

MX18000A
Signal Quality Analyzer
Control Software
Operation Manual

14th Edition


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


ANRITSU CORPORATION


Safety Symbols

To prevent the risk of personal injury or loss related to equipment malfunction, Anritsu Corporation uses the following safety symbols to indicate safety-related information. Ensure that you clearly understand the meanings of the symbols BEFORE using the equipment. Some or all of the following symbols may be used on all Anritsu equipment. In addition, there may be other labels attached to products that are not shown in the diagrams in this manual.

Symbols used in manual

 **DANGER** This indicates a very dangerous procedure that could result in serious injury or death if not performed properly.

 **WARNING** This indicates a hazardous procedure that could result in serious injury or death if not performed properly.

 **CAUTION** This indicates a hazardous procedure or danger that could result in light-to-severe injury, or loss related to equipment malfunction, if proper precautions are not taken.

Safety Symbols Used on Equipment and in Manual

The following safety symbols are used inside or on the equipment near operation locations to provide information about safety items and operation precautions. Ensure that you clearly understand the meanings of the symbols and take the necessary precautions BEFORE using the equipment.



This indicates a prohibited operation. The prohibited operation is indicated symbolically in or near the barred circle.



This indicates an obligatory safety precaution. The obligatory operation is indicated symbolically in or near the circle.



This indicates a warning or caution. The contents are indicated symbolically in or near the triangle.



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



These indicate that the marked part should be recycled.

MX180000A
Signal Quality Analyzer Control Software
Operation Manual

27 November 2006 (First Edition)
4 April 2016 (14th Edition)

Copyright © 2006-2016, ANRITSU CORPORATION.

All rights reserved. No part of this manual may be reproduced without the prior written permission of the publisher.

The contents of this manual may be changed without prior notice.

Printed in Japan

Equipment Certificate

Anritsu Corporation guarantees that this equipment was inspected at shipment and meets the published specifications.

Anritsu Warranty

- During the warranty period, Anritsu Corporation will repair or exchange this software free-of-charge if it proves defective when used as described in the operation manual.
- The warranty period is 6 months from the purchase date.
- The warranty period after repair or exchange will remain 6 months from the original purchase date, or 30 days from the date of repair or exchange, depending on whichever is longer.
- This warranty does not cover damage to this software caused by Acts of God, natural disasters, and misuse or mishandling by the customer.

In addition, this warranty is valid only for the original equipment purchaser. It is not transferable if the equipment is resold.

Anritsu Corporation shall assume no liability for injury or financial loss of the customer due to the use of or a failure to be able to use this equipment.

Anritsu Corporation Contact

In the event of this equipment malfunctions, contact an Anritsu Service and Sales office. Contact information can be found on the last page of the printed version of this manual, and is available in a separate file on the CD version.

Notes On Export Management

This product and its manuals may require an Export License/Approval by the Government of the product's country of origin for re-export from your country.

Before re-exporting the product or manuals, please contact us to confirm whether they are export-controlled items or not.

When you dispose of export-controlled items, the products/manuals need to be broken/shredded so as not to be unlawfully used for military purpose.

Software End-User License Agreement (EULA)

Please read this Software End-User License Agreement (hereafter this EULA) carefully before using (includes executing, copying, registering, etc.) this software (includes programs, databases, scenarios, etc., used to operate, set, etc., Anritsu electronic equipment). By reading this EULA and using this software, you are agreeing to be bound by the terms of its contents and Anritsu Corporation (hereafter Anritsu) hereby grants you the right to use this Software with the Anritsu-specified equipment (hereafter Equipment) for the purposes set out in this EULA.

1. Grant of License and Limitations

1. Regardless of whether this Software was purchased from or provided free-of-charge by Anritsu, you agree not to rent, lease, lend, or otherwise distribute this Software to third parties and further agree not to disassemble, recompile, reverse engineer, modify, or create derivative works of this Software.
2. You may make one copy of this Software for backup purposes only.
3. You are not permitted to reverse engineer this software.
4. This EULA allows you to install one copy of this Software on one piece of Equipment.

2. Disclaimers

To the extent not prohibited by law, in no event shall Anritsu be liable for personal injury, or any incidental, special, indirect or consequential damages whatsoever, including, without limitation, damages for loss of profits, loss of data, business interruption or any other commercial damages or losses, arising out of or related to your use or inability to use this Software.

3. Limitation of Liability

- a. If a fault (bug) is discovered in this Software, preventing operation as described in the operation manual or specifications whether or not the customer uses this software as described in the manual, Anritsu shall at its own discretion, fix the bug, or exchange the software, or suggest a workaround, free-of-charge. However, notwithstanding the above, the following items shall be excluded from repair and warranty.
 - i) If this Software is deemed to be used for purposes not described in the operation manual or specifications.
 - ii) If this Software is used in conjunction with other non-Anritsu-approved software.
 - iii) Recovery of lost or damaged data.
 - iv) If this Software or the Equipment has been modified, repaired, or otherwise altered without Anritsu's prior approval.
 - v) For any other reasons out of Anritsu's direct control and responsibility, such as but not limited to, natural disasters, software virus infections, etc.
- b. Expenses incurred for transport, hotel, daily allowance, etc., for on-site repairs by Anritsu engineers necessitated by the above faults shall be borne by you.
- c. The warranty period for faults listed in article 3a above covered by this EULA shall be either 6 months from the date of purchase of this Software or 30 days after the date of repair, whichever is longer.

4. Export Restrictions

You may not use or otherwise export or re-export directly or indirectly this Software except as authorized by Japanese and United States law. In particular, this software may not be exported or re-exported (a) into any Japanese or US embargoed countries or (b) to anyone on the Japanese or US Treasury Department's list of Specially Designated Nationals or the US Department of Commerce Denied Persons List or Entity List. By using this Software, you warrant that you are not located in any such country or on any such list. You also agree that you will not use this Software for any purposes prohibited by Japanese and US law, including, without limitation, the development, design and manufacture or production of missiles or nuclear, chemical or biological weapons of mass destruction.

5. Termination

Anritsu shall deem this EULA terminated if you violate any conditions described herein. This EULA shall also be terminated if the conditions herein cannot be continued for any good reason, such as violation of copyrights, patents, or other laws and ordinances.

6. Reparations

If Anritsu suffers any loss, financial or otherwise, due to your violation of the terms of this EULA, Anritsu shall have the right to seek proportional damages from you.

7. Responsibility after Termination

Upon termination of this EULA in accordance with item 5, you shall cease all use of this Software immediately and shall as directed by Anritsu either destroy or return this Software and any backup copies, full or partial, to Anritsu.

8. Dispute Resolution

If matters of dispute or items not covered by this EULA arise, they shall be resolved by negotiations in good faith between you and Anritsu.

9. Court of Jurisdiction

This EULA shall be interpreted in accordance with Japanese law and any disputes that cannot be resolved by negotiation described in Article 8 shall be settled by the Japanese courts.

Cautions Against Computer Virus Infection

- Copying files and data
Only files that have been provided directly from Anritsu or generated using Anritsu equipment should be copied to the instrument.
All other required files should be transferred by means of USB or CompactFlash media after undergoing a thorough virus check.
- Adding software
Do not download or install software that has not been specifically recommended or licensed by Anritsu.
- Network connections
Ensure that the network has sufficient anti-virus security protection in place.

Protection Against Computer Virus Infections

Prior to the software installation

Before installing this software or any other software recommended or approved by Anritsu, run a virus scan on your computer, including removable media (e.g. USB memory stick and CF memory card) you want to connect to your computer.

When using this software and connecting with the measuring instrument

- Copying files and data

On your computer, do not save any copies other than the following:

- Files and data provided by Anritsu
- Files created by this software
- Files specified in this document

Before copying these files and/or data, run a virus scan, including removable media (e.g. USB memory stick and CF memory card).

- Connecting to network

Connect your computer to the network that provides adequate protection against computer viruses.

Cautions on Proper Operation of Software

This software may not operate normally if any of the following operations are performed on your computer:

- Simultaneously running any software other than that recommended or approved by Anritsu
- Closing the lid (Laptop computer)
- Turning on the screen saver function
- Turning on the battery-power saving function (Laptop computer)

For how to turn off the functions, refer to the operation manual that came with your computer.

CE Conformity Marking

Anritsu affixes the CE conformity marking on the following product(s) in accordance with the Council Directive 93/68/EEC to indicate that they conform to the EMC and LVD directive of the European Union (EU).

CE marking



1. Product Model

Software: MX180000A Signal Quality Analyzer Control Software

2. Applied Directive and Standards

When the MX180000A Signal Quality Analyzer Control Software is installed in the MP1800A or MT1810A, the applied directive and standards of this software conform to those of the MP1800A or MT1810A main frame.

PS: About main frame

Please contact Anritsu for the latest information on the main frame types that MX180000A can be used with.

C-tick Conformity Marking

Anritsu affixes the C-tick mark on the following product(s) in accordance with the regulation to indicate that they conform to the EMC framework of Australia/New Zealand.

C-tick marking



1. Product Model

Software: MX180000A Signal Quality Analyzer Control Software

2. Applied Directive and Standards

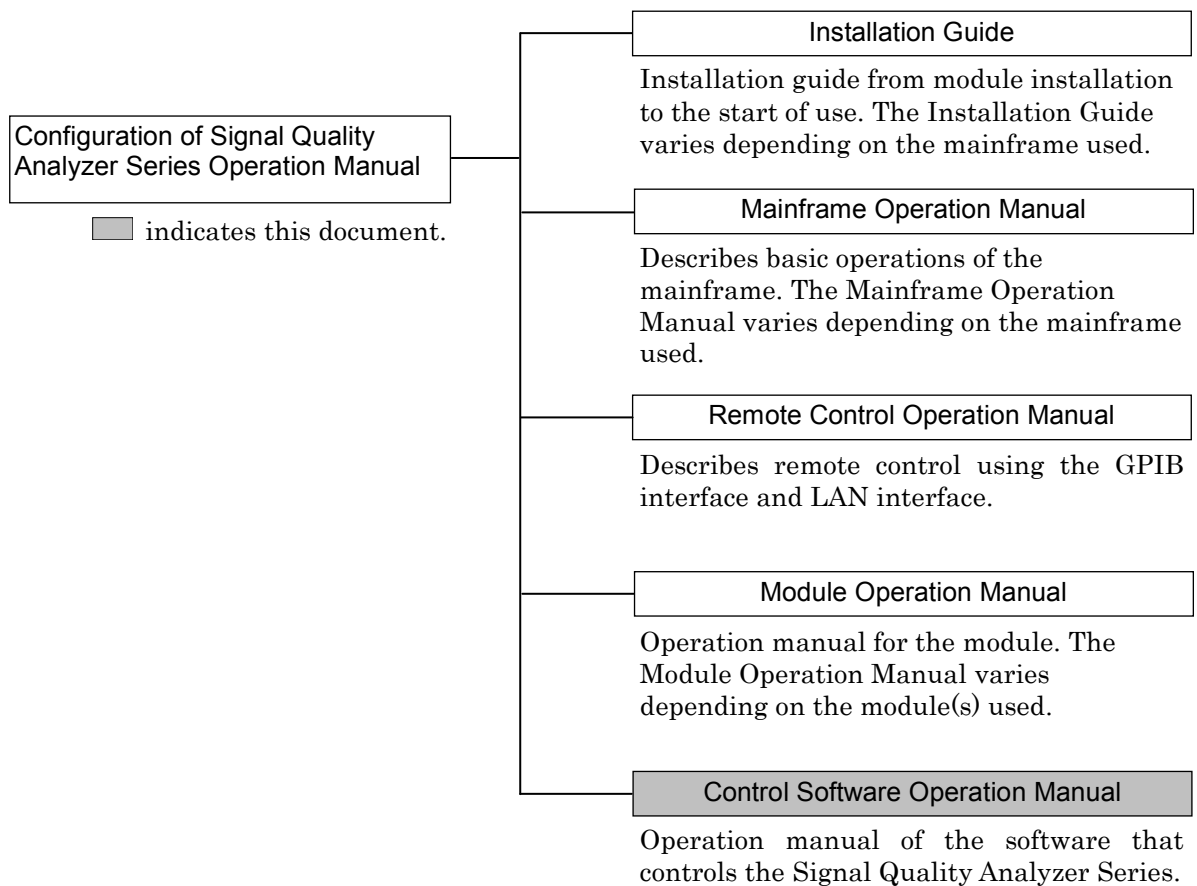
When the MX180000A Signal Quality Analyzer Control Software is installed in the MP1800A or MT1810A, the applied directive and standards of this software conform to those of the MP1800A or MT1810A main frame.

PS: About main frame

Please contact Anritsu for the latest information on the main frame types that MX180000A can be used with.

About This Manual

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



Note:

Modules are described generically in this document except in the case of special items.

| Modules | Name |
|-------------------------------------|-------------|
| MU181000A 12.5GHz Synthesizer | Synthesizer |
| MU181000B 12.5GHz 4port Synthesizer | |
| MU181020A 12.5Gbit/s PPG | PPG |
| MU181020B 14Gbit/s PPG | |
| MU181040A 12.5Gbit/s ED | ED |
| MU181040B 14Gbit/s ED | |

Table of Contents

| | |
|--|------------|
| About This Manual..... | I |
| Chapter 1 Overview..... | 1-1 |
| 1.1 Overview | 1-2 |
| 1.2 Features | 1-3 |
| 1.3 Operating Environment..... | 1-4 |
| Chapter 2 Start/Stop Procedures..... | 2-1 |
| 2.1 Start Procedures | 2-2 |
| 2.2 Stop Procedures | 2-6 |
| 2.3 Selector Screen | 2-7 |
| Chapter 3 Screen Configuration | 3-1 |
| 3.1 Screen Configuration for MP1800A..... | 3-2 |
| 3.2 Screen Configuration for MT1810A | 3-4 |
| Chapter 4 Basic Operation and Settings.. | 4-1 |
| 4.1 Component Operation..... | 4-2 |
| 4.2 MP1800A Front Panel Operation..... | 4-6 |
| 4.3 Tree View | 4-15 |
| Chapter 5 Operation and Settings for Common Functions | 5-1 |
| 5.1 Overview of Common Functions..... | 5-2 |
| 5.2 Drop-Down Menu..... | 5-3 |
| 5.3 Common Function Buttons | 5-19 |
| 5.4 Customization | 5-28 |
| 5.5 ESD/EOS Video Function | 5-39 |

| | | |
|------------------|---|------------|
| Chapter 6 | How to Use Setup Utility | 6-1 |
| 6.1 | Overview | 6-2 |
| 6.2 | Starting and Exiting Setup Utility | 6-4 |
| 6.3 | Setting Remote Control..... | 6-6 |
| 6.4 | Displaying IP Address..... | 6-10 |
| 6.5 | Downloading | 6-11 |
| 6.6 | Displaying Version Information on Installed Software .. | 6-13 |
| 6.7 | Help Tab Window..... | 6-15 |
| 6.8 | Setting Date and Time | 6-17 |
| 6.9 | Adding Options | 6-18 |
| | | |
| Chapter 7 | Self-Test | 7-1 |
| 7.1 | Overview | 7-2 |
| 7.2 | Starting Self-Test Application | 7-3 |
| 7.3 | MX180000A Self-Test..... | 7-4 |
| 7.4 | Error Codes..... | 7-16 |

Chapter 1 Overview

This chapter provides an overview and describes the features of the MX180000A Signal Quality Analyzer Control Software (hereinafter referred to as “MX180000A”).

| | | |
|-----|----------------------------|-----|
| 1.1 | Overview | 1-2 |
| 1.2 | Features | 1-3 |
| 1.3 | Operating Environment..... | 1-4 |

1.1 Overview

The MX180000A provides the same operation functions as the MP1800A Signal Quality Analyzer (hereinafter, referred to as “MP1800A”), on a PC running on Windows® XP or Windows 7. The MT1810A 4 Slot Chassis (hereinafter, referred to as “MT1810A”) can be operated from a control PC with the MX180000A installed.

The MP1800A is shipped with the MX180000A installed.
For the MT1810A, the MX180000A is required to be installed into the control PC to be used by the customer.

Refer to the installation guide of each unit for the installation procedure.

1.2 Features

The MX180000A can operate modules installed on the MP1800A or MT1810A. Independent measurement using multiple modules can be performed simultaneously.

The MX180000A can operate up to 4 units of the MT1810A that are connected.

The MX180000A provides the following functions:

- Error measurement
- Automatic measurements, including Eye Margin measurement and Eye Diagram measurement
- Capture function
- Pattern edit function

GPIB and LAN are supported as the remote control interfaces. In addition, as the remote control commands, the MX180000A employs the SCPI commands that are becoming global standards.

Refer to the *MX180000A Signal Quality Analyzer Control Software Operation Manual Remote Control* for details.

1.3 Operating Environment

Use a PC with at least the performance shown below.

Table 1.3-1 Windows XP Operating System

| Item | Specifications |
|--------------------|--|
| Device type | IBM-PC or compatible PC |
| CPU | Pentium4 processor, 1.6-GHz or faster |
| OS | Windows XP Version 2002 Service Pack 2 |
| Memory | At least 512 MB |
| Monitor resolution | At least 800 × 600 dots |
| Display colors | At least 256 colors |
| CD-ROM drive | Required for installation |
| Hard disk | At least 200 MB disk space for full installation |
| Remote Interface | 10 BASE-T or 100 BASE-TX |

Table 1.3-2 Windows 7 Operating System

| Item | Specifications |
|--------------------|--|
| Device type | IBM-PC or compatible PC |
| CPU | 1 GHz or faster 32- (x86) or 64-bit (x64) processor |
| OS | Windows 7 Professional/Enterprise/Ultimate |
| Memory | 32-bit: At least 1 GB RAM 64-bit: At least 2 GB RAM |
| Monitor resolution | At least 800 × 600 dots |
| Display colors | At least 256 colors |
| CD-ROM drive | Required for installation |
| Hard disk | At least 200 MB disk space for full installation |
| Remote Interface | 10 BASE-T or 100 BASE-TX |

CAUTION

Operation failure may arise if any of the following occurs on the PC when the MX180000A is operating:

- Simultaneous execution with another application
- Closing the display (for laptop PCs)
- Screensaver activation
- Battery saving function activation (for laptop PCs)

Refer to the operation manual of the PC used for how to turn off each function.

Chapter 2 Start/Stop Procedures

This chapter describes the MX18000A start and stop procedures.

| | | |
|-----|------------------------|-----|
| 2.1 | Start Procedures | 2-2 |
| 2.2 | Stop Procedures | 2-6 |
| 2.3 | Selector Screen | 2-7 |

2.1 Start Procedures

This section describes the procedures for starting the MX180000A. The start procedure is provided for each mainframe.

- (1) Starts the main application
 - (a) For MP1800A Signal Quality Analyzer

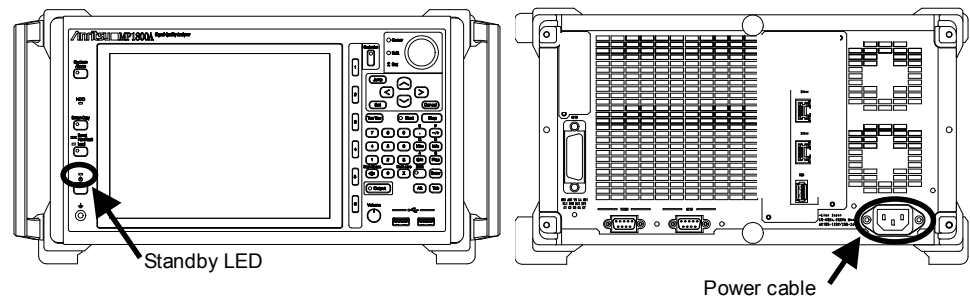


Figure 2.1-1 Standby LED and power cable connector of MP1800A

- Out of standby status (when the Standby LED is off)
 1. Connect the MP1800A power cable to an outlet. The MP1800A is activated.
 2. The Power lamp turns on.
The selector screen opens automatically after startup of Windows. Select Main application to activate the MX18000A. See Section 2.3 “Selector Screen” for details.
- During standby status (when the Standby LED is on)
 1. Turn on the MP1800A power switch.
 2. The Power lamp turns on.
The selector screen opens automatically after startup of Windows. Select Main application to activate the MX18000A.



Figure 2.1-2 Selector screen

(b) For MT1810A 4 Slot Chassis

1. Connect the control PC and the MT1810A, using an Ethernet cable.
2. Connect the MT1810A power cable to an outlet.
3. Turn on the MT1810A power switch.
4. Check that the Power lamp turns on.

Next, double-click the MT1810A shortcut icon on the control PC desktop, or select “Programs” → “MX180000A” → “MT1810A” from the Windows start menu to open the selector screen.

Select Main application to activate the MX18000A.

5. The selector screen opens.

(2) Checking the Internal Software Version

When the main application is activated, it checks for the modules inserted into the MP1800A or MT1810A.


If the module configuration has changed from that at the last termination of the application, the internal software corresponding to the new configuration may be downloaded.


Do not power-off the MP1800A/MT1810A during downloading, or the MP1800A/MT1810A may be damaged.

The internal software version is also checked.

The software version format is “xx.yy.zz” (xx: major version, yy: minor version, zz: revision). The versions are compared between the internal software object corresponding to the installed version and the actually downloaded one.

Operations may be limited according to the comparison results.

- (a) If the major version does not match with any module, the screen shown in Figure 2.1-3 and operation is disabled for the corresponding unit. In this case, the Unit icon corresponding to the unit on the Tree View screen is  (indicating that it is invalid). When this screen appears, update the internal software from the [Download] tab of the Setup utility.

- (b) If the major version matches but the minor version or revision differs, the screen shown in Figure 2.1-3. The corresponding unit can still be operated, but its operation or measurement may be abnormal. In this case, the module icon corresponding to the unit on the Tree View screen is  (indicating that it is invalid). When this screen appears, update the internal software from the [Download] tab of the Setup utility.

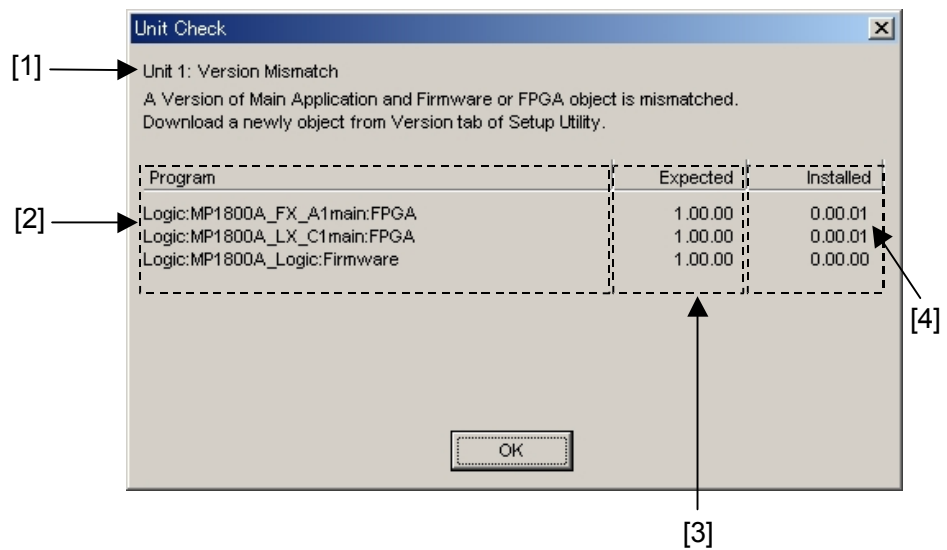


Figure 2.1-3 Version Mismatch Display Screen

Table 2.1-1 Version Mismatch Display Screen

| No. | Description |
|-----|---|
| [1] | Shows the unit number where version mismatch occurs. |
| [2] | Shows the internal software object where version mismatch occurs. |
| [3] | Shows the internal software object version that matches with the installed version. |
| [4] | Shows the internal software object version currently downloaded to the MP1800A/MT1810A. |

(3) Require for Multi Channel Calibration

When the message requiring Multi Channel Calibration as shown in Figure 2.1-4, perform the calibration following the instruction of screen message.

For more information about functions, refer to Section 5.5.3 “Function of Multi Channel Calibration” in the *MU181020A/B Operation Manual*.

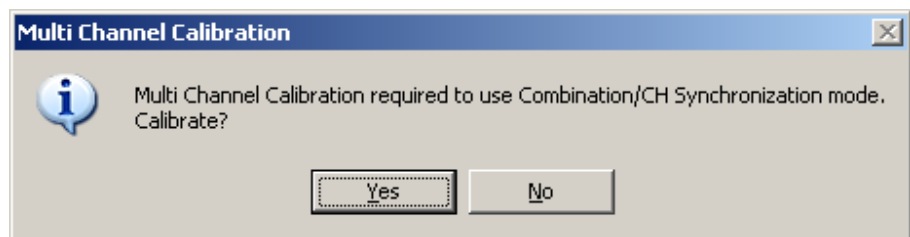


Figure 2.1-4 Requirement message for Multi Channel Calibration

2.2 Stop Procedures

This section explains the procedures for stopping of the MX180000A. The stop procedure is provided for each mainframe.

(1) For MP1800A Signal Quality Analyzer

The following two methods are available:

- (a) Press the power switch on the MP1800A front panel. The Power lamp turns off, and the Standby LED then turns on (enters the standby status).
- (b) Click the [Shut down] button on the selector screen. The Power lamp turns off, and then the Standby LED turns on (enters the standby status).

(2) For MT1810A 4 Slot Chassis

Follow the procedure below to stop the MX180000A.

1. Stop the MX180000A application to display the selector screen.
2. Click either the [×] or [Exit] button to close the selector screen and stop this software.
3. Turn off the MT1810A power switch.

2.3 Selector Screen

When using the MP1800A, the selector screen opens after power-on or after exiting the main application. If no icon button is clicked within 15 seconds, the main application activates automatically. For the MT1810A, the selector screen opens after starting the application or after exiting the main application.

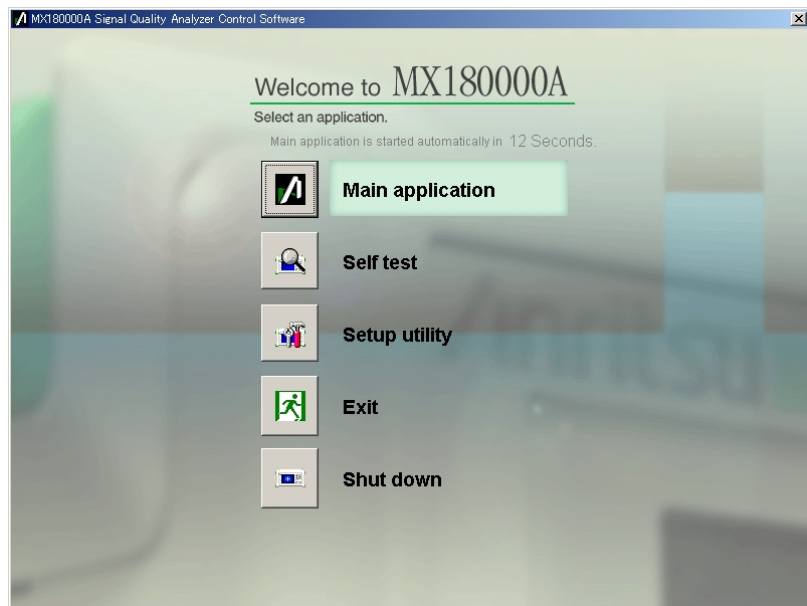


Figure 2.3-1 Selector screen of MP1800A

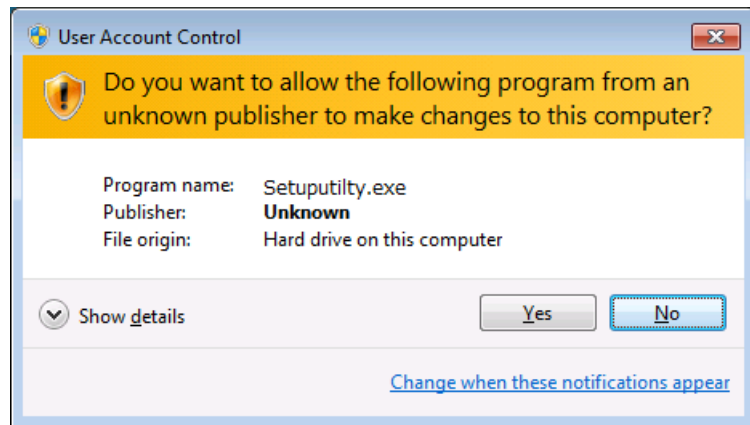
Click the appropriate icon button on this screen to activate the corresponding application.

- **Main application**
Starts the main application. If the module configuration has changed from that at the last termination of the application, the internal software corresponding to the new configuration may be downloaded. Do not power-off the MP1800A/MT1810A during downloading, or the MP1800A/MT1810A may be damaged. Refer to Chapters 3 “Screen Configuration” and 4 “Basic Operation and Settings” for details.
- **Self test**
Starts self test.
Refer to Chapter 7 “Self-Test” for details.

- Setup utility

Starts the setup utility.

At startup in Windows 7, the dialog screen shown below is displayed requesting permission to make the change. Click [Yes].



The setup utility can be used to set remote functions, to display the option installation information and the version of the MX18000A, and to update the internal software (firmware) of the MP1800A/MT1810A or modules.

Refer to Chapter 6 “How to Use Setup Utility” for details.

- Exit

When using the MP1800A, this icon button closes the selector screen and opens the Tool button screen.

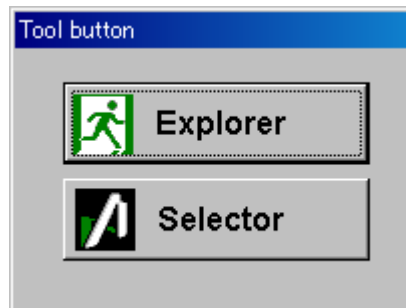


Figure 2.3-2 Tool button screen

Click the [Explorer] to start Windows Explorer.

Click the [Selector] to return to the selector screen.

When using the MT1810A, clicking this icon button closes the selector screen.

- **Shut down**
This icon button is displayed on the selector screen only for the MP1800A. Click this icon button to close the selector screen and turn off the MP1800A.

Chapter 3 Screen Configuration

This chapter describes the configuration of the MX180000A setup dialog box.

| | | |
|-----|---------------------------------------|-----|
| 3.1 | Screen Configuration for MP1800A..... | 3-2 |
| 3.2 | Screen Configuration for MT1810A..... | 3-4 |

3.1 Screen Configuration for MP1800A

This section describes the screen configuration of the main application when using the MX180000A on the MP1800A.

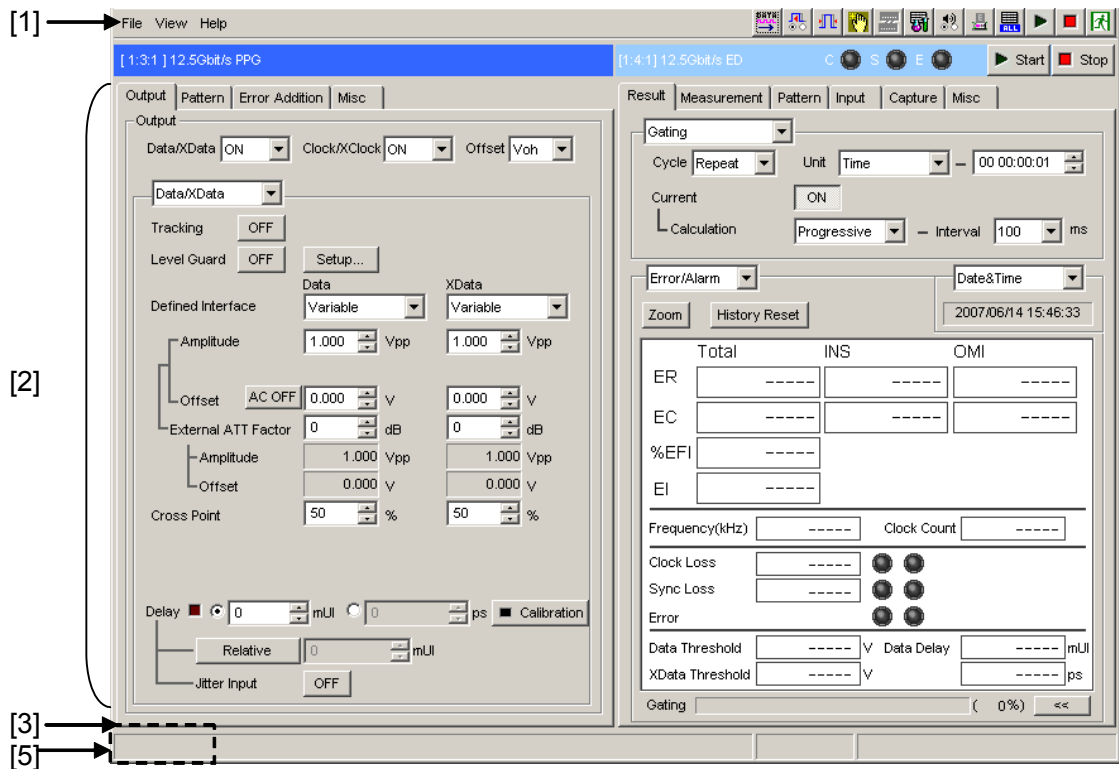


Figure 3.1-1 Main application screen configuration – 1

Table 3.1-1 Main application screen configuration – 1

| No. | Item | Description |
|-----|-----------------------|--|
| [1] | Menu bar | Shows the common function buttons and pull-down menus. |
| [2] | Operation tab windows | Shows up to two module operation tab windows. Unit number, slot number, port number and module name are displayed at the top of the screen. Multiple tab windows are provided, and can be selected by clicking the appropriate tab. Refer to the operation manual of each module for operation and settings of the operation tab windows. |
| [3] | Message area | Shows messages to the user. |

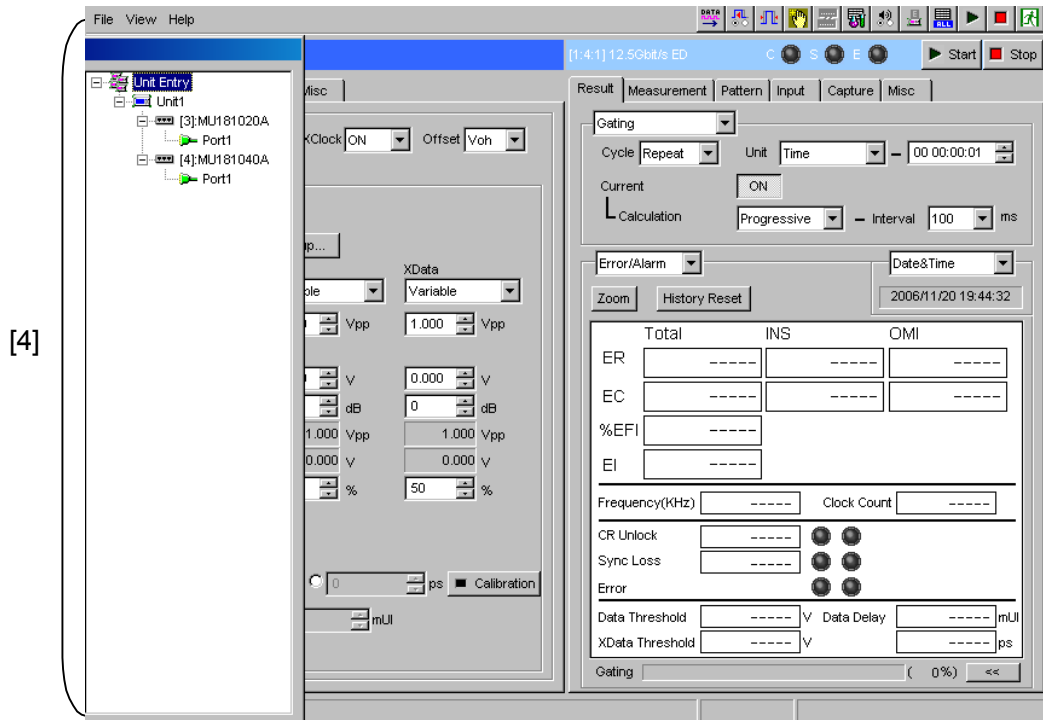


Figure 3.1-2 Main application screen configuration – 2

Table 3.1-2 Main application screen configuration – 2

| No. | Item | Description |
|-----|---------------------|---|
| [4] | Tree view | Shows the module installed into each slot. This area is normally hidden at the left of the main application screen. Press the [Tree View] key on the mainframe front panel to display/hide this view, or press the [Jump] key to display it. The port under each module model is displayed in a tree format and can be operated by using the mouse or keys. Clicking on this view is equivalent to pressing the [Slot] key on the front panel. An icon with a red “X” mark in Tree View indicates that the internal software version of the installed software does not match with the currently used one. Update the internal software from the [Download] tab of the Setup utility. |
| [5] | Tree view call area | Calls the Tree View screen by moving the cursor over this area. |

3.2 Screen Configuration for MT1810A

This section describes the screen configuration of the main application when using the MX180000A on the MT1810A. The MT1810A is controlled from the control PC with the MX180000A installed. This section shows the differences between the MP1800A and MT1810A screen configurations.

When using the MX180000A on the control PC, some screens are added to the main application screen for the MP1800A. The additional screens correspond to the functions of the device keys on the MP1800A front panel.

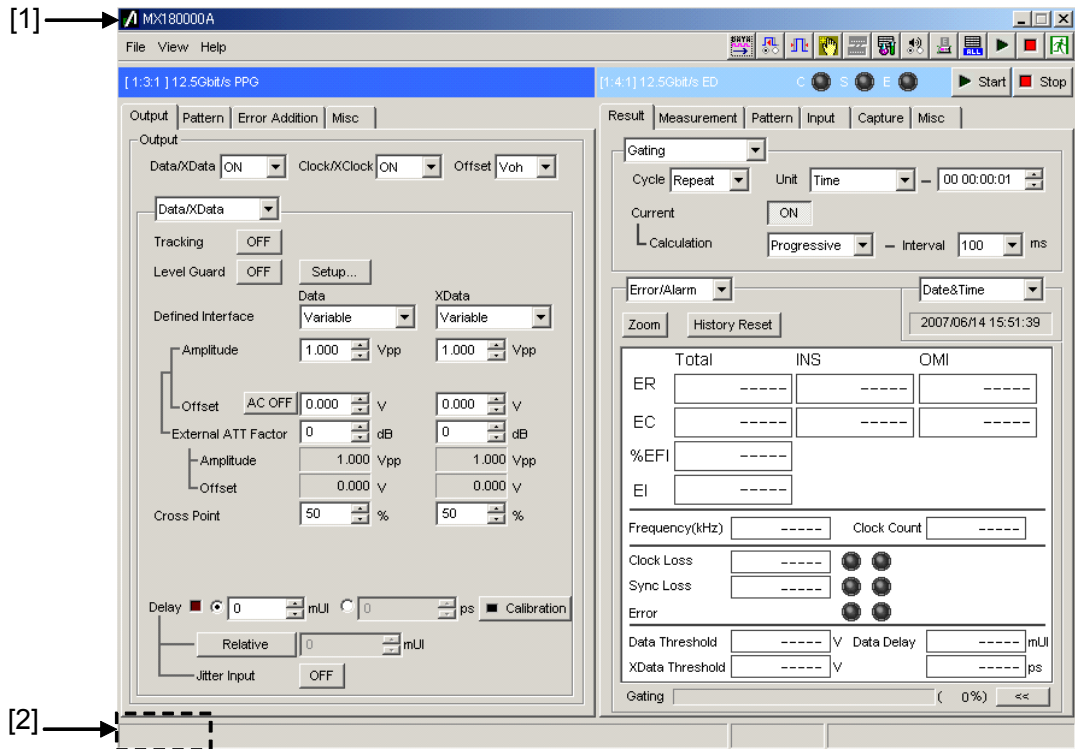


Figure 3.2-1 Main application screen configuration – 1

Table 3.2-1 Main application screen configuration – 1

| No. | Item | Description |
|-----|---------------------|--|
| [1] | Title bar | Shows the application name “MX180000A” as well as the minimize and exit buttons. |
| [2] | Tree View call area | Calls the Tree View screen by moving the cursor over this area. |

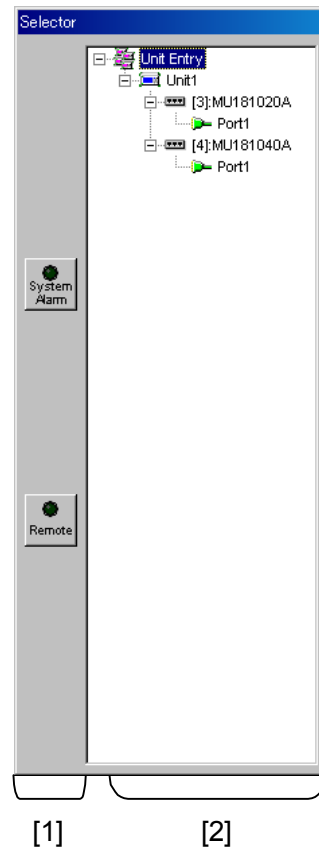


Figure 3.2-2 Selector screen configuration

Table 3.2-2 Selector screen configuration

| No. | Item | Description |
|-----|-----------|---|
| [1] | State bar | Shows the [System Alarm] and [Remote] (switching) buttons. They correspond to the [System Alarm] and [Remote/Panel Lock] keys on the MP1800A front panel. |
| [2] | Tree view | As with the MP1800A, shows the module installed into each slot and selects the module to be displayed in the main view area. When multiple MT1810A units are connected, a tree display for each MT1810A unit is provided. This view is included in the same screen as the state bar that is always displayed in a different window from the main application screen. An icon with a red “X” mark in Tree View indicates that the internal software version of the installed software does not match with the currently used one. Update the internal software from the [Download] tab of the Setup utility. |

Chapter 4 Basic Operation and Settings

This chapter describes the basic operation and settings of the basic parameters of the MX18000A.

| | | |
|-------|------------------------------------|------|
| 4.1 | Component Operation | 4-2 |
| 4.1.1 | Setting parameters | 4-2 |
| 4.1.2 | Input methods | 4-4 |
| 4.2 | MP1800A Front Panel Operation..... | 4-6 |
| 4.2.1 | Front panel operation | 4-6 |
| 4.2.2 | Moving Input Focus | 4-13 |
| 4.3 | Tree View..... | 4-15 |
| 4.3.1 | Operation in tree view..... | 4-16 |
| 4.3.2 | Port icons..... | 4-17 |


4.1 Component Operation

This section describes operating methods of the controls used on the operation screen of the MX18000A, using the front panel keys and the mouse.

Note that the front panel key operation is possible for the MP1800A only.

4.1.1 Setting parameters


- (1) Command buttons


Example: 

Clicking a button executes the corresponding function, including start or stop of measurement, editor display, enable or disable of editor setting, etc.

To execute a function, press the [Set] key during key input or click the mouse button on it.

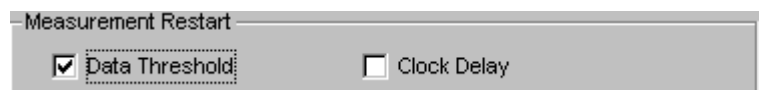
- (2) Drop-down list box

Example: 

Select one from among multiple items. The currently selected item is displayed on the screen. During key input, press the [Set] key to select item, using the rotary encoder or arrow keys. After selection, press the [Set] key again to determine the selection. When using the mouse, click  to display the list of selectable items, then click an item to make a selection.

- (3) Checkbox

Example:



Multiple items can be selected at the same time. Select items by pressing the [Set] key during key input or use the mouse to click the checkbox. The checkbox for the selected item is selected.

(4) Radio button

Example:



Select one from multiple items. Select an item by pressing the cursor keys and [Set] key during key input or use the mouse to click the button.

(5) Spin box

Example:



Inputs numeric values. During key input, press the [Set] key and use the left and right arrow keys to move between digits and use the up and down keys to increase or decrease the numeric value, or directly input the value by using the numeric keypad. Next, press the [Set] key to determine the value. When using the mouse, click on the target digit and then increase or decrease the value by clicking the up and down buttons.

4.1.2 Input methods

- (1) Front panel keys

Use the MP1800A front panel keys for operation.

- (2) Keyboard

Connect the keyboard to the MP1800A to operate the MX180000A. The keyboard of the control PC for the MT1810A can also be used. The correspondence between the front panel keys and those of the keyboard is shown below.

Table 4.1.2-1 Correspondence between front panel keys and keyboard keys

| Front panel key | Keyboard |
|-------------------|------------|
| 0 to 9 | 0 to 9 |
| -/+ | - |
| . (Period) | . |
| ↑ | ↑ |
| → | → |
| ↓ | ↓ |
| ← | ← |
| A to F | A to F |
| Set | Enter |
| Enter | Enter |
| Cancel | Esc |
| Alt | Alt |
| Tab | Tab |
| X (Don't care) | X |
| ← (Backspace) | BS |
| Screen Copy | Alt + F2 |
| Remote/Panel Lock | Alt + F3 |
| System Alarm | Alt + F11 |
| Start | Alt + F8 |
| SLOT1 | Ctrl + F2 |
| SLOT2 | Ctrl + F3 |
| SLOT3 | Ctrl + F5 |
| SLOT4 | Ctrl + F6 |
| SLOT5 | Ctrl + F7 |
| SLOT6 | Ctrl + F8 |
| Tree View | Ctrl + F9 |
| Customize | Ctrl + F11 |

Table 4.1.2-1 Correspondence between front panel keys and keyboard keys (Cont'd)

| Front panel key | Keyboard |
|-----------------------------|-------------|
| K/m | Shift + F2 |
| M/u | Shift + F3 |
| G/n | Shift + F5 |
| Pico | Shift + F6 |
| Output | Shift + F7 |
| Stop | Shift + F8 |
| Jump | Shift + F9 |
| Rotary Encoder ← | Shift + Tab |
| Rotary Encoder → | Tab |
| Pressing the rotary encoder | Enter |
| Shift | None |

(3) Mouse

Connect the mouse to the MP1800A to operate the MX180000A in the same way as Windows®. The mouse of the control PC for the MT1810A can also be used.

4.2 MP1800A Front Panel Operation

This section describes the operation of the MP1800A.

4.2.1 Front panel operation

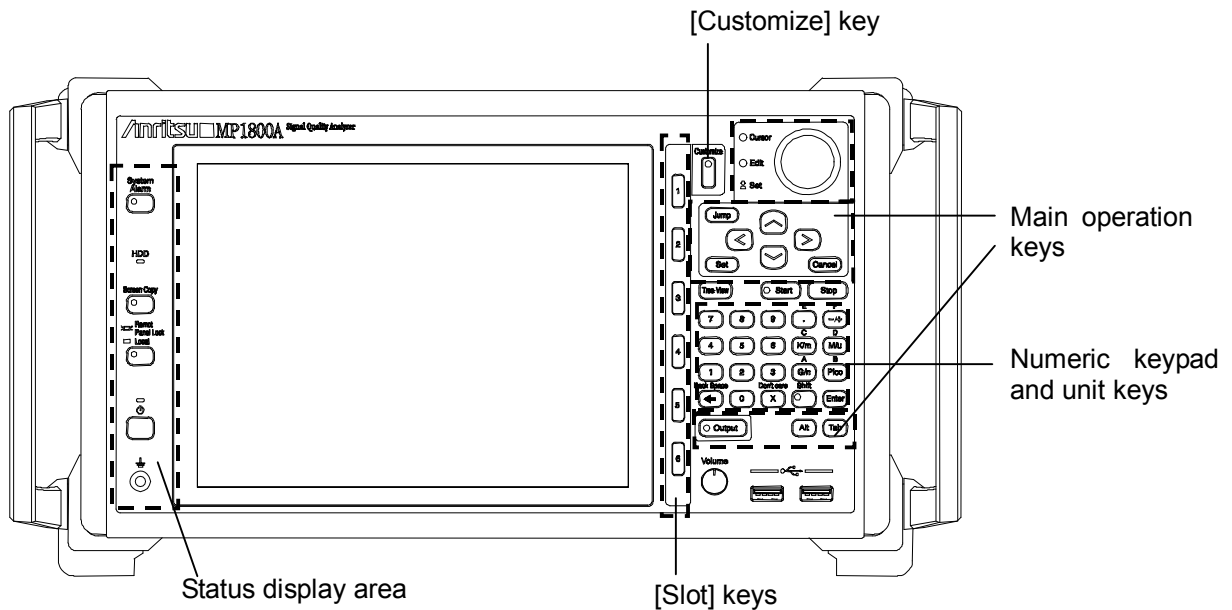


Figure 4.2.1-1 Front panel

Front panel operation is described below. The operation area on the front panel is divided into two main parts, the status display area on the left and the main operation area on the right. In the main operation area on the right of the front panel for normal operation includes the slot shortcut keys, rotary encoder, arrow keys, [Set] key and numeric keypad for smooth operation such as screen transition or data input. This section describes the hardware keys used for GUI operation.

4.2.1.1 Main operation keys



Figure 4.2.1.1-1 Main operation keys

Table 4.2.1.1-1 Main operation keys

| Hardware key | Description |
|----------------|---|
| Rotary encoder | Push-type rotary encoder used to move the input focus among the controls on the GUI screen and data input. Turn it clockwise to move in the input focus order. Turn it counterclockwise to move in the reverse order. Push to switch between the input focus move mode (Cursor LED lights) and edit mode (Edit LED lights), or to determine the input data. |
| Arrow keys | Moves the input focus in any direction. During the edit mode, used for data input or moving the cursor within the editor. Corresponds to the arrow keys on the keyboard. |
| Jump | Moves the input focus in screen units. The operation of this key is ignored while a modal dialog box, such as Auto Measurement, is displayed. |
| Set | Determines the input data or switches between operating modes. Corresponds to the [Enter] key on the keyboard. |
| Cancel | Cancels the data entered during the edit mode. Corresponds to the [Esc] key on the keyboard. |
| Output | Turns the Data/Clock outputs of the PPG or optical interface module output on/off. Corresponds to [Output On/Off] button on the menu bar. LED on the key lights up during output. |
| Start | Starts measurement. Corresponds to the Measurement Start button on the menu bar. LED on the key lights up during measurement. |
| Stop | Stops measurement. Corresponds to the Measurement Stop button on the menu bar. |
| Tree View | Displays the tree view at the left of the screen. |

Table 4.2.1.1-1 Main operation keys (Cont'd)

| Hardware key | Description |
|---------------------|--|
| Alt | Corresponds to the [Alt] key on the keyboard. Use in the combination of [Alt + Tab] to move the input focus to MX180000A. |
| Tab | Corresponds to the [Tab] key on the keyboard. |
| Customize | Displays the User-customize dialog box. Functions the same as the Customize Dialog button located on the menu bar. |
| Cursor LED | Turns on during the input focus move mode. |
| Edit LED | Turns on during the edit mode for [Spin Edit Box] control. |

4.2.1.2 Numeric keypad and unit keys

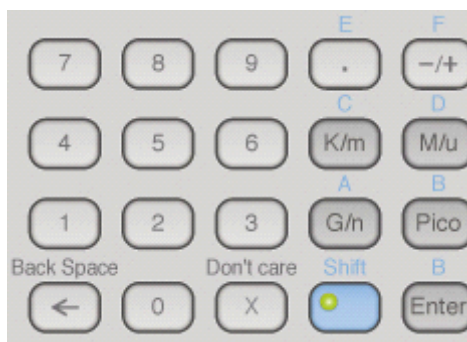


Figure 4.2.1.2-1 Numeric keypad and unit keys

Table 4.2.1.2-1 Numeric keypad and unit keys

| Hardware key | Description |
|--|--|
| Numeric keypad -/+ key Decimal point key | Used for numeric value input. |
| ← | Corresponds to the [Back Space] key on the keyboard. |
| Shift | When the [Shift] key is enabled, the LED on this key turns on. |
| Unit keys | When the [Shift] key is off: The unit of the input data is determined for items for which units can be set. Disabled for items of which unit cannot be set. When the [Shift] key is on: Input of 'A' to 'F' is enabled for hexadecimal input. |
| Don't care | Inputs the "Don't care" character during pattern input. |
| Enter | Same function as the [Set] key. Determines the input data or switches between the operation modes. Corresponds to the [Enter] key on the keyboard. |

A unit key may only be used with a control that accept the unit key and is given input focus.

Pressing a unit key converts the value currently displayed in the [value + unit] format into the value with the unit corresponding to the unit key that is pressed. Note that pressing a unit key determines the data as well as pressing the [Set] key.

Input value [1000]/when the unit is fixed to K

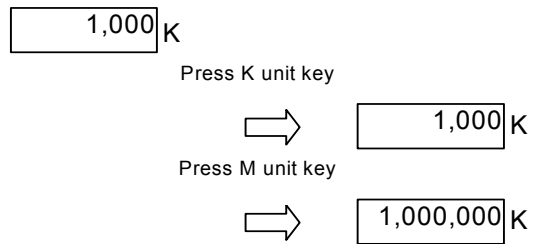


Table 4.2.1.2-2 Unit keys

| Unit key | Description |
|----------|-------------------|
| M/u | M: mega/u: micro |
| G/n | G: giga/n: nano |
| Pico | Pico |
| K/m | K: killo/m: milli |

4.2.1.3 Slot keys



Figure 4.2.1.3-1 Slot keys

Table 4.2.1.3-1 Slot keys

| Hardware key | Description |
|--------------|---|
| [Slot] keys | Select the module operation tab window to be displayed in the main view. Press the [Slot] key corresponding to the module application to be displayed. Disabled if a valid module is not installed into the slot. |

4.2.1.4 Status display area



Figure 4.2.1.4-1 Status display area

The status display area on the left of the front panel includes the MP1800A error/alarm status display, remote/panel lock switching, screen copy and power switch. Operation of each key is shown below.

Table 4.2.1.4-1 Status display area

| Hardware key | Description |
|--------------------|---|
| System Alarm | Indicates the system alarm status for each module. LED on: An alarm has occurred. LED off: No alarm has occurred. Pressing this button while its LED is on displays the [System Alarm] screen. |
| Screen Copy | Outputs the active screen image to a file or the printer |
| Remote /Panel Lock | Switches panel lock on/off. LED on: Panel lock on LED off: Panel lock off Pressing this button or establishing remote connection turns on the LED. While the LED is on, the system is in the Panel Lock status and screen operation is disabled. |
| Power | Power on/off key |

4.2.2 Moving Input Focus

This section describes how to move the input focus on the operation screen of the MX180000A.

4.2.2.1 Moving input focus between forms

This section describes how to move the input focus between forms.

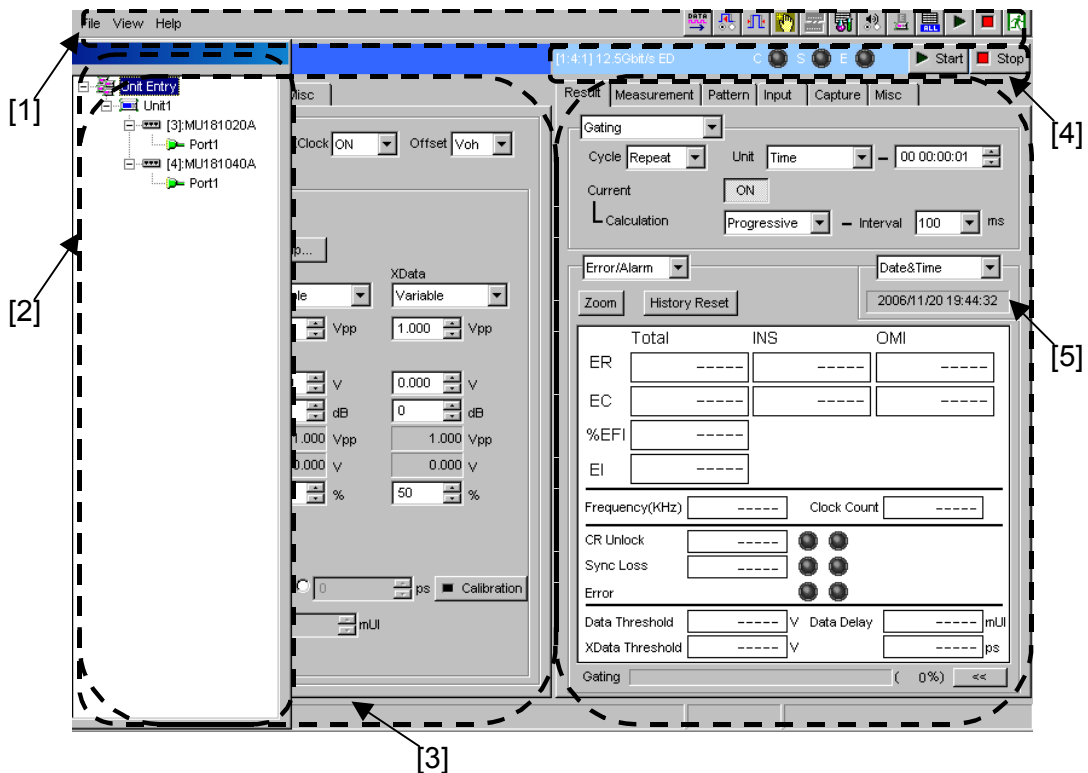


Figure 4.2.2.1-1 Moving input focus between forms

Use the [Jump] key on the front panel and the mouse to move the input focus between forms [1] to [5]. Click a control, using the mouse to directly move the input focus on it. Press the [Jump] key to move between forms in the input focus moving order.

The input focus moves from [1] to [5] in Figure 4.2.2.1-1 each time the [Jump] key is pressed.

Note that area [4] is skipped when control is not available.

4.2.2.2 Moving input focus between controls

This section describes how to move the input focus between controls within a form.

Use the [Tab] key, rotary encoder, arrow keys and mouse to move the input focus between controls within a form.

Table 4.2.2.2-1 Moving input focus between controls

| Operation | Description |
|----------------|--|
| [Tab] key | Moves the input focus in the tab order. |
| Rotary encoder | Turn clockwise to move the input focus in the tab order. Turn counterclockwise to move the input focus in the reverse order. |
| Arrow keys | Move the input focus in the directions pointed to by the arrows. |
| Mouse | Directly moves the input focus to the left-clicked control. |

4.2.2.3 Cursor

This section describes the status of the cursor during editing and moving.

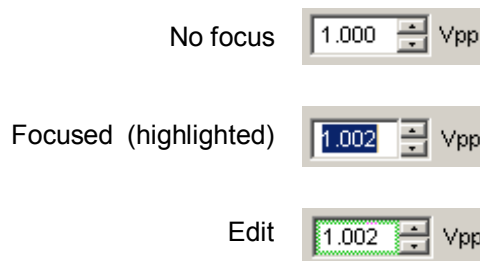


Figure 4.2.2.3-1 Cursor statuses

When the cursor is moved to a control, the characters of the control are highlighted or the control frame becomes a dotted line. At this time, the Cursor LED on the front panel lights up.

When the [Set] or [Enter] key is pressed in this state, the control becomes the edit status. At this time, the control frame becomes green or the item become selectable, and on the front panel, the Cursor LED goes off and the Edit LED lights up. When the [Set] or [Enter] key is pressed in this state, the control becomes the focused state.

4.3 Tree View

This section describes the operations in the tree view. The operations are common to the MP1800A and MT1810A.

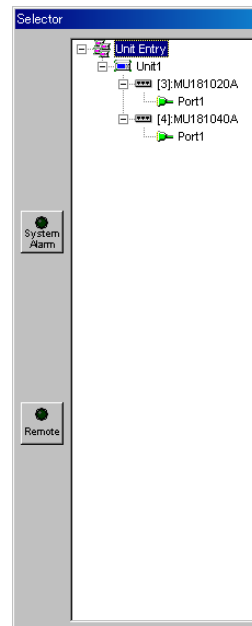


Figure 4.3-1 Tree View

Use the arrow keys, [Set] key, rotary encoder, or mouse for operation on information displayed in the tree view. Select [Port] in the 4th layer to display the module operation tab window in the main view.

4.3.1 Operation in tree view

Table 4.3.1-1 Operation in tree view

| Hardware key | Description |
|----------------|--|
| Rotary encoder | Rotate the rotary encoder clockwise/counterclockwise to move the input focus. When the uppermost/lowermost node of the tree has been reached, the input focus does not move. Select a port to switch between the module operation tab windows. |
| Arrow keys | Move the input focus within the tree display. [↑]: Moves the input focus upward. [↓]: Moves the input focus downward. [→]: Expands the node. [←]: Closes the node. |
| [Set] key | Selects a port. |
| Mouse | Expands/closes a node and selects a port. Click “+” or “-” in the tree to expand or close a node. Click the port number to select or deselect a port. |





Interlocking with the slot keys

Operations in the tree view are interlocked to [Slot] keys on the MP1800A front panel. The LED of the key corresponding to the slot in which the selected module is installed turns on.

4.3.2 Port icons

An icon is added to each port name in the tree view. To indicate port status, the icon changes according to the port status.

Table 4.3.2-1 Port icons

| Status | Description | Icon | Display priority |
|--------------------|--|---|------------------|
| Can be selected | Port can be selected (normal status). |  | C |
| System error | A system error occurs. |  | A |
| Alarm | An alarm occurs. |  | B |
| Cannot be selected | Port cannot be selected. Indicates that the PPG or ED module cannot be used due to limitation of the insertion slot location. |  | — |

Note:

When two or more statuses occur at the same time, the statuses are displayed according to the display priority. Rank A has the highest display priority.

Chapter 5 Operation and Settings for Common Functions

This chapter describes the operations and settings for the common functions of the signal quality analyzer mainframe.

| | | |
|--------|--|------|
| 5.1 | Overview of Common Functions..... | 5-2 |
| 5.2 | Drop-Down Menu..... | 5-3 |
| 5.2.1 | Quick Open window..... | 5-6 |
| 5.2.2 | Quick Save window | 5-7 |
| 5.2.3 | Open window | 5-9 |
| 5.2.4 | Save window | 5-10 |
| 5.2.5 | Screen Copy Setup dialog box..... | 5-13 |
| 5.2.6 | Print window | 5-15 |
| 5.2.7 | Printer Setup dialog box | 5-16 |
| 5.2.8 | Initialization function | 5-16 |
| 5.2.9 | Help menu | 5-17 |
| 5.2.10 | Multi Channel Calibration Function | 5-18 |
| 5.3 | Common Function Buttons | 5-19 |
| 5.3.1 | Buzzer Setting dialog box..... | 5-21 |
| 5.3.2 | System Alarm window | 5-22 |
| 5.3.3 | Combination Setting dialog box..... | 5-23 |
| 5.4 | Customization | 5-28 |
| 5.4.1 | Customizing function buttons | 5-28 |
| 5.4.2 | Customizing automatic measurement functions | 5-30 |
| 5.4.3 | User Customize dialog box | 5-32 |
| 5.5 | ESD/EOS Video Function..... | 5-39 |

5.1 Overview of Common Functions

The common functions of the signal quality analyzer mainframe are provided in the menu bar described in Chapter 3 “Screen Configuration”. This section describes how to operate and set the functions commonly used among the measuring instruments, such as a file saving function and file printing function. It also describes the customize function provided for user definition.

See the operation manual of the corresponding module for details on how to operate and set the functions of each module.

The menu bar consists of the drop-down menus and the common function buttons that provide the functions commonly used among the modules inserted into the signal quality analyzer.

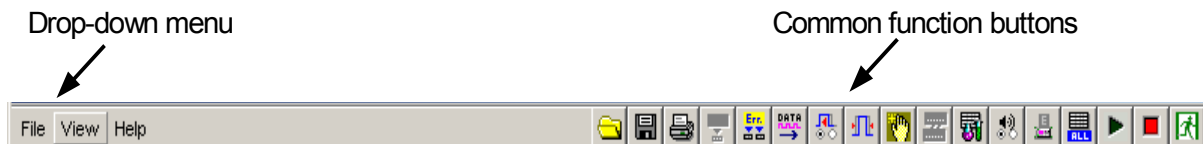


Figure 5.1-1 Menu bar

Notes:

- A common function button is disabled and cannot be operated when the function assigned to the button is invalid.
- The display of some function buttons can be customized by a user. Note, however, that display customization of some function buttons is unavailable.

5.2 Drop-Down Menu

This section describes the functions of the drop-down menus provided in the menu bar.

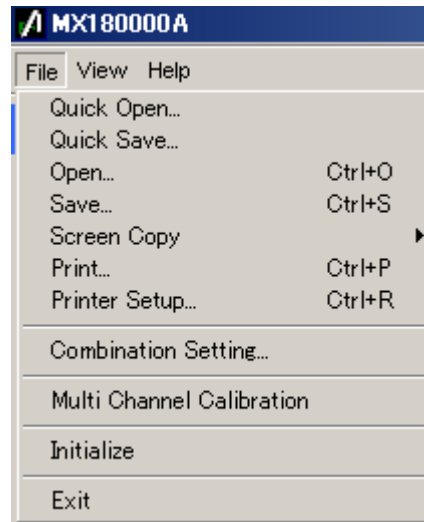


Figure 5.2-1 Drop-down menu example (File menu)

Click a menu on the menu bar to open the drop-down list, and then select a desired menu item from the list. Table 5.2-1 shows the menu items in the drop-down lists and their functions. See Table 5.2-2 for the operations in the drop-down menu, using keys or the mouse.

Table 5.2-1 Menu items in drop-down lists

| Menu | Description |
|------|--|
| File | <p>Contains menus related to file operation functions, such as print and screen copy.</p> <p>[Quick Open...] Displays the Quick Open window used to open multiple data of all modules at once.</p> <p>[Quick Save...] Displays the Quick Save window used to save multiple data of all modules at once.</p> <p>[Open...] Displays the Open window used to open data of a selected module.</p> <p>[Save...] Displays the Save window used to save data of a selected module.</p> <p>[Screen Copy] [Execute] Copies an image of the active window. [Setup...] Displays the Screen Copy Setup dialog box.</p> |

Table 5.2-1 Menu items in drop-down lists (Cont'd)

| Menu | Description |
|------------------|---|
| File (continued) | <p>[Print...] Displays the Print window.</p> <p>[Printer Setup...] Displays the Printer Setup window.</p> <p>[Combination Setting...] Displays the Combination Setting window.</p> <p>[Multi Channel Calibration] Displays the Multi Channel Calibration window.</p> <p>[Initialize] Resets the settings of all the inserted modules to the default settings at factory shipment.</p> <p>[Exit] Exits the main application, and returns to the selector screen.</p> |
| View | <p>Contains menus related to user customization.</p> <p>[Button Menu...] Display the Function Button Setup dialog box for customizing the common function buttons on the menu bar.</p> <p>[Auto Measurement Menu...] Display the Auto Measurement Setup dialog box for customizing the automatic measurement.</p> |
| Help | <p>Contains a menu for providing the module information.</p> <p>[ESD/EOS video] [Play video] Plays the video that explains how to control ESD and EOS. [Auto play] Sets whether to play the video automatically on startup of the MX180000A.</p> <p>[Version] Displays the Version Information window that shows the module information.</p> |

Table 5.2-2 Operations on drop-down menu

| Control | Operation |
|---|--|
| Cursor keys | <p>Moves the input focus on the drop-down list.</p> <p>[↑] The input focus is moved upward. The input focus moves to the lowermost item when this key is pressed with the input focus on the uppermost item.</p> <p>[↓] The input focus is moved downward. The input focus moves to the uppermost item when this key is pressed with the input focus on the lowermost item.</p> <p>[←] The input focus is moved to the upper layer on the list.</p> <p>[→] The input focus is moved to the lower layer (sublist) on the list, if the current item has the sublist. Items having the lower layer are indicated with “▶” on the right.</p> |
| [Set] key [Enter] key Rotary encoder (push) | <p>Executes the item highlighted on the drop-down list.</p> <p>Opens the sublist if the highlighted item has a sublist.</p> |
| Cancel key Esc key | <p>Closes the drop-down list and moves the input focus to the parent menu. When a sublist is displayed, pressing either of these keys closes the sublist items (the upper-level list item remains).</p> |
| Mouse click | <p>When clicking an item that does not have the sublist, that item is executed. When clicking an item that has the sublist, the sublist is displayed.</p> |

5.2.1 Quick Open window

In the Quick Open window, multiple data, including the setting data for the mainframe and the setting data for any inserted units, can be opened at once. It is useful to open all data in a batch in the current unit and module configuration.

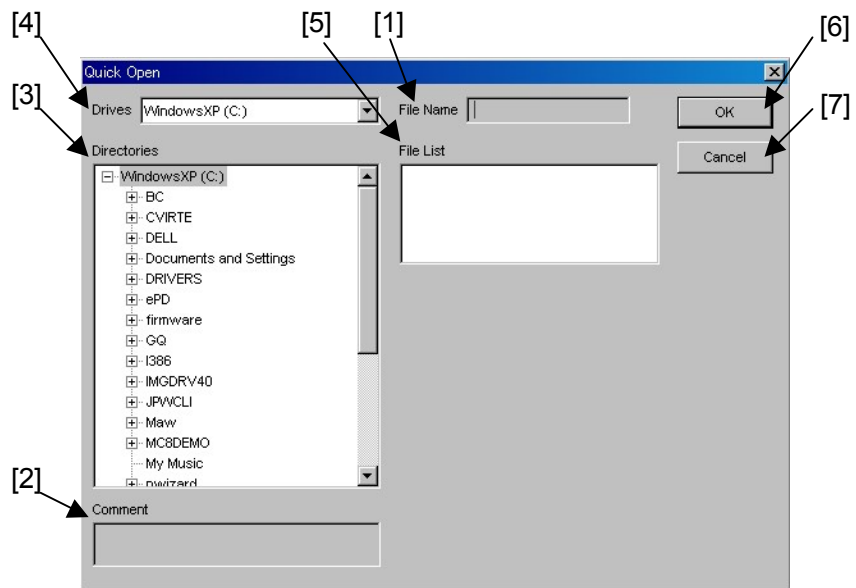


Figure 5.2.1-1 Quick Open window

Table 5.2.1-1 Items in Quick Open window

| No. | Item | Description |
|-----|-------------|--|
| [1] | File Name | Displays the file name selected in the File List. |
| [2] | Comment | Displays the comment entered from the Quick Save window. |
| [3] | Directories | Displays the folders and files in a tree view for selecting data to be opened. |
| [4] | Drives | Select the drive that contains the data to be opened. |
| [5] | File List | Select a file to be opened. |
| [6] | OK | Click to load the selected file and close the Quick Open window. |
| [7] | Cancel | Click to close the Quick Open window. |

5.2.2 Quick Save window

In the Quick Save window, multiple data, including the setting data for the mainframe and the setting data for any inserted units, can be saved at once. It is useful to save all data in a batch in the current unit and module configuration.

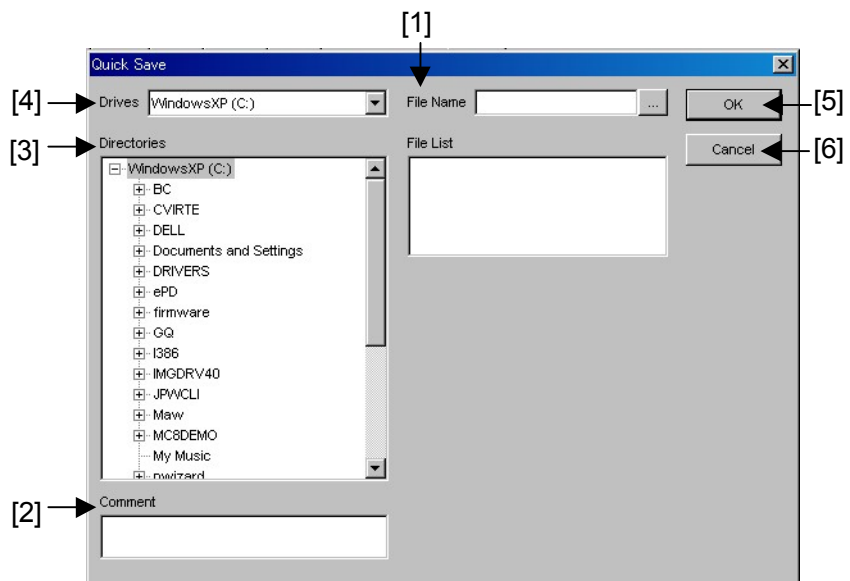



Figure 5.2.2-1 Quick Save window

Table 5.2.2-1 Items in Quick Save window

| No. | Item | Description |
|-----|-------------|--|
| [1] | File Name | Enter the name of a file to be saved. The extension can be omitted. A file name can be entered from the keyboard or the virtual keyboard. To open the virtual keyboard, click the  button. After entering a file name, click [Enter] key. |
| [2] | Comment | Enter a comment to be added to the file. A maximum of 60 1-byte characters can be entered. |
| [3] | Directories | Displays the folders in a tree view for selecting the data save destination. |
| [4] | Drives | Select the drive to save the file. |
| [5] | OK | Click to save the selected file and close the Quick Save window. |
| [6] | Cancel | Click to close the Quick Save window. |

Note:

The settings will not be read from the saved file if the file name is changed.

Table 5.2.2-2 lists the setting files that are saved by the Quick Save operation. In addition to the setting files, module setting files for slots and pattern setting files are saved.

Note:

When using a setting file saved by the Quick Save operation in another MP1800A/MT1810A unit, it is necessary to copy all the files listed below. The loading operation may fail if some files are missing.

Table 5.2.2-2 Files saved by Quick Save operation

| File name (.extension) | Description |
|-------------------------------------|---|
| XXXXX.CND | Overall setting file |
| XXXXX_UxxSyyCzz.MOD | Setting files for modules inserted in a slot. Uxx, Syy and Czz indicate unit number xx, slot number yy, and port number zz, respectively. Example: U01S03C01 |
| XXXXX_UxxSyyCzz_AltPattern.dat | Pattern setting files for PPG modules. Uxx, Syy and Czz indicate unit number xx, slot number yy, and port number zz of the module, respectively. Example: "U01S03C01" for unit number 1, slot number 3, and port number 1. |
| XXXXX_UxxSyyCzz_DataPattern.dat | |
| XXXXX_UxxSyyCzz_MxAltPattern.dat | |
| XXXXX_UxxSyyCzz_MxDatPattern.dat | |
| XXXXX_UxxSyyCzz_SeqPattern.dat | |
| XXXXX_UxxSyyCzz_Sequence.dat | |
| XXXXX_UxxSyyCzz_ED_AltPattern.dat | Pattern setting files for ED modules. Uxx, Syy and Czz indicate unit number xx, slot number yy, and port number zz of the module, respectively. Example: "U01S03C01" for unit number 1, slot number 3, and port number 1. |
| XXXXX_UxxSyyCzz_ED_DataPattern.dat | |
| XXXXX_UxxSyyCzz_ED_MxAltPattern.dat | |
| XXXXX_UxxSyyCzz_ED_MxDatPattern.dat | |
| XXXXX_UxxSyyCzz_ED_SeqPattern.dat | |
| XXXXX_UxxSyyCzz_ED_Sequence.dat | |

XXXXX indicates the file name entered in [File Name] by a user.

5.2.3 Open window

In the Open window, the setting data and measurement result data for an inserted module can be opened. It is useful to open the setting data of a module.

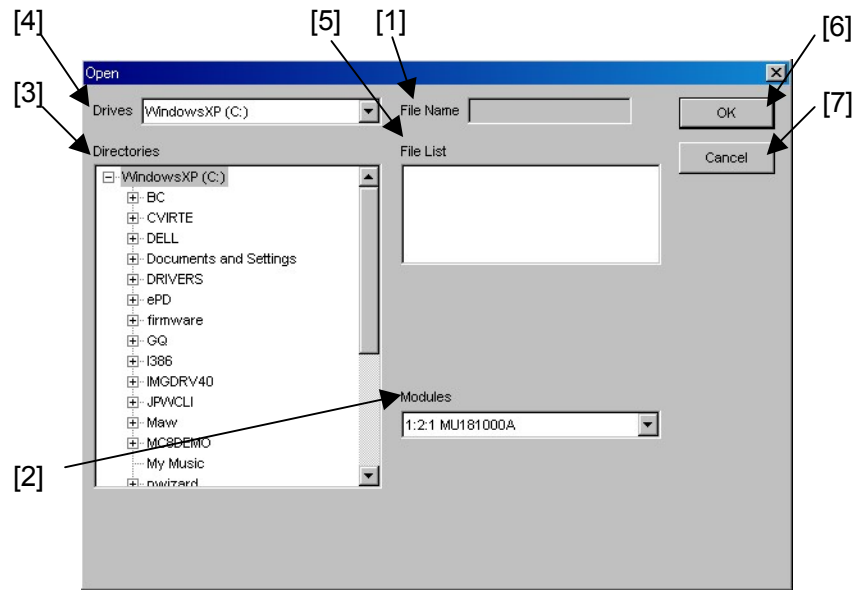


Figure 5.2.3-1 Open window

Table 5.2.3-1 Items in Open window

| No. | Item | Description |
|-----|-------------|--|
| [1] | File Name | Displays the file name selected in the File List. |
| [2] | Modules | Select a module whose file is to be opened. The display format is as follows: Unit No.:Slot No.:Port No. Model Name Example: 1:1:1 MU181020A |
| [3] | Directories | Displays the folders and files in a tree view for selecting data to be opened. |
| [4] | Drives | Select the drive that contains the data to be opened. |
| [5] | File List | Select a file to be opened. |
| [6] | OK | Click to load the selected file and close the Open window. |
| [7] | Cancel | Click to close the Open window. |

5.2.4 Save window

In the Save window, the setting data and measurement result data for an inserted module can be saved. It is useful to save the setting data and/or the measurement result data of a module.

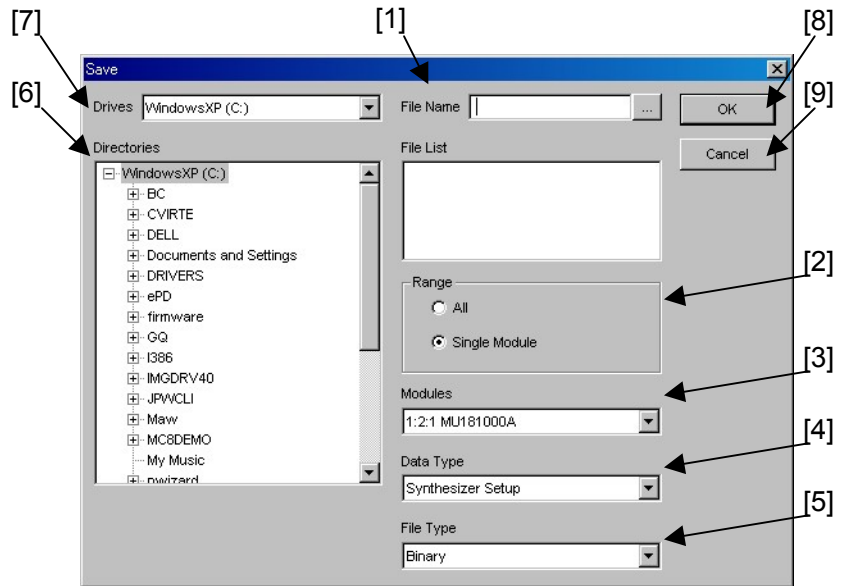


Figure 5.2.4-1 Save window

Table 5.2.4-1 Items in Save window

| No. | Item | Description |
|-----|-----------|--|
| [1] | File Name | Enter the name of a file to be saved. The extension can be omitted. A file name can be entered from the keyboard or the virtual keyboard. To open the virtual keyboard, click the ... button. After entering a file name, click [Enter] key. |
| [2] | Range | Select file saving method. All: The data of the several same type modules is selected by the data type and saved. The file name format is “file name + Unit/Slot/Port”, as shown below. Example: When the setting data of four MU181040A modules are saved: File name/Unit/Slot/Port: edsetup_U01S01C01.ED edsetup_U01S02C01.ED edsetup_U01S03C01.ED edsetup_U01S04C01.ED Single: The data of the modules with the selected data type is saved. |
| [3] | Modules | Select a module whose file is to be saved. The display format is as follows: Unit No.:Slot No.:Port No. Model Name Example: 1:1:1 MU181020A |

Table 5.2.4-1 Items in Save window (Cont'd)

| No. | Item | Description |
|-----|-------------|---|
| [4] | Data Type | Select the data type to be saved. The selectable data types for the setting data or the measurement result data differ according to the selected module. See Table 5.2.4-2 for the correspondence between the module type and the selectable data type. |
| [5] | File Type | Select the file type of the data to be saved. The selectable file types differ according to the selected module. See Table 5.2.4-2 for the correspondence between the data type and the file type supported for each module. |
| [6] | Directories | Displays the folders in a tree view for selecting the data save destination. |
| [7] | Drives | Select the drive to save the file. |
| [8] | OK | Click to save the selected file and close the Save window. |
| [9] | Cancel | Click to close the Save window. |

Table 5.2.4-2 Data and file types supported for each module

| Module | Data Type | File Type |
|------------------------|---------------------|-----------|
| MU181000A MU181000B | Synthesizer Setup | Binary |
| MU181020A MU181020B | PPG Setup | Binary |
| MU181040A MU181040B | ED Setup | Binary |
| | Error/Alarm Result | CSV/Text |
| | Histogram Result | CSV/Text |
| | Capture Result | Binary |
| | Error/Alarm Logging | Text |
| MU181600A | XFP Setup | Binary |
| MU181601A | SFP Setup | Binary |
| MU181620A | Transmitter Setup | Binary |
| MU181640A | Receiver Setup | Binary |
| MU182020A MU182021A | MUX Setup | Binary |
| MU182040A MU182041A | DEMUX Setup | Binary |
| | Error/Alarm Result | CSV/Text |

Note:

The settings will not be read from the saved file if the file name is changed.

Table 5.2.4-3 lists the module setting files that are saved by the Save operation.

For the MU181020A, MU181020B, MU181040A and MU181040B pattern setting files are also saved in addition to the setting files.

Note:

When using a setting file saved by the Save operation in another MP1800A/MT1810A unit, it is necessary to copy all the files listed below. The loading operation may fail if some files are missing.

Table 5.2.4-3 Files saved by Save operation

| Module | File name (.extension) | Description |
|------------------------|---------------------------|---------------------------------------|
| MU181000A MU181000B | XXXXX.SYN | Setting file for synthesizer modules. |
| MU181020A MU181020B | XXXXX.PPG | Setting file for PPG modules |
| | XXXXX_AltPattern.dat | Pattern files for PPG modules |
| | XXXXX_DataPattern.dat | |
| | XXXXX_MxAltPattern.dat | |
| | XXXXX_MxDatPattern.dat | |
| | XXXXX_SeqPattern.dat | |
| XXXXX_Sequence.dat | | |
| MU181040A MU181040B | XXXXX.ED | Setting file for ED modules |
| | XXXXX_ED_AltPattern.dat | Pattern files for ED modules |
| | XXXXX_ED_DataPattern.dat | |
| | XXXXX_ED_MxAltPattern.dat | |
| | XXXXX_ED_MxDatPattern.dat | |
| | XXXXX_ED_SeqPattern.dat | |
| XXXXX_ED_Sequence.dat | | |
| MU181600A | XXXXX.XFP | Setting file for XFP modules. |
| MU181601A | XXXXX.SFP | Setting file for SFP modules. |
| MU181620A | XXXXX.OTX | Setting file for Transmitter modules. |
| MU181640A | XXXXX.ORH | Setting file for Receiver modules. |
| MU182020A | XXXXX.MXI | Setting file for 1ch MUX modules |
| MU182021A | XXXXX.MXZ | Setting file for 2ch MUX modules |
| MU182040A | XXXXX.DX1 | Setting file for 1ch DEMUX modules |
| MU182041A | XXXXX.DX2 | Setting file for 2ch DEMUX modules |

XXXXX indicates the file name entered in [File Name] by a user.

5.2.5 Screen Copy Setup dialog box

The screen image output method (file or printer) can be selected, and the file output destination can also be specified.

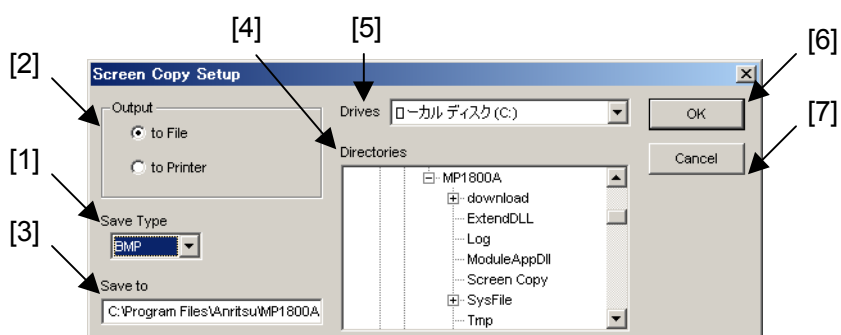


Figure 5.2.5-1 Screen Copy Setup dialog box

Table 5.2.5-1 Items in Screen Copy Setup dialog box

| No. | Item | Description |
|-----|-------------|---|
| [1] | Save Type | Select the screen image file type from “BMP”, “PNG”, or “JPG”. “BMP” is selected by default. |
| [2] | Output | Select the output destination. [to File] The screen image is output to a file. [to Printer] The screen image is output to the default printer. See Section 5.2.7 “Printer Setup dialog box” for how to set the default printer. The “to File” radio button is selected by default. |
| [3] | Save to | Enter the destination for file saving. While the destination can be entered directly, it can also be selected from the Directories tree view. |
| [4] | Directories | Provides a tree view for selecting the destination directory for file saving. |
| [5] | Drives | Select the destination drive for file saving. |
| [6] | OK | Click to save the settings and close the Screen Copy Setup dialog box. |
| [7] | Cancel | Click to cancel the settings and close the Screen Copy Setup dialog box. |

Screen image files are named in the following format.
ScreenCopy_YYMMDDhhmmss.***

Table 5.2.5-2 Graphics file naming rules

| File Name | Rule |
|------------------|--|
| SC | Always prefixed to the file name. |
| YYMMDDhhmmss | File creation date and time YY: Last two digits of the year MM: Month DD: Day hh: Hours (24-hour format) mm: Minutes ss: Seconds |
| Extension | [.bmp], [.png], [.jpg] |

5.2.6 Print window

In the Print window, the measurement result data of the modules can be printed. The data is output to the printer set in the Printer Setup dialog box (opened by selecting [Printer Setup...] from the File drop-down menu).

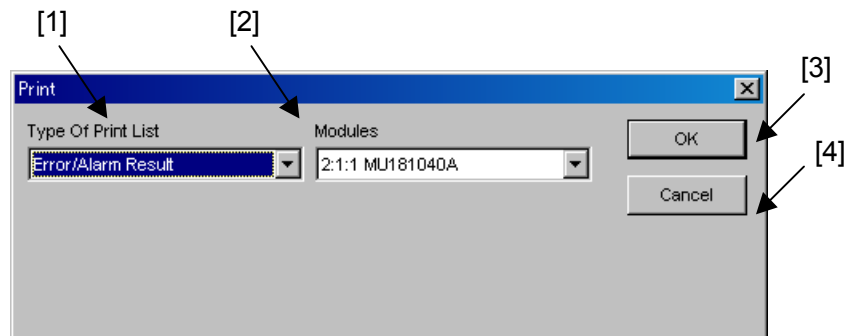


Figure 5.2.6-1 Print window

Table 5.2.6-1 Items in Print window

| No. | Item | Description |
|-----|--------------------|--|
| [1] | Type Of Print List | Select the type of the data to be printed from “Error/Alarm Result”, “Histogram Result”, or “Error/Alarm Logging”. |
| [2] | Modules | Select a module targeted for print. The display format is as follows: Unit No.:Slot No.:Port No. Model Name Example: 1:1:1 MU181040A |
| [3] | OK | Click to print the data and close the Print window. |
| [4] | Cancel | Click to cancel printing and close the Print window. |

5.2.7 Printer Setup dialog box

The default printer can be set in the Printer Setup dialog box.

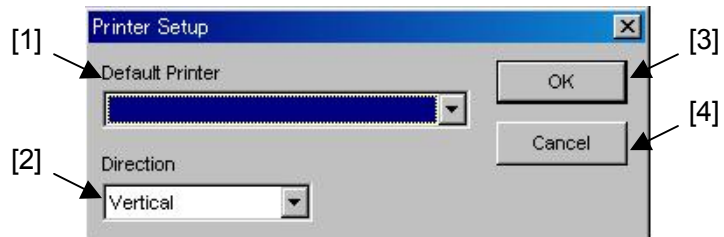


Figure 5.2.7-1 Printer Setup dialog box

Table 5.2.7-1 Items in Printer Setup dialog box

| No. | Item | Description |
|-----|-----------------|---|
| [1] | Default Printer | Lists the printer drivers recognized by Windows®. This is blank when the default printer is set. |
| [2] | Direction | Select the printing direction from “Vertical” or “Horizontal”. “Vertical” is selected by default. |
| [3] | OK | Click to save the settings and close the Printer Setup dialog box. |
| [4] | Cancel | Click to cancel the settings and close the Printer Setup dialog box. |

5.2.8 Initialization function

The initialization function resets the settings of all the inserted modules to the default settings at factory shipment.

Note:

When the initialization function is executed while the PPG and ED are in the Combination or Channel Synchronization status, they will be restored to the initial status, Independent.

5.2.9 Help menu

When “Version” is selected from the Help menu, the Version Information window is displayed, showing the information on the MX180000A, the mainframe, and inserted modules. It is useful to confirm the version of the instruments used.

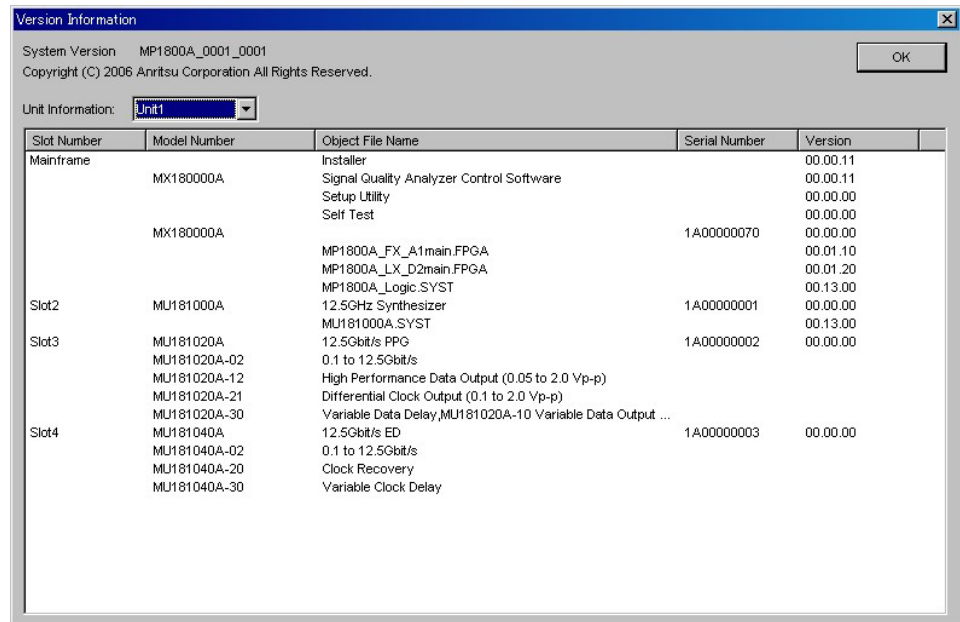


Figure 5.2.9-1 Version Information window

Table 5.2.9-1 Information displayed in Version Information window (for Software)

| Column Title | Description |
|------------------|---|
| Slot Number | Displays “Main Frame” and “Slot n”. [Main Frame]: Character string of the mainframe [Slot n]: Slot number |
| Model Number | Displays the model number and option number. |
| Object File Name | Displays the names of the software, module, and options installed into the mainframe or module. |
| Serial Number | Displays the serial number (for mainframe or module only). |
| Version | Displays the versions of the mainframe, module, FPGA, and module CPU. Note: Blank for options. |

5.2.10 Multi Channel Calibration Function

This function executes the Multi Channel Calibration. For more information about this function, refer to Section 5.5.3 “Multi Channel Calibration Function” in the *MU181020A/B Operation Manual*.

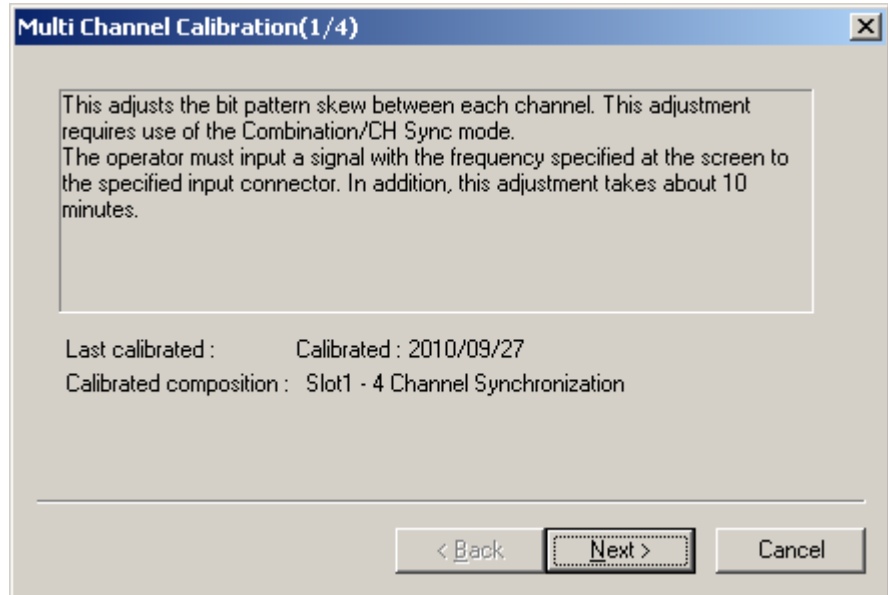


Figure 5.2.10-1 Multi Channel Calibration Screen

5.3 Common Function Buttons

This section describes the common function buttons provided on the menu bar.

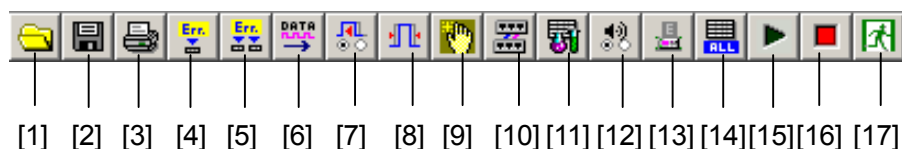


Figure 5.3-1 Common function buttons

Table 5.3-1 Common function buttons

| No. | Button | Description |
|------|------------------------------|--|
| [1] | Open | Click to display the file loading window (Open window). Refer to Section 5.2.3 “Open window” for details. |
| [2] | Save | Click to display the file saving window (Save window). Refer to Section 5.2.4 “Save window” for details. |
| [3] | Print | Click to display the Print window. Refer to Section 5.2.6 “Print window” for details. |
| [4] | Single Error Addition On/Off | Click to enable (On) or disable (Off) the single error addition function for all the inserted PPG modules. Refer to the <i>MU181020A 12.5 Gbit/s PPG Operation Manual</i> for details on the error addition function. |
| [5] | Error Addition On/Off | Click to enable (On) or disable (Off) the error addition function for all the inserted PPG modules. Refer to the <i>MU181020A/B Operation Manual</i> for details on the error addition function. |
| [6] | Output On/Off | Click to enable (On) or disable (Off) the Data/Clock output and the optical output of the optical interface modules. The Data, Clock, and optical signals will not be output until this button is set to On, even if the output for each application is set to On. |
| [7] | Auto Search | Click to display the Auto Search dialog box. Refer to the <i>MU181040A/B Operation Manual</i> for details on the Auto Search function. |
| [8] | Auto Adjust | Click to enable or disable the Auto Adjust function. Refer to the <i>MU181040A/B Operation Manual</i> for details on the Auto Adjust function. |
| [9] | Customize Dialog | Click to display the User Customize dialog box. Refer to Section 5.4.3 “User Customize dialog box” for details. |
| [10] | Combination Setup | Click to display the Combination Setting dialog box used to configure the PPG and ED combination settings. Refer to 5.3.3 “Combination Setting dialog box” for details. |
| [11] | Auto Measurement | Click to display the Auto Measurement Setup dialog box. Refer to Section 5.4.2 “Customizing automatic measurement functions” for details. |

Table 5.3-1 Common function buttons (Cont'd)

| No. | Button | Description |
|------------|-------------------|--|
| [12] | Buzzer Setting | Click to display the Buzzer Setting dialog box used to enable or disable the buzzer sound. Refer to 5.3.1 “Buzzer Setting dialog box” for details. |
| [13] | System Alarm | Click to display the System Alarm window that shows details on the system alarm. Refer to 5.3.2 “System Alarm window” for details. |
| [14] | ED Result All | Click to display the measurement result window that displays the measurement results of all the inserted ED modules. |
| [15] | Measurement Start | Click to start measurement. Common to all applications. |
| [16] | Measurement Stop | Click to stop the measurement. Common to all applications. |
| [17] | Exit | Click to exit the main application. The selector screen is displayed again when the main application is exited, after clicking the Exit button. |

5.3.1 Buzzer Setting dialog box

The Buzzer Setting dialog box is displayed when the Buzzer Setting button on the menu bar is clicked. The buzzer sound at the occurrence of a system error, error, and alarm can be enabled and disabled.

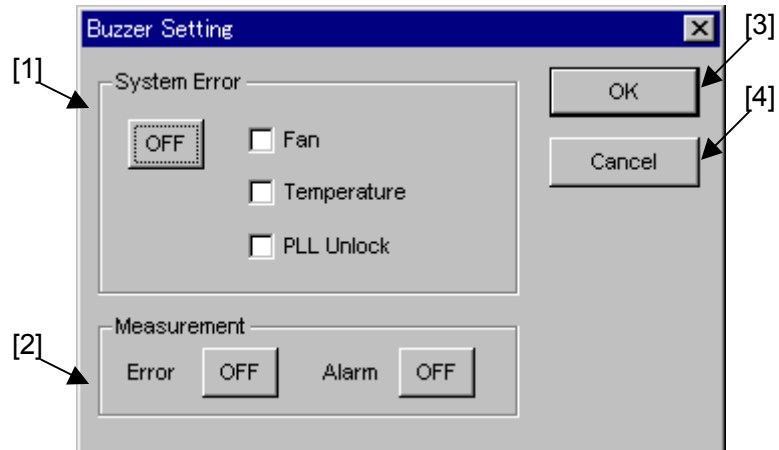


Figure 5.3.1-1 Buzzer Setting dialog box

Table 5.3.1-1 Items in Buzzer Setting dialog box

| No. | Item | Description |
|-----|--------------|---|
| [1] | System Error | Click the button to enable (ON) or disable (OFF) a buzzer sound at the occurrence of a system error. The PLL Unlock checkbox is enabled and can be set when the MU181000A is installed in a slot. |
| [2] | Measurement | Click the button to enable (ON) or disable (OFF) a buzzer sound at the occurrence of an error and/or an alarm. |
| [3] | OK | Click to finalize the settings and close the Buzzer Setting dialog box. |
| [4] | Cancel | Click to cancel the settings and close the Buzzer Setting dialog box. |

5.3.2 System Alarm window

The System Alarm window is displayed when the System Alarm button on the menu bar is clicked. The window shown in Figure 5.3.2-1 is displayed if the System Alarm button is clicked when a system error has occurred within the system, and the window in Figure 5.3.2-2 is displayed if no error has occurred. Table 5.3.2-1 shows the content of the system errors for the MP1800A/MT1810A.

The System Alarm button operates in conjunction with the [System Alarm] key on the front panel of the MP1800A, and the system alarm occurrence is indicated by the LED on the [System Alarm] key. Refer to Section 4.2.1.4 “Status display area” for details.

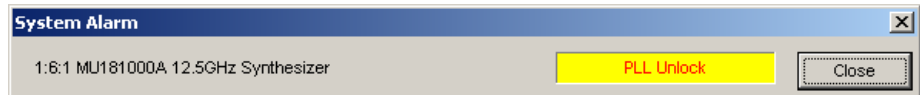


Figure 5.3.2-1 System Alarm window (when system error has occurred)

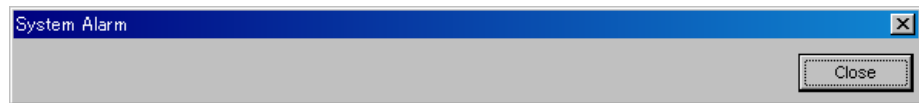


Figure 5.3.2-2 System Alarm window (when no system error has occurred)

Table 5.3.2-1 System errors

| System Error | Description |
|--------------|---|
| Fan | Issued when a fan error is detected on the MP1800A or MT1810A. |
| Temperature | Issued when a temperature error is detected on the MP1800A, MT1810A, or an inserted module. |
| PLL Unlock | Issued when a PLL Unlock is detected on the MU181000A 12.5 GHz Synthesizer. |

Note:

If a fan error or temperature error occurs, the System Alarm window shown in Table 5.3.2-1 appears automatically.

If an abnormal status continues for 30 seconds or longer, the power is turned off.

5.3.3 Combination Setting dialog box

The Combination Setting screen is displayed.

Combination and Channel Synchronization can be set for the MU181020A and MU181020B. In addition, Combination can be set for the MU181040A and MU181040B.

Refer to the *MU181020A/B Operation Manual* and the *MU181040A/B Operation Manual* for details on the combination function and channel synchronization function.

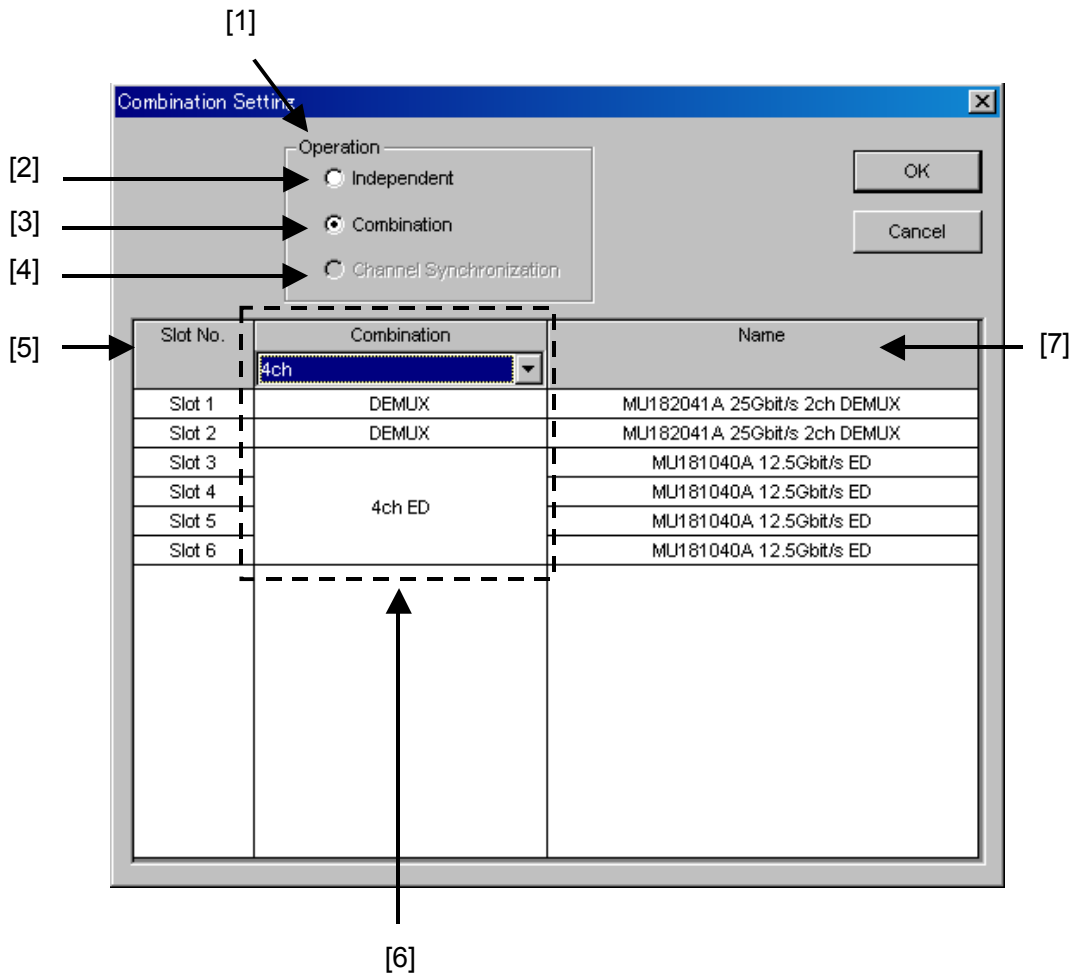


Figure 5.3.3-1 Combination Setting dialog box

Table 5.3.3-1 Items in Combination Setting dialog box

| No. | Item | Description |
|-----|-------------------------|--|
| [1] | Operation | Specify the operation of the target unit from [Independent], [Combination], and [Channel Synchronization]. “Independent” is selected by default. |
| [2] | Independent | When this radio button is selected, all the installed modules operate independently. |
| [3] | Combination | Combination can be set for multiple combined PPG boards. In addition, Combination can be set for multiple combined ED boards. The Combination configuration can be set by changing the display in field [6]. (Figure 5.3.3-2 Combination Setting dialog box) |
| [4] | Channel Synchronization | Channel Synchronization can be performed for multiple PPG boards. Channel Synchronization can be set between the same board types by changing the display in field [6]. (Figure 5.3.3-4 Channel Synchronization Setting dialog box). |
| [5] | Slot No. | Displays the slot number of the target module. The maximum slot number is four for the MT1810A, and is six for the MP1800A. |

Table 5.3.3-1 Items in Combination Setting dialog box (Cont'd)

| No. | Item | Description |
|-----|--|---|
| [6] | Independent/ Combination/ Channel Synchronization | <p>The contents displayed by the selection for Operation in [1] can be switched.</p> <p>Independent: No display</p> <p>Combination: When [2 Ch] is selected at the Combination checkbox at the top of the field, two modules can be set; when either [4 Ch] or [25Gx2Ch Combination] is selected, four modules can be set. This selection displays each module for field [6] as follows:</p> <ul style="list-style-type: none"> • Any one of the 2 Ch PPG, 4 Ch PPG, 2 Ch ED and 4 Ch ED modules set at [Combination] is displayed. • Modules that can be used at Independent are displayed as either PPG or ED. • Modules that cannot be used are displayed as Unavailable. <p>When [2 Ch Combination] or [25 Gx2Ch Combination] is selected when the MU182021A 25 Gbit/s 2 Ch MUX or MU182041A 25 Gbit/s 2 Ch DEMUX are installed, each module set at [Combination] is distinguished by color (Figure 5.3.3-3 Combination (with MUX/DEMUX) setting screen).</p> <p>Channel Synchronization: When [12.5 Ch Sync] is selected at the Combination checkbox at the top of the field, the ASYNC checkbox displays modules that support Channel Synchronization. When this checkbox is checked, modules displaying SYNC are Channel Synchronization targets. Since Channel Synchronization always requires two or more modules, at least two checkboxes must always be checked.</p> <p>When [25G Ch Sync] is selected, there are no checkboxes and SYNC is always displayed.</p> <p>This selection displays each module for area [6] as follows:</p> <ul style="list-style-type: none"> • When [12.5G Ch Sync] is selected, SYNC PPG is displayed; when [25G Ch Sync] is selected, SYNC 2ch PPG is displayed. • Unselected modules display ASYNC and use Independent operation. • Non-target modules display PPG and use Independent operation. <p>When the MU182021A 25 Gbit/s 2 Ch MUX is installed and [25G Ch Sync] is selected, each module set at [Combination] is distinguished by color (Figure 5.3.3-5 Channel Synchronization (with 2Ch MUX) setting screen).</p> |
| [7] | Name | Displays the name of the module installed in the mainframe. |

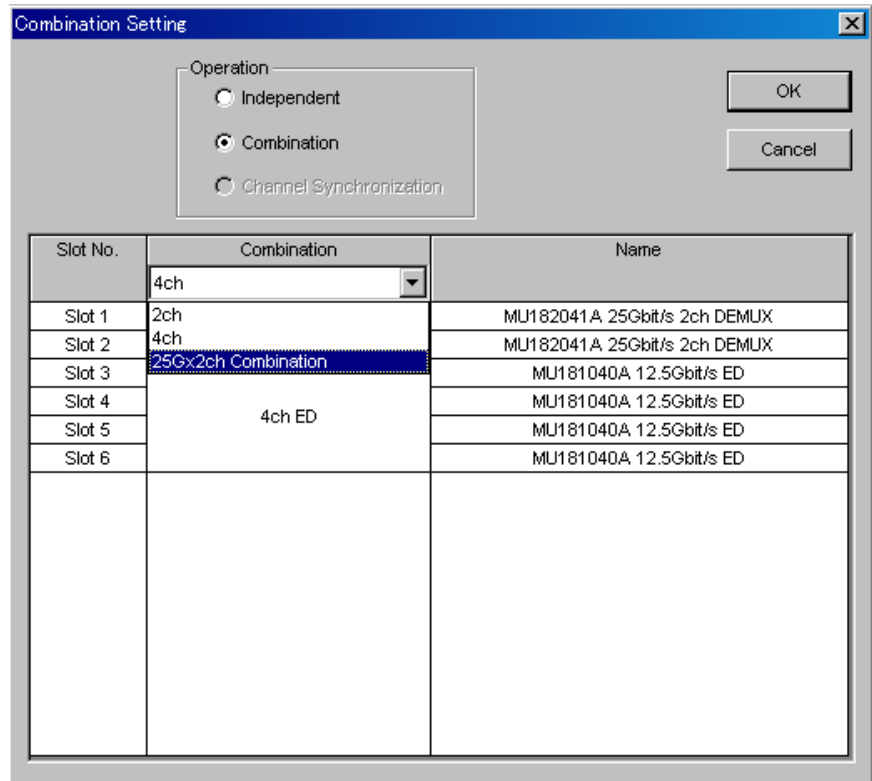


Figure 5.3.3-2 Combination Setting dialog box

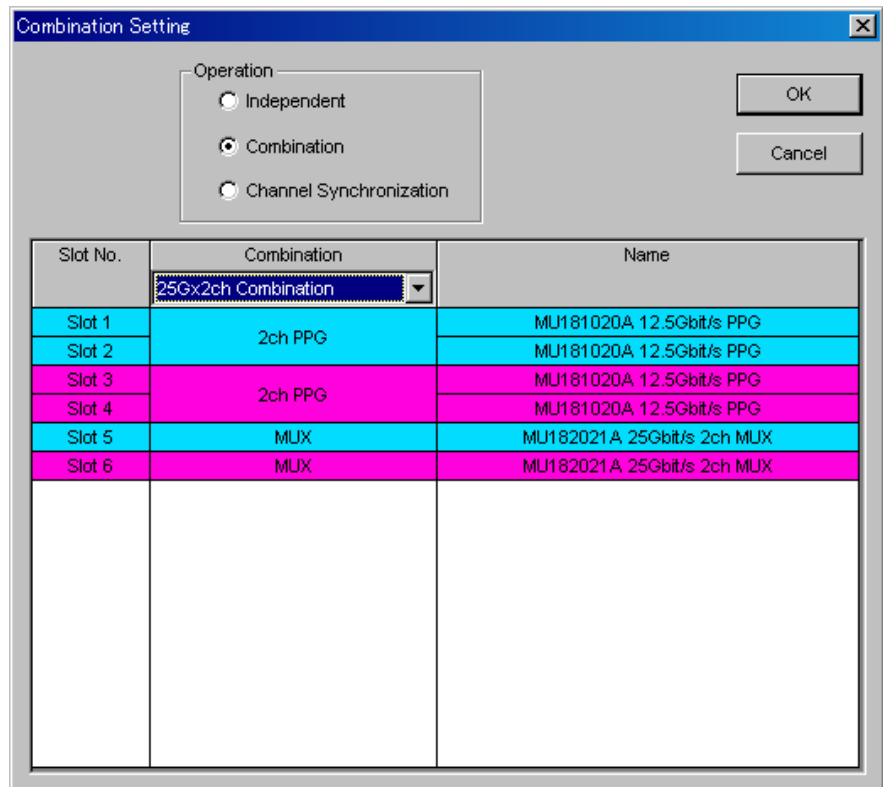


Figure 5.3.3-3 25 Gx2ch Combination Setting dialog box

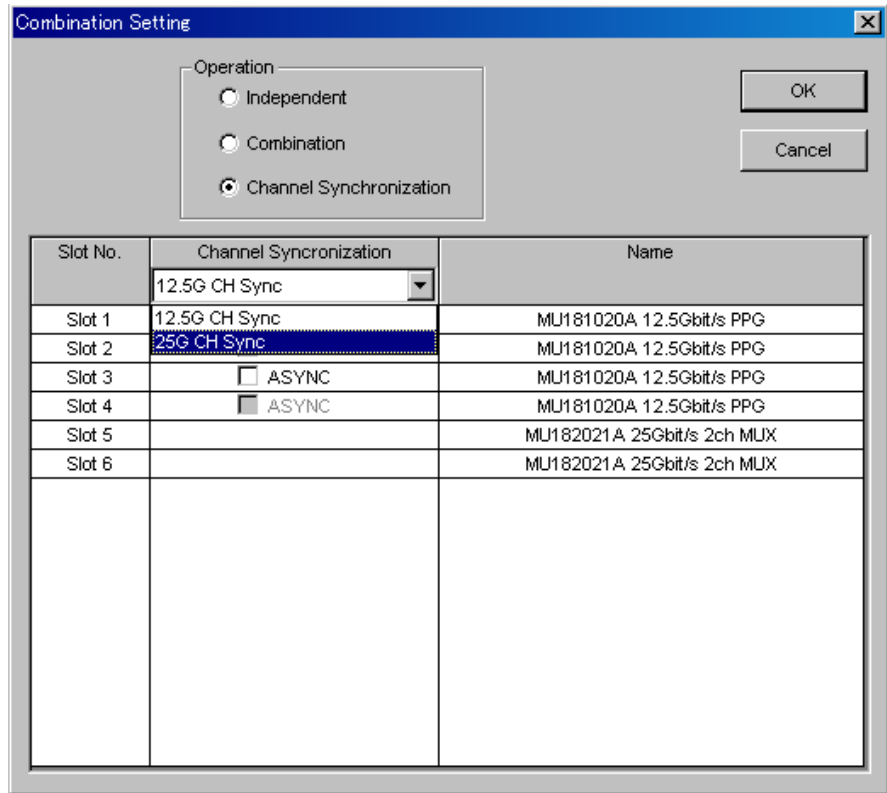


Figure 5.3.3-4 Channel Synchronization Setting dialog box

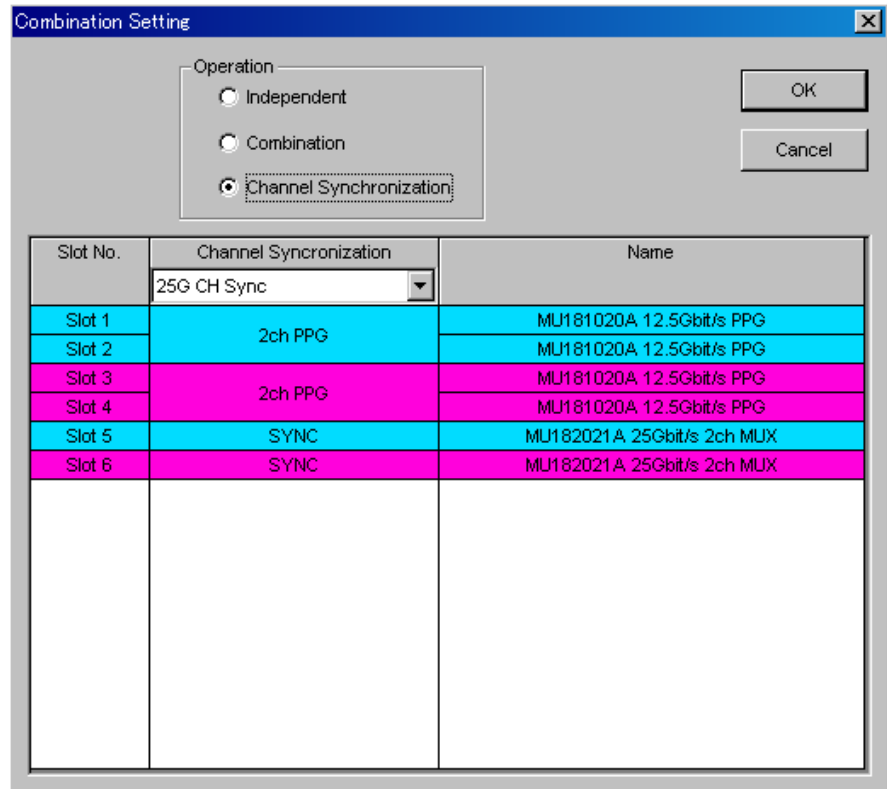


Figure 5.3.3-5 25G CH Sync Setting dialog box

5.4 Customization

With the MX180000A, a user can customize the display format of items on the window. This section describes how to customize the drop-down menu and common function buttons on the menu bar.

5.4.1 Customizing function buttons

The layout of the common functions buttons on the menu bar can be arranged as desired. Note that the position of the Measurement Start, Measurement Stop, and Exit buttons cannot be changed or hidden. Select “Button Menu...” from the View menu on the menu bar to display the Function Button Setup dialog box.

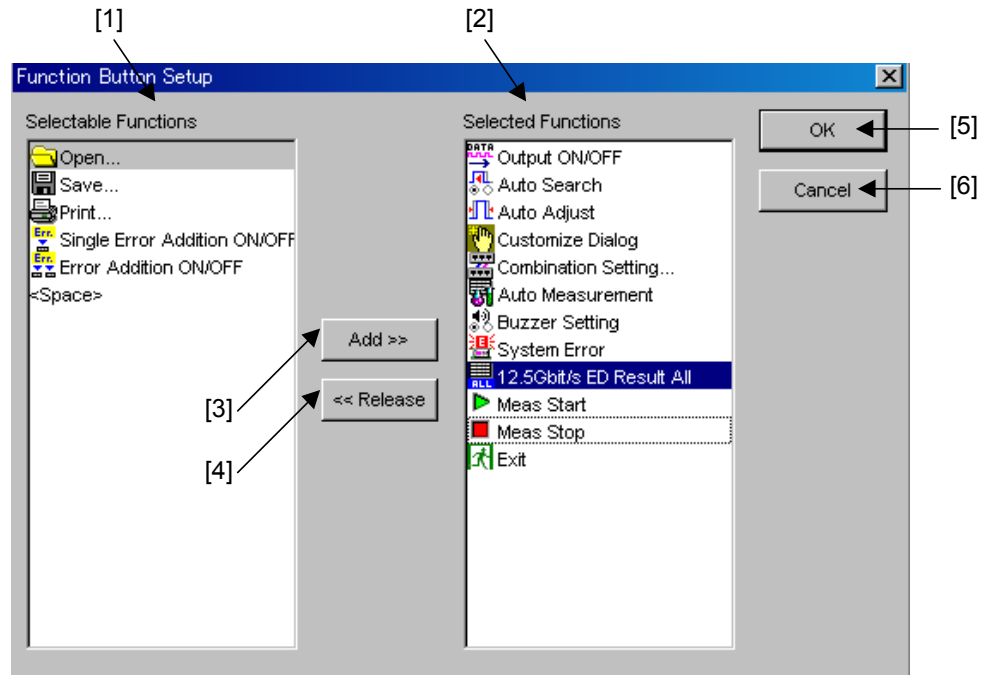


Figure 5.4.1-1 Function Button Setup dialog box

Table 5.4.1-1 Items in Function Button Setup dialog box

| No. | Item | Description |
|-----|----------------------|---|
| [1] | Selectable Functions | <p>A list of the common function buttons that can be added to the menu bar is displayed. The function name and the icon are displayed together. Two or more icons can be selected at the same time.</p> <p>A display item “<space>” is also provided for entering a blank character. A user can insert “<space>” into any position, enabling the function button layout to be arranged according to the function button type.</p> |
| [2] | Selected Functions | <p>A list of the function buttons that are currently provided on the menu bar is displayed. Up to the maximum number of the functions are selectable. Two or more icons can be selected at the same time.</p> |
| [3] | Add | <p>To add a common function button to the menu bar, select the target function button from the Selectable Function list, and then click [Add]. The selected function button is moved from the Selectable Functions list to the Selected Functions list, and the corresponding button is displayed on the menu bar.</p> |
| [4] | Release | <p>To hide a function button from the menu bar, select the target function button from the Selected Functions list, and then click [Release]. The selected function button is moved from the Selected Functions list to the Selectable Functions list, and the corresponding button is hidden from the menu bar.</p> |
| [5] | OK | <p>Click to finalize the customization settings for the common function buttons, and close the Function Button Setup dialog box.</p> |
| [6] | Cancel | <p>Click to cancel the customization settings for the common function buttons, and close the Function Button Setup dialog box.</p> |

5.4.2 Customizing automatic measurement functions

The automatic measuring function items to be displayed in the Auto Measurement Select window can be set in the Auto Measurement Setup dialog box. Select “Auto Measurement Menu...” from the View menu on the menu bar to display the Auto Measurement Setup dialog box.

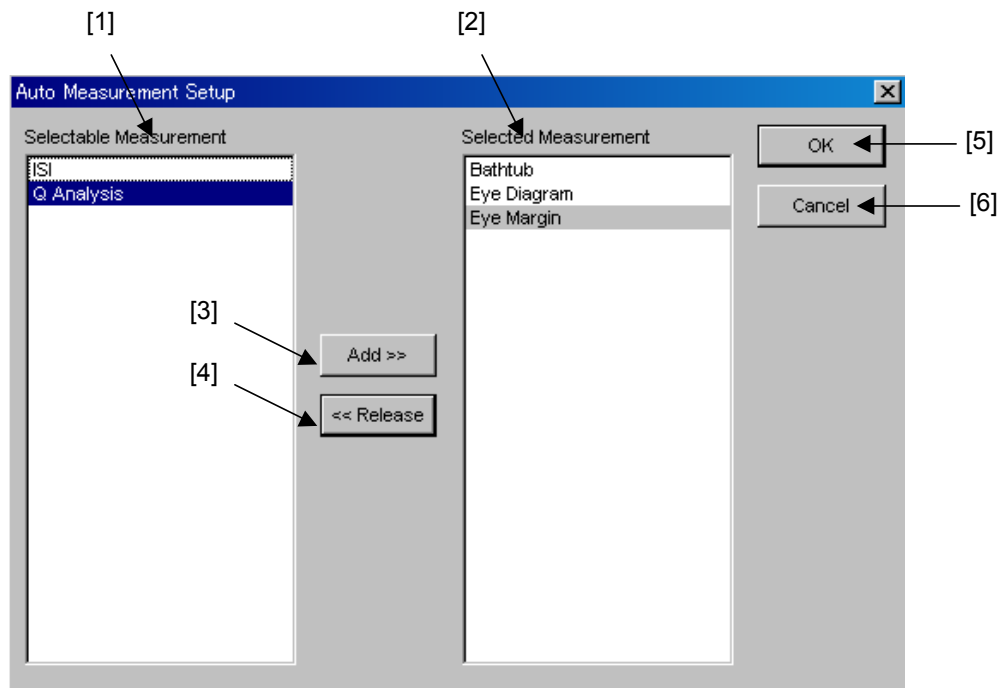


Figure 5.4.2-1 Auto Measurement Setup dialog box

Table 5.4.2-1 Items in Auto Measurement Setup dialog box

| No. | Item | Description |
|-----|------------------------|--|
| [1] | Selectable Measurement | A list of the automatic measurement functions that can be added to the Auto Measurement Select window is displayed. Two or more items can be selected at the same time. |
| [2] | Selected Measurement | A list of the automatic measurement functions that are currently displayed in the Auto Measurement Select window is displayed. Two or more items can be selected at the same time. |
| [3] | Add | Click to move the automatic measurement function items selected in the Selectable Measurement list to the Selected Measurement list. The functions moved into the Selected Measurement list will be displayed in the Auto Measurement Select window. |
| [4] | Release | Click to move the automatic measurement function items selected in the Selected Measurement list to the Selectable Measurement list. The functions moved into the Selectable Measurement list will not be displayed in the Auto Measurement Select window. |
| [5] | OK | Click to finalize the customization settings, and close the Auto Measurement Setup dialog box. |
| [6] | Cancel | Click to cancel the customization settings, and close the Auto Measurement Setup dialog box. |

5.4.3 User Customize dialog box

A user can arrange the layout of setting items in the User Customize dialog box. It is possible to place the setting items of various modules in one window, facilitating data input and reference.

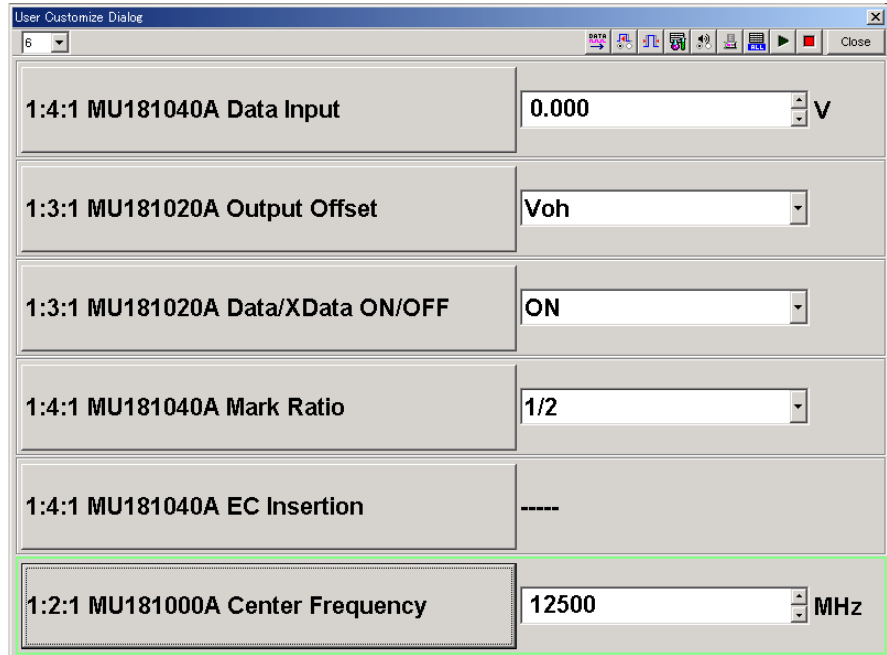


Figure 5.4.3-1 User Customize dialog box

The setting items of each module operation tab window are displayed in the User Customize dialog box, as a mirror image. When settings are changed in the corresponding module operation tab window, the change results are therefore applied into the User Customize dialog box, and vice versa. Similarly, the settings for control entry and display status are reflected to the other side.

The common area in the main window cannot be operated when the User Customize dialog box is displayed. This is why the same common function buttons as those in the menu bar on the main window are provided in the upper portion of the User Customize dialog box. With the MP1800A, however, note that the input focus in this area can be moved by pressing the Tab or Shift + Tab key or pressing the rotary encoder, while the focus on the menu bar of the main window can be moved by pressing the [Jump] key.

5.4.3.1 User customization procedure

Perform the user customization, using the following procedure.

1. Set the number of setting items to be displayed.

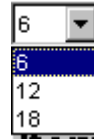


Figure 5.4.3.1-1 Selecting the number of setting items

Select the number of items to be displayed in the User Customize dialog box from the combo box. The selectable numbers are 6, 12, and 18, and the default setting is 6.

When the number of items to be displayed is reduced from 12 to 6, if six or more displayed items are already displayed, only six items from the beginning are displayed.

The table below shows the layout format of the control placed on the User Customize dialog box according to the number of displayed items.

Table 5.4.3.1-1 Number of displayed items and control layout format

| Number of Displayed Items | Control Layout Format |
|---------------------------|-----------------------|
| 6 | 6 lines × 1 row |
| 12 | 6 lines × 2 rows |
| 18 | 6 lines × 3 rows |

2. Press the displayed setting item name button.

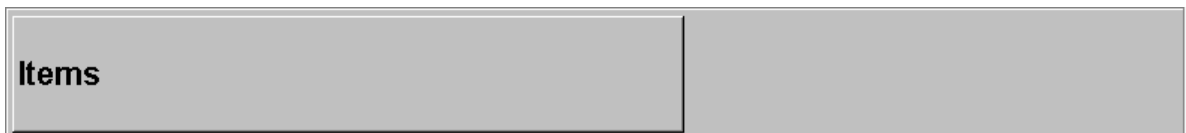


Figure 5.4.3.1-2 Setting item name button (when unselected)

3. In the setting item selection window, select the setting item to be displayed.
See Section 5.4.3.4 “Setting item selection window (Select Item Setup)” for details.

4. The target setting item is displayed in the User Customize dialog box.



Figure 5.4.3.1-3 Setting item name button (when selected)

5.4.3.2 Setting item display

The format of a setting item displayed on the User Customize dialog box consists of the controls for “setting item name”, “data display”, and “unit display”. The data display varies depending on the type of the setting item.

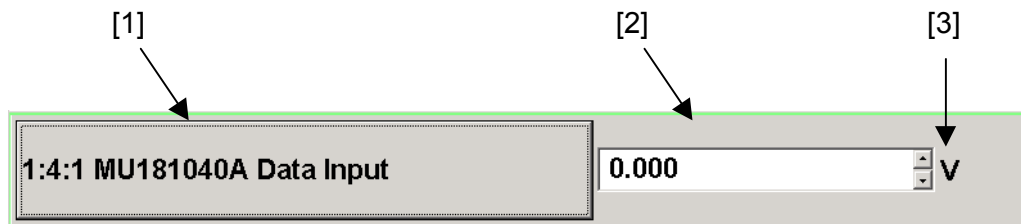


Figure 5.4.3.2-1 Setting item display

Table 5.4.3.2-1 Setting item display

| No. | Controls | Description |
|-----|-------------------|---|
| [1] | Setting item name | Displays the setting item name in the following format. [Unit No.:Slot No.:Port No. Setting item name] “Items” is displayed when no setting item is set. |
| [2] | Data display | Displays the current data of the setting item, and is provided for data entry. The control type (spin edit box, label, combo box, and button) varies depending on the setting item. |
| [3] | Unit display | Displays the unit of the setting item. May be blank for some setting items. |

Since the setting items displayed in the User Customize dialog box are mirror images, their enable or disable/non-display statuses match those of the corresponding setting items in the module operation tab window. The following describes the displays of the controls in the User Customize dialog box, according to each setting status.

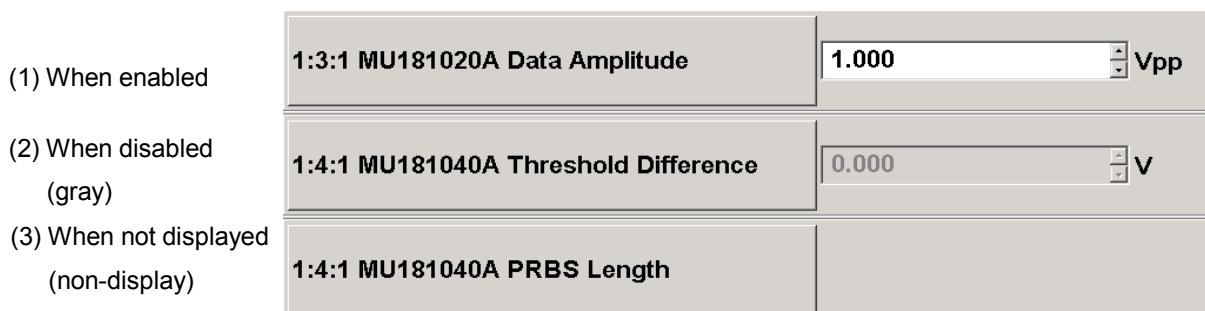


Figure 5.4.3.2-2 Customizing setting item display status

Note:

The setting item name button can always be pressed in any status of (1) to (3).

5.4.3.3 Interlock operation with Slot keys on front panel

When the [Customize] key on the front panel of the MP1800A is pressed, the LED on the [Customize] key lights up and the User Customize dialog box is displayed. The [Slot] keys on the front panel have a special function when the LED on the [Customize] key is on.

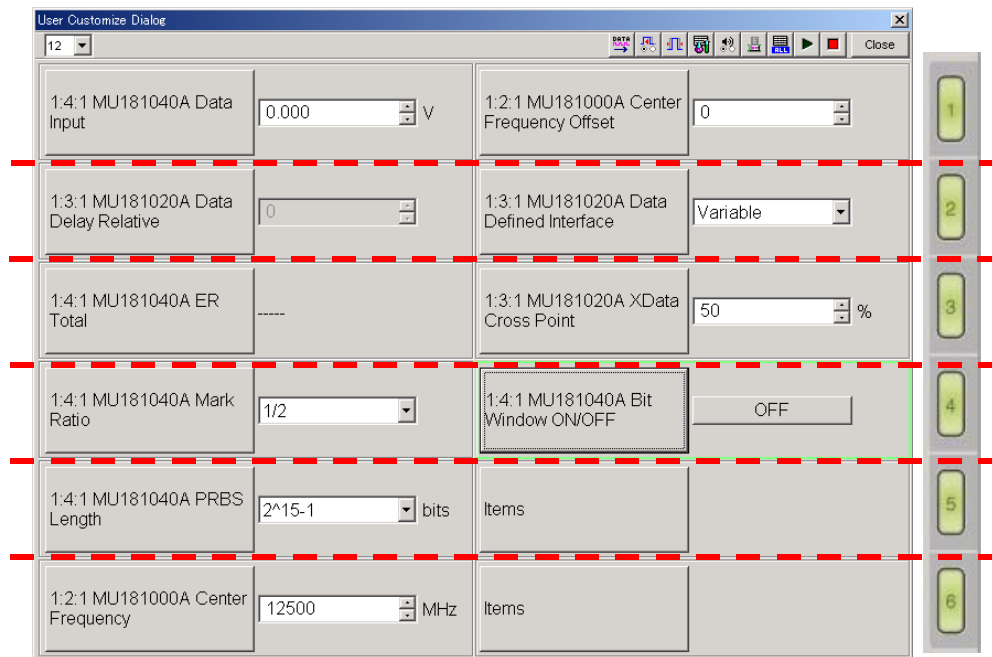


Figure 5.4.3.3-1 Interlock operation with Slot keys

When a [Slot] key is pressed while the LED on the [Customize] key is off, the module operation tab window corresponding to the selected slot is displayed in the Main View area. When a [Slot] key is pressed while the LED on the [Customize] key is on, though, it can be used to set a setting item in the User Customize dialog box to the input mode and to move the input focus in a specified range.

The operation area is divided into six areas (see red lines in Figure 5.4.3.3-1), and each area corresponds to the [Slot] keys 1 to 6, respectively. When the [Slot] key 1 is pressed, the input focus is moved to the data display control in the corresponding operation area.

The group box frame of the highlighted setting item is highlighted if it is in the input mode.

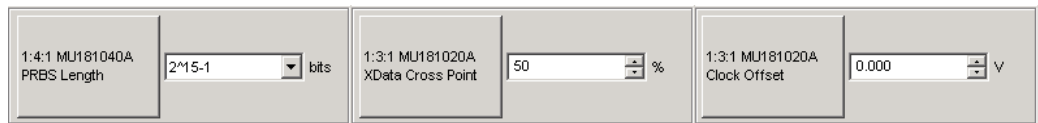


Figure 5.4.3.3-2 Customizing setting item display

When a [Slot] key is pressed several times in succession, the input focus moves within the corresponding operation area. The input focus does not move if there is only one setting item in the operation area.

Focus* transition by pressing [Slot] key several times

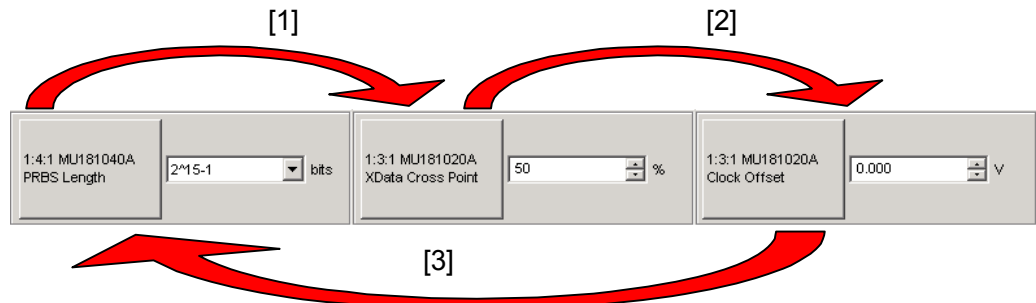


Figure 5.4.3.3-3 Focus transition between setting item

When the [Customize] key (the LED is on) is pressed while the User Customize dialog box is displayed, the dialog box is closed and the module operation tab window is displayed again. At this time, the lighting status of the [Slot] keys are resumed to the status before the User Customize dialog box is displayed.

5.4.3.4 Setting item selection window (Select Item Setup)

To display a desired setting item in the User Customize dialog box, click the button of the setting item to display the Select Item Setup dialog box, and select the target setting item.

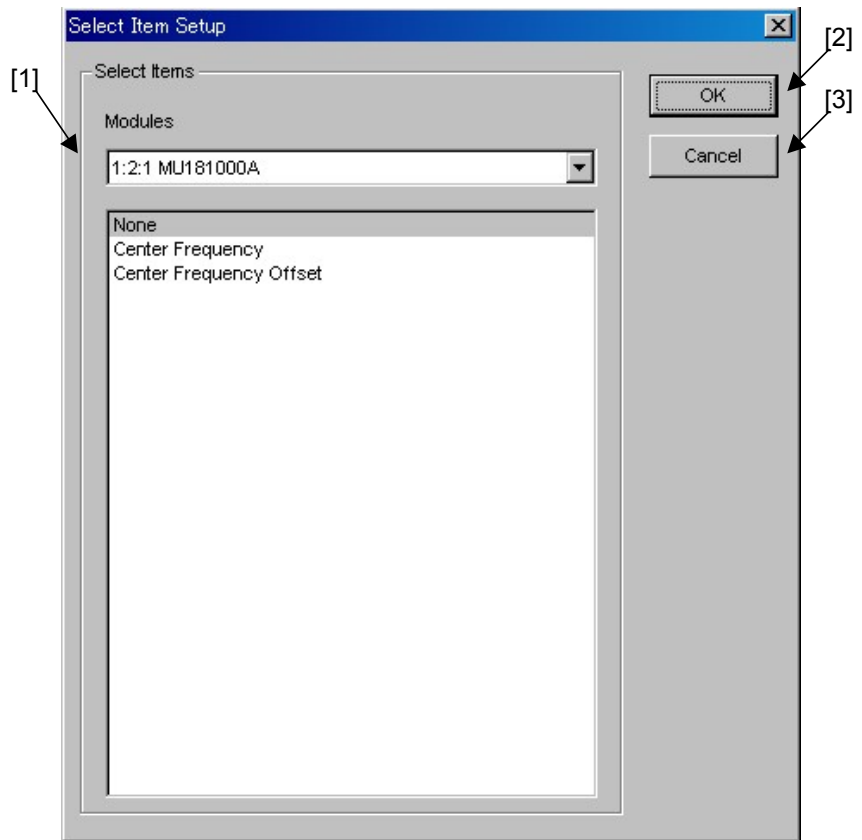


Figure 5.4.3.4-1 Select Item Setup dialog box

Table 5.4.3.4-1 Items in Select Item Setup dialog box

| No. | Item | Description |
|-----|--------------|--|
| [1] | Select Items | The Modules drop-down list to select a module and a list of setting items are provided. The module name is displayed in the following format. A combination of modules is also displayed in this format. [Unit No.:Slot No.:Port No. Module model name] |
| [2] | OK | Click to finalize the setting items selected in the Select Item Setup dialog box and close the dialog box. The finalized setting items are displayed in the controls for “Setting item name”, “Data display”, and “Unit display” in the User Customize dialog box. |
| [3] | Cancel | Click to close the Select Item Setup dialog box. |

5.5 ESD/EOS Video Function

This section describes the function to play the video that explains how to control ESD and EOS.

Additionally, you can set whether to play the video automatically on startup of the MX180000A.

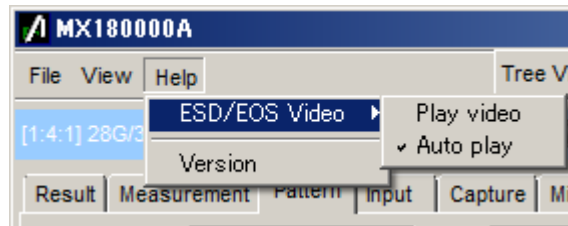


Figure 5.5-1 ESD/EOS Video Menu

Table 5.5-1 ESD/EOS Video Operation Items

| No. | Operation Item | Description |
|-----|----------------|---|
| [1] | Play video | Plays the video that explains how to control ESD and EOS. |
| [2] | Auto play | When selected, plays the video automatically on startup of the MX180000A. If execute Initialize from the File menu, Auto play is selected automatically. |

Chapter 6 How to Use Setup Utility

This chapter describes how to use the Setup Utility.

| | | |
|-------|--|------|
| 6.1 | Overview | 6-2 |
| 6.2 | Starting and Exiting Setup Utility | 6-3 |
| 6.3 | Setting Remote Control | 6-5 |
| 6.3.1 | Settings for GPIB..... | 6-7 |
| 6.3.2 | Settings for Ethernet..... | 6-8 |
| 6.4 | Displaying IP Address..... | 6-9 |
| 6.5 | Downloading | 6-10 |
| 6.6 | Displaying Version Information on Installed Software | 6-12 |
| 6.7 | Help Tab Window | 6-14 |
| 6.8 | Setting Date and Time | 6-16 |
| 6.9 | Adding Options | 6-17 |

6.1 Overview

The Setup Utility function is provided for configuring the necessary settings for the mainframe. The Setup Utility function enables the following operations:

- Selection and initial settings of optional remote interface
- Downloading software files
- Displaying version information on installed software
- Initializing settings
- Setting date and time
- Installing additional options

(1) Setting operating environment for remote options

The operating environment for remote options can be set.

In addition, when several remote options are installed, set the remote option to use. Note that the mainframe operates with only one selected remote option if several remote options are installed.

When a remote option Ethernet is selected, it is required to specify the IP address of the Windows® side of the mainframe that is controlled remotely, from the PC that performs remote control. See Section 6.3 “Setting Remote Control” for how to set each remote option.

(2) Displaying IP address

The IP addresses of the mainframe and modules can be displayed. See Section 6.4 “Displaying IP Address” for details.

(3) Downloading software files

Software files can be downloaded by using the Setup Utility. See Section 6.5 “Downloading” for details.

(4) Displaying software and hardware version information

The version information on the software and hardware integrated in the mainframe can be displayed. See Section 6.6 “Displaying Version Information on Installed Software” for details.

(5) Initializing settings

The Windows® application and unit can be initialized.

Section 6.7 “Help Tab Window (2) Initialization” for details.

(6) Setting date and time

The date and time of Windows® can be set. See Section 6.8 “Setting Date and Time” for details.

(7) Installing additional options

Options can be added to a mainframe or a module. See Section 6.9 “Adding Options” for details.

6.2 Starting and Exiting Setup Utility

Be sure to exit the main application before starting the Setup Utility application.

Select [Setup utility] from the selector screen.



Figure 6.2-1 Starting Setup Utility

The setup utility login window is displayed. Select "User" from the Login drop-down list, and then click [OK] to display the Setup Utility for MX180000A window (hereinafter, referred to as the "Setup Utility window").

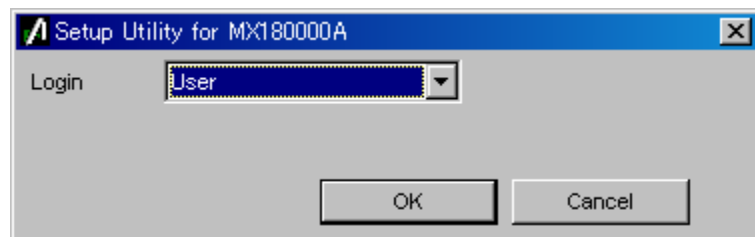


Figure 6.2-2 Setup Utility login window

Click [Exit] to close the Setup Utility window. The selector screen is then displayed again.

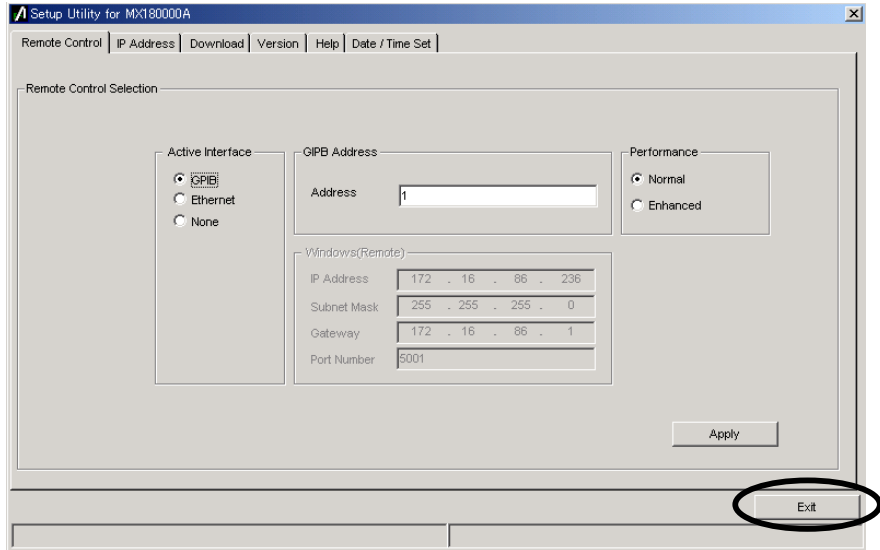


Figure 6.2-3 Setup Utility window

6.3 Setting Remote Control

Click the [Remote Control] tab on the Setup Utility window to open the Remote Control tab window used to set the operating environment for remote control. A remote interface to be used by the MP1800A or MT1810A can be selected and the operating environment for the selected interface can be set in this tab window

Note:

When the MP1800A is used, setting in this tab window is impossible when no remote control option is installed.

When the MT1810A is used, settings can be configured regardless of whether the remote control option is installed.

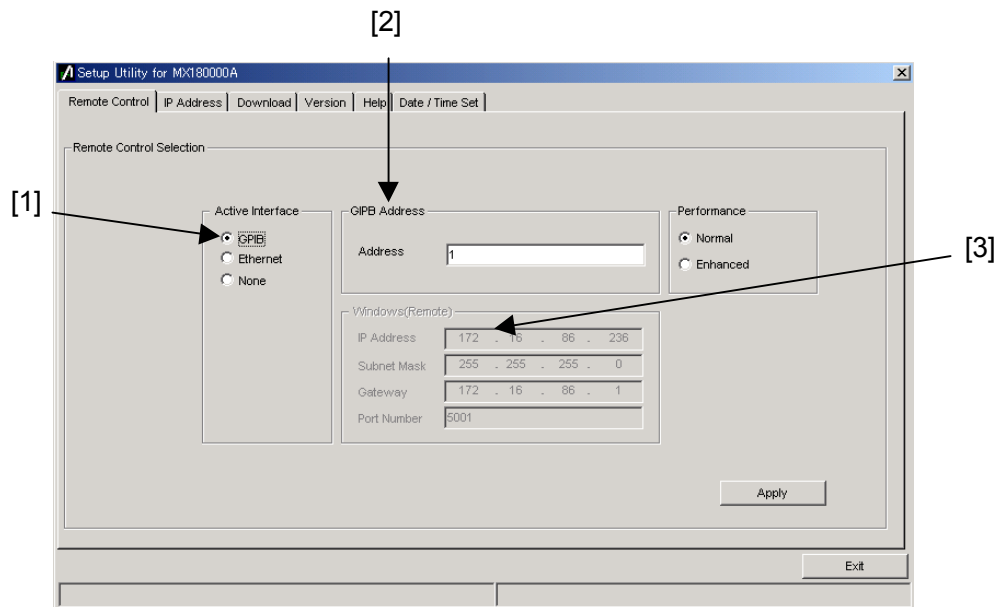


Figure 6.3-1 Remote Control tab window

Table 6.3-1 Items in Remote Control tab window

| No. | Item | Function/operation |
|-----|------------------|--|
| [1] | Active Interface | Set the remote interface used for the MP1800A or MT1810A. Select [GPIB], [Ethernet] or [None] if no remote interface is used. The corresponding option must be installed in advance when selecting [GPIB] or [Ethernet]. |
| [2] | GPIB Address | For the MP1800A, set the device address of the MP1800A when remote control is performed via GPIB. For the MT1810A, set the address of the control PC. |
| [3] | Windows (Remote) | For the MP1800A, set the TCP/IP socket port number of the MP1800A when remote control is performed via an Ethernet. Set this item according to the remote control PC. For the socket type, the MP1800A side is the server side. For the MT1810A, configure the settings of the control PC. |

See the *MX180000A Signal Quality Analyzer Control Software Operation Manual Remote Control* for details.

6.3.1 Settings for GPIB

The settings required when GPIB is used for the remote interface are described below.

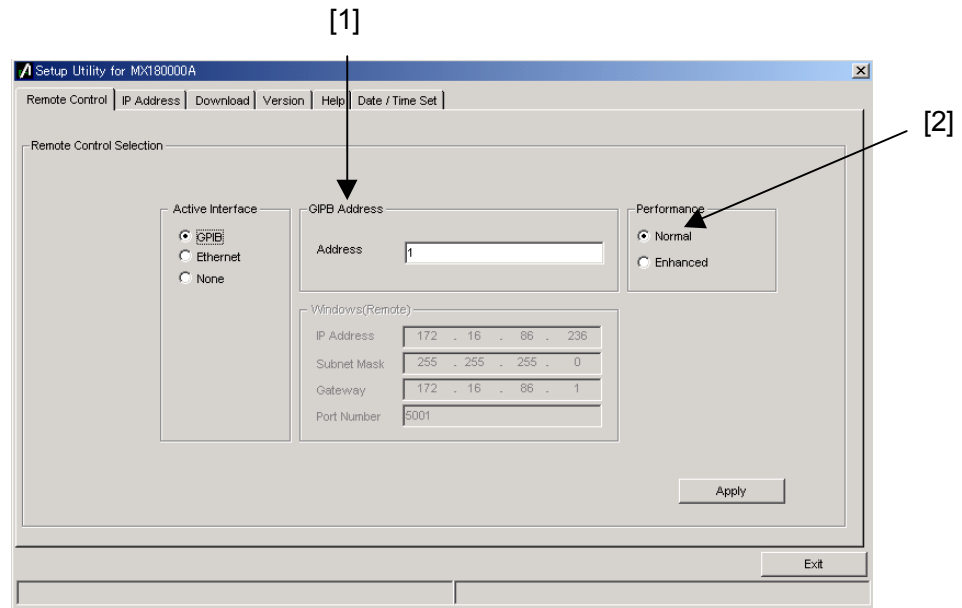


Figure 6.3.1-1 Settings for GPIB in Remote Control tab window

Table 6.3.1-1 Settings for GPIB

| No. | Type | Function/operation |
|-----|-------------|--|
| [1] | Address | Set the address from 1 to 30. |
| [2] | Performance | Set the GPIB remote command processing mode Normal: To use commands and responses including binary data, the EOI terminator is required. Enhanced: Remote processing speed increases. The EOI terminator is required for all commands and responses. |

6.3.2 Settings for Ethernet

The settings required when Ethernet is used for the remote interface are described below.

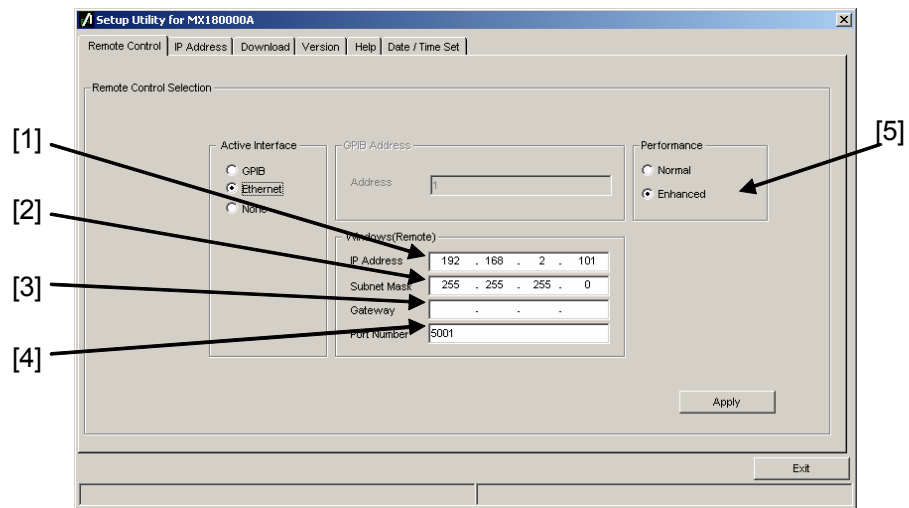


Figure 6.3.2-1 Settings for Ethernet in Remote Control tab window

Table 6.3.2-1 Settings for Ethernet

| No. | Type | Function/operation |
|-----|-------------|--|
| [1] | IP Address | Set the IP address. |
| [2] | Subnet Mask | Set the subnet mask. |
| [3] | Gateway | Set the gateway address. |
| [4] | Port Number | Set the port number from 1024 to 5001. |
| [5] | Performance | Set the Ethernet remote command processing mode Normal: Normal mode Enhanced: Remote processing speed increases. |

For details about the setting restrictions, refer to *MX180000A Signal Quality Analyzer Control Software Remote Control Operation Manual*.

Note:

When an IP address is changed, the message dialog box shown in Figure 6.3.2-2 is displayed, prompting to restart the system for applying the changed settings. Click [Yes] to restart the system.

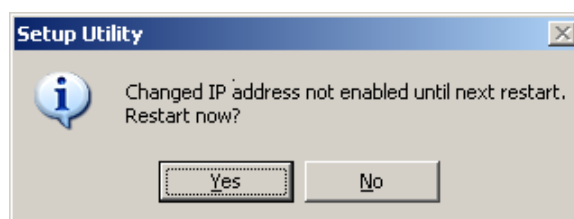


Figure 6.3.2-2 Message dialog

6.4 Displaying IP Address

Click the [IP Address] tab on the Setup Utility window to open the IP Address tab window. In this tab window, the IP addresses of the mainframe and installed modules are displayed. This function is provided for expansion in the future, and is not used currently.

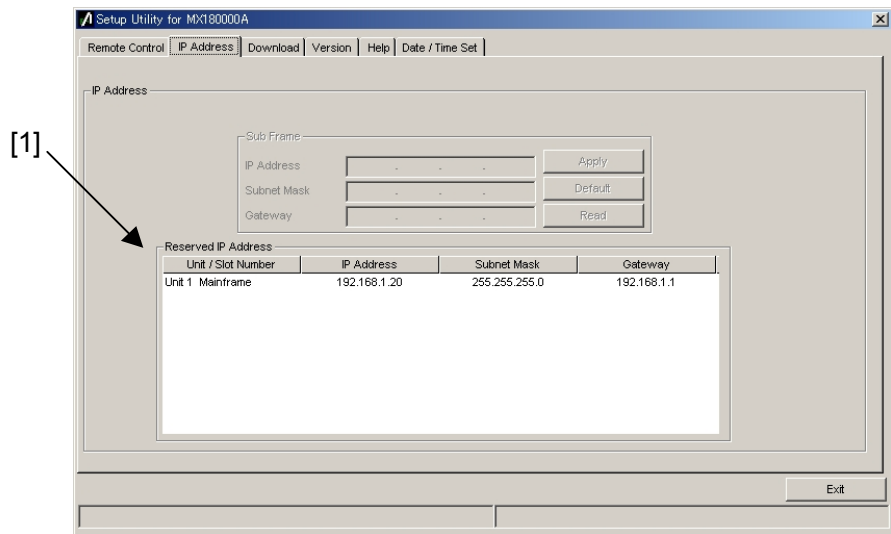


Figure 6.4-1 IP Address tab window

Table 6.4-1 Item in IP Address tab window

| No. | Item | Function |
|-----|---------------------|---|
| [1] | Reserved IP Address | Displays the IP addresses of the mainframe and modules inserted into each slot. |

6.5 Downloading

Click the [Download] tab on the Setup Utility window to open the Download tab window. This window is used to update the firmware and FPGA when upgrading the application software version.

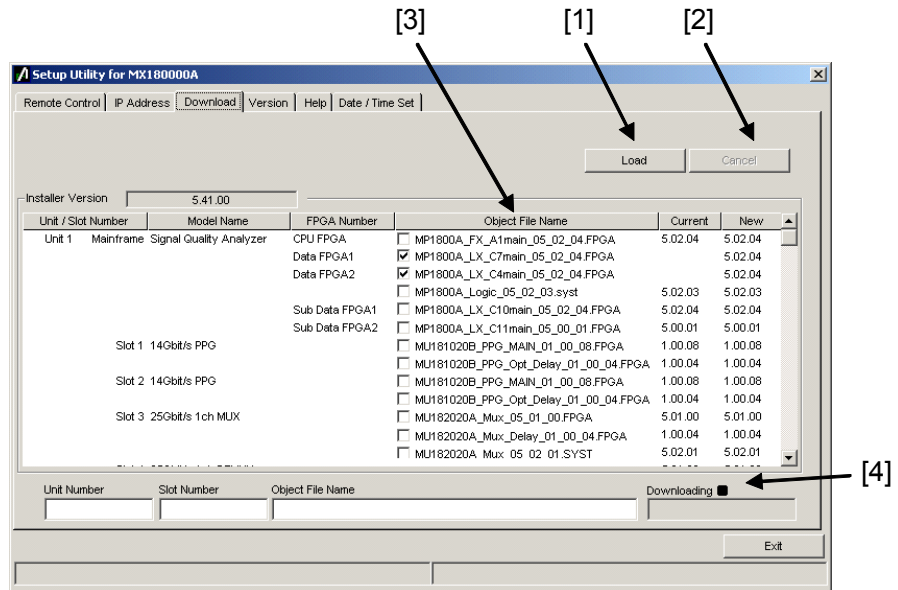


Figure 6.5-1 Download tab window

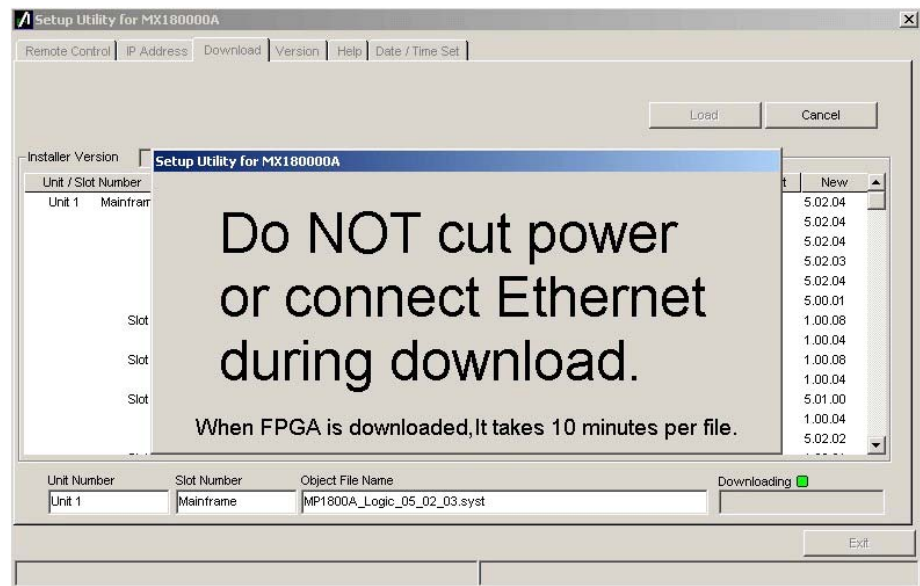


Figure 6.5-2 Download tab window (during download)

Table 6.5-1 Items in Download window

| No. | Item | Function/operation |
|-----|------------------|---|
| [1] | Load | Executes downloading. When this button is clicked, the version of the file that the MX180000A installer has installed is compared with the version of the file downloaded into a module, and if they do not match, the target file is downloaded. The error message such as Figure 6.5-2 is displayed, while downloading the file. |
| [2] | Cancel | Cancels download. |
| [3] | Object File Name | Displays the names of the files to be downloaded. The files whose checkbox is selected will be downloaded. The checkbox is initially selected if the target file is not installed yet (the Current column is blank), or if the current version is earlier than the new version. |
| [4] | – | Displays download progress. LED blinks while downloading the file. |

Notes:

- If the version is not displayed in the Current column and the checkbox is cleared, select the checkbox and execute download.
- When one of the following FPGA is downloaded, the MP1800A or the MT1810A must be turned off and then on again in order to enable the updated information. It takes 10 minutes per file.
 MU181020A_PPG_MAIN_xx_xx_xx.FPGA
 MU181020A_PPG_Opt_Delay_xx_xx_xx.FPGA
 MU181020B_PPG_MAIN_xx_xx_xx.FPGA
 MU181020B_PPG_Opt_Delay_xx_xx_xx.FPGA
 MU181040A_ED_MAIN_xx_xx_xx.FPGA
 MU181040A_ED_Opt_Delay_xx_xx_xx.FPGA
 MU181040B_ED_MAIN_xx_xx_xx.FPGA
 MU181040B_ED_Opt_Delay_xx_xx_xx.FPGA
 MU182020A_Mux_Delay_xx_xx_xx.FPGA
 MU182021A_Mux_Delay1_xx_xx_xx.FPGA
 MU182021A_Mux_Delay2_xx_xx_xx.FPGA
 MU182040A_Demux_Delay_xx_xx_xx.FPGA
 MU182041A_Demux_Delay1_xx_xx_xx.FPGA
 MU182041A_Demux_Delay2_xx_xx_xx.FPGA
 xx indicates the file name version.
- Note that the MP1800A or the MT1810A may not operate normally when the power is turned off during download or the Ethernet cable is disconnected. Do not perform any operation without pressing the Cancel button, while the file is being downloaded.

6.6 Displaying Version Information on Installed Software

Click the [Version] tab on the Setup Utility window to open the Version tab window. The version information on the software applications installed in the mainframe and modules, the serial number of the mainframe and modules, and the installed options are displayed in this tab window.

(1) Software version information display

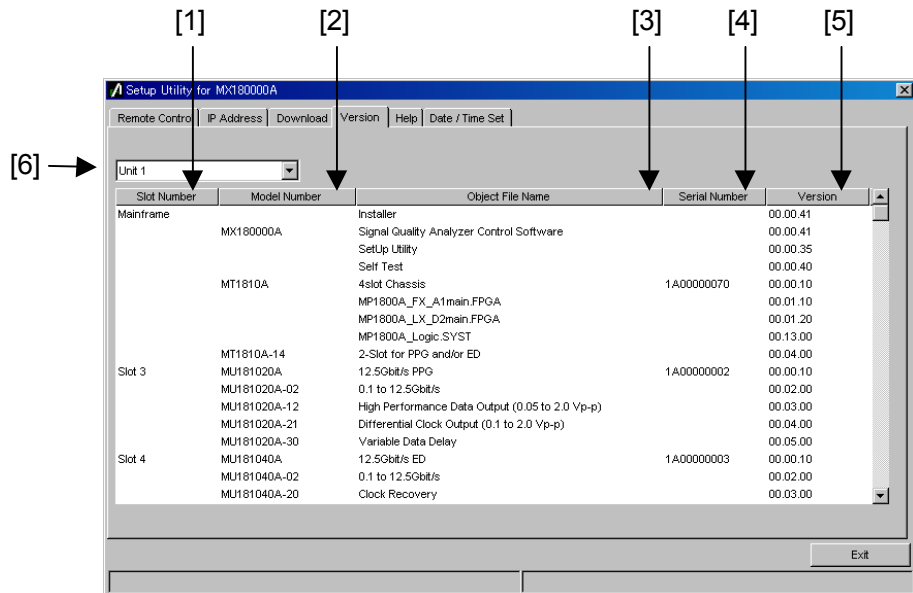


Figure 6.6-1 Version tab window displaying software version information

Table 6.6-1 Items in Version tab window

| No. | Type | Function/operation |
|-----|------------------|--|
| [1] | Slot Number | Displays the slot number where a module is inserted. “Mainframe” is displayed for the mainframe. |
| [2] | Model Number | Displays the model number of the mainframe, modules, and options |
| [3] | Object File Name | Displays the model name of the mainframe, modules, and options |
| [4] | Serial Number | Displays the serial number of the mainframe, modules, and options |
| [5] | Version | Displays the version number of software and FPGA. |
| [6] | Unit1 to 4 | Select a unit number to display the version information. For the MP1800A, it is fixed to Unit1. For the MT1810A, select Unit1 through Unit4 when connecting two or more MT1810A units. |

An object displayed with a yellow background on the Version display screen indicates that its version does not match with the installed one. In this case, update the internal software by referring to Section 5.2 “Updating Software” in the Installation Guide for the MP1800A Signal Quality Analyzer or Section 6.2 “Updating Software” in the Installation Guide for the MT1810A 4-Slot Chassis. Using the MP1800A while the internal software versions mismatch may result in abnormal operation.

6.7 Help Tab Window

- (1) Help display

The version number of MX180000A is displayed in the Help tab window.

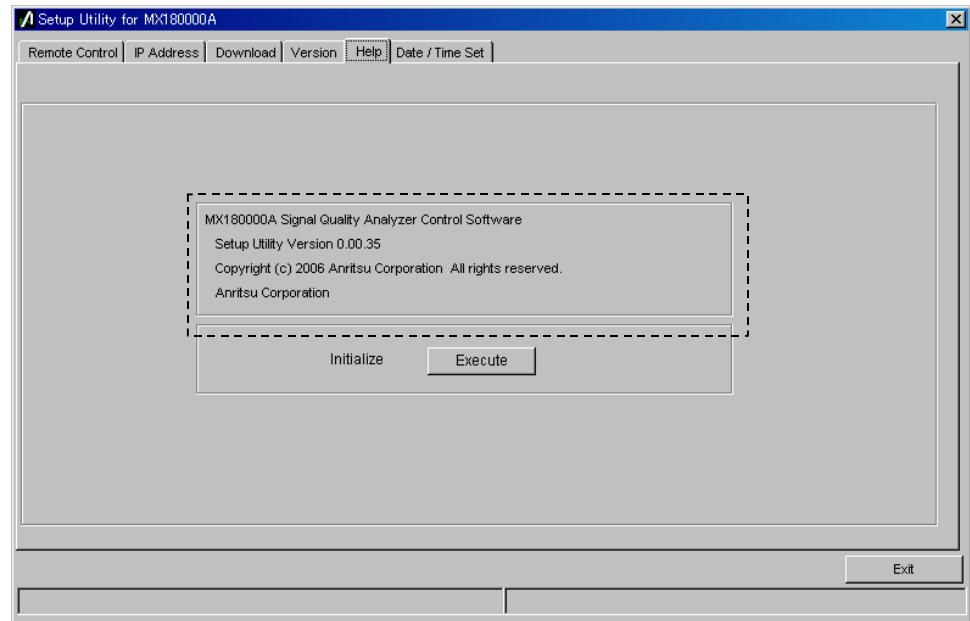


Figure 6.7-1 Displaying software version

(2) Initialization

The settings of all the modules can be initialized from the Help tab window.

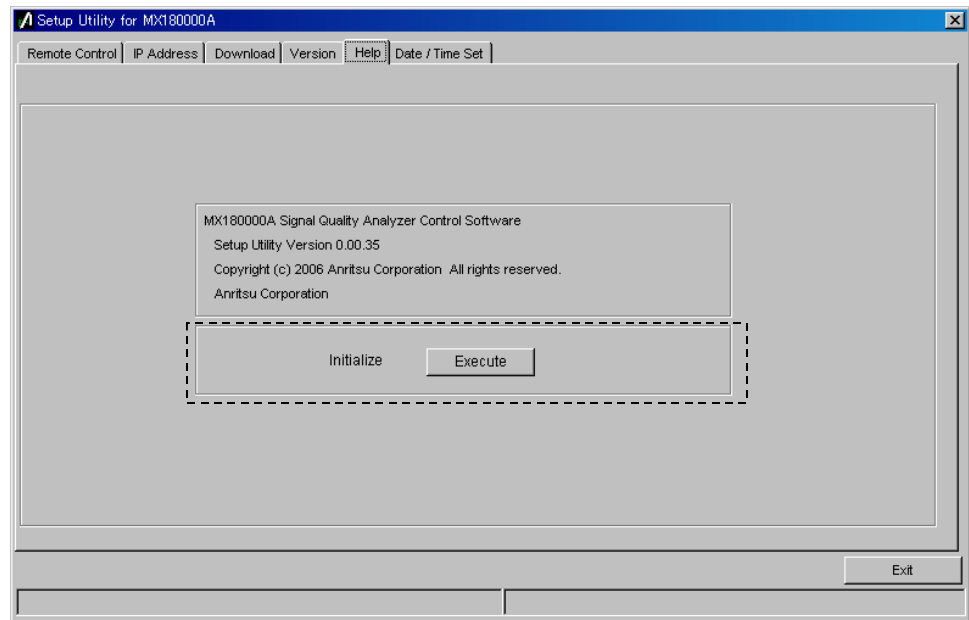


Figure 6.7-2 Initializing settings

Click [Execute] to start initialization.

Note:

The IP address setting is not initialized. The other settings are initialized to the settings at factory shipment.

6.8 Setting Date and Time

Click the Date/Time Set tab on the Setup Utility window to open the Date/Time Set tab window. The date and time settings for Windows® can be set in this tab window.

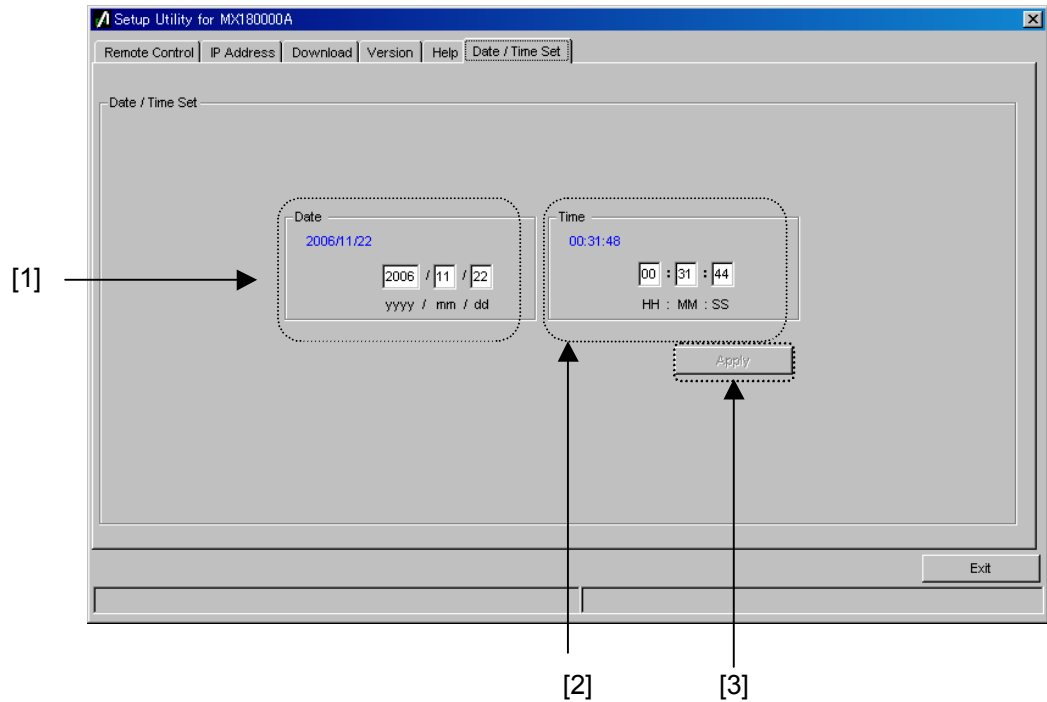


Figure 6.8-1 Date/Time Set tab window

Table 6.8-1 Items in Date/Time Set tab window

| No. | Item | Function/operation |
|-----|-------|--|
| [1] | Date | Set year, month, and day. |
| [2] | Time | Set hours, minutes, and seconds. |
| [3] | Apply | Click this button to update the date and time to the values set in [1] and [2]. The [Apply] button is disabled when the date and time are not set in [1] and [2], respectively. It is enabled and can be clicked when the date and time are set. |

6.9 Adding Options

After purchasing the MP1800A, options of the MP1800A and modules can be added just by entering the option key. Inform Anritsu of your MP1800A serial number when purchasing an option. An “Option Key License Certificate” will be sent to you.

Use Setup Utility to add an option. Select [Setup utility] on the selector screen.



Figure 6.9-1 Selector screen

The Setup Utility login window is displayed. Select [Option] from the Login drop-down list to enable the Option Key input boxes.

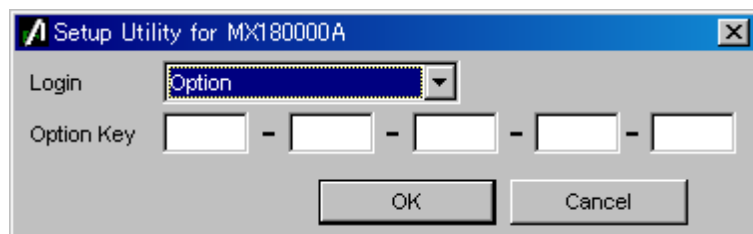


Figure 6.9-2 Entering option key

Enter the key code provided in the “Option Key License Certificate” into the Option Key input boxes. Next, click [OK] to display the option addition screen.

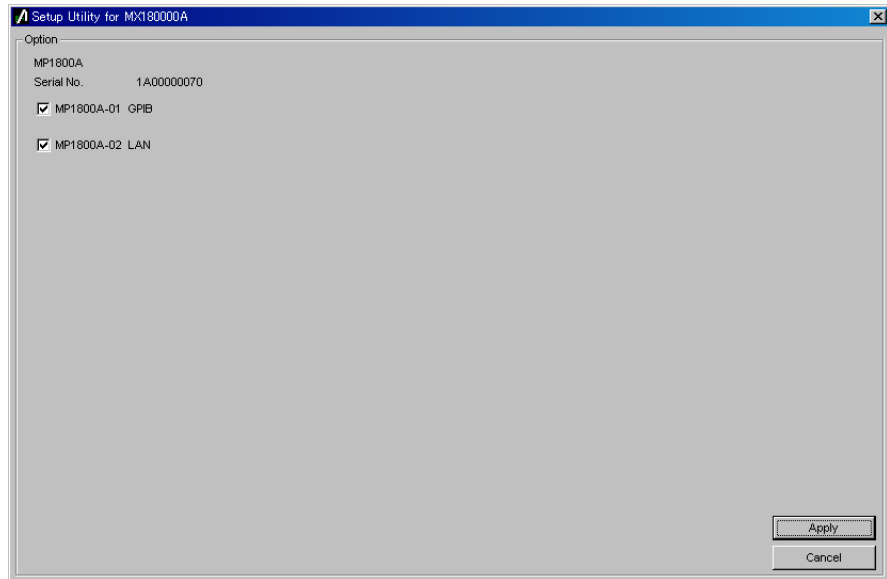


Figure 6.9-3 Option addition screen

A list of options that can be added by the entered key code is displayed. Select the checkbox corresponding to the option to be added, and then click [Apply]. The selected option is then added. To check if the option has been added, use the [Version] tab on the Setup Utility screen.

Clicking [Cancel] closes this screen and the selector screen is displayed again.

Notes:

- The option key can only be used for the mainframe, the serial number for which is shown in the “Option Key License Certificate.”
- The option key provided in the “Option Key License Certificate” includes information about any pre-installed options, in addition to the one to be added. When adding multiple options, only one option key, including information for multiple options, is provided.
- The “Option Key License Certificate” is not provided if an option is purchased together with the mainframe.
- Keep the “Option Key License Certificate” for future support.

Chapter 7 Self-Test

The MT1810A has a self-test function to check if the installed modules operate normally. This chapter describes the self-test procedure.

| | | |
|-----|---|------|
| 7.1 | Overview | 7-2 |
| 7.2 | Starting Self-Test Application | 7-3 |
| 7.3 | MX180000A Self-Test..... | 7-4 |
| | 7.3.1 Self-test application main window | 7-4 |
| | 7.3.2 Test Module Select window..... | 7-5 |
| | 7.3.3 Connection guide..... | 7-12 |
| | 7.3.4 Displaying self-test results..... | 7-14 |
| 7.4 | Error Codes..... | 7-16 |

7.1 Overview

The MP1800A and the MT1810A have a self-test function (self-test application). This function detects module abnormalities.

The self-test application executes a self-test by configuring a combination of modules inserted into the mainframe automatically. A combination of modules can also be user-configured. Note, however, that a self-test cannot be executed for some modules. Refer to 7.3.2.2 “Cases when self-test cannot be executed” for details.

The following table shows modules for self-test.

Table 7.1-1 Modules for Self-test

| Module Code | Module Name |
|--------------------|-----------------------------|
| MU181000A | 12.5 GHz Synthesizer |
| MU181000B | 12.5 GHz 4 port Synthesizer |
| MU181020A | 12.5 Gbit/s PPG |
| MU181020B | 14 Gbit/s PPG |
| MU181040A | 12.5 Gbit/s ED |
| MU181040B | 14 Gbit/s ED |
| MU181600A | Optical Transceiver (XFP) |
| MU181601A | Optical Transceiver (SFP) |
| MU181620A | Stressed Eye Transmitter |
| MU181640A | Optical Receiver |

7.2 Starting Self-Test Application

Be sure to exit the main application before starting the self-test application.

Select [Self test] from the selector screen and press the [Set] key. The self test selector screen is then displayed.

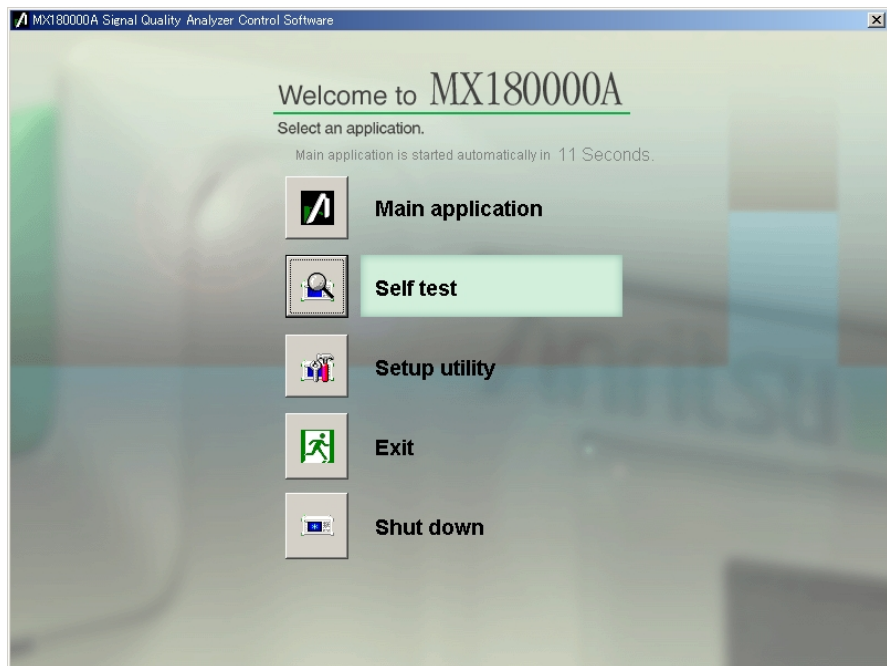


Figure 7.2-1 Starting self-test application

7.3 MX180000A Self-Test

This section presents details on the self-test application windows.

7.3.1 Self-test application main window

Details on the self-test application main window are given below.

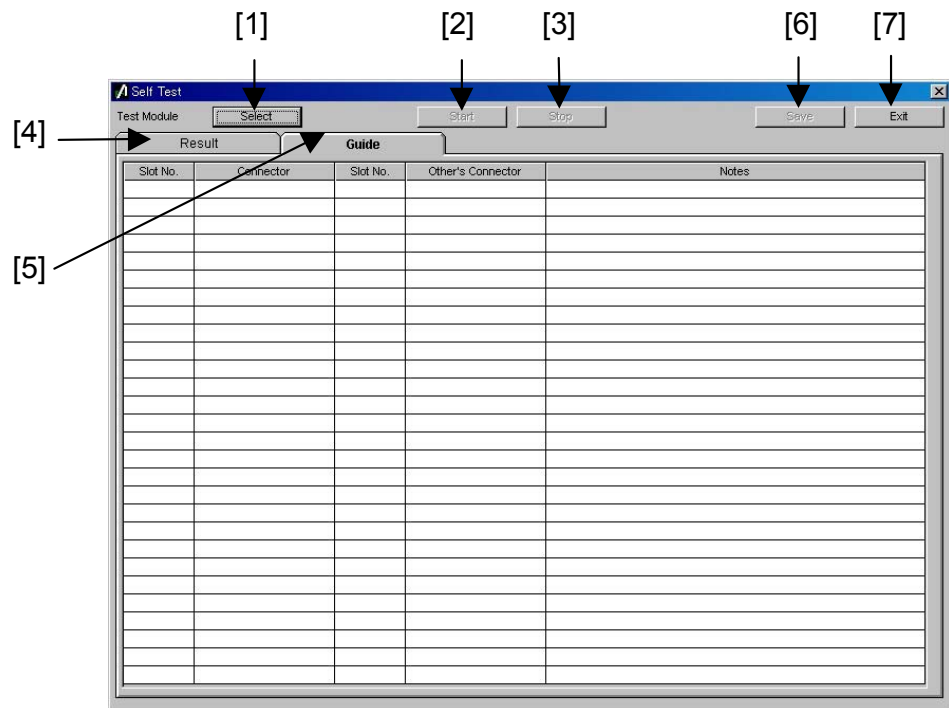


Figure 7.3.1-1 Self-test application main window

Table 7.3.1-1 Items in self-test application main window

| No. | Type | Function/operation |
|-----|------------|--|
| [1] | Select | Click to open the module selection window (Test Module Select) for selecting a module targeted for self-test. |
| [2] | Start | Click to start a self-test. This button is disabled when no module is selected. |
| [3] | Stop | Click to stop the self-test. |
| [4] | Result tab | Displays the self-test results. Nothing is displayed immediately after the self-test application is started up. |
| [5] | Guide tab | Displays the connection guides for the modules targeted for self-test. Nothing is displayed immediately after the self-test application is started up. |
| [6] | Save | Saves the self-test results. Disabled when no test result data exists or during test execution. |
| [7] | Exit | Exits the self-test application and returns to the selftest selector screen. Disabled during test execution. |

7.3.2 Test Module Select window

When [Select] is clicked on the Self-test main screen, the Test Module Select screen shown below is displayed for selecting a self-test target module. In this screen, a combination of modules for which the self-test is executed can be automatically selected by clicking [Auto]. Clicking [OK] closes the Test Module Select screen.

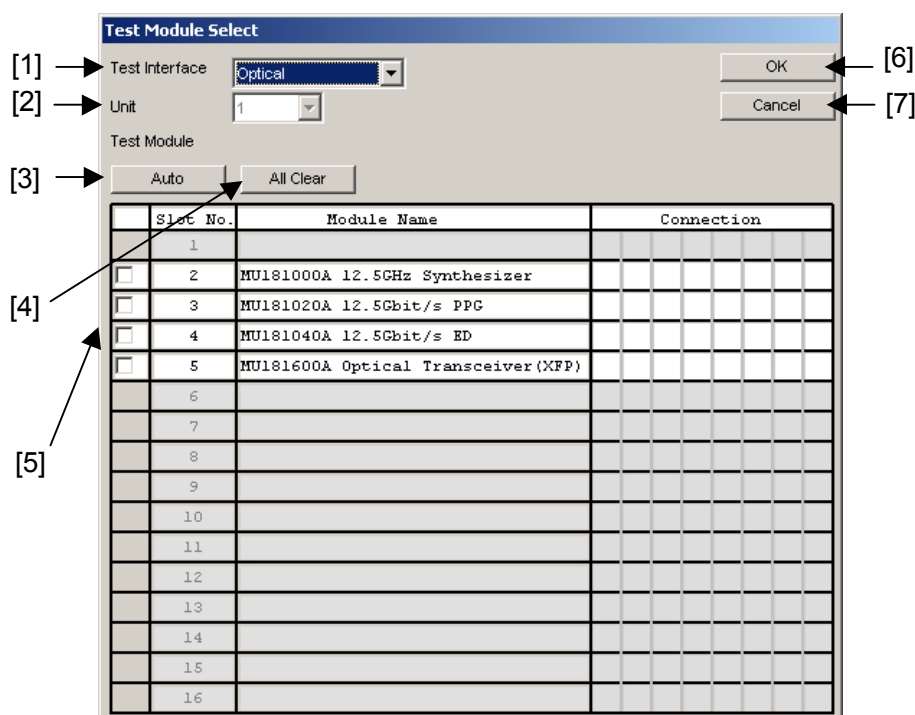


Figure 7.3.2-1 Test Module Select window

Table 7.3.2-1 Items in Test Module Select window

| No. | Type | Function/operation |
|-----|-----------------------------------|---|
| [1] | Test Interface | Sets the self-test interface to [Electrical] or [Optical]. The initial value is [Electrical]. |
| [2] | Unit | Displays the mainframe number (1). |
| [3] | Auto | Automatically selects the combination of modules for which the self-test is executed. |
| [4] | All Clear | Clears selection of all modules. |
| [5] | Test module display for selection | Displays the modules inserted into the mainframe. Select a module to be tested. Combinations of selected modules are also displayed. |
| [6] | OK | Reflects module selection and moves to the self-test main screen. |
| [7] | Cancel | Discards module selection and moves to the self-test main screen. |

7.3.2.1 Selecting module manually

Modules to be tested can be selected manually. The Module Select Guide window is displayed when the checkbox for a target module is selected in the Test module display for selection in the Test Module Select window.

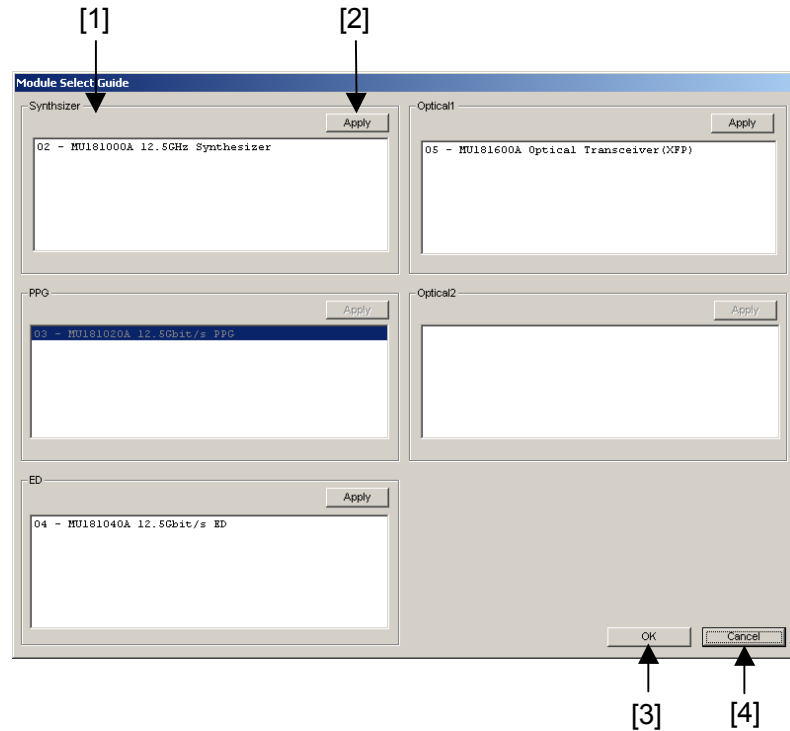


Figure 7.3.2.1-1 Module Select Guide window for selecting modules manually

Table 7.3.2.1-1 Items in Module Select Guide window

| No. | Type | Function/operation |
|-----|------------------------|--|
| [1] | Module category fields | Displays the modules inserted into the mainframe, divided into five category fields according to the module type – Synthesizer, PPG, ED, Optical1 and Optical2. Select a module to be included in a combination from each field. |
| [2] | Apply | Click to determine the selected module. |
| [3] | OK | Click to determine the combination of the modules selected in each field, and return to the Test Module Select window. A message is displayed if an illegal combination is specified. |
| [4] | Cancel | Click to cancel the manual module selection and return to the Test Module Select window. |

■ Manual module selection example

1. An example where the MP1800A has the following module configuration is shown below.

Nos. 1 and 2: synthesizers, No. 3: PPG, No. 4: ED, No. 5: XFP

Test Module Select

Test Interface: OK

Unit: Cancel

Test Module

| Slot No. | Module Name | Connection |
|-------------------------------------|-------------------------------------|------------|
| 1 | | |
| <input checked="" type="checkbox"/> | MU181000A 12.5GHz Synthesizer | |
| <input checked="" type="checkbox"/> | MU181020A 12.5Gbit/s PPG | |
| <input checked="" type="checkbox"/> | MU181040A 12.5Gbit/s ED | |
| <input checked="" type="checkbox"/> | MU181600A Optical Transceiver (XFP) | |
| 6 | | |
| 7 | | |
| 8 | | |
| 9 | | |
| 10 | | |
| 11 | | |
| 12 | | |
| 13 | | |
| 14 | | |
| 15 | | |
| 16 | | |

Figure 7.3.2.1-2 Connection example – 1

- 2. Whether the XFP module in Slot 5 can be selected is determined depending on the selected self-test interface. It can be selected when the test interface is Optical, and cannot be selected when the test interface is Electrical. Select Optical in this example.

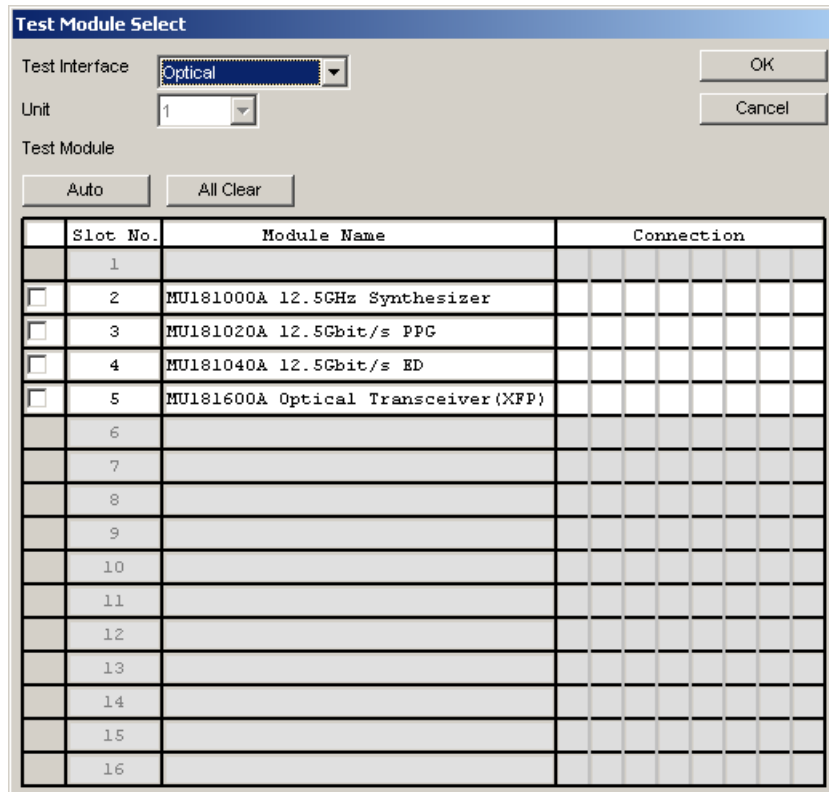


Figure 7.3.2.1-3 Connection example – 2

3. Select the checkbox for Slot 3 PPG module. The Module Select Guide window is displayed.

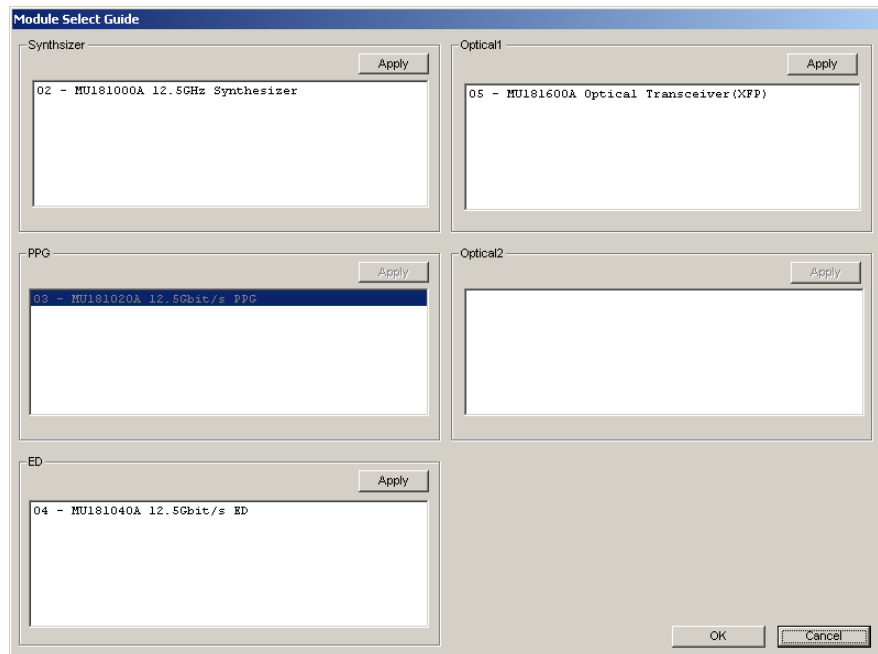


Figure 7.3.2.1-4 Connection example – 3

4. Select a module from each category field and click [Apply].
5. When a module is selected in each category field, click [OK] to close the Module Select Guide window. The Test Module Select window is displayed again, displaying a combination of the modules targeted for self-test.

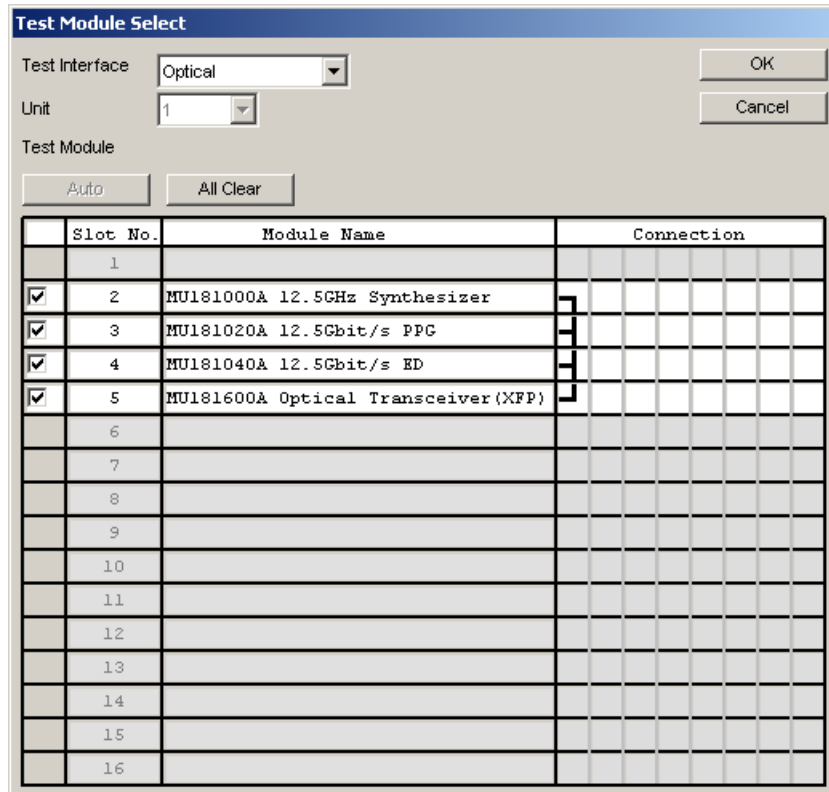


Figure 7.3.2.1-5 Connection example – 4

Note:

For the PPG module, the MU181000A 12.5 GHz Synthesizer and MU181000B 12.5 GHz 4Port Synthesizer can be used in combination with MU181020A-002 0.1 to 12.5 Gbit/s or MU181020B-002 0.1 to 14 Gbit/s, but not with MU181020A-001 9.8 to 12.5 Gbit/s.

7.3.2.2 Cases when self-test cannot be executed

Self-test may not be executed, depending on the conditions of the inserted modules, such as the following:

1. When not more than one set of enabled PPG and ED modules
2. When ED module is MU181040A-002 0.1 to 12.5 Gbit/s or MU181040B-002 0.1 to 14 Gbit/s and MU181040A-x30 Variable Clock Phase or MU181040B-x30 Variable Clock Phase not installed
3. When PPG module is PPG MU181020A-002 0.1 to 12.5 Gbit/s or MU181020B-002 0.1 to 4 Gbit/s and MU181000A 12.5 GHz Synthesizer or MU181000B 12.5 GHz 4-Port Synthesizer not installed
4. When MU181040A-x30 or MU181040B-x30 not installed

7.3.3 Connection guide

The connection guides are displayed in the Guide tab window. Connect the modules, referring to these guides. When the modules are connected completely, click [Start] to start a self-test.

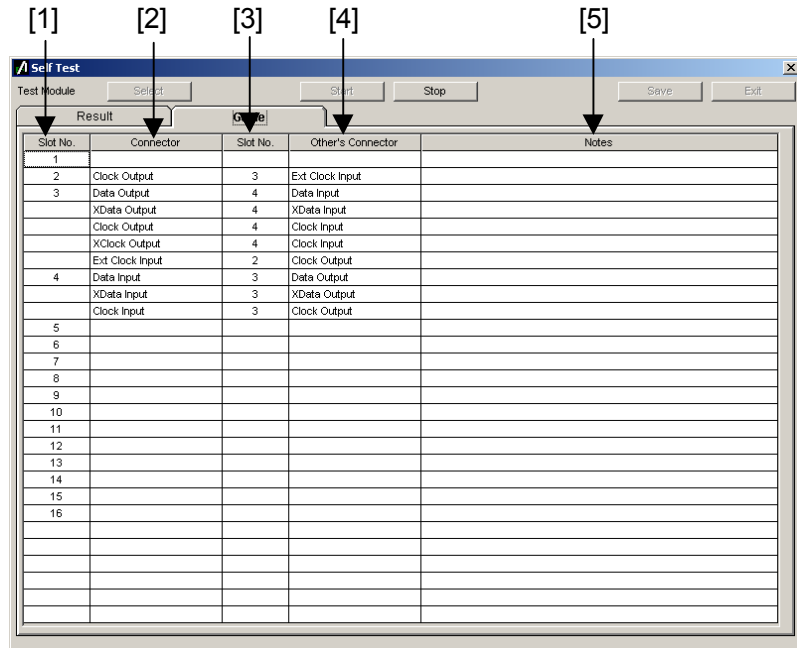


Figure 7.3.3-1 Connection guides in Guide tab window

Table 7.3.3-1 Items in Guide tab window

| No. | Type | Function/operation |
|-----|-------------------|---|
| [1] | Slot No. | Displays the slot numbers of the connection source modules. |
| [2] | Connector | Displays the connector names of the connection source modules. (The connector names are printed on the panel.) |
| [3] | Slot No. | Displays the slot numbers of the connection destination modules. |
| [4] | Other's Connector | Displays the connector names of the connection destination modules. |
| [5] | Note | Displays cautions on connection. Perform connections following the displayed message. A message will also be displayed when connection is not required, according to the options installed. Example: Please Insert 6 dB ATT. |

Notes:

- Modules may be damaged if connected without following the instructions in [5] Note.
- Handle connectors that are not used in a self-test properly, using processes such as termination and open following the description in each module's operation manual.
- In self-tests, optical I/O signals of the MU181600A Optical Transceiver (XFP) and/or MU181601A Optical Transceiver (SFP) should be connected via a loopback connection.

7.3.4 Displaying self-test results

The self-test results are displayed in the Result tab window on the self-test application main window. When the self-test is completed, the self-test results are displayed in the Result tab window. The item is left blank if a self-test is not executed for that item.

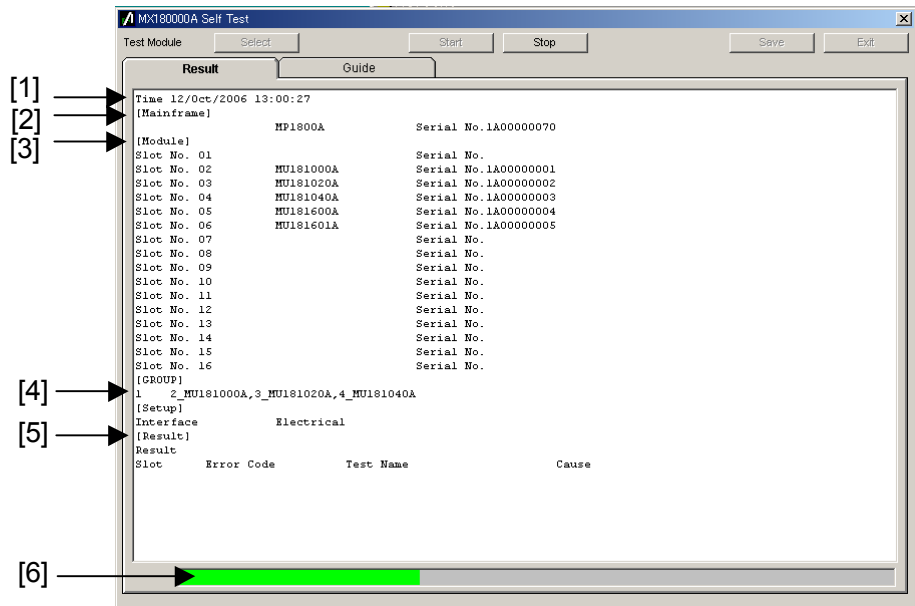


Figure 7.3.4-1 Result tab window

Table 7.3.4-1 Items in Result tab window

| No. | Type | Function/operation |
|------------|-------------|--|
| [1] | Time | Displays the self-test start time. |
| [2] | Mainframe | Displays the model name and serial number of the mainframe. |
| [3] | Module | Displays the slot number, model name, and serial number of the modules inserted into the mainframe. |
| [4] | GROUP | Displays the combination of the modules for which the self-test has been executed. |
| [5] | Result | Displays the self-test results. Pass: Indicates that no error has occurred for all the self-test items. Fail: Indicates that an error has occurred for any self-test item(s). Abort: Indicates that the Stop button is clicked during self-test execution and the self-test is stopped. |
| | Slot | Displays the slot number. |
| | Error Code | Displays the error code for each self-test item. The error codes are displayed regardless of whether an error occurs. See Section 7.4 “Error Codes” for details. |
| | Test Name | Displays the self-test item names. See Section 7.4 “Error Codes” for details. |
| | Cause | Displays the cause of the error if it occurs, for each self-test item. |
| [6] | – | Displays the self-test progress state. |

7.4 Error Codes

This section describes the error code format.

The error code is output as the result code for each self-test item.

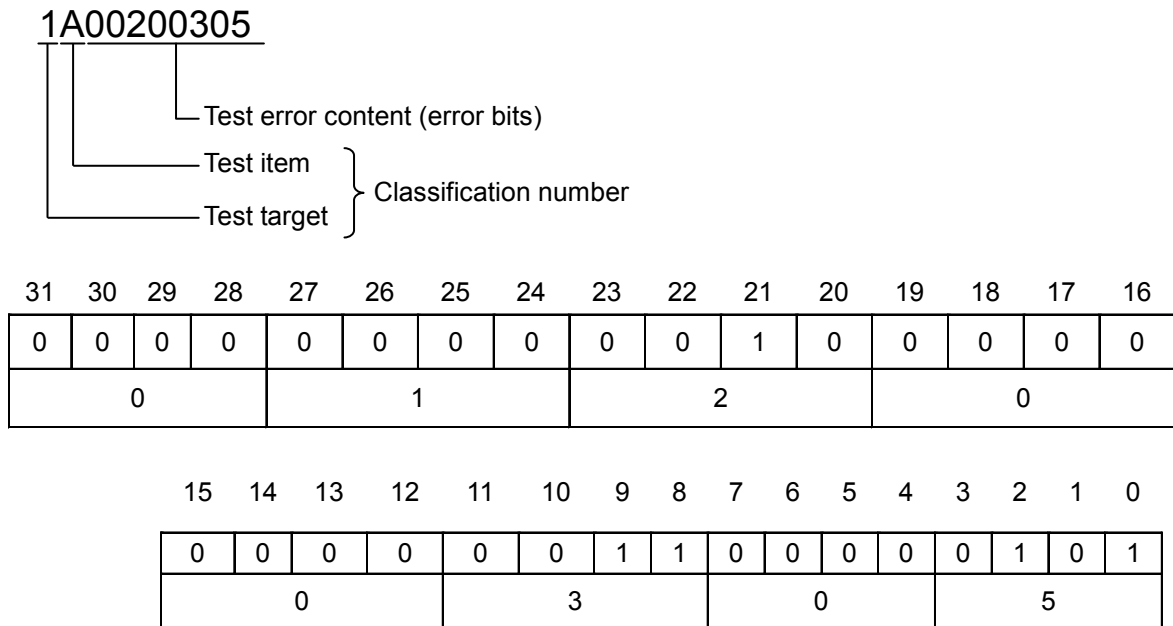


Table 7.4-1 Error code format

| Item | Description |
|--------------------|---|
| Test target | Indicates the self-test target by a number as follows. The error occurrence source is determined from this number and the self-test item (classification number). 0: MU181000A, MU181000B 1: MU181020A, MU181020B 2: MU181040A, MU181040B 3: MU181020A, MU181020B, MU181040A, MU181040B 4: MU181600A, MU181601A 5: MU181620A, MU181640A |
| Test item | Indicates a self-test item. The error occurrence source is determined from the self-test item and the test target (classification number). |
| Test error content | Indicates details on the errors. It is displayed in a 32-bit numeric value, and output in hexadecimal format. |

■ Error code list

Table 7.4-2 lists the error codes for each test item.

Table 7.4-2 Error codes

| Classification Number | Test Error Content (Error Bits) | Self-Test Item | No. of Items |
|-----------------------|---------------------------------|--|--------------|
| 0A | b0 to b23 | Frequency output test (Frequency Test) | 24 |
| 0B | b0 to b23 | Frequency range test (Frequency Coverage) | 24 |
| 1A | b0 to b2 | Internal synthesizer operation test (Frequency Test) | 3 |
| 1B | b0 to b2 | Internal synthesizer frequency range test (Frequency Coverage) | 3 |
| 3A | b0 | Clock output test (Clock Output) | 1 |
| 3B | b0 to b1 | Data output test (Data Output) | 1 |
| 3C | b0 | Pattern output test (Pattern Test) | 1 |
| 3D | b0 to b17 | Amplitude and offset variable test (Data Amplitude) | 18 |
| 1B | b0 to b2 | Data delay test (Data Delay) | 3 |
| 2A | b0 to b2 | Clock delay test (Clock Delay) | 3 |
| 2B | b0 to b21 | Clock recovery test (Clock Recovery) | 11 |
| 4A | b0 | XFP/SFP module recognition test (Module Recognition) | 1 |
| 4B | b0 | XFP/SFP laser emission test (Output Test) | 1 |
| 4C | b0 to b1 | XFP/SFP module operation test (Module Operation) | 1 |
| 5A | b0 to b5 | Optical output power test (Optical Power) | 6 |
| 5B | b0 to b7 | Wavelength/route changing operation test (Wavelength/Route Change) | 8 |

Table 7.4-3 Details on test error content of frequency output test

| Error Bits | Test Error Content Details | Value | |
|------------|---|-------|------|
| | | Pass | Fail |
| b0 | Tests whether a PLL Unlock error occurs when the frequency is set to 100,000 kHz. | 0 | 1 |
| b1 | Tests whether the frequency measurement result falls within 100,000 kHz \pm 10 ppm. | 0 | 1 |
| b2 | Tests whether a PLL Unlock error occurs when the frequency is set to 200,000 kHz. | 0 | 1 |
| b3 | Tests whether the frequency measurement result falls within 200,000 kHz \pm 10 ppm. | 0 | 1 |
| b4 | Tests whether a PLL Unlock error occurs when the frequency is set to 400,000 kHz. | 0 | 1 |
| b5 | Tests whether the frequency measurement result falls within 400,000 kHz \pm 10 ppm. | 0 | 1 |
| b6 | Tests whether a PLL Unlock error occurs when the frequency is set to 800,000 kHz. | 0 | 1 |
| b7 | Tests whether the frequency measurement result falls within 800,000 kHz \pm 10 ppm. | 0 | 1 |

Table 7.4-3 Details on test error content of frequency output test (Cont'd)

| Error Bits | Test Error Content Details | Value | |
|------------|--|-------|------|
| | | Pass | Fail |
| b8 | Tests whether a PLL Unlock error occurs when the frequency is set to 1,600,000 kHz. | 0 | 1 |
| b9 | Tests whether the frequency measurement result falls within 1,600,000 kHz \pm 10 ppm. | 0 | 1 |
| b10 | Tests whether a PLL Unlock error occurs when the frequency is set to 1,875,000 kHz. | 0 | 1 |
| b11 | Tests whether the frequency measurement result falls within 1,875,000 kHz \pm 10 ppm. | 0 | 1 |
| b12 | Tests whether a PLL Unlock error occurs when the frequency is set to 2,650,000 kHz. | 0 | 1 |
| b13 | Tests whether the frequency measurement result falls within 2,650,000 kHz \pm 10 ppm. | 0 | 1 |
| b14 | Tests whether a PLL Unlock error occurs when the frequency is set to 3,200,000 kHz. | 0 | 1 |
| b15 | Tests whether the frequency measurement result falls within 3,200,000 kHz \pm 10 ppm. | 0 | 1 |
| b16 | Tests whether a PLL Unlock error occurs when the frequency is set to 5,300,000 kHz. | 0 | 1 |
| b17 | Tests whether the frequency measurement result falls within 5,300,000 kHz \pm 10 ppm. | 0 | 1 |
| b18 | Tests whether a PLL Unlock error occurs when the frequency is set to 6,400,000 kHz. | 0 | 1 |
| b19 | Tests whether the frequency measurement result falls within 6,400,000 kHz \pm 10 ppm. | 0 | 1 |
| b20 | Tests whether a PLL Unlock error occurs when the frequency is set to 10,000,000 kHz. | 0 | 1 |
| b21 | Tests whether the frequency measurement result falls within 10,000,000 kHz \pm 10 ppm. | 0 | 1 |
| b22 | Tests whether a PLL Unlock error occurs when the frequency is set to 12,500,000 kHz. | 0 | 1 |
| b23 | Tests whether the frequency measurement result falls within 12,500,000 kHz \pm 10 ppm. | 0 | 1 |

Table 7.4-4 Details on test error content of frequency range test

| Error Bits | Test Error Content Details | Value | |
|------------|--|-------|------|
| | | Pass | Fail |
| b0 | Tests whether Auto Search is executed when the frequency is set to 100000 kHz. | 0 | 1 |
| b1 | Tests whether no error occurs when the frequency is set to 100000 kHz. | 0 | 1 |
| b2 | Tests whether Auto Search is executed when the frequency is set to 200000 kHz. | 0 | 1 |
| b3 | Tests whether no error occurs when the frequency is set to 200000 kHz. | 0 | 1 |
| b4 | Tests whether Auto Search is executed when the frequency is set to 400000 kHz. | 0 | 1 |
| b5 | Tests whether no error occurs when the frequency is set to 400000 kHz. | 0 | 1 |
| b6 | Tests whether Auto Search is executed when the frequency is set to 800000 kHz. | 0 | 1 |
| b7 | Tests whether no error occurs when the frequency is set to 800000 kHz. | 0 | 1 |
| b8 | Tests whether Auto Search is executed when the frequency is set to 1600000 kHz. | 0 | 1 |
| b9 | Tests whether no error occurs when the frequency is set to 1600000 kHz. | 0 | 1 |
| b10 | Tests whether Auto Search is executed when the frequency is set to 1875000 kHz. | 0 | 1 |
| b11 | Tests whether no error occurs when the frequency is set to 1875000 kHz. | 0 | 1 |
| b12 | Tests whether Auto Search is executed when the frequency is set to 2650000 kHz. | 0 | 1 |
| b13 | Tests whether no error occurs when the frequency is set to 2650000 kHz. | 0 | 1 |
| b14 | Tests whether Auto Search is executed when the frequency is set to 3200000 kHz. | 0 | 1 |
| b15 | Tests whether no error occurs when the frequency is set to 3200000 kHz. | 0 | 1 |
| b16 | Tests whether Auto Search is executed when the frequency is set to 5300000 kHz. | 0 | 1 |
| b17 | Tests whether no error occurs when the frequency is set to 5300000 kHz. | 0 | 1 |
| b18 | Tests whether Auto Search is executed when the frequency is set to 6400000 kHz. | 0 | 1 |
| b19 | Tests whether no error occurs when the frequency is set to 6400000 kHz. | 0 | 1 |
| b20 | Tests whether Auto Search is executed when the frequency is set to 10000000 kHz. | 0 | 1 |
| b21 | Tests whether no error occurs when the frequency is set to 10000000 kHz. | 0 | 1 |

Table 7.4-4 Details on test error content of frequency range test (Cont'd)

| Error Bits | Test Error Content Details | Value | |
|------------|--|-------|------|
| | | Pass | Fail |
| b22 | Tests whether Auto Search is executed when the frequency is set to 12500000 kHz. | 0 | 1 |
| b23 | Tests whether no error occurs when the frequency is set to 12500000 kHz. | 0 | 1 |

Table 7.4-5 Details on test error content of internal synthesizer operation test

| Error Bits | Test Error Content Details | Value | |
|------------|--|-------|------|
| | | Pass | Fail |
| b0 | Tests whether the frequency measurement result falls within 9,900,000 kHz \pm 10 ppm. | 0 | 1 |
| b1 | Tests whether the frequency measurement result falls within 10,700,000 kHz \pm 10 ppm. | 0 | 1 |
| b2 | Tests whether the frequency measurement result falls within 12,000,000 kHz \pm 10 ppm. | 0 | 1 |

Table 7.4-6 Details on test error content of internal synthesizer frequency range test

| Error Bits | Test Error Content Details | Value | |
|------------|--|-------|------|
| | | Pass | Fail |
| b0 | Tests whether no error occurs when the frequency is set to 9900000 kHz. | 0 | 1 |
| b1 | Tests whether no error occurs when the frequency is set to 10700000 kHz. | 0 | 1 |
| b2 | Tests whether no error occurs when the frequency is set to 12000000 kHz. | 0 | 1 |

Table 7.4-7 Details on test error content of clock output test

| Error Bit | Test Error Content Details | Value | |
|-----------|---|-------|------|
| | | Pass | Fail |
| b0 | Tests whether a clock loss error is detected and recovered by the ED module when the clock output of the PPG module is turned on and off. | 0 | 1 |

Table 7.4-8 Details on test error content of data output test

| Error Bit | Test Error Content Details | Value | |
|-----------|---|-------|------|
| | | Pass | Fail |
| b0 | Tests whether Auto Search is executed. | 0 | 1 |
| b1 | Tests whether a sync loss (CR Unlock) error is detected and recovered by the ED module when the Data/XData output of the PPG module is turned on and off. | 0 | 1 |

Table 7.4-9 Details on test error content of pattern output test

| Error Bit | Test Error Content Details | Value | |
|-----------|--|-------|------|
| | | Pass | Fail |
| b0 | Tests whether no error is detected by the ED module with the set Data pattern. | 0 | 1 |

Table 7.4-10 Details on test error content of amplitude and offset variable test

| Error Bits | Test Error Content Details | Value | |
|------------|--|-------|------|
| | | Pass | Fail |
| b0 | Tests whether Auto Search is executed with the maximum amplitude and the maximum offset. | 0 | 1 |
| b1 | Tests whether no error occurs. | 0 | 1 |
| b2 | Tests whether the data threshold of the ED modules falls within the specified range. | 0 | 1 |
| b3 | Tests whether the result of the threshold margin measurement falls within the specified range. | 0 | 1 |
| b4 | Tests whether Auto Search is executed with the maximum amplitude and the minimum offset. | 0 | 1 |
| b5 | Tests whether no error occurs. | 0 | 1 |
| b6 | Tests whether the data threshold of the ED modules falls within the specified range. | 0 | 1 |
| b7 | Tests whether the result of the threshold margin measurement falls within the specified range. | 0 | 1 |
| b8 | Tests whether Auto Search is executed with the maximum amplitude and the offset of 0 Vth. | 0 | 1 |
| b9 | Tests whether no error occurs. | 0 | 1 |
| b10 | Tests whether the data threshold of the ED modules falls within the specified range. | 0 | 1 |
| b11 | Tests whether the result of the threshold margin measurement falls within the specified range. | 0 | 1 |
| b12 | Tests whether Auto Search is executed with the minimum amplitude and the maximum offset. | 0 | 1 |
| b13 | Tests whether no error occurs. | 0 | 1 |
| b14 | Tests whether the data threshold of the ED modules falls within the specified range. | 0 | 1 |

Table 7.4-10 Details on test error content of amplitude and offset variable test (Cont'd)

| Error Bits | Test Error Content Details | Value | |
|------------|--|-------|------|
| | | Pass | Fail |
| b15 | Tests whether the result of the threshold margin measurement falls within the specified range. | 0 | 1 |
| b16 | Tests whether Auto Search is executed with the minimum amplitude and the minimum offset. | 0 | 1 |
| b17 | Tests whether no error occurs. | 0 | 1 |
| b18 | Tests whether the data threshold of the ED modules falls within the specified range. | 0 | 1 |
| b19 | Tests whether the result of the threshold margin measurement falls within the specified range. | 0 | 1 |
| b20 | Tests whether Auto Search is executed with the minimum amplitude and the offset of 0. | 0 | 1 |
| b21 | Tests whether no error occurs. | 0 | 1 |
| b22 | Tests whether the data threshold of the ED modules falls within the specified range. | 0 | 1 |
| b23 | Tests whether the result of the threshold margin measurement falls within the specified range. | 0 | 1 |

Table 7.4-11 Details on test error content of data delay test

| Error Bit | Test Error Content Details | Value | |
|-----------|--|-------|------|
| | | Pass | Fail |
| b0 | Tests whether the busy state is released when the data delay of the PPG module is changed from 0 mUI to -1000 mUI. | 0 | 1 |
| b1 | Tests whether the busy state is released when the data delay of the PPG module is changed from -1000 mUI to +1000 mUI. | 0 | 1 |
| b2 | Tests whether the busy state is released when the data delay of the PPG module is changed from +1000 mUI to 0 mUI. | 0 | 1 |

Table 7.4-12 Details on test error content of clock delay test

| Error Bit | Test Error Content Details | Value | |
|-----------|--|-------|------|
| | | Pass | Fail |
| b0 | Tests whether the busy state is released when the clock delay of the ED module is changed from 0 mUI to -1000 mUI. | 0 | 1 |
| b1 | Tests whether the busy state is released when the clock delay of the ED module is changed from -1000 mUI to +1000 mUI. | 0 | 1 |
| b2 | Tests whether the busy state is released when the clock delay of the ED module is changed from +1000 mUI to 0 mUI. | 0 | 1 |

Table 7.4-13 Details on test error content of clock recovery test

| Error Bits | Test Error Content Details | Value | |
|------------|--|-------|------|
| | | Pass | Fail |
| b0 | Tests whether Auto Search is executed when the recovery clock is used with bit rate 12.5 Gbit/s. | 0 | 1 |
| b1 | Tests whether no error occurs when the recovery clock is used with bit rate 12.5 Gbit/s. | 0 | 1 |
| b2 | Tests whether Auto Search is executed when the recovery clock is used with bit rate 11.898 Gbit/s. | 0 | 1 |
| b3 | Tests whether no error occurs when the recovery clock is used with bit rate 11.898 Gbit/s. | 0 | 1 |
| b4 | Tests whether Auto Search is executed when the recovery clock is used with bit rate 11.198 Gbit/s. | 0 | 1 |
| b5 | Tests whether no error occurs when the recovery clock is used with bit rate 11.198 Gbit/s. | 0 | 1 |
| b6 | Tests whether Auto Search is executed when the recovery clock is used with bit rate 10.498 Gbit/s. | 0 | 1 |
| b7 | Tests whether no error occurs when the recovery clock is used with bit rate 10.498 Gbit/s. | 0 | 1 |
| b8 | Tests whether Auto Search is executed when the recovery clock is used with bit rate 4.25 Gbit/s. | 0 | 1 |
| b9 | Tests whether no error occurs when the recovery clock is used with bit rate 4.25 Gbit/s. | 0 | 1 |
| b10 | Tests whether Auto Search is executed when the recovery clock is used with bit rate 3.2 Gbit/s. | 0 | 1 |
| b11 | Tests whether no error occurs when the recovery clock is used with bit rate 3.2 Gbit/s. | 0 | 1 |
| b12 | Tests whether Auto Search is executed when the recovery clock is used with bit rate 3 Gbit/s. | 0 | 1 |
| b13 | Tests whether no error occurs when the recovery clock is used with bit rate 3 Gbit/s. | 0 | 1 |
| b14 | Tests whether Auto Search is executed when the recovery clock is used with bit rate 2.75 Gbit/s. | 0 | 1 |
| b15 | Tests whether no error occurs when the recovery clock is used with bit rate 2.75 Gbit/s. | 0 | 1 |
| b16 | Tests whether Auto Search is executed when the recovery clock is used with bit rate 2.5 Gbit/s. | 0 | 1 |
| b17 | Tests whether no error occurs when the recovery clock is used with bit rate 2.5 Gbit/s. | 0 | 1 |
| b18 | Tests whether Auto Search is executed when the recovery clock is used with bit rate 2.25 Gbit/s. | 0 | 1 |
| b19 | Tests whether no error occurs when the recovery clock is used with bit rate 2.25 Gbit/s. | 0 | 1 |
| b20 | Tests whether Auto Search is executed when the recovery clock is used with bit rate 2 Gbit/s. | 0 | 1 |
| b21 | Tests whether no error occurs when the recovery clock is used with bit rate 2 Gbit/s. | 0 | 1 |

Table 7.4-14 Details on test error content of XFP/SFP module recognition test

| Error Bit | Test Error Content Details | Value | |
|-----------|---|-------|------|
| | | Pass | Fail |
| b0 | Tests whether the XFP/SFP module is recognized and is in the ready state. | 0 | 1 |

Table 7.4-15 Details on test error content of XFP/SFP laser emission test

| Error Bit | Test Error Content Details | Value | |
|-----------|---|-------|------|
| | | Pass | Fail |
| b0 | Tests whether the LOS is canceled when the output is looped back by the XFP/SFP module and the Optical Output is set to ON. | 0 | 1 |

Table 7.4-16 Details on test error content of XFP/SFP module operation test

| Error Bit | Test Error Content Details | Value | |
|-----------|---|-------|------|
| | | Pass | Fail |
| b0 | Tests whether Auto Search is executed when the output is looped back by the XFP/SFP module. | 0 | 1 |
| b1 | Tests whether no error occurs when the output is looped back by the XFP/SFP module. | 0 | 1 |

Table 7.4-17 Details on test error content of Optical Power test

| Error Bit | Test Error Content Details | Value | |
|-----------|--|-------|------|
| | | Pass | Fail |
| b0 | Outputs an optical signal of -4.0 dBm with a wavelength of 1310 nm, and measures the optical output power by using the MU181620A to test whether the measured power falls within -4.0 ± 3.0 dBm. | 0 | 1 |
| b1 | Outputs an optical signal of -10.0 dBm with a wavelength of 1310 nm, and measures the optical output power by using the MU181620A to test whether the measured power falls within -10.0 ± 3.0 dBm. | 0 | 1 |
| b2 | Outputs an optical signal of -15.0 dBm with a wavelength of 1310 nm, and measures the optical output power by using the MU181620A to test whether the measured power falls within -15.0 ± 3.0 dBm. | 0 | 1 |
| b3 | Outputs an optical signal of -2.0 dBm with a wavelength of 1550 nm, and measures the optical output power by using the MU181620A to test whether the measured power falls within -2.0 ± 3.0 dBm. | 0 | 1 |
| b4 | Outputs an optical signal of -10.0 dBm with a wavelength of 1550 nm, and measures the optical output power by using the MU181620A to test whether the measured power falls within -10.0 ± 3.0 dBm. | 0 | 1 |

Table 7.4-17 Details on test error content of Optical Power test (Cont'd)

| Error Bit | Test Error Content Details | Value | |
|-----------|---|-------|------|
| | | Pass | Fail |
| b5 | Outputs an optical signal of -15.0 dBm with a wavelength of 1550 nm, and measures the optical output power by using the MU181620A to test whether the measured power falls within -15.0 ±3.0 dBm. | 0 | 1 |

Table 7.4-18 Details on test error content of Wavelength/Route Change test

| Error Bit | Test Error Content Details | Value | |
|-----------|---|-------|------|
| | | Pass | Fail |
| b0 | Tests whether AutoSearch is completed successfully with a wavelength of 1310 nm and Reference as the test type. | 0 | 1 |
| b1 | Tests whether there is no error with a wavelength of 1310 nm and Reference as the test type. | 0 | 1 |
| b2 | Tests whether AutoSearch is completed successfully with a wavelength of 1550 nm and Reference as the test type. | 0 | 1 |
| b3 | Tests whether there is no error with a wavelength of 1550 nm and Reference as the test type. | 0 | 1 |
| b4 | Tests whether AutoSearch is completed successfully with a wavelength of 1310 nm and StressedEye as the test type. | 0 | 1 |
| b5 | Tests whether there is no error with a wavelength of 1310 nm and StressedEye as the test type. | 0 | 1 |
| b6 | Tests whether AutoSearch is completed successfully with a wavelength of 1550 nm and StressedEye as the test type. | 0 | 1 |
| b7 | Tests whether there is no error with a wavelength of 1550 nm and StressedEye as the test type. | 0 | 1 |