MD1230B
Data Quality Analyzer
Operation Manual

32nd Edition

For safety and warning information, please read this manual before attempting to use the equipment.
Keep this manual with the equipment.

ANRITSU CORPORATION

Document No.: M-W1927AE-32.0

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. Ensure that you clearly understand the meanings of the symbols BEFORE using the equipment. Some or all of the following symbols may be used on all Anritsu equipment. In addition, there may be other labels attached to products that are not shown in the diagrams in this manual.

Symbols used in manual

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

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

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

Safety Symbols Used on Equipment and in Manual

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

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

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

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

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

These indicate that the marked part should be recycled.

MD1230B
Data Quality Analyzer
Operation Manual

17 September 2001 (First Edition)
20 February 2015 (32nd Edition)

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

For Safety

⚠ WARNING

- ALWAYS refer to the operation manual when working near locations at which the alert mark shown on the left is attached. If the advice in the operation manual is not followed there is a risk of personal injury or reduced equipment performance. The alert mark shown on the left may also be used with other marks and descriptions to indicate other dangers.

- Overvoltage Category
  This equipment complies with overvoltage category II defined in IEC 61010. DO NOT connect this equipment to the power supply of overvoltage category III or IV.

- Laser radiation warning
  - NEVER look directly into the cable connector on the equipment nor into the end of a cable connected to the equipment. There is a risk of injury if laser radiation enters the eye.
  - The Laser Safety label is attached to the equipment for safety use as indicated in "Laser Safety" later in this section.

Electric Shock

- To ensure that the equipment is grounded, always use the supplied 3-pin power cord, and insert the plug into an outlet with a ground terminal. If power is supplied without grounding the equipment, there is a risk of receiving a severe or fatal electric shock or causing damage to the internal components.

Repair

- Only qualified service personnel with a knowledge of electrical fire and shock hazards should service this equipment. This equipment cannot be repaired by the operator. DO NOT attempt to remove the equipment covers or unit covers or to disassemble internal components. There 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 components.

For Safety

⚠ WARNING

Calibration

- The performance-guarantee seal verifies the integrity of the equipment. To ensure the continued integrity of the equipment, only Anritsu service personnel, or service personnel of an Anritsu sales representative, should break this seal to repair or calibrate the equipment. Be careful not to break the seal by opening the equipment or unit covers.If the performance-guarantee seal is broken by you or a third party, the performance of the equipment cannot be guaranteed.

Falling Over

- This equipment should always be positioned in the correct manner. 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.
  Always set up the equipment in a position where the power switch can be reached without difficulty.

Replacing Battery

- When replacing the battery, use the specified battery and insert it with the correct polarity. If the wrong battery is used, or if the battery is inserted with reversed polarity, there is a risk of explosion causing severe injury or death.

For Safety

⚠ WARNING

Battery Fluid

- DO NOT short the battery terminals and never attempt to disassemble the battery or dispose of it in a fire. If the battery is damaged by any of these actions, the battery fluid may leak. This fluid is poisonous.
  DO NOT touch the battery fluid, ingest it, or get in your eyes. If it is accidentally ingested, spit it out immediately, rinse your mouth with water and seek medical help. If it enters your eyes accidentally, do not rub your eyes, rinse them with clean running water and seek medical help. If the liquid gets on your skin or clothes, wash it off carefully and thoroughly.

Battery Disposal

- DO NOT expose batteries to heat or fire. Do not expose batteries to fire. This is dangerous and can result in explosions or fire. Heating batteries may cause them to leak or explode.

LCD

- This equipment uses a Liquid Crystal Display (LCD). DO NOT subject the equipment to excessive force or drop it. If the LCD is subjected to strong mechanical shock, it may break 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, rinse 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

Fuse Replacement

- Always remove the mains power cable from the power outlet before replacing blown fuses. There is a risk of electric shock if fuses are replaced with the power cable connected. Replace the fuses with the same type. Failure to do so may result in fire.

  T15A indicates a time-lag fuse.

Cleaning

- Always remove the main power cable from the power outlet before cleaning dust around the power supply and fan.
  - Clean the power inlet regularly. If dust accumulates around the power pins, 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.

Check Terminal

- Never input a signal of more than the indicated value between the measured terminal and ground. Input of an excessive signal may damage the equipment.

For Safety

Laser Safety

Class 1, 1M indicate the danger degree of the laser radiation specified below according to IEC 60825-1:2007.

Class 1: Lasers that are safe under reasonably foreseeable conditions of operation, including the use of optical instruments for intrabeam viewing.

Class 1M: Lasers emitting in the wavelength range from 302.5 to 4000 nm that are safe under reasonably foreseeable conditions of operation, but may be hazardous if the user employs optics within the beam. Two conditions apply:

a) for diverging beams, if the user views the laser output with certain optical instruments (for example, eye loupes, magnifiers and microscopes) within a distance of 100 mm ; or

b) for collimated beams, if the user views the laser output with certain optical instruments (for example , telescopes and binoculars).

⚠ CAUTION

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.
The use of optical instruments with this product will increase eye hazard.

⚠ WARNING

The laser in the plug-in unit provided for this equipment is classified as Class 1 or 1M according to the IEC 60825-1:2007 standard, and is safe under reasonably foreseeable operating conditions.

Never use optical instruments to directly view Class 1M laser products. Doing so may result in serious damage to the eyes.

For Safety

Table 1 Laser Safety Classifications Based on IEC 60825-1:2007

Model Name	Class	Max. Optical Output Power (mW)*	Pulse Width (s)/ Repetition Rate	Emitted Wavelength (nm)	Beam Divergence (deg)	Incorporated Laser Specification (refer to Table 2)	Laser Aperture
MU120112A	1	0.4	CW	850	32.0	G0105A	Figure1 [1]
		2.6	CW	1310	11.5	G0107A	
		2.6	CW	1550	11.5	G0108A	
MU120118B	1	0.74	CW	850	23.0	G0277A	Figure2 [1]
		1.2	CW	1310	11.5	G0192A	
		2.6	CW	1550	11.5	G0193A	
MU120118C	1	0.74	CW	850	23.0	G0277A	Figure [1]
		1.2	CW	1310	11.5	G0192A	
		2.6	CW	1550	11.5	G0193A	
MU120122A	1	0.6	CW	850	32.0	G0181A	Figure4 [1]
		2.0	CW	1310	11.5	G0183A	
		3.2	CW	1550	11.5	G0184A	
MU120132A	1	0.6	CW	850	32.0	G0181A	Figure5 [1]
		2.0	CW	1310	11.5	G0183A	
		3.2	CW	1550	11.5	G0184A	
MU120138A	1M	0.8	CW	850	32.0	G0238A	Figure6 [1]
	1	1.2	CW	1310	11.5	G0239A	
		2.6	CW	1550	11.5	G0271A	

*: Indicates the possible optical output power when each and every reasonably foreseeable single-fault condition is included.

The following products are now discontinued.
For Laser Safety Classifications of the discontinued products, see *MD1230B Data Quality Analyzer Operation Manual, 27th Edition*.

MU120102A, MU120103A, MU120103B, MU120104A, MU120104B, MU120105A, MU120106A, MU120118A, MU120119A, MU120120A

Table 2 Incorporated Laser Specification

Incorporated Laser	Max. Optical Output Power (mW)*	Pulse Width (s)/ Repetition Rate	Emitted Wavelength (nm)	Beam Divergence (deg)
G0105A	0.4	CW	850	32.0
G0107A	2.6	CW	1310	11.5
G0108A	2.6	CW	1550	11.5
G0181A	0.6	CW	850	32.0
G0183A	2.0	CW	1310	11.5
G0184A	3.2	CW	1550	11.5
G0192A	1.2	CW	1310	11.5
G0193A	2.6	CW	1550	11.5
G0238A	0.8	CW	850	32.0
G0239A	1.2	CW	1310	11.5
G0271A	2.6	CW	1550	11.5
G0277A	0.74	CW	850	23.0

*: Maximum output power is the estimated value when something breaks down.

For Safety

Table 4 Labels on Product

	Type	Label	Affixed to:	Model Name
1	Explanatory label (IEC 60825-1)		Figure1 A	MU120112A
			Figure4 A	MU120122A
2	Explanatory label (IEC 60825-1)		Figure2 A	MU120118B
			Figure3 A	MU120118C
			Figure7 B	MD1230B
3	Explanatory label (IEC 60825-1)		Figure5 A	MU120132A
4	Explanatory label (IEC 60825-1)		Figure6 A	MU120138A
5	Explanatory label (IEC 60825-1)		Figure6 B	MU120138A
6	Explanatory label (IEC 60825-1)		Figure7 A	MD1230B
7	Certification label (21 CFR 1040.10)		Figure7 C	MD1230B
8	Identification label (21 CFR 1040.10)		Figure7 D	MD1230B

Laser Radiation Markings

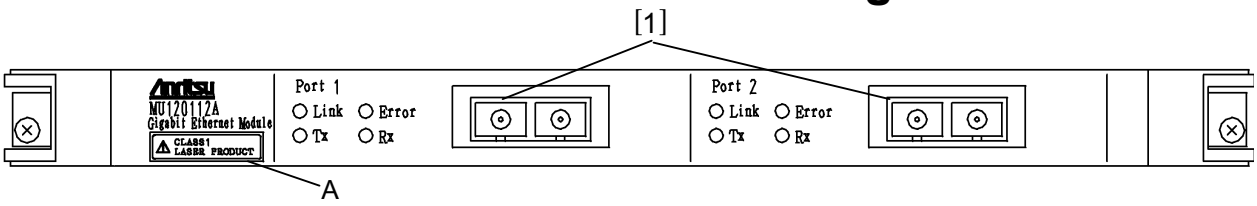


Figure 1 Front panel of MU120112A unit

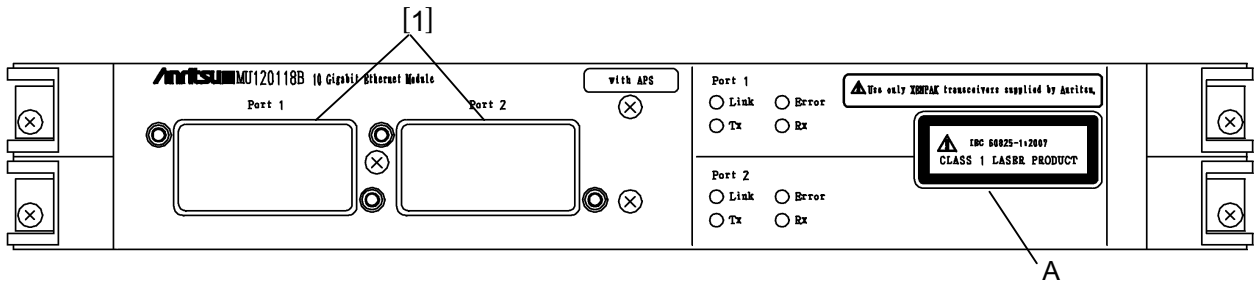


Figure 2 Front panel of MU120118B unit

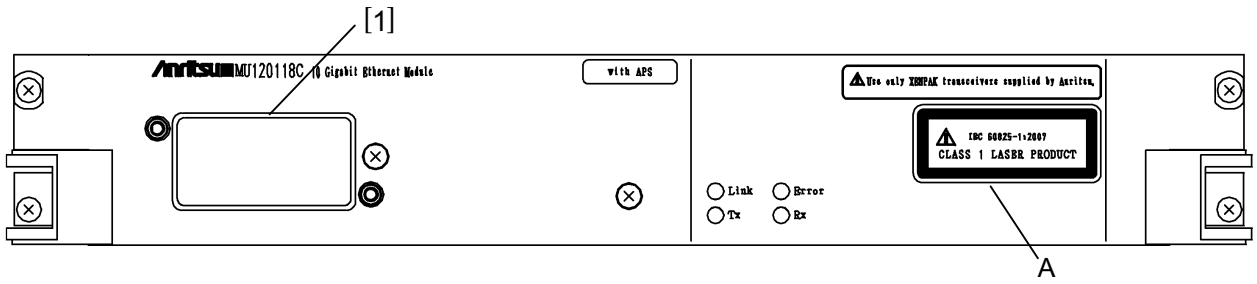


Figure 3 Front panel of MU120118C unit

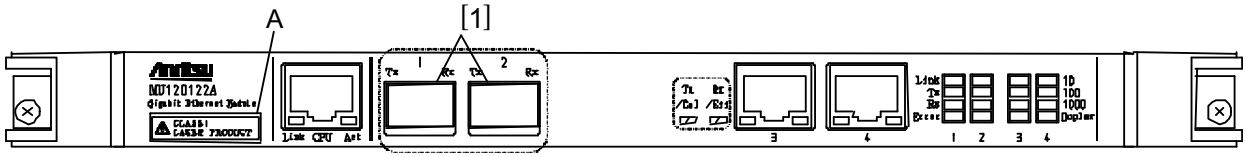


Figure 4 Front panel of MU120122A unit

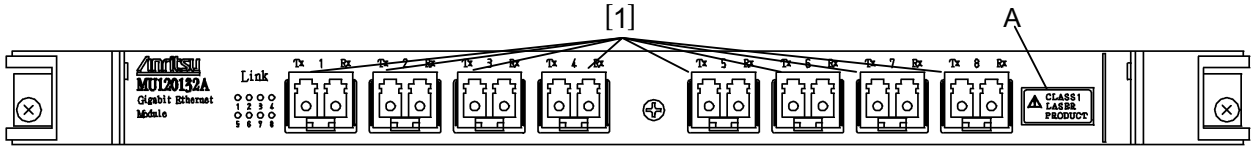


Figure 5 Front panel of MU120132A unit

For Safety

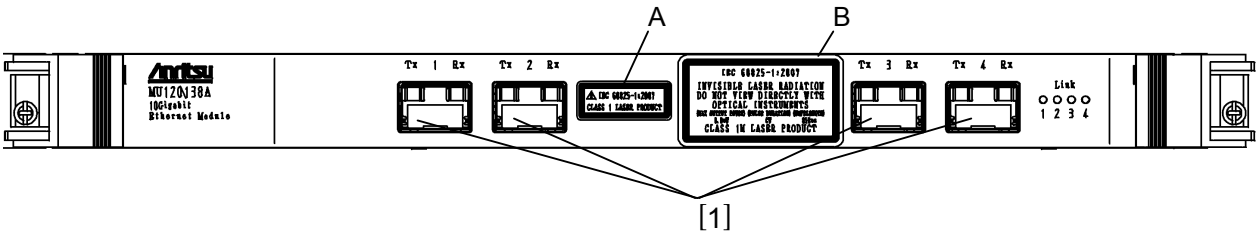


Figure 6 Front panel of MU120138A unit

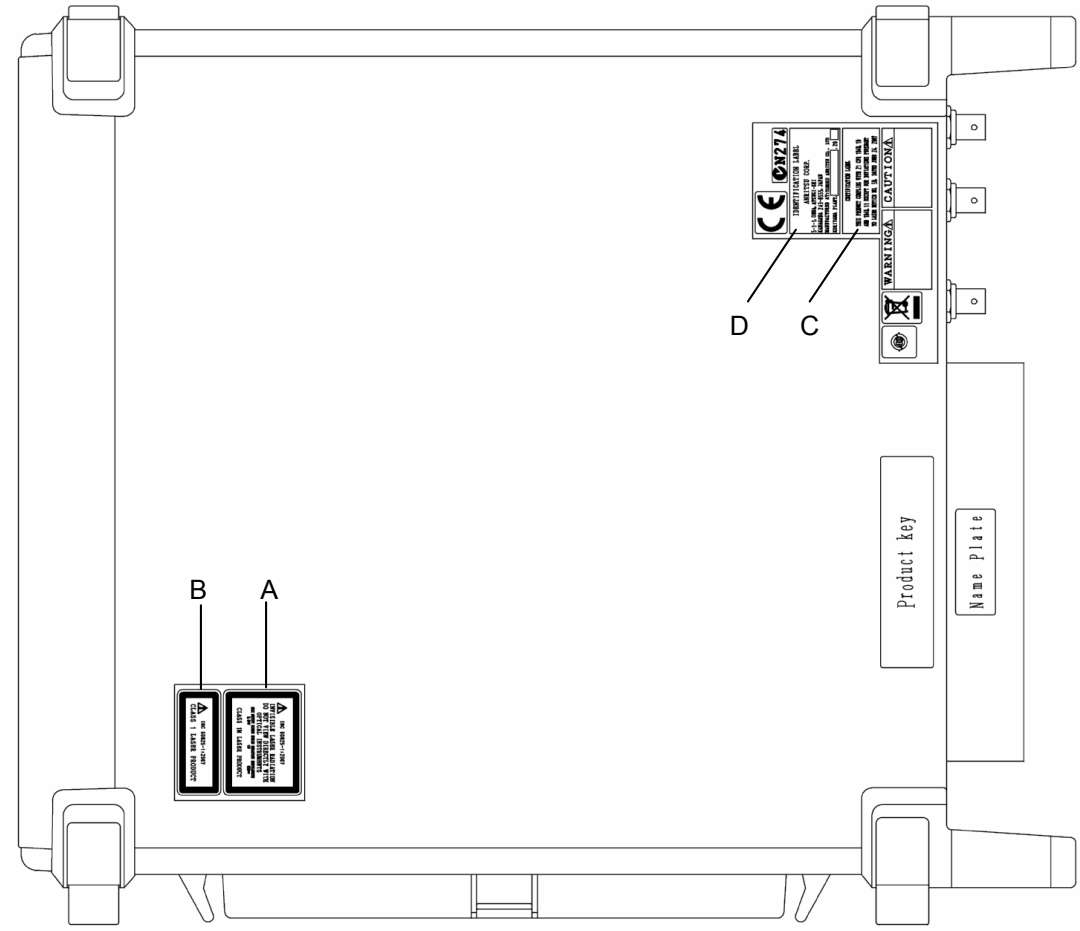


Figure 7 Top panel of MD1230B

For Safety

⚠ CAUTION

Replacing Memory Back-up Battery

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

Note: The battery used in this equipment has a maximum useful life of 7 years. It should be replaced before this period has elapsed.

External Storage Media

This equipment uses floppy disks as external storage media for storing data and programs.

If this media is mishandled or becomes faulty, important data may be lost. To prevent this chance occurrence, all important data and programs should be backed-up.

Anritsu will not be held responsible for lost data.

Pay careful attention to the following point.

- Never remove the floppy disk from the data quality analyzer while it is being accessed.
- The external storage media shipped with the instrument has been thoroughly tested. Users should note that since all other devices have not been tested in this manner, Anritsu is unable to guarantee their performance or suitability.

Floppy Disk

Do not place in a dusty area.
Clean the magnetic head periodically to ensure normal operation.

For Safety

⚠ CAUTION

Hard disk

The equipment is equipped with an internal hard disk from which, as with any hard disk, data may be lost under certain conditions. To prevent this chance occurrence, all important data and programs should be backed-up.
Anritsu will not be held responsible for lost data.

To reduce the possibility of data loss, particular attention should be given to the following points.

- The equipment should only be used within the recommend temperature range, and should not be used in locations where the temperature may fluctuate suddenly.
- Always follow the guidelines to ensure that the equipment is set up in the specified manner.
- Always ensure that the fans at the rear and side of the equipment are not blocked or obstructed in any way.
- Exercise care not to bang or shake the equipment whilst the power is on.
- Never disconnect the mains power at the plug or cut the power at the breaker with the equipment turned on.

Use in a Residential Environment

This equipment is designed for an industrial environment.
In a residential environment, this equipment may cause radio interference in which case the user may be required to take adequate measures.

Use in Corrosive Atmospheres

Exposure to corrosive gases such as hydrogen sulfide, sulfurous acid, and hydrogen chloride will cause faults and failures.
Note that some organic solvents release corrosive gases.

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 National Institute of Advanced Industrial Science and Technology, and the National Institute of Information and Communications Technology, and was found to meet the published specifications.

Anritsu Warranty

Anritsu Corporation will repair this equipment free-of-charge if a malfunction occurs within one year after shipment due to a manufacturing fault. However, software fixes will be made in accordance with the separate Software End-User License Agreement. Moreover, Anritsu Corporation will deem this warranty void when:

- The fault is outside the scope of the warranty conditions separately described in the operation manual.
- The fault is due to mishandling, misuse, or unauthorized modification or repair of the equipment by the customer.
- The fault is due to severe usage clearly exceeding normal usage.
- The fault is due to improper or insufficient maintenance by the customer.
- The fault is due to natural disaster, including fire, wind, flooding, earthquake, lightning strike, or volcanic ash, etc.
- The fault is due to damage caused by acts of destruction, including civil disturbance, riot, or war, etc.
- The fault is due to explosion, accident, or breakdown of any other machinery, facility, or plant, etc.
- The fault is due to use of non-specified peripheral or applied equipment or parts, or consumables, etc.
- The fault is due to use of a non-specified power supply or in a non-specified installation location.
- The fault is due to use in unusual environments(Note).
- The fault is due to activities or ingress of living organisms, such as insects, spiders, fungus, pollen, or seeds.

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

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

Note:
For the purpose of this Warranty, "unusual environments" means use:

- In places of direct sunlight
- In dusty places
- Outdoors
- In liquids, such as water, oil, or organic solvents, and medical fluids, or places where these liquids may adhere
- In salty air or in place chemically active gases (sulfur dioxide, hydrogen sulfide, chlorine, ammonia, nitrogen dioxide, or hydrogen chloride etc.) are present
- In places where high-intensity static electric charges or electromagnetic fields are present
- In places where abnormal power voltages (high or low) or instantaneous power failures occur
- In places where condensation occurs
- In the presence of lubricating oil mists
- In places at an altitude of more than 2,000 m
- In the presence of frequent vibration or mechanical shock, such as in cars, ships, or airplanes

Anritsu Corporation Contact

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

Notes On Export Management

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

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

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

FOR CALIFORNIA USA ONLY

This product contains a CR Coin Lithium Battery which contains Perchlorate Material – special handling may apply; See www.dtsc.ca.gov/hazardouswaste/perchlorate

Crossed-out Wheeled Bin Symbol

Equipment marked with the Crossed-out Wheeled Bin Symbol complies with council directive 2012/19/EC (the ”WEEE Directive") in European Union.

For Products placed on the EU market after August 13, 2005, please contact your local Anritsu representative at the end of the product's useful life to arrange disposal in accordance with your initial contract and the local law.

Software End-User License Agreement (EULA)

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

1. Grant of License and Limitations

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

2. Disclaimers

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

3. Limitation of Liability

a. If a fault (bug) is discovered in this Software, preventing operation as described in the operation manual or specifications whether or not the customer uses this software as described in the manual, Anritsu shall at its own discretion, fix the bug, or exchange the software, or suggest a workaround, free-of-charge. However, notwithstanding the above, the following items shall be excluded from repair and warranty.
   i) If this Software is deemed to be used for purposes not described in the operation manual or specifications.
   ii) If this Software is used in conjunction with other non-Anritsu-approved software.
   iii) Recovery of lost or damaged data.
   iv) If this Software or the Equipment has been modified, repaired, or otherwise altered without Anritsu's prior approval.
   v) For any other reasons out of Anritsu's direct control and responsibility, such as but not limited to, natural disasters, software virus infections, etc.

b. Expenses incurred for transport, hotel, daily allowance, etc., for on-site repairs by Anritsu engineers necessitated by the above faults shall be borne by you.

c. The warranty period for faults listed in article 3a above covered by this EULA shall be either 6 months from the date of purchase of this Software or 30 days after the date of repair, whichever is longer.

4. Export Restrictions

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

5. Termination

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

6. Reparations

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

7. Responsibility after Termination

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

8. Dispute Resolution

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

9. Court of Jurisdiction

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

Cautions against computer virus infection

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

CE Conformity Marking

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

CE marking

1. Product Model

Model: MD1230B Data Quality Analyzer

2. Applied Directive

EMC: Directive 2004/108/EC
LVD: Directive 2006/95/EC

3. Applied Standards

- EMC: Emission: EN 61326-1: 2013 (Class A)
  Immunity: EN 61326-1: 2013 (Table 2)

	Performance Criteria*
IEC 61000-4-2 (ESD)	B
IEC 61000-4-3 (EMF)	A
IEC 61000-4-4 (Burst)	B
IEC 61000-4-5 (Surge)	B
IEC 61000-4-6 (CRF)	A
IEC 61000-4-11 (V dip/short)	B, C

*: Performance Criteria

A: The equipment shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the equipment if used as intended.

B: The equipment shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed. No change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the equipment if used as intended.

C: Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

Harmonic current emissions:
EN 61000-3-2: 2006 +A1:2009 A2:2009
(Class A equipment)

- LVD: EN 61010-1: 2010 (Pollution Degree 2)

4. Authorized representative

Name:	Murray Coleman Head of Customer Service EMEA ANRITSU EMEA Ltd.
Address, city:	200 Capability Green, Luton Bedfordshire, LU1 3LU
Country:	United Kingdom

C-Tick Conformity Marking

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

C-Tick marking

1. Product Model

Model: MD1230B Data Quality Analyzer

2. Applied Standards

EMC: Emission: EN 61326-1: 2013 (Class A equipment)

About Eco Label

The label shown on the left is attached to Anritsu products meeting our environmental standards.

Details about this label and the environmental standards are available on the Anritsu website at http://www.anritsu.com

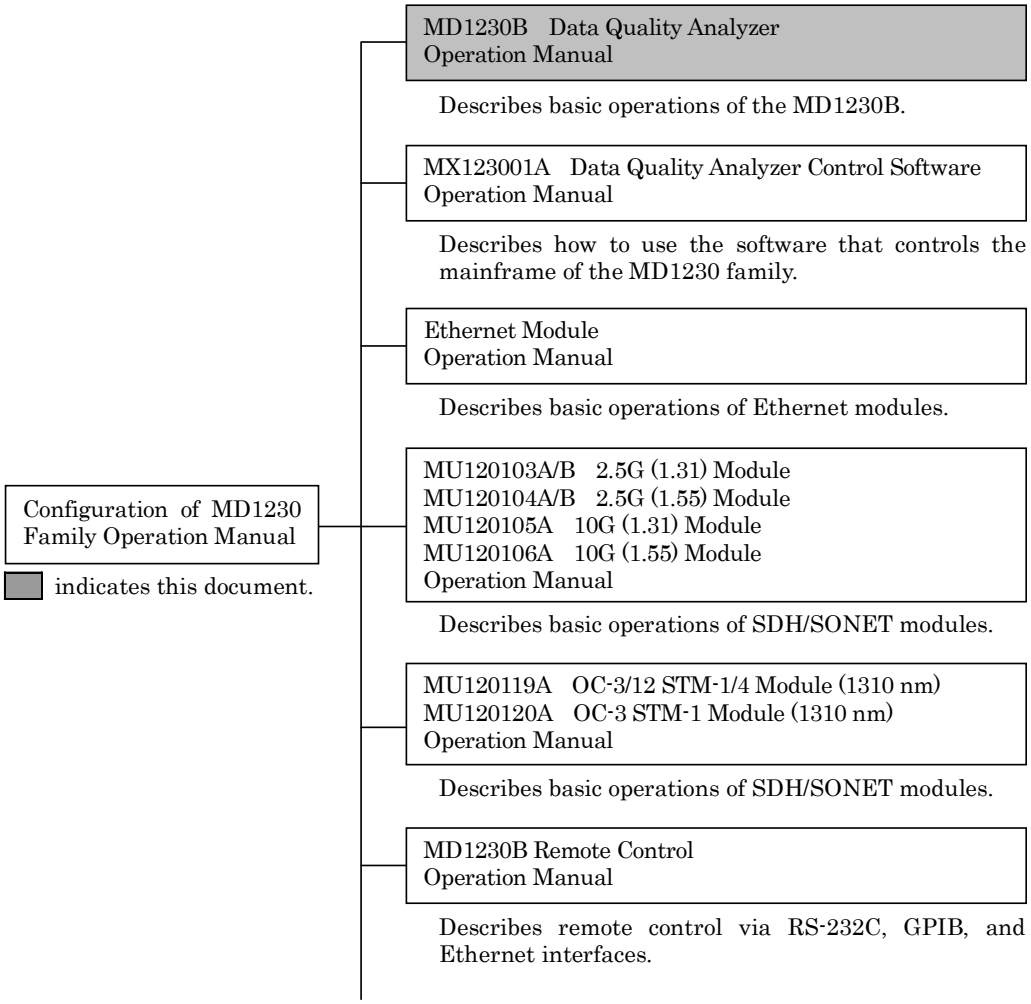
About This Manual

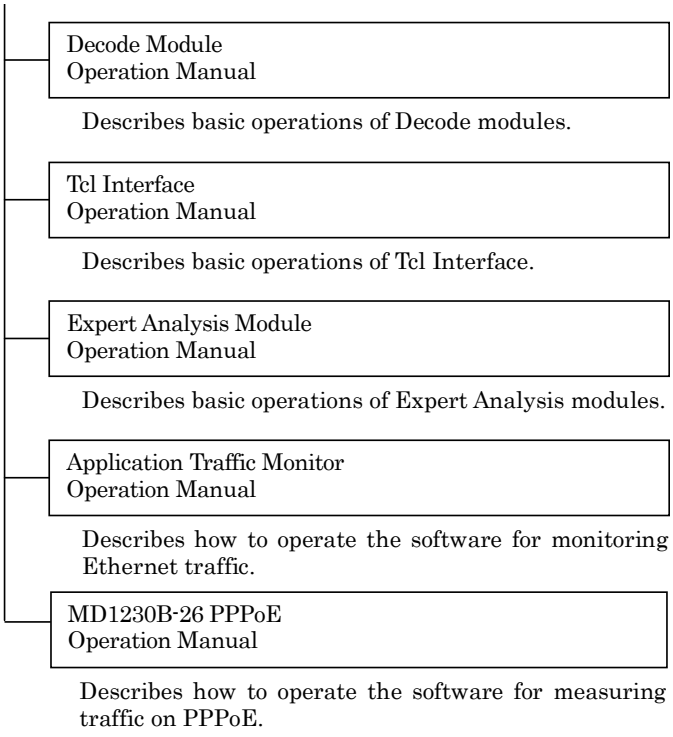
The MD1230 family operation manuals consist of separate documents for the main unit, control software, module(s), remote control operation, and options, as shown below.

Note:

MD1230 family is a general name for the MD1230A/B Data Quality Analyzer, the MD1231A/A1 IP Network Analyzer, and the MT7407A Multislot Chassis.

Note that the MD1230A, MD1231A/A1, and MT7407A are not supported in Ver. 7.0 and above.




Decode Module
Operation Manual
Describes basic operations of Decode modules.
Tcl Interface
Operation Manual
Describes basic operations of Tcl Interface.
Expert Analysis Module
Operation Manual
Describes basic operations of Expert Analysis modules.
Application Traffic Monitor
Operation Manual
Describes how to operate the software for monitoring Ethernet traffic.
MD1230B-26 PPPoE
Operation Manual
Describes how to operate the software for measuring traffic on PPPoE.

In this manual, abbreviations of module names are used.

(1) Module names

Correspondence of the abbreviations and full module names are shown in the table below:

Abb.	Full Name
01A	MU120101A: 10M/100M Ethernet Module
02A	MU120102A: Giga-bit Ethernet Module
03A	MU120103A: 2.5G (1.31) Module
03B	MU120103B: 2.5G (1.31) Module
04A	MU120104A: 2.5G (1.55) Module
04B	MU120104B: 2.5G (1.55) Module
05A	MU120105A: 10G (1.31) Module
06A	MU120106A: 10G (1.55) Module
11A	MU120111A: 10/100M Ethernet Module
12A	MU120112A: Giga-bit Ethernet Module
18A	MU120118A: 10 Giga-bit Ethernet Module
18B	MU120118B: 10 Giga-bit Ethernet Module
18C	MU120118C: 10 Giga-bit Ethernet Module
19A	MU120119A: OC-3/12 STM-1/4 Module (1310 nm)
20A	MU120120A: OC-3 STM-1 Module (1310 nm)
21A	MU120121A: 10/100/1000M Ethernet Module
22A	MU120122A: Giga-bit Ethernet Module
31A	MU120131A: 10/100/1000M Ethernet Module
32A	MU120132A: Giga-bit Ethernet Module
38A	MU120138A: 10 Giga-bit Ethernet Module

Multiple modules are expressed as shown below:

- MU120101A and MU120102A:
  "MU120101A/02A"

Table of Contents

For Safety iii

About This Manual I

Section 1 Overview 1-1

1.1 Product Overview 1-2
1.2 Product Characteristics 1-3
1.3 Product Configuration 1-4
1.4 Module Configuration 1-5

Section 2 Before Use 2-1

2.1 Environmental Conditions at Installation Site 2-2
2.2 Carrying Method 2-3
2.3 Where to Place Product 2-4
2.4 Distance from Cooling Fan 2-5
2.5 Power Connection 2-6
2.6 Connection with Peripherals 2-8
2.7 Attaching/Removing Module 2-10
2.8 Floppy Disk 2-14

Section 3 Names and Functions of Parts .. 3-1

3.1 Front Panel 3-2
3.2 Rear Panel 3-5
3.3 Side Panel 3-8

Section 4 Power-on and Shutdown 4-1

4.1 Power-on Procedure 4-2
4.2 Shutdown Procedure 4-3
4.3 Selector Screen 4-4

Section 5 How to Use Setup Utility 5-1

5.1 Outline 5-2
5.2 Activating Setup Utility 5-3
5.3 Setting IP Address 5-4
5.4 Setting Remote Control 5-6
5.5 Download 5-7
5.6 Checking Version of Installed Software and Initialization of Settings 5-9
5.7 Setting Firmware Functionality 5-11

Section 6 External Connection 6-1

6.1 Multi-user Function and Remote Control 6-2
6.2 Connection of RS-232C Interface 6-4
6.3 Connection of GPIB Interface 6-5
6.4 Connection of Ethernet Interface 6-6
6.5 Notices for Connecting the MD1230B to Network 6-8

Section 7 Self-test Function 7-1

7.1 Self-test function 7-2

Section 8 Other Interfaces 8-1

8.1 CRT interface 8-2
8.2 USB interface 8-3
8.3 Keyboard 8-4
8.4 Floppy Disk Drive 8-5
8.5 GPS Antenna (Option 05) 8-6

Section 9 Maintenance 9-1

9.1 Daily Maintenance 9-2
9.2 Storage Precautions 9-3
9.3 Transporting and Disposals 9-4

Appendix A Specifications A-1

Appendix B Options B-1

Index..... Index-1

Section 1 Overview

This section provides an overview to the functions and the product configuration of the MD1230B Data Quality Analyzer (hereinafter, "MD1230B").

☞ Refer to Appendix A "specifications" for Specifications and performance.
☞ Refer to Appendix B "Options" for options and optional accessories.

1.1 Product Overview 1-2
1.2 Product Characteristics 1-3
1.3 Product Configuration..... 1-4
1.4 Module configuration 1-5

1.1 Product Overview

The MD1230B is a portable measuring instrument to evaluate routers, switches and IP networks. The MD1230B is optimal for quality evaluation made when a device is manufactured or when lines are installed, and for maintenance after installation of lines. The user can readily replace modules in a single MD1230B unit to analyze IP (Internet Protocol) in a variety of data links from 10M to 10G Ethernet, and from 155M to 10G SDH/SONET.

1.2 Product Characteristics

Characteristics of the MD1230B are as follows:

(1) User-friendly operability
The MD1230B incorporates Windows® and offers excellent operability. This analyzer is equipped with three USB ports for easy expansion. Because it is portable, it is useful in a variety of applications including manufacture and maintenance of products.

(2) 10-Mbit/s to 10-Gbit/s physical interfaces
The MD1230B, with easily replaceable modules, supports the 10/100/1000M Ethernet, Gigabit Ethernet, 10G Ethernet, and 156M/622M/2.5G/10G SDH/SONET interfaces.

(3) Port expandability of up to 480
The MD1230B is equipped with five module slots. Control of up to eight devices is allowed per MD1230B as a controller. For the MU120131A module, up to 480 ports are available.

(4) Analysis function for various protocols
For the MU120138A, a maximum 256-Mbyte capture buffer is used to capture frames. Analysis of protocols is possible on capture frames.

(5) Editing function for transmit data
The MD1230B is capable of transmitting up to 256 types of stream data per port. The user can readily edit, set and add errors to stream data on the screen.

(6) Supports various external interfaces
The MD1230B supports optional interfaces for remote control including RS-232C, GPIB and Ethernet.

1.3 Product Configuration

Main unit

Model name/number	Name	Qty.	Remarks
MD1230B	Data Quality Analyzer	1	

Standard accessories supplied

Model name/number	Name	Qty.	Remarks
	Power cord	1	
F0113	Fuse, 15 A	1	
Z0847A	MD1230/MP1590 Family Software	1	CD-ROM (Including manual)
B0329G	Front cover for 3/4MW 4U	1	
B0500A	Side cover	1	

Note:

In the MD1230B, the software uniquely created by Anritsu is installed. Even If OS is reinstalled using CD-ROM of Windows® supplied with the MD1230B, the state at delivery cannot be restored. Do not reinstall OS. Furthermore, operation is not assured if other software is installed.

1.4 Module configuration

The table below lists the modules that can be mounted on the MD1230B.

Model name	Product name
MU120101A*	10M/100M Ethernet Module
MU120102A*	Giga-bit Ethernet Module
MU120103A*	2.5G (1.31) Module
MU120103B*	2.5G (1.31) Module
MU120104A*	2.5G (1.55) Module
MU120104B*	2.5G (1.55) Module
MU120105A*	10G (1.31) Module
MU120106A*	10G (1.55) Module
MU120111A	10/100M Ethernet Module
MU120112A	Giga-bit Ethernet Module
MU120118A*	10 Giga-bit Ethernet Module
MU120118B	10 Giga-bit Ethernet Module
MU120118C	10 Giga-bit Ethernet Module
MU120119A*	OC-3/12 STM-1/4 Module (1310 nm)
MU120120A*	OC-3 STM-1 Module (1310 nm)
MU120121A	10/100/1000M Ethernet Module
MU120122A	Giga-bit Ethernet Module
MU120131A	10/100/1000M Ethernet Module
MU120132A	Giga bit Ethernet Module
MU120138C	10 Giga-bit Ethernet Module

*: Discontinued product

Section 2 Before Use

This section provides information to be understood before using the MD1230B. It also covers precautions for securing safety or avoiding possible faults for the device in use. Read through this section before using the MD1230B.

2.1 Environmental Conditions at Installation Site 2-2
2.2 Carrying Method 2-3
2.3 Where to Place Product 2-4
2.4 Distance from Cooling Fan 2-5
2.5 Power Connection 2-6
2.5.1 Power Requirements 2-6
2.5.2 Connecting the Power Cord 2-7
2.6 Connection with Peripherals 2-8
2.6.1 Keyboard 2-8
2.6.2 USB mouse 2-8
2.6.3 USB devices 2-8
2.6.4 Ethernet 2-8
2.6.5 Display 2-8
2.6.6 GPIB 2-8
2.6.7 Serial devices 2-9
2.6.8 GPS antenna 2-9
2.7 Attaching/Removing Module 2-10
2.7.1 Attaching module 2-10
2.7.2 Removing module 2-12
2.8 Floppy Disk 2-14

2.1 Environmental Conditions at Installation Site

The MD1230B operates best within the temperature range of 5 to 40°C. Avoid using the MD1230B in the following environments to prevent a fault:

- Places that are exposed to direct sunlight
- Outdoors
- In excessively dusty locations
- Where condensation may occur
- In liquids, such as water, oil, or organic solvents, and medical fluids, or places where these liquids may adhere
- In salty air or in place chemically active gases (sulfur dioxide, hydrogen sulfide, chlorine, ammonia, nitrogen dioxide, or hydrogen chloride etc.) are present
- Where toppling over may occur
- In the presence of lubricating oil mists
- In places at an altitude of more than 2,000 m
- In the presence of frequent vibration or mechanical shock, such as in cars, ships, or airplanes
- Places with extreme temperatures and relative humidity such as:
  Temperature: lower than –20°C or higher than 60°C
  Humidity: 90% or more

⚠ CAUTION

When the MD1230B is transported to a location at a high temperature after it is used for a substantial period in a location at a low temperature, condensation may result inside the device. In this case, dry the MD1230B before using it, otherwise the MD1230B may short-circuit causing a fault.

Install the MD1230B horizontally as shown in Figure 2.1-1.

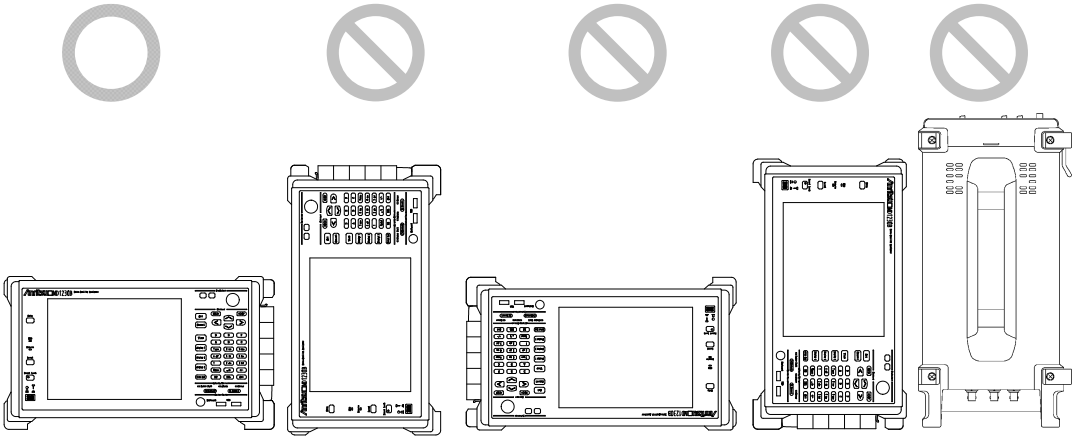


Figure 2.1-1 Installation Orientation

⚠ CAUTION

If the MD1230B is not installed in a "good" direction as above, a small shock may turn it over and harm the user.

2.2 Carrying Method

Carry the MD1230B gripping the handlebar on the side.

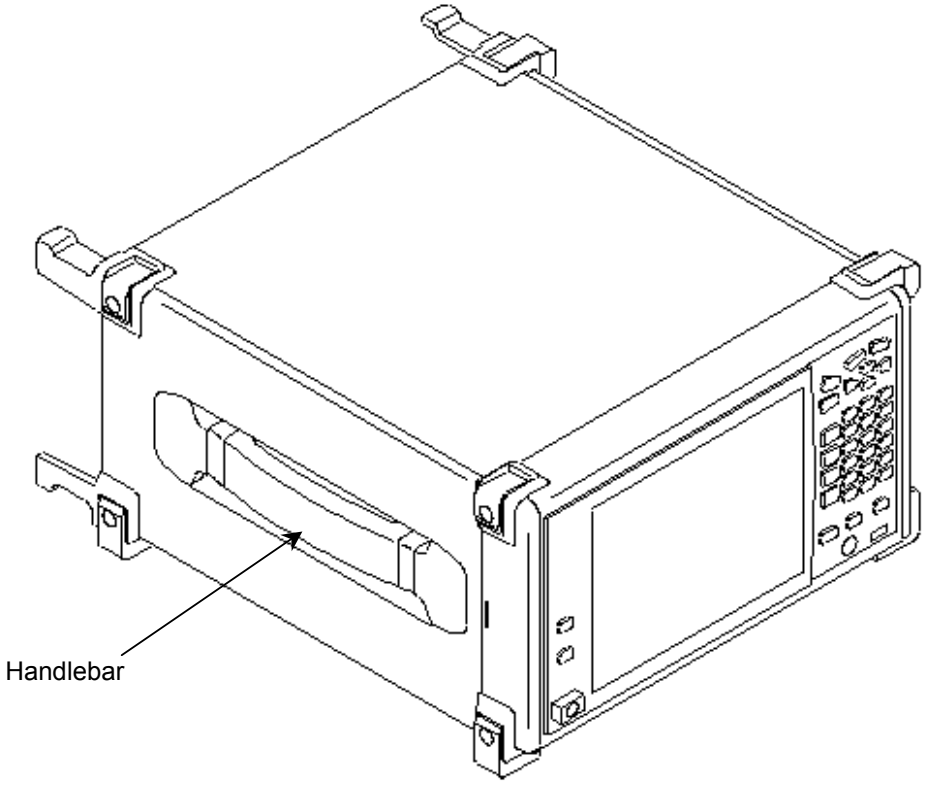


Figure 2.2-1 Handle position

2.3 Where to Place Product

When using the MD1230B, place it horizontally with its bottom down.

Do not use the MD1230B in another orientation because doing so might cause it to tip over.

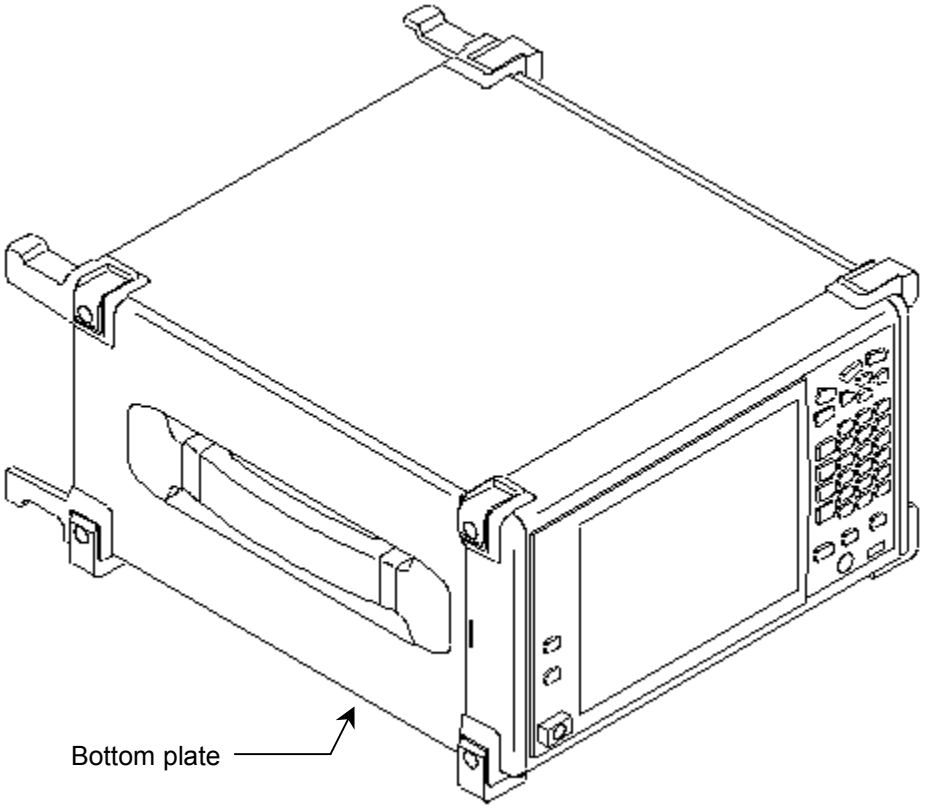


Figure 2.3-1 Orientation for placing unit

2.4 Distance from Cooling Fan

A cooling fan is provided at the rear of the MD1230B. The inlet duct is provided at the side of the MD1230B. In order not to obstruct the flow of air, place the MD1230B at least 10 cm away from an obstacle such as a wall or a peripheral. Besides, the inlet duct is provided at the bottom of the MD1230B. Therefore, do not block up the inlet duct by inserting the object through a gap between the bottom of the MD1230B and the desk face and so on. Unless the flow of air is secured, the internal temperature of the MD1230B rises thus causing a fault.

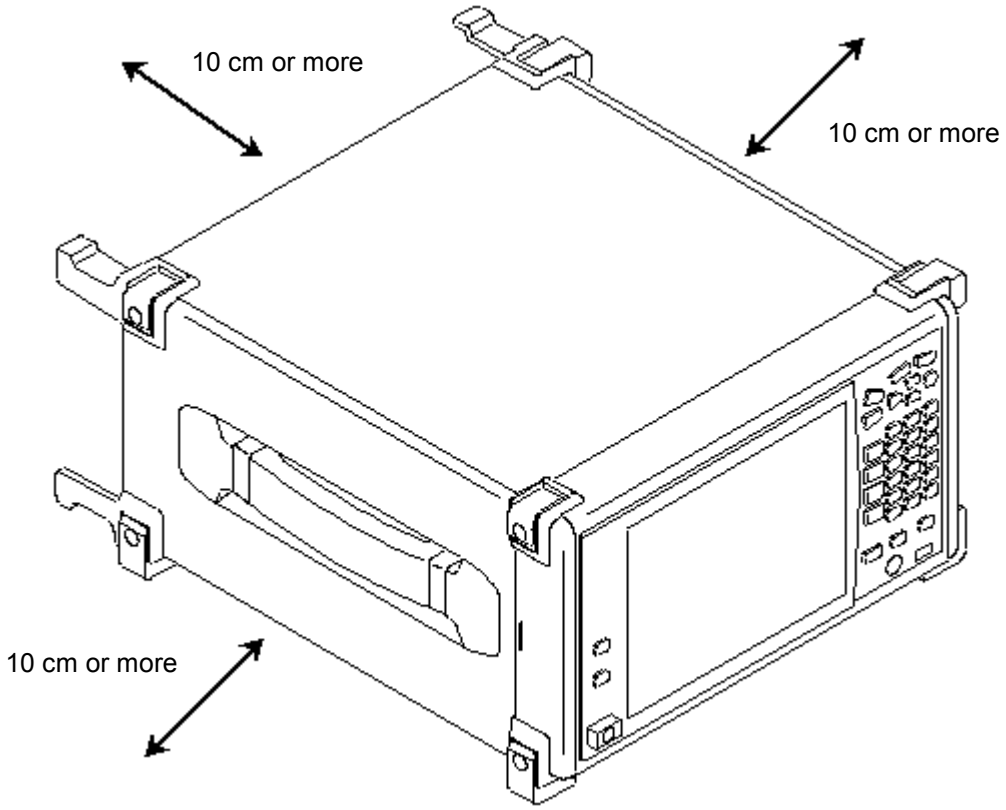


Figure 2.4-1 Distance from cooling fan

2.5 Power Connection

This section describes the procedures for supplying power.

2.5.1 Power Requirements

For normal operation of MD1230B, observe the power voltage range described below.

Power source	Voltage range	Frequency
100 Vac system	100 to 120 V	50 to 60 Hz
200 Vac system	200 to 240 V	50 to 60 Hz

Changeover between 100 and 200 V systems is made automatically.

⚠ CAUTION

Supplying power exceeding the above range may result in electrical shock, fire, failure, or malfunction.

2.5.2 Connecting the Power Cord

Check that the power switch on the front panel is turned Off (switched to the (O) side).
Insert the power plug into an outlet, and connect the other end to the power inlet on the rear panel. To ensure that the MD1230B is grounded, always use the supplied 3-pin power cord, and insert the plug into an outlet with a ground terminal.

⚠ WARNING

If the power cord is connected without the MD1230B grounded, there is a risk of receiving a fatal electric shock. In addition, the peripheral devices connected to the MD1230B may be damaged.

When connecting to the power supply, DO NOT connect to an outlet without a ground terminal. Also, avoid using electrical equipment such as an extension cord or a transformer.

Unless otherwise specified, the signal-connector ground terminal, like an external conductor of the coaxial connector, of the instrument is properly grounded when connecting the power cord to a grounded outlet. Connect the ground terminal of DUT to a ground having the same potential before connecting with the instrument. Failure to do so may result in an electric shock, fire, failure, or malfunction.

⚠ CAUTION

If an emergency arises causing the MD1230B to fail or malfunction, disconnect the MD1230B from the power supply by either turning Off the power switch on the front panel (switch to the (O) side), or by pulling out the power cord or the power inlet.
When installing the MD1230B, place the MD1230B so that an operator may easily operate the power switch.
If the MD1230B is mounted in a rack, a power switch for the rack or a circuit breaker may be used for power disconnection.

2.6 Connection with Peripherals

2.6.1 Keyboard

Connect a keyboard to the PS/2 connector on the front panel before turning on the MD1230B power switch. Turning on the power switch makes available the keyboard. Turning on the power switch of the MD1230B before connecting the keyboard to the PS/2 connector will cause a fault.

2.6.2 USB mouse

Connect a USB mouse to the USB connector on the front or rear panel.

2.6.3 USB devices

Connect the cable (Type A connector) of a USB device to the USB port on the front or rear panel. Turn off the power for the USB device before turning off the MD1230B power switch.

2.6.4 Ethernet

Connect an RJ-45 modular plug for a cable conforming to 10BASE-T or 100BASE-TX to an RJ-45 modular jack on the rear panel.

2.6.5 Display

Connect the display cable to the CRT connector on the rear panel before turning on the MD1230B power switch. The display can be used by then turning on the power switch. Turning on the power switch of the MD1230B before connecting the display to the VGA connector will cause a fault. Turn off the display power before turning off the MD1230B power switch.

2.6.6 GPIB

Connect a GPIB cable to the GPIB connector on the rear panel before turning on the MD1230B power switch. Turning on the MD1230B power switch before connecting the GPIB to the GPIB connector will cause a fault.

2.6.7 Serial devices

Connect an RS-232C cable to the RS-232C connector on the rear panel before turning on the MD1230B power switch. Turning on the MD1230B power switch before connecting the serial device to the RS-232C connector will cause a fault.

2.6.8 GPS antenna

Connect the GPS antenna (attached to Option 05) to the GPS antenna connector on the rear panel before turning on the MD1230B power switch. Turning on the MD1230B power switch before connecting the GPS antenna to the GPS antenna connector will cause a fault.

☞ Refer to Section 3 “Names and Functions of Parts” for details.

2.7 Attaching/Removing Module

2.7.1 Attaching module

[1] Turn Off the MD1230B power switch.

[2] Using the slot, insert the module to the back of the MD1230B.

[3] Check that the ejectors at both ends of the module are facing outward, then fold them inward according to the arrow in the Figure. The ejectors are locked by performing this operation.

[4] When the module is attached, tighten up the right and left screws on the module with a screwdriver.

* Slots are arranged as Slot 1, Slot 2, Slot 3, Slot 4, and Slot 5 from top to bottom. Any slot or any combination of slots is available for attaching module (s).

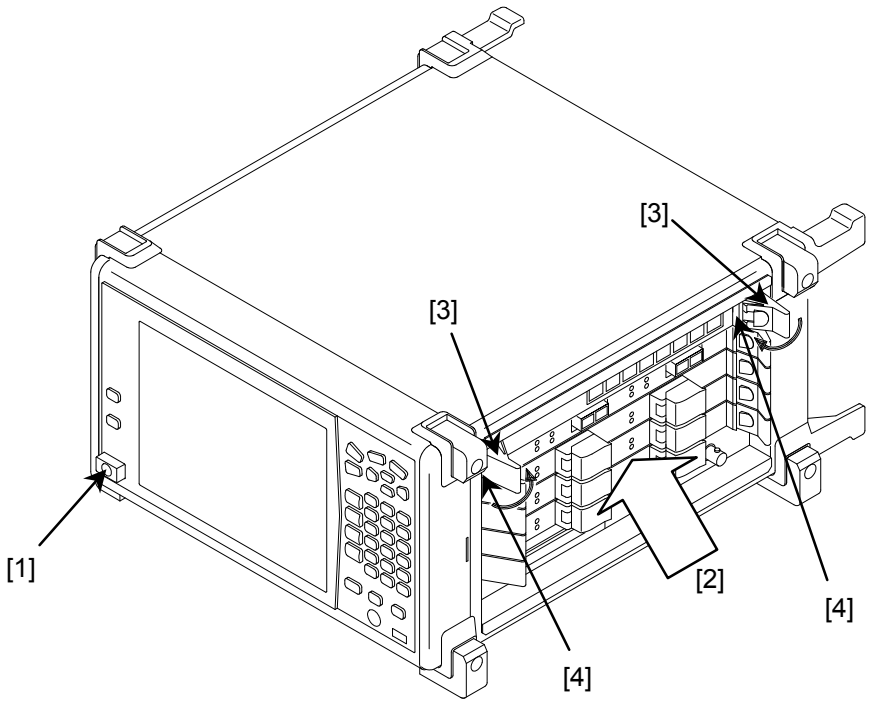
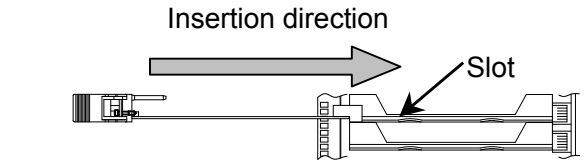


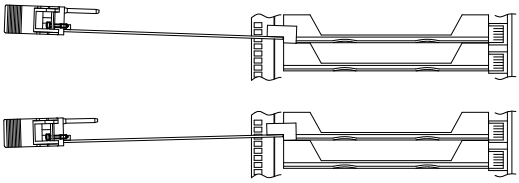
Figure 2.7.1-1 Attaching module

⚠ CAUTION

- **When attaching a module, make sure that the MD1230B Power is in the Off position. Attaching a module with the Power in the On position will cause a fault.**
- **When inserting a module, make sure to insert it parallel to the slot, not inclining upward or downward (Refer to the following Figure). Or, a metal spring on the top of the module will be deformed.**



Correct (The module is parallel to the slot.)



Wrong (The module is not parallel to the slot.)

Figure 2.7.1-2 Example of inserting module

- **Tighten up the right and left screws after the module is secured. Failure to do so may cause a malfunction or a fault during transportation.**
- **Avoid touching the electric parts on the module to prevent possible damage to the parts.**
- **When rotating the ejector, make sure not to pinch your finger. Or, injury could be caused.**
- **Avoid touching the optical fiber cable of module to prevent possible damage to the light characteristics and cable.**

2.7.2 Removing module

[1] Turn Off the MD1230B Power.

[2] Loosen the right and left screws on the module.

[3] Press the red lock buttons of ejectors at both ends of the module to unlock the ejectors.

[4] Fold the ejectors at both ends of the module outward according to the arrow in the Figure.

[5] Pinch the ejectors and gently pull out the module.

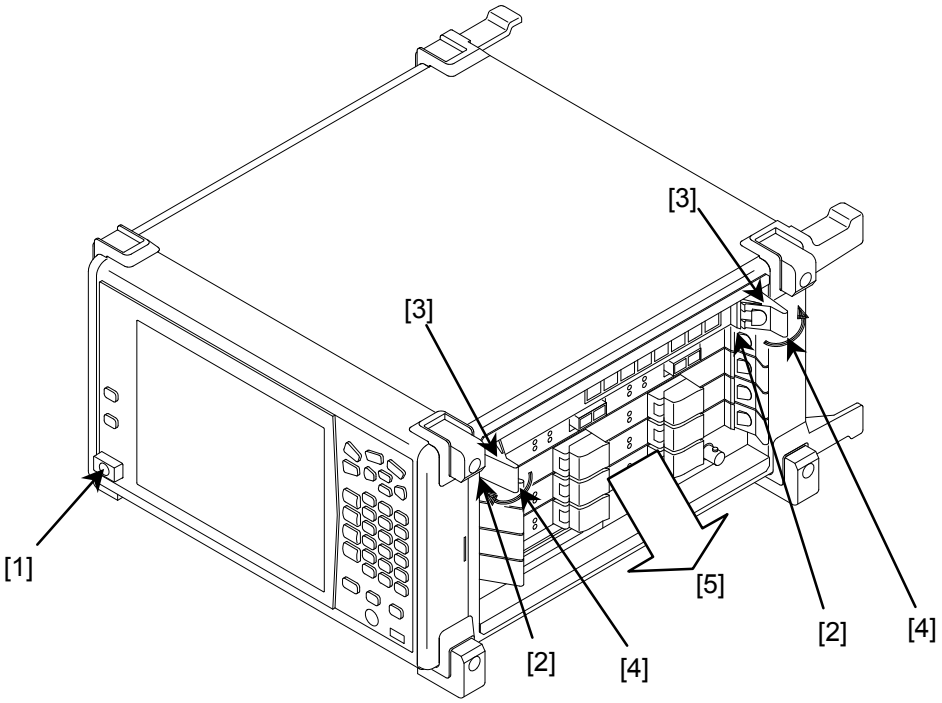


Figure 2.7.2-1 Removing module

⚠ CAUTION

- **When removing a module, make sure that the MD1230B Power is in the Off position. Removing a module with the Power in the On position will cause a fault.**
- **The ejectors may be broken if the screws on the right and left are not loosened or the ejectors are turned outward without the ejectors unlocked.**
- **Avoid touching the electric parts on the module to prevent possible damage to the parts.**
- **When rotating the ejector, make sure not to pinch your finger. Or, injury could be caused.**
- **Avoid touching the optical fiber cable of module to prevent possible damage to the light characteristics and cable.**

2.8 Floppy Disk

Insert a floppy disk until it clicks into place.

Refer to Section 8.3 “Floppy Disk Drive” for details.

⚠ CAUTION

- **Keep floppy disks away from magnetic fields such as television sets, speakers and magnets. Otherwise data recorded on the floppy disk may be lost.**
- **Keep floppy disks out of direct sunlight and away from heating appliances. Otherwise the floppy disk may be deformed and no longer usable.**
- **Close the floppy disk shutter.**
- **Avoid spilling liquid on floppy disks.**
- **To preserve important data, take out the floppy disk from the disk drive and keep it in a case.**

Section 3 Names and Functions of Parts

This section explains the names and functions of MD1230B parts.

3.1 Front Panel 3-2
3.2 Rear Panel 3-5
3.3 Side Panel 3-8

3.1 Front Panel

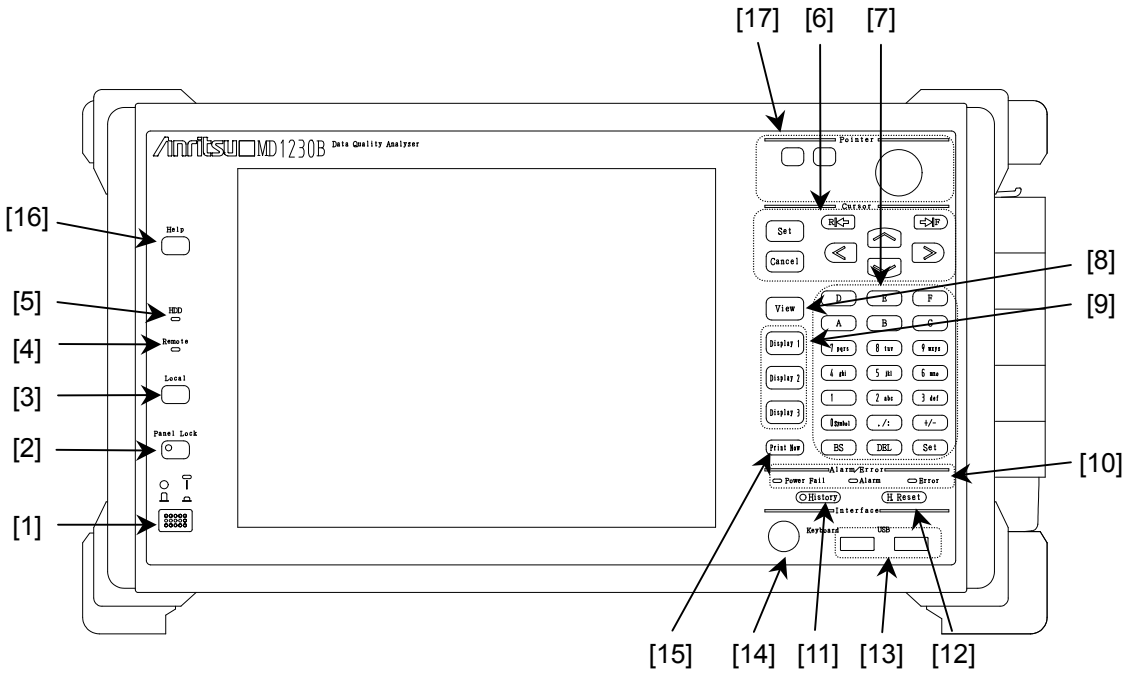


Figure 3.1-1 Front panel

	Key		Function/Operation
[1]	Power		Power for the main unit. Lamp illuminates when power is turned On.
[2]	Panel Lock		Selects between key input enable and disable only at the use of the main application. In case key input is inhibited, Lamp of **Panel Lock** illuminates. Key inputs other than **Panel Lock** and mouse operation are disabled.
[3]	Local		Forcibly places the MD1230B under local control when the MD1230B is under remote control. This key is inactive in the local control mode.
[4]	Remote		Illuminates when the MD1230B is under remote control. Turns Off when the MD1230B moves to the local control mode.
[5]	HDD		Illuminates when the hard disk built into the MD1230B is being accessed.
[6]	Cursor key	Set	Sets input items.
		Cancel	Cancels inputs.
		→| F	Moves the focus forward between components.
		R |←	Moves the focus backward between components.
		< > ∧ ∨	Moves the focus within a component. Modifies the internal setting of a component where the focus is present.
[7]	Input key	0 symbol to 9 wxyz	Enters a numeric value. The Virtual Keyboard screen enables entry of alphabetical characters and marks.
		A to F	Enters alphabetic characters “A to F.”
		./:	Enters decimal point or “.” as alphabetic character. Colon “:” that is separation of IPv6 address can be also entered.
		+/–	Enters mark “–.” The Virtual Keyboard screen also enables entry of mark “+.”
		BS	Deletes one character after cursor.
		DEL	Deletes one character right after a cursor.
		Set	Same function as that for Set in [6]
[8]	View		Selects between the Graphical View screen and the Tree View screen. This key is active if software earlier than Ver. 7.0 is installed.
[9]	Display1 Display2 Display3		Stores the current screen state or reads a stored screen. Pressing the key for two seconds or more consecutively stores the current screen and positions of tab and focus. Pressing the key for less than two seconds displays a stored screen.

	Key	Function/Operation
[10]	Power Fail Alarm Error	The Power Fail LED illuminates if the power is turned off while the built-in Windows is operating. The Alarm/Error LED illuminates if the alarm or error that is specified by **Display Option** of **Counter** occurs at a reserved port. ☞ For details, refer to Sections 5.11 and 5.12 in the MX123001A Data Quality Analyzer Control Software Operation Manual.
[11]	History .	If set to **On**, the Alarm/Error LED remains lit after an alarm or error occurs. If set to **Off**, the Alarm/Error LED illuminates only once when an alarm or error occurs.
[12]	History Reset	This key is active if **History** is set to **On**. Pressing this key turns off the lit LED.
[13]	USB connector	Used to connect a USB device. Connecting a USB mouse upgrades the on-screen operability.
[14]	PS/2 connector	Used to connect a keyboard.
[15]	Print Now	Prints out the current screen when a key is pressed.
[16]	Help	Opens or closes Help. Displays Help corresponding to active Window when a key is pressed. Displays Top of Help when Help is not related with Window. When the key is pressed again while Help lights up, Help closes.
[17]	Pointing Device	Provides the same function as a mouse.

3.2 Rear Panel

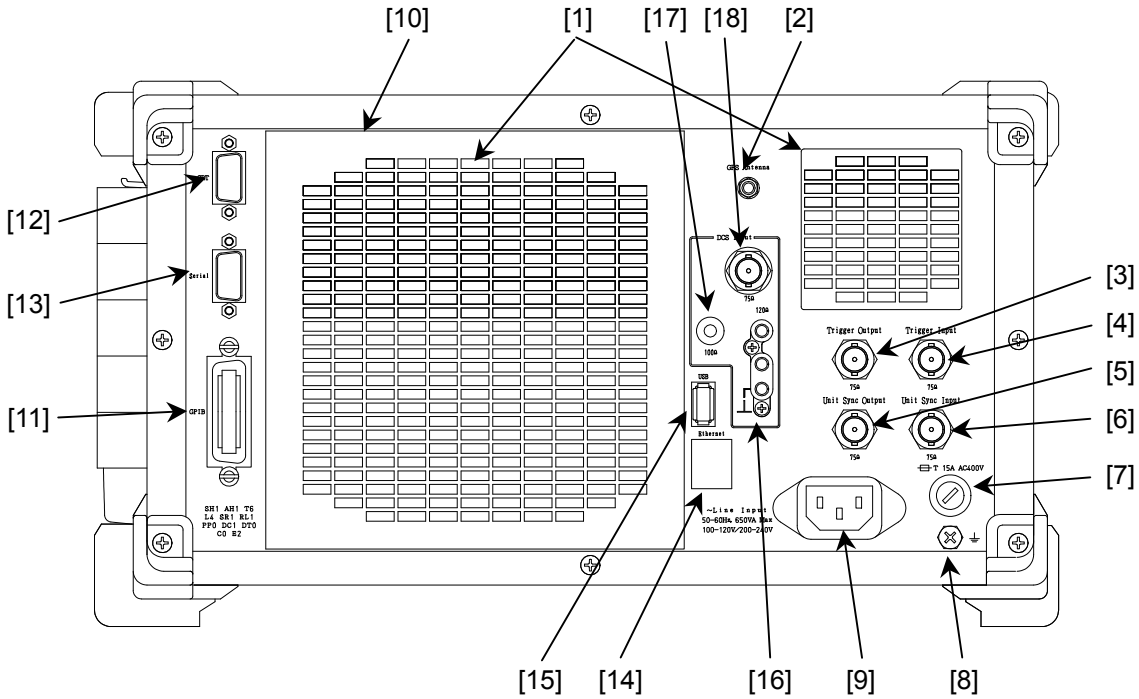


Figure 3.2-1 Rear panel

	Key		Function/Operation
[1]	Fan		Cooling fan. Avoid blocking up this opening.
[2]	Connector for GPS antenna		Connector used to connect a GPS antenna (option).
[3]	Trigger Output	Connector for outputting the trigger generated in the frame capture function.	
		Level	TTL
		Connector	BNC 75 Ω
[4]	Trigger Input	External trigger input connector for APS test and frame capture. Turns active at the leading edge.	
		Level	TTL
		Connector	BNC 75 Ω
[5]	Unit Sync Output	Clock signal output for establishing time synchronization between MD1230 family units when MD1230B units are connected in a daisy chain.	
		Output frequency	1 MHz
		Level	TTL
		Connector	BNC 75 Ω
[6]	Unit Sync Input	Clock signal input for establishing time synchronization between MD1230 family units when MD1230B units are connected in a daisy chain.	
		Input frequency	1 MHz
		Level	TTL
		Connector	BNC 75 Ω
[7]	Fuse holder		Fuse holder for AC power source. Use a fuse of the same rating when replacing a fuse with a new one.
[8]	Functional earth terminal		This is the terminal that is electrically connected to the chassis of the equipment.
[9]	AC power inlet		AC power inlet. Use the attached power cord.
[10]	Name plate		Bears a serial number and an option number.
[11]	GPIB connector		Connector used to connect the MD1230B with an external controller via the GPIB interface.
[12]	CRT connector		Connector used to connect the MD1230B with an external display. Connecting an external display provides a screen that is the same as the LCD.
[13]	RS-232C connector		Connector used to connect the MD1230B with an external controller via the RS-232C interface.
[14]	Ethernet connector		Connector used to connect the MD1230B with an external controller via the Ethernet interface (10BASE-T or 100BASE-TX).
[15]	USB connector		Connector used to connect a USB device.

	Key		Function/Operation
[16]	DCS Input 120 Ω	Clock or data input connector used to synchronize an SDH transmit signal with an external clock. Input a clock, HDB3 data or 64 kHz +8 kHz AMI clock conforming to ITU-T G.703.	
		Input Frequency	2.048 MHz, 64 kHz +8 kHz
		Bit rate	2.048 Mbit/s
		Connector	3 pin Siemens 120 Ω balanced
[17]	DCS Input 100 Ω	Clock input connector used to synchronize an SDH transmit signal with an external clock. Input AMI, B8ZS data or a clock conforming to ANSI T1.	
		Input Frequency	1.544 MHz
		Bit rate	1.544 Mbit/s
		Connector	BANTAM 100 Ω
[18]	DCS Input 75 Ω	Clock input connector used to synchronize an SDH transmit signal with an external clock. Input an clock, HDB3 data conforming to ITU-TG.703.	
		Input Frequency	2.048 MHz
		Bit rate	2.048 Mbit/s
		Connector	BNC 75 Ω unbalanced

CAUTION

Do not input a signal to the DCS Input 120 Ω, DCS Input 100 Ω, and DCS Input 75 Ω connectors at the same time. Doing so might break the internal circuit or cause a malfunction.

3.3 Side Panel

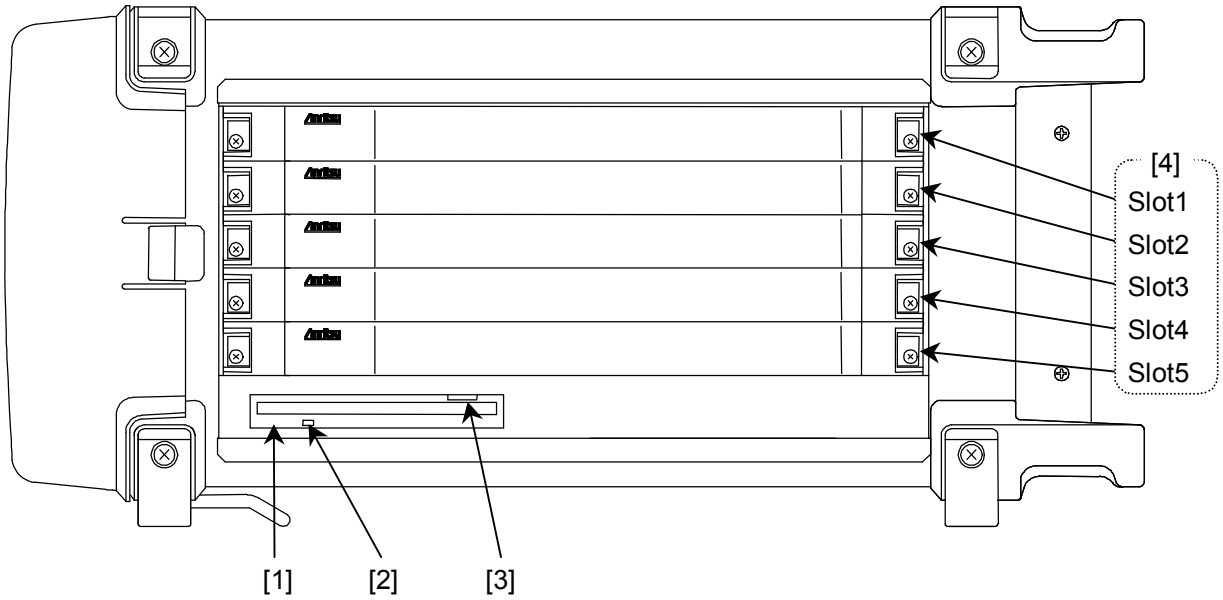


Figure 3.3-1 Side panel

	Key	Function/Operation
[1]	3.5-inch FDD	Floppy disk drive used for settings of setting conditions, analysis data, measurement results and screens, as well as upgrading of version. 2DD (720 KB) and 2HD (1.44 MB) floppy disks may be used.
[2]	FD Access lamp	Illuminates in green when the floppy disk is being accessed.
[3]	FD Eject button	Used to remove a floppy disk.
[4]	Module slot	Module insertion slot. Slots are arranged as Slot1, Slot2, Slot3, Slot4, and Slot5 from top to bottom. For how to attach a module, refer to Section 2.7 “Attaching/Removing a module.”

CAUTION

While the FDD access lamp is On, avoid removing the floppy disk. Doing so may damage the FDD or destroy the data on the floppy disk.

Section 4 Power-on and Shutdown

This section describes how to power on and shut down the MD1230B.

4.1 Power-on Procedure 4-2
4.2 Shutdown Procedure 4-3
4.3 Selector Screen 4-4

4.1 Power-on Procedure

(1) Connect the power cord after confirming that the power switch is off.

(2) Turn on the power switch.

(3) The power lamp turns on and the selector screen is displayed automatically after Windows starts up.

☞ Refer to Section 4.3 “Selector Screen”.

4.2 Shutdown Procedure

(1) Display the selector screen to exit the application.

Refer to Section 4.3 “Selector Screen”

(2) Press **Shut down**.

(3) Switch off the main power switch when the “It is now safe to turn off your computer.”dialog is displayed on-screen.

CAUTION

Do not switch off the main power switch while Windows is running.

4.3 Selector Screen

The selector screen is displayed after the MD1230B is turned on or the application is exited.

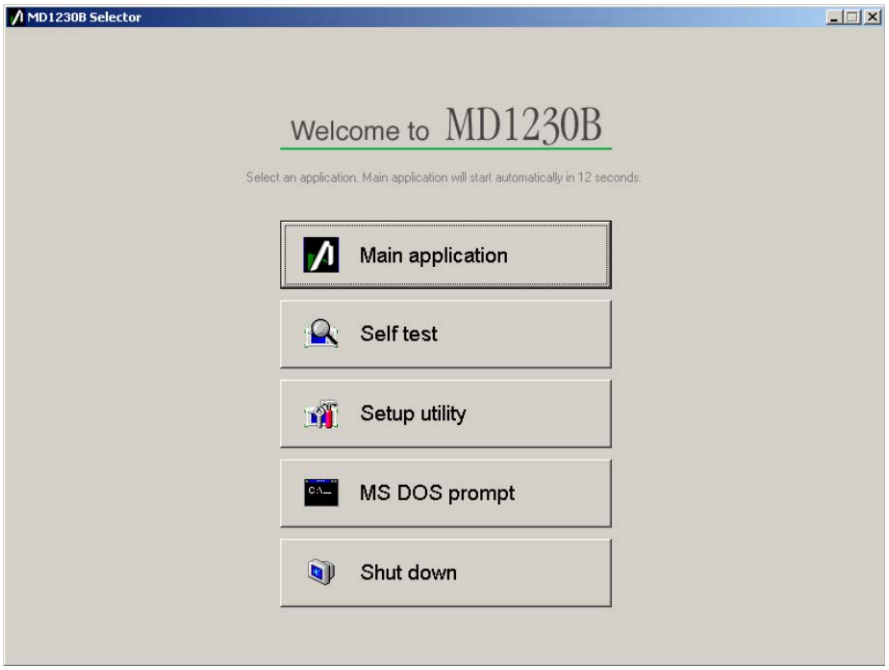


Figure 4.3-1 Selector Screen

From the Selector screen, various applications can be started and the MD1230B can be shut down, by clicking the corresponding icon button. If no key clicks are detected on this screen for a certain period of time, the Main application starts automatically.

Button	Description
Main application	Starts the Main application. ☞ Refer to the MX123001A Data Quality Analyzer Control Software Operation Manual.
Self test	Starts the Self-test application. ☞ Refer to Section 7 “Self-test Function”.
Setup utility	Starts the Setup Utility, which enables you to specify an IP address, set up remote control (optional), download and switch the firmware, and check the software version. ☞ Refer to Section 5 “How to Use Setup Utility”.
MS DOS prompt	Starts the MS DOS prompt.
Shut down	Shuts down the MD1230B.

Section 5 How to Use Setup Utility

This section explains how to use the setup utility.

5.1 Outline 5-2
5.2 Activating Setup Utility 5-3
5.3 Setting IP Address 5-4
5.4 Setting Remote Control 5-6
5.5 Download 5-7
5.6 Checking Version of Installed Software and Initialization of Settings 5-9
5.7 Setting Firmware Functionality 5-11

5.1 Outline

The Setup Utility enables you to specify an IP address, set up remote control (optional), download and switch the firmware, and check the software version.

(1) Setting of IP address
The MD1230B has an IP address on each of the application for Windows to perform setting and display, and on the unit to control modules. Set the IP address, net mask and gateway address, respectively.

☞ Refer to Section 5.3 “Setting of IP Address” for how to set an IP address.

(2) Setting up remote control (optional)
The operating environment for remote control (optional) can be set up.In case multiple remote options are installed, settings are made to determine which remote option is to be used. The MD1230B does not concurrently operate multiple remote options but operates a selected remote option at a time.

☞ Refer to Section 5.4 “Setting of Remote Control” for how to set each of the remote option.

(3) Download
The MD1230B downloads each of software file.

☞ Refer to Section 5.5 “Download” for download.

(4) Display of software version
The MD1230B displays the version of each software product installed in the MD1230B.

☞ Refer to Section 5.6 “Checking Version of Installed Software” for the display of a version.

(5) Setting Firmware Functionality
Switches the firmware according to the usage.

☞ Refer to Section 5.7 “Setting Firmware Functionality” for setting of Firmware Functionality.

5.2 Activating Setup Utility

Select the icon **Setup utility** on the selector and press the **SET** button.

Refer to Section 4.3 “Selector Screen” for details about the Selector screen.

Figure 5.2-1 Selector

5.3 Setting IP Address

The MD1230B is equipped with both the Windows® side where the operation screen and the Ethernet remote are installed and the unit side where the measurement interface module is mounted. These are internally connected by the Ethernet *. Therefore, it is required to set IP address for both the Windows® side and Unit side. This section describes how to set.

Note:

When external devices are not connected, perform settings so that Windows and Unit are the same in the network address and different from each other in the host address. Default settings are not required to change because this condition is satisfied.

When it is connected to the external network, set each network address, etc. to the settings of the external network.

*: The external network devices connected to the Ethernet connectors on the rear panel are also integrated into the network.

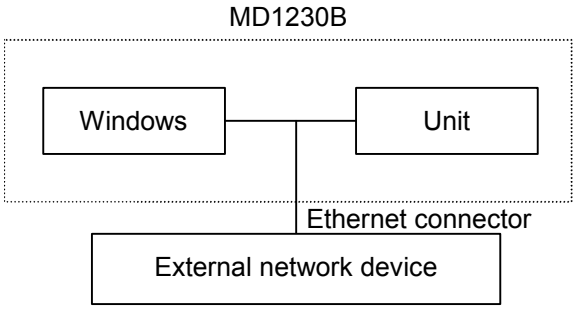


Figure 5.3-1 Internal network structure

Activating the Setup Utility displays the following screen. In the **IP Address** tab, set the IP address, the net mask and gateway address used for the MD1230B on the Windows side and Unit side.

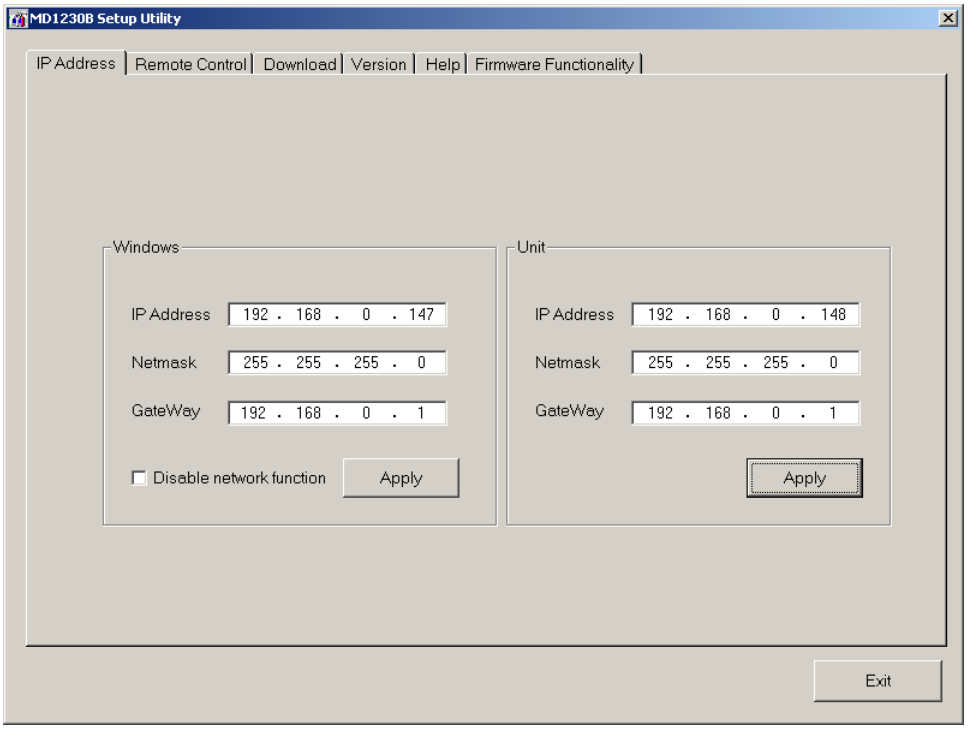


Figure 5.3-2 IP address setting screen

Procedure

(1) Enter **IP Address**, **Netmask** and **Gateway** for **Windows** and **Unit**, respectively.

(2) Press the **Apply** buttons in the **Windows** and **Unit** fields.

(3) Pressing the **Exit** button terminates the Setup Utility and restarts the MD1230B with the current setting.

5.4 Setting Remote Control

Select the **Remote Control** tab to display the Remote Control screen, which enables you to set up the operating environment for remote control. Select the remote control interface used for the MD1230B, and set the operating environment of each interface.

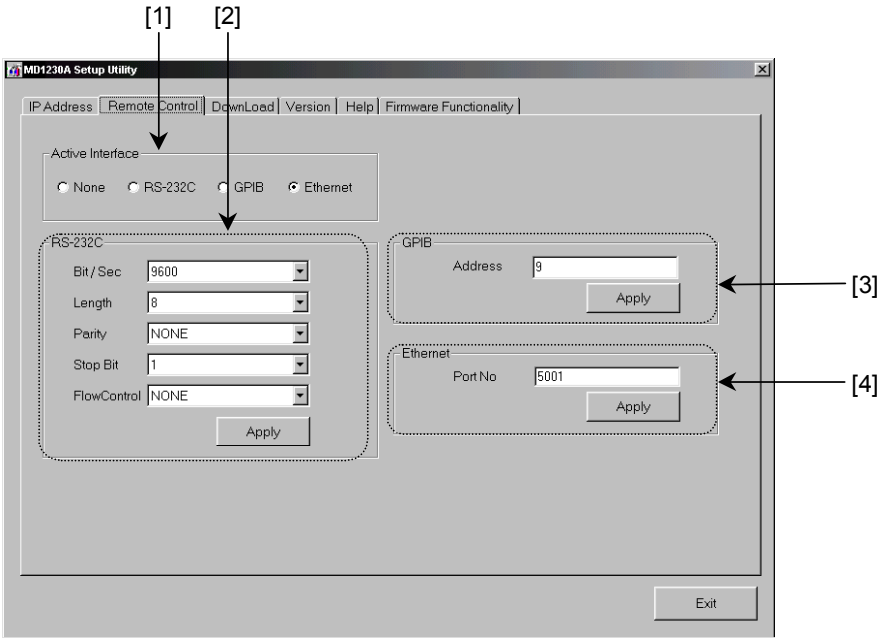


Figure 5.4-1 Remote control setting screen

	Type	Function/Operation
[1]	Active Interface	Sets the remote interface used for the MD1230B. Selects **RS-232C**, **GPIB**, **Ethernet** or **None** (in case none of these are to be selected). (Default value: None)
[2]	RS-232C	Sets the operating environment when remote control is used via **RS-232C**. Match this setting to PC settings to perform remote control. (Default value: Windows default)
[3]	GPIB	Sets the device address of the MD1230B when remote control is used via **GPIB**. (Default value: 9)
[4]	Ethernet	Sets the TCP/IP socket port number of the MD1230B when remote control is used via **Ethernet**. (Default value: 5001). Match this setting to the PC settings to perform remote control. For the socket type, the MD1230B acts as a server.

☞ Refer to “MD1230B Remote Control Operation Manual” for remote control.

5.5 Download

Select the **Download** tab and then press the **Download...** button to display the TFTP dialog box for file transfer. Assorted firmware can be downloaded from this dialog box.

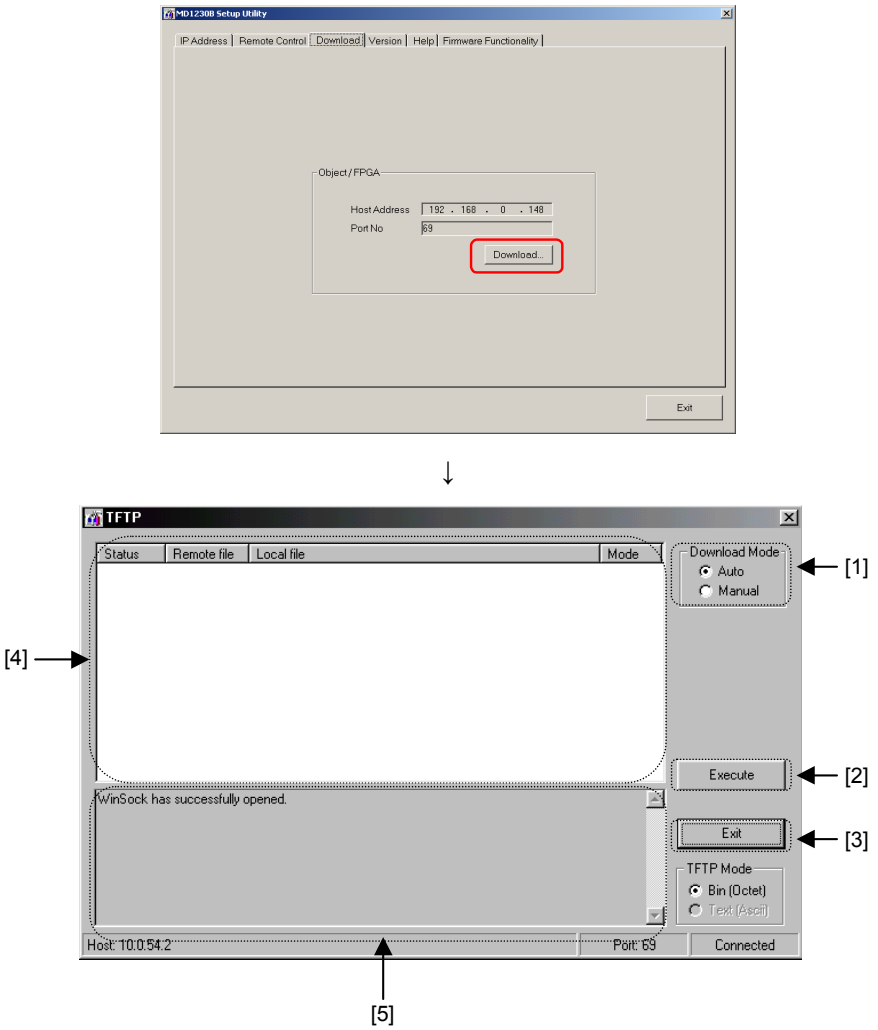


Figure 5.5-1 File-transfer screen

	Function/Operation
[1]	Select Download Mode. **Auto**: Compares an automatically downloaded file at present with the latest file already installed. If they are different from each other, the latest file is transferred. **Manual**: Selects a manually transferred file.
[2]	Performs a file transfer.
[3]	Ends a file transfer screen.
[4]	Displays a file name and condition to be transferred.
[5]	Displays a transfer condition. In addition, when Download Mode is set to **Auto** and then the currently downloaded file is the same as the already installed one, “Download file is Nothing” is displayed.

5.6 Checking Version of Installed Software and Initialization of Settings

Checking Version of Installed Software

Select the **Version** tab to verify the version of each software product installed in the MD1230B, and also the serial number of the MD1230B and option installation state.

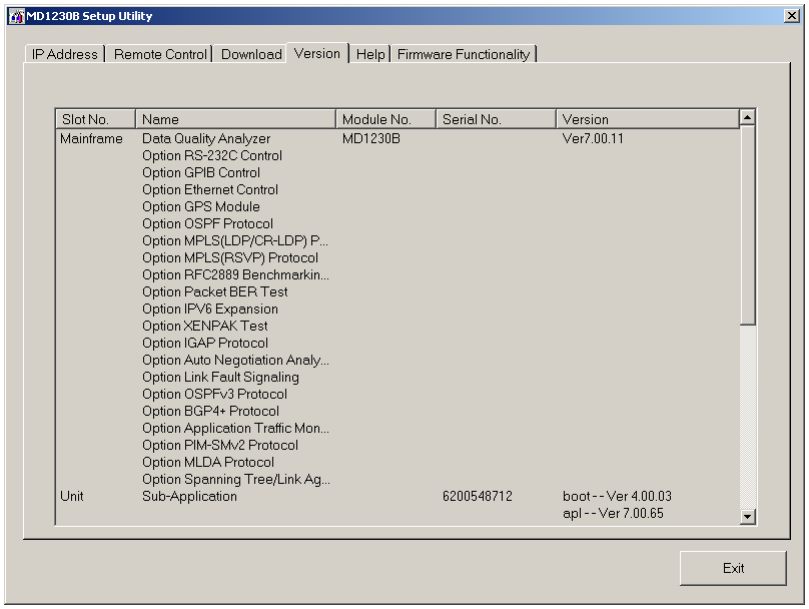


Figure 5.6-1 Software version display screen

Initialization of settings

Select the **Help** tab and then press the **Execute** button in the **Initialize** field to initialize the settings. For details about these settings, refer to Section 11.1.4 “Initializing setting data” in the MX123001A Data Quality Analyzer Control Software Operation Manual.

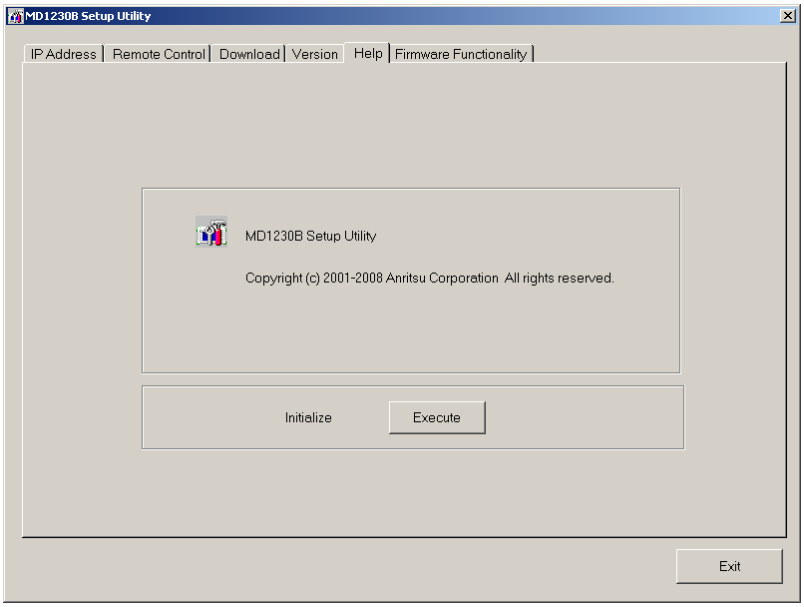


Figure 5.6-2 Help display screen

5.7 Setting Firmware Functionality

Selecting the **Firmware Functionality** tab allows switching of Firmware corresponding to use application for each module.

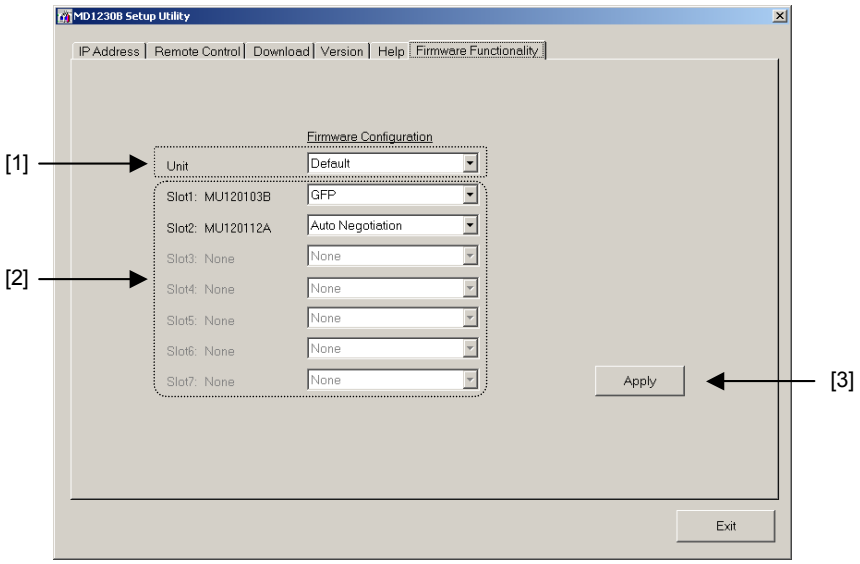


Figure 5.7-1 Firmware Functionality setting screen

[1] Firmware for the unit can be selected. **Default** is initially displayed. The selectable items differ depending on the installed options as follows.

Installed Option	Description
Application traffic monitor option	**Application Traffic Monitor** is available. ☞ Refer to Section 2.1 "Updating Firmware and Activating Application Traffic Monitor" in the Application Traffic Monitor Operation Manual.
PPPoE option	**PPPoE** is available. ☞ Refer to Section 1.4 "Starting Application" in the MD1230B-26 PPPoE Operation Manual.

[2] Firmware for modules can be selected. **Default** is initially displayed. The selectable items differ depending on the inserted modules and installed options as follows.

Module Option	Description
If the traffic impairment emulator option is installed in the MU120121A/22A	**Traffic Impairment Emulator** is available. ☞Refer to Section 6.6 "Traffic Impairment Emulator" in the MX123001A Data Quality Analyzer Control Software Operation Manual. Note: A hardware upgrade might be required when **Traffic Impairment Emulator** is selected. If so, the following message is displayed. Unable to switch mode because Slot1 module not upgraded for Traffic Impairment Emulator Option.
If the auto negotiation option is installed in the MX120112A	**Auto Negotiation** is available. ☞For details about auto negotiation, refer to Section 6.2.1 "Auto Negotiation Analysis Function" in the MX123001A Data Quality Analyzer Operation Manual.
If the EOS mapping option is installed in the MU120103B/04B	**PPP** and **GFP** are available.

[3] Press to apply the firmware selection. The **Apply** and **Exit** buttons are disabled while firmware is switching. Firmware switching is completed if these buttons are enabled.

Section 6 External Connection

This section explains the MD1230B multi-user function, remote control and connection to an external PC.

6.1 Multi-user Function and Remote Control 6-2
6.1.1 Multi-user function 6-2
6.1.2 Remote control 6-3
6.2 Connection of RS-232C Interface 6-4
6.3 Connection of GPIB Interface 6-5
6.4 Connection of Ethernet Interface 6-6
6.4.1 Connection of 10BASE-T/ 100BASE-TX cable 6-6
6.4.2 Multi-user and remote control 6-7
6.5 Notices for Connecting the MD1230B to Network 6-8

6.1 Multi-user Function and Remote Control

6.1.1 Multi-user function

Up to eight PCs* can be connected to the MD1230B to operate the MD1230B on each PC screen. This capability is called the multi-user function.

To realize the multi-user function, operation of the MD1230B is made per port. Changing the settings of ports or performing measurement requires the reservation for a port in advance.

Once a port is reserved on an operation screen, the user cannot change settings, start measurement or halt operation on the port from another operation screen. The user can only view the settings and measurement results. The reservation state is in one of the following three states, which are confirmed by the "Show Status" of each port.

*: The MX123001A Data Quality Analyzer Control Software must be installed in advance.

(1) vacant
The port is not reserved by any operation screen. In this state, the user can view the settings and measurement results but cannot change the settings or perform operations. To make setting changes or operation, the port must be reserved.

(2) owner
The port is reserved by the current operation screen. The user can cancel reservations, set/read the settings, and view measurement results.

(3) occupied
The port is reserved by another operation screen. The user can read the settings and view measurement results. In this state, the user cannot reserve the port.

☞ Refer to "MX123001A Data Quality Analyzer Control Software Operation Manual" for the details of the multi-user function.

6.1.2 Remote control

The MD1230B optionally performs remote control via the RS-232C, GPIB, or Ethernet interface to configure an automatic measurement system.

(1) RS-232C control (option)
The MD1230B has the RS-232C (COM1) interface as a standard interface. The RS-232C interface is used to connect to a controller for controlling the MD1230B.

(2) GPIB control (option)
The MD1230B has the GPIB interface conforming to the IEEE standard 488.1-1987. The GPIB interface is used to connect a controller for controlling the MD1230B.

(3) Ethernet control (option)
The MD1230B has the interface that can be connected to the Ethernet (10BASE-T/100BASE-TX). The TCP/IP protocol is used. This interface is used to connect to LAN for control of the MD1230B via a controller.

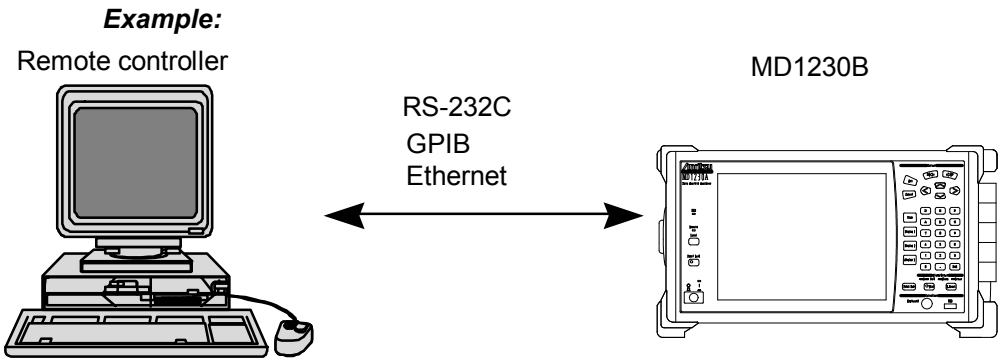


Figure 6.1-1 Remote control

Refer to “MD1230B Remote Control Operation Manual” for remote control.

6.2 Connection of RS-232C Interface

The connector for RS-232C cable is on the rear panel. Connect the RS-232C cable before inputting power to the MD1230B.

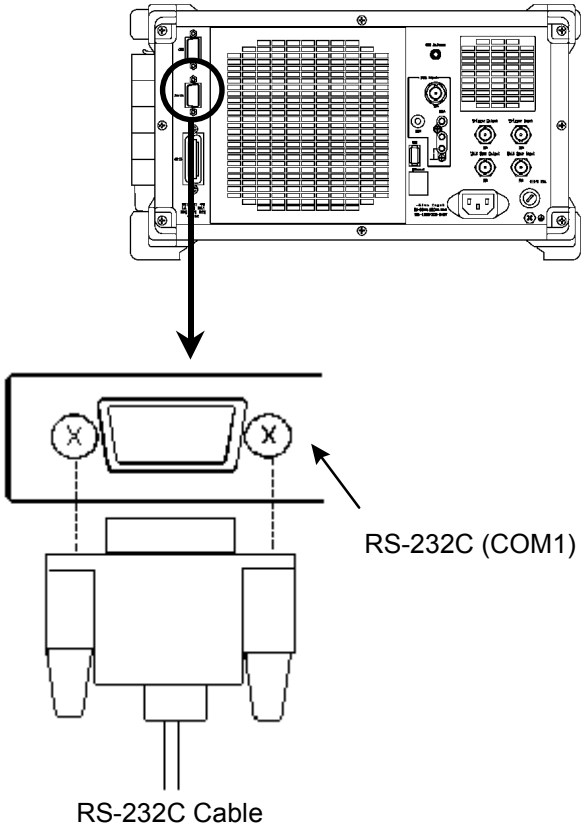


Figure 6.2-1 Connection of RS-232C cable

6.3 Connection of GPIB Interface

The connector for the GPIB cable is on the rear panel. Connect the GPIB cable before inputting power to the MD1230B.

The maximum number of devices including the controller to be connected to a single GPIB system is 15. Cable length is limited as follows:

- Sum of cable length ≤ 20 m
- Length of cable between devices ≤ 4 m

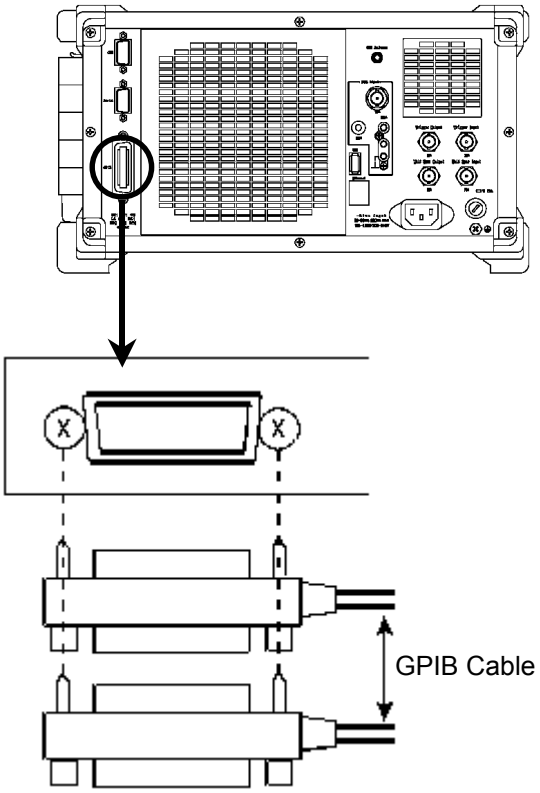


Figure 6.3-1 Connection of GPIB cable

6.4 Connection of Ethernet Interface

6.4.1 Connection of 10BASE-T/100BASE-TX cable

The connector for the 10BASE-T/100BASE-TX cable is mounted on the rear panel.

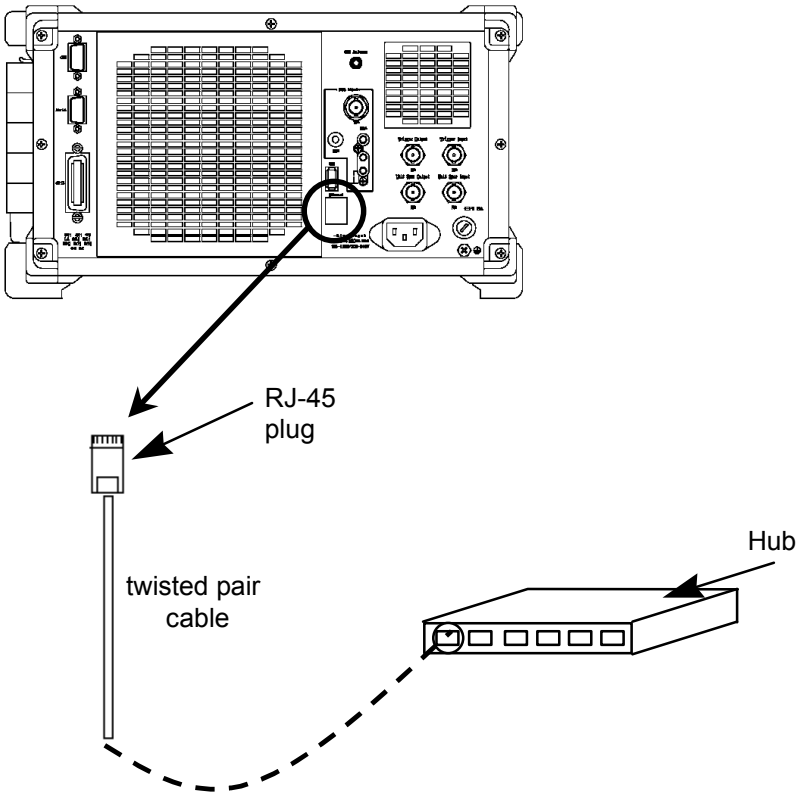


Figure 6.4-1 Connection of 10BASE-T/100BASE-T cable

6.4.2 Multi-user and remote control

As explained in "6.1 Multi-user Function and Remote Control", remote control is available to an external PC via multi-user function and options in case the Ethernet interface is used. The MD1230B uses two IP addresses: one is an IP address on the Windows® side for operation and settings; the other is an IP address on the unit side for integrating and controlling interface modules.

(1) Setting of IP addresses for Windows®/Unit sides
For both sides, use the IP address settings in the Setup Utility to set the IP address, netmask and gateway address.

(2) When multi-user function is used
Set IP addresses for up to eight units (including other MD1230B units) to be connected by the IP address setting/operation screen in the MD1230B.

(3) Remote control
Make TCP/IP connection of the client PCs (for remote control) with the MD1230B (acting as a server) by using the Windows IP address and port number set in the Setup Utility.

6.5 Notices for Connecting the MD1230B to Network

When the MD1230B is connected to the network which may be invaded by a virus, the following operation is needed to disable the network functions of Windows®.

This operation enables the external control according to the control software (MX123001A) in the conditions where Windows® installed in the MD1230B is disconnected to the network.

Restrictions:

However, when this operation is performed, the following functions, including the measurement screen operations from the screen of the MD1230B, cannot be used.

- Main Application (Control software)
- Application Traffic Monitor
- Remote Control Option (Ethernet/RS-232C/GPIB/Tcl)
- Self-test
- Download of Setup Utility and a part of functions of Firmware Functionality (switching to PPPoE)

<Operating procedure>

For the network connection of the MD1230B, perform the following procedures to disconnect Windows® installed in the MD1230B from the network.

[1] Start up the Setup Utility.

[2] Place check at the Disable network function (to disable the network functions) in Windows group on the **IP Address** tab. In this case, the IP Address settings field becomes invalid display.

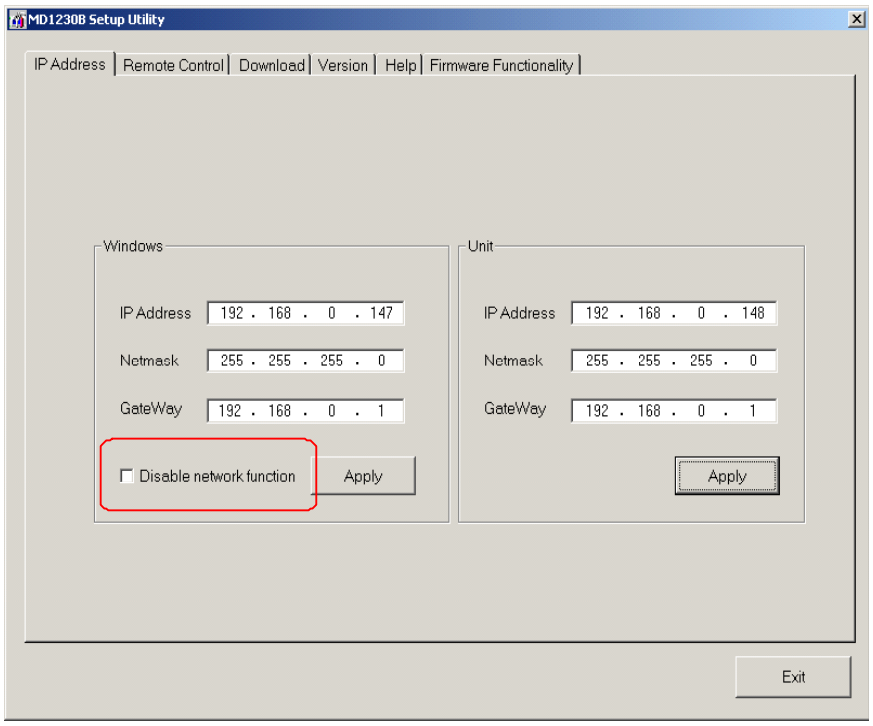


Figure 6.5-1 Disable network function setting

[3] Press the **Apply** button to enable the setting change.
The message dialog is displayed to notice that a part of functions cannot be used, and then press the **OK** button.

[4] In order to complete setting, the dialog box, which indicates that re-startup of Windows® is needed, is displayed, and then press the **OK** button. In addition, when Setup Utility is completed, the dialog box, which queries whether to restart Windows®, is displayed, and then press the **OK** button. (When the **Cancel** button is pressed, the setting of check box is returned to the off-state.)
The Ethernet driver of Windows® becomes invalid by this operation and then Windows® installed in the MD1230B is disconnected with the network connected to the MD1230B.
In this case, the button to activate the functions, which cannot be executed in the Selector screen at setup, becomes invalid.
Moreover, the descriptions about why to disable the button and how to enable the button are displayed as shown below.
These messages are also displayed in the Setup Utility screen.

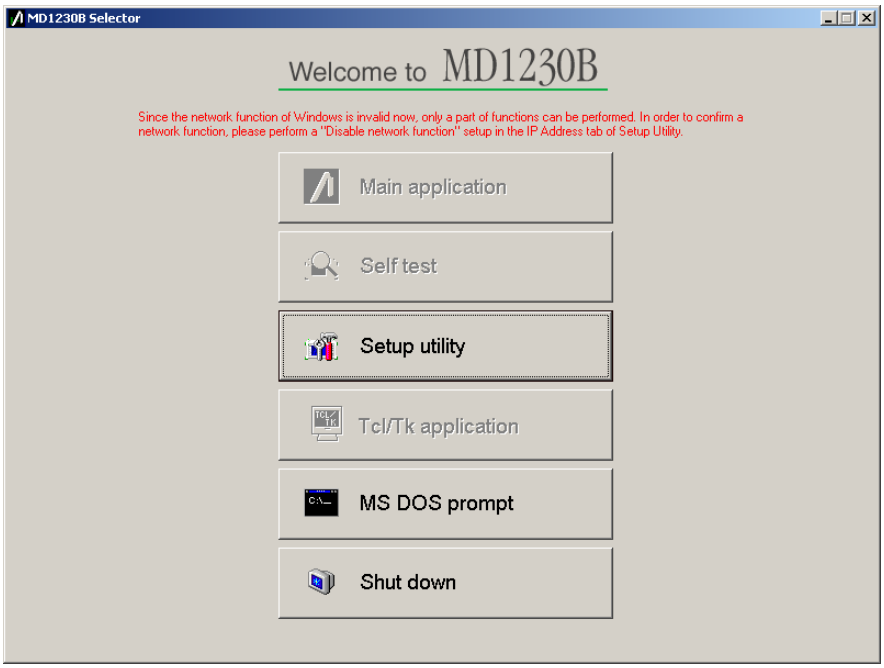


Figure 6.5-2 Selector screen

[5] Where the network is reconnected, set off the checkbox of **Disable network function** and then reboot Windows®.

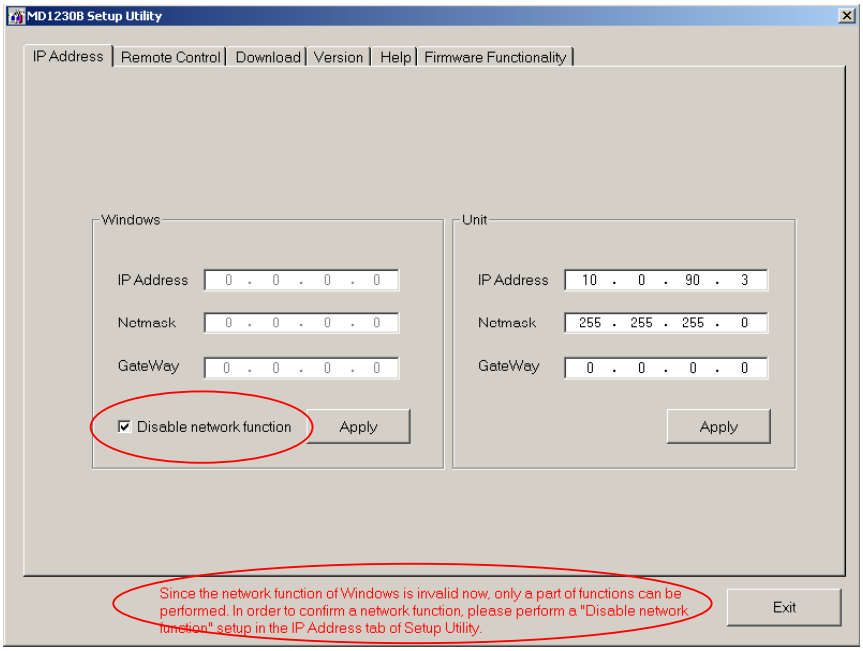


Figure 6.5-3 Network-disabled screen

Section 7 Self-test Function

This section explains the self-test of modules inserted to the MD1230B.

7.1 Self-test function 7-2
7.1.1 Overview 7-2
7.1.2 Starting Self-test application 7-2
7.1.3 Explanation of screen 7-2
7.1.4 Result display and error codes 7-5

7.1 Self-test function

7.1.1 Overview

The MD1230B incorporates a Self-test function. You can detect any abnormalities in a module by using this function.

7.1.2 Starting Self-test application

Terminate the Main application before starting the Self-test application.

Next, press the **Self test** button on the selector screen.

Note:

When the MU120103B/04B is mounted, it is possible to test only when Firmware is PPP. If firmware is GFP, switch to PPP by Setup Utility.
Refer to Section 4.7 "Setting Firmware Functionality" for switching method.
With the MU120121A/22A, testing is only possible when Firmware is Default. When Firmware is Traffic Impairment Emulator, use Setup Utility to switch to Default.

7.1.3 Explanation of screen

The initial Self-test application screen is shown below.

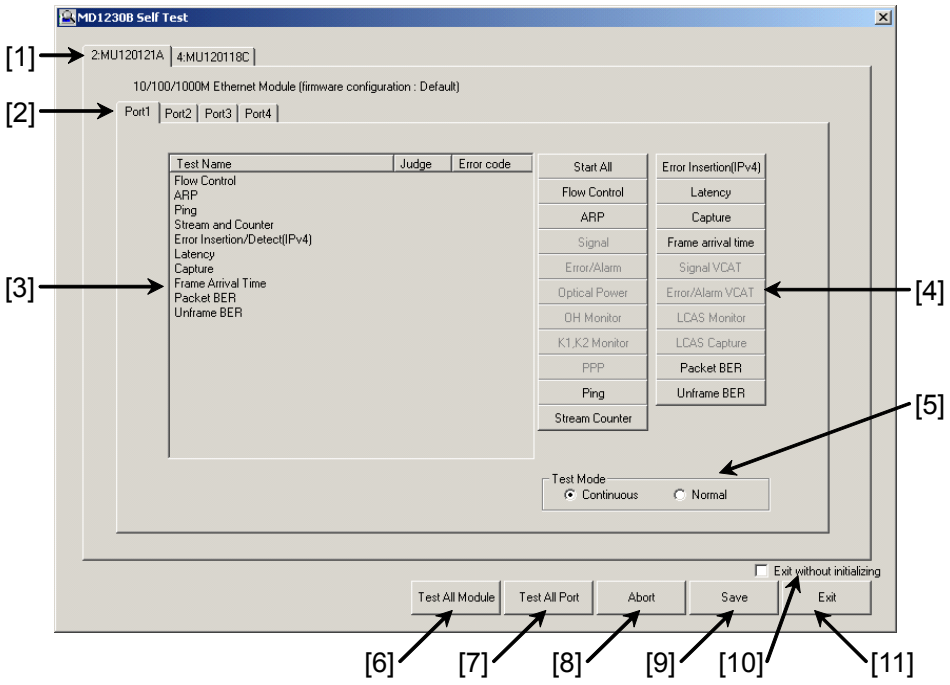


Figure 7.1.3-1 Initial screen

No.	Item	Description
[1]	Module Name Tab	Automatically displays any module inserted into the MD1230B in the form "inserted location: Module model name." Select a module you wish to test.
[2]	Port	Displays the Ports for the selected module. Select a Port you wish to test.
[3]	Test name, Test Result judge display panel	Displays the test results. ☞ Refer to Section 7.1.4 "Result display and error codes" for details.
[4]	Test Item Selection	Select an item you wish to test. Selecting **Start All**] executes all items, excluding **Flow Control**.]
[5]	Test Mode	When **Start All** is executed, selecting **Continuous** executes all items even if a test result is Fail. Selecting **Normal** terminates the test when Fail has occurred.
[6]	Test All Module	Executes all items (except **Flow Control**) of all modules and all port inserted into the MD1230B.
[7]	Test All Port	Executes all items (except **Flow Control**) of all ports of the selected module.
[8]	Abort	Stops the current test item under execution.
[9]	Save	Saves the test results into a text file.
[10]	Exit without initializing	If this checkbox is selected, initialization is not performed while exiting the Self-test application by pressing the **Exit** button.
[11]	Exit	Terminates the Self-test application.

Connecting Module with cable

If any module below is installed, a cable connection is required for executing a test. If not, tests are executed in the loopback mode, so no cable connection is required.

(1) MU120101A/02A/11A/12A/18A/18B/18C/21A/22A/31A/32A/38A

Use a cable to connect the port to be tested and the selected port when testing the flow control.

Notes:

- A cross cable must be used for connection with the MU120101A or 11A. This restriction does not apply to the MU120121A, 22A (RJ-45), and 31A, because their RJ-45 port is Auto MDI-X.
- The MU120118C does not support the flow control test.

(2) MU120103A/04A/05A/06A/03B/04B

Connect Tx-Port to Rx-Port with a cable.

Note:

For MU120104A/B only, a 15 dB attenuator is required for connection.

(3) MU120119A/20A

Use a cable to connect the Output port and Power Meter measurement connector when testing the optical power. This test can be executed only if the optical power meter option is installed.

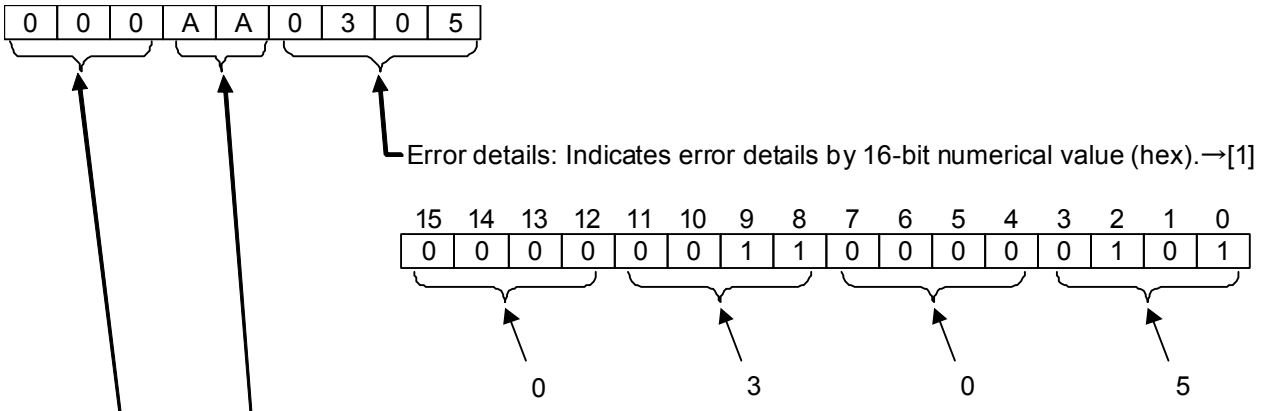
7.1.4 Result display and error codes

There are two types of result displays: When an error occurs during a test, FAIL is displayed. When the test terminates normally, PASS is displayed.

Error code which displays the error contents, is displayed according to the code rule shown below.

Assigned bits on the details of each item refer to error details.

An error code includes a classification number to specify the test target, identification characters for each item and a 16-bit numerical value to refer to the error details.



010: MU120101A 10M/100M Ethernet Module
020: MU120102A Giga-bit Ethernet Module
030: MU120103A 2.5G (1.31) Module
031: MU120103B 2.5G (1.31) Module
040: MU120104A 2.5G (1.55) Module
041: MU120104B 2.5G (1.55) Module
050: MU120105A 10G (1.31) Module
060: MU120106A 10G (1.55) Module
110: MU120111A 10/100M Ethernet Module
120: MU120112A Gigabit Ethernet Module
180: MU120118A 10 Gigabit Ethernet Module
181: MU120118B 10 Gigabit Ethernet Module
182: MU120118C 10 Gigabit Ethernet Module
190: MU120119A OC-3/12 STM-1/4 Module (1310 nm)
200: MU120120A OC-3 STM-1 Module (1310 nm)
210: MU120121A 10/100/1000M Ethernet Module
220: MU120122A Gigabit Ethernet Module
310: MU120131A 10/100M Ethernet Module
320: MU120132A Gigabit Ethernet Module
380: MU120138A 10 Gigabit Ethernet Module

[1] Explanation of “Self-test item”

Value	Test item name
**	General error
SG	Signal
EA	Error/Alarm insertion/Detect (SDH/SONET)
OP	Optical Power
OH	OH Setting/Monitor
KS	K1, K2 Setting/Monitor
PN	PPP Negotiation
PI	Ping
SC	Stream and Counter
EI	Error insertion/Detect (IPv4)
LA	Latency
CA	Capture
FC	Flow Control
AR	ARP
TM	Traffic map, monitor
FA	Frame arrival time
PB	Packet BER
UB	Unframe BER

Notes:

- The packet BER is tested only if the packet BER measurement option is installed.
- The flow control cannot be tested with the MU120118C.
- The frame arrival time is not tested if the MU120112A is used and **Auto Negotiation** is selected for **Firmware**.
- For the MU120118A, 18B, and 18C, the unframe BER is tested only if the XENPAK measurement option is installed..

[2] Explanation of "Error details"

(1) General error (*)

Form	Description
0EEE	General error 0000 No error 0001 Main program, remote interface error 0002 Cancellation via operator action 0003 Unit address unregistered 0004 Time-out 0FFF Other errors
1EEE	Command error EEE is a command number.
2EEE	Setup error EEE is a command number.
3EEE	Query error EEE is a command number.

(2) Signal (S)

When the error in the table below occurs, the corresponding bit becomes 1.

Bit position	Error item
Bit 0	AU-AIS/AIS-P Count
Bit 1	AU-LOP/LOP-P Count
Bit 2	HP-RDI/RDI-P Count
Bit 3	HP-SLM/SLM-P Count
Bit 4	P-UNEQ/UNEQ-P Count
Bit 5	MS-AIS/AIS-L Count
Bit 6	MS-RDI/RDI-L Count
Bit 7	LOF Count
Bit 8	LOS Count
Bit 9	OOF Count
Bit 10	P-REI/REI-P Count
Bit 11	MS-REI/REI-L Count
Bit 12	B1 Bit Error Count
Bit 13	B2 Bit Error Count
Bit 14	B3 Bit Error Count
Bit 15	HP-IEC Bit Error Count

(3) Error/Alarm insertion/Detect (SDH/SONET) (E)

When the error in the table below occurs, the corresponding bit becomes 1.

Bit position	Error item
Bit 0	AU-AIS/AIS-P Count
Bit 1	AU-LOP/LOP-P Count
Bit 2	HP-RDI/RDI-P Count
Bit 3	HP-SLM/SLM-P Count
Bit 4	P-UNEQ/UNEQ-P Count
Bit 5	MS-AIS/AIS-L Count
Bit 6	MS-RDI/RDI-L Count
Bit 7	LOF Count
Bit 8	LOS Count
Bit 9	OOF Count
Bit 10	P-REI/REI-P Count
Bit 11	MS-REI/REI-L Count
Bit 12	B1 Bit Error Count (1 is OK.)
Bit 13	B2 Bit Error Count
Bit 14	B3 Bit Error Count
Bit 15	HP-IEC Bit Error Count

(4) Optical Power

Value	Description
1001	Underflow
1002	Overflow
2001	Not underflow

(5) OH Setting/Monitor

When the error in the table below occurs, the corresponding bit becomes 1.

Bit position	Error occurred position
Bit 0	SOH Ch1 (MU120103A/04A/03B/04B)
Bit 1	SOH Ch8 (MU120103A/04A/03B/04B)
Bit 2	SOH Ch16 (MU120103A/04A/03B/04B)
Bit 3	SOH Ch1 (MU120105A/06A)
Bit 4	SOH Ch32 (MU120105A/06A)
Bit 5	SOH Ch64 (MU120105A/06A)
Bit 6	SOH Ch1 (MU120119A)
Bit 7	SOH Ch1 (MU120120A)

(6) K1, K2 Setting/Monitor

Value	Description
0001	K1
0002	K2

(7) PPP Negotiation

Value	Description
0001	LOS
0002	LOF
0003	AIS
0004	LINK_UP
0005	PPP_DOWN
0006	PPP_LCP
0007	PPP_LCP_UP
0008	PPP_IPCP
0009	PPP_RESTART
000A	LINK_DOWN
000B	LOOPBACK

(8) Ping

Value	Description
0001	Ping execution in progress
0002	Ping start/halt processing in progress
1001	First: No good as a result of ICMP Echo request in IPv4
1002	Second: No good as a result of ICMP Echo request in IPv4
1003	Third: No good as a result of ICMP Echo request in IPv4
1004	Fourth: No good as a result of ICMP Echo request in IPv4
2001	Illegal count value (Ping by IPv4)

(9) Stream and Counter

Value	Description
0001	Inconsistent counter
0002	The result is out of the range +90 to +110 ppm even when Clock is set to +100 ppm.
0003	The result is out of the range –110 to –90 ppm even when Clock is set to –100 ppm.

(10) Error insertion/Detect (IPv4)

Value	Description
0001	Inconsistent counter

(11) Latency

Value	Description
0001	Has not entered latency measurement state.
0002	Has not entered stream transmission state.
0003	Has not entered latency halt state.
0004	Abnormal maximum latency value

(12) Capture

Value	Description
0001	Has not entered capture state.
0002	Abnormal data.
0003	Illegal data form.

(13) Flow Control

Value	Description
0001	CH-1 has not entered stream transmission state (Pause ffff (h)).
0002	CH-2 has not entered stream transmission state (Pause ffff (h)).
0003	CH-1 has not entered stream halt state (Pause ffff (h)).
0004	CH-1 has not entered stream transmission state (Pause 0000 (h)).
0005	CH-2 has not entered stream transmission state (Pause 0000 (h)).

(14) ARP

Value	Description
0001	Has not entered stream transmission state.
0002	Inconsistent counter

(15) Frame arrival time

Value	Description
0001	Has not entered measurement state.
0002	Has not entered stream transmission state.
0003	Abnormal number of measurement result count values

(16) Packet BER

Value	Description
0001	Has not entered stream transmission state
0002	Sequence Error occurrence
0003	PRBS Frame Error occurrence
0004	PRBS Bit Error occurrence

(17) Unframe BER

Value	Description
0001	Inconsistent counter

Section 8 Other Interfaces

This section explains the interfaces with which the MD1230B is equipped as a standard.

8.1 CRT interface 8-2
8.2 USB interface 8-3
8.3 Keyboard 8-4
8.4 Floppy Disk Drive 8-5
8.5 GPS Antenna (Option) 8-6

8.1 CRT interface

The CRT interface is installed on the rear panel of the MD1230B which allows VGA output to an external CRT as a standard. The connector used is a D-SUB 15-pin terminal (D02-M15SAG-20L9). This interface is simultaneously displayed with the LCD built in the MD1230B when the resolution is 800 × 600 dots.

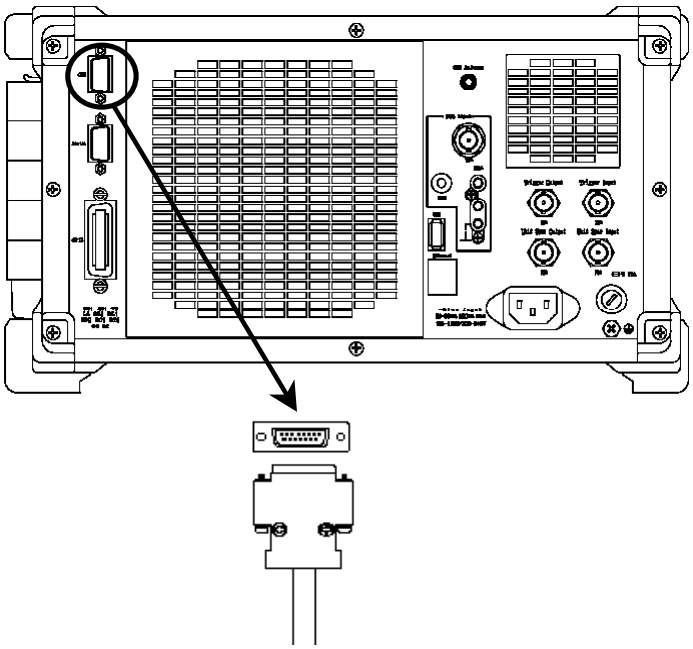


Figure 8.1-1 CRT interface

8.2 USB interface

USB interfaces*1 are installed on the front and rear panels of the MD1230B as a standard. You can connect the USB devices corresponding to Windows®*2 installed as the need arises. The MD1230B is not equipped with the PS/2 mouse interface.
When using a mouse, use the USB mouse.

*1: The MD1230B has the USB interface Revision 1.1.

*2: The version of Windows® installed is Windows® XP Professional.

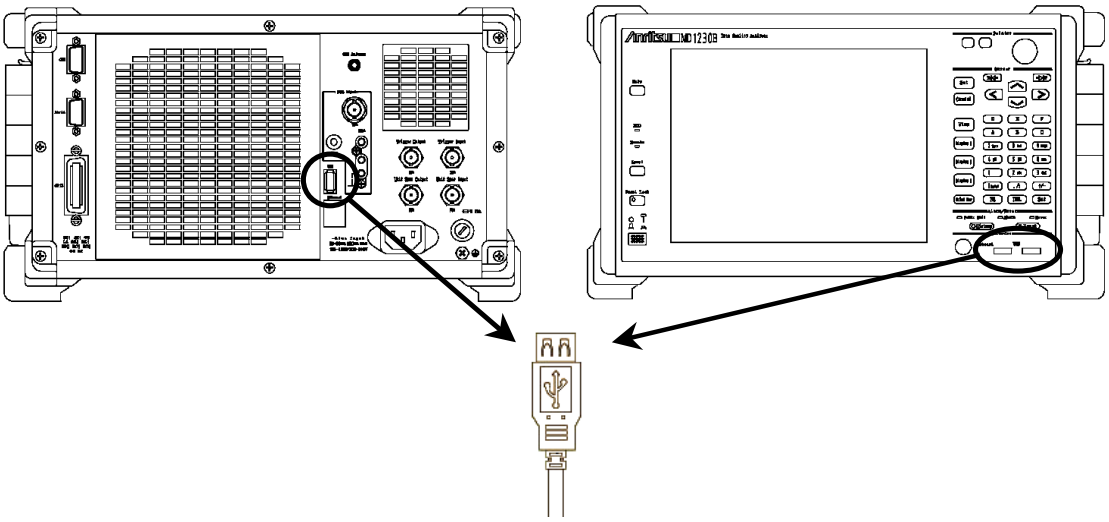


Figure 8.2-1 USB interface

8.3 Keyboard

A PS/2 connector is equipped on the front panel of the MD1230B. You can use a variety of PS/2 keyboards as the need arises.

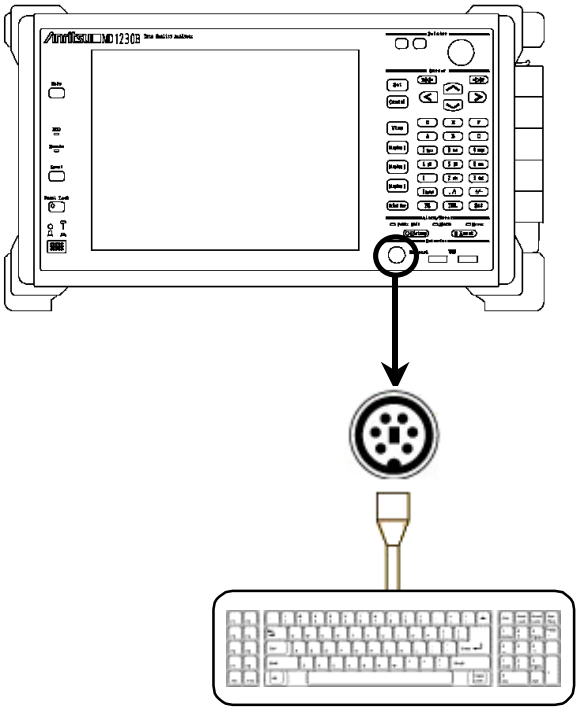


Figure 8.3-1 Keyboard interface

8.4 Floppy Disk Drive

A 3.5-inch floppy disk drive is installed on the side panel of the MD1230B (where interface module is inserted) as a standard. Supported formats are those conforming to Windows®.

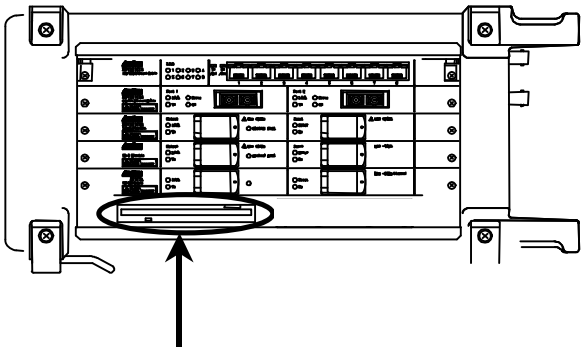


Figure. 8.4-1 Floppy disk drive

☞ Refer to Section 2.8 “Floppy Disk” for the details of the floppy disk.

8.5 GPS Antenna (Option)

A connector for GPS antenna is equipped on the rear panel of the MD1230B. Using the GPS antenna attached to Option, the Latency measurement etc. can be enabled between far remote places.

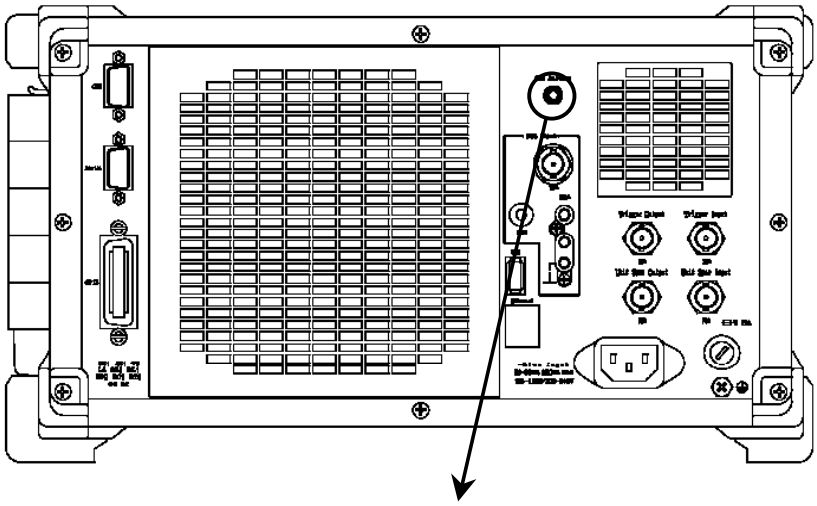


Figure 8.5-1 Connector for GPS antenna

CAUTION ⚠

If the electromagnetic condition is bad, the GPS signal may be not received.

Section 9 Maintenance

This section explains the interfaces with which the MD1230B is equipped as a standard.

9.1 Daily Maintenance 9-2
9.2 Storage Precautions 9-3
9.3 Transporting and Disposal 9-4

9.1 Daily Maintenance

Before daily maintenance of the MD1230B, always turn the power off and unplug from the AC outlet.

Panel surface dirt

If surface dirt is noticeable after the MD1230B has been used in a dusty environment, or when the MD1230B has not been used for an extended period of time, wipe the surface with a damp cloth slightly moistened with detergent and wrung out.

Screen surface dirt

NEVER use organic solvent, such as benzene and thinners for cleaning; otherwise the screen surface may be damaged. Wipe lightly with a dry, soft cloth or a soft cloth slightly moistened with ethanol.

Loose screws

Check for any loose screws and tighten any found using a Phillips screwdriver.

Plugged air vents

This instrument has air vents on the bottom and side panels. Use a vacuum cleaner, etc., to ensure they do not become plugged with dust and dirt, etc.

9.2 Storage Precautions

Wipe dust, fingerprints, stains, spots, etc., from the surface of the MD1230B before storing it.

Put the power cord, CD-ROM and other accessories in the accessory box and keep the box with the main frame.

Avoid storing the MD1230B in:

- Places that are exposed to direct sunlight
- Outdoors
- In excessively dusty locations
- Where condensation may occur
- In liquids, such as water, oil, or organic solvents, and medical fluids, or places where these liquids may adhere
- In salty air or in place chemically active gases (sulfur dioxide, hydrogen sulfide, chlorine, ammonia, nitrogen dioxide, or hydrogen chloride etc.) are present
- Where toppling over may occur
- In the presence of lubricating oil mists
- In places at an altitude of more than 2,000 m
- In the presence of frequent vibration or mechanical shock, such as in cars, ships, or airplanes
- Places with extreme temperatures and relative humidity such as:
  Temperature: lower than –20°C or higher than 60°C
  Humidity: 90% or more

Recommended storage conditions

The MD1230B should be stored in a place that meets the ambient conditions above, plus the following conditions if it is not to be used for a long time:

- Temperature: 5° to 45°C
- Humidity: 40% to 80%
- Little daily change in temperature and humidity

9.3 Transporting and Disposal

The following describes precautions for transporting and disposing of the MD1230B.

Repackaging

Repack the MD1230B in the packing material (box) in which it was delivered. If the packing material has been thrown away or damaged, repack the MD1230B as follows:

1. Refer to Section 9.2 Storage Precautions and fit the caps to the coaxial connectors. Put the accessories in the accessory box and keep it with the main frame.
2. Get a corrugated cardboard, wooden, or aluminum box large enough to pack cushioning material in around the MD1230B.
3. Wrap the MD1230B in plastic or a similar material to protect against water droplets, rain, and dust.
4. Put the MD1230B and accessory box in the packing box.
5. Then, pack the MD1230B in cushioning material so it cannot move inside the box.
6. Secure the outside of the box with packing cord, adhesive tape, bands, or other similar materials.

Transporting

Avoiding vibrations as much as possible and meet the recommended storage conditions during transport.

Disposal

Follow the instructions of your local waste disposal office when finally disposing of the MD1230B.

Before disposal, dismantle or physically destroy any non-volatile memory media or hard-disk in the MD1230B to ensure that data in memory cannot be recovered by third parties.

A. Specifications

MD1230B

Item	Specifications
Model name	MD1230B
Apparatus name	Data Quality Analyzer
Composition	Main frame ×1 Standard Accessories Power cord, 2.5 m ×1 F0113 Fuse, 15 A ×1 B0329G Front cover (for 3/4MW4U) ×1 B0500A Side cover ×1 MD1230/MP1590 Family Software ×1
Corresponding Modules	MU120101A*1: 10M/100M Ethernet Module MU120102A*1: Gigabit Ethernet Module MU120103A*1: 2.5G (1.31) Module MU120103B*1: 2.5G (1.31) Module MU120104A*1: 2.5G (1.55) Module MU120104B*1: 2.5G (1.55) Module MU120105A*1: 10G (1.31) Module MU120106A*1: 10G (1.55) Module MU120111A: 10/100M Ethernet Module MU120112A: Gigabit Ethernet Module MU120118A*1: 10 Gigabit Ethernet Module MU120118B/C: 10 Gigabit Ethernet Module MU120119A*1: OC-3/12 STM-1/4 Module (1310 nm) MU120120A*1: OC-3/STM-1 Module (1310 nm) MU120121A: 10/100/1000M Ethernet Module MU120122A: Gigabit Ethernet Module MU120131A: 10/100/1000M Ethernet Module MU120132A: Gigabit Ethernet Module MU120138A: 10 Gigabit Ethernet Module

*1: Discontinued product

MD1230B (Cont'd)

Item	Specifications
Options	MD1230B-01: RS-232C Control MD1230B-02: GPIB Control MD1230B-03: Ethernet Control MD1230B-04: MD1230B Decode Module*2 MD1230B-05: GPS Module*3 MD1230B-06: Tcl Interface MD1230B-07: OSPF Protocol MD1230B-08: MPLS (LDP/CR-LDP) Protocol MD1230B-09: MPLS (RSVP) Protocol MD1230B-10: RFC2889 Benchmarking Test MD1230B-11: Packet BER Test MD1230B-12: IPv6 Expansion MD1230B-13: XENPAK Test MD1230B-14: IGAP Protocol MD1230B-15: Auto Negotiation Analysis MD1230B-16: Link Fault Signaling MD1230B-17: Traffic Impairment Emulator MD1230B-18: OSPFv3 Protocol*4 MD1230B-19: BGP4+ Protocol*4 MD1230B-20: Application Traffic Monitor MD1230B-21: PIM-SMv2 Protocol*5 MD1230B-22: MLDA Protocol*4 MD1230B-23: Spanning Tree/Link Aggregation MD1230B-26: PPPoE MD1230B-28: Ethernet OAM MX123002A: MD1230A Expert Analysis Module*6

*2: Provided on the supplied CD-ROM.

*3: GPS antenna (5 m cable) attached

*4: MD1230B-12 must be installed.

*5: MD1230B-12 must be installed to use IPv6 for the MD1230B.

*6: MD1230B-04 must be installed.

MD1230B (Cont'd)

Item	Specifications
Number of Slots	5
Indicator	
LCD	8.4 inch, Color TFT, SVGA (800 × 600 dots)
LED	Power, HDD, Remote, Panel Lock, Power Fail, Error, Alarm, History
OS	Windows® XP Professional
Storage Unit	HDD, 3.5 inch FDD
Interface	
Trigger	Trigger Input: for APS test and Frame Capture Trigger Output: Capture Trigger Level: TTL (active HIGH) Connector: BNC (75 Ω)
Unit Sync. Input/Output	Time Synchronization for MD1230 Family Frequency: 1 MHz ±150 ppm Level: TTL Connector: BNC (75 Ω)
DCS Input	Frequency Clock: 1.544 MHz, 2.048 MHz, 64 kHz + 8 kHz Data: 1.544 Mbit/s, 2.048 Mbit/s Input Range: ±50 ppm Level/Code 1.544 M: ANSI T1.403 (B8ZS) 2.048 M: ITU-T G.703 Table 10 (HDB3) 64 kHz + 8 kHz: 0.63 to 1.1 Vo-p (AMI, 8 kHz violation) Connector BNC (75 Ω): 2.048 MHz, 2.048 Mbit/s Siemens (120 Ω balanced): 2.048 MHz, 2.048 Mbit/s, 64 kHz + 8 kHz Bantam (100 Ω balanced): 1.544 MHz, 1.544 Mbit/s
Others	RS-232C, GPIB, Ethernet (RJ-45), USB1.1 × 3 ports, Keyboard (PS/2), GPS antenna, CRT (15-pin mini D-sub)
Input Device	Pointing Device, Front Panel Keys
Remote Control	Remote control using LAN (10BASE-T/100BASE-TX) with MX123001A Remote command control with RS-232C (Opt01) or GPIB (Opt02) or LAN (10BASE-T/100BASE -TX, Opt03/Opt06)

MD1230B (Cont'd)

Item	Specifications
EMC	Emission: EN 61326-1 (Class A) Immunity: EN 61326-1 (Table 2) EN 61000-3-2: 2006 +A1:2009 A2:2009 (Class A equipment)
LVD	EN 61010-1: 2010 (Pollution Degree 2)
Environmental Performance	
Temperature range	Operation: +5 to +40°C Storage: –20 to +60°C
Power*7	AC 100 to 120 V, 200 to 240 V, 50 to 60 Hz
Power Consumption	Less than 650 VA
Size	320 (W) × 177 (H) × 350 (D) mm
Mass	Less than 13.0 kg (excluding option and plug-in modules)

*7: Operating voltage: within the range of +10% to –15% from the rated voltage (Max. 250 V)

B.1 Optional Accessories

The following table lists optional accessories available for the MD1230B.

Model name or type	Product name
B0336C	Carrying case (3/4MW4U, 350D)
B0448	Soft case
B0501B	Blank panel
B0530	Carrying case caster for B0336C
B0533	Carrying case (3/4MW4U, 350D)
J0008	GPIB cable, 2 m
J0162B	Balanced cable (SIEMENS 3P•SIEMENS 3P), 2 m
J0775D	Coaxial cord (BNC-P620•3C-2WS•BNC-P620, 75 Ω), 2 m
J0845A	Balanced cable (BANTAM 3P•BANTAM 3P), 6 ft
MX123001A	Data Quality Analyzer Control Software
MX123002A	MD1230B Expert Analysis Module
MX123003A	Remote Control Software for MX123002A
Z0849A	MD1230/MP1590 Family Manual CD
W1928AE	MX123001A Control Software Operation Manual
W1931AE	Ethernet Module Operation Manual
W1932AE	MU120103A/B 2.5G (1.31) Module MU120104A/B 2.5G (1.55) Module MU120105 10G (1.31) Module MU120106 10G (1.55) Module Operation Manual
W2121AE	MU120119A OC-3/12 STM-1/4 Module (1310 nm) MU120120A OC-3 STM-1 Module (1310 nm) Operation Manual
W1929AE	MD1230B Remote Control Operation Manual
W2107AE	Decode Module Operation Manual
W2122AE	Tcl Interface Operation Manual
W2108AE	Expert Analysis Module Operation Manual
W2134AE	Application Traffic Monitor Operation Manual
W2906AE	MD1230B-26 PPPoE Operation Manual
Z0321A	Keyboard (PS/2)
Z0541A	USB mouse

Index

C

CRT interface 8.1

D

Daily Maintenance 9.1
Display 2.6.5, 3.1

E

Ethernet 2.6.4, 3.2, 5.4, 6.1.2, 6.4, 6.4.2

F

Floppy disk 2.8, 8.4

G

GPIB 2.6.6, 3.2, 5.4, 6.1.2, 6.3
GPS antenna 2.6.8, 3.2, 8.5
Ground 2.5.2

H

Handlebar 2.2

K

Keyboard 2.6.1, 3.1, 8.3

M

Module 2.7.1, 2.7.2
Multi-user function 6.1.1

P

PS/2 connector 2.6.1, 3.1, 8.3

R

Remote control 5.4, 6.1.2, 6.4.2
RS-232C 2.6.7 3.2, 5.4, 6.1.2, 6.2

S

Self-test 7.1
Serial device 2.6.7
Setup Utility 5.2
Storage Precautions 9.2

T

Transporting and Disposal 9.3

U

USB 2.6.3, 3.1, 3.2, 8.2
USB interface 8.2
USB mouse 2.6.2