Parameter	<setting> = <CHARACTER PROGRAM DATA> OFF                          OFF M_10                        10 MHz High-pass filter M_20                        20 MHz High-pass filter
Function	Selects high-pass filter for use at RJ.
Example	To select 10 MHz high-pass filter for RJ. > :SOURce:JITTer:RJ:HPFilter M_10
Compatibility	Incompatible with existing models.

### **:SOURce:JITTer:RJ:HPFilter?**

---

Response	<setting> = <CHARACTER RESPONSE DATA> OFF, M_10, M_20
Function	Queries high-pass filter for use at RJ.
Example	> :SOURce:JITTer:RJ:HPFilter? < M_10
Compatibility	Incompatible with existing models.



**:SOURce:JITTer:RJ:LPFilter <setting>**


---

Parameter	<setting> = <CHARACTER PROGRAM DATA> OFF OFF M_100 100 MHz Low-pass filter
Function	Selects low-pass filter for use at RJ.
Example	To select 100 MHz low-pass filter for use at RJ. > :SOURce:JITTer:RJ:LPFilter M_100
Compatibility	Incompatible with existing models.

**:SOURce:JITTer:RJ:LPFilter?**


---

Response	<setting> = <CHARACTER RESPONSE DATA> OFF, M_100
Function	Queries low-pass filter for use at RJ.
Example	> :SOURce:JITTer:RJ:LPFilter? < M_100
Compatibility	Incompatible with existing models.

**:SOURce:JITTer:RJ:LFAMplitude <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0.0 to 8.8 0.0 to 8.8 ps rms/0.1 ps Step
	<b>Note:</b> When the Data Generator setting is Half-rate Clock (MUX), the setting step becomes 0.2 ps. For details on setting ranges and steps, refer to 1.3.2 “Jitter Modulation Performance” in <i>MU181500B Jitter Modulation Source Operation Manual</i> .
Function	Sets LF modulation amount.
Example	To set LF modulation amount to 0.5 ps. > :SOURce:JITTer:RJ:LFAMplitude 0.5
Compatibility	Incompatible with existing models.

**:SOURce:JITTer:RJ:LFAMplitude?**


---

Response	<numeric> = <NR2 NUMERIC RESPONSE DATA> 0.0 to 8.8 0.0 to 8.8 rms p-p
Function	Queries LF modulation amount of RJ.
Example	> :SOURce:JITTer:RJ:LFAMplitude? < 0.5
Compatibility	Incompatible with existing models.

### **:SOURce:JITTer:RJ:HFAMplitude <numeric>**

---

Response	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0.0 to 8.8                      0.0 to 8.8 ps rms/0.1 ps Step
	<b>Note:</b> When the Data Generator setting is Half-rate Clock (MUX), the setting step becomes 0.2 ps. For details on setting ranges and steps, refer to 1.3.2 “Jitter Modulation Performance” in <i>MU181500B Jitter Modulation Source Operation Manual</i> .
Function	Sets HF modulation amount of RJ.
Example	To set HF modulation amount of RJ to 0.5 ps rms. > :SOURce:JITTer:RJ:HFAMplitude 0.5
Compatibility	Incompatible with existing models.

### **:SOURce:JITTer:RJ:HFAMplitude?**

---

Response	<numeric> = <NR2 NUMERIC RESPONSE DATA> 0.0 to 8.8                      0.0 to 8.8 ps rms
Function	Queries HF modulation amount of RJ.
Example	> :SOURce:JITTer:RJ:HFAMplitude? < 0.5
Compatibility	Incompatible with existing models.

### **:SOURce:JITTer:RJ:DEFault**

---

Parameter	None
Function	Sets RJ LF and HF modulation settings to default values.
Example	> :SOURce:JITTer:RJ:DEFault
Compatibility	Incompatible with existing models.

### **:SOURce:JITTer:RJ:PSAMplitude? <unit>**

---

Parameter	<unit> = <CHARACTER PROGRAM DATA> PP                      ps p-p RMS                      ps rms
Response	<numeric> = <NR2 NUMERIC RESPONSE DATA> 0 to xx.xx                      0 to xx.xx ps p-p 0 to xx.xx                      0 to xx.xx ps rms
Function	Queries RJ’s amplitude amount (ps p-p or ps rms).
Example	To query RJ’s amplitude amount (ps p-p). > :SOURce:JITTer:RJ:PSAMplitude? PP < 0.500
Compatibility	Incompatible with existing models.



### 7.10.3.4 BUJ Settings

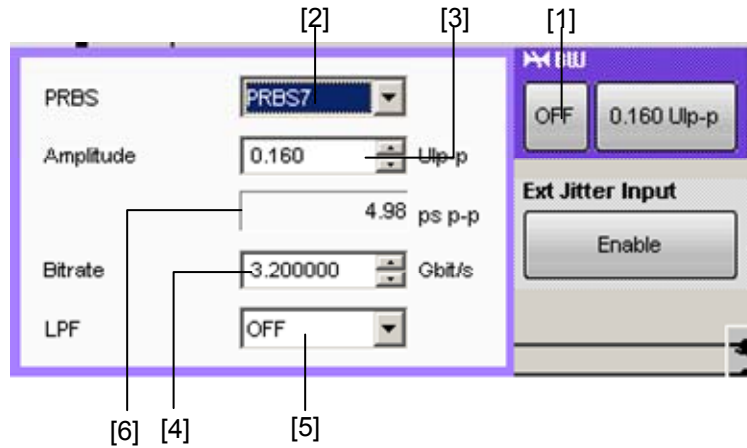


Figure 7.10.3.4-1 BUJ Settings

Table 7.10.3.4-1 BUJ Setting Commands

No.	Setting item	Command
[1]	BUJ ON/OFF	:SOURce:JITTer:BUJ:ENABle :SOURce:JITTer:BUJ:ENABle?
[2]	BUJ PRBS	:SOURce:JITTer:BUJ:PRBS :SOURce:JITTer:BUJ:PRBS?
[3]	BUJ Jitter Amplitude	:SOURce:JITTer:BUJ:AMPLitude :SOURce:JITTer:BUJ:AMPLitude?
[4]	BUJ Bitrate	:SOURce:JITTer:BUJ:BITRate: :SOURce:JITTer:BUJ:BITRate?
[5]	BUJ Low Pass Filter	:SOURce:JITTer:BUJ:LPFilteR :SOURce:JITTer:BUJ:LPFilteR?
[6]	BUJ Jitter Amplitude Query	:SOURce:JITTer:BUJ:PSAMplitude?

**:SOURce:JITTer:BUJ:ENABLE <boolean>**


---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA>
	OFF or 0                      BUJ OFF
	ON or 1                        BUJ ON
Function	Sets BUJ ON/OFF.
Example	To set BUJ setting to ON. > :SOURce:JITTer:BUJ:ENABLE ON
Compatibility	Incompatible with existing models.

**:SOURce:JITTer:BUJ:ENABLE?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	0                                BUJ OFF
	1                                BUJ ON
Function	Queries BUJ ON/OFF status.
Example	> :SOURce:JITTer:BUJ:ENABLE? < 1
Compatibility	Incompatible with existing models.

**:SOURce:JITTer:BUJ:PRBS <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA>
	7                                PRBS $2^{n-1}$ (n = 7)
	9                                PRBS $2^{n-1}$ (n = 9)
	11                               PRBS $2^{n-1}$ (n = 11)
	15                               PRBS $2^{n-1}$ (n = 15)
	23                               PRBS $2^{n-1}$ (n = 23)
	31                               PRBS $2^{n-1}$ (n = 31)
Function	Sets BUJ PRBS pattern.
Example	To set BUJ PRBS pattern to PRBS7. > :SOURce:JITTer:BUJ:PRBS 7
Compatibility	Incompatible with existing models.

**:SOURce:JITTer:BUJ:PRBS?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	7, 9, 11, 15, 23, 31
Function	Queries BUJ PRBS pattern setting.
Example	> :SOURce:JITTer:BUJ:PRBS? < 7
Compatibility	Incompatible with existing models.

### :SOURce:JITTer:BUJ:AMPLitude <numeric>

Parameter <numeric> = <DECIMAL NUMERIC PROGRAM DATA>

Data Generator  Clock Frequency	Half-rate(MUX)		Full-rate(PPG), Full-rate(MUX)		Quarter-rate(MUX)	
	Setting Range (UIp-p)	Step (UI)	Setting Range (UIp-p)	Step (UI)	Setting Range (UIp-p)	Step (UI)
< 2.5 GHz	0 to 0.2f	0.004	0 to 0.2f	0.002	0 to 0.2f	0.008
≥ 2.5 GHz	0 to 0.500	0.004	0 to 0.500	0.002	0 to 0.496	0.008

f: Clock Frequency

When F = 1 GHz, the upper limit is 0.2 UIp-p.

When F = 100 MHz, the upper limit is 0.02 UIp-p.

**Note:**

The setting step varies according to the Data Generator setting.

For details on setting ranges and steps, refer to 1.3.2 “Jitter

Modulation Performance” in *MU181500B Jitter Modulation Source Operation Manual*.

Function Sets BUJ modulation amount.  
 Example To set BUJ modulation amount to 0.5 UI.  
 > :SOURce:JITTer:BUJ:AMPLitude 0.5  
 Compatibility Incompatible with existing models.

### :SOURce:JITTer:BUJ:AMPLitude?

Response <numeric> = <NR2 NUMERIC RESPONSE DATA>  
 0 to 0.500 0 to 0.500 UIp-p  
 Function Queries BUJ modulation amount.  
 Example > :SOURce:JITTer:BUJ:AMPLitude?  
 < 0.500  
 Compatibility Incompatible with existing models.

### :SOURce:JITTer:BUJ:BITRate <numeric>

Parameter <numeric> = <DECIMAL NUMERIC PROGRAM DATA>  
 9.800000 to 12.500000 9.800000 to 12.500000 Gbit/s/0.000001 Step  
 4.900000 to 6.250000 4.900000 to 6.250000 Gbit/s/0.000001 Step  
 0.100000 to 3.200000 0.100000 to 3.200000 Gbit/s/0.000001 Step  
 Function Sets BUJ bit rate.  
 Example To set BUJ bit rate to 1 Gbit/s.  
 > :SOURce:JITTer:BUJ:BITRate 1.0  
 Compatibility Incompatible with existing models.

**:SOURce:JITTer:BUJ:BITRate?**


---

Response	<numeric> = <NR2 NUMERIC RESPONSE DATA> 0.100000 to 12.500000
Function	Queries BUJ bit rate.
Example	> :SOURce:JITTer:BUJ:BITRate? < 1.0000
Compatibility	Incompatible with existing models.

**:SOURce:JITTer:BUJ:LPFilter <setting>**


---

Parameter	<setting> = <CHARACTER PROGRAM DATA> OFF                      OFF M_500                    500 MHz low pass filter M_300                    300 MHz low pass filter M_200                    200 MHz low pass filter M_100                    100 MHz low pass filter M_50                     50 MHz low pass filter
Function	Selects low-pass filter used at BUJ.
Example	To select 100 MHz low-pass filter used at BUJ. > :SOURce:JITTer:BUJ:LPFilter M_100
Compatibility	Incompatible with existing models.

**:SOURce:JITTer:BUJ:LPFilter?**


---

Response	<setting> = <CHARACTER RESPONSE DATA> OFF, M_500, M_300, M_200, M_100, M_50
Function	Queries low-pass filter used BUJ.
Example	> :SOURce:JITTer:BUJ:LPFilter? < M_100
Compatibility	Incompatible with existing models.

**:SOURce:JITTer:BUJ:PSAMplitude?**


---

Response	<numeric> = <NR2 NUMERIC RESPONSE DATA> 0 to x.xxx                0 to x.xxx ps p-p
Function	Queries BUJ's modulation amount (ps p-p).
Example	> :SOURce:JITTer:BUJ:PSAMplitude? < 0.500
Compatibility	Incompatible with existing models.

### 7.10.3.5 Ext Jitter Input Setting

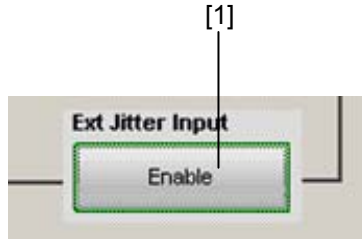


Figure 7.10.3.5-1 Ext. Jitter Input Setting

Table 7.10.3.5-1 Ext. Jitter Setting Command

No.	Setting item	Command
[1]	Ext. Jitter Input ON/OFF	:SOURce:JITTer:EXTJitter:ENABle :SOURce:JITTer:EXTJitter:ENABle?

#### **:SOURce:JITTer:EXTJitter:ENABle <boolean>**

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> OFF or 0                      Ext. Jitter Input OFF ON or 1                        Ext. Jitter Input ON
Function	Sets external jitter input ON/OFF.
Example	To set external data input to ON. > :SOURce:JITTer:EXTJitter:ENABle ON
Compatibility	Incompatible with existing models.

#### **:SOURce:JITTer:EXTJitter:ENABle?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0                                Ext. Jitter Input OFF 1                                Ext. Jitter Input ON
Function	Queries external jitter input ON/OFF status.
Example	> :SOURce:JITTer:EXTJitter:ENABle? < 1
Compatibility	Incompatible with existing models.



### 7.10.4 Output Setting Commands

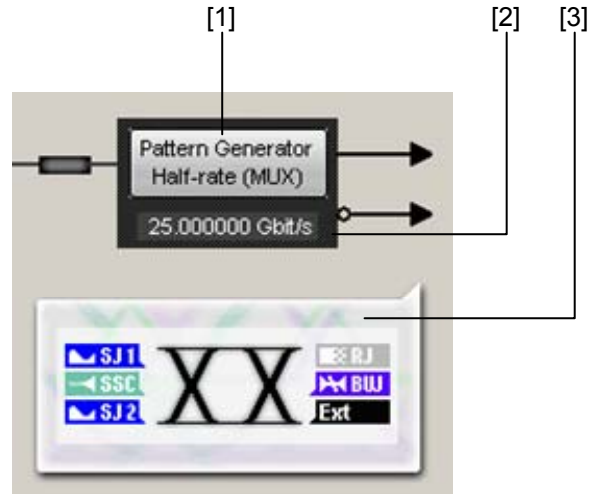


Figure 7.10.4-1 Output Settings

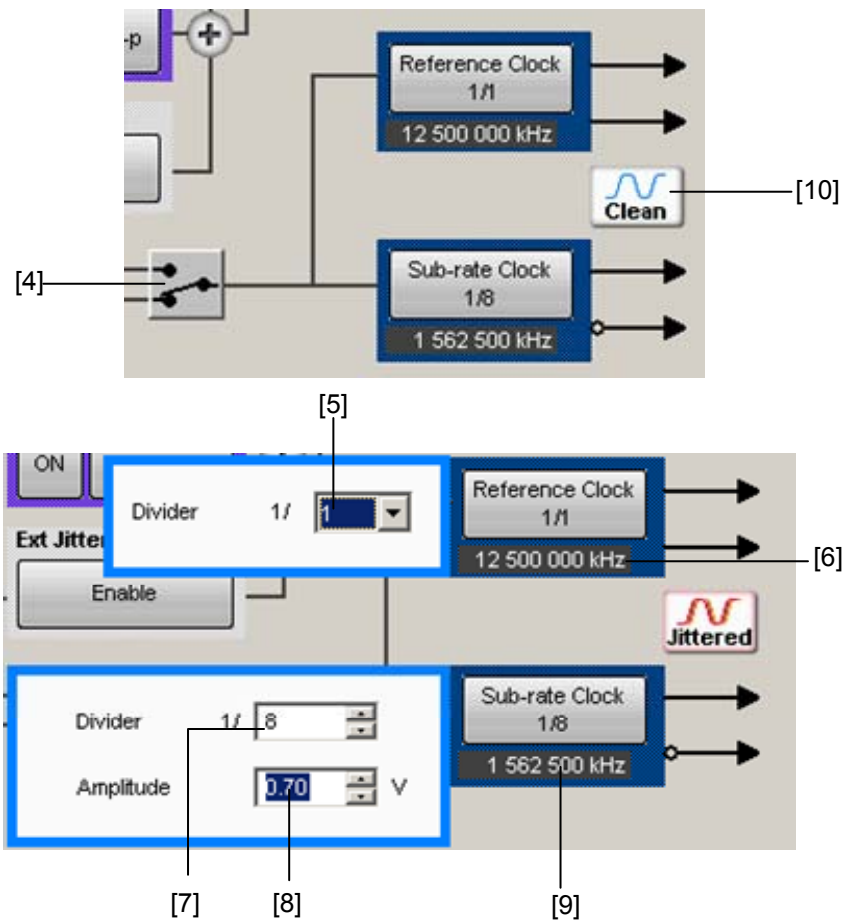


Figure 7.10.4-2 Auxiliary Output Settings

**Table 7.10.4-1 Auxiliary Input/Output Setting Commands**

No.	Setting item	Command
[1]	Data Generator Select	:SOURce:OUTPut:DATA:SElect
		:SOURce:OUTPut:DATA:SElect?
[2]	Bit-rate Monitor	:SOURce:OUTPut:DATA:MONitor?
[3]	Jitter Overload	:SOURce:OUTPut:DATA:JOVerload?
[4]	AUX Selector	:OUTPut:AUX:SElect
		:OUTPut:AUX:SElect?
[5]	Reference Clock	:OUTPut:AUX:REFClock
		:OUTPut:AUX:REFClock?
[6]	Reference Clock Monitor	:OUTPut:AUX:REFClock:MONitor?
[7]	Sub-rate Clock	:OUTPut:AUX:SUBRateclock
		:OUTPut:AUX:SUBRateclock?
[8]	Sub-rate Clock Amplitude	:OUTPut:AUX:SUBRateclock:AMPLitude
		:OUTPut:AUX:SUBRateclock:AMPLitude?
[9]	Sub-rate Clock Monitor	:OUTPut:AUX:SUBRateclock:MONitor?
[10]	Jitter condition	:OUTPut:AUX:JCONdition?

**:SOURce:OUTPut:DATA:SElect <select>**

Parameter	<select> = <CHARACTER PROGRAM DATA>
	FULLrate                    PPG module used when clock at Full rate.
	HALFrate                    MUX Module use when clock at Half rate.
	MUXFullrate                MUX module using Full rate clock
	QUARterrate                MUX module using Quarter rate clock
Function	Selects data generation module.
Example	Uses MUX as data generation module at Half rate. > :SOURce:OUTPut:DATA:SElect HALFrate
Compatibility	Incompatible with existing models.

**:SOURce:OUTPut:DATA:SElect?**

Response	<numeric> = <CHARACTER RESPONSE DATA>
	FULL, HALF, MUXF, QUAR, PPG32, MUX64
Function	Queries data generation module status.
Example	> :SOURce:OUTPut:DATA:SElect? < HALF
Compatibility	Incompatible with existing models.

**:SOURce:OUTPut:DATA:MONitor?**

Response	<string> = <STRING RESPONSE DATA>	
	<b>Format</b>	<b>Description</b>
	"XX.XXXXX"	0.050000 to 66.000000      0.050000 to 66.000000 Gbit/s
	"-----"	When no data corresponds to the query (Out of range)
Function	Queries BitRate of data output.	
Example	<pre>&gt; :SOURce:OUTPut:DATA:MONitor? &lt; "12.5000000"</pre>	
Compatibility	Incompatible with existing models.	

**:SOURce:OUTPut:DATA:JOVerload?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>	
	0	Not overloaded
	1	Overloaded
Function	Queries whether jitter impressed on data output is Overload condition.	
Example	<pre>&gt; :SOURce:OUTPut:DATA:JOVerload? &lt; 1</pre>	
Compatibility	Incompatible with existing models.	

**:OUTPut:AUX:SElect <select>**

Parameter	<select> = <CHARACTER PROGRAM DATA>	
	INTernal	Uses internal signal
	EXTernal	Uses external signal
Function	Selects signal source used at auxiliary output.	
Example	<pre>To use internal signal as auxiliary output. &gt; :OUTPut:AUX:SElect INTernal</pre>	
Compatibility	Incompatible with existing models.	

**:OUTPut:AUX:SElect?**

Response	<numeric> = <CHARACTER RESPONSE DATA>	
	INT, EXT	
Function	Queries signal source used as auxiliary output.	
Example	<pre>&gt; :OUTPut:AUX:SElect? &lt; INT</pre>	
Compatibility	Incompatible with existing models.	

### **:OUTPut:AUX:REFClock <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA>
	1                      1/1 Clock output
	2                      1/2 Clock output
	4                      1/4 Clock output
Function	Sets reference clock output.
Example	To set reference clock output to 1/2. > :OUTPut:AUX:REFClock 2
Compatibility	Incompatible with existing models.

### **:OUTPut:AUX:REFClock?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1, 2, 4,
Function	Queries reference clock output status.
Example	> :OUTPut:AUX:REFClock? < 2
Compatibility	Incompatible with existing models.

### **:OUTPut:AUX:REFClock:MONitor?**

Response	<string> = <STRING RESPONSE DATA>						
	<table border="1"> <thead> <tr> <th>Format</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>"XXXXXXXX"</td> <td>12500 to 16250000    12,500 to 16,250,000 kHz</td> </tr> <tr> <td>"-----"</td> <td>When no data corresponds to the query</td> </tr> </tbody> </table>	Format	Description	"XXXXXXXX"	12500 to 16250000    12,500 to 16,250,000 kHz	"-----"	When no data corresponds to the query
Format	Description						
"XXXXXXXX"	12500 to 16250000    12,500 to 16,250,000 kHz						
"-----"	When no data corresponds to the query						
Function	Queries reference clock output frequency.						
Example	> :OUTPut:AUX:REFClock:MONitor? < "100000"						
Compatibility	Incompatible with existing models.						

### **:OUTPut:AUX:SUBRateclock <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 8 to 256                      1/N (N = 8 to 256)
Function	Sets sub-rate clock division rate.
Example	Sets sub-rate clock division rate to 1/8. > :OUTPut:AUX:SUBRateclock 8
Compatibility	Incompatible with existing models.

**:OUTPut:AUX:SUBRateclock?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 8 to 256                      1/N (N = 8 to 256)
Function	Queries sub-rate clock division rate.
Example	> :OUTPut:AUX:SUBRateclock? < 8
Compatibility	Incompatible with existing models.

**:OUTPut:AUX:SUBRateclock:AMPLitude <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0.10 to 0.70                      0.10 to 0.70 V/0.01 V Step
Function	Sets sub-rate clock output amplitude.
Example	Sets sub-rate clock output amplitude to 0.5 V. > :OUTPut:AUX:SUBRateclock:AMPLitude 0.5
Compatibility	Incompatible with existing models.

**:OUTPut:AUX:SUBRateclock:AMPLitude?**

Response	<numeric> = <NR2 NUMERIC RESPONSE DATA> 0.10 to 0.70
Function	Queries sub-rate clock amplitude status.
Example	> :OUTPut:AUX:SUBRateclock:AMPLitude? < 0.50
Compatibility	Incompatible with existing models.

**:OUTPut:AUX:SUBRateclock:MONitor?**

Response	<string> = <STRING RESPONSE DATA>							
	<table border="1"> <thead> <tr> <th>Format</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>"XXXXXXXX"</td> <td>195 to 4062500                      195 to 4,062,500 kHz</td> </tr> <tr> <td>"-----"</td> <td>When no data corresponds to the query</td> </tr> </tbody> </table>	Format	Description	"XXXXXXXX"	195 to 4062500                      195 to 4,062,500 kHz	"-----"	When no data corresponds to the query	
Format	Description							
"XXXXXXXX"	195 to 4062500                      195 to 4,062,500 kHz							
"-----"	When no data corresponds to the query							
Function	Queries sub-rate clock output frequency.							
Example	> :OUTPut:AUX:SUBRateclock:MONitor? < "100000"							
Compatibility	Incompatible with existing models.							

## **:OUTPut:AUX:JCONdition?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0                      No jitter 1                      Jitter added
Function	Queries status of jitter addition at AUX output (Reference Clock and Sub-rate Clock).
Example	> :OUTPut:AUX:JCONdition? < 1
Compatibility	Incompatible with existing models.

## 7.10.5 File Menu Setting Commands

Table 7.10.5-1 File Menu Setting Commands

No.	Setting item	Command
[1]	Open	:SYSTem:MMEMory:RECall
[2]	Save	:SYSTem:MMEMory:STORe

### **:SYSTem:MMEMory:RECall <file\_name>,<module>,<data\_type>**

Parameter	<file_name> = <STRING PROGRAM DATA> "<drv>:¥[<dir>]<file>" <drv> = C, D, E, F <dir> = <dir1>¥<dir2>¥... (Omitted when root directory) <file> = File name <module> = <STRING PROGRAM DATA> "<unit>:<slot>:<port> <module>" <unit> = 1 to 4 <slot> = 1 to 6 <port> = 1 <module> = MU181500B <data_type> = <CHARACTER PROGRAM DATA> JMS Jitter Modulation Source Setup
Function	Loads MP181500B setting data.
Example	> :SYSTem:MMEMory:RECall "C:¥Test¥example", "1:1:1 MU181500B", JMS
Compatibility	Incompatible with existing models.

**:SYSTem:MMEMory:STORe**  
**<file\_name>,<module>,<data\_type>,<file\_type>**

---

Parameter	<file_name> = <STRING PROGRAM DATA> "<drv>:¥[<dir>]<file>" <drv> = C,D,E,F <dir>=<dir1>¥<dir2>¥...(Omitted when root directory) <file> = File name <module> = <STRING PROGRAM DATA> "<unit>:<slot>:<port> <module>" <unit> = 1 to 4 <slot> = 1 to 6 <port> = 1 <module> = MU181500B <data_type> = <CHARACTER RESPONSE DATA> JMS            Jitter Modulation Source Setup <file_type> = <CHARACTER PROGRAM DATA> BIN            Binary file
Function	Saves MP181500B setting data. <b>Note:</b> Note that if the name of the saved file is changed, it is no longer possible to read the setting data.
Example	To specify save destination, file name and file format for MU181500B setting data. > :SYSTem:MMEMory:STORe "C:¥Test¥example","1:1:1 MU181500B",JMS,BIN
Compatibility	Incompatible with existing models.



## 7.11 28G/32G bit/s PPG Commands

This section describes the setting and query commands for the MU183020A 28G/32G bit/s PPG, MU183021A 28G/32G bit/s 4ch PPG (hereafter, MU183020A/21A).

Before executing a setting/query command for the MU183020A/21A, specify the slot number of the module to be remotely controlled, by using the :MODule:ID command. Refer to Section 7.1 “Common Commands” and 9.1 “Basic Operation of Device Messages” for how to specify a slot number with the :MODule:ID command.

### 7.11.1 Common Commands

This section describes the commands related to common settings and functions of the control software.

#### 7.11.1.1 Commands for common settings

**Table 7.11.1.1-1 Common Setting Commands**

Setting Items	Commands
Number of the unit to be operated	:UENTry:ID
	:UENTry:ID?
Number of the module to be operated (slot position)	:MODule:ID
	:MODule:ID?
Number of the port to be operated	:PORT:ID
	:PORT:ID?
Number of the data interface to be operated	:INTErface:ID
	:INTErface:ID?
Query for error message	:SYSTem:ERRor?
Query for SCPI version	:SYSTem:VERSion?
Query for software status	:SYSTem:CONDition?
Query for hardware system configuration	:SYSTem:ORGanization:HARDware?
Query for system error	:SYSTem:INFormation:ERRor?
Terminator type	:SYSTem:TERMination
Query for model name of mainframe and module	:SYSTem:CONDition:UNITs?
Query for mainframe information	:SYSTem:UNIT?
Query for module information	:SYSTem:MODule?
Module screen display	:DISPlay:ACTive

### **:UENTry:ID <unit\_number>**

---

Parameter	<unit_number> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Unit number
Function	Sets the number of the unit to be operated
Example	To set the number of the unit to be operated to 2: > :UENTry:ID 2
Compatibility	Incompatible with existing models

### **:UENTry:ID?**

---

Response	<unit_number> = <NR1 NUMERIC RESPONSE DATA> 1 to 4
Function	Queries the number of the unit being operated.
Example	> :UENTry:ID? < 2
Compatibility	Incompatible with existing models

### **:MODule:ID <module\_number>**

---

Parameter	<module_number> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 6                      Module number
Function	Sets the number of the module to be operated (slot position).
Example	To set the number of the module to be operated (slot position) to 6: > :MODule:ID 6
Compatibility	Incompatible with existing models

### **:MODule:ID?**

---

Response	<module_number> = <NR1 NUMERIC RESPONSE DATA> 1 to 6
Function	Queries the number of the module being operated (slot position).
Example	> :MODule:ID? < 6
Compatibility	Incompatible with existing models



## **:SYSTem:ERRor?**

---

Response	<p>&lt;error/event_number&gt;,"&lt;error/event_description&gt;" &lt;error/event_number&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; -32768 to 32767 "0" indicates that no errors and events have occurred. Other values return a general error reserved by SCPI or a device-unique error. &lt;error/event_description&gt; = &lt;STRING RESPONSE DATA&gt; This is an error message corresponding to &lt;error/event_number&gt;. The maximum character-string length is 255 characters.</p>
Function	<p>Queries the error message in the error/event queue. For the details about the error message, refer to Chapter 8 and 9 in the MX180000A Remote Control Operation Manual.</p>
Example	<pre>&gt; :SYSTem:ERRor? &lt; 0, "No error"</pre>
Compatibility	<p>Compatible with the MP1632C Digital Data Analyzer (hereinafter, referred to as "MP1632C") and MP1776A Error Detector (hereinafter, referred to as "MP1776A").</p>

## **:SYSTem:VERSion?**

---

Response	<p>&lt;version&gt; = &lt;NR2 NUMERIC RESPONSE DATA&gt; YYYY.V                    YYYY :year                                   V :revision number</p>
Function	<p>Queries the SCPI version to which the MP1800A/MT1810A conforms.</p>
Example	<pre>&gt; :SYSTem:VERSion? &lt; 1999.0</pre>
Compatibility	<p>Compatible with the MP1632C and MP1776A.</p>

**:SYSTem:CONDition?**

Response	<pre>"&lt;mainframe&gt;,&lt;slot1&gt;,...,&lt;slot64&gt;" &lt;mainframe&gt; = &lt;serial&gt;,&lt;mver&gt;,&lt;hver&gt;,&lt;opt1&gt;,&lt;sbver&gt;,&lt;saver&gt;,&lt;opt2&gt; &lt;serial&gt; = &lt;STRING RESPONSE DATA&gt; XXXXXXXXXXXX          0000000000 to 9999999999                         Mainframe serial number  <b>Note:</b>         Alphabetic characters may be included. &lt;mver&gt; = &lt;STRING RESPONSE DATA&gt; XXXX.XX.XX           1.00.00 to 9999.99.99                         Main application software version &lt;hver&gt; = &lt;STRING RESPONSE DATA&gt; XXXX.XX.XX           1.00.00 to 9999.99.99                         Mainframe hardware version &lt;opt1&gt; = &lt;STRING RESPONSE DATA&gt; OPTXXX               Option number (MP1800A/MT1810A)                         See Table 7.11.1.1-2 "Option character                         correspondence table".  <b>Note:</b>         Outputs the numbers for all installed options.         NONE is output if no option is installed.  &lt;sbver&gt; = &lt;STRING RESPONSE DATA&gt; XXXX.XX.XX           1.00.00 to 9999.99.99                         Sub application software version (Boot part) &lt;saver&gt; = &lt;STRING RESPONSE DATA&gt; XXXX.XX.XX           1.00.00 to 9999.99.99                         Sub application software version (Application                         part) &lt;opt2&gt; = &lt;STRING RESPONSE DATA&gt; &lt;slot x&gt; = &lt;module&gt;,&lt;serial&gt;,&lt;fpga1&gt;[,&lt;fpga2&gt;],&lt;boot&gt;, &lt;application&gt;,&lt;opt&gt; x indicates a slot number. The slot number varies depending on the unit number as follows. Unit 1:               1 to 16  For the MP1800A, numbers from 1 to 6                         correspond to actual slots. For the MT1810A,                         numbers from 1 to 4 correspond to actual slots. Unit 2:               17 to 32 For the MT1810A, numbers from 17 to                         20 correspond to actual slots. Unit 3:               33 to 48 For the MT1810A, numbers from 33 to                         36 correspond to actual slots. Unit 4:               49 to 64 For the MT1810A, numbers from 49 to                         52 correspond to actual slots. &lt;module&gt; = &lt;STRING RESPONSE DATA&gt;</pre>
----------	--

XXXXXXXXXX            Module name (e.g.: MU183020A)  
                          See Table 7.11.1.1-2 “Option character  
                          correspondence table”.

**Note:**

NONE is output if no module is installed. For a module that uses two slots, only the slot with the greater number is valid.

<serial> = <STRING RESPONSE DATA>

XXXXXXXXXXXX            0000000000 to 9999999999  
                          Serial number

**Note:**

"-----" is output if no module is installed. For a module that uses two slots, only the slot with the greater number is valid.

<fpga1>[,<fpga2>,.....] = <STRING RESPONSE DATA>

XXXX.XX.XX            1.00.00 to 9999.99.99  
                          FPGA version

<boot> = <STRING RESPONSE DATA>

XXXX.XX.XX            1.00.00 to 9999.99.99  
                          Logic Boot version

**Note:**

"-----" is output if Logic Boot is not installed. For a module that uses two slots, only the slot with the greater number is valid.

<application> = <STRING RESPONSE DATA>

XXXX.XX.XX            1.00.00 to 9999.99.99  
                          Logic Application version

**Note:**

"-----" is output if Logic Application is not installed.  
 For a module that uses two slots, only the slot with the greater number is valid.

<opt> = <STRING RESPONSE DATA>

XXXXXX/XXXXX            Option number  
                          OPTXXX: For MP1800A/MT1810A

**Note:**

Outputs the numbers for all installed options. NONE is output if no option is installed. For a module that uses two slots, only the slot with the greater number is valid. The option names of the MU181020B-003 and MU181040B-003 are not output.

Function

Queries the software status of the MP1800A/MT1810A.

Example

```
> :SYSTem:CONDition?  
<  
6201234567,1.00.00,1.00.20,OPT302,1.00.00,1.00.00,OPT12,  
OPT14,MU181000A,6201234568,1.00.00,1.00.00,1.00.00,OPT10  
1,MU181020A,6201234569,1.00.00,1.00.00,1.00.00,OPT001,OP  
T220,MU181040A,6201234571,1.00.00,1.00.00,1.00.00,OPT002  
,OPT220
```

Compatibility

Incompatible with existing models

Table 7.11.1.1-2 Option Character Correspondence Table

Model/Name	Option Number	Option Name
MP1800A Signal Quality Analyzer	OPT014	2-Slot PPG/ED
	OPT015	4-Slot PPG/ED
	OPT016	6-Slot PPG/ED
	OPT032	32Gbit/s PPG/ED
MT1810A 4 Slot Chassis	OPT014	2-Slot PPG/ED
	OPT015	4-Slot PPG/ED
	OPT032	32Gbit/s PPG/ED
MX180000A Signal Quality Analyzer Control Software	—	—
MU181000A 12.5GHz Synthesizer	OPTx01	Jitter Modulation
MU181000B 12.5GHz 4port Synthesizer	OPTx01	Jitter Modulation
MU181020A 12.5Gbit/s PPG	OPT001	9.8 to 12.5Gbit/s
	OPT002	0.1 to 12.5Gbit/s
	OPTx10	Variable Data Output (0.05 to 0.8 Vp-p)
	OPTx11	Variable Data Output (0.25 to 2.5 Vp-p)
	OPTx12	High Performance Data Output (0.05 to 2.0 Vp-p)
	OPTx13	Variable Data Output (0.5 to 3.5 Vp-p)
	OPTx21	Differential Clock Output (0.1 to 2.0 Vp-p)
	OPTx30	Variable Data Delay
MU181040A 12.5Gbit/s ED	OPT001	9.8 to 12.5Gbit/s
	OPT002	0.1 to 12.5Gbit/s
	OPTx20	Clock Recovery
	OPTx30	Variable Clock Delay
MU181600A Optical Transceiver (XFP)	—	—
MU181601A Optical Transceiver (SFP)	—	—
MU181620A Stressed Eye Transmitter	OPTx01	1310nm Reference
	OPTx02	1550nm Reference
	OPTx03	1310nm/1550nm Reference
	OPTx11	1310nm Stressed Eye
	OPTx12	1550nm Stressed Eye
	OPTx13	1310nm/1550nm Stressed Eye
MU181640A Optical Receiver	OPTx04	Band Width 8.5GHz
MU181800A 12.5GHz Clock Distributor	—	—



Table 7.11.1-2 Option Character Correspondence Table (Cont'd)

Model/Name	Option Number	Option Name
MU181020B 14Gbit/s PPG	OPT002	0.1 to 14.Gbit/s
	OPTx11	Variable Data Output (0.25 to 2.5 Vp-p)
	OPTx12	High Performance Data Output (0.05 to 2.0 Vp-p)
	OPTx13	Variable Data Output (0.5 to 3.5 Vp-p)
	OPTx21	Differential Clock Output (0.1 to 2.0 Vp-p)
	OPTx30	Variable Data Delay
MU181040B 14Gbit/s ED	OPT002	0.1 to 14.Gbit/s
	OPTx20	Clock Recovery
	OPTx30	Variable Clock Delay
MU182020A 25Gbit/s 1ch MUX MU182021A 25Gbit/s 2ch MUX	OPTx01	28Gbit/s Extension
	OPTx02	Clock Input Band Switch
	OPTx10	Variable Data Output (0.25 to 1.75Vp-p)
	OPTx11	Variable Data Output (0.5 to 2.5 Vp-p)
	OPTx12	Variable Data Output (0.5 to 2.0 Vp-p)
	OPTx13	Variable Data Output (0.5 to 3.5 Vp-p)
	OPTx21	Clock output (0.5 to 2.0 Vp-p)
	OPTx30	25Gbit/s Variable Data Delay
	OPTx31	28Gbit/s Variable Data Delay
MU182040A 25Gbit/s 1ch DEMUX MU182041A 25Gbit/s 2ch DEMUX	OPTx01	28Gbit/s Extension
	OPTx02	Clock Input Band Switch
	OPTx30	25GHz Variable Clock Delay
	OPTx31	28GHz Variable Clock Delay
MU183020A 28G/32G bit/s PPG	OPTx01	32G bit/s Extension
	OPTx12	1ch 2V Data Output
	OPTx13	1ch 3.5V Data Output
	OPTx30	1ch Data Delay
	OPTx22	2ch 2V Data Output
	OPTx23	2ch 3.5V Data Output
MU183021A 28G/32G bit/s 4ch PPG	OPTx01	32G bit/s Extension
	OPTx12	4ch 2V Data Output
	OPTx13	4ch 3.5V Data Output
	OPTx30	4ch Data Delay
MU183040A 28G/32G bit/s ED	OPTx01	32G bit/s Extension
	OPTx10	1ch ED
	OPTx20	2ch ED
MU183041A 28G/32G bit/s 4ch ED	OPTx01	32G bit/s Extension

**Note:**

The option names of the MU181020B-003 and MU181040B-003 are not output.



**Note:**

"-----" is output if Logic Application is not installed.  
 For a module that uses two slots, only the slot with the greater number is valid.

<opt> = <STRING RESPONSE DATA>

XXXXXX/XXXXX      Option number OPTXXX:  
 For MP1800A/MT1810A, outputs the numbers  
 for all installed options.

**Note:**

NONE is output if no option is installed. For a module that uses two slots, only the slot with the greater number is valid.  
 The option names of the MU181020B-003 and MU181040B-003 are not output.

Function	Queries the hardware system configuration of the MP1800A
Example	<pre>&gt; :SYSTem:ORGanization:HARDware? &lt; MU181000A, 6201234568, 1.00.00, 1.00.00, 1.00.00, OPT101, MU181020A, 6201234569, 1.00.00, 1.00.00, 1.00.00, OPT001, OPT2 20, MU181040A, 6201234571, 1.00.00, 1.00.00, 1.00.00, OPT002, O PT220</pre>
Compatibility	Partially compatible with the MP1632C and MP1776A.

**:SYSTem:INFormation:ERRor? <unit>**

Parameter	<unit> = <DECIMAL NUMERIC PROGRAM DATA>
	1 to 4                      1 to 4/1 Step
Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	0                            NONE
	1                            PLL Unlock
	2                            Temperature
	3                            Fan
	All the system errors that have currently occurred are displayed, delimited with a comma (,).
Function	Queries the System Error contents.
Example	<pre>&gt; :SYSTem:INFormation:ERRor? 3 &lt; 1, 2, 3 (when a system error has occurred for PLL Unlock, Temperature, or Fan) &lt; 0 (when no system error has occurred)</pre>
Compatibility	Incompatible with existing models

### **:SYSTem:TERMination <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA>
	0                      LF + EOI
	1                      CR + LF + EOI
Function	Sets the terminator type of the response data.
Example	To set the terminator type to LF + EOI: > :SYSTem:TERMination 0
Compatibility	Compatible with the MP1632C.

### **:SYSTem:TERMination?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	0                      LF + EOI
	1                      CR + LF + EOI
Function	Queries the terminator type of the response data.
Example	> :SYSTem:TERMination? < 0
Compatibility	Compatible with the MP1632C.

**:SYSTem:CONDition:UNITs?**

Response	<pre>&lt;unit1&gt;,...,&lt;unit4&gt;,&lt;slot1&gt;,...,&lt;slot6&gt; ="&lt;mainframe1&gt;, ...,&lt;mainframe4&gt;,&lt;module1&gt;,...,&lt;module64&gt;"&lt;mainframe1&gt; to &lt;mainframe4&gt; = &lt;STRING RESPONSE DATA&gt; XXXXXXXXXX      Mainframe name (e.g.,: MP1800A)                 See Table 7.11.1.1-2 "Option character                 correspondence table"</pre> <p><b>Note:</b> NONE is output for mainframe2 to 4, if no mainframe is connected.</p> <pre>&lt;module1&gt; to &lt;module64&gt; = &lt;STRING RESPONSE DATA&gt; XXXXXXXXXX      Module name (e.g.,: MU181020A)                 See Table 7.11.1.1-2 "Option character                 correspondence table".</pre> <p><b>Note:</b> NONE is output if no module is installed. For a module that uses two slots, only the slot with the greater number is valid.</p>
Function	Queries the model name of the mainframe and module.
Example	<pre>&gt; :SYSTem:CONDition:UNITs? &lt; MT1810A,MT1810A,MT1810A,NONE,MU181000A,NONE,MU181020A, MU181040A,NONE,...,MU181600A,MU181601A,MU181620A,NONE, MU181640A,NONE,...,NONE</pre>
Example	<p>To query the model name of the mainframe and module for the MP1800A (1-box type):</p> <pre>&gt; :SYSTem:CONDition:UNITs? &lt; "MP1800A,NONE,NONE,NONE,MU181000A,NONE,MU181020A, MU181040A,NONE,MU181600A,NONE,...,NONE"</pre>
Compatibility	Incompatible with existing models

**:SYSTem:UNIT? <numeric>**

Parameter	<p>&lt;numeric&gt; = &lt;NR1 NUMERIC PROGRAM DATA&gt;                  1 to 4 Mainframe number                  “1” for the MP1800A, “1 to 4” for the MT1810A.</p>
Response	<p>&lt;mainframe&gt; =                  &lt;unit&gt;,&lt;serial&gt;,&lt;mver&gt;,&lt;hver&gt;,&lt;opt1&gt;,&lt;sbver&gt;,&lt;saver&gt;,&lt;opt2&gt;                  &lt;unit&gt; = &lt;STRING RESPONSE DATA&gt;                  XXXXXXXXXX Mainframe name (e.g., : MP1800A/MT1810A)                  See Table 7.11.1.1-2 “Option character                  correspondence table”.</p> <p><b>Note:</b>                  NONE is output if no module is installed. For a unit that uses two                  slots, only the slot with the lower number is valid.</p> <p>&lt;serial&gt; = &lt;STRING RESPONSE DATA&gt;                  XXXXXXXXXXXX 0000000000 to 9999999999                  Mainframe serial number</p> <p><b>Note:</b>                  Alphabetic characters may be included.</p> <p>&lt;mver&gt; = &lt;STRING RESPONSE DATA&gt;                  XXXX.XX.XX 1.00.00 to 9999.99.99                  Main application software version</p> <p>&lt;hver&gt; = &lt;STRING RESPONSE DATA&gt;                  XXXX.XX.XX 1.00.00 to 9999.99.99                  Mainframe hardware version</p> <p>&lt;opt1&gt; = &lt;STRING RESPONSE DATA&gt;                  OPTXXX Option number (MP1800A/MT1810A)                  See Table 7.11.1.1-2 “Option character                  correspondence table”.</p> <p><b>Note:</b>                  Outputs the numbers for all installed options. NONE is output if                  no option is installed.</p> <p>&lt;sbver&gt; = &lt;STRING RESPONSE DATA&gt;                  XXXX.XX.XX 1.00.00 to 9999.99.99                  Sub application software version                  (Boot part)</p> <p>&lt;saver&gt; = &lt;STRING RESPONSE DATA&gt;                  XXXX.XX.XX 1.00.00 to 9999.99.99                  Sub application software version                  (Application part)</p> <p>&lt;opt2&gt; = &lt;STRING RESPONSE DATA&gt;</p>
Function	Queries the mainframe information including model and serial number.
Example	> :SYSTem:UNIT? 1

```
<  
"MP1800A, 6201234568, 1.00.00, 1.00.00, OPT301, 1.00.00, 1.00.  
00"
```

Compatibility

Incompatible with existing models

## :SYSTem:MODule? <numeric>

Parameter	<numeric> = <NR1 NUMERIC PROGRAM DATA> 1 to 6 Slot
Response	1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A <slot> = <module>,<serial>,<fpga1>,<fpga2>,<boot>,<application>,<opt> <module> = <STRING RESPONSE DATA> XXXXXXXXXX Module name (e.g.,: MU181020A) See Table 7.11.1.1-2 "Option character correspondence table".
	<b>Note:</b> NONE is output if no module is installed. For a module that uses two slots, only the slot with the greater number is valid.
	<serial> = <STRING RESPONSE DATA> XXXXXXXXXXXX 0000000000 to 9999999999 Serial number
	<b>Note:</b> "-----" is output if no module is installed. For a module that uses two slots, only the slot with the greater number is valid.
	<fpga1>,<fpga2> = <STRING RESPONSE DATA> XXXX.XX.XX 1.00.00 to 9999.99.99 FPGA version
	<boot> = <STRING RESPONSE DATA> XXXX.XX.XX 1.00.00 to 9999.99.99 Logic Boot version
	<b>Note:</b> "-----" is output if Logic Boot is not installed. For a module that uses two slots, only the slot with the greater number is valid.
	<application> = <STRING RESPONSE DATA> XXXX.XX.XX 1.00.00 to 9999.99.99 Logic Application version
	<b>Note:</b> "-----" is output if Logic Application is not installed. For a module that uses two slots, only the slot with the greater number is valid.
	<opt> = <STRING RESPONSE DATA> XXXXXX/XXXXX Option number OPTXXX: For MP1800A/MT1810A
	<b>Note:</b> Outputs the numbers for all installed options. NONE is output if no option is installed. For a module that uses two slots, only the slot with the greater number is valid. The option names of the MU181020B-003 and MU181040B-003 are not output.



Function                      Queries the module information on the specified slot.  
 Example                      To query the module information on Slot 3:  
                                  > :SYSTem:MODule? 3  
                                  < "MU181020A, 6201234568, 1.00.00, -----, 1.00.00,  
                                  1.00.00, OPT002, OPT211, PT220, "  
 Compatibility                Incompatible with existing models

**:DISPlay:ACTive <unit>, <slot>[, <tab>]**

Parameter                    <unit> = <DECIMAL NUMERIC PROGRAM DATA>  
 1 to 4                      Mainframe No.1 to 4  
 When installing the MT1810A, the mainframe No. is specified.  
 When using the MP1800A, No.1 is fixed.  
 <slot> = <DECIMAL NUMERIC PROGRAM DATA>  
 1 to 6                      Slot No.1 to 6  
 When using the MP1800A, the slot No. is 1 to 6.  
 When using the MT1810A, the slot No. is 1 to 4.  
 [<tab>] = <DECIMAL NUMERIC PROGRAM DATA>  
 1 to X                      Tab IDNo.1 to X  
 When [, <tab>] is omitted, 1 is specified.  
 Tab ID is set to No.1 at the left side dialog, and then the tab ID No. is set  
 to 2, 3, 4...toward the right side.  
 The maximum number (X) of the tab ID varies depending on the module  
 options.

Tab ID	MU183020A-x12/x13	MU183020A-x22/x23, MU183021A
1	Output	Output
2	Pattern	Pattern
3	Error Addition	Error Addition
4	Misc 1	Precode
5	Misc 2	Misc 1
6		Misc 2

Function                      Displays the specified module screen to the front.  
 Example                      To display the Pattern tab of the MU183020A module:  
 (when installing the MU183020A in the unit1 slot1)  
                                  > :DISPlay:ACTive 1,1,2  
 Compatibility                Incompatible with existing models.

7.11.1.2 File menu commands

Table 7.11.1.2-1 File Menu Setting Commands

Setting Items	Commands
Quick Open	:SYSTem:MMEMory:QRECall
Quick Save	:SYSTem:MMEMory:QSTore
Open	:SYSTem:MMEMory:RECall
Save	:SYSTem:MMEMory:STORe
Screen Copy Execute	:SYSTem:PRINt:COPIY
Printer Setup	:SYSTem:PRINt:PRINter:SET
	:SYSTem:PRINt:PRINter:SET?
Combination Setting	:COMBination:OPERation:ABILity:CHSYnc?
	:COMBination:OPERation:CHSetting
	:COMBination:OPERation:PPGChsync
	:COMBination:OPERation:USYNcout
	:COMBination:OPERation:USYNcout?
Initialize	:SYSTem:MEMory:INITialize

**:SYSTem:MMEMory:QRECall <file\_name>**

Parameter	<file_name> = <STRING PROGRAM DATA> "<drv>:\[<dir>]<file>" <drv> = C, D, E, F <dir> = <dir1>\<dir2>\...(Omitted when root directory) <file> = File name
Function	Opens all setting data.
Example	To read all setting files from the specified save destination. > :SYSTem:MMEMory:QRECall "C:\Test\example"
Compatibility	Commands are compatible with those of the MP1632C. Parameters are not compatible with the existing parameters.

**:SYSTem:MMEMory:QSTore <file\_name>,<comment>**

Parameter	<p>&lt;file_name&gt; = &lt;STRING PROGRAM DATA&gt;  "&lt;drv&gt;: \ [&lt;dir&gt;] &lt;file&gt;"  &lt;drv&gt; = C, D, E, F  &lt;dir&gt; = &lt;dir1&gt; \ &lt;dir2&gt; \ ... (Omitted when root directory)  &lt;file&gt; = File name  &lt;comment&gt; = &lt;STRING PROGRAM DATA&gt;  "XXXXXX..." Specify a comment of a character string within 60 characters into the file.</p>
Function	<p>Executes "Quick Save".</p> <p><b>Note:</b>  Note that if the name of the saved file is changed, it is no longer possible to read the setting data.</p>
Example	<p>To specify save destination for all setting files and save them with a comment and measurement result data:</p> <pre>&gt; :SYSTem:MMEMory:QSTore "C:\Test\example", "setup all"</pre>
Compatibility	<p>Commands are compatible with those of the MP1632C.  Parameters are not compatible with the existing parameters.</p>

**:SYSTem:MMEMory:RECall <file\_name>,<module>,<data\_type>**

---

Parameter	<p>&lt;file_name&gt; = &lt;STRING PROGRAM DATA&gt;                  "&lt;drv&gt;:\[&lt;dir&gt;]&lt;file&gt;"                  &lt;drv&gt; = C, D, E, F                  &lt;dir&gt; = &lt;dir1&gt;\&lt;dir2&gt;\... (Omitted when root directory)                  &lt;file&gt; = File name                  &lt;module&gt; = &lt;STRING PROGRAM DATA&gt;                  "&lt;unit&gt;:&lt;slot&gt;:&lt;port&gt; &lt;module&gt;"                  &lt;unit&gt; = 1,2,3,4                  &lt;slot&gt; = 1,2,3,4...,6                  &lt;port&gt; = 1                  &lt;module&gt; = Module model name                  &lt;data_type&gt; = &lt;CHARACTER PROGRAM DATA&gt;</p> <table border="0"> <tr><td>P32</td><td>28G/32G PPG Setup</td></tr> <tr><td>P32X</td><td>28G/32G 4ch PPG Setup</td></tr> <tr><td>E32</td><td>28G/32G ED Setup</td></tr> <tr><td>E32X</td><td>28G/32G 4ch ED Setup</td></tr> <tr><td>ERA_D1</td><td>32G ED Error/Alarm Result (Data1)</td></tr> <tr><td>ERA_D2</td><td>32G ED Error/Alarm Result (Data2)</td></tr> <tr><td>ERA_D3</td><td>32G ED Error/Alarm Result (Data3)</td></tr> <tr><td>ERA_D4</td><td>32G ED Error/Alarm Result (Data4)</td></tr> <tr><td>ERA_C1</td><td>32G ED Error/Alarm Result (2ch Combi1-2)</td></tr> <tr><td>ERA_C2</td><td>32G ED Error/Alarm Result (2ch Combi3-4)</td></tr> <tr><td>ERA_C4</td><td>32G ED Error/Alarm Result (4ch Combi1-4)</td></tr> </table>	P32	28G/32G PPG Setup	P32X	28G/32G 4ch PPG Setup	E32	28G/32G ED Setup	E32X	28G/32G 4ch ED Setup	ERA_D1	32G ED Error/Alarm Result (Data1)	ERA_D2	32G ED Error/Alarm Result (Data2)	ERA_D3	32G ED Error/Alarm Result (Data3)	ERA_D4	32G ED Error/Alarm Result (Data4)	ERA_C1	32G ED Error/Alarm Result (2ch Combi1-2)	ERA_C2	32G ED Error/Alarm Result (2ch Combi3-4)	ERA_C4	32G ED Error/Alarm Result (4ch Combi1-4)
P32	28G/32G PPG Setup																						
P32X	28G/32G 4ch PPG Setup																						
E32	28G/32G ED Setup																						
E32X	28G/32G 4ch ED Setup																						
ERA_D1	32G ED Error/Alarm Result (Data1)																						
ERA_D2	32G ED Error/Alarm Result (Data2)																						
ERA_D3	32G ED Error/Alarm Result (Data3)																						
ERA_D4	32G ED Error/Alarm Result (Data4)																						
ERA_C1	32G ED Error/Alarm Result (2ch Combi1-2)																						
ERA_C2	32G ED Error/Alarm Result (2ch Combi3-4)																						
ERA_C4	32G ED Error/Alarm Result (4ch Combi1-4)																						
Function	Opens module settings and result data.																						
Example	To read a file for the PPG module: > :SYSTem:MMEMory:RECall "C:\Test\example", "1:3:1 MU183020A", P32																						
Compatibility	Commands are compatible with those of the MP1632C1 and MP1776A. Parameters are not compatible with the existing parameters.																						

## :SYSTem:MMEMory:STORe <file\_name>,<module>,<data\_type>,<file\_type>

Parameter	<file_name> = <STRING PROGRAM DATA> "<drv>:\[<dir>]<file>" <drv> = C,D,E,F <dir> = <dir1>\<dir2>\... (Omitted when root directory) <file> = File name <module> = <STRING PROGRAM DATA> "<unit>:<slot>:<port> <module>" <unit> = 1,2,3,4 <slot> = 1,2,3,4...,6 <port> = 1 <module> = Module model name <data_type> = <CHARACTER PROGRAM DATA> PPG                    PPG Setup ED                    ED Setup SYN                   Synthesizer Setup XFP                   XFP Setup SFP                   SFP Setup ERA                   Error/Alarm Result OTX                   Transmitter Setup MX1                   MUX Setup MX2                   MUX Setup DX1                   DEMUX Setup DX2                   DEMUX Setup DER                   DEMUX Error/Alarm Result P32                   28G/32G PPG Setup P32X                   28G/32G 4ch PPG Setup E32                   28G/32G ED Setup E32X                   28G/32G 4ch ED Setup <file_type> = <CHARACTER PROGRAM DATA> BIN                    Binary File CSV                    CSV File TXT                    Text File
Function	Saves the setting and measurement result data for a specified module. <b>Note:</b> Note that if the name of the saved file is changed, it is no longer possible to read the setting data.
Example	To save the setting file for the ED module: > :SYSTem:MMEMory:STORe "C:\Test\example", "1:3:1 MU183020A", P32, BIN
Compatibility	Commands are compatible with those of the MP1632C and MP1776A. Parameters are not compatible with the existing parameters.

### **:SYSTem:PRINT:COPY**

---

Function	Executes Screen Copy.
Example	> :SYSTem:PRINT:COPY
Compatibility	Compatible with the MP1632C and MP1776A.

### **:SYSTem:PRINT:PRINter:SET <printer>,<direction>**

---

Parameter	<printer> = <STRING PROGRAM DATA> "XXXXXXX..." Printer name <direction> = <CHARACTER PROGRAM DATA> VER Vertical HOR Horizontal
Function	Sets the printer and print direction.
Example	> :SYSTem:PRINT:PRINter:SET "printer",VER
Compatibility	Incompatible with existing models.

### **:SYSTem:PRINT:PRINter:SET?**

---

Response	<printer> = <STRING RESPONSE DATA> "XXXXXXX..." Printer name <direction> = <CHARACTER RESPONSE DATA> VER Vertical HOR Horizontal
Function	Queries the default printer and print direction.
Example	> :SYSTem:PRINT:PRINter:SET? < "printer",VER
Compatibility	Incompatible with existing models.

**:COMBination:OPERation:ABILity:CHSYnc? [<unit>]**

Parameter	[<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Mainframe No.1 to 4 When installing the MT1810A, the mainframe No. is specified. Can be omitted. Mainframe No. 1 is specified when omitted.
Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 to 63                      Total number of PPGs that can configure channel synchronization (decimal)  Available bits 0                              No Channel Synchronization 1 (Bit 0)                      PPG in Slot 1 2 (Bit 1)                      PPG in Slot 2 4 (Bit 2)                      PPG in Slot 3 8 (Bit 3)                      PPG in Slot 4 16 (Bit 4)                      PPG in Slot 5 32 (Bit 5)                      PPG in Slot 6
Function	Queries the slot where PPG that can configure channel synchronization combination is inserted.
Example	To query the slot in Unit 3 where PPG that can configure channel synchronization is inserted: > :COMBination:OPERation:ABILity:CHSYnc? 3 < 7
Compatibility	Incompatible with existing models.

**:COMBination:OPERation:CHSetting <configuration>[,<unit>]**

Parameter	<configuration> = <DECIMAL NUMERIC PROGRAM DATA> 0 to 62                      Total number of PPGs that can configure channel synchronization (decimal)  Available bits 0                              Channel Synchronization OFF 2 (Bit 1)                      PPG in Slot 2 4 (Bit 2)                      PPG in Slot 3 8 (Bit 3)                      PPG in Slot 4 16 (Bit 4)                      PPG in Slot 5 32 (Bit 5)                      PPG in Slot 6 [<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                          Mainframe Nos. 1 to 4 When installing the MT1810A, the mainframe No. is specified. Can be omitted. Mainframe No. 1 is specified when omitted.
Function	Specify the slot where the PPG for which channel synchronization is to be set is inserted.
Example	To set channel synchronization for the PPGs in Slots 1 through 4 of Unit 3: > :COMBination:OPERation:CHSetting 14,3
Compatibility	Incompatible with existing models.

**:COMBination:OPERation:PPGChsync <configuration>[,<unit>]**

Parameter	<configuration> = <DECIMAL NUMERIC PROGRAM DATA> 0                              2ch Combination 1                              4ch Combination 3                              Channel Synchronization 4                              64Gx2ch Combination [<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                          Mainframe Nos. 1 to 4 When installing the MT1810A, the mainframe No. is specified. Can be omitted. Mainframe No. 1 is specified when omitted.
Function	Sets the combination type for inter-module sync. You need to set the Channel Synchronization in advance with the :COMBination:OPERation:CHSetting command.
Example	To set the PPG (Unit3) to 2ch Combination: > :COMBination:OPERation:PPGChsync 0,3
Compatibility	Incompatible with existing models.



**:COMBination:OPERation:USYNcout <boolean>**


---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA>
	0                      Unit Sync OFF
	1                      Unit Sync ON
Function	Sets the Unit Sync to On/Off.
Example	To set the Unit Sync to On > :COMBination:OPERation:USYNcout 1
Compatibility	Incompatible with existing models.

**:COMBination:OPERation:USYNcout?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	0                      Unit Sync OFF
	1                      Unit Sync ON
Function	Queries the Unit Sync On/Off.
Example	> :COMBination:OPERation:USYNcout? < 1
Compatibility	Incompatible with existing models.

**:SYSTem:MEMory:INITialize**


---

Function	Initializes the internal setting data to the initial settings at factory shipment.
Example	> :SYSTem:MEMory:INITialize
Compatibility	Compatible with the MP1632C and MP1776A.

7.11.1.3 Common function buttons



Figure 7.11.1.3-1 Common Function Buttons

Table 7.11.1.3-1 Common Function Button Setting Commands

Setting Items	Commands
Output ON/OFF	:SOURce:OUTPut:ASET
	:SOURce:OUTPut:ASET?
Error Addition ON/OFF	:SOURce:PATtern:EADdition:ASET
	:SOURce:PATtern:EADdition:ASET?
Single Error Addition	:SOURce:PATtern:EADdition:ASingle
Open	Refer to Section 7.11.1.2 “Command related to File menu.”
Save	Refer to Section 7.11.1.2 “Command related to File menu.”
Print	Refer to Section 7.11.1.2 “Command related to File menu.”
System Error ON/OFF	:SYSTem:BEEPer:SYSTem:SET
	:SYSTem:BEEPer:SYSTem:SET?
System Error	:SYSTem:BEEPer:SYSTem:TYPE
	:SYSTem:BEEPer:SYSTem:TYPE?
Unit Sync Output	:SOURce:PATtern:USYNcOut

**:SOURce:OUTPut:ASET <boolean>**

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> OFF or 0                      Output OFF ON or 1                        Output ON
Function	Sets Data and Clock outputs of PPG ON or OFF.
Example	To set Data and Clock outputs of PPG to ON: > :SOURce:OUTPut:ASET ON
Compatibility	Incompatible with existing models.

**:SOURce:OUTPut:ASET?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0                                Output OFF 1                                Output ON
Function	Queries the ON/OFF state for Data and Clock outputs of PPG.
Example	> :SOURce:OUTPut:ASET? < 1
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:EADDITION:ASET <boolean>**


---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> OFF or 0                      Error addition OFF ON or 1                        Error addition ON
Function	Sets error addition for all valid modules ON/OFF.
Example	To set error addition for all valid modules to ON: > :SOURce:PATtern:EADDITION:ASET ON
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:EADDITION:ASET?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0                                Error addition OFF 1                                Error addition ON
Function	Queries the error addition ON/OFF state for all valid modules.
Example	> :SOURce:PATtern:EADDITION:ASET? < 1
Compatibility	Incompatible with existing models.

**:SOURce:PATtern:EADDITION:ASINGLE**


---

Function	Adds a single error for all valid modules.
Example	> :SOURce:PATtern:EADDITION:ASINGLE
Compatibility	Incompatible with existing models.

**:SYSTEM:BEEPer:SYSTEM:SET <boolean>**


---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> OFF or 0                      Buzzer OFF ON or 1                        Buzzer ON
Function	Sets buzzer at error occurrence ON/OFF.
Example	To set buzzer at error occurrence ON: > :SYSTEM:BEEPer:SYSTEM:SET ON
Compatibility	Compatible with the MP1632C and MP1776A.

### **:SYSTem:BEEPer:SYSTem:SET?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 Buzzer OFF 1 Buzzer ON
Function	Queries the buzzer ON/OFF state at error occurrence.
Example	> :SYSTem:BEEPer:SYSTem:SET? < 1
Compatibility	Compatible with the MP1632C and MP1776A.

### **:SYSTem:BEEPer:SYSTem:TYPE <type>,<boolean>**

Parameter	<type> = <CHARACTER PROGRAM DATA> PUNLock PLL Unlock FAN FAN TEMPerature Temperature ALL Selects all system errors <boolean> = <BOOLEAN PROGRAM DATA> OFF or 0 ON or 1
Function	Sets system error buzzer for the target item ON/OFF.
Example	To set system error buzzer for "Temperature" ON: > :SYSTem:BEEPer:SYSTem:TYPE TEMPerature,ON
Compatibility	Partially compatible with the MP1632C.

### **:SYSTem:BEEPer:SYSTem:TYPE?**

Response	<type> = <CHARACTER RESPONSE DATA> PUNL, FAN, TEMP, ALL XXX, XXX, Errors for which buzzer is set to ON are delimited with commas (,) and returned. NONE Buzzer is set to OFF for all items.
Function	Queries the ON/OFF state of system error buzzer for target items.
Example	> :SYSTem:BEEPer:SYSTem:TYPE? < PUNL, TEMP
Compatibility	Compatible with the MP1632C.

### **:SOURce:PATtern:USYNcout**

Parameter	None
Function	Outputs the timing signal to synchronize the pattern between multiple main frames.
Example	> :SOURce:PATtern:USYNcout
Compatibility	Incompatible with existing models.

#### 7.11.1.4 PPG status commands

The PPG status commands query the status (such as an alarm) of the MU183020A 28G/32G bit/s Pulse Pattern Generator and MU183021A 28G/32G bit/s 4ch Pulse Pattern Generator.

Note that all the commands described below are incompatible with existing PPGs.

#### **:INSTrument:PPGG32[:EVENT]?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 to 15	Sum total of the bit of event register (DECIMAL)
	Available bits	
	1 (Bit0)	Delay Calibration Require (Data1)
	2 (Bit1)	Delay Calibration Require (Data2)
	4 (Bit2)	Delay Calibration Require (Data3)
	8 (Bit3)	Delay Calibration Require (Data4)
Function	Queries event at 28G/32G bit/s PPG status.	
Example	<pre>&gt; :INSTrument:PPGG32:EVENT? or &gt; :INSTrument:PPGG32? &lt; 4</pre>	

#### **:INSTrument:PPGG32:CONDition?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 to 15	Sum total of the bit of condition register (DECIMAL)
	Available bits	
	1 (Bit0)	Delay Calibration Require (Data1)
	2 (Bit1)	Delay Calibration Require (Data2)
	4 (Bit2)	Delay Calibration Require (Data3)
	8 (Bit3)	Delay Calibration Require (Data4)
Function	Queries condition at 28G/32G bit/s PPG status.	
Example	<pre>&gt; :INSTrument:PPGG32:CONDition? &lt; 4</pre>	

**:INSTRument:PPGG32:PTRansition <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0 to 15	Sum total of the bit of transition filter (DECIMAL)
	Available bits	
	1 (Bit0)	Delay Calibration Require (Data1)
	2 (Bit1)	Delay Calibration Require (Data2)
	4 (Bit2)	Delay Calibration Require (Data3)
	8 (Bit3)	Delay Calibration Require (Data4)
Function	Sets transition filter (positive direction transition) at 28G/32G bit/s PPG status.	
Example	To set the transition filter (positive direction transition) at 28G/32G bit/s PPG status to 1. > :INSTRument:PPGG32:PTRansition 4	

**:INSTRument:PPGG32:PTRansition?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 to 15	Sum total of the bit of transition filter (DECIMAL)
Function	Queries contents of transition filter (positive direction transition) at 28G/32G bit/s PPG status.	
Example	> :INSTRument:PPGG32:PTRansition? < 4	

**:INSTRument:PPGG32:NTRansition <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0 to 15	Sum total of the bit of transition filter (DECIMAL)
	Available bits	
	1 (Bit0)	Delay Calibration Require (Data1)
	2 (Bit1)	Delay Calibration Require (Data2)
	4 (Bit2)	Delay Calibration Require (Data3)
	8 (Bit3)	Delay Calibration Require (Data4)
Function	Sets transition filter (negative direction transition) at 28G/32G bit/s PPG status.	
Example	To set the transition filter (negative direction transition) at 28G/32G bit/s PPG status to 1. > :INSTRument:PPGG32:NTRansition 4	

### **:INSTRument:PPGG32:NTRansition?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 to 15	Sum total of the bit of transition filter (DECIMAL)
Function	Queries contents of transition filter (negative direction transition) at 28G/32G bit/s PPG status.	
Example	> :INSTRument:PPGG32:NTRansition? < 4	

### **:INSTRument:PPGG32:RESet**

---

Function	Initializes event at 28G/32G bit/s PPG status.
Example	> :INSTRument:PPGG32:RESet

### 7.11.1.5 Data Interface Setting Commands

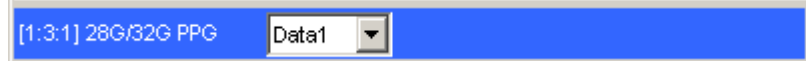


Figure 7.11.1.5-1 Data Interface Select

Table 7.11.1.5-1 Data Interface Select Setting Commands

Setting Item	Command
Data Interface Select	:INTerface:ID
	:INTerface:ID?

#### :INTerface:ID < interface\_number >

Parameter	<interface_number> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Data channel
Function	Sets the control channel number. The setting range varies by the model name. MU183020A-x12/x13:    1 MU183020A-x22/x23:   1 to 2 MU183021A:            1 to 4
Example	To specify Channel 3 of MU183021A. > :INTerface:ID 3

#### :INTerfaceme:ID?

Response	<interface_number> = <NR1 NUMERIC RESPONSE DATA> 1 to 4
Function	Queries the channel of MU183020A and MU183021A specified as control targets.
Example	> :INTerface:ID? < 3



### 7.11.1.6 Pattern Editor

This section describes the commands for saving and loading pattern files to MU183020A/21A. Before executing the commands, use the :MODULE:ID and :INTERFACE:ID commands to specify both slot number and data interface number of the module you want to remote-control. For how to specify the slot number with the :MODULE:ID command, refer to 7.1, “Common Commands” and 9.1, “Basic Operation of Device Messages”.

**Table 7.11.1.6-1 Pattern Editor Setting Commands**

Setting Item	Command
Open	:SYSTem:MMEMory:PATtern:RECall
Save	:SYSTem:MMEMory:PATtern:STORe

#### **:SYSTem:MMEMory:PATtern:RECall <file\_name>,<file\_type>**

Parameter	<file_name> = <STRING PROGRAM DATA> "<drv>:\[<dir>]<file>" <drv> = C, D, E, F <dir> = <dir1>\<dir2>\...(Omitted when root directory) <file> = File name <file_type> = <CHARACTER PROGRAM DATA> BIN                      Binary File TXT                      Text File
Function	Opens the pattern file.
Example	To load the pattern file, specifying the save location (C:\Test), file name (example) and file format (Binary): > :SYSTem:MMEMory:PATtern:RECall "C:\Test\example",BIN
Compatibility	Incompatible with existing models.

**:SYSTem:MMEMory:PATTErn:STORe <file\_name>,<file\_type>**

---

Parameter	<file_name> = <STRING PROGRAM DATA> "<drv>:\[<dir>]<file>" <drv> = C, D, E, F <dir> = <dir1>\<dir2>\...(Omitted when root directory) <file> = File name <file_type> = <CHARACTER PROGRAM DATA> BIN                      Binary File TXT                      Text File
Function	Saves the pattern file. <b>Note:</b> The settings will not be read from the saved file if the file name is changed.
Example	To save the pattern file, specifying the save location (C:\Test), file name (example) and file format (Text): > :SYSTem:MMEMory:PATTErn:STORe "C:\Test\example",TXT
Compatibility	Incompatible with existing models.

## 7.11.2 Output Tab

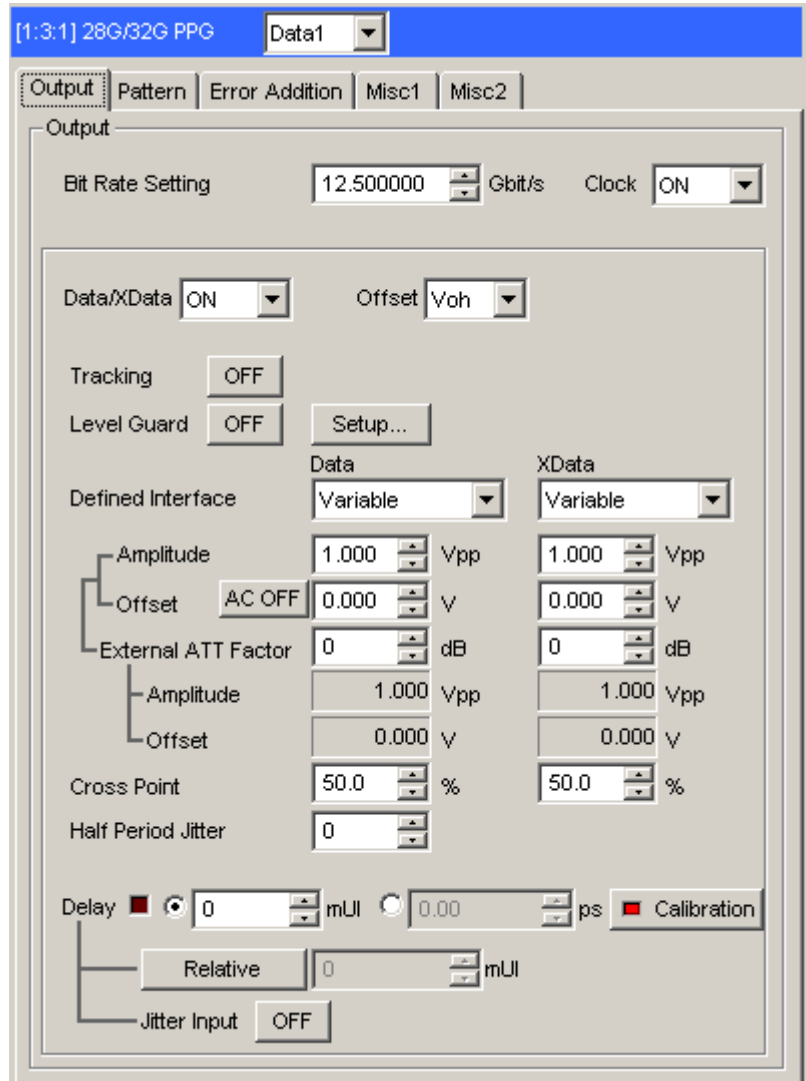


Figure 7.11.2-1 Output Tab

### 7.11.2.1 Output Setting Commands

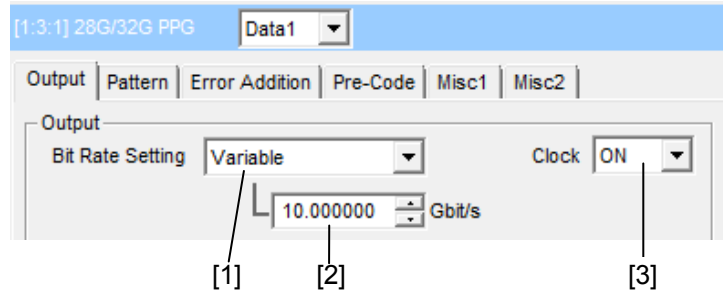


Figure 7.11.2.1-1 Output Settings

Table 7.11.2.1-1 Output Setting Commands

No.	Setting Items	Commands
[1]	Bit Rate Setting	:OUTPut:DATA:STANdard
	Preset Standard Bit Rate	:OUTPut:DATA:STANdard?
[2]	Bit Rate Setting/	:OUTPut:DATA:BITRate
	Bit Rate Monitor	:OUTPut:DATA:BITRate?
[3]	Clock	:OUTPut:CLOCK:OUTPut
		:OUTPut:CLOCK:OUTPut?

**:OUTPut:DATA:STANdard <freq>**

Parameter	<freq> = <STRING PROGRAM DATA>		
	Variable	Variable	Variable*
"PCI_EX1"	PCI Express Gen1		2.500000 Gbit/s
"PCI_EX2"	PCI Express Gen2		5.000000 Gbit/s
"USB3"	USB3.0		5.000000 Gbit/s
"PCI_EX3"	PCI Express Gen3		8.000000 Gbit/s
"8G_FC"	8GFC		8.500000 Gbit/s
"OC_192"	OC192/STM64		9.953280 Gbit/s
"IB_QDR"	Infiniband QDR		10.000000 Gbit/s
"USB3_1"	USB3.1		10.000000 Gbit/s
"10G_FC"	10GFC		10.518750 Gbit/s
"OC_192_G975"	G975 FEC		10.664228 Gbit/s
"OC_192_G709"	OTU2		10.709225 Gbit/s
"10GbE_G709"	10GbE over FEC		11.095700 Gbit/s
"10G_FC_G709"	10GFC over FEC		11.316800 Gbit/s
"16G_FC"	16GFC		14.025000 Gbit/s
"IB_FDR"	Infiniband_FDR		14.062500 Gbit/s
"PCI_EX4"	PCI Express Gen4		16.000000 Gbit/s
"SAS"	SAS		24.000000 Gbit/s
"IB_EDR"	Infiniband_EDR		25.781250 Gbit/s
"100GbE"	100GbE(25.78x4)		25.781250 Gbit/s
"100G_OTU4"	100G OTU4		28.000000 Gbit/s
"32G_FC"	32GFC		28.050000 Gbit/s
"100G_ULH"	100G ULH		32.100000 Gbit/s

\*: The bit rate can be set by :OUTPut: DATA: BITRate.

**Note:**

Available preset frequencies vary depending on the presence of Option x01.

Function	Specifies the preset bit rate that the 32G PPG module outputs.
Example	To set the preset frequency to "USB3_1". > :OUTPut:DATA:STANdard "USB3_1"
Compatibility	Incompatible with the existing modules.

## **:OUTPut:DATA:STANdard?**

---

Response	<freq> = <STRING RESPONSE DATA> "Variable","PCI_EX1", "PCI_EX2", "USB3","PCI_EX3", "8G_FC", "OC_192","IB_QDR", "USB3_1", "10G_FC ", "OC_192_G975", "OC_192_G709", "10GbE_G709", "10G_FC_G709", "16G_FC", "IB_FDR", "PCI_EX4", "SAS","IB_EDR", "100GbE ", "100G_OTU", "32G_FC","100G_ULH"
Function	Queries the preset bit rate that the 32G PPG module outputs.
Example	> :OUTPut:DATA:STANdard? < "USB3_1"
Compatibility	Incompatible with the existing modules.

**:OUTPut:DATA:BITRate <numeric>**

Parameter	<p>&lt;numeric&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;</p> <p>When synchronized with MU181000A/B and set to Full clock output:</p> <p>2.400000 to 12.500000 Gbit/s / 0.000001 Gbit/s step  12.500002 to 20.000000 Gbit/s / 0.000002 Gbit/s step  20.000002 to 25.000000 Gbit/s / 0.000002 Gbit/s step  25.000004 to 28.100000 Gbit/s / 0.000004 Gbit/s step*<sup>1</sup>  25.000004 to 32.100000 Gbit/s / 0.000004 Gbit/s step*<sup>2</sup></p> <p>When synchronized with MU181000A/B and set to Half clock output:</p> <p>2.400000 to 25.000000 Gbit/s / 0.000002 Gbit/s step  25.000004 to 28.100000 Gbit/s / 0.000004 Gbit/s step*<sup>1</sup>  25.000004 to 32.100000 Gbit/s / 0.000004 Gbit/s step*<sup>2</sup></p> <p>When synchronized with MU181000A/B + MU181500B and set to Full clock output:</p> <p>2.400000 to 3.125000 Gbit/s / 0.000001 Gbit/s step  3.200001 to 6.250000 Gbit/s / 0.000001 Gbit/s step  6.400001 to 12.500000 Gbit/s / 0.000001 Gbit/s step  12.800002 to 15.000000 Gbit/s / 0.000002 Gbit/s step  15.000002 to 20.000000 Gbit/s / 0.000002 Gbit/s step  20.000002 to 25.000000 Gbit/s / 0.000002 Gbit/s step  25.600004 to 28.100000 Gbit/s / 0.000004 Gbit/s step*<sup>1</sup>  25.600004 to 32.100000 Gbit/s / 0.000004 Gbit/s step*<sup>2</sup></p> <p>When synchronized with MU181000A/B + MU181500B and set to Half clock output:</p> <p>2.400000 to 3.125000 Gbit/s / 0.000002 Gbit/s step  3.200002 to 6.250000 Gbit/s / 0.000002 Gbit/s step  6.400002 to 12.500000 Gbit/s / 0.000002 Gbit/s step  12.800002 to 25.000000 Gbit/s / 0.000002 Gbit/s step  25.600004 to 28.100000 Gbit/s / 0.000004 Gbit/s step*<sup>1</sup>  25.600004 to 32.100000 Gbit/s / 0.000004 Gbit/s step*<sup>2</sup></p> <p>*1: Not available option x01  *2: Available option x01</p>
Function	<p>Sets the bit rate outputting from the mainframe.</p> <p>When the preset bit rate is set to Variable by :OUTPut: DATA: STANdard, the bit rate can be set by this command.</p>
Example	<p>To set the bit rate to 32.1 Gbit/s:</p> <pre>&gt; :OUTPut:DATA:BITRate 32.100000</pre>
Compatibility	Incompatible with the existing modules.

## **:OUTPut:DATA:BITRate?**

---

Response	When Clock Source is not External. <numeric> = <NR1 NUMERIC RESPONSE DATA> 2.400000 to 32.100000                  2.400000 to 32.100000 Gbit/s When Clock Source is External. <string> = <STRING RESPONSE DATA> "XX.XXXXX"
	2.400000 to 28.100000                  2.400 000 to 28.100 000 Gbit/s (Not available option x01)
	2.400000 to 32.100000                  2.400 000 to 32.100 000 Gbit/s (Available option x01)
Function	Queries operation frequency of tracking built-in synthesizer.
Example	> :OUTPut:DATA:BITRate? < 32.100000
Compatibility	Incompatible with the existing modules.

## **:OUTPut:CLOCK:OUTPut <boolean>**

---

Response	<boolean> = <BOOLEAN PROGRAM DATA> OFF or 0                                  Output OFF ON or 1                                    Output ON
Function	Sets clock output ON/OFF.
Example	To set clock output to ON: > :OUTPut:CLOCK:OUTPut ON
Compatibility	Compatible with MU181020A/B.

## **:OUTPut:CLOCK:OUTPut?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0    Output OFF 1    Output ON
Function	Queries clock output ON/OFF status.
Example	> :OUTPut:CLOCK:OUTPut? < 1
Compatibility	Compatible with MU181020A/B.



7.11.2.2 Data/XData Setting Commands

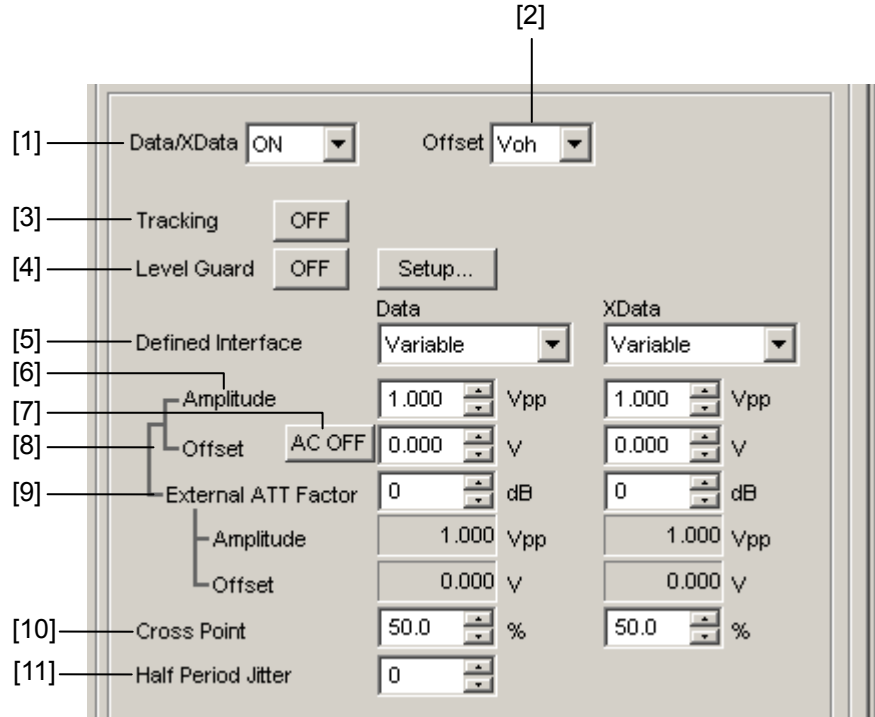


Figure 7.11.2.2-1 Data/XData Settings

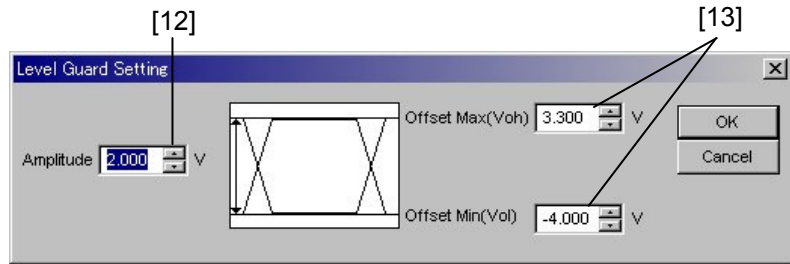


Figure 7.11.2.2-2 Level Guard Settings Dialog Box

Table 7.11.2.2-1 Data/XData Setting Commands

No.	Setting Items	Commands
[1]	Data/XData	:OUTPut:DATA:OUTPut
		:OUTPut:DATA:OUTPut?
[2]	Offset	:OUTPut:OFFset
		:OUTPut:OFFset?
[3]	Tracking	:OUTPut:DATA:TRACking
		:OUTPut:DATA:TRACking?
[4]	Level Guard	:OUTPut:DATA:LEVGuard
		:OUTPut:DATA:LEVGuard?
[5]	Defined Interface	:OUTPut:DATA:LEVel
		:OUTPut:DATA:LEVel?

**Table 7.11.2.2-1 Data/XData Setting Commands (Cont'd)**

No.	Setting Items	Commands
[6]	Amplitude	:OUTPut:DATA:AMPLitude
		:OUTPut:DATA:AMPLitude?
[7]	AC ON/OFF	:OUTPut:DATA:AOFFset
		:OUTPut:DATA:AOFFset?
[8]	Offset	:OUTPut:DATA:OFFSet
		:OUTPut:DATA:OFFSet?
[9]	External ATT Factor	:OUTPut:DATA:ATTFactor
		:OUTPut:DATA:ATTFactor?
[10]	Cross Point	:OUTPut:DATA:CPOint
		:OUTPut:DATA:CPOint?
[11]	Half Period Jitter	:OUTPut:DATA:HPJitter
		:OUTPut:DATA:HPJitter?
[12]	Amplitude	:OUTPut:DATA:LIMitter:AMPLitude
		:OUTPut:DATA:LIMitter:AMPLitude?
[13]	Offset Max/Min	:OUTPut:DATA:LIMitter:OFFSet
		:OUTPut:DATA:LIMitter:OFFSet?

**:OUTPut:DATA:OUTPut <boolean>**

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> OFF or 0                      Output OFF ON or 1                        Output ON
Function	Sets data output ON or OFF. The setting commonly applies to Data and XData.
Example	To set data output ON: > :OUTPut:DATA:OUTPut ON
Compatibility	Compatible with MU181020A/B.

**:OUTPut:DATA:OUTPut?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0                                Output OFF 1                                Output ON
Function	Queries data output ON/OFF.
Example	> :OUTPut:DATA:OUTPut? < 1
Compatibility	Compatible with MU181020A/B.

**:OUTPut:OFFSet <offset>**


---

Parameter	<offset> = <CHARACTER PROGRAM DATA>
	VOH                      Based on the high level
	VTH                      Based on the center level
	VOL                      Based on the low level
Function	Sets the offset reference value for data output.
Example	To set the offset reference to Voh: > :OUTPut:OFFSet VOH
Compatibility	Compatible with MU181020A/B.

**:OUTPut:OFFSet?**


---

Response	<offset> = <CHARACTER RESPONSE DATA> VOH, VTH, VOL
Function	Queries the offset reference value for data outputs.
Example	> :OUTPut:OFFSet? < VOH
Compatibility	Compatible with MU181020A/B.

**:OUTPut:DATA:TRACking <boolean>**


---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA>
	OFF or 0                  Common setting OFF
	ON or 1                    Common setting ON
Function	Sets the common setting for the Data and XData output ON or OFF.
Example	To set the common setting ON: > :OUTPut:DATA:TRACking ON
Compatibility	Compatible with MU181020A/B.

**:OUTPut:DATA:TRACking?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	0                            Common setting OFF
	1                            Common setting ON
Function	Queries the common setting for the Data and XData outputs ON/OFF state.
Example	> :OUTPut:DATA:TRACking? < 1
Compatibility	Compatible with MU181020A/B.

### **:OUTPut:DATA:LEVGuard <boolean>**

---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA>
	OFF or 0                      Output range limitation OFF
	ON or 1                      Output range limitation ON
Function	Sets the data output range limitation ON or OFF.
Example	To set the data output range limitation ON: > :OUTPut:DATA:LEVGuard ON
Compatibility	Compatible with MU181020A/B.

### **:OUTPut:DATA:LEVGuard?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	0                              Output range limitation OFF
	1                              Output range limitation ON
Function	Queries the data output range limitation ON/OFF state.
Example	> :OUTPut:DATA:LEVGuard? < 1
Compatibility	Compatible with MU181020A/B.

### **:OUTPut:DATA:LEVel <port>,<level>**

---

Parameter	<port> = <CHARACTER PROGRAM DATA>
	DATA                      Data output
	XDATA                      XData output
	<level> = <CHARACTER PROGRAM DATA>
	VARIABLE                      Variable
	PCML                      PCML level
	NCML                      NCML level
	SCFL                      SCFL level
	NECL                      NECL level
	LVPECL                      LVPECL level
Function	Sets the level of the fixed interface for the data output.
Example	To set the level of the XData output to the NECL level: > :OUTPut:DATA:LEVel XDATA,NECL
Compatibility	Compatible with MU181020A/B.

**:OUTPut:DATA:LEVel? <port>**

Parameter	<port> = <CHARACTER PROGRAM DATA> DATA, XDATA
Response	<level> = <CHARACTER RESPONSE DATA> VAR, PCML, NCML, SCFL, NECL, LVP
Function	Queries the level of the fixed interface for the data output.
Example	To query the level of the XData output: > :OUTPut:DATA:LEVel? XDATA < NECL
Compatibility	Compatible with MU181020A/B.

**:OUTPut:DATA:AMPLitude <port>,<numeric>**

Parameter	<port> = <CHARACTER PROGRAM DATA> DATA DATA output XDATA XData output <numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0.500 to 2.000 0.500 to 2.000 V/0.002 V Step (MU183020A-x12/x22, MU183021A-x12) 0.500 to 3.500 0.500 to 3.500 V/0.002 V Step (MU183020A-x13/x23, MU183021A-x13)
Function	Sets the amplitude of the data output.
Example	To set the amplitude of the Data output to 1.000 V: > :OUTPut:DATA:AMPLitude DATA,1.000
Compatibility	Partially compatible with MU181020A/B.

**:OUTPut:DATA:AMPLitude? <port>**

Parameter	<port> = <CHARACTER PROGRAM DATA> DATA, XDATA
Response	<numeric> = <NR2 NUMERIC RESPONSE DATA> 0.500 to 2.000 0.500 to 2.000 V (MU183020A-x12/x22, MU183021A-x12) 0.500 to 3.500 0.500 to 2.000 V (MU183020A-x13/x23, MU183021A-x13)
Function	Queries the amplitude of the data output.
Example	To query the amplitude of the Data output: > :OUTPut:DATA:AMPLitude? DATA < 1.000
Compatibility	Compatible with MU181020A/B.

**:OUTPut:DATA:AOFFset <boolean>**

---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> OFF or 0                      Offset OFF (DC output) ON or 1                        Offset ON (AC output)
Function	Sets the data output offset ON or OFF
Example	To set the data output offset ON: > :OUTPut:DATA:AOFFset ON
Compatibility	Compatible with MU181020A/B.

**:OUTPut:DATA:AOFFset?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0                                Offset OFF 1                                Offset ON
Function	Queries the data output offset ON/OFF state.
Example	> :OUTPut:DATA:AOFFset? < 1
Compatibility	Compatible with MU181020A/B.

**:OUTPut:DATA:OFFSet <port>,<numeric>**

---

Parameter	<port> = <CHARACTER PROGRAM DATA> DATA                          Data output XDATA                         XData output <numeric> = <DECIMAL NUMERIC PROGRAM DATA> Voh     -2.000 to 3.300        -2.000 to 3.300 Voh/0.001 V Step Vth     -3.000 to 3.050        -3.000 to 3.050 Vth/0.001 V Step Vol     -4.000 to 2.800        -4.000 to 2.800 Vol/0.001 V Step
Function	Sets the data output offset. The setting range varies depending on the offset reference setting.
Example	To set the XData output offset to 1.000 V (Voh): > :OUTPut:DATA:OFFSet XDATA,1.000
Compatibility	Compatible with MU181020A/B.

**:OUTPut:DATA:OFFSet? <port>**


---

Parameter	<port> = <CHARACTER PROGRAM DATA> DATA, XDATA	
Response	<numeric> = <NR2 NUMERIC RESPONSE DATA> Voh      -2.000 to 3.300      -2.000 to 3.300 Voh/0.001 V Step Vth      -3.000 to 3.050      -3.000 to 3.050 Vth/0.001 V Step Vol      -4.000 to 2.800      -4.000 to 2.800 Vol/0.001 V Step	
Function	Queries the data output offset.	
Example	To query the XData output offset: > :OUTPut:DATA:OFFSet? XDATA < 1.000	
Compatibility	Compatible with MU181020A/B.	

**:OUTPut:DATA:ATTFactor <port>, <numeric>**


---

Parameter	<port> = <CHARACTER PROGRAM DATA> DATA                      Data output XDATA                     XData output <numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0 to 40                    0 to 40 dB/1 dB Step	
Function	Sets the External ATT Factor of the data output.	
Example	To set the External ATT Factor of the Data output to 20 dB: > :OUTPut:DATA:ATTFactor DATA, 20	
Compatibility	Compatible with MU181020A/B.	

**:OUTPut:DATA:ATTFactor? <port>**


---

Parameter	<port> = <CHARACTER PROGRAM DATA> DATA, XDATA	
Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 to 40                    0 to 40 dB/1 dB Step	
Function	Queries the External ATT Factor of the Data output.	
Example	> :OUTPut:DATA:ATTFactor? DATA < 20	
Compatibility	Compatible with MU181020A/B.	

### **:OUTPut:DATA:CPOint <port>,<numeric>**

---

Parameter	<port> = <CHARACTER PROGRAM DATA> DATA                      Data output XDATA                      XData output <numeric> = <DECIMAL NUMERIC PROGRAM DATA> 20.0 to 80.0              20 to 80%/0.1% Step
Function	Sets the data output crosspoint.
Example	To set the crosspoint of the XData output to 60%: > :OUTPut:DATA:CPOint XDATA,60.0
Compatibility	Partially compatible with MU181020A/B.

### **:OUTPut:DATA:CPOint? <port>**

---

Parameter	<port> = <CHARACTER PROGRAM DATA> DATA, XDATA
Response	<numeric> = <NR2 NUMERIC RESPONSE DATA> 20.0 to 80.0              20 to 80%/0.1% Step
Function	Queries the data output crosspoint.
Example	To query the crosspoint of the XData output: > :OUTPut:DATA:CPOint? XDATA < 60.0
Compatibility	Compatible with MU181020A/B.

### **:OUTPut:DATA:HPJitter <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> -20 to 20                      -20 to 20 /1 Step
Function	Sets the half period jitter.
Example	To set the half period jitter to 10: > :OUTPut:DATA:HPJitter 10
Compatibility	Incompatible with existing models.

### **:OUTPut:DATA:HPJitter?**

---

Response	<numeric> = <NR2 NUMERIC RESPONSE DATA> -20 to 20                      -20 to 20
Function	Queries the half period jitter.
Example	> :OUTPut:DATA:HPJitter? < 10
Compatibility	Incompatible with existing models.



**:OUTPut:DATA:LIMitter:AMPLitude <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA>	
	0.500 to 2.000	0.500 to 2.000 V/0.002 V Step (MU183020A-x12/x22, MU183021A-x12)
	0.500 to 3.500	0.500 to 3.500 V/0.002 V Step (MU183020A-x13/x23, MU183021A-x13)
Function	Sets the limitation value for the data output amplitude.	
Example	To set the limitation value for the data output amplitude to 2.000 V: > :OUTPut:DATA:LIMitter:AMPLitude 2.000	
Compatibility	Partially compatible with MU181020A/B.	

**:OUTPut:DATA:LIMitter:AMPLitude?**

Response	<numeric> = <NR2 NUMERIC RESPONSE DATA>	
	0.500 to 2.000	0.500 to 2.000 V (MU183020A-x12/x22, MU183021A-x12)
	0.500 to 3.500	0.500 to 3.500 V (MU183020A-x13/x23, MU183021A-x13)
Function	Queries the limitation value for the data output amplitude.	
Example	> :OUTPut:DATA:LIMitter:AMPLitude? < 2.000	
Compatibility	Compatible with MU181020A/B.	

**:OUTPut:DATA:LIMitter:OFFSet <max>,<min>**

Parameter	<max> = <DECIMAL NUMERIC PROGRAM DATA>	
	-2.000 to 3.300	-2.000 to 3.300 Voh/0.001 V Step (MU183020A-x12/x13/x22/x23, MU183021A-x12/x13)
	<min> = <DECIMAL NUMERIC PROGRAM DATA>	
	-4.000 to 2.800	-4.000 to 2.800 Vol/0.001 V Step (MU183020A-x12/x13/x22/x23, MU183021A-x12/x13)
Function	Sets the limitation value for the data output offset.	
Example	To set the limitation value for the data output offset to 3.000 Voh max., -2.000 Vol min.: > :OUTPut:DATA:LIMitter:OFFSet 3.000,-2.000	
Compatibility	Compatible with MU181020A/B.	

## **:OUTPut:DATA:LIMitter:OFFSet?**

---

Response	<code>&lt;max&gt; = &lt;NR2 NUMERIC RESPONSE DATA&gt;</code> -2.000 to 3.300      -2.000 to 3.300 Voh/0.001 V Step (MU183020A-x12/x13/x22/x23, MU183021A-x12/x13) <code>&lt;min&gt; = &lt;NR2 NUMERIC PROGRAM DATA&gt;</code> -4.000 to 2.800      -4.000 to 2.800 Vol/0.001 V Step (MU183020A-x12/x13/x22/x23, MU183021A-x12/x13)
Function	Queries the limitation value for the data output offset.
Example	<code>&gt; :OUTPut:DATA:LIMitter:OFFSet?</code> <code>&lt; 3.000,-2.000</code>
Compatibility	Compatible with MU181020A/B.

7.11.2.3 Delay Setting Commands

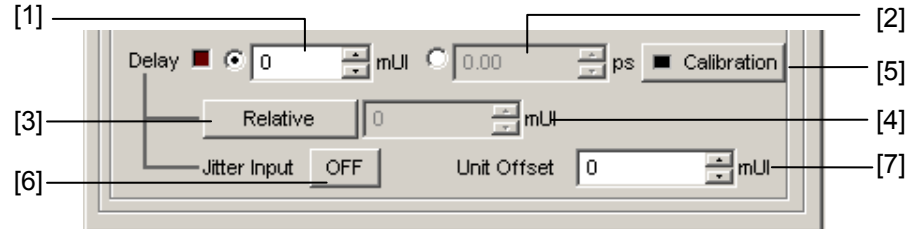


Figure 7.11.2.3-1 Delay Setting

Table 7.11.2.3-1 Delay Setting Commands

No.	Setting Items	Commands
[1]	Delay (mUI setting)	:OUTPut:DATA:UIPadjust
		:OUTPut:DATA:UIPadjust?
[2]	Delay (ps setting)	:OUTPut:DATA:PADJust
		:OUTPut:DATA:PADJust?
[3]	Relative	:OUTPut:DATA:RELative
		:OUTPut:DATA:RELative?
[4]	No label (Relative value setting)	:OUTPut:DATA:RDELay
		:OUTPut:DATA:RDELay?
[5]	Calibration	:OUTPut:DATA:PCALibration
[6]	Jitter Input	:OUTPut:DATA:JINPut
		:OUTPut:DATA:JINPut?
[7]	Unit Offset	:OUTPut:DATA:UDELay:OFFSet
		:OUTPut:DATA:UDELay:OFFSet?

**:OUTPut:DATA:UIPadjust <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> -1000 to 1000      -1000 to 1000 mUI/2 mUI Step (In the case of Combination)
Function	Sets the common phase for the Data and XData outputs in mUI units.
Example	To set the common phase to 500 mUI: > :OUTPut:DATA:UIPadjust 500
Compatibility	Compatible with MU181020A/B.

### **:OUTPut:DATA:UIPadjust?**

---

Response	<code>&lt;numeric&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;</code> -1000 to 1000                    -1000 to 1000 mUI/2 mUI Step (In the case of Combination) -64000 to 64000                -64000 to 64000 mUI/2 mUI Step
Function	Queries the common phase for the Data and XData outputs in mUI units.
Example	To query the common phase in mUI units: > :OUTPut:DATA:UIPadjust? < 500
Compatibility	Compatible with MU181020A/B.

### **:OUTPut:DATA:PADJust <numeric>**

---

Parameter	<code>&lt;numeric&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;</code> -416 to 416                        -416 to 416 ps/0.2 ps (at 2.4 Gbit/s) -80 to 80                            -80 to 80 ps/0.08 ps (at 12.5 Gbit/s) -31.14 to 31.14                   -31.14 to 31.14 ps/0.06 ps (at 32.1 Gbit/s) Converted from the calculated frequency value, based on the setting resolution of mUI.
Function	Sets the common phase for the Data and XData outputs in ps units. The specified value may not be exactly set as is, due to the limitation of the setting resolution. In this event, the value is adjusted to the most approximate value and set.
Example	To set the common phase to 100 ps: > :OUTPut:DATA:PADJust 100
Compatibility	Compatible with MU181020A/B.

### **:OUTPut:DATA:PADJust?**

---

Response	<code>&lt;numeric&gt; = &lt;NR2 NUMERIC RESPONSE DATA&gt;</code> -416 to 416                        -416 to 416 ps/0.2 ps (at 2.4 Gbit/s) -80 to 80                            -80 to 80 ps/0.08 ps (at 12.5 Gbit/s) -31.14 to 31.14                   -31.14 to 31.14 ps/0.06 ps (at 32.1 Gbit/s) Converted from the calculated frequency value, based on the setting resolution of mUI.
Function	Queries the common phase for the Data and XData outputs in ps units.
Example	To query the common phase in ps units: > :OUTPut:DATA:PADJust? < 100
Compatibility	Compatible with MU181020A/B.

**:OUTPut:DATA:RELative <boolean>**


---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA>
	0 or OFF                      Reference OFF
	1 or ON                        Reference ON
Function	Sets the data output delay reference ON or OFF.
Example	To set the data output delay reference ON: > :OUTPut:DATA:RELative ON
Compatibility	Compatible with MU181020A/B.

**:OUTPut:DATA:RELative?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	0                                Reference OFF
	1                                Reference ON
Function	Queries the data output delay reference setting (ON/OFF).
Example	> :OUTPut:DATA:RELative? < 1
Compatibility	Compatible with MU181020A/B.

**:OUTPut:DATA:RDELay <numeric>[,<unit>]**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA>
	-2000 to 2000                -2000 to 2000 mUI/2 mUI Step
	XXXXX.XX                    Converted from the calculated frequency value, based on the setting resolution of mUI.
	[<unit>] = <CHARACTER PROGRAM DATA>
	UI                              mUI units
	PS                              ps units
	The ps unit is selected when [<unit>] is omitted.
Function	Sets the value and unit of the data output delay reference. Set a value using a difference from the reference value. The specified value may not be exactly set as is when the ps unit is set, due to the limitation of the setting resolution. In this event, the value is adjusted to the most approximate value and set.
Example	To set the value for the data output delay reference to -1000 mUI: > :OUTPut:DATA:RDELay -1000,UI
Compatibility	Compatible with MU181020A/B.

### **:OUTPut:DATA:RDELaY? [<unit>]**

Parameter	[<unit>] = <CHARACTER PROGRAM DATA>
	UI                               mUI units
	PS                               ps units
	The ps unit is selected when [<unit>] is omitted.
Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	-2000 to 2000               -2000 to 2000 mUI/2 mUI Step
	XXXXX.XX                    Converted from the calculated frequency value, based on the setting resolution of mUI.
Function	Queries the value and unit of the data output delay reference.
Example	> :OUTPut:DATA:RDELaY? UI
	< -1000
Compatibility	Compatible with MU181020A/B.

### **:OUTPut:DATA:PCALibration**

Function	Executes calibration for Data and XData output phases.
Example	> :OUTPut:DATA:PCALibration
Compatibility	Compatible with MU181020A/B.

### **:OUTPut:DATA:JINPut <boolean>**

Parameter	<boolean> = <BOOLEAN PROGRAM DATA>
	0 or OFF                    Jitter input OFF setting
	1 or ON                      Jitter input ON setting
Function	When a jitter is added to the input signal, the Feedback process for Delay must be set to OFF.
	When a jitter is added, set the Jitter Input button to ON, using this command. When a jitter is not added, set the Jitter Input button to OFF.
Example	To set the Jitter Input button to ON when a jitter is added:
	> :OUTPut:DATA:JINPut ON
Compatibility	Compatible with MU181020A/B.

### **:OUTPut:DATA:JINPut?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	0                             Jitter input OFF setting
	1                             Jitter input ON setting
Function	Queries the Jitter Input button setting.
Example	> :OUTPut:DATA:JINPut?
	< 1
Compatibility	Compatible with MU181020A/B.

**:OUTPut:DATA:UDELAY:OFFSet <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> -128000 to 128000      -128 000 to 128 000 mUI/2 mUI Step
Function	Sets the unit of the Delay offset value.
Example	To set the Delay offset to 500 mUI: > :OUTPut:DATA:UDELAY:OFFSet 500
Compatibility	Incompatible with existing models.

**:OUTPut:DATA:UDELAY:OFFSet?**


---

Response	<numeric> = <NR2 NUMERIC RESPONSE DATA> -128000 to 128000      -128 000 to 128 000 mUI/2 mUI Step
Function	Queries the Delay offset value.
Example	> :OUTPut:DATA:UDELAY:OFFSet? < 500
Compatibility	Incompatible with existing models.

### 7.11.3 Pattern Tab

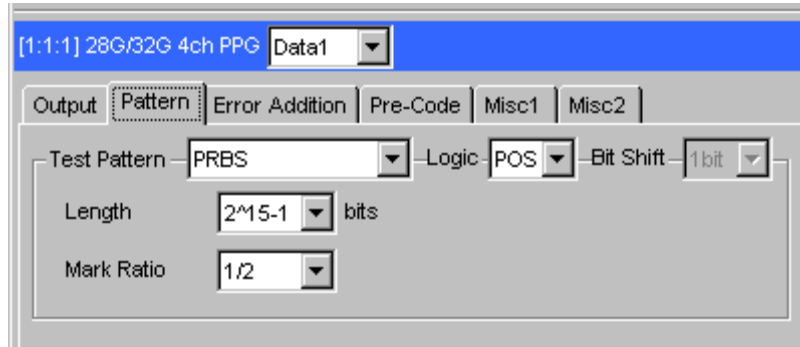


Figure 7.11.3-1 Pattern Tab

#### 7.11.3.1 Test Pattern Setting Commands

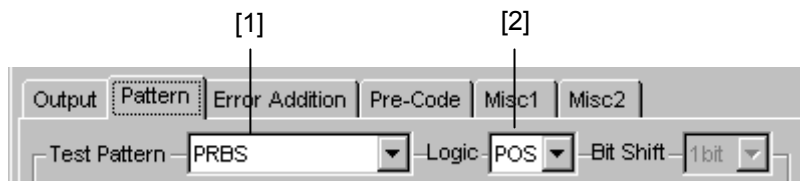


Figure 7.11.3.1-1 Test Pattern Setting

Table 7.11.3.1-1 Test Pattern Setting Commands

No.	Setting Items	Commands
[1]	Test Pattern	:SOURce:PATTern:TYPE
		:SOURce:PATTern:TYPE?
[2]	Logic	:SOURce:PATTern:LOGic
		:SOURce:PATTern:LOGic?

#### **:SOURce:PATTern:TYPE <type>**

Parameter	<type> = <CHARACTER PROGRAM DATA>
	PRBS PRBS pattern
	ZSUBstitution Zero-substitution pattern
	DATA Data pattern
	MIXData Mixed Data pattern
Function	Sets the type of the test pattern.
Example	To set the test pattern type to the Mixed Data pattern: > :SOURce:PATTern:TYPE MIXData
Compatibility	Compatible with MU181020A/B.



**:SOURce:PATtern:TYPE?**


---

Response	<type> = <CHARACTER RESPONSE DATA> PRBS, ZSUB, DATA, MIXD
Function	Queries the type of the test pattern.
Example	> :SOURce:PATtern:TYPE? < MIXD
Compatibility	Compatible with MU181020A/B.

**:SOURce:PATtern:LOGic <logic>**


---

Parameter	<logic> = <CHARACTER PROGRAM DATA> POSitive                      Positive logic NEGative                      Negative logic
Function	Sets the logic (positive or negative) of the test pattern.
Example	To set the logic of the test pattern to the negative logic (NEGative): > :SOURce:PATtern:LOGic NEGative
Compatibility	Compatible with MU181020A/B.

**:SOURce:PATtern:LOGic?**


---

Response	<logic> = <CHARACTER RESPONSE DATA> POS, NEG
Function	Queries the logic of the test pattern.
Example	> :SOURce:PATtern:LOGic? < NEG
Compatibility	Compatible with MU181020A/B.



**:SOURce:PATtern:PRBS:LENGth?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 7, 9, 10, 11, 15, 20, 23, 31
Function	Queries the number of stages during PRBS pattern generation.
Example	> :SOURce:PATtern:PRBS:LENGth? < 15
Compatibility	Compatible with MU181020A/B.

**:SOURce:PATtern:PRBS:MRATio <mratio>**


---

Parameter	<mratio> = <CHARACTER PROGRAM DATA> M1_2                    1/2 I1_2                    1/2INVT
Function	Sets the mark ratio during PRBS pattern generation.
Example	To set the mark ratio to 1/2INVT: > :SOURce:PATtern:PRBS:MRATio I1_2
Compatibility	Compatible with MU181020A/B.

**:SOURce:PATtern:PRBS:MRATio?**


---

Response	<mratio> = <CHARACTER RESPONSE DATA> M1_2, I1_2
Function	Queries the mark ratio during PRBS pattern generation.
Example	> :SOURce:PATtern:PRBS:MRATio? < I1_2
Compatibility	Compatible with MU181020A/B.

**:SOURce:PATtern:PRBS:BSHift?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1
Function	Queries the bit shift number during PRBS pattern generation.
Example	> :SOURce:PATtern:PRBS:BSHift? < 1
Compatibility	Compatible with MU181020A/B.

7.11.3.3 Zero-Substitution pattern setting commands

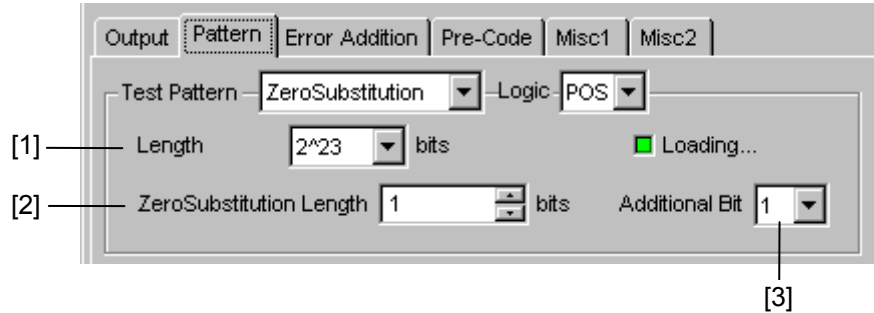


Figure 7.11.3.3-1 Test Pattern Setting (When Zero-Substitution Is Selected)

Table 7.11.3.3-1 Zero-Substitution Pattern Setting Commands

No.	Setting Items	Commands
[1]	Length	:SOURce:PATTern:ZSUBstitute:LENGth
		:SOURce:PATTern:ZSUBstitute:LENGth?
[2]	Zero-Substitution Length	:SOURce:PATTern:ZSUBstitute:ZLENgth
		:SOURce:PATTern:ZSUBstitute:ZLENgth?
[3]	Additional Bit	:SOURce:PATTern:ZSUBstitute:ADDBit
		:SOURce:PATTern:ZSUBstitute:ADDBit?

**:SOURce:PATTern:ZSUBstitute:LENGth <length>**

Parameter	<length> = <DECIMAL NUMERIC PROGRAM DATA>	
	7	2 <sup>n</sup> (n = 7)
	9	2 <sup>n</sup> (n = 9)
	10	2 <sup>n</sup> (n = 10)
	11	2 <sup>n</sup> (n = 11)
	15	2 <sup>n</sup> (n = 15)
	20	2 <sup>n</sup> (n = 20)
	23	2 <sup>n</sup> (n = 23)
	-7	2 <sup>n-1</sup> (n = 7)
	-9	2 <sup>n-1</sup> (n = 9)
	-10	2 <sup>n-1</sup> (n = 10)
	-11	2 <sup>n-1</sup> (n = 11)
	-15	2 <sup>n-1</sup> (n = 15)
	-20	2 <sup>n-1</sup> (n = 20)
	-23	2 <sup>n-1</sup> (n = 23)
Function	Sets the pattern length during Zero-Substitution pattern generation.	
Example	To set the pattern length to 2 <sup>15</sup> : > :SOURce:PATTern:ZSUBstitute:LENGth 15	
Compatibility	Compatible with MU181020A/B.	

**:SOURce:PATtern:ZSUBstitute:LENGth?**

Response	<length> = <NR1 NUMERIC RESPONSE DATA> 7, 9, 10, 11, 15, 20, 23, -7, -9, -10, -11, -15, -20, -23
Function	Queries the pattern length during Zero-Substitution pattern generation.
Example	> :SOURce:PATtern:ZSUBstitute:LENGth? < 15
Compatibility	Compatible with MU181020A/B.

**:SOURce:PATtern:ZSUBstitute:ZLENGth <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> When ZSUBlength, 2 <sup>n</sup> is set: 1 to 2 <sup>n</sup> -1                      1 to 2 <sup>n</sup> -1/1 bit Step When ZSUBlength, 2 <sup>n</sup> - 1 is set: 1 to 2 <sup>n</sup> -2                      1 to 2 <sup>n</sup> -2/1 bit Step n = 7, 9, 11, 15, 20, 23
Function	Sets the number of bits to which "0" is inserted (zero-insertion bit count) during Zero-Substitution pattern generation. Available parameters vary depending on the setting conditions.
Example	To set the zero-insertion bit count to 10 bits: > :SOURce:PATtern:ZSUBstitute:ZLENGth 10
Compatibility	Compatible with MU181020A/B.

**:SOURce:PATtern:ZSUBstitute:ZLENGth?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1 to 2 <sup>n</sup> -1 n = 7, 9, 11, 15, 20, 23
Function	Queries the zero-insertion bit count during Zero-Substitution pattern generation.
Example	> :SOURce:PATtern:ZSUBstitute:ZLENGth? < 10
Compatibility	Compatible with MU181020A/B.

**:SOURce:PATtern:ZSUBstitute:ADDBit <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA>
	0 Adds one bit of “0” next to the last of zero-inserted bits
	1 Adds one bit of “1” next to the last of zero-inserted bits (same as existing models).
Function	Queries whether to add one bit of “0” or “1” next to the last of zero-inserted bits.
Example	To set one bit of “1” next to the last of zero-inserted bits: > :SOURce:PATtern:ZSUBstitute:ADDBit 1
Compatibility	Compatible with MU181020A/B.

**:SOURce:PATtern:ZSUBstitute:ADDBit?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	0 Adds one bit of “0” next to the last of zero-inserted bits.
	1 Adds one bit of “1” next to the last of zero-inserted bits (same as existing models).
Function	Queries whether to add one bit of “0” or “1” next to the last of zero-inserted bits.
Example	> :SOURce:PATtern:ZSUBstitute:ADDBit? < 1
Compatibility	Compatible with MU181020A/B.

7.11.3.4 Data pattern setting commands

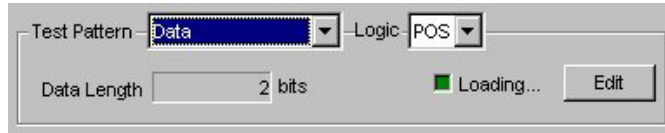


Figure 7.11.3.4-1 Test Pattern Setting (When Data Is Selected)

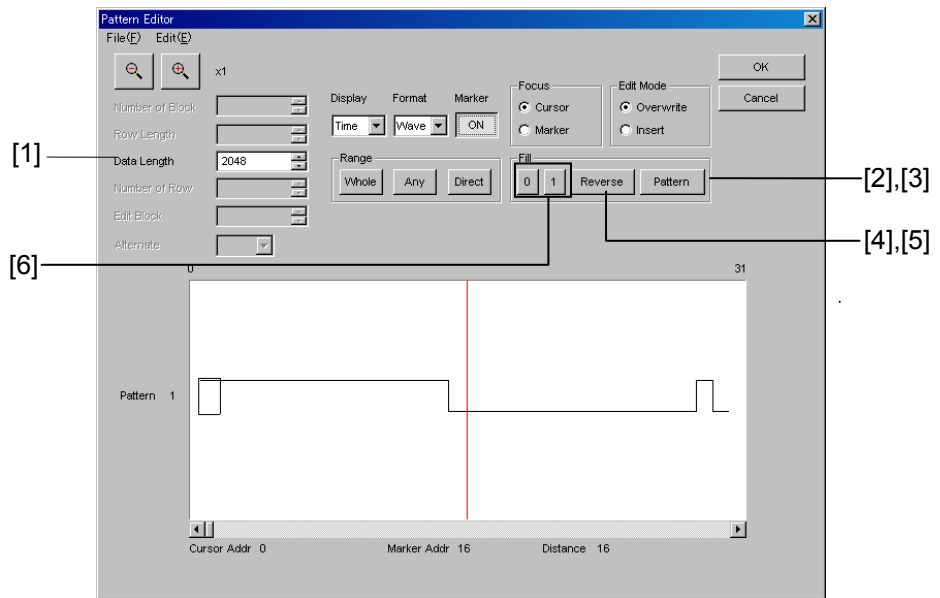


Figure 7.11.3.4-2 Data Pattern Setting (Pattern Editor)

Table 7.11.3.4-1 Data Pattern Setting Commands

No.	Setting Items	Commands
[1]	Data Length	:SOURce:PATTern:DATA:LENGth
		:SOURce:PATTern:DATA:LENGth?
[2]	No label (Pattern setting)	:SOURce:PATTern:DATA:WHOLE
		:SOURce:PATTern:DATA:WHOLE?
[3]	No label (Pattern setting)	:SOURce:PATTern:BDATa:WHOLE
		:SOURce:PATTern:BDATa:WHOLE?
[4]	No label (Data inversion)	:SOURce:PATTern:DREVerse:ADDReSS
[5]	No label (Data inversion)	SOURce:PATTern:DREVerse:DELTA
[6]	No label (All 0 or All 1)	:SOURce:PATTern:DATA:FILL

### **:SOURce:PATtern:DATA:LENGth <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA>		
	Independent	2 to 268435456	2 to 268,435,456 bits/1 bit Step
	2 ch Combination	4 to 536870912	4 to 536,870,912 bits/2 bit Step
	4 ch Combination	8 to 1073741824	8 to 1,073,741,82 bits/4 bit Step
Function	Sets the pattern length during Data pattern generation		
Example	To set the pattern length to 100 bits > :SOURce:PATtern:DATA:LENGth 100		
Compatibility	Partially compatible with MU181020A/B (the parameter range varies depending on the settings).		

### **:SOURce:PATtern:DATA:LENGth?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>		
Function	Queries the pattern length during Data pattern generation.		
Example	> :SOURce:PATtern:DATA:LENGth? < 100		
Compatibility	Compatible with MU181020A/B.		



**:SOURce:PATtern:DATA:WHOLE <start>,<end>,<data>**

Parameter	<p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;  #H0 #HFFFFFFF                    0 to FFFFFFFF bits/1 bit Step  (Specify in hexadecimal)</p> <p>&lt;end&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;  #H0 to #HFFFFFFF                0 to FFFFFFFF bits/1 bit Step  (Specify in hexadecimal)</p> <p><b>Note:</b></p> <p>The maximum setting is the pattern length.  At 2 ch Combination, the setting range and Step are doubled.  At 4 ch Combination, the setting range and Step are quadrupled.</p> <p>&lt;data&gt; = &lt;STRING PROGRAM DATA&gt;  "H****"                            Specify pattern data in hexadecimal format.  1 to 400 characters (pattern data of 400 × 4 bits)  Specify a character string consisting of 0 to 9  and A to F.  If the last character string of the pattern data is  short of a hexadecimal unit (4 bits), add 0 (s) up  to the last bit to make a hexadecimal string.</p> <p>"B****"                            Specify pattern data in binary format.  1 to 400 characters (pattern data of 400 bits)  Specify a character string consisting of 0 and 1.</p>
Function	Sets the pattern data from the <start> to <end> addresses during Data pattern generation. The set data overwrites the specified range.
Example	To set the addresses 0 to 1F of the pattern data to 5A: > :SOURce:PATtern:DATA:WHOLE #H0,#H1F, "H5A"
Compatibility	Partially compatible with MU181020A/B (the parameter range varies depending on the settings).
	<p><b>Note:</b></p> <p>When the number of data bits specified in &lt;data&gt; is smaller than the range specified by &lt;start&gt; and &lt;end&gt;, set &lt;data&gt; repeatedly up to the specified range.</p> <p>&lt;Example&gt;</p> <ul style="list-style-type: none"> <li>• &lt;start&gt; = #H0, &lt;end&gt; = #H1F, &lt;data&gt; = "HABC"  Setting data: ABCABCAB</li> <li>• &lt;start&gt; = #H0, &lt;end&gt; = #H7, &lt;data&gt; = "B011"  Setting data: 01101101</li> </ul> <p>When the number of data bits specified in &lt;data&gt; is greater than the range specified by &lt;start&gt; and &lt;end&gt;, cut off the part of &lt;data&gt; out of the specified range.</p> <p>&lt;Example&gt;</p> <ul style="list-style-type: none"> <li>• &lt;start&gt; = #H0, &lt;end&gt; = #HF, &lt;data&gt; = #HABCDEF</li> </ul>





**:SOURce:PATtern:BDATA:WHOLe? <start>[,<size>]**

Parameter	<p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;                  #H0 to #HFFFFFFF                      0 to FFFFFFFF bits/1 bit Step                  (Specify in hexadecimal)</p> <p><b>Note:</b></p> <p style="padding-left: 40px;">The maximum setting is the pattern length.                  At 2 ch Combination, the setting range is doubled.                  At 4 ch Combination, the setting range is quadrupled.</p> <p>[&lt;size&gt;] = &lt;NR1 NUMERIC PROGRAM DATA&gt;                  1 to 16384                      1 to 16,384 bytes/1 byte Step</p> <p>Binary data of the setting pattern is queried when [&lt;size&gt;] is omitted.</p>
Response	<p>&lt;bdata&gt; = &lt;DEFINITE LENGTH ARBITRARY BLOCK RESPONSE DATA&gt;                  #XYYY&lt;binary&gt;                      X:            Number of YYY digits                  YYY:            Number of bytes of &lt;binary&gt;                  1 to 16,384 bytes                  &lt;binary&gt;: Binary data up to 16,384 bytes</p>
Function	<p>Queries binary data of bytes specified by &lt;size&gt; from &lt;start&gt; address of the pattern data during Data pattern generation.</p>
Example	<p>To query binary data of the setting pattern from the &lt;start&gt; address of the pattern data during Data pattern generation:</p> <pre>&gt; :SOURce:PATtern:BDATA:WHOLe? #H0 &lt; #213AA...</pre> <p>To query binary data of 2 bytes from the &lt;start&gt; address of the pattern data during Data pattern generation:</p> <pre>&gt; :SOURce:PATtern:BDATA:WHOLe? #H0,2 &lt; #12AA</pre>
Compatibility	<p>Partially compatible with MU181020A/B.</p>



**:SOURce:PATtern:DATA:FILL <range>,<page>,<data>**

---

Parameter	<range> = <CHARACTER PROGRAM DATA> PAGE Specifies a page. (One page is defined as 128 bits.) ALL Specifies all data. <page> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 1048576 1 to 1,048,576 (Max.) pages, in 1-page steps Max = Pattern Length / 128 (rounding up fractions) Specify "0" when <range> is set to ALL. <data> = <DECIMAL NUMERIC PROGRAM DATA> 0 Fills the specified range with 0s. 1 Fills the specified range with 1s.
Function	Sets 0s or 1s for the specified page or all data in the program during Data pattern generation.
Example	To set 1s for the second page (from 129th to 256th bits) of the pattern data: > :SOURce:PATtern:DATA:FILL PAGE,2,1
Compatibility	Partially compatible with MU181020A/B (the parameter range varies depending on the settings).

7.11.3.5 Mixed Data pattern setting commands

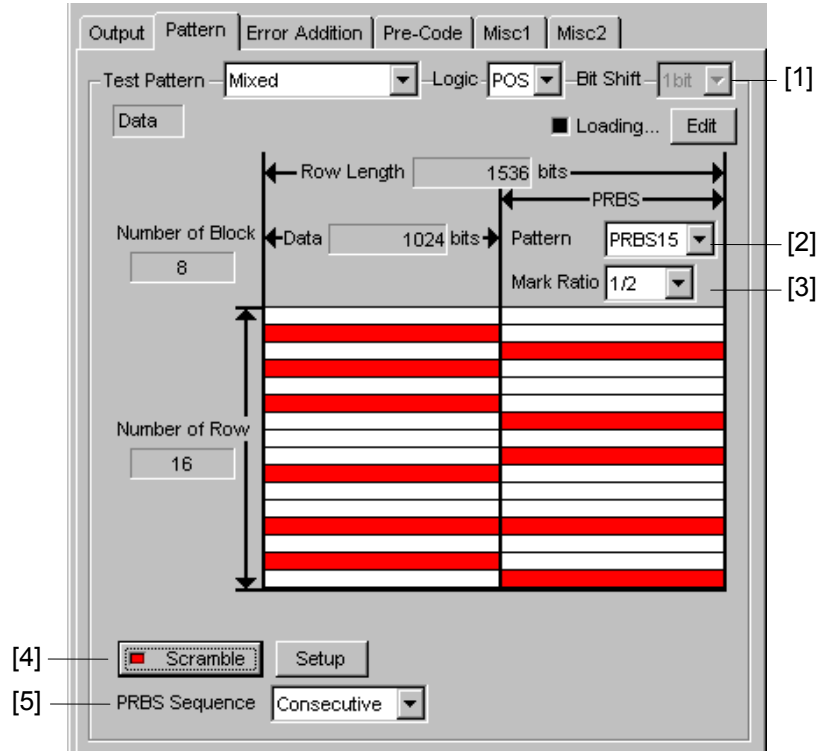


Figure 7.11.3.5-1 Test Pattern Setting (When Mixed Is Selected)

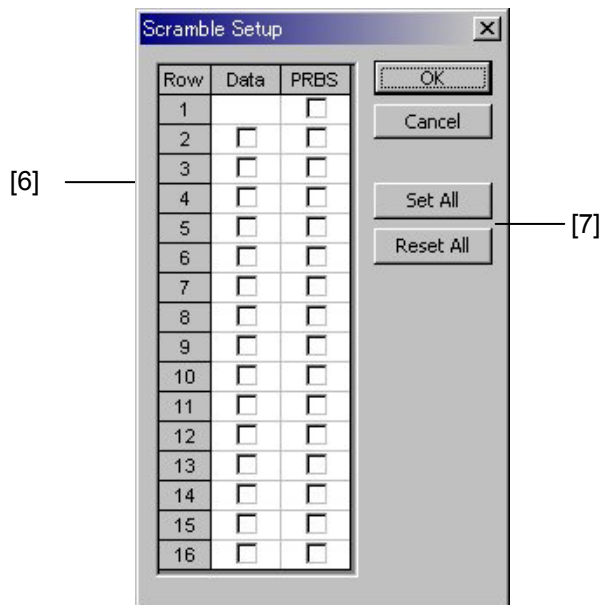


Figure 7.11.3.5-2 Scramble Setup Dialog Box

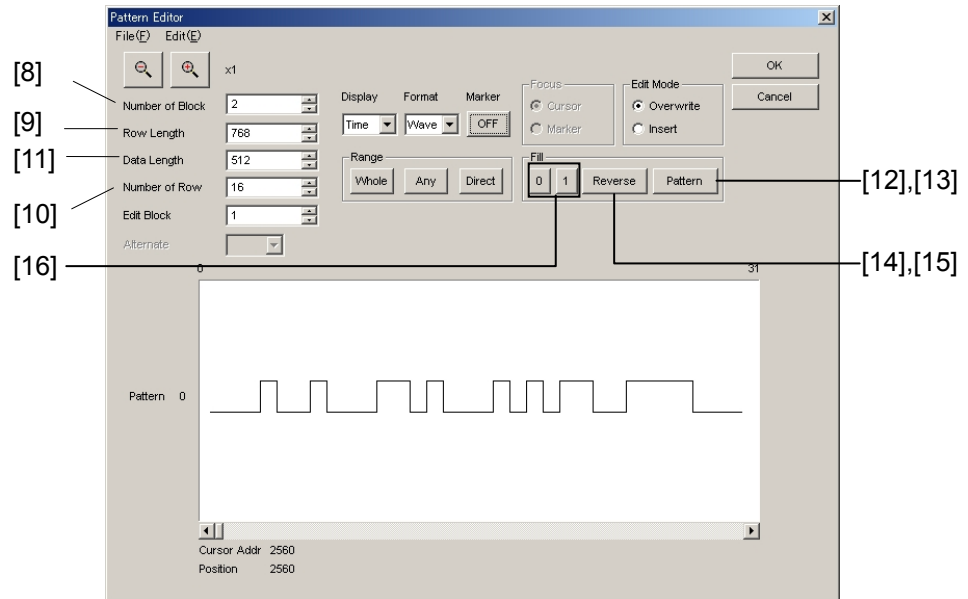


Figure 7.11.3.5-3 Mixed Data Pattern Setting (Pattern Editor)

Table 7.11.3.5-1 Mixed Data Mixed Data Pattern Setting Commands

No.	Setting Items	Commands
[1]	Bit Shift	:SOURce:PATTern:MIXData:PRBS:BITShift?
[2]	Pattern	:SOURce:PATTern:MIXData:PRBS:LENGth :SOURce:PATTern:MIXData:PRBS:LENGth?
[3]	Mark Ratio	:SOURce:PATTern:MIXData:PRBS:MRATio :SOURce:PATTern:MIXData:PRBS:MRATio?
[4]	Scramble	:SOURce:PATTern:MIXData:SCRamble :SOURce:PATTern:MIXData:SCRamble?
[5]	PRBS Sequence	:SOURce:PATTern:MIXData:PRBS:SEQuence :SOURce:PATTern:MIXData:PRBS:SEQuence?
[6]	Setup	:SOURce:PATTern:MIXData:SRSetting :SOURce:PATTern:MIXData:SRSetting?
[7]	Set All/Reset All	:SOURce:PATTern:MIXData:SCRamble:ALLSet
[8]	Number of Block	:SOURce:PATTern:MIXData:BLOCK :SOURce:PATTern:MIXData:BLOCK?
[9]	Row Length	:SOURce:PATTern:MIXData:RLENGth :SOURce:PATTern:MIXData:RLENGth?
[10]	Number of Row	:SOURce:PATTern:MIXData:ROW :SOURce:PATTern:MIXData:ROW?
[11]	Data Length	:SOURce:PATTern:MIXData:DATA:LENGth :SOURce:PATTern:MIXData:DATA:LENGth?
[12]	No label (Pattern setting)	:SOURce:PATTern:MIXData:DATA:WHOLE :SOURce:PATTern:MIXData:DATA:WHOLE?
[13]	No label (Pattern setting)	:SOURce:PATTern:MIXData:BDATa:WHOLE :SOURce:PATTern:MIXData:BDATa:WHOLE?



Table 7.11.3.5-1 Mixed Data Mixed Data Pattern Setting Commands (Cont'd)

No.	Setting Items	Commands
[14]	No label (Data inversion)	:SOURce:PATtern:MIXData:DREVerse:ADDRESS
[15]	No label (Data inversion)	:SOURce:PATtern:MIXData:DREVerse:DELTA
[16]	No label (All 0 or All 1)	:SOURce:PATtern:MIXData:DATA:FILL

**:SOURce:PATtern:MIXData:PRBS:BITShift?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1 1 bit
Function	Sets the bit shift for the PRBS pattern during Mixed Data pattern generation
Example	> :SOURce:PATtern:MIXData:PRBS:BITShift? < 1
Compatibility	Partially compatible with MU181020A/B.

**:SOURce:PATtern:MIXData:PRBS:LENGth <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 7 2 <sup>n</sup> -1 (n = 7) 9 2 <sup>n</sup> -1 (n = 9) 10 2 <sup>n</sup> -1 (n = 10) 11 2 <sup>n</sup> -1 (n = 11) 15 2 <sup>n</sup> -1 (n = 15) 20 2 <sup>n</sup> -1 (n = 20) 23 2 <sup>n</sup> -1 (n = 23) 31 2 <sup>n</sup> -1 (n = 31)
Function	Sets the number of stages of the PRBS pattern during Mixed Data pattern generation.
Example	To set the number of stages of the PRBS pattern to 15: > :SOURce:PATtern:MIXData:PRBS:LENGth 15
Compatibility	Partially compatible with MU181020A/B.

**:SOURce:PATtern:MIXData:PRBS:LENGth?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 7, 9, 10, 11, 15, 20, 23, 31
Function	Queries the number of stages of the PRBS pattern during Mixed Data pattern generation.
Example	> :SOURce:PATtern:MIXData:PRBS:LENGth? < 15
Compatibility	Partially compatible with MU181020A/B.

**:SOURce:PATtern:MIXData:PRBS:MRATio <mratio>**

---

Parameter	<mratio> = <CHARACTER PROGRAM DATA> M1_2                      1/2 I1_2                      1/2INVT
Function	Sets the mark ratio for the PRBS pattern during Mixed Data pattern generation.
Example	To set the mark ratio for the PRBS pattern to 1/2: > :SOURce:PATtern:MIXData:PRBS:MRATio M1_2
Compatibility	Partially compatible with MU181020A/B.

**:SOURce:PATtern:MIXData:PRBS:MRATio?**

---

Response	<mratio> = <CHARACTER RESPONSE DATA> M1_2, I1_2
Function	Queries the mark ratio for the PRBS pattern during Mixed Data pattern generation.
Example	> :SOURce:PATtern:MIXData:PRBS:MRATio? < M1_2
Compatibility	Partially compatible with MU181020A/B.

**:SOURce:PATtern:MIXData:SCRamble <boolean>**

---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> 0 or OFF                      Scramble OFF 1 or ON                      Scramble ON
Function	Sets scramble ON/OFF of the PRBS7 stage during pattern reception.
Example	To set scramble ON of the PRBS7 stage during pattern reception: > :SOURce:PATtern:MIXData:SCRamble 1
Compatibility	Partially compatible with MU181020A/B.

**:SOURce:PATtern:MIXData:SCRamble?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0                      Scramble OFF 1                      Scramble ON
Function	Queries the scramble ON/OFF state of the PRBS7 stage during pattern reception.
Example	> :SOURce:PATtern:MIXData:SCRamble? < 1
Compatibility	Partially compatible with MU181020A/B.

**:SOURce:PATtern:MIXData:PRBS:SEQuence <sequence>**


---

Parameter	<sequence> = <CHARACTER PROGRAM DATA> REStart                      PRBS patterns are not continuous. CONSEcutive                  PRBS patterns are continuous.
Function	Sets the PRBS pattern sequence during Mixed Data pattern generation.
Example	To set the PRBS pattern sequence to Restart: > :SOURce:PATtern:MIXData:PRBS:SEQuence REStart
Compatibility	Partially compatible with MU181020A/B.

**:SOURce:PATtern:MIXData:PRBS:SEQuence?**


---

Response	<sequence> = <CHARACTER RESPONSE DATA> RESt, CONS
Function	Queries the PRBS pattern sequence during Mixed Data pattern generation.
Example	> :SOURce:PATtern:MIXData:PRBS:SEQuence? < RESt
Compatibility	Partially compatible with MU181020A/B.

**:SOURce:PATtern:MIXData:SRSetting <row>,<data>,<prbs>**


---

Parameter	<row> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 16                      1 to 16 Row/1 Row Step <data> = <BOOLEAN PROGRAM DATA> 0 or OFF                      Scramble OFF 1 or ON                        Scramble ON Note, however, that Data of 1 Row Scramble is fixed to Scramble OFF. <prbs> = <BOOLEAN PROGRAM DATA> 0 or OFF                      Scramble OFF 1 or ON                        Scramble ON
Function	Sets Scramble ON or OFF for the Data and PRBS of the specified Row.
Example	To set Scramble ON for the Data and OFF for the PRBS . > :SOURce:PATtern:MIXData:SRSetting 2,1,0
Compatibility	Partially compatible with MU181020A/B.

**:SOURce:PATtern:MIXData:SRSetting? <row>**

---

Parameter	<row> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 16                                      1 to 16 Row/1 Row Step
Response	<data>,<prbs> = <NR1 NUMERIC RESPONSE DATA> 0    Scramble OFF 1    Scramble ON
Function	Queries the scramble setting (ON/OFF) for the Data and PRBS of the specified Row.
Example	To query the Scramble setting for 2 Row: > :SOURce:PATtern:MIXData:SRSetting? 2 < 1, 0
Compatibility	Partially compatible with MU181020A/B.

**:SOURce:PATtern:MIXData:SCRamble:ALLSet <numeric>**

---

Parameter	<numeric> = <NUMERIC PROGRAM DATA> 0    All Reset 1    All Set
Function	Sets or resets all scramble.
Example	To select all scramble: > :SOURce:PATtern:MIXData:SCRamble:ALLSet 1
Compatibility	Partially compatible with MU181020A/B.

**:SOURce:PATtern:MIXData:BLOCK <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 511                                      1 to 511 Block/1 Step
Function	Sets the number of blocks during Mixed Data pattern generation.
Example	To set the number of blocks to 30: > :SOURce:PATtern:MIXData:BLOCK 30
Compatibility	Partially compatible with MU181020A/B.

**:SOURce:PATtern:MIXData:BLOCK?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1 to 511                                      1 to 511 Block/1 Step
Function	Queries the number of blocks during Mixed Data pattern generation.
Example	> :SOURce:PATtern:MIXData:BLOCK? < 30
Compatibility	Partially compatible with MU181020A/B.

**:SOURce:PATtern:MIXData:RLENgth <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA>		
	Independent	1536 to 2415919104	1,536 to 2,415,919,104 bits/ 256 bit Step
	2 ch Combination	3072 to 4831838208	3,072 to 4,831,838,208 bits/ 512 bit Step
	4 ch Combination	6144 to 9663676416	6,144 to 9,663,676,416 bits/ 1,024 bit Step
Function	Sets the pattern length of 1 Row that is edited during Mixed Data pattern generation.		
Example	To set the pattern length to 1536 bits > :SOURce:PATtern:MIXData:RLENgth 1536		
Compatibility	Partially compatible with MU181020A/B (the parameter range varies depending on the settings).		

**:SOURce:PATtern:MIXData:RLENgth?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>		
	Independent	1536 to 2415919104	1,536 to 2,415,919,104 bits/ 256 bit Step
	2 ch Combination	3072 to 4831838208	3,072 to 4,831,838,208 bits/ 512 bit Step
	4 ch Combination	6144 to 9663676416	6,144 to 9,663,676,416 bits/ 1,024 bit Step
Function	Queries the pattern length of 1 Row that is edited during Mixed Data pattern generation.		
Example	> :SOURce:PATtern:MIXData:RLENgth? < 1536		
Compatibility	Partially compatible with MU181020A/B.		

**:SOURce:PATtern:MIXData:ROW <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA>		
	1 to 16	1 to 16 Rows, in 1-row steps	
Function	Sets the number of rows within one block that are edited during Mixed Data pattern generation.		
Example	To set the number of rows within one block to 16: > :SOURce:PATtern:MIXData:ROW 16		
Compatibility	Partially compatible with MU181020A/B.		



**:SOURce:PATtern:MIXData:DATA:WHOLE <block>,<start>,<end>,<data>**

Parameter	<p>&lt;block&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;  1 to 511                            1 to 511 Block/1 Step</p> <p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;  #H0 to #HFFFFFFF                    0 to FFFFFFFF bits/1 bit Step  (Specify in hexadecimal)</p> <p>&lt;end&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;  #H0 to #HFFFFFFF                    0 to FFFFFFFF bits/1 bit Step  (Specify in hexadecimal)</p> <p><b>Note:</b></p> <p style="padding-left: 2em;">The maximum setting is the pattern length.  At 2 ch Combination, the setting range is doubled.  At 4 ch Combination, the setting range is quadrupled.</p> <p>&lt;data&gt; = &lt;STRING PROGRAM DATA&gt;  "H****"                            Specify pattern data in hexadecimal format.  1 to 400 characters (pattern data of 400 (4 bits))  Specify a character string consisting of 0 to 9  and A to F.  If the last character string of the pattern data is  short of a hexadecimal unit (4 bits), add 0(s) up  to the last bit to make a hexadecimal string.</p> <p>"B****"                            Specify pattern data in binary format.  1 to 400 characters (pattern data of 400 bits)  Specify a character string consisting of 0 and 1.</p>
Function	Sets the pattern data from the <start> to <end> addresses during Mixed Data pattern generation. The set data overwrites the specified range.
Example	To set the addresses 0 to 1F of the block 1 pattern data to 11: > :SOURce:PATtern:MIXData:DATA:WHOLE 1, #H0, #H1F, "H11"
Compatibility	Partially compatible with MU181020A/B (the parameter range varies depending on the settings).

**:SOURce:PATtern:MIXData:DATA:WHOLe? <block>,<start>**

---

Parameter	<p>&lt;block&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  1 to 511                                      1 to 511 Block/1 Step</p> <p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;                  #H0 to #HFFFFFFF                              0 to FFFFFFFF bits/1 bit Step                  (Specify in hexadecimal)</p> <p><b>Note:</b></p> <p style="padding-left: 40px;">The maximum setting is the pattern length.                  At 2 ch Combination, the setting range is doubled.                  At 4 ch Combination, the setting range is quadrupled.</p>
Response	<p>&lt;data&gt; = &lt;STRING RESPONSE DATA&gt;                  "H****"                                      Returns the pattern data in hexadecimal format.                  Within 400 characters (pattern data of 400 × 4 bits)</p>
Function	<p>Queries the pattern data of 400 × 4 bits from the &lt;start&gt; address during Mixed Data pattern generation.</p>
Example	<p>To query the block 1 pattern data from address 0:                  &gt; :SOURce:PATtern:MIXData:DATA:WHOLe? 1, #H0                  &lt; "H1111 "</p>
Compatibility	<p>Partially compatible with MU181020A/B.</p>







**:SOURce:PATtern:MIXData:DREVerse:ADDRESS <block>,<start>,<end>**

Parameter	<p>&lt;block&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;  1 to 511                      1 to 511 Block/1 Step</p> <p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;  #H0 to #FFFFFFFF              0 to FFFFFFFF bits/1 bit Step  (Specify in hexadecimal)</p> <p>&lt;end&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;  #H0 to #FFFFFFFF              0 to FFFFFFFF bits/1 bit Step  (Specify in hexadecimal)</p> <p><b>Note:</b></p> <p style="padding-left: 2em;">The maximum setting is the pattern length.  At 2 ch Combination, the setting range is doubled.  At 4 ch Combination, the setting range is quadrupled.</p>
Function	Inverts the data in the program during Mixed Data pattern generation. Specify the inversion range by the <start> and <end> addresses.
Example	To invert addresses 0 to 4F of the block 3 pattern data: > :SOURce:PATtern:MIXData:DREVerse:ADDRESS 3, #H0, #H4F
Compatibility	Partially compatible with MU181020A/B (the parameter range varies depending on the settings).

**:SOURce:PATtern:MIXData:DREVerse:DELTA <block>,<start>,<delta>**

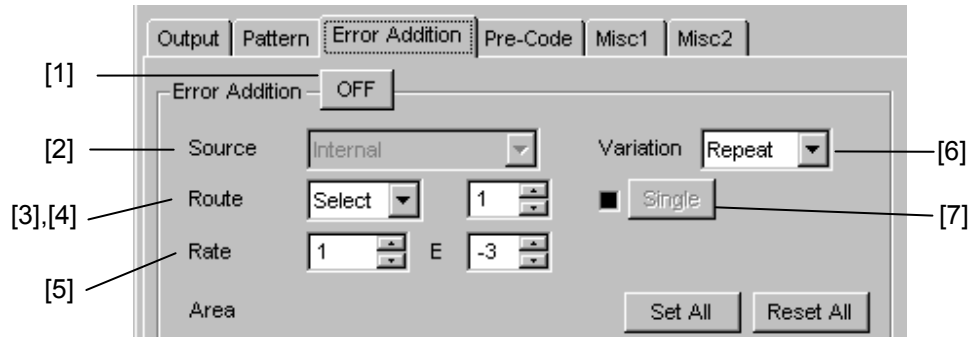
Parameter	<p>&lt;block&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;  1 to 511                      1 to 511 Block/1 Step</p> <p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;  #H0 to #FFFFFFFF              0 to FFFFFFFF bits/1 bit Step  (Specify in hexadecimal)</p> <p>&lt;delta&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;  1 to 134217728              1 to 134,217,728 bits/1 bit Step</p> <p><b>Note:</b></p> <p style="padding-left: 2em;">The maximum setting is the pattern length.  At 2 ch Combination, the setting range is doubled.  At 4 ch Combination, the setting range is quadrupled.</p>
Function	Inverts the data in the program during Mixed Data pattern generation. Specify the inversion range by the number of bits from the <start> address (relative specification).
Example	To invert 256 bits of the block 3 pattern data from address 0: > :SOURce:PATtern:MIXData:DREVerse:DELTA 3, #H0, 256
Compatibility	Partially compatible with MU181020A/B (the parameter range varies depending on the settings).

**:SOURce:PATtern:MIXData:DATA:FILL <block>,<range>,<page>,<data>**

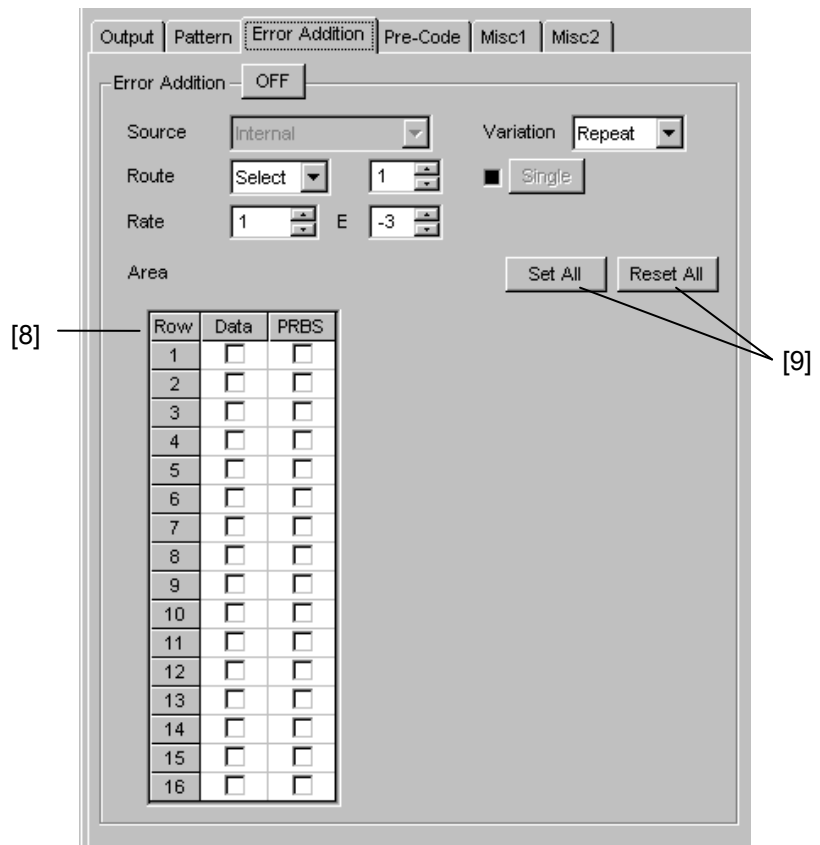
---

Parameter	<p>&lt;block&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  1 to 511                      1 to 511 Block/1 Step</p> <p>&lt;range&gt; = &lt;CHARACTER PROGRAM DATA&gt;                  PAGE                              Specifies a page.                                                      (One page is defined as 128 bits.)</p> <p>ALL                                      Specifies all data.</p> <p>&lt;page&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  1 to 1048576                      1 to 1,048,576 (Max) pages, in 1-page steps                  Max = Pattern Length/128 (rounding up fractions)                  Specify "0" when &lt;range&gt; is set to ALL.</p> <p>&lt;data&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  0                                      Fills the specified range with 0s.                  1                                      Fills the specified range with 1s.</p>
Function	Sets 0s or 1s for the specified page or all data in the program during Mixed Data pattern generation.
Example	To set 0s for the third page of the block 511 pattern data: > :SOURce:PATtern:MIXData:DATA:FILL 511,PAGE,3,0
Compatibility	Partially compatible with MU181020A/B (the parameter range varies depending on the settings).

### 7.11.4 Error Addition Tab



**Figure 7.11.4-1 Error Addition Settings (PRBS, Zero-Substitution, and Data Patterns)**



**Figure 7.11.4-2 Error Addition Settings (Mixed Pattern)**

Table 7.11.4-1 Error Addition Setting Commands

No.	Setting Items	Commands
[1]	Error Addition ON/OFF	:SOURce:PATtern:EADDition:SET
		:SOURce:PATtern:EADDition:SET?
[2]	Source	:SOURce:PATtern:EADDition:SOURce
		:SOURce:PATtern:EADDition:SOURce?
[3]	Route	:SOURce:PATtern:EADDition:SElect
		:SOURce:PATtern:EADDition:SElect?
[4]	Error Addition Route setting	:SOURce:PATtern:EADDition:ROUTE
		:SOURce:PATtern:EADDition:ROUTE?
[5]	Rate	:SOURce:PATtern:EADDition:RATE
		:SOURce:PATtern:EADDition:RATE?
[6]	Variation	:SOURce:PATtern:EADDition:VARiation
		:SOURce:PATtern:EADDition:VARiation?
[7]	Single	:SOURce:PATtern:EADDition:SINGLE
[8]	Error Addition Area setting	:SOURce:PATtern:EADDition:AREA
		:SOURce:PATtern:EADDition:AREA?
[9]	Set All/Reset All	:SOURce:PATtern:EADDition:ALLSet

**:SOURce:PATtern:EADDition:SET <boolean>**

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> OFF or 0                      Output OFF ON or 1                        Output ON
Function	Sets whether to add a bit error to the test pattern.
Example	To set bit error addition ON: > :SOURce:PATtern:EADDition:SET ON
Compatibility	Partially compatible with MU181020A/B.

**:SOURce:PATtern:EADDition:SET?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0                                Error addition OFF 1                                Error addition ON
Function	Queries the bit error addition ON/OFF state to the test pattern.
Example	> :SOURce:PATtern:EADDition:SET? < 1
Compatibility	Partially compatible with MU181020A/B.

**:SOURce:PATtern:EADDITION:SOURce <source>**


---

Parameter	<source> = <CHARACTER PROGRAM DATA> INTernal                      Internal signal EXTTrig                      Rising of external signal trigger EXTDisable                    Disables external signal
Function	Sets the reference signal source for bit error addition to the test pattern.
Example	To set the reference signal source for bit error addition to Internal: > :SOURce:PATtern:EADDITION:SOURce INTernal
Compatibility	Partially compatible with MU181020A/B.

**:SOURce:PATtern:EADDITION:SOURce?**


---

Response	<source> = <CHARACTER RESPONSE DATA> INT, EXTT, EXTD
Function	Queries the reference signal source for bit error addition to the test pattern.
Example	> :SOURce:PATtern:EADDITION:SOURce? < INT
Compatibility	Partially compatible with MU181020A/B.

**:SOURce:PATtern:EADDITION:SElect <select>**


---

Parameter	<select> = <CHARACTER PROGRAM DATA> SCAN                          Changes the route for which 32 Demux is performed every time when an error is added. SElect                          Adds an error to the specified route.
Function	Sets the route setting method for bit error addition.
Example	To set the route setting method to SCAN: > :SOURce:PATtern:EADDITION:SElect SCAN
Compatibility	Partially compatible with MU181020A/B.

**:SOURce:PATtern:EADDITION:SElect?**


---

Response	<select> = <CHARACTER RESPONSE DATA> SCAN, SEL
Function	Queries the route setting method for bit error addition.
Example	> :SOURce:PATtern:EADDITION:SElect? < SCAN
Compatibility	Partially compatible with MU181020A/B

### **:SOURce:PATtern:EADDITION:ROUTE <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 32                                      1 to 32/1 Step
Function	Sets the route to add a bit error.
Example	To set Route 2 as the route to add a bit error: > :SOURce:PATtern:EADDITION:ROUTE 2
Compatibility	Partially compatible with MU181020A/B.

### **:SOURce:PATtern:EADDITION:ROUTE?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1 to 32                                      1 to 32/1 Step
Function	Queries the route to add a bit error.
Example	> :SOURce:PATtern:EADDITION:ROUTE? < 2
Compatibility	Partially compatible with MU181020A/B.

### **:SOURce:PATtern:EADDITION:RATE <rate>[,<numeric>]**

Parameter	<rate> = <CHARACTER PROGRAM DATA> E_3 to E_12                                      E-3 to E-12/E-1 Step <numeric> = <DECIMAL NUMERIC PROGRAM DATA> x:1 to 9    x:1 to 9/1 Step
Function	Set a value in the format of “xE-n”. If x is omitted, 1 is set. Sets the rate of bit errors to be added.
Example	To set the rate of bit errors to be added to 5E-9: > :SOURce:PATtern:EADDITION:RATE E_9,5
Compatibility	Partially compatible with MU181020A/B.

### **:SOURce:PATtern:EADDITION:RATE?**

Response	<rate> = <CHARACTER RESPONSE DATA> E_3 to E_12                                      E-3 to E-12 <numeric> = <NR1 NUMERIC RESPONSE DATA> x:1 to 9    x:1 to 9/1 Step
Function	Queries the rate of bit errors to be added.
Example	> :SOURce:PATtern:EADDITION:RATE? < E_9,5
Compatibility	Partially compatible with MU181020A/B.



**:SOURce:PATtern:EADdition:VARiation <var>**

Parameter	<var> = <CHARACTER PROGRAM DATA> REPeat                      Errors are continuously inserted. SINGle                      An error is inserted by each click.
Function	Sets the bit error addition method for the test pattern (when Internal is selected).
Example	To set the bit error addition method to Repeat: > :SOURce:PATtern:EADdition:VARiation REPeat
Compatibility	Partially compatible with MU181020A/B.

**:SOURce:PATtern:EADdition:VARiation?**

Response	<var> = <CHARACTER RESPONSE DATA> REP, SING
Function	Queries the bit error addition method (when Internal is selected) to the test pattern.
Example	> :SOURce:PATtern:EADdition:VARiation? < REP
Compatibility	Partially compatible with MU181020A/B.

**:SOURce:PATtern:EADdition:SINGle**

Function	Adds a single error to the test pattern.
Example	> :SOURce:PATtern:EADdition:SINGle
Compatibility	Partially compatible with MU181020A/B.

**:SOURce:PATtern:EADdition:AREA <contents>,<row>,<data>[,<prbs>]**

Parameter	<contents> = <CHARACTER PROGRAM DATA> NONE                      (For Mixed Data and Sequence patterns) <row> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 16                      (Specify the row number for Mixed Data patterns) <data> = <BOOLEAN PROGRAM DATA> OFF or 0, ON or 1 [<prbs>] = <BOOLEAN PROGRAM DATA> OFF or 0, ON or 1 (For Mixed patterns only)
Function	Sets an area to add a bit error for Alternate, Mixed, and Sequence patterns.
Example	To set an area to add a bit error to "Pattern A, 1 Row, Data ON, PRBS ON": > :SOURce:PATtern:EADdition:AREA NONE,1,1,1
Compatibility	Partially compatible with MU181020A/B.

**:SOURce:PATtern:EADDITION:AREA? <contents>,<row>**

---

Parameter	<contents> = <CHARACTER PROGRAM DATA> NONE (For Mixed Data and Sequence patterns) <row> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 16 (Specify the row number for Mixed Data patterns)
Response	<data>,[<prbs>] = <NR1 NUMERIC RESPONSE DATA> 0 OFF 1 ON <prbs> is returned for Mixed patterns only.
Function	Queries an area to add a bit error.
Example	To query an error addition area of Pattern A, 1 Row: > :SOURce:PATtern:EADDITION:AREA? NONE,1 < 1,1
Compatibility	Partially compatible with MU181020A/B.

**:SOURce:PATtern:EADDITION:ALLSet <numeric>**

---

Parameter	<numeric> = <NUMERIC PROGRAM DATA> 0 All Reset 1 All Set
Function	Selects (set) or unselects (reset) all areas to add a bit error for Mixed and Sequence patterns.
Example	To select all areas to add a bit error: > :SOURce:PATtern:EADDITION:ALLSet 1
Compatibility	Partially compatible with MU181020A/B.

### 7.11.5 Pre-Code Tab

Figure 7.11.5-1 shows the Pre-Code tab that is added to the MU183020A-x22/x23 and MU183021A PPGs.

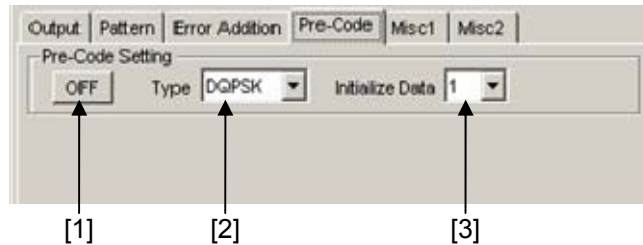


Figure 7.11.5-1 Pre-Code Tab

Table 7.11.5-1 Pre-Code Setting Commands

No.	Setting Items	Commands
[1]	Pre-Code ON/OFF	:SOURce:PRECode:SET :SOURce:PRECode:SET?
[2]	Type	:SOURce:PRECode:TYPE :SOURce:PRECode:TYPE?
[3]	Initialize Data	:SOURce:PRECode:INITialize :SOURce:PRECode:INITialize?

#### **:SOURce:PRECode:SET <boolean>**

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> OFF to 0                      Pre-Code OFF ON or 1                        Pre-Code ON
Function	Sets the Pre-Code Setting ON or OFF.
Example	To set the Pre-Code Setting ON: > :SOURce:PRECode:SET ON
Compatibility	Compatible with MU181020A/B.

#### **:SOURce:PRECode:SET?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0                                Pre-Code OFF 1                                Pre-Code ON
Function	Queries the Pre-Code Setting ON or OFF.
Example	> :SOURce:PRECode:SET? < 1
Compatibility	Compatible with MU181020A/B.

### **:SOURce:PRECode:TYPE <type>**

---

Parameter	<type> = <CHARACTER PROGRAM DATA> DQPSk                    DQPSK DPQPsk                   DPQPSK
Function	Set the Pre-Code Setting type.
Example	To set the Pre-Code Setting type to DQPSK: > :SOURce:PRECode:TYPE DQPSk
Compatibility	Partially compatible with MU181020A/B.

### **:SOURce:PRECode:TYPE?**

---

Response	<type> = <CHARACTER RESPONSE DATA> DQPS, DPQP
Function	Queries the Pre-Code Setting type.
Example	> :SOURce:PRECode:TYPE? < DQPS
Compatibility	Partially compatible with MU181020A/B.

### **:SOURce:PRECode:INITialize <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0, 1
Function	Sets Initialize Data of Pre-Code Setting.
Example	To set Initialize Data of Pre-Code Setting to 1: > :SOURce:PRECode:INITialize 1
Compatibility	Compatible with MU181020A/B.

### **:SOURce:PRECode:INITialize?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0, 1
Function	Queries Initialize Data of Pre-Code Setting.
Example	> :SOURce:PRECode:INITialize? < 1
Compatibility	Compatible with MU181020A/B.

### 7.11.6 Misc1 Tab

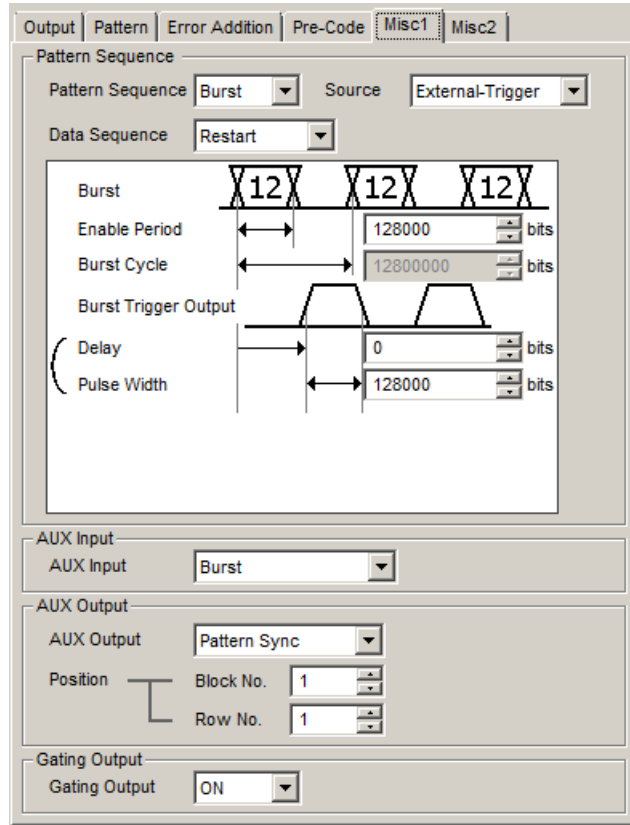


Figure 7.11.6-1 Misc1 Tab

#### 7.11.6.1 Pattern Generation Setting Commands

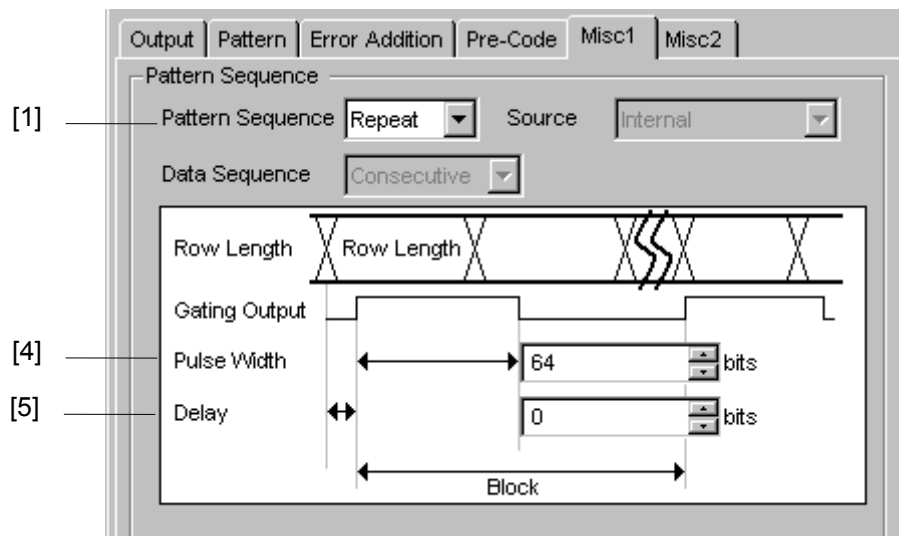


Figure 7.11.6.1-1 Pattern Sequence Setting (When Generating Repeat Signal)

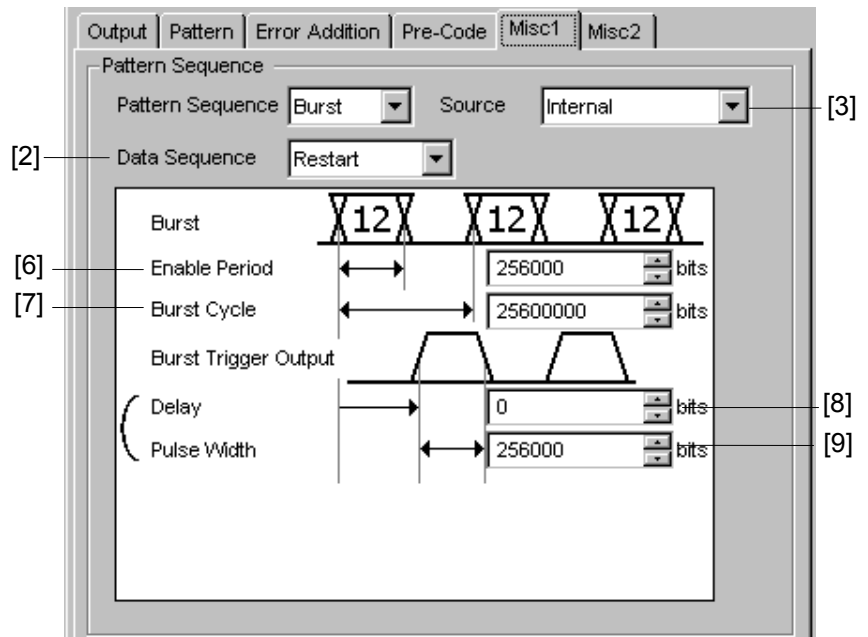


Figure 7.11.6.1-2 Pattern Sequence Setting (When Generating Burst Signal)

Table 7.11.6.1-1 Pattern Generation Setting Commands

No.	Setting Items	Commands
[1]	Pattern Sequence	:SOURce:PATTern:OMODE
		:SOURce:PATTern:OMODE?
[2]	Data Sequence	:SOURce:PATTern:BURSt:SEQuence
		:SOURce:PATTern:BURSt:SEQuence?
[3]	Source	:SOURce:PATTern:BURSt:MODE
		:SOURce:PATTern:BURSt:MODE?
[4]	Pulse Width	:SOURce:PATTern:REPeat:PULSewidth
		:SOURce:PATTern:REPeat:PULSewidth?
[5]	Delay (For Repeat)	:SOURce:PATTern:REPeat:TRIGdelay
		:SOURce:PATTern:REPeat:TRIGdelay?
[6]	Enable Period	:SOURce:PATTern:BURSt:ELENgth
		:SOURce:PATTern:BURSt:ELENgth?
[7]	Burst Cycle	:SOURce:PATTern:BURSt:CYCLE
		:SOURce:PATTern:BURSt:CYCLE?
[8]	Delay (For Burst)	:SOURce:PATTern:BURSt:TRIGdelay
		:SOURce:PATTern:BURSt:TRIGdelay?
[9]	Pulse Width	:SOURce:PATTern:BURSt:PULSewidth
		:SOURce:PATTern:BURSt:PULSewidth?

**:SOURce:PATtern:OMODE <mode>**


---

Parameter	<mode> = <CHARACTER PROGRAM DATA> REPeat                      Repeat signal BURSt                        Burst signal
Function	Sets the signal generation method from Repeat (consecutive) signal or Burst signal.
Example	To set the signal generation method to Burst signal: > :SOURce:PATtern:OMODE BURSt
Compatibility	Partially compatible with MU181020A/B.

**:SOURce:PATtern:OMODE?**


---

Response	<mode> = <CHARACTER RESPONSE DATA> REP, BURS
Function	Queries the signal generation method.
Example	> :SOURce:PATtern:OMODE? < BURS
Compatibility	Partially compatible with MU181020A/B.

**:SOURce:PATtern:BURSt:SEQuence <mode>**


---

Parameter	<mode> = <CHARACTER PROGRAM DATA> REStart                      Restart from the beginning CONSeCutive                Consecutive output in the Burst interval CONTInuous                 Consecutive output regardless of Burst interval
Function	Sets the data output sequence for the Burst data signal.
Example	To set the output sequence to Restart: > :SOURce:PATtern:BURSt:SEQuence REStart
Compatibility	Partially compatible with MU181020A/B.

**:SOURce:PATtern:BURSt:SEQuence?**


---

Response	<mode> = <CHARACTER RESPONSE DATA> REST, CONS, CONT
Function	Queries the data output sequence for the Burst data signal.
Example	> :SOURce:PATtern:BURSt:SEQuence? < REST
Compatibility	Partially compatible with MU181020A/B.





**:SOURce:PATtern:REPeat:PULSewidth?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 to 137438952960      0 to 137,438,952,960 bits
Function	Queries the pulse width of the timing signal to be output during the timing signal period.
Example	To query the pulse width of the timing signal: > :SOURce:PATtern:REPeat:PULSewidth? < 128
Compatibility	Partially compatible with MU181020A/B (the parameter range varies depending on the settings).

**:SOURce:PATtern:REPeat:TRIGdelay <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA>												
	<table border="1"> <thead> <tr> <th></th> <th>PRBS/ZeroSub/Data</th> <th>Mixed</th> </tr> </thead> <tbody> <tr> <td>Independent</td> <td>0 to 34359738240 bits/ 8 bits Step</td> <td>0 to 2415918976/ 8 bits Step</td> </tr> <tr> <td>2 ch Combination</td> <td>0 to 68719476480/ 16 bits Step</td> <td>0 to 4831837952/ 16 bits Step</td> </tr> <tr> <td>4 ch Combination</td> <td>0 to 137438952960/ 32 bits Step</td> <td>0 to 9663675904/ 32 bits Step</td> </tr> </tbody> </table>		PRBS/ZeroSub/Data	Mixed	Independent	0 to 34359738240 bits/ 8 bits Step	0 to 2415918976/ 8 bits Step	2 ch Combination	0 to 68719476480/ 16 bits Step	0 to 4831837952/ 16 bits Step	4 ch Combination	0 to 137438952960/ 32 bits Step	0 to 9663675904/ 32 bits Step
	PRBS/ZeroSub/Data	Mixed											
Independent	0 to 34359738240 bits/ 8 bits Step	0 to 2415918976/ 8 bits Step											
2 ch Combination	0 to 68719476480/ 16 bits Step	0 to 4831837952/ 16 bits Step											
4 ch Combination	0 to 137438952960/ 32 bits Step	0 to 9663675904/ 32 bits Step											
Function	Sets the delay value for the timing signal pulse to be output during the timing signal period.												
Example	To set the timing signal pulse delay to 256 bits: > :SOURce:PATtern:REPeat:TRIGdelay 256												
Compatibility	Partially compatible with MU181020A/B (the parameter range varies depending on the settings).												

**:SOURce:PATtern:REPeat:TRIGdelay?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 to 137438952960      0 to 137,438,952,960 bits
Function	Queries the delay value for the timing signal pulse to be output during the timing signal period.
Example	> :SOURce:PATtern:REPeat:TRIGdelay? < 256
Compatibility	Partially compatible with MU181020A/B (the parameter range varies depending on the settings).

**:SOURce:PATtern:BURSt:ELENgth <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA>		
		Internal	External
	Independent	12800 to 2147483392 bits /256 bits Step	12800 to 2147483648 bits /256 bits Step
	2 ch Combination	25600 to 4294966784 bits /512 bits Step	25600 to 4294967296 bits /512 bits Step
	4 ch Combination	51200 to 8589933568 bits /1024 bits Step	51200 to 8589934592 bits /1024 bits Step
Function	Sets the data signal generation interval for Burst signal generation.		
Example	To set the data signal generation interval to 12,800 bits: > :SOURce:PATtern:BURSt:ELENgth 12800		
Compatibility	Partially compatible with MU181020A/B (the parameter range varies depending on the settings).		

**:SOURce:PATtern:BURSt:ELENgth?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>	
	12800 to 8589934592	12,800 to 8 589 934 592 bits
Function	Queries the data signal generation interval for Burst signal generation.	
Example	> :SOURce:PATtern:BURSt:ELENgth? < 12800	
Compatibility	Partially compatible with MU181020A/B (the parameter range varies depending on the settings).	

**:SOURce:PATtern:BURSt:CYCLE <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA>	
	Independent	25,600 to 2,147,483,648 bits/256 bits Step
	2 ch Combination	51,200 to 4,294,967,296 bits/512 bits Step
	4 ch Combination	102,400 to 8,589,934,592 bits/1024 bits Step
Function	Sets an addition value of the data signal generation interval and the data stop interval for Burst signal generation (Burst generation cycle).	
Example	To set the Burst generation cycle to 25,600 bits: > :SOURce:PATtern:BURSt:CYCLE 25600	
Compatibility	Partially compatible with MU181020A/B (the parameter range varies depending on the settings).	



**:SOURce:PATtern:BURSt:PULSewidth <port>,<numeric>**

Parameter	<port> = <CHARACTER PROGRAM DATA>		
	BURStout1	Burst Output	
	BURStout2	Burst Output2	
	Valid only when AUX Output is set to Burst Output2.		
	<numeric> = <DECIMAL NUMERIC PROGRAM DATA>		
	Independent	0 to 2147483520/ 8 bits Step	0 to 2,147,483,520 bits
	2 ch Combination	0 to 4294967040/ 16 bits Step	0 to 4,294,967,040 bits
	4 ch Combination	0 to 8589934080/ 32 bits Step	0 to 8,589,934,080 bits
	<b>Note:</b>		
	The maximum setting is the pattern length.		
Function	Sets the Burst output trigger signal generation interval width to adjust the phase on the DUT side.		
Example	To set the Burst output trigger signal generation interval width to 1,024 bits: > :SOURce:PATtern:BURSt:PULSewidth BURStout1,1024		
Compatibility	Partially compatible with MU181020A/B (the parameter range varies depending on the settings).		

**:SOURce:PATtern:BURSt:PULSewidth? <port>**

Parameter	<port> = <CHARACTER PROGRAM DATA>		
	BURStout1	Burst Output	
	BURStout2	Burst Output2	
Response	Valid only when AUX Output is set to Burst Output2.		
	<numeric> = <NR1 NUMERIC RESPONSE DATA>		
	0 to 8589934080	0 to 8,589,934,080 bits	
Function	Queries the Burst output trigger signal generation interval width.		
Example	To query the Burst output trigger signal generation interval width: > :SOURce:PATtern:BURSt:PULSewidth? BURStout1 < 1024		
Compatibility	Partially compatible with MU181020A/B (the parameter range varies depending on the settings).		

7.11.6.2 AUX Input setting commands

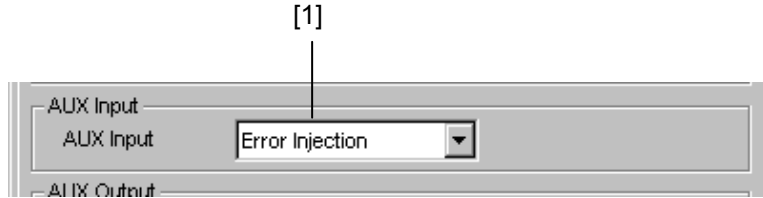


Figure 7.11.6.2-1 AUX Input Setting

Table 7.11.6.2-1 AUX Input Setting Commands

No.	Setting Items	Commands
[1]	AUX Input	:INPut:INPut:FUNcTion :INPut:INPut:FUNcTion?

**:INPut:INPut:FUNcTion <function>**

Parameter <function> = <CHARACTER PROGRAM DATA>  
 BURSt Burst  
 ERRor Error Injection  
 However, Error Injection is set at Repeat.  
 Function Sets the function of AUX Input.  
 Example To set the function of AUX Input to Error Injection.  
 > :INPut:INPut:FUNcTion ERRor  
 Compatibility Compatible with MU181020A/B.

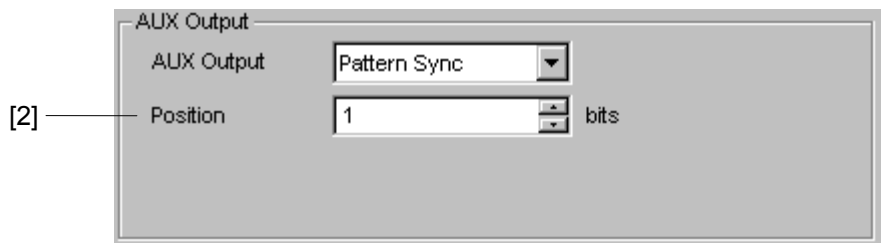
**:INPut:INPut:FUNcTion?**

Response <function> = <CHARACTER RESPONSE DATA>  
 BURS, ERR  
 Function Queries the function of Auxiliary Input.  
 Example > :INPut:INPut:FUNcTion?  
 < ERR  
 Compatibility Compatible with MU181020A/B.

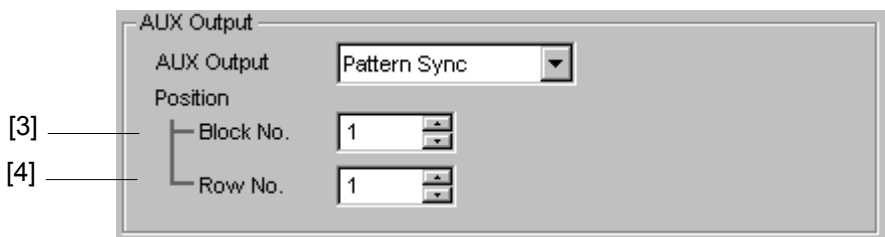
### 7.11.6.3 AUX Output setting commands



**Figure 7.11.6.3-1 AUX Output Setting  
(When 1/N Clock Is Selected)**



**Figure 7.11.6.3-2 AUX Output Setting  
(When Pattern Sync Is Selected: PRBS, Zero-Substitution, Data Pattern)**



**Figure 7.11.6.3-3 AUX Output Setting  
(When Pattern Sync Is Selected: Mixed Data Pattern)**

**Table 7.11.6.3-1 AUX Output Setting Commands**

No.	Setting Items	Commands
[1]	AUX Output	:OUTPut:SYNC:SOURce
		:OUTPut:SYNC:SOURce?
[2]	Position (PRBS, Zero-Substitution, Data)	:OUTPut:SYNC:POSition
		:OUTPut:SYNC:POSition?
[3]	Block No. (Mixed-Data)	:OUTPut:SYNC:MIXData:BLOCK
		:OUTPut:SYNC:MIXData:BLOCK?
[4]	Row No. (Mixed-Data)	:OUTPut:SYNC:MIXData:ROW
		:OUTPut:SYNC:MIXData:ROW?

**:OUTPut:SYNC:SOURce <source>[,<numeric>]**

Parameter	<source> = <CHARACTER PROGRAM DATA> PATtern                      Pattern Sync (Variable) BURSt                        Burst Output2 NCLock                        1/N clock OFF                            OFF [<numeric>] = <DECIMAL NUMERIC PROGRAM DATA> 4 to 512                        4 to 512 / 2 Step Omit <numeric> when NCLock (1/n clocks) is not selected.
Function	Sets the output signal for synchronization output.
Example	To set the output signal to Pattern Sync: > :OUTPut:SYNC:SOURce PATT  To set the output signal for synchronization output to 1/512 clocks: > :OUTPut:SYNC:SOURce NCLock, 512
Compatibility	Partially compatible with MU181020A/B (the parameter range varies depending on the settings).

**:OUTPut:SYNC:SOURce?**

Response	<source> = <CHARACTER RESPONSE DATA> PATT, BURS, NCL, OFF [<numeric>] = <NR1 NUMERIC RESPONSE DATA> Omit <numeric> for other than NCL (1/N clocks). 4 to 512
Function	Queries the output signal for synchronization output.
Example	> :OUTPut:SYNC:SOURce? < PATT  > :OUTPut:SYNC:SOURce? < NCL, 512
Compatibility	Partially compatible with MU181020A/B (the parameter range varies depending on the settings).

### **:OUTPut:SYNC:POSition <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA>		
	Independent	1 to 34359738105/ 8 bits Step	1 to 34,359,738,105 bits
	2 ch Combination	1 to 68719476209/ 16 bits Step	1 to 68,719,476,209 bits
	4 ch Combination	1 to 137438952417/ 32 bits Step	1 to 137,438,952,417 bits
Function	Sets the output position for synchronization output for Data, PRBS, and Zero-Substitution patterns.		
Example	To set the synchronization output position to bit 17: > :OUTPut:SYNC:POSition 17		
Compatibility	Partially compatible with MU181020A/B (the parameter range varies depending on the settings).		

### **:OUTPut:SYNC:POSition?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1 to 137438952417      1 to 137,438,952,417 bits		
	The maximum setting value is the value set in Pattern Length.		
Function	Queries the output position for synchronization output for Data, PRBS, and Zero-Substitution patterns.		
Example	> :OUTPut:SYNC:POSition? < 17		
Compatibility	Partially compatible with MU181020A/B (the parameter range varies depending on the settings).		

### **:OUTPut:SYNC:MIXData:BLOCK <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 511                      1 to 511 Block/1 Block Step		
	The maximum setting value is the set number of blocks.		
Function	Sets the output block position for synchronization output for Mixed Data pattern.		
Example	To set the synchronization output block to block 10: > :OUTPut:SYNC:MIXData:BLOCK 10		
Compatibility	Compatible with MU181020A/B.		



**:OUTPut:SYNC:MIXData:BLOCK?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1 to 511                      1 to 511 Block The maximum setting value is the set number of blocks.
Function	Queries the output block position for synchronization output for Mixed Data pattern.
Example	> :OUTPut:SYNC:MIXData:BLOCK? < 10
Compatibility	Compatible with MU181020A/B.

**:OUTPut:SYNC:MIXData:ROW <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 16                      1 to 16 Row/1 Row Step The maximum setting value is the set number of Rows.
Function	Sets the output Row position for synchronization output for Mixed Data pattern.
Example	To set the synchronization output Row to 1 Row. > :OUTPut:SYNC:MIXData:ROW 1
Compatibility	Compatible with MU181020A/B.

**:OUTPut:SYNC:MIXData:ROW?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1 to 16                      1 to 16 Row/1 Row Step The maximum setting value is the set number of Rows.
Function	Queries the output Row position for synchronization output for Mixed Data pattern.
Example	> :OUTPut:SYNC:MIXData:ROW? < 1
Compatibility	Compatible with MU181020A/B.

### 7.11.6.4 Gating Output setting commands

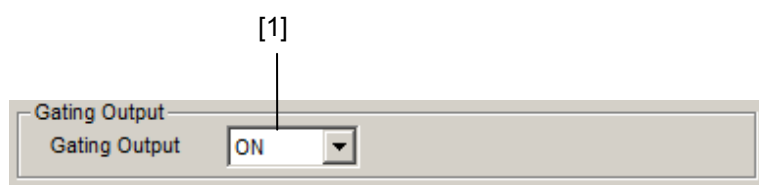


Figure 7.11.6.4-1 Gating Output Setting

Table 7.11.6.4-1 Gating Output Setting Commands

No.	Setting Items	Commands
[1]	Gating Output	:OUTPut:SYNC:GATing:SOURce
		:OUTPut:SYNC:GATing:SOURce?

#### **:OUTPut:SYNC:GATing:SOURce <output>**

Parameter	<output>=<CHARACTER PROGRAM DATA> OFF                      Gating Output OFF ON                         Gating Output ON
Function	Sets Gating Output to ON or OFF.
Example	To set Gating Output to OFF. > :OUTPut:SYNC:GATing:SOURce OFF

#### **:OUTPut:SYNC:GATing:SOURce?**

Response	<output>=<CHARACTER RESPONSE DATA> OFF, ON
Function	Queries if Gating Output is ON or OFF.
Example	> :OUTPut:SYNC:GATing:SOURce? < OFF

### 7.11.7 Misc 2 Tab

#### 7.11.7.1 Clock Setting commands

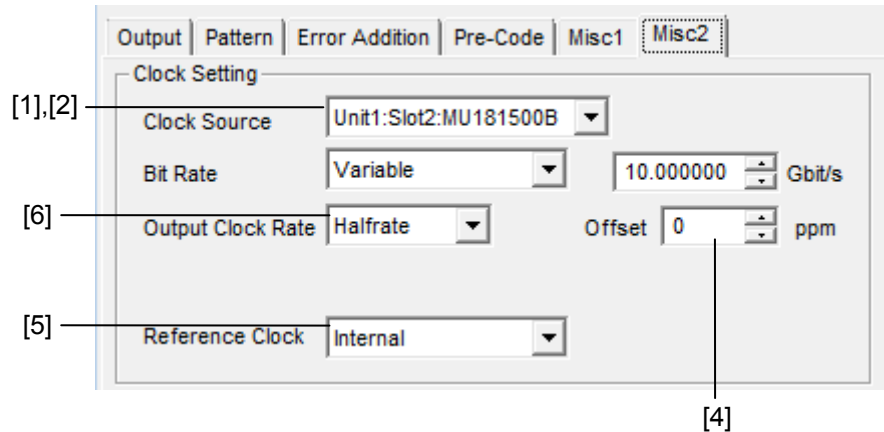


Figure 7.11.7.1-1 Clock Setting Setting (When MU181000B Is Selected)

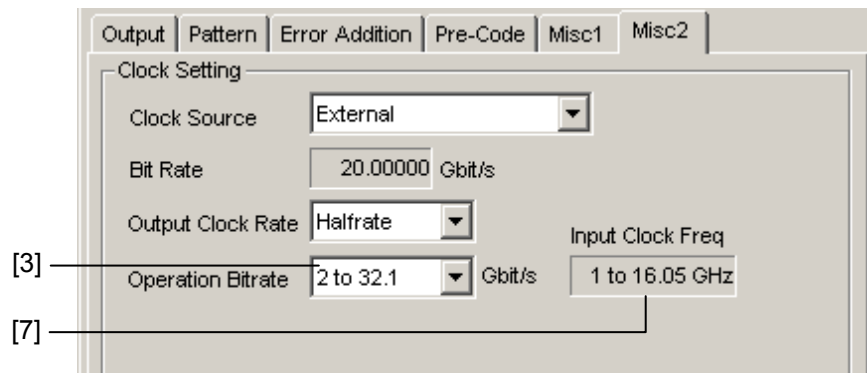


Figure 7.11.7.1-2 Clock Setting Setting (When External Is Selected)

Table 7.11.7.1-1 Reference Clock Setting Commands

No.	Setting Items	Commands
[1]	Clock Source	:SYSTem:INPut:CSElect :SYSTem:INPut:CSElect?
[2]	Queries system built-in synthesizer	:SYSTem:INPut:CSElect:MODule?
[3]	Operation Bitrate	:SYSTem:OUTPut:BITRate :SYSTem:OUTPut:BITRate?
[4]	Clock Offset	:OUTPut:CLOCK:OFFSet:PPM :OUTPut:CLOCK:OFFSet:PPM?
[5]	Reference Clock Source	:OUTPut:RCLock:SElect :OUTPut:RCLock:SElect?
[6]	Output Clock Rate	:SYSTem:OUTPut:CRATe :SYSTem:OUTPut:CRATe?
[7]	Input Clock Freq.	:SYSTem:INPut:CFReq?

Bit Rate in Figure 7.11.7.1-1 “Clock Setting commands (For MU181000B)” is set by the command :OUTPut:DATA:BITRate described in 7.11.2.1 “Output Setting Commands.”

### **:SYSTem:INPut:CSElect <input>**

---

Parameter	<input> = <CHARACTER PROGRAM DATA> EXTeRnal                      External synthesizer INTeRnal[1 to 7]              Built-in synthesizer or jitter generation source
	<b>Note:</b> INTeRnal [1 to 7] specifies the unit and slot numbers from the smallest as 1 to 7 when there is more than one built-in synthesizer. If [1 to 7] is omitted, 1 is assumed.
Function	Selects synthesizer for clock input source.
Example	To choose #2 built-in synthesizer as clock input source. > :SYSTem:INPut:CSElect INT2
Compatibility	Compatible with MU181500B.

### **:SYSTem:INPut:CSElect?**

---

Response	<numeric> = <CHARACTER RESPONSE DATA> EXT, INT1 to 7 <info> = <STRING RESPONSE DATA> "X:Y Z" X: unit                              No. 1 to 4 Y: slot                                No. 1 to 6 Z: module model name    MU181000A/B or MU181500B
Function	Queries the synthesizer of the selecting clock input source.
Example	> :SYSTem:INPut:CSElect? < INT2, "1:4 MU181500B"
Compatibility	Compatible with MU181500B.

**:SYSTem:INPut:CSElect:MODule?**

Response	<info>,<info1>,<info2>,...,<info7> = <STRING RESPONSE DATA> <info> = "X:Y Z" X: unit                      No. 1 to 4 Y: slot                       No. 1 to 6 Z: module model name    MU181000A, MU181000B, or MU181500B NONE is returned when built-in synthesizer and jitter signal source are not present.
Function	Queries the built-in synthesizer in the system.
Example	> :SYSTem:INPut:CSElect:MODule? < "1:2 MU181000A", "1:4 MU181000A" < "NONE"
Compatibility	Compatible with MU181500B.

**:SYSTem:OUTPut:BITRate <input>**

Parameter	<input> = <CHARACTER PROGRAM DATA> When using the external clock: HIGH                        20 to 28.1 G (32.1G) bit/s (when setting Fullrate clock) MIDDLE                     16 to 20.4 Gbit/s (when setting Fullrate clock) LOW                         2.4 to 16 Gbit/s (when setting Fullrate clock) HALF                        2.4 to 28.1 (32.1) G bit/s (when setting Halfrate clock) HIGH1                      25 to 28.1 (32.1) G bit/s (when setting Fullrate/Halfrate clock)  When using the eternal clock and MU181500B Jitter Modulation Source: HIGH                        25to 32.1 Gbit/s (when setting Fullrate clock) MIDDLE1                    20 to 28.1 G (32.1G) bit/s (when setting Fullrate clock) MIDDLE2                    12.5 to 20 Gbit/s (when setting Fullrate clock) LOW                         2.4 to 15 Gbit/s (when setting Fullrate clock) HALF1                      30 to 32.1 Gbit/s (when setting Halfrate clock) HALF2                      2.4 to 28.1 (30.0) G bit/s (when setting Halfrate clock)
Function	Selects operation bit rate band when inputting external clock.
Example	To set operation bit rate band to Halfrate clock 2.4 to 28.1 (32.1) Gbit/s when inputting external clock. > :SYSTem:OUTPut:BITRate HALF
Compatibility	Incompatible with existing models.

### **:SYSTem:OUTPut:BITRate?**

Response	<input> = <CHARACTER RESPONSE DATA> HIGH, MIDD, LOW, HALF, MIDD1, MIDD2, HALF1, HALF2, HIGH1
Function	Queries operation bit rate band when inputting external clock.
Example	> :SYSTem:OUTPut:BITRate? < MIDDLE
Compatibility	Incompatible with existing models.

### **:OUTPut:CLOCK:OFFSet:PPM <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> -1000 to 1000                      -1,000 to +1,000 ppm/Step 1 ppm
Function	Sets offset of frequency (ppm) currently output from tracking built-in synthesizer.
Example	To set offset of currently output frequency to 0 ppm. > :OUTPut:CLOCK:OFFSet:PPM 0
Compatibility	Compatible with MU181500B and MU181000A/B.

### **:OUTPut:CLOCK:OFFSet:PPM?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> -1000 to 1000                      -1,000 to +1,000 ppm
Function	Queries offset (ppm) of frequency currently output from tracking built-in synthesizer.
Example	> :OUTPut:CLOCK:OFFSet:PPM? < 0
Compatibility	Compatible with MU181500B and MU181000A/B.

### **:OUTPut:RClock:SElect <clock>**

Parameter	<clock> = <CHARACTER PROGRAM DATA> INTernal                              Internal reference signal 10 MHz EXTernal10                            External reference signal 10 MHz
Function	Selects either built-in or external input for 10 MHz reference signal of tracking built-in synthesizer.
Example	To set 10 MHz reference signal to external input. > :OUTPut:RClock:SElect EXT10
Compatibility	Compatible with MU181500B and MU181000A/B.

**:OUTPut:RCLock:SElect?**


---

Response	<clock> = <CHARACTER RESPONSE DATA> INT, EXT10
Function	Queries setting for 10 MHz reference signal of tracking built-in synthesizer.
Example	> :OUTPut:RCLock:SElect? < EXT10
Compatibility	Compatible with MU181500B and MU181000A/B.

**:SYSTem:OUTPut:CRATe <rate>**


---

Parameter	<rate> = <CHARACTER PROGRAM DATA> HALFrate                    1/2 clock output to data FULLrate                    1/1 clock output to data
Function	Selects output data and clock correlation.
Example	To set output data/clock to Half Rate: > :SYSTem:OUTPut:CRATe HALF
Compatibility	Incompatible with existing models.

**:SYSTem:OUTPut:CRATe?**


---

Response	<rate> = <CHARACTER RESPONSE DATA> HALF, FULL
Function	Queries the relationship between output data and clock.
Example	> :SYSTem:OUTPut:CRATe? < HALF
Compatibility	Incompatible with existing models.

## **:SYSTem:INPut:CFReq?**

---

Response	<p>&lt;string&gt; = &lt;STRING RESPONSE DATA&gt;</p> <p>When using the external clock:</p> <p>“10 to 16.05 GHz” (when setting Fullrate clock)</p> <p>“10 to 14.05 GHz” Without Opt-x01</p> <p>“8 to 10.02 GHz” (when setting Fullrate clock)</p> <p>“2.4 to 16 GHz” (when setting Fullrate clock)</p> <p>“1.2 to 16.05 GHz” (when setting Halfrate clock)</p> <p>“1.2 to 14.05 GHz” Without Opt-x01</p> <p>“6.25 to 8.025 GHz” (when setting Fullrate/Halfrate clock)</p> <p>“6.25 to 7.025 GHz” Without Opt-x01</p> <p>When using the external clock and MU181500B Jitter Modulation Source:</p> <p>“6.25 to 8.025 GHz” (when setting Fullrate clock)</p> <p>“10.0 to 15.0 GHz” (when setting Fullrate clock)</p> <p>“10.0 to 14.05 GHz” Without Opt-x01</p> <p>“6.25 to 10.0 GHz” (when setting Fullrate clock)</p> <p>“2.4 to 15.0 GHz” (when setting Fullrate clock)</p> <p>“7.5 to 8.025 GHz” (when setting Fullrate clock)</p> <p>“1.2 to 15.0 GHz” (when setting Halfrate clock)</p> <p>“1.2 to 14.05 GHz” Without Opt-x01</p>
Function	Queries frequency band of clock input to MU183020A/MU183021A when inputting external clock.
Example	<pre>&gt; :SYSTem:INPut:CFReq? &lt; "1.2 to 16.05 GHz"</pre>
Compatibility	Incompatible with the existing modules.



7.11.7.2 Combination setting commands

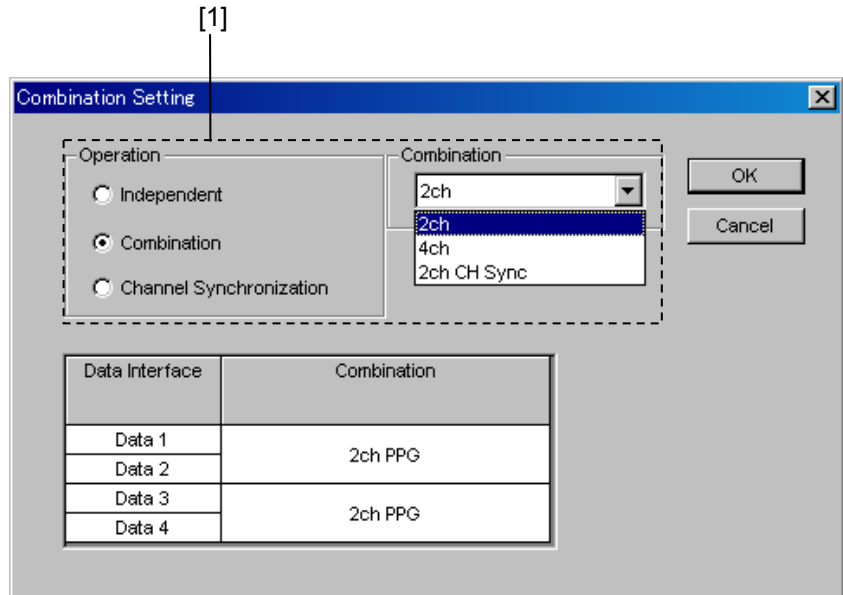


Figure 7.11.7.2-1 Combination Setting Commands (Combination)

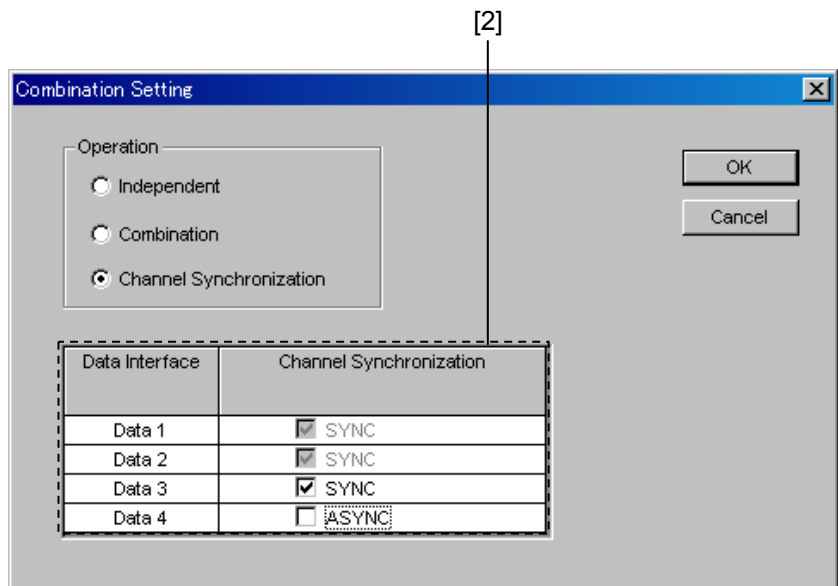


Figure 7.11.7.2-2 Combination Setting Commands (Channel Synchronization)

Table 7.11.7.2-1 Combination Setting Commands

No.	Setting Items	Commands
[1]	Operation	:MCOMbination:OPERation:SETTing :MCOMbination:OPERation:SETTing?
[2]	Combination	:MCOMbination:OPERation:CHSetting :MCOMbination:OPERation:CHSetting?

**:MCOMbination:OPERation:SETTing <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA>
	0 Independent
	1 Channel Synchronization
	2 2ch Combination
	3 2ch Combination CH Sync
	4 4ch Combination
	5 64G x2ch Combination
Function	Sets Combination and Independent at the 32G PPG/ED module.
Example	To set to 4ch Combination: > :MCOMbination:OPERation:SETTing 4
Compatibility	Incompatible with existing models.

**:MCOMbination:OPERation:SETTing?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	0 Independent
	1 Channel Synchronization
	2 2ch Combination
	3 2ch Combination CH Sync
	4 4ch Combination
	5 64G x2ch Combination
Function	Queries the combination status at the 32G PPG/ED module.
Example	> :MCOMbination:OPERation:SETTing? < 0
Compatibility	Incompatible with existing models.

**:MCOMbination:OPERation:CHSetting <interface>**

---

Parameter	<interface> = <DECIMAL NUMERIC PROGRAM DATA>
	2 to 14 Total number of Data Interface that can configure channel synchronization (decimal)
	Available bits
	2 (Bit1) Selects Data2
	4 (Bit2) Selects Data3
	8 (Bit3) Selects Data4
Function	Specifies the Data Interface for setting channel synchronization.
Example	To set Data 1 to 4 to channel synchronization. > :MCOMbination:OPERation:CHSetting 14
Compatibility	Incompatible with existing models.

**:MCOMbination:OPERation:CHSetting?**

Parameter	<interface> = <NR1 NUMERIC RESPONSE DATA> 2 to 14	Total number of Data Interface that can configure channel synchronization (decimal)
	Available bits	
	2 (Bit1)	Data2
	4 (Bit2)	Data3
	8 (Bit3)	Data4
Function	Queries Data Interface for setting Channel Synchronization.	
Example	> :MCOMbination:OPERation:CHSetting? < 2 (at Data1 and 2) < 6 (at Data1 through 3) < 14 (at Data1 through 4)	
Compatibility	Incompatible with existing models.	

### 7.11.7.3 Grouping setting commands

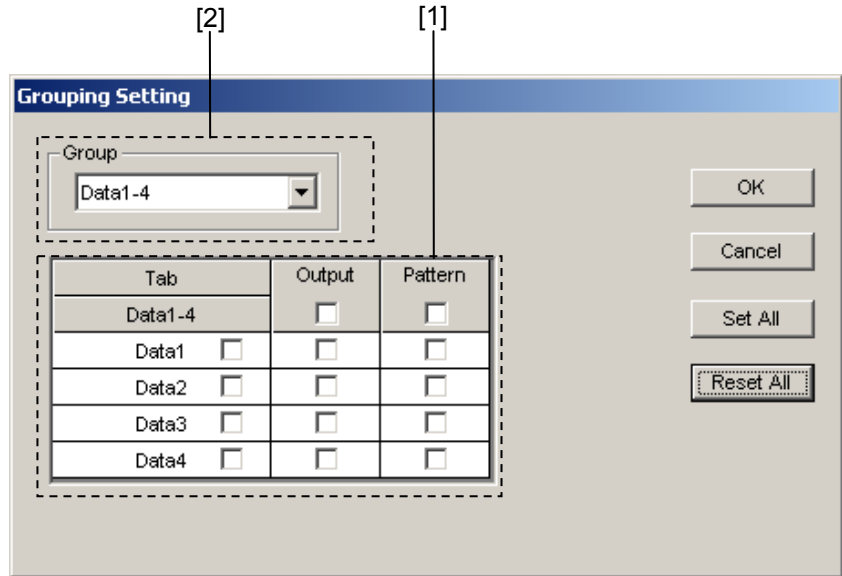


Figure 7.11.7.3-1 Grouping Setting Dialog Box

Table 7.11.7.3-1 Grouping Setting Commands

No.	Setting Items	Commands
[1]	Selects tabs to be grouped together.	:SOURce:GROup:SETTing :SOURce:GROup:SETTing?
[2]	Selects Data Ifs to be grouped together.	:SOURce:GROup:SELEct :SOURce:GROup:SELEct?

#### **:SOURce:GROup:SETTing <tab>,<interface>**

Parameter	<tab> = <CHARACTER PROGRAM DATA> PATtern                      Pattern tab OUTPut                        Output tab <interface> = <NR1 NUMERIC PROGRAM DATA> 0 to 15 Available bits 1 (Bit0)                        Data1 2 (Bit1)                        Data2 4 (Bit2)                        Data3 8 (Bit3)                        Data4
Function	Sets the Grouping function.
Example	To group the Pattern tabs of Data1 and Data 2 together: > :SOURce:GROup:SETTing PATtern,3 To group the Pattern tabs of Data1 to Data 4 together: > :SOURce:GROup:SETTing OUTPut,15
Compatibility	Incompatible with existing models.

**:SOURce:GROup:SETting? <tab>**


---

Parameter	<tab> = <CHARACTER PROGRAM DATA> PATTern                    Pattern tab OUTPut                     Output tab
Response	<interface> = <NR1 NUMERIC RESPONSE DATA> 0 to 15 Available bits 1 (Bit0)                    Data1 2 (Bit1)                    Data2 4 (Bit2)                    Data3 8 (Bit3)                    Data4
Function	Queries the Grouping setting. To query the Data Interfaces whose Output tabs are grouped together:
Example	> :SOURce:GROup:SETting? OUTPut < 12 (Data3 and Data4 are grouped together.)
Compatibility	Incompatible with existing models.

**:SOURce:GROup:SElect <group>**


---

Parameter	<group> = <DECIMAL NUMERIC PROGRAM DATA> 1                            One group (Data1-2 or Data1-4) 2                            Two groups (Data1-2 and Data3-4)
Function	Sets the number of groups.
Example	To set the number of groups to 2: > :SOURce:GROup:SElect 2
Compatibility	Incompatible with existing models.

**:SOURce:GROup:SElect?**


---

Response	<group> = <NR1 NUMERIC RESPONSE DATA> 1                            One group (Data1-2 or Data1-4) 2                            Two groups (Data1-2 and Data3-4)
Function	Queries the number of groups.
Example	> :SOURce:GROup:SElect? < 2
Compatibility	Incompatible with existing models.

## 7.12 28G/32G bit/s ED Commands

This section describes the setting and query commands for the MU183040A 28G/32G bit/s ED, MU183041A 28G/32G bit/s 4ch ED, MU183040B 28G/32G bit/s High Sensitivity ED, MU183041B 28G/32G bit/s 4ch High Sensitivity ED (hereafter, MU183040A/40B/41A/41B). Before executing a setting/query command for the MU183040A/40B/41A/41B, specify the slot number of the module to be remotely controlled, by using the :MODule:ID command. Refer to Section 7.1 “Common Commands” and 9.1 “Basic Operation of Device Messages” for how to specify a slot number with the :MODule:ID command.

### 7.12.1 Common Commands

#### 7.12.1.1 Commands for common settings

Table 7.12.1.1-1 Common Setting Commands

Setting Items	Commands
Number of the unit to be operated	:UENTry:ID
	:UENTry:ID?
Number of the module to be operated (slot position)	:MODule:ID
	:MODule:ID?
Number of the data interface to be operated	:INTerface:ID
	:INTerface:ID?
Setting of automatic measurement to be operated	:SYSTem:CFUNction
	:SYSTem:CFUNction?
Query for error message	:SYSTem:ERRor?
Query for SCPI version	:SYSTem:VERSion?
Query for software status	:SYSTem:CONDition?
Query for hardware system configuration	:SYSTem:ORGanization:HARDware?
Query for system error	:SYSTem:INFormation:ERRor?
Terminator type	:SYSTem:TERMination
	:SYSTem:TERMination?
Query for system error	:SYSTem:CONDition:UNITs?
Query for mainframe information	:SYSTem:UNIT?
Query for module information	:SYSTem:MODule?
Setting of measurement result drawing	:SYSTem:DISPlay:RESult
	:SYSTem:DISPlay:RESult?
Module screen display	:DISPlay:ACTive

**:UENTry:ID <unit\_number>**


---

Parameter	<unit_number> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Unit number
Function	Sets the number of the unit to be operated
Example	To set the number of the unit to be operated to 2: > :UENTry:ID 2
Compatibility	Incompatible with existing models.

**:UENTry:ID?**


---

Response	<unit_number> = <NR1 NUMERIC RESPONSE DATA> 1 to 4
Function	Queries the number of the unit being operated.
Example	> :UENTry:ID? < 2
Compatibility	Incompatible with existing models.

**:MODule:ID <module\_number>**


---

Parameter	<module_number> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 6                      Module number
Function	Sets the number of the module to be operated (slot position).
Example	To set the number of the module to be operated (slot position) to 6: > :MODule:ID 6
Compatibility	Incompatible with existing models.

**:MODule:ID?**


---

Response	<module_number> = <NR1 NUMERIC RESPONSE DATA> 1 to 6
Function	Queries the number of the module being operated (slot position).
Example	> :MODule:ID? < 6
Compatibility	Incompatible with existing models.

### **:INTerface:ID <interface\_number>**

---

Parameter	<interface_number> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Data interface number The setting range varies according to the module model. MU183040A/B-x10:      1 MU183040A/B-x20:      1 to 2 MU183041A/B:            1 to 4
Function	Sets the number of the data interface (Data 1 to 4) to be operated.
Example	To set the number of the data interface to be operated to 4. > :INTerface:ID 4
Compatibility	Incompatible with existing models.

### **:INTerface:ID?**

---

Response	<interface_number> = <NR1 NUMERIC RESPONSE DATA> 1 to 4
Function	Queries the number of the data interface (Data 1 to 4) being operated.
Example	> :INTerface:ID? < 4
Compatibility	Incompatible with existing models.



**:SYSTem:CFUNction <function>**


---

Parameter	<function> = <CHARACTER PROGRAM DATA>
ASE	Auto Search
ISI	ISI measurement
EMAR	Eye Margin measurement
EDI	Eye Diagram measurement
QAN	Q measurement
BTUB	Bathtub measurement
AADJ	Auto Adjust
OFF	Off
ASE32	Auto Search (MU183040A/41A/40B/41B)
EMAR32	Eye Margin measurement (MU183040A/41A/40B/41B)
EDI32	Eye Diagram measurement (MU183040A/41A/40B/41B)
BTUB32	Bathtub measurement (MU183040A/41A/40B/41B)
AADJ32	Auto Adjust (MU183040A/41A/40B/41B)
QAN32	Q measurement (MU183040A/41A/40B/41B)
PAMB	PAM BER measurement (MU183040B/41B)
ECT	Eye Contour measurement (MU183040A/41A/40B/41B)

**Note:**

When “OFF” is set, the operation returns to the port operation previously performed.

Function	Sets the automatic measurement function to be performed.
Example	To set the common function to be performed to Auto Search (32G): > :SYSTem:CFUNction ASE32
Compatibility	Incompatible with existing models.

## :SYSTem:CFUNction?

---

Response	<p>&lt;function&gt; = &lt;CHARACTER RESPONSE DATA&gt;</p> <p>ASE            Auto Search</p> <p>ISI            ISI measurement</p> <p>EMAR          Eye Margin measurement</p> <p>EDI            Eye Diagram measurement</p> <p>QAN            Q measurement</p> <p>BTUB          Bathtub measurement</p> <p>AADJ          Auto Adjust</p> <p>OFF            Off</p> <p>ASE32         Auto Search (MU183040A/41A/40B/41B)</p> <p>EMAR32        Eye Margin measurement (MU183040A/41A/40B/41B)</p> <p>EDI32         Eye Diagram measurement (MU183040A/41A/40B/41B)</p> <p>BTUB32        Bathtub measurement (MU183040A/41A/40B/41B)</p> <p>AADJ32        Auto Adjust (MU183040A/41A/40B/41B)</p> <p>QAN32         Q measurement (MU183040A/41A/40B/41B)</p> <p>PAMB          PAM BER measurement (MU183040B/41B)</p> <p>ECT            Eye Contour measurement (MU183040A/41A/40B/41B)</p>
Function	Queries the automatic measurement function being performed.
Example	<pre>&gt; :SYSTem:CFUNction? &lt; ASE32</pre>
Compatibility	Incompatible with existing models

## :SYSTem:ERRor?

---

Response	<p>&lt;error/event_number&gt;,"&lt;error/event_description&gt;"</p> <p>&lt;error/event_number&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; -32768 to 32767</p> <p>"0" indicates that no errors and events have occurred.</p> <p>Other values return a general error reserved by SCPI or a device-unique error.</p> <p>&lt;error/event_description&gt; = &lt;STRING RESPONSE DATA&gt;</p> <p>This is an error message corresponding to &lt;error/event_number&gt;. The maximum character-string length is 255 characters.</p>
Function	<p>Queries the error message in the error/event queue.</p> <p>Refer to Chapters 8 and 9 for details on the error messages.</p>
Example	<pre>&gt; :SYSTem:ERRor? &lt; 0, "No error"</pre>
Compatibility	Compatible with the MP1632C Digital Data Analyzer (hereinafter, referred to as "MP1632C") and MP1776A Error Detector (hereinafter, referred to as "MP1776A").

---

**:SYSTem:VERSion?**

---

Response	<version> = <NR2 NUMERIC RESPONSE DATA> YYYY.V YYYY: Year V: Revision number
Function	Queries the SCPI version to which the MU183040A/41A/40B/41B conforms.
Example	> :SYSTem:VERSion? < 1999.0
Compatibility	Compatible with MU181040A/B.

## :SYSTem:CONDition?

Response	<p>"&lt;mainframe&gt;,&lt;slot1&gt;,...,&lt;slot64&gt;"</p> <p>&lt;mainframe&gt; = &lt;serial&gt;,&lt;mver&gt;,&lt;hver&gt;,&lt;opt1&gt;,&lt;sbver&gt;,&lt;saver&gt;,&lt;opt2&gt;</p> <p>&lt;serial&gt; = &lt;STRING RESPONSE DATA&gt;</p> <p>XXXXXXXXXXXX            0000000000 to 9999999999</p> <p style="padding-left: 100px;">Mainframe serial number</p> <p><b>Note:</b></p> <p style="padding-left: 40px;">Alphabetic characters may be included.</p> <p>&lt;mver&gt; = &lt;STRING RESPONSE DATA&gt;</p> <p>XXXX.XX.XX            1.00.00 to 9999.99.99</p> <p style="padding-left: 100px;">Main application software version</p> <p>&lt;hver&gt; = &lt;STRING RESPONSE DATA&gt;</p> <p>XXXX.XX.XX            1.00.00 to 9999.99.99</p> <p style="padding-left: 100px;">Mainframe hardware version</p> <p>&lt;opt1&gt; = &lt;STRING RESPONSE DATA&gt;</p> <p>OPTXXX            Option number (MP1800A/MT1810A)</p> <p style="padding-left: 100px;">See Table 7.12.1.1-2 "Option character correspondence table".</p> <p><b>Note:</b></p> <p style="padding-left: 40px;">Outputs the numbers for all installed options.</p> <p style="padding-left: 40px;">NONE is output if no option is installed.</p> <p>&lt;sbver&gt; = &lt;STRING RESPONSE DATA&gt;</p> <p>XXXX.XX.XX            1.00.00 to 9999.99.99</p> <p style="padding-left: 100px;">Sub application software version (Boot part)</p> <p>&lt;saver&gt; = &lt;STRING RESPONSE DATA&gt;</p> <p>XXXX.XX.XX            1.00.00 to 9999.99.99</p> <p style="padding-left: 100px;">Sub application software version (Application part)</p> <p>&lt;opt2&gt; = &lt;STRING RESPONSE DATA&gt;</p> <p>&lt;slot x&gt; = &lt;module&gt;,&lt;serial&gt;,&lt;fpga1&gt;[,&lt;fpga2&gt;],&lt;boot&gt;,&lt;application&gt;,&lt;opt&gt;</p> <p>x indicates a slot number. The slot number varies depending on the unit number as follows.</p> <table border="0" style="width: 100%;"> <tr> <td style="vertical-align: top;">Unit 1: 1 to 16</td> <td>For the MP1800A, numbers from 1 to 6 correspond to actual slots. For the MT1810A, numbers from 1 to 4 correspond to actual slots.</td> </tr> <tr> <td style="vertical-align: top;">Unit 2: 17 to 32</td> <td>For the MT1810A, numbers from 17 to 20 correspond to actual slots.</td> </tr> <tr> <td style="vertical-align: top;">Unit 3: 33 to 48</td> <td>For the MT1810A, numbers from 33 to 36 correspond to actual slots.</td> </tr> <tr> <td style="vertical-align: top;">Unit 4: 49 to 64</td> <td>For the MT1810A, numbers from 49 to 52 correspond to actual slots.</td> </tr> </table>	Unit 1: 1 to 16	For the MP1800A, numbers from 1 to 6 correspond to actual slots. For the MT1810A, numbers from 1 to 4 correspond to actual slots.	Unit 2: 17 to 32	For the MT1810A, numbers from 17 to 20 correspond to actual slots.	Unit 3: 33 to 48	For the MT1810A, numbers from 33 to 36 correspond to actual slots.	Unit 4: 49 to 64	For the MT1810A, numbers from 49 to 52 correspond to actual slots.
Unit 1: 1 to 16	For the MP1800A, numbers from 1 to 6 correspond to actual slots. For the MT1810A, numbers from 1 to 4 correspond to actual slots.								
Unit 2: 17 to 32	For the MT1810A, numbers from 17 to 20 correspond to actual slots.								
Unit 3: 33 to 48	For the MT1810A, numbers from 33 to 36 correspond to actual slots.								
Unit 4: 49 to 64	For the MT1810A, numbers from 49 to 52 correspond to actual slots.								

<module> = <STRING RESPONSE DATA>  
 XXXXXXXXXXXX      Module name (e.g.: MU181020A)  
                          See Table 7.12.1.1-2 “Option character  
                          correspondence table”.

**Note:**

NONE is output if no module is installed.  
 For a module that uses two slots, only the slot with the greater  
 number is valid.

<serial> = <STRING RESPONSE DATA>  
 XXXXXXXXXXXX      0000000000 to 9999999999  
                          Serial number

**Note:**

“-----” is output if no module is installed.  
 For a module that uses two slots, only the slot with the greater  
 number is valid.

<fpga1>[,<fpga2>,.....] = <STRING RESPONSE DATA>  
 XXXX.XX.XX      1.00.00 to 9999.99.99  
                          FPGA version

<boot> = <STRING RESPONSE DATA>  
 XXXX.XX.XX      1.00.00 to 9999.99.99  
                          Logic Boot version

**Note:**

“-----” is output if Logic boot is not installed.  
 For a module that uses two slots, only the slot with the greater  
 number is valid.

<application> = <STRING RESPONSE DATA>  
 XXXX.XX.XX      1.00.00 to 9999.99.99  
                          Logic Application version

**Note:**

“-----” is output if Logic Application is not installed.  
 For a module that uses two slots, only the slot with the greater  
 number is valid.

<opt> = <STRING RESPONSE DATA>  
 XXXXXX/XXXXX      Option number  
                          OPTXXX: For MP1800A/MT1810A

**Note:**

Outputs the numbers for all installed options.  
 For a module that uses two slots, only the slot with the greater  
 number is valid.  
 The option names of the MU181020B-003 and MU181040B-003 are  
 not output.

**Chapter 7 SCPI Commands**

```

Example      > :SYSTem:CONDition?
              <
              6201234567,1.00.00,1.00.20,OPT302,1.00.00,1.00.00,OPT12,
              OPT14,MU181000A,6201234568,1.00.00,1.00.00,1.00.00,OPT10
              1,MU181020A,6201234569,1.00.00,1.00.00,1.00.00,OPT001,OP
              T220,MU181040A,6201234571,1.00.00,1.00.00,1.00.00,OPT002
              ,OPT220
    
```

Compatibility            Incompatible with existing models.

**Table 7.12.1.1-2 Option Character Correspondence Table**

Model/Name	Option Number	Option Name
MP1800A Signal Quality Analyzer	OPT014	2-Slot PPG/ED
	OPT015	4-Slot PPG/ED
	OPT016	6-Slot PPG/ED
	OPT032	32Gbit/s PPG/ED
MT1810A 4 Slot Chassis	OPT014	2-Slot PPG/ED
	OPT015	4-Slot PPG/ED
	OPT032	32Gbit/s PPG/ED
MX180000A Signal Quality Analyzer Control Software	–	–
MU181000A 12.5GHz Synthesizer	OPTx01	Jitter Modulation
MU181000B 12.5GHz 4port Synthesizer	OPTx01	Jitter Modulation
MU181020A 12.5Gbit/s PPG	OPT001	9.9 to 12.5 Gbit/s
	OPT002	0.1 to 12.5 Gbit/s
	OPTx10	Variable Data Output (0.05 to 0.8 Vp-p)
	OPTx11	Variable Data Output (0.25 to 2.5 Vp-p)
	OPTx12	High Performance Data Output (0.05 to 2.0 Vp-p)
	OPTx13	Variable Data Output (0.5 to 3.5 Vp-p)
	OPTx21	Differential Clock Output (0.1 to 2.0 Vp-p)
	OPTx30	Variable Data Delay
MU181040A 12.5Gbit/s ED	OPT001	9.8 to 12.5 Gbit/s
	OPT002	0.1 to 12.5 Gbit/s
	OPTx20	Clock Recovery
	OPTx30	Variable Clock Delay
MU181600A Optical Transceiver (XFP)	–	–
MU181601A Optical Transceiver (SFP)	–	–

Table 7.12.1.1-2 Option Character Correspondence Table (Cont'd)

Model/Name	Option Number	Option Name
MU181620A Stressed Eye Transmitter	OPTx01	1310nm Reference
	OPTx02	1550nm Reference
	OPTx03	1310nm/1550nm Reference
	OPTx11	1310nm Stressed Eye
	OPTx12	1550nm Stressed Eye
	OPTx13	1310nm/1550nm Stressed Eye
MU181640A Optical Receiver	OPTx04	Band Width 8.5 GHz
MU181800A 12.5GHz Clock Distributor	–	–
MU181020B 14Gbit/s PPG	OPT002	0.1 to 14 Gbit/s
	OPTx11	Variable Data Output (0.25 to 2.5 Vp-p)
	OPTx12	High Performance Data Output (0.05 to 2.0 Vp-p)
	OPTx13	Variable Data Output (0.5 to 3.5 Vp-p)
	OPTx21	Differential Clock Output (0.1 to 2.0 Vp-p)
	OPTx30	Variable Data Delay
MU181040B 14Gbit/s ED	OPT002	0.1 to 14 Gbit/s
	OPTx20	Clock Recovery
	OPTx30	Variable Clock Delay
MU182020A 25Gbit/s 1ch MUX MU182021A 25Gbit/s 2ch MUX	OPTx01	28Gbit/s Extension
	OPTx02	Clock Input Band Switch
	OPTx10	Variable Data Output (0.25 to 1.75Vp-p)
	OPTx11	Variable Data Output (0.5 to 2.5Vp-p)
	OPTx12	Variable Data Output (0.5 to 2.0Vp-p)
	OPTx13	Variable Data Output (0.5 to 3.5Vp-p)
	OPTx21	Differential Clock Output (0.5 to 2.0Vp-p)
	OPTx30	25Gbit/s Variable Data Delay
MU182040A 25Gbit/s 1ch DEMUX MU182041A 25Gbit/s 2ch DEMUX	OPTx01	28Gbit/s Extension
	OPTx02	Clock Input Band Switch
	OPTx30	25GHz Variable Clock Delay
	OPTx31	28GHz Variable Clock Delay
MU183020A 28G/32G bit/s PPG	OPTx01	32G bit/s Extension
	OPTx10	1ch 1V Data Output
	OPTx12	1ch 2V Data Output
	OPTx13	1ch 3.5V Data Output
	OPTx30	1ch Data Delay
	OPTx20	2ch 1V Data Output
	OPTx22	2ch 2V Data Output
	OPTx23	2ch 3.5V Data Output
OPTx31	2ch Data Delay	

**Table 7.12.1.1-2 Option Character Correspondence Table (Cont'd)**

Model/Name	Option Number	Option Name
MU183021A 28G/32G bit/s 4ch PPG	OPTx01	32G bit/s Extension
	OPTx10	4ch 1V Data Output
	OPTx12	4ch 2V Data Output
	OPTx13	4ch 3.5V Data Output
	OPTx30	4ch Data Delay
MU183040A 28G/32G bit/s ED	OPTx01	32 Gbit/s Extension
	OPTx10	1ch ED
	OPTx20	2ch ED
MU183041A 28G/32G bit/s 4ch ED	OPTx01	32 Gbit/s Extension
MU183040B 28G/32G bit/s High Sensitivity ED	OPTx01	32 Gbit/s Extension
	OPTx10	1ch ED
	OPTx20	2ch ED
MU183041B 28G/32G bit/s 4ch High Sensitivity ED	OPTx01	32 Gbit/s Extension

**Note:**

The option names of the MU181020B-003 and MU181040B-003 are not output.



**:SYSTem:ORGanization:HARDware?**

Response <slot1>, ... ,<slot64>  
 <slotx> =  
 <module>,<serial>,<fpga1>[,<fpga2>],<boot>,<application>,<opt>  
 x indicates a slot number. The slot number varies depending on the unit number as follows.

Unit 1: 1 to 16	For the MP1800A, numbers from 1 to 6 correspond to actual slots. For the MT1810A, numbers from 1 to 4 correspond to actual slots.
Unit 2: 17 to 32	For the MT1810A, numbers from 17 to 20 correspond to actual slots.
Unit 3: 33 to 48	For the MT1810A, numbers from 33 to 36 correspond to actual slots.
Unit 4: 49 to 64	For the MT1810A, numbers from 49 to 52 correspond to actual slots.

<module> = <STRING RESPONSE DATA>  
 XXXXXXXXXX Module name (e.g.,: MU181020A)  
 See Table 7.12.1.1-2 “Option character correspondence table”.

**Note:**

NONE is output if no module is installed.  
 For a module that uses two slots, only the slot with the greater number is valid.

<serial> = <STRING RESPONSE DATA>  
 XXXXXXXXXXXX 0000000000 to 9999999999  
 Serial number

**Note:**

“-----” is output if no module is installed.  
 For a module that uses two slots, only the slot with the greater number is valid.

<fpga1>[,<fpga2>,<fpga3>] = <STRING RESPONSE DATA>  
 XXXX.XX.XX 1.00.00 to 9999.99.99  
 FPGA version

<boot> = <STRING RESPONSE DATA>  
 XXXX.XX.XX 1.00.00 to 9999.99.99  
 Logic Boot version

**Note:**

“-----” is output if Logic boot is not installed.  
 For a module that uses two slots, only the slot with the greater number is valid.

<application> = <STRING RESPONSE DATA>  
 XXXX.XX.XX                    1.00.00 to 9999.99.99  
                                   Logic Application version

**Note:**

“-----” is output if Logic Application is not installed.  
 For a module that uses two slots, only the slot with the greater number is valid.

<opt> = <STRING RESPONSE DATA>  
 XXXXXX/XXXXX                Option number  
                                   OPTXXX: For MP1800A/MT1810A

**Note:**

Outputs the numbers for all installed options.  
 For a module that uses two slots, only the slot with the greater number is valid.  
 The option names of the MU181020B-003 and MU181040B-003 are not output.

Function	Queries the hardware system configuration of the MP1800A:
Example	<pre>&gt; :SYSTem:ORGanization:HARDware? &lt; MU181000A, 6201234568, 1.00.00, 1.00.00, 1.00.00, OPT101, MU181020A, 6201234569, 1.00.00, 1.00.00, 1.00.00, OPT001, OPT2 20, MU181040A, 6201234571, 1.00.00, 1.00.00, 1.00.00, OPT002, O PT220</pre>
Compatibility	Partially compatible with MU181040A/B.

**:SYSTem:INFormation:ERRor? <unit>**

---

Parameter	<unit> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4:                            1 to 4, in single steps								
Response	<p>&lt;numeric&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;</p> <table border="0"> <tr><td>0</td><td>NONE</td></tr> <tr><td>1</td><td>PLL Unlock</td></tr> <tr><td>2</td><td>Temperature</td></tr> <tr><td>3</td><td>Fan</td></tr> </table> <p>All the system errors that have currently occurred are displayed, delimited with a comma (,).</p>	0	NONE	1	PLL Unlock	2	Temperature	3	Fan
0	NONE								
1	PLL Unlock								
2	Temperature								
3	Fan								
Function	Queries the System Error contents.								
Example	<pre>&gt; :SYSTem:INFormation:ERRor? 3 &lt; 1, 2, 3 (when a system error has occurred for PLL Unlock, Temperature, or Fan) &lt; 0 (when no system error has occurred)</pre>								
Compatibility	Incompatible with existing models.								

**:SYSTem:TERMination <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA>
	0                      LF + EOI
	1                      CR + LF + EOI
Function	Sets the terminator type of the response data.
Example	To set the terminator type to LF + EOI: > :SYSTem:TERMination 0
Compatibility	Compatible with the MP1632C.

**:SYSTem:TERMination?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	0                      LF + EOI
	1                      CR + LF + EOI
Function	Queries the terminator type of the response data.
Example	> :SYSTem:TERMination? < 0
Compatibility	Compatible with the MP1632C.

## :SYSTem:CONDition:UNITs?

---

Response	<p>&lt;unit1&gt;,...,&lt;unit4&gt;,&lt;slot1&gt;,...,&lt;slot6&gt; =                  "&lt;mainframe1&gt;,...,&lt;mainframe4&gt;,&lt;module1&gt;,...,&lt;module64&gt;"                  &lt;mainframe1&gt; to &lt;mainframe4&gt; = &lt;STRING RESPONSE DATA&gt;                  XXXXXXXXXX            Mainframe name (e.g.,: MP1800A)                                           See Table 7.12.1.1-2 "Option character                                           correspondence table".</p> <p><b>Note:</b>                  NONE is output for mainframe2 to mainframe4, if no mainframe is                  connected.</p> <p>&lt;module1&gt; to &lt;module64&gt; = &lt;STRING RESPONSE DATA&gt;                  XXXXXXXXXX            Module name (e.g.,: MU181020A)                                           See Table 7.12.1.1-2 "Option character                                           correspondence table".</p> <p><b>Note:</b>                  NONE is output if no module is installed.                  For a module that uses two slots, only the slot with the greater                  number is valid.</p>
Function	Queries the model name of the mainframe and module.
Example	<pre>&gt; :SYSTem:CONDition:UNITs? &lt; MT1810A,MT1810A,MT1810A,NONE,MU181000A,NONE,MU181020A, MU181040A,NONE,...,MU181600A,MU181601A,MU181620A,NONE, MU181640A,NONE,...,NONE</pre>
Example	<p>To query the model name of the mainframe and module for the MP1800A                  (1-box type):</p> <pre>&gt; :SYSTem:CONDition:UNITs? &lt; "MP1800A,NONE,NONE,NONE,MU181000A,NONE,MU181020A, MU181040A,NONE,MU181600A,NONE,...,NONE"</pre>
Compatibility	Incompatible with existing models.

**:SYSTem:UNIT? <numeric>**

Parameter	<numeric> = <NR1 NUMERIC PROGRAM DATA> 1 to 4                      Mainframe number "1" for the MP1800A, "1 to 4" for the MT1810A.
Response	<mainframe> = <unit>,<serial>,<mver>,<hver>,<opt1>,<sbver>,<saver>,<opt2> <unit> = <STRING RESPONSE DATA> XXXXXXXXXX              Mainframe name (e.g.,: MP1800A) See Table 7.12.1.1-2 "Option character correspondence table".
	<b>Note:</b> NONE is output if no module is installed. For a module that uses two slots, only the slot with the greater number is valid.
	<serial> = <STRING RESPONSE DATA> XXXXXXXXXX              0000000000 to 9999999999 Mainframe serial number
	<b>Note:</b> Alphabetic characters may be included.
	<mver> = <STRING RESPONSE DATA> XXXX.XX.XX              1.00.00 to 9999.99.99 Main application software version
	<hver> = <STRING RESPONSE DATA> XXXX.XX.XX              1.00.00 to 9999.99.99 Mainframe hardware version
	<opt1> = <STRING RESPONSE DATA> OPTXXX                  Option number (MP1800A/MT1810A) See Table 7.12.1.1-2 "Option character correspondence table".
	<b>Note:</b> Outputs the numbers for all installed options. NONE is output if no option is installed.
	<sbver> = <STRING RESPONSE DATA> XXXX.XX.XX              1.00.00 to 9999.99.99 Sub application software version (Boot part)
	<saver> = <STRING RESPONSE DATA> XXXX.XX.XX              1.00.00 to 9999.99.99 Sub application software version (Application part)
Function	<opt2> = <STRING RESPONSE DATA> Queries the mainframe information including model and serial number.

Example	> :SYSTem:UNIT? 1 < "MP1800A, 6201234568, 1.00.00, 1.00.00, OPT301, 1.00.00, 1.00.00"
Compatibility	Incompatible with existing models.

### **:SYSTem:MODule? <numeric>**

---

Parameter	<numeric> = <NR1 NUMERIC PROGRAM DATA> 1 to 6 Slot 1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A
Response	<slot> = <module>,<serial>,<fpga1>,<fpga2>,<boot>,<application>,<opt> <module> = <STRING RESPONSE DATA> XXXXXXXXXX Module name (e.g.,: MU181020A) See Table 7.12.1.1-2 "Option character correspondence table".  <b>Note:</b> NONE is output if no module is installed. For a module that uses two slots, only the slot with the greater number is valid.  <serial> = <STRING RESPONSE DATA> XXXXXXXXXXXX 0000000000 to 9999999999 Serial number  <b>Note:</b> "-----" is output if no module is installed. For a module that uses two slots, only the slot with the greater number is valid.  <fpga1>[,<fpga2>,...] = <STRING RESPONSE DATA> XXXX.XX.XX 1.00.00 to 9999.99.99 FPGA version  <boot> = <STRING RESPONSE DATA> XXXX.XX.XX 1.00.00 to 9999.99.99 Logic Boot version  <b>Note:</b> "-----" is output if Logic boot is not installed. For a module that uses two slots, only the slot with the greater number is valid.  <application> = <STRING RESPONSE DATA> XXXX.XX.XX 1.00.00 to 9999.99.99 Logic Application version  <b>Note:</b> "-----" is output if Logic Application is not installed. For a module that uses two slots, only the slot with the greater number is valid.  <opt> = <STRING RESPONSE DATA>

XXXXXX/XXXXX      Option number  
 OPTXXX: For MP1800A/MT1810A

**Note:**

Outputs the numbers for all installed options.

For a module that uses two slots, only the slot with the greater number is valid.

The option names of the MU181020B-003 and MU181040B-003 are not output.

Function	Queries the module information on the specified slot.
Example	To query the module information on Slot 3: <pre>&gt; :SYSTem:MODUle? 3 &lt; "MU181020A, 6201234568, 1.00.00, -----, 1.00.00, 1.00.00, OPT002, OPT211, PT220, "</pre>
Compatibility	Incompatible with existing models.

**:SYSTem:DISPlay:RESult <boolean>**

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> OFF or 0                      Drawing Processing OFF ON or 1                        Drawing Processing ON (default)
Function	Sets measured results drawing processing ON/OFF
Example	Set measured results drawing processing to OFF <pre>&gt; :SYSTem:DISPlay:RESult OFF</pre>
Compatibility	Incompatible with existing models
Remarks	When measured results drawing processing is set to OFF, a dialog indicating drawing processing is stopped is displayed. Issue the command to set drawing processing to ON or press the Remote button to restart measured results drawing processing.

**:SYSTem:DISPlay:RESult?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0                                Drawing Processing OFF 1                                Drawing Processing ON (default)
Function	Queries drawing processing ON/OFF.
Example	<pre>&gt; :SYSTem:DISPlay:RESult? &lt; 0</pre>
Compatibility	Incompatible with existing models.

**:DISPlay:ACTive <unit>,<slot>[,<tab>]**

**Parameter** <unit> = <DECIMAL NUMERIC PROGRAM DATA>  
 1 to 4 Mainframe No.1 to 4  
 When using two or more MT1810A units in serial connection, specify the mainframe number.  
 When using the MP1800A, No.1 is fixed.  
 <slot> = <DECIMAL NUMERIC PROGRAM DATA>  
 1 to 6 Slot No.1 to 6  
 When using the MP1800A, the slot No. is 1 to 6.  
 When using the MT1810A, the slot No. is 1 to 4.  
 [<tab>] = <DECIMAL NUMERIC PROGRAM DATA>  
 1 to X Tab ID No.1 to X  
 When [<tab>] is omitted, 1 is specified.  
 Tab ID is set to No.1 at the left side dialog, and then the tab ID No. is set to 2, 3, 4...toward the right side.  
 The maximum number (X) of the tab ID varies depending on the module options.

Tab ID	Tab Name
1	Result
2	Measurement
3	Pattern
4	Input
5	Capture
6	Misc 1
7	Misc 2

**Function** Displays the specified module screen to the front.

**Note:**

When the screen processing for measurement result is Off, this function cannot be used. If using this function, set the screen processing to On using the :SYSTem:DISPlay:RESult .

**Example** To display the Input tab of the MU183040A/41A/40B/41B module:  
 (when installing the MU183040A/41A/40B/41B in the unit1 slot4)

```
> :DISPlay:ACTive 1,4,4
```

**Compatibility** Incompatible with existing models.



## 7.12.1.2 Commands for File menu

Table 7.12.1.2-1 Commands Related to File Menu

Setting Items	Commands
Quick Open	:SYSTem:MMEMory:QRECall
Quick Save	:SYSTem:MMEMory:QSTore
Open	:SYSTem:MMEMory:RECall
Save	:SYSTem:MMEMory:STORe
Screen Copy Execute	:SYSTem:PRINt:COPIY
Screen Copy Setup	:SYSTem:PRINt:COPIYsetup:SET
	:SYSTem:PRINt:COPIYsetup:SET?
Print	:SYSTem:PRINt:EALarm
Printer Setup	:SYSTem:PRINt:PRINter:SET
	:SYSTem:PRINt:PRINter:SET?
Initialize	:SYSTem:MEMory:INITialize

**:SYSTem:MMEMory:QRECall <file\_name>**

Parameter	<file_name> = <STRING PROGRAM DATA> "<drv>:\[<dir>]<file>" <drv> = C, D, E, F <dir> = <dir1>\<dir2>\... (Omitted for the root directory) <file> = File name
Function	Opens all setting data.
Example	To read all setting files from the specified save destination. > :SYSTem:MMEMory:QRECall "C:\Test\example"
Compatibility	Commands are compatible with the MP1632C. Parameters are incompatible.

**:SYSTem:MMEMory:QSTore <file\_name>,<comment>**

---

Parameter	<file_name> = <STRING PROGRAM DATA> "<drv>:\[<dir>]<file>" <drv> = C, D, E, F <dir> = <dir1>\<dir2>\... (Omitted for the root directory) <file> = File name <comment> = <STRING PROGRAM DATA> "XXXXXX..." Specify a comment of a character string within 60 characters into the file.
Function	Executes "Quick Save". <b>Note:</b> The settings will not be read from the saved file if the file name is changed.
Example	To specify save destination for all setting files and save them with a comment and measurement result data: > :SYSTem:MMEMory:QSTore "C:\Test\example", "setup all"
Compatibility	Commands are compatible with the MP1632C. Parameters are incompatible.

**:SYSTem:MMEMory:RECall <file\_name>,<module>,<data\_type>**

Parameter	<p>&lt;file_name&gt; = &lt;STRING PROGRAM DATA&gt;  "&lt;drv&gt;:\[&lt;dir&gt;]&lt;file&gt;"  &lt;drv&gt; = C, D, E, F  &lt;dir&gt; = &lt;dir1&gt;\&lt;dir2&gt;\... (Omitted for the root directory)  &lt;file&gt; = File name  &lt;module&gt; = &lt;STRING PROGRAM DATA&gt;  "&lt;unit&gt;:&lt;slot&gt;:&lt;port&gt; &lt;module&gt;"  &lt;unit&gt; = 1,2,3,4  &lt;slot&gt; = 1,2,3,4...,6  &lt;port&gt; = 1  &lt;module&gt; = Module model name  &lt;data_type&gt; = &lt;CHARACTER PROGRAM DATA&gt;</p> <table border="0"> <tr><td>P32</td><td>28G/32G PPG Setup</td></tr> <tr><td>P32X</td><td>28G/32G 4ch PPG Setup</td></tr> <tr><td>E32</td><td>28G/32G ED Setup</td></tr> <tr><td>E32X</td><td>28G/32G 4ch ED Setup</td></tr> <tr><td>CP32</td><td>28G/32G Capture Result</td></tr> </table> <p>Function                    Opens module settings and result data.</p>	P32	28G/32G PPG Setup	P32X	28G/32G 4ch PPG Setup	E32	28G/32G ED Setup	E32X	28G/32G 4ch ED Setup	CP32	28G/32G Capture Result
P32	28G/32G PPG Setup										
P32X	28G/32G 4ch PPG Setup										
E32	28G/32G ED Setup										
E32X	28G/32G 4ch ED Setup										
CP32	28G/32G Capture Result										
Example	<p>To read a file for the ED module:  &gt; :SYSTem:MMEMory:RECall "C:\Test\example", "1:3:1  MU183040A", E32</p>										
Compatibility	<p>Compatible with the MP1632C1 and MP1776A commands.  Parameters are incompatible.</p>										

**:SYSTem:MMEMory:STORe**  
**<file\_name>,<module>,<data\_type>,<file\_type>**

---

Parameter	<file_name> = <STRING PROGRAM DATA> "<drv>:\[<dir>]<file>" <drv> = C, D, E, F <dir> = <dir1>\<dir2>\... (Omitted for the root directory) <file> = File name <module> = <STRING PROGRAM DATA> "<unit>:<slot>:<port> <module>" <unit> = 1,2,3,4 <slot> = 1,2,3,4...,6 <port> = 1 <module> = Module model name <data_type> = <CHARACTER PROGRAM DATA> P32                            28G/32G PPG Setup P32X                           28G/32G 4ch PPG Setup E32                             28G/32G ED Setup E32X                           28G/32G 4ch ED Setup CP32                           28G/32G Capture Result ERA_D1                        32G ED Error/Alarm Result (Data1) ERA_D2                        32G ED Error/Alarm Result (Data2) ERA_D3                        32G ED Error/Alarm Result (Data3) ERA_D4                        32G ED Error/Alarm Result (Data4) ERA_C1                        32G ED Error/Alarm Result (2ch Combi1-2) ERA_C2                        32G ED Error/Alarm Result (2ch Combi3-4) ERA_C4                        32G ED Error/Alarm Result (4ch Combi1-4) <file_type> = <CHARACTER PROGRAM DATA> BIN                             Binary File CSV                             CSV File TXT                             Text File
Function	Saves the setting and measurement result data for a specified module. <b>Note:</b> The settings will not be read from the saved file if the file name is changed.
Example	To save the setting file for the ED module: > :SYSTem:MMEMory:STORe "C:\Test\example", "1:3:1 MU183040A", E32, BIN
Compatibility	Compatible with the MU181040A/B commands. Parameters are incompatible.

**:SYSTem:PRINT:COPY**

Function	Takes a screen shot.
Example	> :SYSTem:PRINT:COPY
Compatibility	Compatible with MU181040A/B.

**:SYSTem:PRINT:COPYsetup:SET <save\_type>,<output>,<save\_to>**

Parameter	<save_type> = <CHARACTER PROGRAM DATA> BMP                      Bitmap format PNG                      PNG format JPG                      JPG format <output> = <CHARACTER PROGRAM DATA> FILE                      Output to a file. PRINter                      Output to the printer. <save_to> = <STRING PROGRAM DATA> "<drv>:\[<dir>]" <drv> = C,D,E,F <dir> = <dir1>\<dir2>\... (Omitted for the root directory)
Function	Sets the extension, output destination, and save destination of the screen shot.
Example	To output the screen shot to the specified file in the bitmap format: > :SYSTem:PRINT:COPYsetup:SET BMP,FILE,"C:\Test\example"
Compatibility	Incompatible with existing models

**:SYSTem:PRINT:COPYsetup:SET?**

Response	<save_type> = <CHARACTER RESPONSE DATA> BMP                      Bitmap format PNG                      PNG format JPG                      JPG format <output> = <CHARACTER RESPONSE DATA> FILE                      Output to a file. PRINter                      Output to the printer. <save_to> = <STRING RESPONSE DATA> "<drv>:\[<dir>]" <drv> = C,D,E,F <dir> = <dir1>\<dir2>\... (Omitted for the root directory)
Function	Queries the extension, output destination, and save destination settings of the screen shot.
Example	> :SYSTem:PRINT:COPYsetup:SET? < BMP,FILE,"C:\Test\example"
Compatibility	Incompatible with existing models

**:SYSTem:PRINT:EALarm <list>,<module>**

Parameter	<list> = <CHARACTER PROGRAM DATA> ERA_D1                    32G ED Error/Alarm Result (Data1) ERA_D2                    32G ED Error/Alarm Result (Data2) ERA_D3                    32G ED Error/Alarm Result (Data3) ERA_D4                    32G ED Error/Alarm Result (Data4) ERA_C1                    32G ED Error/Alarm Result (2ch Combi1-2) ERA_C2                    32G ED Error/Alarm Result (2ch Combi3-4) ERA_C4                    32G ED Error/Alarm Result (4ch Combi1-4) <module> = <STRING PROGRAM DATA> "<unit>:<slot>:<port>:<module>" <unit> = 1,2,3,4 <slot> = 1,2,3,4...,6 <port> = 1,2... <module> = Module name
Function	Prints the Error/Alarm results.
Example	To print the 2ch Combi3-4 measurement result. > :SYSTem:PRINT:EALarm ERA_C2,"1:4:1 MU183040A"
Compatibility	Compatible with the MU181040A/B commands. Parameters are incompatible.

**:SYSTem:PRINT:PRINter:SET <printer>,<direction>**

Parameter	<printer> = <STRING PROGRAM DATA> "XXXXXXX..."            Printer name <direction> = <CHARACTER PROGRAM DATA> VER                        Vertical HOR                        Horizontal
Function	Sets the printer and print direction.
Example	> :SYSTem:PRINT:PRINter:SET "printer",VER
Compatibility	Incompatible with existing models

**:SYSTem:PRINT:PRINter:SET?**

Response	<printer> = <STRING RESPONSE DATA> "XXXXXXX..."            Printer name <direction> = <CHARACTER RESPONSE DATA> VER                        Vertical HOR                        Horizontal
Function	Queries the default printer and print direction.
Example	> :SYSTem:PRINT:PRINter:SET? < "printer",VER
Compatibility	Incompatible with existing models

## **:SYSTem:MEMory:INITialize**

---

Function	Initializes the internal setting data to the initial settings at factory shipment.
Example	> :SYSTem:MEMory:INITialize
Compatibility	Compatible with the MP1632C and MP1776A.

7.12.1.3 Common function buttons



Figure 7.12.1.3-1 Common Function Buttons

Table 7.12.1.3-1 Common Function Button Setting Commands

Setting Items	Commands
Meas. Start	:SENSe:MEASure:ASTRt
Meas. Stop	:SENSe:MEASure:ASTP
(Query for measurement status)	:SENSe:MEASure:ASTate?
Open	Refer to Section 7.12.1.2 “Commands for File menu”.
Save	Refer to Section 7.12.1.2 “Commands for File menu”.
Print	Refer to Section 7.12.1.2 “Commands for File menu”.
Error ON/OFF	:SYSTem:BEEPer:ERRor:SET
	:SYSTem:BEEPer:ERRor:SET?
Alarm ON/OFF	:SYSTem:BEEPer:ALARm:SET
	:SYSTem:BEEPer:ALARm:SET?
System Error ON/OFF	:SYSTem:BEEPer:SYSTem:SET
	:SYSTem:BEEPer:SYSTem:SET?
System Error	:SYSTem:BEEPer:SYSTem:TYPE
	:SYSTem:BEEPer:SYSTem:TYPE?

**:SENSe:MEASure:ASTRt**

Function Starts measurement for all modules.  
 Example > :SENSe:MEASure:ASTRt  
 Compatibility Incompatible with existing models

**:SENSe:MEASure:ASTP**

Function Stops measurement for all modules.  
 Example > :SENSe:MEASure:ASTP  
 Compatibility Incompatible with existing models



**:SENSe:MEASure:AState?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0                                      Measurement stops for all modules. 1                                      During measurement
	<b>Note:</b> If any module is being measured, "1 (During measurement)" is returned.
Function	Queries the measurement state for all modules.
Example	> :SENSe:MEASure:AState? < 0
Compatibility	Incompatible with existing models

**:SYSTem:BEEPer:ERRor:SET <boolean>**


---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> OFF or 0                              Buzzer OFF ON or 1                                Buzzer ON
Function	Sets buzzer at error occurrence ON/OFF.
Example	To set buzzer at error occurrence ON: > :SYSTem:BEEPer:ERRor:SET ON
Compatibility	Compatible with MU181040A/B.

**:SYSTem:BEEPer:ERRor:SET?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0                                      Buzzer OFF 1                                      Buzzer ON
Function	Queries the buzzer ON/OFF state at error occurrence.
Example	> :SYSTem:BEEPer:ERRor:SET? < 1
Compatibility	Compatible with MU181040A/B.

**:SYSTem:BEEPer:ALARm:SET <boolean>**


---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> OFF or 0                              Buzzer OFF ON or 1                                Buzzer ON
Function	Sets buzzer at alarm occurrence ON/OFF.
Example	To set buzzer at alarm occurrence OFF: > :SYSTem:BEEPer:ALARm:SET OFF
Compatibility	Compatible with MU181040A/B.

### **:SYSTem:BEEPer:ALARm:SET?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	0                      Buzzer OFF
	1                      Buzzer ON
Function	Queries the buzzer ON/OFF state at alarm occurrence.
Example	> :SYSTem:BEEPer:ALARm:SET? < 0
Compatibility	Compatible with MU181040A/B.

### **:SYSTem:BEEPer:SYSTem:SET <boolean>**

Parameter	<boolean> = <BOOLEAN PROGRAM DATA>
	OFF or 0              Buzzer OFF
	ON or 1                Buzzer ON
Function	Sets buzzer at system error occurrence ON/OFF.
Example	To set buzzer at system error occurrence ON: > :SYSTem:BEEPer:SYSTem:SET ON
Compatibility	Compatible with MU181040A/B.

### **:SYSTem:BEEPer:SYSTem:SET?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	0                      Buzzer OFF
	1                      Buzzer ON
Function	Queries the buzzer ON/OFF state at system error occurrence.
Example	> :SYSTem:BEEPer:SYSTem:SET? < 1
Compatibility	Compatible with MU181040A/B.

### **:SYSTem:BEEPer:SYSTem:TYPE <type>,<boolean>**

Parameter	<type> = <CHARACTER PROGRAM DATA>
	PUNLock              PLL Unlock
	FAN                    FAN
	TEMPerature      Temperature
	ALL                    Selects all system errors
	<boolean> = <BOOLEAN PROGRAM DATA>
	OFF or 0
	ON or 1
Function	Sets system error buzzer for the target item ON/OFF.
Example	To set system error buzzer for "Temperature" ON: > :SYSTem:BEEPer:SYSTem:TYPE TEMPerature,ON
Compatibility	Partially compatible with the MP1632C.

---

**:SYSTem:BEEPer:SYSTem:TYPE?**

---

Response	<type> = <CHARACTER RESPONSE DATA> PUNL, FAN, TEMP, ALL XXX, XXX	Errors for which buzzer is set to ON are delimited with commas (,) and returned.
	NONE	Buzzer is set to OFF for all items.
Function	Queries the ON/OFF state of system error buzzer for target items.	
Example	> :SYSTem:BEEPer:SYSTem:TYPE? < PUNL, TEMP	
Compatibility	Compatible with the MP1632C.	

### 7.12.1.4 ED status

The ED status shows alarms and errors in MU183040A/41A/40B/41B.  
 There is no compatibility of commands with existing Anritsu EDs.

#### **:INSTrument:EDG32[:EVENT]?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	0 to 16383                      Sum total of the bit of event register (DECIMAL)
	Available bit
	1 (Bit0)                      Error (Data1)
	2 (Bit1)                      Error (Data2)
	4 (Bit2)                      Error (Data3)
	8 (Bit3)                      Error (Data4)
	16 (Bit4)                    Pattern Sync Loss (Data1)
	32 (Bit5)                    Pattern Sync Loss (Data2)
	64 (Bit6)                    Pattern Sync Loss (Data3)
	128 (Bit7)                  Pattern Sync Loss (Data4)
	256 (Bit8)                  Clock Loss
	1024 (Bit10)                Delay Calibration Require (Data1)
	2048 (Bit11)                Delay Calibration Require (Data2)
	4096 (Bit12)                Delay Calibration Require (Data3)
	8192 (Bit13)                Delay Calibration Require (Data4)
Function	Queries event at 28G/32G bit/s ED status.
Example	> :INSTrument:EDG32:EVENT?
	or
	> :INSTrument:EDG32?
	< 1

**:INSTrument:EDG32:CONDition?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 to 16383	Sum total of the bit of condition register (DECIMAL)
	Available bit	
	1 (Bit0)	Error (Data1)
	2 (Bit1)	Error (Data2)
	4 (Bit2)	Error (Data3)
	8 (Bit3)	Error (Data4)
	16 (Bit4)	Pattern Sync Loss (Data1)
	32 (Bit5)	Pattern Sync Loss (Data2)
	64 (Bit6)	Pattern Sync Loss (Data3)
	128 (Bit7)	Pattern Sync Loss (Data4)
	256 (Bit8)	Clock Loss
	1024 (Bit10)	Delay Calibration Require (Data1)
	2048 (Bit11)	Delay Calibration Require (Data2)
	4096 (Bit12)	Delay Calibration Require (Data3)
	8192 (Bit13)	Delay Calibration Require (Data4)
Function	Queries condition at 28G/32G bit/s ED status.	
Example	<pre>&gt; :INSTrument:EDG32:CONDition? &lt; 1</pre>	

**:INSTrument:EDG32:PTRansition <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA>
	0 to 16383                      Sum total of the bit of transition filter (DECIMAL)
	Available bit
	1 (Bit0)                      Error (Data1)
	2 (Bit1)                      Error (Data2)
	4 (Bit2)                      Error (Data3)
	8 (Bit3)                      Error (Data4)
	16 (Bit4)                     Pattern Sync Loss (Data1)
	32 (Bit5)                     Pattern Sync Loss (Data2)
	64 (Bit6)                     Pattern Sync Loss (Data3)
	128 (Bit7)                    Pattern Sync Loss (Data4)
	256 (Bit8)                    Clock Loss
	1024 (Bit10)                 Delay Calibration Require (Data1)
	2048 (Bit11)                 Delay Calibration Require (Data2)
	4096 (Bit12)                 Delay Calibration Require (Data3)
	8192 (Bit13)                 Delay Calibration Require (Data4)
Function	Sets transition filter (positive direction transition) at 28G/32G bit/s ED status.
Example	To set the transition filter (positive direction transition) at 28G/32G bit/s ED status to 1. > :INSTrument:EDG32:PTRansition 1

**:INSTrument:EDG32:PTRansition?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	0 to 16383                      Sum total of the bit of transition filter (DECIMAL)
Function	Queries contents of transition filter (positive direction transition) at 28G/32G bit/s ED status.
Example	> :INSTrument:EDG32:PTRansition? < 1

**:INSTRument:EDG32:NTRansition <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0 to 16383	Sum total of the bit of transition filter (DECIMAL)
	Available bit	
	1 (Bit0)	Error (Data1)
	2 (Bit1)	Error (Data2)
	4 (Bit2)	Error (Data3)
	8 (Bit3)	Error (Data4)
	16 (Bit4)	Pattern Sync Loss (Data1)
	32 (Bit5)	Pattern Sync Loss (Data2)
	64 (Bit6)	Pattern Sync Loss (Data3)
	128 (Bit7)	Pattern Sync Loss (Data4)
	256 (Bit8)	Clock Loss
	1024 (Bit10)	Delay Calibration Require (Data1)
	2048 (Bit11)	Delay Calibration Require (Data2)
	4096 (Bit12)	Delay Calibration Require (Data3)
	8192 (Bit13)	Delay Calibration Require (Data4)
Function	Sets transition filter (negative direction transition) at 28G/32G bit/s ED status.	
Example	To set the transition filter (negative direction transition) at 28G/32G bit/s ED status to 1. > :INSTRument:EDG32:NTRansition 1	

**:INSTRument:EDG32:NTRansition?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 to 16383	Sum total of the bit of transition filter (DECIMAL)
Function	Queries contents of transition filter (negative direction transition) at 28G/32G bit/s ED status.	
Example	> :INSTRument:EDG32:NTRansition? < 1	

**:INSTRument:EDG32:RESet**

Function	Initializes event at 28G/32G bit/s ED status.
Example	> :INSTRument:EDG32:RESet

### 7.12.1.5 Data Interface setting commands



Figure 7.12.1.5-1 Data Interface Select

Table 7.12.1.5-1 Data Interface Setting Commands

Setting Items	Commands
Data Interface Select	:INTerface:ID
	:INTerface:ID?

#### :INTerface:ID <interface\_number>

Parameter	<interface_number> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4	Data interface number
Function	Sets the number of data interface to be operated (Data 1 to 4). The setting range varies according to the module model. MU183040A/B-x10: 1 MU183040A/B-x20: 1 to 2 MU183041A/B: 1 to 4	
Example	To set the number of data interface to be operated to 4: > :INTerface:ID 4	
Compatibility	Incompatible with existing models	

#### :INTerfaceme:ID?

Parameter	<interface_number> = <NR1 NUMERIC RESPONSE DATA> 1 to 4
Function	Queries the number of the data interface being operated (Data 1 to 4).
Example	> :INTerface:ID? < 4
Compatibility	Incompatible with existing models



### 7.12.1.6 Data Interface setting commands

This section describes the commands for saving and loading pattern files to MU183040A/41A/40B/41B. Before executing the commands, use the :MODULE:ID and :INTERFACE:ID commands to specify both slot number and data interface number of the module you want to remote-control. For how to specify the slot number with the :MODULE:ID command, refer to 7.1, “Common Commands” and 9.1, “Basic Operation of Device Messages”.

**Table 7.12.1.6-1 Pattern Editor Setting Commands**

Setting Items	Commands
Open	:SYSTEM:MMEMORY:PATTERN:RECALL
Save	:SYSTEM:MMEMORY:PATTERN:STORE

#### **:SYSTEM:MMEMORY:PATTERN:RECALL <file\_name>,<file\_type>**

Parameter	<file_name> = <STRING PROGRAM DATA> "<drv>:\[<dir>]<file>" <drv> = C, D, E, F <dir> = <dir1>\<dir2>\...(Omitted when root directory) <file> = File name <file_type> = <CHARACTER PROGRAM DATA> BIN                      Binary File TXT                      Text File
Function	Opens the pattern file.
Example	To load the pattern file, specifying the save location (C:\Test), file name (example) and file format (Binary): > :SYSTEM:MMEMORY:PATTERN:RECALL "C:\Test\example",BIN
Compatibility	Incompatible with existing models.

**:SYSTem:MMEMory:PATtern:STORE <file\_name>,<file\_type>**

---

Parameter	<file_name> = <STRING PROGRAM DATA> "<drv>:\[<dir>]<file>" <drv> = C, D, E, F <dir> = <dir1>\<dir2>\...(Omitted when root directory) <file> = File name <file_type> = <CHARACTER PROGRAM DATA> BIN                      Binary File TXT                      Text File
Function	Saves the pattern file. <b>Note:</b> The settings will not be read from the saved file if the file name is changed.
Example	To save the pattern file, specifying the save location (C:\Test), file name (example) and file format (Text): > :SYSTem:MMEMory:PATtern:STORE "C:\Test\example",TXT
Compatibility	Incompatible with existing models.

### 7.12.2 Commands Related to Result Tab

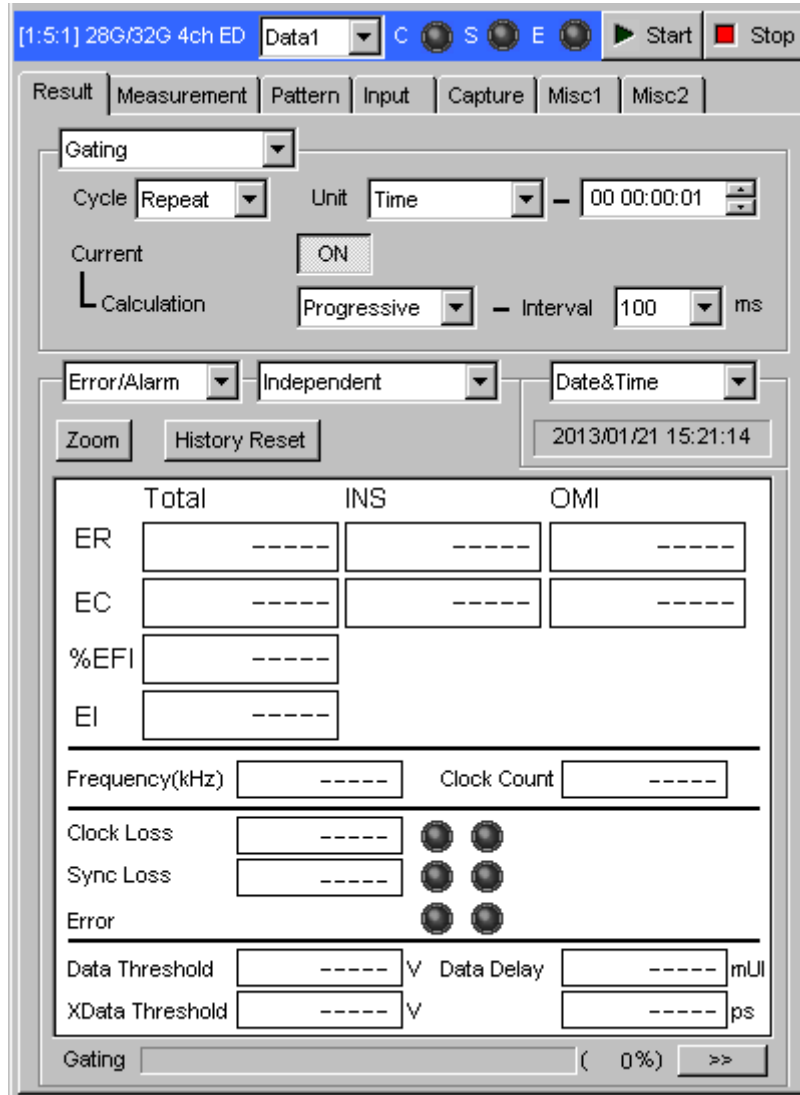


Figure 7.12.2-1 Result Tab

### 7.12.2.1 Result setting commands

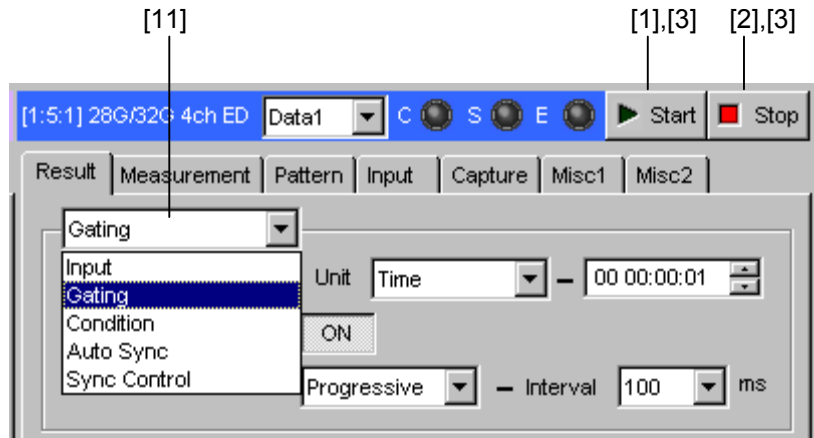


Figure 7.12.2.1-1 Start/Stop Settings

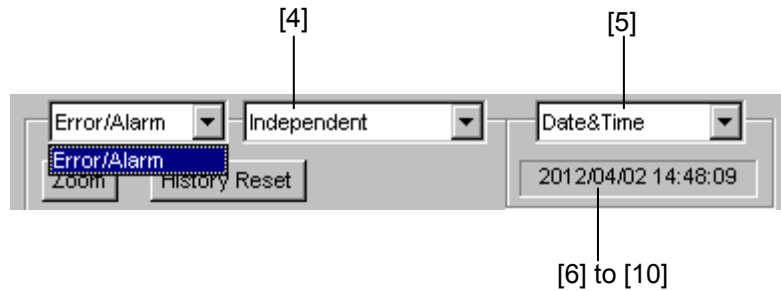


Figure 7.12.2.1-2 Result Settings

Table 7.12.2.1-1 Result Setting Commands

No.	Setting Items	Commands
[1]	Start	:SENSe:MEASure:STARt
[2]	Stop	:SENSe:MEASure:STOP
[3]	Measurement state query	:SENSe:MEASure:EALarm:STATe?
[4]	Selection of result combination status	:DISPlay:RESult:COMBination
		:DISPlay:RESult:COMBination?
[5]	Display time setting	:DISPlay:RESult:TIME
		:DISPlay:RESult:TIME?
[6]	Query for measurement start time	:SENSe:MEASure:EALarm:STARt?
[7]	Query for measurement stop time	:SENSe:MEASure:EALarm:STOP?
[8]	Query for measurement elapsed time	:SENSe:MEASure:EALarm:ELAPsed?
[9]	Query for measurement remaining time	:SENSe:MEASure:EALarm:TIMed?
[10]	Query for alarm occurrence time	:SENSe:MEASure:EALarm:AOCcUr?
[11]	Display measurement items	:SENSe:DISPlay:SETTing

**:SENSe:MEASure:START**


---

Function	Starts BER measurement for the specified module. If this command is issued during measurement, the BER measurement is restarted.
Example	> :SENSe:MEASure:START
Compatibility	Compatible with MU181040A/B.

**:SENSe:MEASure:STOP**


---

Function	Stops the BER measurement of the specified module.
Example	> :SENSe:MEASure:STOP
Compatibility	Compatible with MU181040A/B.

**:SENSe:MEASure:EALarm:STATE?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	0 Measurement stops
	1 During measurement
Function	Queries the measurement processing state during bit error alarm measurement.
Example	> :SENSe:MEASure:EALarm:STATE? < 0
Compatibility	Compatible with MU181040A/B.

**:DISPlay:RESult:COMBination <item>**


---

Parameter	<item> = <DECIMAL NUMERIC PROGRAM DATA>
	1 Independent
	21 Displays the result of 2ch Combination1-2.
	22 Displays the result of 2ch Combination3-4.
	23 Displays the result of 2ch Combination Data1/2 and Data3/4 simultaneously.
	4 4ch Combination
Function	Sets the combination to be displayed.
Example	To set Independent as the combination to be displayed. > :DISPlay:RESult:COMBination 1
Compatibility	Incompatible with existing models

### **:DISPlay:RESult:COMBination?**

---

Response	<item> = <NR1 NUMERIC RESPONSE DATA>
	1 Independent
	21 2ch Combination1-2
	22 2ch Combination3-4
	23 Simultaneous display of 2ch Combination Data1/2 and Data3/4.
	4 4ch Combination
Function	Queries the status of the displayed combination.
Example	> :DISPlay:RESult:COMBination? < 1
Compatibility	Incompatible with existing models

### **:DISPlay:RESult:TIME <time>**

---

Parameter	<time> = <CHARACTER PROGRAM DATA>
	DTIME Displays the current date and time.
	STARt Displays the measurement start time.
	ELAPsed Displays the elapsed time based on the measurement period.
	TIMed Displays the remaining time based on the measurement period.
Function	Sets the measurement time display type.
Example	To set the measurement time display type to DTIME (current date and time): > :DISPlay:RESult:TIME DTIME
Compatibility	Compatible with MU181040A/B.

### **:DISPlay:RESult:TIME?**

---

Response	<time> = <CHARACTER RESPONSE DATA>
	DTIM, STAR, ELAP, TIM
Function	Queries the measurement time display type.
Example	> :DISPlay:RESult:TIME? < DTIM
Compatibility	Compatible with MU181040A/B.

**:SENSe:MEASure:EALarm:START?**


---

Response	<code>&lt;year&gt;,&lt;month&gt;,&lt;day&gt;,&lt;hour&gt;,&lt;min&gt;,&lt;second&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;</code>	
	<code>&lt;year&gt;</code>	0, 2000 to 2036                      2000 to 2036
	<code>&lt;month&gt;</code>	0, 1 to 12                              January to December
	<code>&lt;day&gt;</code>	0, 1 to 31                              1st to 31st
	<code>&lt;hour&gt;</code>	0 to 23                                  0 to 23 hours
	<code>&lt;min&gt;</code>	0 to 59                                  0 to 59 minutes
	<code>&lt;second&gt;</code>	0 to 59                                  0 to 59 seconds
	"0,0,0,0,0,0" is returned if there is no measurement start time data.	
Function	Queries the measurement start time during bit error alarm measurement.	
Example	<pre>&gt; :SENSe:MEASure:EALarm:START? &lt; 2012,1,1,23,59,59</pre>	
Compatibility	Compatible with MU181040A/B.	

**:SENSe:MEASure:EALarm:STOP?**


---

Response	<code>&lt;year&gt;,&lt;month&gt;,&lt;day&gt;,&lt;hour&gt;,&lt;min&gt;,&lt;second&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;</code>	
	<code>&lt;year&gt;</code>	0, 2000 to 2036                      2000 to 2036
	<code>&lt;month&gt;</code>	0, 1 to 12                              January to December
	<code>&lt;day&gt;</code>	0, 1 to 31                              1st to 31st
	<code>&lt;hour&gt;</code>	0 to 23                                  0 to 23 hours
	<code>&lt;min&gt;</code>	0 to 59                                  0 to 59 minutes
	<code>&lt;second&gt;</code>	0 to 59                                  0 to 59 seconds
	"0,0,0,0,0,0" is returned if there is no measurement start time data.	
Function	Queries the measurement end time during bit error alarm measurement.	
Example	<pre>&gt; :SENSe:MEASure:EALarm:STOP? &lt; 0,0,0,0,0,0</pre>	
Compatibility	Compatible with MU181040A/B.	

### **:SENSe:MEASure:EALarm:ELAPsed?**

Response	<code>&lt;day&gt;,&lt;hour&gt;,&lt;min&gt;,&lt;second&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;</code>	
	<code>&lt;day&gt;</code>	0, 1 to 31      1 to 31 days
	<code>&lt;hour&gt;</code>	0 to 23      0 to 23 hours
	<code>&lt;min&gt;</code>	0 to 59      0 to 59 minutes
	<code>&lt;second&gt;</code>	0 to 59      0 to 59 seconds
Function	Queries the measurement elapsed time during bit error alarm measurement.	
Example	<pre>&gt; :SENSe:MEASure:EALarm:ELAPsed? &lt; 0,1,0,0</pre>	
Compatibility	Compatible with MU181040A/B.	

### **:SENSe:MEASure:EALarm:TIMed?**

Response	<code>&lt;day&gt;,&lt;hour&gt;,&lt;min&gt;,&lt;second&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;</code>	
	<code>&lt;day&gt;</code>	0, 1 to 31      1 to 31 days
	<code>&lt;hour&gt;</code>	0 to 23      0 to 23 hours
	<code>&lt;min&gt;</code>	0 to 59      0 to 59 minutes
	<code>&lt;second&gt;</code>	0 to 59      0 to 59 seconds
	"0,0,0,0" is returned when the measurement is finished.	
	When measurement is not performed, the measurement period set at that time is returned.	
Function	Queries the measurement remaining time during bit error alarm measurement.	
Example	<pre>&gt; :SENSe:MEASure:EALarm:TIMed? &lt; 0,0,0,1</pre>	
Compatibility	Compatible with MU181040A/B.	

### **:SENSe:MEASure:EALarm:ITIME?**

Response	<code>&lt;year&gt;,&lt;month&gt;,&lt;day&gt;,&lt;hour&gt;,&lt;min&gt;,&lt;second&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;</code>	
	<code>&lt;year&gt;</code>	0, 2000 to 2036      2000 to 2036
	<code>&lt;month&gt;</code>	0, 1 to 12      January to December
	<code>&lt;day&gt;</code>	0, 1 to 31      1st to 31st
	<code>&lt;hour&gt;</code>	0 to 23      0 to 23 hours
	<code>&lt;min&gt;</code>	0 to 59      0 to 59 minutes
	<code>&lt;second&gt;</code>	0 to 59      0 to 59 seconds
	"0,0,0,0,0,0" is returned if there is no measurement intermediate data.	
Function	Queries the measurement intermediate data creation time during bit error alarm measurement.	
Example	<pre>&gt; :SENSe:MEASure:EALarm:ITIME? &lt; 0,0,0,0,0,0</pre>	



Compatibility Compatible with MU181040A/B.

### **:SENSe:MEASure:EALarm:AOCcUr? <alarm>**

Parameter	<alarm> = <CHARACTER PROGRAM DATA>	
	CLOs	Clock Loss
	PSL	Pattern Sync Loss
Response	<year>,<month>,<day>,<hour>,<min>,<second> = <NR1 NUMERIC RESPONSE DATA>	
	<year>	0, 2000 to 2036                      2000 to 2036
	<month>	0, 1 to 12                              January to December
	<day>	0, 1 to 31                              1st to 31st
	<hour>	0 to 23                                  0 to 23 hours
	<min>	0 to 59                                  0 to 59 minutes
	<second>	0 to 59                                  0 to 59 seconds
	"0,0,0,0,0,0" is returned if no alarm has occurred.	
Function	Queries the last time when a specified alarm has occurred during bit error alarm measurement.	
Example	To query the time when the last clock loss has occurred during bit error alarm measurement: > :SENSe:MEASure:EALarm:AOCcUr? CLOs < 0,0,0,1,0,0	
Compatibility	Partially compatible with the MP1632C (only the clock loss and pattern sync loss are compatible).	

### **:SENSe:DISPlay:SETTing <setting>**

Parameter	<setting> = <CHARACTER PROGRAM DATA>	
	INPut	Displays Input items
	GATing	Displays Gating items
	CONDition	Displays Condition items
	AUTosync	Displays AutoSync items
	SYNCcontrol	Displays SyncControl items
Function	Sets display items in the Result tab	
Example	To display the Input items: > :SENSe:DISPlay:SETTing INPut	
Compatibility	Compatible with MU181040A/B.	

7.12.2.2 Error/Alarm setting commands

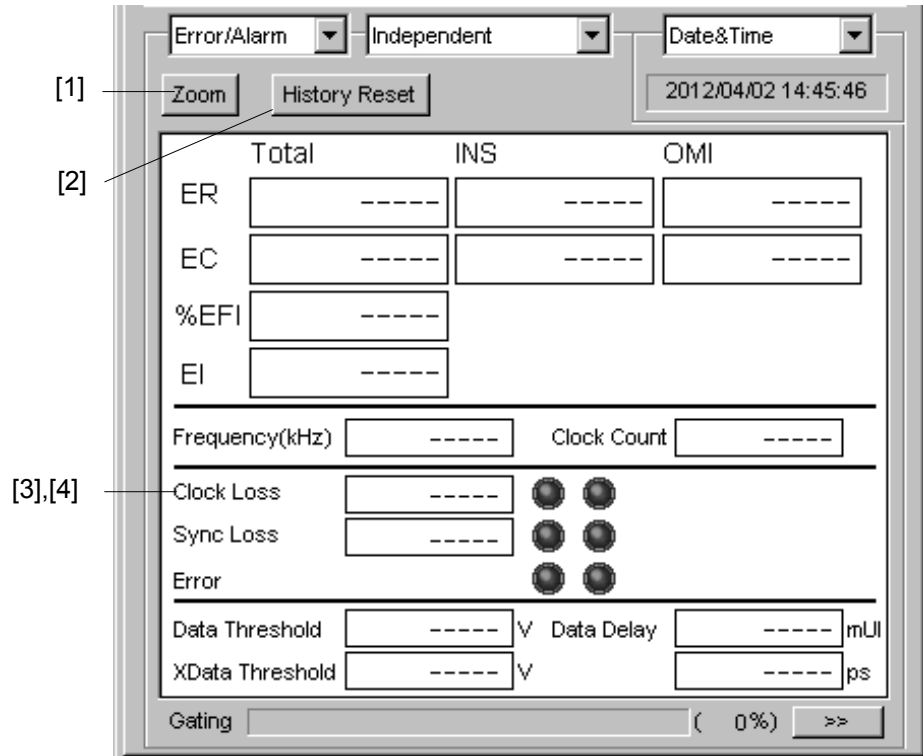


Figure 7.12.2.2-1 Error/Alarm Result Display Area

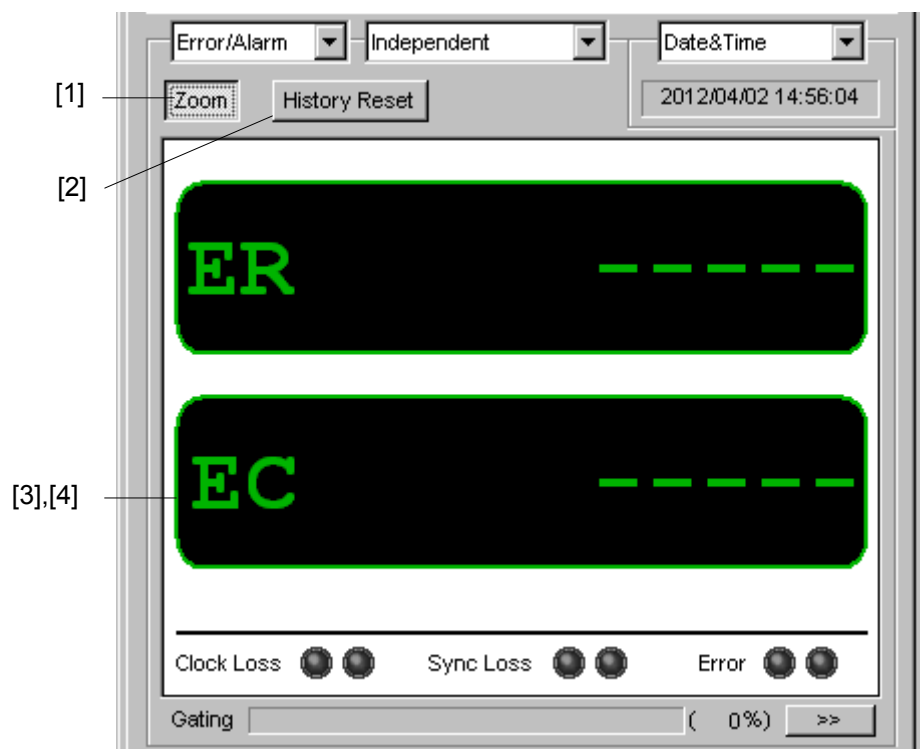


Figure 7.12.2.2-2 Error/Alarm Result Display Area (When Zoom Is Clicked)

Table 7.12.2.2-1 Error/Alarm Setting Commands

No.	Setting Items	Commands
[1]	Zoom	:DISPlay:RESult:ZOOM :DISPlay:RESult:ZOOM?
[2]	History Reset	:DISPlay:RESult:EALarm:HRESet
[3]	No label (Query for error alarm measurement data)	:CALCulate:DATA:EALarm?
[4]	No label (Query for monitoring item)	:CALCulate:DATA:MONitor?
[5]	No label (Query for Combination measurement data)	:CALCulate:CDATa:EALarm?
[6]	No label (Query for Combination monitoring item)	:CALCulate:CDATa:MONitor?

**:DISPlay:RESult:ZOOM <boolean>**

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> 0 or OFF                      Display enlargement OFF 1 or ON                        Display enlargement ON
Function	Sets display enlargement for the measurement result display screen ON/OFF.
Example	To set enlargement for the measurement result display screen ON: > :DISPlay:RESult:ZOOM ON
Compatibility	Compatible with MU181040A/B.

**:DISPlay:RESult:ZOOM?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0                                Display enlargement OFF 1                                Display enlargement ON
Function	Queries the display enlargement for the measurement result display screen ON/OFF state.
Example	> :DISPlay:RESult:ZOOM? < 1
Compatibility	Compatible with MU181040A/B.

**:DISPlay:RESult:EALarm:HRESet**

Function	Resets the histories on the measurement result display screen.
Example	> :DISPlay:RESult:EALarm:HRESet
Compatibility	Compatible with MU181040A/B.

**:CALCulate:DATA:EALarm? <string>**

Parameter	<string> = <STRING PROGRAM DATA> "CURRent:<result>"                      Current data "LAST:<result>"                              Measurement end data See Table 7.12.2.2-3 for details on <result>.
Response	<string> = <STRING RESPONSE DATA>

**Table 7.12.2.2-2 Response Format**

Form	Format	Description
Form1 Integer type	"XXXXXXXX"	For 0 to 9999999
	"X.XXXXEXX"	For 1.0000E07 to 9.9999E17
	"-----"	When no data corresponds to the query
Form2 Fraction type	"X.XXXxE-XX"	For 0.0001E-18 to 1.0000E00
	"-----"	When no data corresponds to the query
Form3 % type	"XXX.XXXXX"	For 0.0000 to 100.0000
	"-----"	When no data corresponds to the query
Form4 Frequency type	"XXXXXXXXXX"	For 0 to MAX (Hz)
	"-----"	When no data corresponds to the query
Form5 Voltage type	"X.XXX, XX.XXX"	For -4.000 to + 4.000
	"-----, -----"	When no data corresponds to the query
Form6 Phase type	"XXXX, XXXX"	For -1000 to +1000, -10000 to +10000
	"-----, -----"	When no data corresponds to the query

Function	Queries the measurement data that corresponds to the parameter.
Example	To query the total error rate measurement data for the current data: > :CALCulate:DATA:EALarm? "CURRent:ER:TOTal" < "0.0000E-16"
Compatibility	Compatible with MU181040A/B.

Table 7.12.2.2-3 Parameters

Items		<result>	Form
Error Rate	Total	ER:TOTAl	Form2
	INS	ER:INSertion	
	OMI	ER:OMISSion	
	Transition	ER:TRANSition	
	Non Transition	ER:NONTransition	
Error Count	Total	EC:TOTAl	Form 1
	INS	EC:INSertion	
	OMI	EC:OMISSion	
	Transition	EC:TRANSition	
	Non Transition	EC:NONTransition	
%EFI	Total	EFI:TOTAl	Form3
EI	Total	EI:TOTAl	Form 1
Frequency(kHz)		FREQuency	Form4
Clock Count		CC:TOTAl	Form1
Clock Loss		AINTerval:CLOSS	Form1
Sync Loss		AINTerval:PSLoss	Form1
Data Threshold		THReshold	Form5
Data Phase		PHASe	Form6

**:CALCulate:DATA:MONitor? <item>**

Parameter	<item> = <STRING PROGRAM DATA> "BIT:TOTal"            Bit Error(Total Error) "CLOSs"                Clock Loss "PSLoss"               Pattern Sync Loss
Response	<string> = <STRING RESPONSE DATA>

**Table 7.12.2.2-4 Response**

Format	Description
"Occur"	When an alarm occurs
"Not Occur"	When no alarm occurs
"-----"	When no data corresponds to the query

Function	Queries the real-time occurrence status of the monitoring item corresponding to the parameter.
Example	To query the bit error occurrence status > :CALCulate:DATA:MONitor? "BIT:TOTal" < "Occur"
Compatibility	Compatible with MU181040A/B.

**:CALCulate:CDATa:EALarm? <string>[,<item>]**

Parameter	<string> = <STRING PROGRAM DATA> "CURRent:<result>"            Current data "LAST:<result>"                Measurement end data See Table 7.12.2.2-6 for details on <result>. <item> = <DECIMAL NUMERIC PROGRAM DATA> 21                                Result of 2ch Combination Data 1/2. 22                                Result of 2ch Combination Data 3/4. 4                                  Result of 4ch Combination. <b>Note:</b> This can be omitted. When <item> is omitted at 2ch Combination, the result of Data1/2 is queried.
Response	<string> = <STRING RESPONSE DATA>

Table 7.12.2.2-5 Response Format

Form	Format	Description
Form1 Integer type	"XXXXXXXX"	For 0 to 9999999
	"X.XXXXEXX"	For 1.0000E07 to 9.9999E17
	"-----"	When no data corresponds to the query
Form2 Fraction type	"X.XXXxE-XX"	For 0.0001E-18 to 1.0000E00
	"-----"	When no data corresponds to the query
Form3 % type	"XXX.XXXXX"	For 0.0000 to 100.0000
	"-----"	When no data corresponds to the query
Form4 Frequency type	"XXXXXXXXXX"	For 0 to MAX (Hz)
	"-----"	When no data corresponds to the query
Form5 Voltage type	"X.XXX, XX.XXX"	For -4.000 to + 4.000
	"-----, -----"	When no data corresponds to the query
Form6 Phase type	"XXXX, XXXX"	For -1000 to + 1000, -10000 to + 10000
	"-----, -----"	When no data corresponds to the query

## Function

Queries the combination measurement data corresponding to Parameter.

## Example

To query the measurement data which totaled the error rate of current data.

```
> :CALCulate:CDATa:EALarm? "CURRENT:ER:TOTAL"
< "0.0000E-16"
```

## Compatibility

Incompatible with existing models

Table 7.12.2.2-6 Parameters

Items		<result>	Form
Error Rate	Total	ER:TOTAL	Form2
	INS	ER:INSertion	
	OMI	ER:OMISSion	
Error Count	Total	EC:TOTAL	Form1
	INS	EC:INSertion	
	OMI	EC:OMISSion	
%EFI	Total	EFI:TOTAL	Form3
EI	Total	EI:TOTAL	Form1
Frequency(kHz)		FREQuency	Form4
Clock Count		CC:TOTAL	Form1
Clock Loss		AINterval:CLOSS	Form1
Sync Loss		AINterval:PSLoss	Form1
Data Threshold		THReshold	Form5
Data Phase		PHASe	Form6

**:CALCulate:CDATa:MONitor? <string>[,<item>]**

Parameter <string> = <STRING PROGRAM DATA>  
 "BIT:TOTal" Bit Error(Total Error)  
 "CLOSs" Clock Loss  
 "PSLoss" Pattern Sync Loss  
 <item> = <DECIMAL NUMERIC PROGRAM DATA>  
 21 Result of 2ch Combination Data 1/2.  
 22 Result of 2ch Combination Data 3/4.  
 4 Result of 4ch Combination.  
**Note:**  
 This can be omitted. Result of Data 1/2 is queried when [<item>] is omitted at 2ch Combination.

Response <string> = <STRING RESPONSE DATA>

**Table 7.12.2.2-7 Response**

Format	Description
"Occur"	When an alarm occurs
"Not Occur"	When no alarm occurs
"-----"	When no data corresponds to the query

Function Queries the real-time occurring state of the monitor item of the combination corresponding to Parameter

Example To query the occurring state of Bit Error.  
 > :CALCulate:CDATa:MONitor? "BIT:TOTal"  
 < "Occur"

Compatibility Incompatible with existing models



### 7.12.3 Commands Related to Measurement Tab

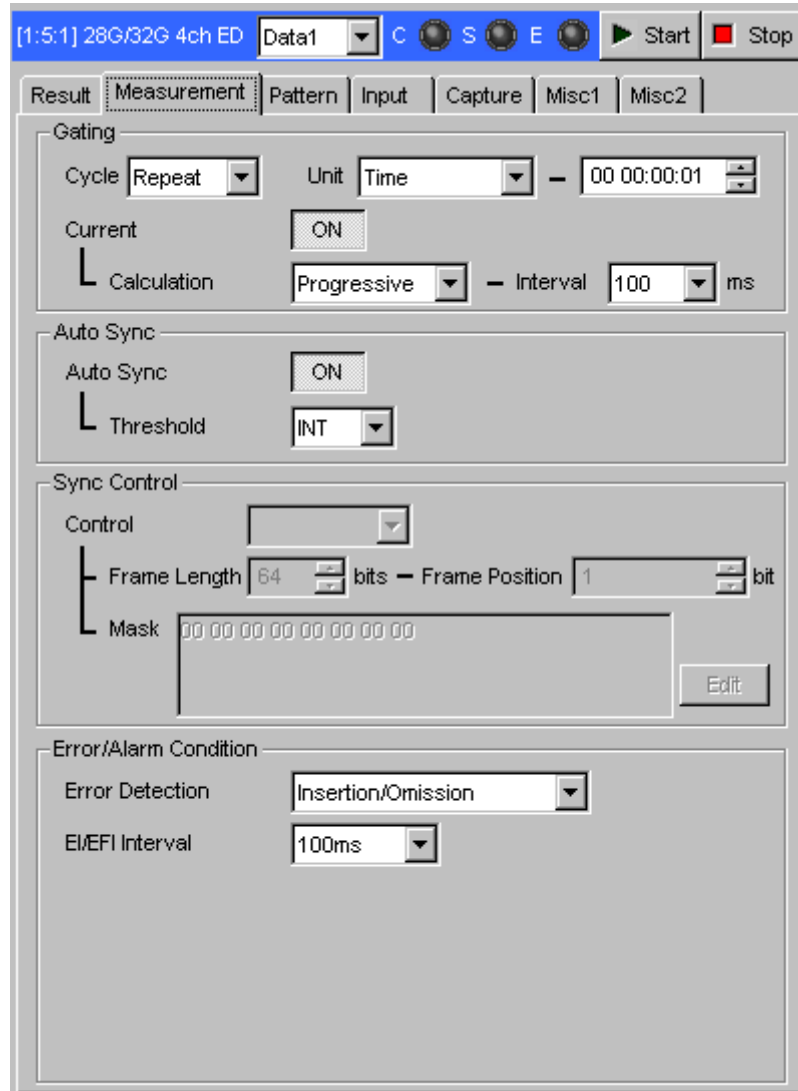


Figure 7.12.3-1 Measurement Tab

### 7.12.3.1 Gating setting commands

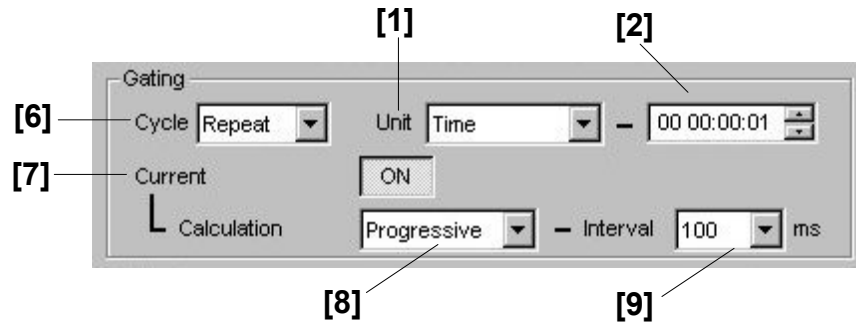


Figure 7.12.3.1-1 Gating Setting (Time)

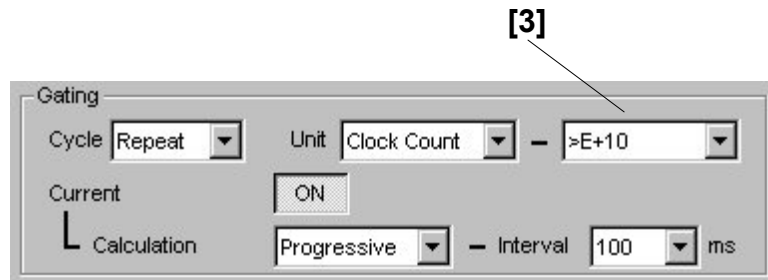


Figure 7.12.3.1-2 Gating Setting (Clock Count)

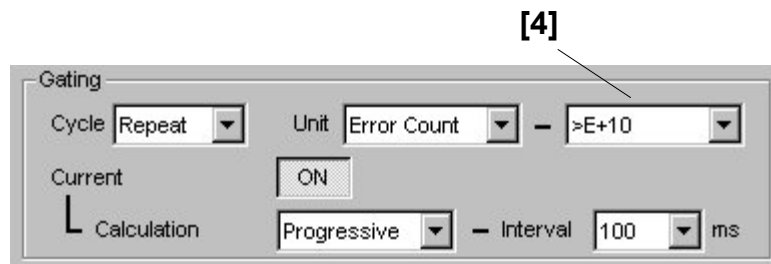


Figure 7.12.3.1-3 Gating Setting (Error Count)

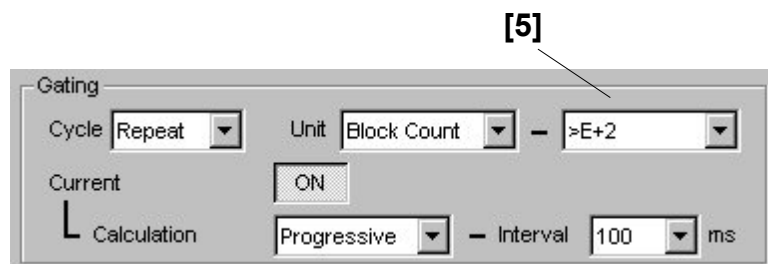


Figure 7.12.3.1-4 Gating Setting (Block Count)

Table 7.12.3.1-1 Gating Setting Commands

No.	Setting Items	Commands
[1]	Unit	:SENSe:MEASure:EALarm:UNIT
		:SENSe:MEASure:EALarm:UNIT?
[2]	No label (Measurement time)	:SENSe:MEASure:EALarm:PERiod
		:SENSe:MEASure:EALarm:PERiod?
[3]	No label (Clock count)	:SENSe:MEASure:EALarm:CLOCkcnt
		:SENSe:MEASure:EALarm:CLOCkcnt?
[4]	No label (Error count)	:SENSe:MEASure:EALarm:ERRorcnt
		:SENSe:MEASure:EALarm:ERRorcnt?
[5]	No label (Block count)	:SENSe:MEASure:EALarm:BLOCkcnt
		:SENSe:MEASure:EALarm:BLOCkcnt?
[6]	Cycle	:SENSe:MEASure:EALarm:MODE
		:SENSe:MEASure:EALarm:MODE?
[7]	Current	:DISPlay:RESult:EALarm:MODE
		:DISPlay:RESult:EALarm:MODE?
[8]	Calculation	:DISPlay:RESult:EALarm:CALCuration
		:DISPlay:RESult:EALarm:CALCuration?
[9]	Interval	:DISPlay:RESult:EALarm:INTerval
		:DISPlay:RESult:EALarm:INTerval?

**:SENSe:MEASure:EALarm:UNIT <unit>**

Parameter	<unit> = <CHARACTER PROGRAM DATA>
	TIME                      Time
	CLOCk                    Clock Count
	ERRor                    Error Count
	BLOCk                    Block Count
Function	Sets the unit of measurement cycle.
Example	To set the unit of measurement cycle to Time. > :SENSe:MEASure:EALarm:UNIT TIME
Compatibility	Compatible with MU181040A/B.

**:SENSe:MEASure:EALarm:UNIT?**

Response	<unit> = <CHARACTER RESPONSE DATA>
	TIME, CLOC, ERR, BLOC
Function	Queries the unit of measurement cycle.
Example	> :SENSe:MEASure:EALarm:UNIT? < TIME
Compatibility	Compatible with MU181040A/B.

**:SENSe:MEASure:EALarm:PERiod <day>,<hour>,<min>,<second>**

Parameter	<day>,<hour>,<min>,<second> = <DECIMAL NUMERIC PROGRAM DATA>		
	<day>	0 to 99	0 to 99 days/day Step
	<hour>	0 to 23	0 to 23 hours/hour Step
	<min>	0 to 59	0 to 59 minutes/minute Step
	<second>	0 to 59	0 to 59 seconds/second Step
Function	Sets the measurement time when the measurement cycle setting is Time.		
Example	To set the measurement time to “0 day 0 hour 1 min 0 second” when the measurement cycle setting is Time. > :SENSe:MEASure:EALarm:PERiod 0,0,1,0		
Compatibility	Compatible with MU181040A/B.		

**:SENSe:MEASure:EALarm:PERiod?**

Response	<day>,<hour>,<min>,<second> = <NR1 NUMERIC RESPONSE DATA>		
	<day>	0 to 99	0 to 99 days
	<hour>	0 to 23	0 to 23 hours
	<min>	0 to 59	0 to 59 minutes
	<second>	0 to 59	0 to 59 seconds
Function	Queries the measurement time when the measurement cycle setting is Time.		
Example	> :SENSe:MEASure:EALarm:PERiod? < 0,0,1,0		
Compatibility	Compatible with MU181040A/B.		

**:SENSe:MEASure:EALarm:CLOCKcnt <count>**

Parameter	<count> = <CHARACTER PROGRAM DATA>
	E_4 >1 E + 4
	E_5 >1 E + 5
	E_6 >1 E + 6
	E_7 >1 E + 7
	E_8 >1 E + 8
	E_9 >1 E + 9
	E_10 >1 E + 10
	E_11 >1 E + 11
	E_12 >1 E + 12
	E_13 >1 E + 13
	E_14 >1 E + 14
	E_15 >1 E + 15
	E_16 >1 E + 16
Function	Sets the threshold for the number of clocks when the measurement cycle setting is Clock Count.
Example	To set the threshold for the number of clocks to 1 E + 4 when the measurement cycle setting is Clock Count. > :SENSe:MEASure:EALarm:CLOCKcnt E_4
Compatibility	Compatible with MU181040A/B.

**:SENSe:MEASure:EALarm:CLOCKcnt?**

Response	<count> = <CHARACTER RESPONSE DATA> E_4, E_5, E_6, E_7, E_8, E_9, E_10, E_11, E_12, E_13, E_14, E_15, E_16
Function	Queries the threshold for the number of clocks when the measurement cycle setting is Clock Count.
Example	> :SENSe:MEASure:EALarm:CLOCKcnt? < E_4
Compatibility	Compatible with MU181040A/B.

**:SENSe:MEASure:EALarm:ERRorcnt <count>**

---

Parameter	<count> = <CHARACTER PROGRAM DATA>
	E_4 >1 E + 4
	E_5 >1 E + 5
	E_6 >1 E + 6
	E_7 >1 E + 7
	E_8 >1 E + 8
	E_9 >1 E + 9
	E_10 >1 E + 10
	E_11 >1 E + 11
	E_12 >1 E + 12
	E_13 >1 E + 13
	E_14 >1 E + 14
	E_15 >1 E + 15
	E_16 >1 E + 16
Function	Sets the threshold for the number of errors when the measurement cycle setting is Error Count.
Example	To set the threshold for the number of errors to 1 E + 4 when the measurement cycle setting is Error Count. > :SENSe:MEASure:EALarm:ERRorcnt E_4
Compatibility	Compatible with MU181040A/B.

**:SENSe:MEASure:EALarm:ERRorcnt?**

---

Response	<count> = <CHARACTER RESPONSE DATA> E_4, E_5, E_6, E_7, E_8, E_9, E_10, E_11, E_12, E_13, E_14, E_15, E_16
Function	Queries the threshold for the number of errors when the measurement cycle setting is Error Count.
Example	> :SENSe:MEASure:EALarm:ERRorcnt? < E_4
Compatibility	Compatible with MU181040A/B.

**:SENSe:MEASure:EALarm:BLOCKcnt <count>**

Parameter	<count> = <CHARACTER PROGRAM DATA>
	E_2 >1 E + 2
	E_3 >1 E + 3
	E_4 >1 E + 4
	E_5 >1 E + 5
	E_6 >1 E + 6
	E_7 >1 E + 7
	E_8 >1 E + 8
	E_9 >1 E + 9
	E_10 >1 E + 10
	E_11 >1 E + 11
	E_12 >1 E + 12
	E_13 >1 E + 13
	E_14 >1 E + 14
Function	Sets the threshold for the number of blocks when the measurement cycle setting is Block Count.
Example	To set the threshold for the number of blocks to 1 E + 4 when the measurement cycle setting is Block Count. > :SENSe:MEASure:EALarm:BLOCKcnt E_4
Compatibility	Compatible with MU181040A/B.

**:SENSe:MEASure:EALarm:BLOCKcnt?**

Response	<count> = <CHARACTER RESPONSE DATA> E_2, E_3, E_4, E_5, E_6, E_7, E_8, E_9, E_10, E_11, E_12, E_13, E_14
Function	Queries the threshold for the number of blocks when the measurement cycle setting is Block Count.
Example	> :SENSe:MEASure:EALarm:BLOCKcnt? < E_4
Compatibility	Compatible with MU181040A/B.

### **:SENSe:MEASure:EALarm:MODE <mode>**

---

Parameter	<mode> = <CHARACTER PROGRAM DATA> REPeat                      Executes the measurement repeatedly. SINGle                      Executes a single measurement. UNTimed                    Executes the measurement until the measurement end is instructed.
Function	Sets the measurement processing mode for the bit-error/alarm measurement.
Example	To set the measurement processing mode for the bit-error/alarm measurement to Repeat. > :SENSe:MEASure:EALarm:MODE REPeat
Compatibility	Compatible with MU181040A/B.

### **:SENSe:MEASure:EALarm:MODE?**

---

Response	<mode> = <CHARACTER RESPONSE DATA> REP, SING, UNT
Function	Queries the measurement processing mode for the bit-error/alarm measurement.
Example	> :SENSe:MEASure:EALarm:MODE? < REP
Compatibility	Compatible with MU181040A/B.

### **:DISPlay:RESult:EALarm:MODE <boolean>**

---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> 0 or OFF                    Turns off the actual value update of the measurement result data display. 1 or ON                     Turns on the actual value update of the measurement result data display.
Function	Sets whether to turn on or off the actual value update of the measurement result data display.
Example	To turn on the actual value update of the measurement result data display. > :DISPlay:RESult:EALarm:MODE ON
Compatibility	Compatible with MU181040A/B.



**:DISPlay:RESult:EALarm:MODE?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 OFF 1 ON
Function	Queries whether the actual value update of the measurement result data display is on.
Example	> :DISPlay:RESult:EALarm:MODE? < 1
Compatibility	Compatible with MU181040A/B.

**:DISPlay:RESult:EALarm:CALCuration <mode>**


---

Parameter	<mode> = <CHARACTER PROGRAM DATA> PROGressive Cumulative processing. IMMEDIATE Immediate processing.
Function	Sets the method of calculating the immediate data.
Example	To set the method of calculating the immediate data to Cumulative processing. > :DISPlay:RESult:EALarm:CALCuration PROGressive
Compatibility	Compatible with MU181040A/B.

**:DISPlay:RESult:EALarm:CALCuration?**


---

Response	<mode> = <CHARACTER RESPONSE DATA> PROG, IMM
Function	Queries the method of calculating the immediate data.
Example	> :DISPlay:RESult:EALarm:CALCuration? < PROG
Compatibility	Compatible with MU181040A/B.

**:DISPlay:RESult:EALarm:INTerval <interval>**


---

Parameter	<interval> = <CHARACTER PROGRAM DATA> I100 Updates display in 100-ms period. I200 Updates display in 200-ms period. I500 Updates display in 500-ms period.
Function	Sets the update cycle of the immediate data display.
Example	To set the update cycle of the immediate data display to 100 ms. > :DISPlay:RESult:EALarm:INTerval I100
Compatibility	Compatible with MU181040A/B.

## **:DISPlay:RESult:EALarm:INTerval?**

---

Response	<interval> = <CHARACTER RESPONSE DATA> I100, I200, I500
Function	Queries the update cycle of the immediate data display.
Example	> :DISPlay:RESult:EALarm:INTerval? < I100
Compatibility	Compatible with MU181040A/B.

## 7.12.3.2 Auto Sync setting commands



Figure 7.12.3.2-1 Auto Sync Setting

Table 7.12.3.2-1 Auto Sync Setting Commands

No.	Setting Items	Commands
[1]	Auto Sync	:SENSe:PATtern:SYnc:ASYNc
		:SENSe:PATtern:SYnc:ASYNc?
[2]	Threshold	:SENSe:PATtern:SYnc:THReshold
		:SENSe:PATtern:SYnc:THReshold?

**:SENSe:PATtern:SYnc:ASYNc <boolean>**

Parameter	<boolean> = <BOOLEAN PROGRAM DATA>
	0 or OFF                      Auto Sync OFF
	1 or ON                        Auto Sync ON
Function	Sets whether or not to automatically retry the synchronization when the synchronization threshold is exceeded.
Example	To set to automatically retry the synchronization. > :SENSe:PATtern:SYnc:ASYNc ON
Compatibility	Compatible with MU181040A/B.

**:SENSe:PATtern:SYnc:ASYNc?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	0                                Auto Sync OFF
	1                                Auto Sync ON
Function	Queries whether the synchronization is automatically retried or not when the synchronization threshold is exceeded.
Example	> :SENSe:PATtern:SYnc:ASYNc? < 1
Compatibility	Compatible with MU181040A/B.

### **:SENSe:PATtern:SYNC:THReshold <thre>**

---

Parameter	<thre> = <CHARACTER PROGRAM DATA>
	INT                      Internal
	E_2                      E-2
	E_3                      E-3
	E_4                      E-4
	E_5                      E-5
	E_6                      E-6
	E_7                      E-7
	E_8                      E-8
Function	Sets the synchronization threshold for determining whether or not to retry the synchronization.
Example	To set the synchronization threshold for determining whether or not to retry the synchronization to Internal. > :SENSe:PATtern:SYNC:THReshold INT
Compatibility	Compatible with MU181040A/B.

### **:SENSe:PATtern:SYNC:THReshold?**

---

Response	<thre> = <CHARACTER RESPONSE DATA> INT, E_2, E_3, E_4, E_5, E_6, E_7, E_8
Function	Queries the synchronization threshold for determining whether or not to retry the synchronization.
Example	> :SENSe:PATtern:SYNC:THReshold? < INT
Compatibility	Compatible with MU181040A/B.

### 7.12.3.3 Sync Control setting commands

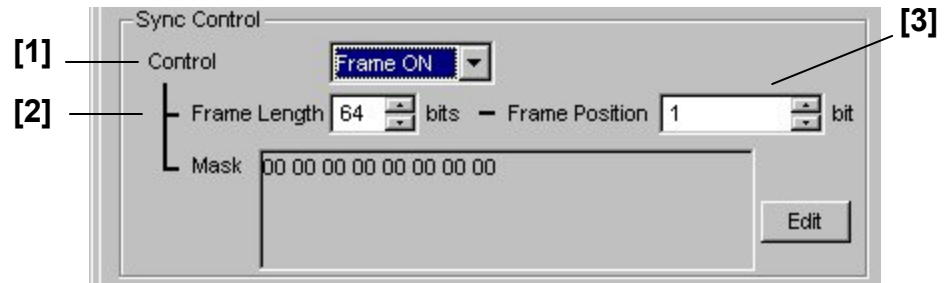


Figure 7.12.3.3-1 Sync Control Setting

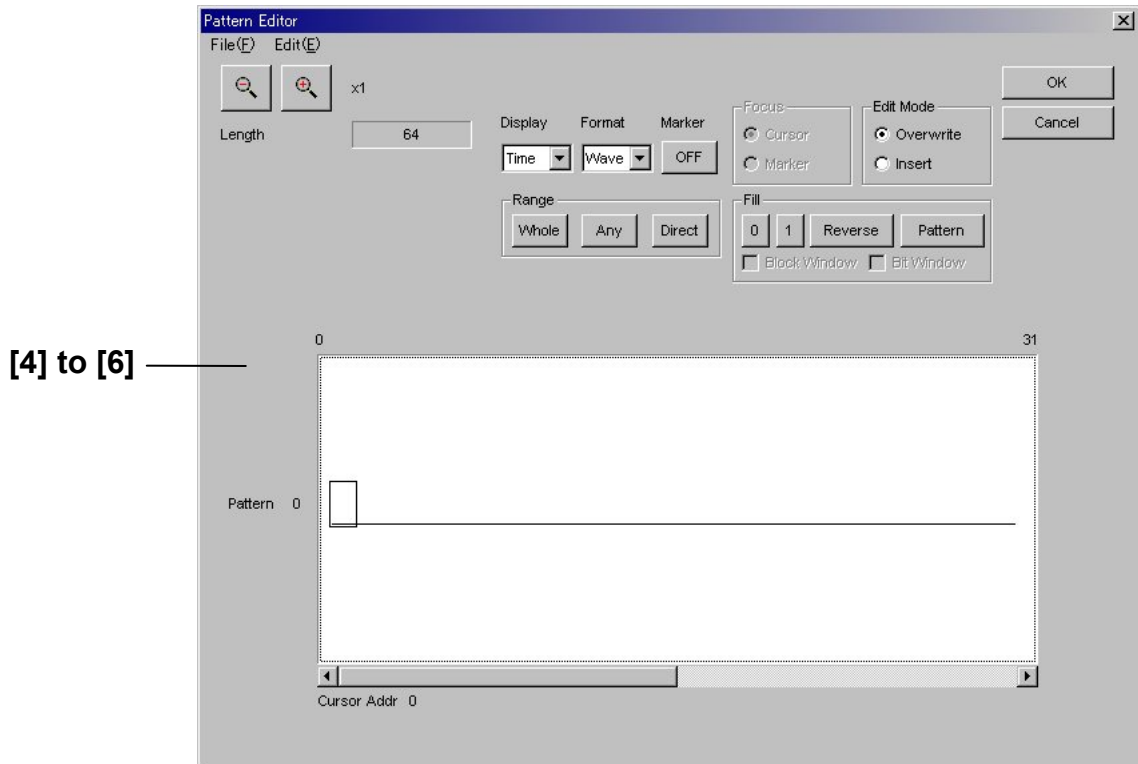


Figure 7.12.3.3-2 Pattern Editor Dialog Box

**Table 7.12.3.3-1 Sync Control Setting Commands**

No.	Setting Items	Commands
[1]	Control	:SENSe:PATtern:SYNC:PSMode
		:SENSe:PATtern:SYNC:PSMode?
[2]	Frame Length	:SENSe:PATtern:SYNC:FLENgth
		:SENSe:PATtern:SYNC:FLENgth?
[3]	Frame Position	:SENSe:PATtern:SYNC:FPOStion
		:SENSe:PATtern:SYNC:FPOStion?
[4]	Mask (Mask pattern setting)	:SENSe:PATtern:SYNC:DATA:WHOLe
		:SENSe:PATtern:SYNC:DATA:WHOLe?
[5]	No label (Data inversion)	:SENSe:PATtern:SYNC:DREVerse:ADDReSS
[6]	No label (All 0 or 1)	:SENSe:PATtern:SYNC:PROGram:FILL

**:SENSe:PATtern:SYNC:PSMode <mode>**

Parameter	<mode> = <CHARACTER PROGRAM DATA> FRAMe                      Frame detection ON QUICK                      Quick synchronization control
Function	Sets the synchronization control of the test pattern.
Example	To set the synchronization control of the test pattern to Frame detection ON. > :SENSe:PATtern:SYNC:PSMode FRAMe
Compatibility	Partially compatible with MU181040A/B.

**:SENSe:PATtern:SYNC:PSMode?**

Response	<mode> = <CHARACTER RESPONSE DATA> FRAM, QUIC
Function	Queries the synchronization control of the test pattern.
Example	> :SENSe:PATtern:SYNC:PSMode? < FRAM
Compatibility	Compatible with MU181040A/B.

**:SENSe:PATtern:SYNC:FLENgth <length>**

Parameter	<length> = <DECIMAL NUMERIC PROGRAM DATA> 4 to 64                      4 to 64 bits/4 bits Step At 2ch Combination, the maximum value and step are doubled. At 4ch Combination, the maximum value and step are quadrupled.
Function	Sets the unique pattern length for the synchronization control with Frame detection ON.
Example	To set the unique pattern length for the synchronization control with Frame detection ON. > :SENSe:PATtern:SYNC:FLENgth 4
Compatibility	Partially compatible with MU181040A/B.

**:SENSe:PATtern:SYNC:FLENgth?**

Response	<length> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries the unique pattern length for the synchronization control with Frame detection ON.
Example	> :SENSe:PATtern:SYNC:FLENgth? < 4
Compatibility	Partially compatible with MU181040A/B.

**:SENSe:PATtern:SYNC:FPOStion <length>**

Parameter	<length> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 268435453              1 to 268,435,453 bits/1 bit Step Allowable parameter setting: Pattern length – Frame length + 1 (bits) At 2ch Combination Setting, 1 to 536870905              1 to 536,870,905 bits/2 bit Step At 4ch Combination Setting, 1 to 1073741809              1 to 1,073,741,809 bits/4 bit Step
Function	Sets the frame synchronization start bit for the synchronization control with Frame detection ON.
Example	To set the frame synchronization start bit for the synchronization control with Frame detection ON to 65 bits. > :SENSe:PATtern:SYNC:FPOStion 65
Compatibility	Partially compatible with MU181040A/B.

### **:SENSe:PATtern:SYNC:FPOsition?**

---

Response	<length> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries the frame synchronization start bit for the synchronization control with Frame detection ON.
Example	> :SENSe:PATtern:SYNC:FPOsition? < 17
Compatibility	Partially compatible with MU181040A/B.

### **:SENSe:PATtern:SYNC:DATA:WHOLe <data>**

---

Parameter	<data> = <STRING PROGRAM DATA> "H*...*" Specifies the pattern data consisting of 1 to 16 hexadecimal characters. "B*...*" Specifies the pattern data consisting of 1 to 64 binary characters.
Function	Edits the mask pattern for the synchronization control with Frame detection ON. Edits the data of up to 64 bits in HEX or BIN. At 2ch Combination, the maximum value and step are doubled. At 4ch Combination, the maximum value and step are quadrupled.
Example	To set the mask pattern for the synchronization control with Frame detection ON to a hexadecimal character. > :SENSe:PATtern:SYNC:DATA:WHOLe "H001"
Compatibility	Compatible with MU181040A/B.

### **:SENSe:PATtern:SYNC:DATA:WHOLe?**

---

Response	<data> = <STRING RESPONSE DATA> "H*...*" Specifies the pattern data consisting of 1 to 16 hexadecimal characters. Up to 64 bits hexadecimal data is returned.
Function	Queries the mask pattern for the synchronization control with Frame detection ON.
Example	> :SENSe:PATtern:SYNC:DATA:WHOLe? < "H001"
Compatibility	Compatible with MU181040A/B.





### 7.12.3.4 Error/Alarm Condition setting commands

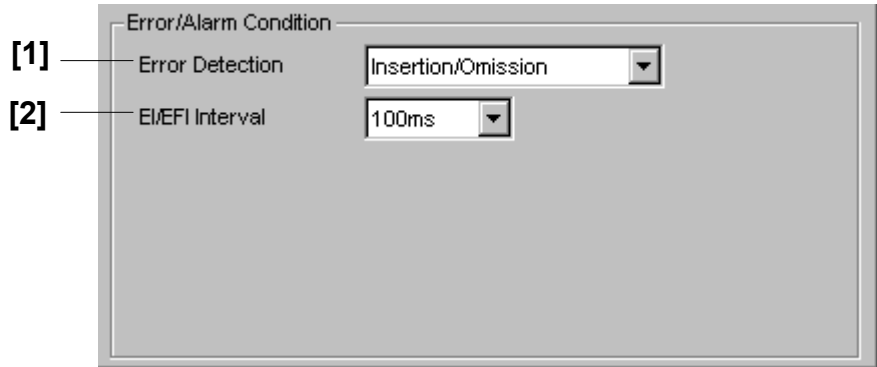


Figure 7.12.3.4-1 Error/Alarm Condition Setting

Table 7.12.3.4-1 Error/Alarm Condition Setting Commands

No.	Setting Items	Commands
[1]	Error Detection	:CALCulate:EALarm:ERRor:EDETect
		:CALCulate:EALarm:ERRor:EDETect?
[2]	El/EFI Interval	:CALCulate:EALarm:ERRor:INTerval
		:CALCulate:EALarm:ERRor:INTerval?

#### :CALCulate:EALarm:ERRor:EDETect <mode>

Parameter	<mode> = <CHARACTER PROGRAM DATA> INSomi                      Detects INS/OMI errors. TRANSition                Detects Transition/Non Transition errors.
Function	Sets the method of detecting errors during the bit-error/alarm measurement.
Example	To set the method of detecting errors during the bit-error/alarm measurement to the INS/OMI error detection. > :CALCulate:EALarm:ERRor:EDETect INSomi
Compatibility	Compatible with MU181040A/B.

#### :CALCulate:EALarm:ERRor:EDETect?

Response	<mode> = <CHARACTER RESPONSE DATA> INS, TRAN
Function	Queries the method of detecting errors during the bit-error/alarm measurement.
Example	> :CALCulate:EALarm:ERRor:EDETect? < INS
Compatibility	Compatible with MU181040A/B.

**:CALCulate:EALarm:ERRor:INTerval <numeric>,<suffix>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA>
	1                      Sets the measurement time value to 1.
	10                     Sets the measurement time value to 10.
	100                    Sets the measurement time value to 100.
	<suffix> = <CHARACTER PROGRAM DATA>
	ms                     Sets the measurement time unit to ms.
	s                        Sets the measurement time unit to second.
Function	Sets the interval for EI and %EFI measurement. Only 1 ms, 10 ms, 100 ms, and 1 s are available.
Example	To set the interval for EI and EFI measurement to 1 ms. > :CALCulate:EALarm:ERRor:INTerval 1,ms
Compatibility	Compatible with MU181040A/B.

**:CALCulate:EALarm:ERRor:INTerval?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	1, 10, 100
	<suffix> = <CHARACTER RESPONSE DATA>
	ms, s
Function	Queries the interval for EI and %EFI measurement.
Example	> :CALCulate:EALarm:ERRor:INTerval? < 1ms
Compatibility	Compatible with MU181040A/B.

### 7.12.4 Commands Related to Pattern Tab

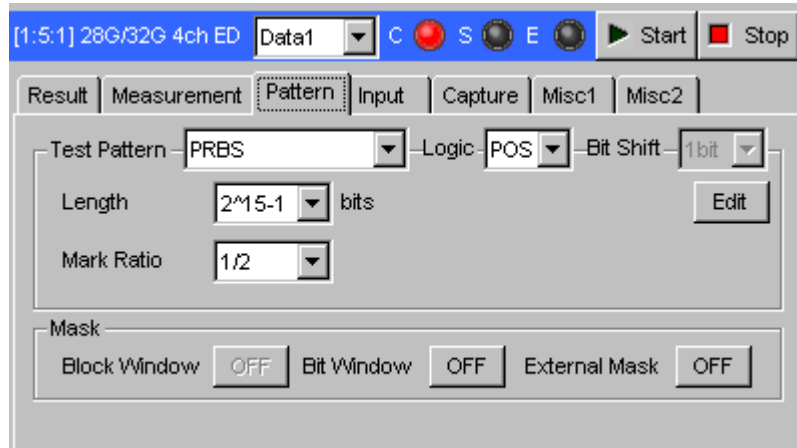


Figure 7.12.4-1 Pattern Tab

#### 7.12.4.1 Test Pattern setting commands

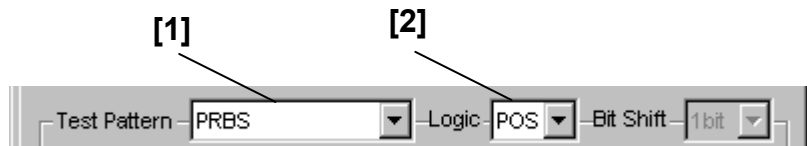


Figure 7.12.4.1-1 Test Pattern Area

Table 7.12.4.1-1 Test Pattern Setting Commands

No.	Setting Items	Commands
[1]	Test Pattern	:SENSe:PATtern:TYPE
		:SENSe:PATtern:TYPE?
[2]	Logic	:SENSe:PATtern:LOGic
		:SENSe:PATtern:LOGic?

**:SENSe:PATtern:TYPE <type>**


---

Parameter	<type> = <CHARACTER PROGRAM DATA> PRBS                      PRBS pattern ZSUBstitution              Zero-Substitution pattern DATA                        Data pattern MIXData                    Mixed Data pattern
Function	Sets the type of the test pattern.
Example	To set the test pattern type to the PRBS pattern: > :SENSe:PATtern:TYPE PRBS
Compatibility	Partially compatible with MU181040A/B. (Only ZSUBstitution)

**:SENSe:PATtern:TYPE?**


---

Response	<type> = <CHARACTER RESPONSE DATA> PRBS, ZSUB, DATA, MIXD
Function	Queries the type of the test pattern.
Example	> :SENSe:PATtern:TYPE? < PRBS
Compatibility	Compatible with MU181040A/B.

**:SENSe:PATtern:LOGic <logic>**


---

Parameter	<logic> = <CHARACTER PROGRAM DATA> POSitive                    Positive logic NEGative                    Negative logic
Function	Sets the logic (positive or negative) of the test pattern.
Example	To set the logic of the test pattern to the positive: > :SENSe:PATtern:LOGic POSitive
Compatibility	Compatible with MU181040A/B.

**:SENSe:PATtern:LOGic?**


---

Response	<logic> = <CHARACTER RESPONSE DATA> POS, NEG
Function	Queries the logic of the test pattern.
Example	> :SENSe:PATtern:LOGic? < POS
Compatibility	Compatible with MU181040A/B.

7.12.4.2 PRBS pattern setting commands

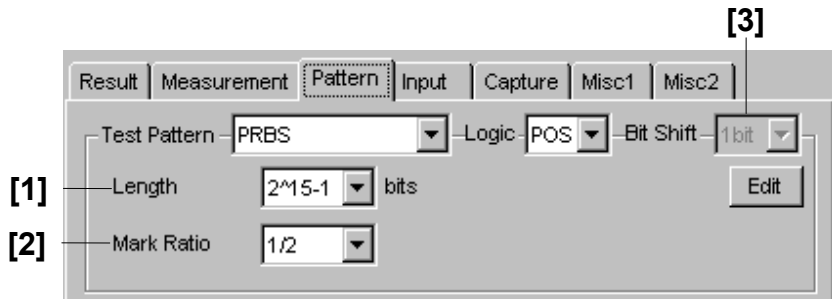


Figure 7.12.4.2-1 Test Pattern Setting (When PRBS Is Selected)

Table 7.12.4.2-1 PRBS Pattern Setting Commands

No.	Setting Items	Commands
[1]	Length	:SENSe:PATtern:PRBS:LENGth
		:SENSe:PATtern:PRBS:LENGth?
[2]	Mark Ratio	:SENSe:PATtern:PRBS:MRATio
		:SENSe:PATtern:PRBS:MRATio?
[3]	Bit Shift	:SENSe:PATtern:PRBS:BSHift?

**:SENSe:PATtern:PRBS:LENGth <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA>	
	7	2 <sup>n</sup> -1 (n = 7)
	9	2 <sup>n</sup> -1 (n = 9)
	10	2 <sup>n</sup> -1 (n = 10)
	11	2 <sup>n</sup> -1 (n = 11)
	15	2 <sup>n</sup> -1 (n = 15)
	20	2 <sup>n</sup> -1 (n = 20)
	23	2 <sup>n</sup> -1 (n = 23)
	31	2 <sup>n</sup> -1 (n = 31)
Function	Sets the number of stages (2 <sup>n</sup> -1 (n = 7, 9, 10, 11, 15, 20, 23, or 31)) for PRBS pattern reception.	
Example	To set the number of stages for PRBS pattern reception to 2 <sup>7</sup> -1. > :SENSe:PATtern:PRBS:LENGth 7	
Compatibility	Compatible with MU181040A/B.	

**:SENSe:PATtern:PRBS:LENGth?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 7, 9, 10, 11, 15, 20, 23, 31
Function	Queries the number of stages for PRBS pattern reception.
Example	> :SENSe:PATtern:PRBS:LENGth? < 7
Compatibility	Compatible with MU181040A/B.

**:SENSe:PATtern:PRBS:MRATio <mratio>**


---

Parameter	<mratio> = <CHARACTER PROGRAM DATA> M1_2                    1/2 I1_2                    1/2INVT
Function	Sets the mark ratio for PRBS pattern reception.
Example	To set the mark ratio for PRBS pattern reception to 1/2. > :SENSe:PATtern:PRBS:MRATio M1_2
Compatibility	Compatible with MU181040A/B.

**:SENSe:PATtern:PRBS:MRATio?**


---

Response	<mratio> = <CHARACTER RESPONSE DATA> M1_2, I1_2
Function	Queries the mark ratio for PRBS pattern reception.
Example	> :SENSe:PATtern:PRBS:MRATio? < M1_2
Compatibility	Compatible with MU181040A/B.

**:SENSe:PATtern:PRBS:BSHift?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1
Function	Queries the bit shift number for PRBS pattern reception.
Example	> :SENSe:PATtern:PRBS:BSHift? < 1
Compatibility	Partially compatible with MU181040A/B.

7.12.4.3 Zero Substitution pattern setting commands

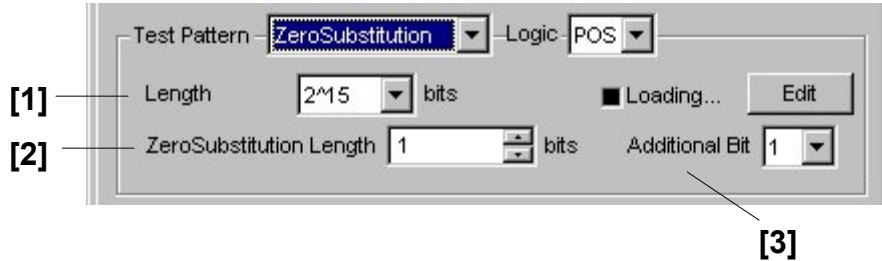


Figure 7.12.4.3-1 Test Pattern Setting (When Zero Substitution Is Selected)

Table 7.12.4.3-1 Zero Substitution Pattern Setting Commands

No.	Setting Items	Commands
[1]	Length	:SENSe:PATtern:ZSUBstitute:LENGth :SENSe:PATtern:ZSUBstitute:LENGth?
[2]	Zero-Substitution Length	:SENSe:PATtern:ZSUBstitute:ZLENGth :SENSe:PATtern:ZSUBstitute:ZLENGth?
[3]	Additional Bit	:SENSe:PATtern:ZSUBstitute:ADDBit :SENSe:PATtern:ZSUBstitute:ADDBit?

**:SENSe:PATtern:ZSUBstitute:LENGth <length>**

Parameter	<length> = <DECIMAL NUMERIC PROGRAM DATA>	
	7	2 <sup>n</sup> (n = 7)
	9	2 <sup>n</sup> (n = 9)
	10	2 <sup>n</sup> (n = 10)
	11	2 <sup>n</sup> (n = 11)
	15	2 <sup>n</sup> (n = 15)
	20	2 <sup>n</sup> (n = 20)
	23	2 <sup>n</sup> (n = 23)
	-7	2 <sup>n-1</sup> (n = 7)
	-9	2 <sup>n-1</sup> (n = 9)
	-10	2 <sup>n-1</sup> (n = 10)
	-11	2 <sup>n-1</sup> (n = 11)
	-15	2 <sup>n-1</sup> (n = 15)
	-20	2 <sup>n-1</sup> (n = 20)
	-23	2 <sup>n-1</sup> (n = 23)
Function	Sets the pattern length for Zero-Substitution pattern reception.	
Example	To set the pattern length for Zero-Substitution pattern reception to 2 <sup>7</sup> . > :SENSe:PATtern:ZSUBstitute:LENGth 7	
Compatibility	Compatible with MU181040A/B.	



**:SENSe:PATtern:ZSUBstitute:LENGth?**

Response	<length> = <NR1 NUMERIC RESPONSE DATA> 7, 9, 10, 11, 15, 20, 23, -7, -9, -10, -11, -15, -20, -23
Function	Queries the pattern length for Zero-Substitution pattern reception.
Example	> :SENSe:PATtern:ZSUBstitute:LENGth? < 7
Compatibility	Compatible with MU181040A/B.

**:SENSe:PATtern:ZSUBstitute:ZLENGth <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> When ZSUBlength, $2^n$ is set: 1 to $2^n-1$ 1 to $2^n-1/1$ bit Step When ZSUBlength, $2^{n-1}$ is set: 1 to $2^n-2$ 1 to $2^n-2/1$ bit Step $n = 7, 9, 11, 15, 20, 23$
Function	Sets the number of bits to which “0” is inserted (zero-insertion bit count) for Zero-Substitution pattern reception.
Example	Available parameters vary depending on the setting conditions. To set 10 bits to the number of bits to which “0” is inserted for Zero-Substitution pattern reception. > :SENSe:PATtern:ZSUBstitute:ZLENGth 10
Compatibility	Compatible with MU181040A/B.

**:SENSe:PATtern:ZSUBstitute:ZLENGth?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1 to $2^n-1$ $n = 7, 9, 11, 15, 20, 23$
Function	Queries the number of bits to which “0” is inserted (zero-insertion bit count) for Zero-Substitution pattern reception.
Example	>:SENSe:PATtern:ZSUBstitute:ZLENGth? < 10
Compatibility	Compatible with MU181040A/B.

**:SENSe:PATtern:ZSUBstitute:ADDBit <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA>
	0 Adds one bit of “0” after the longest consecutive 0s.
	1 Adds one bit of “1” after the longest consecutive 1s. (Similar to the existing models)
Function	Sets to add 0 or 1 after the last bit of the consecutively-inserted 0s for Zero-Substitution pattern reception.
Example	To set to add 0 after the last bit of the consecutively-inserted 0s for Zero-Substitution pattern reception. > :SENSe:PATtern:ZSUBstitute:ADDBit 0
Compatibility	Compatible with MU181040A/B.

**:SENSe:PATtern:ZSUBstitute:ADDBit?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	0 One bit of “0” is added after the longest consecutive 0s.
	1 One bit of “1” is added after the longest consecutive 1s. (Similar to the existing models)
Function	Queries whether one bit of “0” or “1” is added next to the last of zero-inserted.
Example	> :SENSe:PATtern:ZSUBstitute:ADDBit? < 0
Compatibility	Compatible with MU181040A/B.

7.12.4.4 Data pattern setting commands

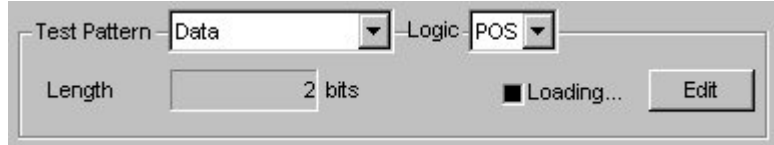


Figure 7.12.4.4-1 Test Pattern Setting (When Data Is Selected)

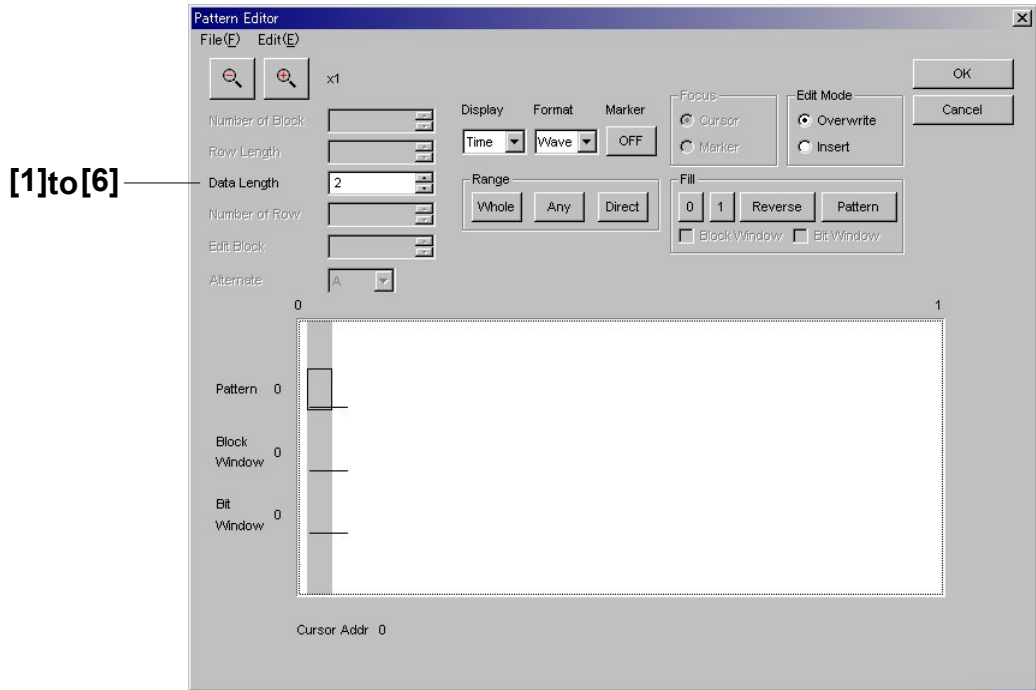


Figure 7.12.4.4-2 Data Pattern Setting (Pattern Editor Dialog Box)

Table 7.12.4.4-1 Data Pattern Setting Commands

No.	Setting Items	Commands
[1]	Data Length	:SENSe:PATtern:DATA:LENGth :SENSe:PATtern:DATA:LENGth?
[2]	No label (Pattern setting)	:SENSe:PATtern:DATA:WHOLE :SENSe:PATtern:DATA:WHOLE?
[3]	No label (Pattern setting)	:SENSe:PATtern:BDATa:WHOLE :SENSe:PATtern:BDATa:WHOLE?
[4]	No label (Data inversion)	:SENSe:PATtern:DREVerse:ADDRess
[5]	No label (Data inversion)	:SENSe:PATtern:DREVerse:DELTA
[6]	No label (All 0 or 1)	:SENSe:PATtern:DATA:FILL

### **:SENSe:PATtern:DATA:LENGth <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 2 to 268435456                      2 to 268,435,456 bits/1 bit Step
	<b>Note:</b> At 2ch Combination, the setting range and Step are doubled. At 4ch Combination, the setting range and Step are quadrupled.
Function	Sets the pattern length during Data pattern reception.
Example	To set the pattern length during Data pattern reception to 2 bits. > :SENSe:PATtern:DATA:LENGth 2
Compatibility	Partially compatible with MU181040A/B.

### **:SENSe:PATtern:DATA:LENGth?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries the pattern length during Data pattern reception.
Example	> :SENSe:PATtern:DATA:LENGth? < 2
Compatibility	Partially compatible with MU181040A/B.

**:SENSe:PATtern:DATA:WHOLe <start>,<end>,<data>**

Parameter	<p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;  #H0 to #H7FFFFFFF                    0 to 7FFFFFFF bits/1 bit Step  (Specify in hexadecimal.)</p> <p>&lt;end&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;  #H0 to #H7FFFFFFF                    0 to 7FFFFFFF bits/1 bit Step  (Specify in hexadecimal.)</p> <p><b>Note:</b></p> <p>The maximum setting is the pattern length.  At 2ch Combination, the setting range is doubled.  At 4ch Combination, the setting range is quadrupled.</p> <p>&lt;data&gt; = &lt;STRING PROGRAM DATA&gt;  "H***...*"                    Specify pattern data in hexadecimal format.  1 to 400 characters (pattern data of 400 x 4 bits)  Specify a character string consisting of 0 to 9  and A to F.  If the last character string of the pattern data is  short of a hexadecimal unit (4 bits), add 0(s)  after the last bit until the last character string  becomes hexadecimal.</p> <p>"B***...*"                    Specify pattern data in binary format.  1 to 400 characters (pattern data of 400 bits)  Specify a character string consisting of 0 and 1.</p>
Function	Sets the pattern data from the <start> to <end> addresses during Data pattern reception. The set data overwrites the specified range.
Example	To set the addresses from bit 0 to bit 7FFFFFFF of the pattern data in hexadecimal format: > :SENSe:PATtern:DATA:WHOLe #H0,#H7FFFFFFF,"H001"
Compatibility	Partially compatible with MU181040A/B.
	<p><b>Note:</b></p> <p>When the number of data bits specified in &lt;data&gt; is smaller than the range specified by &lt;start&gt; and &lt;end&gt;, set &lt;data&gt; repeatedly up to the amount of the specified range.</p> <p>&lt;Example&gt;</p> <ul style="list-style-type: none"> <li>•&lt;start&gt; = #H0, &lt;end&gt; = #H1F, &lt;data&gt; = "HABC"  Setting data: ABCABCAB</li> <li>•&lt;start&gt; = #H0, &lt;end&gt;=#H7, &lt;data&gt;="B011"  Setting data: 01101101</li> </ul> <p>When the number of data bits specified in &lt;data&gt; is greater than the range specified by &lt;start&gt; and &lt;end&gt;, cut off the part of &lt;data&gt; out of the specified range.</p> <p>&lt;Example&gt;</p>





**:SENSe:PATtern:BDATa:WHOLe? <start> [,<size>]**

---

Parameter	<p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;                  #H0 to #HFFFFFFF                      0 to FFFFFFFF bits/1 bit Step                  (Specify in hexadecimal.)</p> <p>[&lt;size&gt;] = &lt;NR1 NUMERIC PROGRAM DATA&gt;                  1 to 16384                      1 to 16,384bytes/1 byte Step</p> <p>Binary data of the setting pattern is queried when [&lt;size&gt;] is omitted.</p> <p><b>Note:</b></p> <p style="padding-left: 40px;">The maximum setting is the pattern length.                  At 2ch Combination, the setting range is doubled.                  At 4ch Combination, the setting range is quadrupled.</p>
Response	<p>&lt;bdata&gt; = &lt;DEFINITE LENGTH ARBITRARY BLOCK RESPONSE DATA&gt;                  #XYYY&lt;binary&gt;                      X:            Number of YYY digits                  YYY:        Number of bytes of &lt;binary&gt;,                  1 to 16,384 (bytes)</p> <p style="padding-left: 40px;">&lt;binary&gt;: Binary data up to 16,384 bytes</p>
Function	<p>Queries binary data of bytes specified by &lt;size&gt; from &lt;start&gt; address of the pattern data during Data pattern reception.</p>
Example	<p>To query the pattern data of 16,384bytes from 0-bit address during Data pattern reception.</p> <pre>&gt; :SENSe:PATtern:BDATa:WHOLe? #H0 &lt; #10011</pre>
Compatibility	<p>Partially compatible with MU181040A/B.</p>





**:SENSe:PATtern:DATA:FILL <range>,<page>,<data>**

---

Parameter	<range> = <CHARACTER PROGRAM DATA> PAGE Specifies a page. (1 page is defined as 128 bits.) ALL Specifies all data. <page> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2097152 1 to 2,097,152 (Max.) pages, in 1-page steps Max = Pattern Length / 128 (rounding up fractions) Specify "0" when <range> is set to ALL. <data> = <DECIMAL NUMERIC PROGRAM DATA> 0 Fills the specified range with 0s. 1 Fills the specified range with 1s.
Function	Sets 0s or 1s for the specified page or all data in the program during Data pattern reception.
Example	To set 0s for the page 1 in the program during Data pattern reception. > :SENSe:PATtern:DATA:FILL PAGE,1,0
Compatibility	Partially compatible with MU181040A/B.

7.12.4.5 Mixed Data pattern setting commands

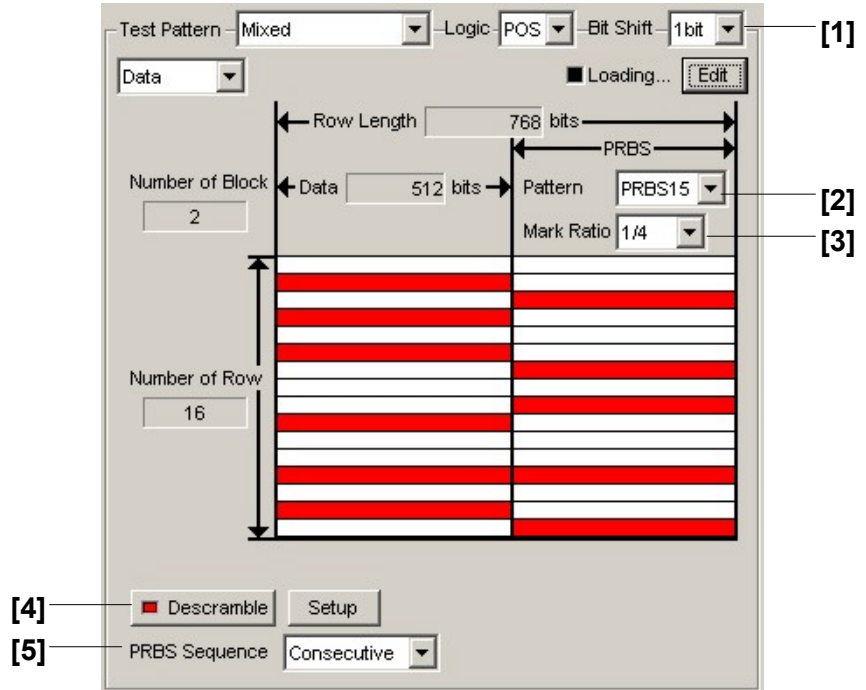


Figure 7.12.4.5-1 Test Pattern Setting (When Mixed Is Selected)

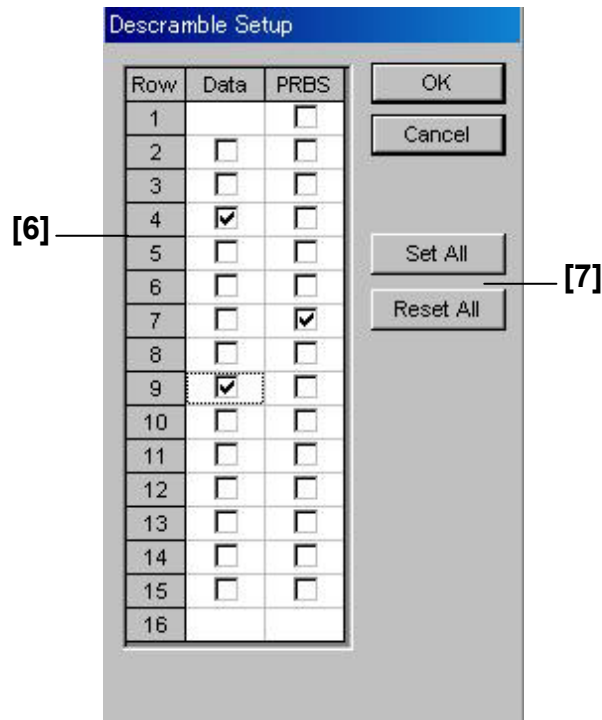
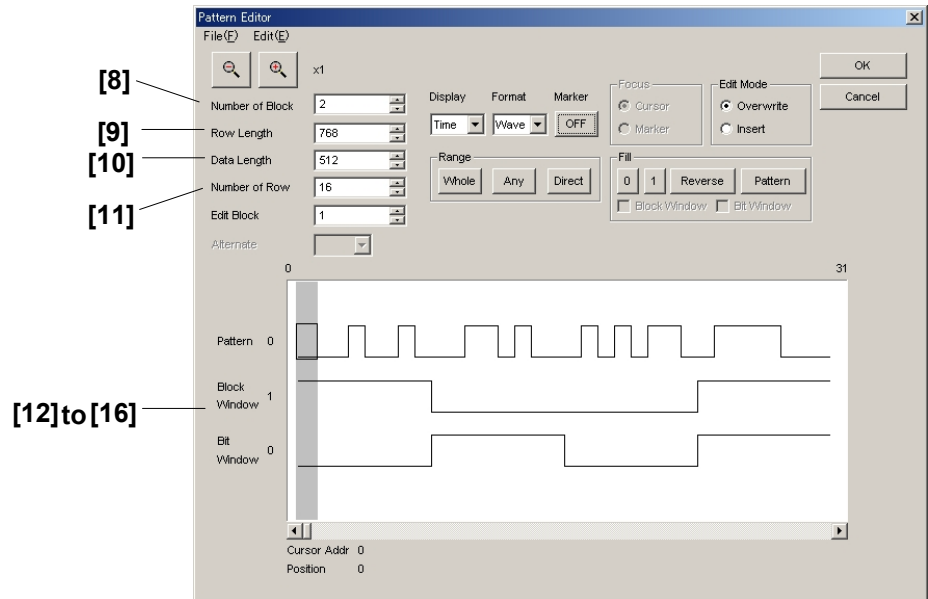


Figure 7.12.4.5-2 Descramble Setup Dialog Box



**Figure 7.12.4.5-3 Mixed Data Pattern Setting (Pattern Editor Dialog Box)**

**Table 7.12.4.5-1 Mixed Data pattern Setting Commands**

No.	Setting Items	Commands
[1]	Bit Shift	:SENSE:PATTERN:MIXData:PRBS:BITShift
		:SENSE:PATTERN:MIXData:PRBS:BITShift?
[2]	PRBS Pattern	:SENSE:PATTERN:MIXData:PRBS:LENGth
		:SENSE:PATTERN:MIXData:PRBS:LENGth?
[3]	PRBS Mark Ratio	:SENSE:PATTERN:MIXData:PRBS:MRATio
		:SENSE:PATTERN:MIXData:PRBS:MRATio?
[4]	Descramble	:SENSE:PATTERN:MIXData:DESCramble
		:SENSE:PATTERN:MIXData:DESCramble?
[5]	PRBS Sequence	:SENSE:PATTERN:MIXData:PRBS:SEQUence
		:SENSE:PATTERN:MIXData:PRBS:SEQUence?
[6]	Setup	:SENSE:PATTERN:MIXData:SRSetting
		:SENSE:PATTERN:MIXData:SRSetting?
[7]	Set All/Reset All	:SENSE:PATTERN:MIXData:DESCramble:ALLSet
[8]	Number of Block	:SENSE:PATTERN:MIXData:BLOCK
		:SENSE:PATTERN:MIXData:BLOCK?
[9]	Row Length	:SENSE:PATTERN:MIXData:RLENGth
		:SENSE:PATTERN:MIXData:RLENGth?
[10]	Data Length	:SENSE:PATTERN:MIXData:DATA:LENGth
		:SENSE:PATTERN:MIXData:DATA:LENGth?
[11]	Number of Row	:SENSE:PATTERN:MIXData:ROW
		:SENSE:PATTERN:MIXData:ROW?
[12]	No label (Pattern setting)	:SENSE:PATTERN:MIXData:DATA:WHOLE
		:SENSE:PATTERN:MIXData:DATA:WHOLE?

Table 7.12.4.5-1 Mixed Data pattern Setting Commands (Cont'd)

No.	Setting Items	Commands
[13]	No label (Pattern setting)	:SENSe:PATtern:MIXData:BDATa:WHOLe :SENSe:PATtern:MIXData:BDATa:WHOLe?
[14]	No label (Data inversion)	:SENSe:PATtern:MIXData:DREVerse:ADDReSS
[15]	No label (Data inversion)	:SENSe:PATtern:MIXData:DREVerse:DELTA
[16]	No label (Data inversion)	:SENSe:PATtern:MIXData:DATA:FILL

**:SENSe:PATtern:MIXData:PRBS:BITShift?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1 1 bit
Function	Queries the bit shift for the PRBS pattern during Mixed Data pattern reception
Example	> :SENSe:PATtern:MIXData:PRBS:BITShift? < 1
Compatibility	Partially compatible with MU181040A/B.

**:SENSe:PATtern:MIXData:PRBS:LENGth <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 7 $2^{n-1}$ (n = 7) 9 $2^{n-1}$ (n = 9) 10 $2^{n-1}$ (n = 10) 11 $2^{n-1}$ (n = 11) 15 $2^{n-1}$ (n = 15) 20 $2^{n-1}$ (n = 20) 23 $2^{n-1}$ (n = 23) 31 $2^{n-1}$ (n = 31)
Function	Sets the number of stages of the PRBS pattern during Mixed Data pattern reception.
Example	To set the number of stages of the PRBS pattern during Mixed Data pattern reception to $2^7-1$ . > :SENSe:PATtern:MIXData:PRBS:LENGth 7
Compatibility	Compatible with MU181040A/B.

**:SENSe:PATtern:MIXData:PRBS:LENGth?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 7, 9, 10, 11, 15, 20, 23, 31
Function	Queries the number of stages of the PRBS pattern during Mixed Data pattern reception.
Example	> :SENSe:PATtern:MIXData:PRBS:LENGth? < 7
Compatibility	Compatible with MU181040A/B.

**:SENSe:PATtern:MIXData:PRBS:MRATio <mratio>**

---

Parameter	<mratio> = <CHARACTER PROGRAM DATA> M1_2                            1/2 I1_2                            1/2INVT
Function	Sets the mark ratio for the PRBS pattern during Mixed Data pattern reception.
Example	To set the mark ratio for the PRBS pattern during Mixed Data pattern reception to 1/2. > :SENSe:PATtern:MIXData:PRBS:MRATio M1_2
Compatibility	Partially compatible with MU181040A/B.

**:SENSe:PATtern:MIXData:PRBS:MRATio?**

---

Response	<mratio> = <CHARACTER RESPONSE DATA> M1_2, I1_2
Function	Queries the mark ratio for the PRBS pattern during Mixed Data pattern reception.
Example	> :SENSe:PATtern:MIXData:PRBS:MRATio? < M1_2
Compatibility	Compatible with MU181040A/B.

**:SENSe:PATtern:MIXData:DESCramble <boolean>**

---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> 0 or OFF                        Descramble OFF 1 or ON                         Descramble ON
Function	Sets descramble ON/OFF of the PRBS7 stage during pattern reception.
Example	To set descramble ON of the PRBS7 stage during pattern reception: > :SENSe:PATtern:MIXData:DESCramble ON
Compatibility	Compatible with MU181040A/B.

**:SENSe:PATtern:MIXData:DESCramble?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 Descramble OFF 1 Descramble ON
Function	Queries the descramble ON/OFF state of the PRBS7 stage during pattern reception.
Example	> :SENSe:PATtern:MIXData:DESCramble? < 1
Compatibility	Compatible with MU181040A/B.

**:SENSe:PATtern:MIXData:PRBS:SEquence <sequence>**


---

Parameter	<sequence> = <CHARACTER PROGRAM DATA> REStart Inconsecutive PRBS pattern CONSeCutive Consecutive PRBS pattern
Function	Sets the PRBS pattern sequence during Mixed Data pattern reception.
Example	To set the PRBS pattern sequence to Restart during Mixed Data pattern reception. > :SENSe:PATtern:MIXData:PRBS:SEquence REStart
Compatibility	Compatible with MU181040A/B.

**:SENSe:PATtern:MIXData:PRBS:SEquence?**


---

Response	<sequence> = <CHARACTER RESPONSE DATA> REST, CONS
Function	Queries the PRBS pattern sequence during Mixed Data pattern reception.
Example	> :SENSe:PATtern:MIXData:PRBS:SEquence? < REST
Compatibility	Compatible with MU181040A/B.

**:SENSe:PATtern:MIXData:SRSetting <row>,<data>,<prbs>**

---

Parameter	<row> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 16                      1 to 16 Row/1 Row Step
	<data> = <BOOLEAN PROGRAM DATA> 0 or OFF                      Descramble OFF 1 or ON                        Descramble ON
	Note, however, that Data of 1 Row is always Descramble OFF.
	<prbs> = <BOOLEAN PROGRAM DATA> 0 or OFF                      Descramble OFF 1 or ON                        Descramble ON
Function	Sets Descramble ON or OFF for the Data and PRBS of the specified Row.
Example	To set Descramble setting of 1 Row to Data ON and PRBS ON. > :SENSe:PATtern:MIXData:SRSetting 1,ON,ON
Compatibility	Compatible with MU181040A/B.

**:SENSe:PATtern:MIXData:SRSetting? <row>**

---

Parameter	<row> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 16                      1 to 16 Row/1 Row Step
Response	<data>,<prbs> = <NR1 NUMERIC RESPONSE DATA> 0                                Descramble OFF 1                                Descramble ON
Function	Queries the descramble setting (ON/OFF) for the Data and PRBS of the specified Row.
Example	> :SENSe:PATtern:MIXData:SRSetting? 1 < 1,1
Compatibility	Compatible with MU181040A/B.

**:SENSe:PATtern:MIXData:DESCramble:ALLSet <numeric>**

---

Parameter	<numeric> = <NUMERIC PROGRAM DATA> 0                                Resets all. 1                                Selects all.
Function	Selects all or resets all of Descramble setting.
Example	To select all of Descramble setting. > :SENSe:PATtern:MIXData:DESCramble:ALLSet 1
Compatibility	Compatible with MU181040A/B.



**:SENSe:PATtern:MIXData:BLOCK <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 511                      1 to 511 Block/1 Step
Function	Sets the number of blocks during Mixed Data pattern reception.
Example	To set the number of blocks during Mixed Data pattern reception to 1. > :SENSe:PATtern:MIXData:BLOCK 1
Compatibility	Compatible with MU181040A/B.

**:SENSe:PATtern:MIXData:BLOCK?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1 to 511                      1 to 511 Block
Function	Queries the number of blocks during Mixed Data pattern reception.
Example	> :SENSe:PATtern:MIXData:BLOCK? < 1
Compatibility	Compatible with MU181040A/B.

**:SENSe:PATtern:MIXData:RLENgth <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 1536 to 2415919104      1,536 to 2,415,919,104 bits/256 bits Step
	<b>Note:</b> At 2ch Combination, the setting range varies and Step is doubled. 3072 to 4831838208      3,072 to 4,831,838,208 bits/512 bits Step  At 4ch Combination, the setting range varies and Step is quadrupled. 6144 to 9663676416      6,144 to 9,663,676,416 bits/1,024 bits Step
Function	Sets the pattern length of 1 Row that is edited during Mixed Data pattern reception.
Example	To set Pattern length of 1 Row edited at Mixed Data pattern reception to 1,536 bits. > :SENSe:PATtern:MIXData:RLENgth 1536
Compatibility	Incompatible with existing models

### **:SENSe:PATtern:MIXData:RLENgth?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries the pattern length of 1 Row that is edited during Mixed Data pattern reception.
Example	> :SENSe:PATtern:MIXData:RLENgth? < 1536
Compatibility	Partially compatible with MU181040A/B.

### **:SENSe:PATtern:MIXData:DATA:LENgth <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 1024 to 268435456      1,024 to 268,435,456 bits/1 bit Step
	<b>Note:</b>
	At 2ch Combination, the setting range and Step are doubled. 2048 to 536870912      2,048 to 536,870,912 bits/2 bit Step
	At 4ch Combination, the setting range and Step are quadrupled. 4096 to 1073741824      4,096 to 1,073,741,824 bits/4 bit Step
Function	Sets the pattern length on the pattern data side that is edited during Mixed Data pattern reception.
Example	To set the pattern length on the pattern data side that is edited during Mixed Data pattern reception. > :SENSe:PATtern:MIXData:DATA:LENgth 1024
Compatibility	Partially compatible with MU181040A/B.

### **:SENSe:PATtern:MIXData:DATA:LENgth?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries the pattern length on the pattern data side that is edited during Mixed Data pattern reception.
Example	> :SENSe:PATtern:MIXData:DATA:LENgth? < 2048
Compatibility	Partially compatible with MU181040A/B.

**:SENSe:PATtern:MIXData:ROW <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 16                      1 to 16 Row/1 Row Step
Function	Sets the number of rows within one block that is edited during Mixed Data pattern reception.
Example	To set the number of rows within one block that is edited during Mixed Data pattern reception to 1. > :SENSe:PATtern:MIXData:ROW 1
Compatibility	Compatible with MU181040A/B.

**:SENSe:PATtern:MIXData:ROW?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1 to 16                      1 to 16 Row
Function	Queries the number of rows within one block that is edited during Mixed Data pattern reception.
Example	> :SENSe:PATtern:MIXData:ROW? < 1
Compatibility	Compatible with MU181040A/B.

**:SENSe:PATtern:MIXData:DATA:WHOLe <block>,<start>,<end>,<data>**

Parameter	<p>&lt;block&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  1 to 511                                      1 to 511 Block/1 Step</p> <p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;                  #H0 to #HFFFFFFF                              0 to FFFFFFFF bits/1 bit Step                  (Specify in hexadecimal.)</p> <p>&lt;end&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;                  #H0 to #HFFFFFFF                              0 to FFFFFFFF bits/1 bit Step                  (Specify in hexadecimal.)</p> <p><b>Note:</b></p> <p style="padding-left: 40px;">The maximum setting is the pattern length.                  At 2ch Combination, the setting range is doubled.                  At 4ch Combination, the setting range is quadrupled.</p> <p>&lt;data&gt; = &lt;STRING PROGRAM DATA&gt;                  "H***...*"                                      Specify pattern data in hexadecimal format.                  1 to 400 characters (pattern data of 400 x 4 bits)                  Specify a character string consisting of 0 to 9                  and A to F.                  If the last character string of the pattern data is                  short of a hexadecimal unit(4 bits), add 0(s) after                  the last bit until the last character string                  becomes hexadecimal.</p> <p>"B***...*"                                      Specify pattern data in binary format.                  1 to 400 characters (pattern data of 400 bits)                  Specify a character string consisting of 0 and 1.</p>
Function	Sets the pattern data from <start> to <end> addresses in each block during Mixed Data pattern reception. The set data overwrites the specified range.
Example	<p>To set the pattern data of addresses from 0 to 7FFFFFFF bits of 3 blocks in hexadecimal during Mixed Data pattern reception.</p> <pre>&gt; :SENSe:PATtern:MIXData:DATA:WHOLe 3,#H0,#H7FFFFFFF, "H001"</pre>
Compatibility	Partially compatible with MU181040A/B.

**:SENSe:PATtern:MIXData:DATA:WHOLe? <block>,<start>**

Parameter	<p>&lt;block&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;  1 to 511                                    1 to 511 Block/1 Step</p> <p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;  #H0 to #HFFFFFFF                        0 to FFFFFFFF bits/1 bit Step  (Specify in hexadecimal.)</p> <p><b>Note:</b>  The maximum setting is the pattern length.  At 2ch Combination, the setting range is doubled.  At 4ch Combination, the setting range is quadrupled.</p>
Response	<p>&lt;data&gt; = &lt;STRING RESPONSE DATA&gt;  "H***...*"                                Returns the pattern data in hexadecimal format.  Up to 400 characters (pattern data of 400 × 4 bits)</p>
Function	Queries the pattern data of 400 × 4 bits from the <start> address in each block during Data pattern reception.
Example	<p>To query the pattern data of 400 x 4 bits from 0-bit address in 3 blocks during Data pattern reception.</p> <pre>&gt; :SENSe:PATtern:MIXData:DATA:WHOLe? 3, #H0 &lt; "H001"</pre>
Compatibility	Partially compatible with MU181040A/B.









**:SENSe:PATtern:MIXData:DATA:FILL <block>,<range>,<page>,<data>**

Parameter	<block> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 511                      1 to 511 Block/1 Step <range> = <CHARACTER PROGRAM DATA> PAGE                      Specifies pages (1 page is defined as 128 bits.) ALL                      Specifies all data. <page> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 2097152              1 to 2,097,152 (Max) page/1 page Step Max = Pattern Length / 128 (rounding up fractions) Specify "0" when <range> is set to ALL. <data> = <DECIMAL NUMERIC PROGRAM DATA> 0                      Fills "0" in specified range. 1                      Fills "1" in specified range.
Function	Sets 0s or 1s for the specified page or all data in the program of block during Data pattern reception.
Example	To set 0s to the one page in the program of three blocks during Data pattern reception. > :SENSe:PATtern:MIXData:DATA:FILL 3,PAGE,1,0
Compatibility	Partially compatible with MU181040A/B.

### 7.12.4.6 Mask setting commands

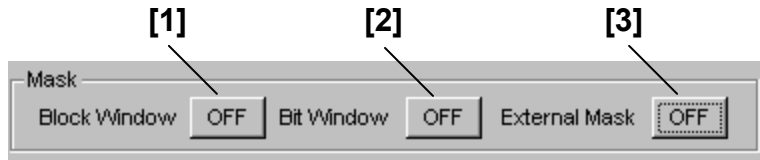


Figure 7.12.4.6-1 Mask ON/OFF Setting

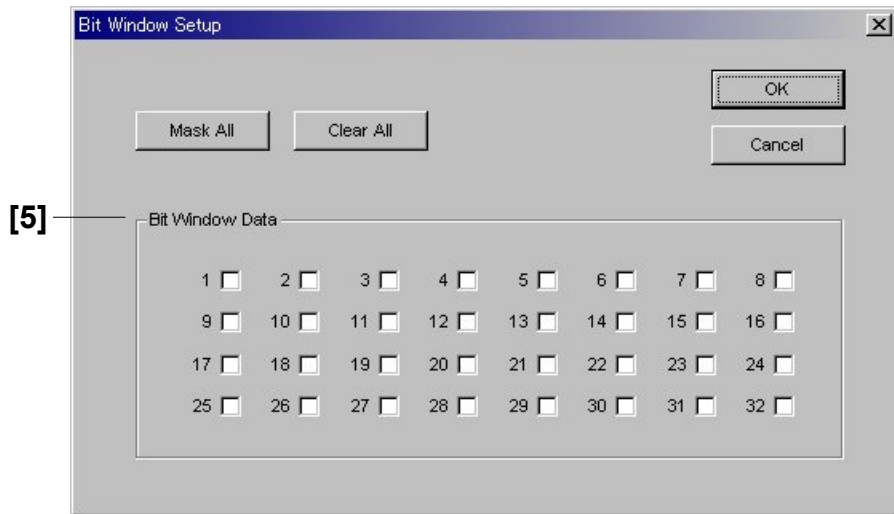


Figure 7.12.4.6-2 Bit Window Setup Dialog Box (For PRBS Pattern)

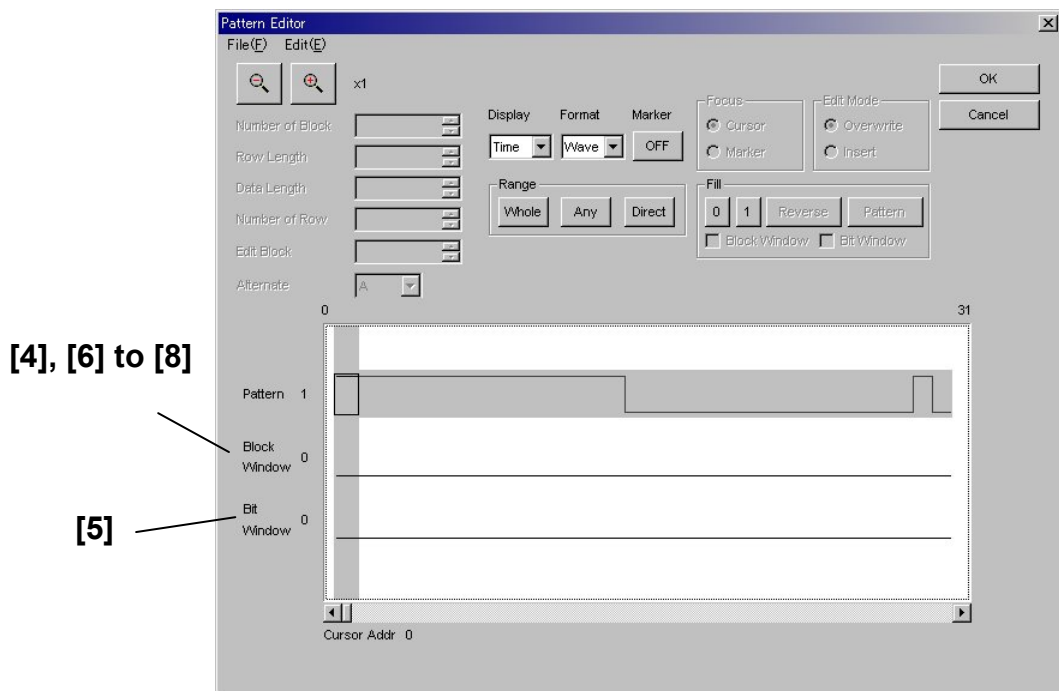


Figure 7.12.4.6-3 Bit Window and Block Window Settings in the Pattern Editor Dialog Box (For Zero Substitution, Data Patterns)

Table 7.12.4.6-1 Mask Setting Commands

No.	Setting Items	Commands
[1]	Block Window ON/OFF	:SENSe:PATtern:MASK:BLOCK
		:SENSe:PATtern:MASK:BLOCK?
[2]	Bit Window ON/OFF	:SENSe:PATtern:MASK:BIT
		:SENSe:PATtern:MASK:BIT?
[3]	External Mask ON/OFF	:SENSe:PATtern:MASK:EXTernal
		:SENSe:PATtern:MASK:EXTernal?
[4]	Block Window (Zero-Substitution, Data)	:SENSe:PATtern:MASK:BLKWindow
		:SENSe:PATtern:MASK:BLKWindow?
[5]	Bit Window	:SENSe:PATtern:MASK:BTWindow
		:SENSe:PATtern:MASK:BTWindow?
[6]	Block Window (Setting pattern)	:SENSe:PATtern:MASK:BDATa:WHOLe
		:SENSe:PATtern:MASK:BDATa:WHOLe?
[7]	Block Window (Inverting data)	:SENSe:PATtern:MASK:DREVerse:ADDRess
[8]	Block Window (Inverting data)	:SENSe:PATtern:MASK:DREVerse:DELTA
[9]	Block Window (All 0 or 1)	:SENSe:PATtern:MASK:DATA:FILL

### **:SENSe:PATtern:MASK:BLOCK <boolean>**

Parameter	<boolean> = <BOOLEAN PROGRAM DATA>
	0 or OFF                      Block Window OFF
	1 or ON                        Block Window ON
Function	Sets On/OFF of Block Window to received pattern.
Example	To set Block Window ON to received pattern. > :SENSe:PATtern:MASK:BLOCK ON
Compatibility	Compatible with MU181040A/B.

### **:SENSe:PATtern:MASK:BLOCK?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	0                                Block Window OFF
	1                                Block Window ON
Function	Queries On/OFF of Block Window to received pattern.
Example	> :SENSe:PATtern:MASK:BLOCK? < 1
Compatibility	Compatible with MU181040A/B.

**:SENSe:PATtern:MASK:BIT <boolean>**

---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> 0 or OFF                      Bit Window OFF 1 or ON                        Bit Window ON
Function	Sets On/OFF of Bit Window to received pattern.
Example	To set Bit Window ON to received pattern > :SENSe:PATtern:MASK:BIT ON
Compatibility	Compatible with MU181040A/B.

**:SENSe:PATtern:MASK:BIT?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0                                Bit Window OFF 1                                Bit Window ON
Function	Queries On/OFF of Bit Window to received pattern.
Example	> :SENSe:PATtern:MASK:BIT? < 1
Compatibility	Compatible with MU181040A/B.

**:SENSe:PATtern:MASK:EXTernal <boolean>**

---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> 0 or OFF                      External Mask OFF 1 or ON                        External Mask ON
Function	Sets On/OFF of External Mask to received pattern
Example	To set External Mask ON to received pattern. > :SENSe:PATtern:MASK:EXTernal ON
Compatibility	Compatible with MU181040A/B.

**:SENSe:PATtern:MASK:EXTernal?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0                                External Mask OFF 1                                External Mask ON
Function	Queries On/OFF of External Mask to received pattern.
Example	> :SENSe:PATtern:MASK:EXTernal? < 1
Compatibility	Compatible with MU181040A/B.

**:SENSe:PATtern:MASK:BLKWindow <start>,<end>,<data>**

Parameter	<p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;          #H0 to #H1FFFFFF 0 to 1FFFFFF bits/1 bit Step          (Specify in hexadecimal.)</p> <p>&lt;end&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;          #H0 to #H1FFFFFF 0 to 1FFFFFF bits/1 bit Step          (Specify in hexadecimal.)</p> <p>&lt;data&gt; = &lt;STRING PROGRAM DATA&gt;          "H***...*" Specify pattern data in hexadecimal format.          1 to 400 characters (pattern data of 400x4 bits)          Specify a character string consisting of 0 to 9          and A to F.</p> <p>"B***...*" Specify pattern data in binary format.          1 to 400 characters (pattern data of 400 bits)          Specify a character string consisting of 0 and 1.</p>
Function	Sets the mask pattern data from the <Start> to <end> addresses while setting Block Window.
Example	<p>The set data overwrites the specified range.</p> <p>To set the mask pattern data by bit address from 0 to 1FFFFFF for Block Window setting in hexadecimal.</p> <pre>&gt; :SENSe:PATtern:MASK:BLKWindow #H0,#H1FFFFFF, "H001"</pre>
Compatibility	Incompatible with existing models. Operation is different from MU181040A/B.

**Notes:**

The maximum allowable value for Block Window is 2 Mbits (2,097,152bits).

The setting step varies depending on the Pattern Length setting.

Pattern Length setting		Block Window step
2*N	to 2,097,152*N bits	1*N bits
2,097,153*N	to 4,194,304*N bits	2*N bits
4,194,305*N	to 8,388,608*N bits	4*N bits
8,388,609*N	to 16,777,216*N bits	8*N bits
16,777,217*N	to 33,554,432*N bits	16*N bits
33,554,433*N	to 67,108,864*N bits	32*N bits
67,108,864*N	to 134,217,728*N bits	64*N bits
134,217,729*N	to 268,435,456*N bits	128*N bits

In addition, relation between pattern length and step is increased by N times according to the Combination setting.

N = 1, 2, 4

Independent: N = 1

2ch Combination: N = 2

4ch Combination: N = 4

### **:SENSe:PATtern:MASK:BLKWindow? <start>**

Parameter	<start> = <NON-DECIMAL PROGRAM DATA> #H0 to #H1FFFFFF 0 to 1FFFFFF bits/1 bit Step (Specify in hexadecimal.)
Response	<data> = <STRING RESPONSE DATA> "H***...*" Returns the pattern data in hexadecimal format. 4 to 400 characters (pattern data of 400 × 4 bits)
Function	Queries the mask pattern data at the time of a Block Window setup by 400 × 4 bits from the <start>address.
Example	To query the mask pattern data at the time of a Block Window setup by 400 × 4 bits from the 0 bit address: > :SENSe:PATtern:MASK:BLKWindow? #H0 < "H001"
Compatibility	Incompatible with existing models MU181040A/B.

### **:SENSe:PATtern:MASK:BTWindow <data>**

Parameter	<data> = <STRING PROGRAM DATA> "H***...*" Specify pattern data in hexadecimal format. 1 to 8 characters (pattern data of 32 bits) Specify a character string consisting of 0 to 9 and A to F. "B***...*" Specify pattern data in binary format. 1 to 32 characters (pattern data of 32 bits) Specify a character string consisting of 0 and 1.
Function	Sets Mask pattern data of Bit Window setting.
Example	To set the mask pattern data of Bit Window setting in hexadecimal. > :SENSe:PATtern:MASK:BTWindow "H001"
Compatibility	Incompatible with existing models MU181040A/B.

### **:SENSe:PATtern:MASK:BTWindow?**

Response	<data> = <STRING RESPONSE DATA> "H***...*" Returns the pattern data in hexadecimal format. Max. 8 characters (pattern data of 32 bits)
Function	Queries Mask pattern data of Bit Window setting.
Example	> :SENSe:PATtern:MASK:BTWindow? < "H00100100"
Compatibility	Incompatible with existing models MU181040A/B.

**:SENSe:PATtern:MASK:BDATa:WHOLe <start>,<end>,<bdata>**

Parameter	<p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;  #H0 to #H1FFFFFF                    0 to 1FFFFFF bits / 1 bit Step  (Specify in hexadecimal.)</p> <p>&lt;end&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;  #H0 to #H1FFFFFF                    0 to 1FFFFFF bits / 1 bit Step  (Specify in hexadecimal.)</p> <p>&lt;bdata&gt; = &lt;ARBITRARY BLOCK PROGRAM DATA&gt;  #XYYY&lt;binary&gt;                    X:        Number of YYY digits      YYY:     Number of bytes of &lt;binary&gt;      1 to 16,384 (bytes)      &lt;binary&gt;: Binary data up to 16,384 byte max.</p>
Function	Sets the binary data of the mask pattern data at the time of a Block Window setup up to the <end>address from <start>.The set data overwrites the specified range.
Example	<p>The mask pattern data at the time of a Block Window setup is set up even for a 0 to 7FFFFFF bits address by the binary data.</p> <p>&gt; :SENSe:PATtern:MASK:BDATa:WHOLe #H0,#H7FFFFFF,#11A</p>
Compatibility	Incompatible with existing models MU181040A/B.





**:SENSe:PATtern:MASK:DREVerse:DELTA <start>,<delta>**

Parameter	<p>&lt;start&gt; = &lt;NON-DECIMAL PROGRAM DATA&gt;                  #H0 to #H1FFFFFF                    0 to 1FFFFFF bits / 1 bit Step                  (Specify in hexadecimal.)</p> <p>&lt;delta&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  1 to 2097152                    1 to 2 097 152 bits / 1 bit Step</p>
Function	Inverts the mask pattern data while setting Block Window. Specify the inversion range by the number of bits from the <start> address (relative specification).
Example	To invert 1 bit of the mask pattern data from address 0 while setting Block Window: > :SENSe:PATtern:MASK:DREVerse:DELTA #H0,1
Compatibility	Incompatible with existing models MU181040A/B.

**:SENSe:PATtern:MASK:DATA:FILL <range>,<page>,<data>**

Parameter	<p>&lt;range&gt; = &lt; CHARACTER PROGRAM DATA &gt;                  PAGE                    Specifies a page. (1 page is defined as 128 bits.)                  ALL                    Specifies all data.</p> <p>&lt;page&gt;=&lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  1 to 2097152                    1 to 2,097,152,(Max) page/1page step                  Max = Pattern Length/128 (round up)                  Specify 0 when &lt;range&gt; is ALL.</p> <p>&lt;data&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  0                    Fills the specified range with 0s.                  1                    Fills the specified range with 1s.</p>
Function	Sets the specified page or all data of mask pattern data to 0 or 1 while setting Block Window.
Example	To set page 1 of mask pattern data to 0 while setting Block Window. > :SENSe:PATtern:MASK:DATA:FILL PAGE,1,0
Compatibility	Incompatible with existing models MU181040A/B.

### 7.12.5 Commands Related to Input Tab

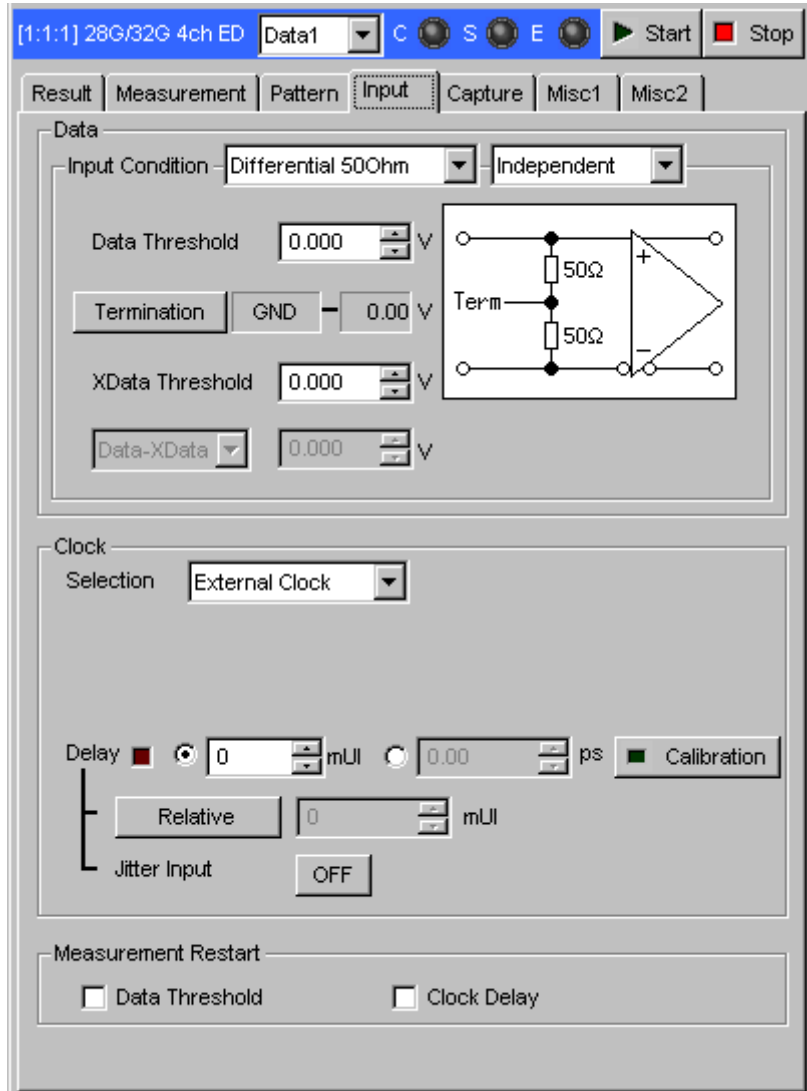


Figure 7.12.5-1 Input Tab

7.12.5.1 Data Input setting commands

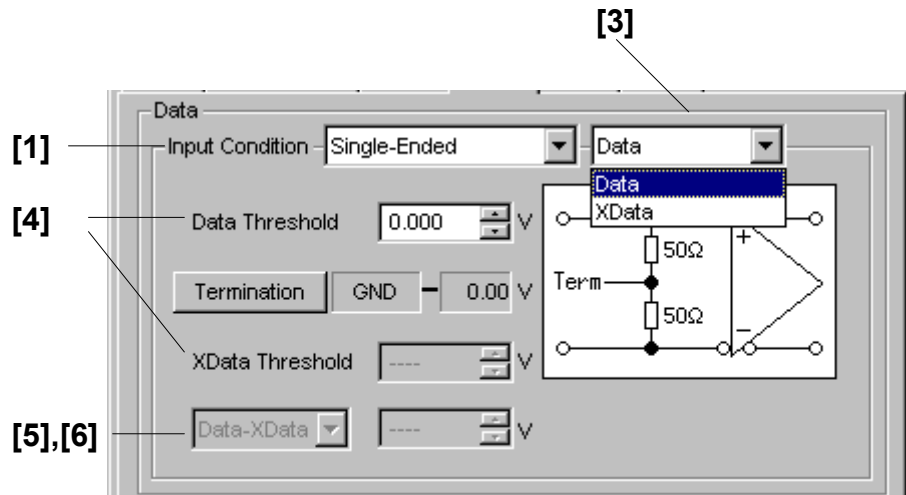


Figure 7.12.5.1-1 Data Setting (When Single-Ended Is Selected)

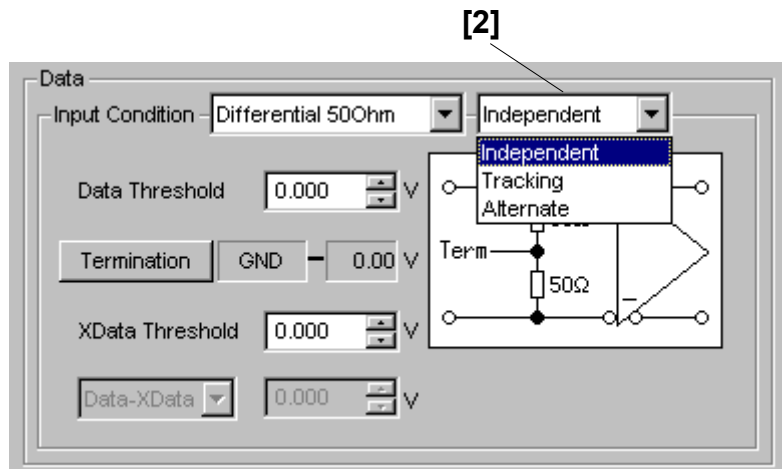


Figure 7.12.5.1-2 Data Setting (When Differential 50 Ohm Is Selected)

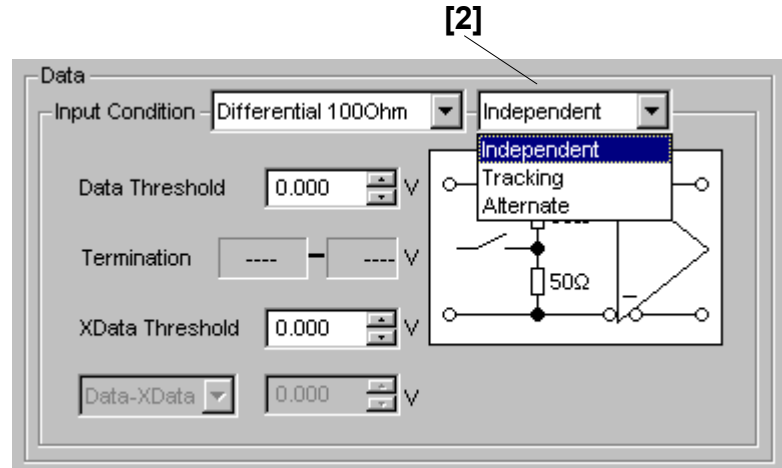


Figure 7.12.5.1-3 Data Setting (When Differential 100 Ohm Is Selected)

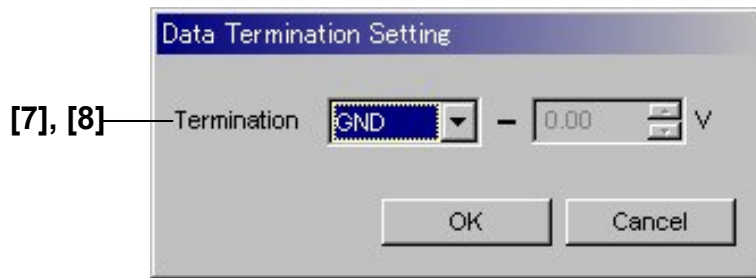


Figure 7.12.5.1-4 Data Termination Setting Dialog Box

Table 7.12.5.1-1 Data Input Setting Commands

No.	Setting Items	Commands
[1]	Input Condition	:INPut:DATA:INTErface :INPut:DATA:INTErface?
[2]	No label (Differential type setting)	:INPut:DATA:DIFFerential :INPut:DATA:DIFFerential?
[3]	No label (Data input port setting)	:INPut:DATA:SINGLE :INPut:DATA:SINGLE?
[4]	Data Threshold XData Threshold	:INPut:DATA:THREshold :INPut:DATA:THREshold?
[5]	No label (Reference signal setting of differential input)	:INPut:DATA:DIFFerential:BASIS :INPut:DATA:DIFFerential:BASIS?
[6]	No label (Threshold setting of differential input)	:INPut:DATA:DIFFerential:THREshold :INPut:DATA:DIFFerential:THREshold?
[7]	Termination	:INPut:DATA:TERMINation :INPut:DATA:TERMINation?
[8]	No label (Termination level setting)	:INPut:DATA:TLEVel :INPut:DATA:TLEVel?

**:INPut:DATA:INTerface <interface>**


---

Parameter	<interface> = <CHARACTER PROGRAM DATA> SINgle                      Single Ended DIF50ohm                  Differential 50 Ω DIF100ohm                Differential 100 Ω
Function	Sets the data input interface.
Example	To set the data input interface to Single Ended: > :INPut:DATA:INTerface SINgle
Compatibility	Compatible with MU181040A/B.

**:INPut:DATA:INTerface?**


---

Response	<interface> = <CHARACTER RESPONSE DATA> SING, DIF50, DIF100
Function	Queries the data input interface.
Example	> :INPut:DATA:INTerface? < SING
Compatibility	Compatible with MU181040A/B.

**:INPut:DATA:DIFFerential <item>**


---

Parameter	<item> = <CHARACTER PROGRAM DATA> INDeendent                Data/Xdata independent setting TRACking                  Data/Xdata common setting ALTeRNate                 Data/Xdata differential setting
Function	Sets the differential type when the data input interface is differential.
Example	To set the differential type to Data/Xdata independent setting: > :INPut:DATA:DIFFerential INDeendent
Compatibility	Compatible with MU181040A/B.

**:INPut:DATA:DIFFerential?**


---

Response	<item> = <CHARACTER RESPONSE DATA> IND, TRAC, ALT
Function	Queries the differential type when the data input interface is set to Differential.
Example	> :INPut:DATA:DIFFerential? < IND
Compatibility	Compatible with MU181040A/B.

### **:INPut:DATA:SINgLe <item>**

Parameter	<item> = <CHARACTER PROGRAM DATA> DATA                      Selects Data. XDATA                     Selects XData.
Function	Sets the input port when the data input interface is set to Single.
Example	To set the input port to Data: > :INPut:DATA:SINgLe DATA
Compatibility	Compatible with MU181040A/B.

### **:INPut:DATA:SINgLe?**

Response	<item> = <CHARACTER RESPONSE DATA> DATA, XDATA
Function	Queries the input port when the data input interface is set to Single.
Example	> :INPut:DATA:SINgLe? < DATA
Compatibility	Compatible with MU181040A/B.

### **:INPut:DATA:THReshold <port>,<numeric>**

Parameter	<port> = <CHARACTER PROGRAM DATA> DATA                      Selects Data. XDATA                     Selects XData. Be sure to input the selected port when Single is selected. <numeric> = <DECIMAL NUMERIC PROGRAM DATA> -3.500 to 3.300          -3.500 to 3.300 V/0.001 V Step
Function	Sets the data input threshold value for the specified input port.
Example	To set the data input threshold value for the Data port to -3.000 V: > :INPut:DATA:THReshold DATA,-3.000
Compatibility	Compatible with MU181040A/B.

### **:INPut:DATA:THReshold? <port>**

Parameter	<port> = <CHARACTER PROGRAM DATA> DATA                      Selects Data. XDATA                     Selects XData.
Response	<numeric> = <NR2 NUMERIC RESPONSE DATA> -3.500 to 3.300          -3.500 to 3.300 V
Function	Queries the data input threshold value for the specified input port.
Example	To query the data input threshold value for the Data port: > :INPut:DATA:THReshold? DATA < -3.000
Compatibility	Compatible with MU181040A/B.

**:INPut:DATA:DIFFerential:BASis <basis>**


---

Parameter	<basis> = <CHARACTER PROGRAM DATA> DATA                      Sets the differential reference signal to Data. XDATA                     Sets the differential reference signal to XData.
Function	Sets the differential reference signal for the data input threshold value.
Example	To set the differential reference signal for the data input threshold value to DATA: > :INPut:DATA:DIFFerential:BASis DATA
Compatibility	Compatible with MU181040A/B.

**:INPut:DATA:DIFFerential:BASis?**


---

Response	<basis> = <CHARACTER RESPONSE DATA> DATA, XDATA
Function	Queries the differential reference signal for the data input threshold value.
Example	> :INPut:DATA:DIFFerential:BASis? < DATA
Compatibility	Compatible with MU181040A/B.

**:INPut:DATA:DIFFerential:THReshold <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> -3.000 to 3.000            -3.000 to 3.000 V/0.001 V Step
Function	Sets the data input threshold value for differential input.
Example	To set the data input threshold value to -3.000 V: > :INPut:DATA:DIFFerential:THReshold -3.000
Compatibility	Compatible with MU181040A/B.

**:INPut:DATA:DIFFerential:THReshold?**


---

Response	<numeric> = <NR2 NUMERIC RESPONSE DATA>
Function	Queries the data input threshold value for differential input.
Example	> :INPut:DATA:DIFFerential:THReshold? < -3.000
Compatibility	Compatible with MU181040A/B.

### **:INPut:DATA:TERMination <term>**

Parameter	<term> = <CHARACTER PROGRAM DATA> GND                      50 Ω to GND VARiable                50 Ω to Variable Voltage
Function	Sets the data input termination condition.
Example	To set the data input termination condition to GND: > :INPut:DATA:TERMination GND
Compatibility	Partially compatible with MU181040A/B.

### **:INPut:DATA:TERMination?**

Response	<term> = <CHARACTER RESPONSE DATA> GND, VAR
Function	Queries the data input termination condition.
Example	> :INPut:DATA:TERMination? < GND
Compatibility	Partially compatible with MU181040A/B.

### **:INPut:DATA:TLEVel <numeric>**

Parameter	<numeric> = <DICIMAL NUMERIC PROGRAM DATA> -2.50 to 3.50            -2.50 to 3.50 V/0.01 V Step
Function	Sets the termination voltage when the input termination condition is set to Variable. The setting is invalid when the data input interface is Differential 100 Ω.
Example	To set the termination voltage when the input termination condition is set to Variable to -2.00 V: > :INPut:DATA:TLEVel -2.00
Compatibility	Compatible with MU181040A/B.

### **:INPut:DATA:TLEVel?**

Response	<numeric> = <NR2 NUMERIC RESPONSE DATA> -2.50 to 3.50            -2.50 to 3.50 V
Function	Queries the termination voltage when the input termination condition is set to Variable.
Example	> :INPut:DATA:TLEVel? < -2.00
Compatibility	Compatible with MU181040A/B.



7.12.5.2 Clock Input setting commands

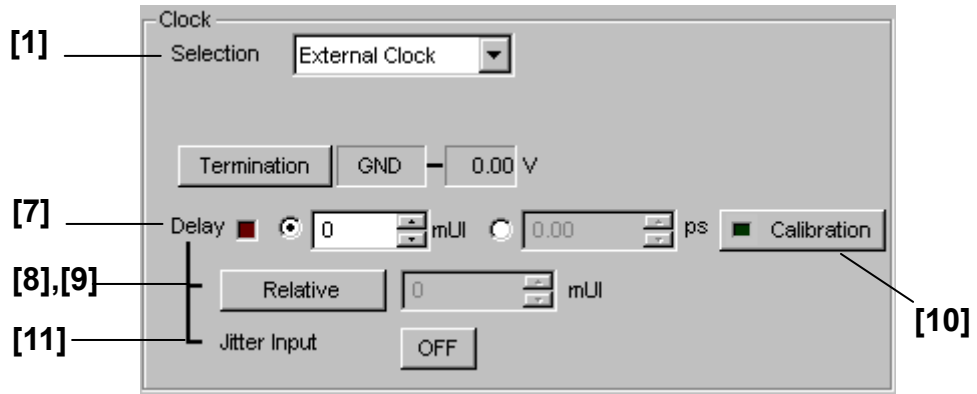


Figure 7.12.5.2-1 Clock Setting (When External Clock Is Selected)

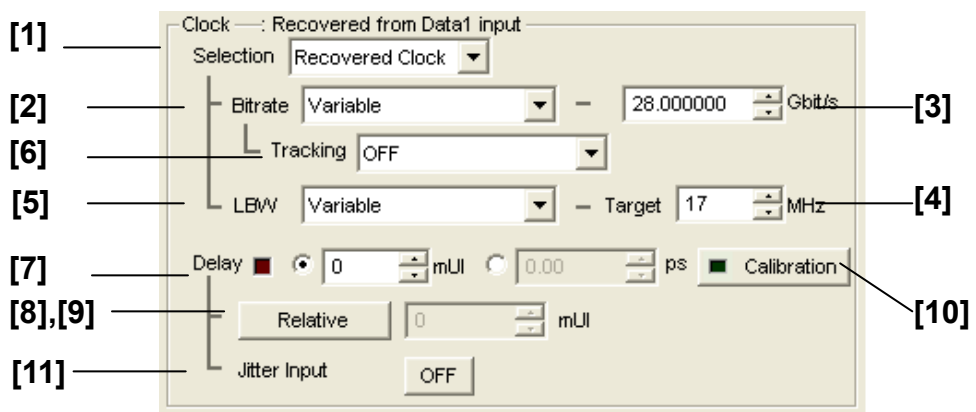


Figure 7.12.5.2-2 Clock Setting (Option 22 When Recovered Clock Is Selected)

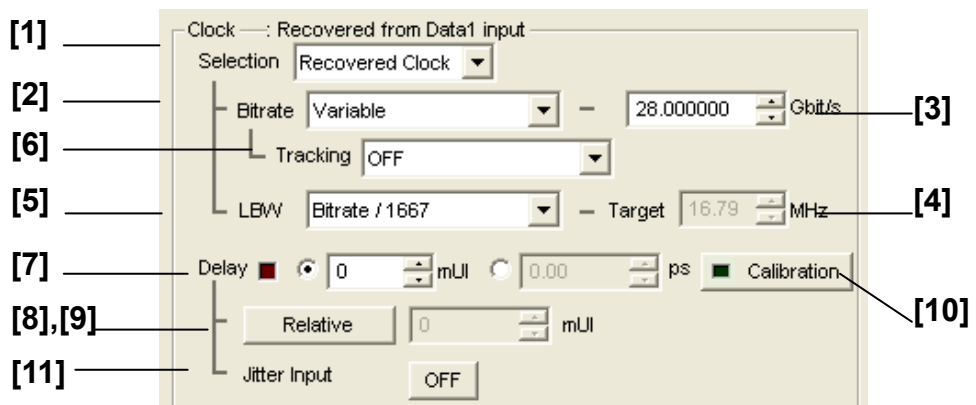


Figure 7.12.5.2-3 Clock Setting (Option 23 When Recovered Clock Is Selected)

**Table 7.12.5.2-1 Clock Input Setting Commands**

No.	Setting Items	Commands
[1]	Selection	:INPut:CLOCK:SElection
		:INPut:CLOCK:SElection?
[2]	Setting of preset frequency for Clock Recovery Preset	:INPut:CLOCK:RECovery
		:INPut:CLOCK:RECovery?
[3]	Setting of frequency for Clock Recovery Operation Bitrate	:INPut:CLOCK:CRFReq
		:INPut:CLOCK:CRFReq?
[4]	Target LBW	:INPut:CLOCK:LBANdwidth
		:INPut:CLOCK:LBANdwidth?
[5]	Selection of a loop band setting	:INPut:CLOCK:LBW
		:INPut:CLOCK:LBW?
[6]	PPG Bitrate Tracking	:INPut:CLOCK:PTRacking
		:INPut:CLOCK:PTRacking?
[7]	Delay	:INPut:CLOCK:DElAy
		:INPut:CLOCK:DElAy?
[8]	Relative	:INPut:CLOCK:RELative
		:INPut:CLOCK:RELative?
[9]	No Label (Relative value setting)	:INPut:CLOCK:RDElAy
		:INPut:CLOCK:RDElAy?
[10]	Calibration	:INPut:CLOCK:CALibration
[11]	Jitter Input	:INPut:CLOCK:JINPut
		:INPut:CLOCK:JINPut?

**:INPut:CLOCK:SElection <sel>**

Parameter <sel> = <CHARACTER RESPONSE DATA>  
 RECovered Recovered Clock  
 EXTernal External Clock  
 Function Sets the type of the input clock.  
 To set the type of the input clock to Recovered Clock:  
 Example > :INPut:CLOCK:SElection RECovered  
 Compatibility Partially compatible with MU181040A/B.

**:INPut:CLOCK:SElection?**

Response <sel> = <CHARACTER RESPONSE DATA>  
 REC Recovered Clock  
 EXT External Clock  
 Function Queries the clock input type.  
 Example > :INPut:CLOCK:SElection?  
 < EXT  
 Compatibility Partially compatible with MU181040A/B.

**:INPut:CLOCk:RECOvery <freq>**

Parameter	<freq> = <STRING PROGRAM DATA>	
	When the Option-22 is installed:	
"Variable"	Variable:	Variable
"OC_48"	OC48/STM16:	2.488320 Gbit/s
"PCI_EX1"	PCI Express Gen1:	2.500000 Gbit/s
"IB_SDR"	Infiniband SDR:	2.500000 Gbit/s
"OC_48_G709"	OTU1:	2.666060 Gbit/s
"SATA3"	SATA 3Gb/s:	3.000000 Gbit/s
"XAUI"	XAUI:	3.125000 Gbit/s
"4G_FC"	4GFC:	4.250000 Gbit/s
"PCI_EX2"	PCI Express Gen2:	5.000000 Gbit/s
"USB3"	USB3.0:	5.000000 Gbit/s
"IB_DDR"	Infiniband DDR:	5.000000 Gbit/s
"SATA6"	SATA 6Gb/s:	6.000000 Gbit/s
"HSBI"	HSBI:	6.250000 Gbit/s
"PCI_EX3"	PCI Express Gen3:	8.000000 Gbit/s
"8G_FC"	8GFC:	8.500000 Gbit/s
"OC_192"	OC192/STM64:	9.953280 Gbit/s
"IB_QDR"	Infiniband QDR:	10.000000 Gbit/s
"10GbE"	10GbE:	10.312500 Gbit/s
"10G_FC"	10GFC:	10.518750 Gbit/s
"OC_192_G975"	G975 FEC:	10.664228 Gbit/s
"OC_192_G709"	OTU2:	10.709225 Gbit/s
"10GbE_G709"	10GbE over FEC:	11.095700 Gbit/s
"10G_FC_G709"	10GFC over FEC:	11.316800 Gbit/s
"16G_FC"	16GFC:	14.025000 Gbit/s
"IB_FDR"	Infiniband_FDR:	14.062500 Gbit/s
"PCI_EX4"	PCI Express Gen4:	16.000000 Gbit/s
"SAS"	SAS:	24.000000 Gbit/s
"IB_EDR"	Infiniband_EDR:	25.781250 Gbit/s
"100GbE"	100GbE (25.78x4):	25.781250 Gbit/s
"100G_OTU4"	100G OTU4:	28.000000 Gbit/s
"32G_FC"	32GFC:	28.050000 Gbit/s
	When the Option-23 is installed:	
"Variable"	Variable:	Variable
"IB_EDR"	Infiniband_EDR:	25.781250 Gbit/s
"100GbE"	100GbE (25.78x4):	25.781250 Gbit/s
"100G_OTU4"	100G OTU4:	28.000000 Gbit/s
"32G_FC"	32GFC:	28.050000 Gbit/s
"100G_ULH"	100G ULH:	32.100000 Gbit/s

**Note:**

The preset frequencies vary depending on your option.

Function	Sets the preset frequency of the clock input that is set to Recovered Clock.
Example	To set the preset frequency to "16G_FC": > :INPut:CLOCK:RECOvery "16G_FC"
Compatibility	Partially compatible with MU181040A/B.

### **:INPut:CLOCK:RECOvery?**

---

Response	<freq> = <STRING RESPONSE DATA> "OC_48", "PCI_EX1", "IB_SDR", "OC_48_G709", "SATA3", "XAUI", "4G_FC", "PCI_EX2", "USB3", "IB_DDR", "SATA6", "HSBI", "PCI_EX3", "8G_FC", "OC_192", "10GbE", "10G_FC ", "OC_192_G975", "OC_192_G709", "10GbE_G709", "10G_FC_G709", "16G_FC", "IB_FDR", "PCI_EX4", "SAS", "IB_EDR", "100GbE ", "100G_OTU", "32G_FC", "100G_ULH", "Variable"
Function	Queries the preset frequency of the clock input that is set to Recovered Clock.
Example	> :INPut:CLOCK:RECOvery? < "16G_FC"
Compatibility	Partially compatible with MU181040A/B.

### **:INPut:CLOCK:CRFReq <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> When the Option-22 is installed: 2.400000 to 28.100000      2.40000 to 28.100000 Gbit/s /1 kbit/s Step When the Option-23 is installed: 25.500000 to 32.100000      25.500000 to 32.100000 Gbit/s /1 kbit/s Step
Function	Set the frequency for Clock Recovery.
Example	To set the frequency for Clock Recovery to 28.100000 Gbit/s: > :INPut:CLOCK:CRFReq 28.100000
Compatibility	Partially compatible with MU181040A/B.

**:INPut:CLOCK:CRFReq?**

Response	<numeric> = <NR2 NUMERIC RESPONSE DATA> When the Option-22 is installed: 2.400000 to 28.100000      2.40000 to 28.100000 Gbit/s /1 kbit/s Step When the Option-23 is installed: 25.500000 to 32.100000      25.500000 to 32.100000 Gbit/s /1 kbit/s Step
Function	Queries the frequency for Clock Recovery.
Example	> :INPut:CLOCK:CRFReq? < 28.100000
Compatibility	Partially compatible with MU181040A/B.

**:INPut:CLOCK:LBANdwidth <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> When the Option-22 is installed: Operation Bitrate [Gbit/s]      Range [MHz] (Step: 1 MHz) 2.400 000 to 5.500 000      Fixed to 3 MHz 5.500 001 to 7.500 000      3 to 4 MHz 7.500 001 to 9.500 000      3 to 5 MHz 9.500 001 to 10.500 000      3 to 6 MHz 10.500 001 to 12.500 000      3 to 7 MHz 12.500 001 to 14.500 000      3 to 8 MHz 14.500 001 to 15.500 000      3 to 9 MHz 15.500 001 to 17.500 000      3 to 10 MHz 17.500 001 to 19.500 000      3 to 11 MHz 19.500 001 to 20.500 000      3 to 12 MHz 20.500 001 to 22.500 000      3 to 13 MHz 22.500 001 to 24.500 000      3 to 14 MHz 24.500 001 to 25.500 000      3 to 15 MHz 25.500 001 to 27.500 000      3 to 16 MHz 27.500 001 to 28.100 000      3 to 17 MHz When the Option-23 is installed, this command is not required.
Function	Sets the loop band for Clock Recovery.
Example	To set the loop band for Clock Recovery to 8 MHz: > :INPut:CLOCK:LBANdwidth 8
Compatibility	Incompatible with existing models.



**:INPut:CLOCK:PTRacking <input>**

Parameter	<input> = <DECIMAL NUMERIC PROGRAM DATA> OFF Does not track. INTernal[1 to 8] MU183020A/21A
	<b>Note:</b> INTernal[1–8] specifies the unit and slot numbers from the smallest as 1 to 8 when there are multiple 32G PPGs installed to MP1800A/MT1810A. If [1–8] is omitted, 1 is assumed. Tracking is available only when the tracking target MU183020A/21A is interworking with either internal synthesizer or jitter generation source.
Function	Sets the Operation Bitrate of 32G PPG to the Operation Bitrate of MP1800A/MT1810A.
Example	To set the Operation Bitrate of 32G PPG installed to Slot2: > :INPut:CLOCK:PTRacking INT2
Compatibility	Incompatible with existing models.

**:INPut:CLOCK:PTRacking?**

Response	<numeric> = <NR2 NUMERIC RESPONSE DATA> OFF, INT1 to 8 <info> = <STRING RESPONSE DATA> "X:Y Z" X: Unit No.1 to 4 Y: Slot No.1 to 6 Z: Module name MU183020A/21A
Function	Queries the MU183020A/21A that is being tracked.
Example	> :INPut:CLOCK:PTRacking? < INT2, "1:2 MU183020A"
Compatibility	Incompatible with existing models.

### **:INPut:CLOCK:DELaY <numeric>[,<unit>]**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> In mUI units: -1000 to 1000    -1000 to 1000 mUI, in 2 mUI steps In ps units:    Converted from the calculated frequency value, based on the setting resolution of mUI. <unit> = <CHARACTER PROGRAM DATA> UI                    mUI unit PS                    ps unit (The ps unit is selected when <unit> is omitted.)
Function	Sets the value and unit of the clock input phase variable. The specified value may not be exactly set as is when the ps unit is set, due to the limitation of the setting resolution. The value is adjusted to the most approximate value and set in this event.
Example	To set the clock input phase variable to -1000 mUI: > :INPut:CLOCK:DELaY -1000,UI
Compatibility	Compatible with MU181040A/B.

### **:INPut:CLOCK:DELaY? [<unit>]**

Parameter	<unit> = <CHARACTER PROGRAM DATA> UI                    mUI unit PS                    ps unit (The ps unit is selected when <unit> is omitted.)
Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> In mUI units: -1000 to 1000    -1000 to 1000 mUI In ps units:    Converted from the calculated frequency value, based on the setting resolution of mUI.
Function	Queries the value and unit of the clock input phase variable.
Example	To query the value of the clock input phase variable in UI unit: > :INPut:CLOCK:DELaY? UI < -1000
Compatibility	Compatible with MU181040A/B.

### **:INPut:CLOCK:RELaTive <boolean>**

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> 0 or OFF                    Reference OFF 1 or ON                      Reference ON
Function	Sets the clock input phase variable reference ON/OFF.
Example	To set the clock input phase variable reference ON: > :INPut:CLOCK:RELaTive ON
Compatibility	Compatible with MU181040A/B.



**:INPut:CLOCK:RELative?**

Response	<boolean> = <NR1 NUMERIC RESPONSE DATA> 0 Reference OFF 1 Reference ON
Function	Queries the clock input phase variable reference setting.
Example	> :INPut:CLOCK:RELative? < 1
Compatibility	Compatible with MU181040A/B.

**:INPut:CLOCK:RDELay <numeric>[,<unit>]**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> In mUI units: -2000 to 2000 -2000 to 2000 mUI, in 2 mUI steps In ps units: Converted from the calculated frequency value, based on the setting resolution of mUI. [<unit>] = <CHARACTER PROGRAM DATA> UI mUI unit PS ps unit (The ps unit is selected when <unit> is omitted.)
Function	Sets the value of the clock input phase variable reference. Set a value using a difference from the reference value. The specified value may not be exactly set as is when the ps unit is set, due to the limitation of the setting resolution. The value is adjusted to the most approximate value and set in this event.
Example	To set the clock phase variable reference to -1000 mUI: > :INPut:CLOCK:RDELay -1000,UI
Compatibility	Compatible with MU181040A/B.

**:INPut:CLOCK:RDELay? [<unit>]**

Parameter	[<unit>] = <CHARACTER PROGRAM DATA> UI mUI unit PS ps unit (The ps unit is selected when <unit> is omitted.)
Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> In mUI units: -2000 to 2000 -2000 to 2000 mUI In ps units: Converted from the calculated frequency value, based on the setting resolution of mUI.
Function	Queries the value of the clock input phase variable reference.
Example	To query the value of the clock input phase variable reference in mUI units. > :INPut:CLOCK:RDELay? UI < -1000
Compatibility	Compatible with MU181040A/B.

### **:INPut:CLOCK:CALibration**

---

Function	Calibrates the input clock phase setting value.
Example	> :INPut:CLOCK:CALibration
Compatibility	Compatible with MU181040A/B.

### **:INPut:CLOCK:JINPut <boolean>**

---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA>
	0 or OFF                      Jitter input OFF setting
	1 or ON                        Jitter input ON setting
Function	Sets the Jitter Input button ON/OFF.
Example	To set the Jitter Input button to ON when a jitter is added: > :INPut:CLOCK:JINPut ON
Compatibility	Compatible with MU181040A/B.

### **:INPut:CLOCK:JINPut?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	0                                Jitter input OFF setting
	1                                Jitter input ON setting
Function	Queries the Jitter Input button setting.
Example	> :INPut:CLOCK:JINPut? < 1
Compatibility	Compatible with MU181040A/B.

### 7.12.5.3 Measurement Restart setting commands



Figure 7.12.5.3-1 Measurement Restart Setting

Table 7.12.5.3-1 Measurement Restart Setting Commands

No.	Setting Item	Commands
[1]	Measurement Restart	:SENSe:MEASure:MREStart :SENSe:MEASure:MREStart?

#### :SENSe:MEASure:MREStart <data>,<clock>

Parameter	<data> = <BOOLEAN PROGRAM DATA> 0 or OFF 1 or ON	Does not restart measurement when the data threshold is changed. Restarts measurement when the data threshold is changed.
	<clock> = <BOOLEAN PROGRAM DATA> 0 or OFF 1 or ON	Does not restart measurement when the clock delay is changed. Restarts measurement when the clock delay is changed.
Function	Sets the measurement restart condition.	
Example	To set the measurement condition so that the measurement is restarted when the Data Threshold or Clock Delay value is changed: > :SENSe:MEASure:MREStart 1,1	
Compatibility	Compatible with MU181040A/B.	

#### :SENSe:MEASure:MREStart?

Response	<data>,<clock> = <NR1 NUMERIC RESPONSE DATA> 0 1	Measurement restart OFF Measurement restart ON
Function	Queries the measurement restart condition.	
Example	> :SENSe:MEASure:MREStart? < 1,1	
Compatibility	Compatible with MU181040A/B.	

### 7.12.6 Commands Related to Capture Tab

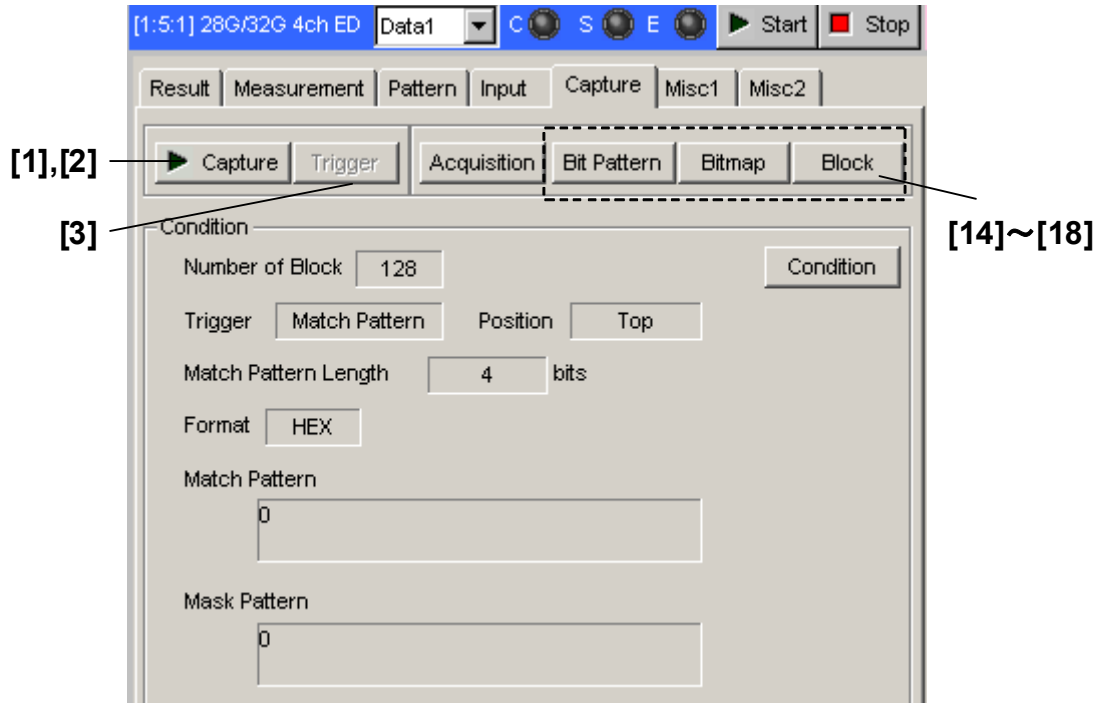


Figure 7.12.6-1 Capture Tab

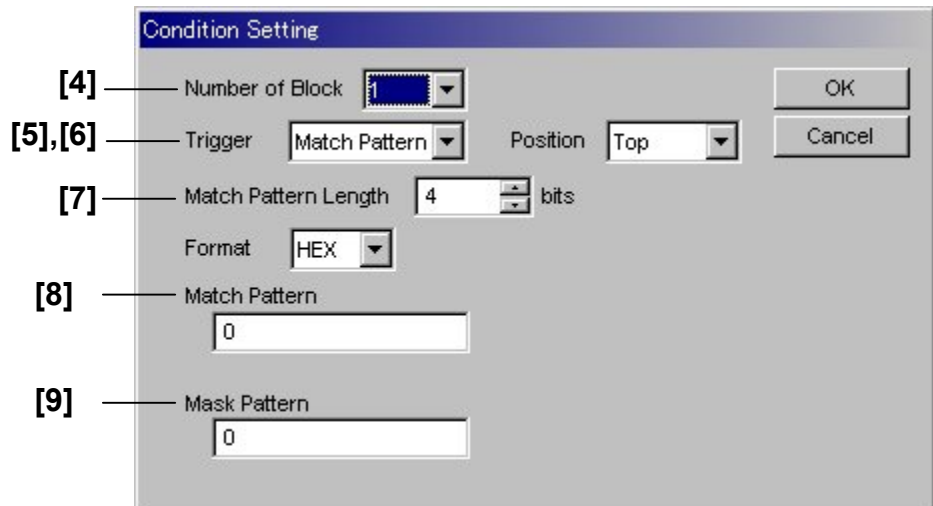


Figure 7.12.6-2 Condition Setting Dialog Box

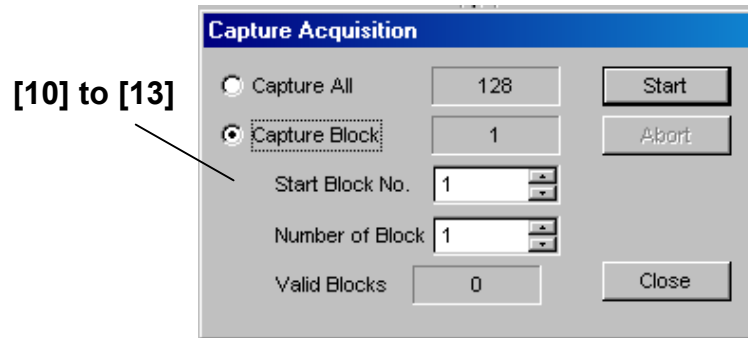


Figure 7.12.6-3 Capture Acquisition Dialog Box

Table 7.12.6-1 Capture Tab Setting Commands

No.	Setting Items	Commands
[1]	Capture Start	:SENSe:CAPTure:STARt
[2]	Capture Stop	:SENSe:CAPTure:STOP
[3]	Trigger	:SENSe:CAPTure:TRIGger
[4]	Number of Block	:SENSe:CAPTure:CONDition:BLOCK
		:SENSe:CAPTure:CONDition:BLOCK?
[5]	Trigger	:SENSe:CAPTure:CONDition:TRIGger
		:SENSe:CAPTure:CONDition:TRIGger?
[6]	Position	:SENSe:CAPTure:CONDition:POSition
		:SENSe:CAPTure:CONDition:POSition?
[7]	Match Pattern Length	:SENSe:CAPTure:CONDition:MPLength
		:SENSe:CAPTure:CONDition:MPLength?
[8]	Match Pattern	:SENSe:CAPTure:CONDition:MPEDit
		:SENSe:CAPTure:CONDition:MPEDit?
[9]	Mask Pattern	:SENSe:CAPTure:CONDition:MASKedit
		:SENSe:CAPTure:CONDition:MASKedit?
[10]	Query for capture data block count	:SENSe:CAPTure:ACQuisition:BNUMber?
[11]	Start of capture data acquisition	:SENSe:CAPTure:ACQuisition:STARt
[12]	Query for capture data acquisition state	:SENSe:CAPTure:ACQuisition:STATe?
[13]	Cancel of capture data acquisition	:SENSe:CAPTure:ACQuisition:CANCel
[14]	Query for capture data length per block	:SENSe:CAPTure:BPATtern:LENGth?
[15]	Query for capture result data	:SENSe:CAPTure:BPATtern:DATA:WHOLe?
[16]	Query for capture result data	:SENSe:CAPTure:BPATtern:BDATA:WHOLe?
[17]	Query for capture result error position	:SENSe:CAPTure:BPATtern:ERRor:WHOLe?
[18]	Query for capture result error position	:SENSe:CAPTure:BPATtern:BERRor:WHOLe?

### **:SENSe:CAPTure:START**

---

Function	Starts capture result acquisition.
Example	> :SENSe:CAPTure:START
Compatibility	Compatible with MU181040A/B.

### **:SENSe:CAPTure:STOP**

---

Function	Stops capture result acquisition.
Example	> :SENSe:CAPTure:STOP
Compatibility	Compatible with MU181040A/B.

### **:SENSe:CAPTure:TRIGger**

---

Function	Generates a capture manual trigger.
Example	> :SENSe:CAPTure:TRIGger
Compatibility	Compatible with MU181040A/B.

### **:SENSe:CAPTure:CONDition:BLOCK <block>**

---

Parameter	<block> = <CHARACTER PROGRAM DATA>	
	B1	1 Block
	B2	2 Block
	B4	4 Block
	B8	8 Block
	B16	16 Block
	B32	32 Block
	B64	64 Block
	B128	128 Block
Function	Sets the capture block division number.	
Example	To set the capture block division number to 8 blocks: > :SENSe:CAPTure:CONDition:BLOCK B8	
Compatibility	Compatible with MU181040A/B.	

**:SENSe:CAPTure:CONDition:BLOCK?**

Response	<block> = <CHARACTER RESPONSE DATA>
	B1                      1 Block
	B2                      2 Block
	B4                      4 Block
	B8                      8 Block
	B16                     16 Block
	B32                     32 Block
	B64                     64 Block
	B128                    128 Block
Function	Queries the capture block division number.
Example	To set the capture block division number to 8 blocks: > :SENSe:CAPTure:CONDition:BLOCK? < B8
Example	Compatible with MU181040A/B.

**:SENSe:CAPTure:CONDition:TRIGger <trigger>**

Parameter	<trigger> = <CHARACTER PROGRAM DATA>
	EDETECT                Error Detect: When an error is detected
	PATTERn                When matches the match pattern
	MANual                 When a manual trigger is generated
	EXTernal                When external trigger is selected
Function	Sets the trigger to store the data to memory for the capture function.
Example	To set the manual trigger: > :SENSe:CAPTure:CONDition:TRIGger MANual
Compatibility	Compatible with MU181040A/B.

**:SENSe:CAPTure:CONDition:TRIGger?**

Response	<trigger> = <CHARACTER RESPONSE DATA>
	EDET, PATT, MAN, EXT
Function	Queries the trigger to store the data to memory for the capture function.
Example	> :SENSe:CAPTure:CONDition:TRIGger? < MAN
Compatibility	Compatible with MU181040A/B.

### **:SENSe:CAPTure:CONDition:POSition <pos>**

---

Parameter	<pos> = <CHARACTER PROGRAM DATA> TOP                                   Store the data to the top of the memory. MIDDLE                               Store the data in the middle of the memory. BOTTom                               Store the data to the last of the memory.
Function	Sets the data storage memory position for the capture function.
Example	To set the data storage memory position to TOP: > :SENSe:CAPTure:CONDition:POSition TOP
Compatibility	Compatible with MU181040A/B.

### **:SENSe:CAPTure:CONDition:POSition?**

---

Response	<pos> = <CHARACTER RESPONSE DATA> TOP, MIDD, BOTT
Function	Queries the data storage memory position for the capture function.
Example	> :SENSe:CAPTure:CONDition:POSition? < TOP
Compatibility	Compatible with MU181040A/B

### **:SENSe:CAPTure:CONDition:MPLength <length>**

---

Parameter	<length> = <DECIMAL NUMERIC PROGRAM DATA> 4 to 64                               4 to 64 bits, in 4-bit steps
Function	Sets the capture trigger match pattern length.
Example	To set the capture trigger match pattern length to 12 bits: > :SENSe:CAPTure:CONDition:MPLength 12
Compatibility	Compatible with MU181040A/B

### **:SENSe:CAPTure:CONDition:MPLength?**

---

Response	<length> = <NR1 NUMERIC RESPONSE DATA> 4 to 64   4 to 64 bits
Function	Queries the capture trigger match pattern length.
Example	> :SENSe:CAPTure:CONDition:MPLength? < 12
Compatibility	Compatible with MU181040A/B



**:SENSe:CAPTure:CONDition:MPEDit <data>**


---

Parameter	<data> = <STRING PROGRAM DATA> ***...*	Edits the pattern data in hexadecimal format. Specify a 1- to 16-character string, consisting of 0 to 9 and A to F.
Function	Edits the capture trigger match pattern.	
Example	To set the capture trigger match pattern to 1010: > :SENSe:CAPTure:CONDition:MPEDit "1010"	
Compatibility	Compatible with MU181040A/B	

**:SENSe:CAPTure:CONDition:MPEDit?**


---

Response	<data> = <STRING RESPONSE DATA> ***...*	Returns the pattern data in hexadecimal format. A 1- to 16-character string, consisting of 0 to 9 and A to F.
Function	Queries the capture trigger match pattern.	
Example	> :SENSe:CAPTure:CONDition:MPEDit? < "1010"	
Compatibility	Compatible with MU181040A/B	

**:SENSe:CAPTure:CONDition:MASKedit <data>**


---

Parameter	<data> = <STRING PROGRAM DATA> ***...*	Edits the pattern data in hexadecimal format. Specify a 1- to 16-character string, consisting of 0 to 9 and A to F.
Function	Edits the capture trigger mask pattern.	
Example	To set the capture trigger mask pattern to FFFF: > :SENSe:CAPTure:CONDition:MASKedit "FFFF"	
Compatibility	Compatible with MU181040A/B.	

**:SENSe:CAPTure:CONDition:MASKedit?**


---

Response	<data> = <STRING RESPONSE DATA> ***...*	Returns the pattern data in hexadecimal format. A 1- to 16-character string, consisting of 0 to 9 and A to F.
Function	Queries the capture trigger mask pattern.	
Example	> :SENSe:CAPTure:CONDition:MASKedit? < "FFFF"	
Compatibility	Compatible with MU181040A/B.	

### **:SENSe:CAPTure:ACQuisition:BNUMber?**

Parameter	<block> = <NR1 NUMERIC RESPONSE DATA> 0 to 128	0 to 128 blocks, in 1-block steps, number of valid capture data blocks
Function	Queries the number of valid capture data blocks.	
Example	> :SENSe:CAPTure:ACQuisition:BNUMber? < 128	
Compatibility	Compatible with MU181040A/B.	

### **:SENSe:CAPTure:ACQuisition:STARt <range>[,<start>,<number>]**

Parameter	<range> = <CHARACTER PROGRAM DATA> ALL SELEct	Acquires all capture data. Acquires capture data of the specified blocks.
	[<start>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 128	1 to 128 blocks, in 1-block steps, acquisition start block
	[<number>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 128	1 to 128 blocks, in 1-block steps, number of blocks to be acquired

**Note:**

The maximum setting value of <start> and <number> is the maximum value of valid data. <start> and <number> are omitted when <range> = All.

Function	Acquires capture data.	
Example	To acquire all capture data: > :SENSe:CAPTure:ACQuisition:STARt ALL To acquire capture data of Blocks 1 to 64: > :SENSe:CAPTure:ACQuisition:STARt SELEct,1,64	
Compatibility	Compatible with MU181040A/B.	

### **:SENSe:CAPTure:ACQuisition:STATe?**

Response	<state> = <NR1 NUMERIC RESPONSE DATA> 0 1	Capture data acquisition is not performed. Capture data acquisition is being performed.
Function	Queries capture data acquisition status.	
Example	> :SENSe:CAPTure:ACQuisition:STATe? < 1	
Compatibility	Compatible with MU181040A/B.	



---

**:SENSe:CAPTure:BPATtern:BDATA:WHOLe? <block>,<start>[,<size>]**

---

Parameter	<block> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 Blocks, in 1 Step <start> = <NON-DECIMAL PROGRAM DATA> #H0 to #H7FFFFFFF                  0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal) [<size>] = <NR1 NUMERIC PROGRAM DATA> 1 to 1048576                      1 to 1,048,576 bytes, in 1 byte Step
Response	<bdata> = <DEFINITE LENGTH ARBITRARY BLOCK RESPONSE DATA> #YYYY<binary>                      X:      Number of YYY digits YYY:     Number of bytes of <binary> 1 to 1,048,576 bytes <binary>: Binary data of up to 1,048,576 bytes
Function	Queries the capture data in the specified block, in 1,048,576 byte binary data starting from the <start> address. Data whose error bit positions are inverted from those in the ED reference data can be obtained.
Example	To query the capture data in block 3, in 1,048,576 byte binary data from the bit 0 address: > :SENSe:CAPTure:BPATtern:BDATA:WHOLe? 3, #H0 < #10011
Compatibility	Partially compatible with MU181040A/B. (The parameter range is not the same.)

---

**:SENSe:CAPTure:BPATtern:ERRor:WHOLe? <block>,<start>**

---

Parameter	<block> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 Blocks, in 1 Step <start> = <NON-DECIMAL PROGRAM DATA> #H0 to #H7FFFFFFF                  0 to 7FFFFFFF bits , in 1 bit steps (Specify in hexadecimal)
Response	<data> = <STRING RESPONSE DATA> "H***...*"                              Returns the pattern data in hexadecimal format. Within 400 characters (pattern data of 400 × 4 bits)
Function	Queries the capture error positions in the specified block, in 400 × 4 bits starting from the <start> address.
Example	To query the capture error positions in block 3, in 400 × 4 bits from the bit 0 address: > :SENSe:CAPTure:BPATtern:ERRor:WHOLe? 3, #H0 < "H001"
Compatibility	Partially compatible with MU181040A/B. (The parameter range is not the same.)

---

**:SENSe:CAPture:BPATtern:BERRor:WHOLe? <block>,<start>[,<size>]**

Parameter	<block> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 128                       1 to 128 blocks, in 1 steps <start> = <NON-DECIMAL PROGRAM DATA> #H0 to #H7FFFFFF                 0 to 7FFFFFF bits, in 1 bit steps (Specify in hexadecimal) [<size>] = <NR1 NUMERIC PROGRAM DATA> 1 to 1048576                 1 to 1,048,576 bytes, in 1 byte Steps
Response	<bdata> = <DEFINITE LENGTH ARBITRARY BLOCK RESPONSE DATA> ##XYYY<binary>           X:     Number of YYY digits YYY:    Number of bytes of <binary> 1 to 1,048,576 bytes <binary>: Binary data of up to 1,048,576 bytes
Function	Queries the capture error positions in the specified block, in 1,048,576 bytes binary data starting from the <start> address.
Example	To query the capture error positions in block 3, in 1,048,576 bytes binary data from the bit 0 address: > :SENSe:CAPture:BPATtern:BERRor:WHOLe? 3, #H0 < #10011
Compatibility	Partially compatible with MU181040A/B. (The parameter range is not the same.)

### 7.12.7 Commands Related to Misc1 Tab

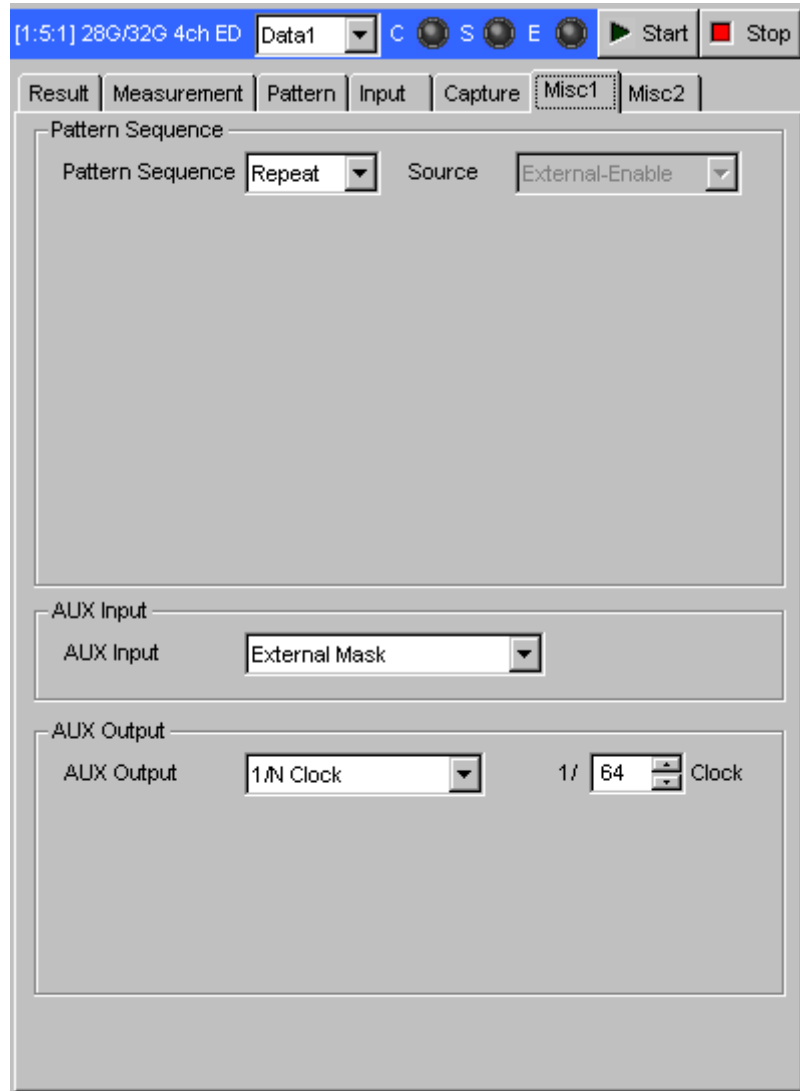


Figure 7.12.7-1 Misc1 Tab

7.12.7.1 Pattern Sequence setting commands

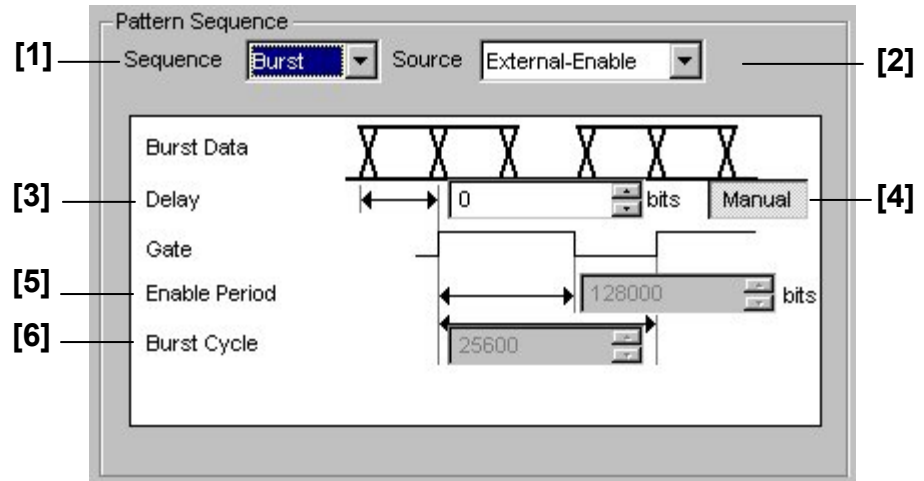


Figure 7.12.7.1-1 Pattern Sequence Setting

Table 7.12.7.1-1 Pattern Sequence Setting Commands

No.	Setting Items	Commands
[1]	Sequence	:SENSe:PATtern:IMODE
		:SENSe:PATtern:IMODE?
[2]	Source	:SENSe:PATtern:BURSt:MODE
		:SENSe:PATtern:BURSt:MODE?
[3]	Delay	:SENSe:PATtern:BURSt:DELay
		:SENSe:PATtern:BURSt:DELay?
[4]	Delay Manual/Auto	:SENSe:PATtern:BURSt:ADJust
		:SENSe:PATtern:BURSt:ADJust?
[5]	Enable Period	:SENSe:PATtern:BURSt:ELENgth
		:SENSe:PATtern:BURSt:ELENgth?
[6]	Burst Cycle	:SENSe:PATtern:BURSt:CYCLE
		:SENSe:PATtern:BURSt:CYCLE?

**:SENSe:PATtern:IMODE <mode>**

Parameter	<mode> = <CHARACTER PROGRAM DATA> REPeat                      Repeat signal BURSt                        Burst signal
Function	Sets the signal reception method from Repeat (consecutive) signal or Burst signal.
Example	To set the signal reception method to Repeat signal: > :SENSe:PATtern:IMODE REPeat
Compatibility	Compatible with MU181040A/B.

### **:SENSe:PATtern:IMODE?**

---

Response	<mode> = <CHARACTER RESPONSE DATA> REP, BURS
Function	Queries the signal reception method.
Example	> :SENSe:PATtern:IMODE? < REP
Compatibility	Compatible with MU181040A/B.

### **:SENSe:PATtern:BURSt:MODE <mode>**

---

Parameter	<mode> = <CHARACTER PROGRAM DATA> INTernal                      Internal EXTTrig                      External Trigger EXTenable                    External Enable
Function	Sets the Burst signal reception sequence.
Example	To set the Burst signal reception sequence to Internal: > :SENSe:PATtern:BURSt:MODE INTernal
Compatibility	Compatible with MU181040A/B.

### **:SENSe:PATtern:BURSt:MODE?**

---

Response	<mode> = <CHARACTER RESPONSE DATA> INT, EXTT, EXT
Function	Queries the Burst signal reception sequence.
Example	> :SENSe:PATtern:BURSt:MODE? < INT
Compatibility	Compatible with MU181040A/B.

### **:SENSe:PATtern:BURSt:DElay <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0 to 2147483640              0 to 2,147,483,640 bits/8 bits Step
	<b>Note:</b> At 2ch Combination, the setting range and Step are doubled. At 4ch Combination, the setting range and Step are quadrupled.
Function	Sets the delay value for the Burst signal.
Example	To set the delay value for the Burst signal to 0 bits: > :SENSe:PATtern:BURSt:DElay 0
Compatibility	Partially compatible with MU181040A/B.



**:SENSe:PATtern:BURSt:DELay?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries the delay value for the Burst signal.
Example	> :SENSe:PATtern:BURSt:DELay? < 0
Compatibility	Partially compatible with MU181040A/B.

**:SENSe:PATtern:BURSt:ADJust <adjust >**


---

Parameter	<adjust> = <CHARACTER PROGRAM DATA> AUTO                      Executes automatic adjustment. MANual                     Does not execute automatic adjustment
Function	Sets whether to execute automatic adjustment of Burst Trigger Delay.
Example	> :SENSe:PATtern:BURSt:ADJust AUTO
Compatibility	Compatible with MU181040A/B.

**:SENSe:PATtern:BURSt:ADJust?**


---

Response	<adjust> = <CHARACTER RESPONSE DATA>
Function	Queries the Burst Trigger Delay adjustment method.
Example	> :SENSe:PATtern:BURSt:ADJust? < AUTO
Compatibility	Compatible with MU181040A/B.

**:SENSe:PATtern:BURSt:ELENgth <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 12800 to 2147483392      12,800 to 2,147,483,392 bits/128 bits Step <b>Note:</b> At 2ch Combination, the setting range and Step are doubled. At 4ch Combination, the setting range and Step are quadrupled.
Function	Sets the data signal reception interval for Burst signal reception.
Example	To set the Burst signal reception interval to 12,800 bits: > :SENSe:PATtern:BURSt:ELENgth 12800
Compatibility	Partially compatible with MU181040A/B.

### **:SENSe:PATtern:BURSt:ELENgth?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries the data signal reception interval for Burst signal reception.
Example	> :SENSe:PATtern:BURSt:ELENgth? < 12800
Compatibility	Partially compatible with MU181040A/B.

### **:SENSe:PATtern:BURSt:CYCLe <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 25600 to 2147483648    25,600 to 2,147,483,648 bits/128 bits Step <b>Note:</b> At 2ch Combination, the setting range and Step are doubled. At 4ch Combination, the setting range and Step are quadrupled.
Function	Sets the Burst signal generation cycle.
Example	To set the Burst signal generation cycle to 25,600 bits: > :SENSe:PATtern:BURSt:CYCLe 25600
Compatibility	Partially compatible with MU181040A/B.

### **:SENSe:PATtern:BURSt:CYCLe?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries the Burst signal generation cycle.
Example	> :SENSe:PATtern:BURSt:CYCLe? < 25600
Compatibility	Partially compatible with MU181040A/B.

### 7.12.7.2 AUX Input setting commands

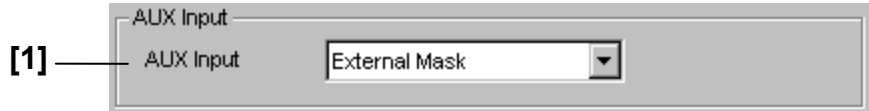


Figure 7.12.7.2-1 AUX Input Setting

Table 7.12.7.2-1 AUX Input Setting Commands

No.	Setting Items	Commands
[1]	AUX Input	:INPut:AUX:USAGe :INPut:AUX:USAGe?

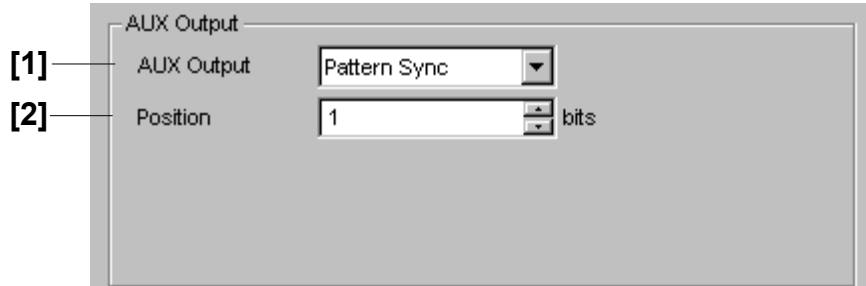
#### :INPut:AUX:USAGe <usage>

Parameter	<usage> = <CHARACTER PROGRAM DATA> BURSt Burst Source MASK External Mask CAPTure Capture External Trigger
Function	Sets the usage of the common connector input.
Example	To set the usage of the common connector input to Burst Source: > :INPut:AUX:USAGe BURSt
Compatibility	Compatible with MU181040A/B.

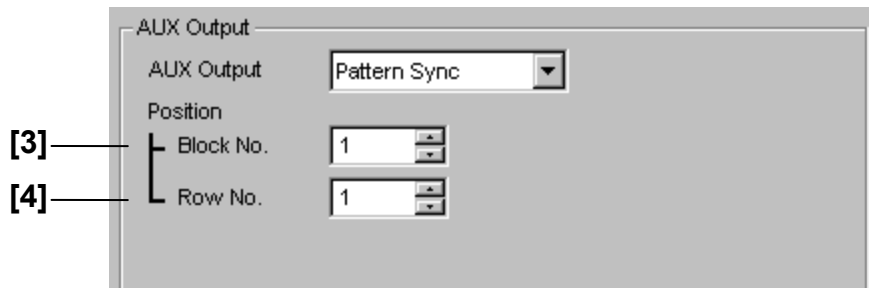
#### :INPut:AUX:USAGe?

Response	<usage> = <CHARACTER RESPONSE DATA> BURS, MASK, CAPT
Function	Queries the usage of the common connector input.
Example	> :INPut:AUX:USAGe? < BURS
Compatibility	Compatible with MU181040A/B.

### 7.12.7.3 AUX Output setting commands



**Figure 7.12.7.3-1 AUX Output Setting  
(For PRBS, Zero Substitution, and Data Patterns)**



**Figure 7.12.7.3-2 AUX Output Setting (For Mixed Pattern)**

**Table 7.12.7.3-1 AUX Output Setting Commands**

No.	Setting Items	Commands
[1]	AUX Output	:OUTPut:SYNC:SOURce
		:OUTPut:SYNC:SOURce?
[2]	Position (PRBS, Zero-Substitution, Data)	:OUTPut:SYNC:POSition
		:OUTPut:SYNC:POSition?
[3]	Block No. (Mixed Data)	:OUTPut:SYNC:MIXData:BLOCK
		:OUTPut:SYNC:MIXData:BLOCK?
[4]	Row No. (Mixed Data)	:OUTPut:SYNC:MIXData:ROW
		:OUTPut:SYNC:MIXData:ROW?

**:OUTPut:SYNC:SOURce <source>[,<numeric>]**

Parameter	<source> = <CHARACTER PROGRAM DATA> CLOCK8                    1/8 clock CLOCK16                   1/16 clock CLOCK32                   1/32 clock CLOCK64                   1/64 clock PATTERN                   Pattern Sync (Variable) SGAIN                      Sync Gain ERROROUT                  Error Output NLOCK                      1/n clock [<numeric>] = <DECIMAL NUMERIC PROGRAM DATA> Omits <numeric> when NLOCK (1/n clocks) is not selected. 4 to 512                    4,6,8,10,...,510,512/2 Step
Function	Sets the output signal for synchronization output.
Example	To set the output signal for synchronization output to 1/8 clocks: > :OUTPut:SYNC:SOURce CLOCK8 To set the output signal for synchronization output to 1/511 clocks: > :OUTPut:SYNC:SOURce NLOCK, 510
Compatibility	Partially compatible with MU181040A/B.

**:OUTPut:SYNC:SOURce?**

Response	<source> = <CHARACTER RESPONSE DATA> CLOC8, CLOC16, CLOC32, CLOC64, PATT, SGA, ERR, NCL [<numeric>] = <DECIMAL NUMERIC RESPONSE DATA> Omits <numeric> for other than NCL (1/n clocks). 4 to 512
Function	Queries the output signal for synchronization output.
Example	> :OUTPut:SYNC:SOURce? < CLOC4 > :OUTPut:SYNC:SOURce? < NCL, 510
Compatibility	Partially compatible with MU181040A/B.

### **:OUTPut:SYNC:POSition <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 34359738105      1 to 34,359,738,105 bits/8bits Step
	<b>Note:</b> At 2ch Combination, the setting range varies and Step is doubled. 1 to 68719476209      1 to 68,719,476,209 bits/16 bits Step At 4ch Combination, the setting range varies and Step is quadrupled. 1 to 137438952417      1 to 1,374,389,524,171 bits/32 bits Step
Function	Sets the output position for synchronization output for Data, PRBS, and Zero Substitution patterns.
Example	To set the synchronization output position to bit 1: > :OUTPut:SYNC:POSition 1
Compatibility	Partially compatible with MU181040A/B.

### **:OUTPut:SYNC:POSition?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries the output position for synchronization output for Data, PRBS, and Zero Substitution patterns.
Example	> :OUTPut:SYNC:POSition? < 1
Compatibility	Partially compatible with MU181040A/B (the parameter range varies depending on the settings).

### **:OUTPut:SYNC:MIXData:BLOCK <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 511      1 to 511 Block/1 Block Step
	The maximum setting value is the value set in Block No
Function	Sets the output block for synchronization output for Mixed Data pattern
Example	To set the output block for synchronization output to block 1: > :OUTPut:SYNC:MIXData:BLOCK 1
Compatibility	Compatible with MU181040A/B.

**:OUTPut:SYNC:MIXData:BLOCK?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries the output block for synchronization output for Mixed Data pattern.
Example	> :OUTPut:SYNC:MIXData:BLOCK? < 1
Compatibility	Compatible with MU181040A/B.

**:OUTPut:SYNC:MIXData:ROW <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 16                      1 to 16 Row/1 Row Step The maximum setting value is the value set in Row No.
Function	Sets the output Row position for synchronization output for Mixed Data pattern.
Example	To set the synchronization output Row to 1 Row. > :OUTPut:SYNC:MIXData:ROW 1
Compatibility	Compatible with MU181040A/B.

**:OUTPut:SYNC:MIXData:ROW?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1 to 16                      1 to 16 Row
Function	Queries the output Row position for synchronization output for Mixed Data pattern.
Example	> :OUTPut:SYNC:MIXData:ROW? < 1
Compatibility	Compatible with MU181040A/B.

## 7.12.8 Commands Related to Misc2 Tab

### 7.12.8.1 Combination setting commands

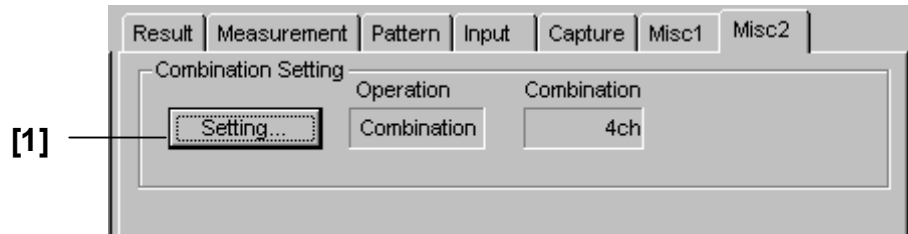


Figure 7.12.8.1-1 Misc2 Tab

Table 7.12.8.1-1 Combination Setting Commands

No.	Setting Item	Commands
[1]	Combination Setting	:MCOMBination:OPERation:SETTing :MCOMBination:OPERation:SETTing?

#### **:MCOMBination:OPERation:SETTing <configuration>**

Parameter	<configuration> = <DECIMAL NUMERIC PROGRAM DATA>
	0 Independent
	2 2ch Combination
	4 4ch Combination
Function	Sets the combination setting for 32G ED Module, from Combination or Independent.
Example	To set the combination setting to 4ch Combination. > :MCOMBination:OPERation:SETTing 4
Compatibility	Incompatible with existing models

#### **:MCOMBination:OPERation:SETTing?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	0 Independent
	2 2ch Combination
	4 4ch Combination
Function	Queries the combination setting of 32G ED Module.
Example	> :MCOMBination:OPERation:SETTing? < 4
Compatibility	Incompatible with existing models



7.12.8.2 Grouping setting commands

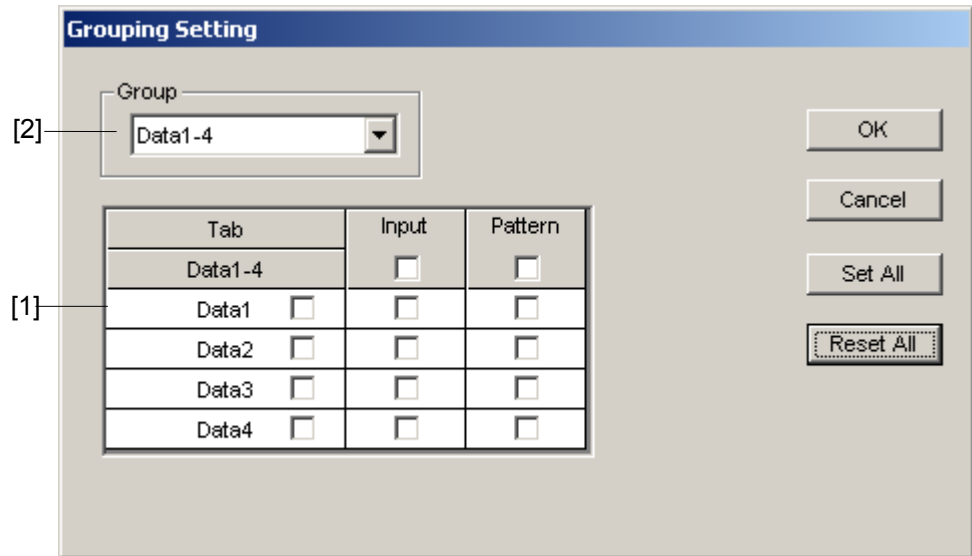


Figure 7.12.8.2-1 Grouping Setting Dialog Box for Misc 2 Tab

Table 7.12.8.2-1 Combination Setting Commands

No.	Setting Items	Commands
[1]	Selects tabs to be grouped together.	:SENSE:GROUp:SETTing :SENSE:GROUp:SETTing?
[2]	Selects Data IFs to be grouped together.	:SENSE:GROUp:SELEct :SENSE:GROUp:SELEct?

**:SENSE:GROUp:SETTing <tab>,<interface>**

Parameter	<tab> = <CHARACTER PROGRAM DATA> PATTern                      Pattern tab INPut                            Input tab <interface> = <NR1 NUMERIC PROGRAM DATA> 0 to 15 Available bits 1 (Bit0)                        Data1 2 (Bit1)                        Data2 4 (Bit2)                        Data3 8 (Bit3)                        Data4
Function	Sets the Grouping function.
Example	To group the Pattern tabs of Data1 and Data 2 together: > :SENSE:GROUp:SETTing PATTern, 3  To group the Input tabs of Data1 to Data 4 together: > :SENSE:GROUp:SETTing INPut, 15
Compatibility	Incompatible with existing models.

### **:SENSe:GROup:SETTing? <tab>**

---

Parameter	<tab> = <CHARACTER PROGRAM DATA> PATtern                      Pattern tab INPut                          Input tab
Response	<interface> = <NR1 NUMERIC RESPONSE DATA> 0 to 15 Available bits 1 (Bit0)                      Data1 2 (Bit1)                      Data2 4 (Bit2)                      Data3 8 (Bit3)                      Data4
Function	Queries the Grouping setting. To query the Data Interfaces whose Input tabs are grouped together:
Example	> :SENSe:GROup:SETTing? INPut < 12 (Data3 and Data4 are grouped together.)
Compatibility	Incompatible with existing models.

### **:SENSe:GROup:SELEct <group>**

---

Parameter	<group> = <DECIMAL NUMERIC PROGRAM DATA> 1                                  One group (Data1-2 or Data1-4) 2                                  Two groups (Data1-2 and Data3-4)
Function	Sets the number of groups.
Example	To set the number of groups to 2: > :SENSe:GROup:SELEct 2
Compatibility	Incompatible with existing models.

### **:SENSe:GROup:SELEct?**

---

Response	<group> = <NR1 NUMERIC RESPONSE DATA> 1                                  One group (Data1-2 or Data1-4) 2                                  Two groups (Data1-2 and Data3-4)
Function	Queries the number of groups.
Example	> :SENSe:GROup:SELEct? < 2
Compatibility	Incompatible with existing models.

## 7.12.9 Eye Margin Measurement

This section describes the commands for Eye Margin measurement.

### 7.12.9.1 Eye Margin measurement setting commands

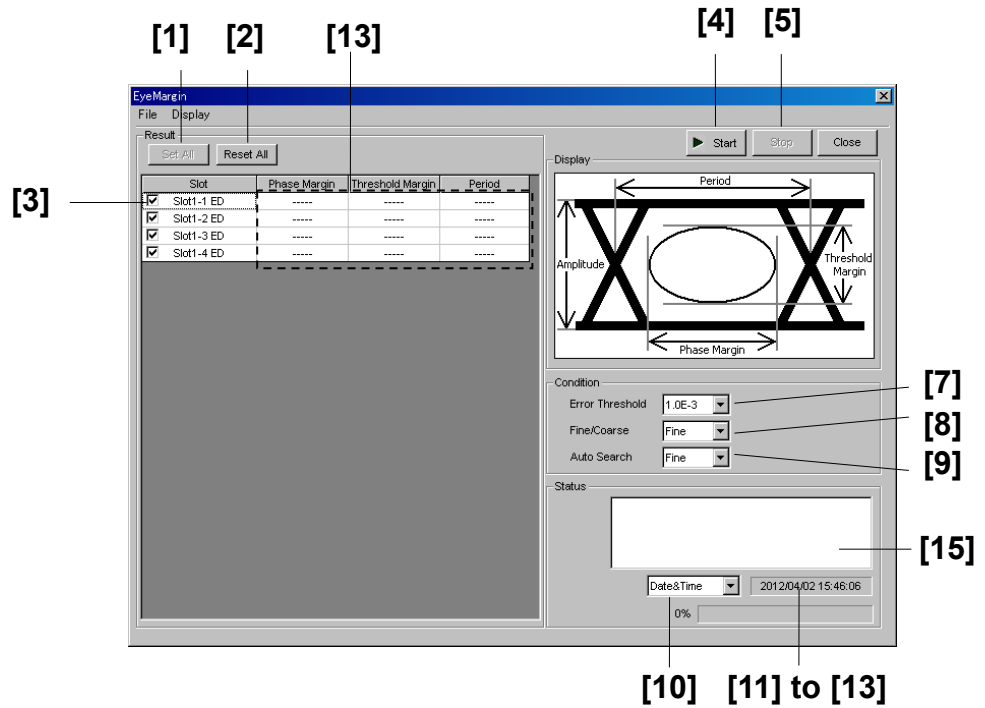


Figure 7.12.9.1-1 Eye Margin Window

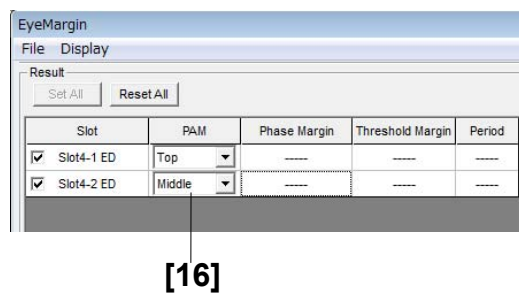


Figure 7.12.9.1-2 Eye Margin Window (PAM mode)

Table 7.12.9.1-1 Eye Margin measurement Setting Commands

No.	Setting Items	Commands
[1]	Set All	:SENSe:MEASure:EMARgin:MARGin:ASLot
[2]	Reset All	:SENSe:MEASure:EMARgin:MARGin:RSLot
[3]	Slot	:SENSe:MEASure:EMARgin:MARGin:SLOT
		:SENSe:MEASure:EMARgin:MARGin:SLOT?
[4]	Start	:SENSe:MEASure:STARt
[5]	Stop	:SENSe:MEASure:STOP
[6]	No label (Query for measurement state)	:SENSe:MEASure:EMARgin:STATe?
[7]	Error Threshold	:SENSe:MEASure:EMARgin:MARGin:THReshold
		:SENSe:MEASure:EMARgin:MARGin:THReshold?
[8]	Fine/Coarse	:SENSe:MEASure:EMARgin:MARGin:RESolution
		:SENSe:MEASure:EMARgin:MARGin:RESolution?
[9]	Auto Search	:SENSe:MEASure:EMARgin:MARGin:ASEarch
		:SENSe:MEASure:EMARgin:MARGin:ASEarch?
[10]	Selection of measurement time display	:SENSe:MEASure:EMARgin:TIME
		:SENSe:MEASure:EMARgin:TIME?
[11]	Query for date and time	:SENSe:MEASure:EMARgin:DTIME?
[12]	Query for measurement start time	:SENSe:MEASure:EMARgin:STARt?
[13]	Query for measurement elapsed time	:SENSe:MEASure:EMARgin:ELAPsed?
[14]	Query for measurement result	:CALCulate:DATA:EMARgin?
[15]	No label (Query for measurement status)	:CALCulate:DATA:EMARgin:STATus?
[16]	Selection of search target threshold (In PAM mode only)	:SENSe:MEASure:EMARgin:MARGin:ASEarch:PAMSet
		:SENSe:MEASure:EMARgin:MARGin:ASEarch:PAMSet?

### **:SENSe:MEASure:EMARgin:MARGin:ASLot**

Function Selects all Eye Margin measurement slots to be set to ON.  
 Example > :SENSe:MEASure:EMARgin:MARGin:ASLot  
 Compatibility Incompatible with existing models

### **:SENSe:MEASure:EMARgin:MARGin:RSLot**

Function Selects all Eye Margin measurement slots to be set to OFF.  
 Example > :SENSe:MEASure:EMARgin:MARGin:RSLot  
 Compatibility Incompatible with existing models

---

**:SENSe:MEASure:EMARgin:MARGin:SLOT  
<slot>,<interface>,<boolean>[,<unit>]**


---

Parameter	<slot> = <CHARACTER PROGRAM DATA> SLOT1 to SLOT6      Slots No. 1 to No. 6 1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Data No.1 to 4 <boolean> = <BOOLEAN PROGRAM DATA> ON or 1                      ON OFF or 0                      OFF [<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number. Can be omitted. Mainframe No. 1 is specified when omitted.
Function	Selects the Eye Margin measurement slot.
Example	To select Eye Margin measurement Slot 1, Data 3 to be ON: > :SENSe:MEASure:EMARgin:MARGin:SLOT SLOT1,3,ON
Compatibility	Incompatible with existing models

---

**:SENSe:MEASure:EMARgin:MARGin:SLOT? <slot>,<interface>[,<unit>]**


---

Parameter	<slot> = <CHARACTER PROGRAM DATA> SLOT1 to SLOT6      Slots No. 1 to No. 6 1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Data No.1 to 4 [<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number.
Response	<boolean> = <NR1 NUMERIC RESPONSE DATA> 1                              ON 0                              OFF
Function	Queries whether the specified slot is targeted for the Eye Margin measurement.
Example	To query whether the slot 1, Data 3 is targeted for the Eye Margin measurement: > :SENSe:MEASure:EMARgin:MARGin:SLOT? SLOT1,3 < 1
Compatibility	Incompatible with existing models

### **:SENSe:MEASure:STARt**

Function	Starts the Eye Margin measurement.
Example	> :SENSe:MEASure:STARt
Compatibility	Incompatible with existing models

### **:SENSe:MEASure:STOP**

Function	Stops the Eye Margin measurement.
Example	> :SENSe:MEASure:STOP
Compatibility	Incompatible with existing models

### **:SENSe:MEASure:EMARgin:STATe?**

Response	<boolean> = <NR1 NUMERIC RESPONSE DATA>
	1 Starts measurement
	0 Stops measurement
	-1 Measurement failure
Function	Queries the Eye Margin measurement state.
Example	> :SENSe:MEASure:EMARgin:STATe? < 1
Compatibility	Compatible with the MP1632C.

### **:SENSe:MEASure:EMARgin:MARGIn:THReshold <thre>**

Parameter	<thre> = <CHARACTER PROGRAM DATA> E_3 to E_12 1E-3 to 1E-12, in single steps
Function	Sets the threshold value that is to be the boundary of the Eye Margin measurement margin.
Example	To set the threshold value that is to be the Eye Margin measurement margin to 1E-4: > :SENSe:MEASure:EMARgin:MARGIn:THReshold E_4
Compatibility	Compatible with the MP1632C.

### **:SENSe:MEASure:EMARgin:MARGIn:THReshold?**

Response	<thre> = <CHARACTER RESPONSE DATA> E_3 to E_12 1E-3 to 1E-12
Function	Queries the threshold value that is to be the boundary of the Eye Margin measurement margin.
Example	> :SENSe:MEASure:EMARgin:MARGIn:THReshold? < E_4
Compatibility	Compatible with the MP1632C.

**:SENSe:MEASure:EMARgin:MARGin:RESolution <type>**

Parameter	<type> = <CHARACTER PROGRAM DATA> FINE                      FINE mode COARse                    COARse mode
Function	Sets the accuracy of the error ratio for the Eye Margin measurement.
Example	To set the accuracy of the error ratio for the Eye Margin measurement to the Fine mode: > :SENSe:MEASure:EMARgin:MARGin:RESolution FINE
Compatibility	Compatible with the MP1632C.

**:SENSe:MEASure:EMARgin:MARGin:RESolution?**

Response	<type> = <CHARACTER RESPONSE DATA> FINE, COAR
Function	Queries the accuracy of the error ratio for the Eye Margin measurement.
Example	> :SENSe:MEASure:EMARgin:MARGin:RESolution? < FINE
Compatibility	Compatible with the MP1632C.

**:SENSe:MEASure:EMARgin:MARGin:ASEarch <boolean>[,<mode>]**

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> ON or 1                    Auto Search ON OFF or 0                   Auto Search OFF <mode> = <DECIMAL NUMERIC PROGRAM DATA> 1                            Coarse 2                            Fine 3                            PAM Coarse 4                            PAM Fine
	<b>Note:</b> <mode> can be omitted. Coarse is specified when omitted.
Function	Selects whether to perform Auto Search upon start of the Eye Margin measurement.
Example	To set Auto Search upon start of the Eye Margin measurement to ON: > :SENSe:MEASure:EMARgin:MARGin:ASEarch ON
Compatibility	Incompatible with existing models

### **:SENSe:MEASure:EMARgin:MARGin:ASEarch?**

---

Response	<boolean> = <NR1 NUMERIC RESPONSE DATA>
	0 OFF
	1 ON (Coarse)
	2 ON (Fine)
	3 ON (PAM Coarse)
	4 ON (PAM Fine)
Function	Queries whether to perform Auto Search upon start of the Eye Margin measurement.
Example	> :SENSe:MEASure:EMARgin:MARGin:ASEarch? < 1
Compatibility	Incompatible with existing models

### **:SENSe:MEASure:EMARgin:TIME <type>**

---

Parameter	<type> = <CHARACTER PROGRAM DATA>
	DTIME Displays the current date and time.
	START Displays the measurement start time.
	ELAPsed Displays the elapsed time based on the measurement period.
Function	Selects the Eye Margin measurement time display type.
Example	To set the Eye Margin measurement time display type to measurement start time (Start Time): > :SENSe:MEASure:EMARgin:TIME START
Compatibility	Compatible with the MP1632C.

### **:SENSe:MEASure:EMARgin:TIME?**

---

Response	<type> = <CHARACTER RESPONSE DATA>
	DTIM Displays the current date and time.
	STAR Displays the measurement start time.
	ELAP Displays the elapsed time based on the measurement period.
Function	Queries the Eye Margin measurement time display type.
Example	> :SENSe:MEASure:EMARgin:TIME? < STAR
Compatibility	Compatible with the MP1632C.



**:SENSe:MEASure:EMARgin:DTIME?**

Response	<pre>&lt;year&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 2000 to 2036          2000 to 2036 year &lt;month&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 1 to 12              January to December &lt;day&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 1 to 31              1st to 31st &lt;hour&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0 to 23              0 to 23 hours &lt;minute&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0 to 59              0 to 59 minutes &lt;second&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0 to 59              0 to 59 seconds</pre>
Function	Queries the current date and time during Eye Margin measurement.
Example	<pre>&gt; :SENSe:MEASure:EMARgin:DTIME? &lt; 2012,4,1,23,59,59</pre>
Compatibility	Incompatible with existing models

**:SENSe:MEASure:EMARgin:START?**

Response	<pre>&lt;year&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0, 2000 to 2036      2000 to 2036 year &lt;month&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0 to 12              January to December &lt;day&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0 to 31              1st to 31st &lt;hour&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0 to 23              0 to 23 hours &lt;minute&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0 to 59              0 to 59 minutes &lt;second&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0 to 59              0 to 59 seconds</pre> <p><b>Note:</b> The following is output when no measurement is performed: &lt; 0,0,0,0,0,0</p>
Function	Queries the Eye Margin measurement start time.
Example	<pre>&gt; :SENSe:MEASure:EMARgin:START? &lt; 2012,4,1,23,59,59</pre>
Compatibility	Compatible with the MP1632C.

## **:SENSe:MEASure:EMARgin:ELAPsed?**

---

Response	<p>&lt;day&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0 to 99                                    0 to 99 days</p> <p>&lt;hour&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0 to 23                                    0 to 23 hours</p> <p>&lt;minute&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0 to 59                                    0 to 59 minutes</p> <p>&lt;second&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0 to 59                                    0 to 59 seconds</p> <p><b>Note:</b> The following is output when no measurement is performed: &lt; 0,0,0,0</p>
Function	Queries the Eye Margin measurement elapsed time.
Example	<p>&gt; :SENSe:MEASure:EMARgin:ELAPsed?</p> <p>&lt; 99,23,59,59</p>
Compatibility	Compatible with the MP1632C.

**:CALCulate:DATA:EMARgin? <slot>,<interface>,<string>[,<unit>]**

Parameter	<p>&lt;slot&gt; = &lt;CHARACTER PROGRAM DATA&gt;  SLOT1 to SLOT6          Slots No. 1 to No. 6</p> <p>&lt;interface&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;  1 to 4                      Data No.1 to 4</p> <p>&lt;string&gt; = &lt;STRING PROGRAM DATA&gt;  See Table 7.12.9.1-2 for the &lt;string&gt; contents.</p> <p>[&lt;unit&gt;] = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;  1 to 4                      Mainframe Nos. 1 to 4</p> <p>When using two or more MT1810A units in serial connection, specify the mainframe number.</p> <p>Can be omitted. Mainframe No. 1 is specified when omitted.</p>
-----------	---

**Table 7.12.9.1-2 Eye Margin Measurement Items <string>**

Items	<string>	Response Format
Phase margin	"PHASe"	Form1
Threshold margin	"THReshold"	Form2
Period	"PERiod"	Form1

Response	<p>&lt;result&gt; = &lt;STRING RESPONSE DATA&gt;</p> <p>For the contents of the &lt;result&gt; measurement data, see Table 7.12.9.1-3.</p>
----------	--

**Table 7.12.9.1-3 Eye Margin Measurement Results <result>**

Form	Format	Description
Form1 Phase type	" XXXX"	For 0 to MAX (mUI/ps) Displays in the selected unit.
	"Failed"	For measurement failure
	"-----"	When no data corresponds to the query.
Form2 Threshold type	" XXXX"	0 to MAX (mVpp)
	"Failed"	For measurement failure
	"-----"	When no data corresponds to the query.

Function	Queries the Eye Margin measurement result of Slot 1, Data 2.
Example	<pre>&gt; :CALCulate:DATA:EMARgin? SLOT1,2, "THReshold" &lt; "      0"</pre>
Compatibility	Incompatible with existing models

## :CALCulate:DATA:EMARgin:STATus?

Response	<string> = <STRING RESPONSE DATA> "" When no alarm exists "Sync Loss" Sync. Loss "Clock Loss" Clock Loss "Out of range" Out of range "Illegal Error" Illegal Error "Meas. Threshold exceeded" Number of errors exceeds the target rate
	<b>Note:</b> When two or more alarms have occurred, they are displayed in the following order: Illegal Error > Clock Loss > Sync Loss > Out of range
Function	Queries the Eye Margin measurement status.
Example	> :CALCulate:DATA:EMARgin:STATus? < "Sync Loss"
Compatibility	Incompatible with existing models

## :SENSe:MEASure:EMARgin:MARGin:ASEarch:PAMSet <slot>,<interface>,<threshold>[,<unit>]

Parameter	<slot> = <CHARACTER PROGRAM DATA> SLOT1 to SLOT6 Slots No. 1 to No. 6 1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4 Data No.1 to 4 <threshold> = <CHARACTER PROGRAM DATA> TOP Searches the Top threshold MIDDLE Searches the Middle threshold BOTTOm Searches the Bottom threshold [<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4 Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number.
Function	Selects search target threshold for running PAM Auto Search in the Eye Margin measurement.
Example	To set Data 3 of Slot No.1 for Top threshold search. > :SENSe:MEASure:EMARgin:MARGin:ASEarch:PAMSet SLOT1,3, TOP
Compatibility	Incompatible with existing models

---

**:SENSe:MEASure:EMARgin:MARGin:ASEarch:PAMSet?  
<slot>,<interface>[,<unit>]**


---

Parameter	<slot> = <CHARACTER PROGRAM DATA> SLOT1 to SLOT6          Slots No. 1 to No. 6 1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Data No.1 to 4 [<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number. Can be omitted. Mainframe No. 1 is specified when omitted.
Response	<threshold> = <CHARACTER RESPONSE DATA> TOP,MIDD,BOTT
Function	Queries search target threshold for running PAM Auto Search in the Eye Margin measurement.
Example	To query the search target threshold of Data 3 of Slot No.1. > :SENSe:MEASure:EMARgin:MARGin:ASEarch:PAMSet? SLOT1,3 < 1
Compatibility	Incompatible with existing models

### 7.12.9.2 File menu setting commands

Table 7.12.9.2-1 File Menu Setting Commands

No.	Setting Items	Commands
[1]	Open	:SYSTem:MMEMory:MARGin:RECall
[2]	Save	:SYSTem:MMEMory:MARGin:STORe

#### **:SYSTem:MMEMory:MARGin:RECall <file\_name>**

---

Parameter	<file_name> = <STRING PROGRAM DATA> "<drv>:\[<dir>]<file>" <drv> = C,D,E,F <dir> = <dir1>\<dir2>\... (Omitted when root directory) <file> = File name
Function	Opens the Eye Margin measurement result data.
Example	> :SYSTem:MMEMory:MARGin:RECall "C:\Test\example"
Compatibility	Incompatible with existing models

#### **:SYSTem:MMEMory:MARGin:STORe <file\_name>,<file\_type>**

---

Parameter	<file_name> = <STRING PROGRAM DATA> "<drv>:\[<dir>]<file>" <drv> = C,D,E,F <dir> = <dir1>\<dir2>\... (Omitted when root directory) <file> = File name <file_type> = <CHARACTER PROGRAM DATA> BIN                      Binary file CSV                      CSV file TXT                      Text file
Function	Saves the Eye Margin measurement result data. <b>Note:</b> The settings will not be read from the saved file if the file name is changed.
Example	To save the Eye Margin measurement result data by specifying the save destination, file name, and file format: > :SYSTem:MMEMory:MARGin:STORe "C:\Test\example",TXT
Compatibility	Incompatible with existing models

### 7.12.10 Eye Diagram Measurement

This section describes the commands for Eye Diagram measurement. Commands are described for each tab.

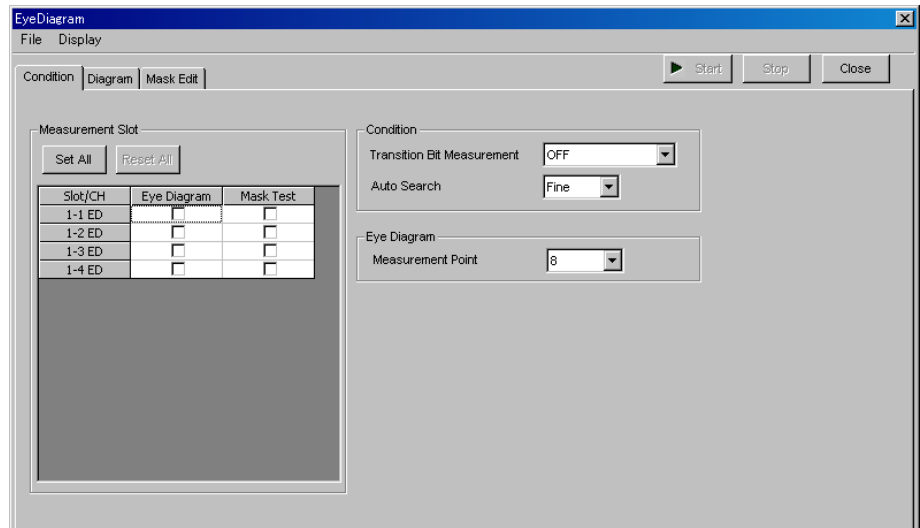


Figure 7.12.10-1 Eye Diagram Window

#### 7.12.10.1 Condition tab

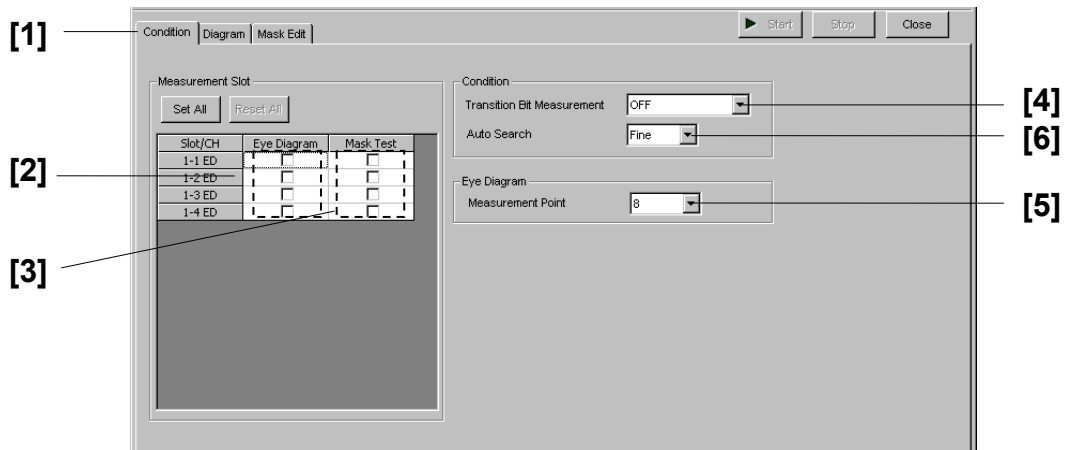


Figure 7.12.10.1-1 Condition Tab

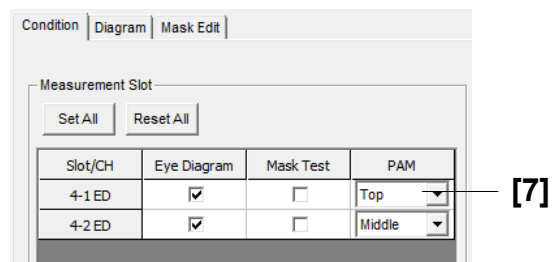


Figure 7.12.10.1-2 Condition Tab (PAM mode)

Table 7.12.10.1-1 Condition Tab Setting Commands

No.	Setting Items	Commands
[1]	Tab Selection	:DISPlay:RESult:EDIagram:TABSelect
		:DISPlay:RESult:EDIagram:TABSelect?
[2]	Slot Eye Diagram	:SENSE:MEASure:EDIagram:DIAGram:SLOT
		:SENSE:MEASure:EDIagram:DIAGram:SLOT?
[3]	Slot Mask Test	:SENSE:MEASure:EDIagram:MTESt:SLOT
		:SENSE:MEASure:EDIagram:MTESt:SLOT?
[4]	Transition Bit Measurement	:SENSE:MEASure:EDIagram:DIAGram:TRANsition
		:SENSE:MEASure:EDIagram:DIAGram:TRANsition?
[5]	Measurement Point	:SENSE:MEASure:EDIagram:DIAGram:TYPE
		:SENSE:MEASure:EDIagram:DIAGram:TYPE?
[6]	Auto Search	:SENSE:MEASure:EDIagram:DIAGram:ASEarch
		:SENSE:MEASure:EDIagram:DIAGram:ASEarch?
[7]	Selection of search target threshold (In PAM mode only)	:SENSE:MEASure:EDIagram:DIAGram:ASEarch:PAMSet
		:SENSE:MEASure:EDIagram:DIAGram:ASEarch:PAMSet?

### **:DISPlay:RESult:EDIagram:TABSelect <tab>**

Parameter	<tab> = <CHARACTER PROGRAM DATA> CONDition                      Condition tab DIAGram                         Diagram tab MASKedit                        Mask Edit tab
Function	Switches the Eye Diagram measurement tab display.
Example	To display the Eye Diagram measurement Condition tab: > :DISPlay:RESult:EDIagram:TABSelect CONDition
Compatibility	Incompatible with existing models

### **:DISPlay:RESult:EDIagram:TABSelect?**

Response	<tab> = <CHARACTER RESPONSE DATA> COND,DIAG,MASK
Function	Queries the Eye Diagram measurement tab display.
Example	> :DISPlay:RESult:EDIagram:TABSelect? < COND
Compatibility	Incompatible with existing models



---

**:SENSe:MEASure:EDIagram:DIAGram:SLOT  
<slot>,<interface>,<boolean>[,<unit>]**


---

Parameter	<slot> = <CHARACTER PROGRAM DATA> SLOT1 to SLOT6      Slots No. 1 to No. 6 1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Data No. 1 to 4 <boolean> = <BOOLEAN PROGRAM DATA> ON or 1                      Eye Diagram measurement ON OFF or 0                      Eye Diagram measurement OFF [<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number. Can be omitted. Mainframe No. 1 is specified when omitted.
Function	Selects the Eye Diagram measurement slot.
Example	To set Eye Diagram measurement Slot 1 to ON: > :SENSe:MEASure:EDIagram:DIAGram:SLOT SLOT1,2,ON
Compatibility	Incompatible with existing models

**:SENSe:MEASure:EDIagram:DIAGram:SLOT?  
<slot>,<interface>[,<unit>]**


---

Parameter	<slot> = <CHARACTER PROGRAM DATA> SLOT1 to SLOT6      Slots No. 1 to No. 6 1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Data No. 1 to 4 [<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number.
Response	<boolean> = <NR1 NUMERIC RESPONSE DATA> 1                              Eye Diagram measurement ON 0                              Eye Diagram measurement OFF
Function	Queries whether the specified slot is targeted for the Eye Diagram measurement.
Example	To query whether the Slot 1, Data 2 is targeted for the Eye Diagram measurement: > :SENSe:MEASure:EDIagram:DIAGram:SLOT? SLOT1,2 < 1
Compatibility	Incompatible with existing models

---

**:SENSe:MEASure:EDIagram:MTESt:SLOT  
<slot>,<interface>,<boolean>[,<unit>]**

---

Parameter	<slot> = <CHARACTER PROGRAM DATA> SLOT1 to SLOT6      Slots No. 1 to No. 6 1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Data No. 1 to 4 <boolean> = <BOOLEAN PROGRAM DATA> ON or 1                      Mask Test measurement ON OFF or 0                      Mask Test measurement OFF [<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number. Can be omitted. Mainframe No. 1 is specified when omitted.
Function	Selects the Mask Test measurement slot.
Example	To set Mask Test measurement Slot 1, Data 1 to be ON: > :SENSe:MEASure:EDIagram:MTESt:SLOT SLOT1,1,ON
Compatibility	Incompatible with existing models

**:SENSe:MEASure:EDIagram:MTESt:SLOT? <slot>,<interface>[,<unit>]**

---

Parameter	<slot> = <CHARACTER PROGRAM DATA> SLOT1 to SLOT6      Slots No. 1 to No. 6 1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Data No. 1 to 4 [<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number. Can be omitted. Mainframe No. 1 is specified when omitted.
Response	<boolean> = <NR1 NUMERIC RESPONSE DATA> 1                                  ON 0                                  OFF
Function	Queries whether the specified slot is targeted for the Mask Test measurement.
Example	To query whether the slot 1, Data 1 is targeted for the Mask Test measurement: > :SENSe:MEASure:EDIagram:MTESt:SLOT? SLOT1,1 < 1
Compatibility	Incompatible with existing models



**:SENSe:MEASure:EDIagram:DIAGram:ASEarch <setting>[,<mode>]**

Parameter	<setting> = <BOOLEAN PROGRAM DATA> ON or 1                    Auto Search ON OFF or 0                   Auto Search OFF <mode> = <DECIMAL NUMERIC PROGRAM DATA> 1                            Coarse 2                            Fine 3                            PAM Coarse 4                            PAM Fine
	<b>Note:</b> <mode> can be omitted. Coarse is specified when omitted.
Function	Selects whether to execute Auto Search when starting the Eye Diagram Measurement.
Example	To set Auto Search to On when starting the Eye Diagram Measurement. > :SENSe:MEASure:EDIagram:DIAGram:ASEarch ON,2
Compatibility	Incompatible with existing models

**:SENSe:MEASure:EDIagram:DIAGram:ASEarch?**

Response	<setting> = <NR1 NUMERIC RESPONSE DATA> 0                            OFF 1                            ON (Coarse) 2                            ON (Fine) 3                            ON (PAM Coarse) 4                            ON (PAM Fine)
Function	Queries whether to execute Auto Search when starting the Eye Diagram Measurement.
Example	> :SENSe:MEASure:EDIagram:DIAGram:ASEarch? < 2
Compatibility	Incompatible with existing models

---

**:SENSe:MEASure:EDIagram:DIAGram:ASEarch:PAMSet  
<slot>,<interface>,<threshold>[,<unit>]**


---

Parameter	<slot> = <CHARACTER PROGRAM DATA> SLOT1 to SLOT6      Slots No. 1 to No. 6 1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Data No.1 to 4 <threshold> = <CHARACTER PROGRAM DATA> TOP                      Searches the Top threshold MIDDLE                  Searches the Middle threshold BOTTom                  Searches the Bottom threshold 1 to 4                      Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number. Can be omitted. Mainframe No. 1 is specified when omitted.
Function	Selects search target threshold for running PAM Auto Search in the Eye Diagram measurement.
Example	To set Data 3 of Slot No.1 for Top threshold search. > :SENSe:MEASure:EDIagram:DIAGram:ASEarch:PAMSet SLOT1,3, TOP
Compatibility	Incompatible with existing models

**:SENSe:MEASure:EDIagram:DIAGram:ASEarch:PAMSet?  
<slot>,<interface>[,<unit>]**


---

Parameter	<slot> = <CHARACTER PROGRAM DATA> SLOT1 to SLOT6      Slots No. 1 to No. 6 1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Data No.1 to 4 [<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number. Can be omitted. Mainframe No. 1 is specified when omitted.
Response	<threshold> = < CHARACTER RESPONSE DATA> TOP,MIDD,BOTT
Function	Queries search target threshold for running PAM Auto Search in the Eye Diagram measurement.
Example	To query the search target threshold of Data 3 of Slot No.1. > :SENSe:MEASure:EDIagram:DIAGram:ASEarch:PAMSet? SLOT1,3 < 1
Compatibility	Incompatible with existing models

---

### 7.12.10.2 Diagram tab

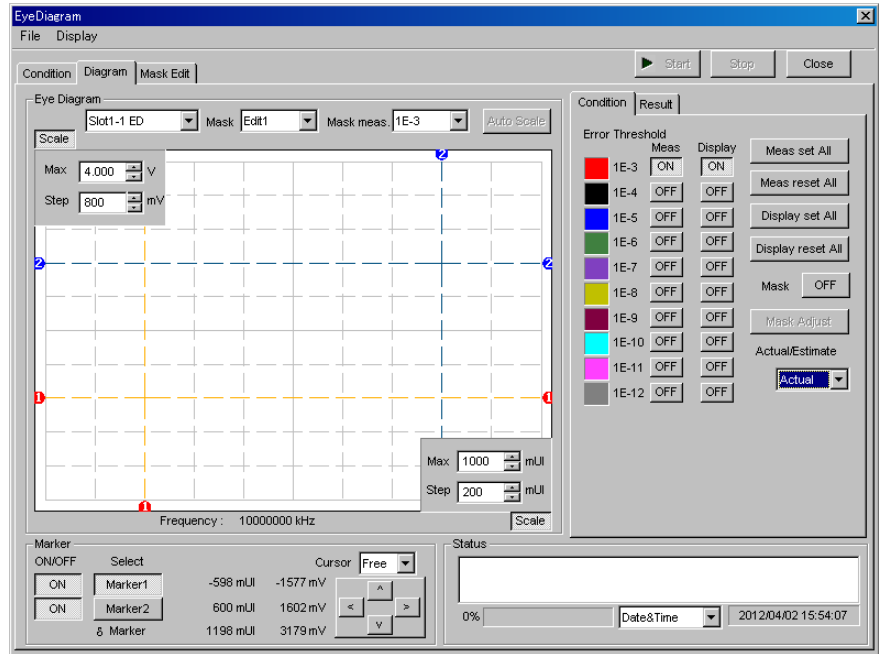


Figure 7.12.10.2-1 Diagram Tab

#### 7.12.10.2.1 Graph display setting commands

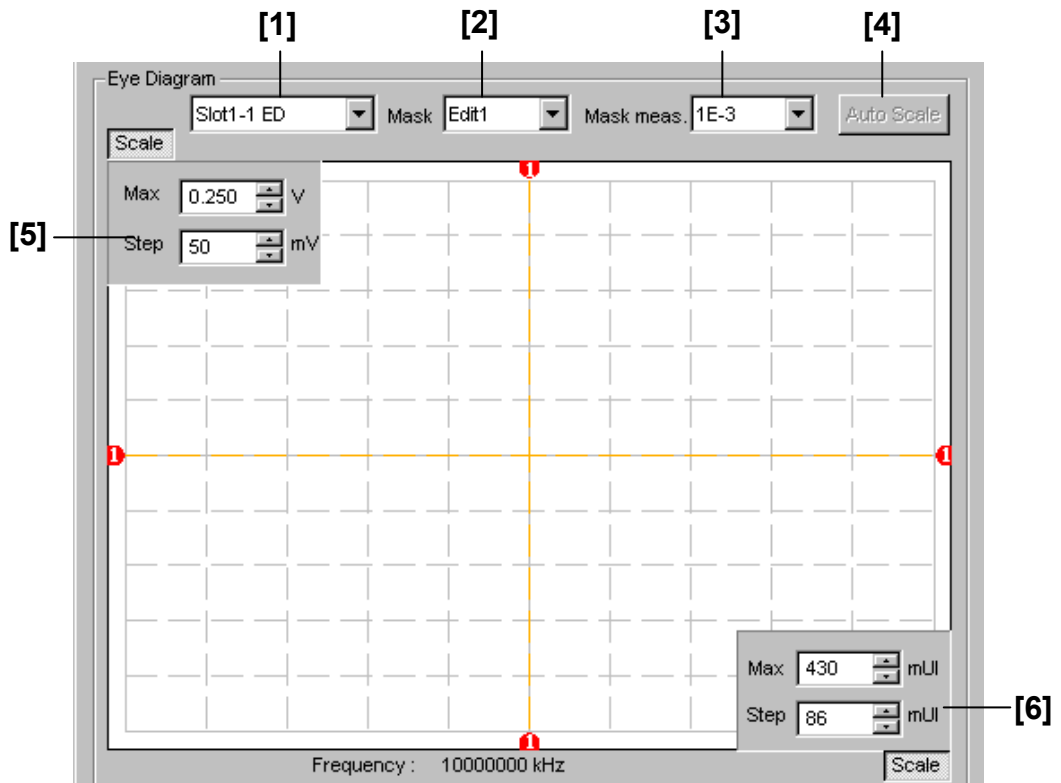


Figure 7.12.10.2.1-1 Graph Display Field

Table 7.12.10.2.1-1 Graph Display Setting Commands

No.	Setting Items	Commands
[1]	No label (Result display slot setting)	:DISPlay:RESult:EDIagram:SLOT
		:DISPlay:RESult:EDIagram:SLOT?
[2]	Mask	:DISPlay:RESult:EDIagram:TEMPlate:SElect
		:DISPlay:RESult:EDIagram:TEMPlate:SElect?
[3]	Mask meas.	:DISPlay:RESult:EDIagram:TEMPlate:THReshold
		:DISPlay:RESult:EDIagram:TEMPlate:THReshold?
[4]	Auto Scale	:DISPlay:RESult:EDIagram:SCALe:ASCale
[5]	Max/Step	:DISPlay:RESult:EDIagram:SCALe:VOLTage
		:DISPlay:RESult:EDIagram:SCALe:VOLTage?
[6]	Max/Step	:DISPlay:RESult:EDIagram:SCALe:PHASe
		:DISPlay:RESult:EDIagram:SCALe:PHASe?

### **:DISPlay:RESult:EDIagram:SLOT <slot>,<interface>[,<unit>]**

Parameter	<p>&lt;slot&gt; = &lt;CHARACTER PROGRAM DATA&gt;            SLOT1 to SLOT6          Slots No. 1 to No. 6            1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A</p> <p>&lt;interface&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;            1 to 4                      Data No. 1 to 4</p> <p>[&lt;unit&gt;] = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;            1 to 4                      Mainframe Nos. 1 to 4</p> <p>When using two or more MT1810A units in serial connection, specify the mainframe number.</p> <p>Can be omitted. Mainframe No. 1 is specified when omitted.</p>
Function	Selects the Eye Diagram result display target slot.
Example	To set the Eye Diagram result display target slot to slot No. 1, Data 1: > :DISPlay:RESult:EDIagram:SLOT SLOT1,1
Compatibility	Incompatible with existing models

### **:DISPlay:RESult:EDIagram:SLOT? [<unit>]**

Parameter	[<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number. Can be omitted. Mainframe No. 1 is specified when omitted.
Response	<slot> = <CHARACTER RESPONSE DATA> SLOT1 to SLOT6              Slots No. 1 to No. 6 <interface> = <NR1 NUMERIC PROGRAM DATA> 1 to 4                      Data No. 1 to 4
Function	Queries the Eye Diagram result display target slot.
Example	> :DISPlay:RESult:EDIagram:SLOT? < SLOT1,1
Compatibility	Incompatible with existing models

### **:DISPlay:RESult:EDIagram:TEMPLate:SElect <type>**

Parameter	<type> = <CHARACTER PROGRAM DATA> E1                      Edit1 E2                      Edit2 E3                      Edit3 E4                      Edit4
Function	Sets the mask pattern for performing the Eye Diagram mask test.
Example	To set the mask pattern for performing the Eye Diagram mask test to Edit2: > :DISPlay:RESult:EDIagram:TEMPLate:SElect E2
Compatibility	Incompatible with existing models

### **:DISPlay:RESult:EDIagram:TEMPLate:SElect?**

Response	<type> = <CHARACTER RESPONSE DATA> E1, E2, E3, E4
Function	Queries the mask pattern for performing the Eye Diagram mask test.
Example	> :DISPlay:RESult:EDIagram:TEMPLate:SElect? < E2
Compatibility	Incompatible with existing models



**:DISPlay:RESult:EDIagram:TEMPlate:THReshold <thre>**

Parameter	<thre> = <CHARACTER PROGRAM DATA> E_3 to E_12                    1E-3 to 1E-12 /1 Step
Function	Sets the Error Threshold for performing the Eye Diagram mask test.
Example	To set the Error Threshold for performing the Eye Diagram mask test to E-3: > :DISPlay:RESult:EDIagram:TEMPlate:THReshold E_3
Compatibility	Incompatible with existing models

**:DISPlay:RESult:EDIagram:TEMPlate:THReshold?**

Response	<thre> = <CHARACTER RESPONSE DATA>
Function	Queries the Error Threshold for performing the Eye Diagram mask test.
Example	> :DISPlay:RESult:EDIagram:TEMPlate:THReshold? < E_3
Compatibility	Incompatible with existing models

**:DISPlay:RESult:EDIagram:SCALe:AScale**

Function	Automatically adjusts the Eye Diagram measurement graph scale.
Example	> :DISPlay:RESult:EDIagram:SCALe:AScale
Compatibility	Incompatible with existing models

**:DISPlay:RESult:EDIagram:SCALe:VOLTage <max>,<step>**

Parameter	<max> = <DECIMAL NUMERIC PROGRAM DATA> -3.990 to 4.000                    -3.990 to 4.000 V, in 0.001 V steps <step> = <DECIMAL NUMERIC PROGRAM DATA> 0.001 to 0.800                    0.001 to 0.800 V, in 0.001 V steps The range varies depending on the option status and input interface setting.
Function	Sets the maximum value in the direction of the Threshold of the Eye Diagram graph, and the grid resolution.
Example	To set the maximum value in the direction of the Threshold of the Eye Diagram graph to 4.000 V, and the grid resolution to 0.800 V: > :DISPlay:RESult:EDIagram:SCALe:VOLTage 4.000,0.800
Compatibility	Incompatible with existing models

### **:DISPlay:RESult:EDIagram:SCALE:VOLTage?**

---

Response	<p>&lt;max&gt; = &lt;NR2 NUMERIC RESPONSE DATA&gt;                  -3.990 to 4.000                    -3.990 to 4.000 V                  &lt;step&gt; = &lt;NR2 NUMERIC RESPONSE DATA&gt;                  0.001 to 0.800                    0.001 to 0.800 V</p>
Function	Queries the maximum value in the direction of the Threshold of the Eye Diagram graph, and the grid resolution.
Example	<p>&gt; :DISPlay:RESult:EDIagram:SCALE:VOLTage?                  &lt; 4.000,0.800</p>
Compatibility	Incompatible with existing models

### **:DISPlay:RESult:EDIagram:SCALE:PHASe <max>,<step>**

---

Parameter	<p>&lt;max&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  -990 to 1000                    -990 to 1000 mUI, in 1-mUI steps                  &lt;step&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  1 to 200                    1 to 200 mUI, in 1-mUI steps</p>
Function	Sets the maximum value in the direction of the Phase of the Eye Diagram graph, and the grid resolution.
Example	<p>To set the maximum value in the direction of the Phase of the Eye Diagram graph to 1000, and the grid resolution to 10 mUI:                  &gt; :DISPlay:RESult:EDIagram:SCALE:PHASe 1000,10</p>
Compatibility	Incompatible with existing models

### **:DISPlay:RESult:EDIagram:SCALE:PHASe?**

---

Response	<p>&lt;max&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;                  &lt;step&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;</p>
Function	Queries the maximum value in the direction of the Phase of the Eye Diagram graph, and the grid resolution.
Example	<p>&gt; :DISPlay:RESult:EDIagram:SCALE:PHASe?                  &lt; 1000,10</p>
Compatibility	Incompatible with existing models

7.12.10.2.2 Condition setting commands

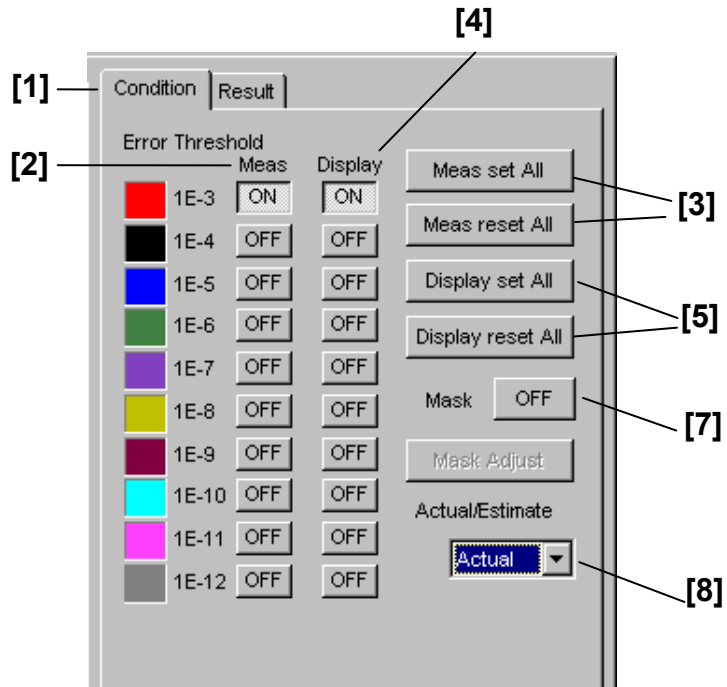


Figure 7.12.10.2.2-1 Condition Tab (Actual)

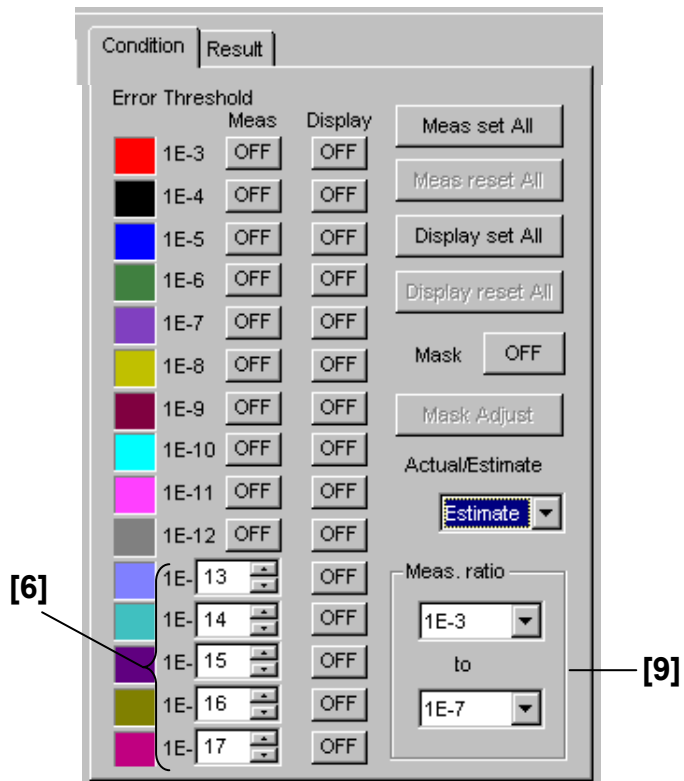


Figure 7.12.10.2.2-2 Condition Tab (Estimate)

Table 7.12.10.2.2-1 Condition Tab Setting Commands

No.	Setting Items	Commands
[1]	Condition Detail Result	:DISPlay:RESult:EDIagram:DIAGram:TABSelect
		:DISPlay:RESult:EDIagram:DIAGram:TABSelect?
[2]	Meas	:SENSe:MEASure:EDIagram:DIAGram:THReshold
		:SENSe:MEASure:EDIagram:DIAGram:THReshold?
[3]	Meas set All Meas reset All	:SENSe:MEASure:EDIagram:DIAGram:ATHReshold
[4]	Display	:DISPlay:RESult:EDIagram:ERATe
		:DISPlay:RESult:EDIagram:ERATe?
[5]	Display set All Display reset All	:DISPlay:RESult:EDIagram:AERate
[6]	Setting of error rate for Estimate measurement	DISPlay:RESult:EDIagram:EERate
		DISPlay:RESult:EDIagram:EERate?
[7]	Mask	:DISPlay:RESult:EDIagram:DISPlay:MASK
		:DISPlay:RESult:EDIagram:DISPlay:MASK?
[8]	Actual/Estimate	:DISPlay:RESult:EDIagram:ESTimate
		:DISPlay:RESult:EDIagram:ESTimate?
[9]	Meas.ratio	:SENSe:MEASure:EDIagram:DIAGram:BTHReshold
		:SENSe:MEASure:EDIagram:DIAGram:BTHReshold?
[10]	Query for measurement point	:SENSe:MEASure:EDIagram:DIAGram:POINT?
[11]	Query for measurement result	:CALCulate:DATA:DIAGram?

**:DISPlay:RESult:EDIagram:DIAGram:TABSelect <tab>**

Parameter	<tab> = <CHARACTER PROGRAM DATA> CONDition                      Condition tab RESult                              Result tab
Function	Switches the tab display within the Diagram tab.
Example	To display the Result tab within the Diagram tab: > :DISPlay:RESult:EDIagram:DIAGram:TABSelect RESult
Compatibility	Incompatible with existing models

**:DISPlay:RESult:EDIagram:DIAGram:TABSelect?**

Response	<tab> = <CHARACTER RESPONSE DATA> COND, RES
Function	Queries the tab selected in the Diagram tab.
Example	> :DISPlay:RESult:EDIagram:DIAGram:TABSelect? < COND
Compatibility	Incompatible with existing models

**:SENSe:MEASure:EDIagram:DIAGram:THReshold <thre>,<boolean>**

Parameter	<type> = <CHARACTER PROGRAM DATA> E_3 to E_12            1E-3 to 1E-12/1 Step <boolean> = <BOOLEAN PROGRAM DATA> ON or 1                Selects ON OFF or 0               Selects OFF
Function	Sets the Eye Diagram measurement target error rate.
Example	To set the Eye Diagram measurement target error rate to 1E-12: > :SENSe:MEASure:EDIagram:DIAGram:THReshold E_12,ON
Compatibility	Incompatible with existing models

**:SENSe:MEASure:EDIagram:DIAGram:THReshold?**

Response	<type> = <CHARACTER RESPONSE DATA> E_3 to E_12            1E-3 to 1E-12 NONE                    When all OFF The selected threshold is delimited with a comma (,) and returned.
Function	Queries the Eye Diagram measurement target error rate.
Example	> :SENSe:MEASure:EDIagram:DIAGram:THReshold? < E_3,E_10,E_12
Compatibility	Incompatible with existing models

**:SENSe:MEASure:EDIagram:DIAGram:ATHReshold <boolean>**

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> ON or 1                Sets all ON OFF or 0               Sets all OFF
Function	Sets all Eye Diagram measurement target error rates to be ON or OFF.
Example	To set all Eye Diagram measurement target error rates to be ON: > :SENSe:MEASure:EDIagram:DIAGram:ATHReshold ON
Compatibility	Incompatible with existing models

**:DISPlay:RESult:EDIagram:ERATe <thre>,<boolean>**

---

Parameter	<type> = <CHARACTER PROGRAM DATA> E_3 to E_17                    1E-3 to 1E-17/1 Step <boolean> = <BOOLEAN PROGRAM DATA> ON or 1                         Display select ON OFF or 0                        Display select OFF
Function	Sets the target error rate of the Eye Diagram measurement result display.
Example	To set the target error rate of the Eye Diagram measurement result display to 1E-12: > :DISPlay:RESult:EDIagram:ERATe E_12,1
Compatibility	Incompatible with existing models

**:DISPlay:RESult:EDIagram:ERATe?**

---

Response	<type> = <CHARACTER RESPONSE DATA> E_3 to E_17                    1E-3 to 1E-17 NONE                            When all OFF
Function	The selected threshold is delimited with a comma (,) and returned. Queries the target error rate of the Eye Diagram measurement result display.
Example	> :DISPlay:RESult:EDIagram:ERATe? < NONE
Compatibility	Incompatible with existing models

**:DISPlay:RESult:EDIagram:AERate <boolean>**

---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> ON or 1                         Sets all ON OFF or 0                        Sets all OFF
Function	Sets all target error rates of the Eye Diagram measurement result display to be ON or OFF.
Example	To set all target error rates of the Eye Diagram measurement result display to be ON: > :DISPlay:RESult:EDIagram:AERate 1
Compatibility	Incompatible with existing models

**:DISPlay:RESult:EDIagram:EERate <numeric>**

Parameter	<numeric> = <DECIMAL PROGRAM DATA> 13 to 199                      1E-13 to 1E-199/1 Step
Function	Up to five parameters can be set, delimited with a comma (.). Sets the result display error rate in Estimate measurement from E-13 to E-199.
Example	To display the result display error rate in Estimate measurement for 1E-15, 1E-100, 1E-150, 1E-199, and 1E-180: >:DISPlay:RESult:EDIagram:EERate 15,100,150,199,180
Compatibility	Incompatible with existing models

**:DISPlay:RESult:EDIagram:EERate?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 13 to 199                      1E-13 to 1E-199
Function	Returns five responses, delimited with a comma (.). Queries the result display error rate setting in Estimate measurement from E-13 to E-199.
Example	>:DISPlay:RESult:EDIagram:EERate? <15,100,150,199,180
Compatibility	Incompatible with existing models

**:DISPlay:RESult:EDIagram:DISPlay:MASK <boolean>**

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> ON or 1                      Display OFF or 0                      Clear
Function	Selects between displaying and clearing the mask test result during Eye Diagram measurement.
Example	To display the mask test result during Eye Diagram measurement: > :DISPlay:RESult:EDIagram:DISPlay:MASK ON
Compatibility	Incompatible with existing models

**:DISPlay:RESult:EDIagram:DISPlay:MASK?**

Response	<boolean> = <NR1 NUMERIC RESPONSE DATA> 1                                  Display 0                                  Clear
Function	Queries the setting whether to display or clear the mask test result during Eye.
Example	> :DISPlay:RESult:EDIagram:DISPlay:MASK? < 1
Compatibility	Incompatible with existing models

### **:DISPlay:RESult:EDIagram:ESTimate <type>**

---

Parameter	<type> = <CHARACTER PROGRAM DATA> ACTual                      Actual measurement ESTimate                    Estimate measurement <b>Note:</b> The Estimate measurement cannot be selected when the number of measurement points is set to 8.
Function	Selects between Actual and Estimate measurement during Eye Diagram measurement.
Example	To set Actual measurement during Eye Diagram measurement: > :DISPlay:RESult:EDIagram:ESTimate ACTual
Compatibility	Incompatible with existing models

### **:DISPlay:RESult:EDIagram:ESTimate?**

---

Response	<type> = <CHARACTER RESPONSE DATA> ACT                            Actual measurement EST                            Estimate measurement
Function	Queries the Actual/Estimate measurement state during Eye Diagram measurement.
Example	> :DISPlay:RESult:EDIagram:ESTimate? < ACT
Compatibility	Incompatible with existing models

### **:SENSe:MEASure:EDIagram:DIAGram:BTHReshold <upper>,<lower>**

---

Parameter	<upper> = <CHARACTER PROGRAM DATA> E_3 to E_7                    1E-3 to 1E-7/1 Step <lower> = <CHARACTER PROGRAM DATA> E_7 to E_12                   1E-7 to E-12/1 Step <b>Note:</b> The difference between the <upper> and <lower> value must be at least 3.
Function	Sets the reference error rate during Eye Diagram Estimate.
Example	To set the reference error rate during Eye Diagram Estimate to E-3 and E-12: > :SENSe:MEASure:EDIagram:DIAGram:BTHReshold E_3,E_12
Compatibility	Incompatible with existing models



**:SENSe:MEASure:EDIagram:DIAGram:BTHReshold?**

Response	<upper> = <CHARACTER RESPONSE DATA> E_3 to E_7                    1E-3 to 1E-7 <lower> = <CHARACTER RESPONSE DATA> E_7 to E_12                    1E-7 to E-12
Function	Queries the reference error rate during Eye Diagram Estimate.
Example	> :SENSe:MEASure:EDIagram:DIAGram:BTHReshold? < E_3,E_12
Compatibility	Incompatible with existing models

**:SENSe:MEASure:EDIagram:DIAGram:POINT?  
<slot>,<interface>,<thre>[,<unit>]**

Parameter	<slot> = <CHARACTER PROGRAM DATA> SLOT1 to SLOT6            Slots No. 1 to No. 6 <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Data1 to 4 <thre> = <CHARACTER PROGRAM DATA> E_3 to E_12                1E-3 to 1E-12 [<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number. Can be omitted. Mainframe No. 1 is specified when omitted.
Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1 to 128                    Returns a valid point. 0                            Returns 0 when all points are invalid.
Function	Multiple valid points are delimited with a comma (,) and returned Queries the valid points in each threshold during the Eye Diagram measurement for a specific slot.
Example	To query the valid points in slot No. 1 during measurement with threshold E-3: > :SENSe:MEASure:EDIagram:DIAGram:POINT? SLOT1,1,E_3 < 1,2,3,4,128
Compatibility	Incompatible with existing models

**:CALCulate:DATA:DIAGram? <slot>,<interface>,<string>[,<unit>]**

Parameter <slot> = <CHARACTER PROGRAM DATA>  
 SLOT1 to SLOT6 Slots No. 1 to No. 6  
 <interface> = <DECIMAL NUMERIC PROGRAM DATA>  
 1 to 4 Data1 to 4  
 <string> = <STRING PROGRAM DATA>  
 <string> Measurement data  
 See Table 7.12.10.2.2-2 for the <string> contents.

**Table 7.12.10.2.2-2 Eye Diagram Measurement Item<string>**

Item		<string>
Eye	1E-3	"MAP:E_3:POINT1",...,"MAP:E_3:POINT128"
Map type	1E-4	"MAP:E_4:POINT1",...,"MAP:E_4:POINT128"
	1E-11	"MAP:E_11:POINT1",...,"MAP:E_11:POINT128"
	1E-12	"MAP:E_12:POINT1",...,"MAP:E_12:POINT128"

[<unit>] = <DECIMAL NUMERIC PROGRAM DATA>

1 to 4 Mainframe Nos. 1 to 4

When using two or more MT1810A units in serial connection, specify the mainframe number.

Can be omitted. Mainframe No. 1 is specified when omitted.

Response <result> = <STRING RESPONSE DATA>

**Table 7.12.10.2.2-3 Response Format**

Type	Format	Description
Form1 Eye Map type	"XXXXX,YYYYY"	XXXXX: Phase (mUI) XXXXX: Phase (ps) (Displays in the selected unit.) YYYYY: Threshold (mV)
	"-----,-----"	When no data corresponds to the query.

Function Queries the Eye Diagram measurement result of a specific slot and point.  
 Example To query the Eye Diagram measurement result at slot No. 1, Data 2, E-3, point 1:

```
>:CALCulate:DATA:DIAGram? SLOT1,2,"MAP:E_3:POINT1"  

<" 100, 1000"
```

Compatibility Incompatible with existing models

7.12.10.2.3 Result query command

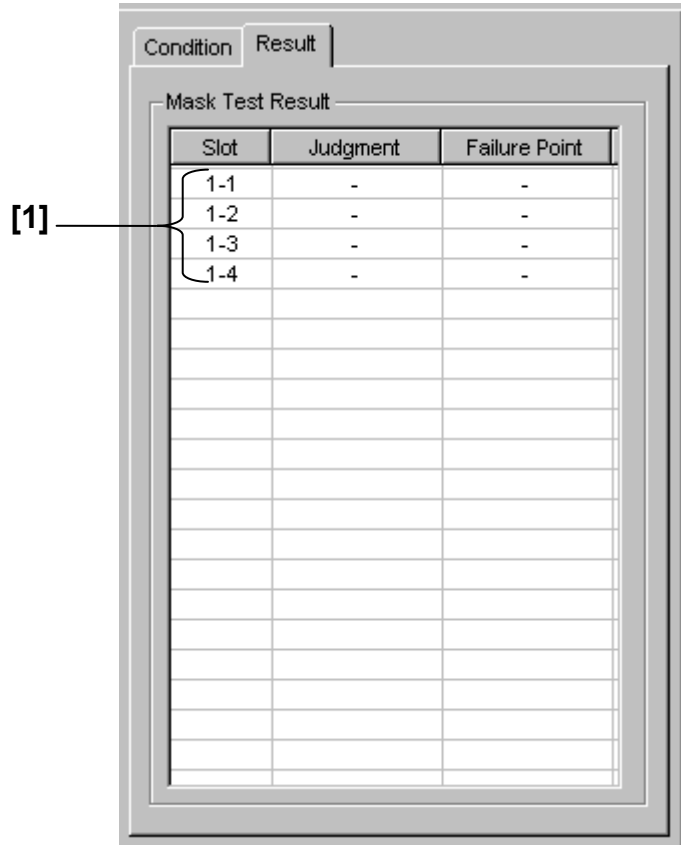


Figure 7.12.10.2.3-1 Result Tab

Table 7.12.10.2.3-1 Result Query Command

No.	Setting Item	Command
[1]	Query for Mask Test result	:CALCulate:DATA:EDIagram:MASK?

**:CALCulate:DATA:EDIagram:MASK? <slot>,<interface>[,<unit>]**

Parameter <slot> = <CHARACTER PROGRAM DATA>  
 SLOT1 to SLOT6 Slots No. 1 to No. 6  
 <interface> = <DECIMAL NUMERIC PROGRAM DATA>  
 1 to 4 Data1 to 4  
 [<unit>] = <DECIMAL NUMERIC PROGRAM DATA>  
 1 to 4 Mainframe Nos. 1 to 4  
 When using two or more MT1810A units in serial connection, specify the mainframe number.  
 Can be omitted. Mainframe No. 1 is specified when omitted.

Response <string> = <STRING RESPONSE DATA>

**Table 7.12.10.2.3-2 Response Format**

Type	Format	Description
Form1 EyeResult type	"XX,Y,Y,Y...Y"	XX: Pass,Failure Y: 1 to 32 (Failure mask point) <b>Note:</b> Multiple NGs are delimited with a comma (,) and returned for the corresponding number of NGs.
	"--,--"	When no data corresponds to the query.

Function Queries the measurement result of the Eye Diagram Mask Test.

Example To query the Mask Test result of Mainframe No.3 Slot1 Data 1:  
 >:CALCulate:DATA:EDIagram:MASK? SLOT1,1,3  
 <"Failure,1,2,3,4,32"  
 <"Pass"

Compatibility Incompatible with existing models (Parameter varies by model.)

7.12.10.2.4 Diagram tab (Status) setting commands

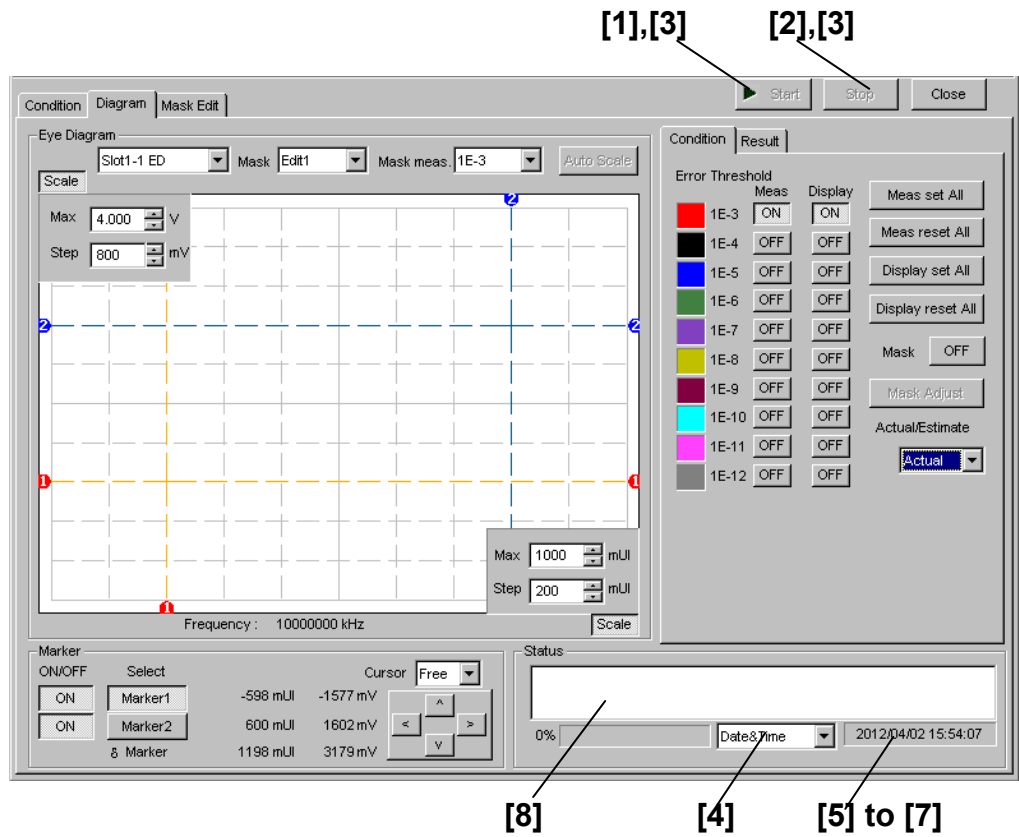


Figure 7.12.10.2.4-1 Diagram Tab, Start and Stop Buttons, and Status Field

Table 7.12.10.2.4-1 Diagram Tab (Status) Setting Commands

No.	Setting Items	Commands
[1]	Start	:SENSE:MEASURE:EDIagram:DIAGram:START
[2]	Stop	:SENSE:MEASURE:EDIagram:DIAGram:STOP
[3]	Query for measurement state	:SENSE:MEASURE:EDIagram:STATE?
[4]	No label (Setting of time display)	:SENSE:MEASURE:EDIagram:TIME :SENSE:MEASURE:EDIagram:TIME?
[5]	Query for current time	:SENSE:MEASURE:EDIagram:DTIME?
[6]	Query for measurement start time	:SENSE:MEASURE:EDIagram:START?
[7]	Query for measurement elapsed time	:SENSE:MEASURE:EDIagram:ELAPsed?
[8]	Query for measurement status	:CALCulate:DATA:EDIagram:STATUS?

### **:SENSe:MEASure:EDIagram:DIAGram:START**

---

Function	Starts the Eye Diagram measurement.
Example	> :SENSe:MEASure:EDIagram:DIAGram:START
Compatibility	Incompatible with existing models

### **:SENSe:MEASure:EDIagram:DIAGram:STOP**

---

Function	Stops the Eye Diagram measurement.
Example	> :SENSe:MEASure:EDIagram:DIAGram:STOP
Compatibility	Incompatible with existing models

### **:SENSe:MEASure:EDIagram:STATe?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	1 Measurement has been started.
	0 Measurement has been stopped.
	-1 Measurement has failed.
Function	Queries the Eye Diagram measurement status.
Example	> :SENSe:MEASure:EDIagram:STATe? < 1
Compatibility	Incompatible with existing models

### **:SENSe:MEASure:EDIagram:TIME <type>**

---

Parameter	<type> = <CHARACTER PROGRAM DATA>
	DTIME Displays the current date and time.
	START Displays the measurement start time.
	ELAPsed Displays the elapsed time based on the measurement period.
Function	Selects the Eye Diagram measurement time display type.
Example	To set the Eye Diagram measurement time display type to measurement start time (Start Time): > :SENSe:MEASure:EDIagram:TIME START
Compatibility	Incompatible with existing models



### **:SENSe:MEASure:EDiagram:START?**

---

Response	<p>&lt;year&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;                  0,2000 to 2036            2000 to 2036 year                  &lt;month&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;                  0,1 to 12                    January to December                  &lt;day&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;                  0,1 to 31                    1st to 31st                  &lt;hour&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;                  0 to 23                      0 to 23 hours                  &lt;minute&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;                  0 to 59                      0 to 59 minutes                  &lt;second&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;                  0 to 59                      0 to 59 seconds</p> <p><b>Note:</b>                  The following is output when no measurement is performed:                  &lt; 0,0,0,0,0,0</p>
Function	Queries the Eye Diagram measurement start time (Start Time).
Example	<p>&gt; :SENSe:MEASure:EDiagram:START?</p> <p>&lt; 2012,4,1,23,59,59</p>
Compatibility	Incompatible with existing models

### **:SENSe:MEASure:EDiagram:ELAPsed?**

---

Response	<p>&lt;day&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;                  0,1 to 99                    1 to 99 days                  &lt;hour&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;                  0 to 23                      0 to 23 hours                  &lt;minute&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;                  0 to 59                      0 to 59 minutes                  &lt;second&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;                  0 to 59                      0 to 59 seconds</p> <p><b>Note:</b>                  The following is output when no measurement is performed:                  0,0,0,0</p>
Function	Queries the Eye Diagram measurement elapsed time (Elapsed Time).
Example	<p>&gt; :SENSe:MEASure:EDiagram:ELAPsed?</p> <p>&lt; 99,23,59,59</p>
Compatibility	Incompatible with existing models



**:CALCulate:DATA:EDIagram:STATus?**

Response	<string> = <STRING RESPONSE DATA>
	" " When no alarm exists
	"Sync Loss" Sync Loss
	"Clock Loss" Clock Loss
	"Out of range" Out of range
	"Illegal Error" Illegal Error
	"Meas. Threshold exceeded" Number of errors exceeds the target rate
	<b>Note:</b>
	When two or more alarms have occurred, they are displayed in the following order:
	Illegal Error > Clock Loss > Sync Loss > Out of range
Function	Queries the status condition during Eye Diagram measurement.
Example	> :CALCulate:DATA:EDIagram:STATus? < "Sync Loss"
Compatibility	Incompatible with existing models

7.12.10.2.5 Mask Edit tab setting commands

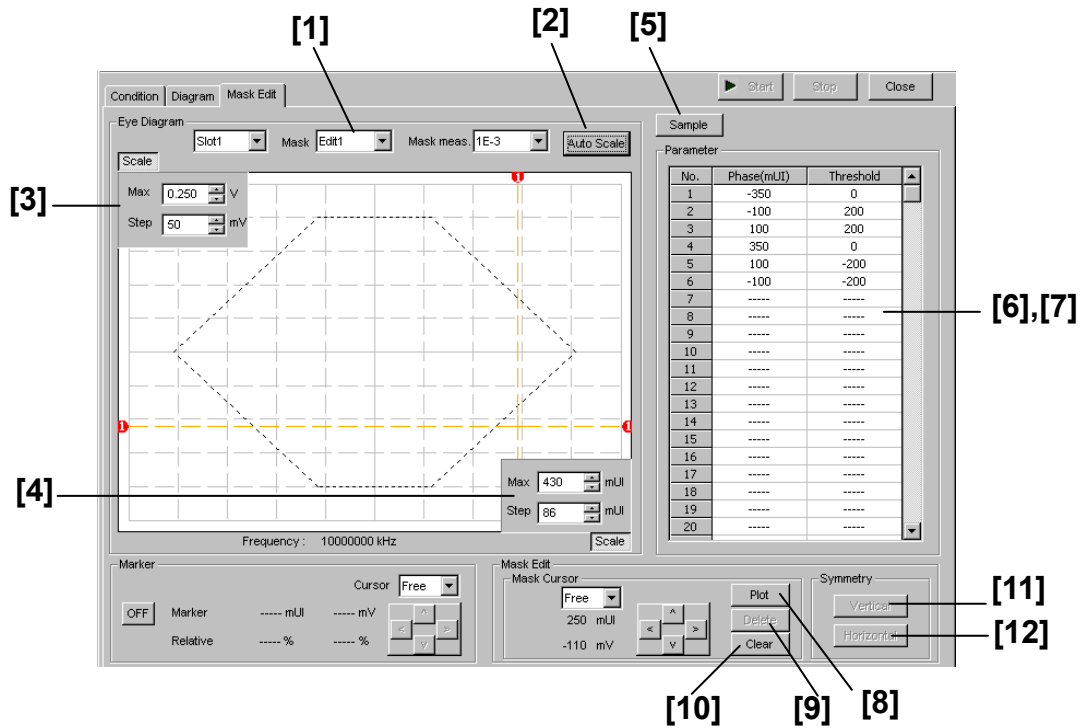


Figure 7.12.10.2.5-1 Mask Edit Tab

Table 7.12.10.2.5-1 Mask Edit Tab Setting Commands

No.	Setting Items	Commands
[1]	Mask	:DISPlay:RESult:EDIagram:TEMPlate:PATtern :DISPlay:RESult:EDIagram:TEMPlate:PATtern?
[2]	Auto Scale	:DISPlay:RESult:EDIagram:TEMPlate:ASCale
[3]	Max Step	:DISPlay:RESult:EDIagram:TEMPlate:SCALe :DISPlay:RESult:EDIagram:TEMPlate:SCALe?
[4]	Max Step	:DISPlay:RESult:EDIagram:TEMPlate:PSCALe :DISPlay:RESult:EDIagram:TEMPlate:PSCALe?
[5]	Sample	:DISPlay:RESult:EDIagram:TEMPlate:SAMPle
[6]	Query for mask point count	:DISPlay:RESult:EDIagram:TEMPlate:PNUMber?
[7]	Phase(mUI) Threshold	:DISPlay:RESult:EDIagram:TEMPlate:EDIT :DISPlay:RESult:EDIagram:TEMPlate:EDIT?
[8]	Plot	:DISPlay:RESult:EDIagram:TEMPlate:PLOT
[9]	Delete	:DISPlay:RESult:EDIagram:TEMPlate:DELeTe
[10]	Clear	:DISPlay:RESult:EDIagram:TEMPlate:CLEAr
[11]	Vertical	:DISPlay:RESult:EDIagram:TEMPlate:VERTical
[12]	Horizontal	:DISPlay:RESult:EDIagram:TEMPlate:HORIZontal

**:DISPlay:RESult:EDIagram:TEMPlate:PATtern <type>**

Parameter	<type> = <CHARACTER PROGRAM DATA> E1 Edit1 E2 Edit2 E3 Edit3 E4 Edit4
Function	Sets the pattern to be edited during Eye Diagram measurement.
Example	To set the pattern to be edited during Eye Diagram measurement to Edit4: > :DISPlay:RESult:EDIagram:TEMPlate:PATtern E4
Compatibility	Incompatible with existing models

**:DISPlay:RESult:EDIagram:TEMPlate:PATtern?**

Response	<type> = <CHARACTER RESPONSE DATA> E1,E2,E3,E4
Function	Queries the pattern that was edited during Eye Diagram measurement.
Example	> :DISPlay:RESult:EDIagram:TEMPlate:PATtern? < E4
Compatibility	Incompatible with existing models

**:DISPlay:RESult:EDIagram:TEMPlate:ASCale**

Function	Executes automatic adjustment of the Mask Edit measurement graph scale.
Example	> :DISPlay:RESult:EDIagram:TEMPlate:ASCale
Compatibility	Incompatible with existing models

**:DISPlay:RESult:EDIagram:TEMPlate:SCALE <max>,<step>**

Parameter	<max> = <DECIMAL NUMERIC PROGRAM DATA> -3.990 to 4.000      -3.990 to 4.000 V/0.001 V Step <step> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 800      1 to 800 mV/1 mV Step
Function	Sets the maximum value and the grid resolution in the direction of the Threshold of the Mask Edit graph.
Example	To set the maximum value and the grid resolution in the direction of the Threshold of the Mask Edit graph to 4.000 V and 800 mV, respectively: >:DISPlay:RESult:EDIagram:TEMPlate:SCALE 4.000,800
Compatibility	Incompatible with existing models

### **:DISPlay:RESult:EDIagram:TEMPlate:SCALE?**

Response	<max> = <NR2 NUMERIC RESPONSE DATA> <step> = <NR2 NUMERIC RESPONSE DATA>
Function	Queries the maximum value and the grid resolution in the direction of the Threshold of the Mask Edit graph.
Example	> :DISPlay:RESult:EDIagram:TEMPlate:SCALE? < 4000,800
Compatibility	Incompatible with existing models

### **:DISPlay:RESult:EDIagram:TEMPlate:PSCale <max>,<step>**

Parameter	<max> = <DECIMAL NUMERIC PROGRAM DATA> -990 to 1000                      -990 to 1000 mUI/1 mUI Step <step> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 200                              1 to 200 mUI/1 mUI Step
Function	Sets the maximum value and the grid resolution in the direction of the Phase of the Mask Edit graph.
Example	To set the maximum value and the grid resolution in the direction of the Phase of the Mask Edit graph to 1000 and 10 mUI, respectively: > :DISPlay:RESult:EDIagram:TEMPlate:PSCale 1000,10
Compatibility	Incompatible with existing models

### **:DISPlay:RESult:EDIagram:TEMPlate:PSCale?**

Response	<max> = <NR2 NUMERIC RESPONSE DATA> <step> = <NR2 NUMERIC RESPONSE DATA>
Function	Queries the maximum value and the grid resolution in the direction of the Phase of the Mask Edit graph.
Example	> :DISPlay:RESult:EDIagram:TEMPlate:PSCale? < 1000,10
Compatibility	Incompatible with existing models

### **:DISPlay:RESult:EDIagram:TEMPlate:SAMPLE <string>**

Parameter	<string> = <STRING PROGRAM DATA> "<drv>:\[<dir>]<file>" <drv> = C,D,E,F <dir> = <dir1>\<dir2>\...(Omitted when root directory) <file> = File name
Function	Expands the selected sample pattern to the Edit Pattern.
Example	> :DISPlay:RESult:EDIagram:TEMPlate:SAMPLE "C:\Test\sample.MSK"
Compatibility	Incompatible with existing models

**:DISPlay:RESult:EDIagram:TEMPlate:PNUMber?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 to 32                      0 to 32 points
Function	Queries the number of Mask points.
Example	> :DISPlay:RESult:EDIagram:TEMPlate:PNUMber? < 0
Compatibility	Incompatible with existing models

**:DISPlay:RESult:EDIagram:TEMPlate:EDIT <point>,<phase>,<voltage>**

Parameter	<point> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 32                      1 to 32 points, in 1-point steps <phase> = <DECIMAL NUMERIC PROGRAM DATA> -1000 to 1000              -1000 to 1000 mUI/1 mUI Step <voltage> = <DECIMAL NUMERIC PROGRAM DATA> -4.000 to 4.000            -4.000 to 4.000 V/0.001 V Step
Function	Sets a Mask point position.
Example	To set a Mask point position (1 point, 1000 mUI, 4.000 V): > :DISPlay:RESult:EDIagram:TEMPlate:EDIT 1,1000,4.000
Compatibility	Incompatible with existing models

**:DISPlay:RESult:EDIagram:TEMPlate:EDIT? <point>**

Parameter	<point> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 32                      1 to 32 points
Response	<phase> = <NR1 NUMERIC RESPONSE DATA> <voltage> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries a Mask point position.
Example	To query the position of point 1: > :DISPlay:RESult:EDIagram:TEMPlate:EDIT? 1 < 1000,4.000
Compatibility	Incompatible with existing models

**:DISPlay:RESult:EDIagram:TEMPlate:PLOT <phase>,<voltage>**

Parameter	<phase> = <DECIMAL NUMERIC PROGRAM DATA> -1000 to 1000              -1000 to 1000 mUI/1 mUI Step <voltage> = <DECIMAL NUMERIC PROGRAM DATA> -4000 to 4000              -4000 to 4000 mV/1 mV Step
Function	Sets a Mask point position.
Example	To set a Mask point position to 1000 mUI (phase), 4000 mV (voltage): > :DISPlay:RESult:EDIagram:TEMPlate:PLOT 1000,4000
Compatibility	Incompatible with existing models

### **:DISPlay:RESult:EDIagram:TEMPlate:DELeTe <pos>**

---

Parameter	<pos> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 32                      1 to 32 points, in 1-point steps
Function	Deletes the selected Mask point.
Example	To delete Mask point 3: > :DISPlay:RESult:EDIagram:TEMPlate:DELeTe 3
Compatibility	Incompatible with existing models

### **:DISPlay:RESult:EDIagram:TEMPlate:CLEar**

---

Function	Clears the selected Mask pattern.
Example	> :DISPlay:RESult:EDIagram:TEMPlate:CLEar
Compatibility	Incompatible with existing models

### **:DISPlay:RESult:EDIagram:TEMPlate:VERTical**

---

Function	Plots a Mask pattern onto the vertically-symmetric position.
Example	> :DISPlay:RESult:EDIagram:TEMPlate:VERTical
Compatibility	Incompatible with existing models

### **:DISPlay:RESult:EDIagram:TEMPlate:HORizontal**

---

Function	Plots a Mask pattern onto the horizontally-symmetric position.
Example	> :DISPlay:RESult:EDIagram:TEMPlate:HORizontal
Compatibility	Incompatible with existing models

## 7.12.10.2.6 File menu setting commands

Table 7.12.10.2.6-1 File Menu Setting Commands

No.	Setting Items	Commands
[1]	Open	:SYSTem:MMEMory:DIAGram:RECall
[2]	Save	:SYSTem:MMEMory:DIAGram:STORe

**:SYSTem:MMEMory:DIAGram:RECall <file\_name>,<file\_type>**

Parameter	<file_name> = <STRING PROGRAM DATA> "<drv>:\[<dir>]<file>" <drv> = C,D,E,F <dir> = <dir1>\<dir2>\...(Omitted when root directory) <file> = File name <file_type> = <CHARACTER PROGRAM DATA> BIN                      Binary file TXT                      Text(UMP) file
Function	Opens the Eye Diagram measurement result data.
Example	> :SYSTem:MMEMory:DIAGram:RECall "C:\Test\example",TXT
Compatibility	Incompatible with existing models

**:SYSTem:MMEMory:DIAGram:STORe  
<file\_name>,<data\_type>,<file\_type>**

---

Parameter	<p>&lt;file_name&gt; = &lt;STRING PROGRAM DATA&gt;                  "&lt;drv&gt;:\[&lt;dir&gt;]&lt;file&gt;"                  &lt;drv&gt; = C,D,E,F                  &lt;dir&gt; = &lt;dir1&gt;\&lt;dir2&gt;\...(Omitted when root directory)                  &lt;file&gt; = File name                  &lt;data_type&gt; = &lt;CHARACTER PROGRAM DATA&gt;                  EDG                      Eye Diagram Result                  UMP                      Eye Mask Template File                  &lt;file_type&gt; = &lt;CHARACTER PROGRAM DATA&gt;                  BIN                      Binary file                  CSV                      CSV file                  TXT                      Text file</p> <p>When BIN is selected for &lt;file_type&gt;, the Eye Diagram measurement settings and results are saved, regardless of the setting of &lt;data_type&gt;. When UMP is selected for &lt;data_type&gt;, select TXT for &lt;file_type&gt;.</p>
Function	<p>Saves the Eye Diagram measurement result data.</p> <p><b>Note:</b></p> <p style="padding-left: 40px;">The settings will not be read from the saved file if the file name is changed.</p>
Example	<p>To save the Eye Mask Detail measurement results of the Eye Diagram measurement, by specifying the file format, file name, and save destination:</p> <pre>&gt; :SYSTem:MMEMory:DIAGram:STORe "C:\Test\example",EDG,TXT</pre>
Compatibility	<p>Incompatible with existing models</p>



### 7.12.11 Bathtub measurement

This section describes the commands for Bathtub measurement.

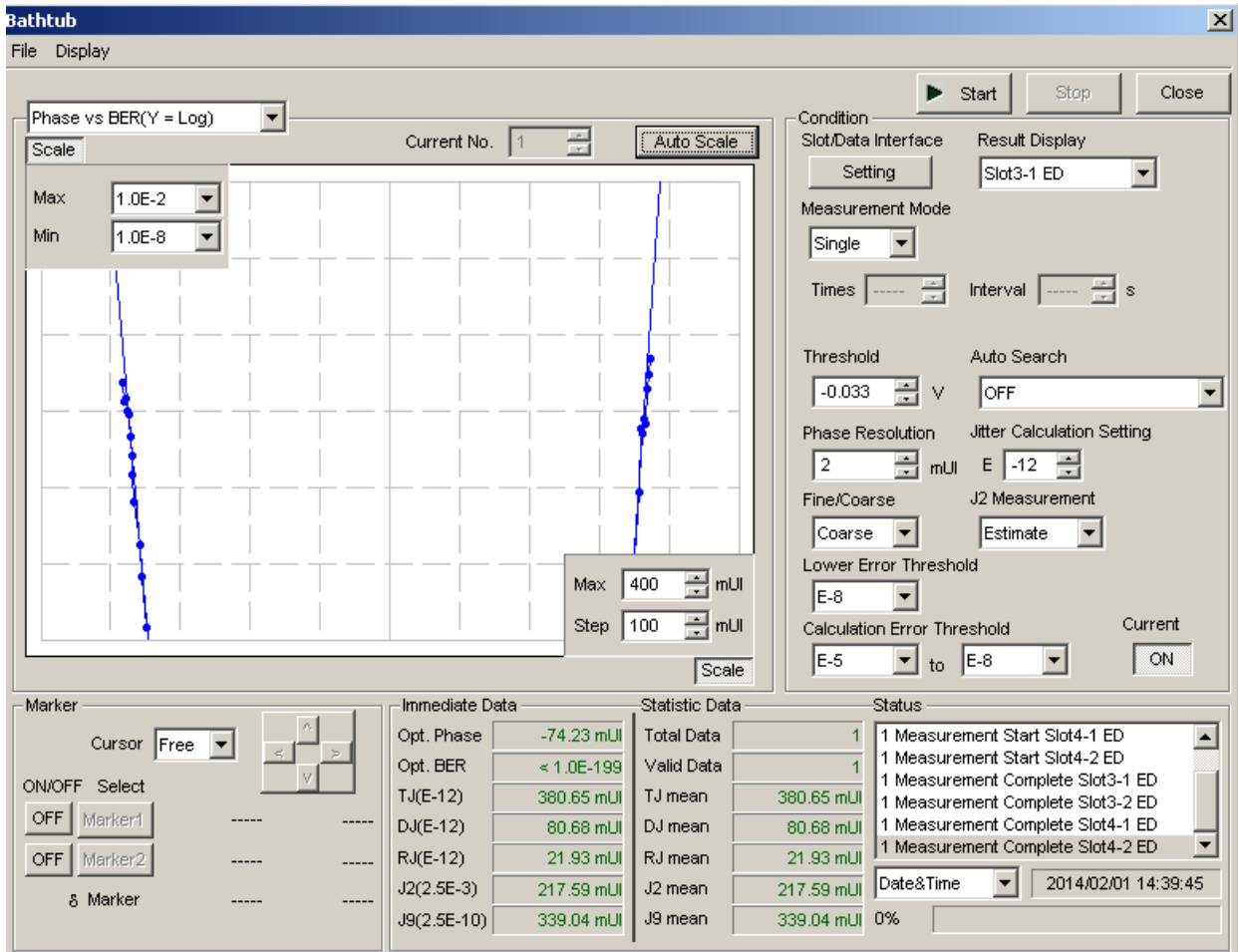


Figure 7.12.11-1 Bathtub Window

7.12.11.1 Measurement setting commands

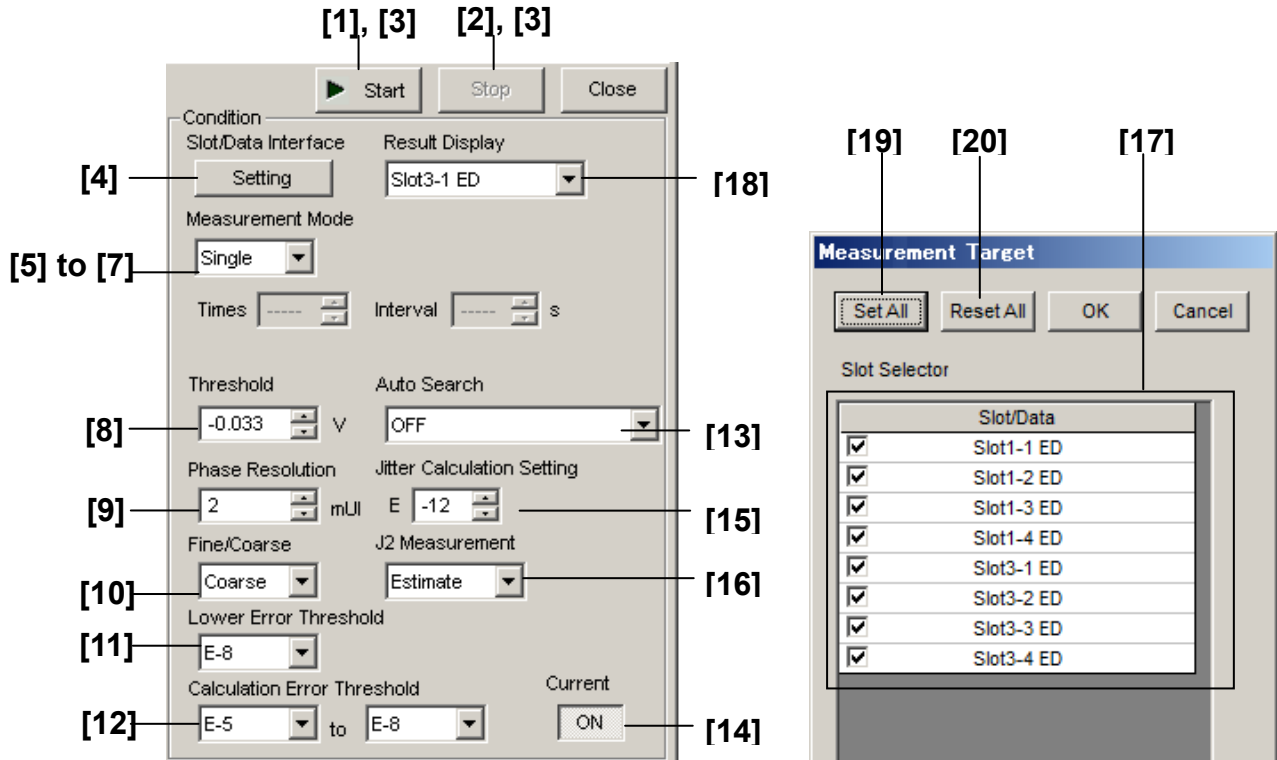


Figure 7.12.11.1-1 Condition Field

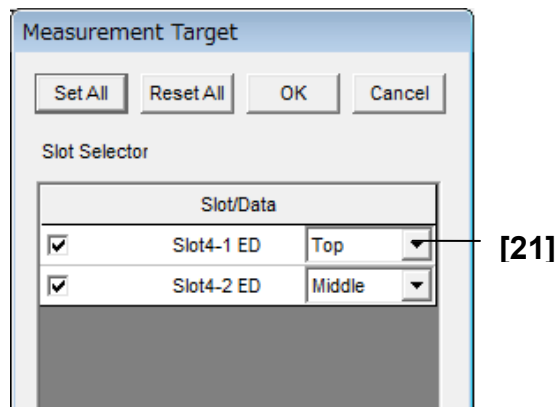


Figure 7.12.11.1-2 Measurement Target dialog box (PAM mode)

Table 7.12.11.1-1 Measurement Setting Commands

No.	Setting Items	Commands
[1]	Start	:SENSE:MEASure:BATHtub:START
[2]	Stop	:SENSE:MEASure:BATHtub:STOP
[3]	Measurement status query	:SENSE:MEASure:BATHtub:STATe?
[4]	Slot	:SENSE:MEASure:BATHtub:SLOT
		:SENSE:MEASure:BATHtub:SLOT?
[5]	Measurement Mode	:SENSE:MEASure:BATHtub:MODE
		:SENSE:MEASure:BATHtub:MODE?
[6]	Time	:SENSE:MEASure:BATHtub:TIMes
		:SENSE:MEASure:BATHtub:TIMes?
[7]	Interval	:SENSE:MEASure:BATHtub:INTerval
		:SENSE:MEASure:BATHtub:INTerval?
[8]	Threshold	:SENSE:MEASure:BATHtub:DATA
		:SENSE:MEASure:BATHtub:DATA?
[9]	Phase Resolution	:SENSE:MEASure:BATHtub:REsolution:MUI
		:SENSE:MEASure:BATHtub:REsolution:MUI?
[10]	Fine/Coarse	:SENSE:MEASure:BATHtub:ECOUNT
		:SENSE:MEASure:BATHtub:ECOUNT?
[11]	Lower Error Threshold	:SENSE:MEASure:BATHtub:RANGe
		:SENSE:MEASure:BATHtub:RANGe?
[12]	Calculation Error Threshold	:SENSE:MEASure:BATHtub:CALRange
		:SENSE:MEASure:BATHtub:CALRange?
[13]	Auto Search	:SENSE:MEASure:BATHtub:ASEarch
		:SENSE:MEASure:BATHtub:ASEarch?
[14]	Current	:SENSE:MEASure:BATHtub:CURRent
		:SENSE:MEASure:BATHtub:CURRent?
[15]	Jitter Calculation Setting	:SENSE:MEASure:BATHtub:JCALculation
		:SENSE:MEASure:BATHtub:JCALculation?
[16]	J2 Measurement	:SENSE:MEASure:BATHtub:J2Meas
		:SENSE:MEASure:BATHtub:J2Meas?
[17]	Selection of Slot(s) to be measured	:SENSE:MEASure:BATHtub:SELSlot
		:SENSE:MEASure:BATHtub:SELSlot?
[18]	Selection of Slot(s) you want to view measurement results	:SENSE:MEASure:BATHtub:DISPlay
[19]	Set All	:SENSE:MEASure:BATHtub:SLASet
[20]	Reset All	:SENSE:MEASure:BATHtub:SLAReset
[21]	Selection of search target threshold. (In PAM mode only)	:SENSE:MEASure:BATHtub:ASEarch:PAMSet
		:SENSE:MEASure:BATHtub:ASEarch:PAMSet?



**:SENSe:MEASure:BATHtub:SLOT? [<unit>]**

Parameter	[<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number. Can be omitted. Mainframe No. 1 is specified when omitted.
Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1 to 6                      Slot1 to 6 <numeric> = <NR1 NUMERIC RESPONSE DATA> 1 to 4                      Data1 to 4
Function	Queries the Bathtub measurement target slot and Data Interface.
Example	> :SENSe:MEASure:BATHtub:SLOT? < 3,1
Compatibility	Incompatible with existing models

**:SENSe:MEASure:BATHtub:MODE <mode>**

Parameter	<mode> = <CHARACTER PROGRAM DATA> SINGle                      Executes measurement once. REPeat                      Repeats measurement for the specified number of times. UNTimed                      Repeats measurement until measurement is stopped.
Function	Sets the measurement processing mode during Bathtub measurement.
Example	To set the measurement processing mode to Single mode. > :SENSe:MEASure:BATHtub:MODE SINGle
Compatibility	Incompatible with existing models

**:SENSe:MEASure:BATHtub:MODE?**

Response	<mode> = <CHARACTER RESPONSE DATA> SING,REP,UNT
Function	Queries the measurement processing mode during Bathtub measurement.
Example	> :SENSe:MEASure:BATHtub:MODE? < SING
Compatibility	Incompatible with existing models

### **:SENSe:MEASure:BATHtub:TIMes <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 2 to 1000                      2 to 1000 times, in 1-time steps
Function	Sets the number of measurements during Bathtub measurement.
Example	To set the number of measurements to 100 times: > :SENSe:MEASure:BATHtub:TIMes 100
Compatibility	Incompatible with existing models

### **:SENSe:MEASure:BATHtub:TIMes?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries the number of measurements during Bathtub measurement.
Example	> :SENSe:MEASure:BATHtub:TIMes? < 100
Compatibility	Incompatible with existing models

### **:SENSe:MEASure:BATHtub:INTerval <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0 to 9999                      0 to 9999 s., in 1-s steps
Function	Sets the measurement interval time during Bathtub measurement.
Example	To set the measurement interval time to 50 s.: > :SENSe:MEASure:BATHtub:INTerval 50
Compatibility	Incompatible with existing models

### **:SENSe:MEASure:BATHtub:INTerval?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 to 9999                      0 to 9999 s
Function	Queries the measurement interval time during Bathtub measurement.
Example	> :SENSe:MEASure:BATHtub:INTerval? < 50
Compatibility	Incompatible with existing models

**:SENSe:MEASure:BATHtub:DATA <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> -3.500 to 3.300            -3.500 to 3.300 V, in 0.001-V steps
Function	The range varies according to the option and input interface settings. Sets the measurement voltage threshold position during Bathtub measurement.
Example	To set the measurement voltage threshold position to 0.5 V: > :SENSe:MEASure:BATHtub:DATA 0.5
Compatibility	Incompatible with existing models

**:SENSe:MEASure:BATHtub:DATA?**


---

Response	<numeric> = <NR2 NUMERIC RESPONSE DATA>
Function	Queries the measurement voltage threshold position during Bathtub measurement.
Example	> :SENSe:MEASure:BATHtub:DATA? < 0.505
Compatibility	Incompatible with existing models

**:SENSe:MEASure:BATHtub:RESolution:MUI <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 2 to 100                    2 to 100 mUI, in 2-mUI steps
Function	Sets the Bathtub measurement phase resolution (mUI).
Example	To set the phase resolution to 10 mUI: > :SENSe:MEASure:BATHtub:RESolution:MUI 10
Compatibility	Incompatible with existing models

**:SENSe:MEASure:BATHtub:RESolution:MUI?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries the Bathtub measurement phase resolution (mUI).
Example	> :SENSe:MEASure:BATHtub:RESolution:MUI? < 10
Compatibility	Incompatible with existing models

### **:SENSe:MEASure:BATHtub:ECOut <mode>**

---

Parameter	<mode> = <CHARACTER PROGRAM DATA> FINE                      Fine (Number of error counts: 100) COARse                    Coarse (Number of error counts: 1)
Function	Sets the minimum number of error counts during Bathtub measurement.
Example	To set the number of error counts to 100: > :SENSe:MEASure:BATHtub:ECOut FINE
Compatibility	Incompatible with existing models

### **:SENSe:MEASure:BATHtub:ECOut?**

---

Response	<numeric> = <CHARACTER RESPONSE DATA> FINE, COAR
Function	Queries the minimum number of error counts during Bathtub measurement.
Example	> :SENSe:MEASure:BATHtub:ECOut? < FINE
Compatibility	Incompatible with existing models

### **:SENSe:MEASure:BATHtub:RANGe <range>**

---

Parameter	<range> = <CHARACTER PROGRAM DATA> E_7 to E_14              E-7 to E-14
Function	Sets the lower limit value of measurement error threshold during Bathtub measurement.
Example	To set the lower limit value of measurement error threshold to E-12: > :SENSe:MEASure:BATHtub:RANGe E_12
Compatibility	Incompatible with existing models

### **:SENSe:MEASure:BATHtub:RANGe?**

---

Response	<range> = <CHARACTER RESPONSE DATA>
Function	Queries the lower limit value of measurement error threshold during Bathtub measurement.
Example	> :SENSe:MEASure:BATHtub:RANGe? < E_12
Compatibility	Incompatible with existing models



**:SENSe:MEASure:BATHtub:CALRange <upper>,<lower>**

Parameter	<upper> = <CHARACTER PROGRAM DATA> E_3 to E_5                    E-3 to E-5 <lower> = <CHARACTER PROGRAM DATA> E_7 to E_14                    E-7 to E-14
Function	Sets the error threshold range during Bathtub measurement recalculation.
Example	To set the error threshold range during recalculation to E-5 to E-10: > :SENSe:MEASure:BATHtub:CALRange E_5,E_10
Compatibility	Incompatible with existing models

**:SENSe:MEASure:BATHtub:CALRange?**

Response	<upper>,<lower> = <CHARACTER RESONSE DATA>
Function	Queries the error threshold range during Bathtub measurement recalculation.
Example	> :SENSe:MEASure:BATHtub:CALRange? < E_5,E_10
Compatibility	Incompatible with existing models

**:SENSe:MEASure:BATHtub:ASEarch**

Parameter	<item> = <CHARACTER PROGRAM DATA> OFF                                    Auto search OFF PHASe                                  Phase auto search (Coarse) PTHReshold                          Phase & threshold auto search (Coarse) FPHase                                Phase auto search (Fine) FPTHreshold                          Phase & Threshold auto search (Fine) PPTHreshold                          Phase & Threshold auto search (PAM Coarse) PFPTThreshold                        Phase & Threshold auto search (PAM Fine)
Function	Sets execution of auto search during Bathtub measurement.
Example	To set the phase auto search ON: > :SENSe:MEASure:BATHtub:ASEarch PHASe
Compatibility	Incompatible with existing models

**:SENSe:MEASure:BATHtub:ASEarch?**

Response	<item> = <CHARACTER RESPONSE DATA> OFF,PHAS,PTHR,FPH,FPTH,PPTH,PFPT
Function	Queries the execution of auto search during Bathtub measurement.
Example	> :SENSe:MEASure:BATHtub:ASEarch? < PHAS
Compatibility	Incompatible with existing models

### **:SENSe:MEASure:BATHtub:CURRent <boolean>**

---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> 0 or OFF                      OFF: Updates at measurement termination. 1 or ON                        ON: Updates every second.
Function	Sets the graph display update period during Bathtub measurement.
Example	To set the graph display update timing to every second: > :SENSe:MEASure:BATHtub:CURRent 1
Compatibility	Incompatible with existing models

### **:SENSe:MEASure:BATHtub:CURRent?**

---

Response	<boolean> = <NR1 NUMERIC RESPONSE DATA> 0,1
Function	Queries the graph display update period during Bathtub measurement.
Example	> :SENSe:MEASure:BATHtub:CURRent? < 1
Compatibility	Incompatible with existing models

### **:SENSe:MEASure:BATHtub:JCALculation <setting>**

---

Parameter	<setting> = <DECIMAL NUMERIC PROGRAM DATA> 7 to 20                        E-7 to E-20 Specified as E-n where n: 7 to 20/1 step
Function	Sets the error rate used to calculate jitter at Bathtub measurement.
Example	To set jitter calculation error rate to E-14: > :SENSe:MEASure:BATHtub:JCALculation 14
Compatibility	Incompatible with existing models

### **:SENSe:MEASure:BATHtub:JCALculation?**

---

Response	<setting> = <NR1 NUMERIC RESPONSE DATA> 7 to 20
Function	Queries the error rate used to calculate jitter at Bathtub measurement.
Example	> :SENSe:MEASure:BATHtub:JCALculation? < 14
Compatibility	Incompatible with existing models

**:SENSe:MEASure:BATHtub:J2Meas <mode>**


---

Parameter	<mode> = <CHARACTER PROGRAM DATA> ACTual                      Calculates J2 from BER measurement point. ESTimate                     Calculates J2 from Best Fit Line.
Function	Selects J2 calculation method.
Example	To set J2 calculation method to Actual: > :SENSe:MEASure:BATHtub:J2Meas ACTual
Compatibility	Incompatible with existing models

**:SENSe:MEASure:BATHtub:J2Meas?**


---

Response	<mode> = <CHARACTER RESPONSE DATA> ACT, EST
Function	Queries J2 calculation method.
Example	> :SENSe:MEASure:BATHtub:J2Meas? < ACT
Compatibility	Incompatible with existing models

**:SENSe:MEASure:BATHtub:SELSlot  
<slot>,<interface>,<boolean>[,<unit>]**


---

Parameter	<Slot> = <CHARACTER PROGRAM DATA> SLOT1 to SLOT6            Slot No. 1 to 6 When using the MP1800A, the slot No. is 1 to 6. When using the MT1810A, the slot No. is 1 to 4. <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4 Data1 to 4 <boolean> = <BOOLEAN PROGRAM DATA> ON or 1                      ON OFF or 0                     OFF [<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                        Mainframe Nos. 1 to 4 When multiple MT1810As are connected, specify the mainframe No. to each of them. Can be omitted. Mainframe No. 1 is specified when omitted.
Function	Selects a Slot and Data Interface combination as the Bathtub measurement target.
Example	To select Slot 1 and Data3 as the Bathtub measurement target: > :SENSe:MEASure:BATHtub:SELSlot SLOT1,3,ON
Compatibility	Incompatible with existing models

---

### **:SENSe:MEASure:BATHtub:SELSlot? <slot>,<interface>[,<unit>]**

---

Parameter	<p>&lt;Slot&gt; = &lt;CHARACTER PROGRAM DATA&gt;                  SLOT1 to SLOT6      Slot No. 1 to 6                  When using the MP1800A, the slot No. is 1 to 6.                  When using the MT1810A, the slot No. is 1 to 4.</p> <p>&lt;interface&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  1 to 4                      Data1 to 4</p> <p>&lt;boolean&gt; = &lt;BOOLEAN PROGRAM DATA&gt;                  ON or 1                      ON                  OFF or 0                      OFF</p> <p>[&lt;unit&gt;] = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  1 to 4                      Mainframe Nos. 1 to 4                  When multiple MT1810As are connected, specify the mainframe No. to each of them.                  Can be omitted. Mainframe No. 1 is specified when omitted.</p>
Response	<p>&lt;boolean&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;                  1                              ON                  0                              OFF</p>
Function	<p>Queries whether the specified Slot and Data Interface combination is subject to the Bathtub measurement.</p>
Example	<p>To query whether Slot 1 and Data3 are subject to measurement:</p> <pre>&gt; :SENSe:MEASure:BATHtub:SELSlot? SLOT1,3 &lt; 1</pre>
Compatibility	<p>Incompatible with existing models</p>

---

### **:SENSe:MEASure:BATHtub:DISPlay <slot>,<interface>[,<unit>]**

---

Parameter	<p>&lt;slot&gt; = &lt;CHARACTER PROGRAM DATA&gt;                  SLOT1 to SLOT6      Slot No. 1 to 6                  When using the MP1800A, the slot No. is 1 to 6.                  When using the MT1810A, the slot No. is 1 to 4.</p> <p>&lt;interface&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  1 to 4                      Data1 to 4</p> <p>[&lt;unit&gt;] = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  1 to 4                      Mainframe Nos. 1 to 4                  When multiple MT1810As are connected, specify the mainframe No. to each of them.                  Can be omitted. Mainframe No. 1 is specified when omitted.</p>
Function	<p>Selects a Slot and Data Interface combination you want to view Bathtub measurement results.</p>
Example	<p>To view Bathtub measurement results of Slot3 and Data1:</p> <pre>&gt; :SENSe:MEASure:BATHtub:DISPlay Slot3,1</pre>
Compatibility	<p>Incompatible with existing models</p>

**:SENSe:MEASure:BATHtub:SLASet**


---

Parameter	None
Function	Sets all Slot and Data Interface combinations as the Bathtub measurement objects.
Example	> :SENSe:MEASure:BATHtub:SLASet
Compatibility	Incompatible with existing models

**:SENSe:MEASure:BATHtub:SLAReset**


---

Parameter	None
Function	Resets all Slot and Data Interface combinations set as the Bathtub measurement objects.
Example	> :SENSe:MEASure:BATHtub:SLAReset
Compatibility	Incompatible with existing models

**:SENSe:MEASure:BATHtub:ASEarch:PAMSet  
<slot>,<interface>,<threshold>[,<unit>]**


---

Parameter	<slot> = <CHARACTER PROGRAM DATA> 1 to 6                      Slots No. 1 to No. 6 1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Data1 to 4 <threshold> = <CHARACTER PROGRAM DATA> TOP                          Searches the Top threshold MIDDLE                      Searches the Middle threshold BOTTom                      Searches the Bottom threshold [<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number. Can be omitted. Mainframe No. 1 is specified when omitted.
Function	Selects search target threshold for running PAM Auto Search in the Bathtub measurement.
Example	To set Data 3 of Slot No.1 for Top threshold search. > :SENSe:MEASure:BATHtub:ASEarch:PAMSet SLOT1,3, TOP
Compatibility	Incompatible with existing models

**:SENSe:MEASure:BATHtub:ASEarch:PAMSet?  
<slot>,<interface>[,<unit>]**

---

Parameter	<slot> = <CHARACTER PROGRAM DATA> 1 to 6                                Slots No. 1 to No. 6 1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                                Data1 to 4 [<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                                Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number. Can be omitted. Mainframe No. 1 is specified when omitted.
Response	<threshold> = <CHARACTER RESPONSE DATA> TOP,MIDD,BOTT
Function	Queries search target threshold for running PAM Auto Search in the Bathtub measurement.
Example	To query the search target threshold of Data 3 of Slot No.1. > :SENSe:MEASure:BATHtub:ASEarch:PAMSet? SLOT1,3 < 1
Compatibility	Incompatible with existing models

7.12.11.2 Graph display setting commands

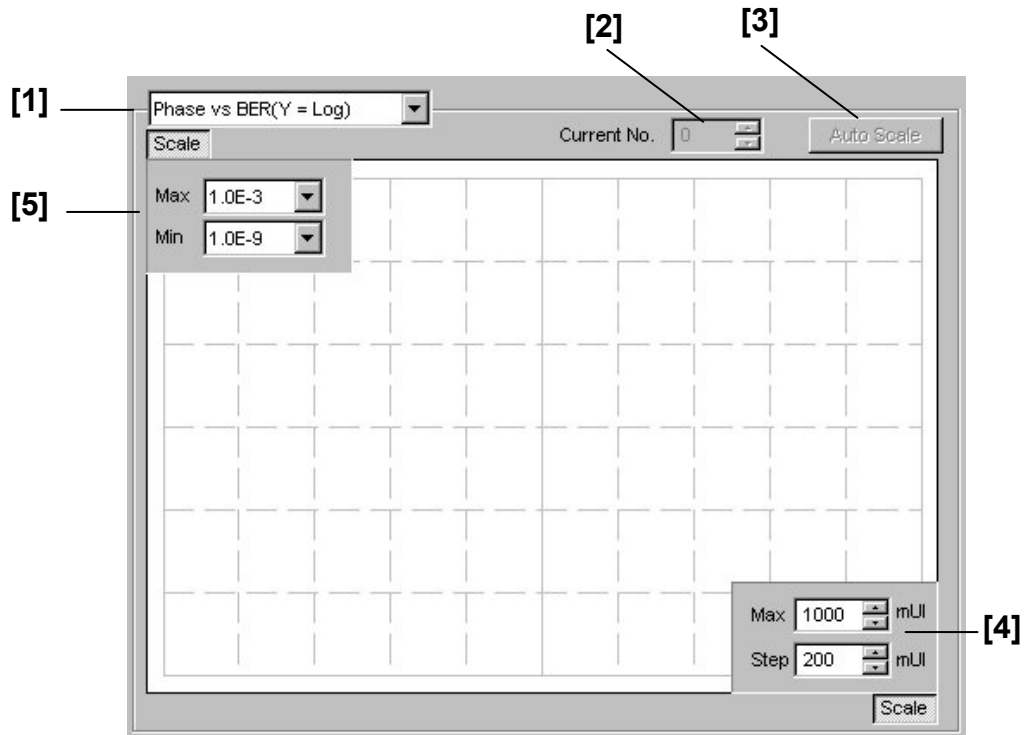


Figure 7.12.11.2-1 Graph Display Field

Table 7.12.11.2-1 Graph Display Setting Commands

No.	Setting Items	Commands
[1]	Display graph selection	:DISPlay:RESult:BATHtub:ITEM :DISPlay:RESult:BATHtub:ITEM?
[2]	Current No.	:DISPlay:RESult:BATHtub:MNUMber :DISPlay:RESult:BATHtub:MNUMber?
[3]	Auto Scale	:DISPlay:RESult:BATHtub:SCALE:ASCale
[4]	Horizontal axis scale setting	:DISPlay:RESult:BATHtub:SCALE:HORIZontal :DISPlay:RESult:BATHtub:SCALE:HORIZontal?
[5]	Vertical axis scale setting	:DISPlay:RESult:BATHtub:SCALE:VERTical :DISPlay:RESult:BATHtub:SCALE:VERTical?

### **:DISPlay:RESult:BATHtub:ITEM <mode>**

---

Parameter	<mode> = <CHARACTER PROGRAM DATA> PBER                      Phase vs BER (Y axis Log) PLNBer                    Phase vs BER (Y axis Log (-Ln)) HISTogram                Histogram
Function	Sets the item to be displayed in the graph during Bathtub measurement.
Example	To set the display item to Histogram: > :DISPlay:RESult:BATHtub:ITEM HISTogram
Compatibility	Incompatible with existing models

### **:DISPlay:RESult:BATHtub:ITEM?**

---

Response	<mode> = <CHARACTER RESPONSE DATA> PBER, PLNB, HIST
Function	Queries the item to be displayed in the graph during Bathtub measurement.
Example	> :DISPlay:RESult:BATHtub:ITEM? < HIST
Compatibility	Incompatible with existing models

### **:DISPlay:RESult:BATHtub:MNUMber <numeric>**

---

Parameter	<numeric> = <DECIMAL PROGRAM DATA> 1 to 1000                      Measurement number 1 to 1000 (number of measurements during repeat measurement)
Function	Selects the measurement number for which the Bathtub measurement result is displayed in a graph.
Example	To select the measurement number 100 to display the graph: > :DISPlay:RESult:BATHtub:MNUMber 100
Compatibility	Incompatible with existing models

### **:DISPlay:RESult:BATHtub:MNUMber?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries the measurement number for which the Bathtub measurement result is displayed in a graph.
Example	> :DISPlay:RESult:BATHtub:MNUMber? < 100
Compatibility	Incompatible with existing models



**:DISPlay:RESult:BATHtub:SCALE:AScale**

Function	Automatically adjusts the graph display during Bathtub measurement.
Example	> :DISPlay:RESult:BATHtub:SCALE:AScale
Compatibility	Incompatible with existing models

**:DISPlay:RESult:BATHtub:SCALE:HORizontal <max>[,<step>]**

Parameter	<max>,<step> = <DECIMAL NUMERIC PROGRAM DATA>
-----------	---

Table 7.12.11.2-2 Parameters

Form	<max>	<step>
Phase type	-900 to 1000 (mUI), in 100-mUI steps	10 to 200 (mUI), in 10-mUI steps
Histogram type	16,32,64,128,256	Omitted

Function	Sets the horizontal scale of the graph display during Bathtub measurement. In case of a histogram, <step> is omitted.
Example	To set the scale to maximum 800 mUI, in 100-mUI steps: > :DISPlay:RESult:BATHtub:SCALE:HORizontal 800,100
Compatibility	Incompatible with existing models

**:DISPlay:RESult:BATHtub:SCALE:HORizontal?**

Response	<max>,<step> = <NR2 NUMERIC RESPONSE DATA> Same as the :DISPlay:RESult:BATHtub:SCALE:HORizontal command parameter.
Function	Queries the horizontal scale of the graph display during Bathtub measurement.
Example	> :DISPlay:RESult:BATHtub:SCALE:HORizontal? < 800,100
Compatibility	Incompatible with existing models

**:DISPlay:RESult:BATHtub:SCALE:VERTical <max>,<min>**

Parameter <max>,<min> = <DECIMAL NUMERIC PROGRAM DATA>

**Table 7.12.11.2-3 Parameters**

Form	<max>	<min>
Histogram Type	6 to 15 (E + 6 to E + 15)	Input 0
Error Rate Type	2 to 7 (E-2 to E-7)	8 to 15 (E-8 to E-15)

**Note:**

In case of the Error Rate type, the difference between the maximum and minimum value must be at least 6, and the value must be an even number.

Function Sets the vertical scale of the graph display during Bathtub measurement.  
 Example To set the scale during Error Rate type display to maximum E-4 and minimum E-10:  
 > :DISPlay:RESult:BATHtub:SCALE:VERTical 4,10  
 Compatibility Incompatible with existing models

**:DISPlay:RESult:BATHtub:SCALE:VERTical?**

Response <min>,<max> = <NR2 NUMERIC RESPONSE DATA>  
 Same as the :DISPlay:RESult:BATHtub:SCALE:VERTical command parameter.  
 Function Queries the vertical scale of the graph display during Bathtub measurement.  
 Example > :DISPlay:RESult:BATHtub:SCALE:VERTical?  
 < 4,10  
 Compatibility Incompatible with existing models

7.12.11.3 Measurement result and status query commands

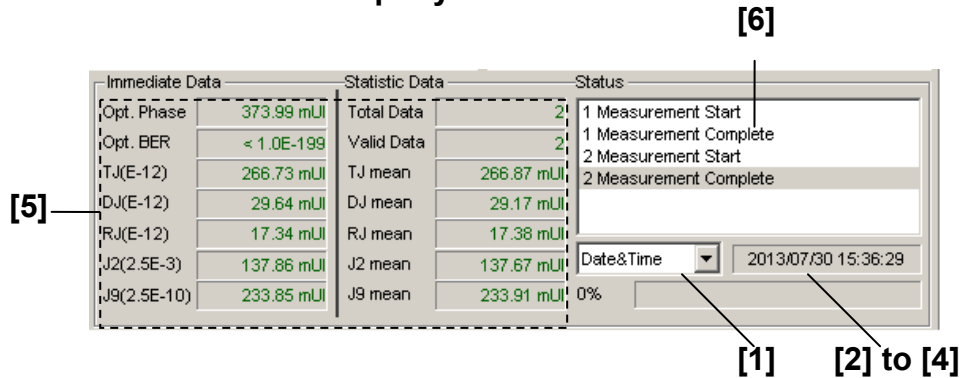


Figure 7.12.11.3-1 Measurement Result and Status Display

Table 7.12.11.3-1 Measurement Result and Status Query Commands

No.	Setting Items	Commands
[1]	Display time selection	:SENSe:MEASure:BATHtub:DTIME :SENSe:MEASure:BATHtub:DTIME?
[2]	Query for current time	:SENSe:MEASure:BATHtub:TIME:DTIME?
[3]	Query for measurement start time	:SENSe:MEASure:BATHtub:TIME:STARt?
[4]	Query for measurement elapsed time	:SENSe:MEASure:BATHtub:TIME:ELAPsed?
[5]	Query for result	:CALCulate:DATA:BATHtub?
[6]	Query for status	:CALCulate:DATA:BATHtub:STATus?

**:SENSe:MEASure:BATHtub:DTIME <type>**

Parameter	<type> = <CHARACTER PROGRAM DATA> DTIME Displays the current date and time. STARt Displays the measurement start time. ELAPsed Displays the elapsed time based on the measurement period.
Function	Selects the Bathtub measurement time display type.
Example	To set the Bathtub measurement time display type to measurement start time (Start Time): > :SENSe:MEASure:BATHtub:DTIME STARt
Compatibility	Incompatible with existing models

**:SENSe:MEASure:BATHtub:DTIME?**

Response	<type> = <CHARACTER RESPONSE DATA> DTIM,STAR,ELAP
Function	Queries the Bathtub measurement time display type.
Example	> :SENSe:MEASure:BATHtub:DTIME? < STAR
Compatibility	Incompatible with existing models

**:SENSe:MEASure:BATHtub:TIME:DTIME?**

---

Response	<year> = <NR1 NUMERIC RESPONSE DATA> 2000 to 2036                      2000 to 2036 year <month> = <NR1 NUMERIC RESPONSE DATA> 1 to 12                              January to December <day> = <NR1 NUMERIC RESPONSE DATA> 1 to 31                              1st to 31st <hour> = <NR1 NUMERIC RESPONSE DATA> 0 to 23                              0 to 23 hours <minute> = <NR1 NUMERIC RESPONSE DATA> 0 to 59                              0 to 59 minutes <second> = <NR1 NUMERIC RESPONSE DATA> 0 to 59                              0 to 59 seconds
Function	Queries the current date and time during the Bathtub measurement.
Example	> :SENSe:MEASure:BATHtub:TIME:DTIME? < 2012,12,31,23,59,59
Compatibility	Incompatible with existing models

**:SENSe:MEASure:BATHtub:TIME:START?**

---

Response	<year> = <NR1 NUMERIC RESPONSE DATA> 0,2000 to 2036                      2000 to 2036 year <month> = <NR1 NUMERIC RESPONSE DATA> 0,1 to 12                              January to December <day> = <NR1 NUMERIC RESPONSE DATA> 0,1 to 31                              1st to 31st <hour> = <NR1 NUMERIC RESPONSE DATA> 0 to 23                              0 to 23 hours <minute> = <NR1 NUMERIC RESPONSE DATA> 0 to 59                              0 to 59 minutes <second> = <NR1 NUMERIC RESPONSE DATA> 0 to 59                              0 to 59 seconds "0,0,0,0,0,0" is returned if there is no measurement start time data.
Function	Queries the current date and time during the Bathtub measurement.
Example	> :SENSe:MEASure:BATHtub:TIME:START? < 2012,12,31,23,59,59
Compatibility	Incompatible with existing models

**:SENSe:MEASure:BATHtub:TIME:ELAPsed?**

Response	<p>&lt;day&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0 to 99                      0 to 99 days</p> <p>&lt;hour&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0 to 23                      0 to 23 hours</p> <p>&lt;minute&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0 to 59                      0 to 59 minutes</p> <p>&lt;second&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0 to 59                      0 to 59 seconds</p> <p>“0,0,0,0” is returned if there is no measurement start time data.</p>
Function	Queries the measurement elapsed time during Bathtub measurement.
Example	<p>&gt; :SENSe:MEASure:BATHtub:TIME:ELAPsed?</p> <p>&lt; 31, 23, 59, 59</p>
Compatibility	Incompatible with existing models

**:CALCulate:DATA:BATHtub? <string>**

Parameter	<p>&lt;string&gt; = &lt;STRING PROGRAM DATA&gt;</p> <p>For the contents of measurement data &lt;result1&gt;, see Table 7.12.11.3-2.</p> <p>For the contents of measurement data &lt;result2&gt;, see Table 7.12.11.3-3.</p> <p>For the contents of measurement data &lt;result3&gt;, see Table 7.12.11.3-4.</p>
-----------	---

**Table 7.12.11.3-2 Phase vs. BER Measurement Result <result1>**

Items		<Result1>	Response Format
Phase vs BER (Phase/Error Rate)	Number of measurements 1 to 1000	"BATH:1"... "BATH:1000"	Form1
Histogram (Phase/Error Count)		"HIST:1"... "HIST:1000"	Form2

The measurement result for each Phase is delimited by a comma (,) and returned.

**Table 7.12.11.3-3 Phase vs. BER Immediate Data <result2>**

Items		<Result2>	Response Format
Optimum BER	Number of measurements 1 to 1000	"OPTBer:1"... "OPTBer:1000"	Form3
Optimum Phase		"OPTPh:1"... "OPTPh:1000"	Form4
Total Jitter		"TJ:1"... "TJ:1000"	Form4
Deterministic Jitter		"DJ:1"... "DJ:1000"	Form4
Random Jitter		"RJ:1"... "RJ:1000"	Form4
J2		"J2:1"... "J2:1000"	Form4
J9		"J9:1"... "J9:1000"	Form4

**Table 7.12.11.3-4 Phase vs. BER Measurement Statistic Data <result3>**

Items	<Result3>	Response Format
Total Data	"TOTal"	Form5
Valid Data	"VALid"	Form5
Total Jitter Mean	"TJMean"	Form4
Deterministic Jitter Mean	"DJMean"	Form4
Random Jitter Mean	"RJMean"	Form4
J2 Mean	"J2Mean"	Form4
J9 Mean	"J9Mean"	Form4

Response <string> = <STRING RESPONSE DATA>

**Table 7.12.11.3-5 Response Format**

Form	Format	Description
Form1 Phase-BER type	"XXXX.XX, Y.YYYYYE-YYY"	XXXX.XX: Phase (mUI or PS) Y.YYYYYE-YYY: Error Rate
	"-----,-----"	When no data corresponds to the query.
Form2 Histogram type	"XXXX.XX, Y.YYYYYE-YYY"	XXXX.XX: Phase (mUI or PS) Y.YYYYYE-YYY: Error Count
	"-----,-----"	When no data corresponds to the query.
Form3 Fraction type 1	"X.XXXXXE-XXX"	When 0.0000E-016 to 1.0000E000
	"-----"	When no data corresponds to the query.
	"< 1.0E-199"	When E-199 or less
Form4 Fraction type 2	"XXXX.XX"	When -9999.99 to 9999.99
	"-----"	When no data corresponds to the query.
Form5 Integer type	"XXXX"	When 0 to 9999
	"----"	When no data corresponds to the query.

Function Queries the Phase vs. BER measurement result.

Example To query the Phase vs. BER the measurement result for the 10th time:  
 > :CALCulate:DATA:BATHtub? "BATH:10"  
 < "0,1.2345E-003", "20,1.2345E-004", "40,1.2345E-005",  
 "60,1.2345E-006"

Compatibility Incompatible with existing models

**:CALCulate:DATA:BATHtub:STATus?**


---

Response	<string> = <STRING RESPONSE DATA>
	"" When no alarm exists.
	"Sync Loss" Sync. Loss
	"Clock Loss" Clock Loss
	"Out of range" Out of range
	"Illegal Error" Illegal Error
	"Meas. Threshold exceeded" Number of errors exceeds the target rate

**Note:**

Displays any one of the alarms.

Illegal Error > Clock Loss > Sync Loss > Out of range

Function

Queries the Q measurement status.

Example

```
> :CALCulate:DATA:BATHtub:STATus?
```

```
< "Sync Loss"
```

### 7.12.11.4 File menu setting commands

Table 7.12.11.4-1 File Menu Setting Commands

No.	Setting Items	Commands
[1]	Open	:SYSTem:MMEMory:BATHtub:RECall
[2]	Save	:SYSTem:MMEMory:BATHtub:STORe

#### **:SYSTem:MMEMory:BATHtub:RECall <file\_name>**

---

Parameter	<file_name> = <STRING PROGRAM DATA> "<drv>:\[<dir>]<file>" <drv> = C,D,E,F <dir> = <dir1>\<dir2>\...(Omitted when root directory) <file> = File name
Function	Opens the Bathtub measurement result data.
Example	> :SYSTem:MMEMory:BATHtub:RECall "C:\Test\example"
Compatibility	Incompatible with existing models

#### **:SYSTem:MMEMory:BATHtub:STORe <file\_name>,<data\_type>,<file\_type>**

---

Parameter	<file_name>=<STRING PROGRAM DATA> "<drv>:\[<dir>]<file>" <drv> = C,D,E,F <dir> = <dir1>\<dir2>\...(Omitted when root directory) <file> = File name <data_type> = <CHARACTER RESPONSE DATA> PSB                      Phase vs BER Result <file_type> = <CHARACTER RESPONSE DATA> BIN                      Binary File CSV                      CSV File TXT                      Text File
Function	Saves the Bathtub measurement result data. <b>Note:</b> The settings will not be read from the saved file if the file name is changed.
Example	To save the Bathtub measurement result data by specifying the save destination (C:\Test), file name (example), and file format (CSV): > :SYSTem:MMEMory:BATHtub:STORe "C:\Test\example", PSB, CSV
Compatibility	Incompatible with existing models



### 7.12.12 Auto Search

This chapter describes the commands that are used after Auto Search is set by the :SYSTEM:CFUNCTION command.

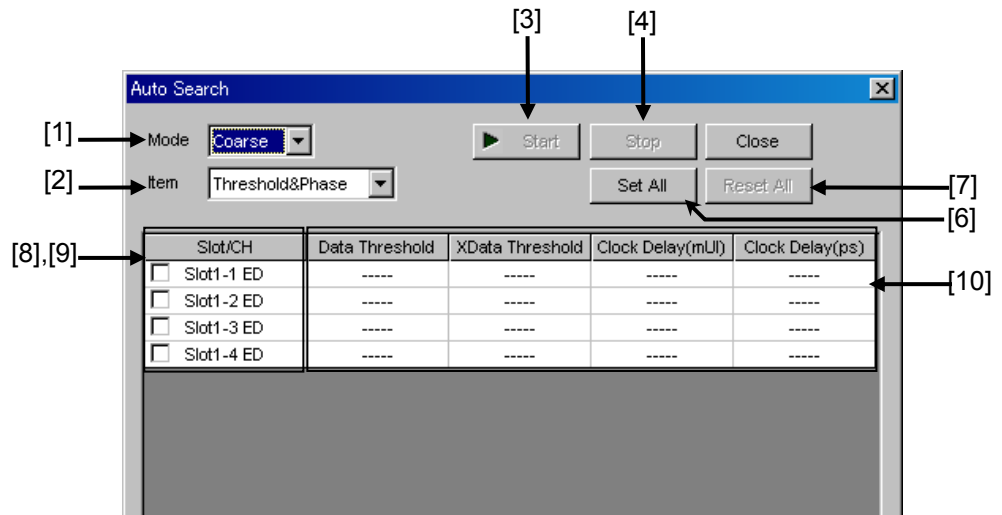


Figure 7.12.12-1 Auto Search Dialog Box

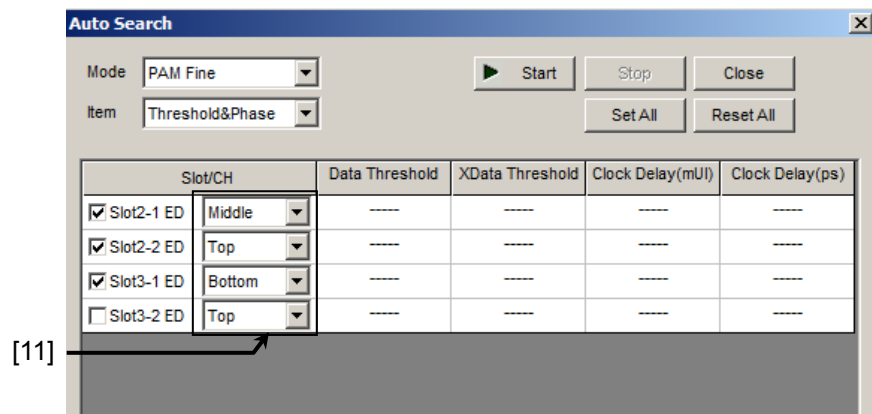


Figure 7.12.12-2 Auto Search Dialog Box (PAM Mode)

**Table 7.12.12-1 Auto Search Setting Commands**

No.	Setting Items	Commands
[1]	Mode	:SENSe:MEASure:ASEarch:SMODE
		:SENSe:MEASure:ASEarch:SMODE?
[2]	Item	:SENSe:MEASure:ASEarch:MODE
		:SENSe:MEASure:ASEarch:MODE?
[3]	Start	:SENSe:MEASure:ASEarch:START
[4]	Stop	:SENSe:MEASure:ASEarch:STOP
[5]	No label (Query for function state)	:SENSe:MEASure:ASEarch:STATE?
[6]	Set All	:SENSe:MEASure:ASEarch:SLASet
[7]	Reset All	:SENSe:MEASure:ASEarch:SLAReset
[8]	Slot Select	:SENSe:MEASure:ASEarch:SELSlot
		:SENSe:MEASure:ASEarch:SELSlot?
[9]	No label (Query for slot state)	:SENSe:MEASure:ASEarch:SLOT?
[10]	No label (Query for auto search results)	:CALCulate:DATA:ASEarch?
[11]	Search target threshold (In PAM mode only)	:SENSe:MEASure:ASEarch:PAMSet
		:SENSe:MEASure:ASEarch:PAMSet?

**:SENSe:MEASure:ASEarch:SMODE <mode>**

Parameter	<mode> = <CHARACTER PROGRAM DATA>
	FINE                      Fine mode
	COARse                  Coarse mode
	PAMFine                PAM4 Fine mode
	PAMCoarse              PAM4 Coarse mode
Function	Sets the Auto Search mode.
Example	To set the Fine mode: > :SENSe:MEASure:ASEarch:SMODE FINE
Compatibility	Incompatible with existing models

**:SENSe:MEASure:ASEarch:SMODE?**

Response	<mode> = <CHARACTER RESPONSE DATA>
	FINE, COAR, PAMF, PAMC
Function	Queries the Auto Search mode.
Example	> :SENSe:MEASure:ASEarch:SMODE? < FINE
Compatibility	Incompatible with existing models

**:SENSe:MEASure:ASEarch:MODE <mode>**


---

Parameter	<mode> = <CHARACTER PROGRAM DATA>
	PTHReshold            Phase & Threshold
	THReshold            Threshold
	PHASe                Phase
Function	Sets the execution item of Auto Search.
Example	To set the execution item of Auto Search to Phase & Threshold: > :SENSe:MEASure:ASEarch:MODE PTHReshold
Compatibility	Compatible with the MP1632C.

**:SENSe:MEASure:ASEarch:MODE?**


---

Response	<mode> = <CHARACTER RESPONSE DATA>
	PTHR                Phase & Threshold
	THR                 Threshold
	PHAS                Phase
Function	Queries the execution item of Auto Search.
Example	> :SENSe:MEASure:ASEarch:MODE? < PTHR
Compatibility	Compatible with the MP1632C.

**:SENSe:MEASure:ASEarch:START**


---

Function	Starts the Auto Search function.
Example	> :SENSe:MEASure:ASEarch:START
Compatibility	Compatible with the MP1632C.

**:SENSe:MEASure:ASEarch:STOP**


---

Function	Stops the Auto Search function.
Example	> :SENSe:MEASure:ASEarch:STOP
Compatibility	Compatible with the MP1632C.

**:SENSe:MEASure:ASEarch:STATE?**


---

Response	<boolean> = <NR1 NUMERIC RESPONSE DATA>
	1                    Started
	0                    Stopped
	-1                   Auto Search failure (when any slot has failed)
Function	Queries the Auto Search function state.
Example	> :SENSe:MEASure:ASEarch:STATE? < 1
Compatibility	Compatible with the MP1632C.

---

**:SENSe:MEASure:ASEarch:SLASet**

---

Function	Sets Auto Search execution for all slots to ON.
Example	> :SENSe:MEASure:ASEarch:SLASet
Compatibility	Incompatible with existing models

**:SENSe:MEASure:ASEarch:SLAReset**

---

Function	Sets Auto Search execution for all slots to OFF.
Example	> :SENSe:MEASure:ASEarch:SLAReset
Compatibility	Incompatible with existing models

**:SENSe:MEASure:ASEarch:SELSlot  
<slot>,<interface>,<boolean>[,<unit>]**

---

Parameter	<slot> = <CHARACTER PROGRAM DATA> SLOT1 to SLOT6      Slots No. 1 to No. 6 1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Data1 to 4 <boolean> = <BOOLEAN PROGRAM DATA> ON,1                      Auto Search ON OFF,0                      Auto Search OFF [<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number. Can be omitted. Mainframe No. 1 is specified when omitted.
Function	Selects the slot for execution of Auto Search.
Example	To set Auto Search for Slot No.1, Data 3 to ON: > :SENSe:MEASure:ASEarch:SELSlot SLOT1,3,ON
Compatibility	Incompatible with existing models (Parameter varies by model.)

**:SENSe:MEASure:ASEarch:SELSlot? <slot>,<interface>[,<unit>]**

Parameter	<p>&lt;slot&gt; = &lt;CHARACTER PROGRAM DATA&gt;  SLOT1 to SLOT6        Slots No. 1 to No. 6  1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A</p> <p>&lt;interface&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;  1 to 4                    Data1 to 4</p> <p>[&lt;unit&gt;] = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;  1 to 4                    Mainframe Nos. 1 to 4</p> <p>When using two or more MT1810A units in serial connection, specify the mainframe number.</p> <p>Can be omitted. Mainframe No. 1 is specified when omitted.</p>
Response	<p>&lt;boolean&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;  1                        ON  0                        OFF</p>
Function	Queries the ON/OFF state of Auto Search for each slot.
Example	<p>To query the ON/OFF state of Auto Search for Slot No.1, Data 3:</p> <pre>&gt; :SENSe:MEASure:ASEarch:SELSlot? SLOT1,3 &lt; 1</pre>
Compatibility	Incompatible with existing models (Parameter varies by model.)

**:SENSe:MEASure:ASEarch:SLOT? <slot>,[<unit>]**

Parameter	<p>&lt;slot&gt; = &lt;CHARACTER PROGRAM DATA&gt;  SLOT1 to SLOT6        Slots No. 1 to No. 6  1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A</p> <p>[&lt;unit&gt;] = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;  1 to 4                    Mainframe Nos. 1 to 4</p> <p>When using two or more MT1810A units in serial connection, specify the mainframe number.</p> <p>Can be omitted. Mainframe No. 1 is specified when omitted.</p>
Response	<p>&lt;interface&gt; = &lt;NR1 NUMERICRESPONSE DATA&gt;  1 to 4                    Data1 to 4</p> <p><b>Note:</b></p> <p style="padding-left: 40px;">The above response returns all slots for which Auto Search can be executed by delimiting with commas (,).</p>
Function	Queries the data interface of slot 1 for which Auto Search can be executed.
Example	<pre>&gt; :SENSe:MEASure:ASEarch:SLOT? SLOT1 &lt; 1,2,3,4</pre>
Compatibility	Incompatible with existing models

**:CALCulate:DATA:ASEarch? <slot>,<interface>[,<unit>]**

Parameter	<p>&lt;slot&gt; = &lt;CHARACTER PROGRAM DATA&gt;                  SLOT1 to SLOT6      Slots No. 1 to No. 6                  1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A</p> <p>&lt;interface&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  1 to 4                      Data1 to 4</p> <p>[&lt;unit&gt;] = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  1 to 4                      Mainframe Nos. 1 to 4</p> <p>When using two or more MT1810A units in serial connection, specify the mainframe number.</p>
Response	<p>Can be omitted. Mainframe No. 1 is specified when omitted.</p> <p>&lt;data&gt;,&lt;xdata&gt;,&lt;delay&gt;,&lt;numeric1&gt;,&lt;numeric2&gt;,&lt;numeric3&gt;,&lt;numeric4&gt;</p> <p>&lt;data&gt;,&lt;xdata&gt;,&lt;delay&gt;, = &lt;STRING RESPONSE DATA&gt;                  "Done"                      Normal termination                  "Fail"                      Abnormal termination                  "----"                      Not executed</p> <p>&lt;numeric1&gt;,&lt;numeric2&gt; = &lt;NR2 NUMERIC RESPONSE DATA&gt;                  -3.500 to 3.300 -3.500 to 3.300 V/Step 0.001 V                  "----"                      Not executed                  "----"                      Abnormal termination</p> <p>&lt;numeric3&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt;                  -1000 to 1000 -1000 to 1000 mUI/Step 1 mUI                  "----"                      Not executed                  "----"                      Abnormal termination</p> <p>&lt;numeric4&gt; = &lt;NR2 NUMERIC RESPONSE DATA&gt;                  -xxx.xx to xxx.xx      ps (This value is converted from mUI units.)                  "----"                      Not executed                  "----"                      Abnormal termination</p>
Function	<p>Queries the Auto Search execution result.</p>
Example	<p>To query the Auto Search execution result of slot 1, Data 1.</p> <pre>&gt; :CALCulate:DATA:ASEarch? SLOT1,1 &lt; "Done", "Done", "Done",1.000,1.100,-500,50.00 &lt; "Done", "Done", "----",1.000,1.100,0,0.00 (When not executed in the Phase direction)</pre>
Compatibility	<p>Incompatible with existing models. (Parameter varies by model.)</p>

---

**:SENSe:MEASure:ASEarch:PAMSet  
<slot>,<interface>,<threshold>[,<unit>]**


---

Parameter	<slot> = <CHARACTER PROGRAM DATA> SLOT1 to SLOT6      Slots No. 1 to No. 6 1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Data1 to 4 <threshold> = <CHARACTER PROGRAM DATA> TOP                      Top threshold MIDDLE                  Middle threshold BOTTom                  Bottom threshold [<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number. Can be omitted. Mainframe No. 1 is specified when omitted.
Function	Sets search target threshold for running PAM Auto Search.
Example	To set Data 3 of Slot No. 1 as Bottom threshold search target. > :SENSe:MEASure:ASEarch:PAMSet SLOT1,3,BOTTom
Compatibility	Incompatible with existing models.

---

**:SENSe:MEASure:ASEarch:PAMSet? <slot>,<interface>[,<unit>]**


---

Parameter	<slot> = <CHARACTER PROGRAM DATA> SLOT1 to SLOT6      Slots No. 1 to No. 6 1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Data1 to 4 [<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number. Can be omitted. Mainframe No. 1 is specified when omitted.
Response	<threshold> = <CHARACTER RESPONSE DATA> TOP,MIDD,BOTT
Function	Queries search target threshold of the slot for running PAM Auto Search.
Example	To query search target threshold of Data 3 of Slot No. 1. > :SENSe:MEASure:ASEarch:PAMSet? SLOT1,3 < BOTT
Compatibility	Incompatible with existing models.

### 7.12.13 Auto Adjust

This chapter describes the commands that are used after Auto Adjust is set by the :SYSTEM:CFUNCTION command.

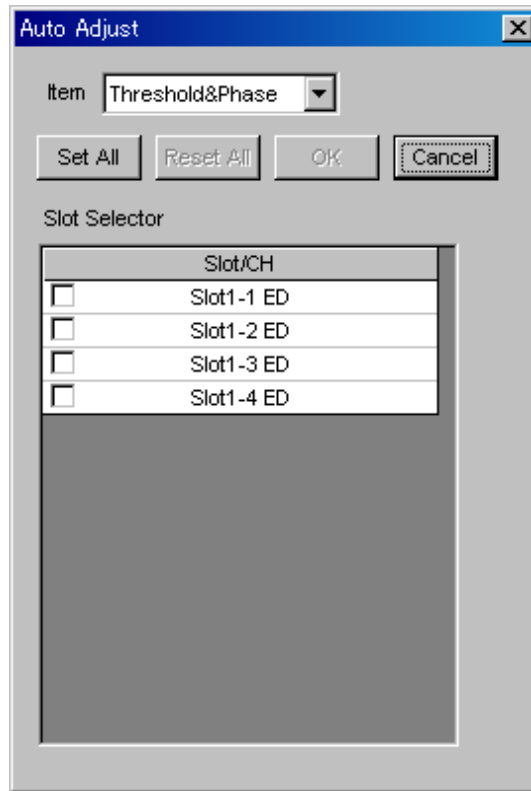


Figure 7.12.13-1 Auto Adjust Dialog Box

Table 7.12.13-1 Auto Adjust Setting Commands

Setting Items	Commands
Item	:SENSE:MEASure:AADJust32:ITEM
	:SENSE:MEASure:AADJust32:ITEM?
Start	:SENSE:MEASure:AADJust32:STARt
Stop	:SENSE:MEASure:AADJust32:STOP
No label (Query for function state)	:SENSE:MEASure:AADJust32:STATe?
Slot Select	:SENSE:MEASure:AADJust32:SELSlot
	:SENSE:MEASure:AADJust32:SELSlot?
No label (Query for slot state)	:SENSE:MEASure:AADJust32:SLOT?
Set All	:SENSE:MEASure:AADJust32:SLASet
Reset All	:SENSE:MEASure:AADJust32:SLAReset



**:SENSe:MEASure:AADJust32:ITEM <item>**

Parameter	<item> = <CHARACTER PROGRAM DATA>						
	<table border="0"> <tr> <td>PTHReshold</td> <td>Phase &amp; Threshold: Phase &amp; Threshold: Auto tracking in the voltage and phase directions</td> </tr> <tr> <td>THReshold</td> <td>Threshold: Auto tracking in the voltage direction</td> </tr> <tr> <td>PHASe</td> <td>Phase:Auto tracking in the phase direction</td> </tr> </table>	PTHReshold	Phase & Threshold: Phase & Threshold: Auto tracking in the voltage and phase directions	THReshold	Threshold: Auto tracking in the voltage direction	PHASe	Phase:Auto tracking in the phase direction
PTHReshold	Phase & Threshold: Phase & Threshold: Auto tracking in the voltage and phase directions						
THReshold	Threshold: Auto tracking in the voltage direction						
PHASe	Phase:Auto tracking in the phase direction						
Function	Sets the execution item of Auto Adjust.						
Example	To set the execution item of Auto Adjust to Phase & Threshold: > :SENSe:MEASure:AADJust32:ITEM PTHReshold						
Compatibility	Incompatible with existing models						

**:SENSe:MEASure:AADJust32:ITEM?**

Response	<item> = <CHARACTER RESPONSE DATA>						
	<table border="0"> <tr> <td>PTHR</td> <td>Phase &amp; Threshold</td> </tr> <tr> <td>THR</td> <td>Threshold</td> </tr> <tr> <td>PHAS</td> <td>Phase</td> </tr> </table>	PTHR	Phase & Threshold	THR	Threshold	PHAS	Phase
PTHR	Phase & Threshold						
THR	Threshold						
PHAS	Phase						
Function	Queries the execution item of Auto Adjust.						
Example	> :SENSe:MEASure:AADJust32:ITEM? < PTHR						
Compatibility	Incompatible with existing models						

**:SENSe:MEASure:AADJust32:START**

Function	Starts the Auto Adjust function.
Example	> :SENSe:MEASure:AADJust32:START
Compatibility	Incompatible with existing models

**:SENSe:MEASure:AADJust32:STOP**

Function	Stops the Auto Adjust function.
Example	> :SENSe:MEASure:AADJust32:STOP
Compatibility	Incompatible with existing models

**:SENSe:MEASure:AADJust32:STATe?**

Response	<boolean> = <NR1 NUMERIC RESPONSE DATA>				
	<table border="0"> <tr> <td>1</td> <td>Start</td> </tr> <tr> <td>0</td> <td>Stop</td> </tr> </table>	1	Start	0	Stop
1	Start				
0	Stop				
Function	Queries the Auto Adjust function state.				
Example	> :SENSe:MEASure:AADJust32:STATe? < 1				
Compatibility	Incompatible with existing models				

**:SENSe:MEASure:AAJust32:SELSlot  
<slot>,<interface>,<boolean>[,<unit>]**

---

Parameter	<slot> = <CHARACTER PROGRAM DATA> SLOT1 to SLOT6      Slots No. 1 to No. 6 1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Data1 to 4 <boolean> = <BOOLEAN PROGRAM DATA> ON, 1                      Auto Adjust ON OFF, 0                      Auto Adjust OFF [<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number. Can be omitted. Mainframe No. 1 is specified when omitted.
Function	Selects the slot and data interface for which Auto Adjust is executed.
Example	To set Data 2 of Slot No.1 to Auto Adjust ON: > :SENSe:MEASure:AAJust32:SELSlot SLOT1,2,ON
Compatibility	Incompatible with existing models

**:SENSe:MEASure:AAJust32:SELSlot? <slot>,<interface>[,<unit>]**

---

Parameter	<slot> = <CHARACTER PROGRAM DATA> SLOT1 to SLOT6      Slots No. 1 to No. 6 1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Data1 to 4 [<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number. Can be omitted. Mainframe No. 1 is specified when omitted.
Response	<boolean> = <NR1 NUMERIC RESPONSE DATA> 0                              OFF 1                              ON
Function	Queries the Auto Adjust ON/OFF state for each data interface.
Example	To query the Auto Adjust ON/OFF state for Data 2 of Slot No.1: > :SENSe:MEASure:AAJust32:SELSlot? SLOT1,2 < 1
Compatibility	Incompatible with existing models

**:SENSe:MEASure:AADJust32:SLOT? [<unit>]**

Parameter	[<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number. Can be omitted. Mainframe No. 1 is specified when omitted.
Response	<slot> = <CHARACTER RESPONSE DATA> SLOT1 to SLOT6              Slots No. 1 to No. 6 1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A <b>Note:</b> The above response returns all slots for which Auto Adjust can be executed by delimiting with commas (.).
Function	<interface> = <NR1 NUMERIC RESPONSE DATA> 1 to 4                      Data interface No.1 to 4 Queries the data interface for which Auto Adjust can be executed.
Example	To query the data interface in Mainframe No.3 for which Auto Adjust can be executed: > :SENSe:MEASure:AADJust32:SLOT? 3 < SLOT1,1, SLOT1,2, SLOT1,3
Compatibility	Incompatible with existing models

**:SENSe:MEASure:AADJust32:SLASet**

Function	Select all slots for Auto Adjust execution.
Example	> :SENSe:MEASure:AADJust32:SLASet
Compatibility	Incompatible with existing models

**:SENSe:MEASure:AADJust32:SLAReset**

Function	Deselect all slots for Auto Adjust execution.
Example	> :SENSe:MEASure:AADJust32:SLAReset
Compatibility	Incompatible with existing models

### 7.12.14 Q measurement

This section describes the commands for Q measurement.

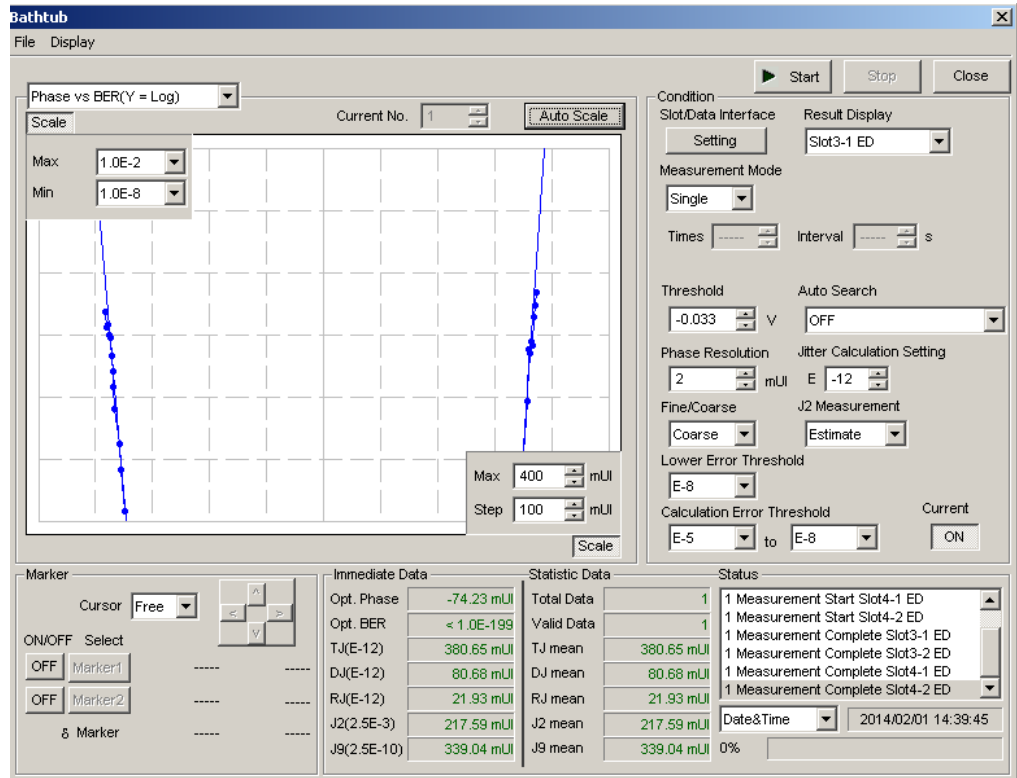


Figure 7.12.14-1 Q measurement screen

7.12.14.1 Vth vs. Q measurement commands

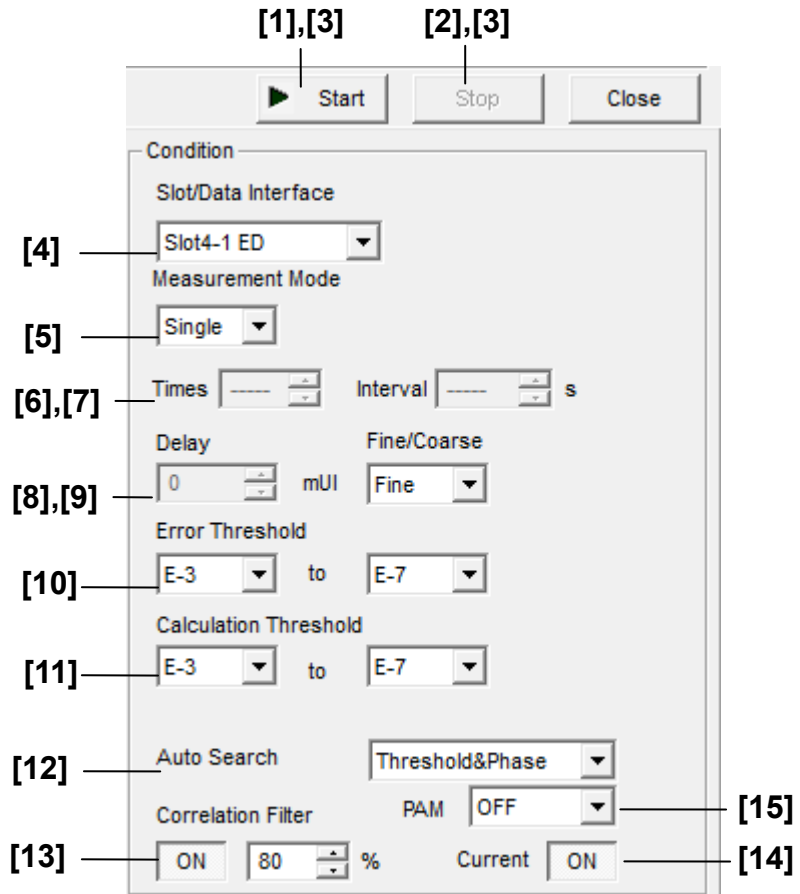


Figure 7.12.14.1-1 Vth vs. Q measurement setting field

Table 7.12.14.1-1 Vth vs. Q measurement setting commands

No.	Setting Items	Commands
[1]	Start	:SENSE:MEASURE:QANalysis:THReshold:START
[2]	Stop	:SENSE:MEASURE:QANalysis:THReshold:STOP
[3]	Query for measurement progress state	:SENSE:MEASURE:QANalysis:STATe?
[4]	Slot	:SENSE:MEASURE:QANalysis:THReshold:SLOT
		:SENSE:MEASURE:QANalysis:THReshold:SLOT?
[5]	Meas Mode	:SENSE:MEASURE:QANalysis:THReshold:MODE
		:SENSE:MEASURE:QANalysis:THReshold:MODE?
[6]	Times	:SENSE:MEASURE:QANalysis:THReshold:TIMEs
		:SENSE:MEASURE:QANalysis:THReshold:TIMEs?
[7]	Interval	:SENSE:MEASURE:QANalysis:THReshold:INTerval
		:SENSE:MEASURE:QANalysis:THReshold:INTerval?
[8]	Delay	:SENSE:MEASURE:QANalysis:THReshold:DELay
		:SENSE:MEASURE:QANalysis:THReshold:DELay?

Table 7.12.14.1-1 Vth vs. Q measurement setting commands

No.	Setting Items	Commands
[9]	Fine/Coarse	:SENSe:MEASure:QANalysis:THReshold:RESolution :SENSe:MEASure:QANalysis:THReshold:RESolution?
[10]	Error Threshold	:SENSe:MEASure:QANalysis:THReshold:ERANge :SENSe:MEASure:QANalysis:THReshold:ERANge?
[11]	Calculation Threshold	:SENSe:MEASure:QANalysis:THReshold:CALRange :SENSe:MEASure:QANalysis:THReshold:CALRange?
[12]	Auto Search	:SENSe:MEASure:QANalysis:THReshold:ASEarch :SENSe:MEASure:QANalysis:THReshold:ASEarch?
[13]	Correlation Filter	:SENSe:MEASure:QANalysis:THReshold:CFILter :SENSe:MEASure:QANalysis:THReshold:CFILter?
[14]	Current	:SENSe:MEASure:QANalysis:THReshold:CURRent :SENSe:MEASure:QANalysis:THReshold:CURRent?
[15]	Selection of PAM search target threshold	:SENSe:MEASure:QANalysis:THReshold:ASEarch:PAMSet :SENSe:MEASure:QANalysis:THReshold:ASEarch:PAMSet?

### **:SENSe:MEASure:QANalysis:THReshold:START**

Function	Starts Vth vs. Q measurement.
Example	> :SENSe:MEASure:QANalysis:THReshold:START
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:QANalysis:THReshold:STOP**

Function	Stops Vth vs. Q measurement.
Example	> :SENSe:MEASure:QANalysis:THReshold:STOP
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:QANalysis:STATe?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	0 Measurement has been stopped.
	1 During measurement
Function	Queries the Q measurement processing state.
Example	> :SENSe:MEASure:QANalysis:STATe? < 1
Compatibility	Incompatible with existing models.

---

**:SENSe:MEASure:QANalysis:THReshold:SLOT  
<numeric>,<interface>[,<unit>]**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 6                      Slots No. 1 to No. 6 1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A [<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number. Can be omitted. Mainframe No. 1 is specified when omitted.
Function	Sets the Vth vs. Q measurement target slot.
Example	To set the target slot to Slot 2,Data1: > :SENSe:MEASure:QANalysis:THReshold:SLOT 2,1
Compatibility	Incompatible with existing models.

---

**:SENSe:MEASure:QANalysis:THReshold:SLOT? [<unit>]**


---

Parameter	[<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number. Can be omitted. Mainframe No. 1 is specified when omitted.
Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1 to 6                      Slots No. 1 to No. 6 <interface> = <NR1 NUMERIC RESPONSE DATA> 1 to 4                      Data1 to 4
Function	Queries the Vth vs. Q measurement target slot.
Example	> :SENSe:MEASure:QANalysis:THReshold:SLOT? < 2,1
Compatibility	Incompatible with existing models.

---

**:SENSe:MEASure:QANalysis:THReshold:MODE <mode>**


---

Parameter	<mode> = <CHARACTER PROGRAM DATA> SINGLE                      Executes measurement once. REPeat                      Repeats measurement for the specified number of times. UNTImed                      Repeats measurement until it is directed to stop.
Function	Sets the measurement processing mode during Vth vs. Q measurement.
Example	To set the measurement processing mode to Single mode: > :SENSe:MEASure:QANalysis:THReshold:MODE SINGLE
Compatibility	Incompatible with existing models.

---

### **:SENSe:MEASure:QANalysis:THReshold:MODE?**

---

Response	<mode> = <CHARACTER RESPONSE DATA> SING, REP, UNT
Function	Queries the measurement processing mode during Vth vs. Q measurement.
Example	> :SENSe:MEASure:QANalysis:THReshold:MODE? < SING
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:QANalysis:THReshold:TIMes <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 2 to 1000                      2 to 1000 times, in 1-time steps
Function	Sets the number of measurements during Vth vs. Q measurement.
Example	To set the number of measurements to 100 times: > :SENSe:MEASure:QANalysis:THReshold:TIMes 100
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:QANalysis:THReshold:TIMes?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries the number of measurements during Vth vs. Q measurement.
Example	> :SENSe:MEASure:QANalysis:THReshold:TIMes? < 100
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:QANalysis:THReshold:INTerval <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0 to 9999                      0 to 9999 s., in 1-s steps
Function	Sets the measurement interval time during Vth vs. Q measurement.
Example	To set the measurement interval time to 50 sec.: > :SENSe:MEASure:QANalysis:THReshold:INTerval 50
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:QANalysis:THReshold:INTerval?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries the measurement interval time during Vth vs. Q measurement.
Example	> :SENSe:MEASure:QANalysis:THReshold:INTerval? < 50
Compatibility	Incompatible with existing models.



**:SENSe:MEASure:QANalysis:THReshold:DElay <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> -1000 to 1000                    -1000 to 1000 mUI, in 2-mUI steps
Function	Sets the measurement start delay position during Vth vs. Q measurement.
Example	To set the measurement start delay position to 100 mUI: > :SENSe:MEASure:QANalysis:THReshold:DElay 100
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:THReshold:DElay?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries the measurement start delay position during Vth vs. Q measurement.
Example	> :SENSe:MEASure:QANalysis:THReshold:DElay? < 100
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:THReshold:RESolution <mode>**


---

Parameter	<mode> = <CHARACTER PROGRAM DATA> FINE                                    Fine mode COARse                                Coarse mode
Function	Sets the measurement resolution (Fine/Coarse mode) during Vth vs. Q measurement.
Example	To set the measurement resolution to Fine mode: > :SENSe:MEASure:QANalysis:THReshold:RESolution FINE
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:THReshold:RESolution?**


---

Response	<mode> = <CHARACTER RESPONSE DATA> FINE, COAR
Function	Queries the measurement resolution (Fine/Coarse mode) during Vth vs. Q measurement.
Example	> :SENSe:MEASure:QANalysis:THReshold:RESolution? < FINE
Compatibility	Incompatible with existing models.

---

### **:SENSe:MEASure:QANalysis:THReshold:ERANge <upper>,<lower>**

Parameter	<upper> = <CHARACTER PROGRAM DATA> E_3 to E_5                    E-3 to E-5, in single steps <lower> = <CHARACTER PROGRAM DATA> E_7 to E_12                  E-7 to E-12, in single steps
Function	Sets the measurement error threshold range during Vth vs. Q measurement.
Example	To set the measurement error threshold range to E-3 to E-12: > :SENSe:MEASure:QANalysis:THReshold:ERANge E_3,E_12
Compatibility	Incompatible with existing models.

---

### **:SENSe:MEASure:QANalysis:THReshold:ERANge?**

Response	<upper> = <CHARACTER RESPONSE DATA> <lower> = <CHARACTER PROGRAM DATA>
Function	Queries the measurement error threshold range during Vth vs. Q measurement.
Example	> :SENSe:MEASure:QANalysis:THReshold:ERANge? < E_3,E_12
Compatibility	Incompatible with existing models.

---

### **:SENSe:MEASure:QANalysis:THReshold:CALRange <upper>,<lower>**

Parameter	<upper> = <CHARACTER PROGRAM DATA> E_3 to E_5                    E-3 to E-5, in single steps <lower> = <CHARACTER PROGRAM DATA> E_7 to E_12                  E-7 to E-12, in single steps
Function	Sets the error threshold range during Vth vs. Q measurement recalculation.
Example	To set the error threshold range during recalculation to E-5 to E-10: > :SENSe:MEASure:QANalysis:THReshold:CALRange E_5,E_10
Compatibility	Incompatible with existing models.

---

### **:SENSe:MEASure:QANalysis:THReshold:CALRange?**

Response	<upper> = <CHARACTER RESPONSE DATA> <lower> = <CHARACTER RESPONSE DATA>
Function	Queries the error threshold range during Vth vs. Q measurement recalculation.
Example	> :SENSe:MEASure:QANalysis:THReshold:CALRange? < E_5,E_10
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:THReshold:ASEarch <item>**


---

Parameter	<item> = <CHARACTER PROGRAM DATA> OFF                      Auto search OFF THReshold              Threshold auto search PThReshold              Phase & threshold auto search
Function	Sets whether to execute auto search during Vth vs. Q measurement.
Example	To set the threshold auto search ON: > :SENSe:MEASure:QANalysis:THReshold:ASEarch THReshold
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:THReshold:ASEarch?**


---

Response	<item> = <CHARACTER RESPONSE DATA> OFF, THR, PTHR
Function	Queries whether to execute auto search during Vth vs. Q measurement.
Example	> :SENSe:MEASure:QANalysis:THReshold:ASEarch? < THR
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:THReshold:CFILter<boolean>,[<numeric>]**


---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> 0 or OFF                      Filter ON 1 or ON                        Filter OFF [<numeric>] = <DECIMAL NUMERIC PROGRAM DATA> 80 to 100                      80 to 100%, in 1% steps When <boolean> is set to "0" or "OFF", <numeric> can be omitted.
Function	Sets the minimum correlation coefficient with which the Q value is recognized to be valid during Vth vs. Q measurement.
Example	To set the minimum correlation coefficient to 90%: > :SENSe:MEASure:QANalysis:THReshold:CFILter 1,90
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:QANalysis:THReshold:CFILter?**

---

Response	<boolean> = <NR1 NUMERIC RESPONSE DATA> 0 OFF 1 ON <numeric> = <NR1 NUMERIC RESPONSE DATA> 80 to 100 When <boolean> is 0, <numeric> is omitted.
Function	Queries the minimum correlation coefficient with which the Q value is recognized to be valid during Vth vs. Q measurement.
Example	> :SENSe:MEASure:QANalysis:THReshold:CFILter? < 1, 90
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:QANalysis:THReshold:CURRent <boolean>**

---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> 0 or OFF OFF: Updates at measurement termination 1 or ON ON: Updates every second
Function	Sets the graph display update period during Vth vs. Q measurement.
Example	To set the graph display update timing to every second: > :SENSe:MEASure:QANalysis:THReshold:CURRent 1
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:QANalysis:THReshold:CURRent?**

---

Response	<boolean> = <NR1 NUMERIC RESPONSE DATA> 0 OFF 1 ON
Function	Queries the graph display update period during Vth vs. Q measurement.
Example	> :SENSe:MEASure:QANalysis:THReshold:CURRent? < 1
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:THReshold:ASEarch:PAMSet <threshold>**

Parameter	<threshold> = <CHARACTER PROGRAM DATA> OFF PAM Auto Search OFF TOP Searches the Top threshold MIDDLE Searches the Middle threshold BOTTom Searches the Bottom threshold
Function	Sets the search target threshold for PAM Auto Search when measuring Vth vs Q.
Example	To set to Top threshold search. > :SENSe:MEASure:QANalysis:THReshold:ASEarch:PAMSet TOP
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:THReshold:ASEarch:PAMSet?**

Response	<item> = <CHARACTER RESPONSE DATA> OFF, TOP, MIDD, BOTT
Function	Queries the search target threshold for PAM Auto Search when measuring Vth vs Q.
Example	> :SENSe:MEASure:QANalysis:THReshold:ASEarch:PAMSet? < TOP
Compatibility	Incompatible with existing models.

7.12.14.2 Phase vs. Q measurement setting commands

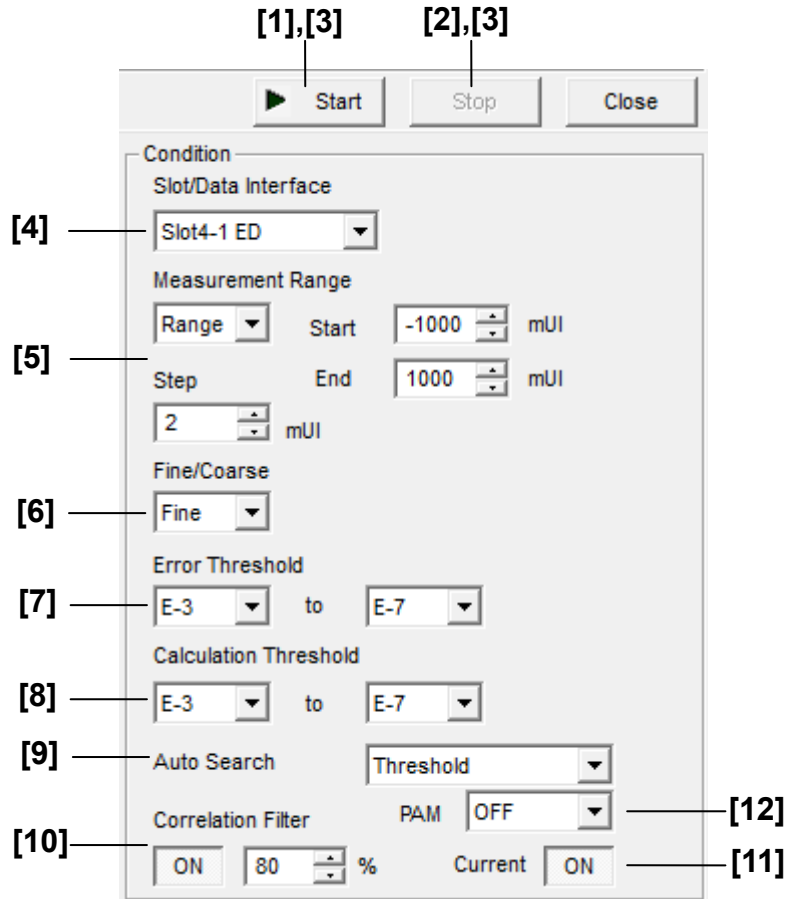


Figure 7.12.14.2-1 Phase vs. Q measurement setting field

Table 7.12.14.2-1 Phase vs. Q measurement setting commands

No.	Setting Items		Commands
[1]	Start		:SENSe:MEASure:QANalysis:PHASe:STARt
[2]	Stop		:SENSe:MEASure:QANalysis:PHASe:STOP
[3]	Query for measurement state		:SENSe:MEASure:QANalysis:STATe?
[4]	Slot		:SENSe:MEASure:QANalysis:PHASe:SLOT :SENSe:MEASure:QANalysis:PHASe:SLOT?
[5]	Measurement Range	Start	:SENSe:MEASure:QANalysis:PHASe:RANGe
		End	:SENSe:MEASure:QANalysis:PHASe:RANGe?
		Center	:SENSe:MEASure:QANalysis:PHASe:WIDTh
		Span	:SENSe:MEASure:QANalysis:PHASe:WIDTh?
[6]	Fine/Coarse		:SENSe:MEASure:QANalysis:PHASe:RESolution :SENSe:MEASure:QANalysis:PHASe:RESolution?
	Error Threshold		:SENSe:MEASure:QANalysis:PHASe:ERANGe :SENSe:MEASure:QANalysis:PHASe:ERANGe?

Table 7.12.14.2-1 Phase vs. Q measurement setting commands (Cont'd)

No.	Setting Items	Commands
[8]	Calculation Threshold	:SENSe:MEASure:QANalysis:PHASe:CALRange
		:SENSe:MEASure:QANalysis:PHASe:CALRange?
[9]	Auto Search	:SENSe:MEASure:QANalysis:PHASe:ASEarch
		:SENSe:MEASure:QANalysis:PHASe:ASEarch?
[10]	Correlation Filter	:SENSe:MEASure:QANalysis:PHASe:CFILter
		:SENSe:MEASure:QANalysis:PHASe:CFILter?
[11]	Current	:SENSe:MEASure:QANalysis:PHASe:CURRent
		:SENSe:MEASure:QANalysis:PHASe:CURRent?
[12]	Selection of PAM search target threshold	:SENSe:MEASure:QANalysis:PHASe:ASEarch:PAMSet
		:SENSe:MEASure:QANalysis:PHASe:ASEarch:PAMSet?

**:SENSe:MEASure:QANalysis:PHASe:START**

Function	Starts Phase vs. Q measurement.
Example	> :SENSe:MEASure:QANalysis:PHASe:START
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:PHASe:STOP**

Function	Stops Phase vs. Q measurement.
Example	> :SENSe:MEASure:QANalysis:PHASe:STOP
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:STATe?**

Response	numeric> = <NR1 NUMERIC RESPONSE DATA>
	0                      During measurement stop
	1                      During measurement
Function	Queries the measurement processing state during Q measurement.
Example	> :SENSe:MEASure:QANalysis:STATe? < 1
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:PHASe:SLOT  
<numeric>,<interface>[,<unit>]**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 6                      Slots No. 1 to No. 6 1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Data1 to 4 [<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number. Can be omitted. Mainframe No. 1 is specified when omitted.
Function	Selects the Phase vs. Q measurement target slot.
Example	To set the target slot to Slot2,Data1: > :SENSe:MEASure:QANalysis:PHASe:SLOT 2,1
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:PHASe:SLOT? [<unit>]**

---

Parameter	[<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number. Can be omitted. Mainframe No. 1 is specified when omitted.
Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 1 to 6                      Slots No. 1 to No. 6 <interface> = <NR1 NUMERIC RESPONSE DATA> 1 to 4                      Data1 to 4
Function	Queries the Phase vs. Q measurement target slot.
Example	> :SENSe:MEASure:QANalysis:PHASe:SLOT? < 2,1
Compatibility	Incompatible with existing models.



**:SENSe:MEASure:QANalysis:PHASe:RANGe <start>,<end>,<step>**

Parameter	<start> = <DECIMAL NUMERIC PROGRAM DATA> -1000 to 998                      -1000 to 998mUI/2 mUI Step <end> = <DECIMAL NUMERIC PROGRAM DATA> -998 to 1000                      -998 to 1000 mUI/2 mUI Step <step> = <DECIMAL NUMERIC PROGRAM DATA> 2 to 200                              2 to 200 mUI/2 mUI Step
Function	Sets the measurement range and measurement step during Phase vs. Q measurement.
Example	To set the measurement range to -200 to 300 mUI and measurement step to 10 mUI: > :SENSe:MEASure:QANalysis:PHASe:RANGe -200,300,10
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:PHASe:RANGe?**

Response	<start> = <NR1 NUMERIC RESPONSE DATA> <end> = <NR1 NUMERIC RESPONSE DATA> <step> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries the measurement range during Phase vs. Q measurement.
Example	> :SENSe:MEASure:QANalysis:PHASe:RANGe? < -200,300,10
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:PHASe:WIDTh <center>,<span>,<step>**

Parameter	<center> = <DECIMAL NUMERIC PROGRAM DATA> -998 to 998                      -998 to 998 mUI/2 mUI Step <span> = <DECIMAL NUMERIC PROGRAM DATA> 4 to 2000                              4 to 2000 mUI/4 mUI Step <step> = <DECIMAL NUMERIC PROGRAM DATA> 2 to 200                              2 to 200 mUI/2 mUI Step
Function	Sets the measurement range and measurement step during Phase vs. Q measurement.
Example	To set the measurement range to 100 mUI, centered at 200 mUI, in 10-mUI steps: > :SENSe:MEASure:QANalysis:PHASe:WIDTh 100,200,10
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:QANalysis:PHASe:WIDTh?**

Response	<center> = <NR1 NUMERIC RESPONSE DATA> <span> = <NR1 NUMERIC RESPONSE DATA> <step> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries the measurement range during Phase vs. Q measurement.
Example	> :SENSe:MEASure:QANalysis:PHASe:WIDTh? < 100,200,10
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:QANalysis:PHASe:RESolution <mode>**

Parameter	<mode> = <CHARACTER PROGRAM DATA> FINE                      Fine mode COARse                    Coarse mode
Function	Sets the measurement resolution (Fine/Coarse mode) during Phase vs. Q measurement.
Example	To set the measurement resolution to Fine mode: > :SENSe:MEASure:QANalysis:PHASe:RESolution FINE
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:QANalysis:PHASe:RESolution?**

Response	<mode> = <CHARACTER RESPONSE DATA> FINE, COAR
Function	Queries the measurement resolution (Fine/Coarse mode) during Phase vs. Q measurement.
Example	> :SENSe:MEASure:QANalysis:PHASe:RESolution? < FINE
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:QANalysis:PHASe:ERANge <upper>,<lower>**

Parameter	<upper> = <CHARACTER PROGRAM DATA> E_3 to E_5                E-3 to E-5, in single steps <lower> = <CHARACTER PROGRAM DATA> E_7 to E_12              E-7 to E-12, in single steps
Function	Sets the measurement error threshold range during Phase vs. Q measurement.
Example	To set the measurement error threshold range to E-3 to E-12: > :SENSe:MEASure:QANalysis:PHASe:ERANge E_3,E_12
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:PHASe:ERANge?**

Response	<upper> = <CHARACTER RESPONSE DATA> <lower> = <CHARACTER RESPONSE DATA>
Function	Queries the measurement error threshold range during Phase vs. Q measurement.
Example	> :SENSe:MEASure:QANalysis:PHASe:ERANge? < E_3,E_12
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:PHASe:CALRange <upper>,<lower>**

Parameter	<upper> = <CHARACTER PROGRAM DATA> E_3 to E_5                      E-3 to E-5, in single steps <lower> = <CHARACTER PROGRAM DATA> E_7 to E_12                    E-7 to E-12, in single steps
Function	Sets the error threshold range during Phase vs. Q measurement recalculation.
Example	To set the error threshold range during recalculation to E-5 to E-10: > :SENSe:MEASure:QANalysis:PHASe:CALRange E_5,E_10
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:PHASe:CALRange?**

Response	<upper> = <CHARACTER RESPONSE DATA> <lower> = <CHARACTER RESPONSE DATA>
Function	Queries the error threshold range during Phase vs. Q measurement recalculation.
Example	> :SENSe:MEASure:QANalysis:PHASe:CALRange? < E_5,E_10
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:PHASe:ASEarch <item>**

Parameter	<item> = <CHARACTER PROGRAM DATA> OFF                              Auto search OFF THReshold                      Threshold auto search
Function	Sets execution of auto search during Phase vs. Q measurement.
Example	To set the threshold auto search ON: > :SENSe:MEASure:QANalysis:PHASe:ASEarch THReshold
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:PHASe:ASEarch?**

---

Response	<item> = <CHARACTER RESPONSE DATA> OFF, THR
Function	Queries the execution of auto search during Phase vs. Q measurement.
Example	> :SENSe:MEASure:QANalysis:PHASe:ASEarch? < THR
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:PHASe:CFILter <boolean>[,<numeric>]**

---

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> 0 or OFF                      Filter OFF 1 or ON                         Filter ON <numeric> = <DECIMAL NUMERIC PROGRAM DATA> 80 to 100                      80 to 100%, in 1% steps Omitted when <boolean> is "0" or "OFF".
Function	Sets the minimum correlation coefficient with which the Q value is recognized to be valid during Phase vs. Q measurement.
Example	To set the minimum correlation coefficient to 90%: > :SENSe:MEASure:QANalysis:PHASe:CFILter 1,90
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:PHASe:CFILter?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0                                      OFF 1                                      ON <numeric> = <NR1 NUMERIC RESPONSE DATA> 80 to 100                      80 to 100%
Function	Queries the minimum correlation coefficient with which the Q value is recognized to be valid during Phase vs. Q measurement.
Example	> :SENSe:MEASure:QANalysis:PHASe:CFILter? < 1,90
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:PHASe:CURRent <boolean>**

Parameter	<boolean> = <BOOLEAN PROGRAM DATA> 0 or OFF                      OFF: Updates at measurement termination 1 or ON                        ON: Updates every second
Function	Sets the graph display update period during Phase vs. Q measurement.
Example	To set the graph display update timing to every second: > :SENSe:MEASure:QANalysis:PHASe:CURRent 1
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:PHASe:CURRent?**

Response	<boolean> = <NR1 NUMERIC RESPONSE DATA> 0                                OFF 1                                ON
Function	Queries the graph display update period during Phase vs. Q measurement.
Example	> :SENSe:MEASure:QANalysis:PHASe:CURRent? < 1
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:PHASe:ASEarch:PAMSet <threshold>**

Parameter	<threshold> = <CHARACTER PROGRAM DATA> OFF                              PAM Auto Search OFF TOP                               Searches the Top threshold MIDDLE                         Searches the Middle threshold BOTTom                         Searches the Bottom threshold
Function	Sets the search target threshold for PAM Auto Search when measuring Phase vs Q.
Example	To set to Top threshold search. > :SENSe:MEASure:QANalysis:PHASe:ASEarch:PAMSet TOP
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:PHASe:ASEarch:PAMSet?**

Response	<item> = <CHARACTER RESPONSE DATA> OFF, TOP, MIDD, BOTT
Function	Queries the search target threshold for PAM Auto Search when measuring Phase vs Q.
Example	> :SENSe:MEASure:QANalysis:PHASe:ASEarch:PAMSet? < TOP
Compatibility	Incompatible with existing models.

### 7.12.14.3 Graph display setting commands

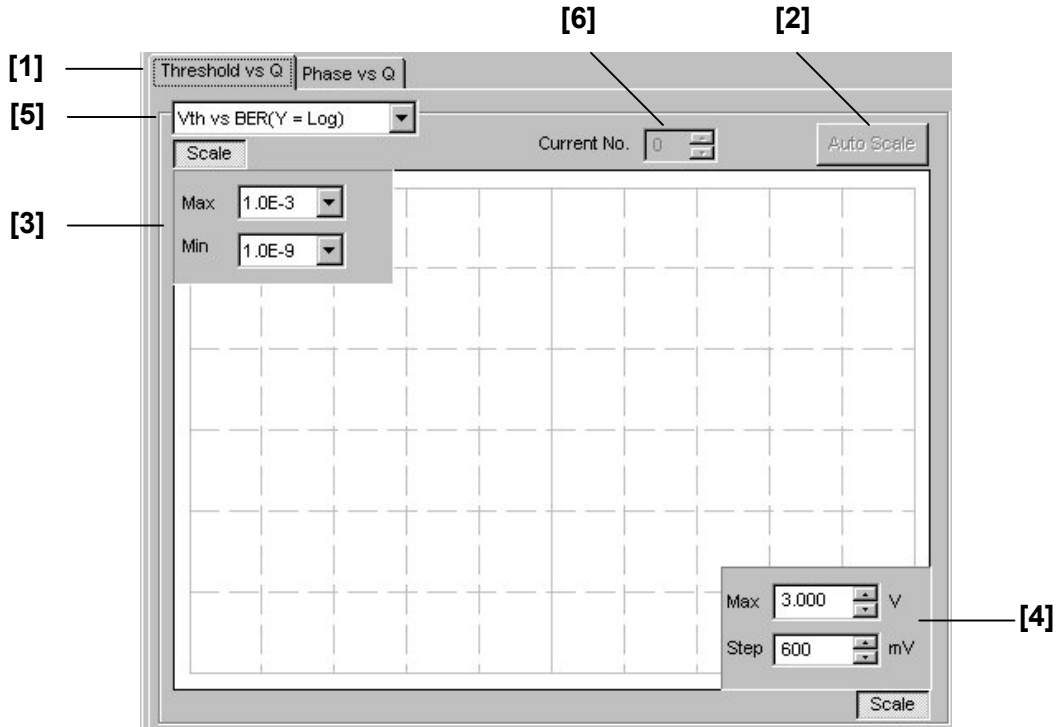


Figure 7.12.14.3-1 Graph display screen (Threshold vs Q tab window)

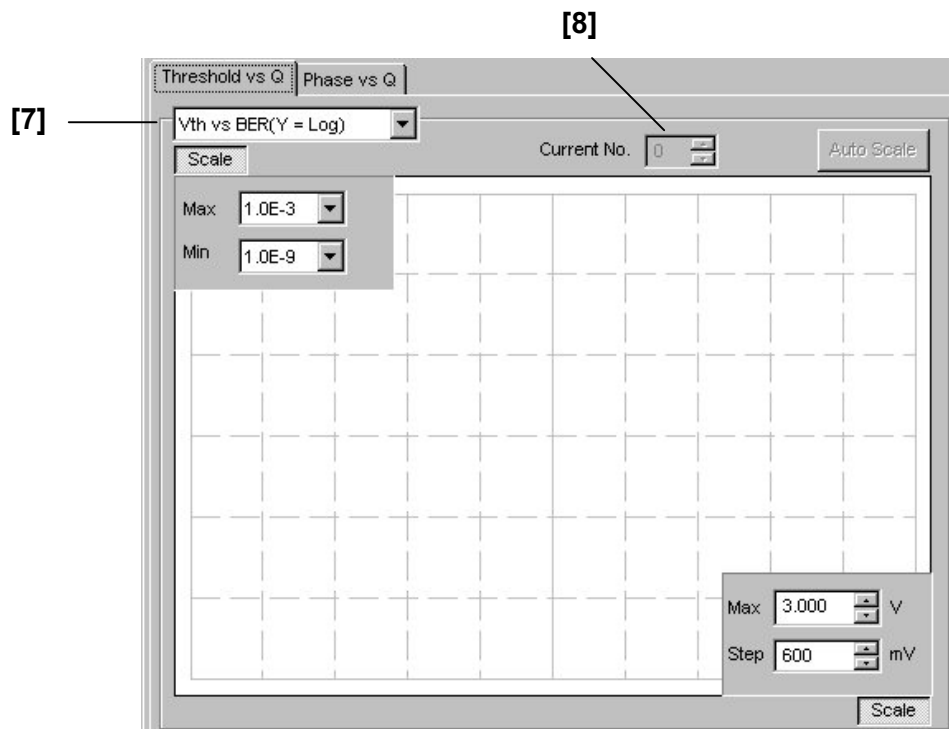


Figure 7.12.14.3-2 Graph display screen (Phase vs Q tab)

Table 7.12.14.3-1 Graph display setting commands

No.	Setting Items	Commands
[1]	Measurement mode switching	:DISPlay:RESult:QANalysis:MODE
		:DISPlay:RESult:QANalysis:MODE?
[2]	Auto Scale	:DISPlay:RESult:QANalysis:SCALe:ASCale
[3]	Max Min	:DISPlay:RESult:QANalysis:SCALe:VERTical
		:DISPlay:RESult:QANalysis:SCALe:VERTical?
[4]	Max Step	:DISPlay:RESult:QANalysis:SCALe:HORizontal
		:DISPlay:RESult:QANalysis:SCALe:HORizontal?
[5]	Threshold vs. Q Display graph selection	:DISPlay:RESult:QANalysis:THREshold:ITEM
		:DISPlay:RESult:QANalysis:THREshold:ITEM?
[6]	Threshold vs. Q Current No.	:DISPlay:RESult:QANalysis:THREshold:MNUMber
		:DISPlay:RESult:QANalysis:THREshold:MNUMber?
[7]	Phase vs. Q Display graph selection	:DISPlay:RESult:QANalysis:PHASe:ITEM
		:DISPlay:RESult:QANalysis:PHASe:ITEM?
[8]	Phase vs. Q Current No.	:DISPlay:RESult:QANalysis:PHASe:MNUMber
		:DISPlay:RESult:QANalysis:PHASe:MNUMber?

### :DISPlay:RESult:QANalysis:MODE <mode>

Parameter	<mode> = <CHARACTER PROGRAM DATA> THREshold                    Vth vs. Q measurement PHASe                        Phase vs. Q measurement
Function	Sets the graph display item from Vth vs. Q measurement or Phase vs. Q measurement. The settings for the display scale and the marker correspond to this setting.
Example	To set to Vth vs. Q measurement: > :DISPlay:RESult:QANalysis:MODE THREshold
Compatibility	Incompatible with existing models.

### :DISPlay:RESult:QANalysis:MODE?

Response	<mode> = <CHARACTER RESPONSE DATA> THRE, PHAS
Function	Queries the item to be displayed in the graph during Vth vs. Q measurement.
Example	> :DISPlay:RESult:QANalysis:MODE? < THRE
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:QANalysis:SCALE:AScale**

Function	Automatically adjusts the graph display in Q measurement.
Example	> :DISPlay:RESult:QANalysis:SCALE:AScale
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:QANalysis:SCALE:VERTical <max>,[<step>]**

Parameter	<max>,[<step>] = <DECIMAL NUMERIC PROGRAM DATA>
-----------	---

**Table 7.12.14.3-2 Parameters for Threshold vs. Q tab window**

Format	<max>	<step>	Remarks
Vth vs BER(Y = Log)	2 to 7 (E-2 to E-7), in single steps	Inputs the minimum value. 8 to 14 (E-8 to E-14), in single steps	A difference between <max> and <step> must be 7 or greater even number.
Vth vs BER(Y = Log(-Ln))	2 to 7 (E-2 to E-7), in single steps	Inputs the minimum value. 8 to 14 (E-8 to E-14), in single steps	A difference between <max> and <step> must be 7 or greater even number.
Vth vs Q	10 to 1000, in 10 steps	1 to 100, in single steps	When Linear
	-40 to 60, in 10 steps	1 to 11, in single steps	When Log
Times vs Q	10 to 1000, in 10 steps	1 to 100, in single steps	When Linear
	-40 to 60, in 10 steps	1 to 11, in single steps	When Log
Histogram	50 to 1000, in 50 steps	Omitted	



Table 7.12.14.3-3 Parameters for Phase vs. Q tab window

Format	<max>	<step>	Remarks
Vth vs BER(Y = Log)	2 to 7 (E-2 to E-7), in single steps	Inputs the minimum value. 8 to 14 (E-8 to E-14), in single steps	A difference between <max> and <step> must be 7 or greater even number.
Vth vs BER(Y = Log(-Ln))	2 to 7 (E-2 to E-7), in single steps	Inputs the minimum value. 8 to 14 (E-8 to E-14), in single steps	A difference between <max> and <step> must be 7 or greater even number.
Vth vs Q	10 to 1000, in 10 steps	1 to 100, in single steps	When Linear
	-40 to 60, in 10 steps	1 to 11, in single steps	When Log
Phase vs Q	10 to 1000, in 10 steps	1 to 100, in single steps	When Linear
	-40 to 60, in 10 steps	1 to 11, in single steps	When Log
Phase vs $\sigma$	0.0010 to 1.0000, in 0.0010 steps	0.001 to 0.1000, 0.0001 steps	
Phase vs $\mu$	-3.990 to 4.000 (V), in 0.010 V steps	0.001 to 0.800 (V), in 0.001 V steps	
Phase vs Opt BER	10 to 1 (E-10 to E-1), in single steps	Inputs the minimum value. 199 to 20 (E-199 to E-20), in single steps	
Phase vs Opt Threshold	-3.990 to 4.000 (V), in 0.010 V steps	0.001 to 0.800 (V), in 0.001 V steps	
Phase vs Correlation	10 to 100 (%), in 10 % steps	0 to 90 (%), in 10 % steps	A difference between <max> and <step> must be 10 or greater

**Note:**

Settings vary, depending on the status of the installed options for each slot, and the data input interface settings.

Function	Sets the vertical scale of the graph display during Q measurement. Inputs the minimum value instead of the step width, only when the vertical axis displays the error rate.
Example	To set the vertical scale during QLog display to maximum 10 dB, in 1-dB steps: > :DISPlay:RESult:QANalysis:SCALE:VERTical 10,1
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:QANalysis:SCALE:VERTical?**

Response	<max>,<step> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries the vertical scale of the graph display during Q measurement.
Example	To query the vertical graph scale during QLog display: > :DISPlay:RESult:QANalysis:SCALE:VERTical? < 10,1
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:QANalysis:SCALE:HORizontal <max>,<step>**

Parameter <max>,<step> = <DECIMAL NUMERIC PROGRAM DATA>

**Table 7.12.14.3-4 Parameters for Threshold vs. Q tab window**

Format	<max>	<step>	Remarks
Vth vs BER(Y = Log)	-3.990 to 4.000 (V), in 0.010 V steps	0.001 to 0.800 (V), in 0.001 V steps	
Vth vs BER(Y = Log(-Ln))	-3.990 to 4.000 (V), in 0.010 V steps	0.001 to 0.800 (V), in 0.001 V steps	
Vth vs Q	-3.990 to 4.000 (V), in 0.010 V steps	0.001 to 0.800 (V), in 0.001 V steps	
Times vs Q	100 to 1000, in 50 steps	10 (fixed)	
Histogram	0.16 to 1000.00, in 0.01 steps	16/32/64/128/256	When Linear <max> must be greater than <step>.
	-49.84 to 60.00 (dB), in 0.01 steps	16/32/64	When Log

**Table 7.12.14.3-5 Parameters for Phase vs. Q tab window**

Format	<max>	<step>	Remarks
Vth vs BER(Y = Log)	-3.990 to 4.000 (V), in 0.010 V steps	0.001 to 0.800 (V), in 0.001 V steps	
Vth vs BER(Y = Log(-Ln))	-3.990 to 4.000 (V), in 0.010 V steps	0.001 to 0.800 (V), in 0.001 V steps	
Vth vs Q	-3.990 to 4.000 (V), in 0.010 V steps	0.001 to 0.800 (V), in 0.001 V steps	
Phase vs Q	-900 to 1000 (mUI), in 100 mUI steps	10 to 200 (mUI), in 10 mUI steps	
Phase vs $\sigma$	-900 to 1000 (mUI), in 100 mUI steps	10 to 200 (mUI), in 10 mUI steps	
Phase vs $\mu$	-900 to 1000 (mUI), in 100 mUI steps	10 to 200 (mUI), in 10 mUI steps	
Phase vs Opt BER	-900 to 1000 (mUI), in 100 mUI steps	10 to 200 (mUI), in 10 mUI steps	
Phase vs Opt Threshold	-900 to 1000 (mUI), in 100 mUI steps	10 to 200 (mUI), in 10 mUI steps	
Phase vs Correlation	-900 to 1000 (mUI), in 100 mUI steps	10 to 200 (mUI), in 10 mUI steps	

**Note:**

Settings vary, depending on the status of the installed options for each slot, and the data input interface settings.

---

Function	Sets the horizontal scale of the graph display during Q measurements. The format varies depending on the graph type.
Example	To set the horizontal scale during Vth display to maximum -1.000 V, in 0.100 steps: > :DISPlay:RESult:QANalysis:SCALe:HORizontal -1.000,0.100
Compatibility	Incompatible with existing models.

### **:DISPlay:RESult:QANalysis:SCALe:HORizontal?**

---

Response	<max>,<step> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries the horizontal scale of the graph display during Q measurement.
Example	To query the horizontal graph scale during Vth display: > :DISPlay:RESult:QANalysis:SCALe:HORizontal? < -1.000,0.100
Compatibility	Incompatible with existing models.

### **:DISPlay:RESult:QANalysis:THReshold:ITEM <mode>**

---

Parameter	<mode> = <CHARACTER PROGRAM DATA> LBER                      Vth vs. BER (Y axis Log) LNBER                     Vth vs. BER (Y axis Log (-Ln)) VTHQ                       Vth vs. Q TIMQ                       Times vs. Q HISTogram                Histogram
Function	Sets the item to be displayed in the graph during Vth vs. Q measurement.
Example	To set the item to be displayed to Vth vs. Q: > :DISPlay:RESult:QANalysis:THReshold:ITEM VTHQ
Compatibility	Incompatible with existing models.

### **:DISPlay:RESult:QANalysis:THReshold:ITEM?**

---

Response	<mode> = <CHARACTER RESPONSE DATA> LBER, LNB, VTHQ, TIMQ, HIST
Function	Queries the item to be displayed in the graph during Vth vs. Q measurement.
Example	> :DISPlay:RESult:QANalysis:THReshold:ITEM? < VTHQ
Compatibility	Incompatible with existing models.

### **:DISPlay:RESult:QANalysis:THReshold:MNUMber <numeric>**

Parameter	<numeric> = <DECIMAL PROGRAM DATA> 1 to 1000	Measurement number (number of measurements during repeat measurement)
Function	Sets the measurement number for which the Vth vs. Q measurement result is displayed in a graph.	
Example	To set the measurement number for graph display to 100: > :DISPlay:RESult:QANalysis:THReshold:MNUMber 100	
Compatibility	Incompatible with existing models.	

### **:DISPlay:RESult:QANalysis:THReshold:MNUMber?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>	
Function	Queries the measurement number for which the Vth vs. Q measurement result is displayed in a graph.	
Example	> :DISPlay:RESult:QANalysis:THReshold:MNUMber? < 100	
Compatibility	Incompatible with existing models.	

### **:DISPlay:RESult:QANalysis:PHASe:ITEM <mode>**

Parameter	<mode> = <CHARACTER PROGRAM DATA>	
	LBER	Vth vs. BER (Y axis Log)
	LNber	Vth vs. BER (Y axis Log (-Ln))
	VTHQ	Vth vs. Q
	PHAQ	Phase vs. Q
	PHASigma	Phase vs. $\sigma$
	PHAMu	Phase vs. $\mu$
	PHABer	Phase vs. Optimum BER
	PHAVth	Phase vs. Optimum Vth
	PHACorre	Phase vs. Correlation coefficient
Function	Sets the item to be displayed in the graph during Phase vs. Q measurement.	
Example	To set the item to be displayed in the graph to Phase vs. Q: > :DISPlay:RESult:QANalysis:PHASe:ITEM PHAQ	
Compatibility	Incompatible with existing models.	

**:DISPlay:RESult:QANalysis:PHASe:ITEM?**


---

Response	<mode> = <CHARACTER RESPONSE DATA> LBER, LNB, VTHQ, PHAQ, PHAS, PHAM, PHAB, PHAV, PHAC
Function	Queries the item to be displayed in the graph during Phase vs. Q measurement.
Example	> :DISPlay:RESult:QANalysis:PHASe:ITEM? < PHAQ
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:QANalysis:PHASe:MNUMber <numeric>**


---

Parameter	<numeric> = <DECIMAL PROGRAM DATA> 1 to 1000                      Measurement number 1 to 1000 (number of measurements during repeat measurement)
Function	Sets the measurement number for which the Phase vs. Q measurement result is displayed in a graph.
Example	To set the measurement number graph display to 100: > :DISPlay:RESult:QANalysis:PHASe:MNUMber 100
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:QANalysis:PHASe:MNUMber?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
Function	Queries the measurement number for which the Phase vs. Q measurement result is displayed in a graph.
Example	> :DISPlay:RESult:QANalysis:PHASe:MNUMber? < 100
Compatibility	Incompatible with existing models.

7.12.14.4 Measurement results and status query commands

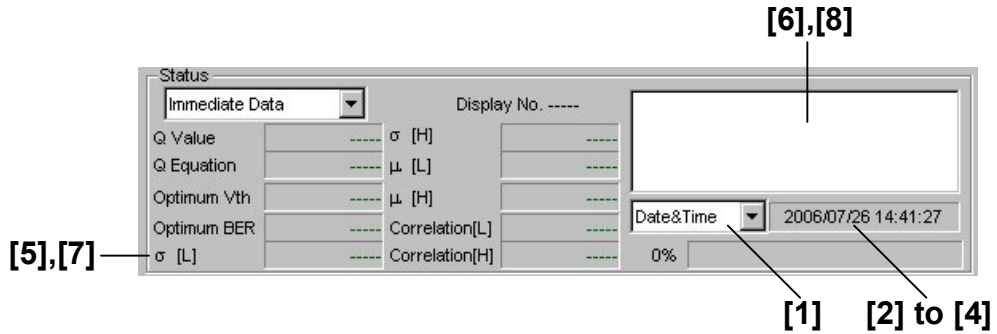


Figure 7.12.14.4-1 Measurement results and status display field

Table 7.12.14.4-1 Measurement results and status query commands

No.	Setting Items	Commands
[1]	No label (Setting of time display)	:SENSE:MEASure:QANalysis:TIME :SENSE:MEASure:QANalysis:TIME?
[2]	Query for current time	:SENSE:MEASure:QANalysis:DTIME?
[3]	Query for measurement start time	:SENSE:MEASure:QANalysis:START?
[4]	Query for measurement elapsed time	:SENSE:MEASure:QANalysis:ELAPsed?
[5]	Query for Vth vs. Q measurement result	:CALCulate:DATA:QANalysis:THReshold?
[6]	Query for Vth vs. Q measurement status	:CALCulate:DATA:QANalysis:TSTatus?
[7]	Query for Phase vs. Q measurement result	:CALCulate:DATA:QANalysis:PHASe?
[8]	Query for Phase vs. Q measurement status	:CALCulate:DATA:QANalysis:PSTatus?

**:SENSE:MEASure:QANalysis:TIME <type>**

Parameter	<type> = <CHARACTER PROGRAM DATA> DTIME Displays the current date and time. START Displays the measurement start time. ELAPsed Displays the elapsed time based on the measurement period.
Function	Selects the Q measurement time display type.
Example	To set the Q measurement time display type to measurement start time (Start Time): > :SENSE:MEASure:QANalysis:TIME START
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:TIME?**


---

Response	<type> = <CHARACTER RESPONSE DATA> DTIM, STAR, ELAP
Function	Queries the Q measurement time display type.
Example	> :SENSe:MEASure:QANalysis:TIME? < STAR
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:QANalysis:DTIME?**


---

Response	<year>,<month>,<day>,<hour>,<min>,<sec> <year> = <NR1 NUMERIC RESPONSE DATA> 2000 to 2036                      2000 to 2036 year <month> = <NR1 NUMERIC RESPONSE DATA> 1 to 12                              January to December <day> = <NR1 NUMERIC RESPONSE DATA> 1 to 31                                1st to 31st <hour> = <NR1 NUMERIC RESPONSE DATA> 0 to 23                                0 to 23 hours <minute> = <NR1 NUMERIC RESPONSE DATA> 0 to 59                                0 to 59 minutes <second> = <NR1 NUMERIC RESPONSE DATA> 0 to 59                                0 to 59 seconds
Function	Queries the current date and time during Q measurement.
Example	> :SENSe:MEASure:QANalysis:DTIME? < 2005,12,31,23,59,59
Compatibility	Incompatible with existing models.

## **:SENSe:MEASure:QANalysis:START?**

---

Response	<p>&lt;year&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0, 2000 to 2036            2000 to 2036 year &lt;month&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0, 1 to 12                 January to December &lt;day&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0, 1 to 31                 1st to 31st &lt;hour&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0 to 23                    0 to 23 hours &lt;minute&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0 to 59                    0 to 59 minutes &lt;second&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0 to 59                    0 to 59 seconds "0,0,0,0,0,0" is returned if there is no measurement start time data.</p>
Function	Queries the measurement start time (Start Time) during Q measurement.
Example	<pre>&gt; :SENSe:MEASure:QANalysis:START? &lt; 2005,12,31,23,59,59</pre>
Compatibility	Incompatible with existing models.

## **:SENSe:MEASure:QANalysis:ELAPsed?**

---

Response	<p>&lt;day&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0 to 99                    0 to 99 days &lt;hour&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0 to 23                    0 to 23 hours &lt;minute&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0 to 59                    0 to 59 minutes &lt;second&gt; = &lt;NR1 NUMERIC RESPONSE DATA&gt; 0 to 59                    0 to 59 seconds "0,0,0,0" is returned if there is no measurement elapsed time data.</p>
Function	Queries the measurement elapsed time (Elapsed time) during Q measurement.
Example	<pre>&gt; :SENSe:MEASure:QANalysis:ELAPsed? &lt; 31,23,59,59</pre>
Compatibility	Incompatible with existing models.



**:CALCulate:DATA:QANalysis:THReshold? <string>**

Parameter	<string> = <STRING PROGRAM DATA>
	<result1> For the contents of measurement data <result1> see Table 7.12.14.4-2.
	<result2> For the contents of immediate data <result2> see Table 7.12.14.4-3.
	<result3> For the contents of statistic data <result3> see Table 7.12.14.4-4.

**Table 7.12.14.4-2 Vth vs. Q measurement result <result1>**

Items		<result1>	Response Format
Top side Vth/Error Rate	Number of measurements 1 to 1000	"VTHQ:TOP,1" ... "VTHQ:TOP,1000"	Form 1
Bottom side Vth/Error Rate	Number of measurements 1 to 1000	"VTHQ:BTM,1" ... "VTHQ:BTM,1000"	Form 1

The measurement result for each Vth is delimited with a comma (,) and returned.

**Table 7.12.14.4-3 Vth vs. Q immediate data <result2>**

Items		<result2>	Response Format
Q value	Number of measurements 1 to 1000	"QVALue:1"... "QVALue:1000"	Form 2
Optimum BER		"OPTBer:1"... "OPTBer:1000"	Form 3
Optimum Vth		"OPTVth:1"... "OPTVth:1000"	Form 4
Correlation bottom		"CORBtm:1"... "CORBtm:1000"	Form 2
Correlation top		"CORTop:1"... "CORTop:1000"	Form 2
$\sigma$ bottom		"SGMBtm:1"... "SGMBtm:1000"	Form 2
$\sigma$ top		"SGMTop:1"... "SGMTop:1000"	Form 2
$\mu$ bottom		"MUBtm:1"... "MUBtm:1000"	Form 4
$\mu$ top		"MUTop:1"... "MUTop:1000"	Form 4
Q Equation		"QEQ:1"... "QEQ:1000"	Form 2

Table 7.12.14.4-4 Vth vs. Q measurement statistic data <result3>

Items	<Result3>	Response Format
Total Data	"TOTAl"	Form5
Valid Data	"VALid"	Form5
Q Max	"QMAX"	Form2
Q Min	"QMIN"	Form2
Q Mean	"QMEan"	Form2
Q $\sigma$	"QSGM"	Form2
Q-5 $\sigma$	"QSGM5"	Form2

Response <string> = <STRING RESPONSE DATA>

Table 7.12.14.4-5 Response format

Form	Format	Description
Form1 Vth-Q type	"XX.XXX,Y.YYYYYE-YYY"	XX.XXX: Threshold (V) Y.YYYYYE-YYY: Error Rate
	"-----"	When no data corresponds to the query.
Form2 %type (dB type)	"XXX.XX"	When 0.00 to 100.00
	"-----"	When no data corresponds to the query.
Form3 Fraction type	"X.XXXXXE-XXX"	When 0.0000E-016 to 1.0000E000
	"-----"	When no data corresponds to the query.
	"< 1.0E-199"	When E-199 or less
Form4 Voltage type	"XX.XXXX"	When -4.0000 to 4.0000
	"-----"	When no data corresponds to the query.
Form5 Integer type	"XXXX"	When 0 to 9999
	"-----"	When no data corresponds to the query.

Function Queries the Vth vs. Q measurement result.

Example To query the measurement result of the 10th time, on the top side:  
 > :CALCulate:DATA:QANalysis:THReshold? "VTHQ:TOP,10"  
 < "1.000,1.2345E-003", "1.100,1.2345E-004",  
 "1.200,1.2345E-005",  
 "1.300,1.2345E-006"

Compatibility Incompatible with existing models.

**:CALCulate:DATA:QANalysis:TStatus?**

Response	<string> = <STRING RESPONSE DATA>
	"" When no alarm exists
	"Sync Loss" Sync. Loss
	"Clock Loss" Clock Loss
	"CR Unlock" CR Unlock
	"Out of range" Out of range
	"Frequency NG" Frequency NG
	"Illegal Error" Illegal Error
	"Meas. Threshold exceeded" Number of errors exceeds the target rate

**Note:**

Displays any one of the alarms.

When two or more alarms have occurred, they are displayed in the following order:

Illegal Error > Frequency NG > Clock Loss(CR Unlock) > Sync Loss > Out of range

Function	Queries the Vth vs. Q measurement status.
Example	> :CALCulate:DATA:QANalysis:TStatus? < "Sync Loss"
Compatibility	Incompatible with existing models.

**:CALCulate:DATA:QANalysis:PHASe? <string>**

Parameter	<string> = <STRING PROGRAM DATA>
	<result1> For the contents of measurement data <result1>, see Table 7.12.14.4-6.
	<result2> For the contents of immediate data <result2>, see Table 7.12.14.4-7.

**Table 7.12.14.4-6 Phase vs. Q measurement result <result1>**

Items		<result1>	Response Format
Top side Vth-Error Rate	Phase -1000 to 1000 mUI	"VTHQ:TOP,XXXXX"	Form1
Bottom side Vth-Error Rate	Phase -1000 to 1000 mUI	"VTHQ:BTM,XXXXX"	Form1

**Table 7.12.14.4-7 Phase vs. Q immediate data <result2>**

Items		<result2>	Response Format
Q value	Phase -1000 to 1000	"QVALue:-1000"... "QVALue:1000"	Form2
Optimum BER		"OPTBer:-1000"... "OPTBer:1000"	Form3
Optimum Vth		"OPTVth:-1000"... "OPTVth:1000"	Form4
Correlation bottom		"CORBtm:-1000"... "CORBtm:1000"	Form2
Correlation top		"CORTop:-1000"... "CORTop:1000"	Form2
Σ bottom		"SGMBtm:-1000"... "SGMBtm:1000"	Form2
Σ top		"SGMTop:-1000"... "SGMTop:1000"	Form2
M bottom		"MUBtm:-1000"... "MUBtm:1000"	Form4
M top		"MUTop:-1000"... "MUTop:1000"	Form4
Q equation		"QEQ:-1000"... "QEQ:1000"	Form2

Response	<string> = <STRING RESPONSE DATA>
----------	-----------------------------------

**Table 7.12.14.4-8 Response format**

Form	Format	Description
Form1 Vth-ER type	"XX.XXX,Y.YYYYYE-YYY"	XX.XXX: Threshold (V) Y.YYYYYE-YYY: Error Rate
	"----,----,-----"	When no data corresponds to the query.
Form2 %type (dB type)	"XXX.XX"	When 0.00 to 100.00
	"-----"	When no data corresponds to the query.
Form3 Fraction type	"X.XXXXE-XXX"	When 0.0000E-016 to 1.0000E000
	"-----"	When no data corresponds to the query.
	"< 1.0E-199"	When E-199 or less
Form4 Voltage type	"XX.XXXX"	When -4.0000 to 4.0000
	"-----"	When no data corresponds to the query.

Function	Queries the Phase vs. Q measurement result.
Example	To query the TOP side measurement result: <pre>&gt; :CALCulate:DATA:QANalysis:PHASe? "VTHQ:TOP,100" &lt; "10,1.000,1.2345E-003", "10,1.100,1.2345E-004", "10,1.200,1.2345E-005"</pre>
Compatibility	Incompatible with existing models.

### :CALCulate:DATA:QANalysis:PStatus?

Response	<string> = <STRING RESPONSE DATA>
	"" When no alarm exists
	"Sync Loss" Sync. Loss
	"Clock Loss" Clock Loss
	"CR Unlock" CR Unlock
	"Out of range" Out of range
	"Frequency NG" Frequency NG
	"Illegal Error" Illegal Error
	"Meas. Threshold exceeded" Number of errors exceeds the target rate

**Note:**

Displays any one of the alarms.

When two or more alarms have occurred, they are displayed in the following order:

Illegal Error > Frequency NG > Clock Loss (CR Unlock) > Sync Loss > Out of range

Function	Queries the Phase vs. Q measurement status.
Example	<pre>&gt; :CALCulate:DATA:QANalysis:PStatus? &lt; "Sync Loss"</pre>

### 7.12.14.5 File menu setting commands

Table 7.12.14.5-1 File menu setting commands

No.	Setting Items	Commands
[1]	Open	:SYSTem:MMEMory:QANalysis:RECall
[2]	Save	:SYSTem:MMEMory:QANalysis:STORe
[3]	Print	:SYSTem:PRINt:QANalysis
[4]	Q Unit	:SENSe:MEASure:QANalysis:THReshold:LSCale
		:SENSe:MEASure:QANalysis:THReshold:LSCale?
		:SENSe:MEASure:QANalysis:PHASe:LSCale
		:SENSe:MEASure:QANalysis:PHASe:LSCale?

#### **:SYSTem:MMEMory:QANalysis:RECall <file\_name>**

---

Parameter	<file_name> = <STRING PROGRAM DATA> "<drv>:\[<dir>]<file>" <drv> = C,D,E,F <dir> = <dir1>\<dir2>\... (Omitted when root directory) <file> = File name
Function	Opens the Q measurement result data.
Example	> :SYSTem:MMEMory:QANalysis:RECall "C:\Test\example"
Compatibility	Incompatible with existing models.

## **:SYSTem:MMEMory:QANalysis:STORE** **<file\_name>,<data\_type>,<file\_type>**

Parameter	<p>&lt;file_name&gt; = &lt;STRING PROGRAM DATA&gt;  "&lt;drv&gt;:\[&lt;dir&gt;]&lt;file&gt;"  &lt;drv&gt; = C,D,E,F  &lt;dir&gt; = &lt;dir1&gt;\&lt;dir2&gt;\... (Omitted when root directory)  &lt;file&gt; = File name  &lt;data_type&gt; = &lt;CHARACTER PROGRAM DATA&gt;  VTQ                    Vth vs. Q Result  PSQ                    Phase vs. Q Result  &lt;file_type&gt; = &lt;CHARACTER PROGRAM DATA&gt;  BIN                    Binary file  CSV                    CSV file  TXT                    Text file</p>
Function	<p>Saves the Q measurement result data.  <b>Note:</b>                    The settings will not be read from the saved file if the file name is changed.</p>
Example	<p>Saves the Vth vs. Q measurement result data of Q measurement by specifying the save destination, file name, and file format.  &gt; :SYSTem:MMEMory:QANalysis:STORE  "C:\Test\example",VTQ,CSV</p>
Compatibility	<p>Incompatible with existing models.</p>

## **:SYSTem:PRINT:QANalysis <list>**

Parameter	<p>&lt;list&gt; = &lt;CHARACTER PROGRAM DATA&gt;  VTQ                    Prints Vth vs. Q measurement results.  PSQ                    Prints Phase vs. Q measurement results.</p>
Function	<p>Prints the Q measurement result data.</p>
Example	<p>To print the Vth vs. Q measurement results:  &gt; :SYSTem:PRINT:QANalysis VTQ</p>
Compatibility	<p>Incompatible with existing models.</p>

### **:SENSe:MEASure:QANalysis:THReshold:LSCale <scale>**

---

Parameter	<scale> = <CHARACTER PROGRAM DATA> LINear                      Linear display LOG                              Log display
Function	Sets the Q value display scale during Vth vs. Q measurement to Linear or Log display.
Example	To set the display scale to Log display: > :SENSe:MEASure:QANalysis:THReshold:LSCale LOG
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:QANalysis:THReshold:LSCale?**

---

Response	<scale> = <CHARACTER RESPONSE DATA> LIN, LOG
Function	Queries whether the Q value display scale during Vth vs. Q measurement is set to Linear or Log display.
Example	> :SENSe:MEASure:QANalysis:THReshold:LSCale? < LOG
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:QANalysis:PHASe:LSCale <scale>**

---

Parameter	<scale> = <CHARACTER PROGRAM DATA> LINear                      Linear display LOG                              Log display
Function	Sets the Q value display scale during Phase vs. Q measurement to Linear or Log display.
Example	To set the display scale to Log display: > :SENSe:MEASure:QANalysis:PHASe:LSCale LOG
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:QANalysis:PHASe:LSCale?**

---

Response	<scale> = <CHARACTER RESPONSE DATA> LIN, LOG
Function	Queries whether the Q value display scale during Phase vs. Q measurement is set to Linear or Log display.
Example	> :SENSe:MEASure:QANalysis:PHASe:LSCale? < LOG
Compatibility	Incompatible with existing models.



### 7.12.15 PAM BER measurement

This section describes PAM BER measurement commands.

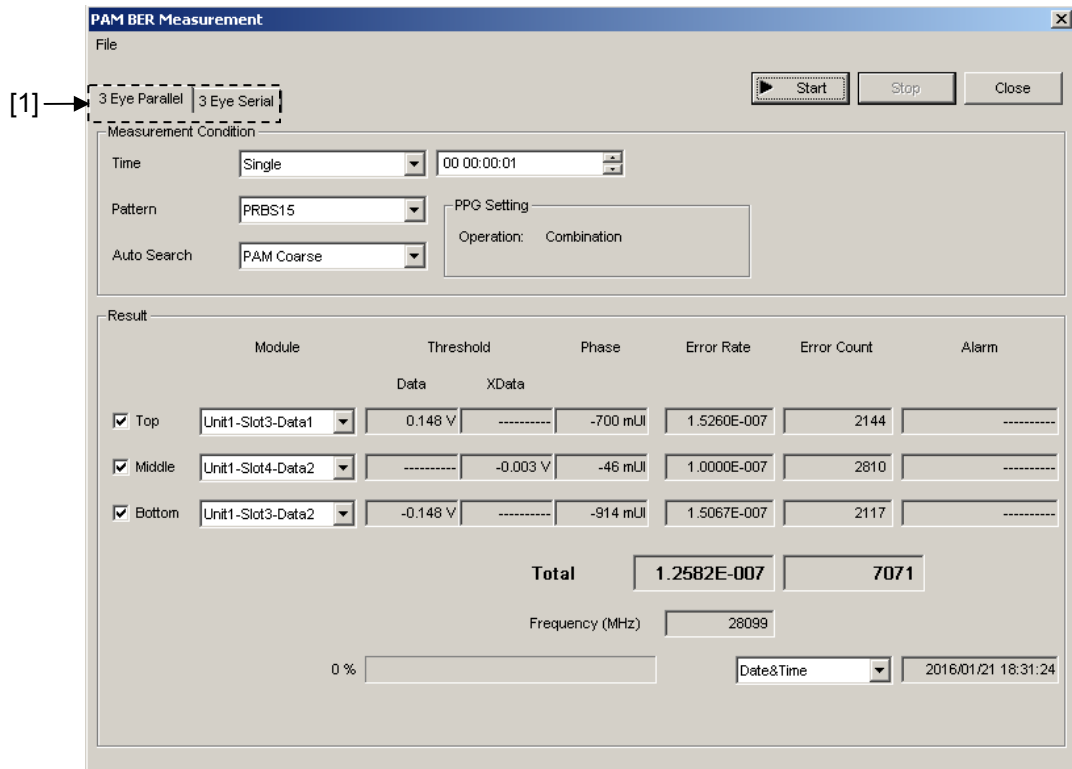


Figure 7.12.15-1 PAM BER Measurement Screen

Table 7.12.15-1 PAM BER Measurement Commands

No.	Setting Items	Commands
[1]	Tab Selection	:DISPlay:RESult:PAMBer:TABSelect
		:DISPlay:RESult:PAMBer:TABSelect?

### **:DISPlay:RESult:PAMBer:TABSelect <tab>**

---

Parameter	<tab> = <CHARACTER PROGRAM DATA> PBSerial                      Selects the 3 Eye Serial tab. PBParallel                    Selects the 3 Eye Parallel tab.
Function	Selects the PAM BER measurement type. Selects serial measurement using 3 Eye Serial or the 3 Eye Parallel measurement tab using 3ch.
Example	To select the 3Lvl Serial tab. > :DISPlay:RESult:PAMBerTABSelect PBSerial
Compatibility	Incompatible with existing models.

### **:DISPlay:RESult:PAMBer:TABSelect?**

---

Response	<tab> = <CHARACTER RESPONSE DATA> PBS, PBP
Function	Queries the tab displayed for PAM BER measurement.
Example	> :DISPlay:RESult:PAMBerTABSelect? < PBS
Compatibility	Incompatible with existing models.

7.12.15.1 3 Eye Serial Measurement Commands

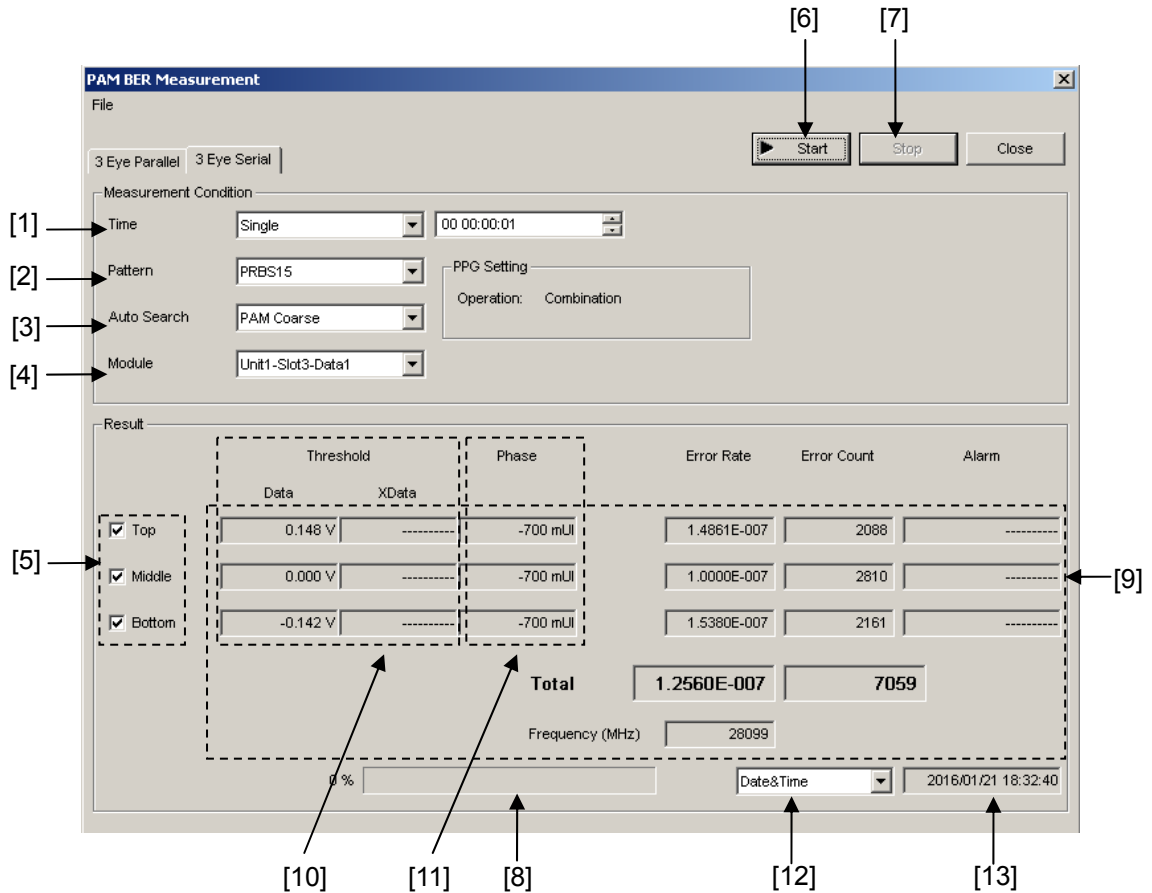


Figure 7.12.15.1-1 3 Eye Serial Measurement Screen

Table 7.12.15.1-1 3 Eye Serial Measurement Commands

No.	Setting Items	Commands
[1]	Time	:SENSE:MEASure:PBSerial:PERiod :SENSE:MEASure:PBSerial:PERiod?
[2]	Pattern	:SENSE:PATtern:PBSerial:TYPE :SENSE:PATtern:PBSerial:TYPE?
[3]	Auto Search	:SENSE:MEASure:PBSerial:ASEarch :SENSE:MEASure:PBSerial:ASEarch?
[4]	Slot	:SENSE:MEASure:PBSerial:SLOT :SENSE:MEASure:PBSerial:SLOT?
[5]	Measurement PAM Threshold	:SENSE:MEASure:PBSerial:PAMSet :SENSE:MEASure:PBSerial:PAMSet?
[6]	Start	:SENSE:MEASure:PBSerial:STARt
[7]	Stop	:SENSE:MEASure:PBSerial:STOP
[8]	State	:SENSE:MEASure:PBSerial:STATe?

Table 7.12.15.1-1 3 Eye Serial Measurement Commands (Cont'd)

No.	Setting Items	Commands
[9]	Result	:CALCulate:DATA:PBSerial?
[10]	Threshold	:SENSe:MEASure:PBSerial:DATA:THReshold
		:SENSe:MEASure:PBSerial:DATA:THReshold?
[11]	Delay	:SENSe:MEASure:PBSerial:CLOCK:DELay
		:SENSe:MEASure:PBSerial:CLOCK:DELay?
[12]	Display time selection	:SENSe:MEASure:PBSerial:TIME
		:SENSe:MEASure:PBSerial:TIME?
[13]	Query for current time	:SENSe:MEASure:PBSerial:TIME:DTIME?
	Query for measurement start time	:SENSe:MEASure:PBSerial:TIME:STARt?
	Query for measurement elapsed time	:SENSe:MEASure:PBSerial:TIME:ELAPsed?

**:SENSe:MEASure:PBSerial:PERiod <hour>,<min>,<second>**

Parameter	<hour>,<min>,<second> = <DECIMAL NUMERIC PROGRAMDATA>	
	<hour>	0 to 23                      0 to 23 hours/hour Step
	<min>	0 to 59                      0 to 59 minutes/minute Step
	<second>	0 to 59                      0 to 59 seconds/second Step
Function	Sets the measurement time using ED 1ch.	
Example	To set the measurement time to one minute. > :SENSe:MEASure:PBSerial:PERiod 0,1,0	
Compatibility	Incompatible with existing models.	

**:SENSe:MEASure:PBSerial:PERiod?**

Response	<hour>,<min>,<second> = <NR1 NUMERIC RESPONSE DATA>	
	<hour>	0 to 23                      0 to 23 hours/hour Step
	<min>	0 to 59                      0 to 59 minutes/minute Step
	<second>	0 to 59                      0 to 59 seconds/second Step
Function	Queries the measurement time using ED 1ch.	
Example	> :SENSe:MEASure:PBSerial:PERiod? < 0,1,0	
Compatibility	Incompatible with existing models.	

**:SENSe:PATtern:PBSerial:TYPE <type>**

Parameter	<type> = <STRING PROGRAM DATA> "PRBS7"                    PRBS7 "PRBS9"                    PRBS9 "PRBS10"                   PRBS10 "PRBS11"                   PRBS11 "PRBS15"                   PRBS15 "PRBS20"                   PRBS20 "PRBS13Q"                   PRBS13Q "PRQS10"                   PRQS10
Function	Selects the test pattern.
Example	To set the test pattern to PRBS13Q. > :SENSe:PATtern:PBSerial:TYPE "PRBS13Q"
Compatibility	Incompatible with existing models.

**:SENSe:PATtern:PBSerial:TYPE?**

Response	<type> = <STRING RESPONSE DATA> "PRBS7", "PRBS9", "PRBS10", "PRBS11", "PRBS15", "PRBS20", "PRBS13Q", "PRQS10"
Function	Queries the test pattern.
Example	> :SENSe:PATtern:PBSerial:TYPE? < "PRBS13Q"
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:PBSerial:ASEarch <item>**

Parameter	<slot> = <CHARACTER PROGRAM DATA> OFF                            Auto Search OFF PAMFine                        PAM4 Fine mode PAMCoarse                      PAM4 Coarse mode
Function	Sets Auto Search execution for 3 Eye Serial PAM BER measurement.
Example	To set Auto Search to PAM4 Fine mode. > :SENSe:MEASure:PBSerial:ASEarch PAMFine
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:PBSerial:ASEarch?**

Response	<item> = <CHARACTER RESPONSE DATA> OFF, PAMF, PAMC
Function	Queries the Auto Search execution mode for 3 Eye Serial PAM BER measurement.
Example	> :SENSe:MEASure:PBSerial:ASEarch? < PAMFine
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:PBSerial:SLOT <slot>,<interface>[,<unit>]**

Parameter	<slot> = <DECIMAL PROGRAM DATA> 1 to 6                      Slots No.1 to 6 1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Data1 to 4 [<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Mainframe No.1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number. Can be omitted. Mainframe No. 1 is specified when omitted.
Function	Selects the target slot for 3 Eye Serial PAM BER measurement.
Example	To set the measurement target to slot No. 4 and Data1. > :SENSe:MEASure:PBSerial:SLOT 4,1
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:PBSerial:SLOT? [<unit>]**

Parameter	[<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4                      Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number.
Response	<slot> = <NR1 NUMERIC RESPONSE DATA> 1 to 6                      Slots No. 1 to No. 6 1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A <interface> = <NR1 NUMERIC RESPONSE DATA> 1 to 4                      Data1 to 4
Function	Queries the target slot and data interface for 3 Eye Serial PAM BER measurement.
Example	> :SENSe:MEASure:PBSerial:SLOT? < 4,1
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:PBSerial:PAMSet <threshold>,<boolean>**


---

Parameter	<threshold> = <CHARACTER PROGRAM DATA> TOP                      Top threshold MIDDLE                  Middle threshold BOTTom                  Bottom threshold <boolean> = <BOOLEAN PROGRAM DATA> ON, 1                    ON OFF, 0                   OFF
Function	Selects the threshold to be measured in 3 Eye Serial PAM BER measurement.
Example	To set the Top threshold as the measurement target. > :SENSe:MEASure:PBSerial:PAMSet TOP,ON
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:PBSerial:PAMSet? <threshold>**


---

Parameter	<threshold> = <CHARACTER PROGRAM DATA> TOP                      Top threshold MIDDLE                  Middle threshold BOTTom                  Bottom threshold
Response	<boolean> = <NR1 NUMERIC RESPONSE DATA> 1                          ON 0                          OFF
Function	Queries the measurement target threshold.
Example	To query whether the Top threshold is the target of measurement. > :SENSe:MEASure:PBSerial:PAMSet? TOP < 1
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:PBSerial:START**


---

Function	Starts 3 Eye Serial PAM BER measurement.
Example	> :SENSe:MEASure:PBSerial:START
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:PBSerial:STOP**


---

Function	Stops 3 Eye Serial PAM BER measurement.
Example	> :SENSe:MEASure:PBSerial:STOP
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:PBSerial:STATe?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 Measurement stopped. 1 Measurement in progress
Function	Queries the measurement progress status for 3 Eye Serial PAM BER measurement.
Example	> :SENSe:MEASure:PBSerial:STATe? < 1
Compatibility	Incompatible with existing models.

**:CALCulate:DATA:PBSerial? <string>**

Parameter	<string> = <STRING PROGRAM DATA> "TOP:<result>" "MIDDLE:<result>" "BOTTOm:<result>" "TOTAl:<result>"
-----------	--

**Table 7.12.15.1-1 3 Eye Serial Measurement Results <result>**

Item	<result>	Response Format
Error Count	EC	Form1
Error Rate	ER	Form2
Frequency(Hz)	FREQuency	Form3
Data Threshold	THReShold	Form4
Data Phase	PHASe	Form5

Response	<string> = <STRING RESPONSE DATA>
----------	-----------------------------------

**Table 7.12.15.1-2 Response Format**

Type	Format	Description
Form1 Integer type	"XXXXXXXX"	0 to 9999999
	"X.XXXEXX"	1.0000E07 to 9.9999E17
	"-----"	When no data corresponds to the query
Form2 Fraction type	"X.XXXE-XX"	0.0001E-18 to 1.0000E00
	"-----"	When no data corresponds to the query
Form3 Frequency type	"XXXXXXXXXX"	For 0 to MAX (Hz)
	"-----"	When no data corresponds to the query
Form4 Voltage type	"X.XXX,XX.XXX"	For -4.000 to +4.000
	"-----"	When no data corresponds to the query
Form5 Phase type	"XXXX"	For -1000 to +1000, -10000 to +10000
	"-----"	When no data corresponds to the query

Function	Queries the ED 1ch results for PAM BER measurement.
----------	---



Example	To query the total error rate result for 3 Eye Serial measurement. <pre>&gt; :CALCulate:DATA:PBSerial? "TOTal:ER" &lt; "1.2345E-03"</pre>
Compatibility	Incompatible with existing models.

### **:SENSE:MEASure:PBSerial:DATA:THReshold <threshold>,<port>,<numeric>**

Parameter	<threshold> = <CHARACTER PROGRAM DATA> TOP Top level MIDDLE Middle level BOTTom Bottom level <port> = <CHARACTER PROGRAM DATA> DATA Selects Data. XDATA Selects XData. <numeric> = <DECIMAL NUMERIC PROGRAM DATA> -3.500 to 3.300 -3.500 to 3.300 V/0.001 V Step
Function	Sets input port and measurement threshold for Top, Middle, and Bottom levels respectively in the 3 Eye Serial PAM BER measurement.
Example	To select Data and specify 0.100 V for the measurement threshold of Top level.. <pre>&gt; :SENSE:MEASure:PBSerial:DATA:THReshold TOP,DATA,0.100</pre>
Compatibility	Incompatible with existing models.

### **:SENSE:MEASure:PBSerial:DATA:THReshold? <threshold>,<port>**

Parameter	<threshold> = <CHARACTER PROGRAM DATA> TOP Top level MIDDLE Middle level BOTTom Bottom level <port> = <CHARACTER PROGRAM DATA> DATA Selects Data. XDATA Selects XData.
Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> -3.500 to 3.300 -3.500 to 3.300 V/0.001 V Step
Function	Queries measurement threshold for Top, Middle, and Bottom levels respectively in the 3 Eye Serial PAM BER measurement.
Example	To query threshold of Top level, data input. <pre>&gt; :SENSE:MEASure:PBSerial:DATA:THReshold? TOP,DATA &lt; 0.100</pre>
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:PBSerial:CLOCK:DElay <threshold>,<numeric>**

Parameter	<threshold> = <CHARACTER PROGRAM DATA> TOP Top level MIDDLE Middle level BOTTom Bottom level <numeric> = <DECIMAL NUMERIC PROGRAM DATA> -1000 to 1000 -1000 to 1000 mUI/2 mUI Step
Function	Sets Delay for Top, Middle, and Bottom levels respectively in the 3 Eye Serial PAM BER measurement.
Example	To set Delay of Top level to 300 mUI. > :SENSe:MEASure:PBSerial:CLOCK:DElay TOP,300
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:PBSerial:CLOCK:DElay? <threshold>**

Parameter	<threshold> = <CHARACTER PROGRAM DATA> TOP Top level MIDDLE Middle level BOTTom Bottom level
Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> -1000 to 1000 -1000 to 1000 mUI/2 mUI Step
Function	Queries Delay for Top, Middle, and Bottom levels respectively in the 3 Eye Serial PAM BER measurement.
Example	To query the measurement threshold of Top level, data input. > :SENSe:MEASure:PBSerial:CLOCK:DElay? TOP < 300
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:PBSerial:TIME <type>**

Parameter	<type> = <CHARACTER PROGRAM DATA> DTIME Displays the current date and time. START Displays the measurement start time. ELAPsed Displays the elapsed time based on the measurementperiod.
Function	Selects the measurement time display for 3 Eye Serial PAM BER measurement.
Example	To display elapsed measurement time. > :SENSe:MEASure:PBSerial:TIME ELAPsed
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:PBSerial:TIME?**


---

Response	<type> = <CHARACTER RESPONSE DATA> DTIM, STAR, ELAP
Function	Queries the measurement time display for 3 Eye Serial PAM BER measurement.
Example	> :SENSe:MEASure:PBSerial:TIME? < ELAP
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:PBSerial:TIME:DTIME?**


---

Response	<year>,<month>,<day>,<hour>,<min>,<second> <year> = <NR1 NUMERIC RESPONSE DATA> 2000 to 2036                      2000 to 2036 year <month> = <NR1 NUMERIC RESPONSE DATA> 1 to 12                              January to December <day> = <NR1 NUMERIC RESPONSE DATA> 1 to 31                                1st to 31st <hour> = <NR1 NUMERIC RESPONSE DATA> 0 to 23                                0 to 23 hours <minute> = <NR1 NUMERIC RESPONSE DATA> 0 to 59                                0 to 59 minutes <second> = <NR1 NUMERIC RESPONSE DATA> 0 to 59                                0 to 59 seconds
Function	Queries the current time for 3 Eye Serial PAM BER measurement.
Example	> :SENSe:MEASure:PBSerial:TIME:DTIME? < 2016,12,31,23,59,59
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:PBSerial:TIME:START?**

---

Response	<year>,<month>,<day>,<hour>,<min>,<second> <year> = <NR1 NUMERIC RESPONSE DATA> 2000 to 2036                      2000 to 2036 year 1 to 12                              January to December <day> = <NR1 NUMERIC RESPONSE DATA> 1 to 31                              1st to 31st <hour> = <NR1 NUMERIC RESPONSE DATA> 0 to 23                              0 to 23 hours <minute> = <NR1 NUMERIC RESPONSE DATA> 0 to 59                              0 to 59 minutes <second> = <NR1 NUMERIC RESPONSE DATA> 0 to 59                              0 to 59 seconds
Function	Queries the start time for 3 Eye Serial PAM BER measurement.
Example	> :SENSe:MEASure:PBSerial:TIME:START? < 2016,12,31,23,59,59
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:PBSerial:TIME:ELAPsed?**

---

Response	<hour>,<min>,<second> <hour> = <NR1 NUMERIC RESPONSE DATA> 0 to 23                              0 to 23 hours <minute> = <NR1 NUMERIC RESPONSE DATA> 0 to 59                              0 to 59 minutes <second> = <NR1 NUMERIC RESPONSE DATA> 0 to 59                              0 to 59 seconds
Function	Queries the elapsed time for 3 Eye Serial PAM BER measurement.
Example	> :SENSe:MEASure:PBSerial:TIME:ELAPsed? < 23,59,59
Compatibility	Incompatible with existing models.

### 7.12.15.2 3 Eye Parallel Measurement Commands

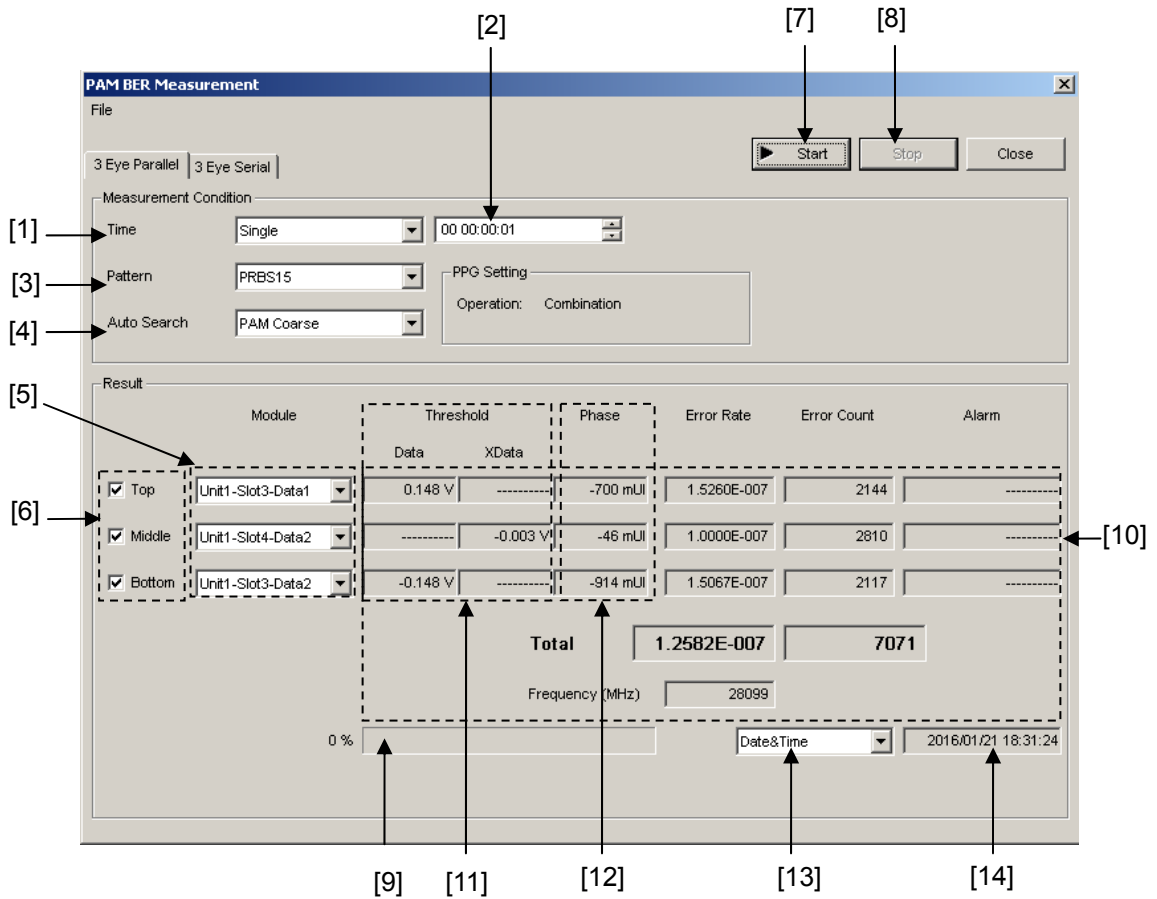


Figure 7.12.15.2-1 3 Eye Parallel Measurement Screen

**Table 7.12.15.2-1 3 Eye Parallel Measurement Commands**

No.	Setting Items	Commands
[1]	Mode	:SENSe:MEASure:PBParallel:MODE
		:SENSe:MEASure:PBParallel:MODE?
[2]	Time	:SENSe:MEASure:PBParallel:PERiod
		:SENSe:MEASure:PBParallel:PERiod?
[3]	Pattern	:SENSe:PATtern:PBParallel:TYPE
		:SENSe:PATtern:PBParallel:TYPE?
[4]	Auto Search	:SENSe:MEASure:PBParallel:ASEarch
		:SENSe:MEASure:PBParallel:ASEarch?
[5]	Slot	:SENSe:MEASure:PBParallel:SLOT
		:SENSe:MEASure:PBParallel:SLOT?
[6]	Measurement PAM Threshold	:SENSe:MEASure:PBParallel:PAMSet
		:SENSe:MEASure:PBParallel:PAMSet?
[7]	Start	:SENSe:MEASure:PBParallel:START
[8]	Stop	:SENSe:MEASure:PBParallel:STOP
[9]	State	:SENSe:MEASure:PBParallel:STATe?
[10]	Result	:CALCulate:DATA:PBParallel?
[11]	Threshold	:SENSe:MEASure:PBParallel:DATA:THReshold
		:SENSe:MEASure:PBParallel:DATA:THReshold?
[12]	Delay	:SENSe:MEASure:PBParallel:CLOCK:DELay
		:SENSe:MEASure:PBParallel:CLOCK:DELay?
[13]	Display time selection	:SENSe:MEASure:PBParallel:TIME
		:SENSe:MEASure:PBParallel:TIME?
[14]	Query for current time	:SENSe:MEASure:PBParallel:TIME:DTIME?
	Query for measurement start time	:SENSe:MEASure:PBParallel:TIME:START?
	Query for measurement elapsed time	:SENSe:MEASure:PBParallel:TIME:ELAPsed?

**:SENSe:MEASure:PBParallel:MODE <hour>,<min>,<second>**

Parameter	<mode> = <CHARACTER PROGRAM DATA> REPeat                      Executes the measurement repeatedly. SINGle                      Executes a single measurement.
Function	Selects the repeated measurement setting for PAM BER measurement using 3 Eye Parallel.
Example	To select repeated measurement. > :SENSe:MEASure:PBParallel:MODE REPeat
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:PBParallel:MODE?**


---

Response	<mode> = <CHARACTER RESPONSE DATA> REP, SING
Function	Queries the measurement repeat setting.
Example	> :SENSe:MEASure:PBParallel:MODE? < REP
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:PBParallel:PERiod <hour>,<min>,<second>**


---

Parameter	<hour>,<min>,<second> = <DECIMAL NUMERIC PROGRAMDATA>
	<hour>            0 to 23            0 to 23 hours/hour Step
	<min>            0 to 59            0 to 59 minutes/minute Step
	<second>        0 to 59            0 to 59 seconds/second Step
Function	Sets the measurement time using 3 Eye Parallel.
Example	To set the measurement time to one minute. > :SENSe:MEASure:PBParallel:PERiod 0,1,0
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:PBParallel:PERiod?**


---

Response	<hour>,<min>,<second> = <NR1 NUMERIC RESPONSE DATA>
	<hour>            0 to 23            0 to 23 hours/hour Step
	<min>            0 to 59            0 to 59 minutes/minute Step
	<second>        0 to 59            0 to 59 seconds/second Step
Function	Queries the measurement time using 3 Eye Parallel.
Example	> :SENSe:MEASure:PBParallel:PERiod? < 0,1,0
Compatibility	Incompatible with existing models.

### **:SENSe:PATtern:PBParallel:TYPE <type>**

Parameter	<type> = <STRING PROGRAM DATA> "PRBS7"                    PRBS7 "PRBS9"                    PRBS9 "PRBS10"                   PRBS10 "PRBS11"                   PRBS11 "PRBS15"                   PRBS15 "PRBS20"                   PRBS20 "PRBS13Q"                  PRBS13Q "PRQS10"                   PRQS10
Function	Selects the test pattern.
Example	To set the test pattern to PRBS13Q. > :SENSe:PATtern:PBParallel:TYPE "PRBS13Q"
Compatibility	Incompatible with existing models.

### **:SENSe:PATtern:PBParallel:TYPE?**

Response	<type> = <STRING RESPONSE DATA> "PRBS7", "PRBS9", "PRBS10", "PRBS11", "PRBS15", "PRBS20", "PRBS13Q", "PRQS10"
Function	Queries the test pattern.
Example	> :SENSe:PATtern:PBParallel:TYPE? < "PRBS13Q"
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:PBParallel:ASEarch <item>**

Parameter	<slot> = <CHARACTER PROGRAM DATA> OFF                            Auto Search OFF PAMFine                        PAM4 Fine mode PAMCoarse                      PAM4 Coarse mode
Function	Sets Auto Search execution for 3 Eye Parallel PAM BER measurement.
Example	To set Auto Search to PAM4 Fine mode. > :SENSe:MEASure:PBParallel:ASEarch PAMFine
Compatibility	Incompatible with existing models.



**:SENSe:MEASure:PBParallel:ASEarch?**


---

Response	<item> = < CHARACTER RESPONSE DATA> OFF, PAMF, PAMC
Function	Queries the Auto Search execution mode for 3 Eye Parallel PAM BER measurement.
Example	> :SENSe:MEASure:PBParallel:ASEarch? < PAMFine
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:PBParallel:SLOT  
<threshold>,<slot>,<interface>[,<unit>]**


---

Parameter	<threshold> = <CHARACTER PROGRAM DATA> TOP Top threshold MIDDLE Middle threshold BOTTom Bottom threshold <slot> = <DECIMAL PROGRAM DATA> 1 to 6 Slots No. 1 to No. 6 1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A <interface> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4 Data1 to 4 [<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4 Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number. Can be omitted. Mainframe No. 1 is specified when omitted.
Function	Selects the ED (slot and data interface) for measuring individual thresholds in 3 Eye Parallel PAM BER measurement.
Example	To measure the Top threshold using slot No. 4 and Data1. > :SENSe:MEASure:PBParallel:SLOT TOP,4,1
Compatibility	Incompatible with existing models.

---

**:SENSe:MEASure:PBParallel:SLOT? <threshold>[,<unit>]**

---

Parameter	<threshold> = <CHARACTER PROGRAM DATA> TOP Top threshold MIDDLE Middle threshold BOTTom Bottom threshold [<unit>] = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4 Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number. Can be omitted. Mainframe No. 1 is specified when omitted.
Response	<slot> = <NR1 NUMERIC RESPONSE DATA> 1 to 6 Slots No. 1 to No. 6 1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A <interface> = <NR1 NUMERIC RESPONSE DATA> 1 to 4 Data1 to 4
Function	Queries the ED slot and data interface forming the measurement target for each threshold in 3 Eye Parallel PAM BER measurement.
Example	To query the ED for which the Top threshold is the target of measurement. > :SENSe:MEASure:PBParallel:SLOT? TOP < 4,1
Compatibility	Incompatible with existing models.

---

**:SENSe:MEASure:PBParallel:PAMSet <threshold>,<boolean>**

---

Parameter	<threshold> = <CHARACTER PROGRAM DATA> TOP Top threshold MIDDLE Middle threshold BOTTom Bottom threshold <boolean> = <BOOLEAN PROGRAM DATA> ON, 1 ON OFF, 0 OFF
Function	Selects the threshold to be measured in 3 Eye Parallel PAM BER measurement.
Example	To set the Top threshold as the measurement target. > :SENSe:MEASure:PBParallel:PAMSet TOP,ON
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:PBParallel:PAMSet? <threshold>**


---

Parameter	<threshold> = <CHARACTER PROGRAM DATA>
	TOP                      Top threshold
	MIDDLE                  Middle threshold
	BOTTOM                  Bottom threshold
Response	<boolean> = <NR1 NUMERIC RESPONSE DATA>
	1                          ON
	0                          OFF
Function	Queries the measurement target threshold.
Example	To query whether the Top threshold is the target of measurement. > :SENSe:MEASure:PBParallel:PAMSet? TOP < 1
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:PBParallel:START**


---

Function	Starts 3 Eye Parallel PAM BER measurement.
Example	> :SENSe:MEASure:PBParallel:START
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:PBParallel:STOP**


---

Function	Stops 3 Eye Parallel PAM BER measurement.
Example	> :SENSe:MEASure:PBParallel:STOP
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:PBParallel:STATe?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	0                          Measurement stopped.
	1                          Measurement in progress
Function	Queries the measurement progress status for 3 Eye Parallel PAM BER measurement.
Example	> :SENSe:MEASure:PBParallel:STATe? < 1
Compatibility	Incompatible with existing models.

**:CALCulate:DATA:PBParallel? <string>**

Parameter <string> = <STRING PROGRAM DATA>  
 "TOP:<result>"  
 "MIDDLE:<result>"  
 "BOTTOM:<result>"  
 "TOTAL:<result>"

**Table 7.12.15.2-2 3 Eye Parallel Measurement Results <result>**

Items	<result>	Response Format
Error Count	EC	Form1
Error Rate	ER	Form2
Frequency (Hz)	FREQUENCY	Form3
Data Threshold	THRESHOLD	Form4
Data Phase	PHASE	Form5

Response <string> = <STRING RESPONSE DATA>

**Table 7.12.15.2-3 Response Format**

Form	Format	Description
Form1 Integer type	"XXXXXXXX"	0 to 9999999
	"X.XXXEXX"	1.0000E07 to 9.9999E17
	"-----"	When no data corresponds to the query
Form2 Fraction type	"X.XXXE-XX"	0.0001E-18 to 1.0000E00
	"-----"	When no data corresponds to the query
Form3 Frequency type	"XXXXXXXXXX"	For 0 to MAX (Hz)
	"-----"	When no data corresponds to the query
Form4 Voltage type	"X.XXX,XX.XXX"	For -4.000 to +4.000
	"-----"	When no data corresponds to the query
Form5 Phase type	"XXXX,XXXX"	For -1000 to +1000,-10000 to +10000
	"-----"	When no data corresponds to the query

Function Queries the 3 Eye Parallel results for PAM BER measurement.

Example To query the total error rate result for 3 Eye Parallel measurement.  
 > :CALCulate:DATA:PBParallel? "TOTAL:ER"  
 < "1.2345E-03"

Compatibility Incompatible with existing models.

### **:SENSe:MEASure:PBParallel:DATA:THReshold <threshold>,<port>,<numeric>**

Parameter	<threshold> = <CHARACTER PROGRAM DATA> TOP Top level MIDDLE Middle level BOTTom Bottom level <port> = <CHARACTER PROGRAM DATA> DATA Selects Data. XDATA Selects XData. <numeric> = <DECIMAL NUMERIC PROGRAM DATA> -3.500 to 3.300 -3.500 to 3.300 V/0.001 V Step
Function	Sets input port and measurement threshold for Top, Middle, and Bottom levels respectively in the 3 Eye Parallel PAM BER measurement.
Example	To set the measurement threshold to Data input, 0.100 V. > :SENSe:MEASure:PBParallel:DATA:THReshold TOP,DATA,0.100
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:PBParallel:DATA:THReshold? <threshold>,<port>**

Parameter	<threshold> = <CHARACTER PROGRAM DATA> TOP Top level MIDDLE Middle level BOTTom Bottom level <port> = <CHARACTER PROGRAM DATA> DATA Selects Data. XDATA Selects XData.
Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> -3.500 to 3.300 -3.500 to 3.300 V/0.001 V Step
Function	Queries input port and measurement threshold for Top, Middle, and Bottom levels respectively in the 3 Eye Parallel PAM BER measurement.
Example	To query threshold of Top level, data input. > :SENSe:MEASure:PBParallel:DATA:THReshold? TOP,DATA < 0.100
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:PBParallel:CLOCK:DELaY <threshold>,<numeric>**

Parameter	<threshold> = <CHARACTER PROGRAM DATA> TOP Top level MIDDLE Middle level BOTTom Bottom level <numeric> = <DECIMAL NUMERIC PROGRAM DATA> -1000 to 1000 -1000 to 1000 mUI/2 mUI Step
Function	Sets Delay for Top, Middle, and Bottom levels respectively for the 3 Eye Parallel PAM BER measurement.
Example	To set Delay of Top level to 300mUI. > :SENSe:MEASure:PBParallel:CLOCK:DELaY TOP,300
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:PBParallel:CLOCK:DELaY? <threshold>**

Parameter	<threshold> = <CHARACTER PROGRAM DATA> TOP Top level MIDDLE Middle level BOTTom Bottom level
Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> -1000 to 1000 -1000 to 1000 mUI/2 mUI Step
Function	Queries Delay for Top, Middle, and Bottom levels respectively in the 3 Eye Parallel PAM BER measurement.
Example	To query the measurement threshold of Top level, data input. > :SENSe:MEASure:PBParallel:CLOCK:DELaY? TOP < 300
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:PBParallel:TIME <type>**

Parameter	<type> = <CHARACTER PROGRAM DATA> DTIME Displays the current date and time. START Displays the measurement start time. ELAPsed Displays the elapsed time based on the measurement period.
Function	Selects the measurement time display for 3 Eye Parallel PAM BER measurement.
Example	To display elapsed measurement time. > :SENSe:MEASure:PBParallel:TIME ELAPsed
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:PBParallel:TIME?**


---

Response	<type> = <CHARACTER RESPONSE DATA> DTIM, STAR, ELAP
Function	Queries the measurement time display for 3 Eye Parallel PAM BER measurement.
Example	> :SENSe:MEASure:PBParallel:TIME? < ELAP
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:PBParallel:TIME:DTIME?**


---

Response	<year>,<month>,<day>,<hour>,<min>,<second> <year> = <NR1 NUMERIC RESPONSE DATA> 2000 to 2036                      2000 to 2036 year <month> = <NR1 NUMERIC RESPONSE DATA> 1 to 12                              January to December <day> = <NR1 NUMERIC RESPONSE DATA> 1 to 31                                1st to 31st <hour> = <NR1 NUMERIC RESPONSE DATA> 0 to 23                                0 to 23 hours <minute> = <NR1 NUMERIC RESPONSE DATA> 0 to 59                                0 to 59 minutes <second> = <NR1 NUMERIC RESPONSE DATA> 0 to 59                                0 to 59 seconds
Function	Queries the current time for 3 Eye Parallel PAM BER measurement.
Example	> :SENSe:MEASure:PBParallel:TIME:DTIME? < 2016,12,31,23,59,59
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:PBParallel:TIME:START?**

---

Response	<year>,<month>,<day>,<hour>,<min>,<second> <year> = <NR1 NUMERIC RESPONSE DATA> 2000 to 2036                      2000 to 2036 year <month> = <NR1 NUMERIC RESPONSE DATA> 1 to 12                              January to December <day> = <NR1 NUMERIC RESPONSE DATA> 1 to 31                              1st to 31st <hour> = <NR1 NUMERIC RESPONSE DATA> 0 to 23                              0 to 23 hours <minute> = <NR1 NUMERIC RESPONSE DATA> 0 to 59                              0 to 59 minutes <second> = <NR1 NUMERIC RESPONSE DATA> 0 to 59                              0 to 59 seconds
Function	Queries the start time for 3 Eye Parallel PAM BER measurement.
Example	> :SENSe:MEASure:PBParallel:TIME:START? < 2016,12,31,23,59,59
Compatibility	Incompatible with existing models.

### **:SENSe:MEASure:PBParallel:TIME:ELAPsed?**

---

Response	<hour>,<min>,<second> <hour> = <NR1 NUMERIC RESPONSE DATA> 0 to 23                              0 to 23 hours <minute> = <NR1 NUMERIC RESPONSE DATA> 0 to 59                              0 to 59 minutes <second> = <NR1 NUMERIC RESPONSE DATA> 0 to 59                              0 to 59 seconds
Function	Queries the elapsed time for 3 Eye Parallel PAM BER measurement.
Example	> :SENSe:MEASure:PBParallel:TIME:ELAPsed? < 23,59,59
Compatibility	Incompatible with existing models.



## 7.12.15.3 File Menu Setting Commands

Table 7.12.15.3-1 File Menu Setting Commands

No.	Setting Items	Commands
[1]	3 Eye serial measurement file open	:SYSTem:MMEMory:PBSerial:RECall
[2]	3 Eye serial measurement file save	:SYSTem:MMEMory:PBSerial:STORE
[3]	3 Eye parallel measurement file open	:SYSTem:MMEMory:PBParallel:RECall
[4]	3 Eye parallel measurement file save	:SYSTem:MMEMory:PBParallel:STORE

**:SYSTem:MMEMory:PBSerial:RECall <file\_name>**

Parameter	<file_name> = <STRING PROGRAM DATA> "<drv>:\[<dir>]<file>" <drv> = C,D,E,F <dir> = <dir1>\<dir2>\...(Omitted when root directory) <file> = File name
Function	Opens the measurement result data for 3 Eye Serial PAM BER measurement.
Example	> :SYSTem:MMEMory:PBSerial:RECall "C:\Test\example"
Compatibility	Incompatible with existing models.

**:SYSTem:MMEMory:PBSerial:STORE <file\_name>,<file\_type>**

Parameter	<file_name> = <STRING PROGRAM DATA> "<drv>:\[<dir>]<file>" <drv> = C,D,E,F <dir> = <dir1>\<dir2>\... (Omitted when root directory) <file> = File name <file_type> = <CHARACTER PROGRAM DATA> BIN                      Binary file CSV                       CSV file TXT                       Text file
Function	Saves the measurement result data for 3 Eye Serial PAM BER measurement. <b>Note:</b> The settings will not be read from the saved file if the file name is changed.
Example	To save the 3 Eye Serial PAM BER measurement result data, specifying the save destination, file name and file format. > :SYSTem:MMEMory:PBSerial:STORE "C:\Test\example",TXT
Compatibility	Incompatible with existing models.

**:SYSTem:MMEMory:PBParallel:RECall <file\_name>**

---

Parameter	<file_name> = <STRING PROGRAM DATA> "<drv>:\[<dir>]<file>" <drv> = C,D,E,F <dir> = <dir1>\<dir2>\...(Omitted when root directory) <file> = File name
Function	Opens the measurement result data for 3 Eye Parallel PAM BER measurement.
Example	> :SYSTem:MMEMory:PBParallel:RECall "C:\Test\example"
Compatibility	Incompatible with existing models.

**:SYSTem:MMEMory:PBParallel:STORE <file\_name>,<file\_type>**

---

Parameter	<file_name> = <STRING PROGRAM DATA> "<drv>:\[<dir>]<file>" <drv> = C,D,E,F <dir> = <dir1>\<dir2>\...(Omitted when root directory) <file> = File name <file_type> = <CHARACTER PROGRAM DATA> BIN                      Binary file CSV                      CSV file TXT                      Text file
Function	Saves the measurement result data for 3 Eye Parallel PAM BER measurement. <b>Note:</b> The settings will not be read from the saved file if the file name is changed.
Example	To save the 3 Eye Parallel PAM BER measurement result data, specifying the save destination, file name and file format. > :SYSTem:MMEMory:PBParallel:STORE "C:\Test\example",TXT
Compatibility	Incompatible with existing models.

### 7.12.16 Eye Contour measurement

This section describes Eye Contour measurement commands. The commands on each tab are described in separate sections below. For details of commands specific to Eye Contour measurement, refer to 7.12.16.1 "Eye Contour Measurement Commands." Commands shared with Eye Diagram measurement are listed in 7.12.16.2 "Compatible Commands with Eye Diagram Measurement". Refer to 7.12.10 "Eye Diagram Measurement" for details of the commands.

#### 7.12.16.1 Eye Contour Measurement Commands

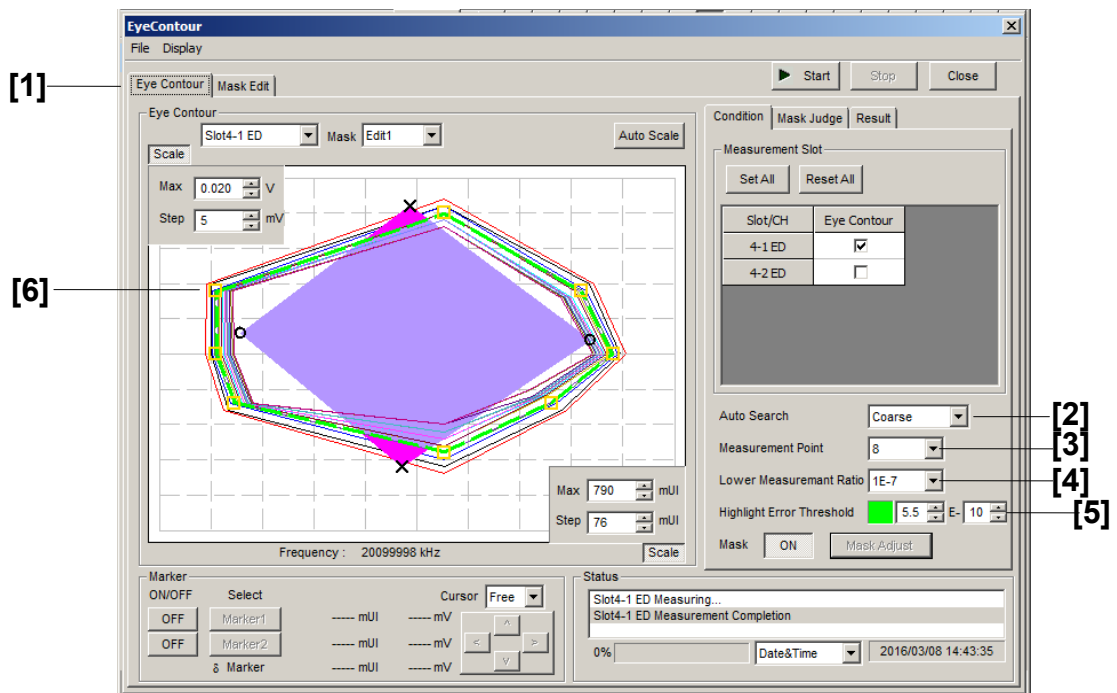


Figure 7.12.16.1-1 Eye Contour Measurement Screen

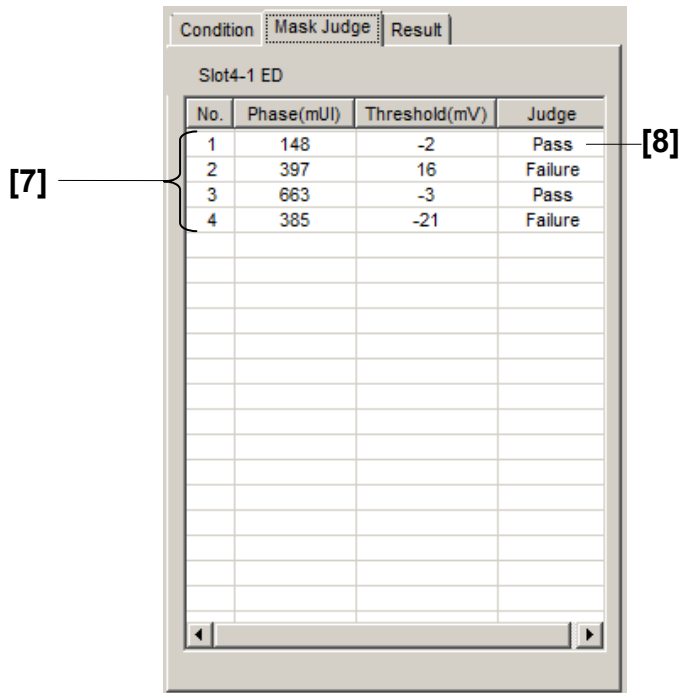


Figure 7.12.16.1-2 Eye Contour Mask Judge Screen

Table 7.12.16.1-1 Contour Tab Setting Commands

No.	Setting Items	Commands
[1]	Tab Selection	:DISPlay:RESult:EDIagram:TABSelect :DISPlay:RESult:EDIagram:TABSelect?
[2]	Auto Search	:SENSe:MEASure:EDIagram:DIAGram:ASEarch :SENSe:MEASure:EDIagram:DIAGram:ASEarch?
[3]	Measurement Point	:SENSe:MEASure:EDIagram:DIAGram:TYPE :SENSe:MEASure:EDIagram:DIAGram:TYPE?
[4]	Lower Measurement Ratio	:SENSe:MEASure:EDIagram:DIAGram:LMRatio :SENSe:MEASure:EDIagram:DIAGram:LMRatio?
[5]	Highlight Error Threshold	:DISPlay:RESult:EDIagram:HETHreshold :DISPlay:RESult:EDIagram:HETHreshold?
[6]	Query for measurement results	:CALCulate:DATA:DIAGram?
[7]	Query Mask point number	:CALCulate:DATA:EDIagram:DETail:PNUMBER?
[8]	Query Mask Judge results	:CALCulate:DATA:EDIagram:DETail:POINT?

**:DISPlay:RESult:EDIagram:TABSelect <tab>**


---

Parameter	<tab> = <CHARACTER PROGRAM DATA> CONTOur                    Contour tab MASKedit                    Mask Edit tab
Function	Selects the Eye Contour measurement tab display.
Example	To display the Eye Contour measurement tab. > :DISPlay:RESult:EDIagram:TABSelect CONTOur
Compatibility	Some parameters are compatible with Eye Diagram measurement (32G).

**:DISPlay:RESult:EDIagram:TABSelect?**


---

Response	<tab> = <CHARACTER RESPONSE DATA> CONT, MASK
Function	Queries the Eye Contour measurement tab display.
Example	> :DISPlay:RESult:EDIagram:TABSelect? < CONT
Compatibility	Some parameters are compatible with Eye Diagram measurement (32G).

**:SENSe:MEASure:EDIagram:DIAGram:ASEarch <setting>[,<mode>]**


---

Parameter	<setting> = <BOOLEAN PROGRAM DATA> ON or 1                    Auto Search ON OFF or 0                    Auto Search OFF <mode> = <DECIMAL NUMERIC PROGRAM DATA> 1                            Coarse 3                            PAM Coarse
	<b>Note:</b> <mode> can be omitted. Coarse is is specified when omitted.
Function	Selects the Auto Search mode when starting Eye Contour measurement.
Example	To execute Auto Search Coarse when starting Eye Contour measurement. > :SENSe:MEASure:EDIagram:DIAGram:ASEarch 1
Compatibility	Some parameters are compatible with Eye Diagram measurement (32G).

### **:SENSe:MEASure:EDIagram:DIAGram:ASEarch?**

---

Response	<mode> = <DECIMAL NUMERIC RESPONSE DATA> 0 OFF 1 ON (Coarse) 3 ON (PAM Coarse)
Function	Queries the Auto Search type to be executed when starting Eye Contour measurement.
Example	> :SENSe:MEASure:EDIagram:DIAGram:ASEarch? < 2
Compatibility	Some parameters are compatible with Eye Diagram measurement (32G).

### **:SENSe:MEASure:EDIagram:DIAGram:TYPE <type>**

---

Parameter	<type> = <CHARACTER PROGRAM DATA> POINT4 4 Point POINT8 8 Point POINT16 16 Point
Function	Sets the number of measurement points for Eye Contour measurement.
Example	To change the number of measurement points to 8 for Eye Contour measurement. > :SENSe:MEASure:EDIagram:DIAGram:TYPE POINT8
Compatibility	Some parameters are compatible with Eye Diagram measurement (32G).

### **:SENSe:MEASure:EDIagram:DIAGram:TYPE?**

---

Response	<type> = <CHARACTER RESPONSE DATA> POIN4, POIN8, POIN16
Function	Queries the number of measurement points for Eye Diagram measurement.
Example	> :SENSe:MEASure:EDIagram:DIAGram:TYPE? < POIN8
Compatibility	Some parameters are compatible with Eye Diagram measurement (32G).

### **:SENSe:MEASure:EDIagram:DIAGram:LMRatio <range>**

---

Parameter	<range> = <CHARACTER PROGRAM DATA> E_7 to E_12 E-7 to E-12
Function	Sets the measurement error threshold lower limit for Eye Contour measurement.
Example	To set the measurement error threshold lower limit to E-12. > :SENSe:MEASure:EDIagram:DIAGram:LMRatio E_12
Compatibility	Incompatible with existing models.

**:SENSe:MEASure:EDIagram:DIAGram:LMRatio?**


---

Response	<range> = <CHARACTER RESPONSE DATA> E_7 to E_12                    E-7 to E-12
Function	Queries the measurement error threshold lower limit for Eye Contour measurement.
Example	> :SENSe:MEASure:EDIagram:DIAGram:LMRatio? < E_12
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:EDIagram:HETHreshold <range>,<numeric1>**


---

Parameter	<range> = <CHARACTER PROGRAM DATA> E_6 to E_20                    E-6 to E-20 <numeric1> = <DECIMAL NUMERIC PROGRAM DATA> 1.0 to 9.9                    Mantissa
Function	Sets two separated by a comma (,). Sets the error ratio displayed for Eye Contour.
Example	To display the Eye Contour for 5.5E-10. >:DISPlay:RESult:EDIagram:HETHreshold E_10,5.5
Compatibility	Incompatible with existing models.

**:DISPlay:RESult:EDIagram:HETHreshold?**


---

Response	<range> = <CHARACTER RESPONSE DATA> E_6 to E_20                    E-6 to E-20 <numeric1> = <DECIMAL NUMERIC RESPONSE DATA> 1.0 to 9.9                    Mantissa
Function	Returns two separated by a comma (,). Queries the setting of error ratio displayed for Eye Contour.
Example	> :DISPlay:RESult:EDIagram:HETHreshold? < E_10,5.5
Compatibility	Incompatible with existing models.

**:CALCulate:DATA:DIAGram? <slot>,<interface>,<string>[,<unit>]**

Parameter <slot> = <CHARACTER PROGRAM DATA>  
 1 to 6 Slots No. 1 to No. 6  
 <interface> = <DECIMAL NUMERIC PROGRAM DATA>  
 1 to 4 Data 1 to 4  
 <string> = <STRING PROGRAM DATA>  
 1 to 16 Measurement point  
 Specify the measurement point and the error rate of the Eye contour.  
 Examples of <string> when specifying the measurement point 1 are shown in the table below.

**Table 7.12.16.1-2 Examples specifying a measurement point**

Error rate	<string>
1E-6	"MAP:E_6:POINT1"
1E-7	"MAP:E_7:POINT1"
:	:
1E-19	"MAP:E_19:POINT1"
1E-20	"MAP:E_20:POINT1"
Highlight Error Threshold	"MAP:HET:POINT1"

<unit> = <DECIMAL NUMERIC PROGRAM DATA>

1 to 4 Mainframe Nos. 1 to 4

When using two or more MT1810A units in serial connection, specify the mainframe number.

Can be omitted. Mainframe No. 1 is specified when omitted.

Response <result> = <STRING RESPONSE DATA>

<result> Measured data

For the format of <result>, refer to Table 7.12.16.1-3.

**Table 7.12.16.1-3 Response Format**

Form	Format	Description
Form 1 Eye Map type	"XXXXX,YYYYY"	XXXXX: Phase (mUI) XXXXX: Phase (ps) (Displays in the selected unit.) YYYYY: Threshold (mV)
	"-----,-----"	When no data corresponds to the query

Function Queries the Eye Contour measurement result of a specific slot and point.

Example To query the Eye Contour measurement result at slot No. 1, Data 2, Highlight Error Threshold, point 1:

>:CALCulate:DATA:DIAGram? SLOT1,2,"MAP:HET:POINT1"

<" 100,1000"

Compatibility Some parameters are compatible with Eye Diagram measurement (32G).



**:DISPlay:RESult:EDIagram:DIAGram:TABSelect <tab>**


---

Parameter	<tab> = <CHARACTER PROGRAM DATA> CONDition                    Condition tab MJUDge                        Mask Judge tab RESult                         Result tab
Function	Switches tab display on the Diagram tab.
Example	To display the Result tab on the Diagram tab. > :DISPlay:RESult:EDIagram:DIAGram:TABSelect RESult
Compatibility	Some parameters of this command are not the same as those for the Eye Diagram measurement (32G).

**:DISPlay:RESult:EDIagram:DIAGram:TABSelect?**


---

Response	<tab> = <CHARACTER RESPONSE DATA> COND, MJUD, RES
Function	Queries tab display on the Diagram tab.
Example	> :DISPlay:RESult:EDIagram:TABSelect? < COND
Compatibility	Some parameters of this command are not the same as those for the Eye Diagram measurement (32G).

**:CALCulate:DATA:EDIagram:DETail:PNUMber?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> 0 to 32                         Result point number
Function	Queries result point number of Mask Judge.
Example	> :CALCulate:DATA:EDIagram:DETail:PNUMber? < 6
Compatibility	Some parameters of the Eye Contour measurement and the Eye Diagram measurement of the MU181040A/B are interchangeable.

**:CALCulate:DATA:EDIagram:DETail:POINT? <string>**

Parameter <string> = <STRING PROGRAM DATA>  
 <result> Measurement data  
 Refer to Table 7.12.16.1-5 for the details of <result>.

Response <string>=<STRING RESPONSE DATA>

**Table 7.12.16.1-4 Response Format**

Form	Format	Description
Form1 Eye Map type	"XXXXX,YYYYY,ZZ"	XXXXX: Phase (mUI) XXXXX: Phase (ps) <i>Note:</i> Displays in the specified unit. YY.YYY : Threshold (mV) ZZ : OK, NG
	"-----,--.--,--"	When no data corresponds to the query

Function Queries the measurement results of the Eye Contour Mask Judge measurement.

**Table 7.12.16.1-5 Eye Contour Mask Judge Measurement Item <result>**

Items		<result>	Response Format
Judgment type	Point1 Point2   Point31 Point32	"JDG:POINT1" "JDG:POINT2"   "JDG:POINT31" "JDG:POINT32"	Form1

Example To query the measurement result of Point1 of the Eye Contour Mask Judge.

```
> :CALCulate:DATA:EDIagram:DETail:POINT? "JDG:POINT1"  
< " 0, 4000,OK"
```

Compatibility Parameters of this command are the same as those for the existing MU181040A/B command for the Eye Diagram measurement.

7.12.16.2 Compatible Commands with Eye Diagram Measurement

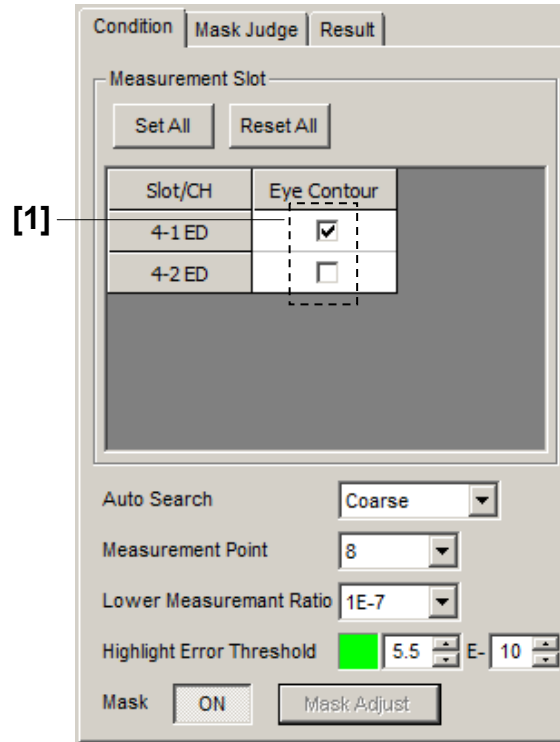


Figure 7.12.16.2-1 Condition Tab

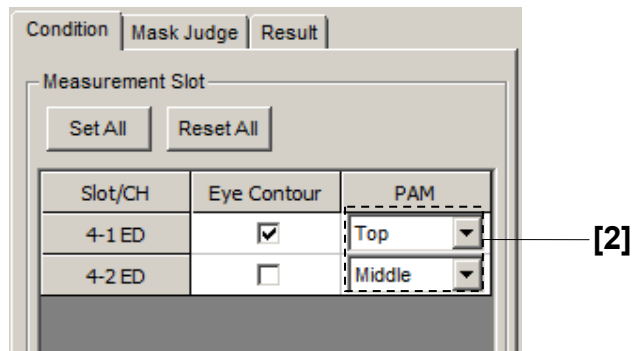


Figure 7.12.16.2-2 Condition Tab (PAM mode)

Table 7.12.16.2-1 Condition Tab Setting Commands

No.	Setting Items	Commands
[1]	Slot Eye Diagram	:SENSE:MEASURE:EDIagram:DIAGram:SLOT
		:SENSE:MEASURE:EDIagram:DIAGram:SLOT?
[2]	Search target threshold (In PAM mode only)	:SENSE:MEASURE:EDIagram:DIAGram:ASEarch:PAMSet
		:SENSE:MEASURE:EDIagram:DIAGram:ASEarch:PAMSet?

For commands description, refer to 7.12.10.1 “Condition tab”.

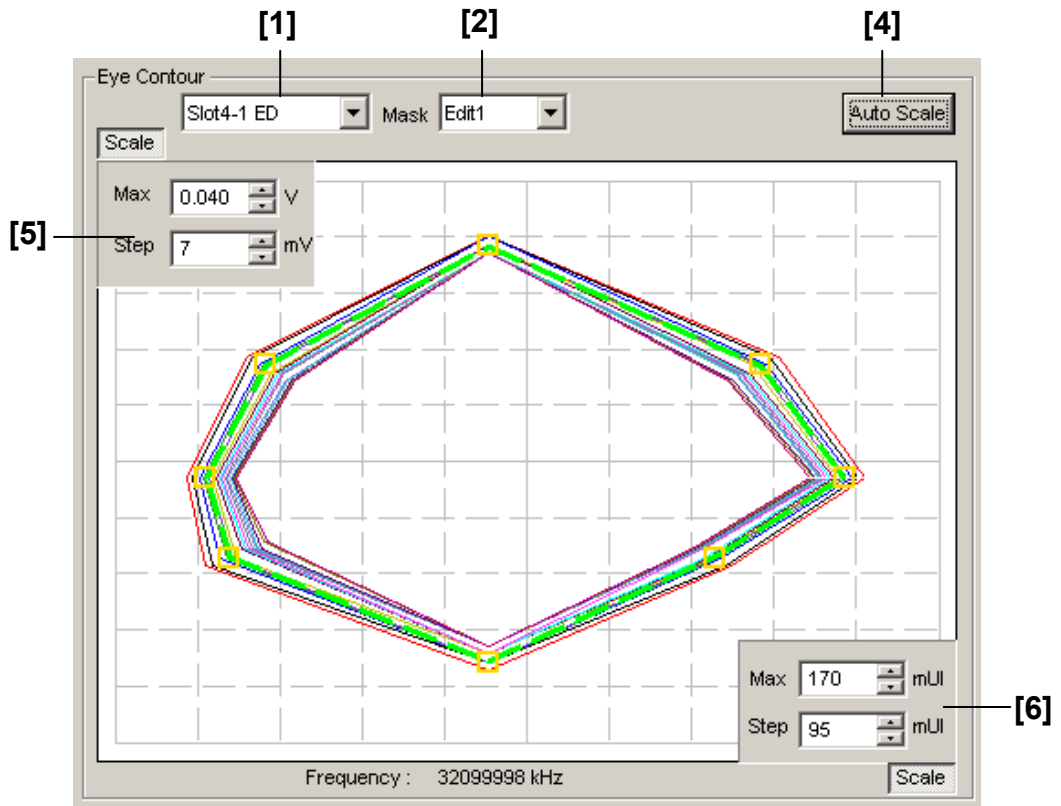


Figure 7.12.16.2-3 Graph Display Field

Table 7.12.16.2-2 Graph Display Setting Commands

No.	Setting Items	Commands
[1]	No label (Result display slot setting)	:DISPlay:RESult:EDIagram:SLOT :DISPlay:RESult:EDIagram:SLOT?
[2]	Mask	:DISPlay:RESult:EDIagram:TEMPlate:SElect :DISPlay:RESult:EDIagram:TEMPlate:SElect?
[4]	Auto Scale	:DISPlay:RESult:EDIagram:SCALE:ASCale
[5]	Max/Step	:DISPlay:RESult:EDIagram:SCALE:VOLTage :DISPlay:RESult:EDIagram:SCALE:VOLTage?
[6]	Max/Step	:DISPlay:RESult:EDIagram:SCALE:PHASe :DISPlay:RESult:EDIagram:SCALE:PHASe?

For commands description, refer to 7.12.10.2.1 “Graph display setting commands”.

7.12.16.2.1 Condition setting commands

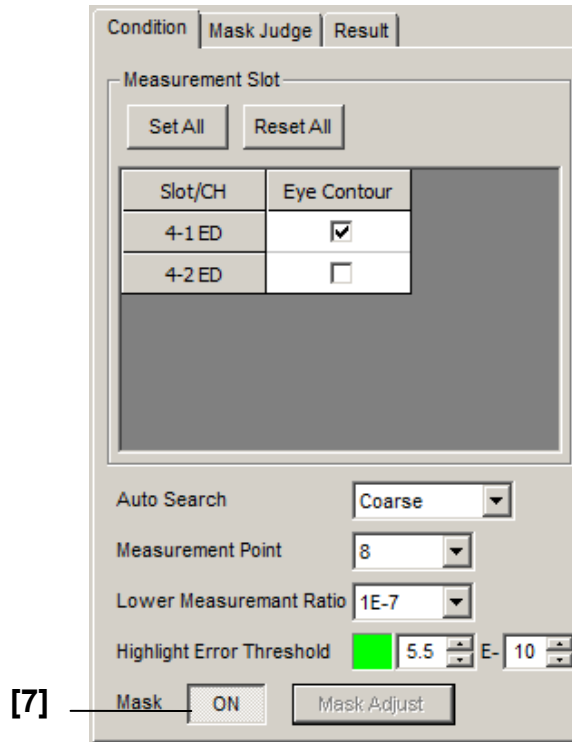


Figure 7.12.16.2.1-1 Condition Tab

Table 7.12.16.2.1-1 Condition Tab Setting Commands

No.	Setting Items	Commands
[7]	Mask	:DISPlay:RESult:EDIagram:DISPlay:MASK
		:DISPlay:RESult:EDIagram:DISPlay:MASK?

For commands description, refer to 7.12.10.2.2 “Condition setting commands”.

7.12.16.2.2 Eye Contour tab (Status) setting commands

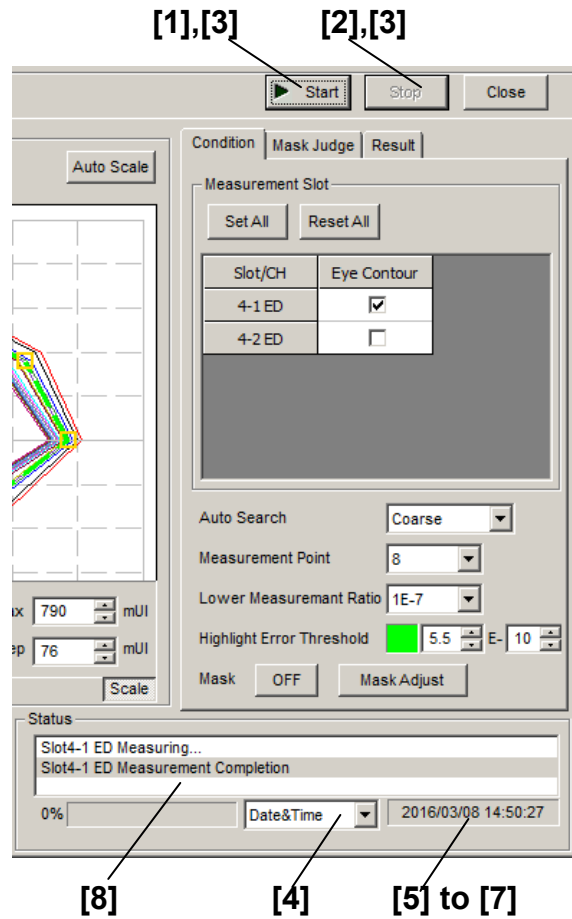


Figure 7.12.16.2.2-1 Diagram Tab, Start and Stop Buttons, and Status Field

Table 7.12.16.2.2-1 Diagram Tab (Status) Setting Commands

No.	Setting Items	Commands
[1]	Start	:SENSE:MEASURE:EDIagram:DIAGram:START
[2]	Stop	:SENSE:MEASURE:EDIagram:DIAGram:STOP
[3]	Query for measurement state	:SENSE:MEASURE:EDIagram:STATe?
[4]	No label (Setting of time display)	:SENSE:MEASURE:EDIagram:TIME :SENSE:MEASURE:EDIagram:TIME?
[5]	Query for current time	:SENSE:MEASURE:EDIagram:DTIME?
[6]	Query for measurement start time	:SENSE:MEASURE:EDIagram:START?
[7]	Query for measurement elapsed time	:SENSE:MEASURE:EDIagram:ELAPsed?
[8]	Query for measurement status	:CALCulate:DATA:EDIagram:STATus?

For commands description, refer to 7.12.10.2.4 “Diagram tab (Status) setting commands”.

7.12.16.2.3 Mask Edit tab setting commands

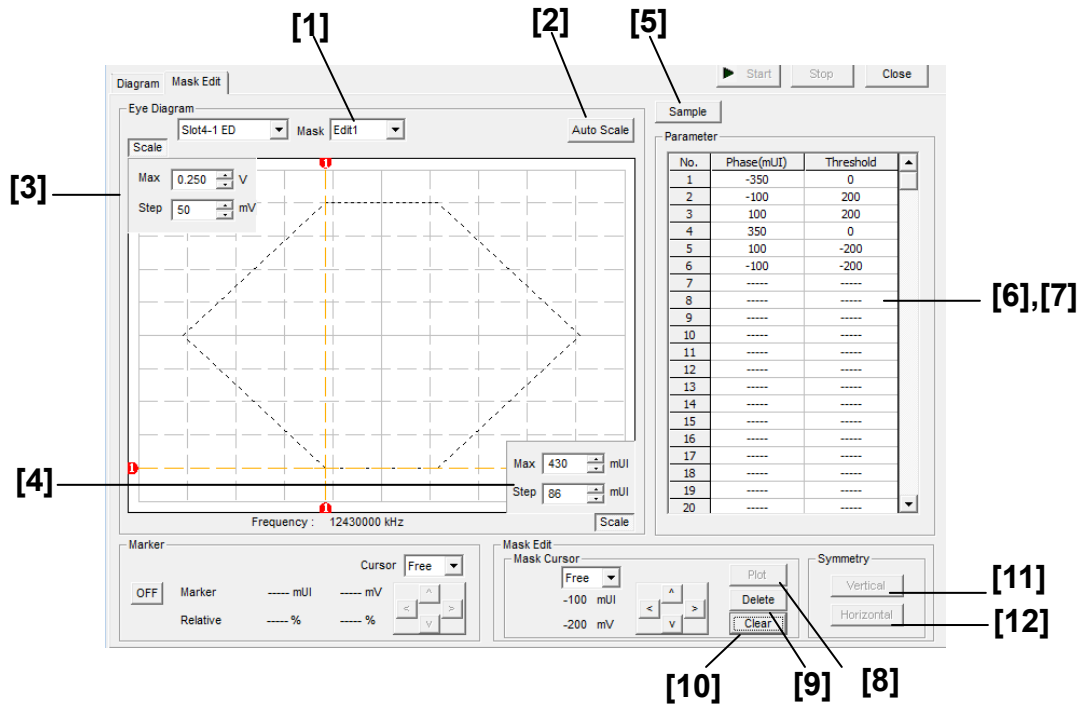


Figure 7.12.16.2.3-1 Mask Edit Tab

Table 7.12.16.2.3-1 Mask Edit Tab Setting Commands

No.	Setting Items	Commands
[1]	Mask	:DISPlay:RESult:EDIagram:TEMPLate:PATtern :DISPlay:RESult:EDIagram:TEMPLate:PATtern?
[2]	Auto Scale	:DISPlay:RESult:EDIagram:TEMPLate:ASCale
[3]	Max Step	:DISPlay:RESult:EDIagram:TEMPLate:SCALe :DISPlay:RESult:EDIagram:TEMPLate:SCALe?
[4]	Max Step	:DISPlay:RESult:EDIagram:TEMPLate:PSCale :DISPlay:RESult:EDIagram:TEMPLate:PSCale?
[5]	Sample	:DISPlay:RESult:EDIagram:TEMPLate:SAMPLe
[6]	Query for mask point count	:DISPlay:RESult:EDIagram:TEMPLate:PNUMber?
[7]	Phase (mUI) Threshold	:DISPlay:RESult:EDIagram:TEMPLate:EDIT :DISPlay:RESult:EDIagram:TEMPLate:EDIT?
[8]	Plot	:DISPlay:RESult:EDIagram:TEMPLate:PLOT
[9]	Delete	:DISPlay:RESult:EDIagram:TEMPLate:DELete
[10]	Clear	:DISPlay:RESult:EDIagram:TEMPLate:CLear
[11]	Vertical	:DISPlay:RESult:EDIagram:TEMPLate:VERTical
[12]	Horizontal	:DISPlay:RESult:EDIagram:TEMPLate:HORIZontal

For commands description, refer to 7.12.10.2.5 “Mask Edit tab setting commands”.

### 7.12.16.2.4 File menu setting commands

Table 7.12.16.2.4-1 File Menu Setting Commands

No.	Setting Items	Commands
[1]	Open	:SYSTem:MMEMory:DIAGram:RECall
[2]	Save	:SYSTem:MMEMory:DIAGram:STORe

For commands description, refer to 7.12.10.2.6 “File menu setting commands”.

### 7.12.16.2.5 Result Query Command

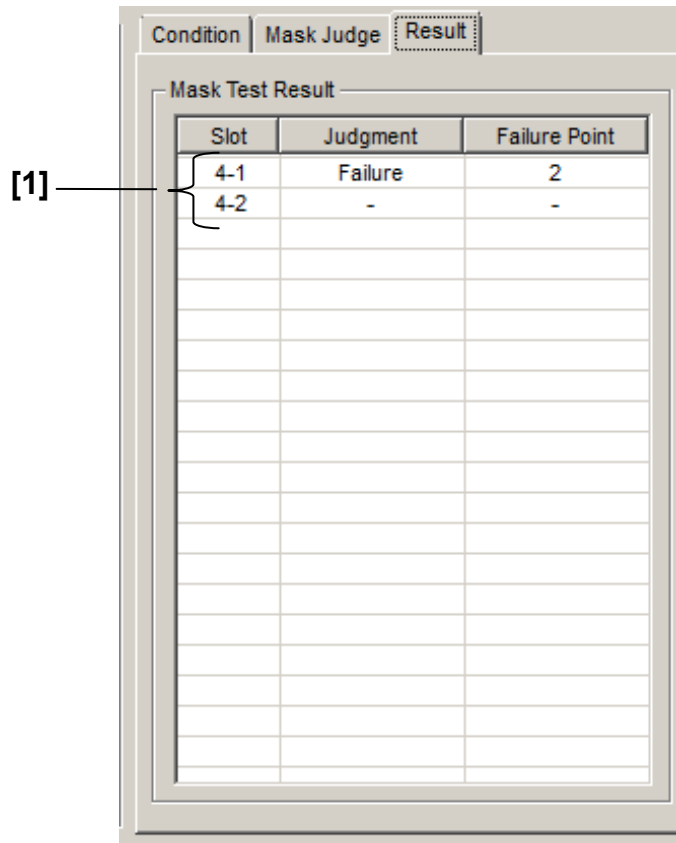


Figure 7.12.16.2.5-1 Result Tab

Table 7.12.16.2.5-1 Result Query Command

No.	Setting Item	Command
[1]	Query Mask Test result	:CALCulate:DATA:EDIagram:MASK?

For details of command, refer to 7.12.16.2.3 “Result query command”.



## Chapter 8 Native Commands

---

This chapter describes the Native commands specific to the MP1800A.

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## 8.1 Common Commands

This section describes the commands related to common settings and functions of the control software. Before executing a setting/query command, specify the slot number of the module to be remotely controlled, by using the :MODULE:ID command. Refer to Chapter 7.1 "Common Commands" and 9.1 "Basic Operation of Device Messages" for how to specify a slot number with the :MODULE:ID command.

### 8.1.1 Commands for common settings

Table 8.1.1-1 Commands for common settings

Setting Items	Commands
Query for software status	CND?
Query for hardware system configuration	HDR?
Query for system error	INF?
Terminator type	TRM?
Query for model name of mainframe and module	CUN?
Query for mainframe information	UNT?
Query for module information	MDN?

**CND?**

## Response

<mainframe>,<slot1>,...,<slot6>

<mainframe> = <serial>,<mver>,<hver>,<opt1>,<sbver>,<saver>,<opt2>

<serial> = <STRING RESPONSE DATA>

XXXXXXXXXX (FIX10) 0000000000 to 9999999999  
Main frame serial number

**Note:**

Alphabetic characters may be included.

<mver> = <STRING RESPONSE DATA>

XXXX.XX.XX (FIX10) 1.00.00 to 9999.99.99  
Main application software version

<hver> = <STRING RESPONSE DATA>

XXXX.XX.XX (FIX10) 1.00.00 to 9999.99.99  
Mainframe hardware version

<opt1> = <STRING RESPONSE DATA>

OPTXXX (FIX6) Option number (MP1800A/MT1810A)  
See Table 8.1.1-2 "Option character  
correspondence table"

**Note:**

Outputs the numbers for all installed  
options.

NONE is output if no option is installed.

<sbver> = <STRING RESPONSE DATA>

XXXX.XX.XX (FIX10) 1.00.00 to 9999.99.99  
Sub application software version (Boot part)

<saver> = <STRING RESPONSE DATA>

XXXX.XX.XX (FIX10) 1.00.00 to 9999.99.99  
Sub application software version (Application part)

<opt2> = <STRING RESPONSE DATA>

<slotx> = <module>,<serial>,<fpga1>[,<fpga2>],<boot>,  
<application>,<opt>

x indicates a slot number. The slot number varies depending on the unit  
number as follows.

Unit 1: 1 to 16 For the MP1800A, numbers from 1 to 6 correspond to actual  
slots.

For the MT1810A, numbers from 1 to 4 correspond to actual  
slots.

Unit 2: 17 to 32 For the MT1810A, numbers from 17 to 20 correspond to  
actual slots.

Unit 3: 33 to 48 For the MT1810A, numbers from 33 to 36 correspond to  
actual slots.

Unit 4: 49 to 64 For the MT1810A, numbers from 49 to 52 correspond to  
actual slots.

<module> = <STRING RESPONSE DATA>

XXXXXXXXXX (FIX9) See Table 8.1.1-2 "Option character  
correspondence table".

**Note:**

NONE is output if no module is installed.  
For a unit that uses two slots, only the  
slot with the greater number is valid.

<serial> = <STRING RESPONSE DATA>  
 XXXXXXXXXXX (FIX10) 000000000 to 9999999999  
 Serial number  
**Note:** "-----" is output if no module is installed.  
 For a module that uses two slots, only the slot with the greater number is valid.

<fpga1>[,<fpga2>,.....] = <STRING RESPONSE DATA>  
 XXXX.XX.XX (FIX10) 1.00.00 to 9999.99.99  
 FPGA version

<boot> = <STRING RESPONSE DATA>  
 XXXX.XX.XX (FIX10) 1.00.00 to 9999.99.99  
 Logic Boot version  
**Note:** "-----" is output if Logic Boot is not installed.  
 For a module that uses two slots, only the slot with the greater number is valid.

<application> = <STRING RESPONSE DATA>  
 XXXX.XX.XX (FIX10) 1.00.00 to 9999.99.99  
 Logic Application version  
**Note:** "-----" is output if Logic Boot is not installed.  
 For a module that uses two slots, only the slot with the greater number is valid.

<opt> = <STRING RESPONSE DATA>  
 XXXXXX (FIX6) Option number  
 OPTXXX: For MP1800A/MT1810A  
**Note:** Outputs the numbers for all installed options.  
 NONE is output if no option is installed.  
 For a module that uses two slots, only the slot with the greater number is valid.  
 The option names of the MU181020B-003 and MU181040B-003 are not output.

Function  
 Example

Queries the software status of the MP1800A/MT1810A.  
 > CND?  
 < CND 6201234567, 1.00.00, 1.00.20,OPT301,OPT302,  
 1.00.00, 1.00.00,OPT 12,  
 MU181000A,6201234568,0001.00.00,0001.00.00,0001.00.00,OPT101,  
 MU181020A,6201234569,0001.00.00,0001.00.00,0001.00.00,OPT001,  
 OPT220,  
 MU181040A,6201234571,0001.00.00,0001.00.00,0001.00.00,OPT002,  
 OPT220

Compatibility

Incompatible with existing models.

Table 8.1.1-2 Option character correspondence table

Model/Name	Option Number	Option Name
MP1800A Signal Quality Analyzer	OPT014	2-Slot PPG/ED
	OPT015	4-Slot PPG/ED
	OPT016	6-Slot PPG/ED
MT1810A 4 Slot Chassis	OPT014	2-Slot PPG/ED
	OPT015	4-Slot PPG/ED
MX180000A Signal Quality Analyzer Control Software	–	–
MU181000A 12.5 GHz Synthesizer	OPTx01	Jitter Modulation
MU181000B 12.5 GHz 4port Synthesizer	OPTx01	Jitter Modulation
MU181020A 12.5 Gbit/s PPG	OPT001	9.8 to 12.5 Gbit/s
	OPT002	0.1 to 12.5 Gbit/s
	OPTx10	Variable Data Output (0.05 to 0.8 Vp-p)
	OPTx11	Variable Data Output (0.25 to 2.5 Vp-p)
	OPTx12	High Performance Data Output (0.05 to 2.0 Vp-p)
	OPTx13	Variable Data Output (0.5 to 3.5 Vp-p)
	OPTx21	Differential Clock Output (0.1 to 2.0 Vp-p)
	OPTx30	Variable Data Delay
MU181040A 12.5 Gbit/s ED	OPT001	9.8 to 12.5 Gbit/s
	OPT002	0.1 to 12.5 Gbit/s
	OPTx20	Clock Recovery
	OPTx30	Variable Clock Delay
MU181600A Optical Transceiver (XFP)	–	–
MU181601A Optical Transceiver (SFP)	–	–
MU181620A Stressed Eye Transmitter	OPTx01	1310nm Reference
	OPTx02	1550nm Reference
	OPTx03	1310nm/1550nm Reference
	OPTx11	1310nm Stressed Eye
	OPTx12	1550nm Stressed Eye
	OPTx13	1310nm/1550nm Stressed Eye
MU181640A Optical Receiver	OPTx04	Band Width 8.5GHz
MU181800A 12.5GHz Clock Distributor	–	–

**Table 8.1.1-2 Option character correspondence table (Cont'd)**

Model/Name	Option Number	Option Name
MU181020B 14 Gbit/s PPG	OPT002	0.1 to 14 Gbit/s
	OPTx11	Variable Data Output (0.25 to 2.5 Vp-p)
	OPTx12	High Performance Data Output (0.05 to 2.0 Vp-p)
	OPTx13	Variable Data Output (0.5 to 3.5 Vp-p)
	OPTx21	Differential Clock Output (0.1 to 2.0 Vp-p)
	OPTx30	Variable Data Delay
MU181040B 14 Gbit/s ED	OPT002	0.1 to 14 Gbit/s
	OPTx20	Clock Recovery
	OPTx30	Variable Clock Delay
MU182020A 25 Gbit/s 1ch MUX MU182021A 25 Gbit/s 2ch MUX	OPTx01	28 Gbit/s Extension
	OPTx02	Clock Input Band Switch
	OPTx10	Variable Data Output (0.25 to 1.75Vp-p)
	OPTx11	Variable Data Output (0.5 to 2.5Vp-p)
	OPTx12	Variable Data Output (0.5 to 2.0Vp-p)
	OPTx13	Variable Data Output (0.5 to 3.5Vp-p)
	OPTx21	Differential Clock Output (0.5 to 2.0Vp-p)
	OPTx30	25Gbit/s Variable Data Delay
MU182040A 25 Gbit/s 1ch DEMUX MU182041A 25 Gbit/s 2ch DEMUX	OPTx01	28Gbit/s Extension
	OPTx02	Clock Input Band Switch
	OPTx30	25GHz Variable Clock Delay
	OPTx31	28GHz Variable Clock Delay

**Note:**

The option names of the MU181020B-003 and MU181040B-003 are not output.

**HDR?**

## Response

&lt;slot1&gt;,...,&lt;slot6&gt;

<slotx> = <module>,<serial>,<fpga1>[,<fpga2>],<boot>,<application>,<opt>  
 x indicates a slot number. The slot number varies depending on the unit number as follows.

Unit 1: 1 to 16 For the MP1800A, numbers from 1 to 6 correspond to actual slots.

For the MT1810A, numbers from 1 to 4 correspond to actual slots.

Unit 2: 17 to 32 For the MT1810A, numbers from 17 to 20 correspond to actual slots.

Unit 3: 33 to 48 For the MT1810A, numbers from 33 to 36 correspond to actual slots.

Unit 4: 49 to 64 For the MT1810A, numbers from 49 to 52 correspond to actual slots.

&lt;module&gt; = &lt;STRING RESPONSE DATA&gt;

XXXXXXXXXX (FIX9)

Module name

See Table 8.1.1-2 "Option character  
 correspondence table"

**Note:**

NONE is output if no module is installed.  
 For a unit that uses two slots, only the  
 slot with the lower number is valid.

&lt;serial&gt; = &lt;STRING RESPONSE DATA&gt;

XXXXXXXXXXXX (FIX10)

0000000000 to 9999999999

Serial number

**Note:**

"-----" is output if no module is  
 installed.  
 For a unit that uses two slots, only the  
 slot with the lower number is valid.

&lt;fpga1&gt;[,&lt;fpga2&gt;,...] = &lt;STRING RESPONSE DATA&gt;

XXXX.XX.XX (FIX10)

1.00.00 to 9999.99.99

FPGA version

&lt;boot&gt; = &lt;STRING RESPONSE DATA&gt;

XXXX.XX.XX (FIX10)

1.00.00 to 9999.99.99

Logic Boot version

**Note:**

"-----" is output if Logic Boot is not  
 installed.  
 For a module that uses two slots, only  
 the slot with the lower number is valid.

&lt;application&gt; = &lt;STRING RESPONSE DATA&gt;

XXXX.XX.XX (FIX10)

1.00.00 to 9999.99.99

Logic Application version

**Note:**

"-----" is output if Logic Application  
 is not installed.  
 For a module that uses two slots, only  
 the slot with the lower number is valid.

	<opt> = <STRING RESPONSE DATA> XXXXXX (FIX6)	Option number OPTXXX: For MP1800A/MT1810A
		<b>Note:</b> Outputs the numbers for all installed options. NONE is output if no option is installed. For a module that uses two slots, only the slot with the lower number is valid.
Function	The option names of the MU181020B-003 and MU181040B-003 are not output.	
Example	Queries the hardware system configuration of the MP1800A/MT1810A. Queries the software status of the MP1800A: > HDR? < HDR "MU181000A,6201234568,0001.00.00,0001.00.00,0001.00.00, OPT101, MU181020A,6201234569,0001.00.00,0001.00.00,0001.00.00,OPT001, OPT220, MU181040A,6201234571,0001.00.00,0001.00.00,0001.00.00,OPT002, OPT220"	
Compatibility	Partially compatible with the MP1632C and MP1776A.	

### INF? <unit>

---

Parameter	<unit> = <DECIMAL NUMERIC PROGRAM DATA> 1 to 4: Mainframe number	
Response	<numeric> = <DEFINITE LENGTH ARBITRARY BLOCK RESPONSE DATA> #B0000 NONE #B100 PLL Unlock #B0100 Temperature #B0010 Fan	
Function	Queries the content of the system error that has currently occurred.	
Example	To query the content of the system error that has occurred in Mainframe 1: > INF? 1 < INF #B1000	
Compatibility	Incompatible with existing models.	



**TRM <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0 Switches the terminator type to LF+EOI. 1 Switches the terminator type to CR+LF+EOI.
Function	Sets the terminator type of the response data.
Example	To set the terminator type to LF+EOI: > TRM 0
Compatibility	Compatible with the MP1632C.

**TRM?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> (FIX1) 0 Terminator type LF+EOI 1 Terminator type CR+LF+EOI
Function	Queries the terminator type of the response data.
Example	> TRM? < TRM 0
Compatibility	Compatible with the MP1632C.

**CUN?**


---

Response	<unit1>,...,<unit4>,<slot1>,...,<slot6> ="<mainframe1>,...,<mainframe4>,<module1>,...,<module6>" <mainframe1> to <mainframe4> = <STRING RESPONSE DATA> XXXXXXXXXX Main frame name (e.g. MT1800A) See Table 8.1.1-2 "Option character correspondence table". <b>Note:</b> NONE is output for mainframe2 to mainframe4, if no mainframe is connected. <module1> to <module6> = <STRING RESPONSE DATA> XXXXXXXXXX Module name (e.g. MU181020A) See Table 8.1.1-2 "Option character correspondence table". <b>Note:</b> NONE is output if no module is installed. For a unit that uses two slots, only the slot with the lower number is valid.
Function	Queries the model name of the MP1800A/MT1810A and module.
Example	> CUN? < NONE,MU181000A,NONE,MU181020A, MU181040A,NONE,...,MU181600A,MU181601A,MU181620A,NONE, MU181640A,NONE,...,NONE
Example	To query the model name of the MP1800A/MT1810A and module for the MP1800A (1-box type): > CUN? < MP1800A,NONE,NONE,NONE,MU181000A,NONE,MU181020A, MU181040A,NONE,MU181600A,NONE,...,NONE
Compatibility	Incompatible with existing models.

---

## UNT? <numeric>

Parameter	<numeric> = <NR1 NUMERIC PROGRAM DATA> 1 to 4 Chassis number
Response	For the MP1800A set to "1" and for the MT1810A set to 1 to 4. "<mainframe>", <mainframe> = <module>,<serial>,<mver>,<hver>,<opt1>,<sbver>,<saver>,<opt2> <module> = <STRING RESPONSE DATA> XXXXXXXXXX Mainframe name (e.g. MP1800A, MT1810A) See Table 8.1.1-2 "Option character correspondence table". <b>Note:</b> NONE is output if no module is installed. For a unit that uses two slots, only the slot with the lower number is valid.  <serial> = <STRING RESPONSE DATA> XXXXXXXXXX 0000000000 to 9999999999 Main frame serial number <b>Note:</b> Alphabetic characters may be included.  <mver> = <STRING RESPONSE DATA> XXXX.XX.XX 1.00.00 to 9999.99.99 Main application software version  <hver> = <STRING RESPONSE DATA> XXXX.XX.XX 1.00.00 to 9999.99.99 Mainframe hardware version  <opt1> = <STRING RESPONSE DATA> OPTXXX Option number (MP1800A/MT1810A) See Table 8.1.1-2 "Option character correspondence table" <b>Note:</b> Outputs the numbers for all installed options. NONE is output if no option is installed.  <sbver> = <STRING RESPONSE DATA> XXXX.XX.XX 1.00.00 to 9999.99.99 Sub application software version (Boot part)  <saver> = <STRING RESPONSE DATA> XXXX.XX.XX 1.00.00 to 9999.99.99 Sub application software version (Application part)
Function	Queries the mainframe information including model and serial number.
Example	To query the Mainframe 1 information: > UNT? 1 < "MP1800A,6201234568,1.00.00,1.00.00,OPT301,1.00.00,1.00.00"
Compatibility	Incompatible with existing models.

**MDN? <numeric>**

Parameter	<numeric> = <NR1 NUMERIC PROGRAM DATA> 1 to 6 Slots 1 to 6
Response	When using the MP1800A: 1 to 6, when using the MT1810A: 1 to 4 <slot> = "<module>,<serial>,<fpga1>,<fpga2>,<boot>,<application>,<opt>" <module> = <STRING RESPONSE DATA> XXXXXXXXXX Module name (e.g. MU181020A) See Table 8.1.1-2 "Option character correspondence table". <b>Note:</b> NONE is output if no module is installed. For a unit that uses two slots, only the slot with the lower number is valid.  <serial> = <STRING RESPONSE DATA> XXXXXXXXXXXX 0000000000 to 9999999999 Serial number <b>Note:</b> "-----" is output if no module is installed. For a unit that uses two slots, only the slot with the lower number is valid.  <fpga1>,<fpga2>,... = <STRING RESPONSE DATA> XXXX.XX.XX 1.00.00 to 9999.99.99 FPGA version  <boot> = <STRING RESPONSE DATA> XXXX.XX.XX 1.00.00 to 9999.99.99 Logic Boot version <b>Note:</b> "-----" is output if Logic Boot is not installed. For a unit that uses two slots, only the slot with the lower number is valid.  <application> = <STRING RESPONSE DATA> XXXX.XX.XX 1.00.00 to 9999.99.99 Logic Application version <b>Note:</b> "-----" is output if Logic Boot is not installed. For a unit that uses two slots, only the slot with the lower number is valid.  <opt> = <STRING RESPONSE DATA> XXXXXX/XXXXX Option number OPTXXX: For MP1800A/MT1810A <b>Note:</b> Outputs the numbers for all installed options. NONE is output if no option is installed. For a unit that uses two slots, only the slot with the lower number is valid. The option names of the MU181020B-003 and MU181040B-003 are not output.
Function	Queries the module information on the specified slot.
Example	To query the module information on Slot 3: > MDN? 3 < MDN "MU181020A,6201234568,1.00.00,----,1.00.00,1.00.00,OPT002,OPT211,OPT220,"
Compatibility	Incompatible with existing models.

### 8.1.2 Commands related to File menu

Table 8.1-2 File Menu Setting Command

Setting Items	Commands
Screen Copy	HCP
Combination Setting	CST?
	CMA?
	CST
	CHA?
	CHS
Initialize	INI

#### HCP

Function Takes a screen shot.  
 Example > HCP  
 Compatibility Compatible with the MP1632C.

#### CST? <slot>[,<unit>]

Parameter <slot>=<DECIMAL NUMERIC PROGRAM DATA>  
 1 to 6 Slot Nos.1 to 6  
 0 All modules (units)  
 When using the MP1800A: 1 to 6, when using the MT1810A: 1 to 4  
 [<unit>]=<DECIMAL NUMERIC PROGRAM DATA>  
 1 to 4 Mainframe Nos. 1 to 4  
 When using two or more MT1810A units in serial connection, specify the mainframe number.  
 Response Can be omitted. Mainframe No. 1 is specified when omitted.  
 <numeric>=<NR1 NUMERIC RESPONSE DATA> <FIX4>  
 0 Independent  
 1 Channel Synchronization  
 21 2 Ch PPG Combination  
 22 2 Ch ED Combination  
 23 2 Ch PPG/ED Combination  
 41 4 Ch PPG Combination  
 42 4 Ch ED Combination  
 71 25G x 2 Ch PPG Combination  
 72 25G x 2 Ch ED Combination  
 Function Queries the combination setting of the specified slot.  
 Example To query the combination setting of Unit 1:  
 > CST? 0  
 < CST 0  
 To query the combination setting of Slot 3 in Unit 2:  
 > CST? 3,2  
 < CST 41  
 Compatibility Incompatible with existing models.

**CMA? [<unit>]**


---

Parameter	[<unit>]=<DECIMAL NUMERIC PROGRAM DATA> 1 to 4 Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number.
Response	Can be omitted. Mainframe No. 1 is specified when omitted. <numeric>=<NR1 NUMERIC RESPONSE DATA> <FIX4> 0 Independent 21 2 Ch PPG Combination 22 2 Ch ED Combination 23 2 Ch PPG/ED Combination 41 4 Ch PPG Combination 42 4 Ch ED Combination 71 25G x 2 Ch PPG Combination 72 25G x 2 Ch ED Combination
Function	Queries the available combination configuration.
Example	To query the combination configuration available for Unit 1: > CMA? < CMA 41
Compatibility	Incompatible with existing models.

**CST <configuration>[,<unit>]**


---

Parameter	<configuration>=<NR1 NUMERIC RESPONSE DATA> 0 Independent 21 2 Ch PPG Combination 22 2 Ch ED Combination 23 2 Ch PPG/ED Combination 41 4 Ch PPG Combination 42 4 Ch ED Combination 71 25G x 2 Ch PPG Combination 72 25G x 2 Ch ED Combination [<unit>]=<DECIMAL NUMERIC PROGRAM DATA> 1 to 4 Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number.
Function	Can be omitted. Mainframe No. 1 is specified when omitted. Sets the combination setting for the specified unit, from Combination or Independent.
Example	To set the combination setting of Unit 3 to 4-ch PPG combination: > CST 41,3
Compatibility	Incompatible with existing models.

### CHA? [<unit>]

Parameter	[<unit>]=<DECIMAL NUMERIC PROGRAM DATA> 1 to 4 Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number. Can be omitted. Mainframe No. 1 is specified when omitted.
Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> <FIX4> 0 to 64 Total number of PPGs that can configure channel synchronization (decimal)  Available bits: 0 No PPG that can configure channel synchronization 1 (Bit 0) PPG in Slot 1 2 (Bit 1) PPG in Slot 2 4 (Bit 2) PPG in Slot 3 8 (Bit 3) PPG in Slot 4 16 (Bit 4) PPG in Slot 5 32 (Bit 5) PPG in Slot 6
Function	Queries the slot where PPG that can configure channel synchronization combination is inserted.
Example	To query the slot in Unit 3 where PPG that can configure channel synchronization is inserted: > CHA? 3 < CHA 7
Compatibility	Incompatible with existing models.

### CHS <configuration>[,<unit>]

Parameter	<configuration>=<NR1 NUMERIC PROGRAM DATA> 0 to 64 Total number of PPGs that can configure channel synchronization (decimal)  Available bits: 2 (Bit 1) PPG in Slot 2 4 (Bit 2) PPG in Slot 3 8 (Bit 3) PPG in Slot 4 16 (Bit 4) PPG in Slot 5 32 (Bit 5) PPG in Slot 6
Function	[<unit>]=<DECIMAL NUMERIC PROGRAM DATA> 1 to 4 Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number. Can be omitted. Mainframe No. 1 is specified when omitted. Specify the slot where the PPG for which channel synchronization is to be set is inserted.
Example	To set channel synchronization for the PPGs in Slots 1 through 4 of Unit 3: > CHS 14,3
Compatibility	Incompatible with existing models.

### INI

Function	Initializes the internal setting data to the initial settings at factory shipment.
Example	> INI
Compatibility	Compatible with the MP1632C and MP1776A.

### 8.1.3 Common function button



Figure 8.1.3-1 Common function button

Table 8.1.3-1 Common Function Button Setting Commands

Setting Items	Commands
Data/Clock Output ON/OFF	OON
	OON?
Error Addition ON/OFF	EAS
	EAS?
Single Error Addition	EAI
Meas. Start	SAT
Meas. Stop	SOT
(Query for measurement status)	STT?
Buzzer Setting Error ON/OFF	MON
	MON?
Buzzer Setting Alarm ON/OFF	ALM
	ALM?
Buzzer Setting System Error ON/OFF	SYS
	SYS?
Buzzer Setting System Error	SYT
	SYT?

### OON <numeric>

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0 Data and Clock output OFF 1 Data and Clock output ON
Function	Sets ON or OFF of Data and Clock outputs of optical PPG.
Example	To set Data and Clock outputs of optical PPG to ON: > OON 1
Compatibility	Compatible with the MP1632C and MP1761C Pulse Pattern Generator (hereinafter referred to as MP1761C).

### OON?

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> (FIX)
Function	Queries the ON/OFF state for Data and Clock outputs of optical PPG.
Example	> OON? < OON 1
Compatibility	Compatible with the MP1632C and MP1761C.

### EAS <numeric>

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0 Error addition OFF 1 Error addition ON
Function	Sets error addition for all valid modules ON/OFF.
Example	To set error addition for all valid modules ON: > EAS 1
Compatibility	Incompatible with existing models.

### EAS?

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> (FIX)
Function	Queries the error addition ON/OFF state for all valid modules.
Example	> EAS? < EAS 1
Compatibility	Incompatible with existing models.

### EAI

---

Function	Adds an error for all valid modules.
Example	> EAI
Compatibility	Incompatible with existing models.

### SAT

---

Function	Starts measurement for all modules.
Example	> SAT
Compatibility	Incompatible with existing models.

### SOT

---

Function	Stops measurement for all modules.
Example	> SOT
Compatibility	Incompatible with existing models.



**STT?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> (FIX1) 0 Measurement stops for all modules 1 During measurement
	<b>Note:</b> If any module is being measured, the response is deemed as being "during measurement".
Function	Queries the measurement state for all modules.
Example	> STT? < STT 0
Compatibility	Incompatible with existing models.

**MON <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0 Buzzer OFF 1 Buzzer ON
Function	Sets buzzer at error occurrence ON/OFF.
Example	To set buzzer at error occurrence ON: > MON 1
Compatibility	Compatible with the MP1632C and MP1762D Error Detector (hereinafter referred to as MP1762D).

**MON?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the buzzer ON/OFF state at error occurrence.
Example	> MON? < MON 1
Compatibility	Compatible with the MP1632C and MP1762D.

**ALM <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0 Buzzer OFF 1 Buzzer ON
Function	Sets buzzer at alarm occurrence ON/OFF.
Example	To set buzzer at alarm occurrence OFF: > ALM 0
Compatibility	Compatible with the MP1632C and MP1762D.

**ALM?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the buzzer ON/OFF state at alarm occurrence.
Example	> ALM? < ALM 0
Compatibility	Compatible with the MP1632C and MP1762D.

### **SYS <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA>
	0 Buzzer OFF
	1 Buzzer ON
Function	Sets buzzer at system error occurrence ON/OFF.
Example	To set buzzer at system error occurrence ON: > SYS 1
Compatibility	Compatible with the MP1632C.

### **SYS?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries buzzer at system error occurrence ON/OFF.
Example	> SYS? < SYS 1
Compatibility	Compatible with the MP1632C.

### **SYT <numeric>**

---

Parameter	<numeric> = <NON-DECIMAL NUMERIC PROGRAM DATA> #B0000: Does not activate system error alarming buzzer for all items. #B1000: Activates buzzer for "PLL Unlock" only. #B0100: Activates buzzer for "FAN" only. #B0010: Activates buzzer for "Temperature" only. #B0001: Activates buzzer for "Required Calibration" only. #B1111: Activates system error alarming buzzer for all items. For items for which the buzzer is activated, set the corresponding bits to 1. Set corresponding bits to 0 for items for which the buzzer is not activated.
Function	Sets system error alarming buzzer for the target item ON/OFF.
Example	To set system error alarming buzzer for PLL Unlock ON only: > SYT #B1000
Compatibility	Partially compatible with the MP1632C.

### **SYT?**

---

Response	<numeric> =<DEFINITE LENGTH ARBITORARY BLOCK RESPONSE DATA>
Function	Queries the ON/OFF state of system error alarming buzzer for target items.
Example	> SYT? < SYT #B1000
Compatibility	Partially compatible with the MP1632C.

## 8.1.4 Auto Search

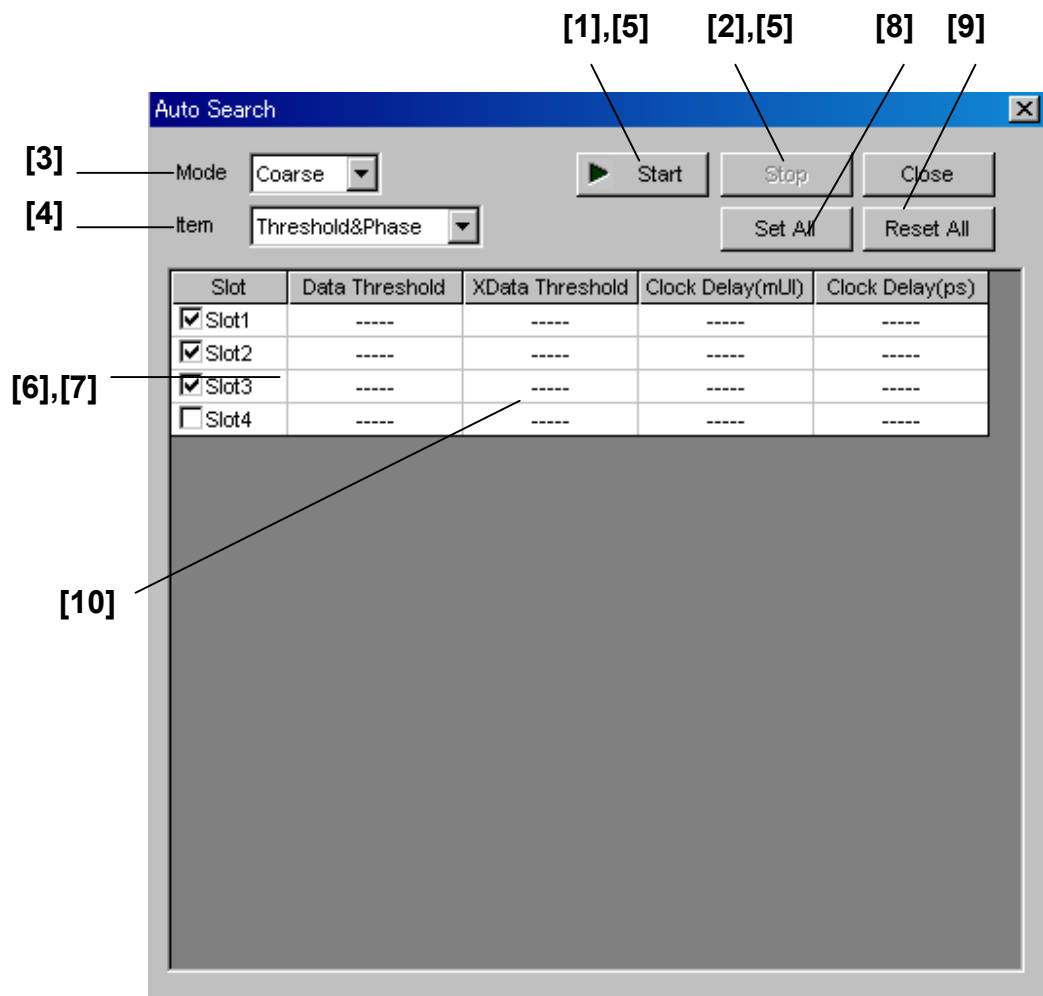


Figure 8.1.4-1 Auto Search dialog box

Table 8.1.4-1 Auto Search Setting Commands

No.	Setting Items	Commands
[1]	Start	AST
[2]	Stop	ASO
[3]	Mode	AMS
		AMS?
[4]	Item	ASM
		ASM?
[5]	Start/Stop	SRH
		SRH?
[6]	No label (Query for slot state)	ASL?
[7]	Slot Select	ASE
		ASE?
[8]	Set All	ASA
[9]	Reset All	ASR
[10]	No label (Query for results)	ARS?

### AST

---

Function Starts Auto Search function.  
 Example > AST  
 Compatibility Incompatible with existing models.

### ASO

---

Function Stops Auto Search function.  
 Example > ASO  
 Compatibility Incompatible with existing models.

### AMS <mode>

---

Parameter <mode>=<DECIMAL NUMERIC PROGRAM DATA>  
 0 Fine mode  
 1 Coarse mode  
 Function Sets the Auto Search mode.  
 Example To set the Auto Search mode to Fine mode:  
 > AMS 0  
 Compatibility Incompatible with existing models.

### AMS?

---

Response <mode>=<NR1 NUMERIC RESPONSE DATA> (FIX1)  
 Function Queries the Auto Search mode.  
 Example > AMS?  
 < AMS 0  
 Compatibility Incompatible with existing models.

**ASM <mode>**


---

Parameter	<mode>=<DECIMAL NUMERIC PROGRAM DATA>
	0 Phase & Threshold
	1 Threshold
	2 Phase
Function	Sets the execution item of Auto Search.
Example	To set the execution item of Auto Search to Phase & Threshold: > ASM 0
Compatibility	Compatible with the MP1632C.

**ASM?**


---

Response	<mode>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the execution item of Auto Search.
Example	> ASM? < ASM 0
Compatibility	Compatible with the MP1632C.

**SRH <numeric>**


---

Parameter	<numeric> = <NR1 NUMERIC PROGRAM DATA>
	1 Start
	0 Stop
Function	Starts or stops the Auto Search function.
Example	To start the Auto Search function: > SRH 1
Compatibility	Compatible with the MP1632C and MP1762D.

**SRH?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA>
	1 Start
	0 Stop
	-1 Auto Search failure
Function	Queries the Auto Search function state.
Example	> SRH? < SRH 1
Compatibility	Partially compatible with the MP1632C and MP1762D.

### ASL? [<unit>]

---

Parameter	[<unit>]=<DECIMAL NUMERIC PROGRAM DATA> 1 to 4 Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number.
Response	<slot>=<NR1 NUMERIC RESPONSE DATA> 1 to 6 SLOT1 to SLOT6 <b>Note:</b> The above response returns all slots for which Auto Search can be executed by delimiting with commas (.). When using the MP1800A: 1 to 6, when using the MT1810A: 1 to 4
Function	Queries the slot for which Auto Search can be executed.
Example	> ASL? < ASL 1, 2, 6
Compatibility	Incompatible with existing models.

### ASE <slot>,<numeric>[,<unit>]

---

Parameter	<slot>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 6 SLOT1 to SLOT6 When using the MP1800A: 1 to 6, when using the MT1810A: 1 to 4 <numeric> = <DECIMAL NUMERIC PROGRAM DATA> 1 ON 0 OFF  [<unit>]=<DECIMAL NUMERIC PROGRAM DATA> 1 to 4 Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number.
Function	Can be omitted. Mainframe No. 1 is specified when omitted. Selects the slot for which Auto Search is to be executed.
Example	To set Auto Search for Slot 1 to ON: > ASE 1,1
Compatibility	Incompatible with existing models.

### ASE? <slot>[,<unit>]

---

Parameter	<slot>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 6 SLOT1 to SLOT6 When using the MP1800A: 1 to 6, when using the MT1810A: 1 to 4 [<unit>]=<DECIMAL NUMERIC PROGRAM DATA> 1 to 4 Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number.
Response	Can be omitted. Mainframe No. 1 is specified when omitted. <numeric > = <NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the slot for which Auto Search is to be executed.
Example	> ASE? 1 < ASE 1
Compatibility	Incompatible with existing models.

### ASA

Function	Sets all slots for which Auto Search is to be executed to ON.
Example	> ASA
Compatibility	Incompatible with existing models.

### ASR

Function	Sets all slots for which Auto Search is to be executed to OFF.
Example	> ASR
Compatibility	Incompatible with existing models.

### ARS? <slot>[,<unit>]

Parameter	<slot>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 6 SLOT 1 to SLOT 6 When using the MP1800A: 1 to 6, when using the MT1810A: 1 to 4
	[<unit>]=<DECIMAL NUMERIC PROGRAM DATA> 1 to 4 Mainframe Nos. 1 to 4 When using two or more MT1810A units in serial connection, specify the mainframe number.
Response	Can be omitted. Mainframe No. 1 is specified when omitted. <data>,<xdata>,<delay>,<numeric1>,<numeric2>,<numeric3> <data>,<xdata>,<delay> = <NR1 NUMERIC RESPONSE DATA> (FIX1) 0 Normal termination 1 Abnormal termination 2 Not executed <numeric1>,<numeric2> = <NR2 NUMERIC RESPONSE DATA> (FIX6) -3.500 to 3.300 V <b>Note:</b> "-----" when not executed <numeric3> = <NR1 NUMERIC RESPONSE DATA> (FIX5) -1000 to 1000 mUI <b>Note:</b> "-----" when no executed <numeric4> = <NR2 NUMERIC RESPONSE DATA> (FIX7) -xxx.xx to xxx.xx ps <b>Note:</b> "-----" when no executed
Function	Queries the Auto Search execution result.
Example	> ARS? 1 < ARS 0,0,0, 3.000, 3.000, 700, 50.00 < ARS 0,0,2, 3.000, 3.000,-----,----- (Delay auto search is not executed)
Compatibility	Incompatible with existing models.

## 8.2 Synthesizer Commands

This section describes MU181000A 12.5 GHz Synthesizer and MU181000B 12.5 GHz 4 port Synthesizer (hereinafter referred to as Synthesizer) commands.

Before executing a setting/query command for the Synthesizer, specify the slot number of the module to be remotely controlled, by using the :MODule:ID command. Refer to Section 7.1 "Common Commands" and 9.1 "Basic Operation of Device Messages" for how to specify a slot number with the :MODule:ID command.

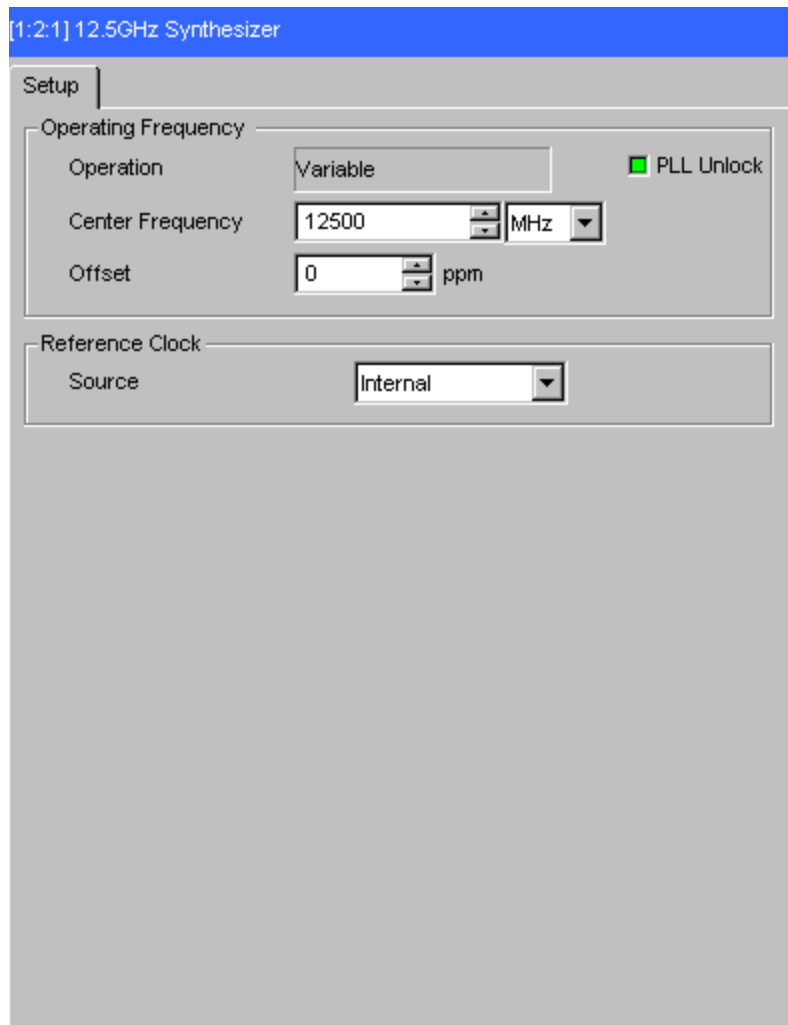


Figure 8.2-1 Synthesizer screen



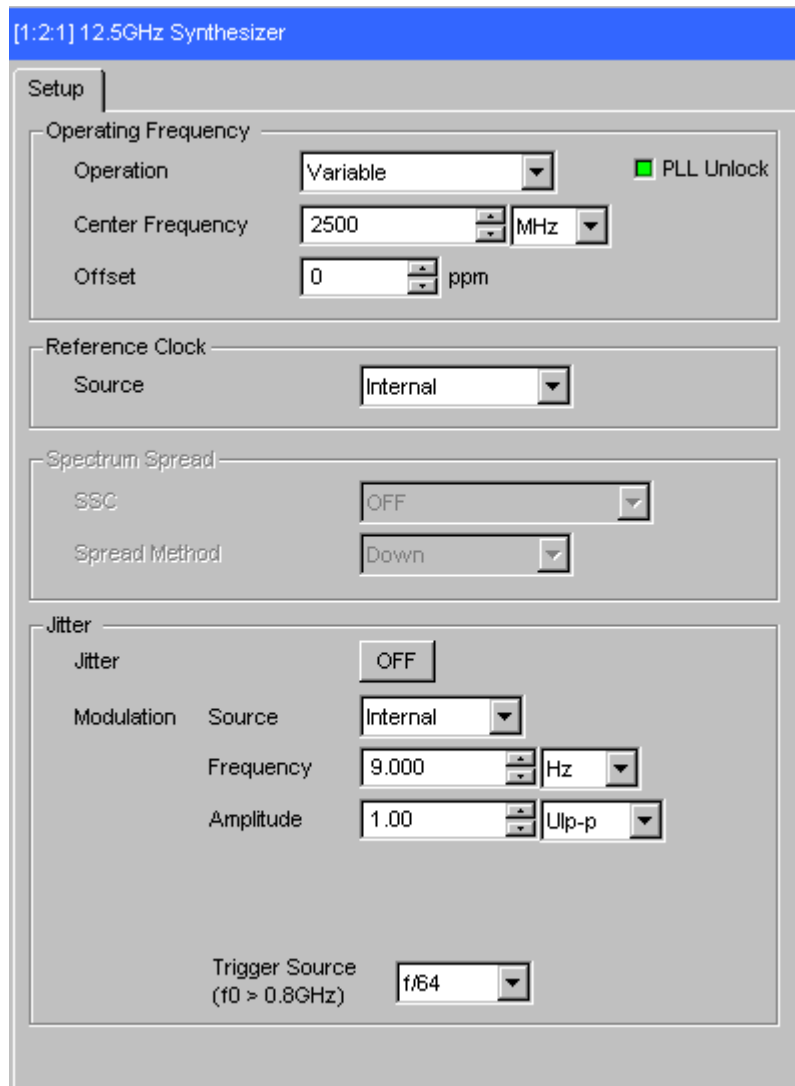


Figure 8.2-2 12.5 GHz Synthesizer Window (Option x01)

### 8.2.1 Operation Frequency setting commands

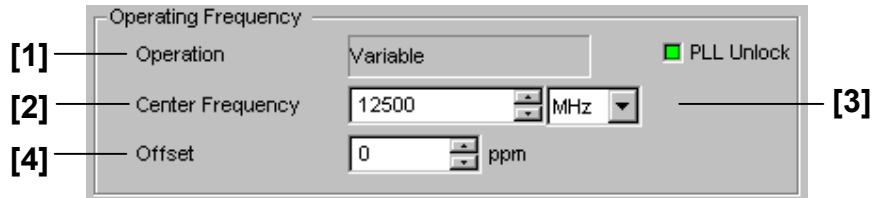


Figure 8.2.1-1 Operation Frequency setting field

Table 8.2.1-1 Operation Frequency setting commands

No.	Setting Items	Commands
[1]	Operation	OPE
		OPE?
[2]	Center Frequency	FRQ
		FRQ?
[3]	Center Frequency Unit	RES
		RES?
[4]	Offset	COP
		COP?

**OPE <numeric>**


---

Parameter	<numeric> = <DECIMAL PROGRAM DATA>
	0 Variable
	1 PCIe-Gen I (2.5 GHz)
	2 PCIe-Gen II (5 GHz)
	3 Serial-ATA (6 GHz)
Function	Sets the operation of the synthesizer.
Example	To set the operation of the synthesizer to Variable: > OPE 0
Compatibility	Incompatible with existing models.

**OPE?**


---

Response	<numeric> = <NR1 RESPONSE DATA> (FIX1)
	0 Variable
	1 PCIe-Gen I (2.5 GHz)
	2 PCIe-Gen II (5 GHz)
	3 Serial-ATA (6 GHz)
Function	Queries the operating of the synthesizer.
Example	> OPE? < OPE 2
Compatibility	Incompatible with existing models.

**Note:**

The OPE and OPE? commands can be executed only when MU181000A-x01 or MU181000B-x01 is installed.

## FRQ <numeric>

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> When the operation frequency setting resolution unit is kHz: 100000 to 12500000      100,000 to 12,500,000 kHz, in 1 kHz steps When the operation frequency setting resolution unit is MHz: 100 to 12500      100 to 12,500 MHz, in 1 MHz steps
Function	Sets the operation frequency of the synthesizer.
Example	To set the operation frequency of the synthesizer to 12500000 kHz: > FRQ 12500000 To set the operation frequency of the synthesizer to 100 MHz: > FRQ 100
Compatibility	Partially compatible with the MP1632C and MP1761C. Compatible with the MP1775A Pulse Pattern Generator (hereinafter, referred to as "MP1775A").

## FRQ?

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> When the operation frequency setting resolution unit is kHz (FIX8): 100000 to 12500000      100,000 to 12,500,000 kHz When the operation frequency setting resolution unit is MHz (FIX5): 100 to 12500      100 to 12,500 MHz
Function	Queries the operating frequency of the synthesizer.
Example	To query the operating frequency of the synthesizer in kHz units: > FRQ? < FRQ 12500000 < FRQ 100000 To query the operating frequency of the synthesizer in MHz units: > FRQ? < FRQ 100
Compatibility	Partially compatible with the MP1632C and MP1761C. Compatible with the MP1775A.

**RES <type>**


---

Parameter	<type> = <DECIMAL NUMERIC PROGRAM DATA> 0 kHz 1 MHz
Function	Sets the resolution for setting the operating frequency of the synthesizer.
Example	To set the resolution for setting the operating frequency of the synthesizer to kHz: > RES 0
Compatibility	Compatible with the MP1761C and MP1775A.

**RES?**


---

Response	<type> = <NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the resolution for setting the operating frequency of the synthesizer.
Example	> RES? < RES 0
Compatibility	Compatible with the MP1761C and MP1775A.

**COP <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> -1000 to 1000 -1,000 to +1,000 ppm, in 1 ppm steps
Function	Sets the offset value (ppm) for the frequency currently being output.
Example	To set the offset value for the frequency currently being output to 0 ppm: > COP -1000
Compatibility	Incompatible with existing models.

**COP?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> (FIX5) -1000 to 1000 -1,000 to +1,000 ppm
Function	Queries the offset value (ppm) for the frequency currently being output.
Example	> COP? < COP -10 < COP -1000
Compatibility	Incompatible with existing models.

## 8.2.2 Reference Clock setting commands

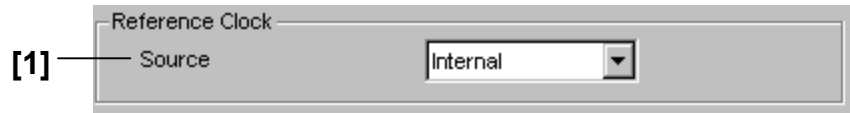


Figure 8.2.2-1 Reference Clock setting field

Table 8.2.2-1 Reference Clock setting commands

No.	Setting Item	Commands
[1]	Source	RFC RFC?

### RFC <numeric>

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA> 0                                   10-MHz internal reference signal 1                                   10-MHz external reference signal
Function	Selects an internal signal or an external input signal for the 10-MHz reference signal.
Example	To set 10-MHz reference signal for external input: > RFC 1
Compatibility	Partially compatible with the MP1632C.

### RFC?

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the setting of the 10-MHz reference signal currently selected.
Example	> RFC? < RFC 1
Compatibility	Partially compatible with the MP1632C.

### 8.2.3 Spectrum Spread setting commands

The following commands are enabled only when the Option MU181000A-x01 or MU181000B-x01 is available.

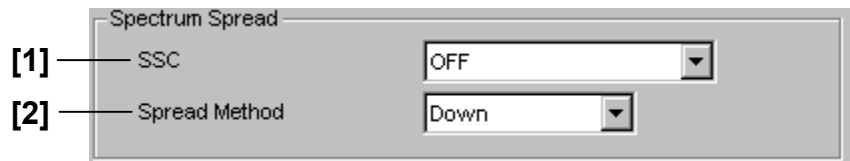


Figure 8.2.3-1 Spectrum Spread setting

Table 8.2.3-1 Spectrum Spread setting commands

No.	Setting Items	Commands
[1]	SSC	RSU
		RSU?
[2]	Spread Method	RSM
		RSM?

#### RSU <numeric>

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA>
	0 SSC function off
	1 SSC function on (using internal reference signal)
	2 SSC function on (using external 10 MHz reference signal)
	3 SSC function on (using external 100 MHz reference signal)
Function	Sets whether to use the SSC (Spread Spectrum Clocking) function of the synthesizer and the reference signal to be used.
Example	Sets the SSC function to on using internal reference signal of the synthesizer. > RSU 1
Compatibility	Incompatible with existing models.

#### RSU?

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA (FIX1)>
	0 SSC function off
	1 SSC function on (using internal reference signal)
	2 SSC function on (using external 10 MHz reference signal)
	3 SSC function on (using external 100 MHz reference signal)
Function	Queries setting of SSC (Spread Spectrum Clocking) function of the synthesizer.
Example	> RSU? < RSU 1
Compatibility	Incompatible with existing models.

## **RSM <numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA>
	0 Changes frequency within the range from 0 to -0.5%
	1 Changes frequency within the range of +/-0.25%
Function	Sets spectrum spreading method for SSC (Spread Spectrum Clocking) using 100 MHz reference signal.
Example	Sets spectrum spreading method for SSC using 100 MHz reference signal to DOWN. > RSM 0
Compatibility	Incompatible with existing models.

## **RSM?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> (FIX1)
	0 Changes frequency within the range from 0 to -0.5%
	1 Changes frequency within the range of +/-0.25%
Function	Queries spectrum spreading method for SSC (Spread Spectrum Clocking) using 100 MHz reference signal.
Example	> RSM? < RSM 0
Compatibility	Incompatible with existing models.



### 8.2.4 Jitter setting commands

The following commands are enabled only when the Option MU181000A-x01 or MU181000B-x01 is available.

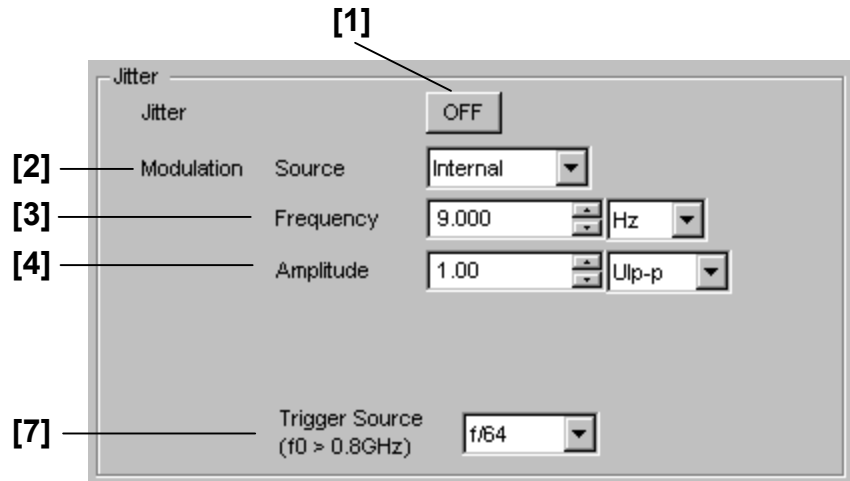


Figure 8.2.4-1 Jitter setting (Modulation Source: Internal)

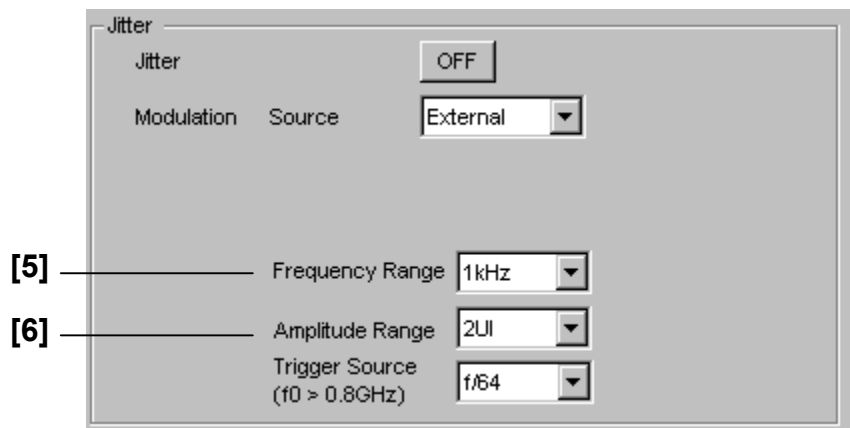


Figure 8.2.4-2 Jitter setting (Modulation Source: External)

**Table 8.2.4-1 Jitter setting commands**

No.	Setting Items	Commands
[1]	Jitter ON/OFF	JOU
		JOU?
[2]	Modulation Source	JMS
		JMS?
[3]	Frequency	JMF
		JMF?
[4]	Amplitude	JMP
		JMP
[5]	Frequency Range	JMG
		JMG?
[6]	Amplitude Range	JMA
		JMA?
[7]	Trigger Source	JTS
		JTS?

**JOU <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA>
	0                      Jitter modulation off
	1                      Jitter modulation on
Function	Sets on/off of Jitter output.
Example	Sets Jitter output to off. > JOU 0
Compatibility	Incompatible with existing models.

**JOU?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> (FIX1)
	0                      Jitter modulation off
	1                      Jitter modulation on
Function	Queries on/off of Jitter output.
Example	> JOU? < JOU 0
Compatibility	Incompatible with existing models.

**JMS <numeric>**


---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA>
	0                      Internal modulation source
	1                      External modulation source
	2                      External modulation source (IQ)
Function	Sets modulation signal source.
Example	Sets modulation signal source to internal modulation source. > JMS 0
Compatibility	Incompatible with existing models.

**JMS?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> (FIX1)
	0                      Internal modulation source
	1                      External modulation source
	2                      External modulation source (IQ)
Function	Queries modulation signal source.
Example	> JMS? < JMS 0
Compatibility	Incompatible with existing models.

## JMF <numeric1>,<numeric2>

Parameter	<p>&lt;numeric&gt; = &lt;DECIMAL NUMERIC PROGRAM DATA&gt;</p> <p>When Hz is selected for &lt;numeric2&gt;</p> <p>9.000 to 1000.0                      9.000 to 1000.0 Hz</p> <p>Setting steps</p> <p>9.000[Hz] ≤ fmod ≤ 10.000 [Hz]: In 0.001-Hz steps</p> <p>10.01[Hz] ≤ fmod ≤ 100.00 [Hz]: In 0.01-Hz steps</p> <p>100.1[Hz] ≤ fmod ≤ 1000.0 [Hz]: In 0.1-Hz steps</p> <p>When kHz is selected for &lt;numeric2&gt;</p> <p>1.001 to 1000.0                      1.00 to 1000.0 kHz</p> <p>Setting steps</p> <p>1.001[kHz] ≤ fmod ≤ 10.000 [kHz]: In 0.001-kHz steps</p> <p>10.01[kHz] ≤ fmod ≤ 100.00 [kHz]: In 0.01-kHz steps</p> <p>100.1[kHz] ≤ fmod ≤ 1000.0 [kHz]: In 0.1-kHz steps</p> <p>When MHz is selected for &lt;numeric2&gt;</p> <p>1.001 to 80.00                      1.00 to 80 MHz</p> <p>Setting steps</p> <p>1.001[MHz] ≤ fmod ≤ 10.000 [MHz]: In 0.001-MHz step</p> <p>10.01[MHz] ≤ fmod ≤ 80.00 [MHz]: In 0.01-MHz steps</p> <p>&lt;numeric2&gt; = &lt;CHARACTER PROGRAM DATA&gt;</p> <p>0                                      Hz units</p> <p>1                                      kHz units</p> <p>2                                      MHz units</p>
Function	Sets internal modulation frequency and units.
Example	<p>Sets internal modulation frequency to 10 kHz.</p> <p>&gt; JMF 10.00,1</p>
Compatibility	Incompatible with existing models.

**JMF?**


---

Response	<numeric1> = <NR2 NUMERIC RESPONSE DATA> (FIX6)
	9.000 to 1000.0                      9.000 to 1000.0 Hz (When Hz is selected for resolution)
	1.001 to 1000.0                      1.00 to 1000.0 kHz (When kHz is selected for resolution)
	1.001 to 80.00                        1.00 to 80 MHz (When MHz is selected for resolution)
	<numeric2> = <NR1 NUMERIC RESPONSE DATA> (FIX1)
	0    Hz units
	1    kHz units
	2    MHz units
Function	Queries internal modulation frequency and units.
Example	> JMF? < JMF 10.000,1
Compatibility	Incompatible with existing models.

**JMP <numeric1>,<numeric2>**


---

Parameter	<numeric1> = <DECIMAL NUMERIC PROGRAM DATA>
	0 to 999                                0 to 999 mUlp-p, in 1-mUp-p steps
	1.00 to 32.00                        1.00 to 32.00 Ulp-p, in 0.01-Ulp-p steps
	32.1 to 256.0                        32.1 to 256.0 Ulp-p, in 0.1-Ulp-p steps
	257 to 2049                           257 to 2049 Ulp-p, in 1-Ulp-p steps
	2050 to 4000                        2050 to 4000 Ulp-p, in 10-Ulp-p steps
	<numeric2> = <DECIMAL NUMERIC PROGRAM DATA>
	0    mUlp-p units
	1    Ulp-p units
Function	Sets internal modulation amplitude and units.
Example	Sets internal modulation amplitude to 1.100 Ulp-p. > JMP 1.100,1
Compatibility	Incompatible with existing models.

## JMP?

---

Response	<numeric1> = <NR2 NUMERIC RESPONSE DATA> 0 to 999                      0 to 999 mUlp-p 1.00 to 32.00                1.00 to 32.00 Ulp-p 32.1 to 256.0                32.1 to 256.0 Ulp-p 257 to 2049                  257 to 2049 Ulp-p 2050 to 4000                 2050 to 4000 Ulp-p <numeric2> = <DECIMAL NUMERIC PROGRAM DATA> (FIX1) 0                                mUlp-p units 1                                Ulp-p units
Function	Queries internal modulation amplitude and units.
Example	> JMP? < JMP 1.100,1
Compatibility	Incompatible with existing models.

**JMG <numeric>**

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA>
	0 275 Hz
	1 550 Hz
	2 1 kHz
	3 1.1 kHz
	4 2.2 kHz
	5 2.75 kHz
	6 4.4 kHz
	7 5.5 kHz
	8 11 kHz
	9 22 kHz
	10 27.5 kHz
	11 44 kHz
	12 55 kHz
	13 100 kHz
	14 110 kHz
	15 220 kHz
	16 250 kHz
	17 440 kHz
	18 500 kHz
	19 1 MHz
	20 2 MHz
	21 4 MHz
	22 80 MHz
	23 500 MHz
	24 1 GHz
	27 All range
Function	Sets external modulation frequency range.
Example	Sets external modulation frequency range to 275 kHz. > JMG 0
Compatibility	Incompatible with existing models.

**JMG?**

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> (FIX2)
Function	Queries external modulation frequency range.
Example	> JMG? < JMG 0
Compatibility	Incompatible with existing models.

### **JMA<numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA>
	0            0.22 UI
	1            2.00 UI
	2            20 UI
	3            200 UI
	4            4,000 UI
Function	Sets external modulation amplitude.
Example	Sets external modulation amplitude to 0.22 UI. > JMA 0
Compatibility	Incompatible with existing models.

### **JMA?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> (FIX1)
	0            0.22 UI
	1            2.00 UI
	2            20 UI
	3            200 UI
	4            4,000 UI
Function	Queries external modulation amplitude.
Example	> JMA? < JMA 0
Compatibility	Incompatible with existing models.

### **JTS<numeric>**

---

Parameter	<numeric> = <DECIMAL NUMERIC PROGRAM DATA>
	0            f/1
	1            f/64
Function	Selects trigger output division ratio.
Example	Sets trigger output division ratio to f/1. > JTR 0
Compatibility	Incompatible with existing models.

### **JTS?**

---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> (FIX1)
	0            f/1
	1            f/64
Function	Queries trigger output division ratio.
Example	> JTR? < JTR 0
Compatibility	Incompatible with existing models.

---



## 8.3 PPG Commands

This section describes the setting/query commands for the MU181020A 12.5 Gbit/s PPG and the MU181020B 14 Gbit/s PPG. Commands are described for each tab. Before executing a setting/query command for the MU181020A/B, specify the slot number of the module to be remotely controlled, by using the :MODULE:ID command. Refer to Section 7.1 "Common Commands" and 9.1 "Basic Operation of Device Messages" for how to specify a slot number with the :MODULE:ID command. However, unless there is a special item, see the MU181020A.

### 8.3.1 Commands related to Output tab window

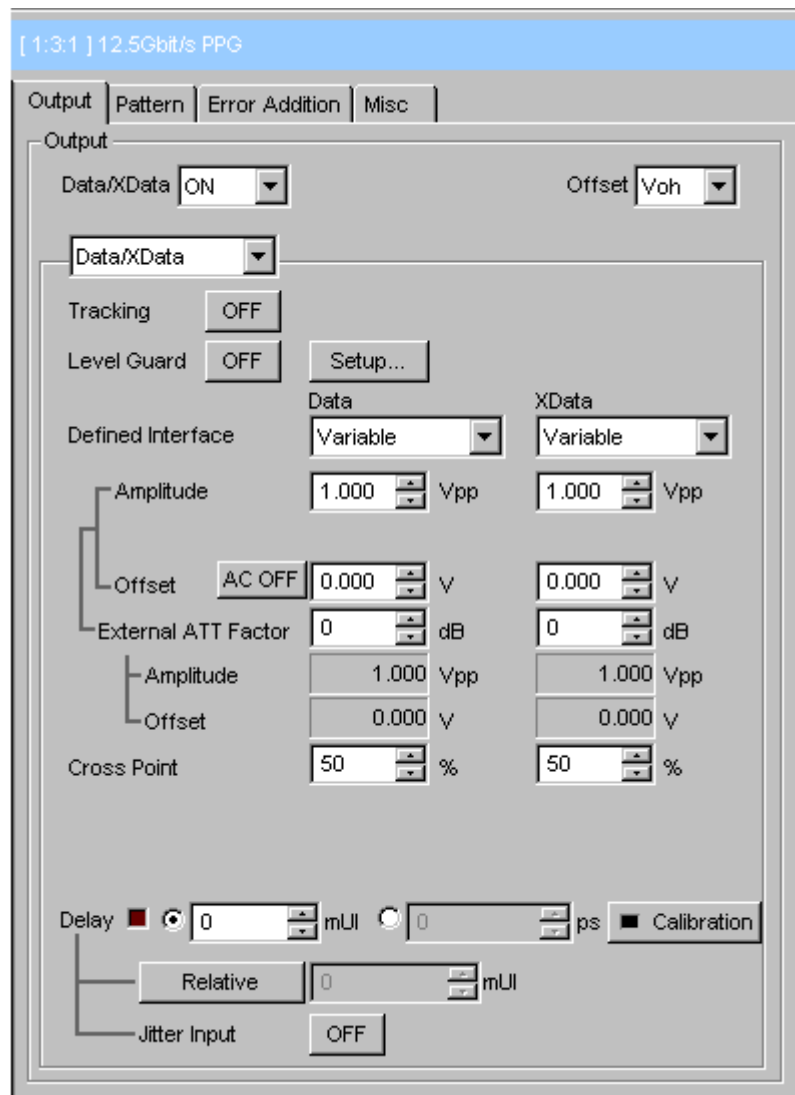


Figure 8.3.1-1 Output tab window

8.3.1.1 Output setting commands

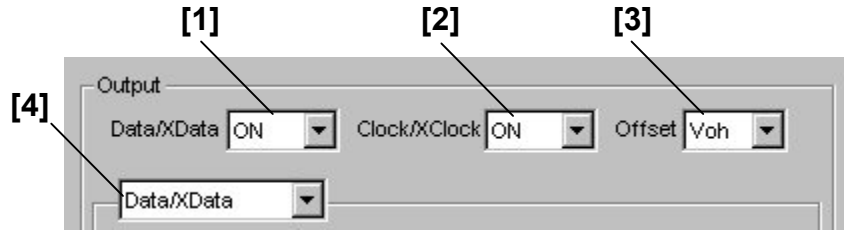


Figure 8.3.1.1-1 Output setting field

Table 8.3.1.1-1 Output setting commands

No.	Setting Items	Commands
[1]	Data/XData	DON
		DON?
[2]	Clock/XClock	CON
		CON?
[3]	Offset	OFS
		OFS?
[4]	No label (Setting item selection)	OOF
		OOF?

**DON <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA>
	0            Output OFF
	1            Output ON
Function	Sets data output ON or OFF.
Example	To set data output ON: > DON 1
Compatibility	Compatible with the MP1632C.

**DON?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the data output ON/OFF state.
Example	> DON? < DON 1
Compatibility	Compatible with the MP1632C.

**CON <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA>
	0            Output OFF
	1            Output ON
Function	Sets clock output ON or OFF.
Example	To set clock output ON: > CON 1
Compatibility	Compatible with the MP1632C.

**CON?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the clock output ON/OFF state.
Example	> CON? < CON 1
Compatibility	Compatible with the MP1632C.

### OFS <offset>

---

Parameter	<offset>=<DECIMAL NUMERIC PROGRAM DATA>
	0           VOH           High level
	1           VTH           Center value between High and Low levels
	2           VOL           Low level
Function	Sets the offset reference value for data and clock output.
Example	To set the offset reference value to Voh: > OFS 0
Compatibility	Compatible with the MP1632C, MP1761C and MP1775A.

### OFS?

---

Response	<offset>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the offset reference value for data and clock outputs.
Example	> OFS? < OFS 1
Compatibility	Compatible with the MP1632C, MP1761C and MP1775A.

### OOF <numeric>

---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA>
	0                           Data/XData setting screen
	1                           Clock/XClock setting screen
	2                           CMU Bitrate setting screen
Function	Selects the data output, clock output, or CMU setting screen.
Example	To select the data output setting screen: > OOF 0
Compatibility	Incompatible with existing models.

### OOF?

---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the selected setting screen.
Example	> OOF? < OOF 0
Compatibility	Incompatible with existing models.

8.3.1.2 Data/XData setting commands

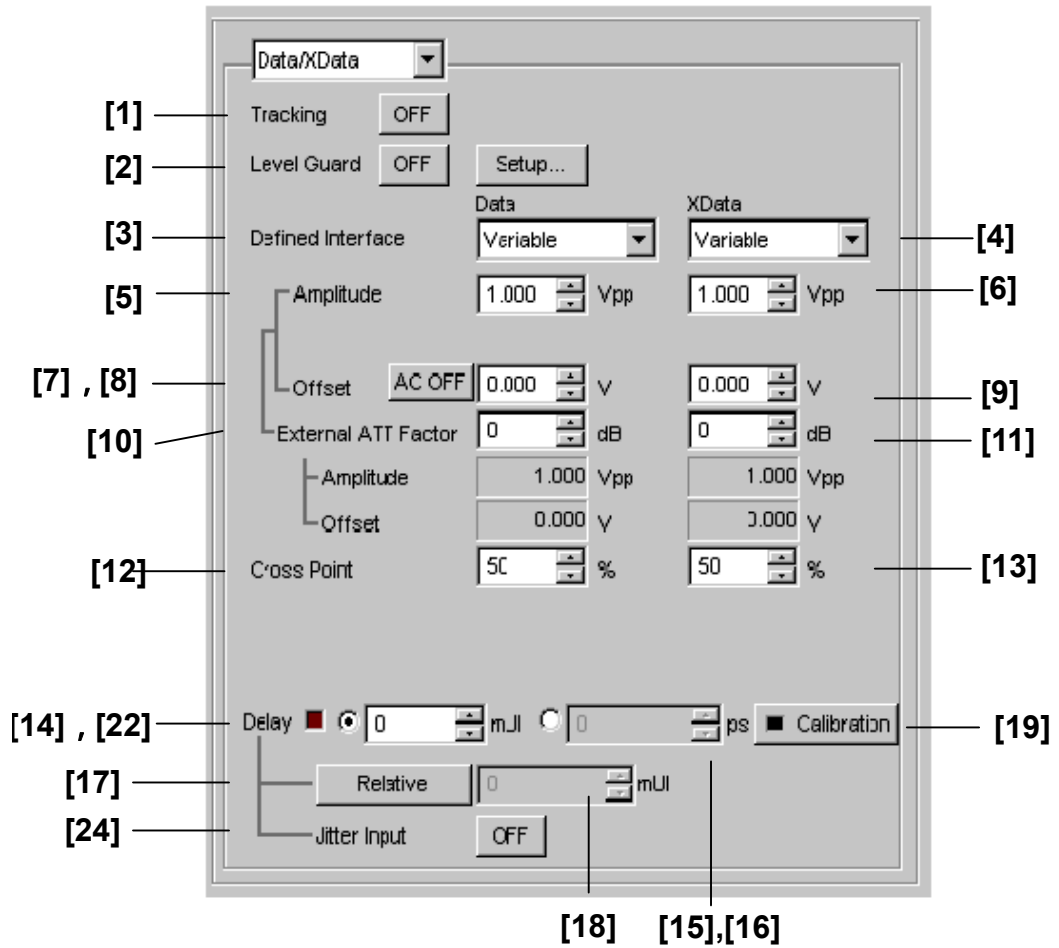


Figure 8.3.1.2-1 Data/XData setting field

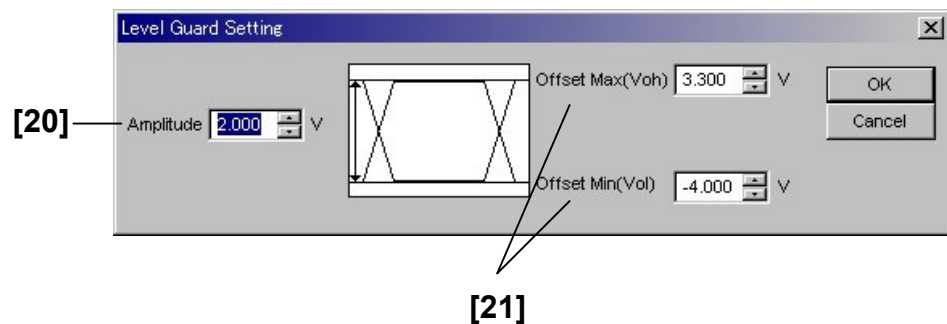


Figure 8.3.1.2-2 Level Guard Setting dialog box

**Table 8.3.1.2-1 Data/XData setting commands**

No.	Setting Items	Commands
[1]	Tracking	TRK
		TRK?
[2]	Level Guard	DGD
		DGD?
[3]	Defined Interface (Data)	DAL
		DAL?
[4]	Defined Interface (XData)	XDL
		XDL?
[5]	Amplitude (Data)	DAP
		DAP?
[6]	Amplitude (XData)	NAP
		NAP?
[7]	AC ON/OFF	DAD
		DAD?
[8]	Offset (Data)	DOS
		DOS?
[9]	Offset (XData)	NOS
		NOS?
[10]	External ATT Factor (Data)	DAT
		DAT?
[11]	External ATT Factor (XData)	XAT
		XAT?
[12]	Cross Point (Data)	DCR
		DCR?
[13]	Cross Point (XData)	XDC
		XDC?

Table 8.3.1.2-1 Data/XData setting commands (Cont'd)

No.	Setting Items	Commands
[14]	Phase Adjust	PAU
		PAU?
[15]	Phase Adjust	PAD
		PAD?
[16]	Phase Adjust	CDL
		CDL?
[17]	Relative 0	PRO
		PRO?
[18]	No label (Relative value setting)	PRE
		PRE?
[19]	Calibration	PCA
[20]	Amplitude max	DLM
		DLM?
[21]	Offset max/min	DOF
		DOF?
[22]	No label (Delay status query)	DLY?
[23]	No label (Query for data/clock output setting completion status)	OCS?
[24]	Jitter Input	PJO
		PJO?

### **TRK <numeric>**

---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 0 OFF 1 ON
Function	Sets the common setting for the Data and XData output ON or OFF.
Example	To set the common setting ON: > TRK 1
Compatibility	Compatible with the MP1632C and MP1761C.

### **TRK?**

---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the common setting for the Data and XData outputs ON/OFF state.
Example	> TRK? < TRK 1
Compatibility	Compatible with the MP1632C and MP1761C.

### **DGD <numeric>**

---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 0 OFF 1 ON
Function	Sets the data output range limitation ON or OFF.
Example	To set the data output range limitation ON: > DGD 1
Compatibility	Incompatible with existing models.

### **DGD?**

---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the data output range limitation ON/OFF state.
Example	> DGD? < DGD 1
Compatibility	Incompatible with existing models.



**DAL(XDL) <level>**


---

Parameter	<level>=<DECIMAL NUMERIC PROGRAM DATA>
	0 Variable
	1 NECL
	2 PCML
	3 NCML
	4 SCFL
	5 LVPECL
	6 LVDS200 mV
	7 LVDS400 mV
Function	Sets the level of the fixed interface for the Data (XData) output.
Example	To set the level of the XData output to the NECL level: > XDL 1
Compatibility	Compatible with the MP1632C.

**DAL(XDL)?**


---

Response	<level>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the level of the fixed interface for the Data (XData) output.
Example	To query the level of the XData output: > XDL? < XDL 1
Compatibility	Compatible with the MP1632C.

**DAP(NAP) <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA>
	0.050 to 0.8 0.050 to 0.8 V, in 0.002-V steps (MU181020A-x10)
	0.250 to 2.500 0.250 to 2.500 V, in 0.002-V steps (MU181020A-x11, MU181020B-X11)
	0.050 to 2.000 0.050 to 2.000 V, in 0.002-V steps (MU181020A-x12, MU181020B-x12)
	0.500 to 3.500 0.500 to 3.500 V, in 0.002 V steps (MU181020A-x13, MU181020B-x13)
Function	Sets the amplitude of the Data (XData) output.
Example	To set the amplitude of the Data output to 1.000 V: > DAP 1.000
Compatibility	Compatible with the MP1632C, MP1761C and MP1775A (0.50 to 2.00 V).

**DAP(NAP)?**


---

Response	<numeric>=<NR2 NUMERIC RESPONSE DATA> (FIX5)
Function	Queries the amplitude of the Data (XData) output.
Example	To query the amplitude of the Data output: > DAP? < DAP 1.000
Compatibility	Compatible with the MP1632C, MP1761C and MP1775A.

### DAD <numeric>

---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA>
	0 Offset OFF (DC output)
	1 Offset ON (AC output)
Function	Sets the data output offset ON or OFF
Example	To set the data output offset ON: > DAD 1
Compatibility	Incompatible with existing models.

### DAD?

---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the data output offset ON/OFF state.
Example	> DAD? < DAD 1
Compatibility	Incompatible with existing models.

### DOS(NOS) <numeric>

---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA>
	-2.000 to 3.300 -2.000 to 3.300 Voh, in 0.001-V steps (MU181020A-x10, -x11, -x12, -x13, MU181020B-x11, -x12, -x13, -x14)
	-2.500 to 3.225 -2.500 to 3.225 Vth, in 0.001-V steps (MU181020A-x10)
	-3.250 to 3.175 -3.250 to 3.175 Vth, in 0.001-V steps (MU181020A-x11, MU181020B-x11)
	-3.000 to 3.275 -3.000 to 3.275 Vth, in 0.001-V steps (MU181020A-x12, MU181020B-x12)
	-3.000 to 3.050 -3.000 to 3.050 Vth, in 0.001-V steps (MU181020A-x13, MU181020B-x13)
	-3.000 to 3.250 -3.000 to 3.250 Vol, in 0.001-V steps (MU181020A-x10)
	-4.500 to 3.050 -4.500 to 3.050 Vol, in 0.001-V steps (MU181020A-x11, MU181020B-x11)
	-4.000 to 3.250 -4.000 to 3.250 Vol, in 0.001-V steps (MU181020A-x12, MU181020B-x12)
	-4.000 to 2.800 -4.000 to 2.800 Vol, in 0.001-V steps (MU181020A-x13, MU181020B-x13)
Function	Sets the Data (XData) output offset.
Example	To set the XData output offset to 1.000 Voh: > NOS 1.000
Compatibility	Compatible with the MP1632C, MP1761C and MP1775A.

### DOS(NOS)?

---

Response	<numeric>=<NR2 NUMERIC RESPONSE DATA> (FIX6)
Function	Queries the Data (XData) output offset.
Example	To query the XData output offset: > NOS? < NOS 1.000 < NOS -1.000
Compatibility	Compatible with the MP1632C, MP1761C and MP1775A.







**PRE <numeric>[,<unit>]**

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> (mUI units) -2000 to 2000    -2,000 to 2,000 mUI, in 1-mUI steps (ps units) Converted from the calculated frequency value, based on the setting resolution of mUI. -20000 to 20000                    -20,000 to 20,000 ps, in 10-ps steps (at 0.1 GHz) -2000.0 to 2000.0                    -2,000 to 2,000 ps, in 1-ps steps (at 1 GHz) -160.00 to 160.00                    -160 to 160 ps, in 0.08-ps steps (at 12.5 GHz) In the case of Combination (mUI units) -64000 to 64000    -64,000 to 64,000 mUI, in 1-mUI steps (ps units) Converted from the calculated frequency value, based on the setting resolution of mUI. -640000 to 640000                    -640,000 to 640,000 ps, in 10-ps steps <span style="float: right;">(at 0.1 GHz)</span> -64000.0 to 64000.0                    -64,000 to 64,000 ps, in 1-ps steps (at 1 GHz) -5120.00 to 5120.00                    -5120 to 5120 ps, in 0.08-ps steps (at 12.5 GHz) [<unit>]=<DECIMAL NUMERIC PROGRAM DATA> 0    mUI units 1    ps units <span style="float: right;">(The mUI unit is selected when &lt;unit&gt; is omitted.)</span>
Function	Sets the value and unit of the data output delay reference. Set a value using a difference from the reference value. The specified value may not be exactly set as is when the ps unit is set, due to the limitation of the setting resolution. The value is adjusted to the most approximate value and set in this event.
Example	To set the value for the data output delay reference to -1000 mUI: > PRE -1000,0
Compatibility	Incompatible with existing models.

**PRE? [<unit>]**

Parameter	[<unit>]=<DECIMAL NUMERIC PROGRAM DATA> 0    mUI units 1    ps units <span style="float: right;">(The ps unit is selected when &lt;unit&gt; is omitted.)</span>
Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> <span style="float: right;">&lt;NR2 NUMERIC RESPONSE DATA&gt; (FIX8)</span>
Function	Queries the value and units for the data output delay reference.
Example	> PRE? 0 < PRE    -1000 < PRE        0
Compatibility	Incompatible with existing models.

**PCA**

Function	Executes calibration for Data and XData output phases.
Example	> PCA
Compatibility	Incompatible with existing models.

**DLM <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 0.050 to 0.800      0.050 to 0.800 V, in 0.002-V steps (MU181020A-x10) 0.250 to 2.500      0.250 to 2.500 V, in 0.002-V steps (MU181020A-x11, MU181020B-x11) 0.050 to 2.000      0.050 to 2.000 V, in 0.002-V steps (MU181020A-x12, MU181020B-x12) 0.500 to 3.500      0.500 to 3.500 V, in 0.002-V steps (MU181020A-x13, MU181020B-x13)
Function	Sets the limitation value for the data output amplitude.
Example	To set the limitation value for the data output amplitude to 2.000 V: > DLM 2.000
Compatibility	Incompatible with existing models.

**DLM?**


---

Response	<numeric>=<NR2 NUMERIC RESPONSE DATA> (FIX5)
Function	Queries the limitation value for the data output amplitude.
Example	> DLM? < DLM 2.000
Compatibility	Incompatible with existing models.

**DOF <max>,<min>**


---

Parameter	<max>=<DECIMAL NUMERIC PROGRAM DATA> -2.000 to 3.300      -2.000 to 3.300 Voh, in 0.001-Voh steps (MU181020A-x10, -x11, -x12, -x13, MU181020B-x11, -x12, -x13) <min>=<DECIMAL NUMERIC PROGRAM DATA> -2.800 to 3.250      -2.800 to 3.250 Vol, in 0.001-Vol steps (MU181020A-x10) -4.500 to 3.050      -4.500 to 3.050 Vol, in 0.001-Vol steps (MU181020A-x11, MU181020B-x11) -4.000 to 3.250      -4.000 to 3.250 Vol, in 0.001-Vol steps (MU181020A-x12, MU181020B-x12) -4.000 to 2.800      -4.000 to 2.800 Vol, in 0.001-Vol steps (MU181020A-x13, MU181020B-x13)
Function	Sets the limitation value for the data output offset.
Example	To set the limitation value for the data output offset to 3.000 Voh max., -2.000 Vol min.: > DOF 3.000,-2.000
Compatibility	Incompatible with existing models.

**DOF?**


---

Response	<max>=<NR2 NUMERIC RESPONSE DATA> (FIX6) <min>=<NR2 NUMERIC RESPONSE DATA> (FIX6)
Function	Queries the limitation value for the data output offset.
Example	> DOF? < DOF 3.000, 1.000 < DOF -1.000,-2.000
Compatibility	Incompatible with existing models.

### DLY?

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1) 0 Ready 1 Delay Busy
Function	Queries the PPG Delay setting state.
Example	> DLY? < DLY 1
Compatibility	Compatible with the MP1632C, MP1761C and MP1775A.

### OCS?

Response	<state>=<NR1 NUMERIC RESPONSE DATA> (FIX 1) 0 Amplitude and Offset settings of Data/XData and Clock/XClock have been changed completely. 1 Amplitude or Offset setting of Data/XData or Clock/XClock is being changed.
Function	Queries the completion status of changing of data output and clock output settings.
Example	> OCS? < OCS 1
Compatibility	Incompatible with existing models.

### PJO <numeric>

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 0 Jitter input OFF setting 1 Jitter input ON setting
Function	When a jitter is added to the input signal, the Feedback process for Delay must be set to OFF. When a jitter is added, set the Jitter Input button to ON, using this command. When a jitter is not added, set the Jitter Input button to OFF.
Example	To set the Jitter Input button to ON when a jitter is added: > PJO 1
Compatibility	Incompatible with existing models.

### PJO?

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> (FIX 1) 0 Jitter input OFF setting 1 Jitter input ON setting
Function	Queries the Jitter Input button setting.
Example	> PJO? < PJO 1
Compatibility	Incompatible with existing models.



8.3.1.3 Clock/XClock setting commands

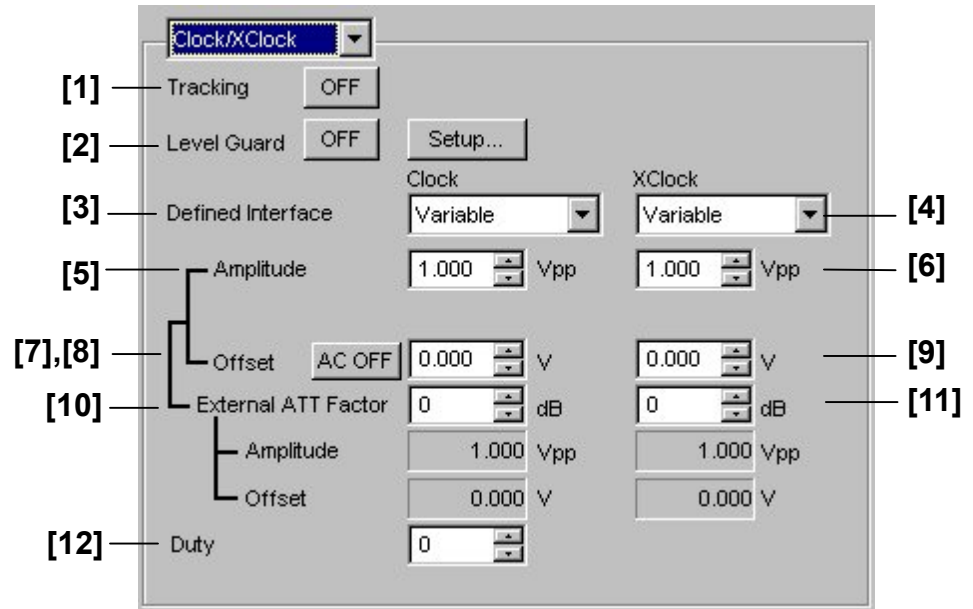


Figure 8.3.1.3-1 Clock/XClock setting field

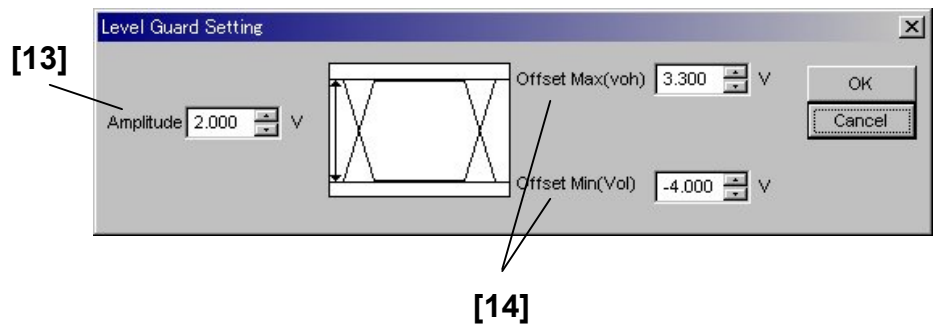


Figure 8.3.1.3-2 Level Guard Setting dialog box

**Table 8.3.1.3-1 Clock/XClock setting commands**

No.	Setting Items	Commands
[1]	Tracking	CGR
		CGR?
[2]	Level Guard	CLG
		CLG?
[3]	Defined Interface (Clock)	CLV
		CLV?
[4]	Defined Interface (XClock)	XLV
		XLV?
[5]	Amplitude (Clock)	CAP
		CAP?
[6]	Amplitude (XClock)	XCA
		XCA?
[7]	AC ON/OFF	CLA
		CLA?
[8]	Offset (Clock)	COS
		COS?
[9]	Offset (XClock)	XCF
		XCF?
[10]	External ATT Factor (Clock)	CAF
		CAF?
[11]	External ATT Factor (XClock)	XAF
		XAF?
[12]	Duty (Clock)	CDT
		CDT?
[13]	Amplitude	CLM
		CLM?
[14]	Offset Max/Min	CLO
		CLO?
[15]	No label (Query for data/clock output setting completion status)	OCS? Refer to Section 8.3.1.2 "Data/XData setting commands" for details on this command.

**CGR <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 0 OFF 1 ON
Function	Sets the common setting for the Clock and XClock output ON or OFF.
Example	To set the common setting ON: > CGR 1
Compatibility	Compatible with the MP1632C.

**CGR?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the common setting for the Clock and XClock outputs ON/OFF state.
Example	> CGR? < CGR 1
Compatibility	Compatible with the MP1632C.

**CLG <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 0 OFF 1 ON
Function	Sets the clock output range limitation ON or OFF.
Example	To set the clock output range limitation ON: > CLG 1
Compatibility	Incompatible with existing models.

**CLG?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the clock output range limitation ON/OFF state.
Example	> CLG? < CLG 1
Compatibility	Incompatible with existing models.

### CLV(XLV)<level>

Parameter	<level>=<DECIMAL NUMERIC PROGRAM DATA>
	0 Variable
	1 NECL
	2 PCML
	3 NCML
	4 SCFL
	5 LVPECL
	6 LVDS200 mV
	7 LVDS400 mV
Function	Sets the level of the fixed interface for the Clock (XClock) output.
Example	To set the level of the Clock output to the NECL level: > CLV 1
Compatibility	Incompatible with existing models.

### CLV?(XLV?)

Response	<level>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the level of the fixed interface for the Clock (XClock) output.
Example	To query the level of the Clock output: > CLV? < CLV 1
Compatibility	Incompatible with existing models.

### CAP(XCA) <numeric>

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 0.100 to 2.000 0.100 to 2.000 V, in 0.002-V steps
Function	Sets the amplitude of the Clock (XClock) output.
Example	To set the amplitude of the Clock output to 1.000 V: > CAP 1.000
Compatibility	Compatible with the MP1632C, MP1761C and MP1775A.

### CAP(XCA)?

Response	<numeric>=<NR2 NUMERIC RESPONSE DATA> (FIX5)
Function	Queries the amplitude of the Clock (XClock) output.
Example	To query the amplitude of the Clock output: > CAP? < CAP 1.000
Compatibility	Compatible with the MP1632C, MP1761C and MP1775A.

**CLA <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA>
	0                                   Offset OFF (DC output)
	1                                   Offset ON (AC output)
Function	Sets the clock output offset ON or OFF.
Example	To set the clock output offset ON: > CLA 1
Compatibility	Incompatible with existing models.

**CLA?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the clock output offset ON/OFF state.
Example	> CLA? < CLA 1
Compatibility	Incompatible with existing models.

**COS(XCF) <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA>
	-2.000 to 3.300                   -2.000 to 3.300 Voh, in 0.001-V steps
	-3.000 to 3.250                   -3.000 to 3.250 Vth, in 0.001-V steps
	-4.000 to 3.200                   -4.000 to 3.200 Vol, in 0.001-V steps
Function	Sets the Clock (XClock) output offset.
Example	To set the XClock output offset to -1.000 Voh: > XCF -1.000
Compatibility	Partially compatible with the MP1632C, MP1761C and MP1775A (only when <numeric> is set to a value within the range from -4.0 to 2.0).

**COS(XCF)?**


---

Response	<numeric>=<NR2 NUMERIC RESPONSE DATA> (FIX6)
Function	Queries the Clock (XClock) output offset.
Example	To query the XClock output offset: > XCF? < XCF -1.000 < XCF 2.000
Compatibility	Partially compatible with the MP1632C, MP1761C and MP1775A.



**CLM <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 0.100 to 2.000                      0.100 to 2.000 V, in 0.002-V steps
Function	Sets the limitation value for the clock output amplitude.
Example	To set the limitation value for the clock output amplitude to 2.000 V: > CLM 2.000
Compatibility	Incompatible with existing models.

**CLM?**


---

Response	<numeric>=<NR2 NUMERIC RESPONSE DATA> (FIX5)
Function	Queries the limitation value for the clock output amplitude.
Example	> CLM? < CLM 2.000
Compatibility	Incompatible with existing models.

**CLO <max>,<min>**


---

Parameter	<max>=<DECIMAL NUMERIC PROGRAM DATA> -2.000 to 3.300                      -2.000 to 3.300 V, in 0.001-V steps <min>=<DECIMAL NUMERIC PROGRAM DATA> -4.000 to 3.200                      -4.000 to 3.200 V, in 0.001-V steps
Function	Sets the limitation value for the clock output offset.
Example	To set the limitation value for the clock output offset to 3.000 V max., -4.000 V min.: > CLO 3.000,-4.000
Compatibility	Incompatible with existing models.

**CLO?**


---

Response	<max>=<NR2 NUMERIC RESPONSE DATA> (FIX6) <min>=<NR2 NUMERIC RESPONSE DATA> (FIX6)
Function	Queries the limitation value for the clock output offset.
Example	> CLO? < CLO 2.000,-4.000 < CLO -2.000,-4.000 < CLO 3.300, 0.000
Compatibility	Incompatible with existing models.

8.3.1.4 CMU Bit Rate setting commands

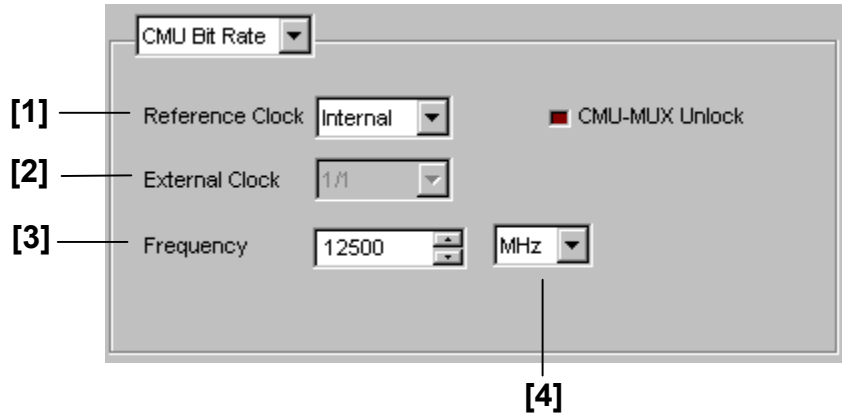


Figure 8.3.1.4-1 CMU Bit Rate setting field (for Internal)

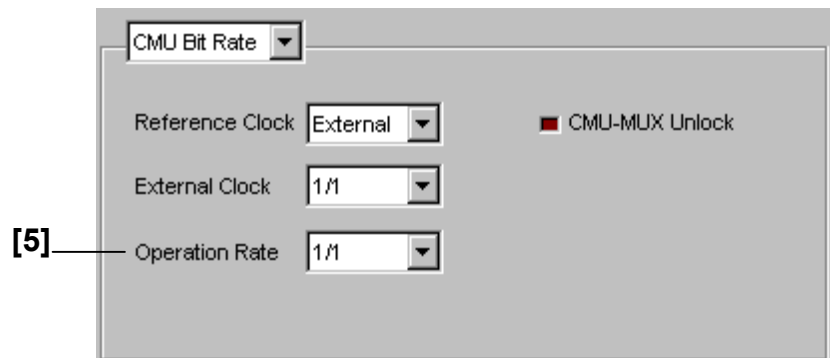


Figure 8.3.1.4-2 CMU Bit Rate setting field (for External)

Table 8.3.1.4-1 CMU Bit Rate setting commands

No.	Setting Items	Commands
[1]	Reference Clock	CRE
		CRE?
[2]	External Clock	CEC
		CEC?
[3]	Frequency	CRF
		CRF?
[4]	No label (Frequency unit setting)	CRS
		CRS?
[5]	Operation Rate	COR
		COR?



**CRE <mode>**


---

Parameter	<mode>=<DECIMAL NUMERIC PROGRAM DATA> 0                                   Uses the internal reference signal. 1                                   Uses the external reference signal.
Function	Selects whether to use the internal reference signal or the external reference signal for the clock reference signal.
Example	To select the internal reference signal for the clock reference signal: > CRE 0
Compatibility	Incompatible with existing models.

**CRE?**


---

Response	<mode>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the clock reference signal.
Example	> CRE? < CRE 0
Compatibility	Incompatible with existing models.

**CEC <source>**


---

Parameter	<source>=<DECIMAL NUMERIC PROGRAM DATA> 0                                   1/1 Clock 1                                   1/64 Clock
Function	Sets the division cycle when the external reference signal is used.
Example	To set the division cycle to 1/1 Clock: > CEC 0
Compatibility	Incompatible with existing models.

**CEC?**


---

Response	<source>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the division cycle when the external reference signal is used.
Example	> CEC? < CEC 0
Compatibility	Incompatible with existing models.

## CRF <numeric>

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> When the operation frequency setting resolution is MHz: 1225 to 1562                    1225 to 1562 MHz, in 1-MHz steps 2450 to 3125                    2450 to 3125 MHz, in 1-MHz steps 4900 to 6250                    4900 to 6250 MHz, in 1-MHz steps 9800 to 12500                   9800 to 12500 MHz, in 1-MHz steps When the operation frequency setting resolution is kHz: 1225000 to 1562500            1225000 to 1562500 kHz, in 1-kHz steps 2450000 to 3125000            2450000 to 3125000 kHz, in 1-kHz steps 4900000 to 6250000            4900000 to 6250000 kHz, in 1-kHz steps 9800000 to 12500000           9800000 to 12500000 kHz, in 1-kHz steps Default value is 12500000 kHz.
Function	Sets the operation frequency of the internal synthesizer.
Example	To set the operation frequency of the internal synthesizer to 1225 MHz: > CRF 1225
Compatibility	Incompatible with existing models.

## CRF?

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX5/8)
Function	Queries the operating frequency of the internal synthesizer.
Example	> CRF? When the operation frequency setting resolution is MHz (FIX5): < CRF 1225 < CRF 12500 When the operation frequency setting resolution is kHz (FIX8): < CRF 12500000 < CRF 1225000
Compatibility	Incompatible with existing models.

**CRS <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA>
	0                               Sets the kHz unit.
	1                               Sets the MHz unit.
Function	Selects the resolution for setting the operating frequency of the internal synthesizer.
Example	To set the resolution for setting the operating frequency of the internal synthesizer to kHz: > CRS 0
Compatibility	Incompatible with existing models.

**CRS?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the resolution for setting the operating frequency of the internal synthesizer.
Example	> CRS? < CRS 0
Compatibility	Incompatible with existing models.

**COR <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA>
	1                               Operates with 1/1 of external reference signal (12.5 to 9.8 GHz)
	2                               Operates with 1/2 of external reference signal (6.25 to 4.9 GHz)
	4                               Operates with 1/4 of external reference signal (3.125 to 2.45 GHz)
	8                               Operates with 1/8 of external reference signal (1.5625 to 1.225 GHz)
Function	Sets the operating frequency rate when the external reference signal is used for the reference clock.
Example	To set the operating frequency rate of the internal synthesizer to 1/4 (3.125 to 2.45 GHz): > COR 4
Compatibility	Incompatible with existing models.

**COR?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the operating frequency rate setting state when the external reference signal is used for the reference clock.
Example	> COR? < COR 4
Compatibility	Incompatible with existing models.

### 8.3.2 Commands related to Pattern tab window

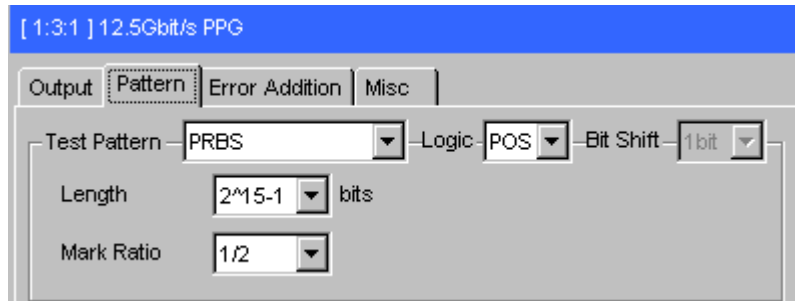


Figure 8.3.2-1 Pattern tab window

#### 8.3.2.1 Test Pattern setting commands



Figure 8.3.2.1-1 Test Pattern setting field

Table 8.3.2.1-1 Test Pattern setting commands

No.	Setting Items	Commands
[1]	Test Pattern	PTS
		PTS?
[2]	Logic	LGC
		LGC?

**PTS <type>**


---

Parameter	<type>=<DECIMAL NUMERIC PROGRAM DATA>
	0 Alternate pattern
	1 Data pattern
	2 Zero-Substitution pattern
	3 PRBS pattern
	4 Mixed Data pattern
	5 Mixed Alternate pattern
	6 Sequence pattern
Function	Sets the type of the test pattern.
Example	To set the test pattern type to the Mixed Data pattern: > PTS 4
Compatibility	Compatible with the MP1761C.

**PTS?**


---

Response	<type>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the type of the test pattern.
Example	> PTS? < PTS 4
Compatibility	Compatible with the MP1761C.

**LGC <logic>**


---

Parameter	<logic>=<DECIMAL NUMERIC PROGRAM DATA>
	0 Positive (positive logic)
	1 Negative (negative logic)
Function	Sets the logic (positive or negative) at test pattern generation.
Example	To set the logic of the test pattern to the negative logic (Negative): > LGC 1
Compatibility	Compatible with the MP1632C, MP1761C and MP1775A.

**LGC?**


---

Response	<logic>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the logic at test pattern generation.
Example	> LGC? < LGC 1
Compatibility	Compatible with the MP1632C, MP1761C and MP1775A.

8.3.2.2 PRBS pattern setting commands

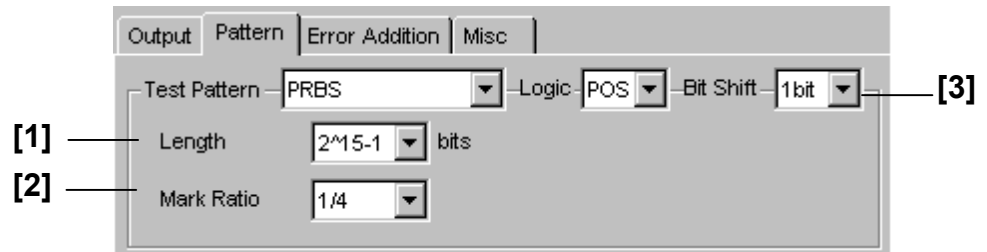


Figure 8.3.2.2-1 PRBS pattern setting field

Table 8.3.2.2-1 PRBS pattern setting commands

No.	Setting Items	Commands
[1]	Length	PTN
		PTN?
[2]	Mark Ratio	MRK
		MRK?
[3]	Bit Shift	SFT
		SFT?

**PTN <numeric>**

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA>			
	PRBS		Zero-Substitution	
	2	$2^7-1$	2	$2^7$
	3	$2^9-1$	3	$2^9$
	4	$2^{10}-1$	4	$2^{10}$
	5	$2^{11}-1$	5	$2^{11}$
	6	$2^{15}-1$	6	$2^{15}$
	7	$2^{20}-1$	7	$2^{20}$
	8	$2^{23}-1$	8	$2^{23}$
	9	$2^{31}-1$	—	
			12	$2^7-1$
			13	$2^9-1$
			14	$2^{10}-1$
			15	$2^{11}-1$
			16	$2^{15}-1$
			17	$2^{20}-1$
			18	$2^{23}-1$
Function	Sets the number of stages ( $2^n - 1$ (n = 7, 9, 10, 11, 15, 20, 23, or 31)) during PRBS pattern or Zero-Substitution pattern generation.			
Example	To set PRBS15: > PTN 6			
Compatibility	Compatible with the MP1632C, MP1761C and MP1775A.			

**PTN?**

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX2)
Function	Queries the number of stages during PRBS pattern or Zero-Substitution pattern generation.
Example	> PTN? < PTN 6 < PTN 18
Compatibility	Compatible with the MP1632C, MP1761C and MP1775A.

### MRK <mratio>

Parameter	<mratio>=<DECIMAL NUMERIC PROGRAM DATA>		
		POS	NEG
	0	0/8	8/8
	1	1/8	7/8
	2	1/4	3/4
	3	1/2	1/2INVT
Function	Sets the mark ratio during PRBS pattern generation.		
Example	To set the mark ratio to 1/8: > MRK 1		
Compatibility	Compatible with the MP1632C and MP1761C.		

### MRK?

Response	<mratio>=<NR1 NUMERIC RESPONSE DATA> (FIX1)		
Function	Queries the mark ratio during PRBS pattern generation.		
Example	> MRK? < MRK 1		
Compatibility	Compatible with the MP1632C and MP1761C.		

### SFT <numeric>

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA>	
	0	1 bit
	1	3 bits
Function	Sets the bit shift during PRBS pattern generation.	
Example	To set the bit shift to 1 bit: > SFT 0	
Compatibility	Compatible with the MP1632C and MP1761C.	

### SFT?

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)	
Function	Queries the bit shift number during PRBS pattern generation.	
Example	> SFT? < SFT 0	
Compatibility	Compatible with the MP1632C and MP1761C.	



8.3.2.3 Zero-Substitution pattern setting commands

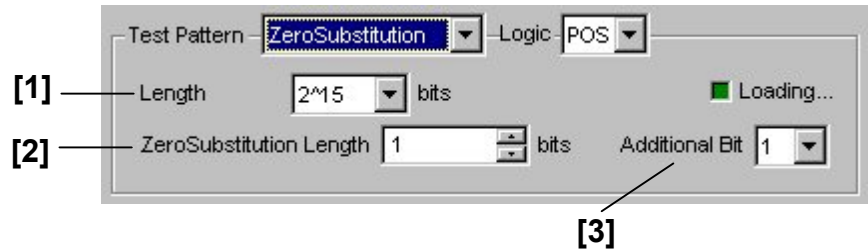


Figure 8.3.2.3-1 Zero-Substitution pattern setting field

Table 8.3.2.3-1 Zero-Substitution pattern setting commands

No.	Setting Items	Commands
[1]	Length	PTN Refer to Section 8.3.2.2 "PRBS pattern setting commands" for detail on this command.
		PTN? Refer to Section 8.3.2.2 "PRBS pattern setting commands" for detail on this command.
[2]	Zero-Substitution Length	ZLN
		ZLN?
[3]	Additional Bit	ZAD
		ZAD?

### ZLN <numeric>

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> When ZSUBlength, $2^n$ is set: 1 to $2^n-1$ 1 to $2^n-1$ , in 1-bit steps When ZSUBlength, $2^n - 1$ is set: 1 to $2^n-2$ 1 to $2^n-2$ , in 1-bit steps n = 7, 9, 11, 15, 20, 23
Function	Sets the number of bits to which "0" is inserted (zero-insertion bit count) during Zero-Substitution pattern generation.
Example	Available parameters vary depending on the setting conditions. To set the zero-insertion bit count to 10 bits: > ZLN 10
Compatibility	Partially compatible with the MP1761C.

### ZLN?

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX7)
Function	Queries the zero-insertion bit count during Zero-Substitution pattern generation.
Example	> ZLN? < ZLN            1 < ZLN 8388607
Compatibility	Partially compatible with the MP1632C, MP1761C and MP1775A.

### ZAD <numeric>

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 0                                      Adds one bit of "0" next to the last of zero-inserted bits. 1                                      Adds one bit of "1" next to the last of zero-inserted bits (same as existing models).
Function	Sets whether to add one bit of "0" or "1" next to the last of zero-inserted bits.
Example	To set one bit of "1" next to the last of zero-inserted bits: > ZAD 1
Compatibility	Incompatible with existing models.

### ZAD?

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries whether to add one bit of "0" or "1" next to the last of zero-inserted bits.
Example	> ZAD? < ZAD 1
Compatibility	Incompatible with existing models.

8.3.2.4 Data pattern setting commands

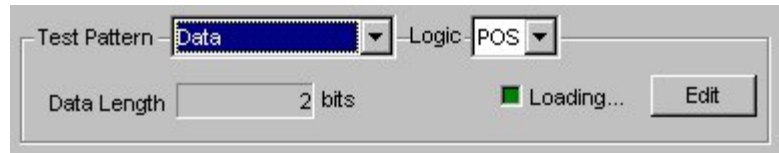


Figure 8.3.2.4-1 Data pattern setting field

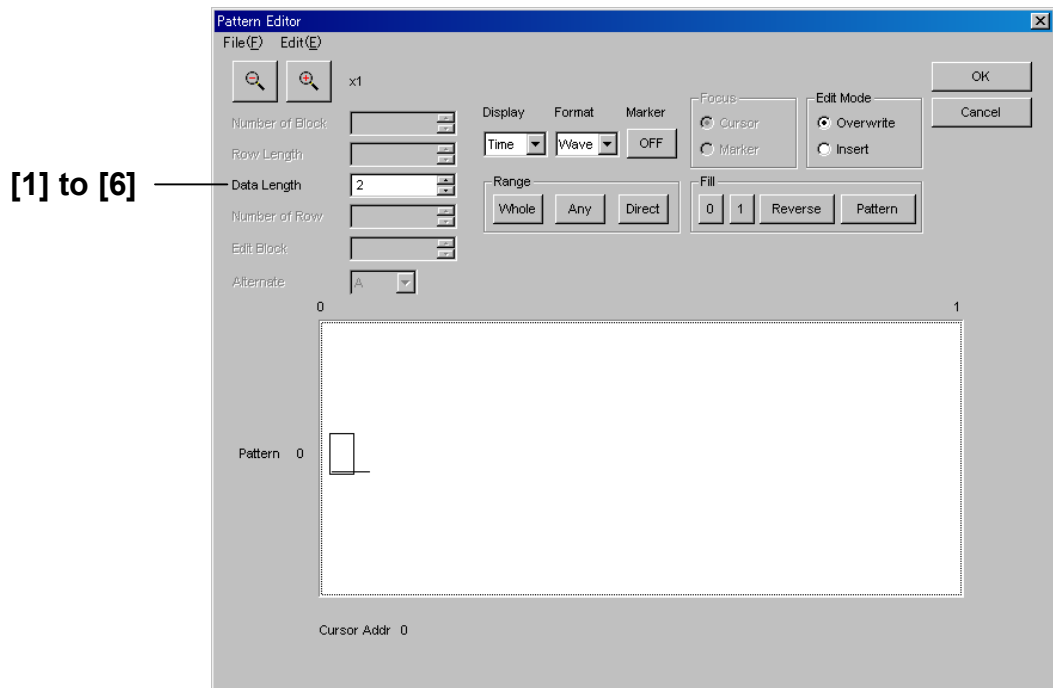


Figure 8.3.2.4-2 Data pattern setting (Pattern Editor screen)

Table 8.3.2.4-1 Data pattern setting commands

No.	Setting Items	Commands
[1]	Data Length	DLN
		DLN?
[2]	No label (Pattern setting)	PDT
		PDT?
[3]	No label (Pattern setting)	BDT
		BDT?
[4]	No label (Data inversion)	DRA
[5]	No label (Data inversion)	DRD
[6]	No label (All 0 or All 1)	ALL
[7]	No label (Pattern setting)	WRT
[8]	No label (Pattern reading)	RED?

**DLN <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 2 to 134217728                      2 to 134,217,728 bit, in 1-bit steps
	<b>Note:</b> At 2 ch Combination, the setting range and Step are doubled. At 4 ch Combination, the setting range and Step are quadrupled.
Function	Sets the pattern length during Data pattern generation.
Example	To set the pattern length to 100 bits: > DLN 100
Compatibility	Compatible with the MP1632C, MP1761C and MP1775A.

**DLN?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX10)
Function	Queries the pattern length during Data pattern generation.
Example	> DLN? < DLN                      2 < DLN 134217728
Compatibility	Compatible with the MP1632C, MP1761C and MP1775A. <b>Note:</b> The number of query digits differs from existing models.

## PDT <start>,<end>,<data>

Parameter	<p>&lt;start&gt;=&lt;NON-DECIMAL NUMERIC PROGRAM DATA&gt;                  #H0 to #H7FFFFFFF      0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal)</p> <p>&lt;end&gt;=&lt;NON-DECIMAL NUMERIC PROGRAM DATA&gt;                  #H0 to #H7FFFFFFF      0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal)</p> <p><b>Note:</b>                  The maximum setting is the pattern length.                  At 2 ch Combination, the setting range is doubled.                  At 4 ch Combination, the setting range is quadrupled.</p> <p>&lt;data&gt;=&lt;NON-DECIMAL NUMERIC PROGRAM DATA&gt;                  #H**...*      Specify pattern data in hexadecimal format.                  1 to 400 characters (pattern data of 400 × 4 bits).                  Specify a character string consisting of 0 to 9 and A to F.                  If the last character string of the pattern data is short of a hexadecimal unit (4 bits), add 0(s) up to the last bit to make a hexadecimal string.</p> <p>#B**...*      Specify pattern data in binary format.                  1 to 400 characters (pattern data of 400 bits).                  Specify a character string consisting of 0 and 1.</p>
Function	<p>Sets the pattern data from the &lt;start&gt; to &lt;end&gt; addresses during Data pattern generation.</p> <p>The set data overwrites the specified range.</p>
Example	<p>To set the addresses 0 to 1F of the pattern data to 5A:                  &gt; PDT #H0,#H1F,#H5A</p>
Compatibility	<p>Compatible with the MP1632C.</p>

**Note:**

When the number of data bits specified in <data> is less than the range specified by <start> and <end>, set <data> repeatedly up to the specified range.

<ex.>

- <start>=#H0, <end>=#H1F, <data>=#HABC  
 Setting data: ABCABCAB
- <start>=#H0, <end>=#H7, <data>=#B011  
 Setting data: 01101101

When the number of data bits specified in <data> is more than the range specified by <start> and <end>, cutoff the part of <data> out of the specified range.

<ex.>

- <start>=#H0, <end>=#HF, <data>=#HABCDEF  
 Setting data: ABCD
- <start>=#H0, <end>=#H3, <data>=#B01100110  
 Setting data: 0110

**PDT? <start>**


---

Parameter	<p>&lt;start&gt;=&lt;NON-DECIMAL NUMERIC PROGRAM DATA&gt;          #H0 to #H7FFFFFFF      0 to 7FFFFFFF bits (Specify in hexadecimal)</p> <p><b>Note:</b></p> <p style="padding-left: 40px;">The maximum setting is the pattern length.          At 2 ch Combination, the setting range is doubled.          At 4 ch Combination, the setting range is quadrupled.</p>
Response	<p>&lt;data&gt;=&lt;HEXADECIMAL NUMERIC RESPONSE DATA&gt;          #H**...*      Returns the pattern data in hexadecimal format.          Within 400 characters (pattern data of 400 × 4 bits)</p>
Function	<p>Queries the pattern data of 400 × 4 bits from the &lt;start&gt; address during Data pattern generation.</p>
Example	<p>To query the pattern data from address 0:          &gt; PDT? #H0          &lt; PDT #H0123456789ABCDEF... (1 to 400 characters in hexadecimal)          &lt; PDT #H0</p>
Compatibility	<p>Compatible with the MP1632C.</p>

**BDT <start>,<end>,<bdata>**

Parameter	<start>=<NON-DECIMAL NUMERIC PROGRAM DATA> #H0 to #H7FFFFFFF      0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal)  <end>=<NON-DECIMAL NUMERIC PROGRAM DATA> #H0 to #H7FFFFFFF      0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal)  <b>Note:</b> The maximum setting is the pattern length. At 2 ch Combination, the setting range is doubled. At 4 ch Combination, the setting range is quadrupled.  <bdata>=<ARBITRARY BLOCK PROGRAM DATA> #XYYY<binary>            X:      Number of YYY digits YYY:    Number of bytes of <binary> 1 to 16,777,216 bytes <binary>: Binary data up to 16,777,216 bytes  <b>Note:</b> The maximum setting value is the pattern length.
Function	Sets binary data of the pattern data from <start> to <end> addresses during Data pattern generation. The set data overwrites the specified range.
Example	To set the addresses 0 to 1F of the pattern data to 41: > BDT #H0,#H1F,#11A(A=41)
Compatibility	Compatible with the MP1632C.

**BDT? <start>[,<size>]**

Parameter	<start>=<NON-DECIMAL NUMERIC PROGRAM DATA> #H0 to #H7FFFFFFF      0 to 7FFFFFFF bits (Specify in hexadecimal)  <b>Note:</b> The maximum setting is the pattern length. At 2 ch Combination, the setting range is doubled. At 4 ch Combination, the setting range is quadrupled.  [<size>]=<DECIMAL NUMERIC PROGRAM DATA> 1 to 16777216              1 to 16,777,216, in 1-byte steps
Response	Binary data of the setting pattern is queried when [<size>] is omitted. <bdata>=<DEFINITE LENGTH ARBITRARY BLOCK RESPONSE DATA> #XYYY<binary>            X:      Number of YYY digits YYY:    Number of bytes of <binary> 1 to 16,777,216 bytes <binary>: Binary data up to 16,777,216 bytes
Function	Queries binary data of bytes specified by <size> from <start> address of the pattern data during Data pattern generation.
Example	To query the pattern data during Data pattern generation for 2 bytes of binary data from address 0: > BDT? #H0,2 < BDT #12AA  To query the pattern data during Data pattern generation for the setting pattern of binary data from address 0: > BDT? #H0 < BDT #516000AA... (Binary data of 16,000 bytes)
Compatibility	Compatible with the MP1632C.



**DRA <start>,<end>**


---

Parameter	<start>=<NON-DECIMAL NUMERIC PROGRAM DATA> #H0 to #H7FFFFFFF      0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal) <end>=<NON-DECIMAL NUMERIC PROGRAM DATA> #H0 to #H7FFFFFFF      0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal)
	<b>Note:</b> The maximum setting is the pattern length. At 2 ch Combination, the setting range is doubled. At 4 ch Combination, the setting range is quadrupled.
Function	Inverts the data in the program during Data pattern generation. Specify the inversion range by the <start> and <end> addresses.
Example	To invert addresses 0 to 4F of the pattern data: > DRA #H0,#H4F
Compatibility	Compatible with the MP1632C.

**DRD <start>,<delta>**


---

Parameter	<start>=<NON-DECIMAL NUMERIC PROGRAM DATA> #H0 to #H7FFFFFFF      0 to 7FFFFFFF bits (Specify in hexadecimal) <delta>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 134217728          1 to 134,217,728 bit
	<b>Note:</b> The maximum setting is the pattern length. At 2 ch Combination, the setting range is doubled. At 4 ch Combination, the setting range is quadrupled.
Function	Inverts the data in the program during Data pattern generation. Specify the inversion range by the number of bits from the <start> address (relative specification).
Example	To invert 128 bits of the pattern data from address 0: > DRD #H0,128
Compatibility	Compatible with the MP1632C.

**ALL <data>**


---

Parameter	<data>=<DECIMAL NUMERIC PROGRAM DATA> 0                              Fills all bits with 0s. 1                              Fills all bits with 1s.
Function	Sets 0 or 1 for all bits in the program during Data pattern generation.
Example	To set 1 for all bits in the pattern data: > ALL 1
Compatibility	Compatible with the MP1632C, MP1761C and MP1775A.

**WRT <byte>,<address>**

Parameter	<p>&lt;byte&gt;=&lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  Number of pattern transfer bytes                  1 to 16777216                      1 to 16,777,216 bytes, in 1-byte steps</p> <p><b>Note:</b>                  At 2 ch Combination, the setting range is doubled.                  At 4 ch Combination, the setting range is quadrupled.</p> <p>&lt;address&gt;=&lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  Start address of pattern input                  0 to 134217720                      0 to 134,217,720, in single steps</p> <p><b>Note:</b>                  At 2 ch Combination, the setting range is doubled.                  At 4 ch Combination, the setting range is quadrupled.</p>
Function	Sets the number of bytes and the s pattern input tart address for binary transfer during Data pattern generation.
Example	To transfer 16-byte data from address 0: > WRT 16,0 ABCDEFGHIJKLMNOP (Binary data of 16 bytes)
Compatibility	Compatible with the MP1632C, MP1761C and MP1775A.

**RED? <byte>,<address>**

Parameter	<p>&lt;byte&gt;=&lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  Number of pattern transfer bytes                  1 to 16777216                      1 to 16,777,216 bytes, in 1-byte steps</p> <p><b>Note:</b>                  At 2 ch Combination, the setting range is doubled.                  At 4 ch Combination, the setting range is quadrupled.</p> <p>&lt;address&gt;=&lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  Start address of pattern input                  0 to 134217720                      0 to 134,217,720, in single steps</p> <p><b>Note:</b>                  At 2 ch Combination, the setting range is doubled.                  At 4 ch Combination, the setting range is quadrupled.</p>
Response	Data pattern row (binary data)
Function	Sets the number of bytes to be read and the pattern input start address using binary transfer during Data pattern generation.
Example	To read 16-byte data from address 0: > RED? 16,0 < ABCDEFGHIJKLMNOP (Binary data of 16 bytes)
Compatibility	Compatible with the MP1632C, MP1761C and MP1775A.

8.3.2.5 Alternate pattern setting commands

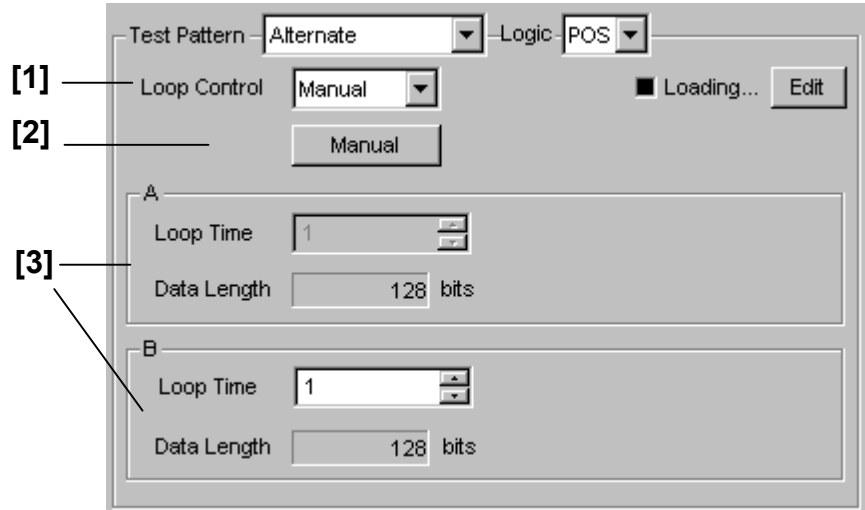


Figure 8.3.2.5-1 Alternate pattern setting field

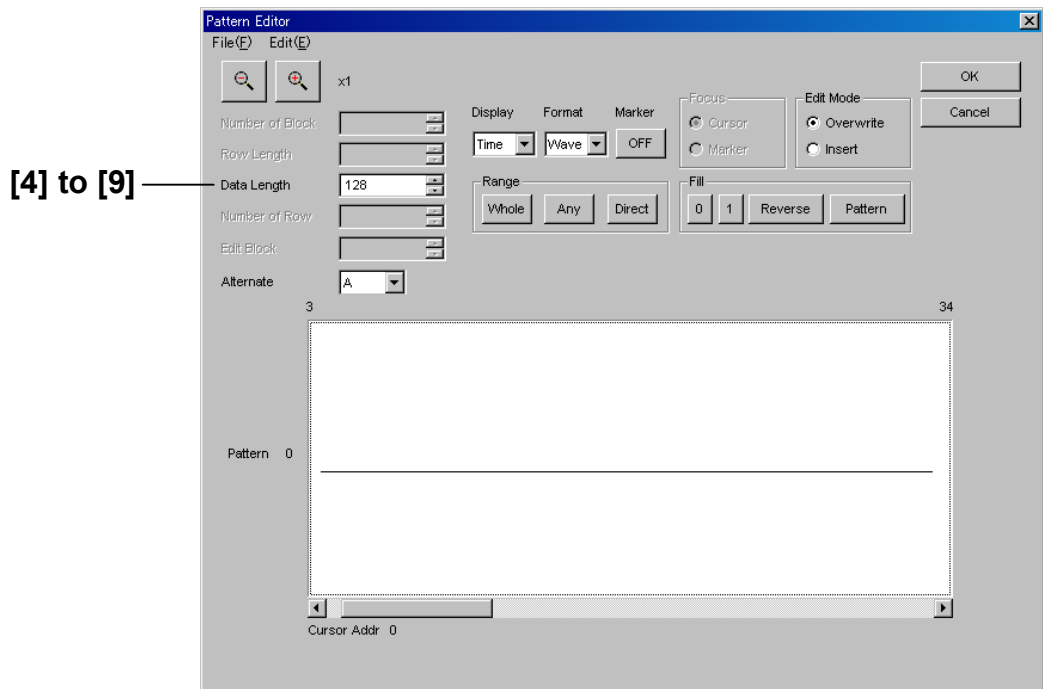


Figure 8.3.2.5-2 Alternate pattern setting (Pattern Editor screen)

Table 8.3.2.5-1 Alternate pattern setting commands

No.	Setting Items	Commands
[1]	Loop Control	APS
		APS?
[2]	Manual	AMN
[3]	A/B LoopTime	LPT
		LPT?
[4]	Data Length/Alternate	ALE
		ALE?
[5]	No label (Pattern setting)	ADW
		ADW?
[6]	No label (Pattern setting)	ABW
		ABW?
[7]	No label (Data inversion)	ARA
[8]	No label (Data inversion)	ARD
[9]	No label (All 0 or All 1)	ADF

**APS <loop>**


---

Parameter	<loop>=<DECIMAL NUMERIC PROGRAM DATA> 0 Internal: Switching control using internal signal 1 External: Switching control using external signal 2 Manual: Manual switching control
Function	Sets the Alternate pattern A/B switching control method.
Example	To set the external control for the Alternate pattern A/B switching: > APS 1
Compatibility	Compatible with the MP1761C.

**APS?**


---

Response	<loop>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the Alternate pattern A/B switching control method.
Example	> APS? < APS 1
Compatibility	Compatible with the MP1761C.

**AMN**


---

Function	Switches the Alternate pattern A/B manually.
Example	> AMN
Compatibility	Incompatible with existing models.

**LPT <content>,<numeric>**


---

Parameter	<content>=<DECIMAL NUMERIC PROGRAM DATA> 0 Pattern A 1 Pattern B <numeric>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 511 1 to 511 times, in 1-time steps
Function	Sets the number of generation times of the Alternate pattern A or B.
Example	o set the number of pattern B generation times to 20: > LPT 1,20
Compatibility	Incompatible with existing models.



**ADW <content>,<start>,<end>,<data>**

Parameter	<content>=<DECIMAL NUMERIC PROGRAM DATA> 0 Pattern A 1 Pattern B <start>=<NON-DECIMAL NUMERIC PROGRAM DATA> #H0 to #H3FFFFFF 0 to 3FFFFFF bits, in 1-bit steps (Specify in hexadecimal) <end>=<NON-DECIMAL NUMERIC PROGRAM DATA> #H0 to #H3FFFFFF 0 to 3FFFFFF bits, in 1-bit steps (Specify in hexadecimal)
	<b>Note:</b> The maximum setting value is the pattern length.
	<data>=<NON-DECIMAL NUMERIC PROGRAM DATA> #H**...* Specify pattern data in hexadecimal format. 1 to 400 characters (pattern data of 400 × 4 bits) Specify a character string consisting of 0 to 9 and A to F. If the last character string of the pattern data is short of a hexadecimal unit (4 bits), add 0(s) up to the last bit to make a hexadecimal string.
	#B**...* Specify pattern data in binary format. 1 to 400 characters (pattern data of 400 bits) Specify a character string consisting of 0 and 1.
Function	Sets the pattern data from the <start> to <end> addresses during Alternate pattern generation.
Example	The set data overwrites the specified range. To set the addresses 0 to 1F of the pattern A to AA: > ADW 0,#H0,#H1F,#HAA
Compatibility	Incompatible with existing models.

**ADW? <content>,<start>**

Parameter	<content>=<DECIMAL NUMERIC PROGRAM DATA> 0 Pattern A 1 Pattern B <start>=<NON-DECIMAL NUMERIC PROGRAM DATA> #H0 to #H3FFFFFF 0 to 3FFFFFF bits (Specify in hexadecimal)
	<b>Note:</b> The maximum setting value is the pattern length.
Response	<data>=<HEXADECIMAL NUMERIC RESPONSE DATA> #H**...* Returns the pattern data in hexadecimal format. Within 400 characters (pattern data of 400 × 4 bits)
Function	Queries the pattern data of 400 × 4 bits from the <start> address during Alternate pattern generation.
Example	To query the pattern A data from address 0: > ADW? 0,H0 < ADW #H0123456789ABCDEF... (1 to 400 characters in Hex.) < ADW #H0
Compatibility	Incompatible with existing models.

**ABW <content>,<start>,<end>,<bdata>**

Parameter	<content>=<DECIMAL NUMERIC PROGRAM DATA> 0 Pattern A 1 Pattern B <start>=<NON-DECIMAL NUMERIC PROGRAM DATA> #H0 to #H3FFFFFF 0 to 3FFFFFF bits, in 1-bit steps (Specify in hexadecimal) <end>=<NON-DECIMAL NUMERIC PROGRAM DATA> #H0 to #H3FFFFFF 0 to 3FFFFFF bits, in 1-bit steps (Specify in hexadecimal)
	<b>Note:</b> The maximum setting value is the pattern length. <bdata>=<ARBITRARY BLOCK PROGRAM DATA> #XYYY<binary> X: Number of YYY digits YYY: Number of bytes of <binary> 1 to 8,388,608 bytes <binary>: Binary data up to 8,388,608 bytes
Function	Sets the binary data from <start> to <end> addresses of the pattern data during Alternate pattern generation.
Example	The set data overwrites the specified range. To set the addresses 0 to 1F of the pattern A data to 42: > ABW 0,#H0,#H1F,#11B(B=42)
Compatibility	Incompatible with existing models.

**ABW? <content>,<start>[,<size>]**

Parameter	<content>=<DECIMAL NUMERIC PROGRAM DATA> 0 Pattern A 1 Pattern B <start>=<NON-DECIMAL NUMERIC PROGRAM DATA> #H0 to #H3FFFFFF 0 to 3FFFFFF bits, in 1-bit steps (Specify in hexadecimal)
	<b>Note:</b> The maximum setting value is the pattern length. [<size>]=<DECIMAL NUMERIC PROGRAM DATA > 1 to 8388608 1 to 8,388,608, in 1-byte steps
Response	<bdata>=<DEFINITE LENGTH ARBITRARY BLOCK RESPONSE DATA> #XYYY<binary> X: Number of YYY digits YYY: Number of bytes of <binary> 1 to 8,388,608 bytes <binary>: Binary data up to 8,388,608 bytes
Function	Binary data of the setting pattern is queried when [<size>] is omitted. Queries binary data of bytes specified by <size> from the <start> address of the pattern data during Alternate pattern generation.
Example	To query binary data of 2 bytes from address 0 of the pattern A data: > ABW? 0,#H0,2 < ABW #12AA To query binary data of the setting pattern from address 0 of the pattern A data: > ABW? 0,#H0 < ABW #516000AA... (Binary data of 8,388,608 bytes)
Compatibility	Incompatible with existing models.



**ARA <content>,<start>,<end>**


---

Parameter	<content>=<DECIMAL NUMERIC PROGRAM DATA> 0                                   Pattern A 1                                   Pattern B <start>=<NON-DECIMAL NUMERIC PROGRAM DATA> #H0 to #H3FFFFFF           0 to 3FFFFFF bits, in 1-bit steps (Specify in hexadecimal) <end>=<NON-DECIMAL NUMERIC PROGRAM DATA> #H0 to #H3FFFFFF           0 to 3FFFFFF bits, in 1-bit steps (Specify in hexadecimal)
	<b>Note:</b> The maximum setting value is the pattern length.
Function	Inverts the data in the program during Alternate pattern generation. Specify the inversion range by the <start> and <end> addresses.
Example	To invert addresses 0 to 1F of the pattern A: > ARA 0,#H0,#H1F
Compatibility	Incompatible with existing models.

**ARD <content>,<start>,<delta>**


---

Parameter	<content>=<DECIMAL NUMERIC PROGRAM DATA> 0                                   Pattern A 1                                   Pattern B <start>=<NON-DECIMAL NUMERIC PROGRAM DATA> #H0 to #H3FFFFFF           0 to 3FFFFFF bits, in 1-bit steps (Specify in hexadecimal) <delta>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 67108864                1 to 67,108,864 bit, in 1-bit steps
	<b>Note:</b> The maximum setting value is the pattern length.
Function	Inverts the data in the program during Alternate pattern generation. Specify the inversion range by the number of bits from the <start> address (relative specification).
Example	To invert 64 bits of the pattern A from address 0: > ARD 0,#H0,64
Compatibility	Incompatible with existing models.

**ADF <content>,<range>,<page>,<data>**

---

Parameter	<content>=<DECIMAL NUMERIC PROGRAM DATA> 0 Pattern A 1 Pattern B <range>=<DECIMAL NUMERIC PROGRAM DATA> 0 Specifies a page. (One page is defined as 128 bits.) 1 Specifies all data. <page>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 524288 1 to 524,288 (Max.) pages, in 1-page steps Max = Pattern Length / 128 (rounding up fractions) Specify "0" when <range> is set to ALL. <data>=<NUMERIC PROGRAM DATA> 0 Fills the specified range with 0s. 1 Fills the specified range with 1s.
Function	Sets 0s or 1s for the specified page or all data in the program during Alternate pattern generation.
Example	To set 0s for the second page of the pattern A: > ADF 0,0,2,0
Compatibility	Incompatible with existing models.

8.3.2.6 Mixed Data pattern setting commands

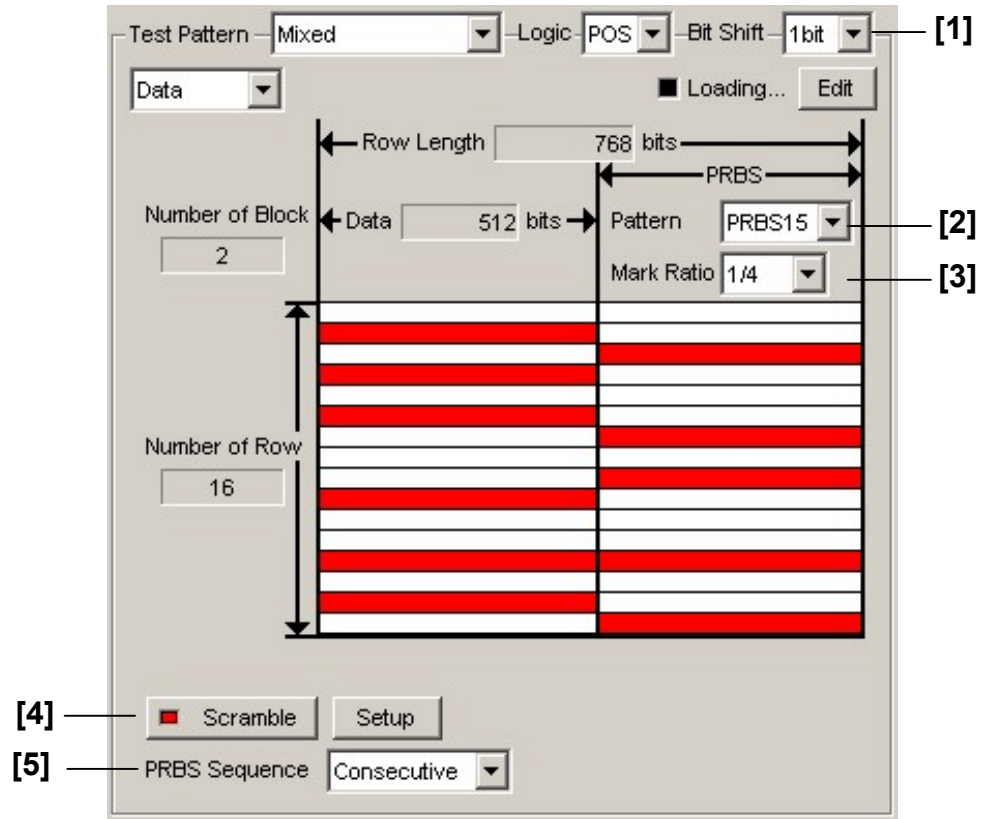


Figure 8.3.2.6-1 Mixed Data pattern setting field

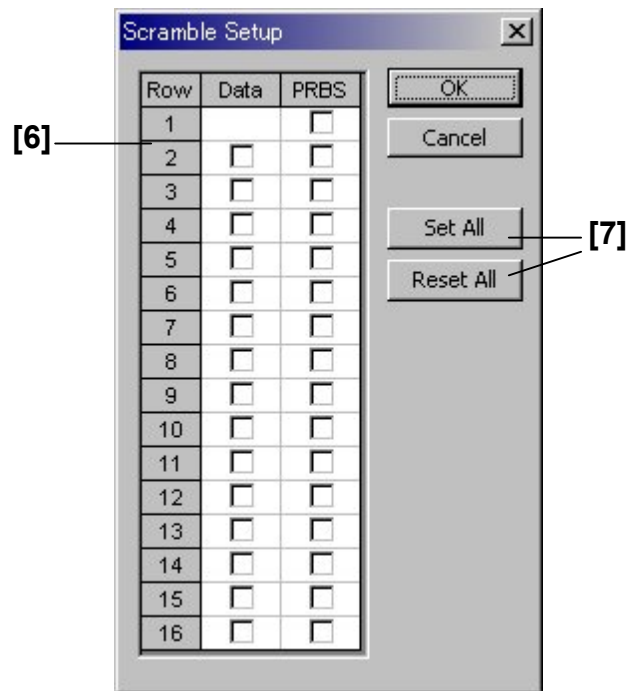


Figure 8.3.2.6-2 Descramble Setup dialog box

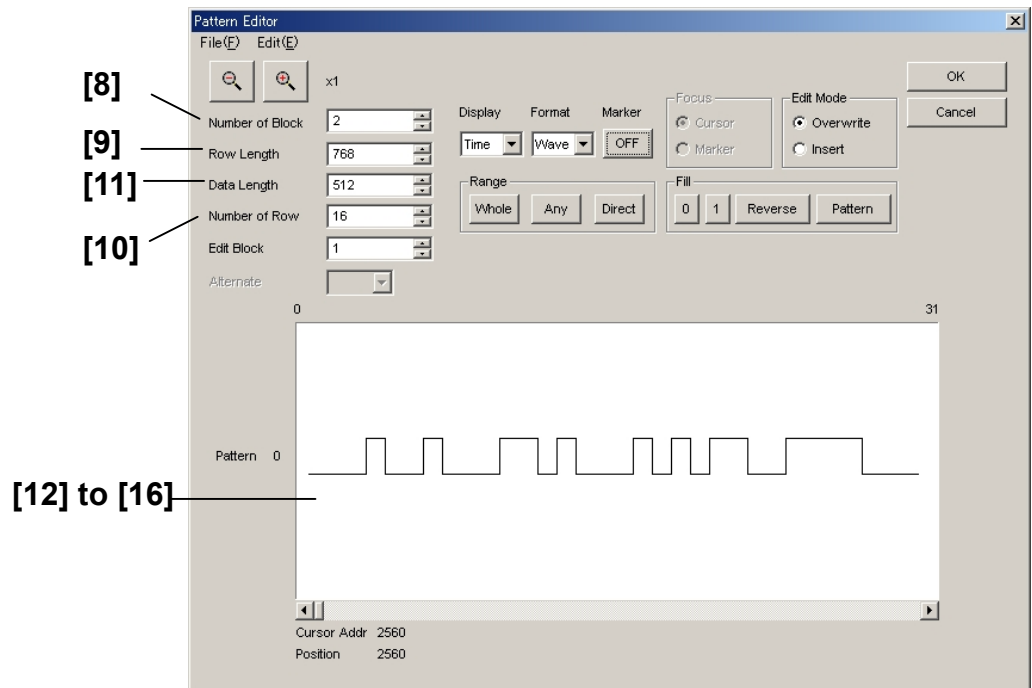


Figure 8.3.2.6-3 Mixed Data pattern setting (Pattern Editor screen)

Table 8.3.2.6-1 Mixed Data pattern setting commands

No.	Setting Items	Commands
[1]	Bit Shift	MPB
		MPB?
[2]	PRBS Pattern	MPP
		MPP?
[3]	PRBS Mark Ratio	MPM
		MPM?
[4]	Scramble ON/OFF	MSC
		MSC?
[5]	PRBS Sequence	MPS
		MPS?
[6]	Scramble Setup	MSS
		MSS?
[7]	Set All/Reset All	MSL
[8]	Number of Block	MBL
		MBL?
[9]	Row Length	MRL
		MRL?
[10]	Data Length	MRW
		MRW?
[11]	Number of Row	MDL
		MDL?
[12]	No label (Pattern setting)	MDW
		MDW?
[13]	No label (Pattern setting)	MBW
		MBW?
[14]	No label (Data inversion)	MDA
[15]	No label (Data inversion)	MDD
[16]	No label (All 0 or All 1)	MDF



**MPM <mratio>**


---

Parameter	<mratio>=<DECIMAL NUMERIC PROGRAM DATA>															
	<table> <tr> <td></td> <td>POS</td> <td>NEG</td> </tr> <tr> <td>0</td> <td>0/8</td> <td>8/8</td> </tr> <tr> <td>1</td> <td>1/8</td> <td>7/8</td> </tr> <tr> <td>2</td> <td>1/4</td> <td>3/4</td> </tr> <tr> <td>3</td> <td>1/2</td> <td>1/2INVT</td> </tr> </table>		POS	NEG	0	0/8	8/8	1	1/8	7/8	2	1/4	3/4	3	1/2	1/2INVT
	POS	NEG														
0	0/8	8/8														
1	1/8	7/8														
2	1/4	3/4														
3	1/2	1/2INVT														
Function	Sets the mark ratio for the PRBS pattern during Mixed Data pattern generation.															
Example	To set the mark ratio for the PRBS pattern to 1/4: > MPM 2															
Compatibility	Incompatible with existing models.															

**MPM?**


---

Response	<mratio>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the mark ratio for the PRBS pattern during Mixed Data pattern generation.
Example	> MPM? < MPM 2
Compatibility	Incompatible with existing models.

**MSC <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA>				
	<table> <tr> <td>0</td> <td>Scramble OFF</td> </tr> <tr> <td>1</td> <td>Scramble ON</td> </tr> </table>	0	Scramble OFF	1	Scramble ON
0	Scramble OFF				
1	Scramble ON				
Function	Sets whether to scramble the PRBS7 stage before pattern generation.				
Example	To set Scramble ON: > MSC 1				
Compatibility	Incompatible with existing models.				

**MSC?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries whether to scramble the PRBS7 stage before pattern generation.
Example	> MSC? < MSC 1
Compatibility	Incompatible with existing models.

### **MPS <sequence>**

Parameter	<sequence>=<DECIMAL NUMERIC PROGRAM DATA> 0 Restart: PRBS patterns are not continuous. 1 Consecutive: PRBS patterns are continuous.
Function	Sets the PRBS pattern sequence during Mixed Data pattern generation.
Example	To set the PRBS pattern sequence to Restart: > MPS 0
Compatibility	Incompatible with existing models.

### **MPS?**

Response	<sequence>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the PRBS pattern sequence during Mixed Data pattern generation.
Example	> MPS? < MPS 0
Compatibility	Incompatible with existing models.

### **MSS <row>,<data>,<prbs>**

Parameter	<row>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 16 1 to 16 Row, in 1-row steps <data>=<DECIMAL NUMERIC PROGRAM DATA> 0 Scramble OFF 1 Scramble ON Note, however, that Scramble is always OFF only for Data of 1 Row. <prbs>=<DECIMAL NUMERIC PROGRAM DATA> 0 Scramble OFF 1 Scramble ON
Function	Sets Scramble ON or OFF for the Data and PRBS of the specified Row.
Example	To set the Scramble settings for 2 Row to Data ON, PRBS OFF: > MSS 2,1,0
Compatibility	Incompatible with existing models.

### **MSS? <row>**

Parameter	<row>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 16 1 to 16 Row, in 1-row steps
Response	<data>,<prbs>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the scramble setting (ON/OFF) for the Data and PRBS of the specified Row.
Example	To query the Scramble setting for 2 Row: > MSS? 2 < MSS 1,0
Compatibility	Incompatible with existing models.



**MSL <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA>
	0 All Reset
	1 All Set
Function	Sets or resets all Scramble settings.
Example	To select all Scramble settings: > MSL 1
Compatibility	Incompatible with existing models.

**MBL <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA>
	1 to 511 1 to 511 blocks, in 1-block steps
Function	Sets the number of blocks during Mixed Data pattern generation.
Example	To set the number of blocks to 30: > MBL 30
Compatibility	Incompatible with existing models.

**MBL?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX3)
Function	Queries the number of blocks during Mixed Data pattern generation.
Example	> MBL? < MBL 1 < MBL 511
Compatibility	Incompatible with existing models.

### MRL <numeric>

---

Parameter <numeric>=<DECIMAL NUMERIC PROGRAM DATA>  
768 to 2281701376 768 to 2,281,701,376 bit, in 128-bit steps

**Note:**

At 2 ch Combination, the setting range and Step are doubled.  
At 4 ch Combination, the setting range and Step are quadrupled.

Function Sets the pattern length of 1 Row that is edited during Mixed Data pattern generation.

Example To set the pattern length to 768 bits:

> MRL 768

Compatibility Incompatible with existing models.

### MRL?

---

Response <numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX11)

Function Queries the pattern length of 1 Row that is edited during Mixed Data pattern generation.

Example

> MRL?  
< MRL 768  
< MRL 2281701376  
< MRL 9126805504

Compatibility Incompatible with existing models.

### MRW <numeric>

---

Parameter <numeric>=<DECIMAL NUMERIC PROGRAM DATA>  
1 to 16 1 to 16 Rows, in 1-row steps

Function Sets the number of rows within one block that are edited during Mixed Data pattern generation.

Example To set the number of rows within one block to 16:

> MRW 16

Compatibility Incompatible with existing models.

### MRW?

---

Response <numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX2)

Function Queries the number of rows within one block that are edited during Mixed Data pattern generation.

Example

> MRW?  
< MRW 16  
< MRW 1

Compatibility Incompatible with existing models.

**MDL <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 512 to 134217728                      512 to 134,217,728 bit, in 1-bit steps
	<b>Note:</b> The maximum setting is the pattern length. At 2 ch Combination, the setting range and Step are doubled. At 4 ch Combination, the setting range and Step are quadrupled.
Function	Sets the Data pattern length that is edited during Mixed Data pattern generation.
Example	To set the pattern length to 512 bits. > MDL 512
Compatibility	Incompatible with existing models.

**MDL?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX10)
Function	Queries the Data pattern length that is edited during Mixed Data pattern generation.
Example	> MDL? < MDL            512 < MDL 134217728
Compatibility	Incompatible with existing models.

## MDW <block>,<start>,<end>,<data>

Parameter	<p>&lt;block&gt;=&lt;DECIMAL NUMERIC PROGRAM DATA&gt;          1 to 511                      1 to 511 blocks, in 1-block steps</p> <p>&lt;start&gt;=&lt;NON-DECIMAL NUMERIC PROGRAM DATA&gt;          #H0 to #H7FFFFFFF            0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal)</p> <p>&lt;end&gt;=&lt;NON-DECIMAL NUMERIC PROGRAM DATA&gt;          #H0 to #H7FFFFFFF            0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal)</p> <p><b>Note:</b></p> <p style="padding-left: 40px;">The maximum setting is the pattern length.          At 2 ch Combination, the setting range is doubled.          At 4 ch Combination, the setting range is quadrupled.</p> <p>&lt;data&gt;=&lt;NON-DECIMAL NUMERIC PROGRAM DATA&gt;          #H**...*                      Specify pattern data in hexadecimal format.                                              1 to 400 characters (pattern data of 400 × 4 bits)                                              Specify a character string consisting of 0 to 9 and A to F.                                              If the last character string of the pattern data is short of a hexadecimal unit (4 bits), add 0(s) up to the last bit to make a hexadecimal string.</p> <p>#B**...*                      Specify pattern data in binary format.                                              1 to 400 characters (pattern data of 400 bits)                                              Specify a character string consisting of 0 and 1.</p>
Function	Sets the pattern data from the <start> to <end> addresses during Mixed Data pattern generation.
Example	The set data overwrites the specified range. To set the addresses 0 to 1F of the block 1 pattern data to 11: > MDW 1,#H0,#H1F,#H11
Compatibility	Incompatible with existing models.

## MDW? <block>,<start>

Parameter	<p>&lt;block&gt;=&lt;DECIMAL NUMERIC PROGRAM DATA&gt;          1 to 511                      1 to 511 blocks, in 1-block steps</p> <p>&lt;start&gt;=&lt;NON-DECIMAL NUMERIC PROGRAM DATA&gt;          #H0 to #H7FFFFFFF            0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal)</p> <p><b>Note:</b></p> <p style="padding-left: 40px;">The maximum setting is the pattern length.          At 2 ch Combination, the setting range is doubled.          At 4 ch Combination, the setting range is quadrupled.</p>
Response	<p>&lt;data&gt;=&lt;HEXADECIMAL NUMERIC RESPONSE DATA&gt;          "H****"                      Returns the pattern data in hexadecimal format.                                              Within 400 characters (pattern data of 400 × 4 bits)</p>
Function	Queries the pattern data of 400 × 4 bits from the <start> address during Mixed Data pattern generation.
Example	To query the block 1 pattern data from address 0: > MDW? 1,#H0 < MDW #H0123456789ABCDEF... (1 to 400 characters in Hex.) < MDW #H0
Compatibility	Incompatible with existing models.



### MDA <block>,<start>,<end>

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 511                                    1 to 511 blocks, in 1-block steps <start>=<NON-DECIMAL NUMERIC PROGRAM DATA> #H0 to #H7FFFFFFF                    0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal) <end>=<NON-DECIMAL NUMERIC PROGRAM DATA> #H0 to #H7FFFFFFF                    0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal)
	<p><b>Note:</b></p> <p style="padding-left: 40px;">The maximum setting is the pattern length.                  At 2 ch Combination, the setting range is doubled.                  At 4 ch Combination, the setting range is quadrupled.</p>
Function	Inverts the data in the program during Mixed Data pattern generation. Specify the inversion range by the <start> and <end> addresses.
Example	To invert addresses 0 to 4F of the block 1 pattern data: > MDA 1,#H0,#H4F
Compatibility	Incompatible with existing models.

### MDD <block>,<start>,<delta>

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 511                                    1 to 511 blocks, in 1-block steps <start>=<NON-DECIMAL NUMERIC PROGRAM DATA> #H0 to #H7FFFFFFF                    0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal) <delta>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 134217728                            1 to 134,217,728 bit, in 1-bit steps
	<p><b>Note:</b></p> <p style="padding-left: 40px;">The maximum setting is the pattern length.                  At 2 ch Combination, the setting range is doubled.                  At 4 ch Combination, the setting range is quadrupled.</p>
Function	Inverts the data in the program during Mixed Data pattern generation. Specify the inversion range by the number of bits from the <start> address (relative specification).
Example	To invert 256 bits of the block 1 pattern data from address 0: > MDD 1,#H0,256
Compatibility	Incompatible with existing models.

**MDF <block>,<range>,<page>,<data>**


---

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 511                      1 to 511 blocks, in 1-block steps <range>=<DECIMAL NUMERIC PROGRAM DATA> 0                                Specifies a page. (One page is defined as 128 bits.) 1                                Specifies all data. <page>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 1048576                1 to 1,048,576 (Max.) pages, in 1-page steps Max = Pattern Length / 128 (rounding up fractions) Specify "0" when <range> is set to ALL. <data>=<DECIMAL NUMERIC PROGRAM DATA> 0                                Fills the specified range with 0s. 1                                Fills the specified range with 1s.
Function	Sets 0s or 1s for the specified page or all data in the program during Mixed Data pattern generation.
Example	To set 0s for the third page: > MDF 1,0,3,0
Compatibility	Incompatible with existing models.

8.3.2.7 Mixed Alternate pattern setting commands

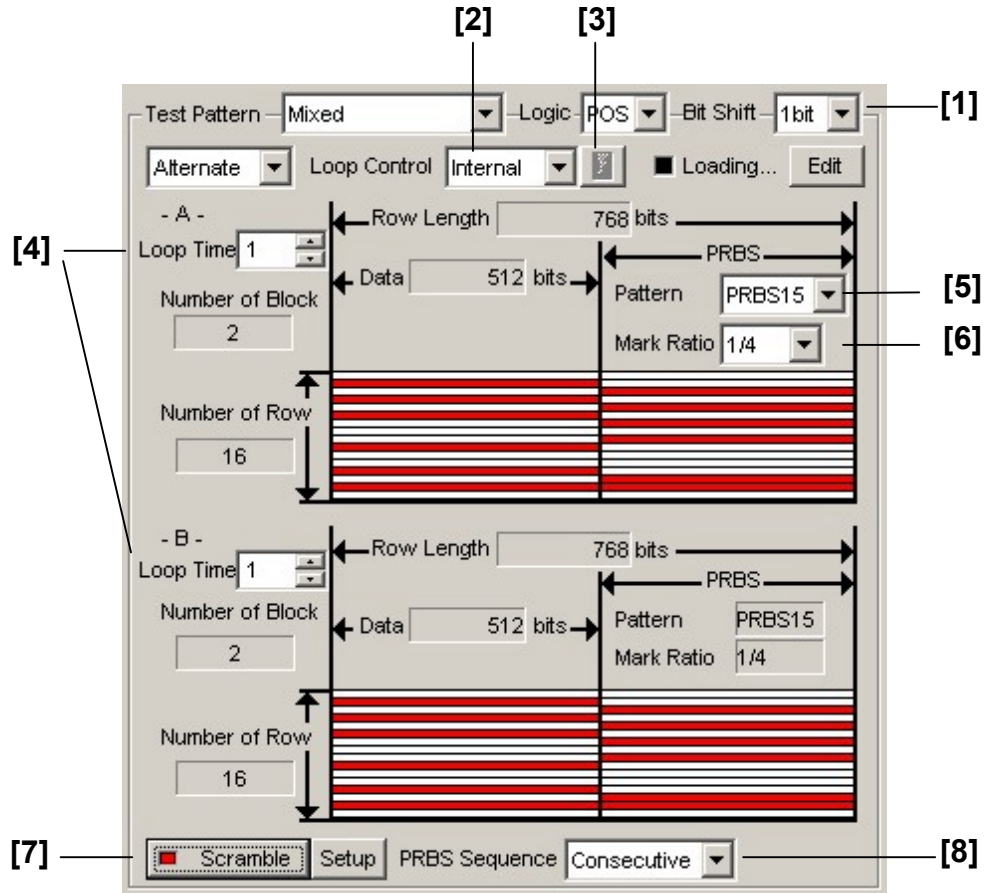


Figure 8.3.2.7-1 Mixed Alternate pattern setting field



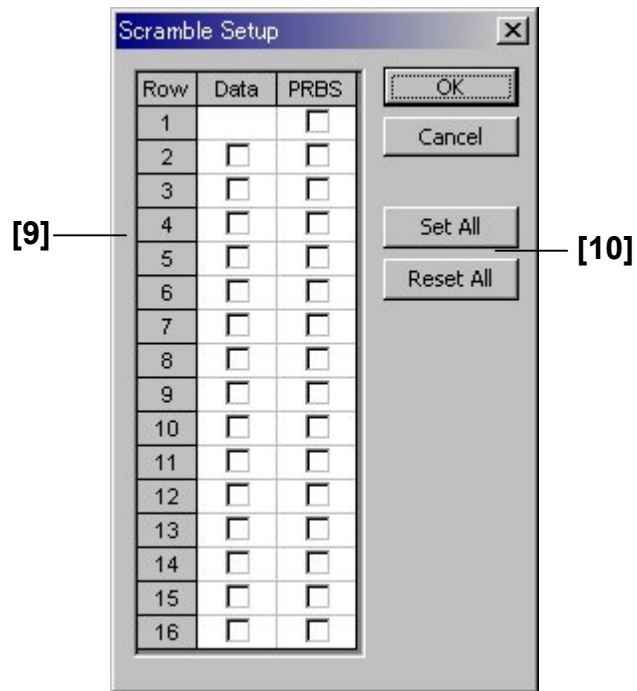


Figure 8.3.2.7-2 Descramble Setup dialog box

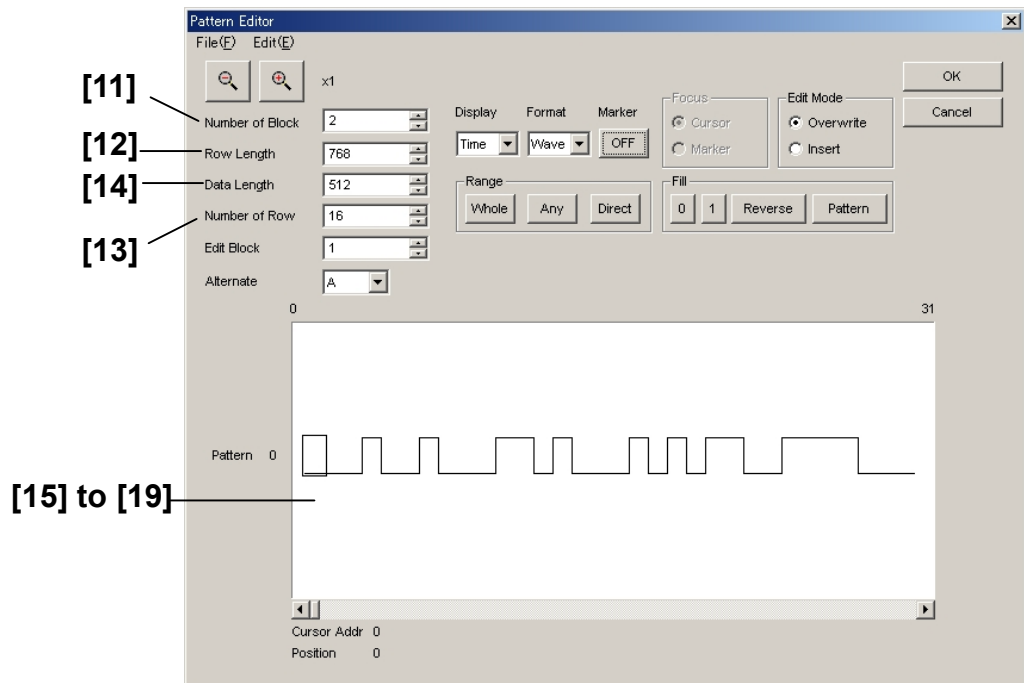


Figure 8.3.2.7-3 Mixed Alternate pattern setting (Pattern Editor screen)

**Table 8.3.2.7-1 Mixed Alternate pattern setting commands**

No.	Setting Items	Commands
[1]	Bit Shift	XPB
		XPB?
[2]	Loop Control	XLC
		XLC?
[3]	Manual button	XMN
[4]	Loop Time	XPT
		XPT?
[5]	Pattern	XPP
		XPP?
[6]	Mark Ratio	XPM
		XPM?
[7]	Scramble ON/OFF	XSC
		XSC?
[8]	PRBS Sequence	XPS
		XPS?
[9]	Scramble Setup	XSR
		XSR?
[10]	Set All/Reset All	XSA
[11]	Number of Block	XBL
		XBL?
[12]	Row Length	XRL
		XRL?
[13]	Data Length	XML
		XML?
[14]	Number of Row	XRW
		XRW?
[15]	No label (Pattern setting)	XDW
		XDW?
[16]	No label (Pattern setting)	XBW
		XBW?
[17]	No label (Data inversion)	XDA
[18]	No label (Data inversion)	XDD
[19]	No label (All 0 or All 1)	XDF



**XPT <content>,<numeric>**

Parameter	<content>=<DECIMAL NUMERIC PROGRAM DATA> 0 Pattern A 1 Pattern B <numeric>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 511 1 to 511 times, in 1-time steps
Function	Sets the number of generation times of the Mixed Alternate pattern A or B.
Example	To set the number of pattern B generation times to 20: > XPT 1,20
Compatibility	Incompatible with existing models.

**XPT? <content>**

Parameter	<content>=<DECIMAL NUMERIC PROGRAM DATA> (FIX3) 0 Pattern A 1 Pattern B
Response	<numeric>=<NR1 NUMERIC RESPONSE DATA>
Function	Queries the number of generation times of the Mixed Alternate pattern A or B.
Example	To set the number of pattern B generation times: > XPT? 1 < XPT 1 < XPT 511
Compatibility	Incompatible with existing models.

**XPP <numeric>**

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 2 $2^7-1$ 3 $2^9-1$ 4 $2^{10}-1$ 5 $2^{11}-1$ 6 $2^{15}-1$ 7 $2^{20}-1$ 8 $2^{23}-1$ 9 $2^{31}-1$
Function	Sets the number of stages of the PRBS pattern during Mixed Alternate pattern generation.
Example	To set the number of stages of the PRBS pattern to 7: > XPP 2
Compatibility	Incompatible with existing models.

**XPP?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the number of stages of the PRBS pattern during Mixed Alternate pattern generation.
Example	> XPP? < XPP 2
Compatibility	Incompatible with existing models.

**XPM <mratio>**


---

Parameter	<mratio>=<DECIMAL NUMERIC PROGRAM DATA>															
	<table> <thead> <tr> <th></th> <th>POS</th> <th>NEG</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0/8</td> <td>8/8</td> </tr> <tr> <td>1</td> <td>1/8</td> <td>7/8</td> </tr> <tr> <td>2</td> <td>1/4</td> <td>3/4</td> </tr> <tr> <td>3</td> <td>1/2</td> <td>1/2INVT</td> </tr> </tbody> </table>		POS	NEG	0	0/8	8/8	1	1/8	7/8	2	1/4	3/4	3	1/2	1/2INVT
	POS	NEG														
0	0/8	8/8														
1	1/8	7/8														
2	1/4	3/4														
3	1/2	1/2INVT														
Function	Sets the mark ratio for the PRBS pattern during Mixed Alternate pattern generation.															
Example	To set the mark ratio for the PRBS pattern to 1/8: > XPM 1															
Compatibility	Incompatible with existing models.															

**XPM?**


---

Response	<mratio>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the mark ratio for the PRBS pattern during Mixed Alternate pattern generation.
Example	> XPM? < XPM 1
Compatibility	Incompatible with existing models.

### **XSC <numeric>**

---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 0 Scramble OFF 1 Scramble ON
Function	Sets whether to scramble the PRBS7 stage before pattern generation.
Example	To set Scramble ON: > XSC 1
Compatibility	Incompatible with existing models.

### **XSC?**

---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries whether to scramble the PRBS7 stage before pattern generation.
Example	> XSC? < XSC 1
Compatibility	Incompatible with existing models.

### **XPS <sequence>**

---

Parameter	<sequence>=<DECIMAL NUMERIC PROGRAM DATA> 0 Restart: PRBS patterns are not continuous. 1 Consecutive: PRBS patterns are continuous.
Function	Sets the PRBS pattern sequence during Mixed Alternate pattern generation.
Example	To set the PRBS pattern sequence to Restart: > XPS 0
Compatibility	Incompatible with existing models.

### **XPS?**

---

Response	<sequence>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the PRBS pattern sequence during Mixed Alternate pattern generation.
Example	> XPS? < XPS 0
Compatibility	Incompatible with existing models.

**XSR <row>,<data>,<prbs>**


---

Parameter	<row>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 16                            1 to 16 Rows, in 1-row steps <data>=<DECIMAL NUMERIC PROGRAM DATA> 0                                    Scramble OFF 1                                    Scramble ON Note, however, that Data of 1 Row Scramble is fixed to Scramble OFF. <prbs>=<DECIMAL NUMERIC PROGRAM DATA> 0                                    Scramble OFF 1                                    Scramble ON
Function	Sets Scramble ON or OFF for the Data and PRBS of the specified Row.
Example	To set the Scramble settings for 3 Row to Data ON, PRBS OFF: > XSR 3,1,0
Compatibility	Incompatible with existing models.

**XSR? <row>**


---

Parameter	<row>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 16                            1 to 16 Rows, in 1-row steps
Response	<data>,<prbs>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the scramble setting (ON/OFF) for the Data and PRBS of the specified Row.
Example	To query the Scramble setting for 3 Row: > XSR? 3 < XSR 1,0
Compatibility	Incompatible with existing models.

**XSA <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 0                                    All Reset 1                                    All Set
Function	Sets or resets all Scramble settings.
Example	To select all Scramble settings: > XSA 1
Compatibility	Incompatible with existing models.





**XML <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 512 to 67108864                      512 to 67,108,864 bits, in 128-bit steps
Function	Sets the Data pattern length that is edited during Mixed Alternate pattern generation.
Example	To set the Data pattern length to 12,800 bits: > XML 12800
Compatibility	Incompatible with existing models.

**XML?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX8)
Function	Queries the Data pattern length that is edited during Mixed Alternate pattern generation.
Example	> XML? < XML            512 < XML 67108864
Compatibility	Incompatible with existing models.

**XRW <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 16                                      1 to 16 Rows, in 1-row steps
Function	Sets the number of rows within one block that are edited during Mixed Alternate pattern generation.
Example	To set the number of rows within one block to 8: > XRW 8
Compatibility	Incompatible with existing models.

**XRW?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX2)
Function	Queries the number of rows within one block that are edited during Mixed Alternate pattern generation.
Example	> XRW? < XRW    8 < XRW 16
Compatibility	Incompatible with existing models.









**XDF <block>,<content>,<range>,<page>,<data>**

---

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 511                                    1 to 511 blocks, in 1-block steps
	<content>=<DECIMAL NUMERIC PROGRAM DATA> 0    Pattern A 1    Pattern B
	<range>=<DECIMAL NUMERIC PROGRAM DATA> 0    Specifies a page. (One page is defined as 128 bits.) 1    Specifies all data.
	<page>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 524288                                1 to 524,288 (Max.) pages, in 1-page steps Max = Pattern Length / 128 (rounding up fractions) Specify "0" when <range> is set to 1.
	<data>=<NUMERIC PROGRAM DATA> 0    Fills the specified range with 0s. 1    Fills the specified range with 1s.
Function	Sets 0s or 1s for the specified page or all data in the program during Mixed Alternate pattern generation.
Example	To set 1s for all the data of the block 1 pattern B: > XDF 1,1,1,0,1
Compatibility	Incompatible with existing models.

8.3.2.8 Sequence pattern setting commands

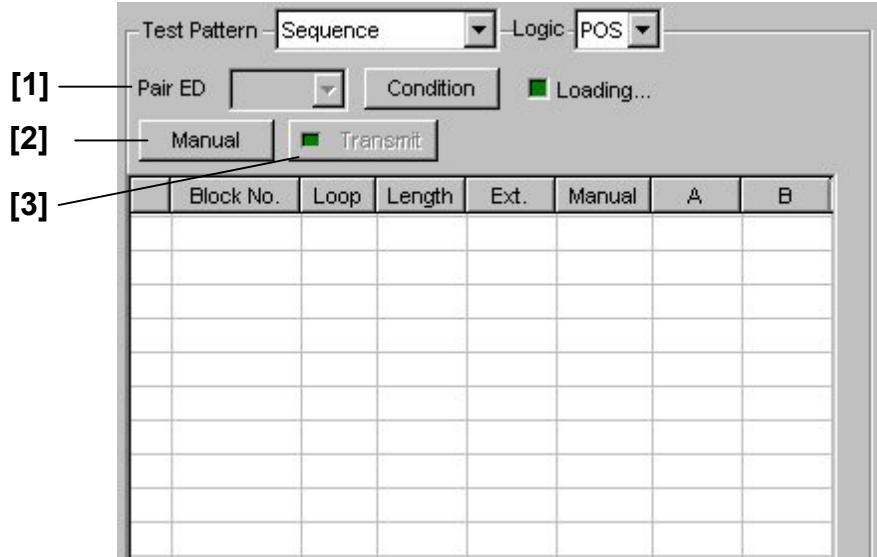


Figure 8.3.2.8-1 Sequence pattern setting field

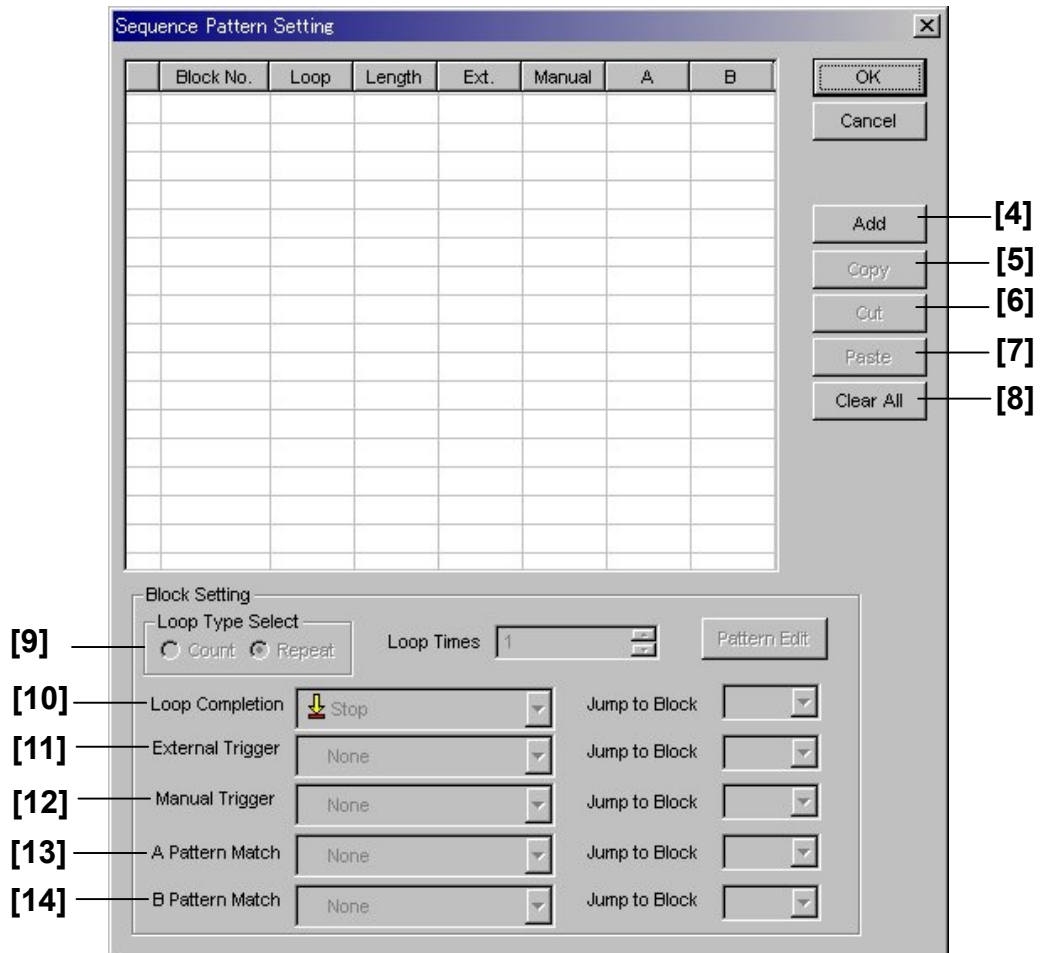


Figure 8.3.2.8-2 Sequence Pattern Setting screen

[15] to [21]

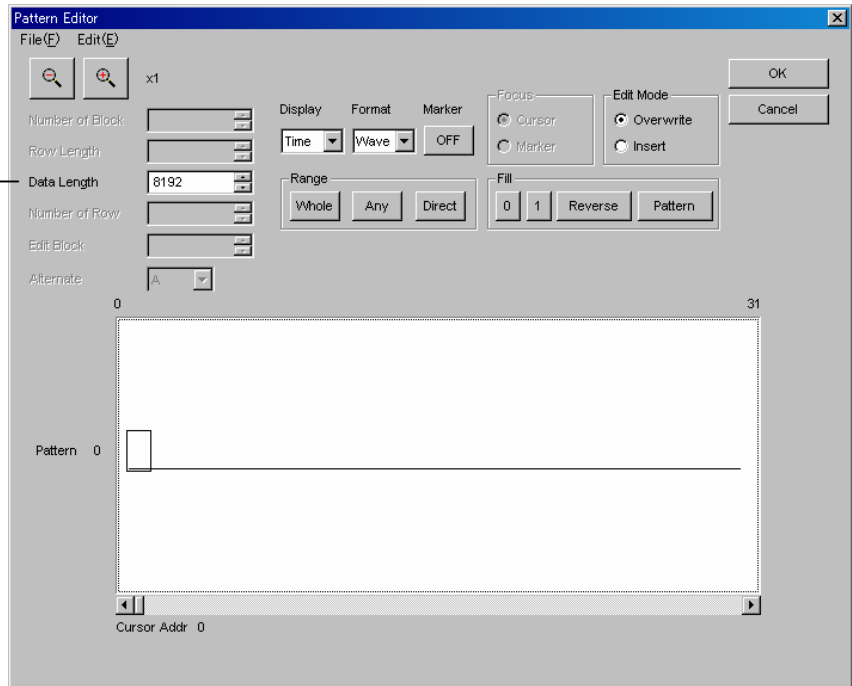


Figure 8.3.2.8-3 Sequence pattern setting (Pattern Editor screen)



Table 8.3.2.8-1 Sequence pattern setting commands

No.	Setting Items	Commands
[1]	Pair ED	SPR
		SPR?
[2]	Manual	SMA
[3]	Transmit	SRE
[4]	Add	SAD
		SAD?
[5]	Copy	SCO
[6]	Cut	SCU
[7]	Paste	SPA
[8]	Clear All	SCD
[9]	Loop times	SLP
		SLP?
[10]	Loop Completion	SCL
		SCL?
[11]	External Trigger	SCE
		SCE?
[12]	Manual Trigger	SCM
		SCM?
[13]	A Pattern Match	SCA
		SCA?
[14]	B Pattern Match	SCB
		SCB?
[15]	Data Length	SLG
		SLG?
[16]	No label (Pattern setting)	SDW
		SDW?
[17]	No label (Pattern setting)	SBW
		SBW?
[18]	No label (Data inversion)	SDA
[19]	No label (Data inversion)	SDD
[20]	No label (All 0 or All 1)	SDF



**SAD <block>**


---

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128                                    1 to 128 blocks, in 1-block steps
Function	Set the number of blocks that are edited during Sequence pattern generation.
Example	To set the number of blocks that are edited to 10: > SAD 10
Compatibility	Incompatible with existing models.

**SAD?**


---

Response	<block>=<NR1 NUMERIC RESPONSE DATA> (FIX3)
Function	Queries the number of blocks that are edited during Sequence pattern generation.
Example	> SAD? < SAD    1 < SAD 128
Compatibility	Incompatible with existing models.

**SCO <block>**


---

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128                                    1 to 128 blocks, in 1-block steps
Function	Copies the setting conditions in the specified block during Sequence pattern generation.
Example	To copy the setting conditions in block 12: > SCO 12
Compatibility	Incompatible with existing models.

**SCU <block>**


---

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128                                    1 to 128 blocks, in 1-block steps
Function	Cuts (copies and removes) the settings in the specified block during Sequence pattern generation.
Example	To cut the settings in block 15: > SCU 15
Compatibility	Incompatible with existing models.

**SPA <block>**


---

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128                                    1 to 128 blocks, in 1-block steps
Function	Pastes the settings to the specified block during Sequence pattern generation. A block is added to the specified block number.
Example	To paste the setting conditions to block 20: > SPA 20
Compatibility	Incompatible with existing models.

## SCD

Function	Clears all the setting conditions during Sequence pattern generation.
Example	> SCD
Compatibility	Incompatible with existing models.

## SLP <block>, <type> [,<numeric>]

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128                            1 to 128 blocks, in 1-block steps <type>=<DECIMAL NUMERIC PROGRAM DATA> 0                                        Specifies the number of repetition times. 1                                        Does not specify the number of repetition times. [<numeric>]=<DECIMAL NUMERIC PROGRAM DATA> 1 to 1024                            1 to 1,024 loops, in 1-loop steps <b>Note:</b> <numeric> can be omitted when <type> is set to 1. Also, the setting in <numeric> is ignored when <type> is set to 1.
Function	Sets the number of loops for the specified block during Sequence pattern generation.
Example	To set the number of loops for block 1 to 150: > SLP 1,0,150
Compatibility	Incompatible with existing models.

## SLP? <block>

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128                            1 to 128 blocks, in 1-block steps
Response	<type>=<NR1 NUMERIC RESPONSE DATA> (FIX1) [<numeric>]=<NR1 NUMERIC RESPONSE DATA> (FIX4) <b>Note:</b> When <type> is set to 1, <numeric> is omitted.
Function	Queries the number of loops for the specified block during Sequence pattern generation.
Example	To query the number of loops for block 1: > SLP? 1 < SLP 1 < SLP 0,    1 < SLP 0,1024
Compatibility	Incompatible with existing models.

**SCL <block>,<loop>,[<jump>]**


---

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 blocks, in 1-block steps <loop>=<DECIMAL NUMERIC PROGRAM DATA> 0                                  STOP 1                                  JUMP 2                                  NEXT [<jump>]=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 blocks, in 1-block steps When selecting JUMP, specify the jump destination block number n from 1 to 128. Can be omitted when JUMP is not selected.
Function	Sets the loop completion condition of each block during Sequence pattern generation.
Example	To set NEXT for the loop completion condition of block 3: > SCL 3,2
Compatibility	Incompatible with existing models.

**SCL? <block>**


---

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 blocks, in 1-block steps
Response	<loop>=<NR1 NUMERIC RESPONSE DATA> (FIX1) [<jump>]=<NR1 NUMERIC RESPONSE DATA> (FIX3) 1 to 128                      1 to 128 blocks When selecting JUMP, specify the jump destination block number n from 1 to 128. Can be omitted when JUMP is not selected.
Function	Queries the loop completion condition of each block during Sequence pattern generation.
Example	To query the loop completion condition of block 3: > SCL? 3 < SCL 2 < SCL 1,128 < SCL 1, 1
Compatibility	Incompatible with existing models.

**SCE <block>, <ext>, [<jump>]**

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128                                    1 to 128 blocks, in 1-block steps
	<ext>=<CHARACTER PROGRAM DATA> 0    STOP 1    JUMP 2    NEXT 3    NONE
	[<jump>]=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128                                    1 to 128 blocks, in 1-block steps When selecting JUMP, specify the jump destination block number n from 1 to 128. Can be omitted when JUMP is not selected.
Function	Sets the external trigger condition of each block during Sequence pattern generation.
Example	To set STOP for the external trigger condition of block 5: > SCE 5, 0
Compatibility	Incompatible with existing models.

**SCE? <block>**

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128                                    1 to 128 blocks, in 1-block steps
Response	<ext>=<NR1 NUMERIC RESPONSE DATA> (FIX1) 0, 1, 2, 3 [<jump>]=<NR1 NUMERIC RESPONSE DATA> (FIX3) 1 to 128                                    1 to 128 blocks When selecting JUMP, specify the jump destination block number n from 1 to 128. Can be omitted when JUMP is not selected.
Function	Queries the external trigger condition of each block during Sequence pattern generation.
Example	To query the external trigger condition of block 5: > SCE? 5 < SCE 0 < SCE 1, 1 < SCE 1,128
Compatibility	Incompatible with existing models.

**SCM <block>,<man>[,<jump>]**


---

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 blocks, in 1-block steps <man>=<DECIMAL NUMERIC PROGRAM DATA> 0                                  STOP 1                                  JUMP 2                                  NEXT 3                                  NONE [<jump>]=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 blocks, in 1-block steps When selecting JUMP, specify the jump destination block number n from 1 to 128. Can be omitted when JUMP is not selected.
Function	Sets the manual trigger condition of each block during Sequence pattern generation.
Example	To set the manual trigger condition of block 2 to "Jump to block 5". > SCM 2,1,5
Compatibility	Incompatible with existing models.

**SCM? <block>**


---

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 blocks, in 1-block steps
Response	<man>=<NR1 NUMERIC RESPONSE DATA> (FIX1) 0, 1, 2, 3 [<jump>]=<NR1 NUMERIC RESPONSE DATA> (FIX3) 1 to 128                      1 to 128 blocks When selecting JUMP, specify the jump destination block number n from 1 to 128. Can be omitted when JUMP is not selected.
Function	Queries the manual trigger condition of each block during Sequence pattern generation.
Example	To query the manual trigger condition of block 2: > SCM? 2 < SCM 2 < SCM 1, 5 < SCM 1,128
Compatibility	Incompatible with existing models.

### SCA <block>,<a>[,<jump>]

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128                                   1 to 128 blocks, in 1-block steps
	<a>=<DECIMAL NUMERIC PROGRAM DATA> 0    STOP 1    JUMP 2    NEXT 3    NONE
	[<jump>]=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128                                   1 to 128 blocks, in 1-block steps When selecting JUMP, specify the jump destination block number n from 1 to 128. Can be omitted when JUMP is not selected.
Function	Sets the pattern A match condition of each block during Sequence pattern generation.
Example	To set NONE for the pattern A match condition of block 3: > SCA 3,3
Compatibility	Incompatible with existing models.

### SCA? <block>

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128                                   1 to 128 blocks, in 1-block steps
Response	<a>= NR1 NUMERIC RESPONSE DATA> (FIX1) 0, 1, 2, 3 [<jump>]=<NR1 NUMERIC RESPONSE DATA> (FIX3) 1 to 128                                   1 to 128 blocks, in 1-block steps When selecting JUMP, specify the jump destination block number n from 1 to 128. Can be omitted when JUMP is not selected.
Function	Queries the pattern A match condition of each block during Sequence pattern generation.
Example	To query the pattern A match condition of block 3: > SCA? 3 < SCA 3 < SCA 1, 1 < SCA 1,128
Compatibility	Incompatible with existing models.



**SCB <block>, <b>, [, <jump>]**


---

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 blocks, in 1-block steps
	<b>=<DECIMAL NUMERIC PROGRAM DATA> 0                                STOP 1                                JUMP 2                                NEXT 3                                NONE
	[<jump>]=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 blocks, in 1-block steps When selecting JUMP, specify the jump destination block number n from 1 to 128. Can be omitted when JUMP is not selected.
Function	Sets the pattern B match condition of each block during Sequence pattern generation.
Example	To set NEXT for the pattern B match condition of block 7: > SCB 7,2
Compatibility	Incompatible with existing models.

**SCB? <block>**


---

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 blocks, in 1-block steps
Response	<b>=<NR1 NUMERIC RESPONSE DATA> (FIX1) 0, 1, 2, 3 [<jump>]=<NR1 NUMERIC RESPONSE DATA> (FIX3) 1 to 128                      1 to 128 blocks When selecting JUMP, specify the jump destination block number n from 1 to 128. Can be omitted when JUMP is not selected.
Function	Queries the pattern B match condition of each block during Sequence pattern generation.
Example	To query the pattern B match condition of block 7: > SCB? 7 < SCB 2 < SCB 1, 10 < SCB 1,128
Compatibility	Incompatible with existing models.

**SLG <block>,<numeric>**

---

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128 1 to 128 blocks, in 1-block steps
	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 8192 to 1048576 8,192 to 1,048,576 bits, in 128-bit steps
Function	Sets the pattern length of the specified block during Sequence pattern generation.
Example	To set the pattern length of block 3 to 8192 bits: > SLG 3,8192
Compatibility	Incompatible with existing models.

**SLG? <block>**

---

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128 1 to 128 blocks, in 1-block steps
Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX7) 8192 to 1048576 8,192 to 1,048,576 bits, in 128-bit steps
Function	Queries the pattern length of the specified block during Sequence pattern generation.
Example	To query the pattern length of block 3: > SLG? 3 < SLG 8192 < SLG 1048576
Compatibility	Incompatible with existing models.

**SDW <block>,<start>,<end>,<data>**

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 blocks, in 1-block steps <start>=<NON-DECIMAL NUMERIC PROGRAM DATA> #H0 to #HFFFFFF            0 to FFFFF bits, in 1-bit steps (Specify in hexadecimal) <end>=<NON-DECIMAL NUMERIC PROGRAM DATA> #H0 to #HFFFFFF            0 to FFFFF bits, in 1-bit steps (Specify in hexadecimal)
	<b>Note:</b> The maximum setting value is the pattern length.
	<data>=<NON-DECIMAL NUMERIC PROGRAM DATA> #H**...*                      Specify pattern data in hexadecimal format. 1 to 400 characters (pattern data of 400 × 4 bits) Specify a character string consisting of 0 to 9 and A to F. If the last character string of the pattern data is short of a hexadecimal unit (4 bits), add 0(s) up to the last bit to make a hexadecimal string. #B**...*                      Specify pattern data in binary format. 1 to 400 characters (pattern data of 400 bits) Specify a character string consisting of 0 and 1.
Function	Sets the pattern data from the <start> to <end> addresses during Sequence pattern generation.
Example	The set data overwrites the specified range. To set the addresses 0 to FFFF of the block 1 data to 5A: > SDW 1,#H0,#HFFFFFF,#H5A
Compatibility	Incompatible with existing models.

**SDW? <block>,<start>**

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 blocks, in 1-block steps <start>=<NON-DECIMAL NUMERIC PROGRAM DATA> #H0 to #HFFFFFF            0 to FFFFF bits, in 1-bit steps (Specify in hexadecimal)
	<b>Note:</b> The maximum setting value is the pattern length.
Response	<data>=<HEXADECIMAL NUMERIC RESPONSE DATA> #H**...*                      Returns the pattern data in hexadecimal format. Within 400 characters (pattern data of 400 × 4 bits)
Function	Queries the pattern data of 400 × 4 bits from the <start> address during Sequence pattern generation.
Example	To query the pattern data of 400 × 4 bits from address 0: > SDW? 1,#H0 < SDW #H0123456789ABCDEF...(1 to 400 characters in Hex.) < SDW #H0
Compatibility	Incompatible with existing models.

### **SBW <block>,<start>,<end>,<bdata>**

Parameter	<b>&lt;block&gt;=&lt;DECIMAL NUMERIC PROGRAM DATA&gt;</b> 1 to 128                            1 to 128 blocks, in 1-block steps <b>&lt;start&gt;=&lt;NON-DECIMAL NUMERIC PROGRAM DATA&gt;</b> #H0 to #HFFFFFF                0 to FFFF bits, in 1-bit steps (Specify in hexadecimal) <b>&lt;end&gt;=&lt;NON-DECIMAL NUMERIC PROGRAM DATA&gt;</b> #H0 to #HFFFFFF                0 to FFFF bits, in 1-bit steps (Specify in hexadecimal)
	<b>Note:</b> The maximum setting value is the pattern length.
	<b>&lt;bdata&gt;=&lt;ARBITRARY BLOCK PROGRAM DATA&gt;</b> #XYYY<binary>            X:        Number of YYY digits YYY:     Number of bytes of <binary> 1 to 131,072 bytes <binary>: Binary data up to 131,072 bytes
Function	Sets binary data of the pattern data from <start> to <end> addresses during Sequence pattern generation. The set data overwrites the specified range.
Example	To set the addresses 0 to FFFF of the block 1 data to 44: > SBW 1,#H0,#HFFFFFF,#11D
Compatibility	Incompatible with existing models.

### **SBW? <block>,<start>[,<size>]**

Parameter	<b>&lt;block&gt;=&lt;DECIMAL NUMERIC PROGRAM DATA&gt;</b> 1 to 128                            1 to 128 blocks, in 1-block steps <b>&lt;start&gt;=&lt;NON-DECIMAL NUMERIC PROGRAM DATA&gt;</b> #H0 to #HFFFFFF                0 to FFFF bits, in 1-bit steps (Specify in hexadecimal) <b>[&lt;size&gt;]=&lt;DECIMAL NUMERIC PROGRAM DATA&gt;</b> 1 to 131072                        1 to 131,072, in 1-byte steps
	<b>Note:</b> The maximum setting value is the pattern length.
Response	<b>&lt;bdata&gt;=&lt;DEFINITE LENGTH ARBITRARY BLOCK RESPONSE DATA&gt;</b> Binary data of the setting pattern is queried when [<size>] is omitted.
Function	Queries binary data of bytes specified by <size> from <start> address of the pattern data during Sequence pattern generation.
Example	To query the pattern data of 2 bytes in block 1 from address 0: > SBW? 1,#H0,2 < SBW #12DD To query the pattern data of the setting pattern in block 1 from address 0: > SBW? 1,#H0 < SBW #516000AA... (Binary data of 16,000 bytes)
Compatibility	Incompatible with existing models.

**SDA <block>,<start>,<end>**


---

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128	1 to 128 blocks, in 1-block steps
	<start>=<NON-DECIMAL NUMERIC PROGRAM DATA> #H0 to #HFFFFFF	0 to FFFFF bits, in 1-bit steps (Specify in hexadecimal)
	<end>=<NON-DECIMAL NUMERIC PROGRAM DATA> #H0 to #HFFFFFF	0 to FFFFF bits, in 1-bit steps (Specify in hexadecimal)
	<b>Note:</b> The maximum setting value is the pattern length.	
Function	Inverts the data in the program during Sequence pattern generation. Specify the inversion range by the <start> and <end> addresses.	
Example	To invert addresses 0 to FFF of the block 3 data: > SDA 3,#H0,#HFFF	
Compatibility	Incompatible with existing models.	

**SDD <block>,<start>,<delta>**


---

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128	1 to 128 blocks, in 1-block steps
	<start>=<NON-DECIMAL NUMERIC PROGRAM DATA> #H0 to #HFFFFFF	0 to FFFFF bits, in 1-bit steps (Specify in hexadecimal)
	<delta>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 1048576	1 to 1,048,576, in 1-bit steps
	<b>Note:</b> The maximum setting value is the pattern length.	
Function	Inverts the data in the program during Sequence pattern generation. Specify the inversion range by the number of bits from the <start> address (relative specification).	
Example	To invert 128 bits of the block 5 data from address 0: > SDD 5,#H0,128	
Compatibility	Incompatible with existing models.	

### **SDF <block>,<range>,<page>,<data>**

---

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128                                    1 to 128 blocks, in 1-block steps
	<range>=<DECIMAL NUMERIC PROGRAM DATA> 0    Specifies a page. (One page is defined as 128 bits.) 1    Specifies all data.
	<page>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 8192                                    1 to 8,192 (Max.) pages, in 1-page steps Max = Pattern Length / 128 (rounding up fractions) Specify "0" when <range> is set to 1.
	<data>=<DECIMAL NUMERIC PROGRAM DATA> 0    Fills the specified range with 0s. 1    Fills the specified range with 1s.
Function	Sets 0s or 1s for the specified page or all data in the program during Sequence pattern generation.
Example	To set 1s for all the data of the block 8: > SDF 8,1,0,1
Compatibility	Incompatible with existing models.

### 8.3.3 Commands related to Error Addition tab window

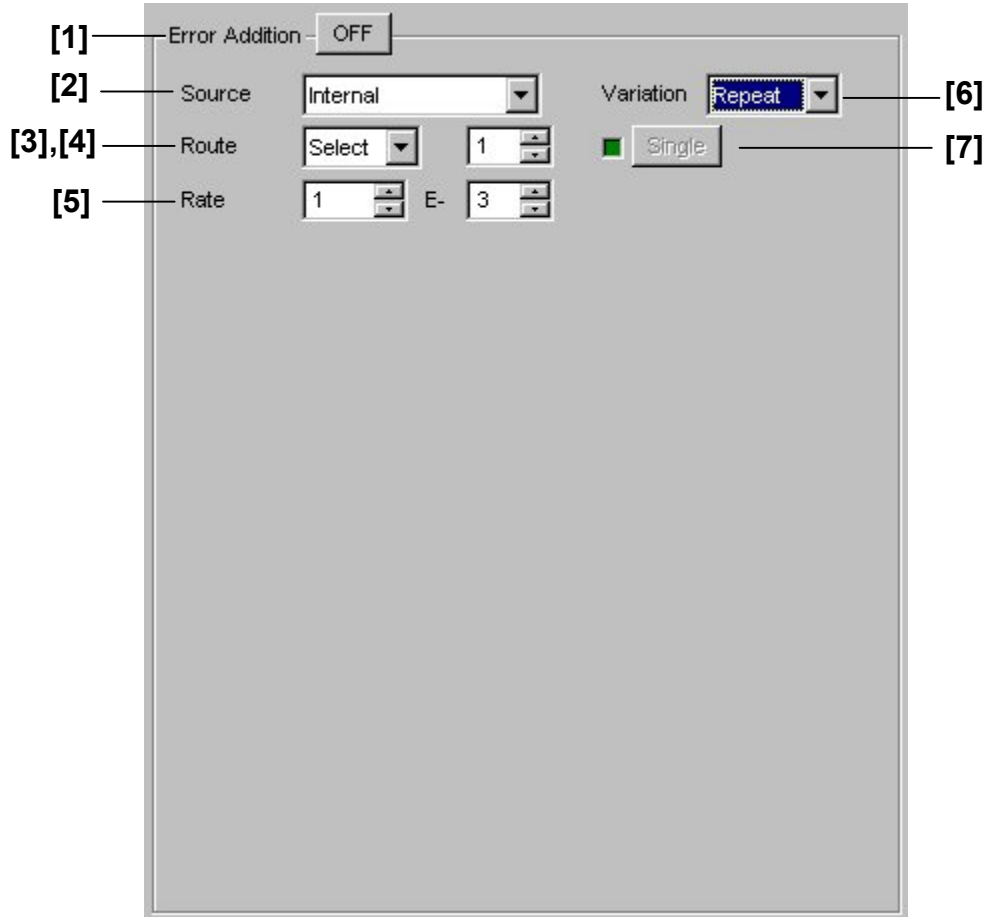


Figure 8.3.3-1 Error Addition setting field (For PRBS, Zero-Substitution, Data patterns)

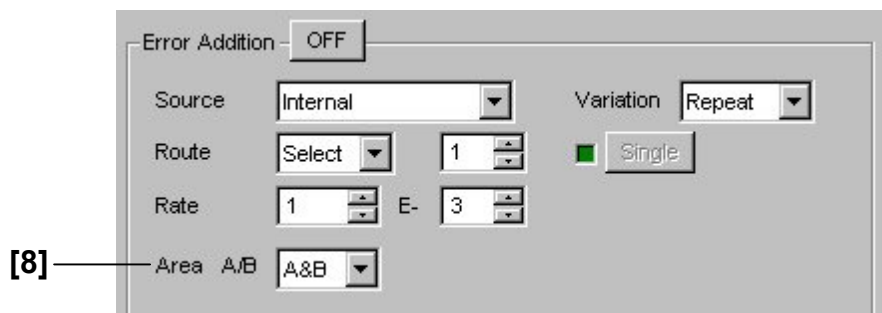


Figure 8.3.3-2 Error Addition setting field (For Alternate pattern)

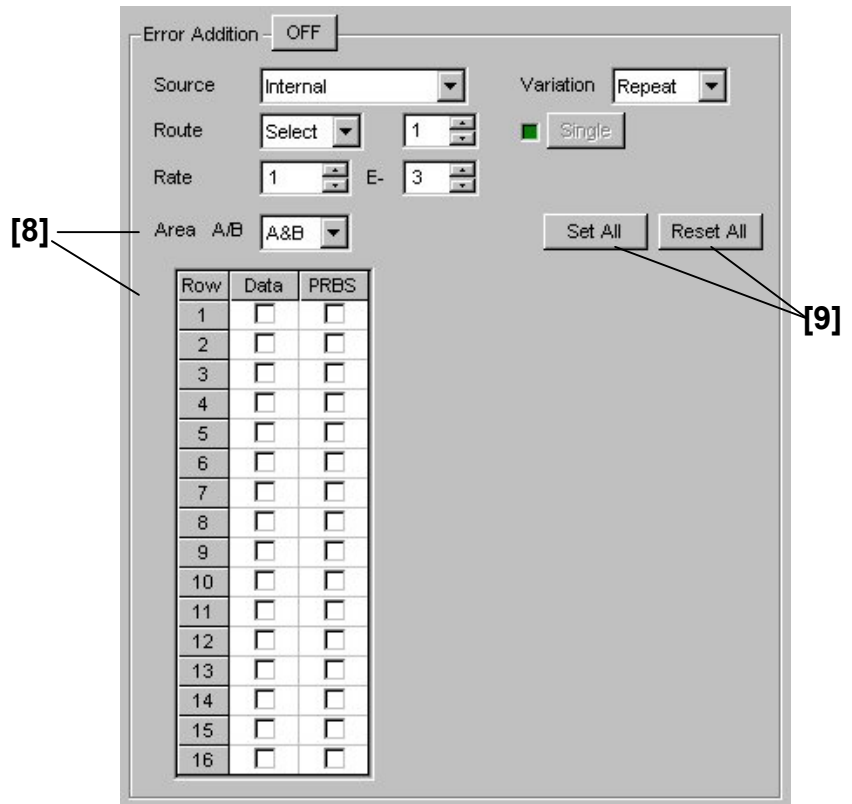


Figure 8.3.3-3 Error Addition setting field (For Mixed pattern)



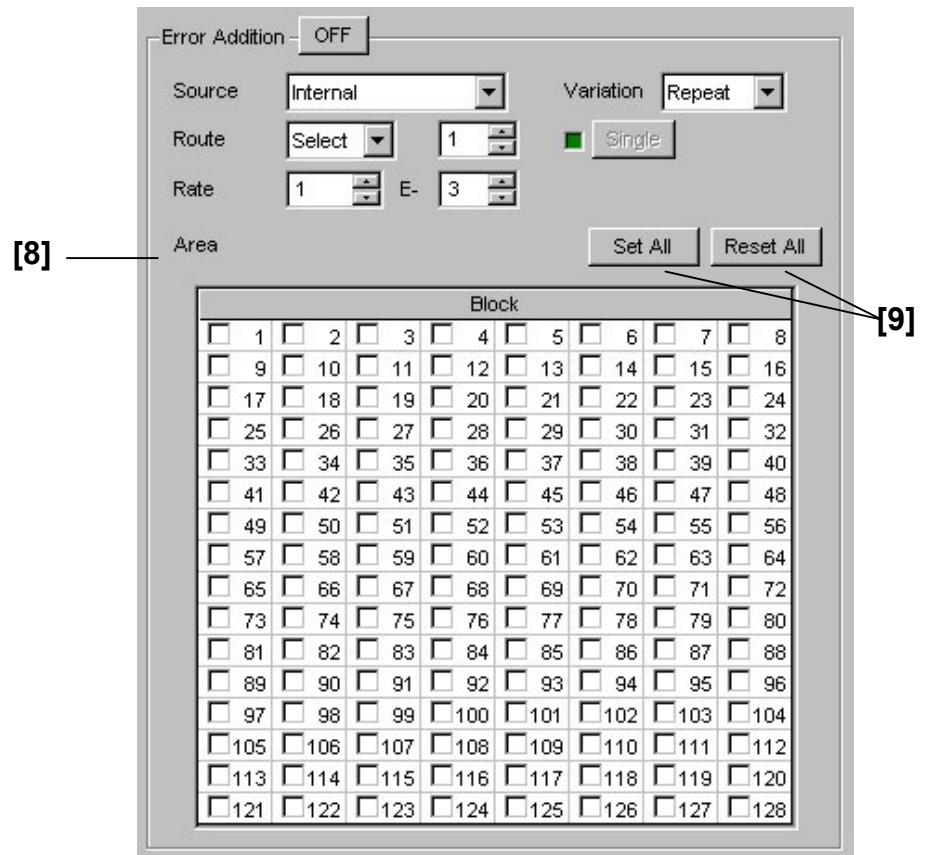


Figure 8.3.3-4 Error Addition setting field (For Sequence pattern)

**Table 8.3.3-1 Error Addition tab setting commands**

No.	Setting Items	Commands
[1]	Error Addition ON, OFF	EAD
		EAD?
[2]	Source	EEL
		EEL?
[3]	Route	ESL
		ESL?
[4]	Error Addition Route setting	ECH
		ECH?
[5]	Rate	ERT
		ERT?
[6]	Variation	EAV
		EAV?
[7]	Single	ESI
[8]	Area A/B (Error addition area setting)	EAR
		EAR?
[9]	Set All/Reset All	EAA

**EAD <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA>
	0 Bit error addition OFF
	1 Bit error addition ON
	7 Single error addition
Function	Sets whether to add a bit error to the test pattern.
Example	To set bit error addition ON: > EAD 1
Compatibility	Partially compatible with the MP1632C, MP1761C and MP1775A (Only 0: OFF, 7: Single).

**EAD?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the bit error addition ON/OFF state to the test pattern.
Example	> EAD? < EAD 1
Compatibility	Partially compatible with the MP1632C, MP1761C and MP1775A.

**EEl <source>**


---

Parameter	<source>=<DECIMAL NUMERIC PROGRAM DATA>
	0 Internal: Internal signal
	1 External Trigger: Rising of external signal trigger
	2 External Disable: Disables external signal
Function	Sets the reference signal source for bit error addition to the test pattern.
Example	To set the reference signal source for bit error addition to Internal: > EEl 0
Compatibility	Compatible with the MP1761C.

**EEl?**


---

Response	<source>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the reference signal source for bit error addition to the test pattern.
Example	> EEl? < EEl 0
Compatibility	Compatible with the MP1761C.

### ESL <select>

---

Parameter	<select>=<DECIMAL NUMERIC PROGRAM DATA> 0	Scan: Changes the route for which 32 Demux of 1/1 signal is performed every time when an error is added.
	1	Select: Adds an error to the specified route.
Function	Sets the route addition method for bit error addition.	
Example	To set the route addition method to Scan: > ESL 0	
Compatibility	Incompatible with existing models.	

### ESL?

---

Response	<select>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the route addition method for bit error addition.
Example	> ESL? < ESL 0
Compatibility	Incompatible with existing models.

### ECH <numeric>

---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 32	1 to 32, in single steps
Function	Sets the route to add a bit error.	
Example	To set Route 2 as the route to add a bit error: > ECH 2	
Compatibility	Compatible with the MP1632C (Routes 1 to 8 only). Compatible with the MP1761C and MP1775A.	

### ECH?

---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX2)	
Function	Queries the route to add a bit error.	
Example	> ECH? < ECH 1 < ECH 32	
Compatibility	Compatible with the MP1632C (Routes 1 to 8 only). Compatible with the MP1761C and MP1775A.	

**ERT <numeric>,<rate>**


---

Parameter	Set a value in the format of "xE-n". x: <numeric>, n: <rate> <numeric>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 9                                   1 to 9, in single step <rate>=<DECIMAL NUMERIC PROGRAM DATA> 2 to 12                                   2 to 12, in single step <b>Note:</b> 3 to 12 in the case of Combination.
Function	Sets the rate of bit errors to be added.
Example	To set the rate of bit errors to be added to 5E-9: > ERT 5,9
Compatibility	Incompatible with existing models.

**ERT?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1) <rate>=<NR1 NUMERIC RESPONSE DATA> (FIX2)
Function	Queries the rate of bit errors to be added.
Example	> ERT? < ERT 5, 9 < ERT 9,12
Compatibility	Incompatible with existing models.

**EAV <var>**


---

Parameter	<var>=<DECIMAL NUMERIC PROGRAM DATA> 0   Inserts Repeat errors continuously. 1   Inserts Single error by button operation (one-shot).
Function	Sets the bit error addition method for the test pattern (when Internal is selected).
Example	To set the bit error addition method to Repeat: > EAV 0
Compatibility	Incompatible with existing models.

**EAV?**


---

Response	<var>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the bit error addition method (when Internal is selected) to the test pattern.
Example	< EAV ? > EAV 0
Compatibility	Incompatible with existing models.

## ESI

Function	Adds a single error to the test pattern.
Example	> ESI
Compatibility	Incompatible with existing models.

## EAR <content>,<numeric>,<data>,<prbs>

Parameter	<content>=<DECIMAL NUMERIC PROGRAM DATA>
	0 Pattern A
	1 Pattern B
	2 Patterns A and B
	3 None (Always set for Mixed Data and Sequence patterns)
	<numeric>=<DECIMAL NUMERIC PROGRAM DATA>
	1 to 16 1 to 16 Rows, in 1-row steps (For Mixed Data and Mixed Alternate patterns)
	1 to 128 1 to 128 blocks, in 1-block steps (For Sequence pattern)
	0 None (For Alternate pattern)
	<data>=<DECIMAL NUMERIC PROGRAM DATA>
	0 Bit error addition OFF (Always set for Alternate pattern)
	1 Bit error addition ON
	<prbs>=<DECIMAL NUMERIC PROGRAM DATA>
	0 Bit error addition OFF (Always set for Alternate pattern)
	1 Bit error addition ON
Function	Sets an area to add a bit error for Alternate, Mixed Data, Mixed Alternate and Sequence patterns.
Example	To set an area to add a bit error to "Pattern A, 1 Row, Data ON, PRBS ON" for Mixed Alternate pattern: > EAR 0,1,1,1
Compatibility	Incompatible with existing models.

## EAR? <content>,<numeric>

Parameter	<content>=<DECIMAL NUMERIC PROGRAM DATA>
	<numeric>=<DECIMAL NUMERIC PROGRAM DATA>
Response	<data>,<prbs>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
	<b>Note:</b>
	<prbs> is returned only for Mixed Data and Mixed Alternate patterns.
Function	Queries an area to add a bit error.
Example	To query the error addition ON/OFF state of Pattern A, 1 Row for Mixed Alternate pattern: > EAR? 0,1 < EAR 1,1 To query the error addition ON/OFF state of Pattern A, for Alternate pattern: > EAR? 1,0 < EAR 1
Compatibility	Incompatible with existing models.

**EAA <numeric>**

---

Parameter	<numeric> = <NUMERIC PROGRAM DATA>
	0 All Reset
	1 All Set
Function	Selects (set) or unselects (reset) all areas to add a bit error for Mixed and Sequence patterns.
Example	To select all areas to add a bit error: > EAA 1
Compatibility	Incompatible with existing models.

### 8.3.4 Commands related to Misc tab window

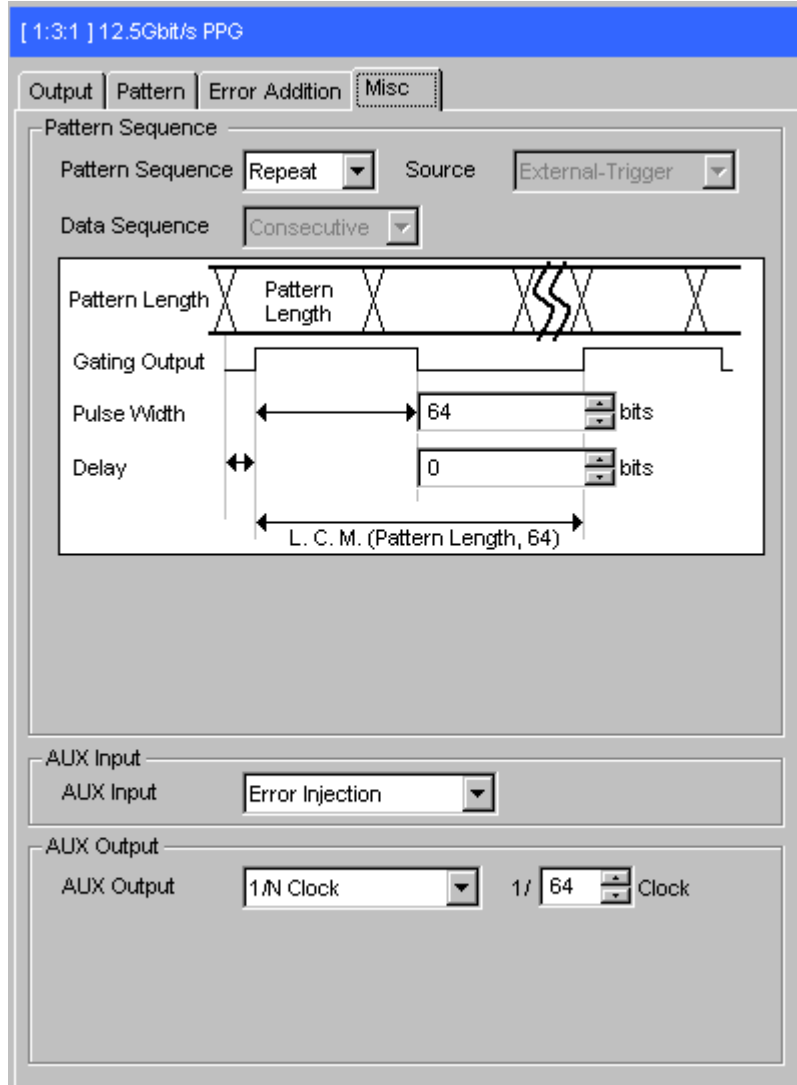


Figure 8.3.4-1 Misc tab window



8.3.4.1 Pattern Generation setting commands

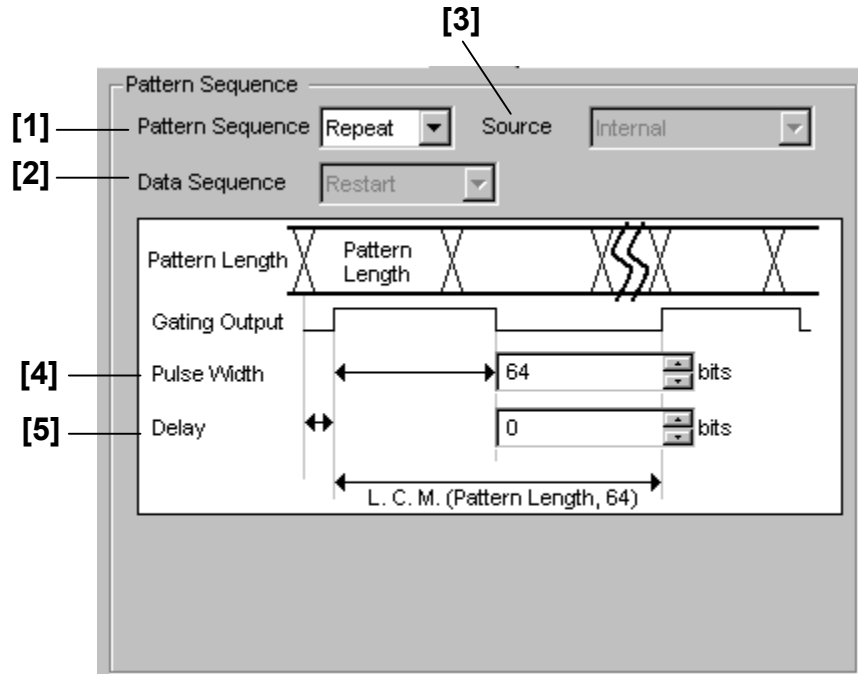


Figure 8.3.4.1-1 Pattern Generation setting field (for Repeat signal generation)

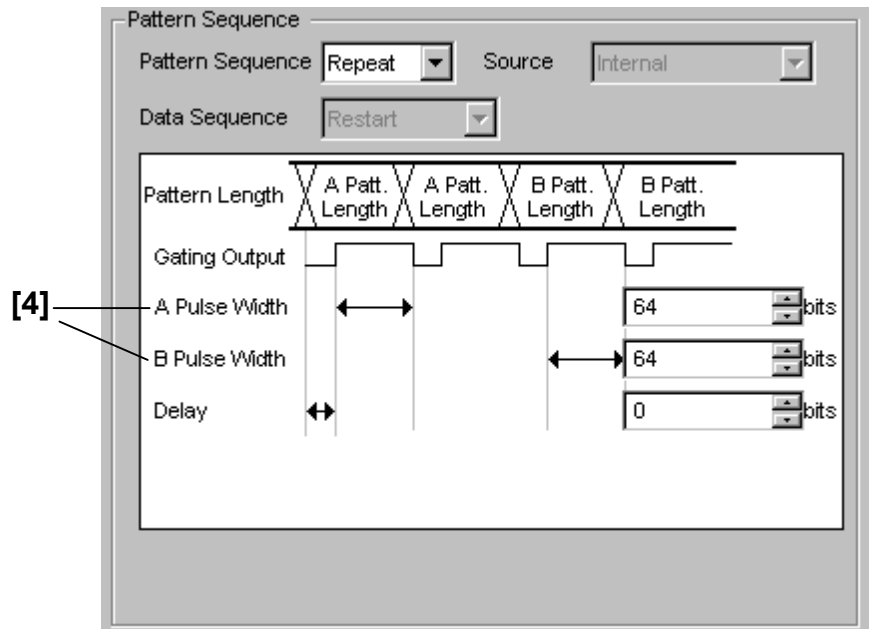


Figure 8.3.4.1-2 Pattern Generation setting field (for Repeat signal generation, Alternate pattern)

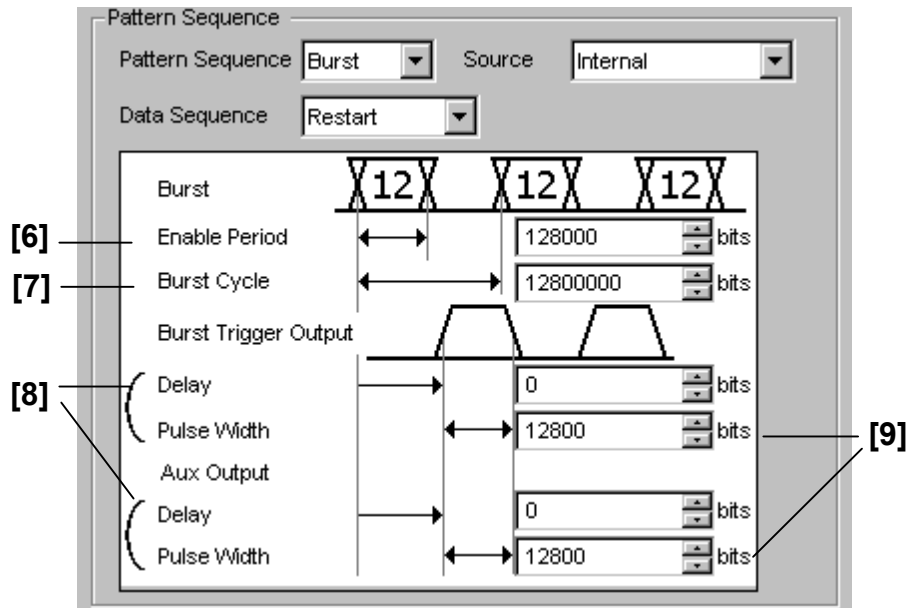


Figure 8.3.4.1-3 Pattern Generation setting field (for Burst signal generation)

Table 8.3.4.1-1 Pattern Generation setting commands

No.	Setting Items	Commands
[1]	Pattern Sequence	PTO
		PTO?
[2]	Data Sequence	BSQ
		BSQ?
[3]	Source	BRM
		BRM?
[4]	Pulse Width	RPW
		RPW?
[5]	Delay (For Repeat signal generation)	RTD
		RTD?
[6]	Enable Period	BRE
		BRE?
[7]	Burst Cycle	BRC
		BRC?
[8]	Delay (For Burst signal generation)	TGD
		TGD?
[9]	Enable Pulse Width	PWD
		PWD?

### **PTO <mode>**

Parameter	<mode>=<DECIMAL NUMERIC PROGRAM DATA> 0 Repeat signal 1 Burst signal
Function	Sets the signal generation method from Repeat (consecutive) signal or Burst signal.
Example	To set the signal generation method to Burst signal: > PTO 1
Compatibility	Compatible with the MP1632C.

### **PTO?**

Response	<mode>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the signal generation method.
Example	> PTO? < PTO 1
Compatibility	Compatible with the MP1632C.

### **BSQ <mode>**

Parameter	<mode>=<DECIMAL NUMERIC PROGRAM DATA> REStart Restart from the beginning CONSEcutive Consecutive output in the Burst interval CONTInuous Consecutive output regardless of Burst interval
Function	Sets the data output sequence for the Burst signal.
Example	To set the output sequence to Restart: > BSQ 0
Compatibility	Incompatible with existing models.

### **BSQ?**

Response	<mode>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the data output sequence for the Burst signal.
Example	> BSQ? < BSQ 0
Compatibility	Incompatible with existing models.

**BRM <mode>**


---

Parameter	<mode>=<DECIMAL NUMERIC PROGRAM DATA>
	0 Internal: Generates based on internal reference signal.
	1 Ext. Enable: Generates during the high level interval of external signal trigger input
	2 Ext Trigger: Generates based on external signal trigger edge.
Function	Sets the Burst signal generation sequence from internal trigger (0), external trigger (2), or external enable (1).
Example	To set the Burst signal generation sequence to Internal: > BRM 0
Compatibility	Compatible with the MP1632C.

**BRM?**


---

Response	<mode>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the Burst signal generation sequence.
Example	> BRM? < BRM 0
Compatibility	Compatible with the MP1632C.

### **RPW <numeric>[,<content>]**

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 0 to 68719476672            0 to 68,719,476,672 bits, in 16-bit steps The setting range is from 0 to 64 if the pattern length is 64 or less. <b>Note:</b> At 2 ch Combination, the setting range and Step are doubled. At 4 ch Combination, the setting range and Step are quadrupled. [<content>]=<DECIMAL NUMERIC PROGRAM DATA> 0                                    Pattern A 1                                    Pattern B <b>Note:</b> For patterns other than the Alternate pattern, <content> cannot be set and should be omitted.
Function	Sets the pulse width of the timing signal to be output during the timing signal period.
Example	To set the pulse width of the timing signal to 128 bits: > RPW 128
Compatibility	Incompatible with existing models.

### **RPW? [<content>]**

Parameter	[<content>]=<DECIMAL NUMERIC PROGRAM DATA> (FIX12) 0                                    Pattern A 1                                    Pattern B <b>Note:</b> For patterns other than the Alternate pattern, <content> cannot be set and should be omitted.
Response	<numeric>=<NR1 NUMERIC RESPONSE DATA>
Function	Queries the pulse width of the timing signal to be output during the timing signal period.
Example	> RPW? < RPW                    64 < RPW 2281701312
Compatibility	Incompatible with existing models.

**RTD <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 0 to 68719476672            0 to 68,719,476,672 bits, in 16-bit steps The settable value is 0 if the pattern length is 79 bits or less.
	<b>Note:</b> At 2 ch Combination, the setting range and Step are doubled. At 4 ch Combination, the setting range and Step are quadrupled.
Function	Sets the delay value for the timing signal pulse to be output during the timing signal period.
Example	To set the timing signal pulse delay to 256 bits: > RTD 256
Compatibility	Incompatible with existing models.

**RTD?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX12)
Function	Queries the delay value for the timing signal pulse to be output during the timing signal period.
Example	> RTD? < RTD            16 < RTD 2281701312
Compatibility	Incompatible with existing models.

**BRE <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 640 to 2147483648            640 to 2,147,483, 648 bits, in 128-bits steps
	<b>Note:</b> In the case of Internal, a Disable period of at least 512 bits is required between Burst Cycle and Enable Period. The setting range and Step at Combination are doubled at 2 ch Combination and quadrupled at 4 ch Combination.
Function	Sets the data signal generation interval for Burst signal generation.
Example	To set the data signal generation interval to 12,800 bits: > BRE 12800
Compatibility	Incompatible with the MP1632C parameters.

**BRE?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX11)
Function	Queries the data signal generation interval for Burst signal generation.
Example	> BRE? < BRE            12800 < BRE 8589934080
Compatibility	Incompatible with the MP1632C parameters.

### **BRC <numeric>**

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 1280 to 2147483648      1,280 to 2,147,483,648 bits, in 128-bit steps
	<b>Note:</b> At 2 ch Combination, the setting range and Step are doubled. At 4 ch Combination, the setting range and Step are quadrupled.
Function	Sets an addition value of the data signal generation interval and the data stop interval for Burst signal generation (Burst generation cycle).
Example	To set the Burst generation cycle to 25,600 bits: > BRC 25600
Compatibility	Incompatible with the MP1632C parameters.

### **BRC?**

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX11)
Function	Queries the addition value of the data signal generation interval and the data stop interval for Burst signal generation (Burst generation cycle).
Example	> BRC? < BRC            1280 < BRC 8589934592
Compatibility	Incompatible with the MP1632C parameters.

### **TGD <port>,<numeric>**

Parameter	<port>=<CHARACTER PROGRAM DATA> 0                            Burst Output 1                            Burst Output2 Valid only when AUX Output is set to Burst Output2. <numeric>=<DECIMAL NUMERIC PROGRAM DATA> 0 to 2147483648            0 to 2,147,483, 648 bits, in 16-bit steps
	<b>Note:</b> The maximum setting is the pattern length. At 2 ch Combination, the setting range is doubled. At 4 ch Combination, the setting range is quadrupled.
Function	Sets the Burst output trigger signal generation timing (delay) to adjust the phase on the DUT side.
Example	To set the Burst output trigger generation timing (delay) to 128 bits: > TGD 0,128
Compatibility	Incompatible with existing models.

### **TGD? <port>**

Parameter	<port>=<CHARACTER PROGRAM DATA> 0                            Burst Output 1                            Burst Output2 Valid only when AUX Output is set to Burst Output2.
Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX11)
Function	Queries the Burst output trigger signal generation timing (delay).
Example	To query the Burst output trigger signal generation timing: > TGD? 0 < TGD                    1 < TGD 8589934336
Compatibility	Incompatible with existing models.



**PWD <port>,<numeric>**


---

Parameter	<port>=<CHARACTER PROGRAM DATA> 0 Burst Output 1 Burst Output2 Valid only when AUX Output is set to Burst Output2. <numeric>=<DECIMAL NUMERIC PROGRAM DATA> 0 to 2147483648 0 to 2,147,483,648 bits, in 16-bit steps
	<b>Note:</b> The maximum setting is the pattern length. At 2 ch Combination, the setting range and Step are doubled. At 4 ch Combination, the setting range and Step are quadrupled. The maximum setting value is "Burst cycle – 64 bits".
Function	Sets the Burst output trigger signal generation interval width to adjust the phase on the DUT side.
Example	To set the Burst output trigger signal generation interval width to 1,024 bits: > PWD 0,1024
Compatibility	Incompatible with existing models.

**PWD? <port>**


---

Parameter	<port>=<CHARACTER PROGRAM DATA> 0 Burst Output 1 Burst Output2 Valid only when AUX Output is set to Burst Output2.
Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX11) 0 to 21474835848 0 to 2,147,483,584 bit
Function	Queries the Burst output trigger signal generation interval width.
Example	To query the Burst output trigger signal generation interval width: > PWD? 0 < PWD 1 < PWD 8589934336
Compatibility	Incompatible with existing models.

8.3.4.2 AUX Input setting commands



Figure 8.3.4.2-1 AUX Input setting field

Table 8.3.4.2-1 AUX Input setting commands

No.	Setting Item	Commands
[1]	AUX Input	FNC
		FNC?

**FNC <function>**

Parameter	<function>=<DECIMAL NUMERIC PROGRAM DATA>
	0 Burst Source
	1 Error Injection
	2 Sequence Control
	3 Alternate Control
	Set Error Injection in the case of Repeat.
Function	Sets the function of AUX Input.
Example	To set the function of AUX Input to Error Injection: > FNC 1
Compatibility	Incompatible with existing models.

**FNC?**

Response	<function>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the function of AUX Input.
Example	> FNC? < FNC 1
Compatibility	Incompatible with existing models.

8.3.4.3 AUX Output setting commands

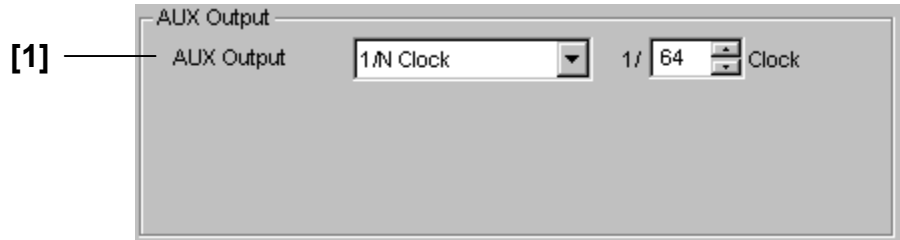


Figure 8.3.4.3-1 AUX Output setting field

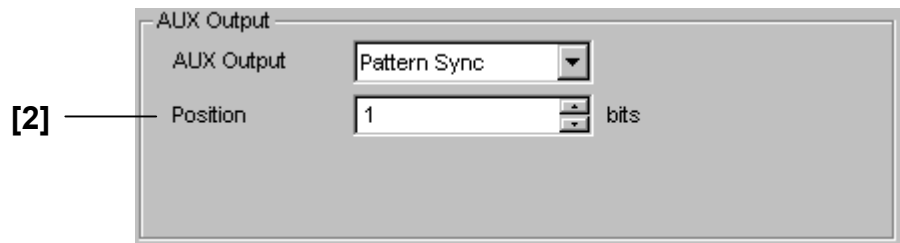


Figure 8.3.4.3-2 AUX Output setting field

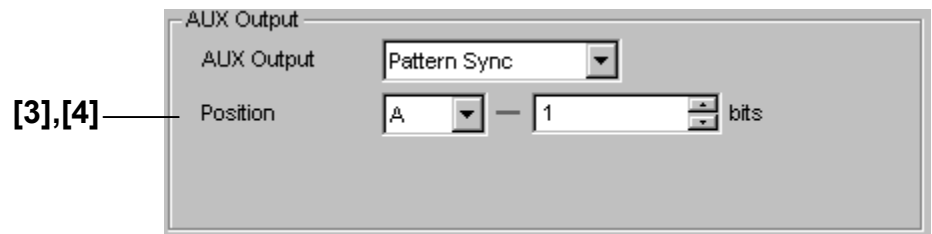


Figure 8.3.4.3-3 AUX Output setting field (For Alternate pattern)

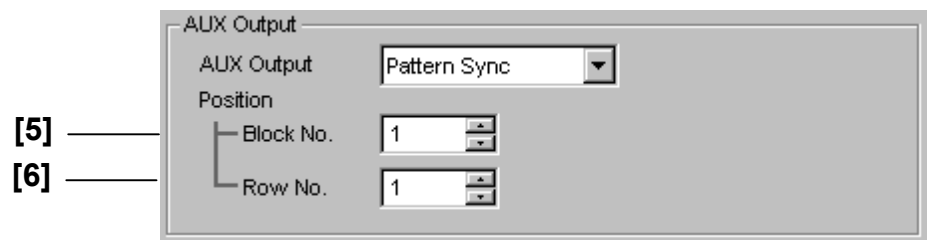


Figure 8.3.4.3-4 AUX Output setting field (For Mixed Data pattern)

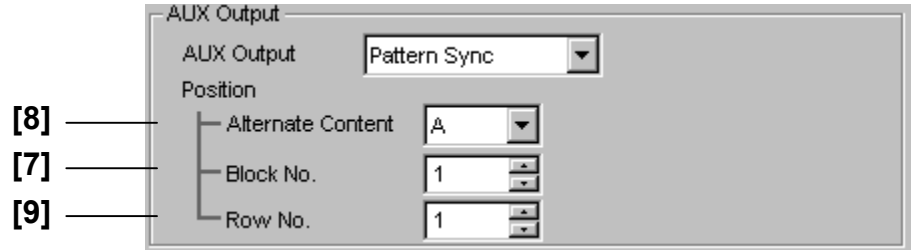


Figure 8.3.4.3-5 AUX Output setting field (For Mixed Alternate pattern)

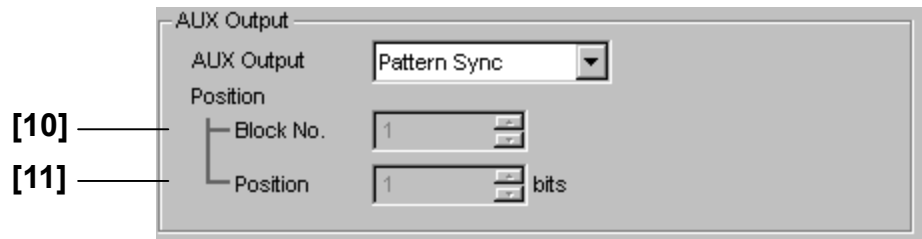


Figure 8.3.4.3-6 AUX Output setting field (For Sequence pattern)

Table 8.3.4.3-1 AUX Output setting commands

No.	Setting Items	Commands
[1]	AUX Output	SOP
		SOP?
[2]	Position	PSP
		PSP?
[3]	A/B switching (Alternate)	SCN
		SCN?
[4]	Position	APO
		APO?
[5]	Block No. (Mixed Data)	SBL
		SBL?
[6]	Row No. (Mixed Data)	SRW
		SRW?
[7]	Block No. (Mixed Alternate)	SML
		SML?
[8]	Alternate Content (Mixed Alternate)	SXO
		SXO?
[9]	Row No. (Mixed Alternate)	SXW
		SXW?
[10]	Block No. (Sequence)	SQB
		SQB?
[11]	Position (Sequence)	SQP
		SQP?

**SOP <source>[,<numeric>]**

Parameter	<source>=<DECIMAL NUMERIC PROGRAM DATA> 0                           1/64 clock 1                           Pattern Sync (Variable) 2                           Pattern Sync (Variable) 4                           1/8 clock 6                           1/16 clock 8                           1/32 clock 10                          Burst Output2 11                          1/n clock [<numeric>]=<DECIMAL NUMERIC PROGRAM DATA> When 11 (1/n clock) is not selected, <numeric> cannot be set and should be omitted. 2,4,8 to 511                   2,4,8 to 511, in single steps Valid only for MU181020A-001, and the setting upper limit varies as follows: In 1/2 mode: 1, 2, 4, 8, 9 to 255, in single steps In 1/4 mode: 1, 2, 4, 8, 9 to 127, in single steps In 1/8 mode: 1, 2, 4, 8, 9 to 63, in single steps
Function	Sets the output signal for synchronization output.
Example	To set the output signal for synchronization output to 1/32 clock: > SOP 8 To set the output signal for synchronization output to 1/511 clock: > SOP 11,511
Compatibility	Partially compatible with the MP1632C and MP1775A (1: Pattern Sync only). Compatible with the MP1761C.

**SOP?**

Response	<source>=<NR1 NUMERIC RESPONSE DATA> (FIX2) [<numeric>]=<DECIMAL NUMERIC PROGRAM DATA> (FIX3) Omit <numeric> for other than 1/n clock.
Function	Queries the output signal for synchronization output.
Example	> SOP? < SOP 11,511 < SOP 11, 8 < SOP 2
Compatibility	Partially compatible with the MP1632C and MP1775A. Compatible with the MP1761C.

**PSP <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 68719476657            1 to 68,719,476,657 bits, in 16-bit steps In the case of Combination 1 to 274877906625            1 to 274,877,906,625 bits, in 64-bit steps
Function	Sets the output position for synchronization output for Data, PRBS, and Zero-Substitution patterns.
Example	To set the synchronization output position to 17 bits: > PSP 17
Compatibility	Compatible with the MP1632C. (Note that the resolution (step) is incompatible.) Compatible with the MP1761C. (Note that the resolution (step) should be 1-bit steps)

**PSP?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX12)
Function	Queries the output position for synchronization output for Data, PRBS, and Zero-Substitution patterns.
Example	> PSP? < PSP                            1 < PSP    2147483569
Compatibility	Compatible with the MP1632C and MP1761C.

**SCN <content>**


---

Parameter	<content>=<DECIMAL NUMERIC PROGRAM DATA> 0                                Outputs synchronization signal at the top of Pattern A. 1                                Outputs synchronization signal at the top of Pattern B.
Function	Sets the output position for synchronization output for Alternate pattern.
Example	To set the output position for synchronization output at the top of Pattern A: > SCN 0
Compatibility	Incompatible with existing models.

**SCN?**


---

Response	<content>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the output position for synchronization output for Alternate pattern.
Example	> SCN? < SCN 0
Compatibility	Incompatible with existing models.

### **APO <numeric>**

---

Parameter <numeric>=<DECIMAL NUMERIC PROGRAM DATA>  
1 to 67108785 1 to 67,108,785 bits, in 16-bit steps

Function Sets the output position for synchronization output for Alternate pattern.

Example To set the synchronization output position to 33 bits:  
> APO 33

Compatibility Incompatible with existing models.

### **APO?**

---

Response <numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX8)

Function Queries the output position for synchronization output for Alternate pattern.

Example > APO?  
< APO 1  
< APO 67108785

Compatibility Incompatible with existing models.

### **SBL <numeric>**

---

Parameter <numeric>=<DECIMAL NUMERIC PROGRAM DATA>  
1 to 511 1 to 511 blocks, in 1-block steps

Function The maximum setting value is the set number of blocks.  
Sets the output block position for synchronization output for Mixed Data pattern.

Example To set the synchronization output block to block 10:  
> SBL 10

Compatibility Incompatible with existing models.

### **SBL?**

---

Response <numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX3)

Function Queries the output block position for synchronization output for Mixed Data pattern.

Example > SBL?  
< SBL 1  
< SBL 511

Compatibility Incompatible with existing models.



**SRW <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 16                                    1 to 16 Rows, in 1-row steps The maximum setting value is the set number of Rows.
Function	Sets the output Row position for synchronization output for Mixed Data pattern.
Example	To set the synchronization output Row to 1 Row. > SRW 1
Compatibility	Incompatible with existing models.

**SRW?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX2)
Function	Queries the output Row position for synchronization output for Mixed Data pattern.
Example	> SRW? < SRW 1 < SRW 16
Compatibility	Incompatible with existing models.

**SML <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 511                                    1 to 511 blocks, in 1-block steps The maximum setting value is the set number of blocks.
Function	Sets the output block position for synchronization output for Mixed Alternate pattern.
Example	To set the synchronization output block to block 10: > SML 10
Compatibility	Incompatible with existing models.

**SML?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX3)
Function	Queries the output block position for synchronization output for Mixed Alternate pattern.
Example	> SML? < SML 1 < SML 511
Compatibility	Incompatible with existing models.

### **SXO <content>**

---

Parameter	<content>=<DECIMAL NUMERIC PROGRAM DATA> 0 Outputs synchronization signal at the top of Pattern A. 1 Outputs synchronization signal at the top of Pattern B.
Function	Sets the output position for synchronization output for Mixed Alternate pattern.
Example	To set the synchronization output position to the top of Pattern A: > SXO 0
Compatibility	Incompatible with existing models.

### **SXO?**

---

Response	<content>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the output position for synchronization output for Mixed Alternate pattern.
Example	> SXO? < SXO 0
Compatibility	Incompatible with existing models.

### **SXW <numeric>**

---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 16 1 to 16 Rows, in 1-row steps The maximum setting value is the set number of Rows.
Function	Sets the output Row position for synchronization output for Mixed Alternate pattern.
Example	To set the synchronization output row to 2 Row: > SXW 2
Compatibility	Incompatible with existing models.

### **SXW?**

---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX2)
Function	Queries the output Row position for synchronization output for Mixed Alternate pattern.
Example	> SXW? < SXW 2 < SXW 16
Compatibility	Incompatible with existing models.

**SQB <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128                                    1 to 128 blocks, in 1-block steps The maximum setting value is the set number of blocks.
Function	Sets the output block position for synchronization output for Sequence pattern.
Example	To set the synchronization output block to block 128: > SQB 128
Compatibility	Incompatible with existing models.

**SQB?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX3)
Function	Queries the output block position for synchronization output for Sequence pattern.
Example	> SQB? < SQB    1 < SQB 128
Compatibility	Incompatible with existing models.

**SQP <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 1048497                                1 to 1,048,497 bits, in 16-bit steps
Function	Sets the output position for synchronization output for Sequence pattern.
Example	To set the synchronization output position to 1,048,497: > SQP 1048497
Compatibility	Incompatible with existing models.

**SQP?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX7)
Function	Queries the output position for synchronization output for Sequence pattern.
Example	> SQP? < SQP            1 < SQP 1048497
Compatibility	Incompatible with existing models.

## 8.4 ED Commands

This section describes the commands for the MU181040A 12.5 Gbit/s ED and the MU181040B 14 Gbit/s ED. The corresponding commands for each tab window are described below. Before executing a setting/query command for the MU181040A, specify the slot number of the module to be remotely controlled, by using the :MODULE:ID command. Refer to Section 7.1 "Common Commands" and 9.1 "Basic Operation of Device Messages" for how to specify a slot number with the :MODULE:ID command.

However, unless there is a special item, see the MU181040A.

### 8.4.1 Commands related to Result tab window

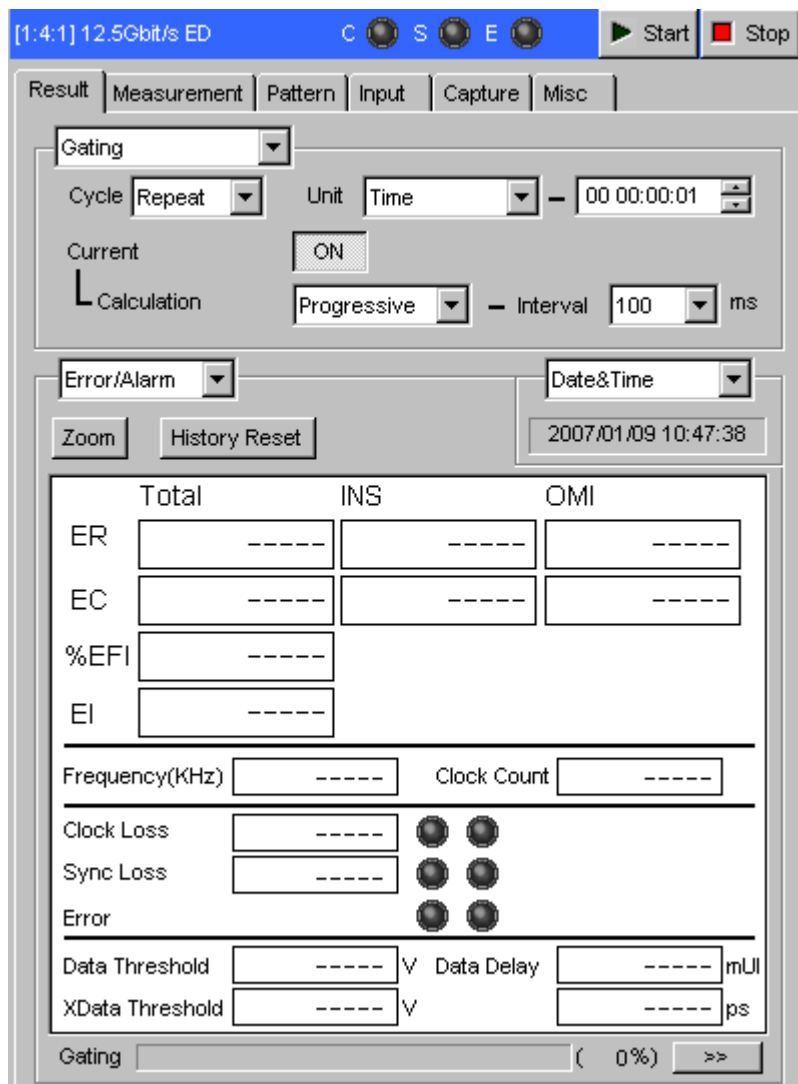


Figure 8.4.1-1 Result tab window

8.4.1.1 Result setting commands

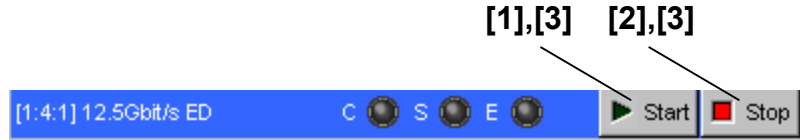


Figure 8.4.1.1-1 Start/Stop setting



Figure 8.4.1.1-2 Result setting field

Table 8.4.1.1-1 Result setting commands

No.	Setting Items	Commands
[1]	Start	STA
[2]	Stop	STO
[3]	Query for measurement status	MSR?
[4]	Switching of measurement result display	SET
		SET?
[5]	Switching of time display	TIM
		TIM?
[6]	Query for measurement start time	MSA?
[7]	Query for measurement end time	MSO?
[8]	Query for measurement elapsed time	MLP?
[9]	Query for measurement remaining time	ETI?
[10]	Query for intermediate data creation time	INT?
[11]	Query for alarm occurrence time	AMD?

### STA

Function	Starts BER measurement for the specified module. If this command is issued during measurement, the BER measurement is restarted.
Example	> STA
Compatibility	Compatible with the MP1632C and MP1762D.

### STO

Function	Stops the BER measurement of the specified module.
Example	> STO
Compatibility	Compatible with the MP1632C and MP1762D.

### MSR?

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1) 0 Measurement stops 1 During measurement
Function	Queries the measurement processing state during bit error alarm measurement.
Example	> MSR? < MSR 0
Compatibility	Partially compatible with the MP1632C (0: measurement stops).

### SET <setting>

Parameter	<setting>=<DECIMAL NUMERIC PROGRAM DATA> 0 Bit error alarm measurement result 1 Logging measurement result 2 Histogram measurement result
Function	Sets the display item on the BER measurement result screen.
Example	To set the display item on the BER measurement result screen to the bit error alarm measurement results: > SET 0
Compatibility	Incompatible with existing models.

### SET?

Response	<setting>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the display item on the BER measurement result screen.
Example	> SET? < SET 0
Compatibility	Incompatible with existing models.

**TIM <time>**


---

Parameter	<time>=<DECIMAL NUMERIC PROGRAM DATA>
	0 Displays the current date and time (Date&Time).
	1 Displays the current date and time (Date&Time).
	3 Displays the remaining time based on the measurement period (Remain Time).
	4 Displays the elapsed time based on the measurement period (Elapsed Time).
	5 Displays the measurement start time (Start Time).
Function	Sets the measurement time display type.
Example	To set the measurement time display type to current time: > TIM 0
Compatibility	Compatible with the MP1632C. Partially compatible with the MP1762D. (0: Date&Time, 1: Date&Time, 3: Remain Time, 4: Elapsed Time)

**TIM?**


---

Response	<time>=<NR1 NUMERIC RESPONSE DATA> (FIX1) 0, 3, 4, 5
Function	Queries the measurement time display type.
Example	> TIM? < TIM 0
Compatibility	Compatible with the MP1632C. Partially compatible with the MP1762D.

**MSA?**


---

Response	<year>,<month>,<day>,<hour>,<min>,<second> =<NR1 NUMERIC RESPONSE DATA>
	<year> 0000, 2000 to 2036 2000 to 2036 (FIX4)
	<month> 00, 01 to 12 January to December (FIX2)
	<day> 00, 01 to 31 1st to 31st (FIX2)
	<hour> 00 to 23 0 to 23 hours (FIX2)
	<min> 00 to 59 0 to 59 minutes (FIX2)
	<second> 00 to 59 0 to 59 seconds (FIX2)
Function	Queries the measurement start time during bit error alarm measurement.
Example	"0000,00,00,00,00,00" is returned if there is no measurement start time data. > MSA? < MSA 2036,12,31,23,59,59
Compatibility	Incompatible with existing models.

### MSO?

Response	<year>, <month>, <day>, <hour>, <min>, <second> =<NR1 NUMERIC RESPONSE DATA> <year> 0000, 2000 to 2036 2000 to 2036 (FIX4) <month> 00, 01 to 12 January to December (FIX2) <day> 00, 01 to 31 1st to 31st (FIX2) <hour> 00 to 23 0 to 23 hours (FIX2) <min> 00 to 59 0 to 59 minutes (FIX2) <second> 00 to 59 0 to 59 seconds (FIX2)
Function	Queries the measurement end time during bit error alarm measurement. "0000,00,00,00,00,00" is returned if there is no measurement end time data.
Example	> MSO? < MSO 2036,12,31,23,59,59
Compatibility	Compatible with the MP1632C.

### MLP?

Response	<day>, <hour>, <min>, <second>=<NR1 NUMERIC RESPONSE DATA> <day> 00 to 31 0 to 31st (FIX2) <hour> 00 to 23 0 to 23 hours (FIX2) <min> 00 to 59 0 to 59 minutes (FIX2) <second> 00 to 59 0 to 59 seconds (FIX2)
Function	Queries the measurement elapsed time during bit error alarm measurement. "00,00,00,00" is returned if there is no measurement elapsed time data.
Example	> MLP? < MLP 00,00,00,00 < MLP
Compatibility	Incompatible with existing models.

### ETI?

Response	<day>, <hour>, <min>, <second>=<NR1 NUMERIC RESPONSE DATA> <day> 00 to 31 0 to 31st (FIX2) <hour> 00 to 23 0 to 23 hours (FIX2) <min> 00 to 59 0 to 59 minutes (FIX2) <second> 00 to 59 0 to 59 seconds (FIX2) "0,0,0,0" is returned when the measurement is finished. When measurement is not performed, the measurement period set at that time is returned.
Function	Queries the measurement remaining time during bit error alarm measurement.
Example	> ETI? < ETI 00,00,00,00
Compatibility	Incompatible with existing models.



**INT?**


---

Response	<code>&lt;year&gt;,&lt;month&gt;,&lt;day&gt;,&lt;hour&gt;,&lt;min&gt;,&lt;second&gt;</code> <code>=&lt;NR1 NUMERIC RESPONSE DATA&gt;</code> <code>&lt;year&gt;</code> 0000, 2000 to 2036 2000 to 2036 (FIX4) <code>&lt;month&gt;</code> 00, 01 to 12 January to December (FIX2) <code>&lt;day&gt;</code> 00, 01 to 31 1st to 31st (FIX2) <code>&lt;hour&gt;</code> 00 to 23 0 to 23 hours (FIX2) <code>&lt;min&gt;</code> 00 to 59 0 to 59 minutes (FIX2) <code>&lt;second&gt;</code> 00 to 59 0 to 59 seconds (FIX2)
Function	Queries the measurement intermediate data creation time during bit error alarm measurement. "0000,00,00,00,00,00" is returned if there is no measurement intermediate data.
Example	<code>&gt; INT?</code> <code>&lt; INT 2036,12,31,23,59,59</code>
Compatibility	Incompatible with existing models.

**AMD? <alarm>**


---

Parameter	<code>&lt;alarm&gt;=&lt; DECIMAL NUMERIC PROGRAM DATA&gt;</code> 0 Outputs all item data 3 Clock Loss occurrence time 4 Clock Loss recovery time 5 Pattern Sync Loss occurrence time 6 Pattern Sync Loss recovery time 7 CR Unlock occurrence time 8 CR Unlock recovery time
Response	<code>&lt;year&gt;,&lt;month&gt;,&lt;day&gt;,&lt;hour&gt;,&lt;min&gt;,&lt;second&gt;</code> <code>=&lt;NR1 NUMERIC RESPONSE DATA&gt;</code> <code>&lt;year&gt;</code> 00 to 36 2000 to 2036z (FIX2) <code>&lt;month&gt;</code> 01 to 12 January to December (FIX2) <code>&lt;day&gt;</code> 01 to 31 1st to 31st(FIX2) <code>&lt;hour&gt;</code> 00 to 23 0 to 23 hours(FIX2) <code>&lt;min&gt;</code> 00 to 59 0 to 59 minutes(FIX2) <code>&lt;second&gt;</code> 00 to 59 0 to 59 seconds(FIX2)
Function	Queries the time when a specified alarm has occurred or recovered during bit error alarm measurement. "99-99-99 99:99:99" is returned if no alarm has been occurred.
Example	To query the time when the clock loss has occurred during bit error alarm measurement: <code>&gt; AMD? 3</code> <code>&lt; AMD 06-01-01 01:01:01</code> To query the time for occurrences and recoveries of all alarm items during bit error alarm measurement: <code>&gt; AMD? 0</code> <code>&lt; AMD 06-01-01 01:01:01,06-01-01 01:02:01,06-01-01 01:01:01,</code> <code>06-01-01 02:01:01,06-01-01 01:01:01,06-01-01 02:01:01</code>
Compatibility	Compatible with the MP1762D.

8.4.1.2 Error/Alarm setting commands

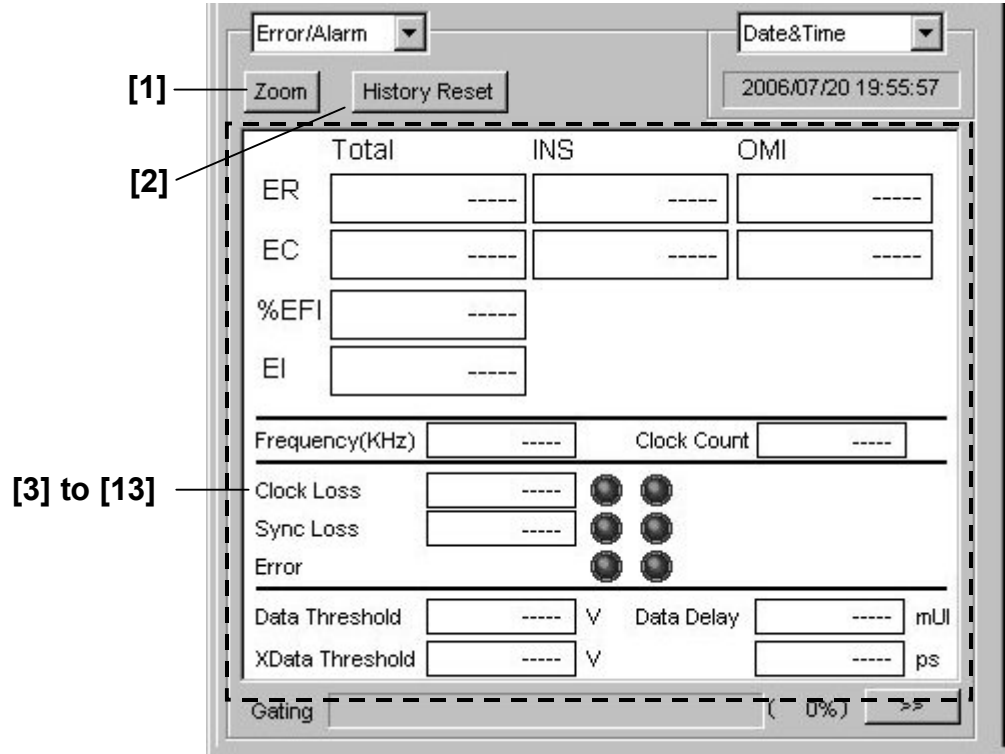


Figure 8.4.1.2-1 Error/Alarm result display screen

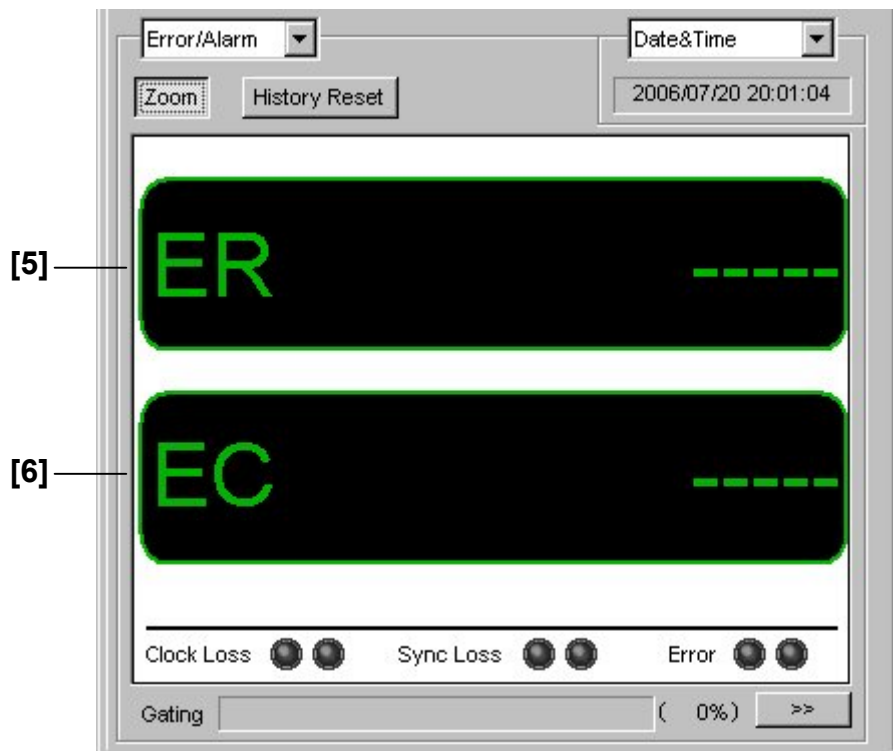


Figure 8.4.1.2-2 Error/Alarm result display screen (when Zoom is selected)

Result Sub Display			
Threshold	EI		%EFI
> 1.0E-3	<input type="text" value="-----"/>		<input type="text" value="-----"/>
> 1.0E-4	<input type="text" value="-----"/>		<input type="text" value="-----"/>
> 1.0E-5	<input type="text" value="-----"/>		<input type="text" value="-----"/>
> 1.0E-6	<input type="text" value="-----"/>		<input type="text" value="-----"/>
> 1.0E-7	<input type="text" value="-----"/>		<input type="text" value="-----"/>
> 1.0E-8	<input type="text" value="-----"/>		<input type="text" value="-----"/>
<= 1.0E-8	<input type="text" value="-----"/>		<input type="text" value="-----"/>
Error Performance			
ES	<input type="text" value="-----"/>	%ES	<input type="text" value="-----"/>
EFS	<input type="text" value="-----"/>	%EFS	<input type="text" value="-----"/>
SES	<input type="text" value="-----"/>	%SES	<input type="text" value="-----"/>
DM	<input type="text" value="-----"/>	%DM	<input type="text" value="-----"/>
US	<input type="text" value="-----"/>	%US	<input type="text" value="-----"/>
EC	<input type="text" value="-----"/>		

[14] to [17] —

Figure 8.4.1.2-3 Error/Alarm result display screen  
(Result Sub Display)

Table 8.4.1.2-1 Error/Alarm setting commands

No.	Setting Items	Commands
[1]	Zoom	ZOM ZOM?
[2]	History Reset	HRE
[3]	No label (Query for measurement data)	END?
[4]	No label (Query for monitoring item)	MTR?
[5]	ER (Total)	ER?
[6]	EC (Total)	EC?
[7]	%EFI	EFI?
[8]	EI	EI?
[9]	Frequency (kHz)	FRQ?
[10]	Clock Count	CC?
[11]	Clock Loss	CLI?
[12]	Sync Loss	SLI?
[13]	Error	ERS?
[14]	Error Performance	PFP?
[15]	Error Performance %	PFC?
[16]	Threshold EI	THE?
[17]	Threshold %EFI	THF?
[18]	No label (Query for alarm interval measurement data)	AIN?
[19]	No label (Query for 1 second data)	OSD?
[20]	No label (Query for intermediate data)	IMD?
[21]	No label (Query for error rate detection status)	BES?

---

**ZOM <numeric>**

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 0 Zoom out 1 Zoom in
Function	Sets display enlargement for the measurement result display screen IN and OUT.
Example	To set enlargement for the measurement result display screen IN: > ZOM 1
Compatibility	Incompatible with existing models.

**ZOM?**

---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the display enlargement for the measurement result display screen IN and OUT states.
Example	> ZOM? < ZOM 1
Compatibility	Incompatible with existing models.

**HRE**

---

Function	Resets the histories on the measurement result display screen.
Example	> HRE
Compatibility	Compatible with the MP1632C.

**END? <result>,<item>**

Parameter	<result>=<DECIMAL NUMERIC PROGRAM DATA>
	0 Time data
	1 Alarm measurement data
	2 Error measurement data
	3 Threshold EI,EFI data
	4 Error performance
	<item>=<DECIMAL NUMERIC PROGRAM DATA>
	0 Outputs all items
	1 to 13 Outputs data of 1 item
Response	For the display result items corresponding to each <result> see Table 8.4.1.2-2. <string>=<STRING RESPONSE DATA>

**Table 8.4.1.2-2 Response Format**

Form	Format	Description
Form1 Integer type	XXXXXXX	For 0 to 9999999
	X.XXXXEXX	For 1.0000E07 to 9.9999E17
	ERR	When no data corresponds to the query
Form2 Fraction type	X.XXXXE-XX	For 0.0000E-18 to 1.0000E00
	ERR	When no data corresponds to the query
Form3 % type	XXX.XXXXX	For 0.0000 to 100.0000
	ERR	When no data corresponds to the query
Form4 Frequency type	XXXXXXXXXX	For 0 to MAX (Hz)
	ERR	When no data corresponds to the query
Form5 Time type	XX-XX-XX XX:XX:XX	For year-month-day hour:minute:second
	X XX:XX:XX	For day hour:minute:second
	ERR	When no data corresponds to the query
Form6 Mixed type	XXXXXXXX,XXX.XXXX	For less than 1E+8
	X.XXXXEXX,XXX.XXXX	For 1E+8 and above
	ERR	When no data corresponds to the query

Function Queries the measurement data corresponding to the parameter.

**Table 8.4.1.2-3 Parameter**

<result>	<item>	Items	Format
0 Time data	1	Measurement start time	Form5
	2	Measurement end time	Form5
	3	Measurement elapsed time	Form5
	4	Measurement remaining time	Form5
1 Alarm measurement data	2	Clock Loss interval counts	Form1
	3	Sync Loss interval counts	Form1
	4	CR Unlock interval counts	Form1

Table 8.4.1.2-3 Parameter (cont'd)

<result>	<item>	Items	Format
2 Error measurement data	1	Error Rate (total)	Form2
	2	Error Count (total)	Form1
	3	Clock Count	Form1
	4	EI	Form1
	5	%EFI	Form3
	6	Error Rate (INS)	Form2
	7	Error Rate (OMI)	Form2
	8	Error Count (INS)	Form1
	9	Error Count (OMI)	Form1
	10	Error Rate (Transition)	Form2
	11	Error Rate (Non Transition)	Form2
	12	Error Count (Transition)	Form1
	13	Error Count (Non Transition)	Form1
3 Threshold EI,EFI data	1	>1.0E-3	Form6
	2	>1.0E-4	Form6
	3	>1.0E-5	Form6
	4	>1.0E-6	Form6
	5	>1.0E-7	Form6
	6	>1.0E-8	Form6
	7	≤1.0E-8	Form6
4 Error performance data	1	ES	Form1
	2	EFS	Form1
	3	SES	Form1
	4	DM	Form1
	5	US	Form1
	6	%ES	Form3
	7	%EFS	Form3
	8	%SES	Form3
	9	%DM	Form3
	10	%US	Form3

Example

```
> END? 0,1
< 05-11-30 18:00:00
```

Compatibility

Partially compatible with the MP1762D.

### **MTR? <item>**

Parameter	<item>=<DECIMAL NUMERIC PROGRAM DATA> 0 Bit Error (Total Error) 3 Clock Loss or CR Unlock 4 Pattern Sync Loss
Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1) 0 When an alarm occurs 1 When no alarm occurs 2 When no data corresponds to the query
Function	Queries the real-time occurrence status of the monitoring item corresponding to the parameter.
Example	To query the real-time occurrence status of the Total Error: > MTR? 0 < MTR 0
Compatibility	Incompatible with existing models.

### **ER?**

Response	<numeric>=<NR3 NUMERIC RESPONSE DATA> 0.0000E-18 to 1.0000E00 Error rate
Function	Outputs the error rate measurement result according to the output format. "0.0000E-00" is returned if no data exists.
Example	> ER? < ER 0.0000E-00 < ER 1.9999E-1
Compatibility	Compatible with the MP1632C and MP1762D.

### **EC?**

Response	<numeric>=<NR1 or NR3 NUMERIC RESPONSE DATA> 1.0000E07 to 9.9999E17 Error count 0 to 9999999
Function	Outputs the error count measurement results according to the output format. "1.0000E-99" is returned if no data exists.
Example	> EC? < EC 1.0000E-99 < EC 1.0000E09 < EC 9999999
Compatibility	Compatible with the MP1632C and MP1762D.



---

**EFI?**

Response	<numeric>=<NR2 NUMERIC RESPONSE DATA> 0.0000 to 100.0000      Error free interval rate
Function	Outputs the measurement result of the error free interval rate according to the output format. "999.9999" is returned if no data exists.
Example	> EFI? < EFI 999.9999 < EFI    20.0088 < EFI    100.0000
Compatibility	Compatible with the MP1632C and MP1762D.

---

**EI?**

Response	<numeric>=<NR1 or NR3 NUMERIC RESPONSE DATA> 1.0000E07 to 9.9999E17      Error interval
Function	Outputs the measurement result of the error interval count according to the output format. "1.0000E-99" is returned if no data exists.
Example	> EI? < EI 1.0000E-99 < EI 1.0000E09 < EI    1999984
Compatibility	Compatible with the MP1632C and MP1762D.

## FRQ?

Response	<numeric>=<NR2 NUMERIC RESPONSE DATA> XXXXX.XXX                      Clock frequency
Function	Outputs the measurement results of the clock frequency according to the output format "FRQ     0.000" is returned for clock loss.
Example	> FRQ? < FRQ  0.000 < FRQ  12500.000
Compatibility	Compatible with the MP1632C and MP1762D.

## CC?

Response	<numeric>=<NR1 or NR3 NUMERIC RESPONSE DATA> 1.0000E07 to 9.9999E17    Clock count 0 to 9999999
Function	Outputs the measurement results of the clock count according to the output format "1.0000E-99" is returned if no data exists.
Example	> CC? < CC  1.0000E-99 < CC  1.0000E-09 < CC    5000256
Compatibility	Compatible with the MP1632C and MP1762D.

## CLI?

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1) 0                                Non Clock Loss status 1                                Clock Loss status
Function	Displays the clock input status.
Example	> CLI? < CLI 0
Compatibility	Compatible with the MP1632C and MP1762D.

## SLI?

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1) 0                                Non Sync Loss status 1                                Sync Loss status
Function	Displays the pattern synchronization status.
Example	> SLI? < SLI 0
Compatibility	Compatible with the MP1632C and MP1762D.



## PFC?

Response	<p>&lt;numeric&gt;=&lt;NR1 or NR3 NUMERIC RESPONSE DATA&gt; (FIX10)  XXXXXXXXXX           ES data  &lt;numeric&gt;=&lt;NR1 or NR3 NUMERIC RESPONSE DATA&gt; (FIX10)  XXXXXXXXXX           EFS data  &lt;numeric&gt;=&lt;NR1 or NR3 NUMERIC RESPONSE DATA&gt; (FIX10)  XXXXXXXXXX           SFS data  &lt;numeric&gt;=&lt;NR1 or NR3 NUMERIC RESPONSE DATA&gt; (FIX10)  XXXXXXXXXX           US data  &lt;numeric&gt;=&lt;NR1 or NR3 NUMERIC RESPONSE DATA&gt; (FIX10)  XXXXXXXXXX           DM data  &lt;numeric&gt;=&lt;NR1 or NR3 NUMERIC RESPONSE DATA&gt; (FIX10)  XXXXXXXXXX           EC data  Displays the above items delimited with a comma (,) (PFC  XX,XX,XX,XX,XX,XX).</p>
Function	<p>"1.0000E-99" is returned if no measurement data exists.</p>
Example	<p>Outputs the Count items of the performance measurement results.  &gt; PFC?  &lt; PFC 1.0000E-99,1.0000E-99,1.0000E-99,1.0000E-99,1.0000E-99,  1.0000E-99  &lt; PFC           1800,           1800,           900,           59,                    100,1.0000E-99</p>
Compatibility	<p>Compatible with the MP1632C.</p>

**THE?**

Response	<pre> &lt;numeric&gt;=&lt;NR1 or NR3 NUMERIC RESPONSE DATA&gt; (FIX10) XXXXXXXXXX          &gt;1E-03 data &lt;numeric&gt;=&lt;NR1 or NR3 NUMERIC RESPONSE DATA&gt; (FIX10) XXXXXXXXXX          &gt;1E-04 data &lt;numeric&gt;=&lt;NR1 or NR3 NUMERIC RESPONSE DATA&gt; (FIX10) XXXXXXXXXX          &gt;1E-05 data &lt;numeric&gt;=&lt;NR1 or NR3 NUMERIC RESPONSE DATA&gt; (FIX10) XXXXXXXXXX          &gt;1E-06 data &lt;numeric&gt;=&lt;NR1 or NR3 NUMERIC RESPONSE DATA&gt; (FIX10) XXXXXXXXXX          &gt;1E-07 data &lt;numeric&gt;=&lt;NR1 or NR3 NUMERIC RESPONSE DATA&gt; (FIX10) XXXXXXXXXX          &gt;1E-08 data &lt;numeric&gt;=&lt;NR1 or NR3 NUMERIC RESPONSE DATA&gt; (FIX10) XXXXXXXXXX          ≤1E-08 data Displays the above items delimited with a comma (,) (THE XX,XX,XX,XX,XX,XX,XX). "1.0000E-99" is returned if no measurement data exists. </pre>
Function	Outputs the threshold EI measurement results.
Example	<pre> &gt; THE? &lt; THE 1.0000E-99,1.0000E-99,1.0000E-99,1.0000E-99,1.0000E-99, 1.0000E-99,1.0000E-99 &lt; THE      3,      4,      5,      6,            7,      8,      9 </pre>
Compatibility	Compatible with the MP1632C.

## THF?

Response	<pre> &lt;numeric&gt;=&lt;NR2 or NR3 NUMERIC RESPONSE DATA&gt; (FIX10)   XXX.XXXX          &gt;1E-03 data &lt;numeric&gt;=&lt;NR2 or NR3 NUMERIC RESPONSE DATA&gt; (FIX10)   XXX.XXXX          &gt;1E-04 data &lt;numeric&gt;=&lt;NR2 or NR3 NUMERIC RESPONSE DATA&gt; (FIX10)   XXX.XXXX          &gt;1E-05 data &lt;numeric&gt;=&lt;NR2 or NR3 NUMERIC RESPONSE DATA&gt; (FIX10)   XXX.XXXX          &gt;1E-06 data &lt;numeric&gt;=&lt;NR2 or NR3 NUMERIC RESPONSE DATA&gt; (FIX10)   XXX.XXXX          &gt;1E-07 data &lt;numeric&gt;=&lt;NR2 or NR3 NUMERIC RESPONSE DATA&gt; (FIX10)   XXX.XXXX          &gt;1E-08 data &lt;numeric&gt;=&lt;NR2 or NR3 NUMERIC RESPONSE DATA&gt; (FIX10)   XXX.XXXX          ≤1E-08 data Displays the above items delimited with a comma (,) (THF XX,XX,XX,XX,XX,XX,XX). "1.0000E-99" is returned if no measurement data exists. </pre>
Function	Outputs the threshold %EFI measurement results.
Example	<pre> &gt; THF? &lt; THF 1.0000E-99,1.0000E-99,1.0000E-99,1.0000E-99,1.0000E-99 1.0000E-99,1.0000E-99 &lt; THF 97.0000, 96.0000, 95.0000, 94.0000, 93.0000, 92.0000, 91.0000 </pre>
Compatibility	Compatible with the MP1632C.

## AIN?

Response	<pre> &lt;numeric&gt;=&lt;NR1 or NR3 NUMERIC RESPONSE DATA&gt; (FIX10) XXXXXXXXXX          Pattern Sync Loss data &lt;numeric&gt;=&lt;NR1 or NR3 NUMERIC RESPONSE DATA&gt; (FIX10) XXXXXXXXXX          Clock Loss data &lt;numeric&gt;=&lt;NR1 or NR3 NUMERIC RESPONSE DATA&gt; (FIX10) XXXXXXXXXX          CR Unlock data Displays the above items delimited with a comma (,) (AIN XX,XX,XX). "1.0000E-99" is returned if no measurement data exists. </pre>
Function	Outputs the alarm interval measurement results.
Example	<pre> &gt; AIN? &lt; AIN 1.0000E-99,1.0000E-99,1.0000E-99 &lt; AIN 0, 0,1.0000E-99 </pre>
Compatibility	Partially compatible with the MP1632C.

**OSD?**


---

Response	<numeric>=<NR1 or NR3 NUMERIC RESPONSE DATA> Average error rate for 1 second, average error count for 1 second X.XXXE-XX, XXXXXXXX (average error count for 1 second is less than 1E+8) X.XXXE-XX,X.XXXEEXX (average error count for 1 second is 1E+8 and above)
Function	Outputs the measurement results for 1 second according to the output format. "0.0000E-00,1.0000E-99" is returned if no data exists.
Example	To output the measurement results for 1 second according to the output format: > OSD? < OSD 0.0000E-00,1.0000E-99 < OSD 2.0000E-01,1.0000E09
Compatibility	Compatible with the MP1762D.

**IMD? <result>,<item>**


---

Parameter	<result>=<DECIMAL NUMERIC PROGRAM DATA> Same as END?
Response	<string>=<STRING RESPONSE DATA> Same as END?
Function	Displays the measurement intermediate data.
Example	> IMD? 0,1 < 05-11-30 18:00:00
Compatibility	Compatible with the MP1762D.

**BES? <error>**


---

Parameter	<error>=< DECIMAL NUMERIC PROGRAM DATA> 0 Total Error 1 Insertion Error 2 Omission Error 3 Transition Error 4 Non-Transition Error
Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1) 0 Error detection 1 No error detection
Function	Displays the error detection status.
Example	> BES? 0 < BES 0
Compatibility	Compatible with the MP1632C. (The response 0 is returned for No error detection, and 1 is returned for Error detection.)

### 8.4.1.3 Logging setting commands

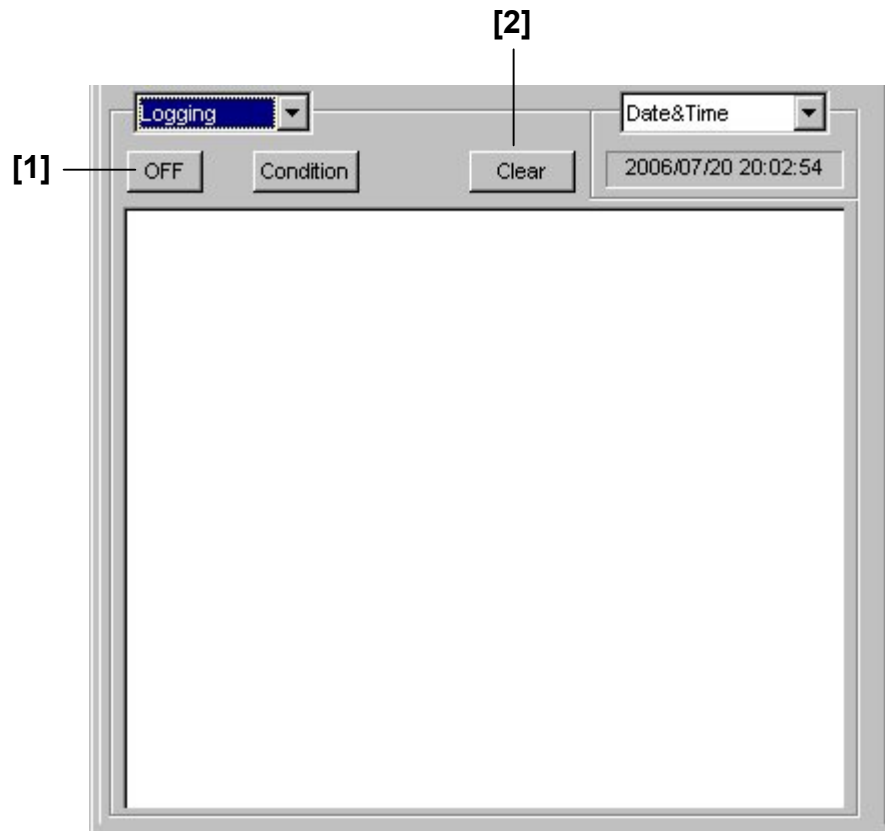


Figure 8.4.1.3-1 Logging setting



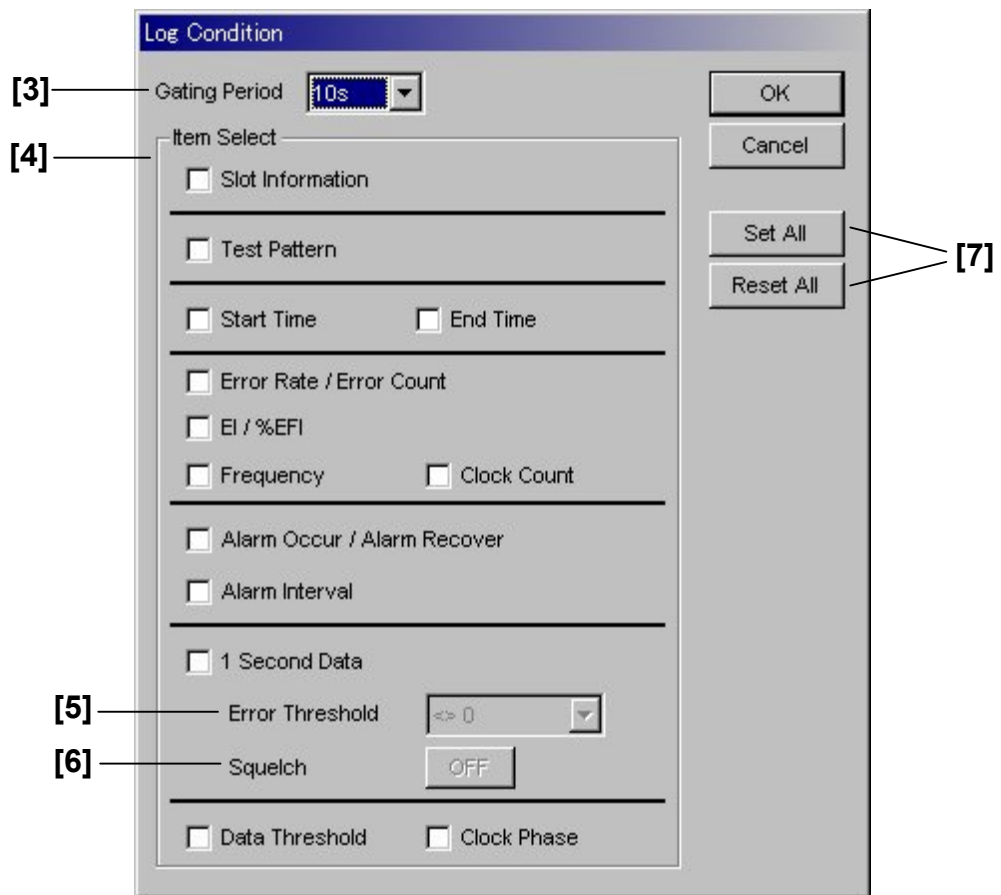


Figure 8.4.1.3-2 Logging Condition

Table 8.4.1.3-1 Logging setting commands

No.	Setting Items	Commands
[1]	Logging ON/OFF	LON
		LON?
[2]	Clear	LCR
[3]	Gating Period	LCP
		LCP?
[4]	Item Select	LCD
		LCD?
[5]	Error Threshold	LCT
		LCT?
[6]	Squelch	LCS
		LCS?
[7]	Set All/Reset All	LAS

**LON <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA>
	0 OFF
	1 ON
Function	Sets logging execution ON/OFF.
Example	To set logging execution ON: > LON 1
Compatibility	Incompatible with existing models.

**LON?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the logging execution ON/OFF state.
Example	> LON? < LON 1
Compatibility	Incompatible with existing models.

**LCR**


---

Function	Clears the logging results.
Example	> LCR
Compatibility	Incompatible with existing models.

**LCP <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA>
	0 10 s
	1 30 s
	2 1 min
	3 10 min
	4 30 min
	5 1 hour
Function	Sets the logging result capturing period.
Example	To set the logging result capturing period to 10 seconds: > LCP 0
Compatibility	Incompatible with existing models.

**LCP?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the logging result capturing period.
Example	> LCP? < LCP 0
Compatibility	Incompatible with existing models.

**LCD <item>,<numeric>**

Parameter	<item>=<DECIMAL NUMERIC PROGRAM DATA>
	0 Slot Information: Slot information
	1 Test Pattern: Test pattern type
	2 Start Time: Measurement start time
	3 End Time: Measurement end time
	4 Error Rate / Count: Error rate and error count
	5 EI • %EFI: Error interval and error free interval rate
	6 Frequency: Frequency
	7 Clock Count: Clock count
	8 Alarm Occur / Recover: Alarm occurrence and recovery time
	9 Alarm Interval: Alarm interval
	10 1 second Data: Average data for 1 second
	11 Adds the data input threshold setting value to the logging item.
	12 Adds the clock phase setting value to the logging item.
	<numeric>=<DECIMAL NUMERIC PROGRAM DATA>
	0 OFF
	1 ON
Function	Sets the specified logging measurement item ON/OFF.
Example	To set the logging slot information ON: > LCD 0,1
Compatibility	Incompatible with existing models.

**LCD? <item>**

Parameter	<item>=<DECIMAL NUMERIC PROGRAM DATA>
	0 to 12 Each logging item
Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
	0 OFF
	1 ON
Function	Sets the specified logging measurement item ON/OFF.
Example	> LCD? 0 < LCD 1
Compatibility	Incompatible with existing models.

**LCT <thre>**


---

Parameter	<thre>=<DECIMAL NUMERIC PROGRAM DATA>
	0                                   <>0
	1                                   >1E-3
	2                                   >1E-4
	3                                   >1E-5
	4                                   >1E-6
	5                                   >1E-7
	6                                   >1E-8
	7                                   >1E-9
Function	Sets the logging error rate threshold value.
Example	To set the logging error rate threshold value to 0: > LCT 0
Compatibility	Incompatible with existing models.

**LCT?**


---

Response	<thre>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the logging error rate threshold value.
Example	> LCT? < LCT 0
Compatibility	Incompatible with existing models.

**LCS <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA>
	0                                   Memory squelch function ON
	1                                   Memory squelch function OFF
Function	Sets the logging memory squelch function ON/OFF.
Example	To set the logging memory squelch function ON: > LCS 0
Compatibility	Incompatible with existing models.

**LCS?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the logging memory squelch function ON/OFF state.
Example	> LCS? < LCS 0
Compatibility	Incompatible with existing models.

**LAS <all>**


---

Parameter	<all>=<DECIMAL NUMERIC PROGRAM DATA>
	0                                   Reset
	1                                   All Set
Function	Selects or reset all logging measurement items.
Example	To reset all logging measurement items: > LAS 0
Compatibility	Incompatible with existing models.

8.4.1.4 Histogram setting commands

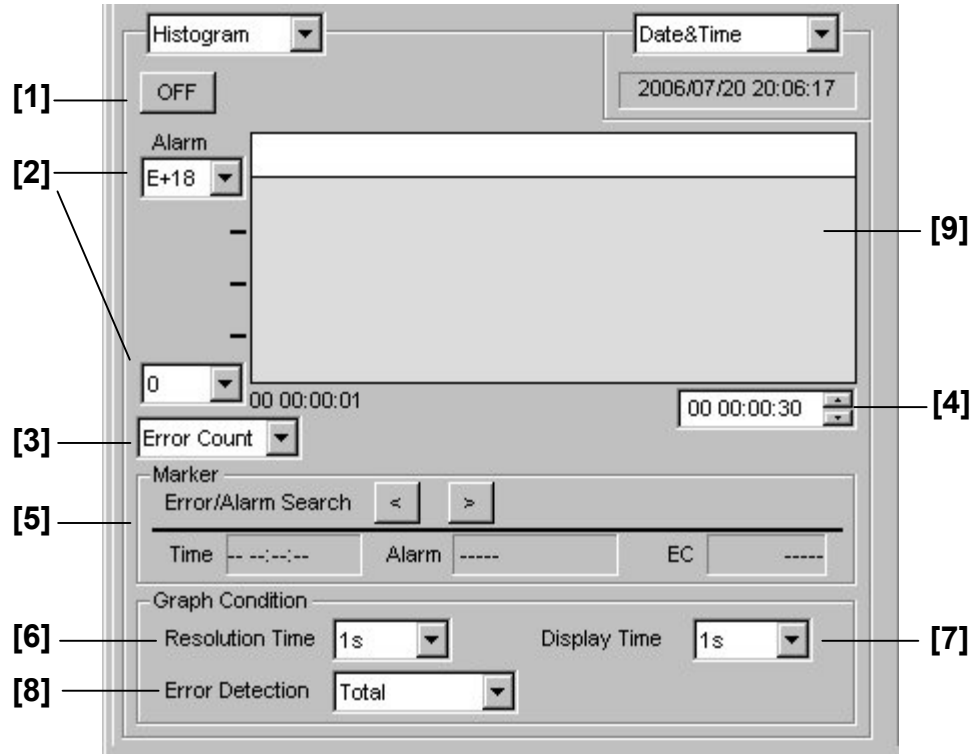


Figure 8.4.1.4-1 Histogram setting

Table 8.4.1.4-1 Histogram setting commands

No.	Setting Items	Commands
[1]	Histogram ON/OFF	HON
		HON?
[2]	Scale setting	HAL
		HAL?
[3]	Measurement item setting	HTP
		HTP?
[4]	Display time setting	HTS
		HTS?
[5]	Marker	HMK
		HMK?
[6]	Resolution Time	HRS
		HRS?
[7]	Display Time	HDT
		HDT?
[8]	Error Detect	HED
		HED?
[9]	Query for measurement result	HIS?

### HON <numeric>

---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 0 OFF 1 ON
Function	Sets histogram execution ON/OFF.
Example	To set histogram execution ON: > HON 1
Compatibility	Incompatible with existing models.

### HON?

---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the histogram execution ON/OFF state.
Example	> HON? < HON 1
Compatibility	Incompatible with existing models.

### HAL <top>,<bottom>

---

Parameter	<top>=<DECIMAL NUMERIC PROGRAM DATA> When the measurement item is Error Rate: 18 to 0 E+0 to E-18 (Step: 1) When the measurement item is Error Count • EI 1 to 18 0, E+0, E+1, E+2,... E+18 (Step: 1) <bottom>=<DECIMAL NUMERIC PROGRAM DATA> When the measurement item is Error Rate: 18 to 0 E+0 to E-18 (Step: 1) (However <top> must be greater than <bottom>) When the measurement item is Error Rate • EI: 0 to 17 0, E+0,E+1,E+2,... to E+17 (Step: 1) (However <top> must be greater than <bottom>)
Function	Sets the vertical axis scale of the histogram.
Example	To set the vertical axis scale of the histogram as top: E-3 and bottom: E-7: > HAL 3,7
Compatibility	Incompatible with existing models.

### HAL?

---

Response	<top>=<NR1 NUMERIC RESPONSE DATA> (FIX2) <bottom>=<NR1 NUMERIC RESPONSE DATA> (FIX2)
Function	Queries the vertical axis scale of the histogram.
Example	> HAL? < HAL 5, 0 < HAL 19,17
Compatibility	Incompatible with existing models.



**HTP <type>**


---

Parameter	<type>=<DECIMAL NUMERIC PROGRAM DATA> 0 1 2	Counts errors. Counts error rate. Counts error interval.
Function	Sets the measurement item counting type displayed in the histogram.	
Example	To set the measurement item counting type displayed in the histogram to 0 (counting errors): > HTP 0	
Compatibility	Incompatible with existing models.	

**HTP?**


---

Response	<type>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the measurement item counting type displayed in the histogram.
Example	> HTP? < HTP 0
Compatibility	Incompatible with existing models.

**HTS <day>,<hour>,<min>,<second>**


---

Parameter	<day>=<DECIMAL NUMERIC PROGRAM DATA> 0 to 99 <hour>=<DECIMAL NUMERIC PROGRAM DATA> 0 to 23 <min>=<DECIMAL NUMERIC PROGRAM DATA> 0 to 59 <second>=<DECIMAL NUMERIC PROGRAM DATA> 0 to 59	0 to 99 days, in 1-day steps 0 to 23 hours, in 1-hour steps 0 to 59 minutes, in 1-minute steps 0 to 59 seconds, in 1-second steps
	The minimum setting value is 0,0,0,30.	
Function	Sets the histogram display time.	
Example	To set the histogram display time to "0 days, 3 hours, 59 minutes, 59 seconds": > HTS 0,3,59,59	
Compatibility	Incompatible with existing models.	



**HMK?**

Response	<p>&lt;day&gt;=&lt;NR1 NUMERIC RESPONSE DATA&gt; (FIX2) 00 to 99                      0 to 99 days</p> <p>&lt;hour&gt;=&lt;NR1 NUMERIC RESPONSE DATA&gt; (FIX2) 00 to 23                      0 to 23 hours</p> <p>&lt;min&gt;=&lt;NR1 NUMERIC RESPONSE DATA&gt; (FIX2) 00 to 59                      0 to 59 minutes</p> <p>&lt;second&gt;=&lt;NR1 NUMERIC RESPONSE DATA&gt; (FIX2) 00 to 59                      0 to 59 seconds</p> <p>"--" is displayed if there is no alarm and error.</p> <p>&lt;alarm&gt;=&lt;NR1 NUMERIC RESPONSE DATA&gt; (FIX1) 0                              Clock Loss 1                              Sync Loss 2                              CR Unlock 3                              No alarm</p> <p>&lt;result&gt;=&lt;STRING RESPONSE DATA&gt;</p> <p>When the measurement item is Error Count or Error Interval, the response is returned in Form1. When the measurement item is Error Rate, the response is returned in Form2.</p>
----------	--

**Table 8.4.1.4-2 Response format**

Form	Format	Description
Form1 Integer type	XXXXXXXX	For 0 to 9999999
	X.XXXXEXX	For 1.0000E07 to 9.9999E17
	1.0000E-99	When no data corresponds to the query
Form2 Fraction type	X.XXXXE-XX	For 0.0001E-18 to 1.0000E00
	1.0000E-99	When no data corresponds to the query

Function	Queries the marker setting time, alarm, and error rate.
Example	> HMK? < HMK 00,01,30,30,3,1.0000E07
Compatibility	Incompatible with existing models.

## HRS <numeric>

---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA>
	0 1 s
	1 10 s
	2 30 s
	3 1 min
	4 10 min
	5 30 min
	6 1 hour
Function	Sets the histogram calculation resolution.
Example	To set the histogram calculation resolution to 1 second: > HRS 0
Compatibility	Incompatible with existing models.

## HRS?

---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the histogram calculation resolution.
Example	> HRS? < HRS 0
Compatibility	Incompatible with existing models.

**HDT <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA>
	0                      1 s
	1                      10 s
	2                      30 s
	3                      1 min
	4                      10 min
	5                      30 min
	6                      1 hour
Function	Sets the histogram display resolution.
Example	To set the histogram display resolution to 1 second: > HDT 0
Compatibility	Incompatible with existing models.

**HDT?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the histogram display resolution.
Example	> HDT? < HDT 0
Compatibility	Incompatible with existing models.

**HED <mode>**


---

Parameter	<mode>=<DECIMAL NUMERIC PROGRAM DATA>
	0                      Total
	1                      INS
	2                      OMI
	3                      Transition
	4                      Non Transition
Function	Sets the bit error alarm measurement method and error detection method for histogram calculation.
Example	To set the bit error alarm measurement method and error detection method for histogram calculation to Total: > HED 0
Compatibility	Incompatible with existing models.

**HED?**


---

Response	<mode>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the bit error alarm measurement method and error detection method for histogram calculation.
Example	> HED? < HED 0
Compatibility	Incompatible with existing models.

### HIS? <day>,<hour>,<min>,<second>

Parameter	<day>=<DECIMAL NUMERIC PROGRAM DATA> 0 to 99                      0 to 99 days, in 1-day steps <hour>=<DECIMAL NUMERIC PROGRAM DATA> 0 to 23                      0 to 23 hours, in 1-hour steps <min>=<DECIMAL NUMERIC PROGRAM DATA> 0 to 59                      0 to 59 minutes, in 1-minute steps <second>=<DECIMAL NUMERIC PROGRAM DATA> 0 to 59                      0 to 59 seconds, in 1-second steps
Response	<alarm>=<NR1 NUMERIC RESPONSE DATA> (FIX1) 0                              Clock Loss 1                              Sync Loss 2                              CR Unlock 3                              No alarm <count>=<STRING RESPONSE DATA> When the measurement item is Error Count, the response is returned in Form1. <rate>=<STRING RESPONSE DATA> When the measurement item is Error Rate, the response is returned in Form2.

**Table 8.4.1.4-3 Response format**

Form	Format	Description
Form1	XXXXXXXX	For 0 to 9999999
Integer type	X.XXXXEXX	For 1.0000E07 to 9.9999E17
	1.0000E-99	When no data corresponds to the query
Form2	X.XXXXE-XX	For 0.0001E-18 to 1.0000E00
Fraction type	1.0000E-99	When no data corresponds to the query

Function	Queries the measurement result item on the histogram corresponding to the parameter.
Example	To query the histogram measurement result for "0 days, 0 hours, 0 minutes, 0 seconds": > HIS? 0,0,0,1 < HIS 3,0,0.0001E-18
Compatibility	Incompatible with existing models.

## 8.4.2 Commands related to Measurement tab window

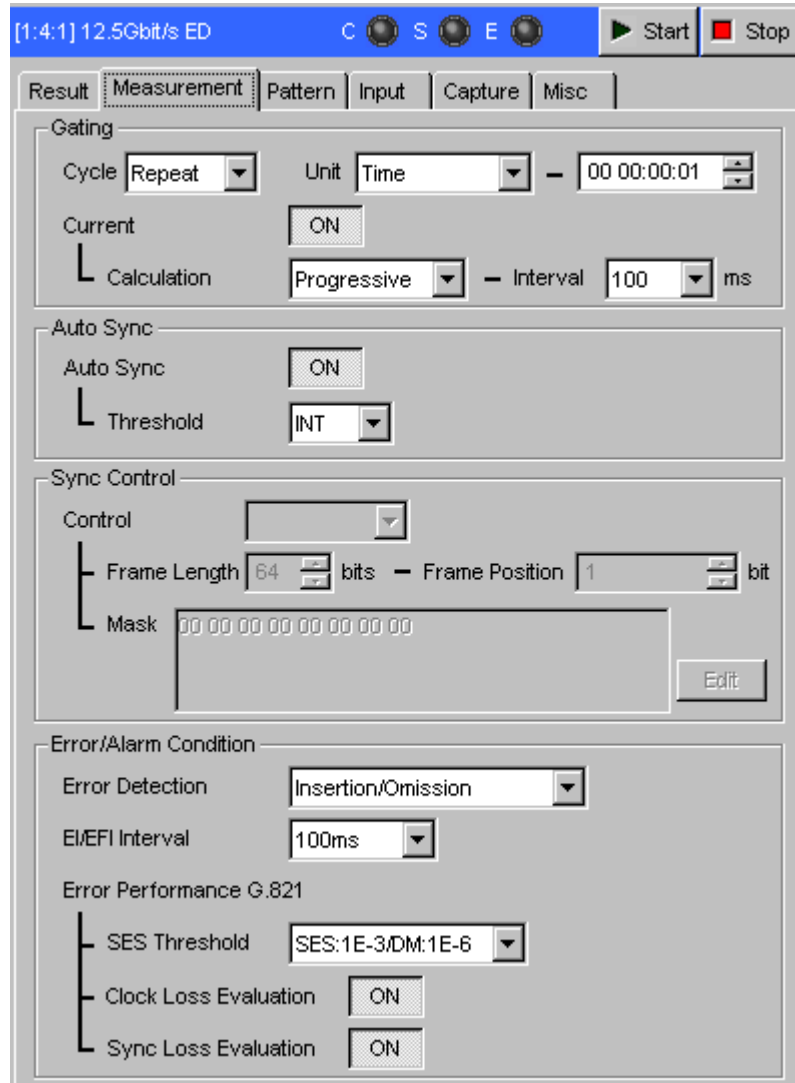


Figure 8.4.2-1 Measurement tab window

8.4.2.1 Gating setting commands

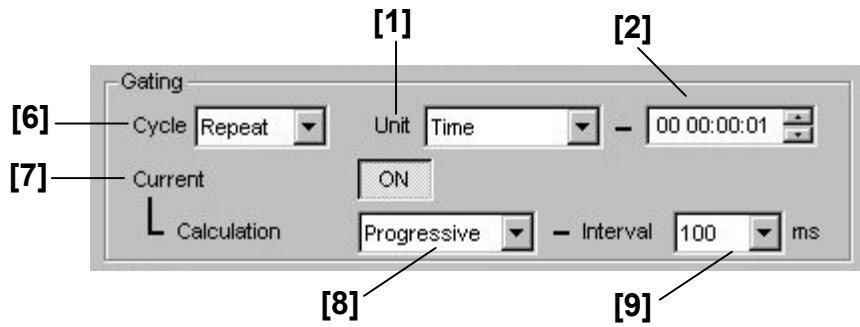


Figure 8.4.2.1-1 Gating setting (Time)

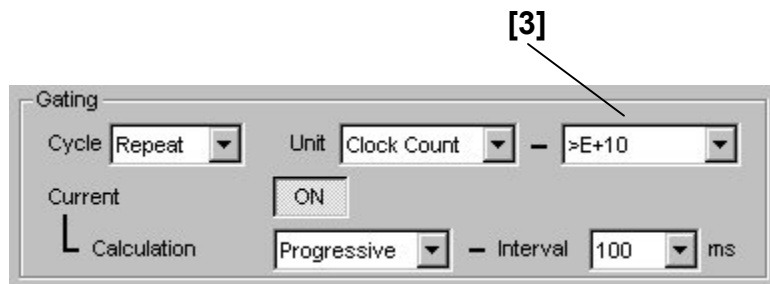


Figure 8.4.2.1-2 Gating setting (Clock Count)

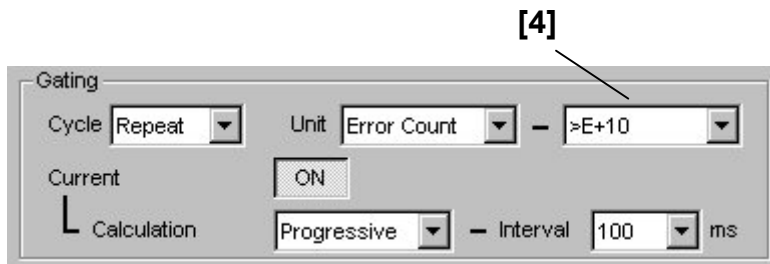


Figure 8.4.2.1-3 Gating setting (Error Count)

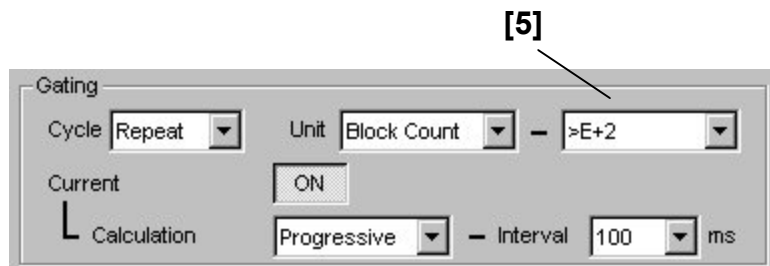


Figure 8.4.2.1-4 Gating setting (Block Count)



Table 8.4.2.1-1 Measurement tab window setting commands

No.	Setting Items	Commands
[1]	Unit	UNT
		UNT?
[2]	No label (Measurement time setting)	PRD
		PRD?
[3]	No label (Clock count setting)	CLC
		CLC?
[4]	No label (Error count setting)	ERC
		ERC?
[5]	No label (Block count setting)	BLC
		BLC?
[6]	Cycle	MOD
		MOD?
[7]	Current	CUR
		CUR?
[8]	Calculation	CAL
		CAL?
[9]	Interval	ITV
		ITV?

### UNI <unit>

Parameter	<unit>=<DECIMAL NUMERIC PROGRAM DATA>
	0 Time
	1 Clock Count
	2 Error Count
	3 Block Count
Function	Sets the measurement period unit.
Example	To set the measurement period unit to Time: > UNI 0
Compatibility	Incompatible with existing models.

### UNI?

Response	<unit>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the measurement period unit.
Example	> UNI? < UNI 0
Compatibility	Incompatible with existing models.

### PRD <day>,<hour>,<min>,<second>

Parameter	<day>,<hour>,<min>,<second> =<DECIMAL NUMERIC PROGRAM DATA>
	<day> 0 to 99 0 to 99 days, in 1-day steps
	<hour> 0 to 23 0 to 23 hours, in 1-hour steps
	<min> 0 to 59 0 to 59 minutes, in 1-minute steps
	<second> 0 to 59 0 to 59 seconds, in 1-second steps
	(Not all values can be set to 00 simultaneously.)
Function	Sets the measurement time when the measurement period is set to Time.
Example	To set the measurement time when the measurement period is set to Time, to "0 days, 1 hour, 0 minutes, 0 seconds": > PRD 0,1,0,0
Compatibility	Compatible with the MP1632C and MP1762D.

### PRD?

Response	<day>,<hour>,<min>,<second>=<NR1 NUMERIC RESPONSE DATA> (FIX2)
	<day> 00 to 99 0 to 99 days
	<hour> 00 to 23 0 to 23 hours
	<min> 00 to 59 0 to 59 minutes
	<second> 00 to 59 0 to 59 seconds
Function	Queries the measurement time when the measurement period is set to Time.
Example	> PRD? < PRD 00,01,00,00
Compatibility	Compatible with the MP1632C and MP1762D.

**CLC<count>**


---

Parameter	<count>=<DECIMAL NUMERIC PROGRAM DATA>
	0 >1E+4
	1 >1E+5
	2 >1E+6
	3 >1E+7
	4 >1E+8
	5 >1E+9
	6 >1E+10
	7 >1E+11
	8 >1E+12
	9 >1E+13
	10 >1E+14
	11 >1E+15
	12 >1E+16
Function	Sets the clock count threshold when the measurement period is set to Clock Count.
Example	To set the clock count threshold when the measurement period is set to Clock Count to 1E+4: > CLC 0
Compatibility	Incompatible with existing models.

**CLC?**


---

Response	<count>=<NR1 NUMERIC RESPONSE DATA> (FIX2)
Function	Queries the clock count threshold when the measurement period is set to Clock Count.
Example	> CLC? < CLC 0 < CLC 12
Compatibility	Incompatible with existing models.

## ERC <count>

Parameter	<count>=<DECIMAL NUMERIC PROGRAM DATA>
	0 >1E+4
	1 >1E+5
	2 >1E+6
	3 >1E+7
	4 >1E+8
	5 >1E+9
	6 >1E+10
	7 >1E+11
	8 >1E+12
	9 >1E+13
	10 >1E+14
	11 >1E+15
	12 >1E+16
Function	Sets the error count threshold when the measurement period is set to Error Count.
Example	To set the error count threshold when the measurement period is set to Error Count to 1E+4: > ERC 0
Compatibility	Incompatible with existing models.

## ERC?

Response	<count>=<NR1 NUMERIC RESPONSE DATA> (FIX2)
Function	Queries the error count threshold when the measurement period is set to Error Count.
Example	> ERC? < ERC 0 < ERC 12
Compatibility	Incompatible with existing models.

**BLC <count>**


---

Parameter	<count>=<DECIMAL NUMERIC PROGRAM DATA>
	0 >1E+2
	1 >1E+3
	2 >1E+4
	3 >1E+5
	4 >1E+6
	5 >1E+7
	6 >1E+8
	7 >1E+9
	8 >1E+10
	9 >1E+11
	10 >1E+12
	11 >1E+13
	12 >1E+14
Function	Sets the block count threshold when the measurement period is set to Block Count.
Example	To set the block count threshold when the measurement period is set to Block Count to 1E+2: > BLC 0
Compatibility	Incompatible with existing models.

**BLC?**


---

Response	<count>=<NR1 NUMERIC RESPONSE DATA> (FIX2)
Function	Queries the block count threshold when the measurement period is set to Block Count.
Example	> BLC? < BLC 0 < BLC 12
Compatibility	Incompatible with existing models.

### MOD <mode>

---

Parameter	<mode>=<DECIMAL NUMERIC PROGRAM DATA> 0 Repeat 1 Single 2 Untimed
Function	Sets the bit error alarm measurement processing mode.
Example	To set the bit error alarm measurement processing mode to Repeat (performing measurement repeatedly): > MOD 0
Compatibility	Compatible with the MP1632C and MP1762D.

### MOD?

---

Response	<mode>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the bit error alarm measurement processing mode.
Example	> MOD? < MOD 0
Compatibility	Compatible with the MP1632C and MP1762D.

### CUR <numeric>

---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 0 Current OFF 1 Current ON
Function	Sets measurement result data display immediate update ON/OFF.
Example	To set measurement result data display immediate update ON. > CUR 1
Compatibility	Compatible with the MP1632C and MP1762D.

### CUR?

---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the measurement result data display immediate update ON/OFF state.
Example	> CUR? < CUR 1
Compatibility	Compatible with the MP1632C and MP1762D.

**CAL<mode>**


---

Parameter	<mode>=<DECIMAL NUMERIC PROGRAM DATA> 0 Progressive accumulation 1 Immediate processing
Function	Sets the immediate data calculation method.
Example	To set the immediate data calculation method to progressive accumulation: > CAL 0
Compatibility	Compatible with the MP1762D.

**CAL?**


---

Response	<mode>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the immediate data calculation method.
Example	> CAL? < CAL 0
Compatibility	Compatible with the MP1762D.

**ITV <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 0 Updates display in 100-ms period. 1 Updates display in 200-ms period.
Function	Sets the immediate data display update period.
Example	To set the immediate data display update period to 100 ms: > ITV 0
Compatibility	Partially compatible with the MP1632C (100-ms setting supported, 200-ms setting not supported). Compatible with the MP1762D.

**ITV?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the immediate data display update period.
Example	> ITV? < ITV 0
Compatibility	Partially compatible with the MP1632C (100-ms setting supported, 200-ms setting not supported). Compatible with the MP1762D.

8.4.2.2 Auto Sync setting commands



Figure 8.4.2.2-1 Auto Sync setting

Table 8.4.2.2-1 Auto Sync setting commands

No.	Setting Items	Commands
[1]	Auto Sync	SYN
		SYN?
[2]	Threshold Gain	SYE
		SYE?



**SYN <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA>
	0 Auto Sync OFF
	1 Auto Sync ON
Function	Sets whether to automatically perform resynchronization (Auto Sync) when the synchronization threshold is exceeded.
Example	To enable automatic resynchronization (Auto Sync ON): > SYN 1
Compatibility	Compatible with the MP1632C and MP1762D.

**SYN?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the Auto Sync ON/OFF state.
Example	> SYN? < SYN 1
Compatibility	Compatible with the MP1632C and MP1762D.

**SYE <thre>**


---

Parameter	<thre>=<DECIMAL NUMERIC PROGRAM DATA>
	0 E-2
	1 E-3
	2 E-4
	3 E-5
	4 E-6
	5 E-7
	6 E-8
	8 Internal
Function	Sets the synchronization detection threshold for resynchronization.
Example	To set the synchronization detection threshold for resynchronization E-2: > SYE 0
Compatibility	Compatible with the MP1762D.

**SYE?**


---

Response	<thre>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the synchronization detection threshold for resynchronization.
Example	> SYE? < SYE 0
Compatibility	Compatible with the MP1762D.

8.4.2.3 Sync Control setting commands

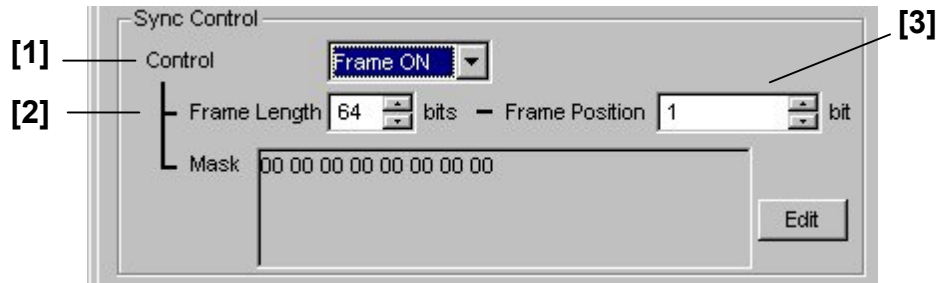


Figure 8.4.2.3-1 Sync Control setting commands

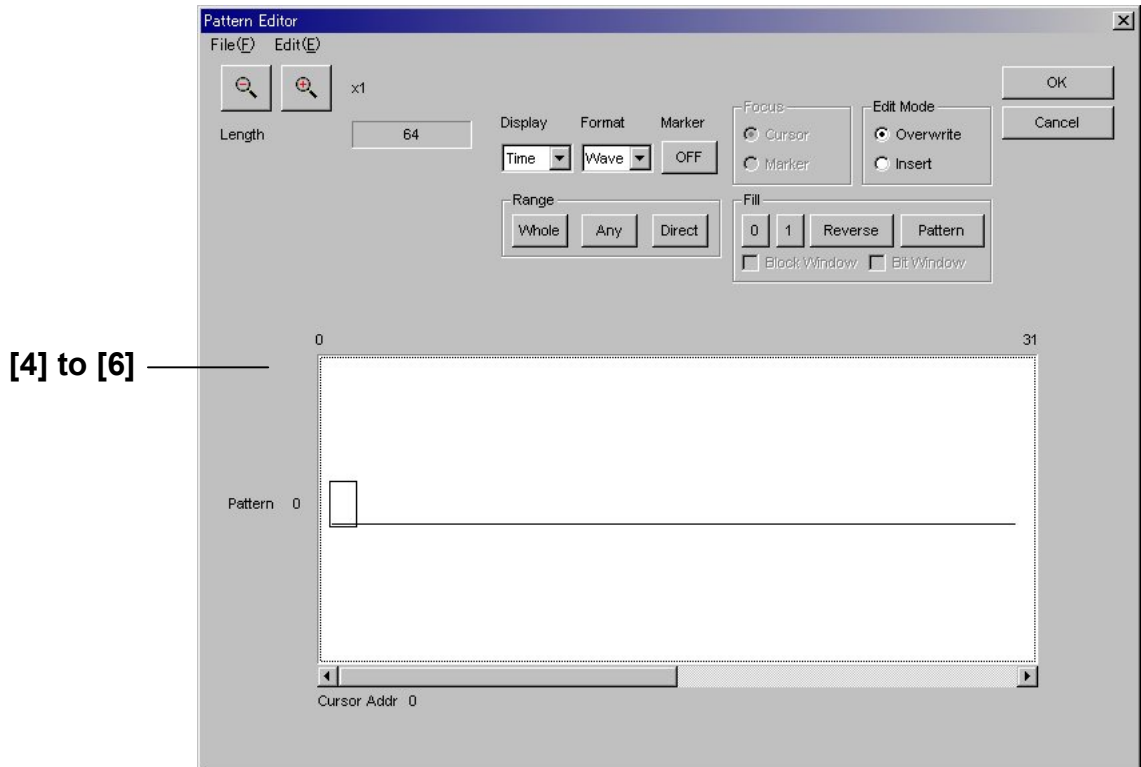


Figure 8.4.2.3-2 Sync Control setting (Pattern Editor screen)

Table 8.4.2.3-1 Sync Control setting commands

No.	Setting Items	Commands
[1]	Control	SYM
		SYM?
[2]	Frame Length	FLN
		FLN?
[3]	Frame Position	FPS
		FPS?
[4]	Mask (Setting of mask pattern)	PDW
		PDW?
[5]	No label (Data inversion)	PSA
[6]	No label (All 0s or 1s)	PFL

### **SYM <mode>**

---

Parameter	<mode>=<DECIMAL NUMERIC PROGRAM DATA> 0                                   Frame detection OFF 1                                   Frame detection ON 2                                   Quick synchronizing mode 3                                   Fast synchronizing mode
Function	Sets the synchronization mode for the test pattern.
Example	To set the synchronization mode for the test pattern to frame detection off: > SYM 0
Compatibility	Compatible with the MP1762D.

### **SYM?**

---

Response	<mode>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the synchronization mode for the test pattern.
Example	> SYM? < SYM 0
Compatibility	Compatible with the MP1762D.

### **FLN <length>**

---

Parameter	<length>=<DECIMAL NUMERIC PROGRAM DATA> 4 to 64                           4 to 64 bits, in 4-bit steps
Function	Sets the unique pattern length when the synchronization mode is set to frame detection ON.
Example	To set the unique pattern length to 4 bits when the synchronization mode is set to frame detection ON: > FLN 4
Compatibility	Compatible with the MP1632C and MP1762D.

### **FLN?**

---

Response	<length>=<NR1 NUMERIC RESPONSE DATA> (FIX3)
Function	Queries the unique pattern length when the synchronization mode is set to frame detection ON.
Example	> FLN? < FLN 4 < FLN 64
Compatibility	Compatible with the MP1632C and MP1762D.

**FPS <length>**


---

Parameter	<length>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 134217725                      1 to 134,217,725 bits, in 64-bit steps The maximum setting value is "Pattern length – Frame length + 1 bit". In the case of Combination, the setting range and resolution (steps) are multiplied by 4.
Function	Sets the frame synchronization start position when the synchronization mode is set to 1 (frame detection ON).
Example	To set the frame synchronization start position when the synchronization mode is set to 1 (frame detection ON) to bit 1: > FPS 1
Compatibility	Incompatible with existing models.

**FPS?**


---

Response	<length>=<NR1 NUMERIC RESPONSE DATA>
Function	Queries the frame synchronization start position when the synchronization mode is set to 1 (frame detection ON).
Example	> FPS? < FPS                      1 < FPS 134217665
Compatibility	Incompatible with existing models.

**PDW <data>**


---

Parameter	<data>=<NON-DECIMAL PROGRAM DATA> #H**...*                      1 to 16 characters (Specify pattern data in hexadecimal format) #B**...*                      1 to 64 characters (Specify pattern data in binary format)
	<b>Note:</b> The maximum setting value is the pattern length.
Function	Edits the mask pattern when the synchronization mode is set to 1 (frame detection ON). Up to 512-bit data can be edited in hexadecimal or binary format.
Example	To set the mask pattern when the synchronization mode is set to 1 (frame detection ON) in hexadecimal format: > PDW #H001
Compatibility	Incompatible with existing models.

**PDW?**


---

Response	<data>=<HEXADECIMAL NUMERIC RESPONSE DATA> #H**...*                      1 to 16 characters (Specify pattern data in hexadecimal format)
Function	Hexadecimal data maximum of 64 bits is returned. Queries the mask pattern when the synchronization mode is set to frame detection ON.
Example	> PDW? < PDW #H001
Compatibility	Incompatible with existing models.

### **PSA <start>,<end>**

---

Parameter	<start>=<NON-DECIMAL PROGRAM DATA> #H0 to #H3F                    0 to 3F bits, in 1-bit steps (Specify in hexadecimal) <end>=<NON-DECIMAL PROGRAM DATA> #H0 to #H3F                    0 to 3F bits, in 1-bit steps (Specify in hexadecimal)
Function	Inverts the mask pattern data when the synchronization mode is set to frame detection ON. Specify the inversion range by the start and end addresses.
Example	To invert the mask pattern data from bit 0 to bit 3F addresses when the synchronization mode is set to 1 (frame detection ON): > PSA #H0,#H3F
Compatibility	Incompatible with existing models.

### **PFL <start>,<page>,<data>**

---

Parameter	<start>=<NON-DECIMAL PROGRAM DATA> #H0 to #H3F                    0 to 3F bits, in 1-bit steps (Specify in hexadecimal) <end>=<NON-DECIMAL PROGRAM DATA> #H0 to #H3F                    0 to 3F bits, in 1-bit steps (Specify in hexadecimal) <data>=<DECIMAL NUMERIC PROGRAM DATA> 0                                 Fills the specified range with 0s. 1                                 Fills the specified range with 1s.
Function	Sets 0s or 1s for the specified range of the mask pattern data when the synchronization mode is set to 1 (frame detection ON). Specify the range with the start and end addresses.
Example	To set 0s for bit 0 to bit 3F of the mask pattern when the synchronization mode is set to 1 (frame detection ON): > PFL #H0,#H3F,0
Compatibility	Incompatible with existing models.

8.4.2.4 Error/Alarm Condition setting commands

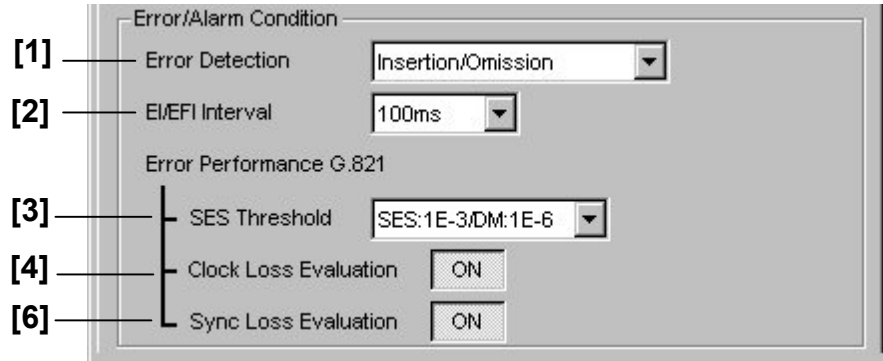


Figure 8.4.2.4-1 Error/Alarm Condition

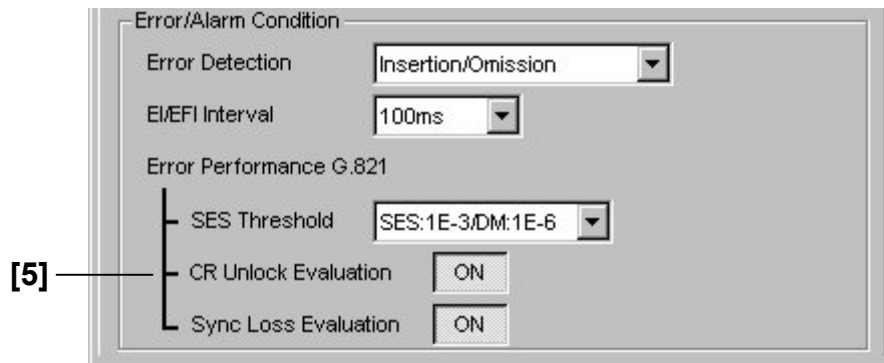


Figure 8.4.2.4-2 Error/Alarm Condition setting (Recovered Clock)

Table 8.4.2.4-1 Error/Alarm Condition setting commands

No.	Setting Items	Commands
[1]	Error Detect	ERD
		ERD?
[2]	EI/EFI Interval	EIT
		EIT?
[3]	SES Threshold	ETH
		ETH?
[4]	Clock Loss Evaluation	CLS
		CLS?
[5]	CR Unlock Evaluation	CRU
		CRU?
[6]	Sync Loss Evaluation	SLS
		SLS?

### ERD <mode>

---

Parameter	<mode>=<DECIMAL NUMERIC PROGRAM DATA> 0                                   INS/OMI 1                                   Transition/Non Transition
Function	Sets the error detection method during bit error alarm measurement.
Example	To set the error detection method during bit error alarm measurement to INS/OMI: > ERD 0
Compatibility	Incompatible with existing models.

### ERD?

---

Response	<mode>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the error detection method during bit error alarm measurement.
Example	> ERD? < ERD 0
Compatibility	Incompatible with existing models.

### EIT <numeric>

---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 0                                   1 ms 1                                   10 ms 2                                   100 ms 3                                   1 s
Function	Sets the interval for EI and %EFI measurement.
Example	To set the interval for EI and %EFI measurement to 1 ms: > EIT 0
Compatibility	Compatible with the MP1762D.

### EIT?

---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the interval for EI and %EFI measurement.
Example	> EIT? < EIT 0
Compatibility	Compatible with the MP1762D.



**ETH <thre>**


---

Parameter	<thre>=<DECIMAL NUMERIC PROGRAM DATA> 0 SES: 1E-3, DM: 1E-6 1 SES: 1E-4, DM: 1E-8
Function	Sets the thresholds for SES and DM calculations during performance measurement.
Example	To set the thresholds for SES and DM calculations during performance measurement to SES: 1E-3, DM: 1E-6: > ETH 0
Compatibility	Compatible with the MP1632C and MP1762D.

**ETH?**


---

Response	<thre>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the thresholds for SES and DM calculations during performance measurement.
Example	> ETH? < ETH 0
Compatibility	Compatible with the MP1632C and MP1762D.

**CLS <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 0 Out of evaluation target 1 Evaluation target
Function	Sets whether to include the Clock Loss occurrence period to the measurement evaluation target.
Example	To include the Clock Loss occurrence period to the measurement evaluation target: > CLS 1
Compatibility	Compatible with the MP1632C and MP1762D.

**CLS?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries whether the Clock Loss occurrence period is included to the measurement evaluation target.
Example	> CLS? < CLS 1
Compatibility	Compatible with the MP1632C and MP1762D.

### **CRU <numeric>**

---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 0 Out of evaluation target 1 Evaluation target
Function	Sets whether to include the CR Unlock occurrence period to the measurement evaluation target.
Example	To include the CR Unlock occurrence period to the measurement evaluation target: > CRU 1
Compatibility	Incompatible with existing models.

### **CRU?**

---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries whether the CR Unlock occurrence period is included to the measurement evaluation target.
Example	> CRU? < CRU 1
Compatibility	Incompatible with existing models.

### **SLS <numeric>**

---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 0 Out of evaluation target 1 Evaluation target
Function	Sets whether to include the Sync Loss occurrence period to the measurement evaluation target.
Example	To include the Sync Loss occurrence period to the measurement evaluation target: > SLS 1
Compatibility	Compatible with the MP1632C and MP1762D.

### **SLS?**

---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries whether the Sync Loss occurrence period is included to the measurement evaluation target.
Example	> SLS? < SLS 1
Compatibility	Compatible with the MP1632C and MP1762D.

### 8.4.3 Commands related to Pattern tab window

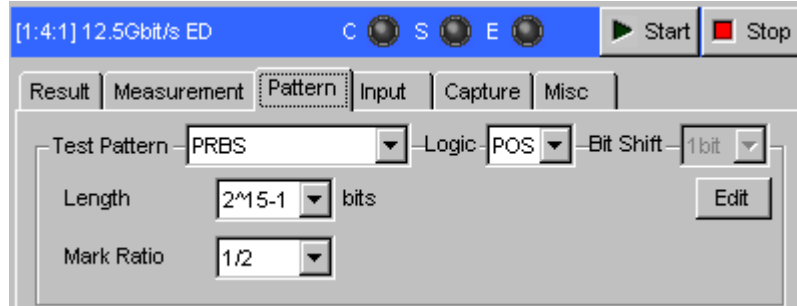


Figure 8.4.3-1 Pattern setting tab window

#### 8.4.3.1 Test Pattern setting commands



Figure 8.4.3.1-1 Test Pattern setting field

Table 8.4.3.1-1 Test Pattern setting commands

No.	Setting Items	Commands
[1]	Test Pattern	PTS
		PTS?
[2]	Logic	LGC
		LGC?

### PTS <type>

---

Parameter	<type>=<DECIMAL NUMERIC PROGRAM DATA>
	1 Data pattern
	2 Zero-Substitution pattern
	3 PRBS pattern
	4 Mixed Data pattern
	6 Sequence pattern
Function	Sets the type of the test pattern.
Example	To set the test pattern type to the Data pattern: > PTS 1
Compatibility	Compatible with the MP1762D.

### PTS?

---

Response	<type>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the type of the test pattern.
Example	> PTS? < PTS 1
Compatibility	Compatible with the MP1762D.

### LGC <logic>

---

Parameter	<logic>=<DECIMAL NUMERIC PROGRAM DATA>
	0 Positive
	1 Negative
Function	Sets the logic (positive or negative) of the pattern during pattern reception.
Example	To set the logic of the pattern during pattern reception to the positive logic: > LGC 0
Compatibility	Compatible with the MP1632C and MP1762D.

### LGC?

---

Response	<logic>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the logic of the pattern during pattern reception.
Example	> LGC? < LGC 0
Compatibility	Compatible with the MP1632C and MP1762D.

## 8.4.3.2 PRBS pattern setting commands

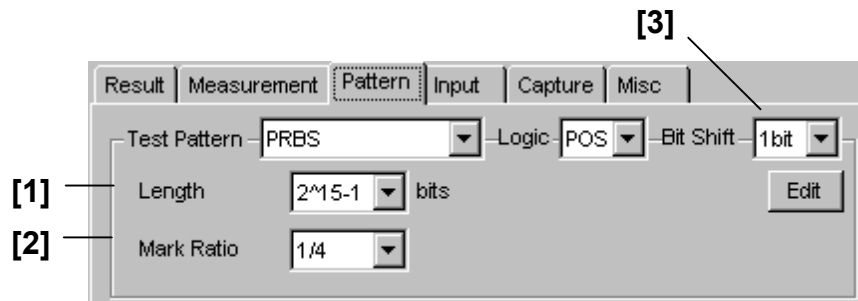


Figure 8.4.3.2-1 PRBS pattern setting

Table 8.4.3.2-1 PRBS pattern setting commands

No.	Setting Items	Commands
[1]	Length	PTN
		PTN?
[2]	Mark Ratio	MRK
		MRK?
[3]	Bit Shift	SFT
		SFT?

## PTN <numeric>

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA>	
	PRBS	Zero-Substitution
	2	2 <sup>7</sup> -1
	3	2 <sup>9</sup> -1
	4	2 <sup>10</sup> -1
	5	2 <sup>11</sup> -1
	6	2 <sup>15</sup> -1
	7	2 <sup>20</sup> -1
	8	2 <sup>23</sup> -1
	9	2 <sup>31</sup> -1
		12
		13
		14
		15
		16
		17
		18
Function	Sets the number of stages (2 <sup>n</sup> -1 (n=7, 9, 10, 11, 15, 20, 23, or 31)) during PRBS and Zero Substitution pattern reception.	
Example	To set the number of stages during PRBS pattern reception to 2 <sup>7</sup> -1: > PTN 2	
Compatibility	Partially compatible with the MP1632C (applies to PRBS only). Compatible with the MP1762D.	

## PTN?

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX2)
Function	Queries the number of stages (2 <sup>n</sup> -1 (n=7, 9, 10, 11, 15, 20, 23, or 31)) during PRBS and Zero Substitution pattern reception.
Example	> PTN? < PTN 2 < PTN 18
Compatibility	Partially compatible with the MP1632C (applies to PRBS only). Compatible with the MP1762D.

**MRK <mratio>**


---

Parameter	<mratio>=<DECIMAL NUMERIC PROGRAM DATA>		
		POS	NEG
	0	0/8	8/8
	1	1/8	7/8
	2	1/4	3/4
	3	1/2	1/2INVT
Function	Sets the mark ratio during PRBS pattern reception.		
Example	To set the mark ratio during PRBS pattern reception to 0/8: > MRK 0		
Compatibility	Compatible with the MP1632C and MP1762D.		

**MRK?**


---

Response	<mratio>=<NR1 NUMERIC RESPONSE DATA> (FIX1)		
Function	Queries the mark ratio during PRBS pattern reception.		
Example	> MRK? < MRK 0		
Compatibility	Compatible with the MP1632C and MP1762D.		

**SFT <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA>		
	0	1-bit Shift	
	1	3-bit Shift	
Function	Sets the bit shift during PRBS pattern reception.		
Example	To set the bit shift during PRBS pattern reception to 1-bit shift: > SFT 0		
Compatibility	Compatible with the MP1632C and MP1762D.		

**SFT?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)		
Function	Queries the bit shift during PRBS pattern reception.		
Example	> SFT? < SFT 0		
Compatibility	Compatible with the MP1632C and MP1762D.		

8.4.3.3 Zero Substitution pattern setting commands

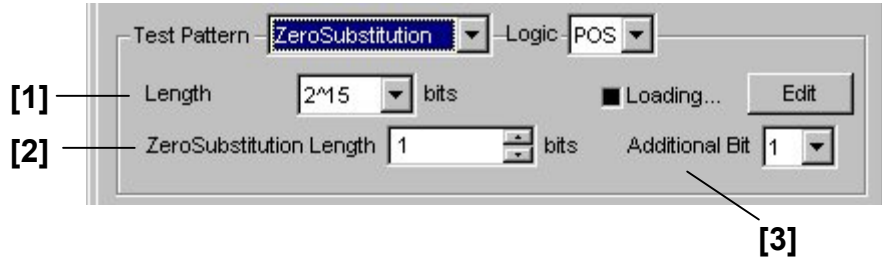


Figure 8.4.3.3-1 Zero-Substitution pattern setting

Table 8.4.3.3-1 Zero-Substitution pattern setting commands

No.	Setting Items	Commands
[1]	Length	PTN Refer to Section 8.4.3.2 "PRBS pattern setting commands" for detail on this command.
		PTN? Refer to Section 8.4.3.2 "PRBS pattern setting commands" for detail on this command.
[2]	Zero Substitution length	ZLN
		ZLN?
[3]	Additional Bit	ZAD
		ZAD?



**ZLN <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 1 to $2^n-1$ 1 to $2^n-1$ , in 1-bit steps (when ZSUBlength, $2^n$ is set) 1 to $2^n-2$ 1 to $2^n-2$ , in 1-bit steps (when ZSUBlength, $2^n-1$ is set) (n=7, 9, 10, 11, 15, 20, 23)
Function	Sets the number of bits to which "0" is inserted (zero-insertion bit count) during Zero-Substitution pattern reception.
Example	Available parameters vary depending on the setting conditions. To set the zero-insertion bit count to 1 bit: > ZLN 1
Compatibility	Partially compatible with the MP1762D.

**ZLN?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX7) 1 to $2^n-1$ n=7, 9, 10, 11, 15, 20, 23
Function	Queries the zero-insertion bit count during Zero-Substitution pattern reception.
Example	> ZLN? < ZLN                      1 < ZLN 8388607
Compatibility	Partially compatible with the MP1632C and the MP1762D.

**ZAD <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 0                                      Adds one bit of "0" next to the last of zero-inserted bits. 1                                      Adds one bit of "1" next to the last of zero-inserted bits (same as existing models).
Function	Sets whether to add one bit of "0" or "1" next to the last of zero-inserted bits during Zero-Substitution pattern reception.
Example	To add one bit of "0" next to the last of zero-inserted bits during Zero-Substitution pattern reception: > ZAD 0
Compatibility	Incompatible with existing models.

**ZAD?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries whether one bit of "0" or "1" is added next to the last of zero-inserted bits during Zero-Substitution pattern reception.
Example	> ZAD? < ZAD 0
Compatibility	Incompatible with existing models.

8.4.3.4 Data pattern setting commands

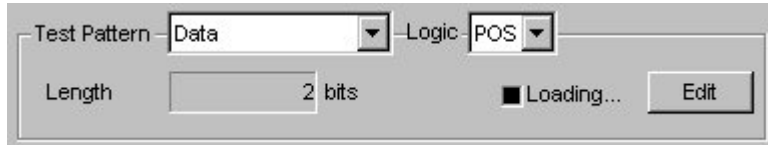


Figure 8.4.3.4-1 Data pattern setting

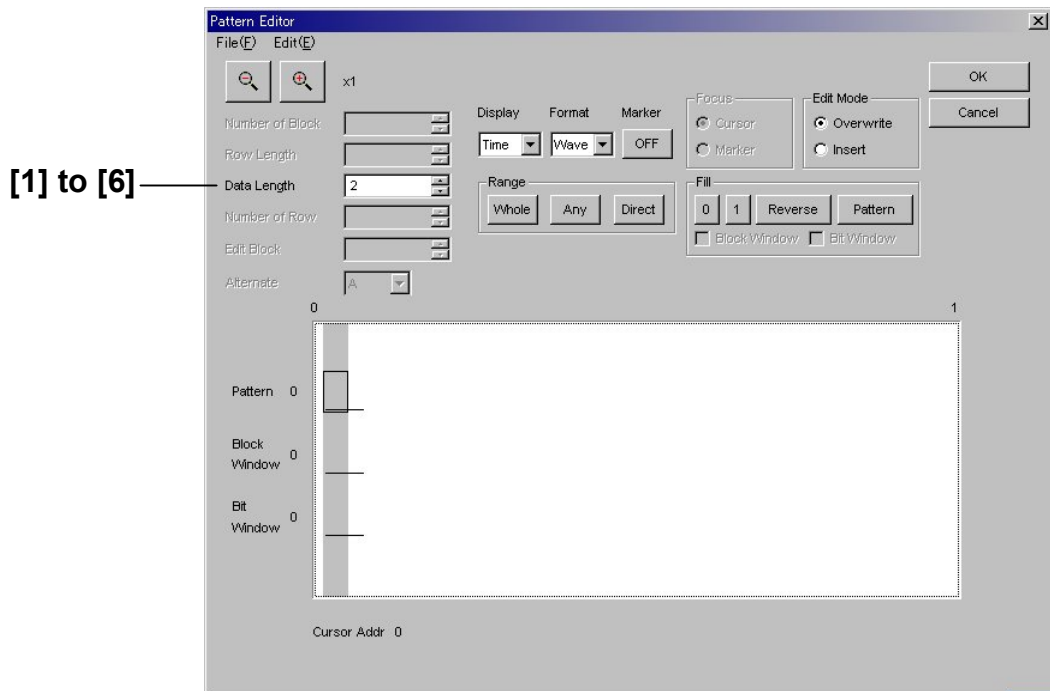


Figure 8.4.3.4-2 Data pattern setting (Pattern Editor)

Table 8.4.3.4-1 Data pattern setting commands

No.	Setting Items	commands
[1]	Data Length	DLN
		DLN?
[2]	No label (Pattern setting)	PDT
		PDT?
[3]	No label (Pattern setting)	BDT
		BDT?
[4]	No label (Data inversion)	DRA
[5]	No label (Data inversion)	DRD
[6]	No label (All 0s or 1s)	ALL
[7]	No label (Pattern setting)	WRT
[8]	No label (Pattern reading)	RED?

**DLN <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 2 to 134217728                      2 to 134,217,728 bits, in 1-bit steps
	<b>Note:</b> At 2 ch Combination, the setting range and Step are doubled. At 4 ch Combination, the setting range and Step are quadrupled.
Function	Sets the pattern length during Data pattern reception.
Example	To set the pattern length during Data pattern reception to 100 bits: > DLN 100
Compatibility	Compatible with the MP1632C and MP1762D.

**DLN?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX10)
Function	Queries the pattern length during Data pattern reception.
Example	> DLN? < DLN                      2 < DLN 134217728
Compatibility	Compatible with the MP1632C and MP1762D.

## PDT <start>,<end>,<data>

Parameter	<p>&lt;start&gt;=&lt;NON-DECIMAL PROGRAM DATA&gt;                  #H0 to #H7FFFFFFF      0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal)</p> <p>&lt;end&gt;=&lt;NON-DECIMAL PROGRAM DATA&gt;                  #H0 to #H7FFFFFFF      0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal)</p> <p><b>Note:</b>                  The maximum setting is the pattern length.                  At 2 ch Combination, the setting range is doubled.                  At 4 ch Combination, the setting range is quadrupled.</p> <p>&lt;data&gt;=&lt;NON-DECIMAL PROGRAM DATA&gt;                  #H***...*      Specify pattern data in hexadecimal format.                  1 to 400 characters (pattern data of 400 × 4 bits)                  Specify a character string consisting of 0 to 9 and A to F.                  If the last character string of the pattern data is short of a hexadecimal unit (4 bits), add 0(s) up to the last bit to make a hexadecimal string.</p> <p>#B***...*      Specify pattern data in binary format.                  1 to 400 characters (pattern data of 400 bits)                  Specify a character string consisting of 0 and 1.</p>
Function	Sets the pattern data from the <start> to <end> addresses during Data pattern reception. The set data overwrites the specified range.
Example	To set 0 to 1F addresses of the pattern data to 5A: > PDT #H0,#H1F,#H5A
Compatibility	Compatible with the MP1632C.

**Note:** When the number of bits specified in <data> is smaller than that of the range specified by <start> and <end>, <data> is set repeatedly for the specified range.

<Example>

- <start>=#H0, <end>=#H1F, <data>=#HABC  
 Setting data: ABCABCAB
- <start>=#H0, <end>=#H7, <data>=#B011  
 Setting data: 01101101

When the number of bits specified in <data> is larger than that of the range specified by <start> and <end>, <data> outside the specified range is cut off.

<Example>

- <start>=#H0, <end>=#HF, <data>=#HABCDEF  
 Setting data: ABCD
- <start>=#H0, <end>=#H3, <data>=#B01100110  
 Setting data: 0110

**PDT? <start>**


---

Parameter	<p>&lt;start&gt;=&lt;NON-DECIMAL PROGRAM DATA&gt;          #H0 to #H7FFFFFFF      0 to 7FFFFFFF bits (Specify in hexadecimal)</p> <p><b>Note:</b></p> <p style="padding-left: 40px;">The maximum setting is the pattern length.          At 2 ch Combination, the setting range is doubled.          At 4 ch Combination, the setting range is quadrupled.</p>
Response	<p>&lt;data&gt;=&lt;HEXADECIMAL NUMERIC RESPONSE DATA&gt;          #H***...*</p> <p style="padding-left: 40px;">Returns the pattern data in hexadecimal format.          Within 400 characters (pattern data of 400 × 4 bits)</p>
Function	<p>Queries 400 × 4 bits of the pattern data from the &lt;start&gt; address during Data pattern reception.</p>
Example	<p>To query the pattern data from 0 address:          &gt; PDT? #H0          &lt; PDT #H0123456789ABCDEF... (minimum: 1, maximum: 400 in hexadecimal)          &lt; PDT #H0</p>
Compatibility	<p>Compatible with the MP1632C.</p>

**BDT <start>,<end>,<bdata>**

Parameter	<p>&lt;start&gt;=&lt;NON-DECIMAL PROGRAM DATA&gt;                  #H0 to #H7FFFFFFF      0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal)</p> <p>&lt;end&gt;=&lt;NON-DECIMAL PROGRAM DATA&gt;                  #H0 to #H7FFFFFFF      0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal)</p> <p><b>Note:</b>                  The maximum setting is the pattern length.                  At 2 ch Combination, the setting range is doubled.                  At 4 ch Combination, the setting range is quadrupled.</p> <p>&lt;bdata&gt;=&lt;ARBITRARY BLOCK PROGRAM DATA&gt;                  #XYYY&lt;binary&gt;            X: Number of YYY digits                                                    YYY: Number of bytes of &lt;binary&gt;, 1 to 16,777,216 bytes</p> <p><b>Note:</b>                  At 2 ch Combination, the setting range is doubled.                  At 4 ch Combination, the setting range is quadrupled.                  During 4ch Combination: 1 to 67,108,864 bytes                  &lt;binary&gt;: Binary data up to maximum bytes</p>
Function	<p>Sets binary data of the pattern data from &lt;start&gt; to &lt;end&gt; addresses during Data pattern reception.</p>
Example	<p>The set data overwrites the specified range.                  To set 0 to 1F addresses of the pattern data to 41:                  &gt; BDT #H0,#H1F,#11A(A=41)</p>
Compatibility	<p>Compatible with the MP1632C.</p>

**BDT? <start>[,<size>]**

Parameter	<p>&lt;start&gt;=&lt;NON-DECIMAL PROGRAM DATA&gt;          #H0 to #H7FFFFFFF      0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal)</p> <p>[&lt;size&gt;]=&lt;NR1 NUMERIC PROGRAM DATA&gt;          1 to 16777216          1 to 16,777,216 bytes, in 1-byte steps</p> <p><b>Note:</b></p> <p style="padding-left: 40px;">The maximum setting is the pattern length.          At 2 ch Combination, the setting range is doubled.          At 4 ch Combination, the setting range is quadrupled.</p>
Response	<bdata>=<DEFINITE LENGTH ARBITRARY BLOCK RESPONSE DATA>
Function	Queries binary data of up to the setting pattern when [<size>] is omitted.
Example	<p>Queries binary data of bytes specified by &lt;size&gt; from &lt;start&gt; address of the pattern data during Data pattern reception.</p> <p>To query 2 bytes of binary data from 0 address of the pattern data during Data pattern reception:          &gt; BDT? #H0,2          &lt; BDT #12AA</p> <p>To query the setting pattern of binary data from 0 address of the pattern data during Data pattern generation:          &gt; BDT? #H0          &lt; BDT #516000AA... (Binary data of 16,777,216 bytes)</p>
Compatibility	Compatible with the MP1632C.

### DRA <start>,<end>

Parameter	<start>=<NON-DECIMAL PROGRAM DATA> #H0 to #H7FFFFFFF      0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal) <end>=<NON-DECIMAL PROGRAM DATA> #H0 to #H7FFFFFFF      0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal)
	<b>Note:</b> The maximum setting is the pattern length. At 2 ch Combination, the setting range is doubled. At 4 ch Combination, the setting range is quadrupled.
Function	Inverts the data in the program during Data pattern reception.
Example	Specify the inversion range by the <start> and <end> addresses. To invert 0 to 4F addresses of the pattern data: > DRA #H0,#H4F
Compatibility	Compatible with the MP1632C.

### DRD <start>,<delta>

Parameter	<start>=<NON-DECIMAL PROGRAM DATA> #H0 to #H7FFFFFFF      0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal) <delta>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 134217728          1 to 134,217,728 bits, in 1-bit steps
	<b>Note:</b> The maximum setting is the pattern length. At 2 ch Combination, the setting range is doubled. At 4 ch Combination, the setting range is quadrupled.
Function	Inverts the data in the program during Data pattern reception.
Example	Specify the inversion range by the number of bits from the <start> address (relative specification). To invert 128 bits of data from 0 address of the pattern data: > DRD #H0,128
Compatibility	Compatible with the MP1632C.

### ALL <data>

Parameter	<data>=<DECIMAL NUMERIC PROGRAM DATA> 0          Fills all bits with 0s. 1          Fills all bits with 1s.
Function	Sets 0s or 1s for all data in the program during Data pattern reception.
Example	To set 1s to all bits of the pattern data. > ALL 1
Compatibility	Compatible with the MP1632C and MP1762D.



**WRT <byte>,<address>**


---

Parameter	<byte>=<DECIMAL NUMERIC PROGRAM DATA> Pattern transmission byte number 1 to 16777216                      1 to 16,777,216, in 1-byte steps <b>Note:</b> At 2 ch Combination, the setting range is doubled. At 4 ch Combination, the setting range is quadrupled. <address>=<DECIMAL NUMERIC PROGRAM DATA> Pattern input start address 0 to 134217720                      0 to 134,217,720, in single step <b>Note:</b> At 2 ch Combination, the setting range is doubled. At 4 ch Combination, the setting range is quadrupled.
Function	Sets the number of bytes and the start address for binary transmission during Data pattern reception.
Example	To transmit 16 bites of data from 0 address: > WRT 16,0 ABCDEFGHIJKLMNOP (16 bites of binary data)
Compatibility	Compatible with the MP1632C and MP1762D.

**RED? <byte>,<address>**


---

Parameter	<byte>=<DECIMAL NUMERIC PROGRAM DATA> Pattern transmission byte number 1 to 16777216                      1 to 16,777,216, in 1-byte steps <b>Note:</b> At 2 ch Combination, the setting range is doubled. At 4 ch Combination, the setting range is quadrupled. <address>=<DECIMAL NUMERIC PROGRAM DATA> Pattern output start address 0 to 134217720                      0 to 134,217,720, in single step <b>Note:</b> At 2 ch Combination, the setting range is doubled. At 4 ch Combination, the setting range is quadrupled.
Response	Data pattern string (binary data)
Function	Sets the number of bytes and the start address for read using binary transmission during Data pattern reception.
Example	To read 16 bytes of data from 0 address: > RED? 16,0 < ABCDEFGHIJKLMNOP (16 bytes of binary data)
Compatibility	Compatible with the MP1632C and MP1762D.

8.4.3.5 Mixed-Data pattern setting commands

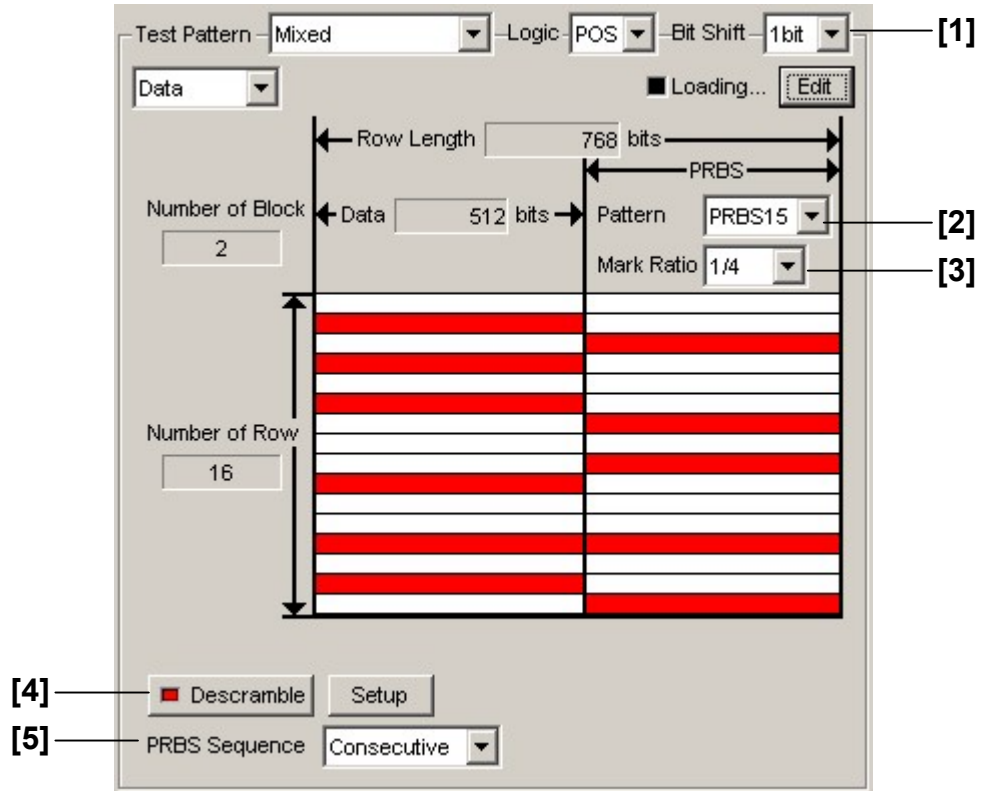


Figure 8.4.3.5-1 Mixed-Data pattern setting

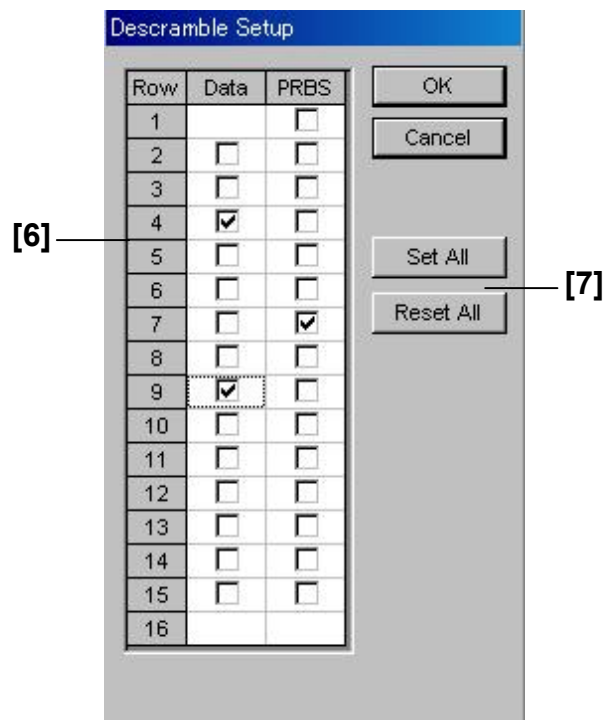


Figure 8.4.3.5-2 Descramble Setup

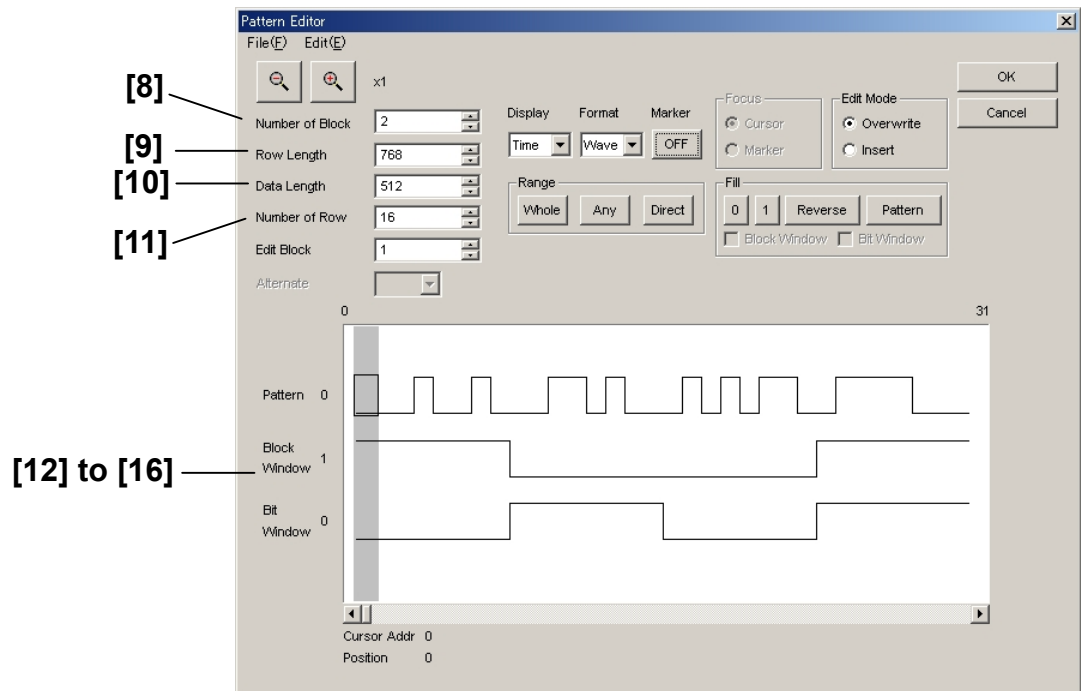


Figure 8.4.3.5-3 Mixed-Data pattern setting (Pattern Editor)

Table 8.4.3.5-1 Mixed-Data pattern setting commands

No.	Setting Items	Commands
[1]	Bit Shift	MPB
		MPB?
[2]	PRBS Pattern	MPP
		MPP?
[3]	PRBS Marl Ratio	MPM
		MPM?
[4]	Descramble ON/OFF	MSC
		MSC?
[5]	PRBS Sequence	MPS
		MPS?
[6]	Setup	MSS
		MSS?
[7]	Set All/Reset All	MSL
[8]	Number of Block	MBL
		MBL?
[9]	Row Length	MRL
		MRL?
[10]	Data Length	MDL
		MDL?
[11]	Number of Row	MRW
		MRW?
[12]	No label (Pattern setting)	MDW
		MDW?
[13]	No label (Pattern setting)	MBW
		MBW?
[14]	No label (Data inversion)	MDA
[15]	No label (Data inversion)	MDD
[16]	No label (All 1s or 0s)	MDF

**MPB <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA>
	0                                   1-bit Shift
	1                                   3-bit Shift
Function	Sets the bit shift for the PRBS pattern during Mixed Data pattern reception.
Example	To set the bit shift for the PRBS pattern during Mixed Data pattern reception to 1-bit shift: > MPB 0
Compatibility	Incompatible with existing models.

**MPB?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the bit shift for the PRBS pattern during Mixed Data pattern reception.
Example	> MPB? < MPB 0
Compatibility	Incompatible with existing models.

**MPP <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA>
	2 $2^7-1$
	3 $2^9-1$
	4 $2^{10}-1$
	5 $2^{11}-1$
	6 $2^{15}-1$
	7 $2^{20}-1$
	8 $2^{23}-1$
	9 $2^{31}-1$
Function	Sets the number of stages of the PRBS pattern during Mixed Data pattern reception.
Example	To set the number of stages of the PRBS pattern during Mixed Data pattern reception to $2^7-1$ : > MPP 2
Compatibility	Incompatible with existing models.

**MPP?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the number of stages of the PRBS pattern during Mixed Data pattern reception.
Example	> MPP? < MPP 2
Compatibility	Incompatible with existing models.

### MPM <mratio>

Parameter	<mratio>=<DECIMAL NUMERIC PROGRAM DATA>
	POS NEG
	0 0/8 8/8
	1 1/8 7/8
	2 1/4 3/4
	3 1/2 1/2INVT
Function	Sets the mark ratio for the PRBS pattern during Mixed Data pattern reception.
Example	To set the PRBS pattern mark (Positive) mark ratio to 0/8 during Mixed Data pattern reception: > MPM 0
Compatibility	Incompatible with existing models.

### MPM?

Response	<mratio>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the mark ratio for the PRBS pattern during Mixed Data pattern reception.
Example	> MPM? < MPM 0
Compatibility	Incompatible with existing models.

### MSC <numeric>

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA>
	0 Descramble OFF
	1 Descramble ON
Function	Sets Descramble ON/OFF of the PRBS7 stage during pattern reception.
Example	To set Descramble ON of the PRBS7 stage during pattern reception: > MSC 1
Compatibility	Incompatible with existing models.

### MSC?

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the Descramble ON/OFF state of the PRBS7 stage during pattern reception.
Example	> MSC? < MSC 1
Compatibility	Incompatible with existing models.

**MPS <sequence>**


---

Parameter	<sequence>=<DECIMAL NUMERIC PROGRAM DATA> 0 Restart: Inconsecutive PRBS pattern 1 Consecutive: Consecutive PRBS pattern
Function	Sets the PRBS pattern sequence during Mixed Data pattern reception.
Example	To set the PRBS pattern sequence during Mixed Data pattern reception to Restart: > MPS 0
Compatibility	Incompatible with existing models.

**MPS?**


---

Response	<sequence>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the PRBS pattern sequence during Mixed Data pattern reception.
Example	> MPS? < MPS 0
Compatibility	Incompatible with existing models.

**MSS <row>,<data>,<prbs>**


---

Parameter	<row>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 16 1 to 16 rows, in 1-row steps <data>=<DECIMAL NUMERIC PROGRAM DATA> 0 Descramble OFF 1 Descramble ON Note, however, that Descramble OFF is fixed for data of 1 row. <prbs>=<DECIMAL NUMERIC PROGRAM DATA> 0 Descramble OFF 1 Descramble ON
Function	Sets Descramble ON or OFF for the Data and PRBS of the specified Row.
Example	To set the Descramble settings for 1 Row to Data OFF, PRBS ON: > MSS 1,0,1
Compatibility	Incompatible with existing models.

**MSS? <row>**


---

Parameter	<row>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 16 1 to 16 rows, in 1-row steps
Response	<data>,<prbs>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the descramble setting (ON/OFF) for the Data and PRBS of the specified Row.
Example	> MSS? 1 < MSS 0,1
Compatibility	Incompatible with existing models.

### **MSL <numeric>**

---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 0 All Reset 1 All Set
Function	Selects or cancels all Descramble settings.
Example	To select all Descramble settings: > MSL 1
Compatibility	Incompatible with existing models.

### **MBL <numeric>**

---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 511 1 to 511 blocks, in 1-block steps
Function	Sets the number of blocks during Mixed Data pattern reception.
Example	To set the number of blocks during Mixed Data pattern reception to 1: > MBL 1
Compatibility	Incompatible with existing models.

### **MBL?**

---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX3)
Function	Queries the number of blocks during Mixed Data pattern reception.
Example	> MBL? < MBL 1 < MBL 511
Compatibility	Incompatible with existing models.

### **MRW <numeric>**

---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 16 1 to 16 rows, in 1-row steps
Function	Sets the number of rows within one block that are edited during Mixed Data pattern reception.
Example	To set the number of rows within one block that are edited during Mixed Data pattern reception to 1: > MRW 1
Compatibility	Incompatible with existing models.

### **MRW?**

---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX2)
Function	Queries the number of rows within one block that are edited during Mixed Data pattern reception.
Example	> MRW? < MRW 1 < MRW 16
Compatibility	Incompatible with existing models.



**MRL <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 768 to 2281701376            768 to 2,281,701,376 bits, in 128-bit steps
	<b>Note:</b> At 2 ch Combination, the setting range and Step are doubled. At 4 ch Combination, the setting range and Step are quadrupled.
Function	Sets the pattern length of 1 row that is edited during Mixed Data pattern reception.
Example	To set pattern length to 768 bits: > MRL 768
Compatibility	Incompatible with existing models.

**MRL?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX11)
Function	Queries the pattern length of 1 row that is edited during Mixed Data pattern reception.
Example	> MRL? < MRL            768 < MRL 2281701376
Compatibility	Incompatible with existing models.

**MDL <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 512 to 134217728            512 to 134,217,728 bits, in 64-bit steps
	<b>Note:</b> At 2 ch Combination, the setting range and Step are doubled. At 4 ch Combination, the setting range and Step are quadrupled.
Function	Sets the Data pattern length that is edited during Mixed Data pattern reception.
Example	To set the pattern length to 512 bits: > MDL 512
Compatibility	Incompatible with existing models.

**MDL?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX10)
Function	Queries the Data pattern length that is edited during Mixed Data pattern reception.
Example	> MDL? < MDL            512 < MDL 134217728
Compatibility	Incompatible with existing models.

## MDW <block>, <start>, <end>, <data>

Parameter	<p>&lt;block&gt;=&lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  1 to 511                      1 to 511 blocks, in 1-block steps</p> <p>&lt;start&gt;=&lt;NON-DECIMAL PROGRAM DATA&gt;                  #H0 to #H7FFFFFFF            0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal)</p> <p>&lt;end&gt;=&lt;NON-DECIMAL PROGRAM DATA&gt;                  #H0 to #H7FFFFFFF            0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal)</p> <p><b>Note:</b></p> <p style="padding-left: 40px;">The maximum setting is the pattern length.                  At 2 ch Combination, the setting range is doubled.                  At 4 ch Combination, the setting range is quadrupled.</p> <p>&lt;data&gt;=&lt;NON-DECIMAL PROGRAM DATA&gt;                  #H***...*                      Specify pattern data in hexadecimal format.                  1 to 400 characters (pattern data of 400 × 4 bits)                  Specify a character string consisting of 0 to 9 and A to F.                  If the last character string of the pattern data is short of a hexadecimal unit (4 bits), add 0(s) up to the last bit to make a hexadecimal string.</p> <p>#B***...*                      Specify pattern data in binary format.                  1 to 400 characters (pattern data of 400 bits)                  Specify a character string consisting of 0 and 1.</p>
Function	Sets the pattern data from the <start> to <end> addresses during Mixed Data pattern reception. The set data overwrites the specified range.
Example	To set block 1 pattern data from 0 to 1F addresses to 11: > MDW 1,#H0,#H1F,#H11
Compatibility	Incompatible with existing models.

## MDW? <block>, <start>

Parameter	<p>&lt;block&gt;=&lt;DECIMAL NUMERIC PROGRAM DATA&gt;                  1 to 511                      1 to 511 blocks, in 1-block steps</p> <p>&lt;start&gt;=&lt;NON-DECIMAL PROGRAM DATA&gt;                  #H0 to #H7FFFFFFF            0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal)</p> <p><b>Note:</b></p> <p style="padding-left: 40px;">The maximum setting is the pattern length.                  At 2 ch Combination, the setting range is doubled.                  At 4 ch Combination, the setting range is quadrupled.</p>
Response	<p>&lt;data&gt;=&lt;HEXADECIMAL NUMERIC RESPONSE DATA&gt;                  #H***...*                      Returns the pattern data in hexadecimal format.                  Within 400 characters (pattern data of 400 × 4 bits)</p>
Function	Queries 400 × 4 bits of the pattern data from the <start> address during Mixed Data pattern reception.
Example	To query block 1 pattern data from 0 address: > MDW? 1,#H0 < MDW #H0123456789ABCDEF... (minimum: 1, maximum: 400 in hexadecimal) < MDW #H0
Compatibility	Incompatible with existing models.





**MDF <block>,<range>,<page>,<data>**

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 511                    1 to 511 blocks, in 1-block steps <range>=<DECIMAL NUMERIC PROGRAM DATA> 0                            Specifies a page (one page is defined as 128 bits). 1                            Specifies all data. <page>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 1048576                1 to 1,048,576 (Max.) pages, in 1-page steps Max=PatternLength/128 (rounding up fractions) Specify "0" when <range> is set to ALL. <data>=<DECIMAL NUMERIC PROGRAM DATA> 0                            Fills the specified range with 0s. 1                            Fills the specified range with 1s.
	<b>Note:</b> The maximum setting value is the pattern length.
Function	Sets 0s or 1s for the specified page or all data in the program during Mixed Data pattern reception.
Example	To set page 3 of block 1 to 0: > MDF 1,0,3,0
Compatibility	Incompatible with existing models.

8.4.3.6 Sequence pattern setting commands

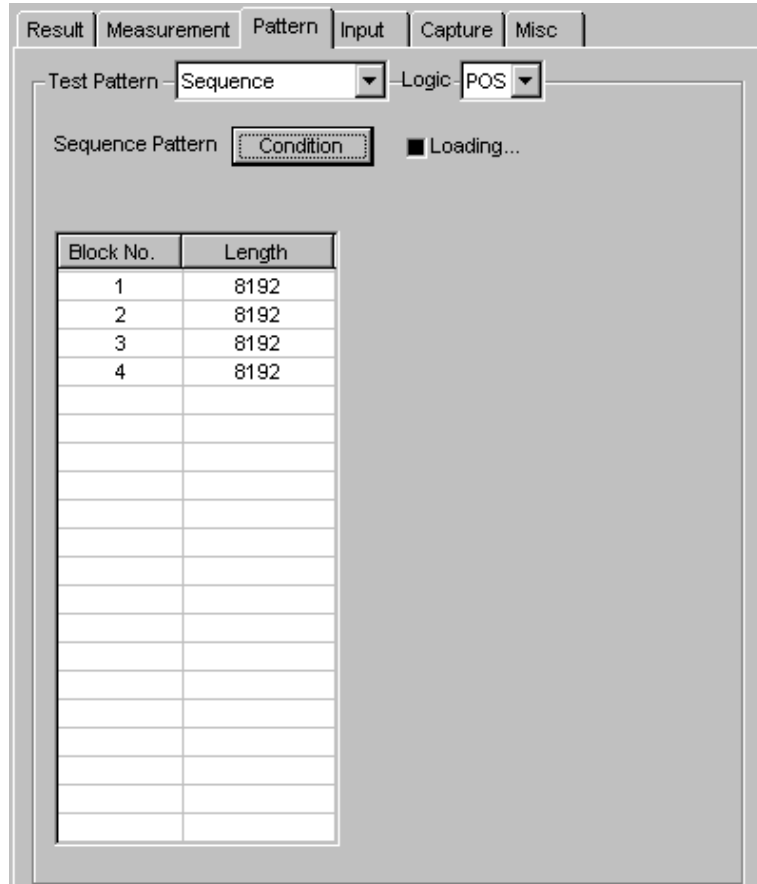


Figure 8.4.3.6-1 Sequence pattern setting

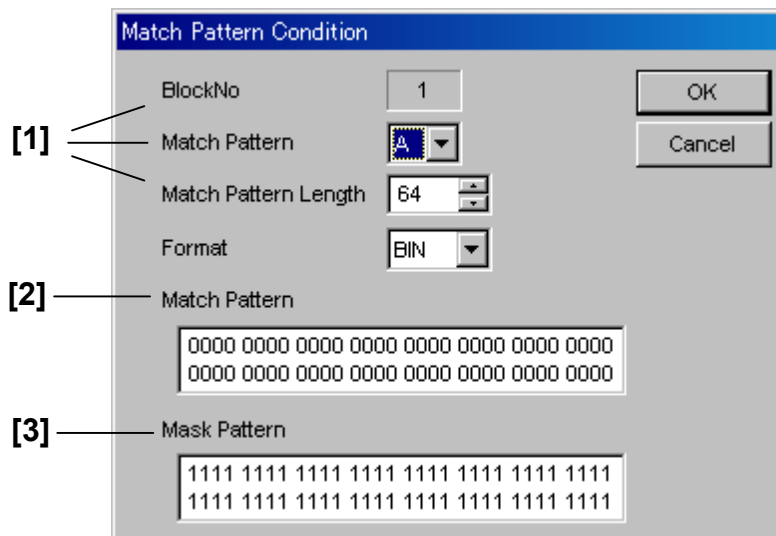


Figure 8.4.3.6-2 Match Pattern Condition



**Table 8.4.3.6-1 Sequence pattern setting commands**

No.	Setting Items	Commands
[1]	BlockNo Match Pattern Match Pattern Length	SQL
		SQL?
[2]	Match Pattern	SQM
		SQM?
[3]	Mask Pattern	SQE
		SQE?
[4]	Add	SAD
		SAD?
[5]	Copy	SCO
[6]	Cut	SCU
[7]	Paste	SPA
[8]	Clear All	SCD
[9]	Number of Block	SLG
		SLG?
[10]	No label (Pattern setting)	SDW
		SDW?
[11]	No label (Pattern setting)	SBW
		SBW?
[12]	No label (Data inversion)	SDA
[13]	No label (Data inversion)	SDD
[14]	No label (All 0s or 1s)	SDF



**SQL <block>,<content>,<length>**


---

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 blocks, in 1-block steps <content>=<DECIMAL NUMERIC PROGRAM DATA> 0                                  Pattern A 1                                  Pattern B <length>=<DECIMAL NUMERIC PROGRAM DATA> 4 to 64                          4 to 64 bits, in 4-bit steps
Function	Sets the pattern length of the Match pattern during Sequence pattern setting.
Example	To set the pattern length of the Match pattern A of block 1 to 4 bits during Sequence pattern setting: > SQL 1,0,4
Compatibility	Incompatible with existing models.

**SQL? <block>,<content>**


---

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 blocks, in 1-block steps <content>=<DECIMAL NUMERIC PROGRAM DATA>
Response	<length>=<NR1 NUMERIC RESPONSE DATA> (FIX2) 4 to 64                          4 to 64 bits
Function	Queries the pattern length of the Match pattern during Sequence pattern setting.
Example	To query the pattern length of the Match pattern A of block 1 during Sequence pattern setting. > SQL? 1,0 < SQL    4 < SQL 64
Compatibility	Incompatible with existing models.

### **SQM <block>,<content>,<data>**

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 blocks, in 1-block steps <content>=<DECIMAL NUMERIC PROGRAM DATA> 0                                  Pattern A 1                                  Pattern B <data>=<NON-DECIMAL NUMERIC PROGRAM DATA> #H**...*                      1 to 16 characters (Specify pattern data in hexadecimal format) #B**...*                      1 to 64 characters (Specify pattern data in binary format)
Function	The editable data length depends on the Length setting.
Example	Edits the Match pattern during Sequence pattern setting. To edit one binary character of the Match pattern A of block 1 during Sequence pattern setting: > SQM 1,0,#H1
Compatibility	Incompatible with existing models.

### **SQM? <block>,<content>,<form>**

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 blocks, in 1-block steps <content>=<DECIMAL NUMERIC PROGRAM DATA> 0                                  Pattern A 1                                  Pattern B <form>=<DECIMAL NUMERIC PROGRAM DATA> 0                                  BIN 1                                  HEX
Response	<data>=<HEXADECIMAL NUMERIC RESPONSE DATA> #H**...*                      Pattern data is returned in hexadecimal format. #B**...*                      Pattern data is returned in binary format.
Function	Queries the Match pattern that is set during Sequence pattern setting.
Example	To query the Match pattern A of block 1 that is set during Sequence pattern setting in hexadecimal format: > SQM? 1,0,1 < SQM #H1
Compatibility	Incompatible with existing models.

**SQE <block>,<content>,<data>**


---

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128                    1 to 128 blocks, in 1-block steps <content>=<DECIMAL NUMERIC PROGRAM DATA> 0                            Pattern A 1                            Pattern B <data>=<NON-DECIMAL PROGRAM DATA> #H**...*                    1 to 16 characters (Specify pattern data in hexadecimal format) #B**...*                    1 to 64 characters (Specify pattern data in binary format)
Function	The editable data length depends on the Length setting. Edits the Mask pattern during Sequence pattern setting.
Example	To edit one binary character of the Mask pattern A of block 1 during Sequence pattern setting in hexadecimal format: > SQE 1,0,#H1
Compatibility	Incompatible with existing models.

**SQE? <block>,<content>,<form>**


---

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128                    1 to 128 blocks, in 1-block steps <content>=<DECIMAL NUMERIC PROGRAM DATA> <form>=<DECIMAL NUMERIC PROGRAM DATA> 0                            BIN 1                            HEX
Response	<data>=<HEXADECIMAL NUMERIC RESPONSE DATA> #H**...*                    Pattern data is returned in hexadecimal format. #B**...*                    Pattern data is returned in binary format.
Function	Queries the Mask pattern that is set during Sequence pattern setting.
Example	To query the Mask pattern A of block 1 that is set during Sequence pattern setting in hexadecimal format: > SQE? 1,0,1 < SQE #H1
Compatibility	Incompatible with existing models.



**SCD**


---

Function	Clears all the settings during Sequence pattern reception.
Example	> SCD
Compatibility	Incompatible with existing models.

**SLG <block>,<numeric>**


---

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128                                    1 to 128 blocks, in 1-block steps <numeric>=<DECIMAL NUMERIC PROGRAM DATA> 8192 to 1048576                        8,192 to 1,048,576 bits, in 128-bit steps Be sure to set a value so that the following condition is satisfied. Number of blocks × Block length ≤ 128 Mbits
Function	Sets the length of the specified block during Sequence pattern reception.
Example	To set the length of block 1 to 1 bit during Sequence pattern reception: > SLG 1,8192
Compatibility	Incompatible with existing models.

**SLG? <block>**


---

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128                                    1 to 128 blocks, in 1-block steps
Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX7) 8192 to 1048576                        8,192 to 1,048,576 bits
Function	Queries the length of the specified block during Sequence pattern reception.
Example	To query the length of block 1 during Sequence pattern reception: > SLG? 1 < SLG    8192 < SLG 1048576
Compatibility	Incompatible with existing models.

### SDW <block>,<start>,<end>,<data>

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 blocks, in 1-block steps <start>=<NON-DECIMAL PROGRAM DATA> #H0 to #HFFFFFF              0 to FFFFF bits, in 1-bit steps (Specify in hexadecimal) <end>=<NON-DECIMAL PROGRAM DATA> #H0 to #HFFFFFF              0 to FFFFF bits, in 1-bit steps (Specify in hexadecimal)
	<p><b>Note:</b>                      The maximum setting value is the pattern length.</p> <data>=<NON-DECIMAL PROGRAM DATA> #H***...*                      Specify pattern data in hexadecimal format. 1 to 400 characters (pattern data of 400 × 4 bits) Specify a character string consisting of 0 to 9 and A to F. If the last character string of the pattern data is short of a hexadecimal unit (4 bits), add 0(s) up to the last bit to make a hexadecimal string. #B***...*                      Specify pattern data in binary format. 1 to 400 characters (pattern data of 400 bits) Specify a character string consisting of 0 and 1.
Function	Sets the binary data from <start> to <end> addresses of the pattern data during Sequence pattern reception.
Example	The set data overwrites the specified range. To set the pattern data of block 1 data from 0 to FFFFF addresses to 5A: > SDW 1,#H0,#HFFFFFF,#H5A
Compatibility	Incompatible with existing models.

### SDW? <block>,<start>

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 blocks, in 1-block steps <start>=<NON-DECIMAL PROGRAM DATA> #H0 to #HFFFFFF              0 to FFFFF bits, in 1-bit steps (Specify in hexadecimal)
	<p><b>Note:</b>                      The maximum setting value is the pattern length.</p> <data>=HEXADECIMAL NUMERIC RESPONSE DATA #H***...*                      Specify pattern data in hexadecimal format. Within 400 characters (pattern data of 400 × 4 bits)
Response	
Function	Queries the pattern data of 400 .× 4 bits from the <start> address during Sequence pattern reception.
Example	To query 400 × 4 bits of pattern data from 0 address: > SDW? 1,#H0 < SDW #H0123456789ABCDEF... (minimum: 1, maximum: 400 in hexadecimal) < SDW #H0
Compatibility	Incompatible with existing models.

**SBW <block>,<start>,<end>,<bdata>**

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 blocks, in 1-block steps <start>=<NON-DECIMAL PROGRAM DATA> #H0 to #HFFFFFF              0 to FFFFF bits, in 1-bit steps (Specify in hexadecimal) <end>=<NON-DECIMAL PROGRAM DATA> #H0 to #HFFFFFF              0 to FFFFF bits, in 1-bit steps (Specify in hexadecimal)  <b>Note:</b> The maximum setting value is the pattern length. <bdata>=<ARBITRARY BLOCK PROGRAM DATA> #XYYY<binary>                X: Number of YYY digits YYY: Number of bytes of <binary>, 1 to 131,072 bytes <binary>: Binary data up to 131,072 bytes
Function	Sets the binary data from <start> to <end> addresses of the pattern data during Sequence pattern reception. The set data overwrites the specified range.
Example	To set block 1 data from 0 to FFFFF addresses to 44: > SBW 1,#H0,#HFFFFFF,#11D
Compatibility	Incompatible with existing models.

**SBW? <block>,<start>[,<size>]**

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 blocks, in 1-block steps <start>=<NON-DECIMAL PROGRAM DATA> #H0 to #HFFFFFF              0 to FFFFF bits, in 1-bit steps (Specify in hexadecimal)  <b>Note:</b> The maximum setting value is the pattern length. [<size>]=<NR1 NUMERIC PROGRAM DATA> 1 to 131072                    1 to 131,072 bytes, in 1-byte steps
Response	<bdata>=<DEFINITE LENGTH ARBITRARY BLOCK RESPONSE DATA> #XYYY<binary>                X: Number of YYY digits YYY: Number of bytes of <binary>, 1 to 131,072 bytes <binary>: Binary data up to 131,072 bytes
Function	Queries the setting pattern of binary data when [<size>] is omitted. Queries binary data of bytes specified by <size> from the <start> address of the pattern data during Sequence pattern reception.
Example	To query 2 bytes of block 1 data from 0 address: > SBW? 1,#H0,2 < SBW #12DD To query the setting pattern of block 1 data from 0 address: > SBW? 1,#H0 < SBW #516000AA... (16,000 bytes of binary data)
Compatibility	Incompatible with existing models.

### SDA <block>,<start>,<end>

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128	1 to 128 blocks, in 1-block steps
	<start>=<NON-DECIMAL PROGRAM DATA> #H0 to #HFFFFFF	0 to FFFFF bits, in 1-bit steps (Specify in hexadecimal)
	<end>=<NON-DECIMAL PROGRAM DATA> #H0 to #HFFFFFF	0 to FFFFF bits, in 1-bit steps (Specify in hexadecimal)

**Note:**

The maximum setting value is the pattern length.

Function	Inverts the data in the program during Sequence pattern reception. Specify the inversion range by the <start> and <end> addresses.
Example	To invert block 3 data from 0 to FFF addresses: > SDA 3,#H0,#HFFF
Compatibility	Incompatible with existing models.

### SDD <block>,<start>,<delta>

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128	1 to 128 blocks, in 1-block steps
	<start>=<NON-DECIMAL PROGRAM DATA> #H0 to #HFFFFFF	0 to FFFFF bits, in 1-bit steps (Specify in hexadecimal)
	<delta>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 1048576	1 to 1,048,576 bits, in 1-bit steps

**Note:**

The maximum setting value is the pattern length.

Function	Inverts the data in the program during Sequence pattern reception. Specify the inversion range by the number of bits from the start address (relative specification).
Example	To invert block 5 data from bit 0 to bit 128 addresses: > SDD 5,#H0,128
Compatibility	Incompatible with existing models.



**SDF <block>,<range>,<page>,<data>**


---

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 blocks, in 1-block steps <range>=<DECIMAL NUMERIC PROGRAM DATA> 0                                  Specifies a page (one page is defined as 128 bits) 1                                  Specifies all data. <page>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 8192                      1 to 8,192 (Max.) pages, in 1-page steps Max=Pattern Length/128 (rounding up fractions) Specify "0" when <range> is set to ALL. <data>=<DECIMAL NUMERIC PROGRAM DATA> 0                                  Fills the specified range with 0s. 1                                  Fills the specified range with 1s.
Function	Sets 0s or 1s for the specified page or all data in the program during Sequence pattern reception.
Example	To set 0s for the first page in block 1: > SDF 1,0,1,0
Compatibility	Incompatible with existing models.

8.4.3.7 Mask setting commands

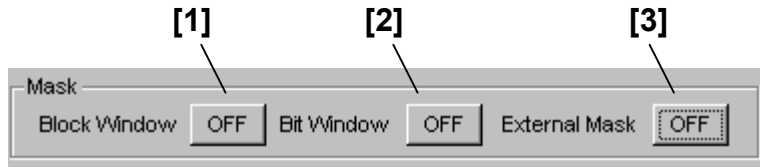


Figure 8.4.3.7-1 Mask ON/OFF setting

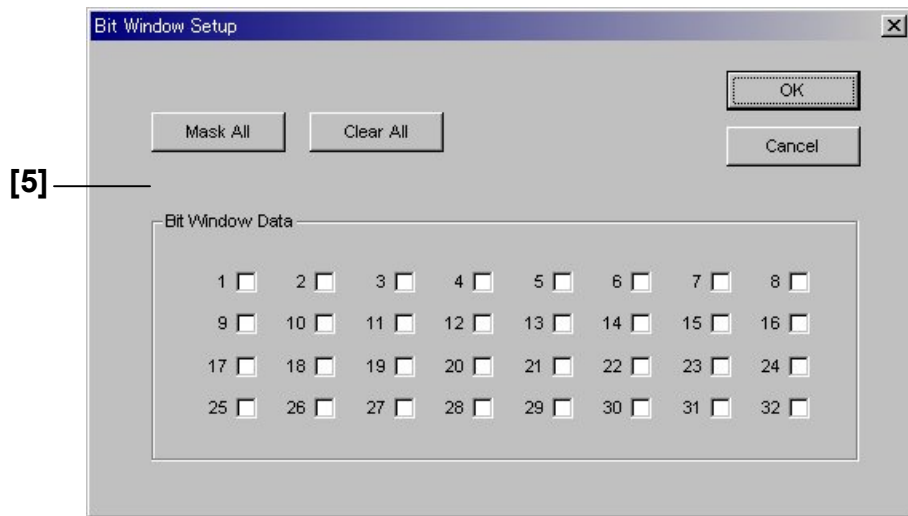


Figure 8.4.3.7-2 Bit Window setting (PRBS pattern)

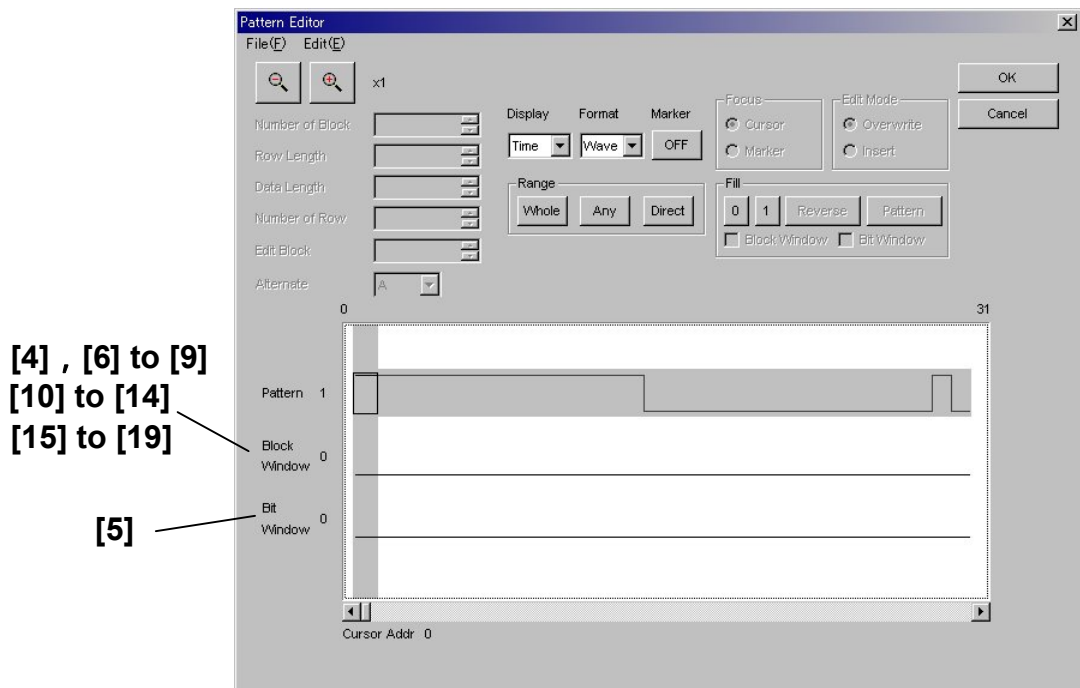


Figure 8.4.3.7-3 Bit Window, Block Window setting (Zero-Substitution, Data, Mixed-Data, Sequence pattern)

Table 8.4.3.7-1 Mask setting commands

No.	Setting Items	Commands
[1]	Block Window ON/OFF	MGE
		MGE?
[2]	Bit Window ON/OFF	MSE
		MSE?
[3]	External Mask ON/OFF	MEX
		MEX?
[4]	Block Window (Zero-Substitution, Data)	MGB
		MGB?
[5]	Bit Window	CHM
		CHM?
[6]	Block Window (Pattern setting)	BDM
		BDM?
[7]	Block Window (Data inversion)	DRM
[8]	Block Window (Data inversion)	DBM
[9]	Block Window (All 0s or 1s)	ALB
[10]	Block Window (Mixed Data)	MDB
		MDB?
[11]	Block Window (Pattern setting)	MBM
		MBM?
[12]	Block Window (Data inversion)	MDM
[13]	Block Window (Data inversion)	MMB
[14]	Block Window (All 0s or 1s)	MFB
[15]	Block Window (Sequence)	MSB
		MSB?
[16]	Block Window (Pattern setting)	SBM
		SBM?
[17]	Block Window (Data inversion)	SDM
[18]	Block Window (Data inversion)	SDB
[19]	Block Window (All 0s or 1s)	SMF

### MGE <numeric>

---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 0 Block Window OFF 1 Block Window ON
Function	Sets Block Window ON/OFF to the received pattern.
Example	To set Block Window ON to the received pattern: > MGE 1
Compatibility	Compatible with the MP1762D.

### MGE?

---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the Block Window ON/OFF state of the received pattern.
Example	> MGE? < MGE 1
Compatibility	Compatible with the MP1762D.

### MSE <numeric>

---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 0 Bit Window OFF 1 Bit Window ON
Function	Sets Bit Window ON/OFF to the received pattern.
Example	To set Bit Window ON to the received pattern: > MSE 1
Compatibility	Compatible with the MP1762D.

### MSE?

---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the Bit Window ON/OFF state of the received pattern.
Example	> MSE? < MSE 1
Compatibility	Compatible with the MP1762D.

### MEX <numeric>

---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 0 External Mask OFF 1 External Mask ON
Function	Sets External Mask ON/OFF to the received pattern.
Example	To set External Mask ON to the received pattern: > MEX 1
Compatibility	Incompatible with existing models.

### MEX?

---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the External Mask ON/OFF state of the received pattern.
Example	> MEX? < MEX 1
Compatibility	Incompatible with existing models.

**MGB <start>,<end>,<data>**

Parameter	<p>&lt;start&gt;=&lt;NON-DECIMAL PROGRAM DATA&gt;          #H0 to #HF7FFFFFFF      0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal)</p> <p>&lt;end&gt;=&lt;NON-DECIMAL PROGRAM DATA&gt;          #H0 to #H7FFFFFFF      0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal)</p> <p><b>Note:</b>          The maximum setting is the pattern length.          At 2 ch Combination, the setting range is doubled.          At 4 ch Combination, the setting range is quadrupled.</p> <p>&lt;data&gt;=&lt;NON-DECIMAL PROGRAM DATA&gt;          #H***...*      Specify pattern data in hexadecimal format.                            1 to 400 characters (pattern data of 400 × 4 bits)                            Specify a character string consisting of 0 to 9 and A to F.                            If the last character string of the pattern data is short of a hexadecimal unit (4 bits), add 0(s) up to the last bit to make a hexadecimal string.</p> <p>#B***...*      Specify pattern data in binary format.                            1 to 400 characters (pattern data of 400 bits)                            Specify a character string consisting of 0 and 1.</p>
Function	Sets the mask pattern data from the <start> to <end> addresses during Block Window setting. The set data overwrites the specified range.
Example	To set one character of the mask pattern data from bit 0 to bit 7FFFFFFF addresses in hexadecimal format during Block Window setting: > MGB #H0,#H7FFFFFFF,#H1
Compatibility	Incompatible with existing models.

**MGB? <start>**

Parameter	<p>&lt;start&gt;=&lt;NON-DECIMAL PROGRAM DATA&gt;          #H0 to #HF7FFFFFFF      0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal)</p> <p><b>Note:</b>          The maximum setting value is the pattern length.          In the case of Combination, the setting range is multiplied by 4.</p>
Response	<p>&lt;data&gt;=&lt;HEXADECIMAL NUMERIC RESPONSE DATA&gt;          #H***...*      Returns the pattern data in hexadecimal format.                            Within 400 characters (pattern data of 400 × 4 bits)</p>
Function	Queries 400 × 4 bits of mask pattern data from the <start> address during Block Window setting.
Example	To query 400 × 4 bits of the mask pattern data from bit 0 address during Block Window setting: > MGB? #H0 < MGB #H1
Compatibility	Incompatible with existing models.

## CHM <data>

---

Parameter	<data>=<NON-DECIMAL PROGRAM DATA> #H***...*  #B***...*	Specify pattern data in hexadecimal format. 1 to 8 characters (pattern data of 32 bits) Specify a character string consisting of 0 to 9 and A to F.  Specify pattern data in binary format. 1 to 32 characters (pattern data of 32 bits) Specify a character string consisting of 0 and 1.
	Note:	The number of settable characters doubled at 2 ch Combination. The number of settable characters are quadrupled at 4 ch Combination.
Function	Sets the mask pattern data during Bit Window setting.	
Example	To set one character of the mask pattern data in hexadecimal format during Bit Window setting: > CHM #H1	
Compatibility	Incompatible with existing models.	

## CHM?

---

Response	<data>=<HEXADECIMAL NUMERIC RESPONSE DATA>
Function	Queries the mask pattern data during Bit Window setting
Example	> CHM? < CHM #H01234567 < CHM #H00000000
Compatibility	Incompatible with existing models.

**BDM <start>,<end>,<bdata>**

Parameter	<p>&lt;start&gt;=&lt;NON-DECIMAL PROGRAM DATA &gt;          #H0 to #H7FFFFFFF 0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal)          &lt;end&gt;=&lt;NON-DECIMAL PROGRAM DATA &gt;          #H0 to #H7FFFFFFF 0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal)</p> <p><b>Note:</b>          The maximum setting is the pattern length.          At 2 ch Combination, the setting range is doubled.          At 4 ch Combination, the setting range is quadrupled.</p> <p>&lt;bdata&gt;=&lt;ARBITRARY BLOCK PROGRAM DATA &gt;          #XYYY&lt;binary&gt; X: Number of YYY digits          YYY: Number of bytes of &lt;binary&gt;          1 to 16,777,216 bytes          &lt;binary&gt;: Binarydata up to 16,777,216 bytes</p>
Function	<p>Sets binary data of the mask pattern data from &lt;start&gt; to &lt;end&gt; addresses during Block Window setting.</p>
Example	<p>The set data overwrites the specified range.          To set binary data of the mask pattern data from bit 0 to bit 7FFFFFFF addresses during Block Window setting:          &gt; BDM #H0,#H7FFFFFFF,#11A</p>
Compatibility	<p>Incompatible with existing models.</p>

**BDM? <start>[,<size>]**

---

Parameter	<p>&lt;start&gt;=&lt;NON-DECIMAL PROGRAM DATA &gt;                  #H0 to #H7FFFFFFF 0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal)                  [&lt;size&gt;]=&lt;NR1 NUMERIC PROGRAM DATA&gt;                  1 to 1677216 1 to 1677216 bytes, in 1-byte steps</p> <p><b>Note:</b></p> <p style="padding-left: 40px;">The maximum setting is the pattern length.                  At 2 ch Combination, the setting range is doubled.                  At 4 ch Combination, the setting range is quadrupled.</p>
Response	<p>&lt;bdata&gt;=&lt;DEFINITE LENGTH ARBITRARY BLOCK RESPONSE DATA&gt;                  #XYYY&lt;binary&gt; X: Number of YYY digits                  YYY: Number of bytes of &lt;binary&gt;                  1 to 16,777,216 bytes                  &lt;binary&gt;: Binary data of up to 16,777,216 bytes</p> <p>Binary data of the setting pattern is queried when [&lt;size&gt;] is omitted.</p>
Function	<p>Queries binary data of bytes specified by &lt;size&gt; from the &lt;start&gt; address of the mask pattern data during Block Window setting.</p>
Example	<p>To query binary data of 2 bytes from bit 0 address of the pattern data during Block Window setting:                  &gt; BDM? #H0,2                  &lt; BDM #12AA</p> <p>To query binary data of the setting pattern from bit 0 address of the pattern data during Block Window setting (in the case of [&lt;size&gt;] is omitted):                  &gt; BDM? #H0                  &lt; BDM #516000AAAAAA●●●●●● (binary data of 16,000 bytes)</p>
Compatibility	<p>Incompatible with existing models.</p>



**DRM <start>,<end>**


---

Parameter	<start>=<NON-DECIMAL PROGRAM DATA > #H0 to #H7FFFFFFF 0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal) <end>=<NON-DECIMAL PROGRAM DATA > <b>Note:</b> The maximum setting is the pattern length. At 2 ch Combination, the setting range is doubled. At 4 ch Combination, the setting range is quadrupled.
Function	Inverts the mask pattern data during Block Window setting. Specify the inversion range by the <start> and <end> addresses.
Example	To invert addresses from bit 0 to bit 7FFFFFFF during Block Window setting: > DRM #H0,#H7FFFFFFF
Compatibility	Incompatible with existing models.

**DBM <start>,<delta>**


---

Parameter	<start>=<NON-DECIMAL PROGRAM DATA > #H0 to #H7FFFFFFF 0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal) <delta>=<DECIMAL NUMERIC PROGRAM DATA > 1 to 134217728 1 to 134,217,728 bits, in 1-bit steps <b>Note:</b> The maximum setting is the pattern length. At 2 ch Combination, the setting range is doubled. At 4 ch Combination, the setting range is quadrupled.
Function	Inverts the mask pattern data during Block Window setting. Specify the inversion range by the number of bits from the <start> address (relative specification).
Example	To invert 1 bit of the mask pattern data from address 0 during Block Window setting: > DBM #H0,1
Compatibility	Incompatible with existing models.

## **ALB <range>,<page>,<data>**

---

Parameter	<range>=<CHARACTER PROGRAM DATA> 0 Specifies a page. (One page is defined as 128 bits.) 1 Specifies all data. <page>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 1048576 1 to 1,048,576 (Max.) pages, in 1-page steps Max=Pattern Length / 128 (rounding up fractions) Specify "0" when <range> is set to ALL. <data>=<DECIMAL NUMERIC PROGRAM DATA> 0 Fills the specified range with 0s. 1 Fills the specified range with 1s.
Function	Sets 0s or 1s for the specified page or all data in mask pattern data during Block Window setting.
Example	To set 0s for the first page of the mask pattern data during Block Window > ALB 0,1,0
Compatibility	Incompatible with existing models.

**MDB <block>,<start>,<end>,<data>**

Parameter	<p>&lt;block&gt;=&lt;DECIMAL NUMERIC PROGRAM DATA&gt; 1 to 511                      1 to 511 blocks, in 1-block steps</p> <p>&lt;start&gt;=&lt;NON-DECIMAL PROGRAM DATA&gt; #H0 to #H7FFFFFFF            0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal)</p> <p>&lt;end&gt;=&lt;NON-DECIMAL PROGRAM DATA&gt; #H0 to #H7FFFFFFF            0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal)</p> <p><b>Note:</b></p> <p style="padding-left: 40px;">The maximum setting is the pattern length. At 2 ch Combination, the setting range is doubled. At 4 ch Combination, the setting range is quadrupled.</p> <p>&lt;data&gt;=&lt;NON-DECIMAL PROGRAM DATA&gt; #H***...*                      Specify pattern data in hexadecimal format. 1 to 400 characters (pattern data of 400 × 4 bits) Specify a character string consisting of 0 to 9 and A to F. If the last character string of the pattern data is short of a hexadecimal unit (4 bits), add 0(s) up to the last bit to make a hexadecimal string.</p> <p>#B***...*                      Specify pattern data in binary format. 1 to 400 characters (pattern data of 400 bits) Specify a character string consisting of 0 and 1.</p>
Function	<p>Sets binary data of the Block Window mask pattern data &lt;start&gt; to &lt;end&gt; addresses during Mixed Data pattern setting. The set data overwrites the specified range.</p>
Example	<p>To set one character of the mask pattern data from bit 0 to bit 7FFFFFFF addresses in hexadecimal format during Block Window setting: &gt; MDB 1,#H0,#H7FFFFFFF,#H1</p>
Compatibility	<p>Incompatible with existing models.</p>

**MDB? <block>,<start>**

Parameter	<p>&lt;block&gt;=&lt;DECIMAL NUMERIC PROGRAM DATA&gt; 1 to 511                      1 to 511 blocks, in 1-block steps</p> <p>&lt;start&gt;=&lt;NON-DECIMAL PROGRAM DATA&gt; #H0 to #H7FFFFFFF            0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal)</p> <p><b>Note:</b></p> <p style="padding-left: 40px;">The maximum setting is the pattern length. At 2 ch Combination, the setting range is doubled. At 4 ch Combination, the setting range is quadrupled.</p>
Response Function	<p>&lt;data&gt;=&lt;HEXADECIMAL NUMERIC RESPONSE DATA&gt; Queries 400 × 4 bits of Block Window mask pattern data from the &lt;start&gt; to &lt;end&gt; addresses during Mixed Data pattern setting.</p>
Example	<p>To query 400 × 4 bits of mask pattern data from bit 0 address during Block Window setting: &gt; MDB? 1,#H0 &lt; MDB #H1</p>
Compatibility	<p>Incompatible with existing models.</p>





### MDM <block>,<start>,<end>

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 511                    1 to 511 blocks, in 1-block steps <start>=<NON-DECIMAL PROGRAM DATA > #H0 to #H7FFFFFFF    0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal) <end>=<NON-DECIMAL PROGRAM DATA > #H0 to #H7FFFFFFF    0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal) <b>Note:</b> The maximum setting is the pattern length. At 2 ch Combination, the setting range is doubled. At 4 ch Combination, the setting range is quadrupled.
Function	Inverts the Block Window mask pattern in during Mixed Data pattern setting. Specify the inversion range by the <start> and <end> addresses.
Example	To invert the Block Window mask pattern from bit 0 to bit 7FFFFFFF addresses during Mixed Data pattern setting: > MDM 1,#H0,#H7FFFFFFF
Compatibility	Incompatible with existing models.

### MMB <block>,<start>,<delta>

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 511                    1 to 511 blocks, in 1-block steps <start>=<NON-DECIMAL PROGRAM DATA > #H0 to #H7FFFFFFF    0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal) <delta>=<DECIMAL NUMERIC PROGRAM DATA > 1 to 134217728        1 to 134,217,728 bits, in 1-bit steps <b>Note:</b> The maximum setting is the pattern length. At 2 ch Combination, the setting range is doubled. At 4 ch Combination, the setting range is quadrupled.
Function	Inverts the Block Window mask pattern during Mixed Data pattern setting. Specify the inversion range by the number of bits from the <start> address (relative specification).
Example	To invert 1 bit of the Block Window mask pattern from address 0 during Mixed Data pattern setting: >MMB 1,#H0,1
Compatibility	Incompatible with existing models.

**MFB <block>,<range>,<page>,<data>**

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 511                      1 to 511 blocks, in 1-block steps <range>=<CHARACTER PROGRAM DATA> 0                                Specifies a page. (One page is defined as 128 bits.) 1                                Specifies all data. <page>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 1048576                  1 to 1,048,576 (Max.) pages, in 1-page steps Max=Pattern Length / 128 (rounding up fractions) Specify "0" when <range> is set to ALL. <data>=<DECIMAL NUMERIC PROGRAM DATA> 0                                Fills the specified range with 0s. 1                                Fills the specified range with 1s.
Function	Sets 0s or 1s for the specified page or all data in the Block Window mask pattern during Mixed Data pattern setting.
Example	To set 0s for the first page of the Block Window mask pattern during Mixed Data pattern setting. > MFB 1,0,1,0
Compatibility	Incompatible with existing models.

### MSB <block>,<start>,<end>,<data>

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 blocks, in 1-block steps <start>=<NON-DECIMAL PROGRAM DATA> #H0 to #HFFFFFF              0 to FFFFF bits, in 1-bit steps (Specify in hexadecimal) <end>=<NON-DECIMAL PROGRAM DATA> #H0 to #HFFFFFF              0 to FFFFF bit, in 1-bit steps (Specify in hexadecimal)
	<p><b>Note:</b></p> <p style="padding-left: 40px;">The maximum setting value is the pattern length.</p> <data>=<NON-DECIMAL PROGRAM DATA> #H***...*                      Specify pattern data in hexadecimal format. 1 to 400 characters (pattern data of 400 × 4 bits) Specify a character string consisting of 0 to 9 and A to F. If the last character string of the pattern data is short of a hexadecimal unit (4 bits), add 0(s) up to the last bit to make a hexadecimal string. #B***...*                      Specify pattern data in binary format. 1 to 400 characters (pattern data of 400 bits) Specify a character string consisting of 0 and 1.
Function	Sets the mask pattern data from the <start> to <end> addresses during Sequence pattern setting and Block Window setting. The set data overwrites the specified range.
Example	To set one character of the mask pattern data from bit 0 to bit FFFFFF addresses in hexadecimal format during Block Window setting: > MSB 1,#H0,#HFFFFFF,#H1
Compatibility	Incompatible with existing models.

### MSB? <block>,<start>

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 blocks, in 1-block steps <start>=<NON-DECIMAL PROGRAM DATA> #H0 to #HFFFFFF              0 to FFFFF bits, in 1-bit steps (Specify in hexadecimal)
	<p><b>Note:</b></p> <p style="padding-left: 40px;">The maximum setting value is the pattern length.</p> <data>=<HEXADECIMAL NUMERIC RESPONSE DATA>
Response	
Function	Queries 400 × 4 bits of masked pattern data from the <start> address during Sequence pattern setting and Block Window setting.
Example	To query 400 × 4 bits of masked pattern data from bit 0 address during Block Window setting: > MSB? 1,#H0 < MSB #H1
Compatibility	Incompatible with existing models.







**SMF <block>,<range>,<page>,<data>**


---

Parameter	<block>=< DECIMAL NUMERIC PROGRAM DATA> 1 to 128                      1 to 128 Blocks, in 1-block steps <range>=<CHARACTER PROGRAM DATA> 0                                      Specifies a page. (One page is defined as 128 bits.) 1                                      Specifies all data. <page>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 8192                      1 to 8192 (Max.) pages, in 1-page steps Max=Pattern Length / 128 (rounding up fractions) Specify "0" when <range> is set to ALL. <data>=<DECIMAL NUMERIC PROGRAM DATA> 0                                      Fills the specified range with 0s. 1                                      Fills the specified range with 1s.
Function	Sets 0s or 1s for the specified page or all data in Block Window mask pattern during Sequence pattern setting.
Example	To set 0s for the first page of the Block Window mask pattern during Sequence pattern setting: > SMF 1,0,1,0
Compatibility	Incompatible with existing models.

### 8.4.4 Commands related to Input tab window

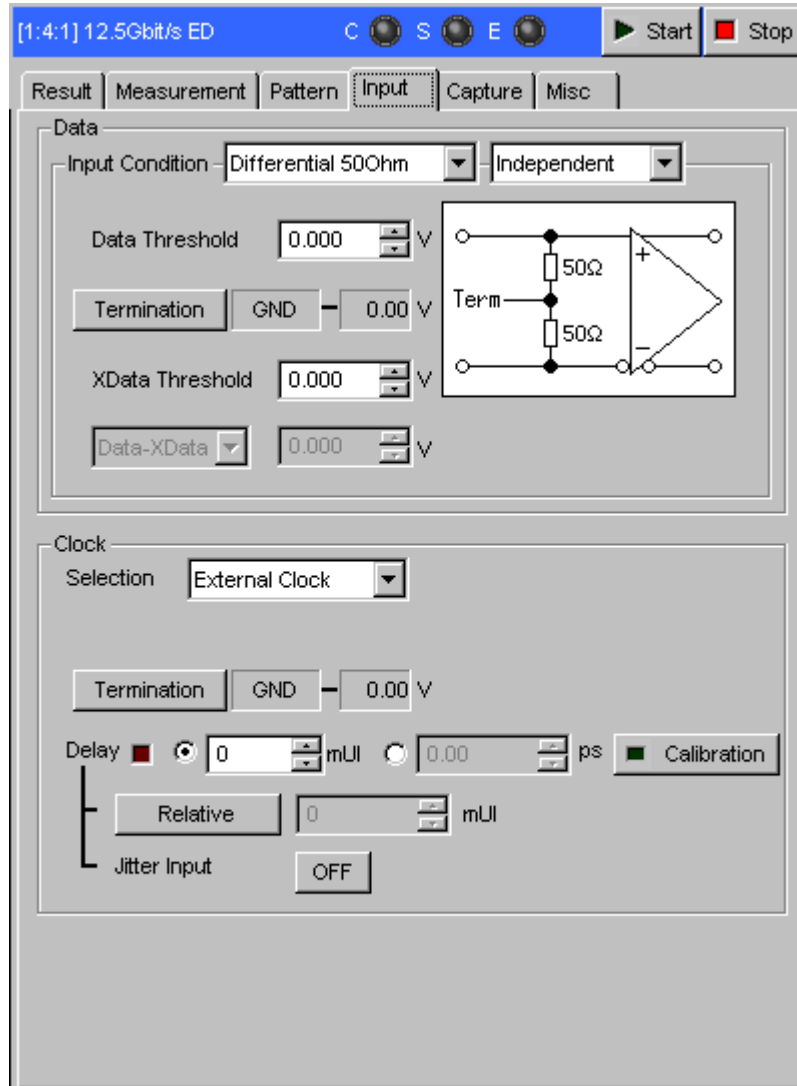


Figure 8.4.4-1 Input tab window setting

8.4.4.1 Data Input setting commands

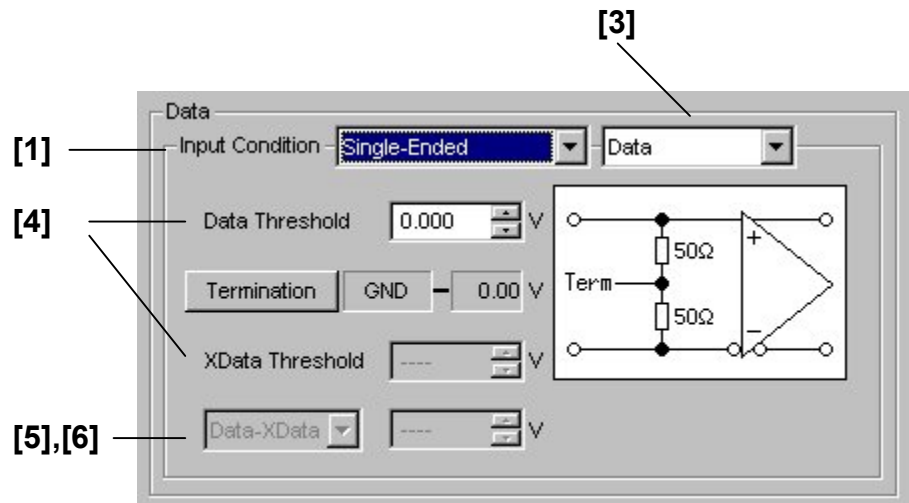


Figure 8.4.4.1-1 Single-End Data

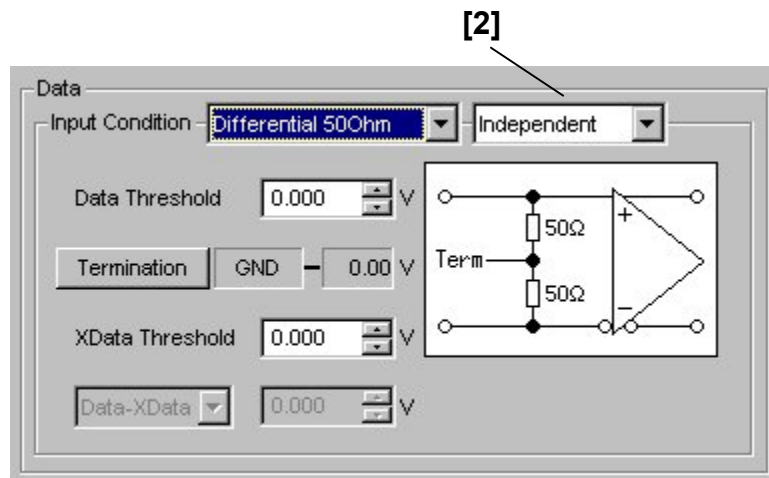


Figure 8.4.4.1-2 Differential 50 Ohm

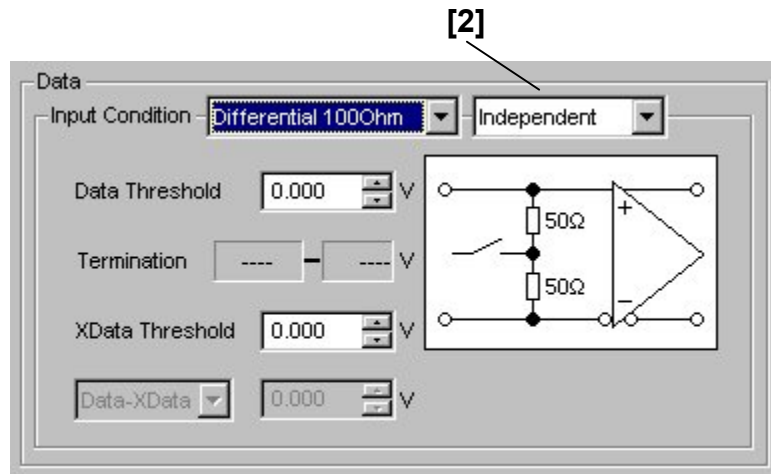


Figure 8.4.4.1-3 Differential 100 Ohm

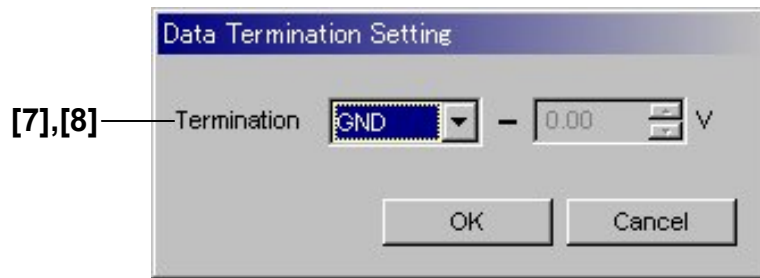


Figure 8.4.4.1-4 Termination Setting

Table 8.4.4.1-1 Data Input setting commands

No.	Setting Items	Commands
[1]	Input Condition	DSD
		DCD?
[2]	Differential type setting	DAC
		DCD?
[3]	Data input port setting	DSL
		DCD?
[4]	Data Threshold XData Threshold	DTH
		DTH?
[5]	Differential reference signal setting	DDB
		DDB?
[6]	Differential data input threshold setting	DDT
		DDT?
[7]	Termination	DTM
		DTM?
[8]	No label (Termination voltage setting)	DTL
		DTL?

**DSD <interface>**


---

Parameter	<interface>=<DECIMAL NUMERIC PROGRAM DATA>
	0                      Single Ended
	1                      Differential 50 Ω
	2                      Differential 100 Ω
Function	Sets the data input interface.
Example	To set the data input interface to Single Ended: > DSD 0
Compatibility	Partially compatible with the MP1762D (0: Single Ended is compatible).

**DAC <tracking>**


---

Parameter	<tracking>=<DECIMAL NUMERIC PROGRAM DATA>
	0                      Independent
	1                      Tracking
	2                      Alternate
Function	Sets the differential type when the data input interface is Differential.
Example	To set the differential type to independent setting: > DAC 0
Compatibility	Partially compatible with the MP1762D (0: Independent and 1: Tracking are compatible).

**DSL <port>**


---

Parameter	<port>=<DECIMAL NUMERIC PROGRAM DATA>
	0                      Data
	1                      XData
Function	Switches between types of data input interfaces (Data, XData). Switches the data input interface when set to Single Ended and selects the input port when set to Differential
Example	To switch the data input interface to Data: > DSL 0
Compatibility	Compatible with the MP1762D.

### DCD?

Response	<port>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
	0 Data
	1 XData
	<tracking>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
	0 Independent (Data/XData independent setting)
	1 Tracking (Data/XData common setting)
	2 Alternate (Data/XData differential setting)
	<interface>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
	0 Single Ended
	1 Differential 50Ω
	2 Differential 100Ω
Function	Queries the data input interface.
Example	> DCD? < DCD 0,0,0
Compatibility	Incompatible with existing models.

### DTH <numeric>

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA>
	-3.500 to 3.300 -3.500 to 3.300 V, in 0.001-V steps (when MU181040A-002 and MU181040B-002 are installed)
	-0.350 to 0.350 -0.350 to 0.350 V, in 0.001-V steps (when MU181040A-001 is installed)
Function	Sets the data input threshold value for the displayed and set port.
Example	To set the data input threshold value for the displayed and set port to -3.000 V: > DTH -3.000
Compatibility	Partially compatible with the MP1632C (within the range of -3.000 to 3.300 V, in 0.001-V steps). Compatible with the MP1762D.

### DTH?

Response	<numeric>=<NR2 NUMERIC RESPONSE DATA> (FIX6)
Function	Queries the data input threshold value for the displayed and set port.
Example	> DTH? < DTH -3.000 < DTH 3.300
Compatibility	Partially compatible with the MP1632C (within the range of -3.000 to 3.300 V, in 0.001-V steps). Compatible with the MP1762D.



**DDB <basis>**


---

Parameter	<basis>=<DECIMAL NUMERIC PROGRAM DATA> 0 Based on Data 1 Based on XData
Function	Sets the differential reference signal for the data input threshold value.
Example	To set the differential reference signal for the data input threshold value to be based on Data: > DDB 0
Compatibility	Incompatible with existing models.

**DDB?**


---

Response	<basis>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the differential reference signal for the data input threshold value.
Example	> DDB? < DDB 0
Compatibility	Incompatible with existing models.

**DDT <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> -3.000 to 3.000 -3.000 to 3.300 V, in 0.001-V steps (when MU181040A-002 and MU181040B-002 are installed) -0.700 to 0.700 -0.700 to 0.700 V, in 0.001-V steps (when MU181040A-001 is installed)
Function	Sets the data input threshold value for differential input.
Example	To set the differential data input threshold value to -3.000 V: > DDT -3.000
Compatibility	Incompatible with existing models.

**DDT?**


---

Response	<numeric>=<NR2 NUMERIC RESPONSE DATA> (FIX6)
Function	Queries the data input threshold value for differential input.
Example	> DDT? < DDT -3.000 < DDT 3.000
Compatibility	Incompatible with existing models.

### DTM <term>

Parameter	<term>=<DECIMAL NUMERIC PROGRAM DATA>
	0 GND (50 Ω to GND)
	1 NECL (50 Ω to -2 V)
	3 LVPECL (50 Ω to 1.3 V)
	4 VARIABLE (50 Ω to Variable Voltage)
	5 PCML (50 Ω to 3.3 V)
Function	Sets the data input termination condition.
Example	To set the data input termination condition to GND: > DTM 0
Compatibility	Partially compatible with the MP1762D (0: GND).

### DTM?

Response	<term>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the data input termination condition.
Example	> DTM? < DTM 0
Compatibility	Partially compatible with the MP1762D (0: GND).

### DTL <numeric>

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> -2.50 to 3.50 -2.50 to 3.50 V, in 0.01-V steps
Function	Sets the termination voltage when the input termination condition is set to Variable.
Example	The setting is impossible when set to "Differential 100 Ω". To set the termination voltage when the input termination condition is set to Variable to -2.00 V: > DTL -2.00
Compatibility	Incompatible with existing models.

### DTL?

Response	<numeric>=<NR2 NUMERIC RESPONSE DATA> (FIX5)
Function	Queries the termination voltage when the input termination condition is set to Variable.
Example	> DTL? < DTL -2.00 < DTL 3.50
Compatibility	Incompatible with existing models.

8.4.4.2 Clock Input setting commands

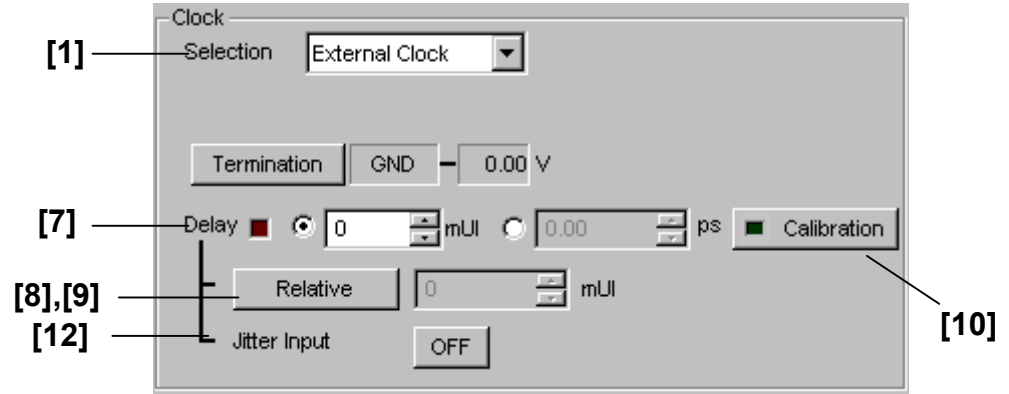


Figure 8.4.4.2-1 External Clock setting

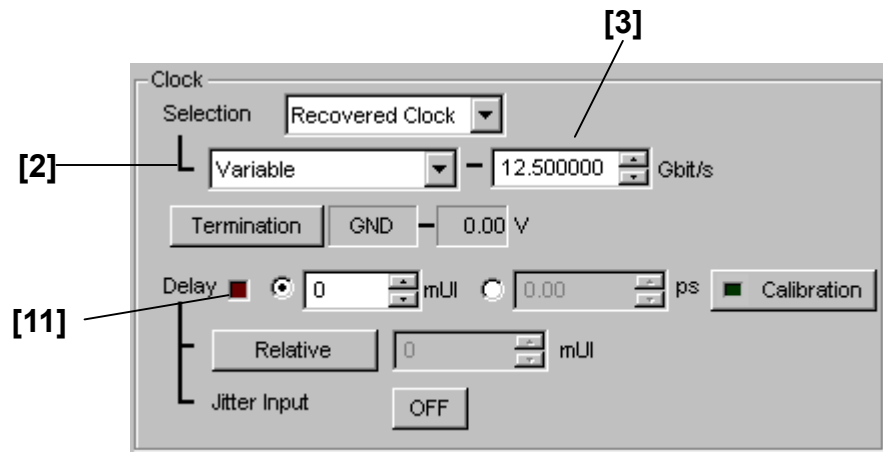


Figure 8.4.4.2-2 Recovered Clock setting

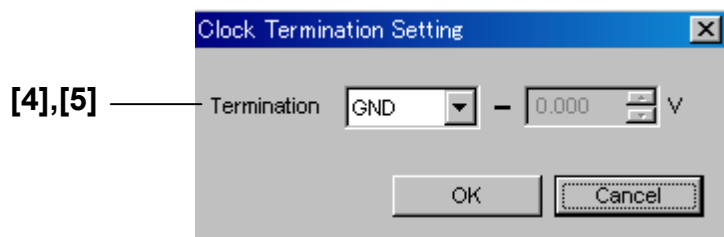


Figure 8.4.4.2-3 Clock Termination setting dialog box

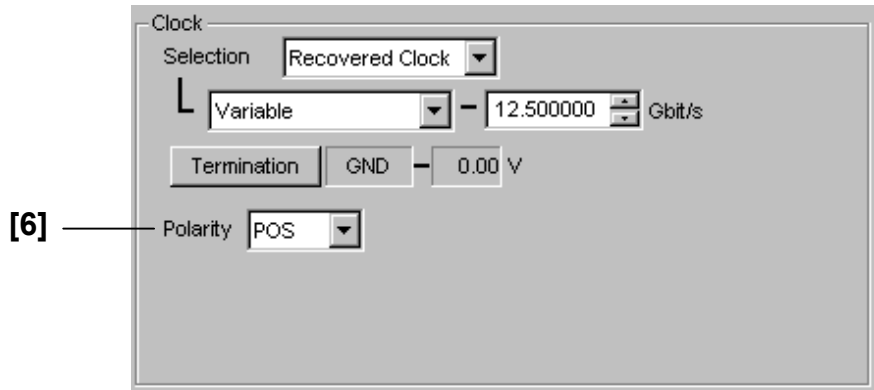


Figure 8.4.4.2-4 Clock Input setting (For no delay option)

Table 8.4.4.2-1 Clock Input setting commands

No.	Setting Items	commands
[1]	Selection	RRC
[2]	Setting for specific frequency of clock recovery	RFQ DRC?
[3]	Setting for clock recovery frequency	CFQ CFQ?
[4]	Termination	CTM CTM?
[5]	No label (Termination voltage setting)	CTL CTL?
[6]	Polarity	CRC CRC?
[7]	Delay (mUI setting)	CPA CPA?
	Delay (ps setting)	CPU CPU?
[8]	Relative	CRO CRO?
[9]	No label (Relative value setting)	CRD CRD?
[10]	Calibration	CCA
[11]	No label (LED)	DLY?
[12]	Jitter Input	CJO CJO?

**RRC <sel>**


---

Parameter	<sel>=<DECIMAL NUMERIC PROGRAM DATA>
	0 External Clock
	1 Recovered Clock
Function	Sets the clock input type.
Example	To set the clock input type to the External clock: > RRC 0
Compatibility	Compatible with the MP1762D.

**RFQ <freq>**


---

Parameter	<freq>=<DECIMAL NUMERIC PROGRAM DATA>
	0 OC3/STM1 0.155520 Gbit/s
	1 OC12/STM4 0.622080 Gbit/s
	2 1GFC 1.062500 Gbit/s
	3 GbE 1.250000 Gbit/s
	4 SATA1.5Gb/s 1.500000 Gbit/s
	5 2GFC 2.125000 Gbit/s
	6 OC48/STM16 2.488320 Gbit/s
	7 PCI Express I 2.500000 Gbit/s
	8 OTU1 2.666060 Gbit/s
	9 SATA 3Gb/s 3.000000 Gbit/s
	10 XAUI 3.125000 Gbit/s
	11 4GFC 4.250000 Gbit/s
	12 PCI Express II 5.000000 Gbit/s
	13 SATA 6Gb/s 6.000000 Gbit/s
	14 OC192/STM64 9.953280 Gbit/s
	15 10GbE 10.312500 Gbit/s
	16 10GFC 10.518750 Gbit/s
	17 G975 FEC 10.664228 Gbit/s
	18 OTU2 10.709225 Gbit/s
	19 10GbE over FEC 11.095700 Gbit/s
	20 10GFC over FEC 11.316800 Gbit/s
	21 Variable Variable
Function	Sets the rated frequency when the clock input type is the recovery clock.
Example	To set the rated frequency when the clock input type is the recovery clock to 0.155520 Gbit/s: > RFQ 0
Compatibility	Partially compatible with the MP1762D.

### DRC?

Response	<sel>=<NR1 NUMERIC RESPONSE DATA> (FIX1) 0 External Clock 1 Recovered Clock <freq>=<NR1 NUMERIC RESPONSE DATA> (FIX2) 0 to 21 Omitted when <sel> is 0.
Function	Queries the input type and the rated frequency of clock input.
Example	> DRC? < DRC 0 < DRC 1, 1 < DRC 1,21
Compatibility	Compatible with the MP1762D.

### CFQ <numeric>

Parameter	<numeric>=<NR2 NUMERIC PROGRAM DATA> 0.100000, 0.125000, 0.140600, 0.155520, 0.156300, 0.171900, 0.187500, 0.200000, 0.250000, 0.281300, 0.312500, 0.343800, 0.375000, 0.400000, 0.500000, 0.562500, 0.622080, 0.625000, 0.687500, 0.750000, 0.800000, 1.000000, 1.062500, 1.125000, 1.250000, 1.375000, 1.500000, 1.600000, 2.000000, 2.125000, 2.488320, 2.250000, 2.500000, 2.666060, 2.750000, 3.000000, 3.125000, 3.200000, 4.250000 Unit is Gbit/s. 4.900000 to 6.250000      4.900000 to 6.250000 Gbit/s /1 kbit/s Step 9.800000 to 12.500000      9.800000 to 12.500000 Gbit/s /1 kbit/s Step Note, however: When MU181040A-001 is installed: 9.8 to 12.5 Gbit/s When MU181040A-002 or MU181040A-x22 is installed: 0.1 to 12.5 Gbit/s When MU181040B-002 or MU181040B-x22 is installed: 0.1 to 14 Gbit/s
Function	Sets the frequency for the clock data recovery (for MU181040A-x20, MU181040B-x20).
Example	To set the frequency for the clock data recovery to 0.100000 Gbit/s: > CFQ 0.100000
Compatibility	Incompatible with existing models.

### CFQ?

Response	<numeric>=<NR2 NUMERIC RESPONSE DATA> (FIX9)
Function	Queries the frequency for the clock data recovery.
Example	> CFQ? < CFQ 0.100000 < CFQ 12.500000
Compatibility	Incompatible with existing models.

**CTM <term>**


---

Parameter	<term>=<NR1 NUMERIC PROGRAM DATA>
	0 GND (50 $\Omega$ to GND)
	1 NECL (50 $\Omega$ to -2 V)
	3 LVPECL (50 $\Omega$ to 1.3 V)
	4 VARIABLE (50 $\Omega$ to Variable Voltage)
	5 PCML (50 $\Omega$ to 3.3 V)
Function	Sets the clock input termination condition.
Example	To set the clock input termination condition to GND: > CTM 0
Compatibility	Partially compatible with the MP1632C and MP1762D (0: GND, 1: ECL).

**CTM?**


---

Response	<term>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the clock input termination condition.
Example	> CTM? < CTM 0
Compatibility	Partially compatible with the MP1632C and MP1762D (0:GND, 1: ECL).

**CTL <numeric>**


---

Parameter	<numeric>=<DICIMAL NUMERIC PROGRAM DATA> -2.50 to 3.50 -2.50 to 3.50 V, in 0.01 steps
Function	Sets the termination voltage when the input termination condition is set to Variable.
Example	To set the termination voltage when the input termination condition is set to Variable to -2.00 V: > CTL -2.00
Compatibility	Incompatible with existing models.

**CTL?**


---

Response	<numeric>=<NR2 NUMERIC RESPONSE DATA> (FIX5)
Function	Queries the termination voltage when the input termination condition is set to Variable.
Example	> CTL? < CTL -2.00 < CTL 3.00
Compatibility	Incompatible with existing models.

### CRC <logic>

Parameter	<logic>=<NR1 NUMERIC PROGRAM DATA> 0 Positive 1 Negative
Function	Selects the phase unit for the clock recovery clock.
Example	To set the phase unit for the clock recovery clock to Positive: > CRC 0
Compatibility	Incompatible with existing models.

### CRC?

Response	<logic>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the phase unit for the clock recovery clock.
Example	> CRC? < CRC 0
Compatibility	Incompatible with existing models.

### CPA <numeric>

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> -10000 to 10000 -10,000 to 10,000 ps, in 10-ps steps (at 0.1 GHz) -1000.0 to 1000.0 -1,000 to 1,000 ps, in 1-ps steps (at 1 GHz) -80.00 to 80.00 -80 to 80 ps, in 0.08-ps steps (at 12.5 GHz) The setting range and resolution (steps) are converted from the calculated frequency value, based on the setting resolution of mUI.
Function	Sets the value of the clock input phase in ps units (only when MU181040A-x30 and MU181040B-x30 are installed). Values which cannot be set due to the limitation of the setting resolution are rounded off to the nearest settable value.
Example	To set the clock input phase to -10,000 ps in ps units: > CPA -10000
Compatibility	Compatible with the MP1632C and MP1762D.

### CPA?

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> <NR2 NUMERIC RESPONSE DATA> (FIX7)
Function	Queries value of the clock input phase in ps units.
Example	> CPA? < CPA -1000.0 > CPA 10000
Compatibility	Compatible with the MP1632C and MP1762D.



**CPU <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> -1000 to 1000                      -1,000 to 1,000 mUI, in 1-mUI steps
Function	Sets the value of the clock input phase in mUI units (only when MU181040A-x30 and MU181040B-x30 are installed).
Example	To set the clock input phase to -1,000 mUI in mUI units: > CPU -1000
Compatibility	Incompatible with existing models.

**CPU?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX5)
Function	Queries the value of the clock input phase in mUI units.
Example	> CPU? < CPU -1000 < CPU 1000
Compatibility	Incompatible with existing models.

**CRO <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 0                                      Reference OFF 1                                      Reference ON
Function	Sets the clock input phase variable reference ON/OFF.
Example	To set the clock input phase variable reference ON: > CRO 1
Compatibility	Incompatible with existing models.

**CRO?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the clock input phase variable reference setting.
Example	> CRO? < CRO 1
Compatibility	Incompatible with existing models.

### CRD <numeric>[,<unit>]

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> In mUI units: -2000 to 2000 -2,000 to 2,000 mUI, in 1-mUI steps In ps units: Converted from the calculated frequency value, based on the setting resolution of mUI. -20000 to 20000 -20,000 to 20,000 ps, in 10-ps steps (at 0.1 GHz) -2000.0 to 2000.0 -2,000 to 2,000 ps, in 1-ps steps (at 1 GHz) -160.00 to 160.00 -160 to 160 ps, in 0.08-ps steps (at 12.5 GHz) [<unit>]=<NR1 NUMERIC PROGRAM DATA> 0 mUI unit 1 ps unit (The ps unit is selected when <unit> is omitted.)
Function	Sets the value and unit of the clock input phase variable reference. Set a value using a difference from the reference value. The specified value may not be exactly set as is when the ps unit is set, due to the limitation of the setting resolution. The value is adjusted to the most approximate value and set in this event.
Example	To set the clock input phase variable reference to -1,000 mUI: > CRD -1000,0
Compatibility	Incompatible with existing models.

### CRD? [<unit>]

Parameter	[<unit>]=<NR1 NUMERIC PROGRAM DATA> 0 mUI unit 1 ps unit (The ps unit is selected when <unit> is omitted.)
Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> <NR2 NUMERIC RESPONSE DATA> (FIX7)
Function	Queries the value of the clock input phase variable reference.
Example	> CRD? 0 < CRD -1000 < CRD -160.00
Compatibility	Incompatible with existing models.

### CCA

Function	Calibrates the input clock phase setting value.
Example	> CCA
Compatibility	Incompatible with existing models.

### DLY?

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1) 0 Ready status 1 Busy status
Function	Displays the operation status of the clock input phase setting delay.
Example	> DLY? < DLY 0
Compatibility	Compatible with the MP1632C and MP1762D.

**CJO <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 0 Jitter input OFF setting 1 Jitter input ON setting
Function	When a jitter is added to the input signal, the Feedback process for Delay must be set to OFF. When a jitter is added, set the Jitter Input button to ON, using this command. When a jitter is not added, set the Jitter Input button to OFF.
Example	To set the Jitter Input button to ON when a jitter is added: > CJO 1
Compatibility	Incompatible with existing models.

**CJO?**


---

Response	<numeric> = <NR1 NUMERIC RESPONSE DATA> (FIX1) 0 Jitter input OFF setting 1 Jitter input ON setting
Function	Queries the Jitter Input button setting.
Example	> CJO? < CJO 1
Compatibility	Incompatible with existing models.

### 8.4.5 Commands related to Capture tab window

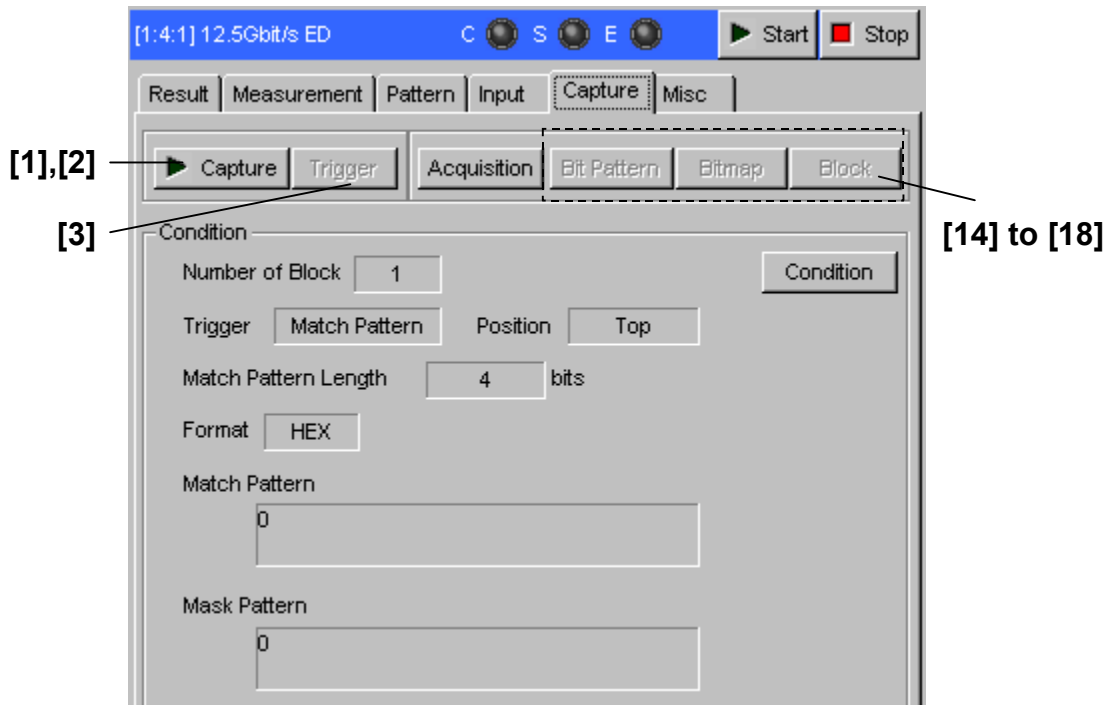


Figure 8.4.5-1 Capture tab window (initial state)

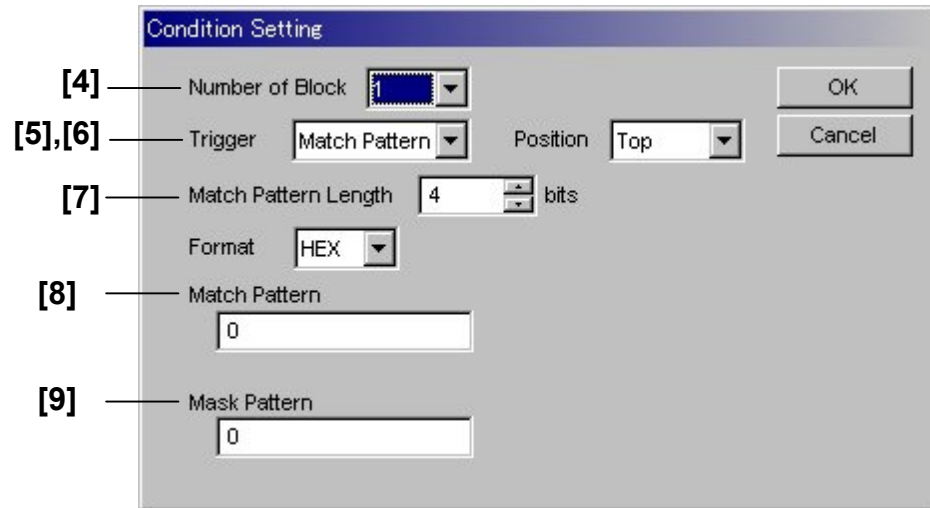


Figure 8.4.5-2 Condition Setting

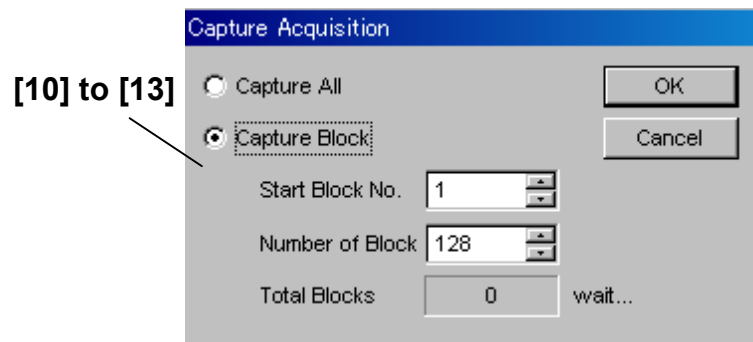


Figure 8.4.5-3 Setting for Capture Data reading

**Table 8.4.5-1 Capture tab setting commands**

No.	Setting Items	Commands
[1]	Capture	CSA
[2]	Capture	CSP
[3]	Trigger	CTG
[4]	Number of Block	CBC
		CBC?
[5]	Trigger	BTG
		BTG?
[6]	Position	CPS
		CPS?
[7]	Match Pattern Length	CMP
		CMP?
[8]	Match Pattern	MPE
		MPE?
[9]	Mask Pattern	CMK
		CMK?
[10]	Query for capture data block count	CAB?
[11]	Start of capture data acquisition	CAS
[12]	Query for capture data acquisition state	CAT?
[13]	Cancel of capture data acquisition	CAC
[14]	Query for capture data length per block	CBL
[15]	Query for capture result data	CDW?
[16]	Query for capture result data	CBW?
[17]	Query for error position in capture result	CED?
[18]	Query for error position in capture result	CEB?

**CSA**


---

Function	Starts capture result acquisition.
Example	> CSA
Compatibility	Incompatible with existing models.

**CSP**


---

Function	Stops capture result acquisition.
Example	> CSP
Compatibility	Incompatible with existing models.

**CTG**


---

Function	Generates a capture manual trigger.
Example	> CTG
Compatibility	Incompatible with existing models.

**CBC <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 1, 2, 4, 8, 16, 32, 64, 128    Capture block division number
Function	Sets the capture block division number.
Example	To set the capture block division number to 1: > CBC 1
Compatibility	Incompatible with existing models.

**CBC?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX3)
Function	Queries the capture block division number.
Example	> CBC? < CBC    1 < CBC 128
Compatibility	Incompatible with existing models.

### **BTG <trigger>**

---

Parameter	<trigger>=<DECIMAL NUMERIC PROGRAM DATA> 0 Error Detect: When an error is detected 1 When matches the match pattern 2 When a manual trigger is generated 4 When external trigger is selected
Function	Sets the trigger to store the data to memory for the capture function.
Example	To set the trigger to store the data to memory for the capture function, to Error Detect: > BTG 0
Compatibility	Incompatible with existing models.

### **BTG?**

---

Response	<trigger>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the trigger to store the data to memory for the capture function.
Example	> BTG? < BTG 0
Compatibility	Incompatible with existing models.

### **CPS <pos>**

---

Parameter	<pos>=<DECIMAL NUMERIC PROGRAM DATA> 0 Store the data to the top of the memory. 1 Store the data in the middle of the memory. 2 Store the data to the last of the memory.
Function	Sets the data storage memory position for the capture function.
Example	To set the data storage memory position for the capture function to the top of the memory: > CPS 0
Compatibility	Incompatible with existing models.

### **CPS?**

---

Response	<pos>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the data storage memory position for the capture function.
Example	> CPS? < CPS 0
Compatibility	Incompatible with existing models.





### CMK <data>

---

Parameter	<data>=<NON-DECIMAL PROGRAM DATA> #H** ...*	Edits the pattern data in hexadecimal format. Specify a 1- to 16-character string, consisting of 0 to 9 and A to F.
Function	Edits the capture trigger mask pattern.	
Example	To edit one character of the capture trigger mask pattern to "A": > CMK #HA	
Compatibility	Incompatible with existing models.	

### CMK?

---

Response	<data>=<HEXADECIMAL NUMERIC RESPONSE DATA>	
Function	Queries the capture trigger mask pattern.	
Example	> CMK? < CMK #H01234...ABCDEF (1 to 16 characters in hexadecimal)	
Compatibility	Incompatible with existing models.	

### CAB?

---

Response	<block>=<NR1 NUMERIC RESPONSE DATA> (FIX3) 0 to 128 0 to 128 blocks, in 1-block steps, number of valid capture data blocks	
Function	Queries the number of valid capture data blocks.	
Example	> CAB? < CAB 128	
Compatibility	Incompatible with existing models.	

### CAS <range>[,<start>,<number>]

---

Parameter	<range>=<DECIMAL NUMERIC PROGRAM DATA> 0 Acquires all capture data. 1 Acquires capture data of the specified blocks. [<start>]=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128 1 to 128, in 1-block steps, acquisition start block [<number>]=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128 1 to 128, in 1-block steps, number of blocks to be acquired	
	<b>Note:</b> The maximum setting value of <start> and <number> is the maximum value of valid data. <start> and <number> are omitted when <range> = 0.	
Function	Acquires capture data.	
Example	To acquire all capture data: > CAS 0 To acquire capture data of Blocks 1 to 64: > CAS 1,1,64	
Compatibility	Incompatible with existing models.	

**CAT?**


---

Response	<state>=<NR1 NUMERIC RESPONSE DATA> (FIX1) 0        Capture data acquisition is not performed. 1        Capture data acquisition is being performed.
Function	Queries capture data acquisition status.
Example	> CAT? < CAT 1
Compatibility	Incompatible with existing models.

**CAC**


---

Function	Cancels capture data acquisition.
Example	> CAC
Compatibility	Incompatible with existing models.

**CBL?**


---

Response	<length>=<NR1 NUMERIC RESPONSE DATA> <FIX10> Maximum capture data/1 to maximum capture data/n bits (n=1, 2, 4, 8, 16, 32, 64, 128) Capture data length per block <b>Note:</b> The maximum capture data length is doubled at 2 ch Combination. The maximum capture data length is quadrupled 4 ch Combination.
Function	Queries capture data length per block.
Example	To query capture data length when the number of blocks is 32: >CBL? < CBL    4194304
Compatibility	Incompatible with existing models.





**CEB? <block>,<start>[,<size>]**

Parameter	<block>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 128                                    1 to 128 blocks, in 1-block steps <start>=<NON-DECIMAL PROGRAM DATA> #H0 to #H7FFFFFFF                    0 to 7FFFFFFF bits, in 1-bit steps (Specify in hexadecimal.) [<size>]=<NR1 NUMERIC PROGRAM DATA> 1 to 16777216                            1 to 16,777,216 bytes, in 1-byte steps
	<p><b>Note:</b></p> <p style="padding-left: 40px;">The maximum setting is the pattern length.                  At 2 ch Combination, the setting range and Step are doubled.                  At 4 ch Combination, the setting range and Step are quadrupled.</p>
Response	<bdata>=<DEFINITE LENGTH ARBITRARY BLOCK RESPONSE DATA> #XYYY<binary>    X:            Number of YYY digits YYY:        Number of <binary> bytes: 1 to 16,777,216 (bytes) <binary>: Binary data up to 16,777,216 bytes
Function	Queries error position of 16,777,216 bytes from <start> address in the specified block acquired by capture function.
Example	To query error position of 16,777,216 bytes from address 0 in block 3 acquired by capture function: > CEB? 3,#H0 < CEB #10011
Compatibility	Incompatible with existing models.

### 8.4.6 Commands related to Misc tab window



Figure 8.4.6-1 Misc tab window

8.4.6.1 Pattern Sequence setting commands

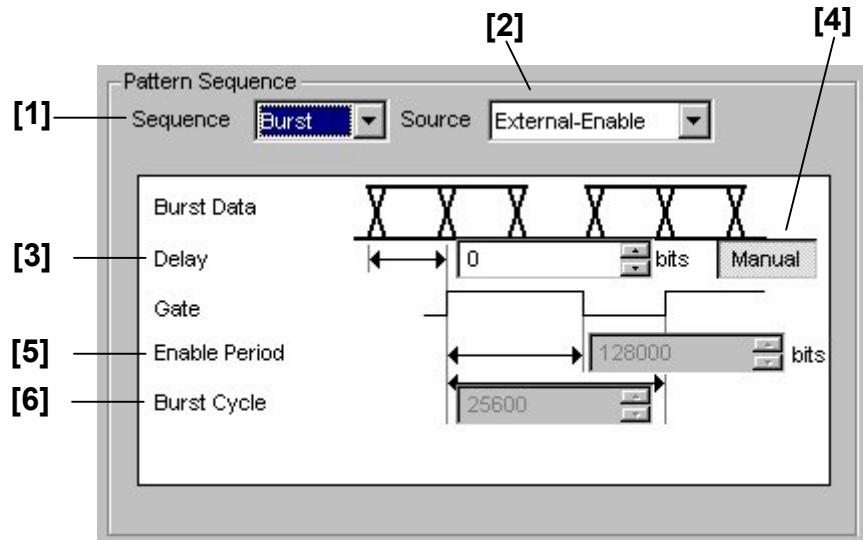


Figure 8.4.6.1-1 Pattern Sequence setting

Table 8.4.6.1-1 Pattern Sequence setting commands

No.	Setting Items	Commands
[1]	Sequence	BST(PTI)
		BST?(PTI?)
[2]	Source	BSM
		BSM?
[3]	Burst Trigger Delay	ABD
		ABD?
[4]	No label (Automatic Adjustment)	BAD
		BAD?
[5]	Enable Period	BEL
		BEL?
[6]	Burst Cycle	BCY
		BCY?



**BST (PTI) <mode>**


---

Parameter	<mode>=<DECIMAL NUMERIC PROGRAM DATA> 0 Repeat: Repeat signal 1 Burst: Burst signal
Function	Sets the signal reception mode to Repeat (consecutive) or Burst.
Example	To set the signal reception mode to Repeat: > BST(PTI) 0
Compatibility	Compatible with the MP1632C (PTI).

**BST? (PTI?)**


---

Response	<mode>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the signal reception mode.
Example	> BST(PTI)? < BST(PTI) 0
Compatibility	Compatible with the MP1632C (PTI?).

**BSM <mode>**


---

Parameter	<mode>=<DECIMAL NUMERIC PROGRAM DATA> 0 Internal 1 External Trigger 2 External Enable
Function	Sets the Burst signal reception sequence.
Example	To set the Burst signal reception sequence to Internal: > BSM 0
Compatibility	Incompatible with existing models.

**BSM?**


---

Response	<mode>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the Burst signal reception sequence.
Example	> BSM? < BSM 0
Compatibility	Incompatible with existing models.

### ABD <numeric>

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 0 to 2147483648                      0 to 2,147,483,648 bits, in 64-bit steps
	<b>Note:</b> At 2 ch Combination, the setting range and Step are doubled. At 4 ch Combination, the setting range and Step are quadrupled.
Function	Sets the delay value for the Burst signal when Burst External Trigger is selected.
Example	To set the delay value for the Burst signal when Burst External Trigger is selected to 0 bit: > ABD 0
Compatibility	Incompatible with existing models.

### ABD?

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX11)
Function	Queries the delay value for the Burst signal when Burst External Trigger is selected.
Example	> ABD? < ABD                      0 < ABD 2147483648
Compatibility	Incompatible with existing models.

### BAD <adjust>

Parameter	<adjust>=<DECIMAL NUMERIC PROGRAM DATA> 0                                      Adjusts automatically 1                                      Does not adjust automatically
Function	Sets whether to execute automatic adjustment of Burst Trigger Delay.
Example	> BAD 0
Compatibility	Incompatible with existing models.

### BAD?

Response	<adjust>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the Burst Trigger Delay adjustment method.
Example	> BAD? < BAD 0
Compatibility	Incompatible with existing models.

**BEL <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 12800 to 2147483520      12,800 to 2,147,483,520 bits, in 128-bit steps
	<b>Note:</b> At 2 ch Combination, the setting range and Step are doubled. At 4 ch Combination, the setting range and Step are quadrupled.
Function	Sets the data signal reception interval for Burst signal reception.
Example	To set the Burst signal reception interval for Burst signal reception to 12,800 bits: > BEL 12800
Compatibility	Incompatible with existing models.

**BEL?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX10)
Function	Queries the data signal reception interval for Burst signal reception.
Example	> BEL? < BEL      12800 < BEL   134217728
Compatibility	Incompatible with existing models.

**BCY <numeric>**


---

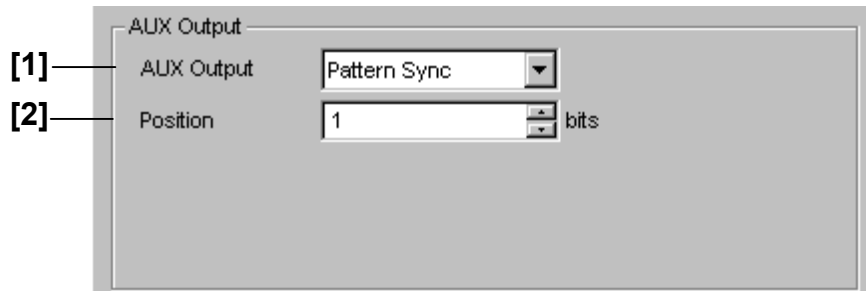
Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 25600 to 2147483648      25,600 to 2,147,483,648 bits, in 128-bit steps
	<b>Note:</b> At 2 ch Combination, the setting range and Step are doubled. At 4 ch Combination, the setting range and Step are quadrupled.
Function	Sets the Burst signal generation cycle.
Example	To set the Burst signal generation cycle to 25,600 bits: > BCY 25600
Compatibility	Incompatible with existing models.

**BCY?**

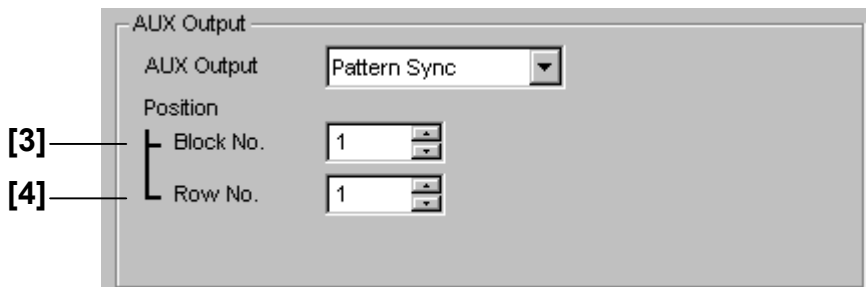

---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX11)
Function	Queries the Burst signal generation cycle.
Example	> BCY? < BCY      25600 < BCY   2147483648
Compatibility	Incompatible with existing models.

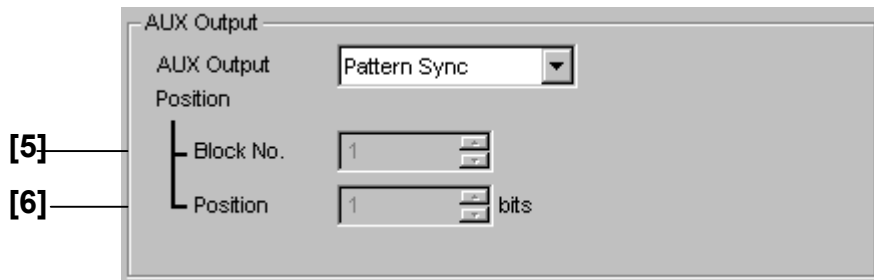
### 8.4.6.2 AUX Output setting commands



**Figure 8.4.6.2-1 Pattern Sync setting**  
(For PRBS, Zero Substitution, and Data patterns)



**Figure 8.4.6.2-2 Pattern Sync setting (For Mixed pattern)**



**Figure 8.4.6.2-3 Pattern Sync setting (For Sequence pattern)**

Table 8.4.6.2-1 AUX Output setting commands

No.	Setting Items	Commands
[1]	AUX Output	SOP
		SOP?
[2]	Position (PRBS, Zero Substitution, Data)	PSP
		PSP?
[3]	Block No. (Mixed Data)	SMB
		SMB?
[4]	Row No. (Mixed Data)	SMR
		SMR?
[5]	Block No. (Sequence)	SSB
		SSB?
[6]	Position (Sequence)	SSP
		SSP?

**SOP <source>[,<numeric>]**

Parameter	<source>=<DECIMAL NUMERIC PROGRAM DATA> 0 1/32 clock 1 Pattern Sync (Variable) 2 Pattern Sync (Variable) 4 1/8 clock (When MU181040A-002 and MU181040B-002 are installed) 6 1/16 clock 9 1/64 clock 10 Sync Gain 11 Error Output 12 Frame 13 1/n clock <numeric>=<DECIMAL NUMERIC PROGRAM DATA> Omit <numeric> when 13 (1/n clock) is not selected. 8 to 511 8 to 511, in single steps Only 16, 32, and 64 are possible for MU181040A-001. Only 8 to 511 are possible for MU181040A-002 and MU181040B-002.
Function	Sets the output signal for synchronization output.
Example	To set the output signal for synchronization output to 1/32 clock: > SOP 0 To set the output signal for synchronization output to 1/511 clock: > SOP 13,511
Compatibility	Partially compatible with the MP1632C (Compatible with 1 only). Partially compatible with the MP1762D (Compatible with 0 and 2 only).

**SOP?**

Response	<source>=<NR1 NUMERIC RESPONSE DATA> (FIX2) <numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX3) 8 to 511 Omit <numeric> when 1/n clock is not selected.
Function	Queries the output signal for synchronization output.
Example	> SOP? < SOP 0 < SOP 13, 8 < SOP 13,511
Compatibility	Partially compatible with the MP1632C (Compatible with 1 only). Partially compatible with the MP1762D (Compatible with 0 and 2 only).

**PSP <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 68719476657            1 to 68,719,476,657 bits, in 16-bit steps In the case of combination, 1 to 274877906625            1 to 274,877,906,625 bits, in 64-bit steps
Function	Sets the output position for synchronization output for Data, PRBS, and Zero Substitution patterns.
Example	To set the output position for synchronization output for Data, PRBS, and Zero Substitution patterns to 1 bit: > PSP 1
Compatibility	Partially compatible with the MP1632C and MP1762D (16-bit resolution (steps) compatible).

**PSP?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX12)
Function	Queries the output position for synchronization output for Data, PRBS, and Zero Substitution patterns.
Example	> PSP? < PSP                    1 < PSP 2147483633
Compatibility	Partially compatible with the MP1632C and MP1762D (16-bit resolution (steps) compatible).

**SMB <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 511                    1 to 511 blocks, in 1-block steps The maximum setting value is the value set in Block No.
Function	Sets the output block position for synchronization output for Mixed Data pattern.
Example	To set the output block position for synchronization output for Mixed Data pattern to block 1. > SMB 1
Compatibility	Incompatible with existing models.

**SMB?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX3)
Function	Queries the output block position for synchronization output for Mixed Data pattern.
Example	> SMB? < SMB 1 < SMB 511
Compatibility	Incompatible with existing models.





**SSP <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 1048497                      1 to 1,048,497 bits, in 16-bit steps
Function	Sets the output position for synchronization output for Sequence pattern.
Example	To set the synchronization output position for Sequence pattern to bit 1: > SSP 1
Compatibility	Incompatible with existing models.

**SSP?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX7)
Function	Queries the output position for synchronization output for Sequence pattern.
Example	> SSP? < SSP                      1 < SSP 1048497
Compatibility	Incompatible with existing models.

8.4.6.3 AUX Input setting commands

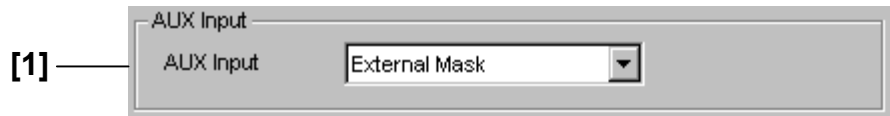


Figure 8.4.6.3-1 AUX Input setting

Table 8.4.6.3-1 AUX Input setting commands

No.	Setting Items	Commands
[1]	AUX Input	AUS
		AUS?

**AUS <usage>**

---

Parameter <usage>=<DECIMAL NUMERIC PROGRAM DATA>  
 0 Burst  
 1 External Mask  
 2 Capture External Trigger

Function Sets the usage of the common connector input.

Example To set the usage of the common connector input to Burst:  
 > AUS 0

Compatibility Incompatible with existing models.

**AUS?**

---

Response <usage>=<NR1 NUMERIC RESPONSE DATA> (FIX1)

Function Queries the usage of the common connector input.

Example > AUS?  
 < AUS 0

Compatibility Incompatible with existing models.

8.4.6.4 Measurement Restart setting commands



Figure 8.4.6.4-1 Measurement Restart setting

Table 8.4.6.4-1 Measurement Restart setting commands

No.	Setting Items	Commands
[1]	Measurement Restart	MRS MRS?

**MRS <data>,<clock>**

Parameter	<data>=<DECIMAL NUMERIC PROGRAM DATA>
	0 Does not restart measurement when the data threshold is changed (Measurement restart at data threshold change OFF).
	1 Restarts measurement when the data threshold is changed (Measurement restart at data threshold change ON).
	<clock>=<DECIMAL NUMERIC PROGRAM DATA>
	0 Does not restart measurement when the clock delay is changed (Measurement restart at clock delay change OFF).
	1 Restarts measurement when the clock delay is changed (Measurement restart at clock delay change ON).
Function	Sets the measurement restart condition.
Example	To set the measurement restart condition to "Measurement restart at data threshold change ON and clock delay change ON": > MRS 1,1
Compatibility	Incompatible with existing models.

**MRS?**

Response	<data>,<clock>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
	0 Measurement restart OFF
	1 Measurement restart ON
	<clock>=< NR1 NUMERIC PROGRAM DATA> (FIX1)
	0 Does not restart measurement when the clock delay is changed (Measurement restart at clock delay change OFF).
	1 Restarts measurement when the clock delay is changed (Measurement restart at clock delay change ON).
Function	Queries the measurement restart condition.
Example	> MRS? < MRS 1,1
Compatibility	Incompatible with existing models.

## 8.5 Automatic Measurement Commands

This section describes the commands for the measurement application. Refer to Section 7.1 "Common Commands" and 9.1 "Basic Operation of Device Messages" for how to specify a slot number with the : SYSTem:CFUNction.

### 8.5.1 Eye Margin measurement setting commands

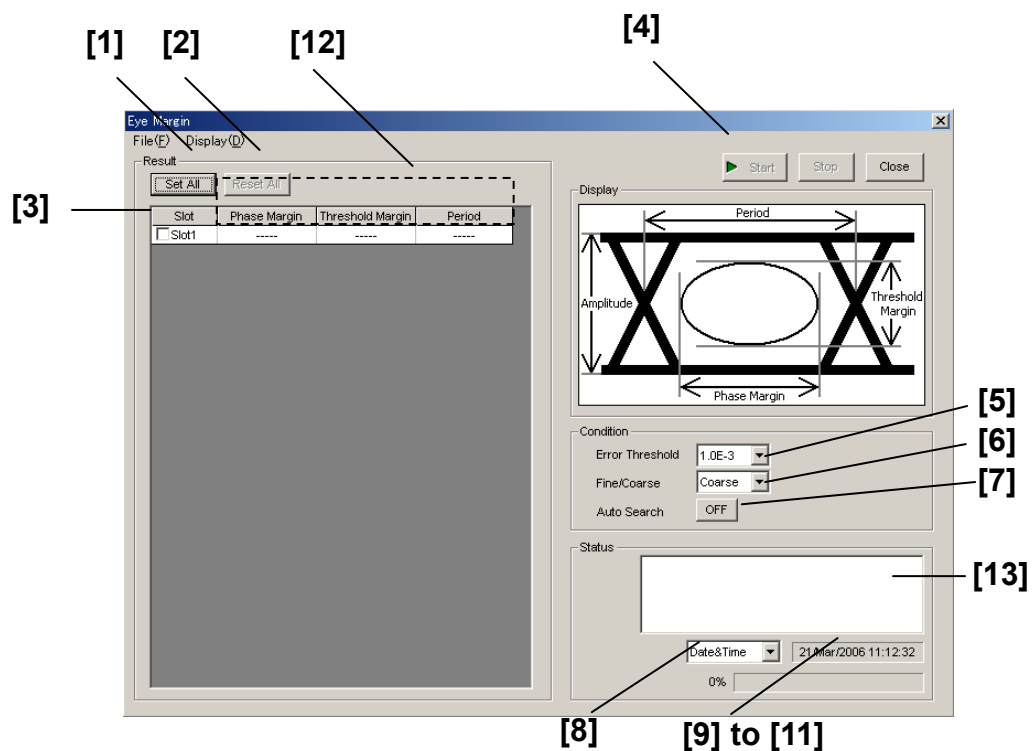


Figure 8.5.1-1 Eye Margin measurement screen

Table 8.5.1-1 Eye Margin measurement setting commands

No.	Setting Items	Commands
[1]	Set All	MEA
[2]	Reset All	MER
[3]	Slot	MES
		MES?
[4]	Start	EST
		EST?
[5]	Error Threshold	EYT
		EYT?
[6]	Fine/Coarse	MMR
		MMR?
[7]	Auto Search ON/OFF	EMA
		EMA?
[8]	Selection of measurement time display	MTI
		MTI?
[9]	Setting of time display	MDT?
[10]	Query for measurement start time	ESA?
[11]	Query for measurement elapsed time	MLP?
[12]	Query for measurement result	EMM?
[13]	Query for measurement status	EMW?

### MEA

Function	Selects all slots to ON.
Example	> MEA
Compatibility	Incompatible with existing models.

### MER

Function	Selects all slots to OFF.
Example	> MER
Compatibility	Incompatible with existing models.

### MES <slot>,<numeric>[,<unit>]

Parameter	<slot>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 6                               Slots No. 1 to No. 6 1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A
	<numeric>=<DECIMAL NUMERIC PROGRAM> 1                                       ON 0                                       OFF
	[<unit>]=<DECIMAL NUMERIC PROGRAM DATA> 1 to 4                               Unit No. 1 to No. 4 Specify the unit No. when connected to the MT1810A. <unit> is optional. When omitted, 1 is specified.
Function	Eye Margin measurement   Selects the slot.
Example	Eye Margin measurement   To set Slot 1 to ON: > MES 1,1
Compatibility	Incompatible with existing models.

### MES? <slot>[,<unit>]

Parameter	<slot>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 6                               Slots No. 1 to No. 6 1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A
	[<unit>]=<DECIMAL NUMERIC PROGRAM DATA> 1 to 4                               Unit No. 1 to No. 4 Specify the unit No. when connected to the MT1810A. <unit> is optional. When omitted, 1 is specified.
Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Eye Margin measurement   Queries the slot.
Example	> MES? 1 < MES 1
Compatibility	Incompatible with existing models.

**EST <type>**


---

Parameter	<type>=<NR1 NUMERIC PROGRAM DATA>
	1 Starts measurement
	0 Stops measurement
Function	Starts and stops Eye Margin measurement.
Example	To start Eye Margin measurement: > EST 1
Compatibility	Compatible with the MP1632C.

**EST?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
	1 Starts measurement
	0 Stops measurement
	2 Measurement failure
Function	Queries the Eye Margin measurement status.
Example	> EST? < EST 2
Compatibility	Compatible with the MP1632C.

**EYT <thre>**


---

Parameter	<thre>=<DECIMAL NUMERIC PROGRAM DATA>
	1 1E-3
	2 1E-4
	3 1E-5
	4 1E-6
	5 1E-7
	6 1E-8
	7 1E-9
	8 1E-10
	9 1E-11
	10 1E-12
Function	Sets the threshold value that is to be the boundary of the Eye Margin measurement margin.
Example	To set the threshold value that is to be the Eye Margin measurement margin to 1E-3: > EYT 1
Compatibility	Incompatible with existing models.

**EYT?**


---

Response	<thre>=<NR1 NUMERIC RESPONSE DATA> (FIX2)
Function	Queries the threshold value that is to be the boundary of the Eye Margin measurement margin.
Example	> EYT? < EYT 1 < EYT 10
Compatibility	Incompatible with existing models.

### MMR <type>

Parameter	<type>=<DECIMAL NUMERIC PROGRAM DATA> 0 COARse 1 FINE
Function	Sets the resolution of the error rate Eye Margin measurement.
Example	To set the resolution of the error rate to FINE: Eye Margin measurement > MMR 1
Compatibility	Compatible with the MP1632C.

### MMR?

Response	<thre>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the precision of the error rate Eye Margin measurement
Example	> MMR? < MMR 1
Compatibility	Compatible with the MP1632C.

### EMA <numeric>

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 2 Auto Search ON(Fine) 1 Auto Search ON(Coarse) 0 Auto Search OFF
Function	Selects between Auto Search ON/OFF upon start of Eye Margin measurement.
Example	To set Auto Search upon start of Eye Margin measurement to ON: > EMA 1
Compatibility	Incompatible with existing models.

### EMA?

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the Auto Search ON/OFF state upon start of Eye Margin measurement.
Example	> EMA? < EMA 1
Compatibility	Incompatible with existing models.



**MTI <type>**


---

Parameter	<type>=<DECIMAL NUMERIC PROGRAM DATA> 0 Displays the current date and time. 1 Displays the measurement start time. 2 Displays the elapsed time based on the measurement period.
Function	Selects the Eye Margin measurement time display type.
Example	To set the Eye Margin measurement time display type to measurement star time (Start Time): > MTI 1
Compatibility	Compatible with the MP1632C.

**MTI?**


---

Response	<type>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the Eye Margin measurement time display type.
Example	> MTI? < MTI 1
Compatibility	Compatible with the MP1632C.

**MDT?**


---

Response	<year>=<NR1 NUMERIC RESPONSE DATA> (FIX4) 2000 to 2036 2000 to 2036 <month>=<NR1 NUMERIC RESPONSE DATA> (FIX2) 01 to 12 January to December <day>=<NR1 NUMERIC RESPONSE DATA> (FIX2) 01 to 31 1st to 31st <hour>=<NR1 NUMERIC RESPONSE DATA> (FIX2) 00 to 23 0 to 23 hours <minute>=<NR1 NUMERIC RESPONSE DATA> (FIX2) 00 to 59 0 to 59 minutes <second>=<NR1 NUMERIC RESPONSE DATA> (FIX2) 00 to 59 0 to 59 seconds
Function	Queries the current date and time during Eye Margin measurement.
Example	> MDT? < MDT 2006,04,01,23,59,59
Compatibility	Incompatible with existing models.

## ESA?

Response	<p>&lt;year&gt;=&lt;NR1 NUMERIC RESPONSE DATA&gt; (FIX4) 0000, 2000 to 2036 (year) 2000 to 2036 &lt;month&gt;=&lt;NR1 NUMERIC RESPONSE DATA&gt; (FIX2) 00, 1 to 12 (month) January to December &lt;day&gt;=&lt;NR1 NUMERIC RESPONSE DATA&gt; (FIX2) 00, 1 to 31 (day) 1st to 31st &lt;hour&gt;=&lt;NR1 NUMERIC RESPONSE DATA&gt; (FIX2) 00 to 23 (hour) 0 to 23 hours &lt;minute&gt;=&lt;NR1 NUMERIC RESPONSE DATA&gt; (FIX2) 00 to 59 (minute) 0 to 59 minutes &lt;second&gt;=&lt;NR1 NUMERIC RESPONSE DATA&gt; (FIX2) 00 to 59 (second) 0 to 59 seconds</p> <p><b>Note:</b> The following content is output when no measurement is performed. &lt; ESA 0000,00,00,00,00,00</p>
Function	Queries the Eye Margin measurement start time (Start Time).
Example	> ESA? < ESA 2006,04,01,23,59,59
Compatibility	Compatible with the MP1632C.

## MLP?

Response	<p>&lt;day&gt;=&lt;NR1 NUMERIC RESPONSE DATA&gt; (FIX2) 00 to 99 1 to 99 days &lt;hour&gt;=&lt;NR1 NUMERIC RESPONSE DATA&gt; (FIX2) 00 to 23 0 to 23 hours &lt;minute&gt;=&lt;NR1 NUMERIC RESPONSE DATA&gt; (FIX2) 00 to 59 0 to 59 minutes &lt;second&gt;=&lt;NR1 NUMERIC RESPONSE DATA&gt; (FIX2) 00 to 59 0 to 59 seconds</p> <p><b>Note:</b> The following content is output when no measurement is performed. &lt; MLP 00,00,00,00</p>
Function	Queries the Eye Margin measurement elapsed time (Elapsed Time).
Example	> MLP? < MLP 99,23,59,59
Compatibility	Compatible with the MP1632C.

**EMM? <slot>,<numeric>[,<unit>]**

Parameter <slot>=<DECIMAL PROGRAM DATA>  
 1 to 6 Slots No. 1 to No. 6  
 <numeric>=<DECIMAL PROGRAM DATA>  
 "<result>" Measurement data  
 For the contents of <result> see Table 8.5.1-3.  
 [<unit>]=<DECIMAL NUMERIC PROGRAM DATA>  
 1 to 4 Unit No. 1 to No. 4  
 Specify the unit No. when connected to the MT1810A.  
 <unit> is optional. When omitted, 1 is specified.  
 Response <string>=<STRING RESPONSE DATA> (FIX7)

**Table 8.5.1-2 Response format**

Form	Format	Description
Form1 Phase type	XXXXXXX	When 0 to MAX (mUI/ps) Displays in the selected unit
	Failed	For measurement failure
	-----	When no data corresponds to the query
Form2 Threshold type	XXXXX	For 0 to MAX (mVpp)
	Failed	For measurement failure
	-----	When no data corresponds to the query

Function Queries the Eye Margin measurement result.

**Table 8.5.1-3 Parameters**

Items	<result>	Response Format
Phase margin	0	Form1
Threshold margin	1	Form2
Period	2	Form1

Example Queries the phase margin result of the Eye Margin measurement for Slot1.  
 > EMM? 1,0  
 < EMM 1000

Compatibility Incompatible with existing models.

## EMW?

Response	<numeric>=<DECIMAL NUMERIC RESPONSE DATA> (FIX1)
	0 When no alarm exists.
	1 Sync. Loss
	2 Clock Loss
	3 CR Unlock
	4 Out of range
	5 Frequency NG
	6 Illegal Error
	<b>Note:</b> Displays any one of the alarms. When two or more alarms have occurred, they are displayed in the following order: Illegal Error > Frequency NG > Clock Loss (CR Unlock) > Sync Loss > Out of range
Function	Queries the measurement status during Eye Margin measurement.
Example	> EMW? < EMW 1
Compatibility	Incompatible with existing models.

### 8.5.2 Eye Diagram measurement commands

This section describes the commands for Eye Diagram measurement. Commands are described for each tab window.

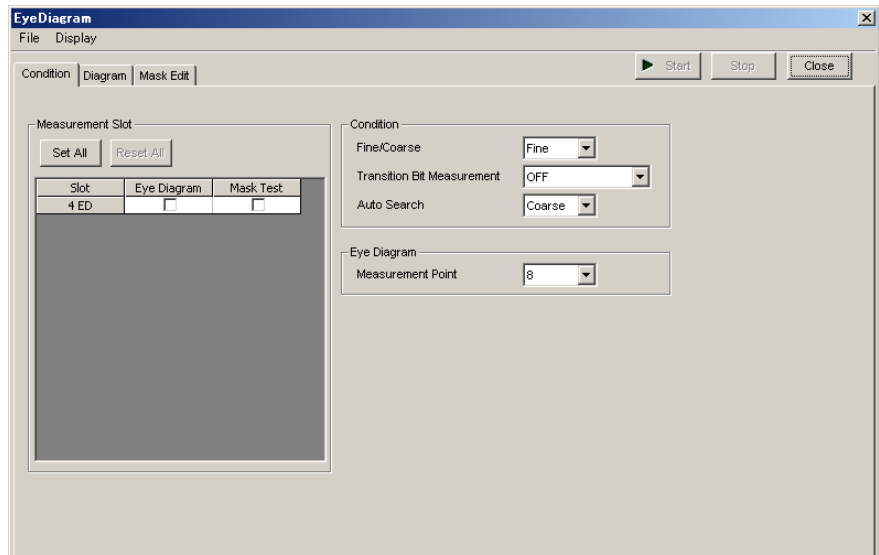


Figure 8.5.2-1 Eye Diagram measurement screen

8.5.2.1 Condition tab window setting commands

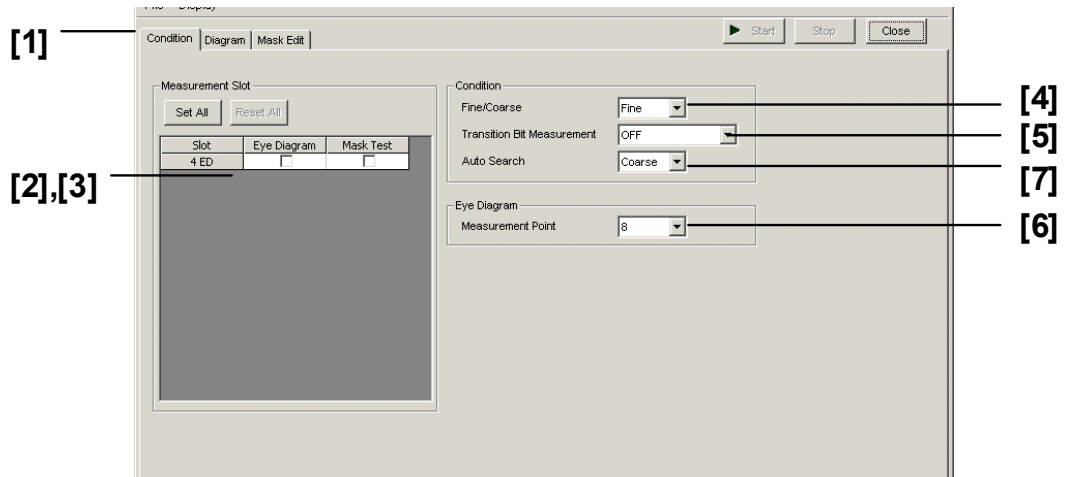


Figure 8.5.2.1-1 Condition tab window

Table 8.5.2.1-1 Condition tab window setting commands

No.	Setting Items	Commands
[1]	Tab selection	ETB
		ETB?
[2]	Slot Eye Diagram	EDS
		EDS?
[3]	Slot Mask Test	EMS
		EMS?
[4]	Fine/Coarse	EMR
		EMR?
[5]	Transition Bit Measurement	EMT
		EMT?
[6]	Measurement Point	EYP
		EYP?
[7]	Auto Search	EDA
		EDA?

**ETB <tab>**

---

Parameter	<tab>=<DECIMAL NUMERIC PROGRAM DATA> 0 Condition tab 1 Diagram tab 2 Mask Edit tab
Function	Switches the Eye Diagram measurement tab display.
Example	To display the Eye Diagram measurement Condition tab: > ETB 0
Compatibility	Incompatible with existing models.

**ETB?**

---

Response	<tab>=<NR1 NUMERIC RESPONSE DATA> (FIX1) 0 to 2
Function	Queries the Eye Diagram measurement tab display.
Example	> ETB? < ETB 0
Compatibility	Incompatible with existing models.

**EDS <slot>,<numeric>[,<unit>]**

---

Parameter	<slot>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 6 Slots No. 1 to No. 6 <numeric>=<DECIMAL NUMERIC PROGRAM DATA> 1 ON 0 OFF [<unit>]=<DECIMAL NUMERIC PROGRAM DATA> 1 to 4 Unit No. 1 to No. 4 Specify the unit No. when connected to the MT1810A. <unit> is optional. When omitted, 1 is specified.
Function	Selects the Eye Diagram measurement slot.
Example	Eye Diagram measurement To set Slot1 to ON: > EDS 1,1
Compatibility	Incompatible with existing models.

**EDS? <slot>[,<unit>]**

---

Parameter	<slot>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 6 Slots No. 1 to No. 6 1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A. [<unit>]=<DECIMAL NUMERIC PROGRAM DATA> 1 to 4 Unit No. 1 to No. 4 Specify the unit No. when connected to the MT1810A. <unit> is optional. When omitted, 1 is specified.
Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	To query whether the specified slot is targeted for the Eye Diagram measurement:
Example	> EDS? 1 < EDS 1
Compatibility	Incompatible with existing models.

**EMS <slot>,<numeric>[,<unit>]**

Parameter	<slot>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 6                               Slots No. 1 to No. 6 1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A. <numeric>=<DECIMAL NUMERIC PROGRAM DATA> 1                                       ON 0                                       OFF [<unit>]=<DECIMAL NUMERIC PROGRAM DATA> 1 to 4                               Unit No. 1 to No. 4 Specify the unit No. when connected to the MT1810A. <unit> is optional. When omitted, 1 is specified.
Function	Mask Test measurement       Selects the slot.
Function	Mask Test measurement       Selects the slot.
Example	Mask Test measurement       To set Slot1 to ON: > EMS 1,1
Compatibility	Incompatible with existing models.

**EMS? <slot>[,<unit>]**

Parameter	<slot>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 6                               Slots No. 1 to No. 6 1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A. [<unit>]=<DECIMAL NUMERIC PROGRAM DATA> 1 to 4                               Unit No. 1 to No. 4 Specify the unit No. when connected to the MT1810A. <unit> is optional. When omitted, 1 is specified.
Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Mask Test measurement       Queries the slot.
Example	To query whether the specified slot is targeted for the Mask Test measurement: > EMS? 1 < EMS 1
Compatibility	Incompatible with existing models.

**EMR <type>**

Parameter	<type>=<DECIMAL NUMERIC PROGRAM DATA> 0                                       Coarse mode 1                                       Fine mode
Function	Sets the resolution of the measurement error rate.
Example	To set the resolution of the measurement error rate to Fine: > EMR 1
Compatibility	Incompatible with existing models.

**EMR?**

Response	<type>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the resolution of the measurement error rate.
Example	> EMR? < EMR 1
Compatibility	Incompatible with existing models.



**EMT <type>**


---

Parameter	<type>=<DECIMAL NUMERIC PROGRAM DATA>
	0 OFF
	1 Transition
	2 Non Transition
Function	Sets Transition/Non Transition error detection.
Example	To set Transition/Non Transition error detection to Transition: > EMT 1
Compatibility	Incompatible with existing models.

**EMT?**


---

Response	<type>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the Transition/Non Transition error detection setting state.
Example	> EMT? < EMT 1
Compatibility	Incompatible with existing models.

**EYP <type>**


---

Parameter	<type>=<DECIMAL NUMERIC PROGRAM DATA>
	3 8 points
	4 16 points
	5 32 points
	6 64 points
	7 132 points
Function	Sets the number of measurement points during Eye Diagram measurement.
Example	To set the number of measurement points during Eye Diagram measurement to 8 points: > EYP 3
Compatibility	Incompatible with existing models.

**EYP?**


---

Response	<type>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the number of measurement points during Eye Diagram measurement.
Example	> EYP? < EYP 3
Compatibility	Incompatible with existing models.

**EDA <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA>
	2 Auto Search ON(Fine)
	1 Auto Search ON(Coarse)
	0 Auto Search OFF
Function	Sets the Auto Search ON/OFF when starting Eye Diagram measurement.
Example	Sets the Auto Search to On when starting Eye Diagram measurement. > EDA 1
Compatibility	Incompatible with existing models.

## EDA?

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the Auto Search ON/OFF when starting Eye Diagram measurement.
Example	> EDA? < EDA 1
Compatibility	Incompatible with existing models.

### 8.5.2.2 Diagram tab window setting commands

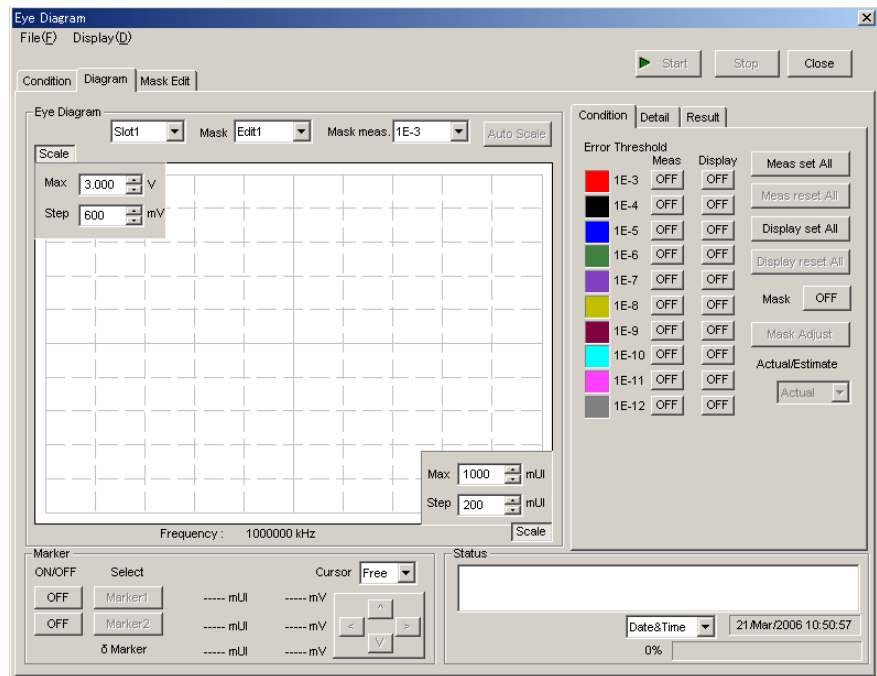


Figure 8.5.2.2-1 Diagram tab window

8.5.2.2.1 Graph display setting commands

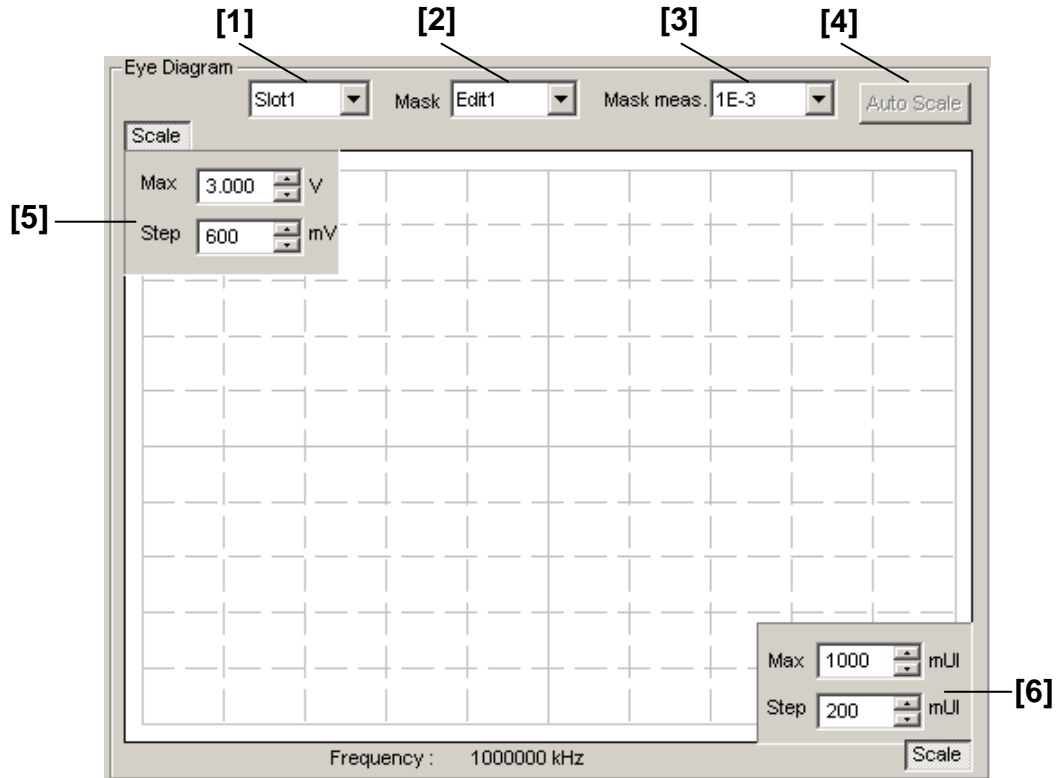


Figure 8.5.2.2.1-1 Eye Diagram field in Diagram tab window

Table 8.5.2.2.1-1 Diagram tab window setting commands

No.	Setting Items	Commands
[1]	No label (Setting of result display slot)	DPS DPS?
[2]	Mask	ETS ETS?
[3]	Mask meas	ETT ETT?
[4]	Auto Scale	ASC
[5]	Max Step (Threshold)	VSC VSC?
[6]	Max Step (Phase)	PSC PSC?

### DPS <slot>[,<unit>]

---

Parameter           <slot>=<DECIMAL NUMERIC PROGRAM DATA>  
                      1 to 6                                       Slots No. 1 to No. 6  
                      1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A.  
[<unit>]=<DECIMAL NUMERIC PROGRAM DATA>  
                      1 to 4                                       Unit No. 1 to No. 4  
                      Specify the unit No. when connected to the MT1810A.  
                      <unit> is optional. When omitted, 1 is specified.

Function            Selects the Eye Diagram result display target slot.

Example            To set the Eye Diagram result display target slot to Slot1:  
                      > DPS 1

Compatibility       Incompatible with existing models.

### DPS? [<unit>]

---

Parameter           [<unit>]=<DECIMAL NUMERIC PROGRAM DATA>  
                      1 to 4                                       Unit No. 1 to No. 4  
                      1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A.  
                      Specify the unit No. when connected to the MT1810A.  
                      <unit> is optional. When omitted, 1 is specified.

Response           <slot>=<NR1 NUMERIC RESPONSE DATA> (FIX2)

Function            Queries the Eye Diagram result display target slot.

Example            > DPS?  
                      < DPS 1  
                      < DPS 64

Compatibility       Incompatible with existing models.

### ETS <type>

---

Parameter           <type>=<DECIMAL NUMERIC PROGRAM DATA>  
                      0    Edit1  
                      1    Edit2  
                      2    Edit3  
                      3    Edit4

Function            Sets the mask pattern for performing the Eye Diagram mask test.

Example            To set the mask pattern for performing the Eye Diagram mask test to Edit4:  
                      > ETS 3

Compatibility       Incompatible with existing models.

### ETS?

---

Response           <type>=<NR1 NUMERIC RESPONSE DATA>(FIX1)

Function            Queries the mask pattern for performing the Eye Diagram mask test.

Example            > ETS?  
                      < ETS 3

Compatibility       Incompatible with existing models.

**ETT <thre>**


---

Parameter	<thre>=<DECIMAL NUMERIC PROGRAM DATA> 3 to 12                                    1E-3 to 1E-12, in single steps
Function	Sets the Error Threshold for performing the Eye Diagram mask test.
Example	To set the Error Threshold for performing the Eye Diagram mask test to E-3: > ETT 3
Compatibility	Incompatible with existing models.

**ETT?**


---

Response	<thre>=<NR1 NUMERIC RESPONSE DATA>(FIX2)
Function	Queries the Error Threshold for performing the Eye Diagram mask test.
Example	> ETT? < ETT 3 < ETT 12
Compatibility	Incompatible with existing models.

**ASC**


---

Function	Automatically adjusts the Eye Diagram measurement graph scale.
Example	> ASC
Compatibility	Incompatible with existing models.

**VSC <max>,<step>**


---

Parameter	<max>=<DECIMAL NUMERIC PROGRAM DATA> -3.990 to 4.000                            -3.990 to 4.000 V, in 0.001-V steps <step>=<DECIMAL NUMERIC PROGRAM DATA> 0.001 to 0.800                            0.001 to 0.800 V, in 0.001-V steps
Function	The range varies depending on the option status and input interface setting. Sets the maximum value in the direction of the Threshold of the Eye Diagram graph, and the grid resolution.
Example	To set the maximum value in the direction of the Threshold of the Eye Diagram graph to 4.000 V, and the grid resolution to 0.800 V: > VSC 4.000,0.800
Compatibility	Incompatible with existing models.

**VSC?**


---

Response	<max>=<NR2 NUMERIC RESPONSE DATA>(FIX6) -3.990 to 4.000                            -3.990 to 4.000 V <step>=<NR2 NUMERIC RESPONSE DATA>(FIX5) 0.001 to 0.800                            0.001 to 0.800 V
Function	Queries the maximum value in the direction of the Threshold of the Eye Diagram graph, and the grid resolution.
Example	> VSC? < VSC 4.000,0.800 < VSC -3.000,0.001
Compatibility	Incompatible with existing models.

### **PSC <max>,<step>**

---

Parameter	<max>=<DECIMAL NUMERIC PROGRAM DATA> -990 to 1000                      -990 to 1000 mUI, in 1-mUI steps <step>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 200                              1 to 200 mUI, in 1-mUI steps
Function	Sets the maximum value in the direction of the Phase of the Eye Diagram graph, and the grid resolution.
Example	To set the maximum value in the direction of the Phase of the Eye Diagram graph to 0, and the grid resolution to 10 mUI: > PSC 0,10
Compatibility	Incompatible with existing models.

### **PSC?**

---

Response	<min>=<NR1 NUMERIC RESPONSE DATA> (FIX4) -990 to 1000                      -990 to 1000 mUI <step>=<NR1 NUMERIC RESPONSE DATA> (FIX3) 1 to 200                              1 to 200 mUI
Function	Queries the maximum value in the direction of the Phase of the Eye Diagram graph, and the grid resolution.
Example	> PSC? < PSC -990, 1 < PSC 0, 1 < PSC 1000,200
Compatibility	Incompatible with existing models.

8.5.2.2.2 Condition setting commands

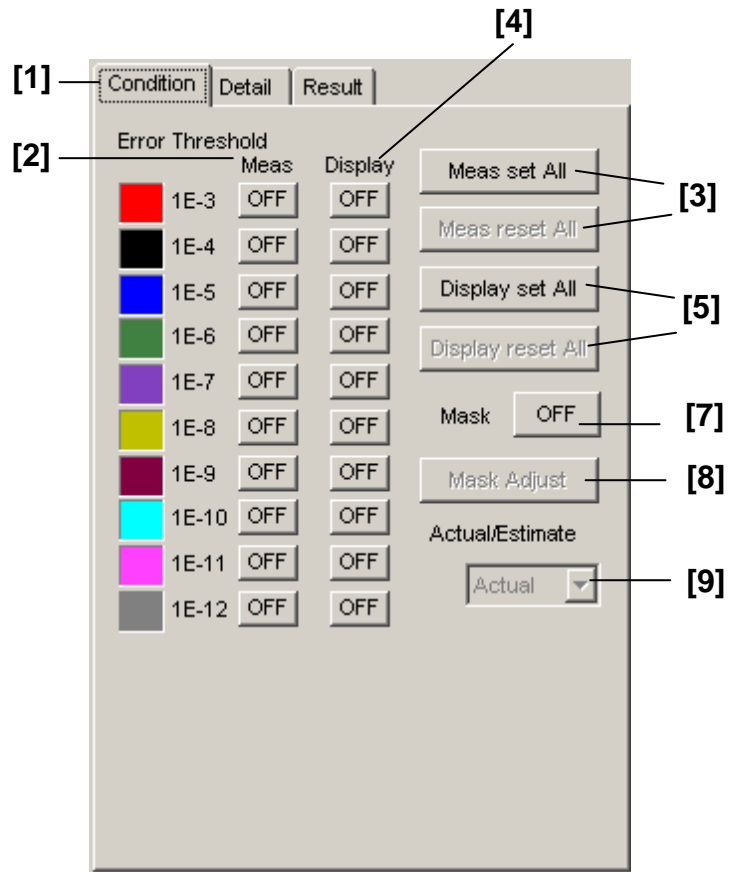


Figure 8.5.2.2.2-1 Condition, Detail and Result tab selection in Diagram tab window

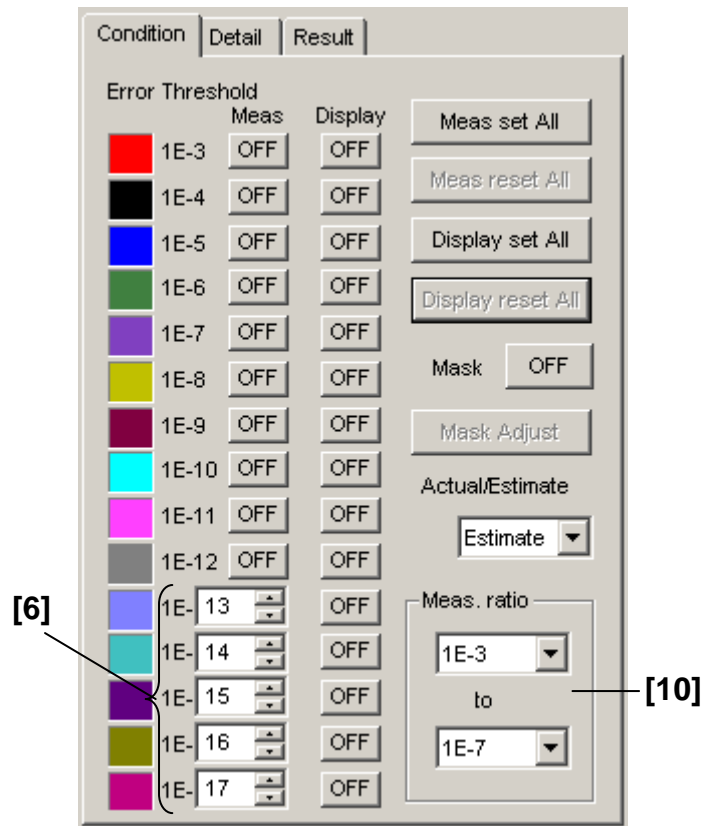


Figure 8.5.2.2.2-2 Condition setting screen (Estimate)



Table 8.5.2.2.2-1 Diagram tab window setting commands

No.	Setting Items	Commands
[1]	Select tab	DTB
		DTB?
[2]	Meas	ETR
		ETR?
[3]	Meas set All Meas reset All	DAS
[4]	Display	DER
		DER?
[5]	Display set All Display reset All	DAR
[6]	Setting of error rate for Estimate measurement	DES
		DES?
[7]	Mask ON/OFF	DPM
		DPM?
[8]	Mask Adjust	DPA
[9]	Actual/Estimate	DPE
		DPE?
[10]	Meas.ratio	DBT
		DBT?
[11]	Query for measurement point	EDP?
[12]	Query for measurement result	EDM?

### DTB <tab>

Parameter	<tab>=<DECIMAL NUMERIC PROGRAM DATA>
	0 Condition tab
	1 Detail tab
	2 Result tab
Function	Switches the tab display within the Diagram tab.
Example	To display the Result tab within the Diagram tab: > DTB 2
Compatibility	Incompatible with existing models.

### DTB?

Response	<tab>=<NR1 NUMERIC RESPONSE DATA> (FIX1) 0 to 2
Function	Queries the tab display within the Diagram tab.
Example	> DTB? < DTB 2
Compatibility	Incompatible with existing models.

### ETR <thre>

Parameter	<thre>=<BINARY NUMERIC PROGRAM DATA>
	B1000000000 1E-3
	B0100000000 1E-4
	B0010000000 1E-5
	B0001000000 1E-6
	B0000100000 1E-7
	B0000010000 1E-8
	B0000001000 1E-9
	B0000000100 1E-10
	B0000000010 1E-11
	B0000000001 1E-12
	<b>Note:</b> Set 1 only for bits that are set to ON.
Function	Selects the Eye Diagram measurement target error rate.
Example	To set the Eye Diagram measurement target error rates 1E-3, 1E-7, and 1E-12 to set ON: > ETR B1000100001
Compatibility	Incompatible with existing models.

**ETR?**

---

Response	<thre>=<NUMERIC RESPONSE DATA> (FIX11)
Function	Queries the Eye Diagram measurement target error rate.
Example	> ETR? < ETR B1000100001
Compatibility	Incompatible with existing models.

**DAS <numeric>**

---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 0 OFF 1 ON
Function	Sets all Eye Diagram measurement target error rates to ON/OFF.
Example	To set all Eye Diagram measurement target error rates to ON: > DAS 1
Compatibility	Incompatible with existing models.

## DER <thre>

Parameter	<thre>=<BINARY NUMERIC PROGRAM DATA>
	B1000000000000000 1E-3
	B0100000000000000 1E-4
	B0010000000000000 1E-5
	B0001000000000000 1E-6
	B0000100000000000 1E-7
	B0000010000000000 1E-8
	B0000001000000000 1E-9
	B0000000100000000 1E-10
	B0000000010000000 1E-11
	B0000000001000000 1E-12
	B0000000000100000 1E-13
	B0000000000010000 1E-14
	B0000000000001000 1E-15
	B0000000000000100 1E-16
	B0000000000000010 1E-17
	<b>Note:</b>
	Set 1 only for bits that are set to ON.
Function	Selects the Eye Diagram measurement result display target.
Example	To change the Eye Diagram measurement result display targets 1E-12 and E-17 to ON: > DER B000000000100001
Compatibility	Incompatible with existing models.

## DER?

Response	<thre>=<NUMERIC RESPONSE DATA> (FIX16)
Function	Queries the Eye Diagram measurement result display target.
Example	> DER? < DER B000000000100001
Compatibility	Incompatible with existing models.

## DAR <numeric>

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA>
	0 OFF
	1 ON
Function	Sets all Eye Diagram measurement result display targets to ON/OFF.
Example	To change all Eye Diagram measurement result display targets to ON: > DAR 1
Compatibility	Incompatible with existing models.

**DES <numeric>**


---

Parameter	<numeric>=<DECIMAL PROGRAM DATA> 13 to 199                      1E-13 to 1E-199, in single steps
Function	Up to five parameters can be set, delimited with a comma (.). Sets the result display error rate in Estimate measurement from E-13 to E-199.
Example	To display the result display error rate in Estimate measurement for 1E-15, 1E-100, 1E-150, 1E-199, and 1E-180: >DES 15,100,150,199,180
Compatibility	Incompatible with existing models.

**DES?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA>(FIX3)(FIX3) (FIX3) (FIX3) (FIX3)
Function	Queries the result display error rate in Estimate measurement from E-13 to E-199.
Example	> DES? < DES 15,100,150,199,180 < DES 15, 30, 70, 80, 99
Compatibility	Incompatible with existing models.

**DPM <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 1                                  Display 0                                  Clear
Function	Selects between displaying and clearing the mask during Eye Diagram measurement.
Example	To display the mask during Eye Diagram measurement: > DPM 1
Compatibility	Incompatible with existing models.

**DPM?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the setting whether to display or clear the mask during Eye Diagram measurement.
Example	> DPM? < DPM 1
Compatibility	Incompatible with existing models.

### DPA

Function	Automatically adjusts the mask during Eye Diagram measurement.
Example	> DPA
Compatibility	Incompatible with existing models.

### DPE <type>

Parameter	<type>=<DECIMAL NUMERIC PROGRAM DATA> 0 Actual measurement 1 Estimate measurement
	<b>Note:</b> The Estimate measurement cannot be selected when the number of measurement points is set to 8.
Function	Selects between Actual and Estimate measurement during Eye Diagram measurement.
Example	To set Actual measurement during Eye Diagram measurement: > DPE 0
Compatibility	Incompatible with existing models.

### DPE?

Response	<type>=<NR1 NUMERIC RESPONSE DATA>(FIX1)
Function	Queries the Actual/Estimate measurement state during Eye Diagram measurement.
Example	> DPE? < DPE 0
Compatibility	Incompatible with existing models.

### DBT <upper>,<lower>

Parameter	<upper>=<DECIMAL NUMERIC PROGRAM DATA> 3 to 7 1E-3 to 1E-7, in single steps <lower>=<DECIMAL NUMERIC PROGRAM DATA> 7 to 12 1E-7 to E-12, in single steps
	<b>Note:</b> The difference between the <upper> and <lower> value must be 3 or greater.
Function	Sets the reference error rate during Eye Diagram Estimate.
Example	To set the reference error rate during Eye Diagram Estimate to E-3 or E-12: > DBT 3,12
Compatibility	Incompatible with existing models.

### DBT?

Response	<upper>=<NR1 NUMERIC RESPONSE DATA>(FIX1) <lower>=<NR1 NUMERIC RESPONSE DATA>(FIX2)
Function	Queries the reference error rate during Eye Diagram Estimate.
Example	> DBT? < DBT 3,12 < DBT 3, 7
Compatibility	Incompatible with existing models.

**EDP? <numeric>,<thre>[,<unit>]**

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 6 Slots No. 1 to No. 6 1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A. <thre>=<DECIMAL NUMERIC PROGRAM DATA> 3 to 12 1E-3 to 1E-12 [<unit>]=<DECIMAL NUMERIC PROGRAM DATA> 1 to 4 Unit No. 1 to No. 4 Specify the unit No. when connected to the MT1810A. <unit> is optional. When omitted, 1 is specified.
Response	<numeric>=<NR1 NUMERIC RESPONSE DATA>(FIX3) 1 to 132 Returns a valid point. 0 Returns 0 when all points are invalid.
Function	Multiple points are delimited with a comma (,) and returned. Queries the valid points in each threshold during the Eye Diagram measurement for a specific slot.
Example	To query the valid points in slot No. 1 during measurement with threshold 1E-3: > EDP? 1,3 < EDP 1, 2, 3, 50,132 < EDP 0
Compatibility	Incompatible with existing models.

**EDM? <numeric1>,<numeric2>,<numeric3>[,<unit>]**

Parameter	<numeric1>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 6 Slots No. 1 to No. 6 <numeric2>=<DECIMAL NUMERIC PROGRAM DATA> 3 to 12 1E-3 to 1E-12, for error rate specification <numeric3>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 132 Measurement points [<unit>]=<DECIMAL NUMERIC PROGRAM DATA> 1 to 4 Unit No. 1 to No. 4 Specify the unit No. when connected to the MT1810A. <unit> is optional. When omitted, 1 is specified.
Response	<phase>=<NR1 NUMERIC RESPONSE DATA>(FIX5) -1000 to 1000 Phase data (mUI) XXXXX Phase data (ps) <b>Note:</b> The converted value from mUI When no measurement result exists, "-----" is returned.
Function	<threshold>=<NR1 NUMERIC RESPONSE DATA>(FIX5) YYYYY Threshold data (mV) When no measurement result exists, "-----" is returned.
Example	Queries the Eye Diagram measurement results. To query the Eye Diagram measurement results at Slot 3, error rate 1E-7, measurement point 1 (measurement point: -300 mUI, 500 mV): > EDM? 3,7,1 < EDM -300, 500 < EDM -----,-----
Compatibility	Incompatible with existing models.

8.5.2.2.3 Detail setting commands

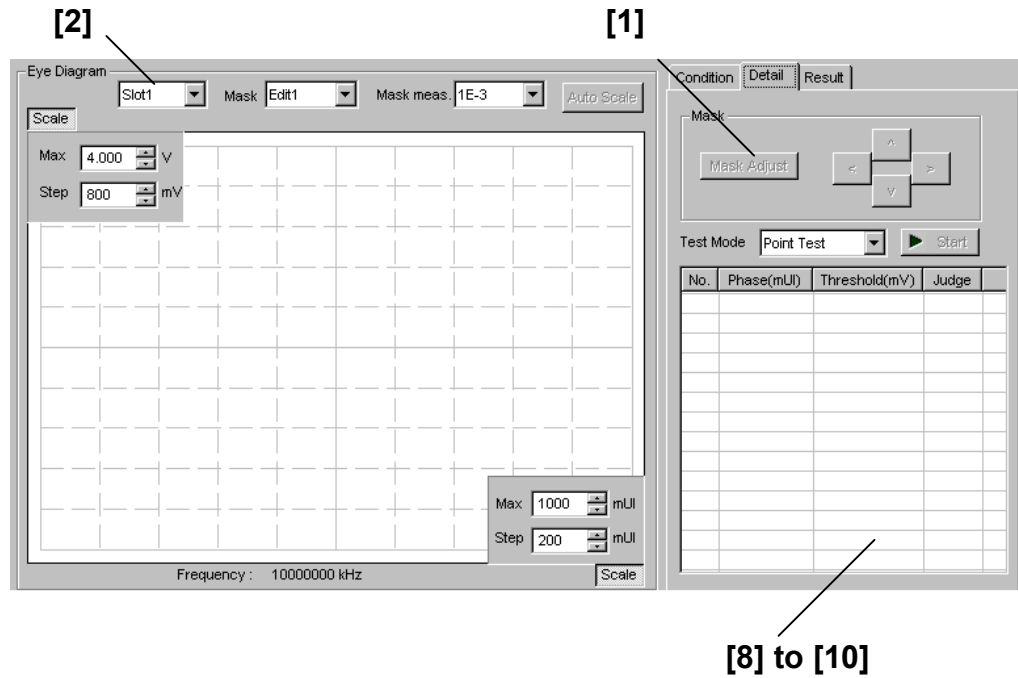


Figure 8.5.2.2.3-1 Detail Mask Point Test screen

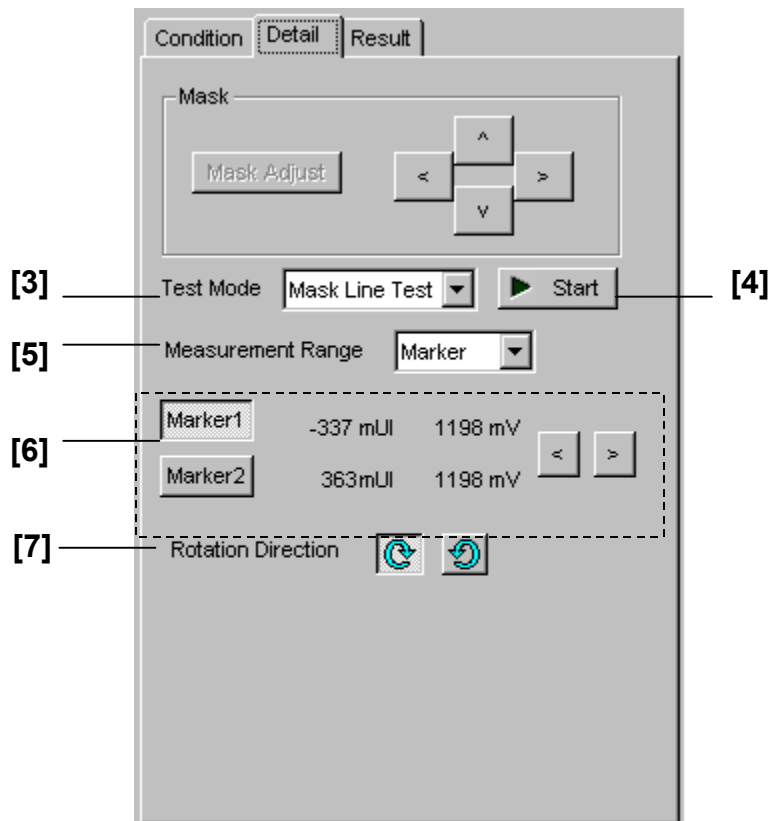


Figure 8.5.2.2.3-2 Detail Mask Line Test screen



Table 8.5.2.2.3-1 Detail setting commands

No.	Setting Items	Commands
[1]	Mask Adjust	DMK
[2]	Slot selection	DTS
		DTS?
[3]	Test Mode	DMO
		DMO?
[4]	Start/Stop	DST
		DSP
		DSA?
[5]	Measurement Range	DLR
		DLR?
[6]	Marker1 Marker2	DMR
		DMR?
[7]	Rotation Direction	DLT
		DLT?
[8]	Query for measurement point	DPN?
[9]	Query for Point test result	DDP?
[10]	Query for Line test result	DDL?

## DMK

Function	Performs automatic mask adjustment during Eye Diagram Detail measurement.
Example	> DMK
Compatibility	Incompatible with existing models.

## DTS <slot>[,<unit>]

Parameter	<slot>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 6                                      Slots No. 1 to No. 6 1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A. [<unit>]=<DECIMAL NUMERIC PROGRAM DATA> 1 to 4                                      Unit No. 1 to No. 4 Specify the unit No. when connected to the MT1810A. <unit> is optional. When omitted, 1 is specified.
Function	Selects the Mask pass/fail measurement target slot during Eye Diagram measurement.
Example	To set the Mask pass/fail measurement target slot during Eye Diagram measurement to Slot1: > DTS 1
Compatibility	Incompatible with existing models.

## DTS? [<unit>]

Parameter	[<unit>]=<DECIMAL NUMERIC PROGRAM DATA> 1 to 4                                      Unit No. 1 to No. 4 Specify the unit No. when connected to the MT1810A. <unit> is optional. When omitted, 1 is specified.
Response	<slot>=<NR1 NUMERIC RESPONSE DATA>(FIX2)
Function	Queries the Mask pass/fail measurement target slot during Eye Diagram measurement.
Example	> DTS? < DTS 1
Compatibility	Incompatible with existing models.

## DMO <mode>

Parameter	<mode>=<DECIMAL NUMERIC PROGRAM DATA> 0    Point Test 1    Mask Line Test
Function	Selects the measurement mode during Eye Diagram Detail measurement.
Example	To set the measurement mode during Eye Diagram Detail measurement to Point Test mode: > DMO 0
Compatibility	Incompatible with existing models.

## DMO?

Response	<mode>=<NR1 NUMERIC RESPONSE DATA>(FIX1)
Function	Queries the measurement mode during Eye Diagram Detail measurement.
Example	> DMO? < DMO 0
Compatibility	Incompatible with existing models.

**DST**


---

Function	Starts the Mask pass/fail judgment during Eye Diagram Detail measurement.
Example	> DST
Compatibility	Incompatible with existing models.

**DSP**


---

Function	Stops the Mask pass/fail judgment during Eye Diagram Detail measurement.
Example	> DSP
Compatibility	Incompatible with existing models.

**DSA?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA>(FIX1) 1 Start 0 Stop
Function	Queries the Mask pass/fail judgment status during Eye Diagram Detail measurement.
Example	> DSA? < DSA 1
Compatibility	Incompatible with existing models.

**DLR <range>**


---

Parameter	<range>=<DECIMAL NUMERIC PROGRAM DATA> 0 ALL 1 Marker
Function	Selects the measurement range during Eye Diagram Detail Line measurement.
Example	To set the measurement range during Eye Diagram Detail Line measurement to Marker: > DLR 1
Compatibility	Incompatible with existing models.

**DLR?**


---

Response	<range>=<NR1 NUMERIC RESPONSE DATA>(FIX1)
Function	Queries the measurement range during Eye Diagram Detail Line measurement.
Example	> DLR? < DLR 1
Compatibility	Incompatible with existing models.

### DMR <marker>,<phase>,<voltage>

Parameter	<marker>=<DECIMAL NUMERIC PROGRAM DATA> 1 Marker 1 2 Marker 2 <phase>=<DECIMAL NUMERIC PROGRAM DATA> -1000 to 1000 -1000 to 1000 mUI, in 1-mUI steps (horizontal direction) <voltage>=<DECIMAL NUMERIC PROGRAM DATA> -4000 to 4000 -4000 to 4000 mV, in 1-mV steps (vertical direction)
	<b>Note:</b> Sets the value of Marker 2 must be equal to or greater than that of marker 1 in the phase direction. The marker is moved onto the mask line closest to the set point.
Function	Sets the positions for the measurement range selection markers 1 and 2 during Eye Diagram Detail Line measurement.
Example	To set the position for marker 1 (100 mUI, 2000 mV): >DMR 1,100,2000
Compatibility	Incompatible with existing models.

### DMR? <marker>

Parameter	<marker>=<DECIMAL NUMERIC PROGRAM DATA> 1 Marker 1 2 Marker 2 <phase>,<voltage> (FIX5)(FIX5)
Response	<phase>=<NR2 NUMERIC RESPONSE DATA> -1000 to 1000 -1000 to 1000 mUI (horizontal direction) XXXXX XXXXX ps <b>Note:</b> The value converted from mUI <voltage>=<NR2 NUMERIC RESPONSE DATA> (FIX5) -4000 to 4000 -4000 to 4000 mV (vertical direction)
Function	Queries the positions for the measurement range selection markers 1 and 2 during Eye Diagram Detail Line measurement.
Example	To query the set value for marker 1 (1,000 V, 100 mUI): > DMR? 1 < DMR -1000,-4000 < DMR 0, 0 < DMR 1000, 4000
Compatibility	Incompatible with existing models.

**DLT <type>**


---

Parameter	<type>=<DECIMAL NUMERIC PROGRAM DATA> 0 Counterclockwise 1 Clockwise
Function	Selects the Mask pass/fail judgment direction during Eye Diagram Detail Line measurement.
Example	To set the Mask pass/fail judgment direction during Eye Diagram Detail Line measurement to clockwise: > DLT 1
Compatibility	Incompatible with existing models.

**DLT?**


---

Response	<type>=<NR1 NUMERIC RESPONSE DATA>(FIX1)
Function	Queries the Mask pass/fail judgment direction during Eye Diagram Detail Line measurement.
Example	> DLT? < DLT 1
Compatibility	Incompatible with existing models.

**DPN?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA>(FIX5) 1 to 20000 Detail measurement point
Function	Queries the number of points during Eye Diagram Detail measurement.
Example	> DPN? < DPN 1000 < DPN 20000
Compatibility	Incompatible with existing models.

### DDP? <point>

Parameter	<point>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 32	Measurement point
Response	<numeric1>=<NR1 NUMERIC RESPONSE DATA>(FIX5) -1000 to 1000 XXXXX	Phase data (mUI) Phase data (ps)
		<b>Note:</b> Displays in the selected unit.
	<numeric2>=<NR1 NUMERIC RESPONSE DATA>(FIX5) -4000 to 4000	Threshold data (mV)
	<numeric3>=<NR1 NUMERIC RESPONSE DATA>(FIX1) 0 1	OK NG
Function	Queries the measurement result of the Eye Diagram Detail Point Test.	
Example	To query the measurement result of the Eye Diagram Detail Point Test at measurement point 1: > DDP? 1 < DDP -1000,-4000,0 < DDP 0, 0,0 < DDP 1000, 4000,1	
Compatibility	Incompatible with existing models.	

### DDL? <point>

Parameter	<point>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 20000	Measurement point
Response	<numeric1>=<NR1 NUMERIC RESPONSE DATA>(FIX5) -1000 to 1000 XXXXX	Phase data (mUI) Phase data (ps)
		<b>Note:</b> Displays in the selected unit.
	<numeric2>=<NR1 NUMERIC RESPONSE DATA>(FIX5) -4000 to 4000	Threshold data (mV)
		When no data exists, "-----" is displayed.
	<numeric3>=<NR1 NUMERIC RESPONSE DATA>(FIX1) 0 1	OK NG
Function	Queries the measurement result of the Eye Diagram Detail Mask Line Test.	
Example	To query the measurement result of the Eye Diagram Detail Mask Line Test at measurement point 1: > DDL? 1 < DDL -1000,-4000,0 < DDL 0, 0,0 < DDL 1000, 4000,1	
Compatibility	Incompatible with existing models.	

## 8.5.2.2.4 Result query commands

Slot	Judgement	NG Point
1	-	-

Figure 8.5.2.2.4-1 Result tab

Table 8.5.2.2.4-1 Result query command

No.	Setting Items	Command
[1]	Query for Mask Test result	MSK?

**MSK? <numeric>[,<unit>]**

Parameter	<p>&lt;numeric&gt;=&lt;DECIMAL NUMERIC PROGRAM DATA&gt;          1 to 6                               Slots No. 1 to No. 6          1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A.          [&lt;unit&gt;]=&lt;DECIMAL NUMERIC PROGRAM DATA&gt;          1 to 4                               Unit No. 1 to No. 4          Specify the unit No. when connected to the MT1810A.          &lt;unit&gt; is optional. When omitted, 1 is specified.</p>
Response	<p>&lt;numeric1&gt;,&lt;numeric2&gt;          &lt;numeric1&gt;=&lt;NR1 NUMERIC RESPONSE DATA&gt;(FIX1)          0                                       OK          1                                       NG          &lt;numeric2&gt;=&lt;NR1 NUMERIC RESPONSE DATA&gt;(FIX2)          0 to 32                               NG mask points  <b>Note:</b>            0 is returned when all items are OK            Multiple NGs are delimited with a comma (,) and returned for the            corresponding number of NGs.</p>
Function	<p>Queries the measurement result of the Eye Diagram Mask Test.</p>
Example	<p>To query the Mask Test result for Slot 1:          &gt; MSK? 1          &lt; MSK 1, 2, 4,32          &lt; MSK 0, 0</p>
Compatibility	<p>Incompatible with existing models.</p>



8.5.2.2.5 Diagram tab window (Status) setting commands

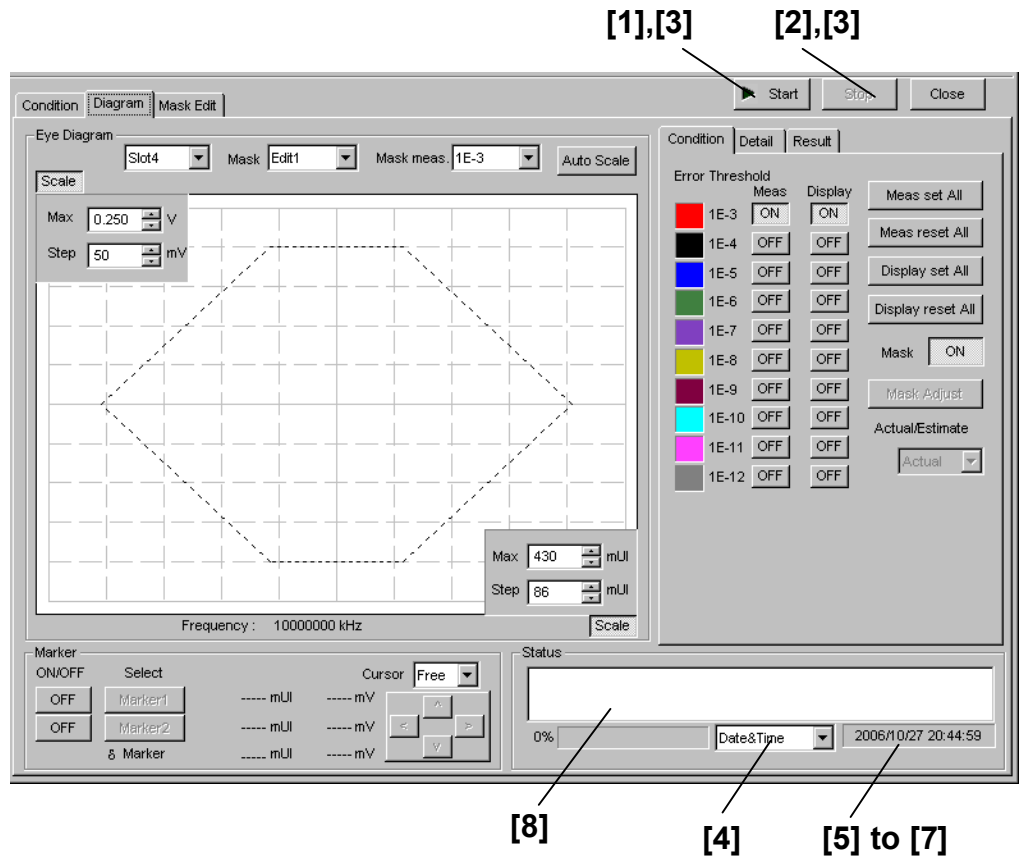


Figure 8.5.2.2.5-1 Diagram tab Start/Stop buttons and Status field

Table 8.5.2.2.5-1 Diagram tab window (Status) setting commands

No.	Setting Items	Commands
[1]	Start	DTA
[2]	Stop	DTO
[3]	Query for measurement state	MSR?
[4]	No label (Setting of time display)	ETM ETM?
[5]	Query for current time	EDT?
[6]	Query for measurement start time	MSA?
[7]	Query for measurement elapsed time	ELP?
[8]	Query for measurement status	EDW?

**DTA**

Function	Starts the Eye Diagram measurement.
Example	> DTA
Compatibility	Incompatible with existing models.

**DTO**

Function	Stops the Eye Diagram measurement.
Example	> DTO
Compatibility	Incompatible with existing models.

**MSR?**

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA>(FIX1) 1                                    During measurement 0                                    Measurement has been stopped. 2                                    Measurement has failed.
Function	Queries the Eye Diagram measurement status.
Example	> MSR? < MSR 1
Compatibility	Incompatible with existing models.

**ETM <type>**

Parameter	<type>=<DECIMAL NUMERIC PROGRAM DATA> 0                                    Displays the current date and time. 1                                    Displays the measurement start time. 2                                    Displays the elapsed time based on the measurement period.
Function	Selects the Eye Diagram measurement time display type.
Example	To set the Eye Diagram measurement time display type to measurement start time (Start Time): > ETM 1
Compatibility	Incompatible with existing models.

**ETM?**

Response	<type>=<NR1 NUMERIC RESPONSE DATA>(FIX1)
Function	Queries the Eye Diagram measurement time display type.
Example	> ETM? < ETM 1
Compatibility	Incompatible with existing models.

### EDT?

Response	<pre>&lt;year&gt;=&lt;NR1 NUMERIC RESPONSE DATA&gt;(FIX4) 2000 to 2036          2000 to 2036 &lt;month&gt;=&lt;NR1 NUMERIC RESPONSE DATA&gt;(FIX2) 01 to 12             January to December &lt;day&gt;=&lt;NR1 NUMERIC RESPONSE DATA&gt;(FIX2) 01 to 31             1st to 31st &lt;hour&gt;=&lt;NR1 NUMERIC RESPONSE DATA&gt;(FIX2) 00 to 23             0 to 23 hours &lt;minute&gt;=&lt;NR1 NUMERIC RESPONSE DATA&gt;(FIX2) 00 to 59             0 to 59 minutes &lt;second&gt;=&lt;NR1 NUMERIC RESPONSE DATA&gt;(FIX2) 00 to 59             0 to 59 seconds</pre>
Function	Queries the current date and time during Eye Diagram measurement.
Example	<pre>&gt; EDT? &lt; EDT 2006,04,01,23,59,59</pre>
Compatibility	Incompatible with existing models.

### MSA?

Response	<pre>&lt;year&gt;=&lt;NR1 NUMERIC RESPONSE DATA&gt;(FIX4) 0000, 2000 to 2036    2000 to 2036 &lt;month&gt;=&lt;NR1 NUMERIC RESPONSE DATA&gt;(FIX2) 00, 01 to 12          January to December &lt;day&gt;=&lt;NR1 NUMERIC RESPONSE DATA&gt;(FIX2) 00, 01 to 31          1st to 31st &lt;hour&gt;=&lt;NR1 NUMERIC RESPONSE DATA&gt;(FIX2) 00 to 23              0 to 23 hours &lt;minute&gt;=&lt;NR1 NUMERIC RESPONSE DATA&gt;(FIX2) 00 to 59              0 to 59 minutes &lt;second&gt;=&lt;NR1 NUMERIC RESPONSE DATA&gt;(FIX2) 00 to 59              0 to 59 seconds</pre> <p><b>Note:</b> The following content is output when no measurement is performed.  <pre>&lt; MSA 0000,00,00,00,00,00</pre></p>
Function	Queries the Eye Diagram measurement start time.
Example	<pre>&gt; MSA? &lt; MSA 2006,04,01,23,59,59</pre>
Compatibility	Incompatible with existing models.

## ELP?

Response	<pre>&lt;day&gt;=&lt;NR1 NUMERIC RESPONSE DATA&gt;(FIX2) 00, 01 to 99          1 to 99 days &lt;hour&gt;=&lt;NR1 NUMERIC RESPONSE DATA&gt;(FIX2) 00 to 23             0 to 23 hours &lt;minute&gt;=&lt;NR1 NUMERIC RESPONSE DATA&gt;(FIX2) 00 to 59             0 to 59 minutes &lt;second&gt;=&lt;NR1 NUMERIC RESPONSE DATA&gt;(FIX2) 00 to 59             0 to 59 seconds</pre> <p><b>Note:</b> The following content is output when no measurement is performed. &lt; ELP 00,00,00,00</p>
Function	Queries the Eye Diagram measurement elapsed time (Elapsed Time).
Example	<pre>&gt; ELP? &lt; ELP 99,23,59,59</pre>
Compatibility	Incompatible with existing models.

## EDW?

Response	<pre>&lt;numeric&gt;=&lt;DECIMAL NUMERIC RESPONSE DATA&gt;(FIX1) 0          When no alarm exists. 1          Sync Loss 2          Clock Loss (CR Unlock) 3          CR Unlock 4          Out of range 5          Frequency NG 6          Illegal Error</pre> <p><b>Note:</b> Displays any one of the alarms. When two or more alarms have occurred, they are displayed in the following order: Illegal Error &gt; Frequency NG &gt; Clock Loss (CR Unlock) &gt; Sync Loss &gt; Out of range</p>
Function	Queries the status condition during Eye Diagram measurement.
Example	<pre>&gt; EDW? &lt; EDW 1</pre>
Compatibility	Incompatible with existing models.

8.5.2.2.6 Mask Edit tab window setting commands

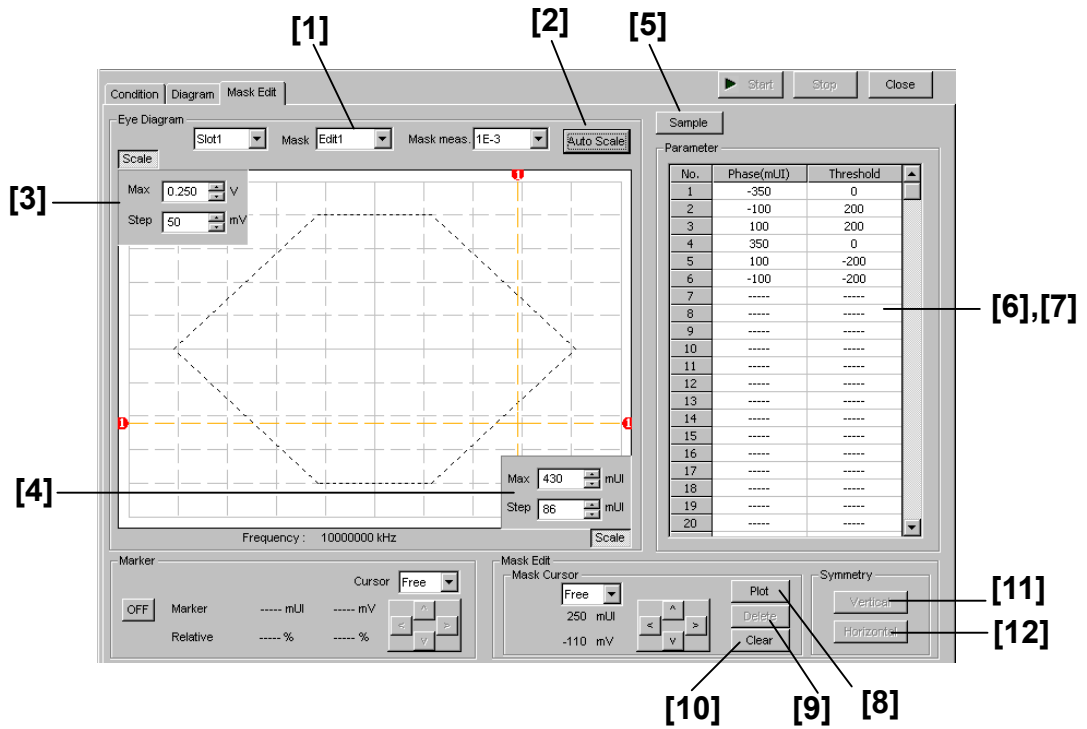


Figure 8.5.2.2.6-1 Mask Edit tab

Table 8.5.2.2.6-1 Mask Edit tab window setting commands

No.	Setting Items	Commands
[1]	Mask	TTP
		TTP?
[2]	Auto Scale	MAS
[3]	Max Step (Threshold)	MVS
		MVS?
[4]	Max Step (Phase)	MPH
		MPH?
[5]	Sample	SAM
[6]	Query for mask point count	TPN?
[7]	Phase (mUI) Threshold	TPV
		TPV?
[8]	Plot	TPL
[9]	Delete	TDL
[10]	Clear	TCL
[11]	Vertical	TVE
[12]	Horizontal	THO

### TTP <type>

Parameter	<type>=<DECIMAL NUMERIC PROGRAM DATA> 0 Edit1 1 Edit2 2 Edit3 3 Edit4
Function	Sets the pattern to be edited during Eye Diagram measurement.
Example	To change the pattern to be edited during Eye Diagram measurement to Edit4: > TTP 3
Compatibility	Incompatible with existing models.

### TTP?

Response	<type>=<NR1 NUMERIC RESPONSE DATA>(FIX1)
Function	Queries the pattern that was edited during Eye Diagram measurement.
Example	> TTP? < TTP 3
Compatibility	Incompatible with existing models.

### MAS

Function	Executes automatic adjustment of the Mask Edit measurement graph scale.
Example	> MAS
Compatibility	Incompatible with existing models.

**MVS <max>,<step>**


---

Parameter	<max>=<DECIMAL NUMERIC PROGRAM DATA> -3.990 to 4.000                      -3.990 to 4.000 V, in 0.001 V steps <step>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 800                                      1 to 800 mV, in 1 mV steps
Function	Sets the maximum value and the grid resolution in the direction of the Threshold of the Mask Edit graph.
Example	To set the maximum value and the grid resolution in the direction of the Threshold of the Mask Edit graph to 4.000 V and 800 mV respectively: > MVS 4.000,800
Compatibility	Incompatible with existing models.

**MVS?**


---

Response	<max>,<step> <max>=<NR2 NUMERIC RESPONSE DATA>(FIX6) <step>=<NR2 NUMERIC RESPONSE DATA>(FIX3)
Function	Queries the maximum value and the grid resolution in the direction of the Threshold of the Mask Edit graph.
Example	> MVS? < MVS -3.990, 1 < MVS 0.000, 1 < MVS 4.000,800
Compatibility	Incompatible with existing models.

**MPH <max>,<step>**


---

Parameter	<max>=<DECIMAL NUMERIC PROGRAM DATA> -990 to 1000                              -990 to 1000 mUI, in 1-mUI steps <step>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 200                                      1 to 200 mUI, in 1- mUI steps
Function	Sets the maximum value and the grid resolution in the direction of the Phase of the Mask Edit graph.
Example	To set the maximum value in the direction of the Phase of the Mask Edit graph to 1000 and the grid resolution value to 10 mUI respectively: > MPH 1000,10
Compatibility	Incompatible with existing models.

**MPH?**


---

Response	<max>,<step> <max>=<NR2 NUMERIC RESPONSE DATA>(FIX4) <step>=<NR2 NUMERIC RESPONSE DATA>(FIX3)
Function	Queries the maximum value and the grid resolution in the direction of the Phase of the Mask Edit graph.
Example	> MPH? < MPH -990, 1 < MPH 1000,200
Compatibility	Incompatible with existing models.

### **SAM <string>**

---

Response <string>=<STRING PROGRAM DATA>  
" <drv>:\[<dir>]<file>"  
<drv>=C,D,E,F  
<dir>=<dir1>\<dir2>\... (Omitted when root directory)  
<file>=File name

Function Expands the selected sample pattern to the Edit Pattern.

Example > SAM "C:\...\sample.MSK"

Compatibility Incompatible with existing models.

### **TPN?**

---

Response <numeric>=<NR1 NUMERIC RESPONSE DATA>(FIX2)  
0 to 32 0 to 32 points

Function Queries the number of Mask points.

Example > TPN?  
< TPN 0  
< TPN 32

Compatibility Incompatible with existing models.

### **TPV <point>,<phase>,<voltage>**

---

Parameter <point>=<DECIMAL NUMERIC PROGRAM DATA>  
1 to 32 1 to 32 points, in 1-point steps  
<phase>=<DECIMAL NUMERIC PROGRAM DATA>  
-1000 to 1000 -1000 to 1000 mUI, in 1-mUI steps  
<voltage>=<DECIMAL NUMERIC PROGRAM DATA>  
-4.000 to 4.000 -4.000 to 4.000 V, in 0.001-V steps

Function Sets a Mask point position.

Example To set a Mask point position (point: 1, phase: 1000, voltage: 4.000):  
> TPV 1,1000,4.000

Compatibility Incompatible with existing models.

### **TPV? <point>**

---

Parameter <point>=<DECIMAL NUMERIC PROGRAM DATA>  
1 to 32 1 to 32 points

Response <phase>=<NR1 NUMERIC RESPONSE DATA>(FIX5)  
<voltage>=<NR2 NUMERIC RESPONSE DATA>(FIX6)

Function Queries a Mask point position.

Example To query the position of point 1:  
> TPV? 1  
< TPV -1000,-4.000  
< TPV 1000, 4.000

Compatibility Incompatible with existing models.



**TPL <phase>,<voltage>**


---

Parameter	<phase>=<DECIMAL NUMERIC PROGRAM DATA> -1000 to 1000                      -1000 to 1000 mUI, in 1-mUI steps <voltage>=<DECIMAL NUMERIC PROGRAM DATA> -4000 to 4000                      -4000 to 4000 mV, in 1-mV steps
Function	Sets a Mask point position.
Example	To set a Mask point position to 1000 mUI (phase), 4000 mV (voltage): > TPL 1000,4000
Compatibility	Incompatible with existing models.

**TDL <pos>**


---

Parameter	<pos>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 32                                      1 to 32 points, in 1-point steps
Function	Deletes the selected Mask point.
Example	To delete Mask point 32: > TDL 32
Compatibility	Incompatible with existing models.

**TCL**


---

Function	Clears the selected Mask point.
Example	> TCL
Compatibility	Incompatible with existing models.

**TVE**


---

Function	Plots a Mask pattern onto the vertically-symmetric position.
Example	> TVE
Compatibility	Incompatible with existing models.

**THO**


---

Function	Plots a Mask pattern onto the horizontally-symmetric position.
Example	> THO
Compatibility	Incompatible with existing models.

### 8.5.3 Q measurement

This section describes the commands for Q measurement.

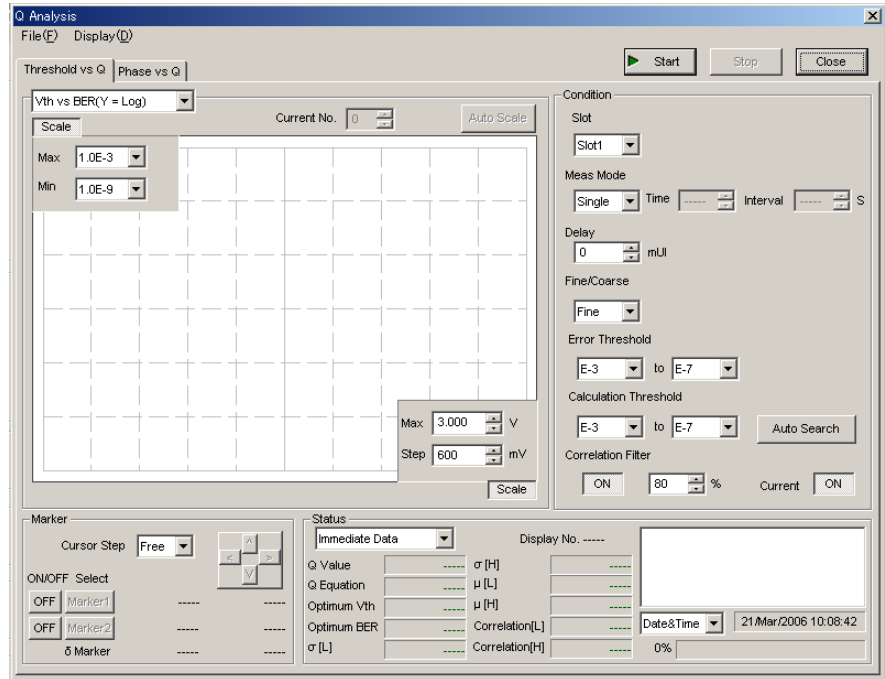


Figure 8.5.3-1 Q measurement screen

8.5.3.1 Graph display setting commands

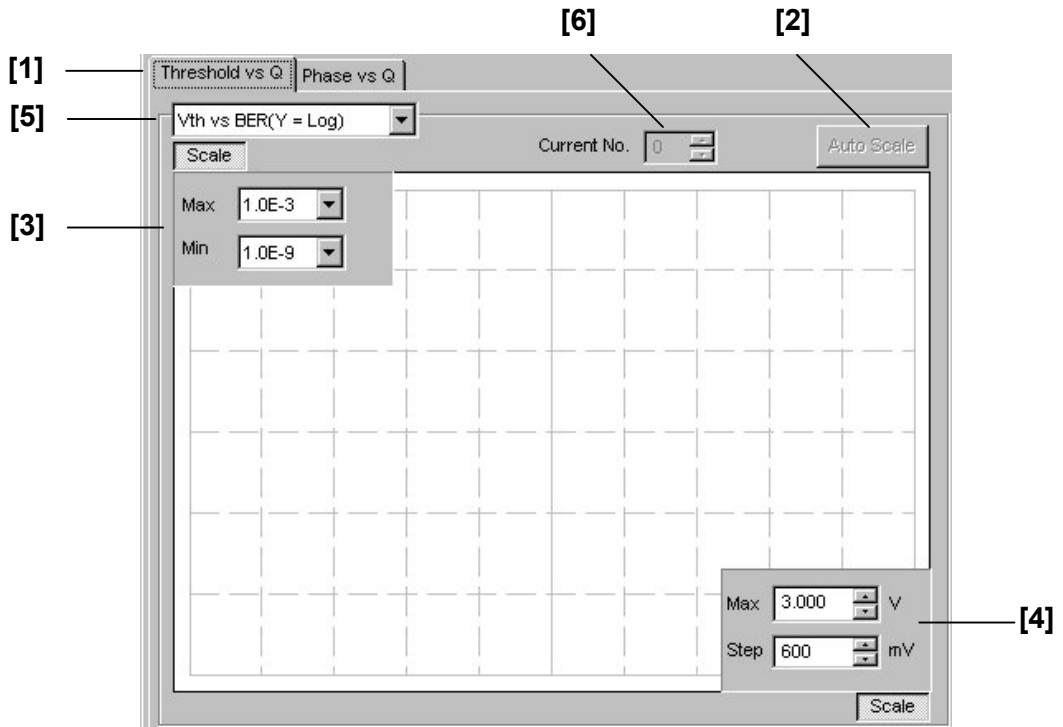


Figure 8.5.3.1-1 Graph display screen (Threshold vs Q tab)

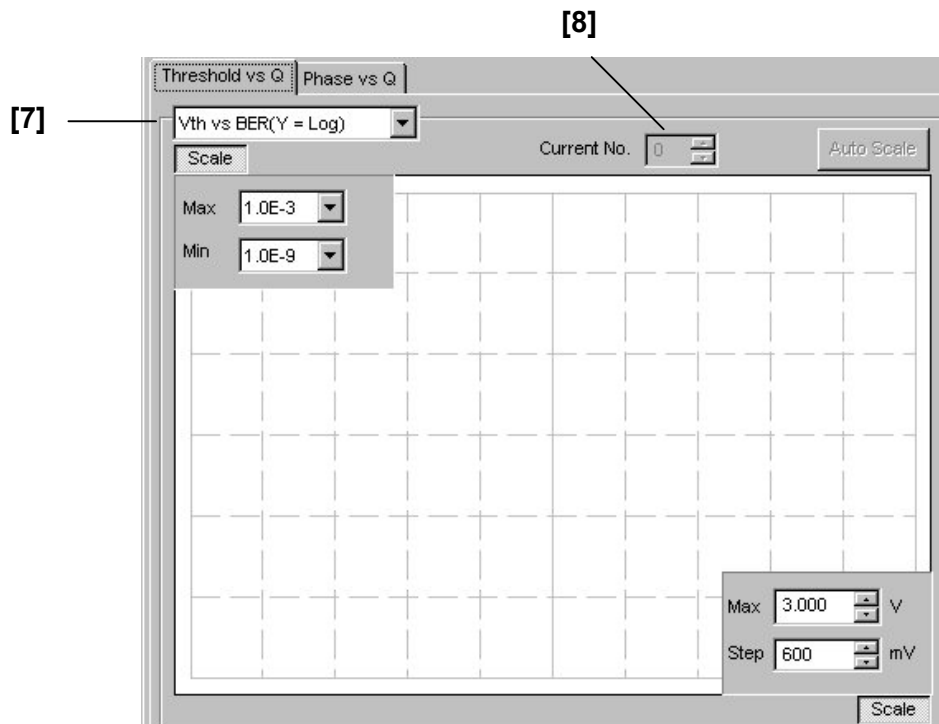


Figure 8.5.3.1-2 Graph display screen (Phase vs Q tab)

**Table 8.5.3.1-1 Graph display setting commands**

No.	Setting Items	Commands
[1]	Measurement mode switching	QMO
		QMO?
[2]	Auto Scale	QSC
[3]	Max Min	QSV
		QSV?
[4]	Max Step	QSH
		QSH?
[5]	Threshold vs. Q Display graph selection	QTI
		QTI?
[6]	Threshold vs. Q Current No.	QMN
		QMN?
[7]	Phase vs. Q Display graph selection	QPI
		QPI?
[8]	Phase vs. Q Current No.	QPM
		QPM?

**QMO <mode>**

---

Parameter	<mode>=<DECIMAL NUMERIC PROGRAM DATA> 0 Vth vs. Q measurement 1 Phase vs. Q measurement
Function	Sets the graph display item from Vth vs. Q measurement or Phase vs. Q measurement.
Example	To set to Vth vs. Q measurement: > QMO 1
Compatibility	Incompatible with existing models.

**QMO?**

---

Response	<mode>= <NR1 NUMERIC RESPONSE DATA>(FIX1)
Function	Queries the graph display item.
Example	> QMO? < QMO 1
Compatibility	Incompatible with existing models.

**QSC**

---

Function	Automatically adjusts the graph display during Q measurement.
Example	> QSC
Compatibility	Incompatible with existing models.

**QSV <max>[,<step>]**

Parameter <max> [,<step>]=<DECIMAL NUMERIC PROGRAM DATA>

**Table 8.5.3.1-2 Parameters for Threshold vs. Q tab window**

Format	<max>	<step>	Remarks
Vth vs BER(Y=Log)	2 to 7 (E-2 to E-7), in single steps	Inputs the minimum value. 8 to 14 (E-8 to E-14), in single steps	A difference between <max> and <step> must be 8 or greater even number.
Vth vs BER(Y=Log(-Ln))	2 to 7 (E-2 to E-7), in single steps	Inputs the minimum value. 8 to 14 (E-8 to E-14), in single steps	A difference between <max> and <step> must be 8 or greater even number.
Vth vs Q	10 to 1000, in 10 steps	1 to 100, in single steps	When Linear
	-40 to 60, in 10 steps	1 to 11, in single steps	When Log
Times vs Q	10 to 1000, in 10 steps	1 to 100, in single steps	When Linear
	-40 to 60, in 10 steps	1 to 11, in single steps	When Log
Histogram	50 to 1000, in 50 steps	Omitted	

**Table 8.5.3.1-3 Parameters for Phase vs. Q tab window**

Format	<max>	<step>	Remarks
Vth vs BER(Y=Log)	2 to 7 (E-2 to E-7), in single steps	Inputs the minimum value. 8 to 14 (E-8 to E-14), in single steps	A difference between <max> and <step> must be 8 or greater even number.
Vth vs BER(Y=Log(-Ln))	2 to 7 (E-2 to E-7), in single steps	Inputs the minimum value. 8 to 14 (E-8 to E-14), in single steps	A difference between <max> and <step> must be 8 or greater even number.
Vth vs Q	10 to 1000, in 10 steps	1 to 100, in single steps	When Linear
	-40 to 60, in 10 steps	1 to 11, in single steps	When Log
Phase vs Q	10 to 1000, in 10 steps	1 to 100, in single steps	When Linear
	-40 to 60, in 10 steps	1 to 11, in single steps	When Log
Phase vs $\sigma$	0.0010 to 1.0000, in 0.0010 steps	0.001 to 0.1000, 0.0001 steps	
Phase vs $\mu$	-3.990 to 4.000 (V), in 0.010 V steps	0.001 to 0.800 (V), in 0.001 V steps	
Phase vs Opt BER	10 to 1 (E-10 to E-1), in single steps	Inputs the minimum value. 199 to 20 (E-199 to E-20), in single steps	
Phase vs Opt Threshold	-3.990 to 4.000 (V), in 0.010 V steps	0.001 to 0.800 (V), in 0.001 V steps	
Phase vs Correlation	10 to 100 (%), in 10 % steps	0 to 90 (%), in 10 % steps	A difference between <max> and <step> must be 10 or greater

**Note:**

Settings vary, depending on the status of the installed options for each slot, and the data input interface settings.

Function

Sets the vertical scale of the graph display during Q measurement.

Input the minimum value instead of the step width, only when the vertical axis displays the error rate.

Example

To set the vertical scale during Q Log display to maximum 10 dB, in 1-dB steps:  
> QSV 10,1

Compatibility

Incompatible with existing models.

**QSV?**

---

Response

<max>,<step>=<NR2 NUMERIC RESPONSE DATA>

Function

Queries the vertical scale of the graph display during Q measurement.

Example

To query the vertical scale during Q Log display:

> QSV?

< QSV 100,10

Compatibility

Incompatible with existing models.

**QSH <max>,<step>**

Parameter <max>,<step>=<DECIMAL NUMERIC PROGRAM DATA>

**Table 8.5.3.1-4 Parameters for Threshold vs. Q tab window**

Format	<max>	<step>	Remarks
Vth vs BER(Y=Log)	-3.990 to 4.000 (V), in 0.010 V steps	0.001 to 0.800 (V), in 0.001 V steps	
Vth vs BER(Y=Log(-Ln))	-3.990 to 4.000 (V), in 0.010 V steps	0.001 to 0.800 (V), in 0.001 V steps	
Vth vs Q	-3.990 to 4.000 (V), in 0.010 V steps	0.001 to 0.800 (V), in 0.001 V steps	
Times vs Q	100 to 1000, in 50 steps	10 (fixed)	
Histogram	0.16 to 1000.00, in 0.01 steps	16/32/64/128/256	When Linear <max> must be greater than <step>.
	-49.84 to 60.00 (dB), in 0.01 steps	16/32/64	When Log

**Table 8.5.3.1-5 Parameters for Phase vs. Q tab window**

Format	<max>	<step>	Remarks
Vth vs BER(Y=Log)	-3.990 to 4.000 (V), in 0.010 V steps	0.001 to 0.800 (V), in 0.001 V steps	
Vth vs BER(Y=Log(-Ln))	-3.990 to 4.000 (V), in 0.010 V steps	0.001 to 0.800 (V), in 0.001 V steps	
Vth vs Q	-3.990 to 4.000 (V), in 0.010 V steps	0.001 to 0.800 (V), in 0.001 V steps	
Phase vs Q	-900 to 1000 (mUI), in 100 mUI steps	10 to 200 (mUI), in 10 mUI steps	
Phase vs $\sigma$	-900 to 1000 (mUI), in 100 mUI steps	10 to 200 (mUI), in 10 mUI steps	
Phase vs $\mu$	-900 to 1000 (mUI), in 100 mUI steps	10 to 200 (mUI), in 10 mUI steps	
Phase vs Opt BER	-900 to 1000 (mUI), in 100 mUI steps	10 to 200 (mUI), in 10 mUI steps	
Phase vs Opt Threshold	-900 to 1000 (mUI), in 100 mUI steps	10 to 200 (mUI), in 10 mUI steps	
Phase vs Opt Correlation	-900 to 1000 (mUI), in 100 mUI steps	10 to 200 (mUI), in 10 mUI steps	

**Note:**

Settings vary, depending on the status of the installed options for each slot, and the data input interface settings.

Function Sets the horizontal scale of the graph display during Q measurements.  
 Example To set the horizontal scale during Vth display to maximum -1.000 V, in 0.100-steps:  
 > QSH -1.000,0.100  
 Compatibility Incompatible with existing models.



**QSH?**


---

Response	<max>,<step>=<NR2 NUMERIC RESPONSE DATA>
Function	Queries the horizontal scale of the graph display during Q measurement.
Example	> QSH? < QSH -1.000,0.100
Compatibility	Incompatible with existing models.

**QTI <mode>**


---

Parameter	<mode>=<DECIMAL NUMERIC PROGRAM DATA>
	0 Vth vs. BER (Y axis Log)
	1 Vth vs. BER (Y axis Log (-Ln))
	2 Vth vs. Q
	3 Times vs. Q
	4 Histogram
Function	Sets the item to be displayed in the graph in Vth vs. Q measurement.
Example	> QTI 2
Compatibility	Incompatible with existing models.

**QTI?**


---

Response	<mode>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the item to be displayed in the graph in Vth vs. Q measurement.
Example	> QTI? < QTI 2
Compatibility	Incompatible with existing models.

### QMN <numeric>

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 1000	Measurement number (number of measurements during repeat measurement)
Function	Sets the measurement number for which the Vth vs. Q measurement result is displayed in a graph.	
Example	To set the measurement number for graph display to 2: > QMN 2	
Compatibility	Incompatible with existing models.	

### QMN?

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA>(FIX4)	
Function	Queries the measurement number for which the Vth vs. Q measurement result is displayed in a graph.	
Example	> QMN? < QMN 2 < QMN 1000	
Compatibility	Incompatible with existing models.	

### QPI <mode>

Parameter	<mode>=<DECIMAL NUMERIC PROGRAM DATA> 0 1 2 3 4 5 6 7 8	Vth vs. BER (Y axis Log) Vth vs. BER (Y axis Log (-Ln)) Vth vs. Q Phase vs. Q Phase vs. $\sigma$ Phase vs. $\mu$ Phase vs. Optimum BER Phase vs. Optimum Vth Phase vs. Correlation coefficient
Function	Sets the item to be displayed in the graph during Phase vs. Q measurement.	
Example	To set the item to be displayed in the graph to Phase vs. Q: > QPI 3	
Compatibility	Incompatible with existing models.	

### QPI?

Response	<mode>=<NR1 NUMERIC RESPONSE DATA>(FIX1)	
Example	Queries the item to be displayed in the graph during Phase vs. Q measurement. > QPI? < QPI 3	
Compatibility	Incompatible with existing models.	

---

**QPM <numeric>**

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 1000	Measurement number (number of measurements during repeat measurement)
Function	Sets the measurement number for which the Phase vs. Q measurement result is displayed in a graph.	
Example	To set the measurement number graph display to 2: > QPM 2	
Compatibility	Incompatible with existing models.	

---

**QPM?**

Response	<numeric>=<NR1 NUMERIC RESPNSE DATA>(FIX4)	
Function	Queries the measurement number for which the Phase vs. Q measurement result is displayed in a graph.	
Example	> QPM? < QPM 2 < QPM 1000	
Compatibility	Incompatible with existing models.	

8.5.3.2 Vth vs. Q measurement commands

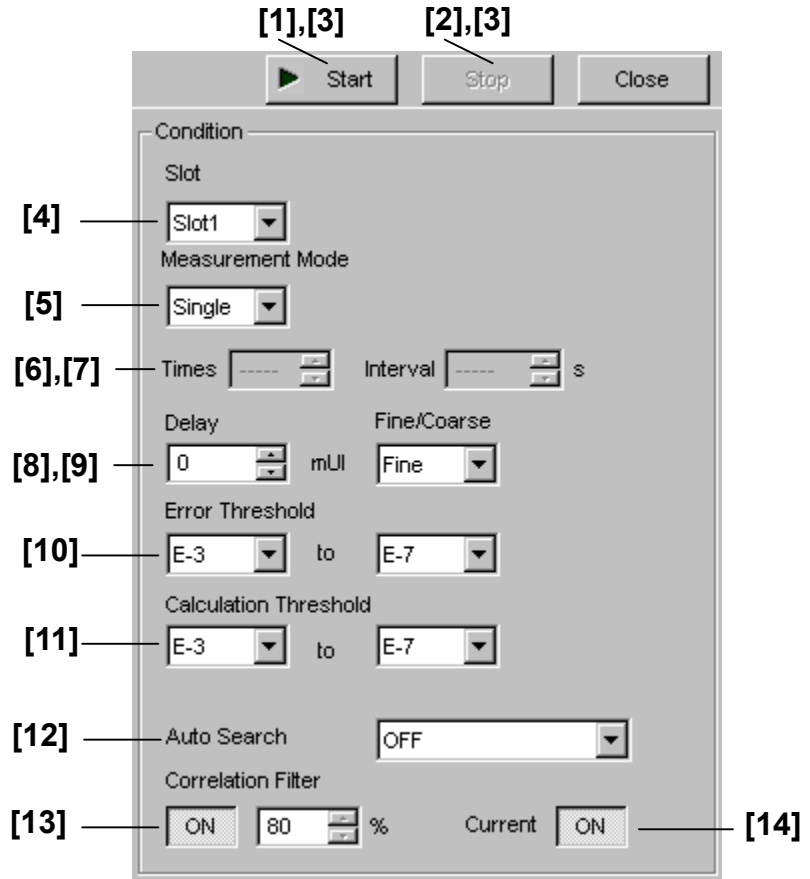


Figure 8.5.3.2-1 Vth vs. Q measurement setting field

Table 8.5.3.2-1 Vth vs. Q measurement setting commands

No.	Setting Items	Commands
[1]	Start	QTT
[2]	Stop	QTP
[3]	Query for measurement progress state	QAS?
[4]	Slot	QSL
		QSL?
[5]	Meas Mode	QTO
		QTO?
[6]	Time	QTM
		QTM?
[7]	Interval	QTN
		QTN?
[8]	Delay	QTD
		QTD?
[9]	Fine/Coarse	QTR
		QTR?
[10]	Error Threshold	QTE
		QTE?
[11]	Calculation Threshold	QTC
		QTC?
[12]	Auto Search	QTA
		QTA?
[13]	Correlation Filter	QTF
		QTF?
[14]	Current	QTU
		QTU?

### QTT

Function	Starts Vth vs. Q measurement.
Example	> QTT
Compatibility	Incompatible with existing models.

### QTP

Function	Stops Vth vs. Q measurement.
Example	To stop measurement: > QTP
Compatibility	Incompatible with existing models.

### QAS?

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1) 0 Measurement has been stopped. 1 During measurement
Function	Queries the Vth vs Q measurement processing state.
Example	> QAS? < QAS 1
Compatibility	Incompatible with existing models.

### QSL <numeric>[,<unit>]

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 6 Slots No. 1 to No. 6 1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A [<unit>]=<DECIMAL NUMERIC PROGRAM DATA> 1 to 4 Unit No. 1 to No. 4 Specify the unit No. when connected to the MT1810A. <unit> is optional. When omitted, 1 is specified.
Function	Sets the Vth vs. Q measurement target slot.
Example	To set the target slot to Slot 2: > QSL 2
Compatibility	Incompatible with existing models.

### QSL? [<unit>]

Parameter	[<unit>]=<DECIMAL NUMERIC PROGRAM DATA> 1 to 4 Unit No. 1 to No. 4 Specify the unit No. when connected to the MT1810A. <unit> is optional. When omitted, 1 is specified.
Response	<numeric>=<NR1 NUMERIC RESPONSE DATA>(FIX2)
Function	Queries the Vth vs. Q measurement target slot.
Example	> QSL? < QSL 2
Compatibility	Incompatible with existing models.

**QTO <mode>**


---

Parameter	<mode>=<DECIMAL NUMERIC PROGRAM DATA> 0 Single 1 Repeat 2 Untimed
Function	Sets the measurement processing mode during Vth vs. Q measurement.
Example	To set the measurement processing mode to Single mode: > QTO 0
Compatibility	Incompatible with existing models.

**QTO?**


---

Response	<mode>=<NR1 NUMERIC RESPONSE DATA>(FIX1)
Function	Queries the measurement processing mode during Vth vs. Q measurement.
Example	> QTO? < QTO 0
Compatibility	Incompatible with existing models.

**QTM <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 2 to 1000 2 to 1000 times, in 1-time steps
Function	Sets the number of measurements during Vth vs. Q measurement.
Example	To set the number of measurements to 100 times: > QTM 100
Compatibility	Incompatible with existing models.

**QTM?**


---

Response	<NUMERIC>=<NR1 NUMERIC RESPONSE DATA>(FIX4)
Function	Queries the number of measurements during Vth vs. Q measurement.
Example	> QTM? < QTM 2 < QTM 1000
Compatibility	Incompatible with existing models.

### QTN <numeric>

---

Parameter <numeric>=<DECIMAL NUMERIC PROGRAM DATA>  
0 to 9999 0 to 9999 s, in 1-s steps

Function Sets the measurement interval time during Vth vs. Q measurement.

Example To set the measurement interval time to 50 s:  
> QTN 50

Compatibility Incompatible with existing models.

### QTN?

---

Response <NUMERIC>=<NR1 NUMERIC RESPONSE DATA>(FIX4)

Function Queries the measurement interval time during Vth vs. Q measurement.

Example > QTN?  
< QTN 50  
< QTN 9999

Compatibility Incompatible with existing models.

### QTD <numeric>

---

Parameter <numeric>=<DECIMAL NUMERIC PROGRAM DATA>  
-1000 to 1000 -1000 to 1000 mUI, in 1-mUI steps

Function Sets the measurement start delay position during Vth vs. Q measurement.

Example To set the measurement start delay position to -100 mUI:  
> QTD -100

Compatibility Incompatible with existing models.

### QTD?

---

Response <numeric>=<NR1 NUMERIC RESPONSE DATA>(FIX5)

Function Queries the measurement start delay position during Vth vs. Q measurement.

Example > QTD?  
< QTD -1000  
< QTD -100  
< QTD 1000

Compatibility Incompatible with existing models.



**QTR <mode>**


---

Parameter	<mode>=<DECIMAL NUMERIC PROGRAM DATA> 0 Fine mode 1 Coarse mode
Function	Sets the measurement resolution (Fine/Coarse mode) during Vth vs. Q measurement.
Example	To set the measurement resolution to Fine mode: > QTR 0
Compatibility	Incompatible with existing models.

**QTR?**


---

Response	<mode>=<NR1 NUMERIC RESPONSE DATA>(FIX1)
Function	Queries the measurement resolution (Fine/Coarse mode) during Vth vs. Q measurement.
Example	> QTR? < QTR 0
Compatibility	Incompatible with existing models.

**QTE <upper>,<lower>**


---

Parameter	<upper>=<DECIMAL NUMERIC PROGRAM DATA> 3 to 5 E-3 to E-5, in single steps <lower>=<DECIMAL NUMERIC PROGRAM DATA> 7 to 12 E-7 to E-12, in single steps
Function	Sets the measurement error threshold range during Vth vs. Q measurement.
Example	To set the measurement error threshold range to E-3 to E-12: > QTE 3,12
Compatibility	Incompatible with existing models.

**QTE?**


---

Response	<upper>=<DECIMAL NUMERIC RESPONSE DATA>(FIX1) <lower>=<DECIMAL NUMERIC RESPONSE DATA>(FIX2)
Function	Queries the measurement error threshold range during Vth vs. Q measurement.
Example	> QTE? < QTE 3, 7 < QTE 5,12
Compatibility	Incompatible with existing models.

### QTC <upper>,<lower>

---

Parameter	<upper>=<DECIMAL NUMERIC PROGRAM DATA> 3 to 5 E-3 to E-5, in single steps <lower>=<DECIMAL NUMERIC PROGRAM DATA> 7 to 12 E-7 to E-12, in single steps
Function	Sets the error threshold range during Vth vs. Q measurement recalculation.
Example	To set the error threshold range during recalculation from E-5 to E-10: > QTC 5,10
Compatibility	Incompatible with existing models.

### QTC?

---

Response	<upper>=<DECIMAL NUMERIC RESPONSE DATA>(FIX1) <lower>=<DECIMAL NUMERIC RESPONSE DATA>(FIX2)
Function	Queries the error threshold range during Vth vs. Q measurement recalculation.
Example	> QTC? < QTC 3, 7 < QTC 5,12
Compatibility	Incompatible with existing models.

### QTA <numeric>

---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 0 Auto search OFF 1 Threshold auto search (Coarse) 2 Phase & Threshold auto search (Coarse) 3 Threshold auto search (Fine) 4 Phase & Threshold auto search (Fine)
Function	Sets whether to execute auto search during Vth vs. Q measurement.
Example	To set to the threshold auto search to ON: > QTA 1
Compatibility	Incompatible with existing models.

### QTA?

---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA>(FIX1)
Function	Queries whether to execute auto search during Vth vs. Q measurement.
Example	> QTA? < QTA 1
Compatibility	Incompatible with existing models.

**QTF <numeric1>,<numeric2>**


---

Parameter	<numeric1>=<DECIMAL NUMERIC PROGRAM DATA> 0 OFF 1 ON <numeric2>=<DECIMAL NUMERIC PROGRAM DATA> 80 to 100 80 to 100%, in 1% steps Omitted when <numeric1> is 0.
Function	Sets the minimum correlation coefficient with which the Q value is recognized to be valid during Vth vs. Q measurement.
Example	To set the minimum correlation coefficient to 80%: > QTF 1,80 > QTF 0
Compatibility	Incompatible with existing models.

**QTF?**


---

Response	<numeric1>=<NR2 NUMERIC RESPONSE DATA>(FIX1) <numeric2>=<NR2 NUMERIC RESPONSE DATA>(FIX3)
Function	Queries the minimum correlation coefficient with which the Q value is recognized to be valid during Vth vs. Q measurement.
Example	> QTF? < QTF 1, 80 < QTF 1,100
Compatibility	Incompatible with existing models.

**QTU <numeric>**


---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 0 OFF: Updates at measurement termination 1 ON: Updates every second
Function	Sets the graph display update period during Vth vs. Q measurement.
Example	To set the graph display update timing to every second: > QTU 1
Compatibility	Incompatible with existing models.

**QTU?**


---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA>(FIX1)
Function	Queries the graph display update period during Vth vs. Q measurement.
Example	> QTU? < QTU 1
Compatibility	Incompatible with existing models.

8.5.3.3 Phase vs. Q measurement commands

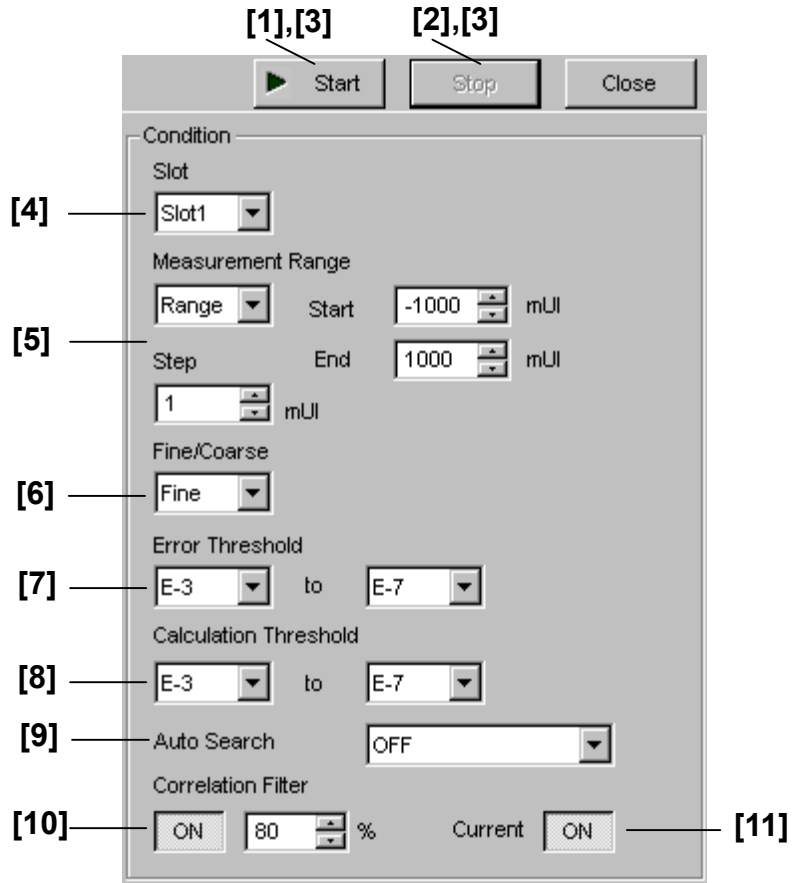


Figure 8.5.3.3-1 Phase vs. Q measurement setting field

Table 8.5.3.3-1 Phase vs. Q measurement setting commands

No.	Setting Items	Commands
[1]	Start	QPT
[2]	Stop	QPP
[3]	Query for measurement progress state	QAS?
[4]	Slot	QSP
		QSP?
[5]	Measurement Range	QMR
		QMR?
	Start	QPO
	End	QPO?
[6]	Center Span	QPW
		QPW?
[6]	Fine/Coarse	QPR
		QPR?
[7]	Error Threshold	QPE
		QPE?
[8]	Calculation Threshold	QPC
		QPC?
[9]	Auto Search	QPA
		QPA?
[10]	Correlation Filter	QPF
		QPF?
[11]	Current	QPU
		QPU?

### QPT

Function	Starts Phase vs. Q measurement.
Example	> QPT
Compatibility	Incompatible with existing models.

### QPP

Function	Stops Phase vs. Q measurement.
Example	> QPP
Compatibility	Incompatible with existing models.

### QAS?

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1) 0 Measurement has been stopped. 1 During measurement
Function	Queries the Phase vs Q measurement processing state.
Example	> QAS? < QAS 1
Compatibility	Incompatible with existing models.

### QSP <numeric>[,<unit>]

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 6 Slots No. 1 to No. 6 1 to 6 when using the MP1800A, 1 to 4 when using the MT1810A [<unit>]=<DECIMAL NUMERIC PROGRAM DATA> 1 to 4 Unit No. 1 to No. 4 Specify the unit No. when connected to the MT1810A. <unit> is optional. When omitted, 1 is specified.
Function	Sets the Phase vs. Q measurement target slot.
Example	To set the target slot to Slot 2: > QSP 2
Compatibility	Incompatible with existing models.

### QSP? [<unit>]

Parameter	[<unit>]=<DECIMAL NUMERIC PROGRAM DATA> 1 to 4 Unit No. 1 to No. 4 Specify the unit No. when connected to the MT1810A. <unit> is optional. When omitted, 1 is specified.
Response	<numeric>=<NR1 NUMERIC RESPONSE DATA>(FIX2)
Function	Queries the Phase vs. Q measurement target slot.
Example	> QSP? < QSP 2 < QSP 64
Compatibility	Incompatible with existing models.

**QMR <mode>**

Parameter	<mode>=<DECIMAL NUMERIC PROGRAM DATA> 0 1	Range: Specifies the start position and end positions of the measurement range. Width: Specifies the center position and width of the measurement range.
Function	Selects the method to specify the Phase vs. Q measurement range.	
Example	To set the method to specify the measurement range to Width: > QMR 1	
Compatibility	Incompatible with existing models.	

**QMR?**

Response	<mode>= < NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the method to specify the Phase vs. Q measurement range.
Example	> QMR? < QMR 1
Compatibility	Incompatible with existing models.

**QPO <start>,<end>,<step>**

Parameter	<start>=<DECIMAL NUMERIC PROGRAM DATA> -1000 to 1000 <end>=<DECIMALNUMERICPROGRAMDATA> -1000 to 1000 <step>=<DECIMALNUMERICPROGRAMDATA> 1 to 200	-1000 to 1000 mUI, in 1-mUI steps -1000 to 1000 mUI, in 1-mUI steps 1 to 200 mUI, in 1-mUI steps
Function	Sets the measurement range and measurement step during Phase vs. Q measurement.	
Example	To set the measurement range from -200 to 300 mUI, in 10-mUI steps: > QPO -200,300,10	
Compatibility	Incompatible with existing models.	

**QPO?**

Response	<start>=<NR1 NUMERIC RESPONSE DATA> (FIX5) <end>=<NR1 NUMERIC RESPONSE DATA> (FIX5) <step>=<NR1 NUMERIC RESPONSE DATA> (FIX3)
Function	Queries the measurement range and measurement step during Phase vs. Q measurement.
Example	> QPO? < QPO -1000,-999, 1 < QPO 999,1000, 1
Compatibility	Incompatible with existing models.

### QPW <center>,<span>,<step>

---

Parameter	<center>=<DECIMAL NUMERIC PROGRAM DATA> -1000 to 1000                      -1000 to 1000 mUI, in 1-mUI steps <span>=<DECIMAL NUMERIC PROGRAM DATA> 0 to 2000                            0 to 2000 mUI, in 1-mUI steps <step>=<DECIMAL NUMERIC PROGRAM DATA> 1 to 200                              1 to 200 mUI, in 1-mUI steps
Function	Sets the center of the Phase vs Q measurement, measurement range, and measurement steps.
Example	To set the measurement range to 200 mUI, centered at 100 mUI, in 10-mUI steps: > QPW 100,200,10
Compatibility	Incompatible with existing models.

### QPW?

---

Response	<center>=<NR1 NUMERIC RESPONSE DATA> (FIX5) <span>=<NR1 NUMERIC RESPONSE DATA> (FIX4) <step>=<NR1 NUMERIC RESPONSE DATA> (FIX3)
Function	Queries the center measurement range and measurement step during Phase vs. Q measurement.
Example	> QPW? < QPW -1000, 0, 1 < QPW 999,1000, 1
Compatibility	Incompatible with existing models.

### QPR <mode>

---

Parameter	<mode>=<DECIMAL NUMERIC PROGRAM DATA> 0                                      Fine mode 1                                      Coarse mode
Function	Sets the measurement resolution (Fine/Coarse mode) during Phase vs. Q measurement.
Example	To set the measurement resolution to Fine mode: > QPR 0
Compatibility	Incompatible with existing models.

### QPR?

---

Response	<mode>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries the measurement resolution (Fine/Coarse mode) during Phase vs. Q measurement.
Example	> QPR? < QPR 0
Compatibility	Incompatible with existing models.



**QPE <upper>,<lower>**


---

Parameter	<upper>=<DECIMAL NUMERIC PROGRAM DATA> 3 to 5                                   E-3 to E-5, in single steps <lower>=<DECIMAL NUMERIC PROGRAM DATA> 7 to 12                                   E-7 to E-12, in single steps
Function	Sets the measurement error threshold range during Phase vs. Q measurement.
Example	To set the measurement error threshold range to E-3 to E-12: > QPE 3,12
Compatibility	Incompatible with existing models.

**QPE?**


---

Response	<upper>=<NR1 NUMERIC RESPONSE DATA> (FIX1) <lower>=<NR1 NUMERIC RESPONSE DATA> (FIX2)
Function	Queries the measurement error threshold range during Phase vs. Q measurement.
Example	> QPE? < QPE 3, 7 < QPE 5,12
Compatibility	Incompatible with existing models.

**QPC <upper>,<lower>**


---

Parameter	<upper>=<DECIMAL NUMERIC PROGRAM DATA> 3 to 5                                   E-3 to E-5, in single steps <lower>=<DECIMAL NUMERIC PROGRAM DATA> 7 to 12                                   E-7 to E-12, in single steps
Function	Sets the error threshold range during Phase vs. Q measurement recalculation.
Example	To set the error threshold range during recalculation to E-5 to E-10: > QPC 5,10
Compatibility	Incompatible with existing models.

**QPC?**


---

Response	<upper>=<NR1 NUMERIC RESPONSE DATA> (FIX1) <lower>=<NR1 NUMERIC RESPONSE DATA>(FIX2)
Function	Queries the error threshold range during Phase vs. Q measurement recalculation.
Example	> QPC? < QPC 3, 7 < QPC 5,10
Compatibility	Incompatible with existing models.

### QPA <numeric>

---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 0 Auto Search OFF 1 Threshold auto search (Coarse) 2 Threshold auto search (Fine)
Function	Sets whether to execute auto search during Phase vs. Q measurement.
Example	To set the threshold auto search to ON: > QPA 1
Compatibility	Incompatible with existing models.

### QPA?

---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA> (FIX1)
Function	Queries whether to execute auto search during Phase vs. Q measurement.
Example	> QPA? < QPA 1
Compatibility	Incompatible with existing models.

### QPF <numeric1>[,<numeric2>]

---

Parameter	<numeric1>=<DECIMAL NUMERIC PROGRAM DATA> 0 OFF 1 ON [<numeric2>]=<DECIMAL NUMERIC PROGRAM DATA> 80 to 100 80 to 100%, in 1% steps Omitted when <numeric1> is 0.
Function	Sets the minimum correlation coefficient with which the Q value is recognized to be valid during Phase vs. Q measurement.
Example	To set the minimum correlation coefficient to 90%: > QPF 1,90 To set the minimum correlation coefficient to OFF: > QPF 0
Compatibility	Incompatible with existing models.

### QPF?

---

Response	<numeric1>=<NR2 NUMERIC RESPONSE DATA>(FIX1) <numeric2>=<NR2 NUMERIC RESPONSE DATA>(FIX3)
Function	Queries the minimum correlation coefficient with which the Q value is recognized to be valid during Phase vs. Q measurement.
Example	> QPF? < QPF 1, 80 < QPF 1,100
Compatibility	Incompatible with existing models.

**QPU <numeric>**

---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 0 OFF: Updates at measurement termination 1 ON: Updates every second
Function	Sets the graph display during Phase vs. Q measurement.
Example	To set the graph display update timing to every second: > QPU 1
Compatibility	Incompatible with existing models.

**QPU?**

---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA>(FIX1)
Function	Queries the graph display update period during Phase vs. Q measurement.
Example	> QPU? < QPU 1
Compatibility	Incompatible with existing models.

8.5.3.4 Measurement results and status query commands

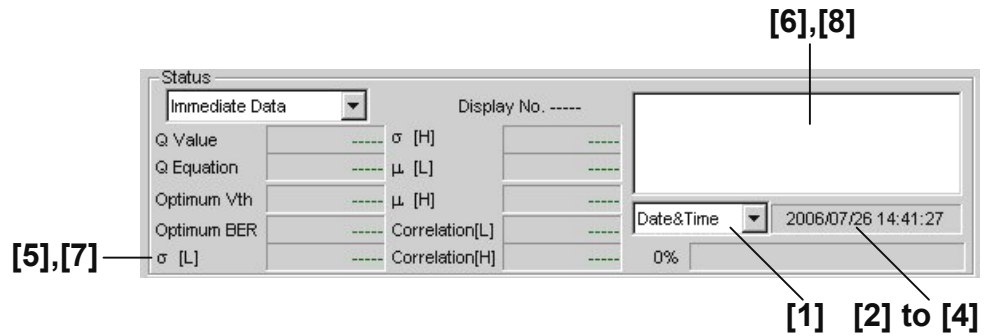


Figure 8.5.3.4-1 Measurement results and status display field

Table 8.5.3.4-1 Measurement results and status query commands

No.	Setting Items	Commands
[1]	No label (Setting of time display)	QAT QAT?
[2]	Query for current time	QSO?
[3]	Query for measurement start time	QST?
[4]	Query for measurement elapsed time	QEL?
[5]	Query for Vth vs. Q measurement result	QTH?
[6]	Query for Vth vs. Q measurement status	QTW?
[7]	Query for Phase vs. Q measurement result	QPH?
[8]	Query for Phase vs. Q measurement status	QSW?

**QAT <type>**


---

Parameter	<type>=<DECIMAL NUMERIC PROGRAM DATA> 0 Displays the current date and time. 1 Displays the measurement start time. 2 Displays the elapsed time based on the measurement period.
Function	Selects the Q measurement time display type.
Example	To set the Q measurement time display type to measurement start time (Start Time): > QAT 1
Compatibility	Incompatible with existing models.

**QAT?**


---

Response	<type>=<NR1 NUMERIC RESPONSE DATA>(FIX1)
Function	Queries the Q measurement time display type.
Example	> QAT? < QAT 1
Compatibility	Incompatible with existing models.

**QSO?**


---

Response	<year>=<NR1 NUMERIC RESPONSE DATA>(FIX4) 2000 to 2036 2000 to 2036 <month>=<NR1 NUMERIC RESPONSE DATA>(FIX2) 01 to 12 January to December <day>=<NR1 NUMERIC RESPONSE DATA>(FIX2) 01 to 31 1st to 31st <hour>=<NR1 NUMERIC RESPONSE DATA>(FIX2) 00 to 23 0 to 23 hours <minute>=<NR1 NUMERIC RESPONSE DATA>(FIX2) 00 to 59 0 to 59 minutes <second>=<NR1 NUMERIC RESPONSE DATA>(FIX2) 00 to 59 0 to 59 seconds
Function	Queries the current date and time during Q measurement.
Example	> QSO? < QSO 2005,12,31,23,59,59
Compatibility	Incompatible with existing models.

### QST?

---

Response <year>=<NR1 NUMERIC RESPONSE DATA>(FIX4)  
0000, 2000 to 2036 2000 to 2036  
<month>=<NR1 NUMERIC RESPONSE DATA>(FIX2)  
00, 01 to 12 January to December  
<day>=<NR1 NUMERIC RESPONSE DATA>(FIX2)  
00, 01 to 31 1st to 31st  
<hour>=<NR1 NUMERIC RESPONSE DATA>(FIX2)  
00 to 23 0 to 23 hours  
<minute>=<NR1 NUMERIC RESPONSE DATA>(FIX2)  
00 to 59 0 to 59 minutes  
<second>=<NR1 NUMERIC RESPONSE DATA>(FIX2)  
00 to 59 0 to 59 seconds  
The following content is output when no measurement is performed.  
< QST 0000,00,00,00,00,00  
Function Queries the measurement start time (Start Time) during Q measurement.  
Example > QST?  
< QST 2005,12,31,23,59,59  
Compatibility Incompatible with existing models.

### QEL?

---

Response <day>=<NR1 NUMERIC RESPONSE DATA>(FIX2)  
00 to 99 0 to 99 days  
<hour>=<NR1 NUMERIC RESPONSE DATA>(FIX2)  
00 to 23 0 to 23 hours  
<minute>=<NR1 NUMERIC RESPONSE DATA>(FIX2)  
00 to 59 0 to 59 minutes  
<second>=<NR1 NUMERIC RESPONSE DATA>(FIX2)  
00 to 59 0 to 59 seconds  
The following content is output when no measurement is performed:  
< QEL 00,00,00,00  
Function Queries the measurement elapsed time (Elapsed time) during Q measurement.  
Example > QEL?  
< QEL 31,23,59,59  
Compatibility Incompatible with existing models.

**QTH? <numeric1>[,<numeric2>]**

Parameter <numeric1>,<numeric2>=<DECIMAL NUMERIC PROGRAM DATA>  
 <numeric1>,<numeric2>For the contents of measurement data <result1>, see Table 8.5.3.4-2.  
 <numeric1>,<numeric2>For the contents of immediate data <result2>, see Table 8.5.3.4-3.  
 <numeric1>For the contents of statistic data <result3>, see Table 8.5.3.4-4.

**Table 8.5.3.4-2 Vth vs. Q measurement data <result1>**

Items		<numeric1>,<numeric2>	Response Format
Top side Vth/Error Rate	Number of measurements 1 to 1000	0,1 ••• 0,1000	Form1
Bottom side Vth/Error Rate	Number of measurements 1 to 1000	1,1 ••• 1,1000	Form1

The measurement result for each Vth is delimited with a comma (,) and returned.

**Table 8.5.3.4-3 Vth vs. Q immediate data <result2>**

Items		<numeric1>,<numeric2>	Response Format
Q value	Number of measurements 1 to 1000	2,1 ••• 2,1000	Form2
Optimum BER		3,1 ••• 3,1000	Form3
Optimum Vth		4,1 ••• 4,1000	Form4
Correlation bottom		5,1 ••• 5,1000	Form2
Correlation top		6,1 ••• 6,1000	Form2
σ bottom		7,1 ••• 7,1000	Form2
σ top		8,1 ••• 8,1000	Form2
μ bottom		9,1 ••• 9,1000	Form4
μ top		10,1 ••• 10,1000	Form4
Q Equation		11,1 ••• 11,1000	Form2

**Table 8.5.3.4-4 Vth vs. Q measurement statistic data <result3>**

Items	<numeric1>	Response Format
Total Data	12	Form5
Valid Data	13	Form5
Q Max	14	Form2
Q Min	15	Form2
Q Mean	16	Form2
Q $\sigma$	17	Form2
Q-5 $\sigma$	18	Form2

\*: <numeric2> is omitted for statistic data.

Response

<string>=<STRING RESPONSE DATA>

**Table 8.5.3.4-5 Response format**

Form	Format	Description
Form1 Vth-Q type	XX.XXX,Y.YYYYYE-YYY	XX.XXX: Threshold (V) Y.YYYYYE-YYY: Error Rate
	-----,-----	When no data corresponds to the query.
Form2 % type (dB type)	XXX.XX	When 0.00 to 100.00
	-----	When no data corresponds to the query.
Form3 Fraction type	X.XXXE-XXX	When 0.0000E-016 to 1.0000E-000
	-----	When no data corresponds to the query.
	< 1.0E-199	When E-199 or less
Form4 Voltage type	XX.XXXX	When -4.0000 to 4.0000
	-----	When no data corresponds to the query.
Form5 Integer type	XXXX	When 0 to 9999
	----	When no data corresponds to the query.

Function  
Example

Queries the Vth vs. Q measurement result.  
To query the measurement result of the 10th time, on the top side:  
> QTH? 0,10  
< QTH 1.000,1.2345E-003, 1.000,1.2345E-003,1.000,1.2345E-003 ●●●

Compatibility

Incompatible with existing models.



**QW?**


---

Response	<numeric>=<DECIMAL NUMERIC RESPONSE DATA>(FIX1)
	0 When no alarm exists.
	1 Sync. Loss
	2 Clock Loss
	3 CR Unlock
	4 Out of range
	5 Frequency NG
	6 Illegal Error
	<b>Note:</b> Displays any one of the alarms. When two or more alarms have occurred, they are displayed in the following order: Illegal Error > Frequency NG > Clock Loss (CR Unlock) > Sync Loss > Out of range
Function	Queries the Vth vs. Q measurement status.
Example	> QW? < QW 1
Compatibility	Incompatible with existing models.

**QPH? <numeric1>,<numeric2>**

Parameter <numeric1>,<numeric2>=<DECIMAL NUMERIC PROGRAM DATA>  
 <numeric1>,<numeric2>For the contents of measurement data <result1> see Table 8.5.3.4-6.  
 <numeric1>,<numeric2>For the contents of immediate data <result2> see Table 8.5.3.4-7.

**Table 8.5.3.4-6 Vth vs. Q measurement result <result1>**

Items		<numeric1>,<numeric2>	Response Format
Top side Vth-Error Rate	Phase -1000 to 1000 mUI	0,-1000 ●● 0,1000	Form1
Bottom side Vth-Error Rate	Phase -1000 to 1000 mUI	1,-1000 ●● 1,1000	Form1

**Table 8.5.3.4-7 Vth vs. Q immediate data <result2>**

Items		<numeric1>,<numeric2>	Response Format
Q value	Phase -1000 to 1000 mUI	2,-1000 ●● 2,1000	Form2
Optimum BER		3,-1000 ●● 3,1000	Form3
Optimum Vth		4,-1000 ●● 4,1000	Form4
Correlation bottom		5,-1000 ●● 5,1000	Form2
Correlation top		6,-1000 ●● 6,1000	Form2
σ bottom		7,-1000 ●● 7,1000	Form2
σ top		8,-1000 ●● 8,1000	Form2
μ bottom		9,-1000 ●● 9,1000	Form4
μ top		10,-1000 ●● 10,1000	Form4
Q Equation		11,-1000 ●● 11,1000	Form2

Response <string>=<STRING RESPONSE DATA>

**Table 8.5.3.4-8 Response format**

Form	Format	Description
Form1 Vth-ER type	XX.XXX,Y.YYYYE-YYY	XX.XXX: Threshold (V) Y.YYYYE-YYY: Error Rate
	-----,-----	When no data corresponds to the query.
Form2 % type (dB type)	XXX.XX	When 0.00 to 100.00
	-----	When no data corresponds to the query.
Form3 Fraction type	X.XXXE-XXX	When 0.0000E-016 to 1.0000E-000
	-----	When no data corresponds to the query.
	< 1.0E-199	When E-199 or less
Form4 Voltage type	XX.XXXX	When -4.0000 to 4.0000
	-----	When no data corresponds to the query.

Function Queries the Phase vs. Q measurement result.  
 Example > QPH? 0,100  
 < QPH 1.000,1.2345E-003, 1.000,1.2345E-003,1.000,1.2345E-003 ●●●  
 Compatibility Incompatible with existing models.

**QSW?**

Response <numeric>=<DECIMAL NUMERIC RESPONSE DATA>(FIX1)

0	When no alarm exists.
1	Sync. Loss
2	Clock Loss
3	CR Unlock
4	Out of range
5	Frequency NG
6	Illegal Error

**Note:**  
 Displays any one of the alarms.  
 When two or more alarms have occurred, they are displayed in the following order:  
 Illegal Error > Frequency NG > Clock Loss (CR Unlock) > Sync Loss > Out of range

Function Queries the Phase vs. Q measurement status condition.  
 Example > QSW?  
 < QSW 1  
 Compatibility Incompatible with existing models.

8.5.3.5 File menu setting commands

Table 8.5.3.5-1 File menu setting commands

No.	Setting Items	Commands
[1]	Q Unit	QTS
		QTS?
		QPS
		QPS?

**QTS <numeric>**

---

Parameter	<numeric>=<DECIMAL NUMERIC PROGRAM DATA> 0 Linear display 1 Log display
Function	Sets the Q value display scale during Vth vs. Q measurement to Linear or Log display.
Example	To set the display scale to Log display: > QTS 1
Compatibility	Incompatible with existing models.

**QTS?**

---

Response	<numeric>=<NR1 NUMERIC RESPONSE DATA>(FIX1)
Function	Queries whether the Q value display scale during Vth vs. Q measurement is set to Linear or Log display.
Example	> QTS? < QTS 1
Compatibility	Incompatible with existing models.

**QPS <scale>**

---

Parameter	<scale>=<DECIMAL NUMERIC PROGRAM DATA> 0 Linear display 1 Log display
Function	Sets the Q value display scale during Phase vs. Q measurement to Linear or Log display.
Example	To set the display scale to Log display: > QPS 1
Compatibility	Incompatible with existing models.

**QPS?**

---

Response	<scale>=<NR1 NUMERIC RESPONSE DATA>(FIX1)
Function	Queries whether the Q value display scale during Phase vs. Q measurement is set to Linear or Log display.
Example	> QPS? < QPS 1
Compatibility	Incompatible with existing models.

## *Chapter 9 Basic Operation of Device Messages*

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This chapter explains about basic operation of Device Message and Error Message of the MP1800A/MT1810A.

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## 9.1 Basic Operation of Device Messages

When performing MP1800A/MT1810A port operation by using device messages, the following 3 commands must be transmitted before transmitting port operation commands:

1. :UENTry:ID <unit\_number>
2. :MODule:ID <module\_number>
3. :PORT:ID <port\_number>

The above 3 commands identify the port to be operated. The device messages transmitted after them are regarded to be for the port.

- The target unit for unit operation commands is that specified by 1 :UENTry:ID command.
- The target module for module operation commands is that specified by the :UENTry:ID command and 2. :MODule:ID command.
- In case of operation for PPG module that is setting unit 1, module 2, Port 1, the following three commands must be transmitted before transmitting operation commands:

Sets to unit 1

:UENTry:ID 1

Sets to module 2

:MODule:ID 2

Sets to port 1

:PORT:ID 1

- In case of performing MP1800A/MT1810A operation for function of automatic measurement by using device messages, the following command must be transmitted before operating function:
  1. :SYSTem:CFUNction <function>

The above command specifies the location of the automatic measurement function to be operated. The device messages transmitted after them are regarded to be for the specified function. Commands except for selected function will not be enabled.

- In case of performing operation for function of Eye Margin Measurement, the following command must be transmitted before transmitting operation commands.

Sets Eye Margin Measurement.

:SYSTem:CFUNction EMAR

Operation command must be transmitted or later.

It returns to port operation before starting to operate automatic measurement function.

:SYSTem:CFUNction OFF

Information of specified location by these commands memorize while the MP1800A/MT1810A is turn on(It is not necessary to transmit each time).

## **9.2 Error Messages**

The error code and message is returned as the response of :SYSTem:ERRor? SCPI command. The following is shown the detail of error message supported in MP1800A/MT1810A.

- Command error
- Execution error
- Device Specific Error



### 9.2.1 Command Error

When the following error occurred, the event status register "bit 5" is set.

The Error is occurred when the following event is happened.

- (1) When the MP1800A/MT1810A receives a message against the IEEE488.2 standard.
- (2) When the device receives a header that does not conform to the specifications of device specific commands and common commands.
- (3) When a GET (Group Execute Trigger) is sent into a program message.

**Table 9.2.1-1 Error messages for command errors**

Code	Message	Error detection condition
-101	Invalid character	<p>An invalid character is included in a header or parameter.</p> <p><b>Notes:</b></p> <ul style="list-style-type: none"> <li>• The top of mnemonic should be stated from alphabet. After this, alphabet character "A" to "Z", "a" to "z", underline "_", number "0" to "9" can be followed.</li> <li>• A rule of character data is similar to program mnemonic.</li> </ul> <p>Ex. : Case where a header includes #: :OUTPut:CLOCK:#REQuency 200 Case where a parameter include *: :OUTPut:CLOCK:FREQuency:UNIT MHZ*</p>
-102	Syntax error	Case that the command excepted a <white space> is only "*".
-104	Data type error	<p>The parameter type differs from the specified type.</p> <p><b>Notes:</b></p> <ul style="list-style-type: none"> <li>• The character data is send as parameter although it should be sent a numeric parameter.</li> <li>• The numeric data is send as parameter although it should be a character parameter.</li> </ul> <p>Ex. : Case where a parameter sends data of character type to a command that accepts only numeric data: :SENSe:MEASure:EALarm:PERiod 1A,D,M,S</p>
-108	Parameter not allowed	<p>The number of parameters does not agree with the defined (required) number.</p> <p>Ex. : Case where a command of four parameter required send five parameters: :SENSe:MEASure:EALarm:PERiod 1,1,10,20,30 Ex. : Case where a command of one parameter required sent no parameter: :SENSe:MEASure:EALarm:MODE</p>

**Table 9.2.1-1 Error messages for command errors (Cont'd)**

Code	Message	Error detection condition
-110	Command header error	The top of character except a <white space> is a command separator or not a alphabet( including case that it is only command separator).
-112	Program mnemonic too long	The number of program mnemonics is 12 or more.
-113	Undefined header	The header syntax is correct but is not defined in the MP1800A/MT1810A. Ex. : Case where a wrong header is included: :SENSe:PATtern:PYPE PRBS

### 9.2.2 Execution Error

When the following error occurred, the event status register "bit 4" is set.

- (1) When <PROGRAM DATA> followed by the header is against the device specification.
- (2) When a program message cannot be executed because of the MP1800A/MT1810A condition.

**Table 9.2.2-1 Error messages for execution errors**

Code	Message	Error detection condition
-220	Parameter error	An error is found in the parameter.
-221	Setting conflict	The parameter is correct but cannot be set because of the MP1800A/MT1810A condition. Ex. : Although the Pattern generation setting is not "Burst", then the command to change the data output sequence for a Burst data is sent

### 9.2.3 Device Specific Error

Device specific error indicate that an error other than command error, query error or execution error occurred. When a device specific error occurred, the event status register "bit 3" is set.

**Table 9.2.3-1 Error messages for device specific errors**

Code	Message	Error detection condition
-310	System error	A system error occurred.

## 9.2.4 Supplement / Error No. and the event status register

Table 9.2.4-1 Error No. and the event status register

Error No.	Error type	the event status register is set	BIT No
-The 100th level	Command error	CME_BIT	5
-The 200th level	Execution error	EXE_BIT	4
-The 100th level	Device specific error	DDE_BIT	3



## *Appendix A Command Compatibility List*

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## A.1 Remote Command Compatibility

When executing in the MP1800A or the MT1810A a program used for an existing Anritsu device, the program must be reconfigured with respect to the items described below.

This section describes the compatibility between the MP1800A or the MT1810A commands and the commands for the following existing devices:

- MP1632C Digital Data Analyzer
- MP1761A/B/C Pulse Pattern Generator
- MP1762A/C/D Error Detector
- MP1775A Pulse Pattern Generator
- MP1776A Error Detector

The compatibility level for a given command is classified as "Compatible", "Partially compatible", and "Incompatible".

**Compatible:** The command for the existing device can be used as is.(A)

**Partially compatible:** The command is the same, but some parameters differ from those for the corresponding THE MP1800A or the MT1810A command. These parameters must be limited or used within the restrictions for the MP1800A or the MT1810A.(B)

**Incompatible:** The command is not compatible with the MP1800A or the MT1810A (the command has changed). Even if a command with the same name may exist, the function is different, or the function itself is not supported in the MP1800A or the MT1810A. (C)  
Use the corresponding the MP1800A or the MT1810A command.  
Commands newly provided for the MP1800A or the MT1810A are also incompatible with the existing devices.(—)

**Compatibility with MP1632C and MP1776A:**

When using a command for the MP1632C and MP1776A that is compatible or partially compatible, delete the channel designation number.

Example: To set the data input threshold voltage:

:SENSe3:PATTerN:TYPE ZSUBstitution (for MP1632C)

→ :SENSe:PATTerN:TYPE ZSUBstitution (for MP1800A/MT1810A)

Example: To set the data input threshold voltage:

:INPut1:DATA:THReshold (for MP1776A)

→ :INPut:DATA:THReshold (for MP1800A/MT1810A)

### A.1.1 Compatibility with MP1632C

This section describes the compatibility between the MP1800A or the MT1810A commands and the MP1632C Digital Data Analyzer.

**Table A.1.1-1 MP1632C PPG commands**

Function	Control Message	Data Request Message	Compatibility
Pattern Output Mode	PTO	PTO?	A
Transmission Pattern	PTN	PTN?	C
Transmission Pattern Mark Ratio	MRK	MRK?	A
Transmission Pattern Logic	LGC	LGC?	A
Bit Shift	SFT	SFT?	A
Zero-Subst Pattern Length	ZPL	ZPL?	A
Length of Consecutive Zeros of Zero Subst Pattern	ZLN	ZLN?	A
PRGM Pattern Length	DLN	DLN?	A
Burst Mode	BRM	BRM?	A
Burst Cycle	BRC	BRC?	C
Burst Enable Length	BRE	BRE?	C
Number of Pattern Pages	PAG ADR	PAG? ADR?	—
Pattern Bit	BIT	BIT?	—
Pattern Data	PDT	PDT?	A
Pattern Binary Data	BDT	BDT?	A
Reversion of Transmission Pattern Specification Address Data (address specification)	DRA	—	A
Reversion of Transmission Pattern Specification Address Data (delta specification)	DRD	—	A
Pattern Data Input Byte Number	WRT	—	A
Pattern Data Output Byte Number	—	RED	A
ALL Preset (All Pages)	ALL	—	A
ALL Preset (One Pages)	PST	—	—
Error Insertion	EAD	EAD?	B
Error Insertion Route	ECH	ECH?	A
Level of PRBS 1	PML	PML?	—
Level of PRGM 1	GML	GML?	—



Table A.1.1-1 MP1632C PPG commands (Cont'd)

Function	Control Message	Data Request Message	Compatibility
On/Off of Output	OON	OON?	C
On/Off of Clock Output	CON	CON?	A
On/Off of XClock Output	XCO	XCO?	A
Setting of Clock Delay	CDL	CDL?	A
Clock Output Level	CLL	CLL?	—
XClock Output Level	XCL	XCL?	—
Clock Output Amplitude	CAP	CAP?	A
XClock Output Amplitude	XCA	XCA?	A
Clock Output Offset	COS	COS?	B
XClock Output Offset	XCF	XCF?	A
Offset Reference Port Selection	OPS	OPS?	A
Offset Reference Value	OFS	OFS?	A
Setting of Clock Duty	CDT	CDT?	A
Setting of XClock Duty	XDT	XDT?	A
Setting of Clock DC Impedance	CIM	CIM?	—
ON/OFF of Data Output	DON	DON?	A
ON/OFF of XData Output	XDO	XDO?	C
Setting of Data DC Impedance	DIM	DIM?	—
Data Cross Point	DCR	DCR?	B
XData Cross Point	XDC	XDC?	B
Data Output Level	DAL	DAL?	A
XData Output Level	XDL	XDL?	A
Data Output Amplitude	DAP	DAP?	A
XData Output Amplitude	NAP	NAP?	A
Data Output Offset	DOS	DOS?	A
XData Output Offset	NOS	NOS?	A
Selection of Sync Output Signal	SOP	SOP?	B
Selection of Pattern Sync Output Position	PSP	PSP?	B
PPG Clock Loss	—	PCL?	A
Delay Trouble3	—	DTR?	A
Delay Setting State	—	DLY?	A
Setting of Clock/XClock Grouping	CGR	CGR?	A
Setting of Data/XData Grouping	TRK	TRK?	A
PPG/ED Pattern Common Setting	PCO	PCO?	—

Table A.1.1-2 MP1632C Internal Synthesizer commands

Function	Control Message	Data Request Message	Compatibility
Setting of Clock Frequency	FRQ	FRQ?	B
Clock Reference Signal	RFC	RFC?	A
PLL Lock State	—	PLL?	—

Table A.1.1-3 MP1632C ED commands

Function	Control Message	Data Request Message	Compatibility
Pattern Reception Mode (Pattern input mode)	PTI	PTI?	A
Reception Pattern	PTN	PTN?	B
Reception Pattern Mark Ratio	MRK	MRK?	A
Reception Pattern Logic	LGC	LGC?	A
Bit Shift	SFT	SFT?	A
Zero-Subst Pattern Length	ZPL	ZPL?	—
Length of Consecutive Zeros of Zero Subst Pattern	ZLN	ZLN?	B
PRGM Pattern Length	DLN	DLN?	A
Automatic Synchronization Function	SYN	SYN?	A
Synchronization Loss Threshold	LTH	LTH?	—
Synchronization Gain Threshold	GTH	GTH?	—
Internal Synchronization Threshold	ITH	ITH?	—
Frame Synchronization Function	FSY	FSY?	—
Frame Length	FLN	FLN?	A
Number of Pattern Pages	PAG ADR	PAG? ADR?	—
Pattern Bit	BIT	BIT?	—
Pattern Data	PDT	PDT?	A
Pattern Binary Data	BDT	BDT?	A
Reversion of Transmission Pattern Specification Address Data (address specification)	DRA	—	A
Reversion of Transmission Pattern Specification Address Data (delta specification)	DRD	—	A
Pattern Data Input Byte Number	WRT	—	—
Pattern Data Output Byte Number	—	RED	—
ALL Preset (All Pages)	ALL	—	A
ALL Preset (One Pages)	PST	—	—
Level of PRBS 1	PML	PML?	—
Level of PRGM 1	GML	GML?	—
Setting of Measurement Item	TIT	TIT?	—

Table A.1.1-3 MP1632C ED commands (Cont'd)

Function	Control Message	Data Request Message	Compatibility
Measurement Start/Restart	STA	—	A
Measurement Stop	STO	—	A
Measurement restart setting	MRS	MRS?	C
Setting of Measurement Mode	MOD	MOD?	A
Measurement Period Setting	PRD	PRD?	A
Timed Start Setting	TSS	TSS?	—
Timed Start Time Setting	STI	STI?	—
Error Detection Mode Selection	ETY	ETY?	—
Measurement Mask Route Selection	SCH	SCH?	—
Measurement Start Time	—	MSA?	—
Measurement Stop Time	—	MSO?	A
Measurement State	—	MSR?	A
Measurement Elapsed Time	—	MLP?	B
Measurement Residual Time	—	ETI?	A
Intermediate Data Creation Time	—	INT?	—
Alarm Occurrence Time	—	AOT?	—
Alarm Recovery Time	—	ART?	—
Setting of Eye Margin Measurement Mode	EMD	EMD?	—
Eye Margin Measurement Item Setting	EYT	EYT?	C
Eye Margin Measurement Threshold Setting	EMT	EMT?	C
Eye Margin Measurement Resolution Setting	EMR	EMR?	C
Eye Diagram Measurement Threshold Setting	EDT	EDT?	C
Eye Diagram Measurement Effective Points	—	EDP?	A
Setting of Auto search Mode	ASM	ASM?	B
Auto search Function	SRH	SRH?	B
PRBS pattern Search Function	PSH	PSH?	—
Clock Input Polarity	CPL	CPL?	—
Clock Input Phase Setting	CPA	CPA?	B
Clock Input Terminal Voltage	CTM	CTM?	—
Data Input Level	DAL	DAL?	B
Data Input Threshold Setting	DTH	DTH?	A
Setting of Data Input Terminal Voltage	DTM	DTM?	B
Clock Loss Process Option	CLS	CLS?	A
Sync Loss Process Option	SLS	SLS?	A

Table A.1.1-3 MP1632C ED commands (Cont'd)

Function	Control Message	Data Request Message	Compatibility
Measurement Interval Time Selection	ITV	ITV?	B
Error Performance Data Measurement ON/OFF	PRF	PRF?	—
Error Performance Threshold Setting	ETH	ETH?	A
Threshold EI/%EFI Measurement ON/OFF	TEI	TEI?	—
Power Fail Measurement ON/OFF	PFM	PFM?	—
Error Ratio Measurement Result	—	ER?	A
Error Count Measurement Result	—	EC?	A
Clock Count Measurement Result	—	CC?	A
Error Interval Count Measurement Result	—	EI?	A
Error Free Interval Rate Measurement Result	—	EFI?	A
Clock Frequency Measurement Result	—	FRQ?	A
Performance % Measurement Result	—	PFM?	A
Performance Count Measurement Result	—	PFC?	A
Threshold EI Measurement Result	—	THE?	A
Threshold %EFI Measurement Result	—	THF?	A
Alarm Interval Measurement Result	—	AIN?	A
1 Second Average Error Ratio Measurement Result	—	OER?	—
1 Second Average Error Count Measurement Result	—	OEC?	—
Data Output Format	FMT	FMT?	—
Intermediate Measurement Result Output Function	—	IMD?	A
Eye Margin Measurement Result	—	EMM?	—
Eye Diagram Measurement Result	—	EDM?	C
Measurement Result Store Function	BST	—	A
Measurement Result Store Buffer Clear Function	BCL	—	—
Clock Loss Status	—	CLI?	A
Sync Loss Status	—	SLI?	A
Error Detection Status	—	ERS?	A
Error Detection Status	—	BES?	A
Power Fail Status	—	POF?	—
Delay Trouble	—	DTR?	—
Delay Setting Status	—	DLY?	A
Synchronous Signal Output Selection	SOP	SOP?	B
PPG/ED Pattern Common Setting	PCO	PCO?	—

Table A.1.1-4 MP1632C Main Frame commands

Function	Control Message	Data Request Message	Compatibility
Child window Open/Close	WOC	WOC?	—
System Child window panel selection	SYW	SYW?	—
System Child window panel selection	SEW	SEW?	—
Test Menu System Child window panel selection	TEW	TEW?	—
Real Time/Measurement Time display selection	TIM	TIM?	A
Result Child window Sub window selection	REW	REW?	—
Intermediate Result display Function	CUR	CUR?	A
Performance Result Display Function	PFD	PFD?	—
Zoom window display ON/OFF setting	ZOM	ZOM?	A
Zoom window display Item setting	ZOI	ZOI?	—
Zoom window Performance item setting	ZOP	ZOP?	—
Zoom window Threshold EI/%EFI setting	ZOT	ZOT?	—
History Lamp Reset	HRE	—	A
Eye Margin Measurement Display Error Rate	DER	DER?	C
Eye Diagram Display window selection	EDD	EDD?	—
Eye diagram display Auto Scale	ASC	—	C
Eye diagram Voltage Scale Setting	VSC	VSC?	C
Eye diagram Phase Scale Setting	PSC	PSC?	C
Eye diagram Marker Display ON/OFF	EMA	EMA?	—
Marker Operation Mode	MKM	MKM?	—
Marker Specification Threshold	MKT	MKT?	—
Marker Move Specification	MMV	—	—
Marker Position	MKP	MKP?	—
Customize window display Slot setting	CUS	CUS?	—
Customize window display Item setting	CUI	CUI?	—
Customize window display Item Port setting	CUP	CUP?	—
Customize window Pattern Setting Unit	CPT	CPT?	A
Customize Edit Pattern Position	CPF	CPF?	—
Customize window Measurement display Item	CRI	CRI?	—
System Error Monitor Buzzer ON/OFF	SYS	SYS?	A
Error Monitor Buzzer ON/OFF	MON	MON?	A
Alarm Monitor Buzzer ON/OFF	ALM	ALM?	A
System Error Type	SYT	SYT?	B
Internal Timer Setting	RTM	RTM?	—

Table A.1.1-4 MP1632C Main Frame commands (Cont'd)

Function	Control Message	Data Request Message	Compatibility
Input/Output Buffer Size	BUF	BUF?	—
Hardware Organization	—	HDR?	C
Software Organization	—	SFR?	—
Data Recall	RCL	—	—
Data Save	SAV	—	—
Quick Recall	QRC	—	—
Quick Save	QSA	—	—
File No./Directory Mode Selection	FIL	FIL?	—
File Catalog	—	CAT?	—
Floppy Access Status	—	MAC?	—
Initialize	INI	—	A
Hard Copy	HCP	—	A
Prints Text	PTX	—	—
Threshold EI/%EFI print selection	THR	THR?	—
Performance Data print selection	EPF	EPF?	—
Error Measurement print selection	ERP	ERP?	—
Alarm Interval print selection	ALP	ALP?	—
Frequency Data print selection	FRP	FRP?	—
Manual Print Start	PSA	—	—
Addressed Pattern Print	PAD	—	—
All Pattern Print	PAL	—	—
Eye Margin Measurement Result Print	PEM	—	—
Recall Eye Diagram Print	PER	—	—
LSB/MSB Swap Command	SWP	SWP?	—
Termination Select	TRM	TRM?	A
Service Request Enable Register(ED)	SRQ	SRQ?	C
Status Byte Register(ED)	STB	STB?	C
Standard Event Status Enable Register(ED)	ESE	ESE?	C
Event Status Register(ED)	ESR	ESR?	C
Extended Event Status Enable Register(ED)(ED)	EES	EES?	C
Event Status Register(ED)	EER	EER?	C
Service Request Enable Register(PPG/Synthe)	SRQ	SRQ?	C
Status Byte Register(PPG/Synthe)	STB	STB?	C
Standard Event Status Enable Register (PPG/Synthe)	ESE	ESE?	C

**Table A.1.1-4 MP1632C Main Frame commands (Cont'd)**

Function	Control Message	Data Request Message	Compatibility
Event Status Register(PPG/Synthe)	ESR	ESR?	C
Extended Event Status Enable Register (PPG/Synthe)	EES	EES?	C
Event Status Register(PPG/Synthe)	EER	EER?	C

**Table A.1.1-5 MP1632C SOURce Subsystem**

Commands	Compatibility
:SOURce:PATtern:OMODE <mode>	A
:SOURce:PATtern:OMODE?	A
:SOURce:PATtern:TYPE <type>	B
:SOURce:PATtern:TYPE?	B
:SOURce:PATtern:PRBS:MRATio <mratio>	A
:SOURce:PATtern:PRBS:MRATio?	A
:SOURce:PATtern:PRBS:BSHift <numeric>	A
:SOURce:PATtern:PRBS:BSHift?	A
:SOURce:PATtern:ZSUBstitute:LENGth <numeric>	A
:SOURce:PATtern:ZSUBstitute:LENGth?	A
:SOURce:PATtern:ZSUBstitute:ZLENgth <numeric>	A
:SOURce:PATtern:ZSUBstitute:ZLENgth?	A
:SOURce:PATtern:ZSUBstitute:LOGic <logic>	—
:SOURce:PATtern:ZSUBstitute:LOGic?	—
:SOURce:PATtern:PROGram:LENGth <numeric>	—
:SOURce:PATtern:PROGram:LENGth?	—
:SOURce:PATtern:PROGram:LOGic <logic>	—
:SOURce:PATtern:PROGram:LOGic?	—
:SOURce:PATtern:BURSt:MODE <mode>	A
:SOURce:PATtern:BURSt:MODE?	A
:SOURce:PATtern:BURSt:CYCLe <numeric>	C
:SOURce:PATtern:BURSt:CYCLe?	C
:SOURce:PATtern:BURSt:ELENgth <numeric>	C
:SOURce:PATtern:BURSt:ELENgth?	C
:SOURce:PATtern:DATA:WHOLe <start>,<end>,<data>	A
:SOURce:PATtern:DATA:WHOLe? <start>	A

**Table A.1.1-5 MP1632C SOURce Subsystem (Cont'd)**

Commands	Compatibility
:SOURce:PATtern:BDATa:WHOLe <start>,<end>,<data>	A
:SOURce:PATtern:BDATa:WHOLe? <start>	A
:SOURce:PATtern:DREVerse:ADDRess <start>,<end>	A
:SOURce:PATtern:DREVerse:DELTA <start>,<delta>	A
:SOURce:PATtern:EADDition:SET <boolean>	C
:SOURce:PATtern:EADDition:SET?	C
:SOURce:PATtern:EADDition:SINGLE	A
:SOURce:PATtern:EADDition:RATE <mode>	B
:SOURce:PATtern:EADDition:RATE?	B
:SOURce:PATtern:EADDition:ROUte <route>	A
:SOURce:PATtern:EADDition:ROUte?	A
:SOURce:PATtern:LOGic:PRBS <mark>	—
:SOURce:PATtern:LOGic:PRBS?	—
:SOURce:PATtern:LOGic:PRGM <mark>	—
:SOURce:PATtern:LOGic:PRGM?	—

**Table A.1.1-6 MP1632C OUTPut Subsystem**

Commands	Compatibility
:OUTPut:SET	C
:OUTPut:SET?	C
:OUTPut:CLOCK:OUTPut <port>,<boolean>	C
:OUTPut:CLOCK:OUTPut? <port>	C
:OUTPut:CLOCK:DELay <numeric>	—
:OUTPut:CLOCK:DELay?	—
:OUTPut:CLOCK:LEVel <port>,<level>	—
:OUTPut:CLOCK:LEVel? <port>	—
:OUTPut:CLOCK:AMPLitude <port>,<numeric>	A
:OUTPut:CLOCK:AMPLitude? <port>	A
:OUTPut:CLOCK:OFFSet <port>,<numeric>	B
:OUTPut:CLOCK:OFFSet? <port>	B
:OUTPut:CLOCK:OREFERENCE <port>,<offset>	—
:OUTPut:CLOCK:OREFERENCE? <port>	—
:OUTPut:CLOCK:Duty <port>,<numeric>	A
:OUTPut:CLOCK:Duty? <port>	A



**Table A.1.1-6 MP1632C OUTPut Subsystem (Cont'd)**

Commands	Compatibility
:OUTPut:CLOCK:IMPedance <impedance>	—
:OUTPut:CLOCK:IMPedance?	—
:OUTPut:DATA:OUTPut <port>,<boolean>	C
:OUTPut:DATA:OUTPut? <port>	C
:OUTPut:DATA:IMPedance <impedance>	—
:OUTPut:DATA:IMPedance?	—
:OUTPut:DATA:CPOint <port>,<numeric>	B
:OUTPut:DATA:CPOint? <port>	B
:OUTPut:DATA:LEVel <port>,<level>	A
:OUTPut:DATA:LEVel? <port>	A
:OUTPut:DATA:AMPLitude <port>,<numeric>	A
:OUTPut:DATA:AMPLitude? <port>	A
:OUTPut:DATA:OFFSet <port>,<numeric>	A
:OUTPut:DATA:OFFSet? <port>	A
:OUTPut:DATA:OREFERENCE <port>,<offset>	—
:OUTPut:DATA:OREFERENCE? <port>	—
:OUTPut:SYNC:SOURce <source>	A
:OUTPut:SYNC:SOURce?	A
:OUTPut:SYNC:POSition <address>	B
:OUTPut:SYNC:POSition?	B
:OUTPut:SYNC:SOURce <source>	A
:OUTPut:SYNC:SOURce?	A
:OUTPut:CLOCK:FREQuency <numeric>	B
:OUTPut:CLOCK:FREQuency?	B
:OUTPut:RClock.:SElect <clock>	B
:OUTPut:RClock.:SElect?	B

**Table A.1.1-7 MP1632C CALCulate Subsystem**

Commands	Compatibility
:CALCulate:DATA:MONitor?	C

**Table A.1.1-8 MP1632C INSTRUMENT Subsystem**

Commands	Compatibility
:INSTRUMENT:COUPLE:CLOCK:TRACking <boolean>	—
:INSTRUMENT:COUPLE:CLOCK:TRACking?	—
:INSTRUMENT:COUPLE:DATA:TRACking <boolean>	—
:INSTRUMENT:COUPLE:DATA:TRACking?	—
:INSTRUMENT:COUPLE:PATTERN:SET <boolean>	—
:INSTRUMENT:COUPLE:PATTERN:SET?	—
:INSTRUMENT:COUPLE:PATTERN:SET <boolean>	—
:INSTRUMENT:COUPLE:PATTERN:SET?	—

**Table A.1.1-9 MP1632C SENSE Subsystem**

Commands	Compatibility
:SENSE:PATTERN:IMODE <mode>	A
:SENSE:PATTERN:IMODE?	A
:SENSE:PATTERN:TYPE <type>	B
:SENSE:PATTERN:TYPE?	B
:SENSE:PATTERN:PRBS:MRATIO <mratio>	A
:SENSE:PATTERN:PRBS:MRATIO?	A
:SENSE:PATTERN:PRBS:BSHIFT <numeric>	A
:SENSE:PATTERN:PRBS:BSHIFT?	A
:SENSE:PATTERN:ZSUBSTITUTE:LENGTH <numeric>	A
:SENSE:PATTERN:ZSUBSTITUTE:LENGTH?	A
:SENSE:PATTERN:ZSUBSTITUTE:ZLENGTH <numeric>	B
:SENSE:PATTERN:ZSUBSTITUTE:ZLENGTH?	B
:SENSE:PATTERN:ZSUBSTITUTE:LOGIC <logic>	—
:SENSE:PATTERN:ZSUBSTITUTE:LOGIC?	—
:SENSE:PATTERN:PROGRAM:LENGTH <numeric>	—
:SENSE:PATTERN:PROGRAM:LENGTH?	—
:SENSE:PATTERN:PROGRAM:LOGIC <logic>	—
:SENSE:PATTERN:PROGRAM:LOGIC?	—
:SENSE:PATTERN:SYNC:ASYNC <boolean>	A
:SENSE:PATTERN:SYNC:ASYNC?	A
:SENSE:PATTERN:SYNC:THRESHOLD:LOSS <thre>	—
:SENSE:PATTERN:SYNC:THRESHOLD:LOSS?	—

Table A.1.1-9 MP1632C SENSE Subsystem (Cont'd)

Commands	Compatibility
:SENSE:PATtern:SYNC:THReshold:GAIN <thre>	C
:SENSE:PATtern:SYNC:THReshold:GAIN?	C
:SENSE:PATtern:SYNC:THReshold:INTernal <boolean>	—
:SENSE:PATtern:SYNC:THReshold:INTernal?	—
:SENSE:PATtern:SYNC:PSMode <mode>	A
:SENSE:PATtern:SYNC:PSMode?	A
:SENSE:PATtern:SYNC:FLENgth <numeric>	A
:SENSE:PATtern:SYNC:FLENgth?	A
:SENSE:PATtern:DATA:WHOLe <start>,<end>,<data>	A
:SENSE:PATtern:DATA:WHOLe? <start>	A
:SENSE:PATtern:BDATA:WHOLe <start>,<end>,<bdata>	A
:SENSE:PATtern:BDATA:WHOLe? <start>	A
:SENSE:PATtern:DREVerse:ADDReSS <start>,<end>	A
:SENSE:PATtern:DREVerse:DELTA <start>,<delta>	A
:SENSE:PATtern:LOGic:PRBS <mark>	—
:SENSE:PATtern:LOGic:PRBS?	—
:SENSE:PATtern:LOGic:PRGM <mark>	—
:SENSE:PATtern:LOGic:PRGM?	—
:SENSE:MEASure:TEST?	—
:SENSE:MEASure:STARt	A
:SENSE:MEASure:STOP	A
:SENSE:MEASure:MREStart <boolean>	A
:SENSE:MEASure:MREStart?	A
:SENSE:MEASure:EALarm:MODE <mode>	A
:SENSE:MEASure:EALarm:MODE?	A
:SENSE:MEASure:EALarm:PERiod <d>,<h>,<m>,<s>	A
:SENSE:MEASure:EALarm:PERiod?	A
:SENSE:MEASure:EALarm:BTIME:SET <boolean>	—
:SENSE:MEASure:EALarm:BTIME:SET?	—
:SENSE:MEASure:EALarm:BTIME:STARt <y>,<m>,<d>,<h>,<m>,<s>	—
:SENSE:MEASure:EALarm:BTIME:STARt?	—
:SENSE:MEASure:EALarm:ERRor:TYPE?	—
:SENSE:MEASure:EALarm:MASK:ROUte <route>,<boolean>	—
:SENSE:MEASure:EALarm:MASK:ROUte?	—
:SENSE:MEASure:EALarm:STARt?	A
:SENSE:MEASure:EALarm:STOP?	A
:SENSE:MEASure:EALarm:STATe?	A
:SENSE:MEASure:EALarm:ELAPsed?	A
:SENSE:MEASure:EALarm:TIMed?	A
:SENSE:MEASure:EALarm:ITIME?	A
:SENSE:MEASure:EALarm:AOCCur? <alarm>	A
:SENSE:MEASure:EALarm:ARECver? <alarm>	A

**Table A.1.1-9 MP1632C SENSE Subsystem (Cont'd)**

Commands	Compatibility
:SENSE:MEASure:EMARgin:MODE <mode>	—
:SENSE:MEASure:EMARgin:MODE?	—
:SENSE:MEASure:EMARgin:TYPE?	—
:SENSE:MEASure:EMARgin:TYPE <type>	—
:SENSE:MEASure:EMARgin:MARGin:THReshold <thre>	A
:SENSE:MEASure:EMARgin:MARGin:THReshold?	A
:SENSE:MEASure:EMARgin:MARGin:RESolution <type>	—
:SENSE:MEASure:EMARgin:MARGin:RESolution?	—
:SENSE:MEASure:EMARgin:DIAGram:THReshold <thre>,<boolean>	—
:SENSE:MEASure:EMARgin:DIAGram:THReshold?	—
:SENSE:MEASure:EMARgin:DIAGram:POINt? <thre>	—
:SENSE:MEASure:EMARgin:STATe?	—
:SENSE:MEASure:EMARgin:STARt?	—
:SENSE:MEASure:EMARgin:STOP?	—
:SENSE:MEASure:EMARgin:ELAPsed?	—
:SENSE:MEASure:ASEarch:MODE <mode>	B
:SENSE:MEASure:ASEarch:MODE?	B
:SENSE:MEASure:ASEarch:STARt	A
:SENSE:MEASure:ASEarch:STOP	A
:SENSE:MEASure:ASEarch:PATTern <boolean>	—
:SENSE:MEASure:ASEarch:PATTern?	—
:SENSE:MEASure:ASEarch:STATe?	A

**Table A.1.1-10 MP1632C INPut Subsystem**

Commands	Compatibility
:INPut:CLOCK:POLarity <pol>	—
:INPut:CLOCK:POLarity?	—
:INPut:CLOCK:DELay <numeric>	A
:INPut:CLOCK:DELay?	A
:INPut:CLOCK:TERMination <term>	A
:INPut:CLOCK:TERMination?	A
:INPut:DATA:LEVel <level>	C
:INPut:DATA:LEVel?	C
:INPut:DATA:THReshold <numeric>	B
:INPut:DATA:THReshold?	B
:INPut:DATA:TERMination <term>	C
:INPut:DATA:TERMination?	C

**Table A.1.1-11 MP1632C CALCulate Subsystem**

Commands	Compatibility
:CALCulate:EALarm:CLEValuation <boolean>	A
:CALCulate:EALarm:CLEValuation?	A
:CALCulate:EALarm:SLEValuation <boolean>	A
:CALCulate:EALarm:SLEValuation?	A
:CALCulate:EALarm:ERRor:INTerval <numeric>,<suffix>	A
:CALCulate:EALarm:ERRor:INTerval?	A
:CALCulate:EALarm:PERFormance:MEASurement <boolean>	—
:CALCulate:EALarm:PERFormance:MEASurement?	—
:CALCulate:EALarm:PERFormance:THReshold <thre>	A
:CALCulate:EALarm:PERFormance:THReshold?	A
:CALCulate:EALarm:TEINterval:MEASurement <boolean>	—
:CALCulate:EALarm:TEINterval:MEASurement?	—
:CALCulate:EALarm:PFail <boolean>	—
:CALCulate:EALarm:PFail?	—
:CALCulate:DATA:EALarm? <string>	B
:CALCulate:DATA:EMARgin? <string>	—
:CALCulate:DATA:STORe <string>	—
:CALCulate:DATA:CLEar <string>	—
:CALCulate:DATA:MONitor? <item>	B
:CALCulate:DATA:MONitor? <string>	A

Table A.1.1-12 MP1632C DISPlay Subsystem

Commands	Compatibility
:DISPlay:WINDow:OPEN <disp>	—
:DISPlay:WINDow:CLOSE <disp>	—
:DISPlay:SYSTem[:NAME] <name>	—
:DISPlay:SYSTem[:NAME]?	—
:DISPlay:SETup[:NAME] <name>	—
:DISPlay:SETup[:NAME]?	—
:DISPlay:TEST[:NAME] <name>	—
:DISPlay:TEST[:NAME]?	—
:DISPlay:RESult:TIME <time>	A
:DISPlay:RESult:TIME?	A
:DISPlay:RESult:EALarm[:NAME] <name>	—
:DISPlay:RESult:EALarm[:NAME]?	—
:DISPlay:RESult:EALarm:MODE <mode>	C
:DISPlay:RESult:EALarm:MODE?	C
:DISPlay:RESult:EALarm:ALL:PTYPE <ptype>	—
:DISPlay:RESult:EALarm:ALL:PTYPE?	—
:DISPlay:RESult:EALarm:ZOOM1   :ZOOM2   :ZOOM3   :ZOOM4:SET <boolean>	—
:DISPlay:RESult:EALarm:ZOOM1   :ZOOM2   :ZOOM3   :ZOOM4:SET?	—
:DISPlay:RESult:EALarm:ZOOM1   :ZOOM2   :ZOOM3   :ZOOM4:ITEM <item>	—
:DISPlay:RESult:EALarm:ZOOM1   :ZOOM2   :ZOOM3   :ZOOM4:ITEM?	—
:DISPlay:RESult:EALarm:ZOOM1   :ZOOM2   :ZOOM3   :ZOOM4:PITem <pittem>	—

Table A.1.1-12 MP1632C DISPlay Subsystem (Cont'd)

Commands	Compatibility
:DISPlay:RESult:EALarm:ZOOM1 :ZOOM2 :ZOOM3 :ZOOM4:PITem?	—
:DISPlay:RESult:EALarm:ZOOM1 :ZOOM2 :ZOOM3 :ZOOM4:TITem <titem>	—
:DISPlay:RESult:EALarm:ZOOM1 :ZOOM2 :ZOOM3 :ZOOM4:TITem?	—
:DISPlay:RESult:EALarm:HRESet	A
:DISPlay:RESult:EMARgin:ERATe <erate>,<boolean>	—
:DISPlay:RESult:EMARgin:ERATe?	—
:DISPlay:RESult:EMARgin:SCALe:ASCale	—
:DISPlay:RESult:EMARgin:SCALe:VOLTage <min>,<step>	—
:DISPlay:RESult:EMARgin:SCALe:VOLTage?	—
:DISPlay:RESult:EMARgin:SCALe:PHASe <min>,<step>	—
:DISPlay:RESult:EMARgin:SCALe:PHASe?	—
:DISPlay:RESult:EMARgin:MARKer:SET <marker>,<boolean>	—
:DISPlay:RESult:EMARgin:MARKer:SET? <marker>	—
:DISPlay:RESult:EMARgin:MARKer:MODE <mode>	—
:DISPlay:RESult:EMARgin:MARKer:MODE?	—
:DISPlay:RESult:EMARgin:MARKer:ERATe <erate>	—
:DISPlay:RESult:EMARgin:MARKer:ERATe?	—
:DISPlay:RESult:EMARgin:MARKer:MOVE <marker>,<mode>	—
:DISPlay:RESult:EMARgin:MARKer:POSition? <marker>	—
:DISPlay:RESult:EMARgin:TEMPlate:SElect <select>,<boolean>	—
:DISPlay:RESult:EMARgin:TEMPlate:SElect?	—
:DISPlay:RESult:EMARgin:TEMPlate:MOVE <template>,<mode>	—
:DISPlay:RESult:EMARgin:TEMPlate:PNUMber <template>,<point>	—
:DISPlay:RESult:EMARgin:TEMPlate:PNUMber? <template>	—
:DISPlay:RESult:EMARgin:TEMPlate:OFFSet:VOLTage <template>,<voltage>	—
:DISPlay:RESult:EMARgin:TEMPlate:OFFSet:VOLTage? <template>	—
:DISPlay:RESult:EMARgin:TEMPlate:OFFSet:PHASe <template>,<phase>	—
:DISPlay:RESult:EMARgin:TEMPlate:OFFSet:PHASe? <template>	—
:DISPlay:RESult:EMARgin:TEMPlate:POINT:VOLTage <template>,<point>,<voltage>	—
:DISPlay:RESult:EMARgin:TEMPlate:POINT:VOLTage? <template>,<point>	—
:DISPlay:RESult:EMARgin:TEMPlate:POINT:PHASe <template>,<point>,<phase>	—
:DISPlay:RESult:EMARgin:TEMPlate:POINT:PHASe? <template>,<point>	—
:DISPlay:RESult:EMARgin:TEMPlate:CONNect <template>,<boolean>	—
:DISPlay:RESult:EMARgin:TEMPlate:SElect? <template>	—
:DISPlay:RESult:CUSTomize:SETup1 :SETup2 :SETup3 :SETup4 :SETup5 :SETup6:UNIT <unit>	—
:DISPlay:RESult:CUSTomize:SETup1 :SETup2 :SETup3 :SETup4 :SETup5 :SETup6:UNIT?	—
:DISPlay:RESult:CUSTomize:SETup1 :SETup2 :SETup3 :SETup4 :SETup5 :SETup6:ITEM <string>	—
:DISPlay:RESult:CUSTomize:SETup1 :SETup2 :SETup3 :SETup4 :SETup5 :SETup6:ITEM?	—
:DISPlay:RESult:CUSTomize:SETup1 :SETup2 :SETup3 :SETup4 :SETup5 :SETup6:PORT <port>	—

**Table A.1.1-12 MP1632C DISPlay Subsystem (Cont'd)**

Commands	Compatibility
:DISPlay:RESult:CUSTomize:SETup1 :SETup2 :SETup3 :SETup4 :SETup5 :SETup6:PORT?	—
:DISPlay:RESult:CUSTomize:PATTern:UNIT <unit>	—
:DISPlay:RESult:CUSTomize:PATTern:UNIT?	—
:DISPlay:RESult:CUSTomize:PATTern:OFFSet <numeric>	—
:DISPlay:RESult:CUSTomize:PATTern:OFFSet?	—
:DISPlay:RESult:CUSTomize:RESult:ITEM <item>	—
:DISPlay:RESult:CUSTomize:RESult:ITEM?	—

**Table A.1.1-13 MP1632C SYSTem Subsystem**

Commands	Compatibility
:SYSTem:BEEPer:ERRor:SET <boolean>	A
:SYSTem:BEEPer:ERRor:SET?	A
:SYSTem:BEEPer:ALARm:SET <boolean>	A
:SYSTem:BEEPer:ALARm:SET?	A
:SYSTem:BEEPer:SYSTem:SET <boolean>	A
:SYSTem:BEEPer:SYSTem:SET?	A
:SYSTem:BEEPer:SYSTem:TYPE <type>,<boolean>	B
:SYSTem:BEEPer:SYSTem:TYPE?	A
:SYSTem:MODE?	—
:SYSTem:DATE <year>,<month>,<day>	—
:SYSTem:DATE?	—
:SYSTem:TIME <hour>,<min>,<sec>	—
:SYSTem:TIME?	—
:SYSTem:BSIZE? <mode>	—
:SYSTem:ERRor?	A
:SYSTem:VERSion?	A
:SYSTem:ORGanization:HARDware?	C
:SYSTem:ORGanization:SOFTware?	—
:SYSTem:MMEMory:RECall <type>,<file_name>,<unit>	C
:SYSTem:MMEMory:RECall "EYE:TEMPlate1", <file_name>,0	—
:SYSTem:MMEMory:STORe <type>,<file_name>,<unit>	C
:SYSTem:MMEMory:STORe "EYE:TEMPlate1", <file_name>,0	—
:SYSTem:MMEMory:QRECall <file_name>	C
:SYSTem:MMEMory:QSTore <file_name>,<comment>	C
:SYSTem:MMEMory:CATalog? <drv_dir>,<type>	—
:SYSTem:MEMory:INITialize	A



**Table A.1.1-13 MP1632C SYSTEM Subsystem (Cont'd)**

Commands	Compatibility
:SYSTem:PRINt:COpy	A
:SYSTem:PRINt:TEXT <string>	—
:SYSTem:PRINt:EALarm <item>	C
:SYSTem:PRINt:PATtern:TABLE:ADDRESS <unit>,<form>,<start>,<end>	—
:SYSTem:PRINt:PATtern:TABLE:ALL <unit>,<form>	—
:SYSTem:PRINt:CANcel	—
:SYSTem:PRINt:EMARgin <boolean>	—
:SYSTem:PRINt:REMARgin <boolean>	—
:SYSTem:TERMination	A
:SYSTem:TERMination?	A

**Table A.1.1-14 1632 STATus Subsystem**

Commands	Compatibility
:STATus:PRESet	A
:STATus:OPERation[:EVENT]?	C
:STATus:OPERation:CONDition?	C
:STATus:OPERation:ENABle <numeric>	C
:STATus:OPERation:ENABle?	C
:STATus:OPERation:PTRansition <numeric>	C
:STATus:OPERation:PTRansition?	C
:STATus:OPERation:NTRansition <numeric>	C
:STATus:OPERation:NTRansition?	C
:STATus:OPERation:INSTrument[:EVENT]?	—
:STATus:OPERation:INSTrument:ENABle <numeric>	—
:STATus:OPERation:INSTrument:ENABle?	—
:STATus:OPERation:INSTrument:PTRansition <numeric>	—
:STATus:OPERation:INSTrument:PTRansition?	—
:STATus:OPERation:INSTrument:NTRansition <numeric>	—
:STATus:OPERation:INSTrument:NTRansition?	—
:STATus:QUEStionable[:EVENT]?	—
:STATus:QUEStionable:CONDition?	—
:STATus:QUEStionable:ENABle <numeric>	—
:STATus:QUEStionable:ENABle?	—

Table A.1.1-14 1632 STATus Subsystem (Cont'd)

Commands	Compatibility
:STATus:QUEStionable:PTRansition <numeric>	—
:STATus:QUEStionable:PTRansition?	—
:STATus:QUEStionable:NTRansition <numeric>	—
:STATus:QUEStionable:NTRansition?	—
:STATus:QUEStionable:MONitor[:EVENT]?	—
:STATus:QUEStionable:MONitor:CONDition?	—
:STATus:QUEStionable:MONitor:ENABle <numeric>	—
:STATus:QUEStionable:MONitor:ENABle?	—
:STATus:QUEStionable:MONitor:PTRansition <numeric>	—
:STATus:QUEStionable:MONitor:PTRansition?	—
:STATus:QUEStionable:MONitor:NTRansition <numeric>	—
:STATus:QUEStionable:MONitor:NTRansition?	—
:STATus:QUEStionable:MONitor:SLOT1   :SLOT3   :SLOT4[:EVENT]?	—
:STATus:QUEStionable:MONitor:SLOT1   :SLOT3   :SLOT4:CONDition?	—
:STATus:QUEStionable:MONitor:SLOT1   :SLOT3   :SLOT4:ENABle <numeric>	—
:STATus:QUEStionable:MONitor:SLOT1   :SLOT3   :SLOT4:ENABle?	—
:STATus:QUEStionable:MONitor:SLOT1   :SLOT3   :SLOT4:PTRansition <numeric>	—
:STATus:QUEStionable:MONitor:SLOT1   :SLOT3   :SLOT4:PTRansition?	—
:STATus:QUEStionable:MONitor:SLOT1   :SLOT3   :SLOT4:NTRansition <numeric>	—
:STATus:QUEStionable:MONitor:SLOT1   :SLOT3   :SLOT4:NTRansition?	—
:STATus:QUEStionable:MONitor:SLOT3   :SLOT4:G32P   :G32E[:EVENT]?	—
:STATus:QUEStionable:MONitor:SLOT3   :SLOT4:G32P   :G32E:CONDition?	—
:STATus:QUEStionable:MONitor:SLOT3   :SLOT4:G32P   :G32E:ENABle <numeric>	—
:STATus:QUEStionable:MONitor:SLOT3   :SLOT4:G32P   :G32E:ENABle?	—
:STATus:QUEStionable:MONitor:SLOT3   :SLOT4:G32P   :G32E:PTRansition <numeric>	—
:STATus:QUEStionable:MONitor:SLOT3   :SLOT4:G32P   :G32E:PTRansition?	—
:STATus:QUEStionable:MONitor:SLOT3   :SLOT4:G32P   :G32E:NTRansition <numeric>	—
:STATus:QUEStionable:MONitor:SLOT3   :SLOT4:G32P   :G32E:NTRansition?	—

### A.1.2 Compatibility with MP1761A/B/C

This section describes the compatibility between the MP1800A or the MT1810A commands and the MP1761A/B/C Pulse Pattern Generator.

**Table A.1.2-1 MP1761A/B/C device message**

Section	Function	Control Message	Data Request Message	Compatibility
INTERNAL CLOCK	Internal clock frequency	FRQ	FRQ?	B
	Internal clock resolution switching	RES	RES?	A
MEMORY	File No./Directory mode switching	FIL	FIL?	—
	FD data recall	RCL	—	—
	FD data delete	DEL	—	—
	FD data save	SAV	—	—
	FD data resave	RSV	—	—
	Memory mode switch	MEM	MEM?	C
	FD format	FDF	—	—
	File contents search	—	FSH?	—
	Memory FD mode	—	FMD?	—
	FD access status	—	MAC?	—
	FD error message	—	FDE?	—
PATTERN	Pattern logic	LGC	LGC?	C
	Generation pattern switch	PTS	PTS?	B
	Zero Subst/PRBS stage	PTN	PTN?	C
	PRBS mark ratio	MRK	MRK?	C
	Alternate A/B display switch	ALT	ALT?	—
	Error insertion	EAD	EAD?	C
	Alternate A/ B loop times	LPT	LPT?	C
	Data length	DLN	DLN?	C
	Zero Subst length	ZLN	ZLN?	C
	Page number	ADR	ADR?	—
		PAG	PAG?	—
	Pattern bit	BIT	BIT?	—
	Pattern data preset (All pages ,All bits)	ALL	—	C
	Pattern data preset (1 page ,All bits)	PST	—	—
Pattern Sync trigger position	PSP	PSP?	C	

Table A.1.2-1 MP1761A/B/C device message (Cont'd)

Section	Function	Control Message	Data Request Message	Compatibility
PATTERN (Cont'd)	Page No./ Pattern sync trigger position display switch	PPD	PPD?	—
OUTPUT	Data output termination	DTM	DTM?	A
	Clock1 output termination	CTM	CTM?	A
	Offset reference value	OFS	OFS?	C
	Data output amplitude	DAP	DAP?	C
	XData output amplitude	NAP	NAP?	—
	Data output offset	DOS	DOS?	C
	XData output offset	NOS	NOS?	—
	Clock1 output amplitude	CAP	CAP?	C
	Clock1 output delay time	CDL	CDL?	A
	Clock1 output offset	COS	COS?	B
	Output ON/OFF	OON	OON?	C
	Data/XData display switch	DDS	DDS?	A
	Data/XData tracking	TRK	TRK?	C
	1/1 SPEED, 1/4 SPEED switch	SPD	SPD?	—
Front panel	Sync signal output selection	SOP	SOP?	C
Rear panel	Error insertion channel	ECH	ECH?	C
Function switch	Mark ratio and bit shift number	SFT	SFT?	C
	External error insertion	EEI	EEI?	C
	Alternate pattern A/B switch signal selection	APS	APS?	C
Other	Initialize	INI	—	A
	Pattern data input byte number	WRT	—	A
	Pattern data output byte number	—	RED?	A
	Internal timer setting	RTM	RTM?	—
	Internal synthesizer PLL	—	PLL?	—
	Power cut, recovery status	—	PWI?	—
	Delay status	—	DLY?	A
	Termination code selection	TRM	TRM?	A

### A.1.3 Compatibility with MP1762A/C/D

This section describes the compatibility between the MP1800A or the MT1810A commands and the MP1762A/C/D Error Detector.

**Table A.1.3-1 MP1762A/C/D device message**

Section	Function	Control Message	Data Request Message	Compatibility
INPUT	Data input threshold voltage	DTH	DTH?	A
	Eye margin measurement result (Threshold)	—	THM?	—
	Eye margin measurement result (Error ratio)	EYT	EYT?	C
	Eye margin measurement start	EST	EST?	—
	Eye margin measurement display	EME	EME?	—
	Clock input phase	CPA	CPA?	B
	Clock input polarity	CPL	CPL?	—
	Clock input termination voltage	CTM	CTM?	A
	Eye margin measurement result (Phase)	—	PHM?	—
	Data/XData tracking	DAC	DCD?	B
	Data input termination condition	DTC	DTC?	B
	Recovery frequency	RFQ	DRC?	C
	PLL reset	RPL	RPL?	—
	Input data select	DSL	DCD?	A
	Clock select	RRC	DRC?	A
	Single-ended/Differential select	DSD	DCD?	B
	Delay status	—	DLY?	A
	Data input termination voltage	DTM	DTM?	B
Automatic phase threshold search	SRH	SRH?	—	
MEMORY	File contents search	—	FSH?	—
	FD data delete	DEL	—	—
	FD error message	—	FDE?	—
	FD format	FDF	—	—
	FD data recall	RCL	—	—
	FD access status	—	MAC?	—
	File No./Directory mode switching	FIL	FIL?	—
	FD data save	SAV	—	—
	Memory FD mode	—	FMD?	—
	FD data resave	RSV	—	—
	Memory mode switch	MEM	MEM?	—

Table A.1.3-1 MP1762A/C/D device message (Cont'd)

Section	Function	Control Message	Data Request Message	Compatibility
PATTERN	Pattern logic	LGC	LGC?	A
	Generation pattern switch	PTS	PTS?	A
	Zero Subst/PRBS stage	PTN	PTN?	A
	PRBS mark ratio	MRK	MRK?	A
	Synchronous method	SYM	SYM?	A
	Display selection	DSP	DSP?	—
	Page number	PAG	PAG?	—
		ADR	ADR?	—
	Pattern bit	BIT	BIT?	—
	Frame length	FLN	FLN?	A
	Bit window pattern	CHM	CHM?	C
	Alternate A/B display switching	ALT	ALT?	—
	Alternate pattern A/B switch signal selection	APS	APS?	—
	Error analysis data	—	EAB?	—
	Error analysis page	EAP	EAP?	—
	Error analysis trigger	EAT	EAT?	—
	Number of pattern data input bytes	WRT	—	A
	Block window ON/OFF	MGE	MGE?	A
	Block window pattern	MGB	MGB?	C
	Bit window ON/OFF	MSE	MSE?	A
	Bit window page	MSK	MSK?	—
	Bit window preset (all pages, all bits)	HAL	—	C
	Bit window preset (1 page, all bits)	HPS	—	—
	Pattern data preset (1 pages, all bits)	PST	—	—
	Pattern data preset (all pages, all bits)	ALL	—	A
	Block window preset (1 page, all bits)	MPS	—	—
	Number of bytes of block window data output	—	MRD?	—
	Block window preset (all pages, all bits)	MAL	MAL?	—
	Number of bytes of block window data input	MWT	—	—
	Page/pattern sync trigger position display switch	PPD	PPD?	A
	Pattern sync position	PSP	PSP?	B
	Zero Subst length	ZLN	ZLN?	B
Number of pattern data output bytes	—	RED?	—	

Table A.1.3-1 MP1762A/C/D device message (Cont'd)

Section	Function	Control Message	Data Request Message	Compatibility
MEASURE-ME NT	Measurement result for clock count	—	CC?	A
	Clock Loss status	—	CLI?	A
	Intermediate result display	CUR	CUR?	A
	Data length	DLN	DLN?	A
	Measurement result display mode	DMS	DMS?	—
	Measurement start/restart	STA	—	A
	Measurement stop	STO	—	A
	Automatic synchronous threshold	SYE	SYE?	A
	Automatic synchronization	SYN	SYN?	A
	Clear data from buffer	EDC	—	—
	Store data in buffer	EDS	—	—
	EI measurement result	—	EI?	A
	EI/EF interval time	EIT	EIT?	A
	1s measurement result	—	OSD?	A
	Clear intermediate data	IMC	—	—
	Output intermediate data	—	IMD?	A
	Store intermediate data in buffer	IMS	—	—
	Internal timer setting	RTM	RTM?	—
	Measurement mode	MOD	MOD?	A
	Measurement period setting	PRD	PRD?	A
	Measurement condition	—	MSR?	A
	Error detection status	—	ERS?	A
	Alarm measurement result	—	AMD?	—
	Error count result	—	EC?	A
	Clock frequency data	—	FRQ?	A
	Synchronous loss status	—	SLI?	A
Synchronous signal output	SOP	SOP?	A	
PATTERN	Real time /measurement time display switching	TIM	TIM?	A
	Measurement termination data	—	END?	B
	Error rate measurement result	—	ER?	A
Front panel	Printer function	PRN	PRN?	—
	Manual print	PSA	—	—
	Alarm monitor	ALM	ALM?	A
	Error monitor	MON	MON?	A
	Sync output selection	SOP	SOP?	A
Rear panel	GPIB2 address	GPA	GPA?	—
Rear panel function switch	Mark ratio and bit shift	SFT	SFT?	A
	Clock loss process	CLS	CLS?	A
	Sync loss process	SLS	SLS?	A
	Burst measurement mode	BST	BST?	A
	Error performance data threshold selection	ETH	ETH?	A

**Table A.1.3-1 MP1762A/C/D device message (Cont'd)**

<b>Section</b>	<b>Function</b>	<b>Control Message</b>	<b>Data Request Message</b>	<b>Compatibility</b>
Rear panel function switch (Cont'd)	Intermediate data calculation	CAL	CAL?	A
	Error detection mode	ETY	ETY?	—
	1s data print threshold	DOT	DOT?	—
	1s data print	OSC	OSC?	—
	Intermediate data print	ITM	ITM?	—
	Measurement interval time	ITV	ITV?	A
	%EFI measurement result	—	EFI?	A
	Error performance print	EPF	EPF?	—
	Data print format	FMT	FMT?	—
	Paper saving function	PSV	PSV?	—
	Threshold EI,EFI data print	THR	THR?	—
	Termination code selection	TRM	TRM?	A



### A.1.4 Compatibility with MP1775A

This section describes the compatibility between the MP1800A or the MT1810A commands and the MP1775A Pulse Pattern Generator.

**Table A.1.4-1 MP1775A device message**

Section	Function	Control Message	Data Request Message	Compatibility
Clock	Operating clock	CLK	CLK?	—
	Internal clock frequency resolution	RES	RES?	A
	Internal clock frequency	FRQ	FRQ?	B
Pattern	Output pattern logic	LGC	LGC?	A
	Output pattern	PTS	PTS?	C
	Zero Subst, PRBS pattern stages	PTN	PTN?	A
	PRGM data channel setting	PCH	PCH?	—
	Data length	DLN	DLN?	A
	Number of page	PAG ADR	PAG? ADR?	—
	Pattern bits	BIT BIT	BIT? BIT?	—
	Pattern data input bytes	WRT	—	A
	Pattern data output bytes	—	RED?	A
	Preset (all bits/channel)	ALL	—	A
	Preset (all bits/page)	PST	—	—
	0 continuous bit length	ZLN	ZLN?	C
	Error addition	EAD	EAD?	C
	Error addition channel	ECH	ECH?	A
	Output	Output offset reference value	OFS	OFS?
Data output termination selection		DTM	DTM?	—
Data output display setting		SCD	SCD?	C
Data output common setting		DCM	DCM?	—
Data output amplitude		DAP	DAP?	—
Data output offset		DOS	DOS?	—
Clock output termination selection		CTM	CTM?	—
Clock output display selection		SCC	SCC?	—
Clock output common setting		CCM	CCM?	C
Clock output amplitude		CAP	CAP?	—
Clock output offset		COS	COS?	B
Clock output delay		CDL	CDL?	A
Data/Clock output ON/OFF		OON	OON?	C
Data Cross point		DCP	DCP?	C
Clock Duty		CDT	CDT?	A
Synchronous output selection	SOP	SOP?	C	

Table A.1.4-1 MP1775A device message (Cont'd)

Section	Function	Control Message	Data Request Message	Compatibility
Memory	Memory function selection	MEM	MEM?	—
	File No./ Directory mode selection	FIL	FIL?	—
	Data recall	RCL	—	—
	Data save	SAV	—	—
	Data resave	RSV	—	—
	Data delete	DEL	—	—
	FD format	FDF	—	—
	File content search	—	FSH?	—
	FD access status	—	MAC?	—
	FD error message	—	FDE?	—
Other	Initialize	INI	—	A
	Internal timer setting	RTM	RTM?	—
	PLL lock state	—	PLL?	—
	Delay state	—	DLY?	A
	Response data termination code	TRM	TRM?	A
	END event status enable register	ESE1	ESE1?	C
	END event status register	—	ESR1?	C
	ERROR event status enable register	ESE2	ESE2?	C
ERROR event status register	—	ESR2?	C	

### A.1.5 Compatibility with MP1776A

This section describes the compatibility between the MP1800A or the MT1810A commands and the MP1776A Error Detector

**Table A.1.5-1 MP1776A SCPI SENSE Subsystem**

Commands	Compatibility
:SENSE1 2 3 4:PATTERN:IMODE <mode>	A
:SENSE1 2 3 4:PATTERN:IMODE?	A
:SENSE1 2 3 4:PATTERN:TYPE <type>	B
:SENSE1 2 3 4:PATTERN:TYPE?	B
:SENSE1 2 3 4:PATTERN:PRBS:LOGIC <logic>	—
:SENSE1 2 3 4:PATTERN:PRBS:LOGIC?	—
:SENSE1 2 3 4:PATTERN:ZSUBSTITUTE:LENGTH <numeric>	A
:SENSE1 2 3 4:PATTERN:ZSUBSTITUTE:LENGTH?	A
:SENSE1 2 3 4:PATTERN:ZSUBSTITUTE:ZLENGTH <numeric>	B
:SENSE1 2 3 4:PATTERN:ZSUBSTITUTE:ZLENGTH?	B
:SENSE1 2 3 4:PATTERN:ZSUBSTITUTE:LOGIC <logic>	—
:SENSE1 2 3 4:PATTERN:ZSUBSTITUTE:LOGIC?	—
:SENSE1 2 3 4:PATTERN:DATA:WHOLE <start>,<end>,<data>	A
:SENSE1 2 3 4:PATTERN:DATA:WHOLE? <start>	A
:SENSE1 2 3 4:PATTERN:BDATA:WHOLE <start>,<end>,<bdata>	A
:SENSE1 2 3 4:PATTERN:BDATA:WHOLE? <start>	A
:SENSE1 2 3 4:PATTERN:PROGRAM:LENGTH <numeric>	—
:SENSE1 2 3 4:PATTERN:PROGRAM:LENGTH?	—
:SENSE1 2 3 4:PATTERN:PROGRAM:LOGIC <logic>	—
:SENSE1 2 3 4:PATTERN:PROGRAM:LOGIC?	—
:SENSE1 2 3 4:PATTERN:PROGRAM:DATA <page>,<start>,<data>	—
:SENSE1 2 3 4:PATTERN:PROGRAM:DATA ? <page>	—
:SENSE1 2 3 4:PATTERN:PROGRAM:FILL <range>,<page>,<data>	—
:SENSE1 2 3 4:PATTERN:SYNC:ASYNC <boolean>	A
:SENSE1 2 3 4:PATTERN:SYNC:ASYNC?	A
:SENSE1 2 3 4:PATTERN:SYNC:THRESHOLD <thre>	A
:SENSE1 2 3 4:PATTERN:SYNC:THRESHOLD?	A
:SENSE1 2 3 4:PATTERN:SYNC:PSMODE <mode>	A
:SENSE1 2 3 4:PATTERN:SYNC:PSMODE?	A
:SENSE1 2 3 4:PATTERN:SYNC:FLENGTH <numeric>	A
:SENSE1 2 3 4:PATTERN:SYNC:FLENGTH?	A
:SENSE1 2 3 4:MEASURE:START	A
:SENSE1 2 3 4:MEASURE:STOP	A
:SENSE1 2 3 4:MEASURE:EALARM:MODE <mode>	A
:SENSE1 2 3 4:MEASURE:EALARM:MODE?	A
:SENSE1 2 3 4:MEASURE:EALARM:PERIOD <d>,<h>,<m>,<s>	A
:SENSE1 2 3 4:MEASURE:EALARM:PERIOD?	A
:SENSE1 2 3 4:MEASURE:EALARM:ERROR:MODE <mode>	—
:SENSE1 2 3 4:MEASURE:EALARM:ERROR:MODE?	—
:SENSE1 2 3 4:MEASURE:EALARM:START?	—

**Table A.1.5-1 MP1776A SCPI SENSE Subsystem (Cont'd)**

Commands	Compatibility
:SENSE1 2 3 4:MEASure:EALarm:STOP?	—
:SENSE1 2 3 4:MEASure:EALarm:STATE?	—
:SENSE1 2 3 4:MEASure:EALarm:ELAPsed?	—
:SENSE1 2 3 4:MEASure:EALarm:TIMed?	—
:SENSE1 2 3 4:MEASure:EALarm:ITIME?	—
:SENSE1 2 3 4:MEASure:EALarm:ALARm? <alarm>	—
:SENSE1 2 3 4:MEASure:ASEarch:MODE <mode>	—
:SENSE1 2 3 4:MEASure:ASEarch:MODE?	—
:SENSE1 2 3 4:MEASure:ASEarch:SET <boolean>	—
:SENSE1 2 3 4:MEASure:ASEarch:SET?	—
:SENSE1 2 3 4:MEASure:ASEarch:START	A
:SENSE1 2 3 4:MEASure:ASEarch:STOP	A
:SENSE1 2 3 4:MEASure:ASEarch:STATE?	A

**Table A.1.5-2 MP1776A INPut Subsystem**

Commands	Compatibility
:INPut1 2 3 4:DATA:LEVel <level>	—
:INPut1 2 3 4:DATA:LEVel?	—
:INPut1 2 3 4:DATA:THReshold <numeric>	B
:INPut1 2 3 4:DATA:THReshold?	B
:INPut1 2 3 4:DATA:TERMination <term>	—
:INPut1 2 3 4:DATA:TERMination?	—
:INPut1 2 3 4:CLOCK:POLarity <pol>	—
:INPut1 2 3 4:CLOCK:POLarity?	—
:INPut1 2 3 4:CLOCK:DELay <numeric>	A
:INPut1 2 3 4:CLOCK:DELay?	A
:INPut1 2 3 4:CLOCK:TERMination <term>	—
:INPut1 2 3 4:CLOCK:TERMination?	—

**Table A.1.5-3 MP1776A CALCulate Subsystem**

Commands	Compatibility
:CALCulate1 2 3 4:EALarm:CLEvaluation <boolean>	A
:CALCulate1 2 3 4:EALarm:CLEvaluation?	A
:CALCulate1 2 3 4:EALarm:SLEvaluation <boolean>	A
:CALCulate1 2 3 4:EALarm:SLEvaluation?	A
:CALCulate1 2 3 4:EALarm:ERRor:INTerval <numeric>,<suffix>	A
:CALCulate1 2 3 4:EALarm:ERRor:INTerval?	A
:CALCulate1 2 3 4:EALarm:PERFormance:THReshold <string>	A
:CALCulate1 2 3 4:EALarm:PERFormance:THReshold?	A
:CALCulate1 2 3 4:DATA:EALarm? <data>,<string>:DATA	B
:CALCulate1 2 3 4:DATA:MONitor? <item>	B
:CALCulate1 2 3 4:DATA:STORe <data>	—
:CALCulate1 2 3 4:DATA:RBUFFer? <data>,<item>	—
:CALCulate1 2 3 4:DATA:CLEar <data>	—
:CALCulate1 2 3 4:DATA:OSECond? <ch>	—

**Table A.1.5-4 MP1776A OUTPut Subsystem**

Commands	Compatibility
:OUTPut1 2 3 4:SYNC:SOURce <source>	B
:OUTPut1 2 3 4:SYNC:SOURce?	B

**Table A.1.5-5 MP1776A INSTrument Subsystem**

Commands	Compatibility
:INSTrument1 2 3 4:COUPle <mode>	—
:INSTrument1 2 3 4:COUPle?	—

Table A.1.5-6 MP1776A DISPLAY Subsystem

Commands	Compatibility
:DISPlay:WINDow:TILE	—
:DISPlay:WINDow:CASCade	—
:DISPlay:WINDow:OPEN <disp>	—
:DISPlay:WINDow:OPEN?	—
:DISPlay:WINDow:CLOSE <disp>	—
:DISPlay:MFRame[:NAME] <name>	—
:DISPlay:MFRame[:NAME]?	—
:DISPlay:RESult:TIME <type>	A
:DISPlay:RESult:TIME?	A
:DISPlay:RESult:EALarm:MODE <mode>	B
:DISPlay:RESult:EALarm:MODE?	B
:DISPlay:RESult:EALarm:CH1   :CH2   :CH3   :CH4:ITEM <item>	—
:DISPlay:RESult:EALarm:CH1   :CH2   :CH3   :CH4:ITEM?	—
:DISPlay:RESult:EALarm:CH1   :CH2   :CH3   :CH4:PITem <pitem>	—
:DISPlay:RESult:EALarm:CH1   :CH2   :CH3   :CH4:PITem?	—
:DISPlay:RESult:EALarm:CH1   :CH2   :CH3   :CH4:TITem <titem>	—
:DISPlay:RESult:EALarm:CH1   :CH2   :CH3   :CH4:TITem?	—
:DISPlay:RESult:EALarm:HRESet	A

Table A.1.5-7 MP1776A SYSTem Subsystem

Commands	Compatibility
SYSTem:BEEPer:ERRor:SET <boolean>	A
SYSTem:BEEPer:ERRor:SET?	A
SYSTem:BEEPer:ERRor:CHANnel <ch>,<boolean>	—
SYSTem:BEEPer:ERRor:CHANnel? <ch>	—
SYSTem:BEEPer:ALARm:SET <boolean>	A
SYSTem:BEEPer:ALARm:SET?	A
SYSTem:BEEPer:ALARm:CHANnel <ch>,<boolean>	—
SYSTem:BEEPer:ALARm:CHANnel? <ch>	—
SYSTem:BEEPer:SYSTem:SET <boolean>	A
SYSTem:BEEPer:SYSTem:SET?	A
SYSTem:BEEPer:SYSTem:TYPE <type>,<boolean>	—
SYSTem:BEEPer:SYSTem:TYPE?	—
SYSTem:DATE <year>,<month>,<day>	—
SYSTem:DATE?	—
SYSTem:TIME <hour>,<min>,<sec>	—
SYSTem:TIME?	—
SYSTem:ERRor?	A
SYSTem:VERSion?	A
SYSTem:ORGanization:HARDware?	C
SYSTem:ORGanization:SOFTware?	—
SYSTem:MMEMory:RECall <type>,<file_name>,<ch>	C
SYSTem:MMEMory:STORe <type>,<file_name>,<ch>	C
SYSTem:MMEMory:STORe:CATalog? <drv_dir>,<type>	—
SYSTem:MEMory:INITialize	A
SYSTem:PRINt:COpy	A
SYSTem:PRINt:EALarm <item>	C
SYSTem:PRINt:PATtern <ch>,<form>,<start>,<end>	—
SYSTem:PRINt:CANCel	—

Table A.1.5-8 MP1776A STATus Subsystem

Commands	Compatibility
STATus:PRESet	A
STATus:OPERation[:EVENT]?	C
STATus:OPERation:CONDtion?	C
STATus:OPERation:ENABle <numeric>	C
STATus:OPERation:ENABle?	C
STATus:OPERation:PTRansition <numeric>	C
STATus:OPERation:PTRansition?	C
STATus:OPERation:NTRansition <numeric>	C
STATus:OPERation:NTRansition?	C
STATus:OPERation:INSTRument[:EVENT]?	—
STATus:OPERation:INSTRument:CONDtion?	—
STATus:OPERation:INSTRument:ENABle <numeric>	—
STATus:OPERation:INSTRument:ENABle?	—
STATus:OPERation:INSTRument:PTRansition <numeric>	—
STATus:OPERation:INSTRument:PTRansition?	—
STATus:OPERation:INSTRument:NTRansition <numeric>	—
STATus:OPERation:INSTRument:NTRansition?	—
STATus:QUEStionable[:EVENT]?	—
STATus:QUEStionable:ENABle <numeric>	—
STATus:QUEStionable:ENABle?	—
STATus:QUEStionable:PTRansition <numeric>	—
STATus:QUEStionable:PTRansition?	—
STATus:QUEStionable:NTRansition <numeric>	—
STATus:QUEStionable:NTRansition?	—
STATus:QUEStionable:MONitor[:EVENT]?	—
STATus:QUEStionable:MONitor:CONDtion?	—



Table A.1.5-8 MP1776A STATUS Subsystem (Cont'd)

Commands	Compatibility
STATUS:QUESTIONable:MONitor:ENABle <numeric>	—
STATUS:QUESTIONable:MONitor:ENABle?	—
STATUS:QUESTIONable:MONitor:PTRansition <numeric>	—
STATUS:QUESTIONable:MONitor:PTRansition?	—
STATUS:QUESTIONable:MONitor:NTRansition <numeric>	—
STATUS:QUESTIONable:MONitor:NTRansition?	—
STATUS:QUESTIONable:MONitor:CH1 :CH2 :CH3 :CH4 :CH1_3 :CH2_4 :CH1_4[:EVENT]?	—
STATUS:QUESTIONable:MONitor:CH1 :CH2 :CH3 :CH4 :CH1_3 :CH2_4 :CH1_4:CONDtion?	—
STATUS:QUESTIONable:MONitor:CH1 :CH2 :CH3 :CH4 :CH1_3 :CH2_4 :CH1_4:ENABle <numeric>	—
STATUS:QUESTIONable:MONitor:CH1 :CH2 :CH3 :CH4 :CH1_3 :CH2_4 :CH1_4:ENABle?	—
STATUS:QUESTIONable:MONitor:CH1 :CH2 :CH3 :CH4 :CH1_3 :CH2_4 :CH1_4:PTRansition <numeric>	—
STATUS:QUESTIONable:MONitor:CH1 :CH2 :CH3 :CH4 :CH1_3 :CH2_4 :CH1_4:PTRansition?	—
STATUS:QUESTIONable:MONitor:CH1 :CH2 :CH3 :CH4 :CH1_3 :CH2_4 :CH1_4:NTRansition <numeric>	—
STATUS:QUESTIONable:MONitor:CH1 :CH2 :CH3 :CH4 :CH1_3 :CH2_4 :CH1_4:NTRansition?	—

