MP1632A
Digital Data Analyzer
Operation Manual

Eighth Edition

Read this manual before using the equipment.
Keep this manual with the equipment

Measuring Instruments Division
Measurement Group
ANRITSU CORPORATION

Document No. : M-W1360AE-8.0
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. Insure that you clearly understand the meanings of the symbols BEFORE using the equipment.

(Some or all of the following symbols may not be used on all Anritsu equipment. In addition, there may be other labels attached to products which are not shown in the diagrams in this manual.)

Safety Symbols Used in Manual

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

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

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

Safety Symbols Used on Equipment and/or in Manual

The following safety symbols are used inside or on the equipment near operation location, and/or in manual to provide information about safety items and operation precautions. Insure 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 in or near the circle.

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

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

This indicates that the marked part should be recycled.

MP1632A
Digital Data Analyzer
Operation Manual

20 August 1998 (First Edition)
12 May 2000 (Eighth Edition)

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The contents of this manual may be changed without prior notice.
Printed in Japan
For Safety

WARNING !

1. ALWAYS refer to the operation manual when working near location at which the alert mark shown on the left is attached. If the operation, etc., is performed without heeding the advice in the operation manual, there is a risk of personal injury. In addition, the equipment performance may be reduced. Moreover, this alert mark is sometimes used with other marks and descriptions indicating other dangerous.

2. When supplying power to this equipment, connect the accessory 3-pin power cord to a 3-pin grounded power outlet. If a grounded 3-pin outlet is not available, before supplying power to the equipment, use a conversion adapter and ground the green wire, or connect the frame ground on the rear panel of the equipment to ground. If power is supplied without grounding the equipment, there is a risk of receiving a severe or fatal electric shock.

3. This equipment cannot be repaired by the user. DO NOT attempt to open the cabinet or to disassemble internal parts. Only Anritsu-trained service personnel or staff from your sales representative with a knowledge of electrical fire and shock hazards should service this equipment. These are high-voltage parts in this equipment presenting a risk of severe injury or fatal electric shock to untrained personnel. In addition, there is a risk of damage to precision parts.
For Safety

**WARNING △**

4. This equipment should be used in the correct position. If the cabinet is turned on its side, etc., it will be unstable and may be damaged if it falls over as a result of receiving a slight mechanical shock.

5. The instrument uses a Liquid Crystal Display (LCD); DO NOT subject the instrument to excessive force or drop it. If the LCD is subjected to strong mechanical shock, it may brake and liquid may leak.

   This liquid is very caustic and poisonous.
   DO NOT touch it, ingest it, or get in your eyes. If it is ingested accidentally, spit it out immediately, rinse your mouth with water and seek medical help. If it enters your eyes accidentally, do not rub your eyes, irrigate them with clean running water and seek medical help. If the liquid gets on your skin or clothes, wash it off carefully and thoroughly.
For Safety

CAUTION ⚠️

1. Before changing the fuses, ALWAYS remove the power cord from the power outlet and replace the blown fuses. ALWAYS use new fuses of the type and rating specified on the fuse marking on the rear panel of cabinet.

   T__A indicates a time-lag fuse.
   _A or F__A indicate a normal fusing type fuse.

   There is risk of receiving a fatal electric shock if the fuses are replaced with the power cord connected.

2. Keep the power supply and cooling fan free of dust.
   • Clean the power inlet regularly. If dust accumulates around the power pin, there is a risk of fire.
   • Keep the cooling fan clean so that the ventilation holes are not obstructed. If the ventilation is obstructed, the cabinet may overheat and catch fire.

3. Use two or more people to lift and move this equipment, or use a trolley. There is a risk of back injury, if this equipment is lifted by one person.
For Safety

CAUTION

Changing memory back-up battery

This equipment uses a lithium battery to back-up the memory. This battery must be replaced by a service engineer when it has reached the end of its useful life; contact the Anritsu sales section or your nearest representative.

Remark: The battery limits approximately 7 years after purchasing date. Advance change is preferable.

This equipment uses HDD and FDD as external media for storing data and programs.

If this media is mishandled, important data may be lost. To prevent this chance occurrence, all important data and program should be back-up.

Storage media

Anritsu will not be held responsible for lost data

Pay careful attention to the following points.

● Never turn off the power, while the HDD is being accessed.
● Never add the equipment vibration or shock to avoid crush in the HDD.
● Never remove the FD from the FDD, while it is being accessed.
● Clean head of floppy disk drive with 3.5 inch head cleaning disk set regularly.
Equipment Certificate

Anritsu Corporation certifies that this equipment was tested before shipment using calibrated measuring instruments with direct traceability to public testing organizations recognized by national research laboratories including the Electrotechnical Laboratory, National Research Laboratory and the Communication Research Laboratory, and was found to meet the published specification.

Anritsu Warranty

Anritsu Corporation will repair this equipment free-of-charge if malfunction occurs within 1 year after shipment due to manufacturing fault, provided that this warranty is rendered void under any or all of following condition.

- The fault is outside the scope of the warranty conditions described in operation manual.
- The fault is due to mishandling, misuse, or unauthorized modification or repair of the equipment by customer.
- The fault is due to severe usage clearly exceeding normal usage.
- The fault is due to improper or insufficient maintenance by customer.
- The fault is due to natural disaster including fire, flooding, earthquake, etc.
- The fault is due to use of non-specified peripheral equipment, peripheral parts, consumables, etc.
- The fault is due to use of non-specified power supply or in a non-specified installation location.

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

Anritsu Corporation will not accept liability for faults due to unforeseen and unusual circumstances, nor faults due to mishandling by the customer.

Anritsu Corporation Contact

If this equipment develops a faults, contact Anritsu Corporation or its representatives at the address in this manual.
Trademark

Microsoft, MS-DOS, Windows is registered trademark of Microsoft Corporation US in US and other countries.

Waste disposal

This equipment uses a lithium battery. Check with your local solid waste officials for details in your area for proper disposal.
Software License Agreement

Please read this Software License Agreement before using the software (hereafter this software) which is installed in MP1632A Digital Data Analyzer (hereafter MP1632A) and which is provided by attached FD.

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CE Marking

Anritsu affix the CE Conformity Marking on the following product(s) accordance with the Council Directive 93/68/EEC to indicate that they conform with the EMC directive of the European Union (EU).

CE Conformity Marking

1. Product Name/Model Name
   Product Name: Digital Data Analyzer, and Expansion Unit
   Model Name: MP1632A


3. Applied Standards
   EMC:
     Electromagnetic radiation :
       EN55011l(ISM, Group 1, Class A equipment)
     Immunity:
       EN50082-1

     Performance Criteria*
     IEC801-2 (ESD) 4 kVCD, 8 kVAD  B
     IEC801-3 (Rad.) 3 V/m          A
     IEC801-4 (EFT) 1 kV            B

*:Performance Criteria
A: No performance degradation or function loss
B: Self-recovered temporary degradation of performance or temporary loss of function

Safety :
EN61010-1(Installation Category II, Pollution Degree 2)
Strategies for the Year 2000 problem

This equipment has already completed strategies for the Year 2000 problem (note), so it is Year 2000 compliant.

Note: The Year 2000 problem

The Year 2000 problem is defined as follows:
Systems computing date data has represented the year as a two-digit number (for example, 1997 is represented as "97"). When the Year 2000 comes or data of 2000 or later is to be computed, the year is indicated as "00", "01" and so on, which causes troubles in comparison of dates, sorting using dates and computation of date data.
Another problem is that Year 2000, a leap year, is not recognized as so.
Introduction

Organization of Operation Manuals
The MP1632A Digital Data Analyzer is the main unit of the measuring equipment into which the plug-in units can be installed. Operation manuals have been prepared for the main unit and the other units, respectively, and consist of the following three Operation Manuals. Read the Operation Manual of the unit you are going to use.

- MP1632A Digital Data Analyzer Operation Manual
  This manual describes a brief overview, preparations before starting operation, the panel, specifications, performance, and operation procedures of the MP1632A and the internal 3.2G synthesizer option.

- MU163220A 3.2G Pulse Pattern Generator and MU163240A 3.2G Error Detector Operation Manual
  This manual describes a brief overview, specifications, performance, and operation procedures related to the units of the 3.2G pulse pattern generator and the error detector.

- MP1632A Remote Control Operation Manual
  This manual describes the controls using the external interface (RS-232C, GPIB option or Ethernet option) and sample programs.

- ETHERNET operation manual
  This manual describes how to connect the MP1632A connect to LAN, using FTP, sample program which controls MP1632A via ethernet.
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CHAPTER 1  OVERVIEW
1.1  Product Overview

The MP1632A Digital Data Analyzer (hereafter simply called 'the instrument') is the mainframe into which various plug-in units can be installed to configure various systems. Combining the instrument and other units enabled various digital communication equipment, the modules such as O/E and E/O, and digital ICs to be evaluated. The instrument is suited for research, development and manufacturing.

Features

- User friendly operability
  
  With Microsoft® Windows® Operating System Version 3.1 support and a large color LCD screen, the instrument makes applications easier to understand and run.

- Operations on the display screen are possible using various tools
  
  The various interfaces such as touch screen, mouse, and panel key can be used as the interface for operations on the display screen in order to achieve better operability of the main unit.

- Storage and read-out of mass data
  
  The instrument has a built-in FDD and HDD as the data storage devices. Storage and read-out of various data such as setup information and results of measurements are possible.

- Various external interfaces are supported
  
  RS-232C and GPIB (option) and Ethernet (option) are supported as the interface for remote control.

- The unit structure having the high expandability
  
  Various systems can be configured, by combining the plug-in units. The expansion slots are prepared for easy upgrading when it becomes necessary in the future.
1.2 Structure of Operation Manual

The Operation Manual consists of the following nine chapters.

<table>
<thead>
<tr>
<th>Chapter Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chapter 1 Overview</td>
<td>Product overview, structure of operation manual, equipment configuration, and specifications</td>
</tr>
<tr>
<td>Chapter 2 Setup</td>
<td>Environmental conditions of installation location, safety precautions, preparations before turning on the power</td>
</tr>
<tr>
<td>Chapter 3 Panel Description and Connections</td>
<td>Layout of keys, LED, connectors of the MP1632A and their functional description</td>
</tr>
<tr>
<td>Chapter 4 Starting and Stopping the MP1632A</td>
<td>Starting up and shutting down the MP1632A, explanation of keywords in this manual</td>
</tr>
<tr>
<td>Chapter 5 Display Description</td>
<td>Structure and operation procedure of display</td>
</tr>
<tr>
<td>Chapter 6 Operating Instructions</td>
<td>Operation procedures of various functions</td>
</tr>
<tr>
<td>Chapter 7 Performance Test</td>
<td>Performance test items of internal 3.2G synthesizer option and procedure</td>
</tr>
<tr>
<td>Chapter 8 Maintenance Scrapping</td>
<td>Preventive maintenance for safety, daily maintenance, calibration, storage method, transportation method and disposal method</td>
</tr>
<tr>
<td>Appendix</td>
<td>Initial setting when shipped from the factory, troubleshooting and index</td>
</tr>
</tbody>
</table>
1.3 Equipment Configuration

1.3.1 Standard Configuration

The standard configuration of the instrument is shown in the following table.

<table>
<thead>
<tr>
<th>Item</th>
<th>Model Name and Symbol</th>
<th>Product Name</th>
<th>Quantity</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equipment configuration</td>
<td>MP1632A</td>
<td>Digital data analyzer</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Accessories supplied</td>
<td>J0491</td>
<td>Shielded power cord</td>
<td>1</td>
<td>13A</td>
</tr>
<tr>
<td></td>
<td>F0071</td>
<td>Fuses</td>
<td>2</td>
<td>8A</td>
</tr>
<tr>
<td></td>
<td>W1360AE</td>
<td>MP1632A operation manual</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>W1361AE</td>
<td>MP1632A remote control operation manual</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Z0319A</td>
<td>PS/2mouse</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Z0320</td>
<td>Input pen</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Z0396A</td>
<td>Pen Holder</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Z0347</td>
<td>MP1632A recovery tool</td>
<td>1 set</td>
<td></td>
</tr>
<tr>
<td></td>
<td>J0905A</td>
<td>SMA cable</td>
<td>1</td>
<td>This is the supplied accessory of OPT03</td>
</tr>
</tbody>
</table>
1.3.2 List of Units

The plug-in units that can be inserted in the instrument are shown in the following table.

<table>
<thead>
<tr>
<th>Item</th>
<th>Product Name</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>MU163220A</td>
<td>3.2G pulse pattern generator</td>
<td>The pulse pattern generator of the operating frequency in the range of 10 Mb/s to 3.2 G/s</td>
</tr>
<tr>
<td>MU163240A</td>
<td>3.2G error detector</td>
<td>Error detector of the operating frequency in the range of 10 Mb/s to 3.2 G/s</td>
</tr>
</tbody>
</table>

Fig 1-1 List of units
1.3.3 List of Options

The options that can be used in the instrument are shown in the following table.

<table>
<thead>
<tr>
<th>Item</th>
<th>Product Name</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>MP1632A*01</td>
<td>GPIB</td>
<td>GPIB interface board</td>
</tr>
<tr>
<td>MP1632A*02</td>
<td>ETHERNET</td>
<td>Ethernet interface board</td>
</tr>
<tr>
<td>MP1632A*03</td>
<td>3.2G Internal Synthesizer</td>
<td>3.2GHz internal synthesizer</td>
</tr>
<tr>
<td>MP1632A*20</td>
<td>Eye Diagram Template</td>
<td>Eye Diagram Template</td>
</tr>
</tbody>
</table>

1.3.4 List of Related Products

The related products that can be used in the instrument are shown in the following table.

<table>
<thead>
<tr>
<th>Item</th>
<th>Product Name</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z0321A</td>
<td>keyboard</td>
<td>PS/2</td>
</tr>
<tr>
<td>J0008</td>
<td>GPIB connection cable</td>
<td>2.0m, 408JE-102</td>
</tr>
<tr>
<td>MB24B</td>
<td>Movable trolley</td>
<td>The rated current of power cord and plug:20A</td>
</tr>
<tr>
<td>B0348</td>
<td>Soft case</td>
<td></td>
</tr>
<tr>
<td>B0329D</td>
<td>Front case</td>
<td></td>
</tr>
<tr>
<td>B0333D</td>
<td>Rack mount kit</td>
<td></td>
</tr>
<tr>
<td>Z0398</td>
<td>Ethernet Installation Disk</td>
<td>This is the supplied accessory of OPT02</td>
</tr>
<tr>
<td>W1529AE</td>
<td>Ethernet Operation Manual</td>
<td>This is the supplied accessory of OPT02</td>
</tr>
<tr>
<td>W1772AE</td>
<td>Eye Diagram Template Operation Manual</td>
<td>This is the supplied accessory of OPT20</td>
</tr>
<tr>
<td>B0447A</td>
<td>Dummy Unit for CG</td>
<td></td>
</tr>
<tr>
<td>B0447B</td>
<td>Dummy Unit for Extension</td>
<td></td>
</tr>
<tr>
<td>B0447C</td>
<td>Dummy Unit for PPG</td>
<td></td>
</tr>
<tr>
<td>B0447D</td>
<td>Dummy Unit for ED</td>
<td></td>
</tr>
<tr>
<td>Z0416</td>
<td>3.5 inch head cleaning disk</td>
<td></td>
</tr>
</tbody>
</table>
1.4 Specifications

The specifications of the instrument are shown in Table 1-5. The items marked by asterisk (*) require installation of options. Their contents are shown outside the table.

<table>
<thead>
<tr>
<th>Items</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS</td>
<td>Microsoft® Widnows® operating system version 3.1</td>
</tr>
<tr>
<td>Screen display</td>
<td>Color LCD display (touch screen)</td>
</tr>
<tr>
<td>Size</td>
<td>10.4 inch, $640 \times 480$ dots</td>
</tr>
<tr>
<td>Display colors</td>
<td>256 colors</td>
</tr>
<tr>
<td>Printer</td>
<td>Parallel port</td>
</tr>
<tr>
<td>Connector</td>
<td>D-sub, 25-pins</td>
</tr>
<tr>
<td>Keyboard</td>
<td>English 101 type keyboard</td>
</tr>
<tr>
<td>Connector</td>
<td>PS/2 type, mini DIN 6-pins</td>
</tr>
<tr>
<td>Mouse</td>
<td>Serial mouse</td>
</tr>
<tr>
<td>Connector</td>
<td>PS/2 type, mini DIN 6-pins</td>
</tr>
<tr>
<td>Floppy disk drive</td>
<td></td>
</tr>
<tr>
<td>Operation mode</td>
<td>Dual modes (1.44MB, 740kB)</td>
</tr>
<tr>
<td>Usable disk</td>
<td>3.5 inch, 2HD/2DD</td>
</tr>
<tr>
<td>Hard disk drive</td>
<td></td>
</tr>
<tr>
<td>Disk capacity</td>
<td>C drive : 474 MB or more (used for system: measurement data, pattern and others)</td>
</tr>
<tr>
<td>D drive : 30MB (not accessible to users)</td>
<td></td>
</tr>
<tr>
<td>Interface</td>
<td>IDE interface</td>
</tr>
<tr>
<td>Remote control</td>
<td></td>
</tr>
<tr>
<td>RS-232C</td>
<td>COM1</td>
</tr>
<tr>
<td>GPIB *1</td>
<td>IEEE488.2</td>
</tr>
<tr>
<td>Ethernet*2</td>
<td>10 Base T</td>
</tr>
<tr>
<td>Command</td>
<td>SCIP or MP1652/53 Compatible (Selectible)</td>
</tr>
<tr>
<td>Clock output*3</td>
<td></td>
</tr>
<tr>
<td>Frequency range</td>
<td>50 MHz to 3.2 GHz (1 kHz steps)</td>
</tr>
<tr>
<td>Frequency accuracy</td>
<td>±2ppm</td>
</tr>
<tr>
<td>SSB phase noise</td>
<td>-85dBc/Hz or less (10kHz offset)</td>
</tr>
<tr>
<td>Non-harmonic spurious</td>
<td>-60dBc or less (however, measurement is limited to the spurious that is 10 kHz or more apart from the carrier frequency)</td>
</tr>
<tr>
<td>Connector</td>
<td>SMA</td>
</tr>
</tbody>
</table>

*1: Possible when OPT01 is installed  
*2: Possible when OPT02 is installed  
*3: Possible when OPT03 is installed
<table>
<thead>
<tr>
<th>Item</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions and weight</td>
<td></td>
</tr>
<tr>
<td>Dimensions</td>
<td>426 (W), 221.5(H), 451(D) mm</td>
</tr>
<tr>
<td>Weight</td>
<td>20 kg or less (when no units are inserted, without OPT03)</td>
</tr>
<tr>
<td></td>
<td>25 kg or less (when no units are inserted, with OPT03)</td>
</tr>
<tr>
<td>Power supply</td>
<td></td>
</tr>
<tr>
<td>Voltage</td>
<td>100 to 120 Vac/200 to 240 Vac</td>
</tr>
<tr>
<td>Frequency</td>
<td>47.5 Hz to 63 Hz</td>
</tr>
<tr>
<td>Power consumption</td>
<td>150 VA or less (when no units are inserted, without OPT03)</td>
</tr>
<tr>
<td></td>
<td>100 VA or less (when no units are inserted, with OPT03)</td>
</tr>
</tbody>
</table>
CHAPTER 2  SETUP
2.1 Ambient Conditions

The instrument operates under the ambient temperature of 5°C to 45°C, and ambient humidity of 85% or less. For storage, store the instrument under the ambient temperature of -20°C to 60°C, and ambient humidity of 85% or less. Avoid using the instrument in the following locations.

1. In places where the instrument will be subject to vibrations.
2. In places where much dust exists.
3. In places that receive direct sunlight.
4. In places where active gas exists.
5. In places where condensation may occur.

CAUTION ⚠

1. Do not block the air intake and air exhaust openings on the rear and the side of the instrument. Install the instrument unit so that the rear of the main unit is 10 cm or more away from the surrounding equipment and obstacles. If sufficient air intake and exhaust cannot be secured, internal temperature will rise and can cause failure of the instrument.

2. When the instrument is used after storage for long hours in a low temperature, the circuitry can short due to dew condensation, causing failure. When the instrument is stored for long hours at a low temperature, start using the main unit after drying it sufficiently.
2.2 Safety Precautions

For safety assurance's sake, observe the safety precautions given below. For tips on starting and stopping the instrument, see Chapter 4, "Starting and Stopping the MP1632A."

**WARNING ▼

1. Before connecting the AC power cord, be sure to confirm that the POWER switch of the instrument is turned off. It can cause physical injury or electric shock.
2. When the two-pole power outlet is used, be sure to connect the grounding terminal on the rear panel of the instrument cabinet to ground.
3. Do not install or remove options and plug-in units by users themselves. Installation, removal, and replacement are performed by Anritsu service department. Contact your dealer or Anritsu sales office. It can cause physical injury or electric shock even to death.

**CAUTION ▼

1. The instrument operates on the power supply in the range of AC 100 V to 120 V or from AC 200 V to 240 V. Confirm the voltage and rating of the power supply carefully then connect the AC power cord.
2. When connecting any signals to INPUT of the instrument, be careful that the excessive voltage exceeding the rating should not be applied. It can damage circuitry.
3. Terminate the OUTPUT in 50 Ω. Never flow any current into the terminal.
4. Before connecting any cables to the input and output connectors, be sure to connect the instrument and other equipment (inclusive of experimental circuit) with the grounding wires.
5. The outer conductor and the core conductor of co-axial cable can form a capacitor between which electricity can be charged. Therefore, use the co-axial cable after discharging the electric charge by shorting the outer conductor and the core conductor with metal or a like.
6. Connect the mouse, keyboard and printer when the main power of the instrument is turned off.
7. The instrument has the hard disk in it. Do not give vibration or shock to the instrument to protect hard disk from damage.
8. Do not turn off the main power of the instrument while the hard disk access lamp on the front panel is illuminating. If not, the hard disk can be damaged.

9. Do not use anything other than the supplied unique pen and fingers to operate the touch panel.

10. Never open the instrument. There can be a case that Anritsu cannot accept the maintenance work when the instrument is opened and the performance cannot be obtained.

11. The memory backup battery of the instrument has the life about seven years. When a memory backup battery is used longer than the life, the information in the backup memory is lost, and the setup condition when the main power is turned off last time, cannot be resumed when the main power is turned on next time. Replace the memory backup battery in an earlier date.
2.3 Grounding

To supply power to the instrument, insert the three-core power cable supplied with the instrument into a grounded receptacle to ensure that it is grounded.

**WARNING △**

Failure to ground the instrument before turning it on could lead to injury, or electrical shocks leading to death. Insert the three-core power cable into a grounded two-pole receptacle or connect the grounding wire of the conversion adapter or the rear-panel grounding terminal to the ground.

2.4 Running Applications Successfully

In addition to the Microsoft® MS-DOS® Operating System and Microsoft® Windows® Operating System, the instrument has device control drivers and other software installed.

While you can make alterations to the Windows® operating environment via Control Panel or Windows setup program, successful functioning of the application would be unpredictable if any alteration is made beyond the scope of alterations mentioned in this operation manual.

Do not make alterations to the Windows® operating environment for any other purpose or in any other method than those mentioned in this operation manual.
3.1 Panel Description

The view of the instrument’s front and rear panels are shown below, along with a summary description of their component functions.

Front panel

![Fig. 3-1 Front Panel]

<table>
<thead>
<tr>
<th>Number</th>
<th>Label</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>Power switch</td>
<td>Turns AC power on or off. (with a power-on LED)</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Floppy disk drive</td>
<td>3.5-inch FDD. Dual modes: 2DD (720 KB) and 2HD (1.44 MB)</td>
</tr>
<tr>
<td>3</td>
<td>Panel Lock</td>
<td>Panel lock key</td>
<td>Disables front-panel operations. The LED is on when the front panel is locked.</td>
</tr>
<tr>
<td>4</td>
<td>Remote</td>
<td>Local key (with a remote LED)</td>
<td>Switches the instrument from the remote mode to the local mode. The LED is on when the instrument is in the remote mode.</td>
</tr>
<tr>
<td>5</td>
<td>HDD</td>
<td>Hard disk drive access LED</td>
<td>Lights when access to the hard disk drive is in progress.</td>
</tr>
<tr>
<td>6</td>
<td>[0] through [9], [-],[.], and [A] through [F]</td>
<td>Numeric value entry keys</td>
<td>Enter numeric values.</td>
</tr>
<tr>
<td>7</td>
<td>Tab, Shift, BS, Enter</td>
<td>Display control keys</td>
<td>Accept entries, move the focus, and otherwise control displays.</td>
</tr>
<tr>
<td>8</td>
<td>m/k, r/M, p/G</td>
<td>Unit keys</td>
<td>Select units for entering numeric values.</td>
</tr>
<tr>
<td>9</td>
<td>Rotary encoder (with up, down, left, and right keys)</td>
<td>Alter numeric values continuously. The up, down, left, and right keys are used mainly to move the highlighted cursor.</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Slots 2 to 4</td>
<td>The front panels of the units inserted in slots 2 to 4 appear at this position.</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Color LCD</td>
<td>Display with a touch screen, that displays setup items and measurement data.</td>
<td></td>
</tr>
</tbody>
</table>

Rear Panel
<table>
<thead>
<tr>
<th>Number</th>
<th>Label</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>AC</td>
<td>AC power connector</td>
<td>AC power connector</td>
</tr>
<tr>
<td>2</td>
<td>Frame</td>
<td>Frame ground terminal</td>
<td>Frame ground terminal</td>
</tr>
<tr>
<td>3</td>
<td>Fuse holder</td>
<td>AC power fuse holder</td>
<td>AC power fuse holder</td>
</tr>
<tr>
<td>4</td>
<td>Printer</td>
<td>Printer connector</td>
<td>Connector to which an external printer is connected</td>
</tr>
<tr>
<td>5</td>
<td>RS-232C(COM1)</td>
<td>RS-232C connector</td>
<td>Connector used to connect an external controller to the instrument via an RS-232C interface</td>
</tr>
<tr>
<td>6</td>
<td>Keyboard</td>
<td>Keyboard</td>
<td>Connector to which the keyboard is connected</td>
</tr>
<tr>
<td>7</td>
<td>Mouse</td>
<td>Mouse connector</td>
<td>Connector to which the mouse is connected</td>
</tr>
<tr>
<td>8</td>
<td>CRT</td>
<td>VGA connector</td>
<td>Connector to which an external display is connected</td>
</tr>
<tr>
<td>9</td>
<td>GPIB (OPT01)</td>
<td>GPIB connector</td>
<td>Connector used to connect an external controller to the instrument via an GPIB interface</td>
</tr>
<tr>
<td>10</td>
<td>ETHERNET (OPT02)</td>
<td>10BaseT(RJ-45) connector</td>
<td>Connector used to connect an external controller to the instrument via an ETHERNET interface</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td>Slot1</td>
<td>Slot in which 3.2G internal synthesizer option is inserted</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td>Slots 2 to 4</td>
<td>Slots in which plug-in units are inserted</td>
</tr>
<tr>
<td>13</td>
<td></td>
<td>Fan</td>
<td>Cooling fan</td>
</tr>
</tbody>
</table>
The view of the 3.2G internal synthesizer (OPT03) rear panel is shown below, along with a summary description of its component functions.

![Rear Panel of 3.2G internal synthesizer](image)

<table>
<thead>
<tr>
<th>Number</th>
<th>Label</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
</table>
| 1      | Lock (10MHz) Input             | Reference clock input       | Used to synchronize an external 10MHz reference signal with the clock of this synthesizer.  
  Frequency : 10MHz±10ppm  
  Level : 0.5Vp-p to 2.0Vp-p  
  Termination condition : 50 Ω to GND  
  Waveform : Square wave or sine save |
| 2      | Lock(10MHz) Output             | Reference clock output      | Outputs 10MHz reference clock pulses to synchronize the clock of external equipment with the clock of this synthesizer.  
  Frequency : 10MHz±2ppm  
  Level : 1.0Vp-p±20%  
  Termination condition:50 Ω to GND |
| 3      | Clock(0.05-3.2GHz) Output      | Clock output connector      | Outputs the clock signal generated by this synthesizer  
  Level : 1.0Vp-p±30%  
  Termination condition : 50 Ω to GND  
  Duty : 50±5% |
3.2 Connections

3.2.1 Sample connections of peripherals

A mouse, a keyboard, a printer, an external display, and a personal computer (used as a controller) can be connected to the instrument's rear panel. Sample connections are shown below.

Fig. 3-4 Connecting peripherals and external instruments
3.2.2 Connecting peripherals

Procedures for connecting peripherals to the instrument are described below, along with tips.

■ Mouse
Connect the serial mouse (supplied with the instrument as a standard accessory) to the rear-panel mouse connector while the instrument is off, and then turn it on. The mouse becomes operable when the application starts running.

To enter detailed mouse settings (such as moving speed and double click intervals), select Mouse from Microsoft® Windows® Operating System Control Panel.

Note
Control Panel can be opened by double-clicking the Control Panel icon from the Microsoft Windows® Main group.

■ Keyboard
Connect the 101-key keyboard to the rear-panel keyboard connector while the instrument is off, and then turn it on. The keyboard becomes operable when the application starts running.

To enter detailed keyboard settings (such as the auto-repeat function), select Keyboard from Windows® Control Panel

Note
To connect any other keyboard than the 101-key keyboard, select the Windows Setup program from the Windows® Main group.

■ Printer
Connect a printer to the rear-panel printer connector while the instrument is off, and then turn it on. When the application has started running, select Printers icon from Windows® Control Panel to set the printer up.

Note
The message of “Insert Microsoft Windows 3.1 Disk #5 ....” may be displayed while setting the printer via Printers of Control Panel. In this case, insert the attached Recovery Disk to FDD. The table below define the disk number of Recovery Disk corresponding to displayed disk number by the message.

<table>
<thead>
<tr>
<th>Displayed disk number by the message</th>
<th>1</th>
<th>2</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disk number of Recovery Disk</td>
<td>5</td>
<td>6</td>
<td>9</td>
<td>10</td>
</tr>
</tbody>
</table>
- External display

An external display connected to the instrument provides high-resolution display images. To connect an external display to the instrument, follow these steps.

1. Connect an external display to the rear-panel VGA connector while the instrument is off.
2. Turn on the instrument. The application will display on both the LCD on the instrument's front panel and on the CRT screen of the external display.
3. Select the ChipsCLP icon from Windows® Control Panel and run the Display Driver Control Panel program.
4. Select a resolution, number of colors, and font size to set the required screen condition, then specify "CRT" in the "Display" group box.
5. The setting has been completed. Press the OK button; the Display Driver Control Panel program exits.

Note

When you select either the CRT or LCD in the Display group box setting of the Display Control panel program, the other not displayed. For example, when you select the CRT, the LCD on the instrument's front panel is disabled; when you select the LCD, the CRT screen of the external display is disabled.
3.2.3 Connection between 3.2G internal synthesizer and Unit

This section describes how to connect 3.2G internal synthesizer to another unit inserted in the MP1632A.

- Connection between 3.2G internal synthesizer and PPG
  - Slot3 : MU163220A 3.2G pulse pattern generator
  - Cable : SMA cable

Fig. 3-5 Connection between internal synthesizer and PPG
- **Connection from peripherals**

  Cable: BNC cable

  ![Diagram of connection from peripherals]

  **Fig. 3-6** Connection from peripherals

- **Connection to peripherals**

  Cable: BNC cable

  ![Diagram of connection to peripherals]

  **Fig. 3-7** Connection to peripherals
CHAPTER 4 STARTING AND STOPPING THE MP1632A
4.1 Starting and Stopping the MP1632A

Microsoft® MS-DOS® Operating System and Microsoft® Windows® Operating System (hereafter simply called Windows®) are used as display control software in the instrument, so that you can run the application for the instrument the same way as you do applications on Windows®. This section describes how to start and stop the instrument.

Starting the MP1632A
There are two ways to start the instrument:

- Turn on the power.
  - Turn on the instrument. The system will start up and the application will run automatically.

- Start from the Windows® program manager.
  - Double-click the MP1632A Digital Analyzer icon in the program manager's MP1632A group, causing the application to start running.

Note

The instrument stores, in its internal memory, the status in which it had been when it was last turned off. This status is resumed when it is turned on.

The remote/local status and the panel lock state are initialized.

(Remote/local status:Local Panel lock state:OFF)

Stopping the MP1632A
To stop the instrument, follow these steps:

1. Select [File]-[Exit] from the parent window menu bar. The application will terminate, with only Windows® operating.
3. When Windows® terminates, the MP1632A program menu opens. Turn off the power in this state.

CAUTION

1. Damage to the hard disk might result if the instrument is stopped in any other way (such as turning off the front-panel power switch while the instrument is functioning). To protect the hard disk, use the method suggested above to stop the instrument, except in times of emergencies (such as a power failure or inadvertent disconnection of the instrument from the AC receptacle). For safeguards against power failures, see the section 6.4 "Setting System Operations".
2. Do not turn off the instrument while access to the hard disk drive is in progress (with the access lamp is lit). Damage to the hard disk could result.
4.2 Definitions of Keywords

Because the instrument supports Windows®, Windows® terms are sometimes used in its context in this user's guide. Windows® terms and operations frequently mentioned in this guide are defined below.

**General terms**

General terms appearing in the user's guide are defined below. (The use of a mouse is assumed.)

- **Mouse pointer**
  An on-screen graphic object that designates the location of the mouse on the screen. The mouse pointer varies in its shape to an arrow, hour glass and so on depending on its location or the operation of the application.

- **Click**
  The process of pressing and then releasing a left mouse button at a given position.

- **Double-click**
  The process of pressing a left mouse button twice in rapid succession at a given position.

- **Drag**
  The process of moving the mouse while holding down a left mouse button.

- **Drop**
  The process of releasing the left mouse button after dragging.

- **Control**
  Refers to an object placed on the screen, such as a button or text box. Controls are used to present data or choose items.

- **Focus**
  The state of being ready to receive the next input is called "having focus." For example, when several controls exist on the screen, the focus is designated by a box in dotted lines or by highlighting.

![Sample Program](image)

**Fig. 4-1 Focus at a Check Box**
Note
The instrument has a touch screen, which can be operated by touching it. Touch screen operations are essentially similar to mouse operations, except that the function of the right mouse button is not supported. Think of the function of pressing the left mouse button as touching the screen surface with the input pen.

Window elements
The elements of a window are shown below.

Fig. 4-2 Window Elements

- Title bar
  Contains the title, control menu box, minimize button, maximize button and so on.
- Title
  Refers to the label that denotes the window function.
• Control menu box
  Click to open the control menu, from which the window can be maximized, minimized, and so on. Additionally, to close the window double-click it.

![Control Menu](image)

Fig. 4-3 Control menu

• Minimize button
  Click to minimize the window, normally as an icon.

• Maximize button
  Click to maximize the window.

• Menu bar
  Refers to an area containing menu titles.

• Menu title
  Refers to a character string appearing on the menu bar. When you click a menu title, a drop-down menu opens. Choose a menu action from the menu and click it to execute the associated function (Fig. 4-4).

![Menu Selection](image)

Fig. 4-4 Selecting Menu Functions

Menu actions may have choices of items. When an item is selected, it is marked by a check mark (Fig. 4-5).

![Menu Selection](image)
Fig. 4-5  Menu with a Check Mark

- Toolbar
  Refers to an area in which frequently used functions are represented, as by buttons.

- Scroll bar
  When not all of the information on the screen can be displayed in a single display image, a scroll bar appears. Move the scroll bar to manipulate hidden information into view.

- Window border
  Refers to a boundary line for a single window.

Window manipulations
Basic window manipulations are described below.

- Minimize a window
  Click the minimize button to reduce the window to an icon.

- Maximize an icon
  To maximize an icon, point to the icon and double-click it.

Fig. 4-6  Icon and Window Displays
• To maximize a window
Click the maximize button in the window, and the window will be enlarged to the full size of the screen. The window will also be maximized by double-clicking the title bar. When the window is maximized, the maximize button changes to a restore button to restore the window to its original size.

• To return a maximized window to its original size
To return a maximized window to its original size, click the restore button or double-click the title bar.

Fig. 4-7  Maximize Action, and Restoring to Original Window Size

• To resize a window
Point to a boundary of the window and an arrow will appear, permitting you to resize the window in the indicated direction. Drag the mouse while holding down the left button, releasing it when the window has changed to the desired size.

• To move the display position of a window
Point to the title bar in the window and hold the left mouse button pressed. Then, drag the mouse to the position where you want the window placed, and release the left mouse button.

• To move the position of an icon
Point to the icon and hold the left mouse button pressed. Then, drag the mouse to the position where you want the icon placed, and release the left mouse button.

• To move the focus from one control to the next
To move the focus to one of the multiple controls existing in a single window, click that control. The control thus clicked will become the focus. Alternatively, press the [Tab] key, or the [Shift] + [Tab] key. The focus will move from one control to the next in the window.
**Controls**
The controls used with the instrument are defined below.

![Image of control elements](image)

**Fig. 4-8 Control**

- **Command button**
  A rectangular button labeled with a function name. Click to execute the associated function. (The instrument also supports toggle buttons, which assume either of the two states, pressed or released, and radio buttons only one of which can be selected at a time.)

- **Option button**
  A round button used to select one out of a group of mutually exclusive options. When an option button is selected, it is marked by a black circle appearing in it. Normally, a set of similar options are placed in a single group box, out of which one is selected.

- **Check box**
  A square box that is selected or cleared to turn on or off an option. When a check box is selected, it is marked by a check mark appearing in it.

- **List box**
  Any type of box containing a list of items available for selection. Click-select one of the items in the list. When an item is selected, it is highlighted. Two types of list boxes available are the standard list box, from which only one item can be selected, and the multiple choice list box, from which two or more can be selected.

- **Drop-down list box**
  Similar in function to the list box mentioned above. Usually, only the selected item is displayed. Click the arrow to display the list, then click-select one of the items in the list.

- **Text box**
  A rectangular box in which text can be entered or edited. Enter or edit text at the cursor in the text box.

- **Spin box**
  A text box with up and down arrows, used to move through a set of fixed values. Valid values may also be typed directly in the spin box using front-panel numeric keys.

- **Group box**
A frame or box that encloses a set of related controls.
CHAPTER 5  DISPLAY DESCRIPTION
5.1 Kinds of Displays

The instrument has a number of setup displays and windows, which can be grouped into four broad categories according to their operation and functions. In this user's guide, these displays and windows are called by the names mentioned below.

- **Parent window**
  The first window that the application opens when it starts running. You can open subwindows or exit the application from the parent window.

- **Subwindow**
  A window that can be opened by clicking a subwindow open/close button in the parent window. Subwindows contains some panels.

- **Panel**
  A window that is opened by switching tabs in a subwindow. Various settings and measurement data appear on panels.

![Parent Window Diagram]  
**Fig. 5-1** Kinds of displays
Dialog box

A window that is opened by clicking a command button or selecting a menu on a panel. Once you open a dialog box with the instrument, you cannot operate other window unless you close it. Dialog boxes are normally used to modify settings.
5.2 Window Organization

5.2.1 Window hierarchy

The hierarchy of the parent window, subwindows, and panels supported by the instrument with a 3.2G internal synthesizer (OPT03), a pulse pattern generator (PPG), and an error detector (ED) unit installed in it. For descriptions of the shaded displays in the table below, refer to the MU163220A 3.2G Pulse Pattern Generator and MU163240A 3.2G Error Detector operation manual.

Table 5-1 Window Hierarchy

<table>
<thead>
<tr>
<th>Subwindow</th>
<th>Panel</th>
<th>Setup item</th>
</tr>
</thead>
<tbody>
<tr>
<td>System</td>
<td>System</td>
<td>Sets the date and time, remote control functions, and system operation mode.</td>
</tr>
<tr>
<td></td>
<td>Option</td>
<td>Displays the configuration of the units installed in the instrument.</td>
</tr>
<tr>
<td>Setup</td>
<td>Setup</td>
<td>Sets basic setup items.</td>
</tr>
<tr>
<td></td>
<td>Frequency</td>
<td>Sets the frequency</td>
</tr>
<tr>
<td></td>
<td>Clock I/F</td>
<td>Sets the clock I/O interface.</td>
</tr>
<tr>
<td></td>
<td>Data I/F</td>
<td>Sets the data I/O interface.</td>
</tr>
<tr>
<td></td>
<td>Pattern</td>
<td>Sets transmitted/received patterns, bursts, and synchronization.</td>
</tr>
<tr>
<td></td>
<td>Trigger I/F</td>
<td>Sets trigger/sync I/O signals.</td>
</tr>
<tr>
<td></td>
<td>Utility</td>
<td>Sets the others</td>
</tr>
<tr>
<td>Test Menu</td>
<td>Measurement</td>
<td>Sets measurement conditions.</td>
</tr>
<tr>
<td></td>
<td>Error Addition</td>
<td>Sets error addition and delay measurement pattern insertion conditions.</td>
</tr>
<tr>
<td>Result</td>
<td>Error/Alarm</td>
<td>Displays error/alarm measurement data and starts or stops measurement.</td>
</tr>
<tr>
<td></td>
<td>Eye Margin</td>
<td>Displays eye margin measurement data and starts or stops measurement.</td>
</tr>
<tr>
<td>Customize</td>
<td></td>
<td>Displays setup and error measurement data (item selection and setup by immediate value entry).</td>
</tr>
</tbody>
</table>
5.2.2 Organization of panel display images

The instrument can house a number of units. Setup and measurement data information is available in a unit-specific manner. Panels display setup and measurement data information in the following organizations:

- Displaying information on multiple units installed

  Information on the units inserted in slots 3 and 4 is displayed on a single panel at the same time. Unit-specific information (as on the 'Setup:Clock I/F' panel and the 'Setup:Data I/F' panel) may be displayed in two group boxes (Fig. 5-3) or in one group box (Fig. 5-4).

![Group box for the unit inserted in slot 3](image)

![Group box for the unit inserted in slot 4](image)

Fig. 5-3 Displaying Information on Multiple Units (Unit-specific group boxes)
- Displaying information on a single unit and the instrument

The 'Setup:Frequency' panel, the 'Result:Eye Margin' panel, and so on each display information on one unit at a time. Unlike the organization described above, no unit-specific group boxes exist in this case.

![Diagram showing the setup interface with a group box for units inserted in Slot3 and Slot4.]

Fig. 5-4 Displaying Information on Multiple Units (Common group box)
5.2.3 Toolbar organization

The instrument provides a number of icons on the toolbar. The icons are in the form of buttons associated with frequently used functions. When buttons are pressed, their corresponding functions are executed. The table below defines the functions corresponding to the icons. Some icons are disable when PPG or ED is not installed in the instrument.

<table>
<thead>
<tr>
<th>Button</th>
<th>Function</th>
<th>Corresponding command</th>
</tr>
</thead>
<tbody>
<tr>
<td>![File Icon]</td>
<td>Opens a file.</td>
<td>Menu bar [File]-[Quick Open]</td>
</tr>
<tr>
<td>![Print Icon]</td>
<td>Hard copies a display image.</td>
<td>Menu bar [File]-[Hard Copy]</td>
</tr>
<tr>
<td>![Start/Stop Icon]</td>
<td>Starts measurement.</td>
<td>Result subwindow Start button</td>
</tr>
<tr>
<td>![Stop Icon]</td>
<td>Stops measurement.</td>
<td>Result subwindow Stop button</td>
</tr>
<tr>
<td>![Auto Search Icon]</td>
<td>Executes an auto search.</td>
<td>Result subwindow Auto Search button</td>
</tr>
<tr>
<td>![Cycle Icon]</td>
<td>Adds a cyclic error.</td>
<td>‘Test Menu:Error Addition’ panel Error Add button</td>
</tr>
<tr>
<td>![Single Icon]</td>
<td>Adds a single error.</td>
<td>‘Test Menu:Error Addition’ panel Single button</td>
</tr>
<tr>
<td>![ON/OFF Icon]</td>
<td>Sets the ON/OFF status of the error beeper.</td>
<td>ON/OFF status setting of the 'System:System' panel error beeper</td>
</tr>
<tr>
<td>![ON/OFF Icon]</td>
<td>Sets the ON/OFF status of the alarm beeper.</td>
<td>ON/OFF status setting of the 'System:System' panel alarm beeper</td>
</tr>
<tr>
<td>![ON/OFF Icon]</td>
<td>Sets the ON/OFF status of all output signals.</td>
<td>ON/OFF status setting of the 'Setup:Clock' and 'Setup:Data' panel output.</td>
</tr>
<tr>
<td>![Tile Icon]</td>
<td>Relocates windows (Tile).</td>
<td>Menu bar [Window]-[Tile]</td>
</tr>
<tr>
<td>![Cascade Icon]</td>
<td>Relocates windows (Cascade).</td>
<td>Menu bar [Window]-[Cascade]</td>
</tr>
</tbody>
</table>
5.3 Opening and Closing Windows

5.3.1 Opening and closing subwindows and switching their displays

Procedures for opening and closing subwindows and switching their displays are described.

Opening and closing a subwindow

To open a subwindow
Click a subwindow open/close button in the parent window. The subwindow associated with the button label will open.

![Subwindow open/close button]

Fig. 5-5 Opening and Closing a Subwindow

- To close the subwindow
  Click the subwindow open/close button again. The subwindow associated with the button label will close.

- To open multiple subwindows concurrently
  You can open multiple subwindows concurrently. Click the buttons corresponding to the subwindows to open.
Switching subwindow displays
You can maximize an open subwindow or switch its display.

- To maximize a subwindow
  Click the maximize button. The subwindow will then be maximized in the parent window.

- To return a maximized subwindow to its original size
  When a subwindow is maximized, the maximize button changes to a restore button. To return the maximized subwindow to its original size, click the restore button.

Fig. 5-6 Maximizing a Subwindow
• To display open subwindows side by side
  Select [Window]-[Tile] from the parent window menu bar. Multiple open subwindows will be displayed, side by side, in the parent window.

![Window Menu]

Fig. 5-7 Window Menu

• To display open subwindows overlapped
  Select [Window]-[Cascade] from the parent window menu bar. Multiple open subwindows will be displayed, overlapped, in the parent window.

• To move the focus to a subwindow
  Click inside the window frame of the subwindow to which the focus is to be moved. Alternately, select [Window]-[Subwindow Name] from the parent window menu bar. The subwindow thus selected will become the focus, with its title bar being highlighted.
5.3.2 Switching panels

Subwindows contain multiple panels each. You cannot view multiple panels of a single subwindow at once.

Fig. 5-8 Switching Panels

- To display a hidden panel
To display a panel hidden behind an open panel, click the tab of the panel to display. The panel thus selected will open.
5.4 Basic Setup Procedures

With the instrument, settings are normally changed by opening dialog boxes. (Some settings are changed on panels.) This section describes how to change instrument settings via dialog boxes.

![Dialog box image]

**Fig. 5-9 Basic Setup Procedures**

1. Click the Setup button associated with the item to change. A setup change dialog box will open.
2. Change the setting in the resulting dialog box. Depending on the setup item, you may have to open another dialog box (such as Pattern Edit). At this point, the change to the setting is simply displayed and does not affect the operation of the instrument itself.
3. Click OK to close the dialog box. The change is accepted and the instrument begins functioning according to the change. To cancel the change entered in the dialog box and return to the original state, click the Cancel button when closing the dialog box.
5.5 Entering Data

With the instrument, the following methods are used to manipulate displays:

- **Mouse manipulations**
  You can run the application for the instrument the same way as you do Windows® applications on a personal computer.

- **Touch screen manipulations**
  The instrument's touch screen offers you an equivalent of the capability of the mouse. Touch it with the custom pen supplied or fingers.

- **Manipulations with front-panel keys and the rotary encoder**
  You can do the same with the instrument front-panel keys and the rotary encoder as you do with Windows® applications on a personal computer. In this case, certain operational differences from keyboard manipulations exist due to the limited number of keys supported by the instrument.

- **Keyboard manipulation**
  Connecting a keyboard to the instrument enables you to manipulate its applications using the keyboard.

- **Software keyboard manipulations**
  The instrument supports a software keyboard as an application program running on Windows®. Even though a keyboard is not available, the software keyboard enables you to enter characters. For instructions on how to use the software keyboard, see section 5.6 "Using Software Keyboard".
Procedures for entering data are described below, along with operational differences, with primary regard to the usage of the front-panel keys and the rotary encoder.

**Moving from one control to the next in a window**
Where multiple controls exist in a single window, you can move the focus from one control to the next in the following ways:

- **[Tab] key**
  Moves the focus from the control placed at the upper left corner of the window to the right.

- **[Shift] + [Tab] key**
  Moves the focus in the direction opposite to the [Tab] key.

**Manipulating windows**
You can use panel keys to resize, move, and otherwise manipulate windows.

1. Click the control box in the window to manipulate, to open the control menu.
2. Using the [↑] and [↓], and [Enter] keys, select the window manipulation function to execute from the control box.
3. Manipulate the window with [↑], [↓], [←], and [→] to suit the function selected.
4. Press the [Enter] key to accept the change to the window.

**Note**
You can also open a control box by pressing [Shift] + [].
Entering data with spin boxes
You can use spin boxes and the rotary encoder to enter numeric values.

1. Move the focus to the spin box to manipulate. When the spin box becomes the focus, a digit of the numeric value is highlighted.

2. Select the digit to change by moving the highlighted cursor, in either of the following ways:
   - [Press the [←] and [→] keys (on the rotary encoder).
   - Click the digit.

3. Change the numeric value. You can change the numeric value continuously with respect to the digit at the highlighted cursor in one of the following ways:
   - Click the spin button.
   - Turn the rotary encoder.
   - Press the [↑] and [↓] keys (on the rotary encoder).

4. You can also enter a numeric value directly with numeric keys. In this case, the current setting on display is entirely cleared regardless of the highlighted cursor position. The display is cleared entirely if you press the [BS] key before accepting the input data.

5. When you have changed a numeric value directly with numeric keys, press the unit key or the [Enter] key to accept the input data. The setting will be canceled when you do one of the following before pressing the unit key or the [Enter] key to accept the input:
   - Move the focus to another control.
   - Close the dialog box.
   - Move to another application.

Note
When a spin box is on a panel (in the Customize subwindow), you need to enable spin box entry by clicking the text entry enable button before changing the numeric value. The pilot lamp is on while the entry is enabled.

Fig. 5-10 Spin Box on a Panel
Using controls
To manipulate controls with panel keys, follow these steps.

- **Command button manipulations**
  1. Move the focus to the command button.
  2. Press the [Enter] key. The function associated with the button is executed.

- **Drop-down list boxes**
  1. Move the focus to the drop-down list box to be altered.
  2. Press the [Shift] + [Enter] keys. A list will open.
  3. Select a list option by pressing the [↑], [↓], [←], and [→] keys on the rotary encoder.
  4. Press the [Enter] key to close the list and accept the input data.

- **List boxes**
  1. Move the focus to the list box to be altered.
  2. Move the focus to the desired option by pressing the [↑], [↓], [←], and [→] keys on the rotary encoder.
  3. Press the [Shift] + [Enter] keys to toggle between the selected and not selected states.

- **Option buttons**
  1. Move the focus to the group box to be altered.
  2. Move the focus by pressing [↑], [↓], [←], and [→]. The option button of the item at the focus will turn on.

- **Check boxes**
  1. Move the focus to the group box containing the check box to be altered.
  2. Move the focus to the desired option by pressing [↑], [↓], [←], and [→].
  3. Press the [Shift] + [Enter] keys to toggle between the selected and not selected states.
5.6 Using Software Keyboard

5.6.1 Character Input

The front panel of the instrument provides only the strict minimum of keys for numerical input. Therefore, a software keyboard is provided as an auxiliary function for character input. The software keyboard allows character input even when no keyboard is connected to the instrument.

The following example describes how to use the software keyboard to input a file name in the Save dialog box.

1. Click the virkey icon in the [MP1632A] group in Program Manager. This starts the software keyboard.
2. Execute [File]-[Save] from the parent window to open the Save dialog box.
3. Click the text box where you want to input characters (in this case, the File Name text box), and click keys on the software keyboard. The characters you click are input in the text box.

![Software Keyboard](image)

Click the shift key

Click the caps key

Fig. 5-11 Software Keyboard

4. To close the software keyboard, open the control box at the top left of the software keyboard, and select [Exit].

**Note**

The software keyboard performs character input to the control that is currently selected (controls for which text input is enabled, such as text boxes and spin boxes). In addition to the File Name text box used in the above example, numerical input can also be performed in controls such as spin boxes and the Windows® Notepad.
5.6.2 Setting the software keyboard

The size and display format of the software keyboard provided with the instrument can be changed to suit each usage condition.

- Changing the size
  Click the button at the top left of the software keyboard to open the control box. Click the Size in the menu, and select a size among SS, S, M, L, and LL. A check mark will appear next to the selected size.

![Fig. 5-12 Changing size](image)

- Changing the display format
  Click the button at the top left of the software keyboard to open the control box. Click the Type in the menu and select one among Full-Key, 10-Key, and 16-Key. A check mark will appear next to the selected format.

<table>
<thead>
<tr>
<th>Full-Key</th>
<th>All keys can be used.</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-Key</td>
<td>Only numerical keys can be used.</td>
</tr>
<tr>
<td>16-Key</td>
<td>Only numerical keys and character keys (A to F) can be used.</td>
</tr>
</tbody>
</table>

![Fig. 5-13 Changing display format](image)

- Changing the background color
  Click the button at the top left of the software keyboard to open the control box. Click Color in the menu and select your favorite color among background displayed.

![Fig. 5-14 Changing the background color](image)
• Saving setup data

Click the button at the top left of the software keyboard to open the control box. When click Save in the menu, current setup data is saved.

Fig. 5-15  Saving setup data
CHAPTER 6  OPERATING INSTRUCTIONS
6.1 Touch Screen Calibration

The instrument allows you to carry out display operations via the touch screen. The touch screen requires preliminary adjustment to ensure that the location of the display surface touched will be correctly transmitted to the software. To adjust the touch screen, follow these steps:

1. Double-click the TTSetup3.20 icon in the program manager Main group. The touch screen setup application will start running.
2. Run [Calibrate] from the touch screen setup application menu bar. Calibrate the touch screen as directed by the screen guidance.
3. Calibration is now complete. Select [Exit] from the menu bar. The touch screen setup application will terminate.

Note
Do not execute any touch screen setup application other than [Calibrate]. Successful functioning of the touch screen could be disabled if its setting is altered by executing such other functions.
6.2 Saving and Opening Setup Data

6.2.1 Saving setup data

With the instrument, you can save setup data to floppy disks or hard disk. There are two ways to save setup data as follows:

- Quick Save
  This function saves multiple records of data, such as instrument setup data and unit-specific setup data, all at once. It is used to save the complete set of data at once by viewing it as an integrated environment for the instrument.

- Save
  This function saves multiple records of data, such as instrument setup data and unit-specific setup data, one at a time. It is used to save selected records of data.

**Note**

While the instrument supports two hard disk drives C and D, drive D is dedicated to virtual memory and is not accessible to users. Drive C would not be available for saving data, either, when system operations have been set in the measurement power fail mode. For more details on system operations, see section 6.4 “Setting System Operations”.

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Quick Save procedure

1. Select [File]-[Quick Save] from the parent window menu bar. The Quick Save dialog box will open.

![Quick Save Dialog box](image)

Fig. 6-1 Quick Save Dialog box

2. Using the Directories and Drives controls, select the directory and drive in which to save an environmental file.

3. Type the filename of the environmental file to save in the Management File Name text box with seven or fewer characters.

Note

Environmental filenames may not be longer than seven characters. Inconveniences might result if this length limit is exceeded.

4. You can type a comment of up to 60 characters in the Comment text box to document the environment saved. A character string giving a summarized description of the environment is recommended as a comment to facilitate ready verification of the data.

5. The setup procedure is now complete. Click OK to save the data. The environmental file thus saved is given the extension .ENV.

Note

This function creates various data files (with extensions, such as .FRM, .CLK, and .PPG) at the same time as it creates a single environmental file (.ENV). The filenames of these data files are the filename of the environmental file with its extension changed to suit the kind of data. They are created in the same directory as the environmental file. The files that are created concurrently with the environmental file are listed in the Setting & Pattern File: list.
Save procedure

1. Select [File]-[Save] from the parent window menu bar. The Save dialog box will open.

   ![Save Dialog Box](figuri/_save_dialog_box.png)

   **Fig. 6-2 Save Dialog Box**

2. Select the type of file to save from the Type of Save File drop-down list box.

<table>
<thead>
<tr>
<th>Type of Save File</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Frame Setup(*.FRM)</td>
<td>Saves instrument (main frame) setup data.</td>
</tr>
<tr>
<td>Slot1 Setup(*.CLK)</td>
<td>Saves 3.2G internal synthesizer (OPT03) setup data</td>
</tr>
</tbody>
</table>

3. Using the Directories and Drives controls, select the directory and drive in which to save a file.

4. Type the filename of the file to save in the File Name text box with eight or fewer characters.

5. The setup procedure is now complete. Click OK to save the data. The file thus saved is given the extension .FRM or .CLK.
6.2.2 Opening setup data

With the instrument, you can open setup data or measurement data from floppy disks or hard disk. There are two ways to open setup data as follows:

- Quick Open
  This function opens multiple records of data, such as instrument setup data and unit-specific setup data, all at once. It is used to open the complete set of data at once by viewing it as an integrated environment for the instrument.

- Open
  This function opens multiple records of data, such as instrument setup data and unit-specific setup data, one at a time. It is used to open selected records of data.

Note

While the instrument supports two hard disk drives C and D, drive D is dedicated to virtual memory and is not accessible to users. Drive C is available for opening data at all times.

Quick Open procedure

1. Select [File]-[Quick Open] from the parent window menu bar. The Quick Open dialog box will open.

2. Using the Directories and Drives controls, select the directory and drive in which the environmental file to open is stored.

3. Select the filename of the environmental file to open from the File Name list box.
4. You may check the Comment check box to read the comment on the environmental file selected, or check the Information check box to view the filenames of the various files managed by the environmental file created.

5. The setup procedure is now complete. Click OK to open the data.

Open procedure

1. Select [File]-[Open] from the parent window menu bar. The Open dialog box will open.

   ![Open Dialog Box]

   **Fig. 6-4  Open Dialog Box**

2. Select the type of file to open from the Type of Open File drop-down list box.

<table>
<thead>
<tr>
<th>Mainframe Setup(*.FRM)</th>
<th>Reads instrument (mainframe) setup data.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slot1 Setup(*.CLK)</td>
<td>Reads 3.2G internal synthesizer (OPT03) setup data.</td>
</tr>
</tbody>
</table>

3. Using the Directories and Drives controls, select the directory and drive in which the file to open is stored.

4. Select the filename of the file to open from the File Name list box.

5. The setup procedure is now complete. Click OK to open the data.
6.2.3 **Manipulating files**

Data written to floppy disks or hard disk can be manipulated from the file manager. The file manager provides functions for deleting, moving, copying, and otherwise manipulating files. For more detailed procedural information, see the help files for file manager.

**Note**

1. You may change filenames with the file manager, but not the extensions. Files could become inaccessible for opening if their extensions are altered.

2. Files managed in the environmental file (one specified at Quick Open/Quick Save) could become inaccessible for opening at Quick Open if their filenames are altered.

3. To provide against possible damage to the hard disks, periodic backups of the stored data are recommended.
6.3 Choosing Remote Control

6.3.1 Choosing remote control interfaces

The instrument supports RS-232C, and GPIB (option), ETHERNET (option) as remote control interfaces. Setup procedures for using these interfaces are described below.

1. Open the 'System: System' panel.

2. Select the type of interface to use from the Remote drop-down list box.

   RS-232C(COM1) Selects the RS-232C remote control interface.

   GPIB Selects the GPIB remote control interface, only if OPT-01 (GPIB option) has been installed.

   ETHERNET Selects the ETHERNET remote control interface, only if OPT-02 (ETHERNET option) has been installed.

   None Does not use a remote control interface.

3. The setup procedure for using a remote control interface is now complete. For more interface details refer to the subsections that follow.
6.3.2 Setting RS-232C

Procedures for selecting the RS-232C remote control interface are described below.

1. Select RS-232C (COM1) from the Remote drop-down list, and the RS-232C (COM1) group box will open on the 'System: System' panel.

2. Click the Setup button in the group box. The RS-232C (COM1) dialog box will open.

![RS-232C(COM1) Setting](image)

Fig. 6-6 RS-232C(COM1) Dialog Box

3. Set the transmission speed by selecting it from the Speed drop-down list box.

<table>
<thead>
<tr>
<th>Speed</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>110</td>
<td>Sets 110 bps.</td>
</tr>
<tr>
<td>300</td>
<td>Sets 300 bps</td>
</tr>
<tr>
<td>600</td>
<td>Sets 600 bps.</td>
</tr>
<tr>
<td>1200</td>
<td>Sets 1200 bps.</td>
</tr>
<tr>
<td>2400</td>
<td>Sets 2400 bps.</td>
</tr>
<tr>
<td>4800</td>
<td>Sets 4800 bps.</td>
</tr>
<tr>
<td>9600</td>
<td>Sets 9600 bps.</td>
</tr>
<tr>
<td>19200</td>
<td>Sets 19,200 bps</td>
</tr>
</tbody>
</table>

4. Set the kind of parity by selecting it from the Parity drop-down list box.

<table>
<thead>
<tr>
<th>Parity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Even</td>
<td>Even parity</td>
</tr>
<tr>
<td>Odd</td>
<td>Odd parity</td>
</tr>
</tbody>
</table>

5. Set the transmission character length in bits by selecting it from the Data Bit drop-down list box.

<table>
<thead>
<tr>
<th>Data Bit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>8bits</td>
<td>Sets 8 bits.</td>
</tr>
<tr>
<td>7bits</td>
<td>Sets 7 bits.</td>
</tr>
</tbody>
</table>

6. Set the stop bit length by selecting it from the Stop Bit drop-down list box.

<table>
<thead>
<tr>
<th>Stop Bit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2bits</td>
<td>Sets 2 bits.</td>
</tr>
<tr>
<td>1bit</td>
<td>Sets 1 bit.</td>
</tr>
</tbody>
</table>
7. Sets the method of flow control by selecting it from the Flow Control drop-down list box.

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xon/Xoff</td>
<td>Implements flow control using the Xon/Xoff characters, in addition to the</td>
</tr>
<tr>
<td></td>
<td>RS-232C control line.</td>
</tr>
<tr>
<td>Hardware</td>
<td>Implements flow control using the RS-232C control line.</td>
</tr>
<tr>
<td>None</td>
<td>Do not implement flow control.</td>
</tr>
</tbody>
</table>

8. The RS-232C setup procedure is now complete. Click OK to enable the settings.
6.3.3 Setting GPIB

Procedures for selecting the GPIB remote control interface are described below.

1. Select GPIB from the Remote drop-down list, and the GPIB group box will open on the 'System:System' panel.
2. Click the Setup button in the group box. The GPIB dialog box will open.

![GPIB Dialog Box](image)

3. Set the GPIB address of the instrument. Specify a valid address in the GPIB Address spin box.

4. The GPIB setup procedure is now complete. Click OK to enable the settings.

6.3.4 Setting ETHERNET

There is no setup items, when you use Ethernet as remote control interface. For descriptions of Ethernet, refer to the Ethernet Option operation manual.
6.4 Setting System Operations

The instrument can be toggled between the system mode in which power failure measurement is enabled or not.

1. Open the 'System: System' panel.

![System: System Panel](image)

Fig. 6-8 System: System Panel

2. Click the Setup button next to the System Mode label in the System panel. The System Mode dialog box will open.

![System Mode Dialog Box](image)

Fig. 6-9 System Mode Dialog Box

3. Set the system operation by selecting it with an option button.

<table>
<thead>
<tr>
<th>Mode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal Mode</td>
<td>Puts the system into the mode in which power failure measurement is disabled.</td>
</tr>
<tr>
<td>Measurement Power Fail Mode</td>
<td>Puts the system into the mode in which power failure measurement is enabled.</td>
</tr>
</tbody>
</table>
Note

In these modes the following functions are operable or inoperable:

<table>
<thead>
<tr>
<th>Function</th>
<th>Normal Mode</th>
<th>Measurement Power Fail Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power failure measurement</td>
<td>×</td>
<td>○</td>
</tr>
<tr>
<td>Data saving to hard disk</td>
<td>○</td>
<td>×</td>
</tr>
<tr>
<td>PRGM pattern editing/printing with the pattern editor</td>
<td>○</td>
<td>×</td>
</tr>
</tbody>
</table>

○ : Operable  × : Inoperable

4. The setup procedure is now complete. Click OK button to enable the setting.

Note

An alteration to this setting in turn alters the setting of Microsoft® Windows® Operating System, requiring it to be rebooted. A warning message appears before the system is rebooted.

---

**CAUTION**

1. The application may access the hard disk to run when the instrument is in the normal mode. Damage to the hard disk might result, therefore, if the application is stopped without following the regular shutdown procedure, as by turning off the front-panel power switch. To protect the hard disk, follow the routines suggested in section 4.1 “Starting and Stopping the MP1632A” to stop the instrument in the normal mode.

2. In an unstable power environment prone to power failures, you should use the instrument in the power fail mode to safeguard the hard disk.
6.5 Setting Date and Time

This section describes how to set the date and time for the instrument.

1. Open the 'System: System' panel.

![System: System Panel](image)

Fig. 6-10 System: System Panel

2. Press the Setup button in the Date & Time group box. The Date & Time dialog box will open.

![Date & Time Setting](image)

Fig. 6-11 Date & Time Dialog Box

3. Set the date by entering into the Date spin box. The date will appear in year-month-day format.

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 99: Step 1</td>
<td>Sets the lower two digits of the year between 1996 and 2037.</td>
</tr>
<tr>
<td>1 to 12: Step 1</td>
<td>Sets from January to December.</td>
</tr>
<tr>
<td>1 to 31: Step 1</td>
<td>Sets the first to 31st.</td>
</tr>
</tbody>
</table>
4. Set the time by entering into the Time spin box. The time will appear in hour-minute-second format.

<table>
<thead>
<tr>
<th>Time Range</th>
<th>Step 1</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 23</td>
<td>Step 1</td>
<td>Sets from 0 to 23 hours.</td>
</tr>
<tr>
<td>0 to 59</td>
<td>Step 1</td>
<td>Sets from 0 to 59 minutes.</td>
</tr>
<tr>
<td>0 to 59</td>
<td>Step 1</td>
<td>Sets from 0 to 59 seconds.</td>
</tr>
</tbody>
</table>

5. The setup procedure is now complete. Press the OK button to enable the settings.

**Note**

The instrument has an IC to manage the measurement reference time. The instrument, when started up, makes the time data retained by the IC meaningful to the application and hardware.

You can set the date and time by using the Windows® functions even while the instrument control application is not running, but the date and time thus set would not be reflected in the time management IC in the instrument. Consequently, two different records of time data would result, the time data altered with Windows® and the time data retained by the time management IC.

If the instrument is started in this condition, the time data retained by the IC would take effect, with the result of the date and time altered with Windows® being reset to their pre-alteration status (date and time retained by the IC).

To avoid this inconvenience, you should use the application’s 'System: System' panel to make alterations to the date and time.
6.6 Setting Buzzer

This section describes how to set the ON or OFF of buzzer for the instrument.

1. Open the 'System: System' panel.

2. To switch error buzzer, press the Error button. Its On/Off status changes as often as the Error button is pressed.

3. To switch alarm buzzer, press the Alarm button. Its On/Off status changes as often as the Alarm button is pressed.

4. To switch system error buzzer, press the button specified by the arrow. Its On/Off status changes as often as the button is pressed.

5. For the system error buzzer you can select valid type of system error. Press the Setup button, and the System Error Buzzer dialog box will open.

![Fig. 6-12 System: System Panel]

![Fig. 6-13 System Error Buzzer Dialog Box]
6. Select the type of desired system error by pressing the corresponding check box. Checked system error becomes valid. Press the OK button to enable the settings.

Description of each system error is below.

(PLL Unlock)
The PLL circuit in the internal synthesizer option unlocked.

(PPG Clock Loss)
The Clock Input connector on the rear panel of the PPG unit is not connected normally.

(Delay Trouble(slot3))
The clock delay module of the PPG unit is out of order.

(Delay Trouble(slot4))
The clock delay module of the ED unit is out of order.
6.7 Checking Occurred System Error

When a system error occurs a bell-button appears at upper right corner of the parent window.

![Fig. 6-14 Bell Button](image)

Clicking this button opens a dialog box where the type of occurred system error is displayed.

![Fig. 6-15 Dialog Box displaying System errors](image)
6.8 Viewing the Configuration of Units Inserted in the MP1632A

'System:Option' panel lets you view the hardware system configuration and the software configuration of the instrument. It displays the following kinds of information:

- Hardware system configuration
  - Kinds of units inserted in slots 1 to 4
  - Availability of options for each unit
  - Availability of options for the mainframe

- Software configuration
  - Software version number
  - Units and options that can be controlled by current software version

1. Open the 'System:Option' panel.

![System:Option Panel](image)

*Fig. 6-16 System:Option Panel*
2. The hardware system configuration and the software configuration of the instrument are displayed.
   A dotted box means that the slot is empty or any other instruments current version of the software can control, is inserted the slot.
   Click the Available Unit button in the Software group box, and the Available Unit dialog box opens, giving you a look at the units and options that an be controlled with the present control application. Click OK to close this dialog box.

![Available Unit Dialog Box](image)

**Fig. 6-17 Available Unit Dialog Box**

3. Click the Option button for the mainframe or units and a drop-down list opens under the button, showing a list of options installed.

![System Option](image)

**Fig. 6-18 Option Drop-down List**
6.9 Printing Out Display Images

The instrument permits hard-copying display images to a printer.

1. Before carrying out a hard-copy operation, you need to set up the printer. Select [File]-[Printer Setup] from the parent window menu bar. The Printer Setup dialog box will open.

![Printer Setup Dialog Box](image)

Fig. 6-19 Printer Setup Dialog Box

2. Set up the printer to suit the kind of printer connected to the instrument.

3. When the setup procedure is complete, click OK to enable the setting.

4. Open the display image to hard-copy. Select [File]-[Hard Copy] from the parent window menu bar. The display image will be hard-copied to the printer connected.

Note

Make sure that printer setting is suitable. For details refer "3.2.2 Connecting peripherals".
6.10 Resetting to Factory Defaults

The instrument can be reset to its factory defaults by initializing its setup status and measurement data.

1. Select [File]-[Initialize] from the parent window menu bar.

2. The instrument is reset to its factory defaults. Before initialization begins, a warning message is displayed asking if you really want to initialize the instrument or cancel the initialization.

Note

This function initializes the setup status and measurement data in the instrument, but not its remote control settings. For the factory defaults of the individual functions see Appendix A, "Display-specific Setup Items."
6.11 Recovering Software

The instrument is controlled by Microsoft® MS-DOS® Operating System, Microsoft® Windows® Operating System, and other applications. The instrument may fail to work correctly if any part of the software is corrupted by HDD fails or invalid file manipulations.

If this happens, you need to carry out software recovery by using the recovery tool supplied with the instrument.

**Note**

1. All the data stored on the hard disk would be lost if software recovery is carried out. You should keep backup copies of the setup data stored on the hard disk beforehand.

2. Do not run the recovery tool on any machine (such as a personal computer) other than the instrument. This act constitutes a violation of the software usage obligations.

**Recovery tool configuration**

The recovery tool is designed to recover the system software, and other applications. It provides the following two functions:

1. System software recovery(Attached Recovery DISK)
   The recovery tool recovers the system software. It also makes the LEDs, rotary encoders, panel keys, touch panel, and software keyboard operable.

2. Application recovery(Attached Application DISK)
   The recovery tool recovers the control application.
Recovery preparations
Complete the following preparations before beginning software recovery:

1. Connect an external keyboard to the instrument.
   The execution of the recovery software requires an external keyboard to be connected to the keyboard. Connect a keyboard to the rear-panel keyboard connector.

2. Enable booting from the floppy disk at power-on time.
   The instrument is normally programmed to boot software from the hard disk when it is turned on. To carry out recovery, it is necessary to insert the recovery disk into the floppy disk drive and then start the recovery tool from that disk. To enable booting from the floppy disk at power-on time, do the following:
   
   ① Turn on the power. When it beeps, press the S key (letter S) while holding down the Ctrl and Alt keys. The setup window will open.

   ② Point to the Quick Boot position on the screen. The current setting is Enabled (booting from the hard disk). Using the + and - keys, change it to Disabled (booting from the floppy disk).

Note
Do not change any setting other than Quick Boot. Turning off the power will reset the setup window to its initial status.

<table>
<thead>
<tr>
<th>SETUP Utility</th>
</tr>
</thead>
<tbody>
<tr>
<td>** Standard System Parameters **</td>
</tr>
<tr>
<td>.................................................</td>
</tr>
<tr>
<td>.................................................</td>
</tr>
<tr>
<td>.................................................</td>
</tr>
<tr>
<td>.................................................</td>
</tr>
<tr>
<td>.................................................</td>
</tr>
<tr>
<td>.................................................</td>
</tr>
<tr>
<td>Quick Boot  Enabled</td>
</tr>
</tbody>
</table>

Fig. 6-20 Recovery Preparations

③ Insert the recovery disk DISK1 into the FDD.

④ Press the ESC key and then F4. The recovery tool starts from FD and recovery processing begins
Recovery procedures
The software recovery procedures are described below.

- System software recovery

1. After this system is ready for recovery, the recovery tool starts and the message below appears on the screen. When the message shown below appears, answer [Y] to proceed with recovery and partitioning. A reply of [N] will cancel recovery. For now, answer [Y].

   ![MP1632A](image)
   
   Fig. 6-21 User Confirmation Message

2. The message shown below indicates that partitioning is in progress. The system will be booted when the partitioning is complete.

   ![MP1632A](image)
   
   Fig. 6-22 Partitioning in Progress

3. When the system is booted, formatting of drives C and D begins. Before formatting starts, the message below appears on the screen to ask you if formatting is executed. In the instrument, however, [Y] is entered automatically and formatting begins.
4. When the formatting is finished, files are copied to the HD. Replace FDs according to the screen guidance.

![MP1632A Recovery Tool](image)

**Fig. 6-23 Copying in Progress**

5. The appearance of the message shown below signifies the completion of system software recovery. Remove the FD and press the [Enter] key. The system is rebooted and Windows® starts running.

![MP1632A Recovery Tool](image)

**Fig. 6-24 Completion of OS Recovery**

- Application recovery
  
  To carry out application recovery, follow these steps:

1. Insert the application installer disk DISK1 into the FDD and select [File]-[Run] from the Windows program manager. Type "a:\setup" into the Command Line text box and click OK. Application recovery will begin. Replace FDs according to the screen guidance.

2. When the recovery is finished, an application icon (icon name: [MP1632A Digital Data Analyzer]) and MP1632A group are created icon in the program manager, and Windows® restarts.

3. The recovery of the system software and applications is now complete.
Messages displayed during recovery

The messages shown below may be displayed while recovery is in progress. Suggested responses are described below.

1. "One or more Visual Basic applications are running. Please close those applications, then check OK to continue."
   This message is displayed when other application software is running.

![Fig. 6-25 Message Dialog Box (No.1)](image1)

When above dialog box appears, click OK after close other applications. Procedure closing those applications is described below.

(1) To open the Task List dialog box, double-click on wallpaper (An area displayed no windows).

![Fig. 6-26 Task List Dialog Box](image2)

(2) To reverse application title you want to close, click the title string.

(3) Press End Task.

(4) Repeat (2) and (3), until all application without "Program Manager" and "SETUP" are closed.
2. "Can not copy file A:\CTL3D.DL_ since the destination file is already in use"

![Warning message](image)

**Fig. 6-27 Message Dialog Box (No.2)**

There is no problem. Click OK.

3. "MP1632A Application is already installed. Are you sure to overwrite?"

This message is displayed when application software already exists on the hard disk (only application recovery has been carried out, without system software recovery). The system versions of the existing and installing applications are displayed in this dialog box. To display the detail of version information, push "Detail" button. Click Available Unit and the controllable units are listed. To continue recovery, click Yes; to cancel, click No.

![MP1632A Setup](image)

**Fig. 6-28 Message Dialog Box (No.3)**

4. "MP1632A application is running"

This message is displayed when the application is already running. To continue recovery, terminate the application first.

5. "The Boot ROM version isn't compatible with this application"

This message is displayed when the boot ROM (ROM required to effect instrument start-up) is newer than the version supported by the recovery tool. Click OK to cancel recovery. The recovery tool may be outdated.
6. "The Main Frame version isn't compatible with this application"
   This message is displayed when the instrument hardware is newer than the version supported
   by the recovery tool. Click OK to cancel recovery. The recovery tool may be outdated.
6.12 Using the MP1632A Menu

When the instrument application is terminated and then Windows® exited, the MP1632A menu program starts running, allowing the following menu of functions to be executed:

1. MP1632A Startup
2. Defrag
3. Scandisk
4. Windows Setup
5. MP1632A Startup with Default Settings

These functions are described below.

MP1632A Startup
Select 1 in response to Select Number on the menu, MP1632A application will start after Windows® start.

Defrag
Select 2 in response to Select Number on the menu, the MS-DOS® command Defrag will start running.

The Defrag command rearranges files, recorded on the hard disk in a discontinuous sequence, into a continuous sequence to speed up access to them. Proceed to run Defrag as directed by the screen guidance.

Note
After many cycles of writing to and reading from the hard disk, the data stored on the hard disk would be gradually fragmented, or scattered. Fragmented data takes extra time to access when compared with defragmented data, though the data itself is the same. Defragmenting stored data makes the data faster to access, without such extra time.
Scandisk

Select 3 in response to Select Number on the menu, the MS-DOS® command Scandisk will start running.

The Scandisk command analyzes the status of the disk and correct errors. Proceed to run Scandisk as directed by the screen guidance.

Note

If you continue using a hard disk without correcting defective disk space, it will eventually fill up the free space. Further, applications could fail to run successfully or data might be lost. The Scandisk command restores damaged disk areas by analyzing the disk status.

Windows Setup

Select 4 in response to Select Number on the menu, the MS-DOS® version of the Windows Setup program will start running.

The Windows Setup program displays information on the currently installed hardware and software. It also detects new hardware or software as they are installed, and set them up to make them recognizable to Windows®.

Run this program when setting up the display, keyboard, and mouse. (The Windows® version of the Windows Setup program can be run from the Windows® Main group.) Both versions are similar in function, except the ways they are run.

- Key assignment on the front panel
  Although function keys and ESC key are needed for the Windows Setup, there is not those keys on the instrument. To be able to use the Windows Setup without a keyboard, some keys on the front panel is assigned to function keys and ESC key. Following table shows their assignment.

<table>
<thead>
<tr>
<th>Keyboard</th>
<th>Panel key on the front panel</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>m/k</td>
</tr>
<tr>
<td>F3</td>
<td>n/M</td>
</tr>
<tr>
<td>F10</td>
<td>p/G</td>
</tr>
<tr>
<td>ESC</td>
<td>Remote</td>
</tr>
</tbody>
</table>

Note

Never run the Windows Setup program to alter settings, unless new peripherals have been connected to the instrument, requiring setup changes. See Chapter 3 for how to connect peripherals to the instrument.
MP1632A Startup with Default Settings

Select 5 in response to Select Number on the menu and MP1632A application will start with all setting initialized after Windows® start.
6.13 Setting a Frequency

3.2G internal synthesizer can generate clock pulses within the frequency range of 50 MHz to 3.2 GHz. Let us take a look at how to make the following settings:

- Clock source
- Reference signal
- Frequency

1. Open the 'Setup:Frequency' panel.

![Fig. 6-29 Setup:Frequency Panel](image)

2. Press the Setup button in the 3.2G Internal Synthesizer(Slot1) Setting group box. The 3.2G Internal Synthesizer(Slot1) dialog box will open.

![Fig. 6-30 3.2G Internal Synthesizer(Slot1) Dialog Box](image)
3. Set whether an internal or external reference signal is to be used by selecting a reference signal type from the Reference drop-down list box.

<table>
<thead>
<tr>
<th>INT</th>
<th>Use an internal reference signal.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXT 10MHz</td>
<td>Use an external reference signal. (10MHz)</td>
</tr>
</tbody>
</table>

4. Select a clock frequency from the Frequency spin box.

50 000kHz to 3 200 000kHz (in 1kHz steps)

5. This completes the frequency setting. Press the OK button to make the new setting effective.
3.2G internal synthesizer monitors the PLL Unlock alarm. This alarm indicates that the PLL loop has been unlocked.

When this alarm occurs, indication LED on the 'Setup:Frequency' panel lights.

Fig. 6-31 Setup:Frequency Panel
6.15 For the Users of the Existing BERTS

6.15.1 Customize Subwindow

The Customize subwindow is a setup screen that adopts the 1-key/1-parameter operation method of the existing BERTS, allowing you to monitor the measurement result by inputting measurement parameters directly. The screen consists of a total of eight frames: six Setup frames, a Result frame, and a Pattern Edit frame. The user can freely assign setting items to these frames, so only one screen is required to perform all operations necessary to carry out measurements. For example, using the Customize subwindow allows you to measure an error rate with the clock frequency changed continuously.

![Customize Subwindow](image)

Fig. 6-32 Customize Subwindow

To change a setting, press the button in the associated frame. The LED on the left of the button will light to indicate that setting is enabled. When the button is pressed again, the LED goes off to indicate that setting is disabled. Of all frames of the Customize subwindow, only one frame can be used at a time to make settings. Table 6-1 lists the setting items that can be assigned to the six Setup frames of the Customize subwindow.

<table>
<thead>
<tr>
<th>Setting items related to 3.2G internal synthesizer</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Frequency</strong></td>
</tr>
<tr>
<td><strong>Setting items related to PPG/ED</strong></td>
</tr>
<tr>
<td><strong>Clock output/input interface</strong></td>
</tr>
<tr>
<td><strong>Amplitude, Offset, Delay, Duty, Polarity</strong></td>
</tr>
<tr>
<td><strong>Data output/input interface</strong></td>
</tr>
<tr>
<td><strong>Amplitude, Offset, Threshold, Cross Point</strong></td>
</tr>
<tr>
<td><strong>Pattern</strong></td>
</tr>
<tr>
<td><strong>Mark Ratio, Logic, Pattern</strong></td>
</tr>
<tr>
<td><strong>Error/Alarm Measurement</strong></td>
</tr>
<tr>
<td><strong>Error Type, MEAS. Mode, MEAS. Time</strong></td>
</tr>
</tbody>
</table>

For details on the settings related to the PPG/ED, refer to the "MU163220A 3.2G Pulse Pattern Generator and MU163240A 3.2G Error Detector Operating Manual."
6.15.2 Assigning setting items to Setup frames

This section describes the procedures for assigning setting items to Setup frames. A maximum of six items can be assigned.

1. Press the Display Setup button in the Customize subwindow.

![Display Setup button in Customize Subwindow](image)

**Fig. 6-33 Display Setup button in Customize Subwindow**

The Customize Window Display Setup dialog box will open.

![Display Setup Dialog Box](image)

**Fig. 6-34 Display Setup Dialog Box**

2. Select a frame to which a setting item is to be assigned. Press a tab (Setup1 to Setup6) to open a desired panel.

3. When multiple units are used in combination, select the target unit from the Unit drop-down list box. When it is not necessary to assign any setting item, select OFF.

**Note**

For the setting item assignment procedure to be followed when a unit other than the "3.2G Internal Synthesizer(Slot1)" is selected, refer to the operation manual that comes with the selected unit.

4. Select a setting item from the Item drop-down list box (1). For the selectable setting items. Here, you can select only Frequency.

5. After selecting the setting item, press the OK button.
7.1 Clock Output

This section describes the procedures for checking the main function of the 3.2G Internal Synthesizer option. Some equipment in below figures is required for this performance test.

7.1.1 Internal clock output

1. To test waveform and frequency of the internal clock output signal, connect equipment as Fig.7-1.

   ![Diagram of internal clock output setup]

   (1) Connect the Clock Output to the signal input of a sampling oscilloscope through a power splitter(-6dB).
   (2) Connect the Clock Output to the trigger input of a sampling oscilloscope through a power splitter(-6dB) and a trigger countdown.
   (3) Connect the Clock Output to the input of a frequency counter (MF76A).

   **Fig. 7-1 Connection for the internal clock output test**

   **CAUTION ⚠**

   Use proper attenuators to input level of the oscilloscope and frequency counter you use. There is a risk of damage to equipment.

2. Make settings on the 'Setup:Frequency' panel as following.
   - Reference drop-down list box : Select "INT"
   - Frequency drop-down list box : Input "3 200 000 kHz"

3. Confirm that the frequency value measured by the frequency counter ranges 3.2GHz ± 6400Hz.
4. Confirm that the amplitude of the waveform measured by the sampling oscilloscope is in the range according to Fig. 7-2.

![Waveform Diagram](image)

**Fig. 7-2** Specification of the clock output signal waveform

5. Change Frequency on the 'Setup: Frequency' to "1 600 001 kHz" and "50 000kHz", and test in the same way as procedure 3 and 4. The specification at each frequency is shown below.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 600 001kHz</td>
<td>1,600,001kHz ± 3,200,002Hz</td>
</tr>
<tr>
<td>50 000kHz</td>
<td>50,000kHz ± 100Hz</td>
</tr>
</tbody>
</table>
8.1 Daily Care

- To remove surface smears from the instrument, wipe with a cloth moistened with a weak neutral detergent solution.
- If dirt or dust collects on the instrument, suck with a vacuum cleaner.
- Clean head of floppy disk drive with 3.5 inch head cleaning disk set regularly.
- If parts, such as screws, get loose, retighten them using a specified tool.

8.2 Storage Notes

Pay attention of following points when storing the instrument for long time.

1. Remove surface dirt, smears, and other foreign before storing the instrument.
2. Avoid storing the instrument at +60°C or higher or -20°C or lower, or at relative humidities of 85% or higher.
3. Avoid storing the instrument in places that are exposed to direct sunlight or that are dusty.
4. Avoid storing the instrument in places where drops of water may collect on it or it may be affected by active gases.
5. Avoid storing the instrument in places that are liable to oxidation or subject to violent vibration.

- Recommended long-term storage conditions
The instrument should be stored over a long period of time in an environment meeting the following conditions, as well as those suggested above:

1. Temperature: 5°C to 45°C
2. Relative humidity: 40% to 75%
3. Little temperature and humidity change per day
8.3 Shipping

When shipping the instrument, package it in the packing materials in which it had been delivered if they are still retained; if not, follow the packaging steps below. In handing the instrument, wear clean gloves and handle it gently with care not scratch or dent it.

1. Clean the exterior surfaces of the instrument with a dry cloth to remove smears and dirt.
2. Check for loose screws or screws out of position.
3. Safeguard the structural projections or those parts that may get easily deformed, and wrap the instrument in polyethylene sheets, and then package in moisture-proof paper.
4. Put the packaged instrument in a corrugated fiberboard box, sealing the seams with adhesive tapes. Finally, house the package in a skidded wooden box to suit the shipping distance, means and other relevant conditions.
5. In shipping, keep the instrument in an environment that meets the conditions suggested in Section 8.2, "Storage Notes".

8.4 Calibration

The instrument can be calibrated only by the manufacturer and nobody else. Periodic calibration is recommended to sustain satisfactory performance.

8.5 Scrapping

The instrument contains a lithium battery. Its scrapping must conform to the requirements of the governing national and local regulations.
APPENDIXES
## Appendix A Display-specific Setup Items

<table>
<thead>
<tr>
<th>Panel</th>
<th>Group box</th>
<th>Setup item</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>System: System</td>
<td>Remote</td>
<td>RS-232C(COM1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>System Mode</td>
<td>Normal Mode</td>
<td></td>
</tr>
<tr>
<td>RS-232C(COM1)</td>
<td>Speed</td>
<td>9600</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Parity</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Data Bit Length</td>
<td>8bits</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stop Bit Length</td>
<td>1bit</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Flow Control</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>GPIB</td>
<td>GPIB Address</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Buzzer: System Error</td>
<td></td>
<td>ON</td>
<td></td>
</tr>
<tr>
<td>Buzzer: Measurement</td>
<td>Error</td>
<td>ON</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Alarm</td>
<td>ON</td>
<td></td>
</tr>
<tr>
<td>Setup: Frequency</td>
<td>3.2G Internal Synthesizer</td>
<td>Reference</td>
<td>INT</td>
</tr>
<tr>
<td></td>
<td>Setting: Clock</td>
<td>Frequency</td>
<td>3200000</td>
</tr>
</tbody>
</table>
Appendix B  Troubleshooting

The instrument is loaded with the Microsoft® MS-DOS® Operating System and Microsoft® Windows® Operating System, so you can run applications or make Windows® setup changes the same way as you run Windows® on a personal computer.

This appendix lists problems that may result from Windows® setup changes and the suggested remedies.

■ The touch screen does not work
The touch screen would be disabled if you alter the mouse driver setting with the Windows Setup program.  Set the mouse to TTwin v3.20:AR5000 and Digitouch with the Windows Setup program and restart Windows®.  The touch panel will become operable after Windows® has been restarted.

■ The front-panel LCD display is off
The front-panel LCD would be turned off if you select ChipsCPL from Windows® Control Panel, start the display Driver Control Panel program, and then select CRT in the Display group box.

If an external display is connected to the instrument, select Both in the Display group box while observing the external display. The LCD display will be turned on. If an external display is not connected to the instrument, turn off the power, but not before checking to see that the hard disk access lamp is off. The LCD display will be restored when the instrument is turned on subsequently.

■ The external display is off
The external display would be turned off if you select ChipsCPL from Windows® Control Panel, start the display Driver Control Panel program, and then select LCD in the Display group box.

Select Both in the Display group box while observing the front-panel LCD. The external display will be restored.

■ Application characters are not displayed correctly
Application characters would not be displayed correctly if you delete the font of characters used by the instrument application by running the Fonts program from Windows® Control Panel.

Reinstall the font deleted by running the Fonts program again.
Message asking for Windows® disk insertion appears

When you are setting printers with the Windows® Control Panel, message like "Insert Microsoft Windows 3.1 Disk #5 ...." may appear. In such a case, insert the correspond recovery FD. The correspondence between number in the message and number labeled recovery FD, is shown below.

<table>
<thead>
<tr>
<th>Number in the message</th>
<th>1</th>
<th>2</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number labeled recovery FD</td>
<td>5</td>
<td>6</td>
<td>9</td>
<td>10</td>
</tr>
</tbody>
</table>
Appendix C  Entry Table of Performance Test Result

Instrument Name  : Option-03 3.2G internal synthesizer
Serial No.        : __________________
Ambient Temperature: ___°C
Ambient Humidity  : ___%

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|}
\hline
Frequency [Hz] & Standard [Hz] & Result \\
\hline
3,200,000,000 & 3,200,000,000±6400 & \\
\hline
1,600,001,000 & 1,600,001,000±3200.002 & \\
\hline
50,000,000 & 50,000,000±100 & \\
\hline
\end{tabular}
\end{table}