Remote Control Manual

Agilent Part Number J1409-90005

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OmniBER 725

In This Book

This manual contains all the information necessary for remote control of the OmniBER 725.

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1

Methods of Remote Control

Methods of Remote Control

The OmniBER 725 can be remotely controlled in one of the following ways:

GPIB Provides a parallel interface that allows the connection of other devices to the system for example: Frequency Counter; Printer; Signal Generator. Allows great flexibility in communicating data and controlling data and provides one of the easiest methods of constructing automatic systems. If long distance communication is required, suitable GPIB Extenders must be connected within the test system at both ends of the communication link.

RS-232-C Provides a serial interface that can be connected directly to the RS-232-C port of a terminal or computer. Only the controller and the OmniBER 725 can be connected within the system. If long distance communication is required, the OmniBER 725 can be connected directly to the RS-232-C port of a Modem and controlled via a telephone line.

LAN Provides a parallel interface that allows the connection of other instruments and controllers to the system for example: workstations; other OmniBER 725's; other test sets that have a LAN interface.

DNA Provides control via a Front Panel displayed on a PC connected to a LAN. Other test sets that have the Virtual Remote capability can be connected to the LAN and controlled via the same PC. *See HP E4540A Manual, Agilent part number E4540-90004.*

UID's OmniBER Universal Instrument Drivers - please refer to the UID sales flyer (part number 5968-5608E) provided with your instrument for information on OmniBER UID's which are provided on a CD-ROM with your instrument.

Connecting the OmniBER 725 via GPIB

The following points should be considered when connecting the OmniBER 725 via GPIB:

- Operating distances
- Communication with the system controller

Operating Distances

1. The total length of GPIB cable must not exceed 2 meters (6 feet) × the number of devices in the system.

2. The total length of GPIB cable, used to interconnect all devices in the system, must not exceed 20 meters (65 feet).

Operating distances can be increased by using GPIB Extenders, as follows:

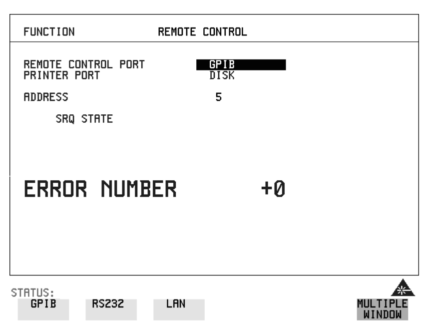
Up to 1250 meters use Agilent 37204A.

Over 1250 meters use two Agilent 37201A and two suitable Modems.

Communication with the System Controller

Each device in the system must have a unique address to allow the controller to access each one individually. On the OmniBER 725 the address is set on the OTHER display under REMOTE CONTROL:

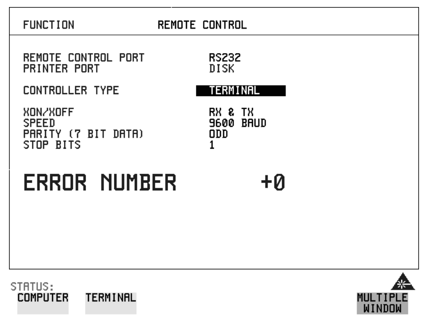
To set the GPIB Address press **OTHER**; **REMOTE CONTROL** and set the display as shown opposite. Address 5 has been selected but any Address in the range 0 to 30 can be selected.



Connecting the OmniBER 725 to RS-232-C

Remote control via RS-232-C requires that the OmniBER 725, RS-232-C interface settings match those of the terminal/computer. These settings are made on the OTHER display under REMOTE CONTROL.

Using ↑ , ↓ and the display softkeys set REMOTE CONTROL PORT [RS232]. Set CONTROLLER TYPE, XON/XOFF, SPEED, PARITY and STOP BITS to match the settings on your terminal/computer.



OmniBER 725 RS-232-C Port

The OmniBER 725 acts as DTE (Data Terminal Equipment), see Table 1-1 for a list of port connections.

The RS-232-C Port is an IBM PC style port which can be connected to a serial device using the same type of cable as would be used to connect the device to a standard IBM PC.

Table 1-1 **OmniBER 725 RS-232-C port connections**

37725 Pin #	Signal	Input/Output
1	DCD	Input
2	RXD	Input
3	TXD	Output
4	DTR	Output
5	GND	GND
6	DSR	Input
7	RTS	Output
8	CTS	Input
9	N/A	N/A

Controller Type

Two methods of controlling the OmniBER 725 via RS-232-C are available:

Terminal Simple method of control when commands are issued manually on a command by command basis.

Computer Typically used when commands are issued via a program.

Terminal Mode

Terminal mode is provided to allow the OmniBER 725 to be controlled by a "dumb" terminal and provides the following features:

When connection is established via RS-232-C the OmniBER 725 responds with a "prompt".

Characters sent to the OmniBER 725 are echoed back to the terminal.

If a mistake is made in the command, the appropriate SCPI Error Message and the "entered" command is returned to the terminal to provide a local record.

A command history buffer is provided with a capacity of 20 commands. This allows frequently used commands to be retransmitted without having to retype the command:

To list the history buffer contents type: **!l** (lower case L)
To retransmit the last Command sent type : **!!**
To retransmit a previously sent command, type: **!n** where n = the commands listed number. If "**n**" is negative, the number is relative to the last command sent.

Computer Mode

Computer mode is provided to allow the OmniBER 725 to be controlled by a computer allowing programs to be run. Unlike Terminal mode commands are not echoed back and SCPI Error Messages are not returned unless the appropriate query command is issued.

Connecting the OmniBER 725 to a LAN

The following information should be obtained from the LAN System Administrator before connecting to the LAN:

- Internet address (Example 015.144.179.145)
- Subnet Mask (Example 255.255.248.0).
- Default Gateway IP Address (Example 15.144.176.1).

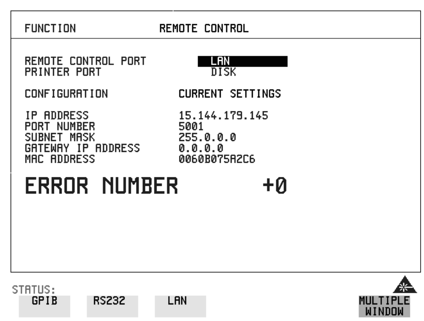
The PORT NUMBER and MAC ADDRESS are assigned to the OmniBER 725 at the time of shipment.

Connect the OmniBER 725 LAN interface to the LAN network.

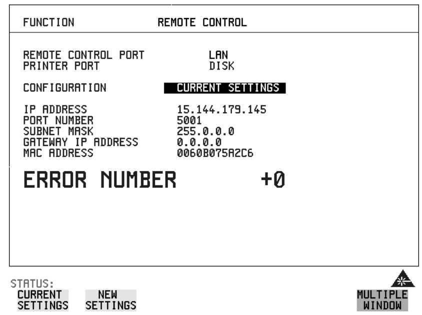
The OmniBER 725 must now be configured to accept the IP address, Subnet Mask and Default Gateway IP Address.

Press **OTHER**, **REMOTE CONTROL** and set up the display as shown opposite.

The OmniBER 725 can be configured to accept the IP address, Subnet Mask and Default Gateway IP Address in one of two ways:



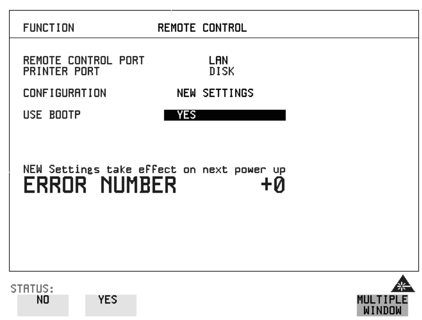
Current Settings



The IP Address, Subnet Mask and Gateway IP Address will adopt the current settings.

The Port Number and MAC Address are displayed for information.

New Settings (BOOTP)



To use BOOTP your system administrator must set up a BOOTP server on the network.

When YES is selected the power must be cycled on the OmniBER 725 to allow for a change of settings.

When power is restored the OmniBER 725 will issue BOOTP requests until it receives a reply from a suitably configured BOOTP server.

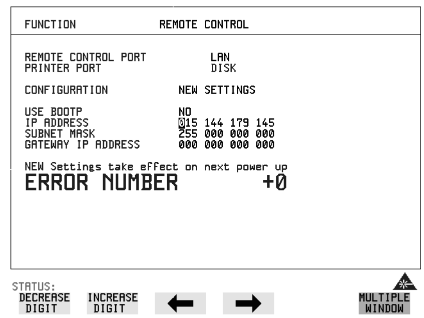
The Settings of IP Address, Subnet Mask and Gateway IP Address will be adopted as the Current Settings.

New Settings (Keyboard Entry)

Use **DECREASE DIGIT** ← → and **INCREASE DIGIT** to set the IP Address, Subnet Mask and Gateway IP Address.

Use ↑ and ↓ to move between the IP Address, Subnet Mask and Gateway IP Address.

The New Settings will not become active until the power is cycled (power off/ power on) on the OmniBER 725.



The entered New settings are checked to ensure they conform to the relationships that should exist between the IP Address, Subnet Mask and Gateway IP Address. If the entered data contravenes these relationships, the OmniBER 725 will change the data to more sensible values.

Configuration

The OmniBER 725 can only accept one tcp connection at a time and it cannot establish an outgoing call. The connection has to be directed to port 5001.

For Example (from a UNIX system):

telnet <IP address> 5001

If ping <IP address> is issued (from a UNIX system), commands issued will be echoed at the local end of the connection.

Controlling the OmniBER 725

The simplest way to verify the connection and become familiar with remote RS-232-C operation is to send a few commands and observe their effect. In this example using a terminal we will:

- Take the OmniBER 725 under remote control
- Initialize the OmniBER 725
- Read the contents of the error register
- Start a test period
- Add errors
- Obtain the result (Option dependent)
- Return the OmniBER 725 to local operation

NOTE Connect the SDH STM-1 OUT (Eletrical) port to the SDH STM-1 IN (Electrical) port for the duration of this exercise.

Table 1-2 OmniBER 725 to RS-232-C Computer

Terminal Input	Comment
:SYST:REM	Takes the OmniBER under remote control. On the instrument the indicator above LOCAL is lit.
*RST	Default settings, registers cleared.
:SYST:ERR?	The SCPI Error Message and number can be read, even in local operation mode. (+0, "No error")
:SENS:DATA:TEL:TEST :TYPE MAN	Selects a manual test period.
:SENS:DATA:TEL:TEST ON	Starts the manual test period. On the instrument the indicator above **RUN/STOP** is lit.
:SOUR:DATA:TEL:ERR :BIT ONCE	Adds a single bit error.
:SENS:DATA:TEL:TEST OFF	Halts the manual test period. On the instrument the indicator above **RUN/STOP** is extinguished.
:SENS:DATA? "ECO:BIT"	Returns the bit error count in numeric form, in this example 3.
:SYST:LOC	Returns the OmniBER 725 to local control. On the instrument the indicator above LOCAL is extinguished.

To Initialize the OmniBER 725

Regardless of the current setup the following command will initialize the OmniBER 725. It sets the OmniBER 725 to the factory default settings and clears all registers.

*RST

It is recommended that you do not rely on default settings but program each setting to what you require.

Remote Control Hints & Tips

The following section gives some Hints & Tips on how to control the OmniBER 725 via remote control. Before writing any program to control the OmniBER 725 it may help to manually go through the steps required to setup the desired configuration. The order in which you should send the corresponding SCPI commands will usually follow the order in which you set up the OmniBER 725's Front Panel. This can be seen in the Application Examples listed in the Manual. These could be used as a starting point in order to find the SCPI commands that correspond to particular OmniBER 725 Front Panel settings.

Default Settings

In general, default settings should not be assumed. It is recommended that each instrument setting should be explicitly programmed to the desired value.

Also commands that affect higher level settings such as Signal Rate or Payload Type should be sent before commands to set up lower level settings e.g. Pattern. This is because, in some cases, higher level setting changes can affect the values of lower settings.

Instrument Coupling

If you wish to set the OmniBER 725 Transmitter and Receiver to the same settings then you can save time by selecting Transmitter/Receiver Coupling and then programming the Receiver only.

To turn coupling on use the :INSTrument:COUPle RTTX command.

Error Checking

It is recommended that, when sending SCPI commands to the OmniBER 725, you also periodically send the SYSTem:ERRor? command to check for any Remote Control Errors reported by the instrument. This command returns 0, "No Error" if there are no errors in the error queue. If the SYSTem:ERRor? command is sent after every setup command then it makes debugging any reported errors much easier since you will know exactly which command caused the error.

The actual error queue within the OmniBER 725 can be cleared by sending the *CLS command.

Command Completion

When programming the instrument over RS-232, it is important to realize that a buffer (of 128 bytes) exists in the OmniBER 725 between the RS-232 port and the SCPI parser.

The effect of this is that even if the OmniBER 725 accepts the last character of a command, it cannot be assumed that it will immediately be executed - there could be several commands ahead of this one waiting in the buffer.

If you need to know when a command, or sequence of commands has been accepted by the instrument, follow them with a query command. When the response to the query command is returned, then you know that all commands prior to that have been executed.

Suitable query commands to use are *OPC? or SYST:ERRor? (which also gives the additional benefit of error checking as described above).

Note that this effect does not apply with GPIB. When GPIB is used to remotely control the OmniBER 725 then, after the last character of a SCPI command has been accepted by the instrument, its execution is imminent. However, it is still good practice to send a SYSTem:ERRor? after each command in order to check for error free completion.

Setup Delays

Even after the OmniBER 725 has accepted a SCPI command it may take some time for it to execute the requested operation (e.g. payload change, single error add). It is therefore recommended that at least 200ms is allowed after the command has completed before expecting the instrument operation to occur. One way of determining if such delays exist is to perform the desired operation manually using the OmniBER 725’s Front Panel and checking if there is any noticeable delay in execution.

Status Registers

Status registers in general are only updated every 100ms by the OmniBER 725. Therefore you should avoid reading them any faster than that since, although it does not do any harm if they are read faster, it means that less processing power will be available to update the display.

If you need to detect a status register bit that is momentarily changing state, avoid using the condition register in the hope of catching both states. Instead it is much better to program the PTRansition and NTRansition registers to catch the event of interest, and then use the event register to monitor for the event.

For example, say you wished to detect when the K1 and K2 bytes in the Multiplex Section Line Overhead of a STM-1/STS-3 signal have changed. There is a K1K2 bit defined (DB6) in the SDH2/SONet2 Status Register that is set when these bytes change value.

However, if you monitored the SDH2/SONet2 status register simply by sending the STATus:SDH2:CONDition? or STATus:SON2:CONDition? command then it is very likely that you would miss any transition in the K1K2 bit.

A better method is as follows.

Set transition filter to pass positive transitions in K1K2 (DB6)	`:STATus:SDH2:PTR 64;NTR 0`
Periodically read SDH2 event register. Periodically read SONet2 event register Check for K1K2 (DB6) being set.	`:STATus:SDH2:EVENt?` `:STATus:SONet2:EVENt?`

Using this technique you will detect any changes in the K1 and K2 bytes.

If you needed to monitor a number of status bits then using this method would not be ideal since it would have the disadvantage of having to regularly read a number of status registers. A general rule is to minimize the number of status register reads required and, to achieve this, use can be made of the Summary register. For details on how to use the Summary register and also the SRQ mechanism see Programmed Status Reporting on page 6-22.

Gating Control

There are a number of status register bits that can be used to indicate the state of the OmniBER 725's measurement system.

When you send the start gating command to the OmniBER 725 you should check the MEAS bit (DB4) in the OPERation status register. This is because the OmniBER 725 takes a finite period of time (the actual length of time can be affected by factors such as whether Stored Measurement Graphics is selected or not) to start gating. When the MEAS bit is set to one it means that the OmniBER 725 is gating.

If it is required to retrieve Short Term results while the OmniBER 725 is gating then the STP bit (DB6) in the INSTrument status register can be used to determine when short term results can read i.e. when the first short term test period has completed.

The EOT bit (DB2) in the INSTrument status register can be used to determine when the OmniBER 725 gating period is complete.

User Locks

User locks are a mechanism used within the OmniBER 725 to prevent the user selecting a particular instrument feature when some other selection takes priority. An example of this would be if you tried to modify the value of a SDH/SONET Overhead byte using the :SOURce:DATA:TELecom:SDHSONet:OVERhead:DATA command at the same time as a sequence was being generated in the same byte. If you tried to do this manually via the OmniBER 725's Front PANEL than a status message warns you that this operation is not possible. If you tried to do it via remote control then a "-200, Execution Error" would result. The solution is to switch of the particular feature (in this example sequence generation) that has priority before sending the command.

Common SCPI Command Reference

Common Commands

This chapter contains general information on SCPI commands, and detailed information on the commands that are common for all types of instrument operation, i.e. SDH, SONET and Jitter.

SCPI Command Format

Instrument functions such as making measurements, retrieving data, and querying status, are performed by stringing together SCPI "nodes" into commands. The SCPI commands are based on a hierarchical structure called a "subsystem" that comprises a top level "root" node and one or more lower-level nodes and their parameters as follows:

:INPut:TELecom:SDH:RATE <STM0> or <STM1>

:INPut is the root node
:TELecom is a second level node
:SDH is a third level node
:RATE is a fourth level node
STM0 and STM1 are parameters of the fourth-level :RATE node.

Command Syntax

Commands are shown as a mix of upper and lowercase characters.

Commands can be abbreviated for shorter program line lengths. The uppercase characters define the abbreviated form of the command.

Commands are formed by linking the root node with lower-level nodes. A colon (:) is used to link nodes.
If the command requires a parameter, a space must separate the lowest level node and the parameter. If there is more than one parameter, a comma (,) is used to separate the parameters.

An example of typical commands and their abbreviated form are shown below :

:INPut:TELecom:SDH:RATE	full form
:INP:TEL:SDH:RATE	abbreviated form
:SOURce:CLOCk:SONet:LEVel	full form
:SOUR:CLOC:SON:LEV	abbreviated form

SCPI Long Form Command Headers

The general rule for SCPI long form command headers that are greater than four characters in length is as follows:

- Abbreviated short form mnemonics - the first four characters from the long form command header are used unless the fourth character is a vowel. In such cases, the vowel is dropped and only the first three characters are used.
- If the command is four characters long then all four characters are used, irrespective of whether the fourth character is a vowel or not.

Linking Command Statements

Command statements can be linked using semicolons (;). For example :

SOURce:DATA:TELecom:SDH:TRIB1;SOURce:DATA:TELecom:SDH:
PAYLoad: ATTern

In this manual, parameters are shown in angled brackets < >. There are five parameter types used in commands as listed in table 2-1.

Table 2-1 **Parameter Types**

Parameter Types	Description
<numeric>	All commonly used decimal numbers including optional signs, decimal points, and scientific notation. Examples are 123, 123E2, –123, –1.23E2, .123, .123E2 and1.2300E–01. Special cases include MINimum and MAXimum. A numeric parameter can also be specified in hex, octal, and/or binary. Examples are #H7B, #Q173 and #B11110111.
<boolean>	A single binary condition that is either true or false. Examples are ON, OFF, 1 and 0.
<discrete>	Values that are represented by a string of alphanumeric characters. Examples are INTernal and EXTernal.
<string>	Any set of ASCII characters enclosed within single quotes or double quotes. Examples are ’1111111111111111’ and"0000000000000000".

Table 2-1 **Parameter Types, continued**

Parameter Types	Description
<block>	Used to transfer large quantities of related data. Blocks can be sent as **definite length blocks** (#<numeric><numeric>) or **indefinite length blocks** (#0).

Occasionally, a command may use more than one parameter of the same type. When this occurs, the order of the parameters used in the command will map to the order of the individual parameter descriptions.

Remote Control Commands

The remote control commands in this manual have been grouped into Sections that relate to instrument functions. These have then been split into Subsystems

The Subsystems used in the OmniBER 725 are listed in table 2-2.

Table 2-2 **SCPI Subsystems**

Instrument Functions	Subsystem
To control SIGNAL OUT port, STM-0/STS-1, STM-1/STS-3 OUT port/ Optical OUT port .	:OUTPut
To control instrument coupling.	:INSTrument
To control the transmitter.	:SOURce
To control the SIGNAL IN port, STM-0/STS-1, STM-1/STS-3 IN port/ Optical IN port.	:INPut
To control the receiver, results and graphics	:SENSe
To obtain results directly accumulated by the instrument.	:FETCh
To control the instrument OTHER functions.	:SYSTem
To control Status Reporting.	:STATus

Instrument Options

The OmniBER 725 Communications Performance Analyzer is a modular product allowing a wide range of test options to be fitted. SCPI commands with the following node names need the appropriate options to be fitted.

SDH - needs SDH option

SONET - needs SONET option

JITTER - needs Jitter option

Commands are not valid unless the correct option has been fitted e.g. **:SOURce:DATA:TELecom:SONet:VTGRoup <numeric>** only works if the SONET option is fitted.

INSTrument subsystem

The INSTrument subsystem is used to control the coupling between the transmitter and the receiver as provided on the OTHER SETTINGS CONTROL display.

:INSTrument:COUPle <mode>

<discrete> =	OFF	Independent
	RTTX	Coupled

After a reset the receiver and transmitter coupling will be OFF. If the instrument is testing and the receiver and transmitter are coupled, changing certain transmitter settings will generate an error because the coupled receiver setting cannot be changed because of testing lock.

The corresponding query returns the Coupling state in discrete form as listed above.

:INSTrument:COUPle?

Returns :	<discrete>

SOURce subsystem

The SOURce subsystem contains commands that allow the transmitter settings to be set. The commands within the SOURce subsystem have been arranged as follows:

Chapter 2	SOURce subsystem - Transmitter Common Commands			
Chapter 3	SOURce subsystem - Transmitter SDH Settings Commands	Transmit	SDH	SDH
	SOURce subsystem - Transmitter SDH OVERHEAD SETUP	Transmit	SDH	OVERHEAD SETUP
	SOURce subsystem - Transmitter SDH Test Function Commands	Transmit	SDH	TEST FUNCTION
Chapter 4	SOURce subsystem - Transmitter SONET Settings Commands	Transmit	SONET	SONET
	SOURce subsystem - Transmitter SONET OVERHEAD SETUP	Transmit	SONET	OVERHEAD SETUP
	:SOURce subsystem - Transmitter SONET Test Function Commands	Transmit	SONET	TEST FUNCTION
Chapter 5	SOURce subsystem - Transmitter Jitter Commands	Transmit	SDH	JITTER
		Transmit	SONET	JITTER

Where commands are applicable to more than one category these are included in all the applicable categories.

SOURce subsystem - Transmitter Common Commands

:SOURce:DATA:TELecom:SOURce <discrete>

<discrete> =	SDH	STM- 0/STM-1 Electrical
	SONet	STS-1/STS-3 electrical
	OPT1	STM-0/STM-1 Optical
	OC3	OC-1/OC-3
	OPT4	STM-0/STM-1/STM-4 Optical
	OC12	OC-1/OC-3/OC-12
	OPT16	STM-0/STM-1/STM-4/STM16 Optical
	OC48	OC-1/OC-3/OC-12/OC-48

Selects the output port.The output characteristics of each port are controlled by the :OUTPut subsystem.
Recommended use: This command selects which transmitter output port is in use, and also selects the TRANSMITTER OUTPUT selection on the transmitter page. The parameters refer to the physical ports on the instrument but do not select the interface rate. There are a number of different optical port parameters, one for each optical module option available. The correct optical parameter must be selected based on the optical module option fitted to the instrument.
After this command has been used to select the applicable port and interface, the interface rate commands should be used to set the required line rate. See the Associated Commands.

Associated Commands: For each parameter of this command, the command to set the interface rate is listed here.

(SDH) :OUTPut:TELecom:SDH:RATE <discrete>

(SONET) :OUTPut:TELecom:SONet:RATE <discrete>

(OPT4) :OUTPut:TELecom:OPT4:RATE <discrete>

(OPT16) :OUTPut:TELecom:OPT16:RATE <discrete>

(OC48) :OUTPut:TELecom:OC48:RATE <discrete>

:SOURce:DATA:TELecom:SOURce?

Returns :	<discrete>

:SOURce:DATA:TELecom:TFUNction <discrete>

<discrete> =	NONE	Test function off
	SDH	
	SONet	
	SDISruption	Service Disruption

Selects the transmitter test function source.

The corresponding query returns the transmitter test function source in discrete form as shown above.

:SOURce:DATA:TELecom:TFUNction?

Returns:	<discrete>

:SOURce:DATA:TELecom:ERRor:BIT <discrete>

<discrete> =	NONE	Off
	ONCE	Single Error Add
	RATE	1E-3

Selects the required bit error add rate.

This command is retained for backwards compatibility only. The recommended commands are:

- :SOURce:DATA:TELecom:SDH:ERRor:TYPE <discrete> and :SOURce:DATA:TELecom:SDH:ERRor:RATE <discrete> for SDH errors.
- :SOURce:DATA:TELecom:SONet:ERRor:TYPE <discrete> and :SOURce:DATA:TELecom:SONet:ERRor:RATE <discrete> for SONET errors.

The corresponding query returns NONE or RATE.

:SOURce:DATA:TELecom:ERRor:BIT?

Returns :	<discrete>

INPut subsystem

This subsystem controls the characteristics of the instrument’s input ports.

:INPut:TELecom:LEVel <discrete>

<discrete> =	TERMinate
	MONitor

Sets the input level for the SDH or SONET electrical input port when that port is selected by :SENSe:DATA:TELecom:SENSe <discrete> , type= SDH or SONET

The corresponding query returns the input level in discrete form, as listed above.

:INPut:TELecom:LEVel?

Returns :	<discrete>

SENSe subsystem

The SENSe subsystem contains the commands that control the Receiver. These have been arranged in the following manner:

Chapter 2	SENSe subsystem - Receiver Common Commands	
Chapter 3	SENSe subsystem - Receiver SDH Settings	Receive SDH SDH
	SENSe subsystem - Receiver SDH Test Function Commands	Receive SDH TEST FUNCTION
Chapter 4	SENSe subsystem - Receiver SONET Settings	Receive SONET SONET
	SENSe subsystem - Receiver SONET Test Function Commands	Receive SONET TEST FUNCTION
Chapter 5	SENSe subsystem - Receiver Jitter Commands	Receive JITTER
Chapter 2	SENSe subsystem - Test Timing	Receive TIMING CONTROL
	SENSe subsystem - Analysis Control	Other MISC
Chapter 3	SENSe subsystem - SDH Tributary Scan Control	Transmit SDH TEST FUNCTION
Chapter 4	SENSe subsystem - SONET Tributary Scan Control	Transmit SONET TEST FUNCTION
Chapter 3	SENSe subsystem - Result Returning Commands	Results SDH

Chapter 2

SENSe subsystem - Trouble Scan Results

SENSe subsystem - Result Returning Commands

SENSe subsystem - Configuring Stored Measurements and Graphics

SENSe subsystem - Managing Graphics Stores

SENSe subsystem - Retrieving Graphics Store Data

SENSe subsystem - Retrieving Data for a Single Graph Element

SENSe subsystem -Obtaining Graphics End of Measurement Results

SENSe subsystem - Receiver Common Commands

:SENSe:DATA:TELecom:SENSe <discrete>

<discrete> =	SDH	SDH Electrical (STM-0, STM-1)
	SONet	STS-1/STS-3
	OPT1	STM-0/STM-1 Optical
	OC3	OC-1/OC-3
	OPT4	STM-0/STM-1/STM-4 Optical
	OC12	OC-1/OC-3/OC-12
	OPT16	STM-0/STM-1/STM-4/STM-16 Optical
	OC48	OC-1/OC-3/OC-12/OC-48

Selects the input port. The input characteristics of each port are controlled by the INPut subsystem.

Recommended use: This command selects which receiver input port is in use, and also selects the top level field on the receiver page. The parameters refer to the physical ports on the instrument but do not select the interface rate. After this command has been used to select the applicable port and interface, the interface rate commands should be used to set the required line rate. See the Associated Commands. There are a number of different optical port parameters, one for each optical module option available. The correct optical parameter must be selected based on the optical module option fitted to the instrument.

Associated Commands: For each parameter of this command, the command to set that interface's rate is listed here.

(SDH) :INPut:TELecom:SDH:RATE <discrete>

(SONet) :INPut:TELecom:SONet:RATE <discrete>

(OPT16) :INPut:TELecom:OPT16:RATE <discrete>

(OC48) :INPut:TELecom:OC48:RATE <discrete>

The corresponding query returns the selected input port in discrete form, as listed above.

:SENSe:DATA:TELecom:SENSe?

Returns :	<discrete>

:SENSe:DATA:TELecom:TEST <boolean>

<boolean> =	0 or OFF	Stop the current test
	1 or ON	Start a new test

Start/Stop the test as **RUN/STOP**.

The corresponding query returns the test state as 0 or 1.

:SENSe:DATA:TELecom:TEST?

Returns :	<boolean>

:SENSe:DATA:TELecom:TFUNction <discrete>

<discrete>=	NONE	
	SDH	
	SONet	
	SDISruption	Service Disruption

Sets the Receiver test function.

The corresponding query returns the receiver test function in discrete form as listed above.

:SENSe:DATA:TELecom:TFUNction?

Returns:	<discrete>

SENSe subsystem - Test Timing

:SENSe:DATA:TELecom:TEST:TYPE <discrete>

<discrete> =	MANual	Manual Test period
	SINGle	Single Test period
	TIMed	Timed Start Test period

Selects the type of test period. If SING or TIM is selected, the duration is set using :SENS:DATA:TEL:TEST:PER. If TIM is selected, the start time is selected using :SENS:DATA:TEL:TEST:STAR.

The corresponding query returns the type of test period in discrete form, as listed above.

:SENSe:DATA:TELecom:TEST:TYPE?

Returns : <discrete>

:SENSe:DATA:TELecom:TEST:PERiod <numeric> <suffix>

<numeric> =	1 to 99	
<suffix> =	d	Days
	h	Hours
	m	Minutes
	s	Seconds

Sets the duration of the test period. Is only valid when :SENS:DATA:TEL:TEST :TYPE SING or TIM is selected.

The corresponding query returns the test duration.

:SENSe:DATA:TELecom:TEST:PERiod?

Returns : <numeric> <suffix>

:SENSe:DATA:TELecom:TEST:STARt <numeric>,<numeric>,<numeric>, <numeric>, <numeric>

<numeric> =	1970 to 2069	Year
<numeric> =	1 to 12	Month
<numeric> =	1 to 31	Day
<numeric> =	0 to 23	Hour
<numeric> =	0 to 59	Minute

Sets the test period start time when :SENS:DATA:TEL:TEST:TYPE <TIM> is selected.

The corresponding query returns the test period start time in numeric form.

:SENSe:DATA:TELecom:TEST:STARt?

Returns <numeric>,<numeric>,<numeric>,<numeric>,<numeric>

:SENSe:DATA:TELecom:STERm:PERiod <numeric> <suffix>

<numeric> =	1 to 100	
<suffix> =	s	Seconds

Sets the short term results calculation period.

The corresponding query returns the short term results period.

:SENSe:DATA:TELecom:STERm:PERiod?

Returns : <numeric> <suffix>

SENSe subsystem - Analysis Control

:SENSe:DATA:TELecom:TEST:SUSPend <boolean>

<boolean> =	0 or OFF	G821 Analysis
	1 or ON	Suspend test during Signal Loss

Sets the state of Analysis Control.

The corresponding query returns the state of Analysis Control as 0 or 1.

:SENSe:DATA:TELecom:TEST:SUSPend?

Returns :	<boolean>

SENSe subsystem - Result Returning Commands

Common Results

:SENSe:DATA? <string>

<string> =	"ETIMe"	Returns the elapsed Time
	"ASEConds:PLOSs"	Power loss
	“ASEConds:PSL”	Pattern Sync Loss

NOTE It is recommended that for Pattern Sync Loss this result is used in preference to the SDH and SONET pattern Sync Loss results, as this removes the dependency on Rx Payload selection.

SENSe subsystem - Trouble Scan Results

:SENSe:DATA:TELecom:TSCan:TYPE?

Returns:	<discrete>	NTR	No Trouble
		ADET	Alarms Detected
		ERR	Errors Detected

Returns the Trouble Scan state.

:SENSe:DATA:TELecom:TSCan:ERRors?

Returns:	<numeric>,<result>	
<numeric> =	0 to 4	Number of Troublescan error messages
<discrete> =	See Table below	Error name and number of errors

Returns the number of active Trouble Scan error messages. If no error messages are active, returns 0. If error message is active, returns the type of error and the error count separated by a comma e.g

2

BIT ERROR, 1

This indicates that 2 trouble scan error messages are active and 1 bit error has occurred.

Trouble Scan Results and Priority

SDH	RS B1 BIP MS B2 BIP PATH B3 BIP VC3 PATH BIP TU2 BIP TU12 BIP A1A2 FRAME MS FEBE/MS-REI PATH FEBE/HP-REI PATH IEC /HP-IEC VC3 PATH FEBE TU2 FEBE TU12 FEBE BIT
SONET	CV-S (B1) CV-L (B2) CV-P (B3) CV-V (V5) A1A2 FRAME CV-IEC (DSn near-end errors except BIT) REI-L REI-P REI-V BIT (DSn far-end errors)

Common System Commands

SENSe subsystem - Configuring Graphics,

SENSe subsystem - Managing Graphics Stores,

SENSe subsystem - Retrieving Graphics Store Data,

SENSe subsystem - Retrieving Data for a Single Graph,

SENSe subsystem -Obtaining Graphics End of Measurement Results,

STATus Subsystem,

SYSTem Subsystem,

IEEE common capabilities

SENSe subsystem - Configuring Stored Measurements and Graphics

:SENSe:DATA:TELecom:SMG <discrete>

<discrete> =	OFF	Storage Off
	ON or T1Second	1 Second resolution
	T1Minute	1 Minute resolution
	T15Minute	15 Minute resolution
	T1Hour	1 Hour resolution

Sets the resolution of the stored measurements and graphics (SMG).

The corresponding query returns the SMG resolution in discrete form.

:SENSe:DATA:TELecom:SMG?

Returns:	<discrete>

:SENSe:DATA:TELecom:SMG:RESolution <discrete>

<discrete> =	COMPress	Storage capacity 20,000 Events
	FULL	Storage capacity 10,000 Events

Sets the resolution of the graphics storage.

The corresponding query returns the storage resolution in discrete form.

:SENSe:DATA:TELecom:SMG:RESolution?

Returns:	<discrete>

:SENSe:DATA:TELecom:SMG:STORe <discrete>

<discrete> =	INTernal	Graphics store location
	DISK	Disk storage

Selects the storage location for the stored measurements and graphics (SMG).

The corresponding query returns the storage location in discrete form.

:SENSe:DATA:TELecom:SMG:STORe?

Returns: <discrete>

SENSe subsystem - Managing Graphics Stores

:SENSe:DATA:TELecom:SMG:CATalog?

Requests a catalogue of the SMG store data. A record, as described, is produced for each SMG store being used.

Returns: <record-1>

<record-2>

|

<record-10>

EOI

<record-n> = <numeric>,<numeric>,<numeric>,<numeric>,<numeric>, <numeric>,<numeric>,<numeric>,<numeric>

<numeric> =	-9 to 0	Graphics Store Location
<numeric> =	1	Unused
<numeric> =	1970 to 2069	Year
<numeric> =	1 to 12	Month
<numeric> =	1 to 31	Day
<numeric> =	0 to 23	Hour
<numeric> =	0 to 59	Minute
<numeric> =	1 to 20000	Number of samples in use
<numeric> =	1, 60, 900 or 3600	Sample period in seconds

:SENSe:DATA:TELecom:SMG:SIZE?

Requests the capacity of the graphics store and the number of store locations in use. The store size is a constant for a given instrument.

Returns: <numeric>,<numeric>

<numeric> =	702000	Store size
<numeric> =	0 to 702000	Stores used

:SENSe:DATA:TELecom:SMG:DELete <numeric>

<numeric> =	-9 to 0	Graphics Store Location

Deletes the given store.

:SENSe:DATA:TELecom:SMG:DELete:ALL

Deletes all stores.

:SENSe:DATA:TELecom:SMG:SINFormation? <numeric>

<numeric> =	-9 to 0	Graphics Store Location

This command returns details of the specified SMG store.

Returns: <numeric>,<discrete>,<special>,<numeric>

<numeric> =	1, 60, 900 or 3600	Sample period in seconds
<discrete> =	COMP	Compressed format
	UNCOMP	Full resolution
<special>	00:00:00 1-JAN-1970 to 23:59:59 31-DEC-2069	Start time and date
<numeric>	1 to 86400000	Seconds since start of test

SENSe subsystem - Retrieving Graphics Store Data

The data used to construct all the graphs within a given store location can be extracted from the instrument and processed by a PC. The following glossary is applicable to the commands within the following sections.

graph element: The stored graphics application presents two selectable graph elements for viewing on the display. These elements are either histograms or alarm bar graphs.

histogram : A graph element used to represent discrete counts, such as errors, versus real time. On the instrument graph display, the horizontal axis represents real time and the vertical axis represents counts obtained within that real time period.

alarm bar graph : A graph element used to represent the presence of up to eight time based events, such as alarm seconds, versus real time. On the instrument graph display, the horizontal axis represents real time and the vertical axis represents the occurrance of event(s) within that real time period.

graph label : Each graph element (histogram or alarm bar graph) is identified by a label.

alarm label : Each alarm bar graph has up to eight individual alarms/events with their own individual labels.

graph number: The ordinal value of a graph element. The total number ‘n’ and order being determined from the command:
:SENSe:DATA:TELecom:SMG:LABels? <numeric>.

:SENSe:DATA:TELecom:SMG:LABels? <numeric>

<numeric> =	-9 to 0	Graphics Store Location
	-10	Disk Storage

Returns all possible graph labels from the given SMG store even if some of those graph elements are not applicable to the particular instrument configuration at the time the measurement was made. The numerical order of the returned labels is termed the graph number and starts from ‘0’. This is used in some commands which make reference to specific graph elements by graph number.

Do not rely upon the order or the total number of these labels from one version of the instrument to the next.

Returns:	<numeric> {,<string> {,<string> {...}}}
<numeric>	Number of strings to follow.
<string>	Graph label string.

:SENSe:DATA:TELecom:SMG:HDATa:NORMal? <numeric>

<numeric> =	-9 to 0	Graphics Store Location
	-10	Disk Storage

Returns a series of numerics (histogram data) and 8 bit binary strings (alarm bar graph data), separated by commas. All results are returned even if some of those graph elements are not applicable to the particular instrument configuration at the time the measurement was made.

One complete record is returned for each SMG measurement sample in the selected store location. The ordinal position of the data within this record corresponds to the order of the graph labels obtained from :SENSe:DATA:TELecom:SMG:LABels? <numeric> :

Returns:	<record-1>	Data from sample period-1
	<record-2>	Data from sample period-2
	|	|
	<record-n>	Data from final sample period
	EOI	End of data indicator.

<record> = <numeric|string> {,<numeric|string> {,<numeric|string> {...}}}

Where each data point in the record is one of :

<numeric>	Histogram data value for sample period
<string>	Alarm bar data value for sample period.

Non-zero alarm bar graph data, e.g. "01000000", indicates that an alarm or event has occurred within the sample period.

:SENSe:DATA:TELecom:SMG:HDATa:PACKed? <numeric>

<numeric> =	-9 to 0	Graphics Store Location
	-10	Disk Storage

Returns a series of numerics (number of unchanged samples and histogram data) and 8 bit binary strings (alarm bar graph data), separated by commas. All results are returned even if some of those graph elements are not applicable to the particular instrument configuration at the time the measurement was made.

One complete record is returned for each SMG measurement sample in the selected store location unless the data in consecutive samples is the same. In that case only one record is returned and the first numeric value in each record indicates the number of SMG measurement samples in which the data was unchanged. The ordinal position of the data within this record corresponds to the order of the graph labels obtained from :SENSe:DATA:TELecom:SMG:LABels? <numeric> :

Returns:	<numeric>,<record-1>	Data from first group of <numeric> sample periods.
	<numeric>,<record-2>	Data from second group of <numeric> sample periods.
	<numeric>,<record-n>	Data from final group of <numeric> sample periods.
	EOI	End of data indicator.

<record> =

<numeric or string> {,<numeric or string> {,<numeric or string> {...}}}

Where each data point in the record is one of :

<numeric>	Histogram data value for sample period
<string>	Alarm bar data value for sample period.

Non-zero alarm bar graph data, e.g. "01000000", indicates that an alarm or event has occurred within the sample period.

:SENSe:DATA:TELecom:SMG:ALABels? <numeric>,<numeric>

<numeric> =	-9 to 0	Graphics Store Location
	-10	Disk Storage
<numeric> =	0 to n	Graph number

Requests the alarm labels from the selected SMG store and graph number.

Do not rely upon the order or the total number of these labels from one version of the instrument to the next.

Returns:	<numeric> {,<string> {,<string> {...}}}
<numeric>	Number of strings to follow.
<string>	Alarm label string.

SENSe subsystem - Retrieving Data for a Single Graph Element

The data associated with each individual graph element may be obtained using one of the following commands:

:SENSe:DATA:TELecom:SMG:EDATa? <numeric>,<numeric>

<numeric> =	-9 to 0	Graphics Store Location
	-10	Disk Storage
<numeric> =	0 to n	Graph number

Returns the number of data points that contributed to the graph element, followed by pairs of data points which include the elapsed time since the start of the measurement and either the histogram count or binary weighted alarm data value at that elapsed time.

Returns:

<numeric> {,<numeric>,<numeric> {,<numeric>,<numeric> {...}}}

<numeric> =	0 to 20,000	Number of events to follow
{ <numeric> =	1 to 86,400,000	Seconds since start of test
<numeric> } =	0 to n	Histogram count or binary weighted alarm value

:SENSe:DATA:TELecom:SMG:VDATa? <numeric>,<numeric>

<numeric> =	-9 to 0	Graphics Store Location
	-10	Disk Storage
<numeric> =	0 to n	Graph number

Returns the number of data points that contributed to the graph element, followed by pairs of data points which include the elapsed time since the start of the measurement absoluted to January 1st 1970, and either the histogram count or binary weighted alarm data value at that elapsed time.

NOTE PCs calculate time based on January 1st 1970.

Returns:

<numeric> {,<numeric>,<numeric> {,<numeric>,<numeric> {...}}}

<numeric> =	0 to 20,000	Number of data point pairs to follow
{ <numeric> =	1 to 2,147,483,647	Seconds since January 1st 1970
<numeric> } =	0 to n	Histogram count or binary weighted alarm value

:SENSe:DATA:TELecom:SMG:TINFormation? <numeric>,<numeric>

<numeric> =	-9 to 0	Graphics Store Location
	-10	Disk Storage
<numeric> =	0 to n	Graph number

Returns, for the graph element corresponding to the passed graph number, the validity, the number of samples and the type of graph element.

Returns:	<boolean> =	0 1	Graph element not valid. Graph element valid.
	<numeric> =	0 to 20000	Number of samples.
	<discrete> =	ALAR HIST	Alarm bar graph element. Histogram graph element.

SENSe subsystem -Obtaining Graphics End of Measurement Results

:SENSe:DATA:TELecom:SMG:DATA? <numeric>,<string>

<numeric> =	-9 to 0	Graphics Store Location
	-10	Disk Storage
<string> =	"ASEConds:PWL"	Power Loss seconds
	"ECOunt:SDH:FRAMe"	SDH Frame error count
	"ECOunt:SDH:RSBip"	B1 RS BIP error count
	"ECOunt:SDH:MSBip"	MS B2 BIP error count
	"ECOunt:SDH:MFEBe" or "ECOunt:SDH:MSRei"	MS FEBE/MS REI error count
	"ECOunt:SDH:PBIP"	Path B3 BIP error count
	"ECOunt:SDH:FEBE" or "ECOunt:SDH:REI"	Path FEBE/HP-REI error count
	"ECOunt:SDH:PIEC"	Path IEC error count
	"ECOunt:SDH:TRIB:FEBE" or "ECOunt:SDH:TRIB:REI"	TU FEBE/LP-REI error count
	"ECOunt:SDH:TRIB:PBIP"	TU path BIP error count
	"ERATio:SDH:FRAMe"	SDH Frame error ratio
	"ERATio:SDH:RSBip"	B1 RS BIP error ratio
	"ERATio:SDH:MSBip"	MS B2 BIP error ratio
	"ERATio:SDH:MFEBe" or "ERATio:SDH:MSRei"	MS FEBE/RS-REI error ratio
	"ERATio:SDH:PBIP"	Path B3 BIP error ratio
	"ERATio:SDH:FEBE" or "ERATio:SDH:REI"	Path FEBE/HP-REI error ratio
	"ERATio:SDH:PIEC"	Path IEC error ratio

"ERATio:SDH:TRIB:FEBE" or "ERATio:SDH:TRIB:REI"	TU FEBE/LP-REI error ratio
"ERATio:SDH:TRIB:PBIP"	TU path BIP error ratio
"PACTivity:SDH:NDFSeconds"	AU Pointer NDF seconds
"PACTivity:SDH:MNDFseconds"	AU Pointer MNDF seconds
"PACTivity:SDH:PCOunt"	AU Pointer +ve Adj Count
"PACTivity:SDH:NCOunt"	AU Pointer -ve Adj Count
"PACTivity:SDH:TRIButary:NDFSeconds"	TU Pointer NDF seconds
"PACTivity:SDH:TRIButary:MNDFseconds"	TU Pointer MNDF seconds
"PACTivity:SDH:TRIButary:PCOunt"	TU Pointer +ve Adj Count
"PACTivity:SDH:TRIButary:NCOunt"	TU Pointer -ve Adj Count
"ASEConds:SDH:PLOSs"	Power loss seconds
"ASEConds:SDH:LOS"	Loss of signal seconds
"ASEConds:SDH:LOF"	Loss of frame seconds
"ASEConds:SDH:OOF"	Out of frame seconds
"ASEConds:SDH:H4MF"	H4 multiframe loss seconds
"ASEConds:SDH:LOP"	Loss of pointer seconds
"ASEConds:SDH:MSAis"	MS AIS seconds
"ASEConds:SDH:PAIS"	Path AIS seconds
"ASEConds:SDH:PSLoss"	Pattern Sync Loss seconds
"ASEConds:SDH:MSFerf" or "ASEConds:SDH:MSRDi"	MS FERF/MS-RDI seconds
"ASEConds:SDH:K1K2"	K1K2 change seconds
"ASEConds:SDH:PFERf" or "ASEConds:SDH:RDI"	STM Path FERF/HP-RDI seconds
"ASEConds:SDH:OPSL"	Overhead Pattern Sync Loss
"ASEConds:SDH:TRIB:LOP"	TU Loss of pointer seconds
"ASEConds:SDH:TRIB:PAIS"	TU Path AIS seconds

"ASEConds:SDH:TRIB:PFERf" or "ASEConds:SDH:TRIB:RDI"	TU Path FERF/LP-RDI seconds
“ASECondS:SDH:TRIB:P1P0”	P1P0 Frame Synchronization Loss
"ECOunt:SONet:FRAMe"	SONET Frame error count
"ECOunt:SONet:CVS"	CV-S (Section B1 BIP) error count
"ECOunt:SONet:CVL"	CV-L (Section B2 BIP) error count
"ECOunt:SONet:REIL"	REI-L (Line FEBE) error count
"ECOunt:SONet:CVP"	CV-P (Path B3 BIP) error count
"ECOunt:SONet:REIP"	REI-P (Path FEBE) error count
"ECOunt:SONet:CVIec"	CV-IEC error count
"ECOunt:SONet:TRIB:REIV"	REI-V (VT FEBE) error count
"ECOunt:SONet:TRIB:CVV"	CV-V (VT path BIP) error count
"ERATio:SONet:FRAMe"	SONET Frame error ratio
"ERATio:SONet:CVS"	CV-S (Section B1 BIP) error ratio
"ERATio:SONet:CVL"	CV-L (Line B2 BIP) error ratio
"ERATio:SONet:REIL"	REI-L (Line FEBE) error ratio
"ERATio:SONet:CVP"	CV-P (Path B3 BIP) error ratio
"ERATio:SONet:REIP"	REI-P (Path FEBE) error ratio
"ERATio:SONet:CVIec"	CV-IEC error ratio
"ERATio:SONet:TRIB:REIV"	REI-V (VT FEBE) error ratio
"ERATio:SONet:TRIB:CVV"	CV-V (VT path BIP) error ratio
"PACTivity:SONet:NDFSeconds"	SPE Pointer NDF seconds
"PACTivity:SONet:MNDFseconds"	SPE Pointer MNDF seconds
"PACTivity:SONet:PCOunt"	SPE Pointer +ve Adj Count
"PACTivity:SONet:NCOunt"	SPE Pointer -ve Adj Count
"PACTivity:SONet:TRIButary:NDFSeconds"	VT Pointer NDF seconds
"PACTivity:SONet:TRIButary:MNDFseconds"	VT Pointer MNDF seconds
"PACTivity:SONet:TRIButary:PCOunt"	VT Pointer +ve Adj Count

"PACTivity:SONet:TRIButary:NCOunt"	VT Pointer -ve Adj Count
"ASEConds:SONet:PLOSs"	Power loss seconds
"ASEConds:SONet:LOS"	Loss of signal seconds
"ASEConds:SONet:LOF"	Loss of frame seconds
"ASEConds:SONet:SEF"	Severely Errored Frame Defect seconds
"ASEConds:SONet:H4MF"	H4 multiframe loss seconds
"ASEConds:SONet:LOPP"	LOP-P (Loss of pointer) seconds
"ASEConds:SONet:AISL"	AIS-L (Line AIS) seconds
"ASEConds:SONet:AISP"	AIS-P (Path AIS) seconds
"ASEConds:SONet:PSLoss"	Pattern Sync Loss seconds
"ASEConds:SONet:RDIL"	RDI-L (Line FERF) seconds
"ASEConds:SONet:K1K2"	K1K2 change seconds
"ASEConds:SONet:RDIP"	RDI-P (Path FERF) seconds
"ASEConds:SONet:OPSL"	Overhead Pattern Sync Loss
"ASEConds:SONet:TRIB:LOPV"	LOP-V (VT Loss of pointer) seconds
"ASEConds:SONet:TRIB:AISV"	AIS-V (VT Path AIS) seconds
"ASEConds:SONet:TRIB:RDIV"	RDI-V (VT Path FERF) seconds
“ASEConds:SONet:TRIB:P1P0	P1P0 Frame Synchronization Loss
“COUNt:JITT:HITS”	Jitter Hit count
“SLIPs:JITT:WANDer:FRAMe”	Estimated frame slips
“SLIPs:JITT:WANDer:BIT”	Estimated bit slips

STATus subsystem

This subsystem controls the status reporting registers. SCPI defined status registers QUEStionable, OPERation and INSTrument are provided. In addition instrument defined status registers DATA, SDH, SDH2, SDH3, SON, SON2, SON3 and JITT are provided. For detailed information on status reporting refer to Section 6 of this manual.

:STATus:CHIStory

Clear the contents of all History registers, and the front panel led history.

:STATus:PRESet

Sets all Status registers to the default state.

For each of the **<Status Registers>**'s listed in Table 6-1 (excluding the Standard Event Register) the following commands exist:

:STATus:<Status Register>:ENABle <numeric>

Sets the Event Enable register mask which allows true conditions in the Event register to be reported in the **<Status Register>**'s summary bit. If a bit is 1 in the Event Enable register and its associated event bit makes the transition to true, a positive transition will occur in the **<Status Register>**'s summary bit.

The corresponding query returns the current mask setting.

:STATus:<Status Register>:ENABle?

Returns :	<numeric>

:STATus:<Status Register>:PTRansition <numeric>

Sets the positive Transition Filter. Setting a bit in the positive Transition filter shall cause a 0 to 1 transition in the corresponding bit of the **<Status Register>**'s Condition register to cause a 1 to be written in the corresponding bit of the **<Status Register>**'s Event register.

The corresponding query returns the current setting.

:STATus:<Status Register>:PTRansition?

Returns : <numeric>

:STATus:<Status Register>:NTRansition <numeric>

Sets the negative Transition filter. Setting a bit in the negative Transition Filter shall cause a 1 to 0 transition in the corresponding bit of the **<Status Register>**'s Condition register to cause a 1 to be written in the corresponding bit of the **<Status Register>**'s Event register.

The corresponding query returns the current setting.

:STATus:<Status Register>:NTRansition?

Returns : <numeric>

:STATus:<Status Register>:EVENt?

Returns : <numeric>

Returns the contents of the Event register associated with the **<Status Register>**. Reading this register clears its contents.

:STATus:<Status Register>:CONDition?

Returns : <numeric>

Returns the contents of the Condition register associated with the **<Status Register>**. Reading this register does not clear its contents.

:STATus:<Status Register>:HISTory?

Returns : <numeric>

Returns the contents of the History register associated with the **<Status Register>**. This is in effect a latched version of the Condition register. A bit set to 1 in the Condition register will set the corresponding bit in the History register. This register is not cleared when it is read. The only time the History register is cleared is at a start of test, when **RESET HISTORY** is pressed or when the commands *RST or :STATus:CHIStory are sent.

SYSTem Subsystem

:SYSTem:WINDow<type>

Selects the display type, Single or Multiple. Selection of SINGle results in faster remote operation.

<type> =	SINGle	Selects single window display
	MULTiple	Selects multiple window display

The corresponding query returns the display type.

:SYSTem:WINDow?

Returns :	<type>

:SYSTem:DATE <year>,<month>,<day>

<year> =	<numeric>	1970 to 2069
<month> =	<numeric>	1 to 12
<day> =	<numeric>	1 to 31

Sets the date within the OTHER TIME & DATE function.

The corresponding query returns the date in numeric form.

:SYSTem:DATE?

Returns :	<year>,<month>,<day>

:SYSTem:TIME <hour>,<minute>,<second>

<hour> =	<numeric>	0 to 23
<minute> =	<numeric>	0 to 59
<second> =	<numeric>	0 to 59

Sets the time within the OTHER TIME & DATE function.

The corresponding query returns the time in numeric form.

:SYSTem:TIME?

Returns : <hour>,<minute>,<second>

:SYSTem:TRIGger <trig_source>

Where	<trig_source> =	NONE
		TXFRame
		RXFRame
		RSBip
		MSBip
		PBIP

:SYSTem:KLOCk <boolean>

<boolean> =	0 or OFF	Keyboard unlocked
	1 or ON	Keyboard locked

Selects the state of the OTHER KEYBOARD LOCK function.

The corresponding query returns the state of KEYBOARD LOCK as 0 or 1.

:SYSTem:KLOCk?

Returns : <boolean>

:SYSTem:LOCal

Set the OmniBER 725 to Local (keyboard) control.

:SYSTem:REMote

Set the HP OmniBER 725 to Remote control.

:SYSTem:PRESet

Sets the instrument to the same state as the front panel reset key (power). This command is similar to *RST but differs in that it duplicates the action of the front panel power on/off key.

:SYSTem:SERial?

The serial number is returned as a string in the form "GBnnnnnnnn". GB signifies the country of origin (Great Britain).

:SYSTem:CONF <block>

<block> =	#0 type Block

Sets the OmniBER 725 to the state defined by the Block data.

The corresponding query returns the instrument state in block form.

:SYSTem:CONF?

Returns :	#0<block>

:SYSTem:VERSion?

Requests the revision state of the SCPI remote control.

The revision state is returned in the form YYYY.V. YYYY signifies the year and V signifies the revision number.

Returns :	<version> =	YYYY.V

:SYSTem:ERRor?

Requests the OmniBER 725 remote control Error status.

The error status is returned as a numeric value and a string containing a description of the error.

Returns :	<numeric>,<string>

:SYSTem:PRINt

The current results are logged to the selected printer.

:SYSTem:PRINt:AUTO <boolean>

<boolean> =	0 or OFF
	1 or ON

Determines whether the selected results are logged to the selected logging device. If OFF is selected results can only be logged using :SYSTem:PRINt. If ON is selected further selection of :SYSTem:PRINt:PERiod <period> is required.

The corresponding query returns the logging state as 0 or 1.

:SYSTem:PRINt:AUTO?

Returns :	<boolean>

:SYSTem:PRINt:PERiod <period>

<period> =	OFF	Log at end of test
	MIN10	Log at 10 minute intervals
	HR1	Log at 1 hour intervals
	HR24	Log at 24 hour intervals
	USER	User defined Logging interval

Determines the interval at which the results are logged to the selected logging device. If anything other than OFF is selected further selection of :SYSTem:PRINt:RESults <type> is required. If USER is selected further selection of :SYSTem:PRINt:UPERiod <numeric>, <discrete> is required.

The corresponding query returns the logging interval in discrete form, as listed above.

:SYSTem:PRINt:PERiod?

Returns :	<period>

:SYSTem:PRINt:UPERiod <numeric>, <discrete>

<numeric> =	1 to 99	
<discrete> =	HR	Hours (1 - 99)
	MIN	Minutes (10 - 99)

Sets the USER defined logging period in the range 10 to 99 minutes or 1 to 99 hours.

The corresponding query returns the User defined period in numeric, discrete form, as listed above.

:SYSTem:PRINt:UPERiod?

Returns : <numeric>,<discrete>

:SYSTem:PRINt:RESults <type>

<type> =	ALL	Print All results
	SELect	Print selected results

Determines which results are logged to the selected logging device. If SEL is selected further selections of :SYSTem:PRINt:CONTent <content> , :SYSTem:PRINt:WHEN <select> and :SYSTem:PRINt:SPAN <content> are required.

The corresponding query returns the logged results selection in discrete form, as listed above.

:SYSTem:PRINt:RESults?

Returns : <type>

:SYSTem:PRINt:CONTent <content>

<content> =	ERATio	Error Ratio results
	ANALysis	Analysis results
	BOTH	Error Ratio & Analysis results

In conjunction with :SYSTem:PRINt:SPAN <content> determines the type of selected results to be logged to the selected logging device.

The corresponding query returns the result content in discrete form, as listed above.

:SYSTem:PRINt:CONTent?

Returns : <content>

:SYSTem:PRINt:SPAN <content>

<content> =	PERiod	Period results
	CUMulative	Cumulative results
	BOTH	Period & Cumulative results

In conjunction with :SYSTem:PRINt:CONTent <content> determines the type of selected results to be logged to the selected logging device.

The corresponding query returns the result content in discrete form, as listed above.

:SYSTem:PRINt:SPAN?

Returns : <content>

:SYSTem:PRINt:WHEN <select>

<select> =	ALWays	Logged at specified interval
	ECOunt	Logged if bit error count is > 0

Determines the conditions for logging results when :SYSTem:PRINt:RESults <type> is set to <SEL>.

The corresponding query returns the logging conditions in discrete form, as listed above.

:SYSTem:PRINt:WHEN?

Returns : <select>

:SYSTem:PRINt:MODE <mode>

<mode> =	NORMal	Normal print format
	COMPressed	Compressed print format

Only valid when RS232 or Parallel printer is selected. Determines the column width of the printed results.

The corresponding query returns the print mode in discrete form, as listed above.

:SYSTem:PRINt:MODE?

Returns :	<mode>

:SYSTem:SELFtest:WAVelength <discrete>

<discrete> =	NM1310	1310nm
	NM1550	1550nm

Selects the relevant optical output port to be used during selftest. Only valid for dual wavelength options (option 106).

The corresponding query returns the port selected in discrete form, as listed above

:SYSTem:PRINt:ESEConds <boolean>

<boolean> =	0 or OFF
	1 or ON

Determines whether occurrences of error seconds are logged on the selected logging device. The corresponding query returns the error second logging state as 0 or 1.

:SYSTem:PRINt:ESEConds?

Returns :	<boolean>

:SYSTem:LOGGing:DEVice <type>

<type> =	INTernal	Internal printer (option 602)
	HPIB	HPIB external printer
	RS232	RS-232-C external printer
	DISK	Internal Disc Drive
	PARallel	Centronics external printer

Selects the logging device for results logging.

The corresponding query returns the logging device selected in discrete form as listed above.

:SYSTem:LOGGing:DEVice?

Returns :	<type>

:SYSTem:PRINt:DEMand <mode>

<mode> =	RESults	Print results snapshot
	OVERhead	Print overhead snapshot
	OCAPture	Print overhead capture results
	PGRaph	Print pointer graph
	TRIBscan	Print SDH/SONET tributary scan
	SDUMp	Copies the current display to the internal disc drive
	ALMScan	Print alarm scan information

Selects the Log on Demand item to be printed.

The corresponding query returns the log on demand item selected in discrete short form.

:SYSTem:PRINt:DEMand?

Returns:	<mode>

:SYSTem:PRINt:SDUMp:DESTination <destination>

Destination=	LID	Send screen dump information to in-lid printer
	DISK	Send screen dump information to floppy disk

Selects the destination of screen dump information.

The corresponding query returns the current selection

:SYSTem:PRINt:SDUMp:COMPression <boolean>

<boolean> =	0 or OFF	Deselect compression of screen dump information
	1 or ON	Select compression of screen dump information

:SYSTem:DISK:FORMat

Format a Disk.

:SYSTem:DISK:LABel <string>

Label the disk with a string of up to 11 alphanumeric characters e.g. "SiteB 28/5"

The corresponding query returns the filename as a string.

:SYSTem:DISK:LABel?

Returns :	<string>

:SYSTem:DISK:SAVE <extension>,<filename>,<overwrite>

<extension> =	CNF	Instrument Configuration
	SMG	Stored Measurement Graphics
	PRN	Data Logging

<filename> = Up to 8 Alphanumeric character string

<overwrite> =	0	If file exists will not overwrite
	1	Will overwrite automatically

Saves required information to disk. If PRN is selected further selection of :SYSTem:DISK:SAVE:MODE <discrete> is required.

:SYSTem:DISK:SAVE:MODE <discrete>

<discrete> =	APPend	Add to file
	OVERwrite	Overwrite existing file

Designates the position within the file to which the results are saved if the file type is PRN.

The corresponding query returns the save mode in discrete form as listed above.

:SYSTem:DISK:SAVE:MODE?

Returns : <discrete>

:SYSTem:DISK:RECall <extension>,<filename>,<confirm>

<extension> =	CNF	Instrument Configuration
	SMG	Stored Measurement Graphics

<filename> = Up to 8 Alphanumeric character string

<confirm> =	0	If Option structure is different from stored configuration will not recall.
	1	Will recall stored configuration automatically.

Recalls stored measurement graphics or instrument configuration from Disk to instrument.

:SYSTem:DISK:FILE:COPY:CNF <to>,<store>,<directory>,<filename>,<overwrite>

<to> =	DISK	Copy to Disk
	MEMory	Copy to Instrument store
<store> =	1 to 4	Instrument store number

<directory> = Up to 256 Alphanumeric character string

<filename> = Up to 8 Alphanumeric character string

<overwrite> =	0	**Copying to Disk:** If file exists will not overwrite.
		Copying to Instrument: If Option structure is different from stored configuration will not copy.
	1	**Copying to Disk:** Will copy automatically.
		Copying to Instrument: Will copy automatically.

Copy instrument configuration from Disk to instrument store or from instrument store to Disk. When TO = MEMory OVERWRITE must be 1.

:SYSTem:DISK:FILE:COPY:SMG:FORMat <type>

<type> =	NORMal	Normal SMG format
	CSV	Comma Separated Variable

Sets the format of the SMG data to be copied to Disk. This should be set before the :SYST:DISK:FILE:COPY:SMG command is issued.

:SYSTem:DISK:FILE:COPY:SMG:FORMat?

Returns :	<discrete>

:SYSTem:DISK:FILE:COPY:SMG <store>,<directory>,<filename>,<overwrite>

<store> =	-9 to 0	Instrument store number

<directory> =	Up to 256 Alphanumeric character string
<filename> =	Up to 8 Alphanumeric character string

<overwrite> =	0	If file exists will not overwrite
	1	Will overwrite automatically

Copy stored measurement graphics from instrument store to Disk. Set :SYSTem:DISK:FILE:COPY:SMG:FORMat <type> to NORM or CSV before issuing this command.

:SYSTem:DISK:FILE:DELete <filename>

<filename> =	Up to 12 Alphanumeric character string including extension

:SYSTem:DISK:DIRectory:DELete

Delete current directory.

:SYSTem:DISK:FILE:REName <from_filename>,<to_dir>, <filename>, <overwrite>

<from_filename> =	Up to 12 Alphanumeric character string including extension
<to_dir> =	Up to 256 Alphanumeric character string
<to_filename> =	Up to 12 Alphanumeric character string including extension

<overwrite> =	0	If file exists will not overwrite
	1	Will overwrite automatically

Rename file. Cannot rename directories.

:SYSTem:DISK:DIRectory:CREate <filename>

<filename>	Up to 8 Alphanumeric character string

Create a directory.

:SYSTem:DISK:DIRectory? <extension>,<format>

<extension> =	ALL	List all files
	CNF	List only files with CNF extension
	SMG	List only files with SMG extension
	PRN	List only files with PRN extension
<format> =	SHORt	List file name only
	LONG	List file name, file size, date & time modified
	DESCription	list file name, file description

Returns directory list.

:SYSTem:DISK:PWD?

Returns :	<string>

Returns directory name.

:SYSTem:DISK:FREE?

Returns :	<numeric>

Returns free space on disk in bytes.

:SYSTem:DISK:CD <string>

<directory> =	"dir_name"	Up to 8 alphanumeric characters
	".."	CD to parent directory
	"\"	CD to root directory

Change directory.

:SYSTem:SSETting:LOCK <boolean>

<boolean> =	0 or OFF	Lock Off
	1 or ON	Lock On

Selects the state of OTHER Stored Settings lock.

The corresponding query returns the state of Stored Settings lock as 0 or 1.

:SYSTem:SSETting:LOCK?

Returns :	<boolean>

:SYSTem:SSETting:LABel <numeric>,<string>

<numeric> =	1 to 4	Stored Setting number
<string> =	1 to 24 characters	Stored Settings store label

Titles the Store Setting location with the contents of the string.

The corresponding query returns the title of the selected Stored Setting location as a string.

:SYSTem:SSETting:LABel? <numeric>

Returns :	<string>	1 to 24 characters

:SYSTem:BEEPer:STATe <boolean>

<boolean> =	0 or OFF	Beep Off
	1 or ON	Beep On

Selects the state of the OTHER BEEP ON ERROR function.

The corresponding query returns the state of the BEEP ON ERROR function as 0 or 1.

:SYSTem:BEEPer:STATe?

Returns :	<boolean>

IEEE common capabilities

*CLS

Clear Status - Clears all status registers and the error queue.

*ESE <numeric>

Event Status Enable - Sets the mask of the Event Status Register.

<numeric> =	1	Operation Complete
	2	Request Control
	4	Query Error
	8	Device Dependent Error
	16	Execution Error
	32	Command Error
	64	User Request
	128	Power On

*ESE?

Event Status Enable Query - Returns the current mask setting.

*ESR?

Event Status Register Query - Returns the state of the Event Status Register in numeric form.

*IDN?

Identification Query - Returns the Manufacture Name, Model Number & Name, Serial Number, Firmware Revision Number as a string. For example:-

Instrument Revision Code

"AGILENT TECHNOLOGIES, J1408 OMNIBER, GBnnnnnnnn, A.nn.nn"
GB signifies the country of origin (Great Britain). J1408 signifies jitter not fitted.J1409A signifies jitter fitted

Please use the *OPT? command to determine options installed and the instrument Line Rate.

*LRN?

Learn Query - Returns the instrument settings configuration in <#0 Block> form.

*OPC

Operation Complete - Masks the OPC bit in the Event Status Register.

*OPC?

Operation Complete Query - Returns a 1 when the OPC bit in the Event Status Register is set to 1 (true).

*OPT?

Option Identification Query - Returns the Options fitted in the instrument as a comma seperated list of option numbers. For example: B, 104, 200, returned indicates that your instrument Line Rate is 622 Mb/s and that 1310 nm, BER Analysis, Jitter Generation and Measurement, are all fitted.

Line Rate/Option/Plug-In Fitted	Returned Result
Test capability up to 2.5 Gb/s	A
Test capability up to 622 Mb/s	B
Test capability up to 155 Mb/s	C
None	0
SDH (ITU-T)	001
SONET/SDH (ANSI/ITU-T)	002
1310 nm, BER analysis	104
1550 nm, BER analysis	105
1310/1550 nm, BER analysis	106
Jitter Generation and Measurement	200
RS-232-C, GP-IB and LAN remote control interfaces	601
80-column in-lid graphics printer	602

If more than one Option/Plug-In combination is fitted a complete list is returned with each list item separated by a comma.

*PSC <numeric>

Sets the value of the Power On Status Clear flag. Controls the automatic clearing of SRQ Enable register, Standard ESR & Parallel Poll Enable register after power on. See IEE 488.2 Section 10.25.

*PSC?

Returns the status of the PSC flag.

*RCL <numeric>

Recall Stored Settings - Sets the instrument to a set of previously stored settings. Numeric is in the range 0 to 4 and determines which set of stored settings is recalled.

*RST

Set the instrument to the Default settings listed.

*SAV <numeric>

Save Stored Settings - Stores the current instrument settings. Numeric is in the range 1 to 4 and determines the store location.

*SRE <numeric>

Service Request Enable - Sets the status byte mask.

<numeric> =	8	QUES Status Summary
	16	Message Available
	32	Event Status Summary
	64	Request Service
	128	OPER Status Summary

*SRE?

Service Request Enable Query - Returns the current mask setting in numeric form.

*STB?

Status Byte Query - Returns the value of the status byte in numeric form.

***TRG**

Trigger - Not implemented on OmniBER 725 .

***TRG?**

Trigger Query - Not implemented on OmniBER 725 .

***WAI**

Wait To Continue - Not implemented on the OmniBER 725.

***TST**

Initiate Self Test

***TST?**

Self Test Query

SDH SCPI Command Reference

SDH Command Reference

SDH Command Reference

This chapter contains detailed information on the SCPI (Standard Commands for Programming Instruments) and IEEE 488.2 common commands you will use when writing programs to control your OmniBER 725 for SDH operation.

Please also refer to chapter 2 Common Commands for general information on SCPI command formats and for a list of commands that are common to SDH, SONET or Jitter operation; they are as follows:

OUTPut subsystem

This subsystem controls the characteristics of the instrument’s output ports.

:OUTPut:TELecom:SDH:RATE <discrete>

<discrete> =	STM0	STM-0 Electrical
	STM1	STM-1 Electrical

Is only valid when :SOURce:DATA:TELecom:SOURce <discrete> is set to SDH.

:OUTPut:TELecom:SDH:RATE?

Returns:	<discrete>

:OUTPut:TELecom:SDH:LEVel <discrete>

<discrete> =	XCON	450 feet simulated cable
	HIGH	0 feet simulated cable
	LOW	900 feet simulated cable

Selects the signal level for the STM-0 output.

The corresponding query returns the STM-0 signal level in discrete short form.

:OUTPut:TELecom:SDH:LEVel?

Returns:	<discrete>

:OUTPut:TELecom:OPT16:RATE <discrete>

<discrete> =	STM0	STM-0 Optical
	STM1	STM-1 Optical
	STM4	STM-4 Optical
	STM16	STM-16 Optical

Selects the output rate for the STM-0/STM-1/STM-4/STM-16 optical output port. This command is only valid when :SOURce:DATA:TELecom:SOURce <discrete> is set to OPT16.

The corresponding query returns the STM-0/STM-1/STM-4/STM-16 output rate in discrete form as listed above. If the OPT16 port is not selected, STM16 will be returned as the default.

:OUTPut:TELecom:OPT16:RATE?

Returns : <discrete>

:OUTPut:TELecom:OPT16:WAVelength <discrete>

<discrete> =	NM1310	1310 nm
	NM1550	1550 nm

Selects the wavelength of the output optical signal on the Optical module. Only valid for Dual Wavelength options.

The corresponding query returns the output optical wavelength in discrete form, as listed above.

:OUTPut:TELecom:OPT16:WAVelength?

Returns : <discrete>

:OUTPut:TELecom:OPT16:INTerface <discrete>

<discrete>	OPTical
	BINary

Selects the output interface.

The corresponding query returns the interface in discrete form.

:OUTPut:TELecom:OPT16:INTerface?

Returns: <discrete>

:OUTPut:TELecom:OPT16:INTerface:BINary:CLOCk:POLarity <discrete>

<discrete >	NORMal	Clock not inverted
	INVert	Clock inverted

Selects the polarity of the output binary clock.

The corresponding query returns the polarity of the binary clock output in discrete form.

:OUTPut:TELecom:OPT16:INTerface:BINary:CLOCk:POLarity? :

Returns :	<discrete>

:OUTPut:TELecom:OPT16:INTerface:BINary:DATA:POLarity <discrete>

<discrete>	NORMal	Data not inverted
	INVert	Data inverted

Selects the polarity of the binary data output.

The corresponding query returns the polarity of the binary data output in discrete form.

:OUTPut:TELecom:OPT16:INTerface:BINary:DATA:POLarity?

Returns : <discrete>

:OUTPut:TELecom:OPT16:LASer <boolean>

<boolean> =	0 or OFF
	1 or ON

Controls the state of the laser (ON or OFF) on the Optical module. Only valid for Dual Wavelength options.

The corresponding query returns the state of the laser as 0 or 1.

:OUTPut:TELecom:OPT16:LASer?

Returns : <boolean> 0 or 1

SOURce subsystem - Transmitter SDH Settings Commands

SDH Clock settings

:SOURce:CLOCk:SDH:SOURce <discrete>

<discrete> =	INTernal	Internal
	EXTernal	External MTS Clock/Data
	RSTM0	STM-0 Electrical
	ROPT0	STM-0 Optical
	RMON0	STM-0 Monitor
	RBIN0	STM-0 Binary
	RSTM1	STM-1 Electrical
	ROPT1	STM-1 Optical
	RMON1	STM-1 Monitor
	RBIN1	STM-1 Binary
	ROPT4	STM-4 Optical
	RMON4	STM-4 Monitor
	ROPT16	STM-16 Optical
	RBIN16	STM-16 Binary

Selects the SDH transmitter clock sync source. If the RX is set to an SDH rate, then the only received clock rate that may be selected is the one in use. This restriction does not apply if the RX is set to a non SDH rate. If EXT is selected, the Format is set using :SOURce:CLOCk:SDH:FORMat <discrete>.

The corresponding query returns the transmitter SDH clock sync source in discrete form as listed above.

:SOURce:CLOCk:SDH:SOURce?

Returns :	<discrete>

:SOURce:CLOCk:SDH:LEVel <discrete>

<discrete> =	TERMinate	Terminated
	MONitor	Monitor

Selects the transmitter SDH clock sync source level.

The corresponding query returns the transmitter SDH clock sync source level in discrete form as listed above.

:SOURce:CLOCk:SDH:LEVel?

Returns : <discrete>

:SOURce:CLOCk:SDH:FORMat <discrete>

<discrete> =	CLOCk	Clock Format
	DATA	Data Format

Selects the transmitter SDH EXT MTS clock sync source format.

The corresponding query returns the EXT MTS clock sync source format in discrete form as listed above.

:SOURce:CLOCk:SDH:FORMat?

Returns : <discrete>

:SOURce:CLOCk:SDH:FOFFset <boolean>

<boolean> =	0 or OFF
	1 or ON

Enables/disables the SDH Frequency Offset. The amount of Offset is set using :SOURce:CLOCk:SDH:FOFFset:OFFSet <numeric><suffix>.

The corresponding query returns the SDH Frequency Offset state as 0 or 1.

:SOURce:CLOCk:SDH:FOFFset?

Returns : <boolean>

:SOURce:CLOCk:SDH:FOFFset:OFFSet <numeric><suffix>

<numeric> =	-999 to +999	Parts per Million
	-0.000999 to 0.000999	% or Ratio
<suffix> =	PPM	Parts per Million
	PCT	Percentage

Sets the amount of SDH Frequency Offset when Frequency Offset is enabled by setting :SOURce:CLOCk:SDH:FOFFset <boolean> to <ON>. If Ratio is chosen as the method of specifying Offset, no suffix is required.

The corresponding query returns the amount of SDH Frequency Offset in ppm.

:SOURce:CLOCk:SDH:FOFFset:OFFSet?

Returns :	<numeric>

Unframed SDH Selection and Settings

:SOURce:DATA:TELecom:SDH:FRAMing <discrete>

<discrete>	NORMal	Normal SDH framing structure
	UNFRamed	Unframed SDH

Select the type of framing on the SDH output. This command should only be sent after the transmitter data rate has been set up.

The corresponding query returns the framing output in discrete form.

:SOURce:DATA:TELecom:SDH:FRAMing?

Returns :	<discrete>

:SOURce:DATA:TELecom:SDH:UNFRamed:ERRor:RATE <discrete>

<discrete>	NONE	No errors added
	ONCE	Single error added
	E_3	1.0E-3 error rate
	E_4	1.0E-4 error rate
	E_5	1.0E-5 error rate
	E_6	1.0E-6 error rate
	E_7	1.0E-7 error rate
	USER	User defined error rate

The corresponding query returns the framing output in discrete form.

:SOURce:DATA:TELecom:SDH:UNFRamed:ERRor:RATE <discrete>

Returns : <discrete>

:SOURce:DATA:TELecom:SDH:UNFRamed:ERRor:RATE:USER<numeric>

<discrete>	1.1E-3 to 0.1E-9	mantissa resolution 0.1, exponent resolution 1

Sets the user defined Unframed SDH bit error error add rate. Only bit errors may be generated.

The corresponding query returns the user defined rate in numeric form.

:SOURce:DATA:TELecom:SDH:UNFRamed:ERRor:RATE:USER?

Returns : <numeric>

:SOURce:DATA:TELecom:SDH:UNFRamed:ALARm <discrete>

<discrete>	NONE	No errors added
	LOS	Loss of signal

Set the alarm generation on the transmit unframed mode test function page. The corresponding query returns the alarm selected in discrete form.

SOURce:DATA:TELecom:SDH:UNFRamed:ALARm?

Returns :	<discrete>

Thru mode settings

:SOURce:DATA:TELecom:SDH:THRumode <discrete>

<discrete> =	INTernal	Select Normal SDH Mode
	THRu	Select SDH Thru Mode

Selects/Deselects SDH THRU mode.

The corresponding query returns the THRU mode state in discrete form as listed above.

:SOURce:DATA:TELecom:SDH:THRumode?

Returns : <discrete>

:SOURce:DATA:TELecom:SDH:THRumode:PAYLoad:OVERwrite <discrete>

<discrete> =	OFF	Payload Overwrite Off
	AU4	Overwrite AU-4 payload
	AU3	Overwrite AU-3 payload
	TU3	Overwrite TU-3 payload
	TU2	Overwrite TU-2 payload
	TU12	Overwrite TU-12 payload
	TU11	Overwrite TU-11 payload

Selects the type of thru-mode payload to overwrite. The payload is not overwritten until explicitly enabled by :SOURce:DATA:TELecom:SDH:THRumode:PAYLoad:OVERwrite:ENABle <boolean> .

The corresponding query returns the payload overwrite state in discrete form as listed above.

:SOURce:DATA:TELecom:SDH:THRumode:PAYLoad:OVERwrite?

Returns : <discrete>

:SOURce:DATA:TELecom:SDH:THRumode:PAYLoad:OVERwrite:ENABle <boolean>

<boolean> =	0 or OFF	
	1 or ON	

Enable the thru-mode payload overwrite.

The corresponding query returns the payload overwrite enable state in discrete form as listed above.

:SOURce:DATA:TELecom:SDH:THRumode:PAYLoad:OVERwrite:ENABle?

Returns :	<boolean>	0 or 1

:SOURce:DATA:TELecom:SDH:THRumode:COVerwrite <boolean>

<boolean> =	0 or OFF	Overhead Overwrite Off
	1 or ON	Overhead Overwrite On

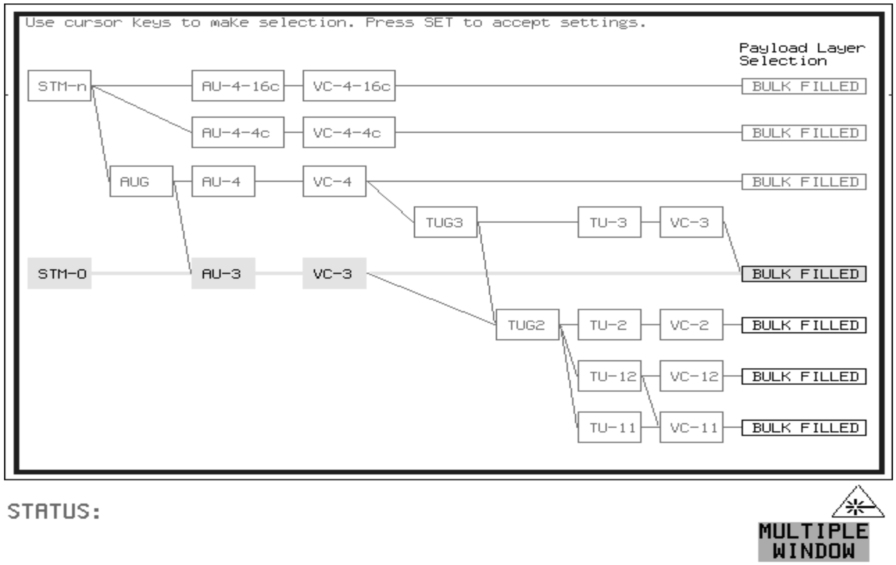
Enables/disables section overhead overwrite.

The corresponding query returns the section overhead overwrite state in discrete form as listed above.

:SOURce:DATA:TELecom:SDH:THRumode:COVerwrite?

Returns :	<boolean>

SDH Mapping Settings



:SOURce:DATA:TELecom:SDH:AU4 <numeric>

<numeric> =	1 to 16	AU-4 number.

Only valid if :OUTPut:TELecom:OPT16:RATE <discrete> is set to a rate higher than STM-1. Selects the transmitted STM-1 AU-4 that is selected for test.

The corresponding query returns the STM-1 AU-4 selected for test in numeric form, as listed above.

:SOURce:DATA:TELecom:SDH:AU4?

Returns :	<numeric>

:SOURce:DATA:TELecom:SDH:AU4C <numeric>

<numeric> =	1 to 4	AU-4-4C number.

Only valid if :OUTPut:TELecom:OPT16:RATE <discrete> is set to STM-16 and :SOURce:DATA:TELecom:SDH:AU:TYPE <discrete> is set to AU4_4C. Selects the transmitted AU-4-4C that is selected for test.

The corresponding query returns the AU-4-4C selected for test in numeric form, as listed on previous page.

:SOURce:DATA:TELecom:SDH:AU4C?

Returns : <numeric>

AU Layer Selection

:SOURce:DATA:TELecom:SDH:AU:TYPE <discrete>

<discrete> = AU4
AU3
AU4_4C
AU4_16C

Set the AU mapping into an STM-N frame.

The corresponding query returns the AU layer in discrete form as listed above.

:SOURce:DATA:TELecom:SDH:AU:TYPE?

Returns: <discrete>

:SOURce:DATA:TELecom:SDH:AU3 <numeric>

<numeric> = 1 to 3 AU3 Number

Selects the SDH Transmitter active AU3 within the AUG.

The corresponding query returns the active AU3 in numeric form.

:SOURce:DATA:TELecom:SDH:AU3?

Returns : <numeric>

TU Layer Selection

:SOURce:DATA:TELecom:SDH:PAYLoad <discrete>

<discrete> =	VC4
	VC3
	TU3
	TU12
	TU2
	TU11
	VC4_4C
	VC4_16C

This command selects the SDH transmitter mapping.

The corresponding query returns the SDH mapping in discrete form, as listed above.

:SOURce:DATA:TELecom:SDH:PAYLoad?

Returns :	<discrete>

TUG Channel

:SOURce:DATA:TELecom:SDH:TUG3 <numeric>

<numeric> =	1 to 3	TUG3 Number

Selects the SDH Transmitter active TUG3 within the AU4.

The corresponding query returns the active TUG3 in numeric form.

:SOURce:DATA:TELecom:SDH:TUG3?

Returns :	<numeric>

:SOURce:DATA:TELecom:SDH:TUG2 <numeric>

<numeric> =	1 to 7	TUG2 Number

Selects the SDH Transmitter active TUG2 within the selected TUG3 or AU3.

The corresponding query returns the active TUG2 in numeric form.

:SOURce:DATA:TELecom:SDH:TUG2?

Returns :	<numeric>

:SOURce:DATA:TELecom:SDH:TRIButary <numeric>

<numeric> =	1 to 3	Tributary Number for TU-12
	1 to 4	Tributary number for TU-11

Selects the SDH Transmitter active TU within the selected TUG2.

The corresponding query returns the active tributary in numeric form.

:SOURce:DATA:TELecom:SDH:TRIButary?

Returns :	<numeric>

TU Test Pattern

:SOURce:DATA:TELecom:SDH:PAYLoad:PATTern <discrete>

<discrete> =	PRBS9	2^9-1
	PRBS11	2^{11}-1
	PRBS15	2^{15}-1
	PRBS20	2^{20}-1
	PRBS23	2^{23}-1
	AZERo	All Zeros
	AONE	All Ones
	P1010	Word 1010
	P1000	Word 1000
	UWORd	16 Bit User Word

Selects the transmitter SDH payload data pattern.

If UWORd is selected, the word pattern is set using :SOURce:DATA:TELecom:SDH:PAYLoad:UWORd <string>.

The corresponding query returns the transmitter SDH payload data pattern in discrete form, as listed above.

:SOURce:DATA:TELecom:SDH:PAYLoad:PATTern?

Returns : <discrete>

:SOURce:DATA:TELecom:SDH:PAYLoad:UWORd <string>

Sets the SDH transmitter user word pattern in the range "0000000000000000" to "1111111111111111".

The corresponding query returns the user word pattern as a string.

:SOURce:DATA:TELecom:SDH:PAYLoad:UWORd?

Returns : <string>

:SOURce:DATA:TELecom:SDH:PRBS:POLarity <discrete>

<discrete> = INVerted
NORMal

Selects the PRBS pattern polarity.

The corresponding query returns the polarity in discrete form as listed above.

:SOURce:DATA:TELecom:SDH:PRBS:POLarity?

Returns: <discrete>

:SOURce:DATA:TELecom:SDH:TRIButary:CONCatenate <numeric>, <numeric>

<numeric> = (first parameter)	0	Concatenation Off
	2	TU2-2C
	3	TU2-3C
	4	TU2-4C
	5	TU2-5C
	6	TU2-6C
<numeric> = (second parameter)	1 to 6	TU2-2C selected
	1 to 5	TU2-3C selected
	1 to 4	TU2-4C selected
	1 to 3	TU2-5C selected
	1 to 2	TU2-6C selected

Selects the TU2 concatenation (first parameter)and starting at TU (second parameter).

The corresponding query returns the TU2 concatenation and starting at TU in numeric form as listed above.

:SOURce:DATA:TELecom:SDH:TRIButary:CONCatenate?

Returns :	<numeric>,<numeric>

Background Settings

:SOURce:DATA:TELecom:SDH:AU3:BACKground <discrete>

<discrete> =	UNEQuipped	Fixed at 00000000
	AS_FG	As Foreground

Selects the payload in the background (non test) AU-3s. This command only applies if the selected mapping is AU3.

The corresponding query returns the type of payload in the background AU-3s in discrete short form.

:SOURce:DATA:TELecom:SDH:AU3:BACKground?

Returns:	<discrete>

:SOURce:DATA:TELecom:SDH:AU4:BACKground <discrete>

<discrete> =	UNEQuipped	Fixed at 00000000
	AS_FG	As Foreground

Selects the payload in the background (non test) AU-4s. This command only applies if the selected mapping is AU4.
The corresponding query returns the type of payload in the background AU-4s in discrete short form.

:SOURce:DATA:TELecom:SDH:AU4:BACKground?

Returns:	<discrete>

:SOURce:DATA:TELecom:SDH:AU4C:BACKground <discrete>

<discrete> =	UNEQuipped	Fixed at 00000000
	AS_FG	As Foreground

Selects the payload in the background (non test) AU-4-4Cs. This command only applies if the selected mapping is AU4-4C.
The corresponding query returns the type of payload in the background AU-4-4Cs in discrete short form.

:SOURce:DATA:TELecom:SDH:AU4C:BACKground?

Returns:	<discrete>

:SOURce:DATA:TELecom:SDH:PRIMary:BACKground:PAYLoad:PATTern <discrete>

<discrete> =	PRBS9	2^9-1
	PRBS15	2^{15}-1
	NUMBered	(TU2 or framed TU12/TU11)
	P1100	word 1100

Selects the background payload pattern for TUs within the foreground TUG3 or AU3.
The corresponding query returns the background pattern in discrete form as listed above.

:SOURce:DATA:TELecom:SDH:PRIMary:BACKground:PAYLoad :PATTern?

Returns:	<discrete>

:SOURce:DATA:TELecom:SDH:TUG3:BACKground:PAYLoad:PATTern <numeric> <discrete>

<numeric> =	1 to 3	TUG 3 to be configured
<discrete>	TU3	TU-3 structure
	TU12	TU-12 structure
	UWORd	User Defined

Selects the structure in a background TUG3. This command is only valid if the selected TUG3 is not the current foreground.

The corresponding query returns the specified TUG3 background structure in discrete form as listed above.

:SOURce:DATA:TELecom:SDH:TUG3:BACKground:PAYLoad:PATTern? <numeric>

<numeric> =	1 to 3

:SOURce:DATA:TELecom:SDH:TUG3:BACKground:PAYLoad:PATTern:UWORd <numeric> <string>

<numeric> =	1 to 3	TUG 3 to be configured
<string>	8 bit	00000000 to 11111111

Sets the user pattern to be transmitted in the specified background TUG3. This command is only valid if the TUG3 selected is not the current foreground.

The corresponding query returns the background word pattern in the TUG 3 selected by numeric.

:SOURce:DATA:TELecom:SDH:TUG3:BACKground:PAYLoad:PATTern:UWORd? <numeric>

<numeric> = 1 to 3

SOURce subsystem - Transmitter SDH OVERHEAD SETUP

Lists the settings for the commands associated with the TRANSMIT OVERHEAD SETUP display.

:SOURce:DATA:TELecom:SDH:OVERhead:DEFault

Sets all overhead bytes to their default value:

Byte	Value	Byte	Value	Byte	Value	Byte	Value
A1	11110110	A2	00101000	J0/Z0	00000001	B1	xxxxxxxx
E1	00000000	F1	00000000	D1	00000000	D2	00000000
D3	00000000	E2	00000000	H1	xxxx10xx	H2	xxxxxxxx
H3	xxxxxxxx	B2	xxxxxxxx	K1	00000000	K2	00000000
D4	00000000	D5	00000000	D6	00000000	D7	00000000
D8	00000000	D9	00000000	D10	00000000	D11	00000000
D12	00000000	S1/Z1	00000000	Z2/M1	00000000	J1	Default
B3	xxxxxxxx	C2	00000001	G1	00000000	F2	00000000
H4	00000000	F3	00000000	K3	00000000	N1	00000000

:SOURce:DATA:TELecom:SDH:OVERhead:DATA <numeric>, <numeric>, <discrete>, <string>

<numeric> = (first parameter) — STM-1 Number: range 1 to 16

<numeric> = (second parameter) — Column Number: range 1 to 3

<discrete> = A1|A2|J0/Z0|E1|F1|D1|D2|D3|H1|K1
K2|D4|D5|D6|D7|D8|D9|D10|D11
D12|S1/Z1|M1/Z2|E2
X11|X12|X13|X21|X22|X23|X31|X32|X33|
X41|X42|X52|X53|X61|X62|X63|
X71|X72|X73|X81|X82|X83|X91|X92|X93

<string> = "00000000" to "11111111"

Sets the binary value for the selected transmitter section overhead byte. All overhead bytes in the transmitted signal can be configured. The required byte is specified by 3 command parameters

The first parameter, STM-1 Number, identifies an STM-1 within the signal. The acceptable range for this parameter will depend on the selected transmit signal rate. For the STM-0 signal rate only 1 is valid.

The second parameter identifies a set of columns within the selected STM-1. A Value of 1 selects Columns 1,4,&7, a value of 2 selects Columns 2,5,&8. and a value of 3 selects Columns 3,6,&9. For the STM-0 signal rate only 1 is valid.

The third parameter identifies the specific byte in the selected set of columns. There are two ways of specifying this byte. The first is to use standard names where these are valid. The set of valid names is shown in the table above. The second method is to use a "Xrc" notation, where r is the numerical value of the bytes row in the transport overhead and c is the numerical value of the bytes column in the transport overhead. This method allows access to ANY byte in the selected STM-1 / Column set.

The fourth command parameter is a 8 character string representing the binary value which should be transmitted in the specified byte.

Where a set of H1 and H2 bytes in the overhead represent an active pointer, only the SS bits in H2 can be set. In this case the fourth parameter is still specified as an 8 bit string but has the unsettable bits set to ’x’. For example, to set bits 2 and 3 to ’11’ send the value ’xxxx11xx’.

The corresponding query returns the binary value of the byte named within the selected STM-1 column.

:SOURce:DATA:TELecom:SDH:OVERhead:DATA? <numeric>, <numeric>, <discrete>

Returns :	<string>

:SOURce:DATA:TELecom:SDH:OVERhead:DATA:HEXadecimal<numeric>, <numeric>, <discrete>, <string>

<numeric> = (first parameter)	STM-1 Number: range 1 to 16
<numeric> = (second parameter)	Column Number: range 1 to 3
<discrete> =	A1|A2|J0/Z0|E1|F1|D1|D2|D3|H1|K1

	K2|D4|D5|D6|D7|D8|D9|D10|D11
	D12|S1/Z1|M1/Z2|E2
	X11|X12|X13|X21|X22|X23|X31|X32|X33|
	X41|X42|X52|X53|X61|X62|X63|
	X71|X72|X73|X81|X82|X83|X91|X92|X93
<string> =	"00" to "FF"

Sets the hexadecimal value for the selected transmitter transport overhead byte. All overhead bytes in the transmitted signal can be configured. The required byte is specified by 3 command parameters

The first parameter, STM-1 Number, identifies an STM-1 within the signal. The acceptable range for this parameter will depend on the selected transmit signal rate. For the STM-0 signal rate only 1 is valid.

The second parameter identifies a set of columns within the selected STM-1. A Value of 1 selects Columns 1,4,&7, a value of 2 selects Columns 2,5,&8. and a value of 3 selects Columns 3,6,&9. For the STM-0 signal rate only 1 is valid.

The third parameter identifies the specific byte in the selected set of columns. There are two ways of specifying this byte. The first is to use standard names where these are valid. The set of valid names is shown in the table above. The second method is to use a "Xrc" notation, where r is the numerical value of the bytes row in the transport overhead and c is the numerical value of the bytes column in the transport overhead. This method allows access to ANY byte in the selected STM-1 / Column set.

The fourth command parameter is a 2 character string representing the hex value which should be transmitted in the specified byte.

Where a set of H1 and H2 bytes in the overhead represent an active pointer, only the SS bits in H2 can be set. In this case the fourth parameter is still specified as an 2 bit string but has the unsettable nibble set to ’x’and the nibble containing the SS bits set to a value which assumes that the other 2 bits are zero. For example, to set bits 2 and 3 to ’11’ send the value ’xC’.

The corresponding query returns the hexadecimal value of the byte named within the selected STM-1 column.

:SOURce:DATA:TELecom:SDH:OVERhead:DATA:HEXadecimal? <numeric>, <numeric>, <discrete>

Returns:	<string>

:SOURce:DATA:TELecom:SDH:POVerhead:DATA <discrete>,<string>

<discrete> = C2|G1|F2|H4|Z3/F3|Z4/K3|Z5/N1|V5

<string> = "xx00xxx0" to "xx11xxx1" for V5

"00000000 to 11111111 not V5

Sets the binary value of the specified VC-4-NC/VC-4/VC-3 High Order POH overhead byte. The corresponding query returns the value of the specified STM-1 path overhead byte as a string, as described above.

:SOURce:DATA:TELecom:SDH:POVerhead:DATA? <discrete>

Returns: <string>

:SOURce:DATA:TELecom:SDH:POVerhead:SLABel <discrete>

<discrete> =	UNEQuipped	Unequipped (00000000)
	EQUipped	Equipped (00000001)
	TUGStructure	TUG structure (00000010)
	LOCKed	Locked TU (00000011)
	DQDB	DQDB (00010100)
	FDDI	FDDI (00010101)
	BULK	Bulk Filled (11111110)
	VCAis	VCAIS
	USER	User Defined

Sets the value of the HP path label (C2 Byte) of the foreground High Order POH. To update the USER byte value use the :SOURce:DATA:TELecom:SDH:POVerhead:DATA <discrete>, <string> command.

The corresponding query returns the value of the C2 byte in discrete short form.

:SOURce:DATA:TELecom:SDH:POVerhead:SLABel?

Returns: <discrete>

:SOURce:DATA:TELecom:SDH:POVerhead:J1:PATTern <discrete>

<discrete> =	DEFault	64 NULL characters
	TEST	Test Message
	USER	User Defined
	CRC7Test	GB(serial number)
	CRC7User	User Defined

Sets the type of pattern that is to be transmitted in the J1 byte of the STM path overhead. The pattern repeats every 64 characters (16 chars in CRC7 case) and is transmitted byte by byte in subsequent frames.

The corresponding query returns the type of pattern being transmitted in STM-1 path overhead byte J1 in discrete form as listed above.

:SOURce:DATA:TELecom:SDH:POVerhead:J1:PATTern?

Returns : <discrete>

:SOURce:DATA:TELecom:SDH:POVerhead:J1 <string>

Sets the user defined pattern that is to be transmitted in the J1 byte of the STM path overhead. The pattern should be 64 characters long, terminated with CR/LF. If less than 64 characters are input, the instrument will pad with the required number of NULL characters and terminate with CR/LF. The pattern repeats every 64 characters and is transmitted byte by byte in subsequent frames.

The corresponding query returns the value of the user defined pattern as a string, as defined above. If the string contains any non printing characters, ~ is substituted.
If CRC7 was returned in response to
:SOURce:DATA:TELecom:SDH:POVerhead:J1:PATTern? , this query command is not valid.

:SOURce:DATA:TELecom:SDH:POVerhead:J1?

Returns : <string>

:SOURce:DATA:TELecom:SDH:POVerhead:J1:CRC7 <string>

This command sets the CRC7 based user defined string that is to be transmitted using the J1 byte and configures the instrument to use this string. The string can be up to 15 characters in length; remaining characters are set to NULLs. A frame marker byte with CRC7 is added to this string.

The string is transmitted byte by byte in subsequent frames. The string repeats every 16 characters. The corresponding query returns the current value of the string. If the string contains any non printing characters, ~ is substituted.

:SOURce:DATA:TELecom:SDH:POVerhead:J1:CRC7?

Returns :	<string>

:SOURce:DATA:TELecom:SDH:POVerhead:J1:HEXadecimal?

Returns :	<block>

Returns a 64 byte block of data. Each byte represents the hexadecimal value of an ASCII character of STM path overhead byte J1 in the range "00" to "FF". The 64 hexadecimal numbers are preceded by the header "#264".
If CRC7 was returned in response to :SOURce:DATA:TELecom:SDH:POVerhead:J1:PATTern?, this query command is not valid.

:SOURce:DATA:TELecom:SDH:TRIButary:POVerhead:DATA <discrete>,<string>

<discrete>=	C2|G1|F2|H4|F3|K3|N1|N2|K4|V5
<string>=	00000000 to 11111111

Sets the value of the specified TU-3, TU-12 or TU-11 path overhead byte to the value specified by string (in the range "00000000" to "11111111"). The byte is specified by the first parameter. Only bits 3, 4 and 8 of V5 can be set but an 8 bit string must be sent with the unsettable bits set to x. To set bits 3, 4 and 8 to "1" send "xx11xxx1".

The value of J1 is set by :SOURce:DATA:TELecom:SDH:POVerhead:J1 <string> and :SOURce:DATA:TELecom:SDH:POVerhead:J1:PATTern <discrete>.

The corresponding query returns the byte specified by type in string form, as described above.

:SOURce:DATA:TELecom:SDH:TRIButary:POVerhead:DATA? <discrete>

Returns:	<string>

:SOURce:DATA:TELecom:SDH:OVERhead:J0:PATTern <discrete>

<discrete> =	FIXed	Fixed Byte
	TEST	GB(serial number)
	USER	User Defined

Sets the type of pattern that is to be transmitted in the J0 byte of the STM regenerator section overhead. The pattern repeats every 16 characters and is transmitted character by character in subsequent frames. Default = FIX.

The corresponding query returns the type of pattern being transmitted in overhead byte J0 in discrete short form.

:SOURce:DATA:TELecom:SDH:OVerhead:J0:PATTern?

Returns: <discrete>

:SOURce:DATA:TELecom:SDH:OVERhead:J0 <string>

Sets the user defined pattern that is to be transmitted in the J0 byte of the regenerator overhead. The pattern should be 15 characters long. The instrument automatically appends a E.164 CRC character to make up a 16 character sequence. If less than 15 characters are input, the instrument will pad with the required number of NULL characters. The pattern repeats every 16 characters and is transmitted character by character in subsequent frames.

The corresponding query returns the value of the user defined pattern as a string, as defined above. If the string contains any non printing characters, ~ is substituted. If FIXed was returned in response to:SOURce:DATA:TELecom:SDH:OVerhead:J0:PATTern?, this query command is not valid.

:SOURce:DATA:TELecom:SDH:OVerhead:J0?

Returns: <string>

:SOURce:DATA:TELecom:SDH:OVERhead:J0:HEXadecimal?

Returns:	<block>

Returns a 15 byte block of data. Each byte represents the hexadecimal value of an ASCII character "00" to "FF". The 15 hexadecimal numbers are preceded by the header "#215".
If FIXed was returned in response to :SOURce:DATA:TELecom:SDH:OVerhead:J0:PATTern?, this query command is not valid.

:SOURce:DATA:TELecom:SDH:TRIButary:POVerhead:J1:PATTern <discrete>

<discrete> =	DEFault	64 NULL characters
	TEST	Test message
	USER	User Defined
	CRC7Test	GB(serial number)
	CRC7User	User Defined

Sets the type of pattern that is to be transmitted in the J1 byte of the TU3 path overhead. The pattern repeats every 64 characters (16 chars in CRC7 case) and is transmitted byte by byte in subsequent frames.

The corresponding query returns the type of pattern being transmitted in TU3 path overhead byte J1 in discrete form as listed above.

:SOURce:DATA:TELecom:SDH:TRIButary:POVerhead:J1:PATTern?

Returns :	<discrete>

:SOURce:DATA:TELecom:SDH:TRIButary:POVerhead:J1 <string>

Sets the user defined pattern that is to be transmitted in the J1 byte of the TU3 path overhead. The pattern should be 64 characters long, terminated with CR/LF. If less than 64 characters are input, the instrument will pad with the required number of NULL characters and terminate with CR/LF. The pattern repeats every 64 characters and is transmitted byte by byte in subsequent frames.

The corresponding query returns the value of the user defined pattern as a string, as defined above. If the string contains any non printing characters, ~ is substituted.

If CRC7T or CRC7U was returned in response to :SOURce:DATA:TELecom:SDH:POVerhead:J1:PATTern?, this query command is not valid.

:SOURce:DATA:TELecom:SDH:TRIButary:POVerhead:J1?

Returns :	<string>

:SOURce:DATA:TELecom:SDH:TRIButary:POVerhead:J1:CRC7 <string>

This command sets the CRC7 based user defined string that is to be transmitted using the J1 byte of the TU3 path overhead, and configures the instrument to use this string. The string can be up to 15 characters in length; remaining characters are set to NULLs. A frame marker byte with CRC7 is added to this string. The string is transmitted byte by byte in subsequent frames. The string repeats every 16 characters. The corresponding query returns the current value of the string. If the string contains any non printing characters, ~ is substituted.

:SOURce:DATA:TELecom:SDH:TRIButary:POVerhead:J1:CRC7?

Returns :	<string>

:SOURce:DATA:TELecom:SDH:TRIButary:POVerhead:J1:HEXadecimal?

Returns :	<block>

Returns a 64 byte block of data. Each byte represents the hexadecimal value of an ASCII character of TU3 byte J1 in the range "00" to "FF". The 64 hexadecimal numbers are preceded by the header "#264".

If CRC7T or CRC7U was returned in response to :SOURce:DATA:TELecom:SDH:POVerhead:J1:PATTern?, this query command is not valid.

:SOURce:DATA:TELecom:SDH:TRIButary:POVerhead:J2:PATTern <discrete>

<discrete> =	DEFault	15 NULL characters
	TEST	GB(serial number)
	USER	User Defined
	FIXed	Fixed Byte

Sets the type of pattern that is to be transmitted in the J2 byte of the VC-2, VC-11 or VC-12 path overhead. The pattern repeats every 16 characters and is transmitted byte by byte in subsequent frames.

The corresponding query returns the type of pattern being transmitted in VC-2, VC-11 or VC-12 path overhead byte J2 in discrete form as listed above.

:SOURce:DATA:TELecom:SDH:TRIButary:POVerhead:J2:PATTern?

Returns : <discrete>

:SOURce:DATA:TELecom:SDH:TRIButary:POVerhead:J2 <string>

Sets the user defined pattern that is to be transmitted in the J2 byte of the VC-2, VC-11 or VC-12 path overhead. The pattern should be 15 characters long. If less than 15 characters are input, the instrument will pad with the required number of NULL characters and a frame marker byte with CRC7 is added to the string. The pattern repeats every 16 characters and is transmitted byte by byte in subsequent frames.

The corresponding query returns the value of the user defined pattern as a string, as defined above. If the string contains any non printing characters, ~ is substituted.

:SOURce:DATA:TELecom:SDH:TRIButary:POVerhead:J2?

Returns : <string>

:SOURce:DATA:TELecom:SDH:TRIButary:POVerhead:J2:HEXadecimal?

Returns : <block>

Returns a 16 byte block of data. Each byte represents the hexadecimal value of an ASCII character of VC-2 or VC12 byte J2 in the range "00" to "FF". The 15 hexadecimal numbers are preceded by the header "#215".

:SOURce:DATA:TELecom:SDH:TRIButary:POVerhead:J2:FIXed <string>

<string> = "00000000" to "11111111"

Sets the user defined fixed byte that is to be transmitted in the J2 byte of the VC-2, VC-11 or VC-12 path overhead. The value is a binary string.

The corresponding query returns the value of the user defined fixed byte as a binary string, as defined above.

:SOURce:DATA:TELecom:SDH:TRIButary:POVerhead:J2:FIXed?

Returns : <string>

:SOURce:DATA:TELecom:SDH:TRIButary:POVerhead:V5:SLABel <numeric>

<numeric> = 0 to 7

Sets the VC-2, VC-12 or VC-11 signal label (Byte V5) value.
The corresponding query returns the signal label value in numeric form.

:SOURce:DATA:TELecom:SDH:TRIButary:POVerhead:V5:SLABel?

Returns : <numeric>

:SOURce:DATA:TELecom:SDH:TRIButary:POVerhead:C2:SLABel <discrete>

<discrete> =	UNEQuipped	Unequipped (00000000)
	EQUipped	Equipped (00000001)
	TUGStructure	TUG structure (00000010)
	LOCKed	Locked TU (00000011)
	DQDB	DQDB (00010100)
	FDDI	FDDI (00010101)
	BULK	Bulk Filled (11111110)
	VCAis	VCAIS
	USER	User Defined

Sets the LP Path Signal Label (C2 byte) if foreground payload TU-3 into an VC-4 is selected.

The corresponding query returns the C2 byte value in discrete short form.

:SOURce:DATA:TELecom:SDH:TRIButary:POV:C2:SLABel?

Returns: <discrete>

:SOURce:DATA:TELecom:SDH:POVerhead:H4Sequence <discrete>

<discrete> =	LONG	Long Sequence
	SHORt	Short Sequence
	C0C1	COC1 Sequence

Sets the H4 path overhead byte sequence length when :SOURce:DATA:TELecom:SDH:PAYLoad <discrete> is set to TU2, TU11 or TU12.

The corresponding query returns the H4 byte sequence length in discrete form as listed above.

:SOURce:DATA:TELecom:SDH:POVerhead:H4Sequence?

Returns : <discrete>

:SOURce:DATA:TELecom:SDH:OVERhead:SBYTe <discrete>

<discrete> =	QUALunknown	(0000)
	G811	(0010)
	G812Transit	(0100)
	G812Local	(1000)
	SETS	(1011)
	DONTusesync	(1111)

Selects the SDH SYNC message type (S1 Byte Bits 5 to 8).

The corresponding query returns the Sync Message type in discrete form as listed above.

:SOURce:DATA:TELecom:SDH:OVERhead:SBYTe?

Returns : <discrete>

SOURce subsystem - Transmitter SDH Test Function Commands

:SOURce:DATA:TELecom:SDH:TFUNction:TYPE <discrete>

<discrete> =	ERRor	Errors & Alarms
	POINter	Pointer
	SEQuence	Overhead sequences
	STESt	Optical Stress
	MSPMessages	MSP messages
	IDCC	Insert Datacomm
	OBERtest	Overhead BER test

Selects the SDH transmit test function type.

The corresponding query returns the test function type in discrete form as listed above.

:SOURce:DATA:TELecom:SDH:TFUNction:TYPE?

Returns :	<discrete>

:SOURce:DATA:TELecom:SDH:ERRor:TYPE <discrete>

<discrete> =	EFRame	Entire Frame
	RSBip	Regenerator section BIP
	MSBip	Multiplexer section BIP
	MSRei	Multiplexer section FEBE
	PBIP	Path BIP
	HPRei	Path FEBE
	PIEC	Path Incoming Error Count
	TUBip	Tributary BIP

LPRei	Tributary FEBE
FRAMe	Frame

Selects SDH transmit test function error type when :SOURce:DATA:TELecom:SDH:TFUNction:TYPE <discrete>is set to ERR . Further selection of :SOURce:DATA:TELecom:SDH:ERRor:RATE <discrete> is required.

The corresponding query returns the SDH error type in discrete form as listed above.

:SOURce:DATA:TELecom:SDH:ERRor:TYPE?

Returns : <discrete>

:SOURce:DATA:TELecom:SDH:ERRor:RATE <discrete>

<discrete> =	NONE	Errors Off
	ONCE	Single Error Add, Not Frame errors
	EALL	Error All (Not Frame)
	MSPThreshold	MSP Threshold (MS Bip only)
	E_3	Line rate dependent
	E_4	All except Frame errors (Line rate dependent)
	E_5	All except Frame errors (Line rate dependent)
	E_6	All except Frame errors
	E_7	All except Frame errors
	E_8	All except Frame errors
	E_9	All except Frame errors
	USER	User error rate
	ONE	Frame Errors only
	TWO	Frame Errors only

THRee	Frame Errors only
FOUR	Frame Errors only

Selects the transmitter SDH Error rate of the error type selected by :SOURce:DATA:TELecom:SDH:ERRor:TYPE <discrete>. This command is applicable when :SOURce:DATA:TELecom:TFUNction <discrete> is set to SDH.

If bit errors are to be added to the PDH payload then :SOURce:DATA:TELecom:TFUNction <discrete> must be set to "PDH.

Associated commands:

:SOURce:DATA:TELecom:SDH:ERRor:RATE:USER <numeric>

The corresponding query returns the selected transmitter SDH error rate in discrete form, as listed above. Note that if this query returns USER, then :SOURce:DATA:TELecom:SDH:ERRor:RATE:USER? must be used to discover the currently injected error rate.

:SOURce:DATA:TELecom:SDH:ERRor:RATE?

Returns :	<discrete>

:SOURce:DATA:TELecom:SDH:ERRor:RATE:USER <numeric>

<numeric>=	9.9E-3 to 0.1E-9	mantissa resolution 0.1, exponent resolution 1

Sets the user defined SDH Error Add rate. Note that if :SOURce:DATA:TELecom:SDH:ERRor:RATE <discrete> is not already set to USER, then this command will automatically set it to USER.

Associated commands:

:SOURce:DATA:TELecom:SDH:ERRor:RATE <discrete>

Note that the maximum user defined error rate is dependent on both error type and line rate.

The corresponding query returns the user defined SDH Error Add rate in numeric form.

:SOURce:DATA:TELecom:SDH:ERRor:RATE:USER?

Returns: <numeric>

:SOURce:DATA:TELecom:SDH:ERRor:MSPThreshold:NERRors <numeric>

<numeric> =	0 to 640	for STM-0
	0 to 1920	for STM-1
	0 to 7680	for STM-4
	0 to 30720	for STM-16

Sets the number of errors for the MSP Threshold when :SOURce:DATA:TELecom:SDH:ERRor:RATE <discrete>is set to MSPT. Default = 0.

The corresponding query returns the number of errors selected for the MSP Threshold in numeric form.

:SOURce:DATA:TELecom:SDH:ERRor:MSPThreshold:NERRors?

Returns : <numeric>

:SOURce:DATA:TELecom:SDH:ERRor:MSPThreshold:EINTerval <discrete>

<discrete> =	MS10	10 milliseconds
	MS100	100 milliseconds
	S1	1 second
	S10	10 seconds
	S100	100 seconds
	S1000	1,000 seconds
	S10000	10,000 seconds

Sets the interval between MSP Threshold errors when :SOURce:DATA:TELecom:SDH:ERRor:RATE <discrete>is set to MSPT .

The corresponding query returns the MSP Threshold error interval in discrete form as listed above.

:SOURce:DATA:TELecom:SDH:ERRor:MSPThreshold:EINTerval?

Returns : <discrete>

:SOURce:DATA:TELecom:SDH:ALARm <discrete>

<discrete> =	NONE	Alarms Off
	LOS	Loss of Signal
	LOF	Loss of Frame
	OOF	Out of Frame
	MSAis	Multiplexer Section AIS
	MSRDi	Multiplexer Section FERF
	LOP	Loss of Pointer
	PAIS	Path AIS
	HPRDi	Path FERF
	PUNequipped	Path Unequipped
	TULop	TU Loss of Pointer
	TUPais	TU Path AIS
	LPRDi	TU Path FERF
	LOMultiframe	Multiframe (H4) Loss
	TUUNequipped	TU Path Unequipped

Selects the TX Test Function alarm type when :SOURce:DATA:TELecom:SDH:TFUNction:TYPE <discrete> is set to ERR.

The corresponding query returns the SDH alarm type in discrete form as listed above.

:SOURce:DATA:TELecom:SDH:ALARm?

Returns : <discrete>

:SOURce:DATA:TELecom:SDH:ALARm:SOOFrame

Generates a single Out Of Frame alarm.

:SOURce:DATA:TELecom:SDH:POINter <discrete>

<discrete> =	BURSt	Adds bursts
	NPOinter	New Pointer
	OFFSet	Adds offset in ppm
	G783	Adds G.783 sequence

Selects the Pointer adjustment type when :SOURce:DATA:TELecom:SDH:TFUNction:TYPE <discrete> is set to POIN.

The corresponding query returns the pointer adjustment type in discrete form as listed above.

:SOURce:DATA:TELecom:SDH:POINter?

Returns : <discrete>

:SOURce:DATA:TELecom:SDH:POINter:TYPE <discrete>

<discrete> =	AU
	TU

Selects the TX pointer type when :SOURce:DATA:TELecom:SDH:TFUNction:TYPE <discrete> is set to POIN.

The corresponding query returns the pointer type in discrete form as listed above.

:SOURce:DATA:TELecom:SDH:POINter:TYPE?

Returns : <discrete>

:SOURce:DATA:TELecom:SDH:POINter:DIRection <discrete>

<discrete> =	INCRement
	DECRement
	ALTernate

Selects the direction of the pointer burst adjustment when :SOURce:DATA:TELecom:SDH:TFUNction:TYPE <discrete> is set to POIN and :SOURce:DATA:TELecom:SDH:POINter <discrete> is set to BURS .

The corresponding query returns the pointer burst direction in discrete form as listed above.

:SOURce:DATA:TELecom:SDH:POINter:DIRection?

Returns :	<discrete>

:SOURce:DATA:TELecom:SDH:POINter:IDECrement <numeric>

<numeric> =	1 to 10	TU-3, AU-3, AU-4, AU-4Nc
	1 to 5	TU-2, TU-12, TU-11

Selects the number of places by which the pointer is to be incremented or decremented when :SOURce:DATA:TELecom:SDH:TFUNction:TYPE <discrete> is set to POIN and :SOURce:DATA:TELecom:SDH:POINter <discrete> is set to BURS .

The corresponding query returns the number of places in numeric form.

:SOURce:DATA:TELecom:SDH:POINter:IDECrement?

Returns :	<numeric>

:SOURce:DATA:TELecom:SDH:POINter:TRANsmitted?

Returns:	<numeric>

Returns the currently transmitted value of the AU pointer in numeric form.

:SOURce:DATA:TELecom:SDH:POINter:ACTion

Forces the new pointer value defined by :SOURce:DATA:TELecom:SDH:POINter:VALue <numeric> to be adopted.

:SOURce:DATA:TELecom:SDH:POINter:VALue <numeric>

<numeric> =	0 to 782

Selects the AU New Pointer value when :SOURce:DATA:TELecom:SDH:TFUNction:TYPE <discrete> is set to POIN and :SOURce:DATA:TELecom:SDH:POINter <discrete> is set to NPO.

The corresponding query returns the new pointer value in numeric form as listed above.

:SOURce:DATA:TELecom:SDH:POINter:VALue?

Returns :	<numeric>

:SOURce:DATA:TELecom:SDH:TRIButary:POINter:TRANsmitted?

Returns:	<numeric>

Returns the currently transmitted value of the TU pointer in numeric form.

:SOURce:DATA:TELecom:SDH:TRIButary:POINter:VALue <numeric>

<numeric> =	0 to 764	for TU-3
	0 to 427	for TU-2
	0 to 139	for TU-12
	0 to 103	for TU-11

Selects the TU New Pointer value when :SOURce:DATA:TELecom:SDH:TFUNction:TYPE <discrete> is set to POIN and :SOURce:DATA:TELecom:SDH:POINter <discrete> is set to NPO.

The corresponding query returns the new pointer value in numeric form as listed above.

:SOURce:DATA:TELecom:SDH:TRIButary:POINter:VALue?

Returns : <numeric>

:SOURce:DATA:TELecom:SDH:POINter:NPOinter <discrete>

<discrete> =	NDF	With New Data Flag
	NNDF	Without New Data Flag

Selects the type of new pointer when :SOURce:DATA:TELecom:SDH:TFUNction:TYPE <discrete> is set to POIN and :SOURce:DATA:TELecom:SDH:POINter <discrete> is set to NPO.

The corresponding query returns the type of new pointer in discrete form as listed above.

:SOURce:DATA:TELecom:SDH:POINter:NPOinter?

Returns : <discrete>

:SOURce:DATA:TELecom:SDH:POINter:ADJust

Adjust pointer to new settings if :SOURce:DATA:TELecom:SDH:POINter <discrete> is set to BURS or NPO .

:SOURce:DATA:TELecom:SDH:POINter:OFFSet <discrete>

<discrete> =	SIGNal	Line offset
	VC4	VC-4 rate offset
	TU	TU rate offset

Determines whether the Output signal rate, VC Rate or TU rate is offset.

The corresponding query returns the signal Rate, which is offset, in discrete form as listed above.

:SOURce:DATA:TELecom:SDH:POINter:OFFSet?

Returns : <discrete>

:SOURce:DATA:TELecom:SDH:POINter:OFFSet:RATE <numeric> <suffix>

<numeric> =	-100 to +100	parts per million
	-0.00010 to +0.00010	percent
<suffix> =	PPM	parts per million
	PCT	percent

Selects the amount of offset applied to the Output Signal Rate or the VC Rate or the TU Rate when :SOURce:DATA:TELecom:SDH:TFUNction:TYPE <discrete> is set to POIN and :SOURce:DATA:TELecom:SDH:POINter <discrete> is set to OFFS.

The default suffix unit is percent.

The corresponding query returns the offset in PPM.

:SOURce:DATA:TELecom:SDH:POINter:OFFSet:RATE?

Returns :	<numeric>

:SOURce:DATA:TELecom:SDH:POINter:G783 <discrete>

<discrete> =	PASingle	Periodic alternate single (a)
	WADDed	Periodic with added (b)
	WCANcelled	Periodic with cancelled (c)
	DOUBle	Periodic alternate double (d)
	RSINgle	Repeating single (e)
	RBURst	Repeating burst (f)
	RPTRansient	Repeating phase transient
	PNORmal	Periodic normal (g/h)
	PADDed	Periodic added (g/h)
	PCANcelled	Periodic cancelled (g/h)
	SINGle	(Obsolete) Set according to value of G783:SINGle

Selects the G.783 Pointer sequence adjustment type when :SOURce:DATA:TELecom:SDH:TFUNction:TYPE <discrete> is set to POIN and :SOURce:DATA:TELecom:SDH:POINter <discrete> is set to G783 .This command is only valid if an SDH option is fitted.

The corresponding query returns the G.783 adjustment type in discrete form as listed above.

:SOURce:DATA:TELecom:SDH:POINter:G783?

Returns :	<discrete>

:SOURce:DATA:TELecom:SDH:POINter:G783:SINGle <discrete>

<discrete> =	APOLarity	Periodic alternate single
	WCANcelled	With Cancelled
	WADDed	With Added

(Obsolete) Set the type of G.783 pointer sequence when :SOURce:DATA:TELecom:SDH:TFUNction:TYPE <discrete> is set to POIN and :SOURce:DATA:TELecom:SDH:POINter <discrete> is set to G783 and :SOURce:DATA:TELecom:SDH:POINter:G783 <discrete> :is set to SING.

The corresponding query returns the type in discrete form as listed above.

:SOURce:DATA:TELecom:SDH:POINter:G783:SINGle?

Returns :	<discrete>

:SOURce:DATA:TELecom:SDH:POINter:G783:PATTern <discrete>

<discrete> =	CONTinuous	No pattern
	P873	87:3 pattern
	P261	26:1 pattern

Selects the pattern of the G.783 pointer sequence when :SOURce:DATA:TELecom:SDH:TFUNction:TYPE <discrete> is set to POIN and :SOURce:DATA:TELecom:SDH:POINter <discrete> is set to G783 and :SOURce:DATA:TELecom:SDH:POINter:G783 <discrete> is set to PNOR, PADD or PCAN.

The corresponding query returns the G.783 pattern in discrete form as listed above.

:SOURce:DATA:TELecom:SDH:POINter:G783:PATTern?

Returns :	<discrete>

:SOURce:DATA:TELecom:SDH:POINter:G783:POLarity <discrete>

<discrete> =	NEGative
	POSitive

Selects the polarity of the G.783 pointer sequence when :SOURce:DATA:TELecom:SDH:TFUNction:TYPE <discrete> is set to POIN and :SOURce:DATA:TELecom:SDH:POINter <discrete> is set to G783 and :SOURce:DATA:TELecom:SDH:POINter:G783 <discrete> is set to SING . Default = NEG.

The corresponding query returns the G.783 polarity in discrete form as listed above.

:SOURce:DATA:TELecom:SDH:POINter:G783:POLarity?

Returns :	<discrete>

:SOURce:DATA:TELecom:SDH:POINter:G783:INTerval <numeric><suffix>

<numeric> =	1 to 500	See text
<suffix> =	MS	milliseconds
	S	seconds

Selects the interval between G.783 adjustments.

(AU-4, AU-4-NC, AU-3, TU-3) Range is 7.5ms, 10ms, 20ms, 30ms, 34ms, 40ms to 100ms in 10ms steps. 100 ms to 1s in 100ms steps. 1s, 2s, 5s and 10s.

(TU-2, TU-12, TU-11) Range is 200ms, 500ms, 1s, 2s, 5s and 10s.

The corresponding query returns the G.783 interval as listed above.

The default suffix unit is seconds.

:SOURce:DATA:TELecom:SDH:POINter:G783:INTerval?

Returns :	<numeric>,<suffix>

:SOURce:DATA:TELecom:SDH:POINter:G783:SEQuence <discrete>

<discrete> =	STOP	Stop the current G.783 pointer sequence
	STARt	Start a G.783 pointer sequence
	INITialize	Start a G.783 pointer sequence preceded by initialization and cooldown

Stops/Starts the G.783 pointer sequence.

The corresponding query returns the sequence start state in discrete form as listed above. See also STAT:SDH2.

:SOURce:DATA:TELecom:SDH:POINter:G783:SEQuence?

Returns :	<discrete>

:SOURce:DATA:TELecom:SDH:SEQuence <discrete>

<discrete> =	STOP	Stop current sequence
	STARt	Start new sequence

Starts/Stops a Single or Repeat run Sequence.

The corresponding query returns the Sequence mode in discrete form as listed above.

:SOURce:DATA:TELecom:SDH:SEQuence?

Returns :	<discrete>

:SOURce:DATA:TELecom:SDH:SEQuence:MODE <discrete>

<discrete> =	SINGle	Single Run
	REPeat	Repeat Run

Selects the type of SEQUENCE when :SOURce:DATA:TELecom:SDH:TFUNction:TYPE <discrete> is set to SEQ.

The corresponding query returns the type of Sequence in discrete form as listed above.

:SOURce:DATA:TELecom:SDH:SEQuence:MODE?

Returns : <discrete>

:SOURce:DATA:TELecom:SDH:SEQuence:OHBYte <discrete>

<discrete> =	A1A2 | J0 | Z0 | E1 | F1 | D1D3 | BNDA1A2|X22|X23|X32|X33	Regenerator Overhead
	K1K2 | D4D12 | S1 | Z1 | Z2 | M1 | E2	Multiplexer Overhead
	J1 | C2 | G1 | F2 | H4 | F3 | K3 | N1	Path Overhead

Selects the overhead byte into which the overhead sequence is to be inserted when :SOURce:DATA:TELecom:SDH:TFUNction:TYPE <discrete> is set to SEQ. Some of the parameters are only available in certain columns or STM-1 channels.

BNDA1A2 selects the 6 middle A1A2 boundary bytes.

The corresponding query returns the sequenced byte in discrete form as listed above.

:SOURce:DATA:TELecom:SDH:SEQuence:OHBYte?

Returns: <discrete>

:SOURce:DATA:TELecom:SDH:SEQuence:COLumn <numeric>

<numeric>	1 to 9	Column in Section overhead of byte to sequence.

Sets the column of the Section Overhead of the byte to be sequenced.

The corresponding query returns the column in numeric form.

:SOURce:DATA:TELecom:SDH:SEQuence:COLumn?

Returns: <numeric>

:SOURce:DATA:TELecom:SDH:SEQuence:CHANnel:SELect <numeric>

<numeric> = 1 to 16

Selects STM-1 number for channels that occur in more than one STM-1:

The corresponding query returns the STM-1 number in numeric form.

:SOURce:DATA:TELecom:SDH:SEQuence:CHANnel:SELect?

Returns: <numeric>

:SOURce:DATA:TELecom:SDH:SEQuence:DATA <discrete>,<string>

<discrete> = A | B | C | D | E

<string> = "00" to "FFFFFFFFFFFFFFFFFF"

Sets the Sequence data pattern for the designated block to the hexadecimal value contained in the string. The number of hexadecimal characters is dependent on the overhead byte or bytes selected. Two hexadecimal characters are required per byte, for Example:

E1 - 1 byte "00" to "FF"

D4D12 - 9 bytes "000000000000000000" to "FFFFFFFFFFFFFFFFFF"

The corresponding query returns the hexadecimal value of the designated block as a string.

:SOURce:DATA:TELecom:SDH:SEQuence:DATA? <discrete>

Returns : <string>

:SOURce:DATA:TELecom:SDH:SEQuence:ORDer <discrete>, <discrete>, <discrete>, <discrete>, <discrete>

<discrete> =	A | B | C | D | E

Selects the order of transmission for the blocks of data used in the Sequence.

The corresponding query returns the block order in discrete form as listed above.

:SOURce:DATA:TELecom:SDH:SEQuence:ORDer?

Returns :	<discrete>, <discrete>, <discrete>, <discrete>, <discrete>

:SOURce:DATA:TELecom:SDH:SEQuence:FCOunt <numeric>, <numeric>

<numeric> = (first parameter)	1 to 5	Block number
<numeric> = (second parameter)	0 to 64000	Frame count

Selects the number of frames in which the block of data, designated by the block_no, is to be transmitted.

The corresponding query returns the frame_count in numeric form.

:SOURce:DATA:TELecom:SDH:SEQuence:FCOunt? <numeric>

Returns :	<numeric>	Frame count

:SOURce:DATA:TELecom:SDH:STESt:SPATtern <discrete>

<discrete> =	AZERos	All Zero’s pattern
	AONes	All Ones pattern
	G958	G.958 sequence

Selects the pattern used in the Optical stress test when :SOURce:DATA:TELecom:SDH:TFUNction:TYPE <discrete> is set to STES.

The corresponding query returns the selected pattern in discrete form as listed above.

:SOURce:DATA:TELecom:SDH:STESt:SPATtern?

Returns : <discrete>

:SOURce:DATA:TELecom:SDH:STESt:BLENgth <numeric>

<numeric> =	2 to 85	Bytes	for STM-0
	2 to 259	Bytes	for STM-1
	2 to 1042	Bytes	for STM-4
	2 to 4174	Bytes	for STM-16

Selects the block length used in the Optical stress test when :SOURce:DATA:TELecom:SDH:TFUNction:TYPE <discrete> is set to STES.

The corresponding query returns the block length in numeric form.

:SOURce:DATA:TELecom:SDH:STESt:BLENgth?

Returns : <numeric>

:SOURce:DATA:TELecom:SDH:MSPMessages:TOPology <discrete>

<discrete> =	LINear	Linear protection
	RING	Ring protection

Selects the type of protection topology.

The corresponding query returns the selected protection topology in discrete short form.

:SOURce:DATA:TELecom:SDH:MSPMessages:TOPology?

Returns: <discrete>

:SOURce:DATA:TELecom:SDH:MSPMessages:REQuest <discrete>

<discrete> =	NREQuest	No Request (0000)
	DNRevert	Do Not Revert (0001)
	RREQuest	Reverse Request (0010)
	THRee	Not Used (0011)
	EXERcise	Exercise (0100)
	FIVE	Not Used (0101)
	WTRestore	Wait To Restore (0110)
	SEVen	Not Used (0111)
	MSWitch	Manual Switch (1000)
	NINE	Not Used (1001)
	SDLPriority	Signal Degrade Low Priority (1010)
	SDHPriority	Signal Degrade High Priority (1011)
	SFLPriority	Signal Fail Low Priority (1100)
	SFHPriority	Signal Fail High Priority (1101)
	FSWitch	Forced Switch (1110)
	LOPRotection	Lockout Of Protection (1111)

Selects the transmitter SDH MSP message to be transmitted (K1 Byte, Bits 1 to 4). Only valid if :SOURce:DATA:TELecom:TFUNction <discrete> is set to SDH and :SOURce:DATA:TELecom:SDH:TFUNction:TYPE <discrete> is set to MSPM. SDHP and SFHP are only valid when :SOURce:DATA:TELecom:SDH:MSPMessages:ARCHitecture <discrete> is set to OTN.

The corresponding query returns the selected transmitter SDH MSP message type in discrete form, as listed above.

:SOURce:DATA:TELecom:SDH:MSPMessages:REQuest?

Returns : <discrete>

:SOURce:DATA:TELecom:SDH:MSPMessages:CHANnel <numeric>

<numeric> =	0	NULL Channel
	1	Working Channel 1
	2	Working Channel 2
	3	Working Channel 3
	4	Working Channel 4
	5	Working Channel 5
	6	Working Channel 6
	7	Working Channel 7
	8	Working Channel 8
	9	Working Channel 9
	10	Working Channel 10
	11	Working Channel 11
	12	Working Channel 12
	13	Working Channel 13
	14	Working Channel 14
	15	Extra Traffic Channel

Selects the transmitter SDH MSP message channel (K1 Byte, Bits 5 to 8). Only valid if :SOURce:DATA:TELecom:TFUNction <discrete> is set to SDH and :SOURce:DATA:TELecom:SDH:TFUNction:TYPE <discrete> is set to MSPM

Working Channel 2 to 14 extra traffic channels are only valid if :SOURce:DATA:TELecom:SDH:MSPMessages:ARCHitecture <discrete> is set to OTN.

The corresponding query returns the selected transmitter SDH MSP message channel in numeric form, as listed above.

:SOURce:DATA:TELecom:SDH:MSPMessages:CHANnel?

Returns : <numeric>

:SOURce:DATA:TELecom:SDH:MSPMessages:BRIDge <string>

<string> =	"0000" to "1111"

Selects the SDH transmitter Linear MSP message bridged channel (K2 Byte, Bits 1 to 4). Only valid if :SOURce:DATA:TELecom:TFUNction <discrete> is set to SDH and :SOURce:DATA:TELecom:SDH:TFUNction:TYPE <discrete> is set to MSPM and :SOURce:DATA:TELecom:SDH:MSPMessages:TOPology <discrete> is set to LIN The corresponding query returns the MSP messages bridged channel as a string as listed above.

:SOURce:DATA:TELecom:SDH:MSPMessages:BRIDge?

Returns :	<string>

:SOURce:DATA:TELecom:SDH:MSPMessages:ARCHitecture <discrete>

<discrete> =	OTONe	1+1
	OTN	1:N

Selects the SDH transmitter Linear MSP architecture (K2 Byte, Bit 5). Only valid if :SOURce:DATA:TELecom:TFUNction <discrete> is set to SDH and :SOURce:DATA:TELecom:SDH:TFUNction:TYPE <discrete> is set to MSPM and :SOURce:DATA:TELecom:SDH:MSPMessages:TOPology <discrete> is set to LIN.

The corresponding query returns the selected transmitter SDH MSP message architecture in discrete form, as listed above.

:SOURce:DATA:TELecom:SDH:MSPMessages:ARCHitecture?

Returns :	<discrete>

:SOURce:DATA:TELecom:SDH:MSPMessages:REServed <numeric>

<numeric> =	0	000
	1	001
	2	010
	3	011
	4	100
	5	101

Selects the SDH transmitter Linear MSP messages reserved bits (K2 Byte, Bits 6 to 8) in numeric form. Only valid if :SOURce:DATA:TELecom:TFUNction <discrete> is set to SDH and :SOURce:DATA:TELecom:SDH:TFUNction:TYPE <discrete> is set to MSPM and :SOURce:DATA:TELecom:SDH:MSPMessages:TOPology <discrete> is set to LIN.

The corresponding query returns the selected transmitter SDH MSP message reserved bits in numeric form.

:SOURce:DATA:TELecom:SDH:MSPMessages:REServed?

Returns:	<numeric>

:SOURce:DATA:TELecom:SDH:MSPMessages:RCODe <discrete>

<discrete> =	NREQuest	No Request (0000)
	RRRIng	Reverse Request - Ring (0001)
	RRSPan	Reverse Request - Span (0010)
	ERINg	Exerciser - Ring (0011)
	ESPan	Exerciser - Span (0100)
	WTRestore	Wait to Restore (0101)
	MSRing	Manual Switch - Ring (0110)
	MSSPan	Manual Switch - Span (0111)
	SDRing	Signal Degrade - Ring (1000)
	SDSPan	Signal Degrade - Span (1001)
	SDPRotection	Signal Degrade - Protection (1010)
	SFRing	Signal Fail - Ring (1011)

SFSPan	Signal Fail - Span (1100)
FSRing	Forced Switch Ring (1101)
FSSPan	Forced Switch - Span(1110)
LOPRotection	Lockout Of Protection (1111)

Selects the transmitter Ring MSP message to be transmitted (K1 Byte, Bits 1 to 4). Only valid if :SOURce:DATA:TELecom:TFUNction <discrete> is set to SDH and :SOURce:DATA:TELecom:SDH:TFUNction:TYPE <discrete> is set to MSPM and topology is set to RING.

The corresponding query returns the selected transmitter SDH MSP message type in discrete short form.

:SOURce:DATA:TELecom:SDH:MSPMessages:RCODe?

Returns: <discrete>

:SOURce:DATA:TELecom:SDH:MSPMessages:DNODe <string>

<string> = "0000" to "1111"

Selects the SDH transmitter Ring MSP message destination node (K1 Byte, Bits 5 to 8). Only valid if :SOURce:DATA:TELecom:TFUNction <discrete> is set to SDH and :SOURce:DATA:TELecom:SDH:TFUNction:TYPE <discrete> is set to MSPM and :SOURce:DATA:TELecom:SDH:MSPMessages:TOPology <discrete> is set to RING.

The corresponding query returns the MSP messages destination node as a string as listed above.

:SOURce:DATA:TELecom:SDH:MSPMessages:DNODe?

Returns: <string>

:SOURce:DATA:TELecom:SDH:MSPMessages:SNODe <string>

<string> = "0000" to "1111"

Selects the SDH transmitter Ring MSP message source node (K2 Byte, Bits 1 to 4) . Only valid if :SOURce:DATA:TELecom:TFUNction <discrete> is set to SDH and :SOURce:DATA:TELecom:SDH:TFUNction:TYPE <discrete> is set to MSPM and :SOURce:DATA:TELecom:SDH:MSPMessages:TOPology <discrete> is set to RING.

The corresponding query returns the MSP messages source node as a string as listed above.

:SOURce:DATA:TELecom:SDH:MSPMessages:SNODe?

Returns: <string>

:SOURce:DATA:TELecom:SDH:MSPMessages:PCODe <discrete>

<discrete> =	SHORt	Short path
	LONG	Long path

Selects the SDH transmitter Ring MSP message path type (K2 bit 5). Only valid if :SOURce:DATA:TELecom:TFUNction <discrete> is set to SDH and :SOURce:DATA:TELecom:SDH:TFUNction:TYPE <discrete> is set to MSPM and :SOURce:DATA:TELecom:SDH:MSPMessages:TOPology <discrete> is set to RING. The corresponding query returns the Ring MSP messages path type in discrete short form.

:SOURce:DATA:TELecom:SDH:MSPMessages:PCODe?

Returns: <discrete>

:SOURce:DATA:TELecom:SDH:MSPMessages:SCODe <discrete>

<discrete> =	IDLE	Idle (000)
	BRIDged	Bridged (001)
	BASWitched	Bridged & Switched (010)
	P011	011
	P100	100
	P101	101

Selects the SDH transmitter Ring MSP messages status code (K2 Byte, Bits 6 to 8). Only valid if :SOURce:DATA:TELecom:TFUNction <discrete> is set to SDH and :SOURce:DATA:TELecom:SDH:TFUNction:TYPE <discrete> is set to MSPM and :SOURce:DATA:TELecom:SDH:MSPMessages:TOPology <discrete> is set to RING.
The corresponding query returns the selected transmitter SDH MSP message status code in discrete form as listed above.

:SOURce:DATA:TELecom:SDH:MSPMessages:SCODe?

Returns: <discrete>

:SOURce:DATA:TELecom:SDH:MSPMessages:DOWNload

Start transmission of the SDH transmitter MSP message. Only valid if

:SOURce:DATA:TELecom:TFUNction <discrete> is set to SDH and :SOURce:DATA:TELecom:SDH:TFUNction:TYPE <discrete> is set to MSPM.

:SOURce:DATA:TELecom:SDH:IDCC <discrete>

<discrete> =	RDCC	Regenerator DCC
	MDCC	Multiplexer DCC

Selects the Data Communication Channel Insert port when :SOURce:DATA:TELecom:SDH:TFUNction:TYPE <discrete> is set to IDCC . The corresponding query returns the selected port in discrete form as listed above.

:SOURce:DATA:TELecom:SDH:IDCC?

Returns : <discrete>

:SOURce:DATA:TELecom:SDH:OBERtest:CHANnel <discrete>

<discrete> =	C1/J0|Z0|E1|F1|D1|D2|D3|	Regenerator Overhead
	K1|K2|D4|D5|D6|D7|	Multiplexer Overhead
	D8|D9|D10|D11|D12|X22|X23|X32|X33	Multiplexer Overhead
	S1/Z1|Z1|M1/Z2|E2|	Multiplexer Overhead
	J1|C2|G1|F2|H4|Z3/F3|Z4/K3|Z5/N1	Path Overhead

Selects the TX overhead byte used for the overhead BER test when :SOURce:DATA:TELecom:SDH:TFUNction:TYPE <discrete> is set to OBER.

The corresponding query returns the overhead byte identity in discrete form as listed above.

:SOURce:DATA:TELecom:SDH:OBERtest:CHANnel?

Returns	<discrete>

:SOURce:DATA:TELecom:SDH:OBERtest:CHANnel:SELect <numeric>

<numeric> =	1-16

Selects STM-1 number for channels that occur in more than one STM-1.

The corresponding query returns the STM-1 number in numeric form.

The command is only valid if :SOURce:DATA:TELecom:SDH:TFUNction:TYPE <discrete> is set to OBER. It is only applicable when Z0 is selected by :SOURce:DATA:TELecom:SDSt:OBERtest:CHANnel <discrete>

:SOURce:DATA:TELecom:SDH:OBERtest:CHANnel:SELect?

Returns:	<numeric>

:SOURce:DATA:TELecom:SDH:OBERtest <discrete>

<discrete> =	ONCE	Single error

Injects a single overhead BER error when :SOURce:DATA:TELecom:SDH:TFUNction:TYPE <discrete> is set to OBER.

INPut subsystem

This subsystem controls the characteristics of the instrument's input ports.

:INPut:TELecom:SDH:RATE <discrete>

<discrete> =	STM0	STM-0 Electrical
	STM1	STM-1 Electrical

Is only valid when the SDH Module is fitted and :SENSe:DATA:TELecom:SENSe <discrete> is set to SDH.

The corresponding query returns the SDH rate in discrete short form.

:INPut:TELecom:SDH:RATE?

Returns :	<discrete>

:INPut:TELecom:SDH:GAIN <discrete>

<discrete> =	DB20	20 dB Gain
	DB26	26 dB Gain

Selects the Monitor gain for the SDH receiver. Only valid when :INPut:TELecom:LEVel <discrete> is set to MON.

The corresponding query returns the Monitor gain in discrete short form.

:INPut:TELecom:SDH:GAIN?

Returns:	<discrete>

:INPut:TELecom:OPT16:RATE <discrete>

<discrete> =	STM0	STM-0 Optical
	STM1	STM-1 Optical
	STM4	STM-4 Optical
	STM16	STM-16 Optical

Sets the input rate for the STM-0/STM-1/STM-4/STM-16 optical input port. Is only valid when Option STM-0/STM-1/STM-4/STM-16 Optical Interface is fitted and :SENSe:DATA:TELecom:SENSe <discrete> is set to OPT16.

The corresponding query returns the STM-0/STM-1/STM-4/STM-16 input rate in discrete form, as listed above.

:INPut:TELecom:OPT16:RATE?

Returns : <discrete>

:INPut:TELecom:OPT16:INTerface <discrete>

<discrete> =	OPTical	Optical input
	MONitor	Protected Monitor Input
	BINary	Binary input

Selects the input interface. This command should only be sent after the receiver data rate has been set up.

The corresponding query returns the interface in discrete form.

:INPut:TELecom:OPT16:INTerface?

Returns: <discrete>

:INPut:TELecom:OPT16:INTerface:BINary:CLOCk:POLarity <discrete>

<discret> =	NORMal	Clock not inverted
	INVert	Clock inverted

Selects the polarity of the input binary clock.

The corresponding query returns the polarity of the binary clock output in discrete form.

:INPut:TELecom:OPT16:INTerface:BINary:CLOCk:POLarity?

Returns:	<discrete>

:INPut:TELecom:OPT16:INTerface:BINary:DATA:POLarity <discrete>

<discrete>=	NORMal	Data not inverted
	INVert	Data inverted

Selects the polarity of the binary data input.

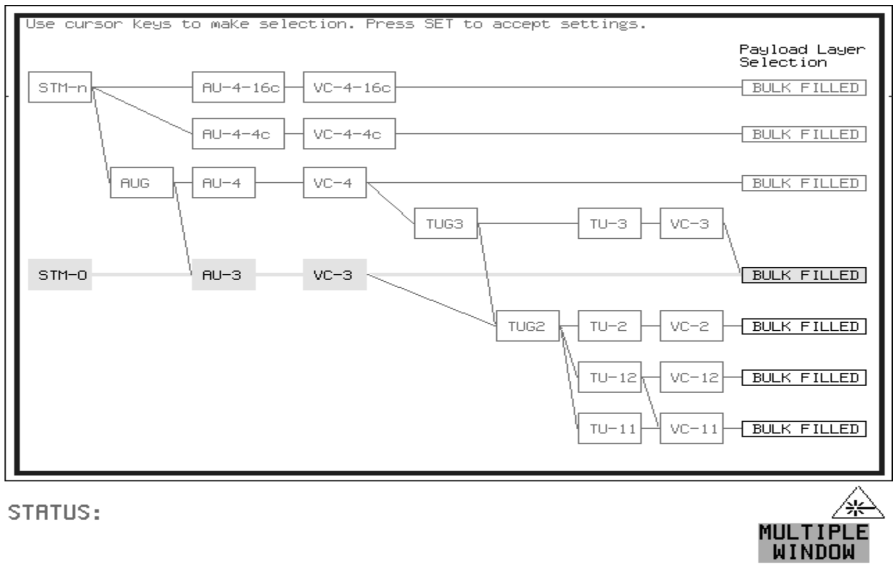
The corresponding query returns the polarity of the binary data output in discrete form.

:INPut:TELecom:OPT16:INTerface:BINary:DATA:POLarity?

Returns:	<discrete>

SENSe subsystem - Receiver SDH Settings

SDH Mapping settings



:SENSe:DATA:TELecom:SDH:AU4 <numeric>

<numeric> =	<numeric> 1 to 16	AU-4 under test

Selects the AU-4 within an STM-N for test.

The corresponding query returns the test AU-4 number.

:SENSe:DATA:TELecom:SDH:AU4?

Returns :	<numeric>

:SENSe:DATA:TELecom:SDH:AU3 <numeric>

<numeric> =	<numeric> 1 to 3	AU-3 under test

Selects the AU-3 within an AUG for test.
Only valid if the selected mapping is AU-3.

The corresponding query returns the test AU-3 number.

:SENSe:DATA:TELecom:SDH:AU3?

Returns : <numeric>

:SENSe:DATA:TELecom:SDH:AU4C <numeric>

<numeric> =	<numeric> 1 to 4	AU-4 under test

Selects the AU-4-4C within an STM-16 for test.

The corresponding query returns the test AU-4-4C number.

:SENSe:DATA:TELecom:SDH:AU4C?

Returns : <numeric>

AU Layer Selection

:SENSe:DATA:TELecom:SDH:AU:TYPE <discrete>

<discrete> =	AU4
	AU3
	AU4_4c
	AU4_16c

Set the AU mapping into an STM-N frame.

The corresponding query returns the AU type in discrete form as listed above.

:SENSe:DATA:TELecom:SDH:AU:TYPE?

Returns: <discrete>

TU Layer Selection

:SENSe:DATA:TELecom:SDH:PAYLoad <discrete>

<discrete> =	VC4
	VC3
	TU3
	TU12
	TU2
	TU11
	VC4_4c
	VC4_16c

This command selects the SDH receiver mapping

The corresponding query returns the mapping in discrete form, as listed above.

:SENSe:DATA:TELecom:SDH:PAYLoad?

Returns : <discrete>

Payload Layer Selection

:SENSe:DATA:TELecom:SDH:PRIMary:TS0 <boolean>

<boolean> =	0 or OFF	Data in TS0
	1 or ON	Signaling in TS0

Determines the content of TS0 as Data/Signaling.

The corresponding query returns the TS0 state in numeric form.

:SENSe:DATA:TELecom:SDH:PRIMary:TS0?

Returns : <boolean>

TUG Channel

:SENSe:DATA:TELecom:SDH:TUG3 <numeric>

<numeric> =	1 to 3

Selects the SDH Receiver active TUG3 within the AU4.

The corresponding query returns the active TUG-3 number in numeric form.

:SENSe:DATA:TELecom:SDH:TUG3?

Returns :	<numeric>

:SENSe:DATA:TELecom:SDH:TUG2 <numeric>

<numeric> =	1 to 7

Selects the SDH Receiver active TUG2 within the selected TUG3 or AU3.

The corresponding query returns the TUG2 number in numeric form.

:SENSe:DATA:TELecom:SDH:TUG2?

Returns :	<numeric>

:SENSe:DATA:TELecom:SDH:TRIButary <numeric>

<numeric> =	1 to 3	Tributary number for TU-12
	1 to 4	Tributary number for TU-11

Selects the SDH Receiver active TU within the selected TUG2.

The corresponding query returns the receiver test tributary in numeric form.

:SENSe:DATA:TELecom:SDH:TRIButary?

Returns :	<numeric>

TU Test Pattern

:SENSe:DATA:TELecom:SDH:PAYLoad:PATTern <discrete>

<discrete> =	PRBS9	2^9-1
	PRBS11	2^{11}-1
	PRBS15	2^{15}-1
	PRBS20	2^{20}-1
	PRBS23	2^{23}-1
	AZERo	All Zero’s
	AONE	All One’s
	P1010	Word 1010
	P1000	Word 1000
	UWORd	16 Bit User Word
	LIVE	Live Traffic

Selects the receiver SDH payload data pattern. If UWORd is selected, the word pattern is set using :SENSe:DATA:TELecom:SDH:PAYLoad:UWORd <string>.

The corresponding query returns the receiver SDH payload data pattern in discrete form as listed above.

:SENSe:DATA:TELecom:SDH:PAYLoad:PATTern?

Returns : <discrete>

:SENSe:DATA:TELecom:SDH:PAYLoad:UWORd <string>

Sets the receiver user word pattern in the range "0000000000000000" to "1111111111111111".

The corresponding query returns the user word pattern as a string.

:SENSe:DATA:TELecom:SDH:PAYLoad:UWORd?

Returns : <string>

:SENSe:DATA:TELecom:SDH:PRBS:POLarity <discrete>

<discrete> =	NORMal
	INVerted

Selects the PRBS pattern polarity.

The corresponding query returns the PRBS pattern polarity in discrete form as listed above.

:SENSe:DATA:TELecom:SDH:PRBS:POLarity?

Returns :	<discrete>

:SENSe:DATA:TELecom:SDH:TRIButary:CONCatenate <numeric>,<numeric>

<numeric> =	0	Concatenation Off
	2	TU2-2c
	3	TU2-3c
	4	TU2-4c
	5	TU2-5c
	6	TU2-6c
<numeric> =	1 to 6	TU2-2c selected
	1 to 5	TU2-3c selected
	1 to 4	TU2-4c selected
	1 to 3	TU2-5c selected
	1 to 2	TU2-6c selected

Selects the TU2 concatenation level (first parameter) and starting at the TU (second parameter).

The corresponding query returns the TU2 concatenation and starting TU in numeric form as listed above.

:SENSe:DATA:TELecom:SDH:TRIButary:CONCatenate?

Returns :	<numeric>,<numeric>

:SENSe:DATA:TELecom:SDH:FRAMing <discrete>

<framing>	NORMal	Normal SDH framing structure
	UNFRamed	Unframed SDH

Select the type of framing on the SDH input. This command should only be sent after the receiver data rate has been set up.

The corresponding query returns the framing input in discrete form.

:SENSe:DATA:TELecom:SDH:FRAMing?

Returns :	<discrete>

SENSe subsystem - Receiver SDH Test Function Commands

Lists the commands associated with the RECEIVE TEST FUNCTION display.

:SENSe:DATA:TELecom:SDH:TFUNction:TYPE <discrete>

<discrete> =	NONE	Off
	OCAPture	Overhead Capture
	DDCC	DCC Drop
	PGRaph	Pointer Graph
	OBERtest	Overhead BER

Selects the active Receiver Test Function.

The corresponding query returns the active Receiver Test Function, in discrete form as listed above.

:SENSe:DATA:TELecom:SDH:TFUNction:TYPE?

Returns :	<discrete>

:SENSe:DATA:TELecom:SDH:OCAPture <discrete>

<discrete> =	STOP	Terminates a Capture
	STARt	Starts a Capture

Starts or terminates an Overhead Capture. Is only valid when :SENSe:DATA:TELecom:SDH:TFUNction:TYPE <discrete> is set to OCAP.

The corresponding query returns the current state of the Overhead Capture, in discrete form as listed above.

:SENSe:DATA:TELecom:SDH:OCAPture?

Returns :	<discrete>

:SENSe:DATA:TELecom:SDH:OCAPture:CHANnel <discrete>

<discrete> =	A1A2 |C1/J0 | Z0 | E1 | F1 | D1D3	RS Overhead
	H1H2 | K1K2 | D4D12 | S1 | Z1_1|Z1_2 | Z1_3 | Z2_4 | Z2_5 | M1 | Z2_5 | Z2_6 | E2	MS Overhead
	J1 | C2 | G1 | F2 | H4 | Z3/F3 | Z4/K3 | Z5/N1	Path Overhead

Selects the overhead byte or bytes to be captured. Is only valid when :SENSe:DATA:TELecom:SDH:TFUNction:TYPE <discrete> is set to OCAP. Z0 is only valid when a rate higher than STM-1 is selected.

The corresponding query returns the overhead byte or bytes currently selected, in discrete form as listed above.

:SENSe:DATA:TELecom:SDH:OCAPture:CHANnel?

Returns :	<discrete>

:SENSe:DATA:TELecom:SDH:OCAPture:OHBYte <discrete>

<discrete> =	A1A2 | J0/Z0 | E1 | F1 | D1D3| BNDA1A2|X22|X23|X32|X33	Regenerator Overhead
	H1H2 | K1K2 | D4D12 | S1/ Z1 | M1/Z2| E2	Multiplexer Overhead
	J1 | C2 | G1 | F2 | H4 | F3 | K3 | N1	Path Overhead

Selects the overhead byte or bytes to be captured. Is only valid when :SENSe:DATA:TELecom:SDH:TFUNction:TYPE <discrete> is set to OCAP. Z0 is only valid when STM-4 or higher is selected.

BNDA1A2 selects the 6 middle A1A2 boundary bytes

The corresponding query returns the byte(s) to be captured in discrete form as listed above.

:SENSe:DATA:TELecom:SDH:OCAPture:OHBYte?

Returns: <discrete>

:SENSe:DATA:TELecom:SDH:OCAPture:COLumn <numeric>

<numeric> = 1 to 9

Selects the Section overhead column from which to capture. This only applies to Z1 and Z2.

The corresponding query returns the column to be captured in numeric form.

:SENSe:DATA:TELecom:SDH:OCAPture:COLumn?

<numeric>= 1 to 9

:SENSe:DATA:TELecom:SDH:OCAPture:CHANnel:SELect <numeric>

<numeric> = 1 to 16

Only valid if a rate higher than STM-1 is selected.

The corresponding query returns the STM-1 number in numeric form.

:SENSe:DATA:TELecom:SDH:OCAPture:CHANnel:SELect?

Returns: <numeric>

:SENSe:DATA:TELecom:SDH:OCAPture:TRIGger <discrete>

<discrete> =	OFF	
	ON	
	ONNot	On Not

Selects the Overhead Capture Trigger mode. If OFF is selected, capture begins immediately. If ON is selected, capture begins when the received data matches the pattern defined by :SENSe:DATA:TELecom:SDH:OCAPture:TRIGger:PATTern <string>. If ONN is selected, capture begins when the received data does not match the pattern defined by :SENSe:DATA:TELecom:SDH:OCAPture:TRIGger:PATTern <string>.

The corresponding query returns the selected Trigger mode, in discrete form as listed above.

:SENSe:DATA:TELecom:SDH:OCAPture:TRIGger?

Returns :	<discrete>

:SENSe:DATA:TELecom:SDH:OCAPture:TRIGger:PATTern <string>

Sets the Overhead Capture Trigger Pattern to the hexadecimal value contained in the string. The number of hexadecimal characters in the string is dependent on the overhead byte or bytes selected.
Two hexadecimal characters are required per byte, for example:
E1 - 1 Byte - "00" to "FF"
D4D12 - 9 Bytes - "000000000000000000" to "FFFFFFFFFFFFFFFFFF"

Is only valid when :SENSe:DATA:TELecom:SDH:TFUNction:TYPE <discrete> is set to OCAP and :SENSe:DATA:TELecom:SDH:OCAPture:TRIGger <discrete> is set to ON or ONN.

The corresponding query returns the Trigger Pattern selected, as a string as described above.

:SENSe:DATA:TELecom:SDH:OCAPture:TRIGger:PATTern?

Returns :	<string>

:SENSe:DATA:TELecom:SDH:DDCC <discrete>

<discrete> =	RDCC	Regenerator Section DCC
	MDCC	Multiplexer Section DCC

Selects the DataCommunications channel to be dropped via the rear panel DROP port. Is only valid when :SENSe:DATA:TELecom:SDH:TFUNction:TYPE <discrete> is set to DDCC.

The corresponding query returns the selected DCC, in discrete form as listed above.

:SENSe:DATA:TELecom:SDH:DDCC?

Returns :	<discrete>

:SENSe:DATA:TELecom:SDH:PGRaph:PTYPe <discrete>

<discrete> =	AU4
	AU3
	TU3
	TU2
	TU12
	TU11
	AU4_4c
	AU4_16c

Selects the type of pointer to be captured for pointer graph.

The corresponding query returns the type of pointer, in discrete short form.

:SENSe:DATA:TELecom:SDH:PGRaph:PTYPe?

Returns:	<discrete>

:SENSe:DATA:TELecom:SDH:PGRaph:CINTerval <discrete>

<discrete> =	SEC1	1 second interval
	SEC5	5 second interval
	SEC20	20 second interval
	MIN1	1 minute interval
	MIN5	5 minute interval
	MIN20	20 minute interval

Selects the pointer graph capture interval.

The corresponding query returns the pointer graph capture interval, in discrete form as listed above.

:SENSe:DATA:TELecom:SDH:PGRaph:CINTerval?

Returns:	<discrete>

:SENSe:DATA:TELecom:SDH:OBERtest:CHANnel <discrete>

<discrete> =	C1/J0 | Z0 | E1 | F1 | D1 | D2 | D3 |	RS Overhead
	K1 | K2 | D4 | D5 | D6 | D7 | D8 | D9 | D10 | D11 | D12 | S1/Z1 | M1/Z1 | E2 |	MS Overhead
	J1 | C2 | G1 | F2 | H4 | Z3/F3 | Z4/K3 | Z5/N1	Path Overhead

Selects the overhead byte used for the overhead BER test. Is only valid when :SENSe:DATA:TELecom:SDH:TFUNction:TYPE <discrete>is set to OBER . Z0 is only valid when a rate above STM-1 is selected.

The corresponding query returns the Overhead byte name in discrete form as listed above.

:SENSe:DATA:TELecom:SDH:OBERtest:CHANnel?

Returns <discrete>

:SENSe:DATA:TELecom:SDH:OBERtest:CHANnel:SELect <numeric>

<numeric> = 1 to 16

Selects STM-1 number for channels that occur in more than one STM-1.

The corresponding query returns the STM-1 number in numeric form.

:SENSe:DATA:TELecom:SDH:OBERtest:CHANnel:SELect?

Returns: <numeric>

SENSe subsystem - Alarm Scan Control

:SENSe:DATA:TELecom:SDH:ASCan:MODE <discrete>

<discrete> =	AUTomatic	Automatic receiver configuration
	RSETtings	Fixed receiver configuration

Selects the SDH alarm scan mode.

The corresponding query returns the alarm scan mode in discrete short form.

:SENSe:DATA:TELecom:SDH:ASCan:MODE?

Returns:	<discrete>

:SENSe:DATA:TELecom:SDH:ASCan:BIP <discrete>

<discrete> =	OFF	Fail if Alarm
	GTE0	Fail if alarm or any BIP error
	GTEE_6	Fail if alarm or BIP ER > 10E-6
	GTEE_3	Fail if alarm or BIP ER > 10E-3

Selects the SDH alarm scan BIP error threshold.

The corresponding query returns the alarm scan BIP error threshold in discrete short form.

:SENSe:DATA:TELecom:SDH:ASCan:BIP?

Returns:	<discrete>

:SENSe:DATA:TELecom:SDH:ASCan <boolean>

<boolean> =	0 or OFF	Stop the current alarm scan
	1 or ON	Start a new alarm scan

Start/Stop the SDH alarm scan.

The corresponding query returns the alarm scan state as 0 or 1.

:SENSe:DATA:TELecom:SDH:ASCan?

Returns:	<boolean>

SENSe subsystem - SDH Tributary Scan Control

:SENSe:DATA:TELecom:SDH:TSCan:PERiod <numeric>, <suffix>

<numeric> =	1 to 99	
<suffix> =	d	Days
	h	Hours
	m	Minutes
	s	Seconds

Sets the test duration for each tributary.

The corresponding query returns the test duration for each tributary.

:SENSe:DATA:TELecom:SDH:TSCan:PERiod?

Returns: <numeric>,<suffix>

:SENSe:DATA:TELecom:SDH:TSCan:BIP <discrete>

<discrete> =	GTE0	Fail if any BIP error
	GTEE_6	Fail if BIP ER > 10E-6
	GTEE_3	Fail if BIP ER > 10E-3

Selects the SDH tributary scan BIP error threshold.

The corresponding query returns the alarm scan BIP error threshold in discrete short form.

:SENSe:DATA:TELecom:SDH:TSCan:BIP?

Returns: <discrete>

:SENSe:DATA:TELecom:SDH:TSCan <boolean>

<boolean> =	0 or OFF	Stop the current tributary scan
	1 or ON	Start a new tributary scan

Start/Stop the SDH tributary scan.

The corresponding query returns the alarm scan state as 0 or 1.

:SENSe:DATA:TELecom:SDH:TSCan?

Returns: <boolean>

SENSe subsystem - MS-REI Measurements Enable/Disable

:SENSe:DATA:TELecom:SDH:MSRei <boolean>

<boolean> =	0 or OFF	MS REI measurements off
	1 or ON	MS REI measurments on

Allows measurement of MS-REI to be suppressed.

The corresponding query returns the MS-REI state as 0 or 1.

:SENSe:DATA:TELecom:SDH:MSRei?

Returns: <boolean>

SENSe subsystem - Result Returning Commands

Frequency Results (SDH)

:SENSe:DATA? <"result">

Result =	"FREQuency:SDH:GATE1S"	RX SDH clock frequency (1s gate)
	"FREQuency:SDH[:GATE16S]"	RX SDH clock frequency (16s gate)
	"FOFPpm:SDH[:GATE16S]"	RX SDH clock offset in ppm (16s gate)
	"FOFHz:SDH[:GATE16S]"	RX SDH clock offset in Hz (16s gate)

SDH Short Term Results

:SENSe:DATA? <"result">

Result =	"ECOunt:SDH:STERm:FRAMe"	Frame error count
	"ERATio:SDH:STERm:FRAMe"	Frame error ratio
	"ECOunt:SDH:STERm:RSBip"	RS B1 BIP error count
	"ERATio:SDH:STERm:RSBip"	RS B1 BIP error ratio
	"ECOunt:SDH:STERm:MSBip"	MS B2 BIP error count
	"ERATio:SDH:STERm:MSBip"	MS B2 BIP error ratio
	"ECOunt:SDH:STERm:MFEBe" or "ECOunt:SDH:STERm:MSRei"	MS FEBE/MS REI error count. See page 3-81.
	"ERATio:SDH:STERm:MFEBe" or "ERATio:SDH:STERm:MSRei"	MS FEBE/MS REI error ratio. See page 3-81.
	"ECOunt:SDH:STERm:PBIP"	Path B3 BIP error count
	"ERATio:SDH:STERm:PBIP"	Path B3 BIP error ratio
	"ECOunt:SDH:STERm:FEBE" or "ECOunt:SDH:STERm:REI"	FEBE/REI error count

"ERATio:SDH:STERm:FEBE" or "ERATio:SDH:STERmREI"	FEBE/REI error ratio
"ECOunt:SDH:STERm:PIEC"	PIEC error count
"ERATio:SDH:STERm:PIEC"	PIEC error ratio
"ECOunt:SDH:STERm:TRIB:PBIP"	TU path BIP error count
"ERATio:SDH:STERm:TRIB:PBIP"	TU path BIP error ratio
"ECOunt:SDH:STERm:TRIB:FEBE" or "ECOunt:SDH:STERm:TRIB:REI"	TU FEBE/LP REI error count
"ERATio:SDH:STERm:TRIB:FEBE" or "ERATio:SDH:STERm:TRIB:REI"	TU FEBE/LP REI error ratio

SDH Cumulative Results

:SENSe:DATA? <"result">

Result =	"ECOunt:SDH:FRAMe"	Frame error count
	"ERATio:SDH:FRAMe"	Frame error ratio
	"ECOunt:SDH:RSBip"	RS B1 BIP error count
	"ERATio:SDH:RSBip"	RS B1 BIP error ratio
	"ECOunt:SDH:MSBip"	MS B2 BIP error count
	"ERATio:SDH:MSBip"	MS B2 BIP error ratio
	"ECOunt:SDH:MFEBe" or "ECOunt:SDH:"MSRei"	MS FEBE/MS REI error count. See page 3-81.
	"ERATio:SDH:MFEBe" or "ERATio:SDH:MSRei"	MS FEBE/MS REI error ratio. See page 3-81.
	"ECOunt:SDH:PBIP"	Path B3 BIP error count
	"ERATio:SDH:PBIP"	Path B3 BIP error ratio
	"ECOunt:SDH:FEBE" or "ECOunt:SDH:REI"	FEBE/REI error count
	"ERATio:SDH:FEBE" or "ERATio:SDH:REI"	FEBE/REI error ratio

"ECOunt:SDH:PIEC"	PIEC error count
"ERATio:SDH:PIEC"	PIEC error ratio
"ECOunt:SDH:TRIB:PBIP"	TU path BIP error count
"ERATio:SDH:TRIB:PBIP"	TU path BIP error ratio
"ECOunt:SDH:TRIB:FEBE" or "ECOunt:SDH:TRIB:REI"	TU FEBE/LP REI error count
"ERATio:SDH:TRIB:FEBE" or "ERATio:SDH:TRIB:REI"	TU FEBE/LP REI error ratio
"ECOunt:SDH:OVERhead"	Overhead error count

SDH RS B1 BIP Analysis Results

:SENSe:DATA? <"result">

Result=	"ESEConds:SDH:RSBip:ANALysis"	Error Seconds
	"SESeconds:SDH:RSBip:ANALysis"	Severely Errored Seconds
	"EBCount:SDH:RSBip:ANALysis"	Errored block count
	"BBECount:SDH:RSBip:ANALysis"	Background block error count
	"ESRatio:SDH:RSBip:ANALysis"	Error Second Ratio
	"SESRatio:SDH:RSBip:ANALysis"	Severely Errored Second Ratio
	"BBERatio:SDH:RSBip:ANALysis"	Background Block Error ratio
	"UASeconds:SDH:RSBip:ANALysis"	Unavailable seconds

SDH MS B2 BIP Analysis Results

:SENSe:DATA? <"result">

Result=	"ESEConds:SDH:MSBip:ANALysis"	Error Seconds
	"SESeconds:SDH:MSBip:ANALysis"	Severely Errored Seconds
	"EBCount:SDH:MSBip:ANALysis"	Errored block count
	"BBECount:SDH:MSBip:ANALysis"	Background block error count

"ESRatio:SDH:MSBip:ANALysis"	Error Second Ratio
"SESRatio:SDH:MSBip:ANALysis"	Severely Errored Second Ratio
"BBERatio:SDH:MSBip:ANALysis"	Background Block Error ratio
"UASeconds:SDH:MSBip:ANALysis"	Unavailable seconds
"PUASeconds:SDH:MSBip:ANALysis"	Path Unavailable seconds

SDH Path MS FEBE Analysis Results

:SENSe:DATA? <"result">

If you wish to disable the MSRei measurement, see page 3-81.

Result=	"ESEConds:SDH:MFEBe:ANALysis" or "ESEConds:SDH:MSRei:ANALysis"	Error Seconds
	"SESeconds:SDH:MFEBe:ANALysis" or "SESeconds:SDH:MSRei:ANALysis"	Severely Errored Seconds
	"EBCount:SDH:MFEBe:ANALysis" or "EBCount:SDH:MSRei:ANALysis"	Errored block count
	"BBECount:SDH:MFEBe:ANALysis" or "BBECount:SDH:MSRei:ANALysis"	Background block error count
	"ESRatio:SDH:MFEBe:ANALysis" or "ESRatio:SDH:MSRei:ANALysis"	Error Second Ratio
	"SESRatio:SDH:MFEBe:ANALysis" or "SESRatio:SDH:MSRei:ANALysis"	Severely Errored Second Ratio
	"BBERatio:SDH:MFEBe:ANALysis" or "BBERatio:SDH:MSREI:ANALysis"	Background Block Error ratio
	"UASeconds:SDH:MFEBe:ANALysis" or "UASeconds:SDH:MSRei:ANALysis"	Unavailable seconds
	"PUASeconds:SDH:MFEBe:ANALysis" or "PUASeconds:SDH:MSRei:ANALysis"	Path Unavailable seconds

SDH Path B3 BIP Analysis Results

:SENSe:DATA? <"result">

Result=	"ESEConds:SDH:PBIP:ANALysis"	Error Seconds
	"SESeconds:SDH:PBIP:ANALysis"	Severely Errored Seconds
	"EBCount:SDH:PBIP:ANALysis"	Errored block count
	"BBECount:SDH:PBIP:ANALysis"	Background block error count
	"ESRatio:SDH:PBIP:ANALysis"	Error Second Ratio
	"SESRatio:SDH:PBIP:ANALysis"	Severely Errored Second Ratio
	"BBERatio:SDH:PBIP:ANALysis"	Background Block Error ratio
	"UASeconds:SDH:PBIP:ANALysis"	Unavailable seconds
	"PUASeconds:SDH:PBIP:ANALysis"	Path Unavailable seconds

SDH Path FEBE Analysis Results

:SENSe:DATA? <"result">

Result=	"ESEConds:SDH:FEBE:ANALysis" or "ESEConds:SDH:REI:ANALysis"	Error Seconds
	"SESeconds:SDH:FEBE:ANALysis" or "SESeconds:SDH:REI:ANALysis"	Severely Errored Seconds
	"EBCount:SDH:FEBE:ANALysis" or "EBCount:SDH:REI:ANALysis"	Errored block count
	"BBECount:SDH:FEBE:ANALysis" or "BBECount:SDH:REI:ANALysis"	Background block error count
	"ESRatio:SDH:FEBE:ANALysis" or "ESRatio:SDH:REI:ANALysis"	Error Second Ratio
	"SESRatio:SDH:FEBE:ANALysis" or "SESRatio:SDH:REI:ANALysis"	Severely Errored Second Ratio
	"BBERatio:SDH:FEBE:ANALysis" or "BBERatio:SDH:REI:ANALysis"	Background Block Error ratio

"UASeconds:SDH:FEBE:ANALysis" or "UASeconds:SDH:REI:ANALysis"	Unavailable seconds
"PUASeconds:SDH:FEBE:ANALysis" or "PUASeconds:SDH:REI:ANALysis"	Path Unavailable seconds

SDH Path IEC Analysis Results

:SENSe:DATA? <"result">

Result=	"ESEConds:SDH:PIEC:ANALysis"	Error Seconds
	"SESeconds:SDH:PIEC:ANALysis"	Severely Errored Seconds
	"EBCount:SDH:PIEC:ANALysis"	Errored block count
	"BBECount:SDH:PIEC:ANALysis"	Background block error count
	"ESRatio:SDH:PIEC:ANALysis"	Error Second Ratio
	"SESRatio:SDH:PIEC:ANALysis"	Severely Errored Second Ratio
	"BBERatio:SDH:PIEC:ANALysis"	Background Block Error ratio
	"UASeconds:SDH:PIEC:ANALysis"	Unavailable seconds

SDH Tributary Path BIP Analysis Results

:SENSe:DATA? <"result">

Result=	"ESEConds:SDH:TRIB:PBIP:ANALysis"	Error Seconds
	"SESeconds:SDH:TRIB:PBIP:ANALysis"	Severely Errored Seconds
	"EBCount:SDH:TRIB:PBIP:ANALysis"	Errored block count
	"BBECount:SDH:TRIB:PBIP:ANALysis"	Background block error count
	"ESRatio:SDH:TRIB:PBIP:ANALysis"	Error Second Ratio
	"SESRatio:SDH:TRIB:PBIP:ANALysis"	Severely Errored Second Ratio
	"BBERatio:SDH:TRIB:PBIP:ANALysis"	Background Block Error ratio

	"UASeconds:SDH:TRIB:PBIP:ANALysis"	Unavailable seconds
	"PUASeconds:SDH:TRIB:PBIP:ANALysis"	Path Unavailable seconds

SDH Tributary Path FEBE Analysis Results

:SENSe:DATA? <"result">

Result =	"ESEConds:SDH:TRIB:FEBE:ANALysis" or "ESEConds:SDH:TRIB:REI:ANALysis"	Error Seconds
	"SESeconds:SDH:TRIB:FEBE:ANALysis" or "SESeconds:SDH:TRIB:REI:ANALysis"	Severely Errored Seconds
	"EBCount:SDH:TRIB:FEBE:ANALysis" or "EBCount:SDH:TRIB:REI:ANALysis"	Errored block count
	"BBECount:SDH:TRIB:FEBE:ANALysis" or "BBECount:SDH:TRIB:REI:ANALysis"	Background block error count
	"ESRatio:SDH:TRIB:FEBE:ANALysis" or "ESRatio:SDH:TRIB:REI:ANALysis"	Error Second Ratio
	"SESRatio:SDH:TRIB:FEBE:ANALysis" or "SESRatio:SDH:TRIB:REI:ANALysis"	Severely Errored Second Ratio
	"BBERatio:SDH:TRIB:FEBE:ANALysis" or "SESRatio:SDH:TRIB:REI:ANALysis"	Background Block Error ratio
	"UASeconds:SDH:TRIB:FEBE:ANALysis" or "UASeconds:SDH:TRIB:REI:ANALysis"	Unavailable seconds
	"PUASeconds:SDH:TRIB:FEBE:ANALysis" or "PUASeconds:SDH:TRIB:REI:ANALysis"	Path Unavailable seconds

SDH Block Based Bit Analysis Results

:SENSe:DATA? <"result">

Result =	"ESEConds:SDH:BLKBit:ANALysis"	Error Seconds
	"SESeconds:SDH:BLKBit:ANALysis"	Severely Errored Seconds

"EBCount:SDH:BLKBit:ANALysis"	Errored block count
"BBECount:SDH:BLKBit:ANALysis"	Background block error count
"ESRatio:SDH:BLKBit:ANALysis"	Error Second Ratio
"SESRatio:SDH:BLKBit:ANALysis"	Severely Errored Second Ratio
"BBERatio:SDH:BLKBit:ANALysis"	Background Block Error ratio
"UASeconds:SDH:BLKBit:ANALysis"	Unavailable seconds

SDH M.2101 Analysis Results

:SENSe:DATA? <“result”>

Result =	“ESEConds:SDH:LOW:RECeive:ANALysis:M2101”	Low Order Path Receive Direction Errored Seconds
	“SESeconds:SDH:LOW:RECeive:ANALysis:M2101”	Low Order Path Receive Direction Severely Errored Seconds
	“UASeconds:SDH:LOW:RECeive:ANALysis:M2101”	Low Order Path Receive Direction Unavailable Seconds
	“ESEConds:SDH:LOW:TRANsmit:ANALysis:M2101”	Low Order Path Transmit Direction Errored Seconds
	“SESeconds:SDH:LOW:TRANsmit:ANALysis:M2101”	Low Order Path Transmit Direction Severely Errored Seconds
	“UASeconds:SDH:LOW:TRANsmit:ANALysis:M2101”	Low Order Path Transmit Direction Unavailable Seconds
	“ESEConds:SDH:HIGH:RECeive:ANALysis:M2101”	High Order Path Receive Direction Errored Seconds
	“SESeconds:SDH:HIGH:RECeive:ANALysis:M2101”	High Order Path Receive Direction Severely Errored Seconds
	“UASeconds:SDH:HIGH:RECeive:ANALysis:M2101”	High Order Path Receive Direction Unavailable Seconds
	“ESEConds:SDH:HIGH:TRANsmit:ANALysis:M2101”	High Order Path Transmit Direction Errored Seconds

“SESeconds:SDH:HIGH:TRANsmit:ANALysis:M2101”	High Order Path Transmit Direction Severely Errored Seconds
“UASeconds:SDH:HIGH:TRANsmit:ANALysis:M2101”	High Order Path Transmit Direction Unavailable Seconds
“ESECönds:SDH:SECTion:RECeive:ANALysis:M2101”	Section Layer Path Receive Direction Errored Seconds
“SESeconds:SDH:SECTion:RECeive:ANALysis:M2101”	Section Layer Path Receive Direction Severely Errored Seconds
“UASeconds:SDH:SECTion:RECeive:ANALysis:M2101”	Section Layer Path Receive Direction Unavailable Seconds
“ESECOnds:SDH:SECTion:TRANsmit:ANALysis:M2101”	Section Layer Path Transmit Direction Errored Seconds
“SESeconds:SDH:SECTion:TRANsmit:ANALysis:M2101”	Section Layer Path Transmit Direction Severely Errored Seconds
“UASeconds:SDH:SECTion:TRANsmit:ANALysis:M2101”	Section Layer Path Transmit Direction Unavailable Seconds

SDH Service Disruption Results

:SENSe:DATA? <"result">

Result =	"SDTest:COUNt:LONG"	Longest error burst
	SDTest:COUNt:SHORt"	Shortest error burst
	"SDTest:COUNt:LAST"	Last error burst

Returns: <range>,<value>

<range> =	0	Result invalid due to receiver configuration
	1	Result valid
	2	Result out of range

Value is returned in milliseconds. If the value is > 2000 or no result is available or the result is not applicable then 9.91E+37 is returned.

SDH Optical Power Result

:SENSe:DATA? <"result">

Result =	"OPOWer:SDH"	Optical power (dBm)

SDH Pointer Activity Results

:SENSe:DATA? <"result">

Result=	"PACTivity:SDH:PVALue"	AU Pointer value
	"PACTivity:SDH:NDFSeconds"	AU Pointer NDF seconds
	"PACTivity:SDH:MNDFseconds"	AU Pointer MNDF seconds
	"PACTivity:SDH:PCOunt"	AU Pointer +ve Adj Count
	"PACTivity:SDH:PSEConds"	AU Pointer +ve Adj Seconds
	"PACTivity:SDH:NCOunt"	AU Pointer -ve Adj Count
	"PACTivity:SDH:NSEConds"	AU Pointer -ve Adj Seconds
	"PACTivity:SDH:IOFFset"	Implied VC4 Offset
	"PACTivity:SDH:TRIButary:PVALue"	TU Pointer Value
	"PACTivity:SDH:TRIButary:NDFSeconds"	TU Pointer NDF seconds
	"PACTivity:SDH:TRIButary:MNDFseconds"	TU Pointer MNDF seconds
	"PACTivity:SDH:TRIButary:PCOunt"	TU Pointer +ve Adj Count
	"PACTivity:SDH:TRIButary:PSEConds"	TU Pointer +ve Adj Seconds
	"PACTivity:SDH:TRIButary:NCOunt"	TU Pointer -ve Adj Count
	"PACTivity:SDH:TRIButary:NSEConds"	TU Pointer -ve Adj Seconds
	“PACTivity:SDH:TRIButary:IOFFset”	Implied TU VC Offset

SDH Alarm Seconds Results

:SENSe:DATA? <"result">

Result =

"ASEConds:SDH:LOS"	Loss Of Signal
"ASEConds:SDH:LOF"	Loss Of Frame
"ASEConds:SDH:OOF"	Out Of Frame
"ASEConds:SDH:H4MF"	H4 Multiframe Loss
"ASEConds:SDH:LOP"	Loss Of Pointer
"ASEConds:SDH:MSAis"	Multiplexer Section AIS
"ASEConds:SDH:PAIS"	Path AIS
"ASEConds:SDH:PSLoss"	Pattern Synchronization Loss (see Note on page 2-20)
"ASEConds:SDH:MSRDi"	Multiplexer Section Remote Defect
"ASEConds:SDH:PFERf" or "ASEConds:SDH:RDI"	STM Path FERF/HP-RDI
"ASEConds:SDH:K1K2"	K1K2 byte change
"ASEConds:SDH:TRIB:LOP"	TU Loss Of Pointer
"ASEConds:SDH:TRIB:PAIS"	TU Path AIS
"ASEConds:SDH:TRIB:PFERf" or "ASEConds:SDH:TRIB:RDI"	TU Path FERF/LP-RDI
“ASEConds:SDH:TRIB:P1P0”	P1P0 Frame Synchronization Loss
"ASEConds:SDH:OPSL"	Overhead Pattern Sync Loss

FETCh subsystem

The FETCh subsystem is used to retrieve data directly accumulated by the instrument.

:FETCh:STRing:DATA:TELecom:SDH:J0?

Returns: <string>

The value of the STM-N regenerator overhead J0 byte is returned as a 16 ASCII character string if CRC7 is not detected, 15 ASCII character string if CRC7 is detected. If the string contains any non printing characters then ~ is substituted. This is a snapshot of the overhead byte and is captured once per second.

:FETCh:STRing:DATA:TELecom:SDH:J0:HEXadecimal?

Returns: <block>

Returns the value of the STM-N regenerator overhead J0 byte as 16 hexadecimal numbers if CRC7 is not detected, 15 hexadecimal numbers if CRC7 is detected. Each number is in the range "00" to "FF". The block header is " #216"if CRC7 not detected, " #215" if CRC7 is detected. This is a snapshot of the overhead byte and is captured once per second.

:FETCh:STRing:DATA:TELecom:SDH:J1?

Returns : <string>

If interfacing at STM-1/4/16, the value of the VC-3, VC-4, VC-4-NC J1 path trace byte is returned as a, 64 ASCII character, string (15 ASCII characters if CRC7 is detected). If interfacing at STM-0, the value of the VC-3 J1 path trace byte is returned as a string. If the string contains any non printing characters then ~ is substituted. This is a snapshot of the overhead byte and is captured once per second.

:FETCh:STRing:DATA:TELecom:SDH:J1:HEXadecimal?

Returns : <block>

If interfacing at STM-1/4/16, returns the value of the VC-3, VC-4, VC-4-NC J1 path trace byte as 64 hexadecimal numbers (15 if CRC7 is detected). If interfacing at STM-0, the value of the VC-3 J1 path trace byte is returned as 64 hexadecimal numbers (15 if CRC7 is detected).

Each number is in the range "00" to "FF". The block header is " #264" (" #215" if CRC7 is detected). This is a snapshot of the overhead byte and is captured once per second.

:FETCh:STRing:DATA:TELecom:SDH:TRIButary:J1?

Returns : <string>

When the VC-3 is mapped into a higher level container such as VC-4 the value of the VC-3 J1 path trace byte is returned as a, 64 ASCII character, string (15 ASCII characters if CRC7 is detected). If the string contains any non printing characters then ~ is substituted. This is a snapshot of the overhead byte and is captured once per second.

:FETCh:STRing:DATA:TELecom:SDH:TRIButary:J1:HEXadecimal?

Returns : <block>

When the VC-3 is mapped into a higher level container such as VC-4 returns the value of the VC-3 J1 path trace byte as 64 hexadecimal numbers (15 if CRC7 is detected). Each number is in the range "00" to "FF". The block header is " #264" ("#215" if CRC7 is detected). This is a snapshot of the overhead byte and is captured once per second.

:FETCh:STRing:DATA:TELecom:SDH:TRIButary:J2?

Returns: <string>

Returns the 15 or 16 byte J2 path trace as a string. The OmniBER 725 attempts to align the received pattern by detecting the CRC7 byte. If the CRC7 byte is detected, a 15 byte pattern is returned. If the CRC7 byte is not detected, a 16 byte pattern is returned. If the string contains any non-printing characters then ~ is substituted. This is a snapshot of the received path trace and is only updated once per second.

:FETCh:STRing:DATA:TELecom:SDH:TRIButary:J2:HEXadecimal?

Returns: <block>

Returns the value of the J2 path trace byte as 15 or 16 hexadecimal numbers. The OmniBER 725 attempts to align the received pattern by detecting the CRC7 byte. If the CRC7 byte is detected, 15 hexadecimal numbers are returned. If the CRC7 byte is not detected, 16 hexadecimal numbers are returned. Each number is in the range "00" to "FF". The block header is " #215" if 15 Hex numbers and " #216" if 16 Hex numbers. This is a snapshot of the overhead byte and is captured once per second.

:FETCh:STRing:DATA:TELecom:SDH:K1?

Returns : <string>

The value of the MPS K1 byte is returned as an 8 bit string in the range "00000000" to "11111111".

:FETCh:STRing:DATA:TELecom:SDH:K2?

Returns : <string>

The value of the MPS K2 byte is returned as an 8 bit string in the range "00000000" to "11111111".

:FETCh:STRing:DATA:TELecom:SDH:S1?

Returns : <string>

The value of the SYNC S1 byte (bits 5-8) is returned as a 4 bit string in the range "0000" to "1111".

:FETCh:SCALar:DATA:TELecom:SDH:OVERhead? <numeric>,<numeric>, <discrete>

<numeric> =	1 to 16	VC4 Number
<numeric> =	1 to 3	Column Number
<discrete> =	A1|A2|C1/J0/ Z0|B1|E1|F1|D1|D2|D3|H1|H2 H3|B2|K1|K2||D11 D12|Z1/S1|Z2/ M1|E2|X13|X21|X22|X23|X31 X32|X33|X52|X53|X61|X62|X63 X71|X72|X73|X81|X82|X83|X93	Byte Name

Returns the selected overhead byte as an 8 bit binary string in the range "00000000" to "11111111". The byte number is given by its defined name if it has one. Undefined bytes are represented by <Xrc>, where r is the numerical value of the bytes row in the transport overhead and c is the numerical value of the bytes column in the transport overhead.

If an STM-1 signal is being transmitted, the only applicable value of VC4 is 1.

Notice that column number 1 is actually columns 1,4 & 7, 2 is columns 2,5 & 8 and 3 is columns 3,6 & 9.

C1/J0 byte: The J0 capability is available at STM-0 and STM-1 only.

Z2/M1 byte: If any other SDH option is fitted, the Z2 capability is available and M1 is not available.

ZO byte is available when STM-4 is selected.

Returns: <string>

:FETCh:SCALar:DATA:TELecom:SDH:POVerhead:H4Sequence?

Obtains the length of the H4 byte sequence.

Returns :	<discrete> =	LONG	Long sequence
		SHORt	Short sequence
		UNKNown	Unknown sequence

:FETCh:SCALar:DATA:TELecom:SDH:POVerhead? <discrete>

<discrete> = J1|B3|C2|G1|F2|H4|Z3/F3|Z4/K3|Z5/N1

Obtains the value of the named path overhead byte. The value of the named byte is returned as a string in the range "00000000" to "11111111". This is a snapshot of the overhead byte and is captured once per second.

:FETCh:SCALar:DATA:TELecom:SDH:TRIButary:POVerhead? <discrete>

<discrete> =	C2|G1|F2|H4|Z3/F3|Z4/K3|Z5/N1|	TU-3
	V5|J2|N2|K4	TU-2/TU-12/TU11

Obtains the value of the specified path overhead byte. The value of the named byte is returned as a string in the range "00000000" to "11111111". This is a snapshot of the overhead byte and is captured once per second.

:FETCh:SCALar:DATA:TELecom:SDH:TRIButary:POVerhead:SLABel?

Returns the TU-2/TU-12/TU-11 signalling label of the selected tributary in numeric form.

:FETCh:ARRay:DATA:TELecom:SDH:ASCan?

Returns (each of one or more rows): <numeric>{,<numeric}

The results returned are those for the last FULL scan. Results from partial scans are not available. If no full scan has been completed since the instrument was powered up, this command will return -1.

If data is available it is returned as a set of string arrays one for each scanned group. The arrays are separated by a CR/LF pair. A group is defined as a set of scanned paths at either the AU or TU level. The arrays consist of comma separated numerics, one for each path scanned. The value of the numeric indicates the status of the scanned path. The following values are valid.

Value	**State**
0	No Problems Detected
1	Alarms or Errors Detected
2	Path Unequipped
3	Loss of Pointer
4	AIS
5	RDI
6	H4 Multiframe Loss
?	Invalid

For a specific signal structure, the format of the returned strings are shown below:

a) STM-1 AU-4 TU-2

This signal consists of 1 AU-4 containing 3 TUG-3's each of which contains 7 TUG-2s. The TUG-2's in turn each contain a TU-2. From the perspective of the Alarm Scan function the paths are 1 at the AU-4 level and 21 at the TU level. The single AU path is defined as a group on its own while the 21 TU's are arranged as 3 groups of 7 paths with the groups corresponding to the TUG-2 allocation. For this configuration, four arrays are returned with formats shown below:

```
AU-4 GROUP -> AU4
TUG-3 #1   -> TU#1,TU#2,TU#3,TU#4,TU#5,TU#6,TU#7
TUG-3 #2   -> TU#1,TU#2,TU#3,TU#4,TU#5,TU#6,TU#7
TUG-3 #3   -> TU#1,TU#2,TU#3,TU#4,TU#5,TU#6,TU#7
```

For Example, the output could look like:

```
0
1,1,1,0,0,1,0
2,2,2,2,2,2,2
0,0,0,0,1,0,0
```

b) STM-1 AU-4 TU-3

This signal consists of 1 AU-4 containing 3 TUG-3's each of which contains 1 TU-3. In this configuration there are 4 paths, 1 at the AU-4 level and 3 at the TU-3 level. Again, the single AU path is defined as a group on its own. The TU paths in this instance are also defined as groups corresponding to their allocation within the TUG-3's. For this configuration, four arrays are returned with the following format:

```
AU-4 Group -> AU-4
TUG-3 #1   -> TU-3 #1
TUG-3 #2   -> TU-3 #2
TUG-3 #3   -> TU-3 #3
```

The output will look something like:

```
0
1
2
2
```

c) STM-1 AU-4 TU-12

This signal again consists of 1 AU-4 containing 3 TUG-3's. In this case however, the TUG-3's each contain 7 TUG-2's. These TUG-2's each contain 3 TU-12's. In terms of paths the signal comprises 1 path at the AU-4 level and 63 paths at the TU-12 level. Again the single AU-4 is defined as a group on its own. The 63 TU-12 paths are split into 3 groups corresponding to their allocation with the 3 TUG-3's. For this configuration, four arrays are returned with the following format:

```
NOTE:  TU-12's designated thus [TUG-3# - TUG-2# - TU#]

AU-4 Group -> AU-4
TUG-3 #1   -> [1-1-1],[1-1-2],[1-1-3],[1-2-1],[1-2-
2],[1-2-3],
             [1-3-1],[1-3-2],[1-3-3],[1-4-1],[1-4-2],[1-
4-3],
             [1-5-1],[1-5-2],[1-5-3],[1-6-1],[1-6-2],[1-
6-3],
              [1-7-1],[1-7-2],[1-7-3]
TUG-3 #2   -> As Above
TUG-3 #3   -> As Above
```

The output will look like:

```
1
0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
1,1,1,0,0,1,0,0,0,0,0,0,0,0,0,1,1,0,0,0,0
2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2
```

d) STM-1 AU-4 TU-11

This signal again consists of 1 AU-4 containing 3 TUG-3's. In this case however, the TUG-3's each contain 7 TUG-2's. These TUG-2's each contain 4 TU-11's. In terms of paths the signal comprises 1 path at the AU-4 level and 84 paths at the TU-11 level. Again the single AU-4 is defined as a group on its own. The 84 TU-11 paths are split into 3 groups corresponding to their allocation with the 3 TUG-3's. For this configuration, four arrays are returned with the following format:

```
NOTE:  TU-11's designated thus [TUG-3# - TUG-2# - TU#]

AU-4 Group -> AU-4
TUG-3 #1   -> [1-1-1],[1-1-2],[1-1-3],[1-1-4],[1-2-
1],[1-2-2],[1-2-3],[1-2-4],
             [1-3-1],[1-3-2],[1-3-3],[1-3-4],[1-4-1],[1-
4-2],[1-4-3],[1-4-4],
             [1-5-1],[1-5-2],[1-5-3],[1-5-4],[1-6-1],[1-
6-2],[1-6-3],[1-6-4],
              [1-7-1],[1-7-2],[1-7-3],[1-7-4]
TUG-3 #2   -> As Above
TUG-3 #3   -> As Above
```

The output will look like:

```
1
0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
1,1,1,1,0,0,1,1,0,0,0,0,0,0,0,0,0,0,0,0,1,1,0,0,0,0,0,0
2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2
```

e) STM-1 AU-3 TU-2

This signal consists of 3 AU-3s each of which contains 7 TUG-2s. The TUG-2's in turn each contain 1 TU-2. From the perspective of the Alarm Scan function the paths are 3 at the AU-3 level and 21 at the TU level. The AU paths are defined as a group on their own while the 21 TU's are arranged as 3 groups of 7 paths with the groups corresponding to the AU-3 allocation. For this configuration, four arrays are returned with formats shown below:

AUG -> AU3#1, AU3#2, AU3#3
AU-3 #1 -> TU#1,TU#2,TU#3,TU#4,TU#5,TU#6,TU#7
AU-3 #2 -> TU#1,TU#2,TU#3,TU#4,TU#5,TU#6,TU#7
AU-3 #3 -> TU#1,TU#2,TU#3,TU#4,TU#5,TU#6,TU#7

For Example, the output could look like:

0,1,1
1,1,1,0,0,1,0
2,2,2,2,2,2,2
0,0,0,0,1,0,0

f) STM-1 AU-3 VC-3

This signal consists of 3 AU-3s each containing 1 VC-3. In this configuration there are 3 paths, 3 at the AU-3 level and no lower paths. For this configuration, 3 arrays are returned with the following format:

```
AUG -> AU3#1, AU3#2, AU3#3
```

The output will look something like:

```
0,1,2
```

g) STM-1 AU-3 TU-12

This signal again consists of 3 AU-3's. In this case however, the AU-3's each contain 7 TUG-2's. These TUG-2's each contain 3 TU-12's. In terms of paths the signal comprises 3 paths at the AU-3 level and 63 paths at the TU-12 level. Again the AU-3s are defined as a group on their own. The 63 TU-12 paths are split into 3 groups corresponding to their allocation with the 3 AU-3's. For this configuration, four arrays are returned with the following format:

```
NOTE:  TU-12's designated thus [AU-3# - TUG-2# - TU#]

AUG -> AU-3#1, AU-3#2, AU-3#3

AU-3 #1   -> [1-1-1],[1-1-2],[1-1-3],[1-2-1],[1-2-2],[1-
2-3],
             [1-3-1],[1-3-2],[1-3-3],[1-4-1],[1-4-2],[1-
4-3],
             [1-5-1],[1-5-2],[1-5-3],[1-6-1],[1-6-2],[1-
6-3],
              [1-7-1],[1-7-2],[1-7-3]
AU-3 #2   -> As Above
AU-3 #3   -> As Above
```

The output will look like:

```
1,2,0
0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
1,1,1,0,0,1,0,0,0,0,0,0,0,0,0,1,1,0,0,0,0
2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2
```

h) STM-1 AU-3 TU-11

This signal again consists of 3 AU-3s. In this case however, the AU-3's each contain 7 TUG-2's. These TUG-2's each contain 4 TU-11's. In terms of paths the signal comprises 3 paths at the AU-3 level and 84 paths at the TU-11 level. Again the AU-3s are defined as a group on their own. The 84 TU-11 paths are split into 3 groups corresponding to their allocation with the 3 AU-3's. For this configuration, four arrays are returned with the following format:

```
NOTE:  TU-11's designated thus [U-3# - TUG-2# - TU#]

AUG -> AU-3#1, AU-3#2, AU-3#3
AU-3 #1   -> [1-1-1],[1-1-2],[1-1-3],[1-1-4],[1-2-1],[1-
2-2],[1-2-3],[1-2-4],[1-3-1],[1-3-2],[1-3-3],[1-3-4],[1-
4-1],[1-4-2],[1-4-3],[1-4-4],[1-5-1],[1-5-2],[1-5-3],[1-
5-4],[1-6-1],[1-6-2],[1-6-3],[1-6-4],[1-7-1],[1-7-2],[1-
7-3],[1-7-4]
AU-3 #2   -> As Above
AU-3 #3   -> As Above
```

The output will look like:

```
1,1,1
0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
1,1,1,1,0,0,1,1,0,0,0,0,0,0,0,0,0,0,0,0,1,1,0,0,0,0,0,0
2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2
```

i) STM-0 AU-3 TU-2

This signal consists of 1 AU-3 containing 7 TUG-2's. Each TUG-2 contains 1 TU-2. There are therefore 8 paths, 1 at the AU-3 level and 7 at the TU-2 level. In this case the AU-3 path is defined as a group on its own, while the 7 TU-2 paths are also defined as one group. For this configuration, 2 groups are returned with the following format:

AU-3 Group -> AU-3
AU-3#1 -> TU-2#1,TU-2#2,TU-2#3,TU-2#4,TU-2#5,TU-2#6,TU-2#7

The output will look like:

```
0
1,1,1,0,0,0,0
```

j) STM-0 AU-3 TU-12

This signal again comprises 1 AU-3 containing 7 TUG-2's. However, this time the TUG-2's each contain 3 TU-12's. As before, the AU-3 path is defined as a group on its own, while the 7 TU-2 paths are also defined as one group. For this configuration, 2 groups are returned with the following format:

```
NOTE:  TU-12's designated thus [TUG-2# - TU-12#]

AU-3 Group -> AU-3
TUG-2      -> [1-1],[1-2],[1-3],[2-1],[2-2],[2-3],[3-1],
              [3-2],[3-3],[4-1],[4-2],[4-3],[5-1],[5-2],
              [5-3],[6-1],[6-2],[6-3],[7-1],[7-2],[7-3]
```

The output will look like:

```
0
1,1,1,0,0,0,0,1,1,1,1,1,1,1,0,0,2,0,0,0,0
```

k) STM-0 AU-3 TU-11

This signal again comprises 1 AU-3 containing 7 TUG-2's. However, this time the TUG-2's each contain 4 TU-11's. As before, the AU-3 path is defined as a group on its own, while the 7 TU-2 paths are also defined as one group. For this configuration, 2 groups are returned with the following format:

```
NOTE:  TU-11's designated thus [TUG-2# - TU-11#]

AU-3 Group -> AU-3
TUG-2      -> [1-1],[1-2],[1-3],[1-4],[2-1],[2-2],[2-
3],[2-4],[3-1],[3-2],[3-3],[3-4],[4-1],[4-2],[4-3],[4-
4],[5-1],[5-2],[5-3],[5-4],[6-1],[6-2],[6-3],[6-4],[7-
1],[7-2],[7-3],[7-4]
The output will look like:

0
1,1,1,1,0,0,0,0,0,1,1,1,1,1,1,1,1,1,0,0,0,2,0,0,0,0,0,1
```

l) Unrecognized Structure

When Alarm Scan is operating in AUTO mode, it is possible that due to various signal alarm conditions, it may not be able to determine the structure for a particular group of paths. When this occurs that group is marked as an "Unrecognized Structure". The string returned for such a group is the SCPI NAN - "9.91E+37"

:FETCh:ARRay:DATA:TELecom:SDH:TSCan?

Returns (each of one or more rows): <numeric>{,<numeric}

The results returned are those for the last FULL scan. Results from partial scans are not available. If no full scan has been completed since the instrument was powered up, this command will return -1.

If data is available it is returned as a set of string arrays one for each scanned group. The arrays are separated by a CR/LF pair. A group is defined as a set of scanned paths at either the AU or TU level. The arrays consist of comma separated numerics, one for each tributary scanned. The value of the numeric indicates the status of the scanned tributary. The following values are valid.

Value	State
0	No Problems Detected
1	Alarms or Errors Detected

For a specific signal structure, the format of the returned strings are shown below:

a) STM-1 AU-4 TU-2

This signal consists of 1 AU-4 containing 3 TUG-3's each of which contains 7 TUG-2s. The TUG-2's in turn each contain a TU-2. There are therefore 21 (7*3) tributaries in this signal which must be scanned. The 21 tributaries are arranged as 3 groups of 7 paths with the groups corresponding to the TUG-2 allocation. For this configuration, three arrays are returned with formats shown below:

```
TUG-3 #1   -> TU#1,TU#2,TU#3,TU#4,TU#5,TU#6,TU#7
TUG-3 #2   -> TU#1,TU#2,TU#3,TU#4,TU#5,TU#6,TU#7
TUG-3 #3   -> TU#1,TU#2,TU#3,TU#4,TU#5,TU#6,TU#7
```

For Example, the output could look like:

```
1,1,1,0,0,1,0
1,1,1,0,0,1,1
0,0,0,0,1,0,0
```

b) STM-1 AU-4 TU-3

This signal consists of 1 AU-4 containing 3 TUG-3's each of which contains 1 TU-3. There are therefore 3 tributaries which must be scanned. The three tributaries are defined as groups corresponding to their allocation within the TUG-3's. For this configuration, three arrays are returned with the following format:

```
TUG-3 #1   -> TU-3 #1
TUG-3 #2   -> TU-3 #2
TUG-3 #3   -> TU-3 #3
```

The output will look something like:

```
0
1
1
```

c) STM-1 AU-4 TU-12

This signal again consists of 1 AU-4 containing 3 TUG-3's. In this case however, the TUG-3's each contain 7 TUG-2's. These TUG-2's each contain 3 TU-12's. There are therefore 63 (3*7*3) tributaries which must be scanned. The 63 TU-12 paths are arranged in 3 groups corresponding to their allocation with the 3 TUG-3's. For this configuration, three arrays are returned with the following format:

```
NOTE:  TU-12's designated thus [TUG-3# - TUG-2# - TU#]

TUG-3 #1   -> [1-1-1],[1-1-2],[1-1-3],[1-2-1],[1-2-
2],[1-2-3],[1-3-1],[1-3-2],[1-3-3],[1-4-1],[1-4-2],[1-4-
3],[1-5-1],[1-5-2],[1-5-3],[1-6-1],[1-6-2],[1-6-3],[1-7-
1],[1-7-2],[1-7-3]
TUG-3 #2   -> As Above
TUG-3 #3   -> As Above
```

The output will look like:

```
0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
1,1,1,0,0,1,0,0,0,0,0,0,0,0,0,1,1,0,0,0,0
1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1
```

d) STM-1 AU-4 TU-11

This signal again consists of 1 AU-4 containing 3 TUG-3's. In this case however, the TUG-3's each contain 7 TUG-2's. These TUG-2's each contain 4 TU-11's. There are therefore 84 (3*7*4) tributaries which must be scanned. The 84 TU-11 paths are arranged in 3 groups corresponding to their allocation with the 3 TUG-3's. For this configuration, three arrays are returned with the following format:

```
NOTE:  TU-11's designated thus [TUG-3# - TUG-2# - TU#]

TUG-3 #1   -> [1-1-1],[1-1-2],[1-1-3],[1-1-4],[1-2-
1],[1-2-2],[1-2-3],[1-2-4],[1-3-1],[1-3-2],[1-3-3],[1-3-
4],[1-4-1],[1-4-2],[1-4-3],[1-4-4],[1-5-1],[1-5-2],[1-5-
3],[1-5-4],[1-6-1],[1-6-2],[1-6-3],[1-6-4],[1-7-1],[1-7-
2],[1-7-3],[1-7-4]
TUG-3 #2   -> As Above
TUG-3 #3   -> As Above
```

The output will look like:

```
0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,1,1,1,1,1,1,1
1,1,1,0,0,1,0,0,0,0,0,0,0,0,0,1,1,0,0,0,0,0,0,0,0,1,0,0
1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1
```

e) STM-0 AU-3 TU-2

This signal consists of 1 AU-3 containing 7 TUG-2's. Each TUG-2 contains 1 TU-2. There are therefore 7 tributaries to be scanned. These are defined as one group and hence for this configuration, 1 array is returned with the following format:

AU3 Group -> TU2#1, TU2#2, TU2#3, TU2#4, TU2#5, TU2#6, TU2#7

The output will look like:

```
1,1,1,0,0,0,0
```

f) STM-0 AU-3 TU-12

This signal again comprises 1 AU-3 containing 7 TUG-2's. However, this time the TUG-2's each contain 3 TU-12's. There are therefore 21 (7*3) tributaries to be scanned. These are defined as one group and are returned in the following format:

```
NOTE:  TU-12's designated thus [TUG-2# - TU-12#]

TUG-2      -> [1-1],[1-2],[1-3],[2-1],[2-2],[2-3],[3-1],
              [3-2],[3-3],[4-1],[4-2],[4-3],[5-1],[5-2],
              [5-3],[6-1],[6-2],[6-3],[7-1],[7-2],[7-3]
```

The output will look like:

```
1,1,1,0,0,0,0,1,1,1,1,1,1,1,0,0,1,0,0,0,0
```

g) STM-0 AU-3 TU-11

This signal again comprises 1 AU-3 containing 7 TUG-2's. However, this time the TUG-2's each contain 4 TU-11's. There are therefore 28 (7*4) tributaries to be scanned. These are defined as one group and are returned in the following format:

```
NOTE:  TU-12's designated thus [TUG-2# - TU-11#]

TUG-2      -> [1-1],[1-2],[1-3],[1-4],[2-1],[2-2],[2-
3],[2-4],[3-1],[3-2],[3-3],[3-4],[4-1],[4-2],[4-3],[4-
4],[5-1],[5-2],[5-3],[5-4],[6-1],[6-2],[6-3],[6-4],[7-
1],[7-2],[7-3],[7-4]
```

The output will look like:

```
1,1,1,0,0,0,0,1,1,1,1,1,1,1,0,0,1,0,0,0,0
```

2) STM-4

For the STM-4 situation, the formats are similar to those defined above for STM-1 except that there will be data returned for all four STM-1's in the signal.

A case which is not described in the formats for STM-1 signals is that of an STM-4 signal with a VC-4 structure. In the STM-1 case this structure is not considered since there is only one tributary in the signal. However in the STM-4 case there are 4 tributaries and the scan is carried out.

In this case each VC-4 is treated as a separate group, hence 4 arrays are returned from the SCPI command:

```
STM-1 #1 VC-4
STM-1 #2 VC-4
STM-1 #3 VC-4
STM-1 #4 VC-4
```

The output will look like:

```
0
0
1
1
```

:FETCh:ARRay:DATA:TELecom:SDH:PGRaph?

Returns: <array>

Returns an array of 576 bytes, 2 bytes for each of the possible 288 points on the displayed pointer graph. The 2 bytes at each point indicate the maximum and minimum offset at that point. Each byte has 3 numeric entries separated by commas.

The value of the 3 numeric entries, <range bit>,<validity bit>,<offset value>, provide the following information:

Range bit	Validity Bit	Offset Value	Description
1	1	-18 to +18	Valid in range result
1	0	0	No measurement
1	1	9.91E+37	Alarms during measurement
2	1	0	Offset out of range > +18
0	1	0	Offset out of range < -18

The graph entries are arranged as shown below. Each entry has the format previously described above:

<max offset 1>,<min offset 1>,<max offset 2>,<min offset 2>,
<max offset 3>,<min offset 3>,<max offset 4>,<min offset 4>,
<max offset 5>,<min offset 5>,<max offset 6>,<min offset 6>,
....
....
<max offset 287>,<min offset 287>,<max offset 288>,<min offset 288>

Range of valid offset values is -18 thru +18

A typical return array might look like:

1,1,9.91E+37,1,1,9.91E+37,1,1, 0,1,1, 0,1,1, +1,1,1, -2, etc....

:FETCh:ARRay:DATA:TELecom:SDH:OCAPture? <numeric>

<numeric = 1 to 16 Overhead channels

Returns: <array>

Returns an array with the number of entries determined by <numeric> and separated by CR/LF.

Each entry consists of an alphanumeric string and a numeric separated by commas. The alphanumeric string provide the hexadecimal value of the captured data. The length of the string depends upon the overhead channel selected for capture, two hexadecimal characters/overhead byte. The numeric indicates the number of frames for which the captured data existed. If this command is issued when a capture is being performed, some entries will contain no data. In this case 9.91E+37 is returned.

The overhead byte or bytes to be captured is specified by :SENS:DATA:TEL:OCAP: CHAN <channel>.

:FETCh:SCALar:DATA:TELecom:SDH:POVerhead? <byte name>

<byte name> = C2|G1|F2|H4|F3|K3|N1

Returns: <string>

Returns the value of the selected path overhead byte as an 8 bit string in the range "00000000" to "11111111".

:FETCh:ARRay:DATA:TELecom:SDH:POVerhead? <numeric>

<numeric> = 1 to 9

Returns the value of the selected path overhead bytes as an array of strings. Each string is in the range "00000000" to "11111111". This is a snapshot of the overhead byte and is captured once per second.
The array always begins with byte 1 of the path overhead and ends with the byte number specified by <bytes>.
Byte Order: (1) J1 (2) B3 (3) C2 (4) G1 (5) F2 (6) H4 (7) F3 (8) K3 (9) N1.

:FETCh:SCALar:DATA:TELecom:SDH:TRIButary:POVerhead:SLABel?

Returns the signalling label of the selected tributary in numeric form.

:FETCh:ARRay:DATA:TELecom:SDH:OVERhead? <numeric>,<numeric>, <numeric>

<numeric> =	1 to 27	(Byte)
<numeric> =	1 to 16	(STM-1 Number)
<numeric> =	1	(Columns 1,4,7)
	2	(Columns 2,5,8)
	3	(Columns 3,6,9)

Returns the value of the selected transport overhead bytes as an array of strings. Each string is in the range "00000000" to "11111111". This is a snapshot of the overhead byte and is captured once per second.
The array always begins with byte 1 of the transport overhead and ends with the byte number specified by the first parameter.

Number	Name	Number	Name	Number	Name
1	A1	10	H1	19	D7
2	A2	11	H2	20	D8
3	J0/Z0/C1	12	H3	21	D9
4	B1	13	B2	22	D10
5	E1	14	K1	23	D11
6	F1	15	K2	24	D12
7	D1	16	D4	25	S1
8	D2	17	D5	26	Z2/M1
9	D3	18	D6	27	E2

4

SONET SCPI Command Reference

SONET Command Reference

SONET Command Reference

This chapter contains detailed information on the SCPI (Standard Commands for Programming Instruments) and IEEE 488.2 common commands you will use when writing programs to control your OmniBER 725 for SONET operation.

Please also refer to chapter 2 Common Commands for general information on SCPI command formats and for a list of commands that are common to SDH, SONET or Jitter operation; they are as follows:

SCPI Command Format

Remote Control Commands

Instrument Options

INSTrument subsystem

SOURce subsystem

SOURce subsystem - Transmitter Common Commands

INPut subsystem

SENSe subsystem

SENSe subsystem - Receiver Common Commands

SENSe subsystem - Test Timing

SENSe subsystem - Analysis Control

SENSe subsystem - Trouble Scan Results

SENSe subsystem - Configuring Graphics

SENSe subsystem - Managing Graphics Stores

SENSe subsystem - Retrieving Graphics Store Data

SENSe subsystem - Retrieving Data for a Single Graph

SENSe subsystem -Obtaining Graphics End of Measurement Results

STATus Subsystem

SYSTem Subsystem

IEEE common capabilities

OUTPut subsystem

This subsystem controls the characteristics of the instrument's output ports.

:OUTPut:TELecom:SONet:RATE <discrete>

<discrete> =	STS1	STS-1 Electrical
	STS3	STS-3 Electrical

Is only valid when :SOURce:DATA:TELecom:SOURce <discrete> is set to SONet.

:OUTPut:TELecom:SONet:RATE?

Returns: <discrete>

:OUTPut:TELecom:SONet:LEVel <discrete>

<discrete> =	XCON	450 feet simulated cable
	HIGH	0 feet simulated cable
	LOW	900 feet simulated cable

Selects the signal level for the STS-1 output.

The corresponding query returns the STS-1 signal level in discrete short form.

:OUTPut:TELecom:SONet:LEVel?

Returns: <discrete>

:OUTPut:TELecom:OC48:RATE <discrete>

<discrete> =	OC1	OC-1 optical
	OC3	OC-3 Optical
	OC12	OC-12 Optical
	OC48	OC-48 Optical

Selects the output rate for the OC-1/OC-3/OC-12/OC-48 optical output port. This command is only valid when :SOURce:DATA:TELecom:SOURce <discrete> is set to OC48.

The corresponding query returns the OC-1/OC-3/OC-12/OC-48 output rate in discrete form as listed above. If the OC-48 port is not selected, OC-48 will be returned as the default.

:OUTPut:TELecom:OC48:RATE?

Returns : <discrete>

Returns the selected output port interface in discrete form - always OPTical.

:OUTPut:TELecom:OC48:WAVelength <discrete>

<discrete> =	NM1310	1310 nm
	NM1550	1550 nm

Selects the wavelength of the output optical signal on the Optical module.

The corresponding query returns the output optical wavelength in discrete form, as listed above.

:OUTPut:TELecom:OC48:WAVelength?

Returns : <discrete>

:OUTPut:TELecom:OC48:LASer <boolean>

<boolean> =	0 or OFF
	1 or ON

Controls the state of the laser (ON or OFF) on the Optical module.

The corresponding query returns the state of the laser as 0 or 1.

:OUTPut:TELecom:OC48:LASer?

Returns :	<boolean>	0 or 1

:OUTPut:TELecom:OC48:INTerface <discrete>

<discrete> =	OPTical
	BINary

Selects the output interface.

The corresponding query returns the interface in discrete form.

:OUTPut:TELecom:OC48:INTerface?

Returns:	<discrete>

:OUTPut:TELecom:OC48:INTerface:BINary:CLOCk:POLarity <discrete>

<discrete>=	NORMal	Clock not inverted
	INVert	Clock inverted

Selects the polarity of the output binary clock.

The corresponding query returns the polarity of the binary clock output in discrete form.

:OUTPut:TELecom:OC48:INTerface:BINary:CLOCk:POLarity?

Returns :	<discrete>

:OUTPut:TELecom:OC48:INTerface:BINary:DATA:POLarity <discrete>

<discrete>=	NORMal	Data not inverted
	INVert	Data inverted

Selects the polarity of the binary data output.

The corresponding query returns the polarity of the binary data output in discrete form.

:OUTPut:TELecom:OC48:INTerface:BINary:DATA:POLarity?

Returns : <discrete>

SOURce subsystem - Transmitter SONET Settings Commands

SONET Clock settings

:SOURce:CLOCk:SONet:SOURce <discrete>

<discrete> =	INTernal	Internal
	EXTernal	External Clock/Data
	RSTS1	STS-1 Electrical
	ROC1	OC-1 Optical
	RMN1	STS-1 Monitor
	RBN1	STS-1 Binary
	RSTS3	STS-3 Electrical
	ROC3	OC-3 Optical
	RMN3	STS-3 Monitor
	RBN3	STS-3 Binary
	ROC12	OC-12 Optical
	RMN12	STS-12 Monitor
	RBN12	STS-12 Binary
	ROC48	OC-48 Optical
	RBN48	STS-48 Binary

Selects the SONET transmitter clock sync source. If the RX is set to an STS rate, then the only received clock rate that may be selected is the one in use. This restriction does not apply if the RX is set to a non STS rate. If EXT is selected, the Format is set using :SOURce:CLOCk:SONet:FORMat <discrete>.

The corresponding query returns the transmitter SONET clock sync source in discrete form as listed above.

:SOURce:CLOCk:SONet:SOURce?

Returns :	<discrete>

:SOURce:CLOCk:SONet:LEVel <discrete>

<discrete> =	TERMinate	Terminated
	MONitor	Monitor

Selects the transmitter SONET clock sync source level.

The corresponding query returns the transmitter SONET clock sync source level in discrete form as listed above.

:SOURce:CLOCk:SONet:LEVel?

Returns :	<discrete>

:SOURce:CLOCk:SONet:FORMat <discrete>

<discrete> =	CLOCk	Clock Format
	DATA	Data Format
	K64	64kb/s data
	DS1Bits	DS1 bit rate
	M10Ref	10 MHz Reference

Selects the transmitter SONET EXT clock sync source format.

The corresponding query returns the EXT clock sync source format in discrete form as listed above.

:SOURce:CLOCk:SONet:FORMat?

Returns :	<discrete>

:SOURce:CLOCk:SONet:FOFFset <boolean>

<boolean> =	0 or OFF
	1 or ON

Enables/disables the SONET Frequency Offset. The amount of Offset is set using :SOURce:CLOCk:SONet:FOFFset:OFFSet <numeric><suffix>.

The corresponding query returns the SONET Frequency Offset state as 0 or 1.

:SOURce:CLOCk:SONet:FOFFset?

Returns :	<boolean>

:SOURce:CLOCk:SONet:FOFFset:OFFSet <numeric><suffix>

<numeric> =	-999 to +999	Parts per Million
	-0.0999 to 0.0999	% or Ratio
<suffix> =	PPM	Parts per Million
	PCT	Percentage

Sets the amount of SONET Frequency Offset when Frequency Offset is enabled by setting :SOURce:CLOCk:SONet:FOFFset <boolean> to ON. If Ratio is chosen as the method of specifying Offset, no suffix is required.

The corresponding query returns the amount of SONET Frequency Offset in ppm.

:SOURce:CLOCk:SONet:FOFFset:OFFSet?

Returns :	<numeric>

Unframed SONET Selection and Settings

:SOURce:DATA:TELecom:SONet:FRAMing <discrete>

<discrete>	NORMal	Normal Sonet framing structure
	UNFRamed	Unframed Sonet

Select the type of framing on the Sonet output. This command should only be sent after the transmitter data rate has been set up.

The corresponding query returns the framing output in discrete form.

:SOURce:DATA:TELecom:SONet:FRAMing?

Returns :	<discrete>

:SOURce:DATA:TELecom:SONet:UNFRamed:ERRor:RATE <discrete>

<discrete>	NONE	No errors added
	ONCE	Single error added
	E_3	1.0E-3 error rate
	E_4	1.0E-4 error rate
	E_5	1.0E-5 error rate
	E_6	1.0E-6 error rate
	E_7	1.0E-7 error rate
	USER	User defined error rate

The corresponding query returns the framing output in discrete form.

:SOURce:DATA:TELecom:SONet:UNFRamed:ERRor:RATE?

Returns : <discrete>

:SOURce:DATA:TELecom:SONet:UNFRamed:ERRor:RATE:USER <numeric>

<discrete>	1.1E-3 to 0.1E-9	mantissa resolution 0.1, exponent resolution 1

Sets the user defined Unframed Sonet bit error error add rate. Only bit errors may be generated.

The corresponding query returns the user defined rate in numeric form.

:SOURce:DATA:TELecom:SONet:UNFRamed:ERRor:RATE:USER?

Returns : <discrete>

:SOURce:DATA:TELecom:SONet:UNFRamed:ALARm <discrete>

<discrete>	NONE	No errors added
	LOS	Loss of signal

Set the alarm generation on the transmit unframed mode test function page. The corresponding query returns the alarm selected in discrete form.

:SOURce:DATA:TELecom:SONet:UNFRamed:ALARm?

Returns : <discrete>

Thru mode settings

:SOURce:DATA:TELecom:SONet:THRumode <discrete>

<discrete> =	INTernal	Select Normal SONET Mode
	THRU	Select SONET Thru Mode

Selects/Deselects SONET THRU mode.

The corresponding query returns the THRU mode state in discrete form as listed above.

:SOURce:DATA:TELecom:SONet:THRumode?

Returns :	<discrete>

:SOURce:DATA:TELecom:SONet:THRumode:PAYLoad:OVERwrite <discrete>

<discrete> =	OFF	Payload Overwrite Off
	STS3c	Overwrite STS-3C payload
	STS1	Overwrite STS-1 payload
	VT6	Overwrite VT-6 payload
	VT2	Overwrite VT-2 payload
	VT15	Overwrite VT-1.5 payload

Selects the type of thru-mode payload to overwrite. The payload is not overwritten until explicitly enabled by :SOURce:DATA:TELecom:SONet:THRumode:PAYLoad:OVERwrite:ENABle <boolean> .

The corresponding query returns the payload overwrite state in discrete form as listed above.

:SOURce:DATA:TELecom:SONet:THRumode:PAYLoad:OVERwrite?

Returns :	<discrete>

:SOURce:DATA:TELecom:SONet:THRumode:PAYLoad:OVERwrite:ENABle <boolean>

<boolean> =	0 or OFF
	1 or ON

Enable the thru-mode payload overwrite.

The corresponding query returns the payload overwrite enable state in discrete form as listed above.

:SOURce:DATA:TELecom:SONet:THRumode:PAYLoad:OVERwrite:ENABle?

Returns :	<boolean>	0 or 1

:SOURce:DATA:TELecom:SONet:THRumode:COVerwrite <boolean>

<boolean> =	0 or OFF	Overhead Overwrite Off
	1 or ON	Overhead Overwrite On

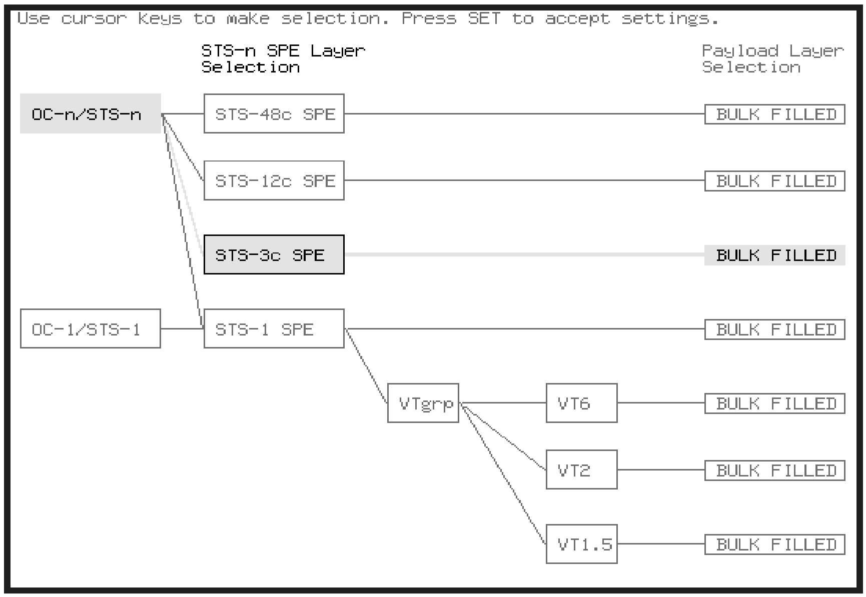
Enables/disables section overhead overwrite.

The corresponding query returns the section overhead overwrite state in discrete form as listed above.

:SOURce:DATA:TELecom:SONet:THRumode:COVerwrite?

Returns :	<boolean>

SONET Mapping Settings



:SOURce:DATA:TELecom:SONet:STS3 <numeric>

<numeric> =	1 to 16	STS3 number under test.

Only valid if :OUTPut:TELecom:OC48:RATE <discrete> is set to a rate higher than STS-3. Selects the transmitted STS-3 that is selected for test.

The corresponding query returns the STS-3 selected for test in numeric form, as listed above.

:SOURce:DATA:TELecom:SONet:STS3?

Returns :	<numeric>

:SOURce:DATA:TELecom:SONet:STS12c <numeric>

<numeric> =	1 to 4	STS12 number under test.

:SOURce:DATA:TELecom:SONet:STS12c?

Returns : <numeric>

SPE Layer Selection

:SOURce:DATA:TELecom:SONet:SPE:TYPE <discrete>

<discrete> = STS3c
STS1
STS12c
STS48c

Set the SPE mapping into an STS-N frame.

The corresponding query returns the SPE layer in discrete form as listed above.

:SOURce:DATA:TELecom:SONet:SPE:TYPE?

Returns: <discrete>

:SOURce:DATA:TELecom:SONet:STS1 <numeric>

<numeric> = 1 to 3 STS1 Number

Selects the SONET Transmitter active STS-1 within the STS-3.

The corresponding query returns the active STS-1 in numeric form.

:SOURce:DATA:TELecom:SONet:STS1?

Returns : <numeric>

VT Layer Selection

:SOURce:DATA:TELecom:SONet:PAYLoad <discrete>

<discrete> = STS3c
STS1
VT2
VT6

STS12c

STS48c

VT15

This command selects the SONET transmitter mapping.

The corresponding query returns the SONET mapping in discrete form, as listed above.

:SOURce:DATA:TELecom:SONet:PAYLoad?

Returns :	<discrete>

VT Group

:SOURce:DATA:TELecom:SONet:VTGRoup <numeric>

<numeric> =	1 to 7	VT Group

Selects the SONET Transmitter active VT Group within the selected STS1.

The corresponding query returns the active VT Group in numeric form.

:SOURce:DATA:TELecom:SONet:VTGRoup?

Returns :	<numeric>

:SOURce:DATA:TELecom:SONet:TRIButary <numeric>

<numeric> =	1 to 3	Tributary Number for VT2
	1 to 4	Tributary number for VT-1.5

Selects the SONET Transmitter active VT within the selected VT Group.

The corresponding query returns the active tributary in numeric form.

:SOURce:DATA:TELecom:SONet:TRIButary?

Returns :	<numeric>

VT Test Pattern

:SOURce:DATA:TELecom:SONet:PAYLoad:PATTern <discrete>

<discrete> =	PRBS9	2^9-1
	PRBS11	2^{11}-1
	PRBS15	2^{15}-1
	PRBS20	2^{20}-1
	PRBS23	2^{23}-1
	AZERo	All Zeros
	AONE	All Ones
	STRess	3-in-24 stress pattern (DS1 only) (requires option 110)
	P1010	Word 1010
	P1000	Word 1000
	UWORd	16 Bit User Word

Selects the transmitter SONET payload data pattern.

If UWORd is selected, the word pattern is set using :SOURce:DATA:TELecom:SONet:PAYLoad:UWORd <string>.

The corresponding query returns the transmitter SONET payload data pattern in discrete form, as listed above.

:SOURce:DATA:TELecom:SONet:PAYLoad:PATTern?

Returns :	<discrete>

:SOURce:DATA:TELecom:SONet:PAYLoad:UWORd <string>

Sets the SONET transmitter user word pattern in the range "0000000000000000" to "1111111111111111".

The corresponding query returns the user word pattern as a string.

:SOURce:DATA:TELecom:SONet:PAYLoad:UWORd?

Returns :	<string>

:SOURce:DATA:TELecom:SONet:PRBS:POLarity <discrete>

<discrete> =	INVerted
	NORMal

Selects the PRBS pattern polarity.

The corresponding query returns the polarity in discrete form as listed above.

:SOURce:DATA:TELecom:SONet:PRBS:POLarity?

Returns:	<discrete>

:SOURce:DATA:TELecom:SONet:TRIButary:CONCatenate <numeric>, <numeric>

<numeric> = (first parameter)	0	Concatenation Off
	2	VT6-2c
	3	VT6-3c
	4	VT6-4c
	5	VT6-5c
	6	VT6-6c
<numeric> = (second parameter)	1 to 6	VT6-2c selected
	1 to 5	VT6-3c selected
	1 to 4	VT6-4c selected
	1 to 3	VT6-5c selected
	1 to 2	VT6-6c selected

Selects the VT6 concatenation (first parameter) and starting at VT (second parameter).

The corresponding query returns the VT6 concatenation and starting at VT in numeric form as listed above.

:SOURce:DATA:TELecom:SONet:TRIButary:CONCatenate?

Returns :	<numeric>, <numeric>

Background Settings

:SOURce:DATA:TELecom:SONet:PRIMary:BACKground:PAYLoad :PATTern <discrete>

<discrete> =	PRBS9	2^9-1
	PRBS15	2^{15}-1
	NUMBered	(VT-6 or framed VT-2/VT-1.5)
	P1100	word 1100

Selects the background payload pattern for VTs within the foreground VT Group. The corresponding query returns the background pattern in discrete form as listed above.

:SOURce:DATA:TELecom:SONet:PRIMary:BACKground:PAYLoad :PATTern?

Returns:	<discrete>

:SOURce:DATA:TELecom:SONet:STS1:BACKground <discrete>

<discrete> =	UNEQuipped	Fixed at 00000000
	AS_FG	As Foreground

Selects the payload in the background (non test) STS-1s. This command only applies if the interface rate is higher than STS-1.
The corresponding query returns the type of payload in the background STS-1s in discrete short form.

:SOURce:DATA:TELecom:SONet:STS1:BACKground?

Returns:	<discrete>

:SOURce:DATA:TELecom:SONet:STS3:BACKground <discrete>

<discrete> =	UNEQuipped	Fixed at 00000000
	AS_FG	As Foreground

Selects the payload in the background (non test) STS-3s. This command only applies if the interface rate is higher than STS-3.
The corresponding query returns the type of payload in the background STS-3s in discrete short form.

:SOURce:DATA:TELecom:SONet:STS3:BACKground?

Returns:	<discrete>

:SOURce:DATA:TELecom:SONet:STS12c BACKground <discrete>

<discrete> =	UNEQuipped	Fixed at 00000000
	AS_FG	As Foreground

Selects the payload in the background (non test) STS-12c’s. This command only applies if the interface rate is higher than STS-12c.
The corresponding query returns the type of payload in the background STS-12c in discrete short form.

:SOURce:DATA:TELecom:SONet:STS12c:BACKground?

Returns:	<discrete>

SOURce subsystem - Transmitter SONET OVERHEAD SETUP

Lists the settings for the commands associated with the TRANSMIT OVERHEAD SETUP display.

:SOURce:DATA:TELecom:SONet:OVERhead:DEFault

Sets all overhead bytes to their default value :

Byte	Value	Byte	Value	Byte	Value	Byte	Value
A1	11110110	A2	00101000	J0/Z0	00000001	B1	xxxxxxxx
E1	00000000	F1	00000000	D1	00000000	D2	00000000
D3	00000000	E2	00000000	H1	xxxx10xx	H2	xxxxxxxx
H3	xxxxxxxx	B2	xxxxxxxx	K1	00000000	K2	00000000
D4	00000000	D5	00000000	D6	00000000	D7	00000000
D8	00000000	D9	00000000	D10	00000000	D11	00000000
D12	00000000	S1/Z1	00000000	M0/M1/Z2	00000000	J1	Default
B3	xxxxxxxx	C2	00000001	G1	00000000	F2	00000000
H4	00000000	Z3	00000000	Z4	00000000	N1	00000000

:SOURce:DATA:TELecom:SONet:OVERhead:DATA <numeric>, <numeric>, <discrete>, <string>

<numeric> = (first parameter)	STS-3 Number: range 1 to 16
<numeric> = (second parameter)	STS-1 Number: range 1 to 3
<discrete> =	A1|A2|J0/Z0|E1|F1|D1|D2|D3|H1|K1
	K2|D4|D5|D6|D7|D8|D9|D10|D11
	D12|S1/Z1|M0/M1/Z2|E2|X11|X12|X13|X21|X22|X23|X31
	X32|X33|X41|X42|X52|X53|X61|X62|X63
	X71|X72|X73|X81|X82|X83|X91|X92|X93
<string> =	"00000000" to "11111111"

Sets the binary value for the selected transmitter section overhead byte. The byte number is given by its defined name if it has one. Undefined bytes are represented by "Xrc", where r is the numerical value of the bytes row in the transport overhead and c is the numerical value of the bytes column in the transport overhead.

If an STS-3 signal is being transmitted, the only applicable value of STS-3 number is 1.

The byte is set to the binary representation of the given 8 character string.

In the case of STS-1 #1 only bits 2 and 3 of H1 may be set. The value sent must however still be 8 bits long. The unused bits should be marked 'x', i.e. to set bits 2 and 3 to '11' send the value 'xxxx11xx'.

The corresponding query returns the binary value of the byte named within the selected STS-3 column.

:SOURce:DATA:TELecom:SONet:OVERhead:DATA? <numeric>, <numeric>, <discrete>

Returns :	<string>

:SOURce:DATA:TELecom:SONet:OVERhead:DATA:HEXadecimal <numeric>, <numeric>, <discrete>, <string>

<numeric> =	STS-3 Number: range 1 to 16
<numeric> =	STS-1 Number: range 1 to 3
<discrete> =	A1|A2|J0/Z0|E1|F1|D1|D2|D3|H1|K1
	K2|D4|D5|D6|D7|D8|D9|D10|D11
	D12|S1/Z1|M0/M1/ Z2|E2|X11|X12|X13|X21|X22|X23|X31
	X32|X33|X41|X42|X52|X53|X61|X62|X63
	X71|X72|X73|X81|X82|X83|X91|X92|X93
<string> =	"00" to "FF"

Sets the hexadecimal value for the selected transmitter transport overhead byte. The byte number is given by its defined name if it has one. Undefined bytes are represented by "Xrc", where r is the numerical value of the bytes row in the transport overhead and c is the numerical value of the bytes column in the transport overhead.

If an STS-3 signal is being transmitted, the only applicable value of STS-3 is 1.

The byte is set to the hexadecimal representation of the given 2 character string.

In the case of STS-1 #1 only bits 2 and 3 of H1 may be set. Any hexadecimal value can be sent but only bits 2 and 3 will be set and all other bits will remain unchanged.

The corresponding query returns the hexadecimal value of the specified byte.

:SOURce:DATA:TELecom:SONet:OVERhead:DATA:HEXadecimal? <numeric>, <numeric>, <discrete>

Returns:	<string>

:SOURce:DATA:TELecom:SONet:POVerhead:DATA <discrete>, <string>

<discrete> =	C2|G1|F2|H4|Z3|Z4|N1
<string> =	"xx00xxx0" to "xx11xxx1" for V5
	“00000000 to 11111111 not V5

Sets the binary value of the specified STS-3, STS-12C and STS-48C path overhead byte.

The corresponding query returns the value of the specified high order path overhead byte as a string, as described above.

:SOURce:DATA:TELecom:SONet:POVerhead:DATA? <discrete>

Returns:	<string>

:SOURce:DATA:TELecom:SONet:POVerhead:SLABel <discrete>

<discrete> =	UNEQuipped	Unequipped (00000000)
	EQUipped	Equipped (00000001)
	VTSTructure	VT structure STS-1 SPE (00000010)
	LOCKed	Locked VT (00000011)
	DQDB	DQDB (00010100)
	FDDI	FDDI (00010101)
	USER	User Defined

Sets the value of the STS POH path label (C2 Byte). To update the USER byte value use the :SOURce:DATA:TELecom:SONet:POVerhead:DATA <discrete>, <string> command.

The corresponding query returns the value of the C2 byte in discrete short form.

:SOURce:DATA:TELecom:SONet:POVerhead:SLABel?

Returns: <discrete>

:SOURce:DATA:TELecom:SONet:POVerhead:J1:PATTern <discrete>

<discrete> =	DEFault	64 NULL characters
	TEST	Test message
	USER	User Defined
	CRC7Test	GB(Serial Number)
	CRC7User	User Defined

Sets the type of pattern that is to be transmitted in the J1 byte of the STS path overhead. The pattern repeats every 64 characters (16 chars in CRC7 case) and is transmitted byte by byte in subsequent frames.

The corresponding query returns the type of pattern being transmitted in STS path overhead byte J1 in discrete form as listed above.

:SOURce:DATA:TELecom:SONet:POVerhead:J1:PATTern?

Returns : <discrete>

:SOURce:DATA:TELecom:SONet:POVerhead:J1 <string>

Sets the user defined pattern that is to be transmitted in the J1 byte of the STS path overhead. The pattern should be 64 characters long, terminated with CR/LF. If less than 64 characters are input, the instrument will pad with the required number of NULL characters and terminate with CR/LF. The pattern repeats every 64 characters and is transmitted byte by byte in subsequent frames.

The corresponding query returns the value of the user defined pattern as a string, as defined above. If the string contains any non printing characters, ~ is substituted.
If CRC7 was returned in response to
:SOURce:DATA:TELecom:SONet:POVerhead:J1:PATTern? , this query command is not valid.

:SOURce:DATA:TELecom:SONet:POVerhead:J1?

Returns : <string>

:SOURce:DATA:TELecom:SONet:POVerhead:J1:CRC7 <string>

This command sets the CRC7 based user defined string that is to be transmitted using the J1 byte and configures the instrument to use this string. The string can be up to 15 characters in length; remaining characters are set to NULLs. A frame marker byte with CRC7 is added to this string.

The string is transmitted byte by byte in subsequent frames. The string repeats every 16 characters. The corresponding query returns the current value of the string. If the string contains any non printing characters, ~ is substituted.

:SOURce:DATA:TELecom:SONet:POVerhead:J1:CRC7?

Returns : <string>

:SOURce:DATA:TELecom:SONet:POVerhead:J1:HEXadecimal?

Returns : <block>

Returns a 64 byte block of data. Each byte represents the hexadecimal value of an ASCII character of STS path overhead byte J1 in the range "00" to "FF". The 64 hexadecimal numbers are preceded by the header "#264".
If CRC7 was returned in response to :SOURce:DATA:TELecom:SONet:POVerhead:J1:PATTern?, this query command is not valid.

:SOURce:DATA:TELecom:SONet:TRIButary:POVerhead:DATA <discrete>, <string>

<discrete>= V5|Z6|Z7

Sets the value of the specific VT-2, VT-1.5 or VT-6 path overhead byte to the value specified by string (in the range "00000000" to "11111111"). The byte is specified by the first parameter.

Only bits 3, 4 and 8 of V5 can be set but an 8 bit string must be sent with the unsettable bits set to x. To set bits 3, 4 and 8 to "1" send "xx11xxx1".

The corresponding query returns the byte specified by type in string form, as described above.

:SOURce:DATA:TELecom:SONet:TRIButary:POVerhead:DATA? <discrete>

Returns: <string>

:SOURce:DATA:TELecom:SONet:OVERhead:J0:PATTern <discrete>

<discrete> =	FIXed	Fixed Byte
	TEST	GB(Serial Number)
	USER	User Defined

Sets the type of pattern that is to be transmitted in the J0 byte of the STS section overhead. The pattern repeats every 16 characters and is transmitted character by character in subsequent frames.

The corresponding query returns the type of pattern being transmitted in overhead byte J0 in discrete short form.

:SOURce:DATA:TELecom:SONet:OVERhead:J0:PATTern?

Returns: <discrete>

:SOURce:DATA:TELecom:SONet:OVERhead:J0 <string>

Sets the user defined pattern that is to be transmitted in the J0 byte of the regenerator overhead. The pattern should be 15 characters long. The instrument automatically appends a E.164 CRC character to make up a 16 character sequence. If less than 15 characters are input, the instrument will pad with the required number of NULL characters. The pattern repeats every 16 characters and is transmitted character by character in subsequent frames.

The corresponding query returns the value of the user defined pattern as a string, as defined above. If the string contains any non printing characters, ~ is substituted. If FIXed was returned in response to:SOURce:DATA:TELecom:SONet:OVERhead:J0:PATTern?, this query command is not valid.

:SOURce:DATA:TELecom:SONet:OVERhead:J0?

Returns: <string>

:SOURce:DATA:TELecom:SONet:OVERhead:J0:HEXadecimal?

Returns:	<block>

Returns a 15 byte block of data. Each byte represents the hexadecimal value of an ASCII character "00" to "FF". The 15 hexadecimal numbers are preceded by the header "#215".
If FIXed was returned in response to :SOURce:DATA:TELecom:SONet:OVERhead:J0:PATTern?, this query command is not valid.

:SOURce:DATA:TELecom:SONet:TRIButary:POVerhead:J1:PATTern <discrete>

<discrete> =	DEFault	64 NULL characters
	TEST	Test message
	USER	User Defined
	CRC7Test	GB(Serial Number)
	CRC7User	User Defined

Sets the type of pattern that is to be transmitted in the J1 byte of the STS SPE path overhead. The pattern repeats every 64 characters (16 chars in CRC7 case) and is transmitted byte by byte in subsequent frames.

The corresponding query returns the type of pattern being transmitted in STS SPE path overhead byte J1 in discrete form as listed above.

:SOURce:DATA:TELecom:SONet:TRIButary:POVerhead:J1:PATTern?

Returns :	<discrete>

:SOURce:DATA:TELecom:SONet:TRIButary:POVerhead:J1 <string>

Sets the user defined pattern that is to be transmitted in the J1 byte of the STS SPE path overhead. The pattern should be 64 characters long, terminated with CR/LF. If less than 64 characters are input, the instrument will pad with the required number of NULL characters and terminate with CR/LF. The pattern repeats every 64 characters and is transmitted byte by byte in subsequent frames.

The corresponding query returns the value of the user defined pattern as a string, as defined above. If the string contains any non printing characters, ~ is substituted.

If CRC7T or CRC7U was returned in response to :SOURce:DATA:TELecom:SONet:POVerhead:J1:PATTern <discrete>, this query command is not valid.

:SOURce:DATA:TELecom:SONet:TRIButary:POVerhead:J1?

Returns :	<string>

:SOURce:DATA:TELecom:SONet:TRIButary:POVerhead:J1:CRC7 <string>

This command sets the CRC7 based user defined string that is to be transmitted using the J1 byte of the STS SPE path overhead, and configures the instrument to use this string. The string can be up to 15 characters in length; remaining characters are set to NULLs. A frame marker byte with CRC7 is added to this string. The string is transmitted byte by byte in subsequent frames. The string repeats every 16 characters. The corresponding query returns the current value of the string. If the string contains any non printing characters, ~ is substituted.

:SOURce:DATA:TELecom:SONet:TRIButary:POVerhead:J1:CRC7?

Returns :	<string>

:SOURce:DATA:TELecom:SONet:TRIButary:POVerhead:J1:HEXadecimal?

Returns :	<block>

Returns a 64 byte block of data. Each byte represents the hexadecimal value of an ASCII character of TU3 byte J1 in the range "00" to "FF". The 64 hexadecimal numbers are preceded by the header "#264".

If CRC7T or CRC7U was returned in response to :SOURce:DATA:TELecom:SONet:POVerhead:J1:PATTern <discrete>, this query command is not valid.

:SOURce:DATA:TELecom:SONet:TRIButary:POVerhead:J2:PATTern <discrete>

<discrete> =	DEFault	15 NULL characters
	TEST	GB(Serial Number)
	USER	User Defined
	FIXed	Fixed Byte

Sets the type of pattern that is to be transmitted in the J2 byte of the VT-6, VT-2 or VT-1.5 path overhead. The pattern repeats every 16 characters and is transmitted byte by byte in subsequent frames.

The corresponding query returns the type of pattern being transmitted in VT-6 or VT-2 path overhead byte J2 in discrete form as listed above.

:SOURce:DATA:TELecom:SONet:TRIButary:POVerhead:J2:PATTern?

Returns : <discrete>

:SOURce:DATA:TELecom:SONet:TRIButary:POVerhead:J2 <string>

Sets the user defined pattern that is to be transmitted in the J2 byte of the VT-6, VT-2 or VT-1.5 path overhead. The pattern should be 15 characters long. If less than 15 characters are input, the instrument will pad with the required number of NULL characters and a frame marker byte with CRC7 is added to the string. The pattern repeats every 16 characters and is transmitted byte by byte in subsequent frames.

The corresponding query returns the value of the user defined pattern as a string, as defined above. If the string contains any non printing characters, ~ is substituted.

:SOURce:DATA:TELecom:SONet:TRIButary:POVerhead:J2?

Returns : <string>

:SOURce:DATA:TELecom:SONet:TRIButary:POVerhead:J2:HEXadecimal?

Returns : <block>

Returns a 16 byte block of data. Each byte represents the hexadecimal value of an ASCII character of VT-6, VT-2 or VT-1.5 byte J2 in the range "00" to "FF". The 15 hexadecimal numbers are preceded by the header "#215".

:SOURce:DATA:TELecom:SONet:TRIButary:POVerhead:J2:FIXed <string>

<string> = "00000000" to "11111111"

Sets the user defined fixed byte that is to be transmitted in the J2 byte of the VT-6, VT-2 or VT-1.5 path overhead. The value is a binary string.

The corresponding query returns the value of the user defined fixed byte as a binary string, as defined above.

:SOURce:DATA:TELecom:SONet:TRIButary:POVerhead:J2:FIXed?

Returns : <string>

:SOURce:DATA:TELecom:SONet:TRIButary:POVerhead:V5:SLABel <numeric>

<numeric> = 0 to 7

Sets the VT-6, VT-2 or VT-1.5 signal label (Byte V5) value.
The corresponding query returns the signal label value in numeric form.

:SOURce:DATA:TELecom:SONet:TRIButary:POVerhead:V5:SLABel?

Returns : <numeric>

:SOURce:DATA:TELecom:SONet:TRIButary:POVerhead:C2:SLABel <discrete>

<discrete> **=**	UNEQuipped	Unequipped (00000000)
	EQUipped	Equipped (00000001)
	TUGStructure	TUG structure (00000010)
	LOCKed	Locked TU (00000011)
	DQDB	DQDB (00010100)
	FDDI	FDDI (00010101)
	BULK	Bulk Filled (11111110)
	VCAis	VCAIS
	USER	User Defined

Sets the LP Path Signal Label (C2 byte) if foreground payload TU-3 into an VC-4 is selected.

The corresponding query returns the C2 byte value in discrete short form.

:SOURce:DATA:TELecom:SONet:TRIButary:POV:C2:SLABel?

Returns: <discrete>

:SOURce:DATA:TELecom:SONet:POVerhead:H4Sequence <discrete>

<discrete> =	LONG	Long Sequence
	SHORt	Short Sequence
	COC1	COC1 Sequence

Sets the H4 path overhead byte sequence length when :SOURce:DATA:TELecom:SONet:PAYLoad <discrete> is set to VT6 or VT2 or VT1.5.

The corresponding query returns the H4 byte sequence length in discrete form as listed above.

:SOURce:DATA:TELecom:SONet:POVerhead:H4Sequence?

Returns : <discrete>

:SOURce:DATA:TELecom:SONet:OVERhead:SBYTe <discrete>

<discrete> =	SYNChronized	Synchronized - traceability unknown (0000)
	STRatum1	Stratum 1 traceable (0001)
	STRatum2	Stratum 2 traceable (0111)
	STRatum3	Startum 3 traceable (1010)
	SONet	SONET minimum clock traceable (1100)
	NETWork	Network synchronization (1110)
	DONTusesync	Do not use for synchronization (1111)
	USER	

Selects the SONET SYNC message type (S1 Byte Bits 5 to 8). To update the USER byte value use either the :SOURce:DATA:TELecom:SONet:OVERhead:DATA <numeric>, <numeric>, <discrete>, <string> or the :SOURce:DATA:TELecom:SONet:OVERhead:DATA:HEXadecimal <numeric>, <numeric>, <discrete>, <string> command.

The corresponding query returns the Sync Message type in discrete form as listed above.

:SOURce:DATA:TELecom:SONet:OVERhead:SBYTe?

Returns : <discrete>

:SOURce subsystem - Transmitter SONET Test Function Commands

:SOURce:DATA:TELecom:SONet:TFUNction:TYPE <discrete>

<discrete> =	ERRor	Errors & Alarms
	POINter	Pointer
	SEQuence	Overhead sequences
	STESt	Optical Stress
	APSMessages	APS messages
	IDCC	Insert Datacomm
	OBERtest	Overhead BER test

Selects the SONET transmit test function type. STESt is only valid when an optical line rate selected.

The corresponding query returns the test function type in discrete form as listed above.

:SOURce:DATA:TELecom:SONet:TFUNction:TYPE?

Returns :	<discrete>

:SOURce:DATA:TELecom:SONet:ERRor:TYPE <discrete>

<discrete> =	FRAMe	A1A2 frame errors
	EFRame	Entire frame or data errors
	CVS	CV-S (Section B1 BIP)
	CVL	CV-L (Line B2 BIP)
	REIL	REI-L (Line FEBE)
	CVP	CV-P (Path B3 BIP)
	REIP	REI-P (Path FEBE)
	CVIec	CV-IEC
	CVV	CV-V (VT Path BIP)
	REIV	REI-V (VT Path FEBE)

Selects SONET transmit test function error type when :SOURce:DATA:TELecom:SONet:TFUNction:TYPE <discrete>is set to ERR . Further selection of :SOURce:DATA:TELecom:SONet:ERRor:RATE <discrete> is required.

The corresponding query returns the SONET error type in discrete form as listed above.

:SOURce:DATA:TELecom:SONet:ERRor:TYPE?

Returns :	<discrete>

:SOURce:DATA:TELecom:SONet:ERRor:RATE <discrete>

<discrete> =	NONE	Errors Off
	ONCE	Single Error Add, Not Frame errors
	EALL	Error All (Not Frame)
	APSThreshold	APS Threshold (CV-L only)
	E_3	Bit, CV-L, REI-L, CV-V & REI-V only
	E_4	All except Frame errors
	E_5	All except Frame errors
	E_6	All except Frame errors
	E_7	All except Frame errors
	E_8	All except Frame errors
	E_9	All except Frame errors
	USER	User defined error rate
	ONE	Frame Errors only
	TWO	Frame Errors only
	THRee	Frame Errors only
	FOUR	Frame Errors only

Selects the transmitter SONET Error rate of the error type selected by :SOURce:DATA:TELecom:SONet:ERRor:TYPE <discrete>. This command is applicable when :SOURce:DATA:TELecom:TFUNction <discrete> is set to SONet.

The corresponding query returns the selected transmitter SONET error rate in discrete form, as listed above.

:SOURce:DATA:TELecom:SONet:ERRor:RATE?

Returns :	<discrete>

:SOURce:DATA:TELecom:SONet:ERRor:RATE:USER <numeric>

<numeric>=	9.9E-3 to 0.1E-9	mantissa resolution 0.1, exponent resolution 1

Sets the user defined SONET Error Add rate. Note that if :SOURce:DATA:TELecom:SONet:ERRor:RATE <discrete> is not already set to USER, then this command will automatically set it to USER.

Associated commands:

:SOURce:DATA:TELecom:SONet:ERRor:RATE <discrete>
Note that the maximum user defined error rate is dependent on both error type and line rate.

The corresponding query returns the user defined SONet Error Add rate in numeric form.

:SOURce:DATA:TELecom:SONet:ERRor:RATE:USER?

Returns: <numeric>

:SOURce:DATA:TELecom:SONet:ERRor:APSThreshold:NERRors <numeric>

<numeric> =	0 to 640 for STS 0
	0 to 1920 for STS1
	0 to 7680 for STS12
	0 to 30720 for STS48

Sets the number of errors for the APS Threshold when :SOURce:DATA:TELecom:SONet:ERRor:RATE <discrete>is set to APST.

The corresponding query returns the number of errors selected for the APS Threshold in numeric form.

:SOURce:DATA:TELecom:SONet:ERRor:APSThreshold:NERRors?

Returns : <numeric>

:SOURce:DATA:TELecom:SONet:ERRor:APSThreshold:EINTerval <discrete>

<discrete> =	MS10	10 milliseconds
	MS100	100 milliseconds
	S1	1 second
	S10	10 seconds
	S100	100 seconds
	S1000	1,000 seconds
	S10000	10,000 seconds

Sets the interval between APS Threshold errors when :SOURce:DATA:TELecom:SONet:ERRor:RATE <discrete>is set to APST .

The corresponding query returns the APS Threshold error interval in discrete form as listed above.

:SOURce:DATA:TELecom:SONet:ERRor:APSThreshold:EINTerval?

Returns : <discrete>

:SOURce:DATA:TELecom:SONet:ALARm <discrete>

<discrete> =	NONE	Alarms Off
	LOS	Loss of Signal
	LOF	Loss of Frame
	SEF	Severely Errored Frame Defect
	AISL	Line AIS (AIS-L)
	RDIL	Line FERF (RDI-L)
	LOPP	Loss of Pointer (LOP-P)
	AISP	Path AIS (AIS-P)
	RDIP	Path FERF (RDI-P)
	PUNequipped	Path Unequipped (UNEQ-P)
	LOPV	VT Loss of Pointer (LOP-V)
	AISV	VT Path AIS (AIS-V)
	RDIV	VT Path FERF (RDI-V)
	LOMultiframe	Multiframe (H4) Loss
	VTUNequipped	VT Unequipped

Selects the TX Test Function alarm type when :SOURce:DATA:TELecom:SONet:TFUNction:TYPE <discrete> is set to ERR.

The corresponding query returns the SONET alarm type in discrete form as listed above.

:SOURce:DATA:TELecom:SONet:ALARm?

Returns : <discrete>

:SOURce:DATA:TELecom:SONet:ALARm:SSEFrame

Generates a single Severely Errored Frame alarm.

:SOURce:DATA:TELecom:SONet:POINter <discrete>

<discrete> =	BURSt	Adds bursts
	NPOinter	New Pointer
	OFFSet	Adds offset in ppm
	T1105	Adds T1.105/GR-253 sequence

Selects the Pointer adjustment type when :SOURce:DATA:TELecom:SONet:TFUNction:TYPE <discrete> is set to POIN.

The corresponding query returns the pointer adjustment type in discrete form as listed above.

:SOURce:DATA:TELecom:SONet:POINter?

Returns : <discrete>

:SOURce:DATA:TELecom:SONet:POINter:TYPE <discrete>

<discrete> =	SPE
	VT

Selects the TX pointer type when :SOURce:DATA:TELecom:SONet:TFUNction:TYPE <discrete> is set to POIN.

The corresponding query returns the pointer type in discrete form as listed above.

:SOURce:DATA:TELecom:SONet:POINter:TYPE?

Returns : <discrete>

:SOURce:DATA:TELecom:SONet:POINter:DIRection <discrete>

<discrete> =	INCRement
	DECRement
	ALTernate

Selects the direction of the pointer burst adjustment when :SOURce:DATA:TELecom:SONet:TFUNction:TYPE <discrete> is set to POIN.

The corresponding query returns the pointer burst direction in discrete form as listed above.

:SOURce:DATA:TELecom:SONet:POINter:DIRection?

Returns : <discrete>

:SOURce:DATA:TELecom:SONet:POINter:IDECrement <numeric>

<numeric> =	1 to 10	SPE
	1 to 5	VT-6, VT-2, VT-1.5

Selects the number of places by which the pointer is to be incremented or decremented when :SOURce:DATA:TELecom:SONet:TFUNction:TYPE <discrete> is set to POIN and :SOURce:DATA:TELecom:SONet:POINter <discrete> is set to BURS .

The corresponding query returns the number of places in numeric form.

:SOURce:DATA:TELecom:SONet:POINter:IDECrement?

Returns : <numeric>

:SOURce:DATA:TELecom:SONet:POINter:TRANsmitted?

Returns: <numeric>

Returns the currently transmitted value of the SPE pointer in numeric form.

:SOURce:DATA:TELecom:SONet:POINter:ACTion

Forces the new pointer value defined by :SOURce:DATA:TELecom:SONet:POINter:VALue <numeric> to be adopted.

:SOURce:DATA:TELecom:SONet:POINter:VALue <numeric>

<numeric> = 0 to 782

Selects the SPE New Pointer value when :SOURce:DATA:TELecom:SONet:TFUNction:TYPE <discrete> is set to POIN and :SOURce:DATA:TELecom:SONet:POINter <discrete> is set to NPO.

The corresponding query returns the new pointer value in numeric form as listed above.

:SOURce:DATA:TELecom:SONet:POINter:VALue?

Returns : <numeric>

:SOURce:DATA:TELecom:SONet:TRIButary:POINter:TRANsmitted?

Returns: <numeric>

Returns the currently transmitted value of the VT pointer in numeric form.

:SOURce:DATA:TELecom:SONet:TRIButary:POINter:VALue <numeric>

0 to 427	for VT-6
0 to 139	for VT-2
0 to 103	for VT-1.5

Selects the VT New Pointer value when :SOURce:DATA:TELecom:SONet:TFUNction:TYPE <discrete> is set to POIN and :SOURce:DATA:TELecom:SONet:POINter <discrete> is set to NPO.

The corresponding query returns the new pointer value in numeric form as listed above.

:SOURce:DATA:TELecom:SONet:TRIButary:POINter:VALue?

Returns : <numeric>

:SOURce:DATA:TELecom:SONet:POINter:NPOinter <discrete>

<discrete> =	NDF	With New Data Flag
	NNDF	Without New Data Flag

Selects the type of new pointer when :SOURce:DATA:TELecom:SONet:TFUNction:TYPE <discrete> is set to POIN and :SOURce:DATA:TELecom:SONet:POINter <discrete> is set to NPO.

The corresponding query returns the type of new pointer in discrete form as listed above.

:SOURce:DATA:TELecom:SONet:POINter:NPOinter?

Returns :	<discrete>

:SOURce:DATA:TELecom:SONet:POINter:ADJust

Adjust pointer to new settings if :SOURce:DATA:TELecom:SONet:POINter <discrete> is set to BURS or NPO .

:SOURce:DATA:TELecom:SONet:POINter:OFFSet <discrete>

<discrete> =	SIGNal	Line offset
	SPE	SPE rate offset
	VT	VT rate offset

Determines whether the Output signal rate, SPE Rate or VT rate is offset.

The corresponding query returns the signal Rate, which is offset, in discrete form as listed above.

:SOURce:DATA:TELecom:SONet:POINter:OFFSet?

Returns :	<discrete>

:SOURce:DATA:TELecom:SONet:POINter:OFFSet:RATE <numeric>, <suffix>

<numeric> =	-100 to +100	parts per million
	-0.010 to +0.010	percent
<suffix> =	PPM	parts per million
	PCT	percent

Selects the amount of offset applied to the Output Signal Rate or the SPE Rate or the VT Rate when :SOURce:DATA:TELecom:SONet:TFUNction:TYPE <discrete> is set to POIN and :SOURce:DATA:TELecom:SONet:POINter <discrete> is set to OFFS. The default suffix unit is percent.

The corresponding query returns the offset in PPM.

:SOURce:DATA:TELecom:SONet:POINter:OFFSet:RATE?

Returns :	<numeric>

:SOURce:DATA:TELecom:SONet:POINter:T1105 <discrete>

<discrete>=	RSINgle	Repeating single (e)
	RBURst	Repeating burst (f)
	RPTRansient	Repeating phase transient
	PNORmal	Periodic normal (g/h)
	PADDed	Periodic added (g/h)
	PCANcelled	Periodic cancelled (g/h)

Selects the T1.105/GR-253 Pointer sequence adjustment type when :SOURce:DATA:TELecom:SONet:TFUNction:TYPE <discrete> is set to POIN and :SOURce:DATA:TELecom:SONet:POINter <discrete> is set to T1105 .

The corresponding query returns the T1.105/GR-253 adjustment type in discrete form as listed above.

:SOURce:DATA:TELecom:SONet:POINter:T1105?

Returns :	<discrete>

:SOURce:DATA:TELecom:SONet:POINter:T1105:PATTern <discrete>

<discrete> =	CONTinuous	No pattern
	P873	87:3 pattern
	P261	26:1 pattern

Selects the pattern of the T1.105/GR-253 pointer sequence when :SOURce:DATA:TELecom:SONet:TFUNction:TYPE <discrete> is set to POIN and :SOURce:DATA:TELecom:SONet:POINter <discrete> is set to T1105 and :SOURce:DATA:TELecom:SONet:POINter:T1105 <discrete> is set to PNOR, PADD or PCAN.

The corresponding query returns the T1.105/GR-253 pattern in discrete form as listed above.

:SOURce:DATA:TELecom:SONet:POINter:T1105:PATTern?

Returns :	<discrete>

:SOURce:DATA:TELecom:SONet:POINter:T1105:POLarity <discrete>

<discrete> =	NEGative
	POSitive

Selects the polarity of the T1.105/GR-253 pointer sequence when :SOURce:DATA:TELecom:SONet:TFUNction:TYPE <discrete> is set to POIN and :SOURce:DATA:TELecom:SONet:POINter <discrete> is set to T1105.

The corresponding query returns the T1.105/GR-253 polarity in discrete form as listed above.

:SOURce:DATA:TELecom:SONet:POINter:T1105:POLarity?

Returns :	<discrete>

:SOURce:DATA:TELecom:SONet:POINter:T1105:INTerval <numeric>, <suffix>

<numeric> =	1 to 500	See text
<suffix> =	MS	milliseconds
	S	seconds

Selects the interval between T1.105/GR-253 adjustments.

(STS-3C, STS-1, STS-12C, STS-48C) Range is 7.5ms, 10ms, 20ms, 30ms, 34ms, 40ms to 100ms in 10ms steps. 100 ms to 1s in 100ms steps. 1s, 2s, 5s and 10s. .

(VT-6, VT-2, VT-1.5) Range is 200ms, 500ms, 1s, 2s, 5s and 10s.

The corresponding query returns the T1.105/GR-253 interval as listed above.

The default suffix unit is seconds.

:SOURce:DATA:TELecom:SONet:POINter:T1105:INTerval?

Returns : <numeric>, <suffix>

:SOURce:DATA:TELecom:SONet:POINter:T1105:SEQuence <discrete>

<discrete> =	STOP	Stop the current T1.105/GR-253 pointer sequence
	STARt	Start a T1.105/GR-253 pointer sequence
	INITialize	Start a T1.105/GR-253 pointer sequence preceded by initialization and cooldown

Stops/Starts the T1.105/GR-253 pointer sequence.

The corresponding query returns the sequence start state in discrete form as listed above. See also STAT:SONet2.

:SOURce:DATA:TELecom:SONet:POINter:T1105:SEQuence?

Returns : <discrete>

:SOURce:DATA:TELecom:SONet:SEQuence <discrete>

<discrete> =	STOP	Stop current sequence
	STARt	Start new sequence

Starts/Stops a Single or Repeat run Sequence.

The corresponding query returns the Sequence mode in discrete form as listed above.

:SOURce:DATA:TELecom:SONet:SEQuence?

Returns : <discrete>

:SOURce:DATA:TELecom:SONet:SEQuence:MODE <discrete>

<discrete> =	SINGle	Single Run
	REPeat	Repeat Run

Selects the type of SEQUENCE when :SOURce:DATA:TELecom:SONet:TFUNction:TYPE <discrete> is set to SEQ.

The corresponding query returns the type of Sequence in discrete form as listed above.

:SOURce:DATA:TELecom:SONet:SEQuence:MODE?

Returns : <discrete>

:SOURce:DATA:TELecom:SONet:SEQuence:OHBYte <discrete>

<discrete> =	A1A2 | J0 | Z0 | E1 | F1 | D1D3| BNDA1A2|X22|X23|X32| X33	Section Overhead
	K1K2 | D4D12 | S1 | Z1 | Z2 | M1 | M0 | E2	Line Overhead
	J1 | C2 | G1 | F2 | H4 | Z3 | Z4 | N1	Path Overhead

Selects the overhead byte into which the overhead sequence is to be inserted when :SOURce:DATA:TELecom:SONet:TFUNction:TYPE <discrete> is set to SEQ. Some of the parameters are only available in certain STS-1’s or STS-3’s.

BNDA1A2 selects the 6 middle A1A2 boundary bytes.

The corresponding query returns the sequenced byte in discrete form as listed above.

:SOURce:DATA:TELecom:SONet:SEQuence:OHBYte?

Returns: <discrete>

:SOURce:DATA:TELecom:SONet:SEQuence:STS1 <numeric>

<numeric>	1 to 3	STS-1 Number of byte to sequence.

Sets the STS-1 Number of the byte to be sequenced.

The corresponding query returns the STS-1 Number in numeric form.

:SOURce:DATA:TELecom:SONet:SEQuence:STS1?

Returns: <numeric>

:SOURce:DATA:TELecom:SONet:SEQuence:STS3:SELect <numeric>

<numeric> = 1 to 16

Selects STS-3 number for channels that occur in more than one STS-3.

The corresponding query returns the STS-3 number in numeric form.

:SOURce:DATA:TELecom:SONet:SEQuence:STS3:SELect?

Returns: <numeric>

:SOURce:DATA:TELecom:SONet:SEQuence:DATA <discrete>, <string>

<discrete> =	A | B | C | D | E
<string> =	"00" to "FFFFFFFFFFFFFFFFFF"

Sets the Sequence data pattern for the designated block to the hexadecimal value contained in the string. The number of hexadecimal characters is dependent on the overhead byte or bytes selected. Two hexadecimal characters are required per byte, for Example:

E1 - 1 byte "00" to "FF"

D4D12 - 9 bytes "000000000000000000" to "FFFFFFFFFFFFFFFFFF"

The corresponding query returns the hexadecimal value of the designated block as a string.

:SOURce:DATA:TELecom:SONet:SEQuence:DATA? <discrete>

Returns : <string>

:SOURce:DATA:TELecom:SONet:SEQuence:ORDer <discrete>, <discrete>, <discrete>, <discrete>, <discrete>

<discrete> =	A | B | C | D | E

Selects the order of transmission for the blocks of data used in the sequence.

The corresponding query returns the block order in discrete form as listed above.

:SOURce:DATA:TELecom:SONet:SEQuence:ORDer?

Returns : <discrete>, <discrete>, <discrete>, <discrete>, <discrete>

:SOURce:DATA:TELecom:SONet:SEQuence:FCOunt <numeric>, <numeric>

<numeric> = (first parameter)	1 to 5	Block number
<numeric> = (second parameter)	0 to 64000	Frame count

Selects the number of frames in which the block of data, designated by the block_no, is to be transmitted.

The corresponding query returns the frame count of the block specified in numeric form.

:SOURce:DATA:TELecom:SONet:SEQuence:FCOunt? <numeric>

<numeric>=	1 to 5	Block number
Returns :	<numeric>	Frame count

:SOURce:DATA:TELecom:SONet:STESt:SPATtern <discrete>

<discrete> =	AZERos	All Zero’s pattern
	AONes	All Ones pattern
	G958	G.958 sequence

Selects the pattern used in the OC-3 Optical stress test when is set to STES.

The corresponding query returns the selected pattern in discrete form as listed above.

:SOURce:DATA:TELecom:SONet:STESt:SPATtern?

Returns :	<discrete>

:SOURce:DATA:TELecom:SONet:STESt:BLENgth <numeric>

<numeric> =	2 to 85	OC-1
	2 to 259	OC-3
	2 to 1042	OC-12
	2 to 4174	OC-48

Selects the block length used in the SONET Optical stress test when :SOURce:DATA:TELecom:SONet:TFUNction:TYPE <discrete> is set to STES.

The corresponding query returns the block length in numeric form.

:SOURce:DATA:TELecom:SONet:STESt:BLENgth?

Returns :	<numeric>

:SOURce:DATA:TELecom:SONet:APSMessages:TOPology <discrete>

<discrete> =	LINear	Linear protection
	RING	Ring protection

Selects the type of protection topology.

The corresponding query returns the selected protection topology in discrete short form.

:SOURce:DATA:TELecom:SONet:APSMessages:TOPology?

Returns:	<discrete>

:SOURce:DATA:TELecom:SONet:APSMessages:REQuest <discrete>

<discrete> =	NREQuest	No Request (0000)
	DNRevert	Do Not Revert (0001)
	RREQuest	Reverse Request (0010)
	THRee	Not Used (0011)
	EXERcise	Exercise (0100)
	FIVE	Not Used (0101)
	WTRestore	Wait To Restore (0110)
	SEVen	Not Used (0111)
	MSWitch	Manual Switch (1000)
	NINE	Not Used (1001)
	SDLPriority	Signal Degrade Low Priority (1010)
	SDHPriority	Signal Degrade High Priority (1011)
	SFLPriority	Signal Fail Low Priority (1100)
	SFHPriority	Signal Fail High Priority (1101)
	FSWitch	Forced Switch (1110)
	LOPRotection	Lockout Of Protection (1111)

Selects the transmitter SONET APS message to be transmitted (K1 Byte, Bits 1 to 4). Only valid if :SOURce:DATA:TELecom:TFUNction <discrete> is set to SONet and :SOURce:DATA:TELecom:SONet:TFUNction:TYPE <discrete> is set to APSM. SDHPriority and SFHPriority are only valid when :SOURce:DATA:TELecom:SONet:APSMessages:ARCHitecture <discrete> is set to OTN.

The corresponding query returns the selected transmitter SONET APS message type in discrete form, as listed above.

:SOURce:DATA:TELecom:SONet:APSMessages:REQuest?

Returns :	<discrete>

:SOURce:DATA:TELecom:SONet:APSMessages:CHANnel <numeric>

<numeric> =	0	NULL Channel
	1	Working Channel 1
	2	Working Channel 2
	3	Working Channel 3
	4	Working Channel 4
	5	Working Channel 5
	6	Working Channel 6
	7	Working Channel 7
	8	Working Channel 8
	9	Working Channel 9
	10	Working Channel 10
	11	Working Channel 11
	12	Working Channel 12
	13	Working Channel 13
	14	Working Channel 14
	15	Extra Traffic Channel

Selects the transmitter SONET APS message channel (K1 Byte, Bits 5 to 8). Only valid if :SOURce:DATA:TELecom:TFUNction <discrete> is set to SONet and :SOURce:DATA:TELecom:SONet:TFUNction:TYPE <discrete> is set to APSM. Working Channels 1 to 14 are only valid if :SOURce:DATA:TELecom:SONet:APSMessages:ARCHitecture <discrete> is set to OTN.

The corresponding query returns the selected transmitter SONET APS message channel in numeric form, as listed above.

:SOURce:DATA:TELecom:SONet:APSMessages:CHANnel?

Returns :	<numeric>

:SOURce:DATA:TELecom:SONet:APSMessages:BRIDge <string>

<string> =	"0000" to "1111"

Selects the SONET transmitter Linear APS message bridged channel (K2 Byte, Bits 1 to 4). Only valid if :SOURce:DATA:TELecom:TFUNction <discrete> is set to SONet and :SOURce:DATA:TELecom:SONet:TFUNction:TYPE <discrete> is set to APSM and :SOURce:DATA:TELecom:SONet:APSMessages:TOPology <discrete> is set to LIN.

The corresponding query returns the APS messages bridged channel as a string as listed above.

:SOURce:DATA:TELecom:SONet:APSMessages:BRIDge?

Returns :	<string>

:SOURce:DATA:TELecom:SONet:APSMessages:ARCHitecture <discrete>

<discrete> =	OTONe	1+1
	OTN	1:N

Selects the SONET transmitter Linear APS architecture (K2 Byte, Bit 5). Only valid if :SOURce:DATA:TELecom:TFUNction <discrete> is set to SONet and :SOURce:DATA:TELecom:SONet:TFUNction:TYPE <discrete> is set to APSM and :SOURce:DATA:TELecom:SONet:APSMessages:TOPology <discrete> is set to LIN.

The corresponding query returns the selected transmitter SONET APS message architecture in discrete form, as listed above.

:SOURce:DATA:TELecom:SONet:APSMessages:ARCHitecture?

Returns :	<discrete>

:SOURce:DATA:TELecom:SONet:APSMessages:REServed <numeric>

<numeric> =	0	000
	1	001
	2	010
	3	011
	4	100
	5	101

Selects the SONET transmitter Linear APS messages reserved bits (K2 Byte, Bits 6 to 8) in numeric form.

Only valid if :SOURce:DATA:TELecom:TFUNction <discrete> is set to SONet and :SOURce:DATA:TELecom:SONet:TFUNction:TYPE <discrete> is set to APSM and :SOURce:DATA:TELecom:SONet:APSMessages:TOPology <discrete> is set to LIN.

The corresponding query returns the selected transmitter SONET APS message reserved bits in numeric form.

:SOURce:DATA:TELecom:SONet:APSMessages:REServed?

Returns: <numeric>

:SOURce:DATA:TELecom:SONet:APSMessages:RCODe <discrete>

<discrete> =	NREQuest	No Request (0000)
	RRRing	Reverse Request - Ring (0001)
	RRSPan	Reverse Request - Span (0010)
	ERINg	Exerciser - Ring (0011)
	ESPan	Exerciser - Span (0100)
	WTRestore	Wait to Restore (0101)
	MSRing	Manual Switch - Ring (0110)
	MSSPan	Manual Switch - Span (0111)
	SDRing	Signal Degrade - Ring (1000)
	SDSPan	Signal Degrade - Span (1001)
	SDPRotection	Signal Degrade - Protection (1010)
	SFRing	Signal Fail - Ring (1011)
	SFSPan	Signal Fail - Span (1100)
	FSRing	Forced Switch Ring (1101)
	FSSPan	Forced Switch - Span(1110)
	LOPRotection	Lockout Of Protection (1111)

Selects the transmitter Ring APS message to be transmitted (K1 Byte, Bits 1 to 4). Only valid if :SOURce:DATA:TELecom:TFUNction <discrete> is set to SONet and :SOURce:DATA:TELecom:SONet:TFUNction:TYPE <discrete> is set to APSM and :SOURce:DATA:TELecom:SONet:APSMessages:TOPology <discrete> is set to RING.

The corresponding query returns the selected transmitter SONET APS message type in discrete short form.

:SOURce:DATA:TELecom:SONet:APSMessages:RCODe?

Returns:	<discrete>

:SOURce:DATA:TELecom:SONet:APSMessages:DNODe <string>

<string> = "0000" to "1111"

Selects the SONET transmitter Ring APS message destination node (K1 Byte, Bits 5 to 8). Only valid if :SOURce:DATA:TELecom:TFUNction <discrete> is set to SONet and :SOURce:DATA:TELecom:SONet:TFUNction:TYPE <discrete> is set to APSM and :SOURce:DATA:TELecom:SONet:APSMessages:TOPology <discrete> is set to RING.

The corresponding query returns the APS messages destination node as a string as listed above.

:SOURce:DATA:TELecom:SONet:APSMessages:DNODe?

Returns: <string>

:SOURce:DATA:TELecom:SONet:APSMessages:SNODe <string>

<string> = "0000" to "1111"

Selects the SONET transmitter Ring APS message source node (K2 Byte, Bits 1 to 4) . Only valid if :SOURce:DATA:TELecom:TFUNction <discrete> is set to SONet and :SOURce:DATA:TELecom:SONet:TFUNction:TYPE <discrete> is set to APSM and :SOURce:DATA:TELecom:SONet:APSMessages:TOPology <discrete> is set to RING.

The corresponding query returns the APS messages source node as a string as listed above.

:SOURce:DATA:TELecom:SONet:APSMessages:SNODe?

Returns: <string>

:SOURce:DATA:TELecom:SONet:APSMessages:PCODe <discrete>

<discrete> =	SHORt	Short path
	LONG	Long path

Selects the SONET transmitter Ring APS message path type (K2 bit 5). Only valid if :SOURce:DATA:TELecom:TFUNction <discrete> is set to SONet and :SOURce:DATA:TELecom:SONet:TFUNction:TYPE <discrete> is set to APSM and :SOURce:DATA:TELecom:SONet:APSMessages:TOPology <discrete> is set to RING.

The corresponding query returns the Ring APS messages path type in discrete short form.

:SOURce:DATA:TELecom:SONet:APSMessages:PCODe?

Returns:	<discrete>

:SOURce:DATA:TELecom:SONet:APSMessages:SCODe <discrete>

<discrete> =	IDLE	Idle (000)
	BRIDged	Bridged (001)
	BASWitched	Bridged & Switched (010)
	P011	011
	P100	100
	P101	101

Selects the SONET transmitter Ring APS messages status code (K2 Byte, Bits 6 to 8). Only valid if :SOURce:DATA:TELecom:TFUNction <discrete> is set to SONet and :SOURce:DATA:TELecom:SONet:TFUNction:TYPE <discrete> is set to APSM and :SOURce:DATA:TELecom:SONet:APSMessages:TOPology <discrete> is set to RING.

The corresponding query returns the selected transmitter SONET APS message status code in discrete form as listed above.

:SOURce:DATA:TELecom:SONet:APSMessages:SCODe?

Returns:	<discrete>

:SOURce:DATA:TELecom:SONet:APSMessages:DOWNload

Start transmission of the SONET transmitter APS message. Only valid if :SOURce:DATA:TELecom:TFUNction <discrete> is set to SONet and :SOURce:DATA:TELecom:SONet:TFUNction:TYPE <discrete> is set to APSM.

:SOURce:DATA:TELecom:SONet:IDCC <discrete>

<discrete> =	SDCC	Section DCC
	LDCC	Line DCC

Selects the Data Communication Channel Insert port when :SOURce:DATA:TELecom:SONet:TFUNction:TYPE <discrete> is set to IDCC .

The corresponding query returns the selected port in discrete form as listed above.

:SOURce:DATA:TELecom:SONet:IDCC?

Returns :	<discrete>

:SOURce:DATA:TELecom:SONet:OBERtest:CHANnel <discrete>

<discrete> =	C1/J0|Z0|E1|F1|D1|D2|D3|	Section Overhead
	K1|K2|D4|D5|D6|D7| D8|D9|D10|D11|D12|X22| X23|X32|X33 S1/Z1|M0/M1/Z2|E2|	Line Overhead
	J1|C2|G1|F2|H4|Z3| Z4|N1	Path Overhead

Selects the TX overhead byte used for the overhead BER test when :SOURce:DATA:TELecom:SONet:TFUNction:TYPE <discrete> is set to OBER. M0 is valid at STS-1 only.

The corresponding query returns the overhead byte identity in discrete form as listed above.

:SOURce:DATA:TELecom:SONet:OBERtest:CHANnel?

Returns	<discrete>

:SOURce:DATA:TELecom:SONet:OBERtest:STS1 <numeric>

<numeric> 1 to 3

Sets the STS-1 Number (within the currently selected STS-3) of the Section Overhead byte currently selected for the overhead bit transmitter error rate test function.

The command is only valid if :SOURce:DATA:TELecom:SONet:TFUNction:TYPE <discrete> is set to OBER. It is only applicable when Z0 is selected by :SOURce:DATA:TELecom:SONet:OBERtest:CHANnel <discrete>

The corresponding query returns the STS-1 Number in numeric form as described above.

:SOURce:DATA:TELecom:SONet:OBERtest:STS1?

Returns: <numeric>

:SOURce:DATA:TELecom:SONet:OBERtest:STS3:SELect <numeric>

<numeric> = 1 to 16

Selects STS-3 number for channels that occur in more than one STS-3:

It is only applicable when Z0 is selected by :SOURce:DATA:TELecom:SONet:OBERtest:CHANnel <discrete>

The corresponding query returns the STS-3 number in numeric form.

:SOURce:DATA:TELecom:SONet:OBERtest:STS3:SELect?

Returns: <numeric>

:SOURce:DATA:TELecom:SONet:OBERtest <discrete>

<discrete> = ONCE Single error

Injects a single overhead BER error when

SOURce:DATA:TELecom:SONet:TFUNction:TYPE <discrete> is set to OBER.

INPut subsystem

This subsytem controls the characteristics of the instrument's input ports.

:INPut:TELecom:SONet:RATE <discrete>

<discrete> =	STS1	STS-1 Electrical
	STS3	STS-3 Electrical

Is only valid when the SONET Module is fitted and :SENSe:DATA:TELecom:SENSe <discrete> is set to SONet.

The corresponding query returns the SONET rate in discrete short form.

:INPut:TELecom:SONet:RATE?

Returns : <discrete>

:INPut:TELecom:SONet:GAIN <discrete>

<discrete> =	DB20	20 dB Gain
	DB26	26 dB Gain

Selects the Monitor gain for the SONET receiver. Only valid when :INPut:TELecom:LEVel <discrete> is set to MON.

The corresponding query returns the Monitor gain in discrete short form.

:INPut:TELecom:SONet:GAIN?

Returns: <discrete>

:INPut:TELecom:OC48:RATE <discrete>

<discrete> =	OC1	OC-1 optical
	OC3	OC-3 Optical
	OC12	OC-12 Optical
	OC48	OC-48 Optical

Sets the input rate for the optical input port.
:SENSe:DATA:TELecom:SENSe <discrete> is set to OC48.

The corresponding query returns the OC-48 input rate in discrete form, as listed above.

:INPut:TELecom:OC48:RATE?

Returns :	<discrete>

:INPut:TELecom:OC48:INTerface <discrete>

<discrete> =	OPTical	Optical input
	MONitor	Protected Monitor Input
	BINary	Binary input

Selects the input interface.

The corresponding query returns the input interface in discrete form, as listed above.

:INPut:TELecom:OC48:INTerface?

Returns:	<discrete>

:INPut:TELecom:OC48:INTerface:BINary:CLOCk:POLarity <discrete>

<discrete>=	NORMal	Clock not inverted
	INVert	Clock inverted

Selects the polarity of the input binary clock.

The corresponding query returns the polarity of the binary clock output in discrete form.

:INPut:TELecom:OC48:INTerface:BINary:CLOCk:POLarity?

Returns:	<discrete>

:INPut:TELecom:OC48:INTerface:BINary:DATA:POLarity <discrete>

<discrete>=	NORMal	Data not inverted
	INVert	Data inverted

Selects the polarity of the binary data input.

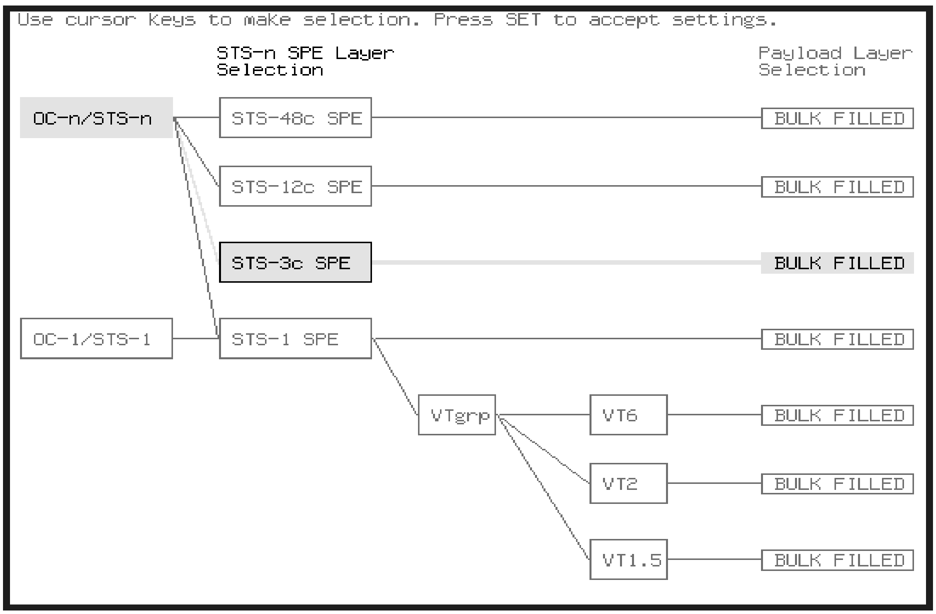
The corresponding query returns the polarity of the binary data output in discrete form.

:INPut:TELecom:OC48:INTerface:BINary:DATA:POLarity?

Returns:	<discrete>

SENSe subsystem - Receiver SONET Settings

SONET Mapping settings



:SENSe:DATA:TELecom:SONet:STS3 <numeric>

<numeric> =	1 to 16	STS-3 Number under test

Selects the STS-3 number under test.

The corresponding query returns the test STS3 number.

:SENSe:DATA:TELecom:SONet:STS3?

Returns :	<numeric>

:SENSe:DATA:TELecom:SONet:STS12c <numeric>

<numeric> =	1 to 4	STS-12c Number under test

SPE Layer Selection

:SENSe:DATA:TELecom:SONet:SPE:TYPE <discrete>

<discrete> =	STS3c
	STS1
	STS12c
	STS48c

Set the SPE mapping into an STS-N frame.

The corresponding query returns the SPE layer in discrete form as listed above.

:SENSe:DATA:TELecom:SONet:SPE:TYPE?

Returns:	<discrete>

:SENSe:DATA:TELecom:SONet:STS1 <numeric>

<numeric> =	1 to 3	STS1 Number

Selects the SONET Receiver active STS-1 within the STS-3.

The corresponding query returns the active STS-1 in numeric form.

:SENSe:DATA:TELecom:SONet:STS1?

Returns :	<numeric>

VT Layer Selection

:SENSe:DATA:TELecom:SONet:PAYLoad <discrete>

<discrete> =	STS3C
	STS1
	VT2
	VT6
	STS12c
	STS48c
	VT15

This command selects the SONET receiver mapping

The corresponding query returns the mapping in discrete form, as listed above.

:SENSe:DATA:TELecom:SONet:PAYLoad?

Returns : <discrete>

Payload Layer Selection

:SENSe:DATA:TELecom:SONet:PRIMary:TS0 <boolean>

<boolean> =	0 or OFF	Data in TS0
	1 or ON	Signaling in TS0

Determines the content of TS0 as Data/Signaling.

The corresponding query returns the TS0 state in numeric form.

:SENSe:DATA:TELecom:SONet:PRIMary:TS0?

Returns : <boolean>

VT Group

:SENSe:DATA:TELecom:SONet:VTGRoup <numeric>

<numeric> =	1 to 7

Selects the SONET Receiver active VT Group within the selected STS-1.

The corresponding query returns the active VT Group in numeric form.

:SENSe:DATA:TELecom:SONet:VTGRoup?

Returns :	<numeric>

:SENSe:DATA:TELecom:SONet:TRIButary <numeric>

<numeric> =	1 to 3	Tributary number for VT-2
	1 to 4	Tributary number for VT-15

Selects the SONET Receiver active VT within the selected VT Group.

The corresponding query returns the receiver test tributary in numeric form.

:SENSe:DATA:TELecom:SONet:TRIButary?

Returns :	<numeric>

VT Test Pattern

:SENSe:DATA:TELecom:SONet:PAYLoad:PATTern <discrete>

<discrete> =	PRBS9	2^{9}-1
	PRBS11	2^{11}-1
	PRBS15	2^{15}-1
	PRBS20	2^{20}-1
	PRBS23	2^{23}-1
	AZERo	All Zero’s
	AONE	All One’s
	P1010	Word 1010
	P1000	Word 1000
	UWORd	16 Bit User Word
	LIVE	Live Traffic

Selects the receiver SONET payload data pattern.

If UWORd is selected, the word pattern is set using :SENSe:DATA:TELecom:SONet:PAYLoad:UWORd <string>

The corresponding query returns the receiver SONET payload data pattern in discrete form as listed above.

:SENSe:DATA:TELecom:SONet:PAYLoad:PATTern?

Returns : <discrete>

:SENSe:DATA:TELecom:SONet:PAYLoad:UWORd <string>

Sets the receiver user word pattern in the range "0000000000000000" to "1111111111111111".

The corresponding query returns the user word pattern as a string.

:SENSe:DATA:TELecom:SONet:PAYLoad:UWORd?

Returns : <string>

:SENSe:DATA:TELecom:SONet:PRBS:POLarity <discrete>

<discrete> =	NORMal
	INVerted

Selects the PRBS pattern polarity.

The corresponding query returns the PRBS pattern polarity in discrete form as listed above.

:SENSe:DATA:TELecom:SONet:PRBS:POLarity?

Returns :	<discrete>

:SENSe:DATA:TELecom:SONet:TRIButary:CONCatenate <numeric>,<numeric>

<numeric> =	0	Concatenation Off
	2	VT6-2c
	3	VT6-3c
	4	VT6-4c
	5	VT6-5c
	6	VT6-6c
<numeric> =	1 to 6	VT6-2c selected
	1 to 5	VT6-3c selected
	1 to 4	VT6-4c selected
	1 to 3	VT6-5c selected
	1 to 2	VT6-6c selected

Selects the VT6 concatenation level (first parameter) and starting at the VT (second parameter).

The corresponding query returns the VT6 concatenation and starting VT in numeric form as listed above.

:SENSe:DATA:TELecom:SONet:TRIButary:CONCatenate?

Returns :	<numeric>,<numeric>

SENSe subsystem - Receiver SONET Test Function Commands

Lists the commands associated with the RECEIVE TEST FUNCTION display.

:SENSe:DATA:TELecom:SONet:TFUNction:TYPE <discrete>

<discrete> =	NONE	Off
	OCAPture	Overhead Capture
	DDCC	DCC Drop
	PGRaph	Pointer Graph
	OBERtest	Overhead BER

Selects the active Receiver Test Function.

The corresponding query returns the active Receiver Test Function, in discrete form as listed above.

:SENSe:DATA:TELecom:SONet:TFUNction:TYPE?

Returns :	<discrete>

:SENSe:DATA:TELecom:SONet:OCAPture <discrete>

<discrete> =	STOP	Terminates a Capture
	STARt	Starts a Capture

Starts or terminates an Overhead Capture. Is only valid when :SENSe:DATA:TELecom:SONet:TFUNction:TYPE <discrete> is set to OCAP.

The corresponding query returns the current state of the Overhead Capture, in discrete form as listed above.

:SENSe:DATA:TELecom:SONet:OCAPture?

Returns :	<discrete>

:SENSe:DATA:TELecom:SONet:OCAPture:OHBYte <discrete>

<discrete> =	A1A2 | J0/Z0 | E1 | F1 | D1D3| BNDA1A2|X22|X23|X32|X33	Section Overhead
	H1H2 | K1K2 | D4D12 | S1/Z1 | M1/Z2| E2	Line Overhead
	J1 | C2 | G1 | F2 | H4 | Z3 | Z4 | N1	Path Overhead

Selects the overhead byte or bytes to be captured. Is only valid when :SENSe:DATA:TELecom:SONet:TFUNction:TYPE <discrete> is set to OCAP.

BNDA1A2 selects the 6 middle A1A2 boundary bytes.

The corresponding query returns the byte(s) to be captured in discrete form as listed above.

:SENSe:DATA:TELecom:SONet:OCAPture:OHBYte?

Returns: <discrete>

:SENSe:DATA:TELecom:SONet:OCAPture:STS1 <numeric>

<numeric> = 1 to 3

Selects the Section overhead column from which to capture. This only applies to Z1 and Z2.

The corresponding query returns the column to be captured in numeric form.

:SENSe:DATA:TELecom:SONet:OCAPture:STS1?

<numeric>= 1 to 3

:SENSe:DATA:TELecom:SONet:OCAPture:STS3:SELect <numeric>

<numeric> = 1 to 16

Only valid if a rate higher than STS-3 is selected. Selects STS-3 number for channels that occur in more than one STS-3.

The corresponding query returns the STS-3 number in numeric form.

:SENSe:DATA:TELecom:SONet:OCAPture:STS3:SELect?

Returns:	<numeric>

:SENSe:DATA:TELecom:SONet:OCAPture:TRIGger <discrete>

<discrete> =	OFF	
	ON	
	ONNot	On Not

Selects the Overhead Capture Trigger mode. If OFF is selected, capture begins immediately. If ON is selected, capture begins when the received data matches the pattern defined by :SENSe:DATA:TELecom:SONet:OCAPture:TRIGger:PATTern <string>. If ONN is selected, capture begins when the received data does not match the pattern defined by :SENSe:DATA:TELecom:SONet:OCAPture:TRIGger:PATTern <string>.

The corresponding query returns the selected Trigger mode, in discrete form as listed above.

:SENSe:DATA:TELecom:SONet:OCAPture:TRIGger?

Returns :	<discrete>

:SENSe:DATA:TELecom:SONet:OCAPture:TRIGger:PATTern <string>

Sets the Overhead Capture Trigger Pattern to the hexadecimal value contained in the string. The number of hexadecimal characters in the string is dependent on the overhead byte or bytes selected.
Two hexadecimal characters are required per byte, for example:
E1 - 1 Byte - "00" to "FF"
D4D12 - 9 Bytes - "000000000000000000" to "FFFFFFFFFFFFFFFFFF"

Is only valid when :SENSe:DATA:TELecom:SONet:TFUNction:TYPE <discrete> is set to OCAP and :SENSe:DATA:TELecom:SONet:OCAPture:TRIGger <discrete> is set to ON or ONN

The corresponding query returns the Trigger Pattern selected, as a string as described above.

:SENSe:DATA:TELecom:SONet:OCAPture:TRIGger:PATTern?

Returns :	<string>

:SENSe:DATA:TELecom:SONet:DDCC <discrete>

<discrete> =	SDCC	Section DCC
	LDCC	Line DCC

Selects the DataCommunications channel to be dropped via the rear panel DROP port. Is only valid when :SENSe:DATA:TELecom:SONet:TFUNction:TYPE <discrete> is set to DDCC.

The corresponding query returns the selected DCC, in discrete form as listed above.

:SENSe:DATA:TELecom:SONet:DDCC?

Returns : <discrete>

:SENSe:DATA:TELecom:SONet:PGRaph:PTYPe <discrete>

<discrete> =	STS3c
	STS1
	STS12c
	STS48c
	VT6
	VT2
	VT15

Selects the type of pointer to be captured for pointer graph.

The corresponding query returns the type of pointer, in discrete short form.

:SENSe:DATA:TELecom:SONet:PGRaph:PTYPe?

Returns: <discrete>

:SENSe:DATA:TELecom:SONet:PGRaph:CINTerval <discrete>

<discrete> =	SEC1	1 second interval
	SEC5	5 second interval
	SEC20	20 second interval
	MIN1	1 minute interval

MIN5	5 minute interval
MIN20	20 minute interval

Selects the pointer graph capture interval.

The corresponding query returns the pointer graph capture interval, in discrete form as listed above.

:SENSe:DATA:TELecom:SONet:PGRaph:CINTerval?

Returns: <discrete>

:SENSe:DATA:TELecom:SONet:OBERtest:STS3 <discrete>

<discrete> =	C1/J0 | Z0 | E1 | F1 | D1 | D2 | D3	Section Overhead
	K1 | K2 | D4 | D5 | D6 | D7 | D8 | D9 | D10 | D11 | D12 | S1/Z1 | M1/Z2 | M0 | E2|X22|X23|X32|X33	Line Overhead
	J1 | C2 | G1 | F2 | H4 | Z3 | Z4 | N1	Path Overhead

Selects the overhead byte used for the overhead BER test. Is only valid when :SENSe:DATA:TELecom:SONet:TFUNction:TYPE <discrete>is set to OBER .

The corresponding query returns the Overhead byte name in discrete form as listed above.

:SENSe:DATA:TELecom:SONet:OBERtest:STS3?

Returns: <discrete>

:SENSe:DATA:TELecom:SONet:OBERtest:STS1 <numeric>

<numeric>= 1 to 3

Sets the STS-1 Number (within the currently selected STS-3) of the Section overhead of the channel for the receiver overhead BER test function. This command is only valid if :SENSe:DATA:TELecom:SONet:TFUNction:TYPE <discrete> is set to OBER and it is only applicable when Z0 is selected by :SENSe:DATA:TELecom:SONet:OBERtest:CHANnel <discrete>.

The corresponding query returns the STS-1 Number in numeric form as listed above

:SENSe:DATA:TELecom:SONet:OBERtest:STS1?

Returns: <numeric>

:SENSe:DATA:TELecom:SONet:OBERtest:STS3:SELect <numeric>

<numeric> = 1 to 16

Only valid if a rate higher than STS-3 is selected. Selects STS-3 number for channels that occur in more than one STS-3. This command is only applicable when Z0 is selected by
:SENSe:DATA:TELecom:SONet:OBERtest:CHANnel <discrete>.

The corresponding query returns the STS-3 number in numeric form.

:SENSe:DATA:TELecom:SONet:OBERtest:STS3:SELect?

Returns: <numeric>

SENSe subsystem - Alarm Scan Control

:SENSe:DATA:TELecom:SONet:ASCan:MODE <discrete>

<discrete> =	AUTomatic	Automatic receiver configuration
	RSETtings	Fixed receiver configuration

Selects the SONET alarm scan mode.

The corresponding query returns the alarm scan mode in discrete short form.

:SENSe:DATA:TELecom:SONet:ASCan:MODE?

Returns:	<discrete>

:SENSe:DATA:TELecom:SONet:ASCan:BIP <discrete>

<discrete> =	OFF	Fail if Alarm
	GTE0	Fail if alarm or any BIP error
	GTEE_6	Fail if alarm or BIP ER > 10E-6
	GTEE_3	Fail if alarm or BIP ER > 10E-3

Selects the SONET alarm scan BIP error threshold.

The corresponding query returns the alarm scan BIP error threshold in discrete short form.

:SENSe:DATA:TELecom:SONet:ASCan:BIP?

Returns:	<discrete>

:SENSe:DATA:TELecom:SONet:ASCan <boolean>

<boolean> =	0 or OFF	Stop the current alarm scan
	1 or ON	Start a new alarm scan

Start/Stop the SONET alarm scan.

The corresponding query returns the alarm scan state as 0 or 1.

:SENSe:DATA:TELecom:SONet:ASCan?

Returns: <boolean>

SENSe subsystem - SONET Tributary Scan Control

:SENSe:DATA:TELecom:SONet:TSCan:PERiod <numeric>, <suffix>

<numeric> =	1 to 99	
<suffix> =	d	Days
	h	Hours
	m	Minutes
	s	Seconds

Sets the test duration for each tributary.

The corresponding query returns the test duration for each tributary.

:SENSe:DATA:TELecom:SONet:SONet:TSCan:PERiod?

Returns: <numeric>,<suffix>

:SENSe:DATA:TELecom:SONet:TSCan:BIP <discrete>

<discrete> =	GTE0	Fail if any BIP error
	GTEE_6	Fail if BIP ER > 10E-6
	GTEE_3	Fail if BIP ER > 10E-3

Selects the SONET tributary scan BIP error threshold.

The corresponding query returns the alarm scan BIP error threshold in discrete short form.

:SENSe:DATA:TELecom:SONet:TSCan:BIP?

Returns: <discrete>

:SENSe:DATA:TELecom:SONet:TSCan <boolean>

<boolean> =	0 or OFF	Stop the current tributary scan
	1 or ON	Start a new tributary scan

Start/Stop the SONET tributary scan.

The corresponding query returns the alarm scan state as 0 or 1.

:SENSe:DATA:TELecom:SONet:TSCan?

Returns:	<boolean>

SENSe subsystem - REI-L Result Enable/Disable

:SENSe:DATA:TELecom:SONet:REIL

<discrete>	OFF- don’t measure REI-L
	ON - measure REI-L

Allows measurement of REI-L to be suppressed. The default value is ON.

:SENSe:DATA:TELecom:SONet:REIL?

Returns:	<boolean>

The corresponding query returns the REI-L status as listed above.

SENSe subsystem - Result Returning Commands

Frequency Results (SONET)

:SENSe:DATA? <"result">

Result =	"FREQuency:SONet:GATE1S"	RX SONET clock frequency (1s gate)
	"FREQuency:SONet[:GATE16S]"	RX SONET clock frequency (16s gate)
	"FOFPpm:SONet[:GATE16S]"	RX SONET clock offset in ppm (16s gate)
	"FOFHz:SONet[:GATE16S]"	RX SONET clock offset in Hz (16s gate)

SONET Short Term Results

:SENSe:DATA? <"result">

Result =	"ECOunt:SONet:STERm:FRAMe"	Frame error count
	"ERATio:SONet:STERm:FRAMe"	Frame error ratio
	"ECOunt:SONet:STERm:CVS"	Section B1 BIP error count
	"ERATio:SONet:STERm:CVS"	Section B1 BIP error ratio
	"ECOunt:SONet:STERm:CVL"	Line B2 BIP error count
	"ERATio:SONet:STERm:CVL"	Line B2 BIP error ratio
	"ECOunt:SONet:STERm:REIL"	REI-L (Line FEBE) error count. See page 4-78.
	"ERATio:SONet:STERm:REIL"	REI-L (Line FEBE) error ratio. See page 4-78.
	"ECOunt:SONet:STERm:CVP"	Path B3 BIP error count
	"ERATio:SONet:STERm:CVP"	Path B3 BIP error ratio
	"ECOunt:SONet:STERm:REIP"	REI-P (Path FEBE) error count
	"ERATio:SONet:STERm:REIP"	REI-P (Path FEBE) error ratio
	"ECOunt:SONet:STERm:CVIec"	CV-IEC error count

"ERATio:SONet:STERm:CVIec"	CV-IEC error ratio
"ECOunt:SONet:STERm:TRIB:CVV"	VT Path BIP error count
"ERATio:SONet:STERm:TRIB:CVV"	VT Path BIP error ratio
"ECOunt:SONet:STERm:TRIB:REIV"	VT FEBE error count
"ERATio:SONet:STERm:TRIB:REIV"	VT FEBE error ratio

SONET Cumulative Results

:SENSe:DATA? <"result">

Result =	"ECOunt:SONet:FRAMe"	Frame error count
	"ERATio:SONet:FRAMe"	Frame error ratio
	"ECOunt:SONet:CVS"	Section B1 BIP error count
	"ERATio:SONet:CVS"	Section B1 BIP error ratio
	"ECOunt:SONet:CVL"	Line B2 BIP error count
	"ERATio:SONet:CVL"	Line B2 BIP error ratio
	"ECOunt:SONet:REIL"	REI-L (Line FEBE) error count. See page 4-78.
	"ERATio:SONet:REIL"	REI-L (Line FEBE) error ratio. See page 4-78.
	"ECOunt:SONet:CVP"	Path B3 BIP error count
	"ERATio:SONet:CVP"	Path B3 BIP error ratio
	"ECOunt:SONet:REIP"	REI-P (Path FEBE) error count
	"ERATio:SONet:REIP"	REI-P (Path FEBE) error ratio
	"ECOunt:SONet:CVIec"	CV-IEC error count
	"ERATio:SONet:CVIec"	CV-IEC error ratio
	"ECOunt:SONet:TRIB:CVV"	VT Path BIP error count
	"ERATio:SONet:TRIB:CVV"	VT Path BIP error ratio
	"ECOunt:SONet:TRIB:REIV"	VT FEBE error count

"ERATio:SONet:TRIB:REIV"	VT FEBE error ratio
"ECOunt:SONet:OVERhead"	Overhead error count

SONET Section B1 BIP (CV-S) Analysis Results

:SENSe:DATA? <"result">

Result=	"ESECondss:SONet:CVS:ANALysis"	Error Seconds
	"SESeconds:SONet:CVS:ANALysis"	Severely Errored Seconds
	"EBCount:SONet:CVS:ANALysis"	Errored block count
	"BBECount:SONet:CVS:ANALysis"	Background block error count
	"ESRatio:SONet:CVS:ANALysis"	Error Second Ratio
	"SESRatio:SONet:CVS:ANALysis"	Severely Errored Second Ratio
	"BBERatio:SONet:CVS:ANALysis"	Background Block Error ratio
	"UASeconds:SONet:CVS:ANALysis"	Unavailable seconds

SONET Line B2 BIP (CV-L) Analysis Results

:SENSe:DATA? <"result">

Result=	"ESEConds:SONet:CVL:ANALysis"	Error Seconds
	"SESeconds:SONet:CVL:ANALysis"	Severely Errored Seconds
	"EBCount:SONet:CVL:ANALysis"	Errored block count
	"BBECount:SONet:CVL:ANALysis"	Background block error count
	"ESRatio:SONet:CVL:ANALysis"	Error Second Ratio
	"SESRatio:SONet:CVL:ANALysis"	Severely Errored Second Ratio
	"BBERatio:SONet:CVL:ANALysis"	Background Block Error ratio
	"UASeconds:SONet:CVL:ANALysis"	Unavailable seconds
	"PUASeconds:SONet:CVL:ANALysis"	Path Unavailable seconds

SONET Line FEBE (REI-L) Analysis Results

:SENSe:DATA? <"result">

Result=	"ESEConds:SONet:REIL:ANALysis"	Error Seconds
	"SESeconds:SONet:REIL:ANALysis"	Severely Errored Seconds
	"EBCount:SONet:REIL:ANALysis"	Errored block count
	"BBECount:SONet:REIL:ANALysis"	Background block error count
	"ESRatio:SONet:REIL:ANALysis"	Error Second Ratio
	"SESRatio:SONet:REIL:ANALysis"	Severely Errored Second Ratio
	"BBERatio:SONet:REIL:ANALysis"	Background Block Error ratio
	"UASeconds:SONet:REIL:ANALysis"	Unavailable seconds
	"PUASeconds:SONet:REIL:ANALysis"	Path Unavailable seconds

If you wish to disable the REI-L measurement, see page 4-78.

SONET Path B3 BIP (CV-P) Analysis Results

:SENSe:DATA? <"result">

Result=	"ESEConds:SONet:CVP:ANALysis"	Error Seconds
	"SESeconds:SONet:CVP:ANALysis"	Severely Errored Seconds
	"EBCount:SONet:CVP:ANALysis"	Errored block count
	"BBECount:SONet:CVP:ANALysis"	Background block error count
	"ESRatio:SONet:CVP:ANALysis"	Error Second Ratio
	"SESRatio:SONet:CVP:ANALysis"	Severely Errored Second Ratio
	"BBERatio:SONet:CVP:ANALysis"	Background Block Error ratio
	"UASeconds:SONet:CVP:ANALysis"	Unavailable seconds
	"PUASeconds:SONet:CVP:ANALysis"	Path Unavailable seconds

SONET Path FEBE (REI-P) Analysis Results

:SENSe:DATA? <"result">

Result=	"ESECconds:SONet:REIP:ANALysis"	Error Seconds
	"SESeconds:SONet:REIP:ANALysis"	Severely Errored Seconds
	"EBCount:SONet:REIP:ANALysis"	Errored block count
	"BBECount:SONet:REIP:ANALysis"	Background block error count
	"ESRatio:SONet:REIP:ANALysis"	Error Second Ratio
	"SESRatio:SONet:REIP:ANALysis"	Severely Errored Second Ratio
	"BBERatio:SONet:REIP:ANALysis"	Background Block Error ratio
	"UASeconds:SONet:REIP:ANALysis"	Unavailable seconds
	"PUASeconds:SONet:REIP:ANALysis"	Path Unavailable seconds

SONET CV-IEC Analysis Results

:SENSe:DATA? <"result">

Result=	"ESECconds:SONet:CVIec:ANALysis"	Error Seconds
	"SESeconds:SONet:CVIec:ANALysis"	Severely Errored Seconds
	"EBCount:SONet:CVIec:ANALysis"	Errored block count
	"BBECount:SONet:CVIec:ANALysis"	Background block error count
	"ESRatio:SONet:CVIec:ANALysis"	Error Second Ratio
	"SESRatio:SONet:CVIec:ANALysis"	Severely Errored Second Ratio
	"BBERatio:SONet:CVIec:ANALysis"	Background Block Error ratio
	"UASeconds:SONet:CVIec:ANALysis"	Unavailable seconds

SONET Virtual Tributary Path BIP (CV-V) Analysis Results

:SENSe:DATA? <"result">

Result=	"ESECconds:SONet:TRIB:CVV:ANALysis"	Error Seconds
	"SESeconds:SONet:TRIB:CVV:ANALysis"	Severely Errored Seconds
	"EBCount:SONet:TRIB:CVV:ANALysis"	Errored block count
	"BBECount:SONet:TRIB:CVV:ANALysis"	Background block error count
	"ESRatio:SONet:TRIB:CVV:ANALysis"	Error Second Ratio
	"SESRatio:SONet:TRIB:CVV:ANALysis"	Severely Errored Second Ratio
	"BBERatio:SONet:TRIB:CVV:ANALysis"	Background Block Error ratio
	"UASeconds:SONet:TRIB:CVV:ANALysis"	Unavailable seconds
	"PUASeconds:SONet:TRIB:CVV:ANALysis"	Path Unavailable seconds

SONET Virtual Tributary Path FEBE (REI-V) Analysis Results

:SENSe:DATA? <"result">

Result =	"ESECconds:SONet:TRIB:REIV:ANALysis"	Error Seconds
	"SESeconds:SONet:TRIB:REIV:ANALysis"	Severely Errored Seconds
	"EBCount:SONet:TRIB:REIV:ANALysis"	Errored block count
	"BBECount:SONet:TRIB:REIV:ANALysis"	Background block error count
	"ESRatio:SONet:TRIB:REIV:ANALysis"	Error Second Ratio
	"SESRatio:SONet:TRIB:REIV:ANALysis"	Severely Errored Second Ratio
	"BBERatio:SONet:TRIB:REIV:ANALysis"	Background Block Error ratio
	"UASeconds:SONet:TRIB:REIV:ANALysis"	Unavailable seconds
	"PUASeconds:SONet:TRIB:REIV:ANALysis”	Path Unavailable seconds

SONET Block Based Bit Analysis Results

:SENSe:DATA? <"result">

Result =	"ESEConds:SONet:BLKBit:ANALysis"	Error Seconds
	"SESeconds:SONet:BLKBit:ANALysis"	Severely Errored Seconds
	"EBCount:SONet:BLKBit:ANALysis"	Errored block count
	"BBECount:SONet:BLKBit:ANALysis"	Background block error count
	"ESRatio:SONet:BLKBit:ANALysis"	Error Second Ratio
	"SESRatio:SONet:BLKBit:ANALysis"	Severely Errored Second Ratio
	"BBERatio:SONet:BLKBit:ANALysis"	Background Block Error ratio
	"UASeconds:SONet:BLKBit:ANALysis"	Unavailable seconds

SONET M.2101 Analysis Results

:SENSe:DATA? <“result”>

Result =	“ESEConds:SONet:LOW:RECeive:ANALysis:M2101”	Low Order Path Receive Direction Errored Seconds
	“SESeconds:SONet:LOW:RECeive:ANALysis:M2101”	Low Order Path Receive Direction Severely Errored Seconds
	“UASeconds:SONet:LOW:RECeive:ANALysis:M2101”	Low Order Path Receive Direction Unavailable Seconds
	“ESEConds:SONet:LOW:TRANsmit:ANALysis:M2101”	Low Order Path Transmit Direction Errored Seconds
	“SESeconds:SONet:LOW:TRANsmit:ANALysis:M2101”	Low Order Path Transmit Direction Severely Errored Seconds
	“UASeconds:SONet:LOW:TRANsmit:ANALysis:M2101”	Low Order Path Transmit Direction Unavailable Seconds
	“ESEConds:SONet:HIGH:RECeive:ANALysis:M2101”	High Order Path Receive Direction Errored Seconds

"SESeconds:SONet:HIGH:RECeive:ANALysis:M2101"	High Order Path Receive Direction Severely Errored Seconds
"UASeconds:SONet:HIGH:RECeive:ANALysis:M2101"	High Order Path Receive Direction Unavailable Seconds
"ESEConds:SONet:HIGH:TRANsmit:ANALysis:M2101"	High Order Path Transmit Direction Errored Seconds
"SESeconds:SONet:HIGH:TRANsmit:ANALysis:M2101"	High Order Path Transmit Direction Severely Errored Seconds
"UASeconds:SONet:HIGH:TRANsmit:ANALysis:M2101"	High Order Path Transmit Direction Unavailable Seconds
"ESEConds:SONet:SECTion:RECeive:ANALysis:M2101"	Section Layer Path Receive Direction Errored Seconds
"SESeconds:SONet:SECTion:RECeive:ANALysis:M2101"	Section Layer Path Receive Direction Severely Errored Seconds
"UASeconds:SONet:SECTion:RECeive:ANALysis:M2101"	Section Layer Path Receive Direction Unavailable Seconds
"ESEConds:SONet:SECTion:TRANsmit:ANALysis:M2101"	Section Layer Path Transmit Direction Errored Seconds
"SESeconds:SONet:SECTion:TRANsmit:ANALysis:M2101"	Section Layer Path Transmit Direction Severely Errored Seconds
"UASeconds:SONet:SECTion:TRANsmit:ANALysis:M2101"	Section Layer Path Transmit Direction Unavailable Seconds

SONET Service Disruption Results

:SENSe:DATA? <"result">

Result =	"SDTest:COUNt:LONG"	Longest error burst
	"SDTest:COUNt:SHORt"	Shortest error burst
	"SDTest:COUNt:LAST"	Last error burst

Returns: <range>,<value>

<range> =	0	Result invalid due to receiver configuration
	1	Result valid
	2	Result out of range

Value is returned in milliseconds. If the value is > 2000 or no result is available or the result is not applicable then 9.91E+37 is returned.

SONET Optical Power Result

:SENSe:DATA? <"result">

Result =	"OPOWer:SONet"	Optical power (dBm)

SONET Pointer Activity Results

:SENSe:DATA? <"result">

SONET Alarm Seconds Results

Result	"PACTivity:SONet:PVALue"	SPE Pointer value
	"PACTivity:SONet:NDFSeconds"	SPE Pointer NDF seconds
	"PACTivity:SONet:MNDFseconds"	SPE Pointer MNDF seconds
	"PACTivity:SONet:PCOunt"	SPE Pointer +ve Adj Count
	"PACTivity:SONet:PSECondsˮ	SPE Pointer +ve Adj Seconds
	"PACTivity:SONet:NCOunt"	SPE Pointer -ve Adj Count
	"PACTivity:SONet:NSEConds"	SPE Pointer -ve Adj Seconds

"PACTivity:SONet:IOFFset"	Implied SPE Offset
"PACTivity:SONet:TRIButary:PVALue"	VT Pointer Value
"PACTivity:SONet:TRIButary:NDFSeconds"	VT Pointer NDF seconds
"PACTivity:SONet:TRIButary:MNDFseconds"	VT Pointer MNDF seconds
"PACTivity:SONet:TRIButary:PCOunt"	VT Pointer +ve Adj Count
"PACTivity:SONet:TRIButary:PSECONds"	VT Pointer +ve Adj Seconds
"PACTivity:SONet:TRIButary:NCOunt"	VT Pointer -ve Adj Count
"PACTivity:SONet:TRIButary:NSECONds"	VT Pointer -ve Adj Seconds

:SENSe:DATA? <"result">

Result =	"ASECONds:SONet:LOS"	Loss Of Signal
	"ASECONds:SONet:LOF"	Loss Of Frame
	"ASECONds:SONet:SEF"	Severely Errored Frame Defect
	"ASECONds:SONet:H4MF"	H4 Multiframe Loss
	"ASECONds:SONet:LOPP"	Loss Of Pointer (LOP-P)
	"ASECONds:SONet:AISL"	Line AIS (AIS-L)
	"ASECONds:SONet:AISP"	Path AIS (AIS-P)
	"ASECONds:SONet:PSLoss"	Pattern Synchronization Loss (see Note on page 2-20)
	"ASECONds:SONet:RDIL"	Line FERF (RDI-L)
	"ASECONds:SONet:RDIP"	Path FERF (RDI-P)
	"ASECONds:SONet:K1K2"	K1K2 byte change
	"ASECONds:SONet:TRIB:LOPV"	VT Loss Of Pointer (LOP-V)
	"ASECONds:SONet:TRIB:AISV"	VT Path AIS (AIS-V)
	"ASECONds:SONet:TRIB:RDIV"	VT Path FERF (RDI-V)
	"ASECONds:SONet:TRIB:P1P0"	P1P0 Frame Synchronization Loss
	"ASECONds:SONet:OPSL"	Overhead Pattern Sync Loss

FETCh subsystem

The FETCh subsystem is used to retrieve data directly accumulated by the instrument.

:FETCh:STRing:DATA:TELecom:SONet:J0?

Returns: <string>

The value of the STS-N Section overhead J0 byte is returned as a 16 ASCII character string if CRC7 is not detected, 15 ASCII character string if CRC7 is detected. If the string contains any non printing characters then ~ is substituted. This is a snapshot of the overhead byte and is captured once per second.

:FETCh:STRing:DATA:TELecom:SONet:J0:HEXadecimal?

Returns: <block>

Returns the value of the STS-N Section overhead J0 byte as 16 hexadecimal numbers if CRC7 is not detected, 15 hexadecimal numbers if CRC7 is detected. Each number is in the range "00" to "FF". The block header is " #216"if CRC7 not detected, " #215" if CRC7 is detected. This is a snapshot of the overhead byte and is captured once per second.

:FETCh:STRing:DATA:TELecom:SONet:J1?

Returns : <string>

The value of the SPE J1 path trace byte is returned as a, 64 ASCII character, string (15 ASCII characters if CRC7 is detected). If the string contains any non printing characters then ~ is substituted. This is a snapshot of the overhead byte and is captured once per second.

:FETCh:STRing:DATA:TELecom:SONet:J1:HEXadecimal?

Returns : <block>

Returns the value of the SPE J1 path trace byte as 64 hexadecimal numbers (15 if CRC7 is detected).

Each number is in the range "00" to "FF". The block header is " #264" (" #215" if CRC7 is detected). This is a snapshot of the overhead byte and is captured once per second.

:FETCh:STRing:DATA:TELecom:SONet:TRIButary:J2?

Returns: <string>

Returns the 15 or 16 byte J2 path trace as a string. The OmniBER 72519 attempts to align the received pattern by detecting the CRC7 byte. If the CRC7 byte is detected, a 15 byte pattern is returned. If the CRC7 byte is not detected, a 16 byte pattern is returned. If the string contains any non-printing characters then ~ is substituted. This is a snapshot of the received path trace and is only updated once per second.

:FETCh:STRing:DATA:TELecom:SONet:TRIButary:J2:HEXadecimal?

Returns: <block>

Returns the value of the J2 path trace byte as 15 or 16 hexadecimal numbers. The OmniBER 725 attempts to align the received pattern by detecting the CRC7 byte. If the CRC7 byte is detected, 15 hexadecimal numbers are returned. If the CRC7 byte is not detected, 16 hexadecimal numbers are returned. Each number is in the range "00" to "FF". The block header is " #215" if 15 Hex numbers and " #216" if 16 Hex numbers. This is a snapshot of the overhead byte and is captured once per second.

:FETCh:STRing:DATA:TELecom:SONet:K1?

Returns : <string>

The value of the MPS K1 byte is returned as an 8 bit string in the range "00000000" to "11111111".

:FETCh:STRing:DATA:TELecom:SONet:K2?

Returns : <string>

The value of the MPS K2 byte is returned as an 8 bit string in the range "00000000" to "11111111".

:FETCh:STRing:DATA:TELecom:SONet:S1?

Returns : <string>

The value of the SYNC S1 byte (bits 5-8) is returned as a 4 bit string in the range "0000" to "1111".

:FETCh:SCALar:DATA:TELecom:SONet:OVERhead? <numeric>,<numeric>, <discrete>

<numeric> =(STS3#)	range 1 to 16
<numeric> =(STS1#)	range 1 to 3
<discrete> =	A1|A2|C1/J0/Z0|B1|E1|F1|D1|D2|D3|H1|H2 H3|B2|K1|K2|D4|D5|D6|D7|D8|D9|D10|D11 D12|S1/Z1|Z2/M1/M0|E2|X13|X21|X22|X23|X31 |X32|X33|X52|X53|X61|X62|X63|X71 |X72|X73|X81|X82|X83|X93

Returns the selected overhead byte as an 8 bit binary string in the range "00000000" to "11111111". The byte number is given by its defined name if it has one. Undefined bytes are represented by <Xrc>, where r is the numerical value of the bytes row in the transport overhead and c is the numerical value of the bytes column in the transport overhead. If an STS-3 signal is being transmitted, the only applicable value of STS3# is 1.

:FETCh:SCALar:DATA:TELecom:SONet:POVerhead:H4Sequence?

Returns: <string>

Obtains the length of the H4 byte sequence.

Returns :	<discrete>	LONG	Long sequence
		SHORt	Short sequence
		UNKNown	Unknown sequence

:FETCh:SCALar:DATA:TELecom:SONet:POVerhead? <discrete>

<discrete> = J1|B3|C2|G1|F2|H4|Z3|Z4|N1

Obtains the value of the named path overhead byte. The value of the named byte is returned as a string in the range "00000000" to "11111111". This is a snapshot of the overhead byte and is captured once per second.

Returns: <string>

:FETCh:SCALar:DATA:TELecom:SONet:TRIButary:POVerhead? <discrete>

<discrete> = V5|Z6|Z7 VT-6/VT-2/VT-1.5

Obtains the value of the specified path overhead byte. The value of the named byte is returned as a string in the range "00000000" to "11111111". This is a snapshot of the overhead byte and is captured once per second.

Returns: <string>

:FETCh:SCALar:DATA:TELecom:SONet:TRIButary:POVerhead:SLABel?

Returns the VT-6/VT-2/VT-1.5 signalling label of the selected tributary in numeric form.

Returns: <numeric>

:FETCh:ARRay:DATA:TELecom:SONet:ASCan?

Returns (each of one or more rows): <numeric>{,<numeric}

The results returned are those for the last FULL scan. Results from partial scans are not available. If no full scan has been completed since the instrument was powered up, this command will return -1.

If data is available it is returned as a set of string arrays one for each scanned group. The arrays are separated by a CR/LF pair. A group is defined as a set of scanned paths at either the SPE or VT level. The arrays consist of comma separated numerics, one for each path scanned. The value of the numeric indicates the status of the scanned path. The following values are valid.

Value	State
0	No Problems Detected
1	Alarms or Errors Detected
2	Path Unequipped
3	Loss of Pointer
4	AIS
5	RDI
6	H4 Multiframe Loss
?	Invalid

For a specific signal structure, the format of the returned strings are shown below:

a) STS-3 STS-1 VT-6

This signal consists of 3 STS-1s each of which contains 7 VT-Groups. The VT-Groups's in turn each contain 1 VT-6. From the perspective of the Alarm Scan function the paths are 3 at the STS-1 level and 21 at the VT level. The STS-1 paths are defined as a group on their own while the 21 VTs are arranged as 3 groups of 7 paths with the groups corresponding to the STS-1 allocation. For this configuration, four arrays are returned with fomats shown below:

STS-3 -> STS1#1, STS1#2, STS1#3
STS-1 #1 -> VT#1,VT#2,VT#3,VT#4,VT#5,VT#6,VT#7
STS-1 #2 -> VT#1,VT#2,VT#3,VT#4,VT#5,VT#6,VT#7
STS-1 #3 -> VT#1,VT#2,VT#3,VT#4,VT#5,VT#6,VT#7

For Example, the output could look like:

0,1,1
1,1,1,0,0,1,0
2,2,2,2,2,2,2
0,0,0,0,1,0,0

b) STS-3 STS-1 Full SPE

This signal consists of 3 STS-1s each containing 1 Full SPE. In this configuration there are 3 paths, 3 at the STS-1 level and no lower paths. For this configuration, 3 arrays are returned with the following format:

```
STS-3 -> STS1#1, STS1#2, STS1#3
```

The output will look something like:

```
0,1,2
```

c) STS-3 STS-1 VT-2

This signal again consists of 3 STS-1's. In this case however, the STS-1's each contain 7 VT-Groups's. These VT-Groups's each contain 3 VT-2's. In terms of paths the signal comprises 3 path at the STS-1 level and 63 paths at the VT-2 level. Again the STS-1s are defined as a group on their own. The 63 VT-2 paths are split into 3 groups corresponding to their allocation with the 3 STS-1's. For this configuration, four arrays are returned with the following format:

```
NOTE:  VT-2's designated thus [STS-1# - VT-Grp# - VT#]

STS-3      -> STS-1#1, STS-1#2, STS-1#3
STS-1 #1   -> [1-1-1],[1-1-2],[1-1-3],[1-2-1],[1-2-2],[1-
2-3],
              [1-3-1],[1-3-2],[1-3-3],[1-4-1],[1-4-2],[1-
4-3],
              [1-5-1],[1-5-2],[1-5-3],[1-6-1],[1-6-2],[1-
6-3],
               [1-7-1],[1-7-2],[1-7-3]
STS-1 #2    -> As Above
STS-1 #3    -> As Above
```

The output will look like:

```
1,2,0
0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
1,1,1,0,0,1,0,0,0,0,0,0,0,0,0,1,1,0,0,0,0
2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2
```

d) STS-3 STS-1 VT-1.5

This signal again consists of 3 STS-1s. In this case however, the STS-1's each contain 7 VT-Groups. These VT-Groups's each contain 4 VT-1.5's. In terms of paths the signal comprises 3 paths at the STS-1 level and 84 paths at the VT-1.5 level. Again the STS-1's are defined as a group on their own. The 84 VT-1.5 paths are split into 3 groups corresponding to their allocation with the 3 STS-1's. For this configuration, four arrays are returned with the following format:

```
NOTE:  VT-1.5's designated thus [STS-1# - VT-Grp# - VT#]

STS-3     -> STS-1#1, STS-1#2, STS-1#3
STS-1#1   -> [1-1-1],[1-1-2],[1-1-3],[1-1-4],[1-2-1],[1-
2-2],[1-2-3],[1-2-4],[1-3-1],[1-3-2],[1-3-3],[1-3-4],[1-
4-1],[1-4-2],[1-4-3],[1-4-4],[1-5-1],[1-5-2],[1-5-3],[1-
5-4],[1-6-1],[1-6-2],[1-6-3],[1-6-4],[1-7-1],[1-7-2],[1-
7-3],[1-7-4]
STS-1#2   -> As Above
STS-1#3   -> As Above
```

The output will look like:

```
1,1,1
0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
1,1,1,1,0,0,1,1,0,0,0,0,0,0,0,0,0,0,0,0,1,1,0,0,0,0,0,0
2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2,2
```

e) STS-1 VT-6

This signal consists of 1 STS-1 containing 7 VT-Groups. Each VT-Group contains 1 VT-6. There are therefore 8 paths, 1 at the STS-1 level and 7 at the VT-6 level. In this case the STS-1 path is defined as a group on its own, while the 7 VT-6 paths are also defined as one group. For this configuration, 2 groups are returned with the following format:

STS-1 -> STS-1
STS-1 #1 -> VT-6#1,VT-6#2,VT-6#3,VT-6#4,VT-6#5,VT-6#6,VT-6#7

The output will look like:

```
0
1,1,1,0,0,0,0
```

f) STS-1 VT-2

This signal again comprises 1 STS-1 containing 7 VT-Groups's. However, this time the VT-Groups's each contain 3 VT-2's. As before, the STS-1 path is defined as a group on its own, while the 7 VT-2 paths are also defined as one group. For this configuration, 2 groups are returned with the following format:

```
NOTE:  VT-2's designated thus [VT-Grp# - VT-2#]

STS-1       -> STS-1
VT-Group    -> [1-1],[1-2],[1-3],[2-1],[2-2],[2-3],[3-1],
               [3-2],[3-3],[4-1],[4-2],[4-3],[5-1],[5-2],
               [5-3],[6-1],[6-2],[6-3],[7-1],[7-2],[7-3]
```

The output will look like:

```
0
1,1,1,0,0,0,0,1,1,1,1,1,1,1,0,0,2,0,0,0,0
```

g) STS-1 VT-1.5

This signal again comprises 1 STS-1 containing 7 VT Groups. However, this time the VT Groups each contain 4 VT-1.5's. As before, the STS-1 path is defined as a group on its own, while the 7 VT-1.5 paths are also defined as one group. For this configuration, 2 groups are returned with the following format:

```
NOTE:  VT-1.5's designated thus [VT-Group# - VT-1.5#]

STS-1       -> STS-1
VT-Group    -> [1-1],[1-2],[1-3],[1-4],[2-1],[2-2],[2-
3],[2-4],[3-1],[3-2],[3-3],[3-4],[4-1],[4-2],[4-3],[4-
4],[5-1],[5-2],[5-3],[5-4],[6-1],[6-2],[6-3],[6-4],[7-
1],[7-2],[7-3],[7-4]
The output will look like:

0
1,1,1,1,0,0,0,0,0,1,1,1,1,1,1,1,1,1,0,0,0,2,0,0,0,0,0,1
```

h) Unrecognized Structure

When Alarm Scan is operating in AUTO mode, it is possible that due to various signal alarm conditions, it may not be able to determine the structure for a particular group of paths. When this occurs that group is marked as an "Unrecognized Structure". The string returned for such a group is the SCPI NAN - "9.91E+37"

:FETCh:ARRay:DATA:TELecom:SONet:TSCan?

Returns (each of one or more rows):	<numeric>{,<numeric}

The results returned are those for the last FULL scan. Results from partial scans are not available. If no full scan has been completed since the instrument was powered up, this command will return -1.

If data is available it is returned as a set of string arrays one for each scanned group. The arrays are separated by a CR/LF pair. A group is defined as a set of scanned paths at either the STS or VT level. The arrays consist of comma separated numerics, one for each tributary scanned. The value of the numeric indicates the status of the scanned tributary. The following values are valid.

Value	State
0	No Problems Detected
1	Alarms or Errors Detected

For a specific signal structure, the format of the returned strings are shown below:

a) STS-1 VT-6

This signal consists of 1 STS-1 containing 7 VT-Groups. Each VT-Group contains 1 VT-6. There are therefore 7 tributaries to be scanned. These are defined as one group and hence for this configuration, 1 array is returned with the following format:

STS-1 -> VT6#1, VT6#2, VT6#3, VT6#4, VT6#5, VT6#6, VT6#7

The output will look like:

```
1,1,1,0,0,0,0
```

b) STS-1 VT-2

This signal again comprises 1 STS-1 containing 7 VT-Groups. However, this time the VT-Groups each contain 3 VT-2's. There are therefore 21 (7*3) tributaries to be scanned. These are defined as one group and are returned in the following format:

```
NOTE:  VT-2's designated thus [VT-Group# - VT-2#]

STS-1   -> [1-1],[1-2],[1-3],[2-1],[2-2],[2-3],[3-1],
              [3-2],[3-3],[4-1],[4-2],[4-3],[5-1],[5-2],
              [5-3],[6-1],[6-2],[6-3],[7-1],[7-2],[7-3]
```

The output will look like:

```
1,1,1,0,0,0,0,1,1,1,1,1,1,1,0,0,1,0,0,0,0
```

c) STS-1 VT-1.5

This signal again comprises 1 STS-1 containing 7 VT-Groups. However, this time the VT-Groups each contain 4 VT-1.5's. There are therefore 28 (7*4) tributaries to be scanned. These are defined as one group and are returned in the following format:

```
NOTE:  VT-1.5's designated thus [VT-Group# - VT-1.5#]

STS-1      -> [1-1],[1-2],[1-3],[1-4],[2-1],[2-2],[2-
3],[2-4],[3-1],[3-2],[3-3],[3-4],[4-1],[4-2],[4-3],[4-
4],[5-1],[5-2],[5-3],[5-4],[6-1],[6-2],[6-3],[6-4],[7-
1],[7-2],[7-3],[7-4]
```

The output will look like:

```
1,1,1,0,0,0,0,1,1,1,1,1,1,1,0,0,1,0,0,0,0
```

2) STS-12/OC-12

For the STS-12/OC-12 situation, the formats are similar to those defined above for STS-1/STS-3 except that there will be data returned for all four STS-3's in the signal.

Consider a STS-12 signal with a STS-3C structure. In the STS-3 case this structure would not be considered since there is only one tributary in the signal. However in the STS-12/OC-12 case there are 4 tributaries and the scan is carried out.

In this case each STS-3C is treated as a separate group, hence 4 arrays are returned from the SCPI command:

```
STS-3 #1 STS-3C
STS-3 #2 STS-3C
STS-3 #3 STS-3C
STS-3 #4 STS-3C
```

The output will look like:

```
0
0
1
1
```

:FETCh:ARRay:DATA:TELecom:SONet:PGRaph?

Returns: <numeric>,<numeric>, <numeric>,...
<numeric>,<numeric>, <numeric>

Returns an array of 576 bytes, 2 bytes for each of the possible 288 points on the displayed pointer graph. The 2 bytes at each point indicate the maximum and minimum offset at that point. Each byte has 3 numeric entries separated by commas.

The value of the 3 numeric entries, <range bit>,<validity bit>,<offset value>, provide the following information:

Range bit	Validity Bit	Offset Value	Description
1	1	-18 to +18	Valid in range result
1	0	0	No measurement
1	1	9.91E+37	Alarms during measurement
2	1	0	Offset out of range > +18
0	1	0	Offset out of range < -18

The graph entries are arranged as shown below. Each entry has the format previously described above:

<max offset 1>,<min offset 1>,<max offset 2>,<min offset 2>,
<max offset 3>,<min offset 3>,<max offset 4>,<min offset 4>,
<max offset 5>,<min offset 5>,<max offset 6>,<min offset 6>,
....
....
<max offset 287>,<min offset 287>,<max offset 288>,<min offset 288>

Range of valid offset values is -18 thru +18

A typical return array might look like:

1,1,9.91E+37,1,1,9.91E+37,1,1, 0,1,1, 0,1,1, +1,1,1, -2, etc....

:FETCh:ARRay:DATA:TELecom:SONet:OCAPture? <numeric>

<numeric> = 1 to 16 Overhead channels

Returns: <array>

Returns an array with the number of entries determined by <numeric> and separated by CR/LF.

Each entry consists of an alphanumeric string and a numeric separated by commas. The alphanumeric string provide the hexadecimal value of the captured data. The length of the string depends upon the overhead channel selected for capture, two hexadecimal characters/overhead byte. The numeric indicates the number of frames for which the captured data existed. If this command is issued when a capture is being performed, some entries will contain no data. In this case 9.91E+37 is returned.

The overhead byte or bytes to be captured is specified by :SENS:DATA:TEL:OCAP: CHAN <channel>.

:FETCh:ARRay:DATA:TELecom:SONet:POVerhead? <numeric>

<numeric> = 1 to 9

Returns the value of the selected path overhead bytes as an array of strings. Each string is in the range "00000000" to "11111111". This is a snapshot of the overhead byte and is captured once per second.
The array always begins with byte 1 of the path overhead and ends with the byte number specified by <numeric>.
Byte Order: (1) J1 (2) B3 (3) C2 (4) G1 (5) F2 (6) H4 (7) Z3 (8) Z4 (9) N1.

Returns: <string>{,<string>}

:FETCh:ARRay:DATA:TELecom:SONet:OVERhead? <numeric><numeric> <numeric>

<numeric> = (first parameter)	1 to 27	(Byte Number)
<numeric> = (second parameter)	1 to 16	(STS-3 number)
<numeric> = (third parameter)	1 to 3	(STS-1 number)

Returns the value of the selected transport overhead bytes as an array of strings. Each string is in the range "00000000" to "11111111". This is a snapshot of the overhead byte and is captured once per second.
The array always begins with byte 1 of the transport overhead and ends with the byte number specified by the first parameter.

Number	Name	Number	Name	Number	Name
1	A1	10	H1	19	D7
2	A2	11	H2	20	D8
3	J0/Z0	12	H3	21	D9
4	B1	13	B2	22	D10
5	E1	14	K1	23	D11
6	F1	15	K2	24	D12
7	D1	16	D4	25	S1/Z1
8	D2	17	D5	26	M0/M1/Z2
9	D3	18	D6	27	E2

Returns (each of one or more rows): <string>,{<string>}

Jitter SCPI Command Reference

Jitter Command Reference

(J1409A Instruments only)

Jitter Command Reference

This chapter contains detailed information on the SCPI (Standard Commands for Programming Instruments) and IEEE 488.2 common commands you will use when writing programs to control your OmniBER 725 for Jitter operation.

Please also refer to chapter 2 Common Commands for general information on SCPI command formats and for a list of commands that are common to SDH, SONET or Jitter operation; they are as follows:

SCPI Command Format

Remote Control Commands

Instrument Options

INSTrument subsystem

SOURce subsystem

SOURce subsystem - Transmitter Common Commands

INPut subsystem

SENSe subsystem

SENSe subsystem - Receiver Common Commands

SENSe subsystem - Test Timing

SENSe subsystem - Analysis Control

SENSe subsystem - Trouble Scan Results

SENSe subsystem - Configuring Graphics

SENSe subsystem - Managing Graphics Stores

SENSe subsystem - Retrieving Graphics Store Data

SENSe subsystem - Retrieving Data for a Single Graph

SENSe subsystem -Obtaining Graphics End of Measurement Results

STATus Subsystem

SYSTem Subsystem

IEEE common capabilities

OUTPut subsystem

This subsystem controls the characteristics of the instrument's output ports.

:OUTPut:TELecom:JITTer <discrete>

<discrete> =	OFF	Jitter Disabled
	ON	Jitter Enabled
	AUTotol	Auto Tolerance Mode
	TRANsfer	Jitter Transfer (Requires Jitter Measurement option)

Selects the jitter modulation operating mode. When AUTotol is selected a further selection of :OUTPut:TELecom:JITTer:AUTotol <boolean> is required. When TRANsfer is selected further selections of :OUTPut:TELecom:JITTer:TRANsfer <boolean> and :OUTPut:TELecom:JITTer:TRANsfer:CALibrate? are required.

The corresponding query command returns the jitter modulation mode in discrete short form.

:OUTPut:TELecom:JITTer?

Returns:	<discrete>

:OUTPut:TELecom:JITTer:AUTotol <boolean>

<boolean> =	0 or OFF
	1 or ON

Start or stop the jitter auto tolerance mode. Before ON is selected, further selections under :SOURce:DATA:TELecom:JITTer:ATOLerance:DELay <numeric> and other AUTotol commands are required.

The corresponding query command returns the jitter auto tolerance mode as 0 or 1.

:OUTPut:TELecom:JITTer:AUTotol?

Returns :	<boolean>

:OUTPut:TELecom:JITTer:TRANsfer <boolean>

<boolean> =	0 or OFF	Jitter Transfer disabled
	1 or ON	Jitter Transfer enabled

Requires a Jitter Measurement option also. Enable/Disable the jitter transfer mode. When ON is selected further selections under :SOURce:DATA:TELecom:JITTer:TRANsfer:MODE <discrete> and related commands are required.

The corresponding query command returns the jitter transfer mode as 0 or 1.

:OUTPut:TELecom:JITTer:TRANsfer?

Returns:	0 or 1

:OUTPut:TELecom:JITTer:TRANsfer:CALibrate?

Returns:	INV	Calibration invalid
	VAL	Calibration valid

Requires a Jitter Measurement option also. Returns the validity of the jitter transfer calibration. To initiate a jitter transfer Calibration or measurement further selections under :SOURce:DATA:TELecom:JITTer:TRANsfer:MODE <discrete> and related commands are required.

:OUTPut:TELecom:JITTer:WANDer <boolean>

<boolean> =	0 or OFF
	1 or ON

Enables or disables wander generation. Jitter generation is automatically disabled when wander generation is enabled.

The corresponding query command returns the wander generation state as 0 or 1.

:OUTPut:TELecom:JITTer:WANDer?

Returns :	0 or 1

SOURce subsystem - Transmitter Jitter Commands

:SOURce:DATA:TELecom:JITTer:MASK <discrete>

<discrete> =	OFF	No mask
	SWEPt	Swept mask
	SPOT	Spot frequency on mask

If OFF is selected, further selections of :SOURce:DATA:TELecom:JITTer:FREQuency <numeric>, :SOURce:DATA:TELecom:JITTer:AMPLitude <numeric> and :SOURce:DATA:TELecom:JITTer:RANGe <discrete> are required. If SPOT is selected, further selection of :SOURce:DATA:TELecom:JITTer:FREQuency <numeric> is required.

The corresponding query returns the selected jitter mask mode in discrete form, as listed above.

:SOURce:DATA:TELecom:JITTer:MASK?

Returns : <discrete>

:SOURce:DATA:TELecom:JITTer:FREQuency <numeric>

<numeric> =	0.1 .. 20000000	Frequency in Hz

Sets the jitter modulation/spot frequency in Hz. The frequency range available is dependant upon the signal rate, range and mask in use.

The corresponding query returns the selected jitter frequency in numeric form, as listed above.

:SOURce:DATA:TELecom:JITTer:FREQuency?

Returns : <numeric>

:SOURce:DATA:TELecom:JITTer:AMPLitude <numeric>

<numeric> =	0.01 .. 800.00	Amplitude in UI

Sets the jitter modulation amplitude in UI. The absolute maximum value is dependant upon the line rate, jitter frequency and range. If a requested amplitude exceeds the maximum permitted, the amplitude is set to the maximum permitted value for that frequency. Amplitude should only be set if :SOURce:DATA:TELecom:JITTer:MASK <discrete> is set to OFF and :OUTPut:TELecom:JITTer:AUTotol <boolean> is set to OFF.

The corresponding query returns the selected jitter amplitude in numeric form, as listed above.

:SOURce:DATA:TELecom:JITTer:AMPLitude?

Returns :	<numeric>

:SOURce:DATA:TELecom:JITTer:RANGe <discrete>

<discrete> =	UI1_0	1.0 UI range
	UI10	10 UI range
	UI20	20 UI range
	UI50	50 UI range
	UI80	80 UI range
	UI200	200 UI range
	UI800	800 UI range

Selects the jitter generation amplitude range.

The corresponding query returns the selected jitter generation amplitude range in discrete form, as listed above.

:SOURce:DATA:TELecom:JITTer:RANGe?

Returns :	<discrete>

Mask Selections

:SOURce:DATA:TELecom:JITTer:MASK:TYPE <discrete>

<discrete> =	G958A	G.958 Type A
	G958B	G.958 Type B
	G825	G.825
	GR253	GR.253
	USER	User selectable mask

Selects the mask for jitter sweep, spot and auto tolerance.

The corresponding query returns the selected mask in discrete short form.

:SOURce:DATA:TELecom:JITTer:MASK:TYPE?

Returns:	<discrete>

:SOURce:DATA:TELecom:JITTer:MASK:TYPE:USER <numeric>

<numeric>=	1 .. 5	User Jitter Mask number

Selects which User Jitter Mask is to be used when the :SOURce:DATA:TELecom:JITTer:MASK:TYPE <discrete> command is set to USER.

The corresponding query returns the selected User Jitter Mask.

:SOURce:DATA:TELecom:JITTer:MASK:TYPE:USER?

Returns:	<numeric>

:SOURce:DATA:TELecom:JITTer:MASK:TYPE:MRANge <discrete>

<discrete> =	HFReq	High frequency
	LFReq	Low frequency

Selects the mask range when generating jitter with a G.825 mask.

The corresponding query returns the selected jitter G.825 mask range in discrete form, as listed above.

:SOURce:DATA:TELecom:JITTer:MASK:TYPE:MRANge?

Returns :	<discrete>

Auto Tolerance

:SOURce:DATA:TELecom:JITTer:ATOLerance:DELay <numeric>

<numeric> =	0.0 .. 99.9

Set the delay in seconds between each autotolerance modulation frequency and amplitude setting. During this delay the output is not jittered. This delay does not include transmitter settling times. The corresponding query returns the delay in numeric form.

:SOURce:DATA:TELecom:JITTer:ATOLerance:DELay?

Returns :	<numeric>

:SOURce:DATA:TELecom:JITTer:ATOLerance:DWELl <numeric>

<numeric> =	1.0 .. 99.9

Set the time in seconds spent gating at each autotolerance, modulation frequency and amplitude, setting.

The corresponding query returns the dwell time in numeric form.

:SOURce:DATA:TELecom:JITTer:ATOLerance:DWELl?

Returns :	<numeric>

:SOURce:DATA:TELecom:JITTer:ATOLerance:ERRor:TYPe <discrete>

<discrete> =	ANY	Any Errors
	BIT	Bit Errors

Selects the type to be used by the auto tolerance feature.

The corresponding query returns the selected error type, as listed above.

:SOURce:DATA:TELecom:JITTer:ATOLerance:ERRor:TYPE?

Returns : <discrete>

:SOURce:DATA:TELecom:JITTer:ATOLerance:THReshold <numeric>

<numeric> = 0 .. 1000000

Set the number of bit errors that constitute an error for each autotolerance gating period as specified by the dwell time. When this value is 0 any errors are assumed to constitute an error otherwise only bit errors are tested. If an alarm that suppresses bit error measurements is present then it is assumed that this threshold has been exceeded.The corresponding query returns the threshold value in numeric form.

:SOURce:DATA:TELecom:JITTer:ATOLerance:THReshold?

Returns : <numeric>

:SOURce:DATA:TELecom:JITTer:ATOLerance:POINts <numeric>

<numeric> = 3 .. 55

Set the number of frequency points at which autotolerance is tested.

This command should only be used to select points for fixed autotolerance masks. If a User Mask is selected, the command :SOURce:DATA:TELecom:JITTer:UMASk:POINts <numeric>, <numeric> should be used.

The corresponding query returns the number of frequency points.

:SOURce:DATA:TELecom:JITTer:ATOLerance:POINts?

Returns : <numeric>

Auto Transfer Function

:SOURce:DATA:TELecom:JITTer:TRANsfer:MODE <discrete>

<discrete> =	CALib	Start Jitter Transfer Calibration
	MEASure	Start Jitter Transfer Measurement

Selects the jitter transfer mode.

The corresponding query returns the selected jitter transfer mode in discrete short form.

:SOURce:DATA:TELecom:JITTer:TRANsfer:MODE?

Returns:	<discrete>

:SOURce:DATA:TELecom:JITTer:TRANsfer:POINts <numeric>

<numeric> =	1 .. 55

Set the number of frequency points at which jitter transfer is tested.

This command should only be used to select points for fixed transfer masks. If a User Mask is selected, the command :SOURce:DATA:TELecom:JITTer:UMASk:POINts <numeric>, <numeric> should be used.

The corresponding query returns the number of frequency points.

:SOURce:DATA:TELecom:JITTer:TRANsfer:POINts?

Returns:	<numeric>

:SOURce:DATA:TELecom:JITTer:TRANsfer:DELay <numeric>

<numeric> =	5.0 .. 99.9

Set the delay in seconds between each jitter transfer modulation frequency and amplitude setting. During this delay the output is not jittered. This delay does not include transmitter settling times.

The corresponding query returns the delay in numeric form.

:SOURce:DATA:TELecom:JITTer:TRANsfer:DELay?

Returns:	<numeric>

:SOURce:DATA:TELecom:JITTer:TRANsfer:DWELl <numeric>

<numeric> =	5 .. 99

Set the data acquisition time, at each jitter transfer point, in 1 second steps. The corresponding query returns the dwell time in numeric form.

:SOURce:DATA:TELecom:JITTer:TRANsfer:DWELl?

Returns:	<numeric>

:SOURce:DATA:TELecom:JITTer:TRANsfer:MASK:INPut <discrete>

<discrete> =	G958A	G.958 Type A
	G958B	G.958 Type B
	GR253A	GR-253-core part A
	GR253B	GR-253-core part B
	USER	User selectable mask

Selects the input mask for jitter transfer.

The corresponding query returns the selected input mask in discrete short form.

:SOURce:DATA:TELecom:JITTer:TRANsfer:MASK:INPut?

Returns:	<discrete>

:SOURce:DATA:TELecom:JITTer:TRANsfer:MASK:INPut:USER <numeric>

<numeric>=	1 .. 5	User Jitter Mask number

Selects which User Jitter Mask is to be used when the :SOURce:DATA:TELecom:JITTer:TRANsfer:MASK:INPut <discrete> command is set to USER.

The corresponding query returns the selected User Jitter Mask.

:SOURce:DATA:TELecom:JITTer:TRANsfer:MASK:INPut:USER?

Returns:	<numeric>

:SOURce:DATA:TELecom:JITTer:TRANsfer:MASK:PASS <discrete>

<discrete> =	G958A	G.958 Type A
	G958B	G.958 Type B
	GR253	GR-253-core
	NONE	No pass mask

Selects the pass mask for jitter transfer.

The corresponding query returns the selected pass mask in discrete short form.

:SOURce:DATA:TELecom:JITTer:TRANsfer:MASK:PASS?

Returns: <discrete>

:SOURce:DATA:TELecom:JITTer:TRANsfer:MASK:PASS[:ADJust] <boolean>

<boolean> =	0 or OFF	Disable JTF pass mask adjustment
	1 or ON	Enable JTF pass mask adjustment

Enables the jitter transfer function pass mask adjustment control.

The corresponding query returns the setting in discrete short form.

:SOURce:DATA:TELecom:JITTer:TRANsfer:MASK:PASS[:ADJust]?

Returns: <boolean>

:SOURce:DATA:TELecom:JITTer:TRANsfer:MASK:PASS:ADJust:OFFSet <numeric>

<numeric> = -2.00 .. 2.00 dB

Sets the adjustment to be added to the Pass Mask.

The corresponding query returns the adjustment value.

:SOURce:DATA:TELecom:JITTer:TRANsfer:MASK:PASS:ADJust:OFFSet?

Returns: <numeric>

:SOURce:DATA:TELecom:JITTer:MODulation <discrete>

<discrete> =	INTernal	
	EXTernal	

Selects the source of the jitter/wander modulation signal. If INTernal is selected, then the modulation frequency and amplitude can be set on the instrument. If EXTernal modulation is selected, frequency and amplitude are determined by the supplied signal.

The corresponding query returns the selected jitter/wander modulation source in discrete form, as listed above.

:SOURce:DATA:TELecom:JITTer:MODulation?

Returns :	<discrete>

:SOURce:DATA:TELecom:JITTer:ERANge <discrete>

<discrete> =	UI2	2 UI range
	UI10	10 UI range

Selects the transmitter output range when using externally modulated jitter.

The corresponding query returns the selected output range in discrete form, as listed above.

:SOURce:DATA:TELecom:JITTer:ERANge?

Returns :	<discrete>

Wander

:SOURce:DATA:TELecom:JITTer:WANDer:MASK <discrete>

<discrete> =	OFF	No mask
	SPOT	Spot frequency

If OFF is selected, further selections of :SOURce:DATA:TELecom:JITTer:WANDer:FREQuency <numeric> and :SOURce:DATA:TELecom:JITTer:WANDer:AMPLitude <numeric> are required. If SPOT is selected, further selection of :SOURce:DATA:TELecom:JITTer:WANDer:FREQuency <numeric> is required and the amplitude value is derived from the ITU-T G.825 mask.

The corresponding query returns the selected mask state in discrete form, as listed above.

:SOURce:DATA:TELecom:JITTer:WANDer:MASK?

Returns :	<discrete>

:SOURce:DATA:TELecom:JITTer:WANDer:FREQuency <numeric>

<numeric> =	10 ..125000	micro Hertz

Sets the wander modulation or spot frequency in micro Hz .

The corresponding query returns the wander modulation or spot frequency.

:SOURce:DATA:TELecom:JITTer:WANDer:FREQuency?

Returns :	<numeric>

:SOURce:DATA:TELecom:JITTer:WANDer:AMPLitude <numeric>

<numeric> =	0.5 .. 57600	UI

Sets the wander modulation amplitude if :SOURce:DATA:TELecom:JITTer:WANDer:MASK <discrete> is set to OFF. The absolute maximum value is dependant upon line rate and modulation frequency.

Any values exceeding the allowed ranges will result in the amplitude being set to the maximum permitted value for that frequency.

The corresponding query returns the wander modulation amplitude.

:SOURce:DATA:TELecom:JITTer:WANDer:AMPLitude?

Returns :	<numeric>

:SOURce:DATA:TELecom:JITTer:SETTings <discrete>

<discrete> =	OFF	Jitter settings display disabled
	ON	Jitter settings display enabled

Enables/disables display of the jitter settings page.

The corresponding query returns an indication of whether the jitter settings page is displayed in discrete form as listed above.

:SOURce:DATA:TELecom:JITTer:SETTings?

Returns :	<discrete>

User Masks

:SOURce:DATA:TELecom:JITTer:UMASk:LOCK <boolean>

<boolean> =	0 or OFF
	1 or ON

User jitter mask editing lock control.

The corresponding query command returns the current setting:

:SOURce:DATA:TELecom:JITTer:UMASk:LOCK?

Returns :	<boolean>

:SOURce:DATA:TELecom:JITTer:UMASk:LABel <numeric>, <string>

<numeric> =	1 .. 5	User Jitter Mask number
<string> =		Label for mask

Writes labeling information into the title field of the nominated user jitter mask. The label must be a string of 1 to 32 printable characters. Avoid the use of leading periods '.' as these are interpreted as spaces. No change is permitted if the user jitter mask lock is on.

:SOURce:DATA:TELecom:JITTer:UMASk:LABel? <numeric>

<numeric> =	1 .. 5	User Jitter Mask number

Returns the labelling information from the title field of the nominated user jitter mask.

Returns : <string>

:SOURce:DATA:TELecom:JITTer:UMASk:POINts <numeric>, <numeric>

<numeric> =	1 .. 5	User Jitter Mask number
<numeric> =	1 .. 55	Number of points in mask

Sets the number of usable points in the nominated user jitter mask. This will not affect the values of any amplitude/frequency points of the mask but it will be the maximum number of points available when the mask is in use. No change is permitted if the user jitter mask lock is on.

:SOURce:DATA:TELecom:JITTer:UMASk:POINts? <numeric>

<numeric> =	1 .. 5	User Jitter Mask number

Returns the number of usable points in the nominated user jitter mask.

Returns : <numeric>

:SOURce:DATA:TELecom:JITTer:UMASk:AMPLitude[:MULTiple] <numeric>, <numeric>, <numeric>, {<numeric>,{...} }

<numeric> =	1 .. 5	User Jitter Mask number
<numeric> =	1 .. 55	Number of following amplitudes
<numeric>, [<numeric>, {...} } =	0.01 .. 800.00	UIpp Jitter amplitude (up to 55-values)

Updates one or more consecutive amplitude values in the nominated user jitter mask, and also set the number of points in the mask. No update is permitted if the user jitter mask lock is on.

:SOURce:DATA:TELecom:JITTer:UMASk:AMPLitude[:MULTiple]? <numeric>

<numeric> =	1 .. 5	User Jitter Mask number

The number of amplitude values in the nominated mask is returned, followed by the actual amplitude values themselves.

Returns :	<numeric>	Number of following amplitudes
	<numeric>	UIpp Jitter amplitudes (up to 55 values)

:SOURce:DATA:TELecom:JITTer:UMASk:AMPLitude:SINGle <numeric>, <numeric>, <numeric>

<numeric> =	1 .. 5	User Jitter Mask number
<numeric> =	1 .. 55	Index of amplitude value to update
<numeric> =	0.01 .. 800.00	UIpp Jitter amplitude

Updates a single amplitude value in the nominated user jitter mask. No update is permitted if the user jitter mask lock is on.

:SOURce:DATA:TELecom:JITTer:UMASk:AMPLitude:SINGle? <numeric>,<numeric>

<numeric> =	1 .. 5	User Jitter Mask number
<numeric> =	1 .. 55	Index of amplitude value

The indexed amplitude value in the nominated mask is returned.

Returns :	<numeric>

:SOURce:DATA:TELecom:JITTer:UMASk:FREQuency[:MULTiple] <numeric>, <numeric>, <numeric>, {<numeric>,}...,}}

<numeric> =	1 .. 5	User Jitter Mask number
<numeric> =	1 .. 55	Number of Frequency points
<numeric>, [<numeric>,{...} } =	2 .. 20000000	Frequency in Hz (up to 55-values)

Updates one or more consecutive frequency values in the nominated user jitter mask, and also updates the number of points in the mask. No change is permitted if the user jitter mask lock is on.

:SOURce:DATA:TELecom:JITTer:UMASk:FREQuency[:MULTiple]? <numeric>

<numeric> =	1 .. 5	User Jitter Mask number

The number of frequency values in the nominated mask is returned, followed by the actual amplitude values themselves.

Returns :	<numeric>	Number of following frequencies
	<numeric>	Jitter frequencies in Hz (up to 55 values)

:SOURce:DATA:TELecom:JITTer:UMASk:FREQuency:SINGle <numeric>, <numeric>, <numeric>

<numeric> =	1 .. 5	User Jitter Mask number
<numeric> =	1 .. 55	Index of frequency value to update
<numeric> =	2 .. 20000000	Frequency in Hz

Updates a single frequency value in the nominated user jitter mask. No change is permitted if the user jitter mask lock is on.

:SOURce:DATA:TELecom:JITTer:UMASk:FREQuency:SINGle? <numeric>,<numeric>

<numeric> =	1 .. 5	User Jitter Mask number
<numeric> =	1 .. 55	Index of frequency value

The indexed frequency value in the nominated mask is returned.

Returns :	<numeric>

:SOURce:DATA:TELecom:JITTer:UMASk:GENerator [:PARameters] <numeric>, <numeric>,<numeric>, <numeric>, <numeric>, <numeric>, <numeric>

<numeric> =	1 .. 55	number of points
<numeric> =	0.01 .. 800.00	Amplitude at A1 in UIpp
<numeric> =	0.01 .. 800.00	Amplitude at A2 in UIpp
<numeric> =	2 .. 20000000	Hz frequency at fa
<numeric> =	2 .. 20000000	Hz frequency at f0
<numeric> =	2 .. 20000000	Hz frequency at ft
<numeric> =	2 .. 20000000	Hz frequency at fb

Presets the parameters of the jitter mask generator prior to the generation of a user jitter mask. Simple range checking is applied to the parameters - more rigourous checking is performed when a subsequent :SOURce:DATA:TELecom:JITTer:UMASk:GENerator :ACTion <numeric> command is issued.

The corresponding query command returns the current settings:

:SOURce:DATA:TELecom:JITTer:UMASk:GENerator [:PARameters]?

Returns : <numeric>, <numeric>, <numeric>, <numeric>, <numeric>, <numeric>, <numeric>

:SOURce:DATA:TELecom:JITTer:UMASk:GENerator :ACTion <numeric>

<numeric> =	1 .. 5	User Jitter Mask number

Generates a jitter mask based on the parameters supplied by the :SOURce:DATA:TELecom:JITTer:UMASk:GENerator [:PARameters] <numeric>, <numeric>,<numeric>, <numeric>, <numeric>, <numeric>, <numeric> command. The generated frequency/amplitude pairs will overwrite those of the selected user jitter mask.

No action is permitted if the user jitter mask lock is on. An execution error will result if the mask profile frequency values are not in ascending order.

SENSe subsystem - Receiver Jitter Settings

:SENSe:DATA:TELecom:JITTer:TYPE <discrete>

<discrete> =	JITTer	Jitter measurement
	WANDer	Wander measurement
	EXTended	Extended jitter measurement

Selects the measurement type.

The corresponding query returns the measurement type in discrete form as listed above.

:SENSe:DATA:TELecom:JITTer:TYPE?

Returns :	<discrete>

:SENSe:DATA:TELecom:JITTer:FILTer <discrete>

<discrete> =	OFF	Filters off
	LP	Low-Pass
	HP1	High-Pass 1
	HP2	High-Pass 2
	HPK12	12 kHz High Pass
	LPHP1	Low-Pass & High-Pass 1
	LPHP2	Low-Pass & High-Pass 2
	LPHPK12	Low-Pass & 12 kHz High Pass

Selects the filters used for jitter measurement.

The corresponding query returns the jitter filter selection in discrete form as listed above.

:SENSe:DATA:TELecom:JITTer:FILTer?

Returns :	<discrete>

:SENSe:DATA:TELecom:JITTer:HP1 <discrete>

<discrete> =	O171	O.171
	O172	O.172
	GR499	GR.499 (same as O.172)

Selects the HP1 (High Pass 1) filter version used for jitter measurement. GR499 is offered as an alternative name for O172.

The corresponding query returns the HP1 filter version selection in discrete form as listed above.

:SENSe:DATA:TELecom:JITTer:HP1?

Returns :	<discrete>

:SENSe:DATA:TELecom:JITTer:RANGe <discrete>

<discrete> =	UI1_6	1.6 UI range
	UI16	16 UI range
	UI64	64 UI range

Selects the jitter measurement range. Range UI1_6 is available at all line rates. Range UI16 is available at all line rates except 2.4Gb/s. Range UI64 is available only at the 2.4Gb/s line rate.

In extended jitter measurement mode there is a fixed range of up to 1024UI, determined by the line rate. This cannot be selected or queried.

The corresponding query returns the jitter measurement range in discrete form as listed above.

:SENSe:DATA:TELecom:JITTer:RANGe?

Returns : <discrete>

:SENSe:DATA:TELecom:JITTer:THReshold <numeric>

<numeric> =	0.05 to 1.60 step 0.01	1.6 UI range
	0.5 to 16.0 step 0.1	16 UI range
	1.0 to 64.0 step 0.2	64 UI range
	5 to 256 step 1	256 UI range
	10 to 1024 step 5	1024 UI range

Selects the jitter hits measurement threshold. The limits and step size are determined by the range setting in effect.

The corresponding query returns the jitter hits measurement threshold in numeric form as listed above.

:SENSe:DATA:TELecom:JITTer:THReshold?

Returns : <numeric>

SENSe subsystem Result Returning Commands

Jitter/Wander Results

:SENSe:DATA? <"result">

Result =	"COUNt:JITT:HITS"	Hit count
	"SEConds:JITT:HITS"	Hit seconds
	"FSEConds:JITT:HITS"	Hit free seconds
	"PEAK:JITT:POSitive"	+ve peak Jitter
	"PEAK:JITT:NEGative"	-ve peak Jitter
	"PEAK:JITT:PKPK"	pk-to-pk Jitter
	"PEAK:JITT:STERm:POSitive"	+ve peak Jitter Short Term
	"PEAK:JITT:STERm:NEGative"	-ve peak Jitter Short Term
	"PEAK:JITT:STERm:PKPK"	pk-to-pk Jitter Short Term
	"RMS:JITT"	RMS jitter
	"RMS:JITT:STERm"	Short TermRMS jitter
	"COUNt:JITT:WANDer:TIERror"	Wander time interval error
	"COUNt:JITT:WANDer:SEConds:TIERror"	Wander time interval error nanoseconds
	"PEAK:JITT:WANDer:POSitive"	+ve peak Wander
	"PEAK:JITT:WANDer:SEConds:POSitive"	+ve peak Wander nanoseconds
	"PEAK:JITT:WANDer:NEGative"	-ve peak Wander
	"PEAK:JITT:WANDer:SEConds:NEGative"	-ve peak Wander nanoseconds
	"PEAK:JITT:WANDer:PKPK"	pk-to-pk Wander
	"PEAK:JITT:WANDer:SEConds:PKPK"	pk-to-pk Wander nanoseconds
	"PEAK:JITT:WANDer:PK15"	pk-to-pk15 min Wander
	"PEAK:JITT:WANDer:SEConds:PK15"	pk-to-pk 15 min Wander nanoseconds

"PEAK:JITT:WANDer:PK24"	pk-to-pk 24 hour Wander
"PEAK:JITT:WANDer:SEConds:PK24"	pk-to-pk 24 hour Wander nanoseconds
"SLIPs:JITT:WANDer:FRAMe"	Estimated frame slips
"SLIPs:JITT:WANDer:BIT"	Estimated bit slips
"FOFPpm:JITT:WANDer:IMPLied"	Wander implied frequency offset

FETCh subsystem

The FETCh subsystem is used to retrieve data directly accumulated by the instrument.

:FETCh:ARRay:DATA:TELecom:JITTer:ATOLerance?

Returns:	<array-1> <array-2> | <array-n> EOI
<array> =	<numeric>, <numeric>, <boolean>
Where:	
<numeric> =	Frequency (Hz)
<numeric> =	Amplitude (UI). Can include '>' symbol
<boolean> =	0 (fail) or 1 (fail)

Returns the jitter tolerance results as shown. The number of array rows, n, depends upon the number of points selected at the beginning of the measurement.

If no bit errors have been detected when the transmit jitter amplitude is a maximum, then the symbol '>' (greater than) is prepended to the <amplitude> value.

:FETCh:ARRay:DATA:TELecom:JITTer:TRANsfer?

Returns:	<array-1> <array-2> | <array-n> EOI
<array> =	<numeric>, <numeric>, <numeric> ,<numeric>, <boolean>
Where:	
<numeric> =	JTF point number
<numeric> =	Frequency (Hz)
<numeric> =	Mask value (UI)
<numeric> =	JTF result (dB)
<boolean> =	0 (fail) or 1 (pass)

Returns the jitter transfer results in numerical form as shown. The number of array rows , n, depends upon the number of points selected at the beginning of the measurement.

6

Status Reporting

Status Reporting

The status reporting capability of the OmniBER 725 is provided by the Status Registers and the Status Byte. The STATus subsystem and some IEEE common capability commands control the status registers and the status byte.

The following status registers are provided in the OmniBER 725 and conform to IEEE 488.2

Table 6-1 Status Registers

Status Register	Description
Standard Event	This register is accessed by issuing the *ESR? common capability command.
QUEStionable	Defined by SCPI.
OPERation	Defined by SCPI.
INSTrument	Monitors general instrument conditions and summarizes the DISK status register.
DATA	Summarizes the SDH, SDH2, SDH3, SONet, SONet2, SONet3 and JIT status registers.
SDH	Monitors the primary conditions of the SDH signal.
SDH2	Monitors miscellaneous SDH conditions.
SDH3	Monitors miscellaneous SDH conditions.
SONet	Monitors the primary conditions of the SONET signal.
SONet2	Monitors miscellaneous SONET conditions.
SONet3	Monitors miscellaneous SONET conditions.
JITTer	Monitors the condition of the Jitter/Wander signal. (Jitter/Wander option in J1409 instruments).
DISK	Monitors the disk activity.

General Status Register

The status registers conform to IEEE 488.2 and each comprises 4 registers as shown in Figure 6-1. For the commands which access and control these registers, see “STATus subsystem” on page 2-38

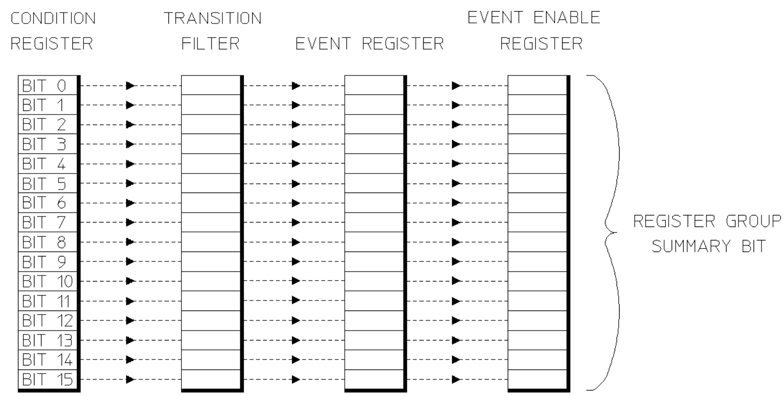


Figure 6-1 **General Status Register**

Condition Register Monitors the defined status conditions. There is no latching of conditions in this register, it is updated in real time.

Transition Filter Determines whether positive or negative transitions (true or false) in the Condition register sets the Event register.

Event Register Latches the transient states that occur in the Condition register as specified by the Transition Filter.

Event Enable Register Acts like a mask on the Event register. It determines which bits in the Event register set the summary bit in the Status Byte.

Status Byte

*STB? or a serial poll - Returns the value of the Status Byte in numeric form.

*SRE <numeric> - Sets the Status Byte mask.

*SRE? - Returns the current mask setting in numeric form.

DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
OPER	RQS	ESR	MAV	QUES	-	-	-

DB0 - DB2 Not used, always read as 0.

DB3 QUES - QUEStionable status register summary. Indicates that a bit has been set in the QUEStionable status register.

DB4 MAV - Message Available. Remains set until all output messages are read from the OmniBER 725.

DB5 ESR - Event status register summary. Indicates that a bit has been set in the Event status register.

DB6 RQS - Request Service. Set when an SRQ is generated for whatever reason. Cleared by SPOLL or *STB?.

DB7 OPER - OPERation status register summary. Indicates that a bit has been set in the OPERation status register.

Standard Event Status Register

*ESR? - Returns the Standard Event Status Register value in numeric form.

*ESE <numeric> - Sets the event enable register mask.

*ESE? - Returns the current mask setting.

DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
PWR	URQ	CME	EXE	DDE	QUE	RQC	OPC

DB0 OPC - Operation Complete.

DB1 RQC - Request Control.

DB2 QUE - Query Error.

DB3 DDE - Device Dependent Error.

DB4 EXE - Execution Error.

DB5 CME - Command Error.

DB6 URQ - User Request.

DB7 PWR - Power On.

QUEStionable Status Register

Provides a summary of the DATA status register.

For related commands, see “STATus subsystem” on page 2-38

Example: STATus:QUEStionable:EVENt?

DB15	DB14	DB13	DB12	DB11	DB10	DB9	DB8
-	CMW	-	-	-	-	DATA	-

DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
-	-	-	-	-	-	-	-

DB0 - DB8 Not used, always read as 0.

DB9 DATA - DATA status register summary.

DB10 - DB13 Not used, always read as 0.

DB14 CMW - Command Warning

DB15 Not used, always reads as 0.

OPERation Status Register

Provides a summary of the INSTrument status register, and reports when a measurement is being made.

For related commands, see “STATus subsystem” on page 2-38

Example: STATus:OPERation:EVENt?

DB15	DB14	DB13	DB12	DB11	DB10	DB9	DB8
-	-	INST	-	-	-	-	-

DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
-	-	-	MEAS	-	-	-	-

DB0 - DB3 Not used, always reads as 0.

DB4 MEAS - Measuring. Currently making a measurement.

DB5 - DB12 Not used, always read as 0.

DB13 INST - INSTrument status register summary.

DB14 - DB15 Not used, always read as 0.

INSTrument Status Register

Reports the instrument status.

For related commands, see "STATus subsystem" on page 2-38

Example: STATus:INSTrument:EVENt?

DB15	DB14	DB13	DB12	DB11	DB10	DB9	DB8
-	-	-	-	-	-	-	-

DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
DISK	STP	STC	-	-	EOT	LQE	SMG

DB0 SMG - Graphics Results enabled.

DB1 LQE - Logging Queue Empty.

DB2 EOT - End Of Test period.

DB3 Not used, always read as 0.

DB4 Not used, always read as 0.

DB5 STC - Self Test complete.

DB6 STP - Short Term Period complete.

DB7 DISK - Disk status register summary.

DB8 - DB15 Not used, always read as 0.

DATA Status Register

Summarizes the alarm status registers shown. In addition provides a Power Failed alarm indication.

For related commands, see “STATus subsystem” on page 2-38

Example: STATus:DATA:EVENt?

DB15	DB14	DB13	DB12	DB11	DB10	DB9	DB8
-	PWF	-	-	-	SDH3/ SON3	-	-

DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
-	-	-	JITT	SDH2/ SON2	SDH/ SON	-	-

DB0, DB1 Reserved for future use, always read as 0.

DB2 SDH - SDH status register summary.

SON - SONet status register summary.

DB3 SDH2 - SDH2 status register summary.

SON2 - SONet2 status register summary.

DB4 JITT - JITTer status register summary.

DB5 Not used, always read as 0.

DB6 Not used, always read as 0.

DB7 - DB9 Reserved for future use, always read as 0.

DB10 SDH3 - SDH3 status register summary.

SON3 - SONet3 status register summary

DB11 - DB13 Not used, always read as 0.

DB14 PWF - Power Failed during measurement.

DB15 Not used, always read as 0.

ISUMmary Status Register

Provides alarm indications summarised from SDH/SONET status registers and should be used in preference to the SDH/SONET status registers. This register provides a summary of the SDH/SONET status registers for each of the conditions shown below. Use this register to determine the status of the instrument independent of its configuration.

NOTE

Note: It is recommended that for pattern loss in particular this register is used in preference to the SDH/SONET registers as this removes the dependence on receiver payload selection.

DB15	DB14	DB13	DB12	DB11	DB10	DB9	DB8
-	ERR	PSL	-	-	-		

DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
-	-	LOP	FAR	AIS	LOF	LOS	PLO

DB0 PLO - Power Loss.

DB1 LOS - Loss of Signal.

DB2 LOF - Loss of frame.

DB3 AIS - Alarm indication signal.

DB4 FAR - Far end alarms.

DB5 LOP - Loss of Pointer.

DB6 - DB12 Not used

DB13 PSL - Pattern sync loss.

DB14 ERR - Errors detected.

DB15 Not used

ISUMmary Status Register Sources

Refer to the following Table for an indication of the source of common alarm conditions

ISUM		SDH			SONET			JITTER		
Data Bit	**Name**	**Reg**	**Data Bit**	**Name**	**Reg**	**Data Bit**	**Name**	**Reg**	**Data Bit**	**Name**
0	PLO									
1	LOS	SDH	0	LOS	SON	0	LOS			
2	LOF	SDH SDH	1 2	LOF OOF	SON SON	1 2	LOF SEF			
3	AIS	SDH SDH SDH	4 5 12	MS-AIS AU-AIS TU-AIS	SON SON SON	4 5 12	AIS-L AIS-P AIS-V			
4	FAR	SDH SDH SDH	9 10 13	MS-RDI HP-RDI LP-RDI	SON SON SON	9 10 13	RDI-L RDI-P RDI-V			
5	LOP	SDH SDH SDH	3 8 11	LOP H4 LOM TU-LOP	SON SON SON	3 8 11	LOP-P H4-LOM LOP-V			
6	JITT							JITT JITT JITT	0 2 5	JSLI WSLI JOVR
7-12										
13	PSL	SDH	6	PSL	SON	6	PSL			
14	ERR	SDH	14	ERR	SON	14	ERR			
15										

SDH Status Register

Provides primary alarm indications related to the SDH signal.

For related commands, see “STATus subsystem” on page 2-38

Example: STATus:SDH:EVENt?

DB15	DB14	DB13	DB12	DB11	DB10	DB9	DB8
-	ERR	LPRDI	TUAIS	TULOP	HPRDI	MSRDI	H4

DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
CSL	PSL	AUAIS	MSAIS	LOP	OOF	LOF	LOS

DB0 LOS - Loss Of Signal.

DB1 LOF - Loss Of Frame.

DB2 OOF - Out Of Frame.

DB3 LOP - Loss Of Pointer.

DB4 MSAIS - Multiplexer Section AIS.

DB5 AUAIS - AU AIS. (Formerly Path AIS).

DB6 PSL - Pattern Synchronization Loss. (see Note on page 6-10)

DB7 CSL - Clock Synchronization Loss.

DB8 H4 - H4 LOM.

DB9 MSRDI - Multiplexer Section RDI. (Formerly MS FERF).

DB10 HPRDI - High Order Path RDI. (Formerly Path FERF).

DB11 TULOP - Tributary Loss Of Pointer.

DB12 TUAIS - Tributary Path AIS.

DB13 LPRDI - Low Order Path FERF. (Formerly TU FERF).

DB14 ERR - Errors Alarm.

DB15 Not used, always read as 0.

SDH2 Status Register

Provides miscellaneous SDH monitoring.

For related commands, see "STATus subsystem" on page 2-38

Example:

STATus:SDH2:EVENt?

DB15	DB14	DB13	DB12	DB11	DB10	DB9	DB8
-	BDL	BCL	PSA	-	-	PSI	FMU

DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
ALSC	K1K2	TMNDF	TNDF	TPADJ	MNDF	NDF	PADJ

DB0 PADJ - AU Pointer Adjust.

DB1 NDF - AU Pointer New Data Flag.

DB2 MNDF - AU Pointer Missing New Data Flag.

DB3 TPADJ - TU Pointer Adjust.

DB4 TNDF - TU Pointer New Data Flag.

DB5 TMNDF - TU Pointer Missing New Data Flag.

DB6 K1K2 - K1K2 change.

DB7 ALSC - SDH Alarm/Trib scan in progress.

DB8 FMU - Frequency Measurement Updated. (16s gate).

DB9 PSI - TX pointer sequence initialization.

DB10 Not used.

DB11 Not used.

DB12 PSA - TX pointer sequence active.

DB13 BCL - SDH Binary Clock Loss.

DB14 BDL - SDH Binary Data Loss.

DB15 Not used, always read as 0.

SDH3 Status Register

Provides miscellaneous SDH monitoring.

For related commands, see "STATus subsystem" on page 2-38

Example:

STATus:SDH3:EVENt?

DB15	DB14	DB13	DB12	DB11	DB10	DB9	DB8
-	-	-	-	-	-	-	FMU_1S

DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
-	-	-	-	-	-	-	P1P0

DB0 P1P0 LOM

DB1 - DB7 Not used, always read as 0.

DB8 FMU_1S - Frequency Measurement Updated. (1s gate). Cleared when the corresponding frequency result is read.

DB9 - DB15 Not used, always read as 0.

SONet Status Register

Provides primary alarm indications related to the SONET signal.

For related commands, see “STATus subsystem” on page 2-38

Example: STATus:SONet:EVENt?

DB15	DB14	DB13	DB12	DB11	DB10	DB9	DB8
-	ERR	RDIV	AISV	LOPV	RDIP	RDIL	H4

DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
CSL	PSL	AISP	AISL	LOPP	SEF	LOF	LOS

DB0 LOS - Loss Of Signal.

DB1 LOF - Loss Of Frame.

DB2 SEF - Severely Errored Frame Defect.

DB3 LOPP - Loss Of Pointer (LOP-P).

DB4 AISL - Line AIS (AIS-L).

DB5 AISP - Path AIS (AIS-P).

DB6 PSL - Pattern Synchronization Loss. (see Note on page6-10)

DB7 CSL - Clock Synchronization Loss.

DB8 H4 - H4 LOM.

DB9 RDIL - Line FERF (RDI-L).

DB10 RDIP - Path FERF (RDI-P).

DB11 LOPV - VT Loss Of Pointer (LOP-V).

DB12 AISV - VT Path AIS (AIS-V).

DB13 RDIV - VT Path FERF. (RDI-V).

DB14 ERR - Errors Alarm.

DB15 Not used, always read as 0.

SONet2 Status Register

Provides miscellaneous SONET monitoring.

For related commands, see “STATus subsystem” on page 2-38

Example: STATus:SONet2:EVENt?

DB15	DB14	DB13	DB12	DB11	DB10	DB9	DB8
-	BDL	BCL	PSA	-	-	PSI	FMU

DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
ALSC	K1K2	TMNDF	TNDF	TPADJ	MNDF	NDF	PADJ

DB0 PADJ - SPE Pointer Adjust.

DB1 NDF - SPE Pointer New Data Flag.

DB2 MNDF - SPE Pointer Missing New Data Flag.

DB3 TPADJ - VT Pointer Adjust.

DB4 TNDF - VT Pointer New Data Flag.

DB5 TMNDF - VT Pointer Missing New Data Flag.

DB6 K1K2 - K1K2 change.

DB7 ALSC - SONET Alarm/Trib scan in progress.

DB8 FMU - Frequency Measurement Updated. (16s gate).

DB9 PSI - TX pointer sequence initialization.

DB10 Not used.

DB11 Not used.

DB12 PSA - TX pointer sequence active.

DB13 BCL - SONET Binary Clock Loss.

DB14 BDL - SONET Binary Data Loss.

DB15 Not used, always read as 0.

SONet3 Status Register

Provides miscellaneous SONET monitoring.

For related commands, see “STATus subsystem” on page 2-38

Example: STATus:SONet3:EVENt?

DB15	DB14	DB13	DB12	DB11	DB10	DB9	DB8
-	-	-	-	-	-	-	FMU_1S

DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
-	-	-	-	-	-	-	P1P0

DB0 P1P0 LOM

DB1 - DB7 Not used, always read as 0.

DB8 FMU_1S - Frequency Measurement Updated. (1s gate).

DB9 - DB15 Not used, always read as 0.

JITTer Status Register

Provides alarm indications related to the Jitter measurement.

For related commands, see “STATus subsystem” on page 2-38

Example: STATus:JITTer:EVENt?

DB15	DB14	DB13	DB12	DB11	DB10	DB9	DB8
-	JTF	-			JAT	JSWP	TSET

DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
ORCL	XCL	JOVR			WSL	JHT	JSL

DB0 JSL - Jitter Unlock.

DB1 JHT - Jitter Hits.

DB2 WSL - Wander Unlock.

DB3 Not Used, always 0.

DB4 Not Used, always 0.

DB5 JOVR - Jitter out of range.

DB6 XCL - Loss of External Timing Reference.

DB7 ORCL - External Timing Reference Out of Range.

DB8 TSET - Jitter transmitter settling.

DB9 JSWP - Jitter sweep in progress.

DB10 JAT - Jitter Autotolerance in progress.

DB11 Not Used, always 0

DB12 Not Used, always 0

DB13 Not Used, always 0.

DB14 JTF - Jitter Transfer in progress.

DB15 Not Used, always 0.

DISK Status Register

Provides miscellaneous floppy disk monitoring.

For related commands, see "STATus subsystem" on page 2-38

Example: STATus:DISK:EVENt?

DB15	DB14	DB13	DB12	DB11	DB10	DB9	DB8
-	-	-	-	-	-	-	-

DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
-	-	-	-	-	-	-	FMT

DB0 FMT - Formatting Disk.

DB1 - DB15 Not used, always read as 0.

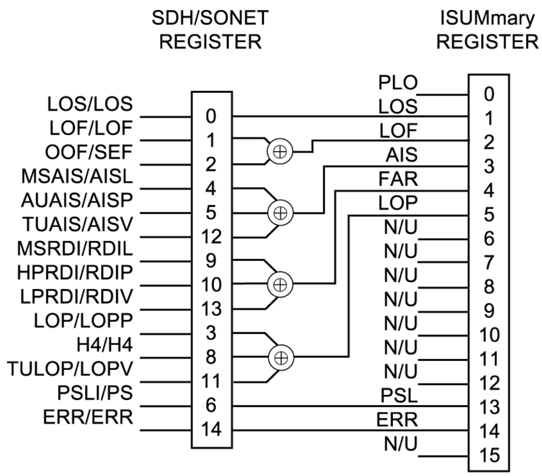


Figure 6-2 **Status Registers Relationship 1**

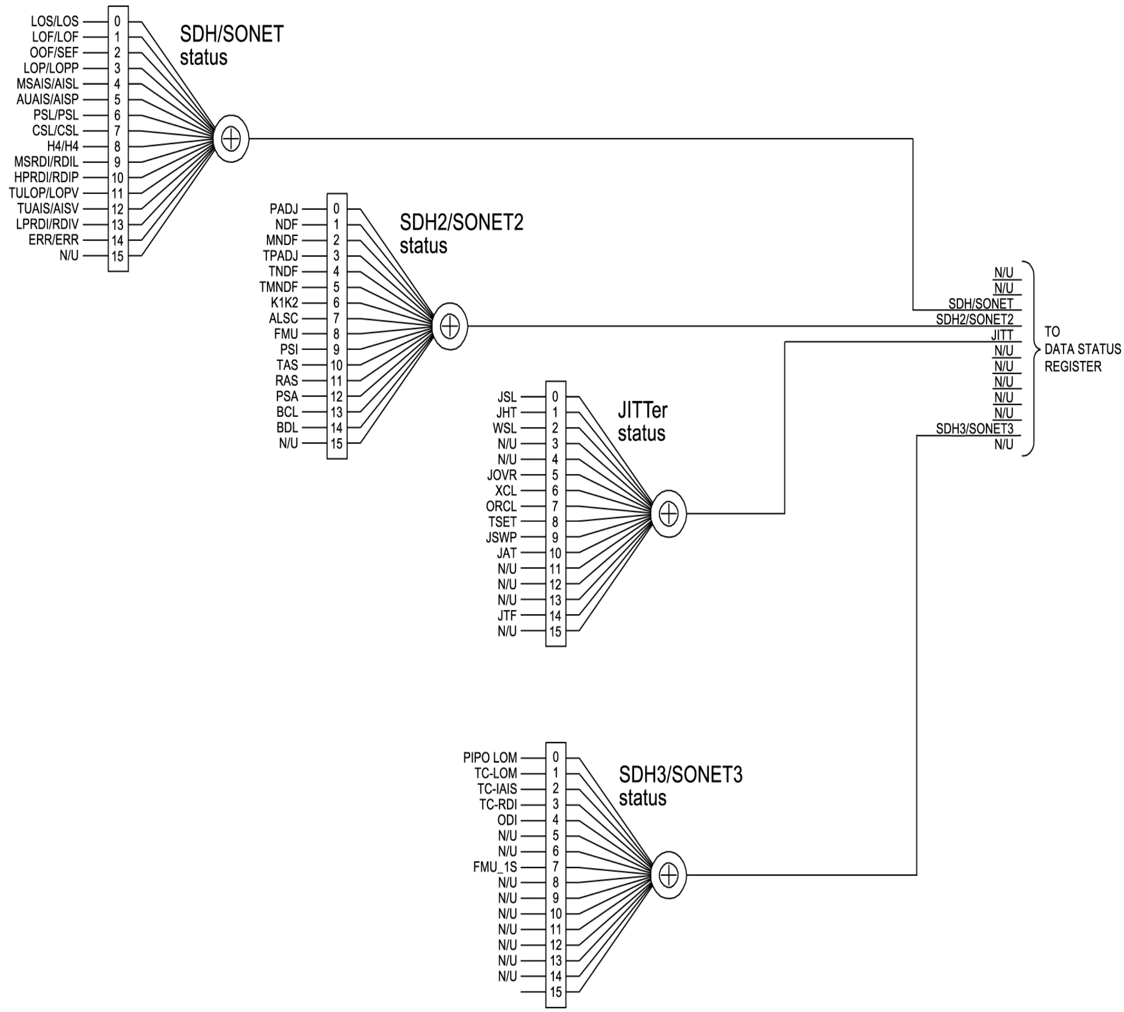


Figure 6-3 **Status Registers Relationship 2**

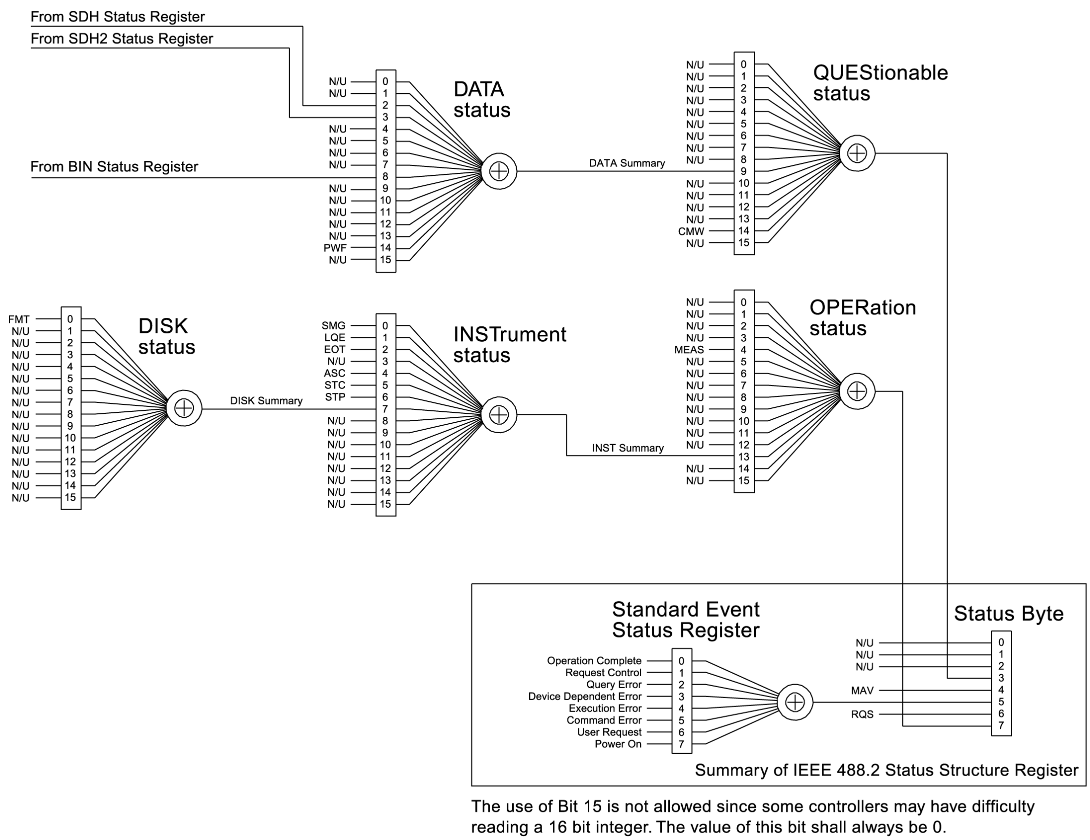


Figure 6-4 **Status Registers Relationship 3**

Programmed Status Reporting

When a condition is detected, a summary bit is generated by the Status Register which detects the condition. The summary bit in most cases passes through other Status Registers before affecting the Status Byte. These other Status Registers also generate a summary bit, therefore to report a condition requires the setting of the Event Enable Register mask in all registers in the chain.

When implementing status reporting into your programming, consider the following with reference to the Status Registers Relationship diagram, Figure 6-2 to Figure 6-4:

Programming Interrupts

1) Define which conditions you want reported. To do this, set the Event Enable Register mask of the Status Register that first detects the defined conditions. Set the Event Enable Register mask of all subsequent Status Registers between the reporting Status Register and the Status Byte. Using an example from the SDH Status Register :

LOS + LOF

:STAT:SDH :ENAB 3	Set the SDH event enable register to summarize for LOF(2) + LOS (1)
:STAT:SDH :PTR 3;NTR 0	Transition filter passes positive transitions bits 0 and 1.
:STAT:DATA:ENAB 4	Set the DATA event enable register to summarize for SDH(4)
:STAT:DATA:PTR 4;NTR 0	Transition filter passes positive transitions bit 2.
:STAT:QUES:ENAB 512	Set the QUES event enable register to summarize for DATA(512)
:STAT:QUES:PTR 512;NTR 0	Transition filter passes positive transitions bit 9.

2) If you are implementing a service request/serial poll operation, set the mask of the Status Byte, for example :

***SRE 40** QUES summary + Standard Event summary

The Status Byte register will initiate a service request (RQS) when either of the masked conditions are detected.

Interpreting Interrupts

1) Check the content of the Status Byte register using the service request/serial poll operation (SPOLL) or by issuing the *STB? common capabilities command, for example :

***STB?** Returns 8 - QUES summary

2) If a condition has been detected, determine which Status Register is responsible for issuing the summary bit, then use the appropriate STATus commands to interrogate the appropriate registers, for example :

:STAT:QUES:EVEN?	Returns 512 - DATA summary
:STAT:DATA:EVEN?	Returns 4 - SDH summary
:STAT:SDH :EVEN?	Returns 3 - LOF (2) + LOS (1)

The interrogation of the status byte and status registers reveals that the cause of the interrupt was Unavailability and Pattern Synchronization Loss.

The following program example is written in Rocky Mountain Basic and utilises a combination of SRQ and Status Register filtering.

NOTE The following program applies to basic OmniBER 725 instruments without Jitter capability. For instruments with Jitter capability, change J1408a to J1409a.

Example Program

```
10   ! Program Name : 21SRQ_DEMO
20   !
30   ! Program to illustrate the use of the Service Request Routine
31   ! in the OmniBER .
40   !
50   !
60   ! The program starts a 10 second BER measurement and
70   ! then continually reads and displays the OmniBER 725 Short-Term
80   ! BER until a Service Request is received from the OmniBER 725 .
90   ! When this happens, the Controller will suspend current activity
100  ! and read registers to determine the cause of the SRQ.
110  ! The maskable registers are set in the program to generate SRQ at the
120  ! end of a measurement or when a OmniBER 725 Alarm condition occurs.
130  ! If the SRQ is found to be caused by End of Measurement then
```

```
140  ! the program will read and print the measurement result before
150  ! continuing to read and display the received Short-Term BER.
160  ! If the SRQ is found to be caused by a masked alarm condition then
170  ! the program will read and print the alarm status then stop as it
180  ! is invalid to return results when a recognized Alarm condition
190  ! exists.
191  !
200  PRINT CHR$(12)    !Clear screen
210  PRINT TABXY(27,1);"Service Request - Demo Program"
220  !
230  COM J1408a                  !Common variable(s)
240  J1408a=705                  ! assign variable to default address
250  CALL Init_instr             ! Sub to initialize the OmniBER
260  !
270  CALL Config_regs_14         ! Sub to configure OmniBER regs for SRQ
280  !
290  ON INTR 7 CALL Read_stat_byte  ! Specify interrupt routine
300  !
310  CALL Tx_setup               ! Sub to set up OmniBER  Transmitter
320  !
330  CALL Rx_setup               ! Sub to set up OmniBER  Receiver
340  !
350  CALL Results_setup          ! Sub to setup results display
360  !
370  OUTPUT J1408a;"*CLS"        ! Clear any existing SRQ/ Remote errors
380  WAIT 3
390  ENABLE INTR 7;2             ! Enable computer to recognize interrupt
400  !
```

```
410  CALL Run_meas
420  !
430  CALL Read_short_rslt
440  END
450  !
460  !
470  !
480  !
490  SUB Config_regs_14
500  ! This sub sets up the conditions for generating an SRQ.
510  ! In this case, an SRQ will occur when Signal Loss or FRame Loss
520  ! alarms are detected.
530  ! An SRQ is also set to occur at the end of the Measurement period.
540  !
550  !
560  COM J1408a
570 !OUTPUT J1408a;"*CLS"        ! Clear any existing SRQ/Remote errors
580  !
590  OUTPUT J1408a;":STAT:SON:PTR 3;NTR 0"
600  ! Set the Transition Filter to pass positive transitions in
610  ! Bits 0,1 of the SONet Register
620  !
630  OUTPUT J1408a;":STAT:SON:ENAB 3"
640  !Enable LOF and LOS bits in the SONet status register
650  !to set the telecom summary bit in the Data status register
660  !on occurrence of any of these events.
661  !
662  !
```

```
663  !
664  !
665  !
666  !
667  !
670  !
680  OUTPUT J1408a;":STAT:DATA:PTR 4;NTR 0"
690  ! Set the Transition Filter to pass positive transitions in Bit 2
700  !of the Data Status register.
710  OUTPUT J1408a;":STAT:DATA:ENAB 4"
720  !Enable the SONet data bit in the Data Status register to set
730  !the data summary bit in the Questionable status register
740  !
750  !
760  OUTPUT J1408a;":STAT:QUES:PTR 512;NTR 0"
770  !Set the transition filter to pass positive transitions in bit 9 of
780  !the Questionable status register
790  OUTPUT J1408a;":STAT:QUES:ENAB 512"
800  !Enable the data summary bit in the Questionable status register
810  !to set the questionable data summary bit in the status byte
820  !
830  !
840  !
850  OUTPUT J1408a;":STAT:INST:PTR 4;NTR 0"
860  ! Set the Transition Filter to pass positive transitions in Bit 2
870  ! (End of Test) in the Instrument Status Register
880  OUTPUT J1408a;":STAT:INST:ENAB 4"
890  !Enable the EOT data bit in the Instrument Status register to set
```

```
900   !the data summary bit in the Operation status register
910   !
920   !

930   OUTPUT J1408a;":STAT:OPER:PTR 8192;NTR 0"
940   !Set the transition filter to pass positive transitions in bit 13
950   !of the Operation status register
960   OUTPUT J1408a;":STAT:OPER:ENAB 8192"
970   !Enable the instrument summary bit in Operation status register
980   !to set the Operation register summary bit in the status byte
990   !
1000  !
1010  OUTPUT J1408a;"*SRE 200"
1020  !Set the SRQ mask to cause an SRQ on occurrence of Bit 3 (Ques Reg)
1030  !Bit 6 (RQS) or 7 (Oper reg) being set in the Status byte.
1040  !
1050  !
1060  SUBEND
1070  !
1080  SUB Read_stat_byte
1090  !This subroutine reads the Telecom status register to determine the
1100  !reason(s) for the SRQ.
1110  COM J1408a
1120  BEEP 700,.5
1130  DISP "SRQ detected"
1140  WAIT 1      ! allow time for registers to be updated
1150  DISP
1160  Intr_check=SPOLL(J1408a) ! Interrogate Primary Status Byte register
```

```
1170  ! using Serial Poll method - returns value Intr_check
1180  ! DISP "interrupt check number is ";Intr_check
1190  SELECT Intr_check ! read the value of Primary Status Byte to see
1200  ! cause of interrupt
1201  !
1210  CASE 0  ! interrupt from unspecified device
1220  PRINT CHR$(12)                !Clear screen
1229  PRINT TABXY(20,10);"The Controller has received an interrupt from"
1230  PRINT TABXY(20,11);"Remove all unspecified equipment from HP-IB"
1231  STOP
1232  !
1240  CASE 192  ! End of Test Period (rqs[64]+oper[128])
1250  CALL Read_meas_rslt ! measurement has ended, so read back result.
1260  !
1270  CASE 72,200  ! masked Alarm condition has occurred (with EOT?)
1280  CALL Read_Sonet_reg
1290  !
1300  CASE ELSE
1305  PRINT TABXY(20,10);"The Controller has received an unspecified"
1310  PRINT TABXY(20,11);"interrupt from the OmniBER  - check cause"
1311  STOP
1312  !
1320  END SELECT
1330  SUBEND
1340  !
1350  !
1360  SUB Init_instr
1370  ! sub to initialize the OmniBER
```

```
1380  !
1390  !
1400  COM J1408a
1410  DISP "Initializing OmniBER "  !
1420  OUTPUT J1408a;"*CLS"       ! Clear any existing SRQ/Remote errors
1430  WAIT 2                     ! allow time for initialization
1440  OUTPUT J1408a;"*RST"        ! set instrument to default settings
1450  WAIT 2                     ! allow time for initialization
1460  DISP
1470  SUBEND
1480  !
1490  !
1500  SUB Tx_setup
1510  !
1520  !sub to setup the OmniBER  transmitter
1530  COM J1408a                  !Common variable(s)
1540  OUTPUT J1408a;"OUTP:TEL:OC48:RATE OC3"
1550  !
1560  !
1570   ! Set up SONet Output conditions
1580   !
1590   !
1600  OUTPUT J1408a;"INST:COUP RTTX"
1610   ! Setup Instrument Subsystem
1620   !
1630   !
1640   !
1650   !
```

```
1660  !
1670  !
1680 !
1690 !
1700 SUBEND
1710 !
1720 !
1730 SUB Rx_setup
1740 !
1750 !sub to setup the OmniBER  Receiver
1760 COM J1408a                  !Common variable(s)
1770 ! Use default
1780 SUBEND
1790 !
1800 !
1810 SUB Results_setup
1820 !
1830 ! Sub to setup the Results page
1840 COM J1408a                  !Common variable(s)
1850 OUTPUT J1408a;"SENS:DATA:TEL:TEST:TYPE SING"
1860 OUTPUT J1408a;"SENS:DATA:TEL:TEST:PER 10s" !Set Test Period
1870 !
1880 SUBEND
1890 !
1900 !
1910 SUB Run_meas
1920 !
1930 ! Sub to start and run the measurement
```

```
1940  COM J1408a                    !Common variable(s)
1950  !
1960  OUTPUT J1408a;"SENS:DATA:TEL:TEST ON"
1970  SUBEND
1980  !
2110  SUB Read_meas_rslt
2120  !
2130  ! Sub to read back the OmniBER  result
2140  COM J1408a                    !Common variable(s)
2150  !
2160  WAIT 2
2170  OUTPUT J1408a;"SENS:DATA? ""ERAT:BIT"""
2180  ! Return the measurement result BER Ratio
2190  ENTER J1408a;Ber_ratio  ! Read back bit error results
2200  PRINT TABXY(27,12);   "MEASURED BER RATIO IS ";Ber_ratio
2210  CALL Run_meas
2220  OUTPUT J1408a;"*CLS"       ! Clear any existing SRQ/Remote errors
2230  WAIT 3
2240  ENABLE INTR 7;2         ! Re-enable computer to recognize interrupt
2250  PRINT TABXY(25,12);"                                        "
2260  SUBEND
2270  !
2280  !
2290  SUB Read_short_rslt
2300  !
2310  ! Sub to read back the OmniBER Short Term Results
2320  WAIT 2  ! Allow time for Short Term results update
2330  !
```

```
2340  COM J1408a                  !Common variable(s)
2350  REPEAT
2360  OUTPUT J1408a;"SENS:DATA? ""ECO:STER:BIT"""
2370  ! Returns the short-term BER Result
2380  ENTER J1408a;Short_rate   ! Readback Short Term BER result
2390  !
2400  PRINT TABXY(27,10);"SHORT-TERM BER COUNT IS ";Short_rate
2410  WAIT 1
2420  PRINT TABXY(25,10);"                                        "
2430 !PRINT CHR$(12)    !Clear screen
2440  UNTIL Forever
2450  SUBEND
2460  !
2470  !
2480  SUB Read_Sonet_reg
2490  !
2500  ! Sub to read the SONet register
2510  COM J1408a                  !Common variable(s)
2520  !
2530  !
2540  OUTPUT J1408a;":STATUS:SON:EVENT?"    !Read SONet Status register
2550  ENTER J1408a;Alrm_reg_value
2570  SELECT Alrm_reg_value
2580  CASE 1  ! LOS detected
2590  PRINT CHR$(12)              !Clear screen
2600  PRINT TABXY(20,10); "Signal loss has been detected on OmniBER "
2601  PRINT TABXY(30,11); "Results invalid"
2602  !
```

```
2610  CASE 2  ! LOF detected
2620  PRINT CHR$(12)              !Clear screen
2630  PRINT TABXY(20,10); "Frame Loss has been detected on OmniBER "
2660  !
2820  CASE ELSE !  unknown SRQ
2830  PRINT CHR$(12)              !Clear screen
2840  PRINT TABXY(20,10);"A Status Alarm has occurred on the OmniBER "
2843  PRINT TABXY(20,11);"Check instrument Front Panel to see cause "
2860  END SELECT
2870  !
2871  STOP
2880  !
2920  !
2930  SUBEND
```

7

General Information

General Information

This chapter contains general remote control information.

- **SCPI Overview** - Gives a brief overview of the SCPI Standard.
- **HP-IB Universal Commands** - Describes the HP-IB Universal commands.

SCPI Overview

Standard Commands for Programmable Instruments (SCPI) is a standard of the SCPI Consortium that provides guidelines for remote programming commands for instruments. The goal of SCPI is to reduce Automatic Test Equipment (ATE) program development time. It accomplishes this by providing a consistent programming environment for instrument control and data usage. This programming environment uses defined programming messages, instrument responses, and data formats across all SCPI instruments, regardless of manufacturer.

SCPI is based on two IEEE standards:

- ANSI/IEEE Standard 488.1-1987, *IEEE Standard Digital Interface for Programmable Instrumentation*
- ANSI/IEEE Standard 488.2-1987, *IEEE Standard Codes, Formats, Protocols, and Common Commands. For use with ANSI/IEEE Standard 488.1-1987, IEEE Standard Digital Interface for Programmable Instrumentation*

GPIB Universal Commands

The Required Commands perform the most basic remote functions over GPIB and are common to all GPIB controllable instruments. The commands are as follows:-

- DEVICE CLEAR
- SERIAL POLL
- REMOTE ENABLE
- LOCAL LOCKOUT
- GO TO LOCAL

Device Clear (CLEAR)

This command will initialize the instrument GPIB hardware.

The command format using HP 200/300 Series Basic, for example is:

CLEAR 705 (where 7 is the Bus I/O select code and 05 is the device address).

Serial Poll (SPOLL)

A serial poll will retrieve the value of the primary status byte. This byte contains useful information about the current state of the instrument.

for example :

SPOLL(705) (where 7 is the Bus I/O select code and 05 is the device address).

Remote Enable (REMOTE)

The Remote command instructs the instrument to enter the REMOTE state and be ready to accept instructions via GPIB.

When the OmniBER 725 receives this command it illuminates the front panel REMOTE indicator.

for example:

REMOTE 705 (where 7 is the Bus I/O select code and 05 is the device address).

Local Lockout (LOCAL LOCKOUT)

It is recommended that the Local Lockout command is sent after the Remote command. This disables the front panel local key preventing the return to local mode and thus any interference to the instrument settings.

It should always be preceded by the REMOTE command.

for example:

LOCAL LOCKOUT 7 (will configure all the instruments on the bus to the Local Lockout condition.)

NOTE

If the instrument has been set to the LOCAL LOCKOUT condition, then the front panel LOCAL key is disabled. The instrument can only be returned to LOCAL operation by the controller sending the LOCAL command or by cycling power to the instrument.

Local (LOCAL)

The Local command returns the instrument from Remote operation to local front panel control.

for example:

LOCAL 7 or LOCAL 705 (where 7 is the Bus I/O select code and 05 is the device address).

8

Application Program Examples

The following application program examples are intended only as a guide to which SCPI Remote Control commands can be used to configure the OmniBER 725 for a particular application. The examples do not describe how to send and receive these commands - please refer to Chapter 1 Methods of Remote Control for further information.

Initializing the OmniBER 725

The following commands can be used to initialize the OmniBER 725. They setup the OmniBER 725 for remote operation, retrieve various instrument details and couple the transmitter to the receiver.

Table 8-1 OmniBER 725 Initialization

Comment	SCPI Command	Ref.
Takes the 37718 under remote control.	`:SYSTem:REMote`	2-41
Reset 37718 to Default settings	`*RST`	2-57
Read SCPI Error Message &Number (+0, "No error")	`:SYSTem:ERRor?`	2-42
Read Model Name, Serial No., Firmware Rev.etc	`*IDN?`	2-55
Retrieve 37718 Option structure	`*OPT?`	2-56
Retrieve 37718 Serial Number	`:SYSTem:SERial?`	2-42
Couple the 37718 Receiver to the Transmitter	`:INSTrument:COUPle RTTX`	2-7
Return the 37718 to local control.	`:SYSTem:LOCal`	2-41

Setup the OmniBER 725 SDH Tx

The following commands can be used to setup the OmniBER 725 SDH Transmitter to generate a STM-1 Optical signal with a TU-12 PCM31 Framed payload.

Table 8-2 **OmniBER 725 SDH Tx Setup**

Comment	SCPI Command	Ref.
Set Tx Output to STM-16/4/1/0 Optical	`SOURce:DATA:TELecom:SOURce OPT16`	2-9
Set Tx Line Rate to STM-1 Optical	`OUTPut:TELecom:OPT16:RATE STM1`	3-3
Set Tx Optical Wavelength to be 1310 nm	`OUTPut:TELecom:OPT16:WAVelength NM1310`	3-4
Ensure that Thru Mode is not selected	`SOURce:DATA:TELecom:SDH:THRumode INTernal`	3--12
Set Clock Sync to Internal	`SOURce:CLOCk:SDH:SOURce INTernal`	3--8
Ensure Frequency Offset is OFF	`SOURce:CLOCk:SDH:FOFFset OFF`	3--9
Setup F/G Mappings		
Set AU Layer Selection to AU-4	`SOURce:DATA:TELecom:SDH:AU:TYPE AU4`	3--15
Set TU Layer Selection to TU-12	`SOURce:DATA:TELecom:SDH:PAYLoad TU12`	3--16
Set TUG3 Number to 1	`SOURce:DATA:TELecom:SDH:TUG3 1`	3--16
Set TUG2 Number to 1	`SOURce:DATA:TELecom:SDH:TUG2 1`	3--16
Set TU Number to 1	`SOURce:DATA:TELecom:SDH:TRIB 1`	3--17
Set Pattern to 2^15-1 PRBS	`SOURce:DATA:TELecom:SDH:PAYLoad:PATTern PRBS15`	3--17

Table 8-2 OmniBER 725 SDH Tx Setup, continued

Comment	SCPI Command	Ref.
Set PRBS Polarity to be Inverted	`SOURce:DATA:TELecom:SDH:PRBS:POLarity INVerted`	3--18
Setup B/G Mappings		
Set Background TUG3 #2 to TU-12 Mapping	`SOURce:DATA:TELecom:SDH:TUG3:BACKground:PAYLoad: PATTern 2,TU12`	3--21
Set Background TUG3 #3 to TU-12 Mapping	`SOURce:DATA:TELecom:SDH:TUG3:BACKground:PAYLoad: PATTern 3,TU12`	3--21
Set Pattern in Background TU-12's within TUG3 #1 to be "1100" Word	`SOURce:DATA:TELecom:SDH:PRIMary:BACKground:PAYLoad: PATTern P1100`	3--21

Setup the OmniBER 725 SDH Rx

The following commands can be used to setup the OmniBER 725 SDH Receiver to receive a STM-4 Optical signal with a TU-12 Unframed payload.

Table 8-3 **OmniBER 725 SDH Rx Setup**

Comment	SCPI Command	Ref.
Set Rx Input to STM-16/4/1/0 Optical	`SENSe:DATA:TELecom:SENSe OPT16`	2-15
Set Rx Line Rate to STM-4 Optical	`INPut:TELecom:OPT16:RATE STM4`	3--62
Set AU Layer Selection to AU-4	`SENSe:DATA:TELecom:SDH:AU:TYPE AU4`	3--66
Set TU Layer Selection to TU-12	`SENSe:DATA:TELecom:SDH:PAYLoad TU12`	3--67
Set STM-1 Number Under Test to 1	`SENSe:DATA:TELecom:SDH:VC4 1`	3-65
Set TUG3 Number to 1	`SENSe:DATA:TELecom:SDH:TUG3 1`	3--68
Set TUG2 Number to 1	`SENSe:DATA:TELecom:SDH:TUG2 1`	3--68
Set TU Number to 1	`SENSe:DATA:TELecom:SDH:TRIB 1`	3--68
Set Pattern to 2^15-1 PRBS	`SENSe:DATA:TELecom:SDH:PAYLoad:PATTern PRBS15`	3--69
Set PRBS Polarity to be Inverted	`SENSe:DATA:TELecom:SDH:PRBS:POLarity INVerted`	3--70

Setup the OmniBER 725 SDH Tx to add Errors & Alarms

The following commands can be used to setup the OmniBER 725 SDH Transmitter to generate errors and alarms using the SDH Test Function.

Table 8-4 OmniBER 725 SDH Tx Error & Alarm Add

Comment	SCPI Command	Ref.
Select SDH Test Function	`SOURce:DATA:TELecom:TFUNction SDH`	2-10
Set Test Function to be Errors & Alarms	`SOURce:DATA:TELecom:SDH:TFUNction:TYPE ERRor`	3--36
Set Error Add type to B3 Path BIP	`SOURce:DATA:TELecom:SDH:ERRor:TYPE PBIP`	3--36
Add a single B3 error. Repeat if required.	`SOURce:DATA:TELecom:SDH:ERRor:RATE ONCE`	3--37
Add a B3 error rate of 1E-4	`SOURce:DATA:TELecom:SDH:ERRor:RATE E_4`	3--37
Switch B3 error rate OFF	`SOURce:DATA:TELecom:SDH:ERRor:RATE NONE`	3--37
Generate a MS FERF alarm	`SOURce:DATA:TELecom:SDH:ALARm MSRDi`	3--40
Switch alarm OFF	`SOURce:DATA:TELecom:SDH:ALARm NONE`	3--40

Setup the OmniBER 725 SDH Tx Overhead Bytes

The following commands can be used to setup the OmniBER 725 SDH Transmitter Overhead bytes. It is assumed that a STM-4 signal is selected.

Table 8-5 **OmniBER 725 SDH Tx Overhead Setup**

Comment	SCPI Command	Ref.
Set the Overhead bytes to their default values	`SOURce:DATA:TELecom:SDH:OVERhead:DEFault`	3--23
Update the D1 byte in STM-1 #1	`SOURce:DATA:TELecom:SDH:OVERhead:DATA 1,1,D1,"11111111"`	3--23
Update the M1 byte in STM-1 #3	`SOURce:DATA:TELecom:SDH:OVERhead:DATA:HEXadecimal 3,1,M1,"FF"`	3--24
Update F2 byte in the VC-4 POH of the selected STM-1	`SOURce:DATA:TELecom:SDH:POVerhead:DATA F2,"11111111"`	3--26
Update J1 trace in VC-4 POH of selected STM-1 to be HP37718 Test string	`SOURce:DATA:TELecom:SDH:POVerhead:J1:PATTern TEST`	3--27
Update F2 byte in VC-3 POH of selected STM-1	`SOURce:DATA:TELecom:SDH:TRIButary:POVerhead:DATA F2,"11111111"`	3--26
Update J1 trace in VC-3 POH of selected STM-1 to be HP37718A Test string	`SOURce:DATA:TELecom:SDH:TRIButary:POVerhead:J1:PATTern TEST`	3--28

Setup the OmniBER 725 SDH Tx for Overhead Byte Sequencing

The following commands can be used to setup the OmniBER 725 SDH Transmitter to generate an Overhead byte sequence. It is assumed that a STM-4 signal is selected.

Table 8-6 OmniBER 725 SDH Tx Overhead Sequence

Comment	SCPI Command	Ref.
Select SDH Test Function.	`SOURce:DATA:TELecom:TFUNction SDH`	2-2-10
Set Test Function to be Overhead Sequences	`SOURce:DATA:TELecom:SDH:TFUNction:TYPE SEQuence`	3--36
Set Sequence Mode to be Repeat Run	`SOURce:DATA:TELecom:SDH:SEQuence:MODE REPeat`	3--49
Select J0 Byte in RSOH	`SOURce:DATA:TELecom:SDH:SEQuence:OHBYte J0`	3--49

Set Sequence byte values to "00","01","02","03","04"	`SOURce:DATA:TELecom:SDH:SEQuence:DATA A,"00"`
	`SOURce:DATA:TELecom:SDH:SEQuence:DATA B,"01"`
	`SOURce:DATA:TELecom:SDH:SEQuence:DATA C,"02"`
	`SOURce:DATA:TELecom:SDH:SEQuence:DATA D,"03"`
	`SOURce:DATA:TELecom:SDH:SEQuence:DATA E,"04"`
		3--50

Set the Sequence order to be A,B,C,D,E	`SOURce:DATA:TELecom:SDH:SEQuence:ORDER A,B,C,D,E"`	3--51

Set the Frame Count for each value to be 10	`SOURce:DATA:TELecom:SDH:SEQuence:FCOunt 1,10`
	`SOURce:DATA:TELecom:SDH:SEQuence:FCOunt 2,10`
	`SOURce:DATA:TELecom:SDH:SEQuence:FCOunt 3,10`
	`SOURce:DATA:TELecom:SDH:SEQuence:FCOunt 4,10`
	`SOURce:DATA:TELecom:SDH:SEQuence:FCOunt 5,10`
		3--51

Start Sequence	`SOURce:DATA:TELecom:SDH:SEQuence STARt`	3--48

Perform OmniBER 725 SDH Rx Measurements

The following commands can be used to setup the OmniBER 725 SDH Receiver to perform B3 measurements.

Table 8-7 OmniBER 725 SDH Rx Measurements

Comment	SCPI Command	Ref.
Setup Results Timing Control		
Set Short Term Period to 10 seconds	`SENse:DATA:TELecom:STERm:PERiod 10s`	2-18
Set Test Timing to Single	`SENse:DATA:TELecom:TEST:TYPE SINGle`	2-17
Set Test Period t o 1 minute	`SENse:DATA:TELecom:TEST:PERiod 1m`	2-17
Start gating	`SENse:DATA:TELecom:TEST ON`	2-16
Wait for measurement to complete		
Retrieve Results		
Read back Cumulative B3 Error Count	`SENse:DATA? "ECOunt:SDH:PBIP"`	3-83
Read back Short Term B3 Error Count	`SENse:DATA? "ECOunt:SDH:STERm:PBIP"`	3-83

Read back some G.826 Analysis Results	`SENse:DATA? "ESEConds:SDH:PBIP:ANALysis"`
	`SENse:DATA? "SESeconds:SDH:PBIP:ANALysis"`
	`SENse:DATA? "UASeconds:SDH:PBIP:ANALysis"`
		3-83

Setup the OmniBER 725 SDH Rx to retrieve Overhead Monitor Bytes

The following commands can be used to retrieve the OmniBER 725 SDH Receiver's Overhead Monitor byte values.

Table 8-8 **OmniBER 725 SDH Rx Overhead Monitor**

Comment	SCPI Command	Ref.
Retrieve the D1 byte in STM-1 #1	`FETCh:SCALar:DATA:TELecom:SDH:OVERhead? 1,1,D1`	4--96
Retrieve the M1 byte in STM-1 #3	`FETCh:SCALar:DATA:TELecom:SDH:OVERhead? 3,1,M1`	4--96
Retrieve F2 byte in VC-4 POH of selected STM-1	`FETCh:SCALar:TELecom:SDH:POVerhead? F2`	4--97
Retrieve J1 trace in VC-4 POH of selected STM-1	`FETCh:STRing:DATA:TELecom:SDH:J1?`	4--93
Fetch F2 byte in VC-3 POH of selected STM-1	`FETCh:SCALar:TELecom:SDH:TRIButary:POVerhead? F2`	4--97
Fetch J1 trace in VC-3 POH of selected STM-1	`FETCh:STRing:DATA:TELecom:SDH:TRIButary:J1?`	4--94

Setup the OmniBER 725 SDH Rx to perform Overhead Byte Capture

The following commands can be used to setup the OmniBER 725 SDH Receiver to capture selected Overhead bytes.

Table 8-9 OmniBER 725 SDH Rx Overhead Byte Capture

Comment	SCPI Command	Ref.
Select SDH Test Function.	`SENSe:DATA:TELecom:TFUNction SDH`	2-16
Set Test Function to be Overhead Sequences	`SENSe:DATA:TELecom:SDH:TFUNction:TYPE OCAPture`	3--72
Select J0 Byte for Sequence Capture	`SENSe:DATA:TELecom:SDH:OCAPture:OHBYte J0`	3--72
Set Overhead Capture to trigger on value.	`SENSe:DATA:TELecom:SDH:OCAPture:TRIGger ON`	3--74
Set Overhead Capture trigger value to "02"	`SENSe:DATA:TELecom:SDH:OCAPture:TRIGger:PATTern "02"`	3--75
Start Overhead Capture	`SENSe:DATA:TELecom:SDH:OCAPture STARt`	3--72
Retrieve Overhead Capure data	`FETCh:ARRay:DATA:TELecom:SDH:OCAPture? 16`	3--72

Setup the OmniBER 725 SONET Tx

The following commands can be used to setup the OmniBER 725 SONET Transmitter to generate a OC-3 Optical signal with a VT-2 PCM31 Framed payload.

Table 8-10 OmniBER 725 SONET Tx Setup

Comment	SCPI Command	Ref.
Set Tx Output to OC-48/12/3/1 Optical	`SOURce:DATA:TELecom:SOURce OC48`	2-9
Set Tx Line Rate to OC-3 Optical	`OUTPut:TELecom:OC48:RATE OC3`	4-4
Set Tx Optical Wavelength to be 1310 nm	`OUTPut:TELecom:OC48:WAVelength NM1310`	4-4
Ensure that Thru Mode is not selected	`SOURce:DATA:TELecom:SONet:THRumode INTernal`	4-12
Set Clock Sync to Internal	`SOURce:CLOCk:SONet:SOURce INTernal`	4-7
Ensure Frequency Offset is OFF	`SOURce:CLOCk:SONet:FOFFset OFF`	4-8
Setup F/G Mappings		
Set SPE Layer Selection to STS-1	`SOURce:DATA:TELecom:SONet:SPE:TYPE STS1`	4-15
Set VT Layer Selection to VT-2	`SOURce:DATA:TELecom:SONet:PAYLoad VT2`	4-15
Set STS-1 Number to 1	`SOURce:DATA:TELecom:SONet:STS1 1`	4-15
Set VT Group Number to 1	`SOURce:DATA:TELecom:SONet:VTGRoup 1`	4-16
Set VT Number to 1	`SOURce:DATA:TELecom:SONet:TRIButary 1`	4-16
Set Pattern to 2^15-1 PRBS	`SOURce:DATA:TELecom:SONet:PAYLoad:PATTern PRBS15`	4-17

Table 8-10 **OmniBER 725 SONET Tx Setup, continued**

Comment	SCPI Command	Ref.
Set PRBS Polarity to be Inverted	`SOURce:DATA:TELecom:SONet:PRBS:POLarity INVerted`	4-18
Setup B/G Mappings		
Set Background STS-1 #2 to VT-2 Mapping	`SOURce:DATA:TELecom:SONet:STS1:BACKground:PAYLoad: PATTern 2,VT2`	4-19
Set Background STS-1 #3 to VT-2 Mapping	`SOURce:DATA:TELecom:SONet:STS1:BACKground:PAYLoad: PATTern 3,VT2`	4-19
Set Pattern in Background VT-2's within STS-1 #1 to be "1100" Word	`SOURce:DATA:TELecom:SONet:PRIMary:BACKground:PAYLoad: PATTern P1100`	4-19

Setup the OmniBER 725 SONET Rx

The following commands can be used to setup the OmniBER 725 SONET Receiver to receive a OC-12 Optical signal with a VT-2 Unframed payload.

Table 8-11 OmniBER 725 SONET Rx Setup

Comment	SCPI Command	Ref.
Set Rx Input to OC-48/12/3/1 Optical	`SENSe:DATA:TELecom:SENSe OC48`	2-15
Set Rx Line Rate to OC-12 Optical	`INPut:TELecom:OC48:RATE OC12`	4-60
Set SPE Layer Selection to STS-1	`SENSe:DATA:TELecom:SONet:SPE:TYPE STS1`	4-64
Set VT Layer Selection to VT-2	`SENSe:DATA:TELecom:SONet:PAYLoad VT2`	4-65
Set STS-3 Number Under Test to 1	`SENSe:DATA:TELecom:SONet:STS3 1`	4-63
Set STS-1 Number to 1	`SENSe:DATA:TELecom:SONet:STS1 1`	4-64
Set VT Group Number to 1	`SENSe:DATA:TELecom:SONet:VTGRoup 1`	4-66
Set VT Number to 1	`SENSe:DATA:TELecom:SONet:TRIButary 1`	4-68
Set Pattern to 2^15-1 PRBS	`SENSe:DATA:TELecom:SONet:PAYLoad:PATTern PRBS15`	4-67
Set PRBS Polarity to be Inverted	`SENSe:DATA:TELecom:SONet:PRBS:POLarity INVerted`	4-68

Setup the OmniBER 725 SONET Tx to add Errors & Alarms

The following commands can be used to setup the OmniBER 725 SONET Transmitter to generate errors and alarms using the SONET Test Function.

Table 8-12 OmniBER 725 SONET Tx Error & Alarm Add

Comment	SCPI Command	Ref.
Select SONET Test Function	`SOURce:DATA:TELecom:TFUNction SONet`	2-10
Set Test Function to be Errors & Alarms	`SOURce:DATA:TELecom:SONet:TFUNction:TYPE ERRor`	4-33
Set Error Add type to CV-P (B3)	`SOURce:DATA:TELecom:SONet:ERRor:TYPE CVP`	4-34
Add a single CV-P error. Repeat if required.	`SOURce:DATA:TELecom:SONet:ERRor:RATE ONCE`	4-35
Add a CV-P error rate of 1E-4	`SOURce:DATA:TELecom:SONet:ERRor:RATE E_4`	4-35
Switch CV-P error rate OFF	`SOURce:DATA:TELecom:SONet:ERRor:RATE NONE`	4-35
Generate a Line FERF (RDI-L) alarm	`SOURce:DATA:TELecom:SONet:ALARm RDIL`	4-38
Switch alarm OFF	`SOURce:DATA:TELecom:SONet:ALARm NONE`	4-38

Setup the OmniBER 725 SONET Tx Overhead Bytes

The following commands can be used to setup the OmniBER 725 SONET Transmitter Overhead bytes. It is assumed that a OC-12 signal is selected. .

Table 8-13 OmniBER 725 SONET Tx Overhead Setup

Comment	SCPI Command	Ref.
Set the Overhead bytes to their default values	`SOURce:DATA:TELecom:SONet:OVERhead:DEFault`	4-21
Update the D1 byte in STS-3 #1	`SOURce:DATA:TELecom:SONet:OVERhead:DATA 1,1,D1,"11111111"`	4-21
Update the M1 byte in STS-3 #3	`SOURce:DATA:TELecom:SONet:OVERhead:DATA:HEXadecimal 3,1,M1,"FF"`	4-22
Update F2 byte in the POH of the selected STS-3	`SOURce:DATA:TELecom:SONet:POVerhead:DATA F2,"11111111"`	4-23
Update J1 trace in POH of selected STS-3 to be HP37718A Test string	`SOURce:DATA:TELecom:SONet:POVerhead:J1:PATTern TEST`	4-24

Setup the OmniBER 725 SONET Tx for Overhead Byte Sequencing

The following commands can be used to setup the OmniBER 725 SONET Transmitter to generate an Overhead byte sequence. It is assumed that an OC-12 signal is selected.   .

Table 8-14 OmniBER 725 SONET Tx Overhead Sequence

Comment	SCPI Command	Ref.
Select SONET Test Function.	`SOURce:DATA:TELecom:TFUNction SONet`	2-10
Set Test Function to be Overhead Sequences	`SOURce:DATA:TELecom:SONet:TFUNction:TYPE SEQuence`	4-33
Set Sequence Mode to be Repeat Run	`SOURce:DATA:TELecom:SONet:SEQuence:MODE REPeat`	4-46
Select J0 Byte in SOH	`SOURce:DATA:TELecom:SONet:SEQuence:OHBYte J0`	4-46

Set Sequence byte values to "00","01","02","03","04"	`SOURce:DATA:TELecom:SONet:SEQuence:DATA A,"00"`
	`SOURce:DATA:TELecom:SONet:SEQuence:DATA B,"01"`
	`SOURce:DATA:TELecom:SONet:SEQuence:DATA C,"02"`
	`SOURce:DATA:TELecom:SONet:SEQuence:DATA D,"03"`
	`SOURce:DATA:TELecom:SONet:SEQuence:DATA E,"04"`
		4-47

Set the Sequence order to be A,B,C,D,E	`SOURce:DATA:TELecom:SONet:SEQuence:ORDER A,B,C,D,E"`	4-48

Set the Frame Count for each value to be 10	`SOURce:DATA:TELecom:SONet:SEQuence:FCOunt 1,10`
	`SOURce:DATA:TELecom:SONet:SEQuence:FCOunt 2,10`
	`SOURce:DATA:TELecom:SONet:SEQuence:FCOunt 3,10`
	`SOURce:DATA:TELecom:SONet:SEQuence:FCOunt 4,10`
	`SOURce:DATA:TELecom:SONet:SEQuence:FCOunt 5,10`
		4-48

Start Sequence	`SOURce:DATA:TELecom:SONet:SEQuence STARt`	4-45

Perform OmniBER 725 SONET Rx Measurements

The following commands can be used to setup the OmniBER 725 SONET Receiver to perform B3 measurements.   .

Table 8-15 **OmniBER 725 SONET Rx Measurements**

Comment	SCPI Command	Ref.
Setup Results Timing Control		
Set Short Term Period to 10 seconds	`SENSe:DATA:TELecom:STERm:PERiod 10s`	2-18
Set Test Timing to Single	`SENSe:DATA:TELecom:TEST:TYPE SINGle`	2-17
Set Test Period t o 1 minute	`SENSe:DATA:TELecom:TEST:PERiod 1m`	2-17
Start gating	`SENSe:DATA:TELecom:TEST ON`	2-16
Wait for measurement to complete		
Retrieve Results		
Read back Cumulative CV-P Error Count	`SENSe:DATA? "ECOunt:SONet:CVP"`	4-79
Read back Short Term CV-P Error Count	`SENSe:DATA? "ECOunt:SONet:STERm:CVP"`	4-79

Read back some G.826 Analysis Results	`SENSe:DATA? "ESEConds:SONet:CVP:ANALysis"`
	`SENSe:DATA? "SESeconds:SONet:CVP:ANALysis"`
	`SENSe:DATA? "UASeconds:SONet:CVP:ANALysis"`
		4-85

Setup the OmniBER 725 SONET Rx to retrieve Overhead Monitor Bytes

The following commands can be used to retrieve the OmniBER 725 SONET Receiver's Overhead Monitor byte values. .

Table 8-16 OmniBER 725 SONET Rx Overhead Monitor

Comment	SCPI Command	Ref.
Retrieve the D1 byte in STS-3 #1	`FETCh:SCALar:DATA:TELecom:SONet:OVERhead? 1,1,D1`	4-91
Retrieve the M1 byte in STS-3 #3	`FETCh:SCALar:DATA:TELecom:SONet:OVERhead? 3,1,M1`	4-91
Retrieve F2 byte in POH of selected STS-3	`FETCh:SCALar:TELecom:SONet:POVerhead? F2`	4-91
Retrieve J1 trace in POH of selected STS-3	`FETCh:STRing:DATA:TELecom:SONet:J1?`	4-89

Setup the OmniBER 725 SONET Rx to perform Overhead Byte Capture

The following commands can be used to setup the OmniBER 725 SONET Receiver to capture selected Overhead bytes.

Table 8-17 OmniBER 725 SONET Rx Overhead Byte Capture

Comment	SCPI Command	Ref.
Select SONET Test Function.	`SENSe:DATA:TELecom:TFUNction SONet`	2-16
Set Test Function to be Overhead Sequences	`SENSe:DATA:TELecom:SONet:TFUNction:TYPE OCAPture`	4-69
Select J0 Byte for Sequence Capture	`SENSe:DATA:TELecom:SONet:OCAPture:OHBYte J0`	4-70
Set Overhead Capture to trigger on value.	`SENSe:DATA:TELecom:SONet:OCAPture:TRIGger ON`	4-71
Set Overhead Capture trigger value to "02"	`SENSe:DATA:TELecom:SONet:OCAPture:TRIGger:PATTern "02"`	4-71
Start Overhead Capture	`SENSe:DATA:TELecom:SONet:OCAPture STARt`	4-69
Retrieve Overhead Capure data	`FETCh:ARRay:DATA:TELecom:SONet:OCAPture? 16`	4-101

Setup the OmniBER 725 to generate SDH/SONET Jitter

The following commands can be used to set up an internally generated jitter modulation frequency of 1.3MHz with a jitter amplitude of 0.59UI on an SDH/ SONET signal.

Table 8-18 OmniBER 725 Jitter Tx Setup

Comment	SCPI Command	Ref.
Set Jitter on	`:OUTPut:TELecom:JITTer ON`	5-4
Set Modulation Source	`:SOURce:DATA:TELecom:JITTer:MODulation INTernal`	5-14
Switch off Jitter Mask	`:SOURce:DATA:TELecom:JITTer:MASK OFF`	5-6
Set Tx Jitter Range	`:SOURce:DATA:TELecom:JITTer:RANGe UI20`	5-7
Set Tx Jitter Modulation Frequency	`:SOURce:DATA:TELecom:JITTer:FREQuency 1300000`	5-6
Set Tx Jitter Amplitude	`:SOURce:DATA:TELecom:JITTer:AMPLitude 0.59`	5-7
Wait for Tx to Settle	`:STAT:JITT:COND?` `Tx amplitude settled when bit 8 is false`	6-18/ 2-39

NOTE The Tx amplitude settled bit should be queried after any transmitter setting change.

Setup the OmniBER 725 to generate a SDH/SONET Jitter Swept Mask

The following commands can be used to set up an internally generated SDH/ SONET GR-253 swept jitter mask.

Table 8-19 OmniBER 725 SDH/SONET Jitter Tx Swept Mask Setup

Comment	SCPI Command	Ref.
Set Jitter on	`:OUTPut:TELecom:JITTer ON`	5-4
Set Modulation Source	`:SOURce:DATA:TELecom:JITTer:MODulation INTernal`	5-14
Set Jitter Mask type	`:SOURce:DATA:TELecom:JITTer:MASK:TYPE GR253`	5-8
Set Swept Jitter Mask	`:SOURce:DATA:TELecom:JITTer:MASK SWEPt`	5-6

Setup the OmniBER 725 to generate an SDH/SONET Jitter Mask Spot Frequency

The following commands can be used to set up an internally generated jitter modulation SPOT frequency of 1MHz on an SDH/SONET G958 Type B mask.

Table 8-20 OmniBER 725 SDH/SONET Jitter Mask Spot Frequency Setup

Comment	SCPI Command	Ref.
Set Jitter on	`:OUTPut:TELecom:JITTer ON`	5-4
Set Modulation Source	`:SOURce:DATA:TELecom:JITTer:MODulation INTernal`	5-14
Set Jitter Mask type	`:SOURce:DATA:TELecom:JITTer:MASK:TYPE     G958B`	5-8
Set Tx Jitter Modulation Frequency	`:SOURce:DATA:TELecom:JITTer:FREQuency 1000000`	5-6
Set Spot Jitter Mask	`:SOURce:DATA:TELecom:JITTer:MASK SPOT`	5-6
Wait for Tx to Settle	`:STAT:JITT:COND?` `Tx amplitude settled when bit 8 is false`	6-18/ 2-39

Perform OmniBER 725 Jitter Rx Measurements

The following commands can be used to setup the OmniBER 725 Jitter Receiver to perform some jitter hit/amplitude measurements. The Jitter Receiver measurement range is 1.6UI, using the HP1 filter selection with a HIT threshold of 1.4UI.

Table 8-21 OmniBER 725 Jitter Rx Measurements

Comment	SCPI Command	Ref.
Jitter Receiver Setting		
Set Jitter Measurement Type	`:SENSe:DATA:TELecom:JITTer:TYPE JITTer`	5-22
Set Jitter Receiver Range	`:SENSe:DATA:TELecom:JITTer:RANGe UI1_6`	5-23
Set Jitter Receiver Hit Threshold	`:SENSe:DATA:TELecom:JITTer:THReshold 1.4`	5-24
Set Jitter Receiver Filter	`:SENSe:DATA:TELecom:JITTer:FILTer HP1`	5-22
Wait for Jitter Rx to settle	`:STAT:JITT:COND?`	6-18
	`Rx locked up when bit 0 is false`	
Setup Results Timing Control		
Set Short Term Period to 10 seconds	`:SENse:DATA:TELecom:STERm:PERiod 10s`	2-18
Set Test Timing to Single	`:SENse:DATA:TELecom:TEST:TYPE SINGle`	2-17
Set Test Period to 1 minute	`:SENse:DATA:TELecom:TEST:PERiod 1m`	2-17
Start gating	`:SENse:DATA:TELecom:TEST ON`	2-16
Wait for measurement to complete		
Retrieve Results		
Read back Cumulative Jitter Hit Counts	`:SENse:DATA? "COUNt:JITT:HITS"`	5-25

Table 8-21 OmniBER 725 Jitter Rx Measurements, continued

Comment	SCPI Command	Ref.
Read back Cumulative Jitter PK-PK Amplitude	`:SENSe:DATA? "PEAK:JITT:PKPK"`	5-25
Read back Short-Term RMS Jitter result	`:SENSe:DATA? "RMS:JITT:STERm"`	5-25

Setup the OmniBER 725 to generate Wander

The following commands can be used to set up a wander modulation frequency of 0.125 Hz with a wander modulation amplitude of 50UI

Table 8-22 OmniBER 725 Wander Tx Setup

Comment	SCPI Command	Ref.
Set Wander on	`:OUTPut:TELecom:JITTer:WANDer ON`	5-5
Switch off Wander Mask	`:SOURce:DATA:TELecom:JITTer:WANDer:MASK OFF`	5-15
Set Tx Wander Modulation Frequency	`:SOURce:DATA:TELecom:JITTer:WANDer:FREQuency 125000`	5-15
Set Tx Wander Modulation Amplitude	`:SOURce:DATA:TELecom:JITTer:WANDer:AMPLitude 50`	5-15

Setup the OmniBER 725 to generate a Wander Mask Spot Frequency

The following commands can be used to set up a wander modulation SPOT frequency of 1.6mHz on an ITU-T G.825 mask

Table 8-23 OmniBER 725 Wander Mask Spot Frequency Setup

Comment	SCPI Command	Ref.
Set Wander on	`:OUTPut:TELecom:JITTer:WANDer ON`	5-5
Set Tx Jitter Modulation Frequency	`:SOURce:DATA:TELecom:JITTer:WANDer:FREQuency 1600`	5-15
Set Spot Jitter Mask	`:SOURce:DATA:TELecom:JITTer:MASK SPOT`	5-6

Perform OmniBER 725 Wander Rx Measurements

The following commands can be used to setup the OmniBER 725 Jitter Receiver to perform some wander measurements. The Jitter Receiver HIT threshold is set at 15UI.

Table 8-24 OmniBER 725 Jitter Rx Measurements

Comment	SCPI Command	Ref.
Wander Receiver Setting		
SetWander Measurement Type	`:SENSe:DATA:TELecom:JITTer:TYPE WANDer`	5-22
Set Jitter Receiver Hit Threshold	`:SENSe:DATA:TELecom:JITTer:THReshold 15`	5-24
Wait for Jitter Rx locked	`:STAT:JITT:COND?` `Rx locked when bit 0 and bit 2 are false`	6-18
Setup Results Timing Control		
Set Test Timing to Single	`:SENse:DATA:TELecom:TEST:TYPE SINGle`	2-17
Set Test Period t o 1 minute	`:SENse:DATA:TELecom:TEST:PERiod 1m`	2-17
Start gating	`:SENse:DATA:TELecom:TEST ON`	2-16
Wait for measurement to complete		
Retrieve Results		
Read back +ve peak Wander	`:SENse:DATA? "PEAK:JITT:WANDer:POSitive"`	5-25
Read back pk-to-pk Wander	`:SENse:DATA? "PEAK:JITT:WANDer:PKPK"`	5-25

Perform OmniBER 725 Jitter Auto-Tolerance Measurement

The following commands can be used to setup the OmniBER 725 to perform a jitter auto-tolerance measurement. The auto-tolerance measurement is carried out for 9 frequency points, using a delay time of 2 seconds and a dwell time of 1 second for each point. Any error during the auto-tolerance gating period will cause a fail at that particular point.

Table 8-25 OmniBER 725 Jitter Auto-Tolerance Measurement

Comment	SCPI Command	Ref.
Select Auto-Tolerance	`:OUTPut:TELecom:JITTer AUTotol`	5-4
Setup Auto-Tolerance Parameters		
Set Number of Points	`:SOURce:DATA:TELecom:JITTer:ATOLerance:POINts 9`	5-10
Set Dwell Time	`:SOURce:DATA:TELecom:JITTer:ATOLerance:DWELl 1`	5-9
Set Delay Time	`:SOURce:DATA:TELecom:JITTer:ATOLerance:DELay 2`	5-9
Set Threshold	`:SOURce:DATA:TELecom:JITTer:ATOLerance:THReshold 0`	5-10
Start Auto-Tolerance	`:OUTPut:TELecom:JITTer:AUTotol ON`	5-4
Wait for Auto-Tolerance to complete	`:STAT:JITT:COND?` `Jitter Auto-Tolerance complete when bit 10 is false`	6-18 /2-39
Retrieve Results	`:FETCh:ARRay:DATA:TELecom:JITTer:ATOLerance?`	5-27

NOTE If a jitter auto-tolerance mask selection is available, this should be set up prior to running the auto-tolerance measurement. The relevant commands is :-
:SOURce:DATA:TELecom:JITTer:MASK:TYPE Ref 65-8

Perform OmniBER 725 Jitter Transfer Function Measurement

The following commands can be used to setup the OmniBER 725 to perform an SDH/SONET jitter transfer function measurement. The transfer function measurement is carried out for 55 frequency points, using a delay time of 5 seconds and a dwell time of 6 second for each point. The G.958 Type A transfer function input mask is selected for the test.

Table 8-26 OmniBER 725 Jitter Transfer Function Measurement

Comment	SCPI Command	Ref.
Select Transfer Function	`:OUTPut:TELecom:JITTer TRANsfer`	5-4
Setup Transfer Function Parameters		
Set Number of Points	`:SOURce:DATA:TELecom:JITTer:TRANsfer:POINts 55`	5-11
Set Dwell Time	`:SOURce:DATA:TELecom:JITTer:TRANsfer:DWELl 6`	5-12
Set Delay Time	`:SOURce:DATA:TELecom:JITTer:TRANsfer:DELay 5`	5-11
Set Input Mask	`:SOURce:DATA:TELecom:JITTer:TRANsfer:MASK:INPut G958A`	5-12
Perform Calibration Run		
Select Calibration Mode	`:SOURce:DATA:TELecom:JITTer:TRANsfer:MODE CALib`	5-11
Initiate Calibration Run	`:OUTPut:TELecom:JITTer:TRANsfer ON`	5-5
Wait for Calibration Run to complete	`:STAT:JITT:COND?` `Calibration Run complete when bit 14 is false`	6-18/ 2-39
Perform Measurement Run		
Select Measurement Mode	`:SOURce:DATA:TELecom:JITTer:TRANsfer:MODE MEASure`	5-11
Initiate Measurement Run	`:OUTPut:TELecom:JITTer:TRANsfer ON`	5-5
Wait for Measurement Run to complete	`:STAT:JITT:COND?` `Measurement Run complete when bit 14 is false`	6-18/ 2-39
Retrieve Results	`:FETCh:ARRay:DATA:TELecom:JITTer:TRANsfer?`	5-28

9

SCPI Error Messages

SCPI Error Messages

The system-defined error/event numbers are chosen on an enumerated (”1 of N”) basis. The SCPI defined error/event numbers and the error description portions of the ERRor query response are listed here. The first error/event described in each class (for example, –100, –200, –300, –400) is a “generic” error. In selecting the proper error/event number to report, more specific error/event codes are preferred, and the generic error/event is used only if the others are inappropriate.

No Error

This message indicates that the device has no errors.

No Error

The queue is completely empty. Every error/event in the queue has been read or the queue was purposely cleared by power-on, *CLS, etc.

Command Errors [–199, –100]

An < error/event number > in the range [–199, –100] indicates that an *IEEE 488.2* syntax error has been detected by the instrument’s parser. The occurrence of any error in this class should cause the command error bit (bit 5) in the event status register (*IEEE 488.2*, section 11.5.1) to be set. One of the following events has occurred:

- An *IEEE 488.2* system error has been detected by the parser. That is, a controller-to-device message was received which is in violation of the *IEEE 488.2* standard. Possible violations include a data element which violates the device listening formats or whose type is unacceptable to the device.
- An unrecognized header was received. Unrecognized headers include incorrect device-specific headers and incorrect or not implemented *IEEE 488.2* common commands.
- A Group Execute Trigger (GET) was entered into the input buffer inside of an

IEEE 488.2 < PROGRAM MESSAGE >.

Events that generate command errors shall not generate execution errors, device-specific errors, or query errors.

–100 **Command error**

This is the generic syntax error for devices that cannot detect more specific errors. This code indicates only that a Command Error as defined in *IEEE 488.2*, 11.5.1.1.4 has occurred.

–101 **Invalid character**

A syntactic element contains a character which is invalid for that type; for example, a header containing an ampersand, SETUP&. This error might be used in place of errors –114, –121, –141, and perhaps some others.

–102 **Syntax error**

An unrecognized command or data type was encountered; for example, a string was received when the device does not accept strings.

–103 **Invalid separator**

The parser was expecting a separator and encountered an illegal character; for example, the semicolon was omitted after a program message unit, *ESE 1 :OUTP1:TEL:RATE 140 Mb/s

–104 **Data type error**

The parser recognized a data element different than one allowed; for example, numeric or string data was expected but block data was encountered.

–105 **GET not allowed**

A Group Execute Trigger was received within a program message (see *IEEE 488.2*, 7.7).

–108 **Parameter not allowed**

More parameters were received than expected for the header; for example, the *RCL common command only accepts one parameter, so receiving *RCL 0,1 is not allowed.

–109 **Missing parameter**

Fewer parameters were received than required for the header; for example, the *ESE common command requires one parameter, so receiving *ESE is not allowed.

–110 **Command header error**

An error was detected in the header. This error message should be used when the device cannot detect the more specific errors described for errors –111 through –119.

–111 **Header separator error**

A character which is not a legal header separator was encountered while parsing the header; for example, no white space followed the header, thus *ESE1 is an error.

–112 **Program mnemonic too long**

The header contains more that twelve characters (see *IEEE 488.2*, 7.6.1.4.1).

–113 **Undefined header**

The header is syntactically correct, but it is undefined by this specific device; for example, *XYZ is not defined for any device.

–114 **Header suffix out of range**

Indicates that a non-header character has been encountered in what the parser expects is a header element.

–120 **Numeric data error**

This error, as well as errors –121 through –129, are generated when parsing a data element which appears to be numeric, including the non-decimal numeric types. This particular error message should be used if the device cannot detect a more specific error.

–121 **Invalid character in number**

An invalid character for the data type being parsed was encountered; for example, an alpha in a decimal numeric or a “9” in octal data.

–123 **Exponent too large**

The magnitude of the exponent was larger than 32000 (see *IEEE 488.2*, 7.7.2.4.1).

–124 **Too many digits**

The mantissa of a decimal numeric data element contained more than 255 digits excluding leading zeros (see *IEEE 488.2*, 7.7.2.4.1).

–128 **Numeric data not allowed**

A legal numeric data element was received, but the device does not accept one in this position for the header.

–130 **Suffix error**

This error, as well as errors –131 through –139, are generated when parsing a suffix. This particular error message should be used if the device cannot detect a more specific error.

–131 **Invalid suffix**

The suffix does not follow the syntax described in *IEEE 488.2*, 7.7.3.2, or the suffix is inappropriate for this device.

–134 **Suffix too long**

The suffix contained more than 12 characters (see *IEEE 488.2*, 7.7.3.4).

–138 **Suffix not allowed**

A suffix was encountered after a numeric element which does not allow suffixes.

–140 **Character data error**

This error, as well as errors –141 through –149, are generated when parsing a character data element. This particular error message should be used if the device cannot detect a more specific error.

–141 **Invalid character data**

Either the character data element contains an invalid character or the particular element received is not valid for the header.

–144 **Character data too long**

The character data element contains more than twelve characters (see *IEEE 488.2*, 7.7.1.4).

–148 **Character data not allowed**

A legal character data element was encountered where prohibited by the device.

–150 **String data error**

This error, as well as errors –151 through –159, are generated when parsing a string data element. This particular error message should be used if the device cannot detect a more specific error.

–151 **Invalid string data**

A string data element was expected, but was invalid for some reason (see IEEE 488.2, 7.7.5.2); for example, an END message was received before the terminal quote character.

–158 **String data not allowed**

A string data element was encountered but was not allowed by the device at this point in parsing.

–160 **Block data error**

This error, as well as errors –161 through –169, are generated when parsing a block data element. This particular error message should be used if the device cannot detect a more specific error.

–161 **Invalid block data**

A block data element was expected, but was invalid for some reason (see IEEE 488.2, 7.7.6.2); for example, an END message was received before the length was satisfied.

–168 **Block data not allowed**

A legal block data element was encountered but was not allowed by the device at this point in parsing.

–170 **Expression error**

This error, as well as errors –171 through –179, are generated when parsing an expression data element. This particular error message should be used if the device cannot detect a more specific error.

–171 **Invalid expression**

The expression data element was invalid (see *IEEE 488.2*, 7.7.7.2); for example, unmatched parentheses or an illegal character.

–178 **Expression data not allowed**

A legal expression data was encountered but was not allowed by the device at this point in parsing.

–180 **Macro error**

This error, as well as errors –181 through –189, are generated when defining a macro or executing a macro. This particular error message should be used if the device cannot detect a more specific error.

–181 **Invalid outside macro definition**

Indicates that a macro parameter placeholder ($<number) was encountered outside of a macro definition.

–183 **Invalid inside macro definition**

Indicates that the program message unit sequence, sent with a *DDT or *DMC command, is syntactically invalid (see 10.7.6.3).

–184 **Macro parameter error**

Indicates that a command inside the macro definition had the wrong number or type of parameters.

Execution Errors [–299, –200]

An < error/event number > in the range [–299, –200] indicates that an error has been detected by the instrument's execution control block. The occurrence of any error in this class should cause the execution error bit (bit 4) in the event status register (*IEEE 488.2*, section 11.5.1) to be set. One of the following events has occurred:

- A < PROGRAM DATA > element following a header was evaluated by the device as outside of its legal input range or is otherwise inconsistent with the device's capabilities.
- A valid program message could not be properly executed due to some device condition.

Execution errors shall be reported by the device after rounding and expression evaluation operations have taken place. Rounding a numeric data element, for example, shall not be reported as an execution error. Events that generate execution errors shall not generate Command Errors, device-specific errors, or Query Errors.

–200 Execution error

This is the generic syntax error for devices that cannot detect more specific errors. This code indicates only that an Execution Error as defined in *IEEE 488.2*, 11.5.1.1.5 has occurred.

–201 Invalid while in local

Indicates that a command is not executable while the device is in local due to a hard local control (see *IEEE 488.2*, 5.6.1.5); for example, a device with a rotary switch receives a message which would change the switches state, but the device is in local so the message can not be executed.

–202 Settings lost due to rtl

Indicates that a setting associated with a hard local control (see *IEEE 488.2*, 5.6.1.5) was lost when the device changed to LOCS from REMS or to LWLS from RWLS.

–210 Trigger error

–211 **Trigger ignored**

Indicates that a GET, *TRG, or triggering signal was received and recognized by the device but was ignored because of device timing considerations; for example, the device was not ready to respond. Note: a DT0 device always ignores GET and treats *TRG as a Command Error.

–212 **Arm ignored**

Indicates that an arming signal was received and recognized by the device but was ignored.

–213 **Init ignored**

Indicates that a request for a measurement initiation was ignored as another measurement was already in progress.

–214 **Trigger deadlock**

Indicates that the trigger source for the initiation of a measurement is set to GET and subsequent measurement query is received. The measurement cannot be started until a GET is received, but the GET would cause an INTERRUPTED error.

–215 **Arm deadlock**

Indicates that the arm source for the initiation of a measurement is set to GET and subsequent measurement query is received. The measurement cannot be started until a GET is received, but the GET would cause an INTERRUPTED error.

–220 **Parameter error**

Indicates that a program data element related error occurred. This error message should be used when the device cannot detect the more specific errors described for errors –221 through –229.

–221 **Setting conflict**

Indicates that a legal program data element was parsed but could not be executed due to the current device state (see *IEEE 488.2*, 6.4.5.3 and 11.5.1.1.5.)

–222 **Data out of range**

Indicates that a legal program data element was parsed but could not be executed because the interpreted value was outside the legal range as defined by the device (see *IEEE 488.2*, 11.5.1.1.5.)

–223 **Too much data**

Indicates that a legal program data element of block, expression, or string type was received that contained more data than the device could handle due to memory or related device-specific requirements.

–224 **Illegal parameter value**

Used where exact value, from a list of possibles, was expected.

–230 **Data corrupt or stale**

Possibly invalid data; new reading started but not completed since last access.

–231 **Data questionable**

Indicates that measurement accuracy is suspect.

–240 **Hardware error**

Indicates that a legal program command or query could not be executed because of a hardware problem in the device. Definition of what constitutes a hardware problem is completely device-specific. This error message should be used when the device cannot detect the more specific errors described for errors –241 through –249.

–241 **Hardware missing**

Indicates that a legal program command or query could not be executed because of missing device hardware; for example, an option was not installed. Definition of what constitutes missing hardware is completely device-specific.

–250 **Mass storage error**

Indicates that a mass storage error occurred. This error message should be used when the device cannot detect the more specific errors described for errors –251 through –259.

–251 **Missing mass storage**

Indicates that a legal program command or query could not be executed because of missing mass storage; for example, an option that was not installed. Definition of what constitutes missing mass storage is device-specific.

–252 **Missing media**

Indicates that a legal program command or query could not be executed because of a missing media; for example, no disk. The definition of what constitutes missing media is device-specific.

–253 **Corrupt media**

Indicates that a legal program command or query could not be executed because of corrupt media; for example, bad disk or wrong format. The definition of what constitutes corrupt media is device-specific.

–254 **Media full**

Indicates that a legal program command or query could not be executed because the media was full; for example, there is no room on the disk. The definition of what constitutes a full media is device-specific.

–255 **Directory full**

Indicates that a legal program command or query could not be executed because the media directory was full. The definition of what constitutes a full media directory is device-specific.

–256 **File name not found**

Indicates that a legal program command or query could not be executed because the file name on the device media was not found; for example, an attempt was made to read or copy a nonexistent file. The definition of what constitutes a file not being found is device-specific.

–257 **File name error**

Indicates that a legal program command or query could not be executed because the file name on the device media was in error; for example, an attempt was made to copy to a duplicate file name. The definition of what constitutes a file name error is device-specific.

–258 **Media protected**

Indicates that a legal program command or query could not be executed because the media was protected; for example, the write-protect tab on a disk was present. The definition of what constitutes protected media is device-specific.

–260 **Expression error**

Indicates that an expression program data element related error occurred. This error message should be used when the device cannot detect the more specific errors described for errors –261 through –269.

–261 **Math error in expression**

Indicates that a syntactically legal expression program data element could not be executed due to a math error; for example, a divide-by-zero was attempted. The definition of math error is device-specific.

–270 **Macro error**

Indicates that a macro-related execution error occurred. This error massage should be used when the device cannot detect the more specific errors described for errors –271 through –279.

–271 **Macro syntax error**

Indicates that a syntactically legal macro program data sequence, according to *IEEE 488.2*, 10.7.2, could not be executed due to a syntax error within the macro definition (see *IEEE 488.2*, 10.7.6.3.)

–272 **Macro execution error**

Indicates that a syntactically legal macro program data sequence could not be executed due to some error in the macro definition (see *IEEE 488.2*, 10.7.6.3.)

–273 **Illegal macro label**

Indicates that the macro label defined in the *DMC command was a legal string syntax but could not be accepted by the device (see *IEEE 488.2*, 10.7.3 and 10.7.6.2); for example, the label was too long, the same as a common command header, or contained invalid header syntax.

–274 **Macro parameter error**

Indicates that the macro definition improperly used a macro parameter placeholder (see *IEEE 488.2*, 10.7.3).

–275 **Macro definition too long**

Indicates that a syntactically legal macro program data sequence could not be executed because the string or block contents were too long for the device to handle (see *IEEE 488.2*, 10.7.6.1).

–276 **Macro recursion error**

Indicates that a syntactically legal macro program data sequence could not be executed because the device found it to be recursive (see *IEEE 488.2*, 10.7.6.6).

–277 **Macro redefinition not allowed**

Indicates that a syntactically legal macro label in the *DMC command could not be executed because the macro label was already defined (see *IEEE 488.2*, 10.7.6.4).

–278 **Macro header not found**

Indicates that a syntactically legal macro label in the *GMC? query could not be executed because the header was not previously defined.

–280 **Program error**

Indicates that a downloaded program-related execution error occurred. This error message should be used when the device cannot detect the more specific errors described for errors –281 through –289.

NOTE A downloaded program is used to add algorithmic capability to a device. The syntax used in the program and the mechanism for downloading a program is device-specific.

–281 **Cannot create program**

Indicates that an attempt to create a program was unsuccessful. A reason for the failure might include not enough memory.

–282 **Illegal program name**

The name used to reference a program was invalid; for example, redefining an existing program, deleting a nonexistent program, or in general, referencing a nonexistent program.

–283 **Illegal variable name**

An attempt was made to reference a nonexistent variable in a program.

–284 **Program currently running**

Certain operations dealing with programs may be illegal while the program is running; for example, deleting a running program might not be possible.

–285 **Program syntax error**

Indicates that a syntax error appears in a downloaded program. The syntax used when parsing the downloaded program is device-specific.

–286 **Program runtime error**

Query Errors [–399, –300]

An < error/event number > in the range [–399, –300] indicates that the instrument has detected an error which is not a command error, a query error, or an execution error; some device operations did not properly complete, possibly due to an abnormal hardware or firmware condition. These codes are also used for self-test response errors. The occurrence of any error in this class should cause the device-specific error bit (bit 3) in the event status register (IEEE 488.2, section 11.5.1) to be set. The meaning of positive error codes is device-dependent and may be enumerated or bit mapped; the <error message> string for positive error codes is not defined by SCPI and available to the device engineer. Note that the string is not optional; if the designer does not wish to implement a string for a particular error, the null string should be sent (for example 42," "). The occurrence of any error in this class should cause the device-specific error bit (bit 3) in the event status register (IEEE 488.2, section 11.5.1) to be set. Events that generate device-specific errors shall not generate command errors, execution errors, or query errors; see the other error definitions in this section.

–300 **Device-specific error**

This is the generic device-dependent error for devices that cannot detect more specific errors. This code indicates only that a Device-Dependent Error as defined in *IEEE 488.2*, 11.5.1.1.6 has occurred.

–310 **System error**

Indicates that some error, termed “system error” by the device has occurred. This code is device dependent.

–311 **Memory error**

Indicates that an error was detected in the device’s memory. The scope of this error is device-dependent.

–312 **PUD memory lost**

Indicates that the protected user data saved by the *PUD command has been lost.

–313 **Calibration memory lost**

Indicates that nonvolatile calibration data used by the *CAL? command has been lost.

–314 **Save/Recall memory lost**

Indicates that the nonvolatile data saved by the *SAV? command has been lost.

–315 **Configuration memory lost**

Indicates that the nonvolatile data saved by the device has been lost. The meaning of this error is device-specific.

–330 **Self-test failed**

–350 **Queue overflow**

A specific code entered into the queue in lieu of the code that caused the error. This code indicates that there is no room in the queue and an error occurred but was not recorded.

–360 **Communication error**

This is the generic communication error for devices that cannot detect the more specific errors described for errors -361 through -363.

–361 **Parity error in program message**

Parity bit not correct when data received for example, on a serial port (for example, a baud rate mismatch).

–362 **Framing error in program message**

A stop bit was not detected when data was received for example, on a serial port.

–363 **Input buffer overrun**

Software or hardware input buffer on serial port overflows with data caused by improper or nonexistent pacing.

Query Errors [–499, –400]

An < error/event number > in the range [–499, –400] indicates that the output queue control of the instrument has detected a problem with the message exchange protocol described in *IEEE 488.2*, chapter 6. The occurrence of any error in this class should cause the query error bit (bit 2) in the event status register (IEEE 488.2, section 11.5.1) to be set. These errors correspond to message exchange protocol errors described in *IEEE 488.2*, section 6.5. One of the following is true:

- An attempt is being made to read data from the output queue when no output is either present or pending;
- Data in the output queue has been lost.

Events that generate query errors shall not generate command errors, execution errors, or device-specific errors; see the other error definitions in this section.

–400 **Query error**

This is the general query error for devices that cannot detect more specific errors. This code indicates only that a Query Error as defined in *IEEE 488.2*, 11.5.1.1.7 and 6.3 has occurred.

–410 **Query INTERRUPTED**

Indicates that a condition causing an INTERRUPTED Query error occurred (see IEEE 488.2, 6.3.2.3); for example, a query followed by DAB or GET before a response was completely sent.

–420 **Query UNTERMINATED**

Indicates that a condition causing an UNTERMINATED Query error occurred (see *IEEE 488.2*, 6.3.2.2); for example, the device was addressed to talk and an incomplete program message was received.

–430 **Query DEADLOCKED**

Indicates that a condition causing a DEADLOCKED Query error occurred (see *IEEE 488.2*, 6.3.1.7); for example, both input buffer and output buffer are full and the device cannot continue.

–440 Query UNTERMINATED after indefinite response

Indicates that a query was received in the same program message after a query requesting an indefinite response was executed (see *IEEE 488.2*, 6.5.7.5.7.)

10

SCPI Backwards Compatibility Differences

SCPI Backwards Compatibility Differences

This chapter lists those commands for which it has not been possible to continue from a previous version of instrument software to the current version.

SCPI forward compatibility is treated with high priority when instrument features evolve. Thus, SCPI commands are written with the following prioritized guidelines:

1. Wherever possible, existing SCPI commands will be used and expanded to cover altered and new functionality.
2. The query form of an existing configuration command may be sacrificed in order to map the configuration form to both old and new capability. For example, where two "discrete" configuration parameters map to a single choice on the instrument display, the new choice will invariably be returned by the query.
3. If all else fails, the default is to create a new command.

The following chapter is organized by functionality differences which may affect commands across a number of subsystems. Listed are those commands which have been altered in such a way that they are incompatible with previously released versions of instrument software.

Also listed are commands which have been retained for backward compatibility but have been replaced by newer commands, the use of which is recommended.

Mixed Backgrounds

:SOURce:DATA:TELecom:SDH:TUG3:BACKground:PAYLoad[:PATTern]

Once, all three backgrounds could be programmed and only the two in context at any time would be in effect. The other would be masked by the foreground selection. Now, there are only two background channels, called LO and HI. LO can be channel 1 (if the foreground is not in channel 1) or 2. HI can be channel 2 or 3, depending on which channel is the foreground. Changing which channel is the foreground will change the channel selections of LO and/or HI.

The mapping selections and user words associated with HI and LO will be unaffected by such a change, but they may apply to a different channel.

For correct operation, it is recommended that the backgrounds are setup after each change of foreground channel number.

Furthermore, the TU3 background is now always of the user selectable word form instead of fixed word for the cases where TU3 was a mixed background. The effect of this is that the parameter UWORD will be converted to TU3. The effect is the same for the command, but the query will return TU3 instead of the previous behavior of returning UWORD.

Sequences and Overheads

:SOURce:DATA:TELecom:SDH:SEQuence:CHANnel

Command retained for backward compatibility only. The following new command is recommended: :SOURce:DATA:TELecom:SDH:SEQuence:OHBYte

DCC Interface

:SOURce:DATA:TELecom:SDH | SONet:IDCC:POLarity
:SENse:DATA:TELecom:SDH | SONet:IDCC:POLarity

Now only accepts NORMal as a parameter - REVersed is no longer supported.

Thru Mode

The following command/query pair is affected.

:SOURce:DATA:TELecom:SDH:THRumode:POVerwrite

This command both sets up and enables the thru-mode payload overwrite. This has been retained for backwards compatibility only. Thru-mode has been enhanced, such that the payload overwrite is set up and enabled separately. The recommended commands are shown below.

:SOURce:DATA:TELecom:SDH:THRumode:PAYLoad:OVERwrite <discrete>

:SOURce:DATA:TELecom:SDH:THRumode:PAYLoad:OVERwrite:ENABle <boolean>

Jitter Auto tolerance

SOURce:DATA:TELecom:JITTer:ATOLerance:THReshold<numeric>

This command has been superceded by the ERRor:TYPe & ERRor:THReshold commands.

SCPI Backwards Compatibility Differences

Fixed Jitter Masks

SOURce:DATA:TELecom:JITTer:SDHMask | SONMask
SOURce:DATA:TELecom:JITTer:TRANsfer:MASK:INPut
SOURce:DATA:TELecom:JITTer:TRANsfer:MASK:PASS

Parameters ATYPE and BTYPE are replaced by G958A and G958B respectively.

SOURce:DATA:TELecom:JITTer:QFACtor
SSOURce:DATA:TELecom:JITTer:SDHMask
SOURce:DATA:TELecom:JITTer:SDHMask:MRANge
SOURce:DATA:TELecom:JITTer:SONMask
SOURce:DATA:TELecom:JITTer:SONMask:MRANge

With the introduction of the User Mask selection for Auto Tolerance, the above commands have been replaced by newer commands. They will continue to be maintained for backwards compatibility.

User Jitter Masks

:SOURce:DATA:TELecom:JITTer:TRANsfer:MASK:INPut:A1
:SOURce:DATA:TELecom:JITTer:TRANsfer:MASK:INPut:A2
:SOURce:DATA:TELecom:JITTer:TRANsfer:MASK:INPut:F1
:SOURce:DATA:TELecom:JITTer:TRANsfer:MASK:INPut:F2
:SOURce:DATA:TELecom:JITTer:TRANsfer:MASK:INPut:F3
:SOURce:DATA:TELecom:JITTer:TRANsfer:MASK:INPut:F4

The feature and hence the commands which defined the Jitter Transfer Function user jitter mask have been deleted from the instrument. A new all encompassing user jitter mask feature is now provided.

Jitter Module Obsoletion

1 :SOURce:CLOCk:JITTer:FORMat
2 :SOURce:CLOCk:JITTer:BALanced
3 :INPut:TELecom:JITTer:...
4 JITTer Status Register:

DB3:	WRSL - Wander Reference Unlock.
DB4:	EXW - Excess wander (>5 UI).
DB11:	JLOS - SDH Loss of Signal. (Jitter optical Rx only).
DB12:	JLOL - SDH Optical Loss of Light. (Jitter optical Rx only).

5 :SENSe:DATA:TELecom:JITTer:SETTings

6 :SENSe:DATA? "PEAK:JITTer:WANDer:SECond:PK15"
7 :SENSe:DATA? "PEAK:JITTer:WANDer:SECond:PK24"

Due to jitter module obsoletion, the above commands and status bits are amended as follows:

1 Only the parameter CLOCk is supported.

2 Only the parameter UNBalanced is supported.

3 There are no primary inputs on the upgraded jitter module and hence all of these commands are obsolete.

4 There are no primary inputs on the upgraded jitter module and hence all of these status bits are obsolete.

5 Obsolete command. No longer required.

6 New module returns results in units of nanoseconds.

7 New module returns results in units of nanoseconds.

Jitter External Clock
:SOURce:CLOCk:JITTer:EXTernal:SOURce
:SOURce:CLOCk:JITTer:EXTernal:FORMat

Due to PDH jitter module obsoletion, there is no longer an external reference clock input on a PDH jitter module. Consequently, the commands :SOUR:CLOC:JITT:EXT:SOUR and :SOUR:CLOC:JITT:EXT:FORM are now obsolete but are retained for backwards compatibility.

The existing command, :SOUR:CLOC:SPDH:SOUR is now extended in line with the :SOUR:CLOC:SDH | SON:SOUR commands. The obsolete parameter JITTer is retained for backwards compatibility.

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