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Find the *Anritsu MD8470A* at our website: ***Click HERE***

MD8470A
Signalling Tester
Operation Manual

Fourth 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-W2432AE-4.0

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Safety Symbols

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

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. Insure that you clearly understand the meanings of the symbols and take the necessary precautions BEFORE using the equipment.



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



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



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



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



These indicate that the marked part should be recycled.

MD8470A
Signalling Tester
Operation Manual

2 July 2004 (First Edition)
22 February 2006 (Fourth Edition)

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For Safety

WARNING ⚠



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

2. Measurement Categories
   This instrument is designed for Measurement category I (CAT I). Don't use this instrument at the locations of measurement categories from CAT II to CAT IV.
   In order to secure the safety of the user making measurements, IEC 61010 clarifies the range of use of instruments by classifying the location of measurement into measurement categories from I to IV.
   The category outline is as follows:
   Measurement category I (CAT I):
   Secondary circuits of a device connected to an outlet via a power transformer etc.
   Measurement category II (CAT II):
   Primary circuits of a device with a power cord (portable tools, home appliance etc.) connected to an outlet.
   Measurement category III (CAT III):
   Primary circuits of a device (fixed equipment) to which power is directly supplied from the power distribution panel, and circuits from the distribution panel to outlets.
   Measurement category IV (CAT IV):
   All building service-line entrance circuits through the integrating wattmeter and primary circuit breaker (power distribution panel).

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For Safety

WARNING ⚠



or



Repair

WARNING ⚠

Calibration



Falling Over

LCD

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

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

5. 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. If the performance-guarantee seal is broken by you or a third party, the performance of the equipment cannot be guaranteed.

6. This equipment should be used in the correct position. If the cabinet is turned on its side, etc., it will be unstable and may be damaged if it falls over as a result of receiving a slight mechanical shock.
   And also DO NOT use this equipment in the position where the power switch operation is difficult.

7. This instrument uses a Liquid Crystal Display (LCD); DO NOT subject the instrument to excessive force or drop it. If the LCD is subjected to strong mechanical shock, it may 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, irrigate them with clean running water and seek medical help. If the liquid gets on your skin or clothes, wash it off carefully and thoroughly.

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For Safety

CAUTION ⚠

Cleaning

1. Keep the power supply and cooling fan free of dust.
   - 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



2. 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.

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For Safety

CAUTION ⚠

Replacing Memory Back-up Battery

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

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 memory cards 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 points.

- Never remove the memory card from the pulse tester, while it is being accessed.
- Memory card may be damaged by static electric charges.

Life Time of Parts

This instrument uses parts with operating time or power-On time life span. These parts must be replaced at the customer's expense even if within the guaranteed period described in Warranty in the beginning of this manual.
Pay attention to the life-span of parts used in continuous long-time operation.
For details on life-span, refer to the corresponding section in this manual.

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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 1 year after shipment due to a manufacturing fault, provided that this warranty is rendered void under any or all of the following conditions.

- The fault is outside the scope of the warranty conditions 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, flooding, earthquake, etc.
- The fault is due to use of non-specified peripheral equipment, peripheral parts, consumables, etc.
- The fault is due to use of a non-specified power supply or in a non-specified installation location.

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

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

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.

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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 are needed to be broken/shredded so as not to be unlawfully used for military purpose.

Disposing of Product

This product that you have purchased contains a lithiumble battery. The battery is recyclable. At the end of its useful life, under various state and local laws, it may be illegal to dispose of this battery into the municipal waste stream. Check with your local solid waste officials for details in your area for recycling options or proper disposal.

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Crossed-out Wheeled Bin Symbol

Equipment marked with the Crossed-out Wheeled Bin Symbol complies with council directive 2002/96/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.

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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 with the EMC and LVD directive of the European Union (EU).

CE marking

CE

1. Product Model

Model:	MD8470A Signalling Tester
	and
Plug-in Units:	MU847010A W-CDMA Signalling Unit
	MU847020A GSM Signalling Unit
	MU847020B GSM Signalling Unit
	MU847030A CDMA2000(R) 1X Signalling Unit
	MU847090A ISDN Interface Unit
	MU847090B ISDN Interface Unit
	and
Software:	MX847010A W-CDMA/GSM Simulation Kit
	MX847030A CDMA2000(R) Simulation Kit

2. Applied Directive

EMC: Council Directive 89/336/EEC

LVD: Council Directive 73/23/EEC

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3. Applied Standards

- EMC: Emission: EN61326: 1997 / A2: 2001 (Class A)
  Immunity: EN61326: 1997 / A2: 2001 (Annex A)

	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 61000-4-8 (RPFMF)	A
IEC 61000-4-11 (V dip/short)	B

*: Performance Criteria

A: During testing normal performance within the specification limits

B: During testing, temporary degradation, or loss of function or performance which is self-recovering

Harmonic current emissions:

EN61000-3-2: 2000 (Class A equipment)

- LVD: EN61010-1: 2001 (Pollution Degree 2)

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C-tick Conformity marking

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

C-tick marking



1. Product Model

Model:	MD8470A Signalling Tester
	and
Plug-in Units:	MU847010A W-CDMA Signalling Unit
	MU847020A GSM Signalling Unit
	MU847020B GSM Signalling Unit
	MU847030A CDMA2000(R) 1X Signalling Unit
	MU847090A ISDN Interface Unit
	MU847090B ISDN Interface Unit
	and
Software:	MX847010A W-CDMA/GSM Simulation Kit
	MX847030A CDMA2000(R) Simulation Kit

2. Applied Standards

EMC: Emission:

AS/NZS 2064.1 / 2 (ISM, Group 1, Class A equipment)

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About This Manual

The MD8470A Signalling Tester (hereinafter, referred to as MD8470A) is a test equipment platform that can simulate mobile communications network and provides test environment for various call processing statuses and services.

When using this equipment, it is necessary to install simulation kit and add optional devices according to a test method and the specifications that the user equipment (hereinafter referred to as UE) conforms to.

This manual describes how to use the panel keys and connectors, main unit setup method, and basic operation methods.

Refer to the separate operation manual of the simulation kit or optional devices for detailed information on test methods.

■Contents of this manual

- Notes and precautions for safe use of MD8470A
- How to use the panel keys and connectors
- Installation of the main unit
- Turning the power On/Off
- Basic operation methods
- Performance test and calibration procedures

■Items not described in this manual

Refer to the separate operation manual for simulation kit or optional devices for details on the following items.

- Functions and usage of simulation kit
- Performance test and calibration procedures implemented by the simulation kit
- Setup procedures and usage of optional devices

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Checking Accessories

When unpacking the package and taking out the main unit and accessories, check that all the products listed in the supplied component list are provided. If a missing or damaged component is found, contact Anritsu or its distributor.

The following components are provided with this product. Refer to Section 1.3 “Product Composition” in this manual for details.

■Standard parts

Main unit and standard accessories

- MD8470A Signalling Tester (main unit, 1 unit)
- Power cord (1)
- Power supply adapter for conversion from 3-pole to 2-pole (1 pc.)
- MD8470A Operation Manual (CD-ROM)
- Handset
- Mouse
- Keyboard (English selectable by OS option)

■Parts on order

Provided on your request. Check the supplied component list.

- Option
- Simulation kit
- Application parts

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Manual Configuration

Section 1 Product Overview

This section provides the overview, product composition and the specifications of the MD8470A. Read this section when using this equipment for the first time.

Section 2 Setup

This section describes the name and function of each part, installation of the MD8470A, and connection method with external devices. Read this section before using this equipment.

Section 3 Getting Started

This section describes the operation flow for the MD8470A from turning On the power and measuring to turning Off the power, and the basic operation methods.

Section 4 Maintenance

This section describes the performance test and calibration procedures to use the MD8470A in its optimal status.

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Notations in This Manual

Notation (font)	Example	Meaning
[ ]	[Enter]	Indicates a panel key. Character strings printed on the panel key or function name (in case there is no printing) are written.
[Extn] + [ ]	[Extn] + [1]	Indicates to press a panel key after pressing [Extn]. This procedure is used to execute the function printed on the panel key in blue ("A" in hexadecimal for [1]).
Arial	RF Main	Indicates the characters printed on the panel, mainly connector names.

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Section 1 Overview

This section describes an overview of the MD8470A on its features and specifications.

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1.1 Product Overview and Uses

The MD8470A Signalling Tester (hereinafter, referred to as MD8470A) is a test equipment platform that can simulate mobile communications network and provides test environment for various call processing statuses and services.

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1.2 Features

The following are features of the MD8470A.

(1) A platform superb in flexibility and expandability
Multiple specifications can be tested with one MD8470A unit as it comes loaded with corresponding units and options. It is suitable for dual terminal development of W-CDMA and GSM/GPRS, and development of service corresponding to both systems.

(2) Wide frequency band
The MD8470A supports a wide frequency range for flexibly responding to the frequency expansion of future systems.

(3) Compact size
The MD8470A is designed considering space-savings, and offers a personal development environment.

(4) Supports various bearers
The MD8470A supports various bearers required for application development with data communication. It also comes with built-in PPP server functions required for IP network connections.

(5) Equipped with various interfaces.
The MD8470A is equipped with Ethernet, ISDN, Handset, Serial I/O and other interfaces as it supports various data transmission services.

(6) Loaded with Windows XP Professional®
The MD8470A comes loaded with Windows XP Professional and can control simulations without using an external PC (it also supports simulation control using external PCs).

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1.3 Product Composition

This section introduces the standard composition of this equipment, unit option, simulation kit, applicable parts and warrantee services.

1.3.1 Standard composition

The following table shows the standard parts for the MD8470A.

Table 1.3.1-1 Standard composition

Item	Model Name/Code	Product Name	Qty.	Remarks
Main Unit	MD8470A	Signalling Tester	1	
Standard Accessories	J0017F	Power Cord, 2.6 m	1	100 V, 3-pole, gray color
	J0266	Adapter	1	3 pole plug → 2 pole plug
	Z0741	MD8470A CD-ROM	1	Operation Manual (English)
	MX847000A	Platform Software	1	Installed in this equipment
	A0013	Handset	1	S80AF-16(FB)(01)-2
	G0134	Mouse	1	Wheel mouse
		Keyboard (English)	1	Selected with OS option.

1.3.2 Unit options

The following shows unit options for the MD8470A. All unit options are sold separately. Specify the model name, code, product name and quantity when ordering.

Table 1.3.2-1 Unit options

Model Name	Product Name	Remarks
MU847010A	W-CDMA Signalling Unit	
MU847020B	GSM Signalling Unit	
MU847030A	CDMA2000(R) 1X Signalling Unit	Cable (J1261C) attached
MU847090B	ISDN Interface Unit	
MD8470A-01	Second RF Option	
W2432AE	MD8470A Operation Manual	English, Printed Version
Z0714	English OS option	Includes English keyboard
Z0716	Retrofit Option	
Z0717	Setup Service Option (Note)	

Note:

The setup service option includes the following:

- Initial settings and activation of Windows XP Professional
- Installation of JAVA, Adobe Reader, Ethereal
- Addition of sample software

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1.3.3 Simulation kit

Table 1.3.3-1 Simulation kit

Model Name/Code	Product Name	Remarks
MX847010A	W-CDMA/GSM Simulation Kit	
MX847010A-01	EGPRS Software	
MX847011A	W-CDMA Ciphering Software	
MX847030A	CDMA2000(R) Simulation Kit	
MX847030A-01	Multi Sector/Multi Carrier	

1.3.4 Application parts

Table 1.3.4-1 Application parts

Model Name/Code	Product Name	Remarks
Z0749	MN8110B + INCH SCREW CABLE	For call processing I/O
J1287	HDD-SUB15P CABLE (MILLI-INCH)	For connecting MN8110B
J1261A	Ethernet Cable (Shield Type)	Straight, 1 m
J1261B	Ethernet Cable (Shield Type)	Straight, 3 m
J1261C	Ethernet Cable (Shield Type)	Cross, 1 m
J1261D	Ethernet Cable (Shield Type)	Cross, 3 m
J1262A	RS-232C Cable	Straight, 2 m, male – female
J1262B	RS-232C Cable	Cross, 2 m, male – female
J1263	W-CDMA Interface Cable	Terminal connection cable
J1264	N-SMA Adapter	N (male), SMA (female)
J1265	Adapter (Serial Connector)	male – female
J0658	Adapter	SMA type, male – female L type
J0576B	Coaxial Cord, 1 m	N-P•5D-2W•N-P
J0576D	Coaxial Cord, 2 m	N-P•5D-2W•N-P
J0127A	Coaxial Cord, 1 m	BNC-P-RG58A/U•BNC-P
J0127B	Coaxial Cord, 2 m	BNC-P-RG58A/U•BNC-P
B0543	Carrying case	
B0329D	FRONT COVER FOR 1MW 5U	

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1.3.5 Warrantee service and support service

Table 1.3.5-1 Warrantee service and support service

Model Name/Code	Product Name	Remarks
MD8470A-90	Extended Three Year Service	
MD8470A-91	Extended Five Year Service	
MX847010A-20	MX847010A Support Service (One Year)	
MX847030A-20	MX847030A Support Service (One Year)	

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1.4 Specifications

The following shows the specifications for the MD8470A.

Table 1.4-1 Specifications

Item	Specifications	
Overall	***RF input/output connector (RF Main, RF Aux1, RF Aux2)***	
	Connector:	N type
	Impedance:	50 Ω
	Reference oscillator	
	Frequency:	10 MHz
	Level:	TTL level
	Connector:	BNC type
	Startup characteristics:	≤±5 × 10^{-8} (5 minutes after power application, based on the frequency 24 hours after power application)
	Aging rate:	≤±1 × 10^{-8}/day, ±1 × 10^{-7}/year (Based on the frequency 24 hours after power application)
	Temperature characteristics:	≤±2 × 10^{-8}
	External reference input	
	Frequency:	10 MHz (±0.5 ppm)
	Level:	≥0 dBm
	Impedance:	50 Ω
	Connector:	BNC type
Transmission Characteristics	***Frequency***	
	Frequency range:	400 to 2700 MHz
	Setting resolution:	100 Hz
	Accuracy:	Based on reference oscillator accuracy.
	Output level	
	Level range:	–120 to –18 dBm (RF Main connector) –106 to –4 dBm (at RF Aux1 Tx mode)
	Resolution:	0.1 dB
	Level accuracy:	±3.0 dB (output level ≥–50 dBm, 18 to 28°C)

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Table 1.4-1 Specifications (Cont'd)

Item	Specifications	
Reception Characteristics	***Frequency***	
	Frequency range:	400 to 2700 MHz
	Set resolution:	100 Hz
	Level	
	Maximum input level:	+34 dBm
General	***Display***	
	Screen:	Color TFT LCD screen
	Size:	10.4 inches
	Dot count:	1024 × 768 dots
	External interface	
	Trigger I/O:	BNC connector
	Call Proc Timing I/O:	15-pin Mini D-Sub connector
	Call Proc Serial I/O:	9-pin D-Sub connector
	Call Proc Ethernet I/O:	RJ-45 connector (10BASE-T)
	ISDN:	RJ-45 connector (option, I.430)
	Handset:	RJ-11 connector
	Headphone:	3.5-mm diam headphone jack
	Microphone:	3.5-mm diam microphone jack
	USB:	USB1.1/USB2.0
	RS-232C:	9-pin D-Sub connector
	PCMCIA:	Compliant with Type I, II
	Keyboard:	PS/2
	Mouse:	PS/2
	VGA:	15-pin Mini D-Sub connector
	Ethernet:	RJ-45 connector (10BASE-T/100BASE-TX)

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Table 1.4-1 Specifications (Cont'd)

Item	Specifications	
Power	100 to 120 VAC/200 to 240 VAC (–15%/+10%, Max. 250 V), 50 to 60 Hz, ≤300 VA	
Dimensions/Mass	426 (W) × 221.5 (H) × 281 (D) mm (Excluding protrusions), ≤17 kg (When all options installed)	
Operating Temperature Range & Humidity	+5 to +40°C, ≤95% (No condensation)	
Storage Temperature & Humidity	–20 to +65°C, ≤95% (No condensation)	
EMC	Conducted Emission:	EN61326: 1997 / A2: 2001
	Radiated Emission:	EN61326: 1997 / A2: 2001
	Harmonic Current Emission:	EN61000-3-2: 2000
	Electrostatic Discharge:	EN61326: 1997 / A2: 2001
	Electromagnetic Field Immunity:	EN61326: 1997 / A2: 2001
	Fast Transient / Burst:	EN61326: 1997 / A2: 2001
	Surge:	EN61326: 1997 / A2: 2001
	Conducted RF:	EN61326: 1997 / A2: 2001
	Power Frequency Magnetic Field:	EN61326: 1997 / A2: 2001
	Voltage Dips / Short Interruptions:	EN61326: 1997 / A2: 2001
Safety	Conforms to EN 61010-1: 2001 (Pollution Degree 2).	

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Section 2 Setup

This section describes names and functions of each part, setting up the MD8470A and the connection method to external devices.

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2.1 Part Names and Functions

This section describes names and functions of the panel keys to operate the MD8470A and connectors to connect external devices.

2.1.1 External appearance

The front panel consists of an LCD, panel keys, connectors, etc. The rear panel consists of power inlet, connectors, etc.

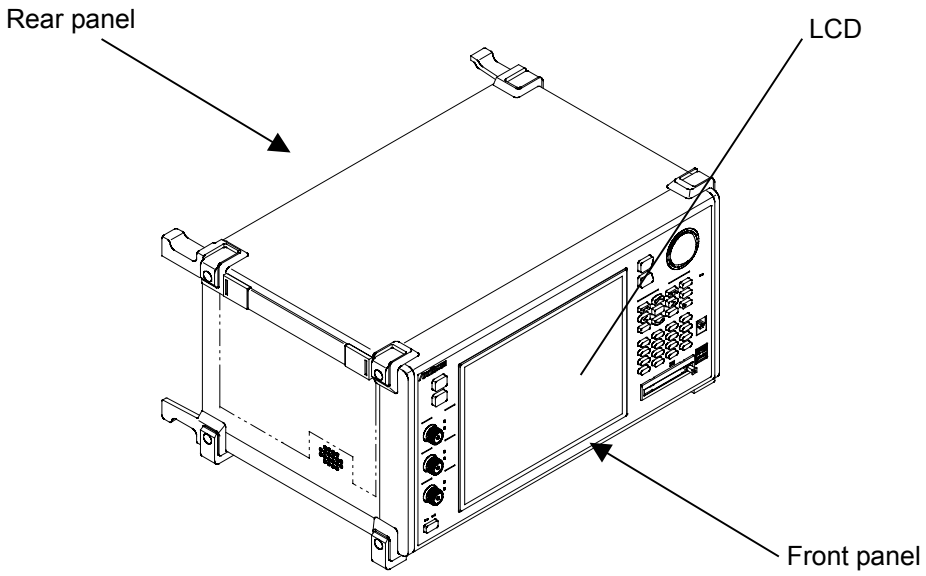


Fig. 2.1.1-1 External appearance

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2.1.2 Front panel

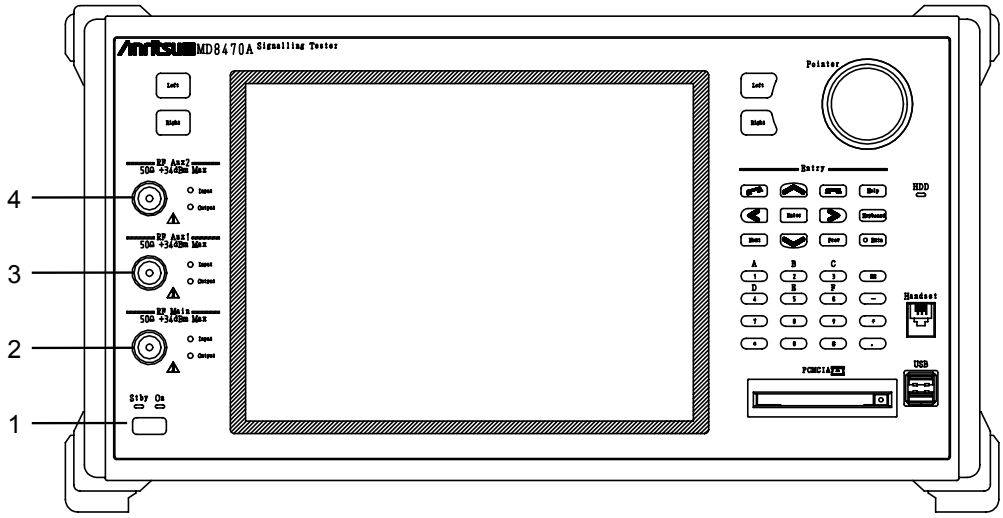


Fig. 2.1.2-1 Front panel (1)

1. Power switch
   This is the switch to switch power ON or to standby (Stby).

RF connector

2. RF Main Main I/O connector
   This is an N-type main I/O connector. It is used as an input connector when Input is lit, as an output connector when Output is lit and as an I/O connector when both Input and Output are lit.
3. RF Aux1 Aux1 I/O connector
   This is an N-type auxiliary I/O connector. It is used as an input connector when Input is lit, as an output connector when Output is lit and as an I/O connector when both Input and Output are lit.
4. RF Aux2 Aux2 I/O connector
   This is an N-type auxiliary I/O connector. It is used as an input connector when Input is lit, as an output connector when Output is lit and as an I/O connector when both Input and Output are lit.

CAUTION

Do not input power beyond the permissible maximum power written on the label or in the specifications to the RF input and output connectors. Do not input a signal to the RF connector set to output. This may damage the internal circuits and cause a fire or accident to occur.

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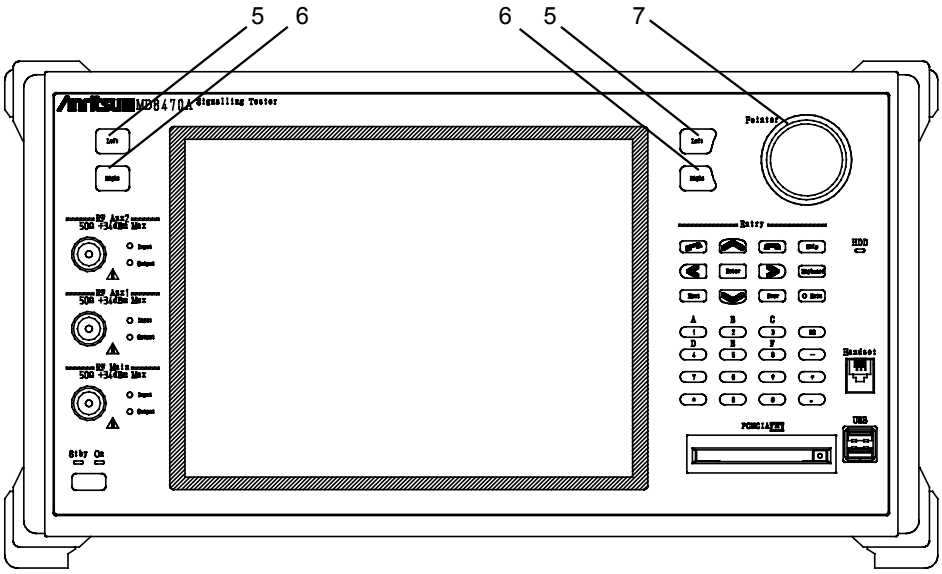


Fig. 2.1.2-2 Front panel (2)

Trackball

Operations equivalent to a mouse that can connect to the rear panel of the MD8470A are enabled by using the Left key, Right key and pointer.

5. Left Left key
   These keys are equivalent to the left-click of a mouse. Either of the two Left keys, one on the left and the other on the right, may be used.
6. Right Right key
   These keys are equivalent to the right-click of a mouse. Either of the two Right keys, one on the left and the other on the right, may be used.
7. Pointer Pointer
   This is used to move the pointer on the screen.

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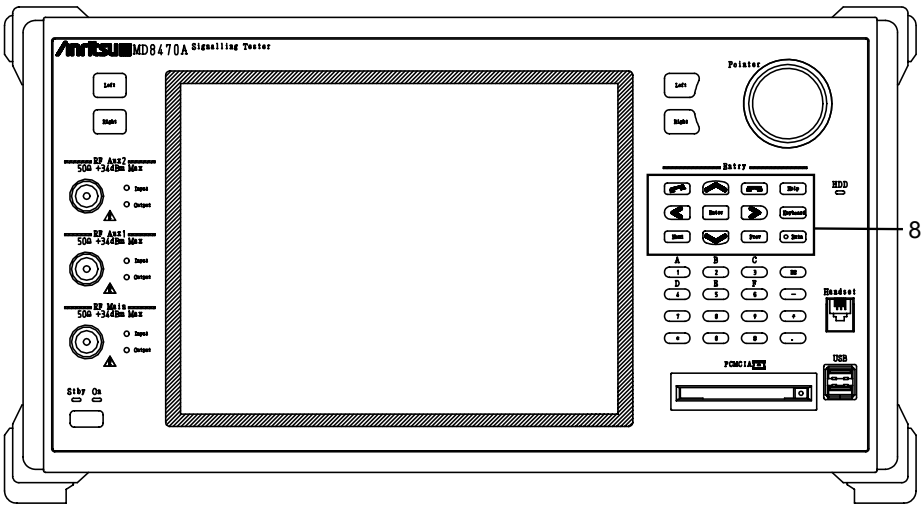


Fig. 2.1.2-3 Front panel (3)

Entry keys

8. [∧] [∨] [<] [>] Cursor keys
These are keys for moving the cursor. These are equivalent to the cursor keys on a keyboard.

9. [Enter] Enter key
This key is equivalent to the [Enter] key on a keyboard.

10. [ ] Off hook key
Off hook operates with simulation kit that supports this key. It is equivalent to the [Shift] + [Ctrl] + [F1] keys on a keyboard.

11. [ ] On hook key
On hook operates with simulation kit that supports this key. It is equivalent to the [Shift] + [Ctrl] + [F2] keys on a keyboard.

12. [Prev] Prev key
This key moves the cursor to the item previous to the item currently selected. It is equivalent to the [Shift] + [Tab] keys on a keyboard.

13. [Next] Next key
This key moves the cursor to the item after the item currently selected. It is equivalent to the [Tab] key on a keyboard.

14. [Help] Help key
This key displays help on screen. It is equivalent to the [F1] key on the keyboard.

15. [Keyboard] Keyboard key
This key displays the on-screen keyboard on screen.

16. [Extn] Extender key
This key is pressed before inputting the key written in blue characters on the panel. The in-key lamp lights up when the Extender key is enabled.

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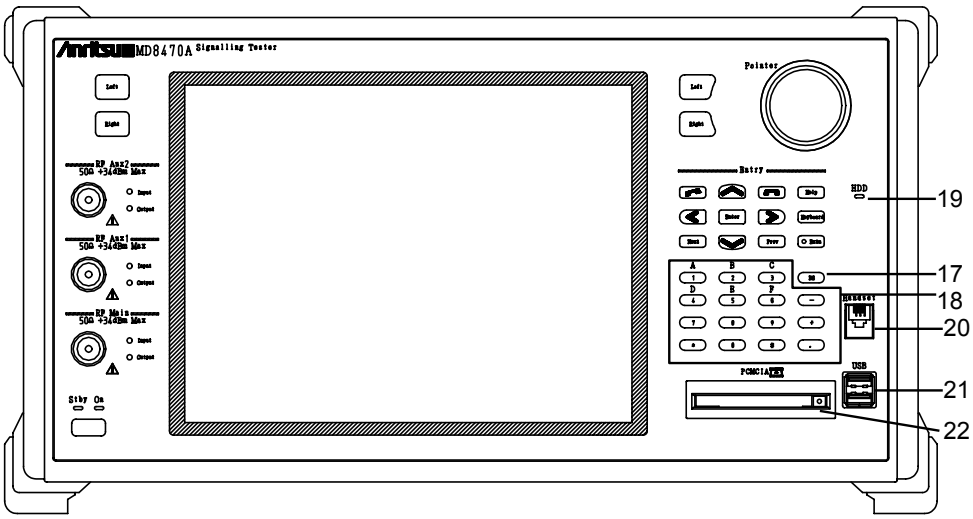


Fig. 2.1.2-4 Front panel (4)

17. [BS] Backspace key
    This key deletes one character previous. It is equivalent to the [Backspace] key on the keyboard.
18. Numeric keypad, symbol keys
    [0] to [9] , [.] , [-] , [+] , [*] , [#]
    This key inputs numerical values for parameters.
    [Extn] + [1] to [Extn] + [6] *A to F*
    This key inputs A-F for hexadecimal numbers.
19. HDD Hard disk access lamp
    This lights when accessing the hard disk installed in the MD8470A.
20. Handset Handset connector
    This is a connector used to connect the handset (standard accessory).
21. USB USB connectors
    This is a connector for connecting a USB device conforming to USB1.1.
22. PCMCIA PCMCIA slot
    This is a slot to insert a PCMCIA compatible (Type I, II) memory card.

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2.1.3 Rear panel

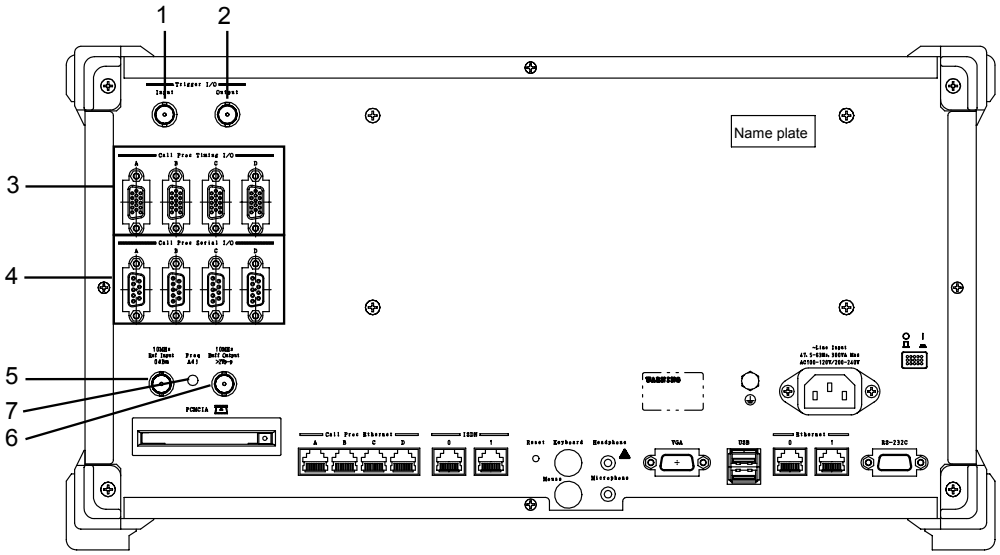


Fig. 2.1.3-1 Rear panel (1)

1. Trigger I/O Input Trigger input connector
   This is a BNC connector for inputting the trigger signal from an external device and performing UE transmission measurement synchronized with external devices.
2. Trigger I/O Output Trigger output connector
   This is a BNC connector for outputting event timing to external devices.
3. Call Proc Timing I/O A to D Timing I/O ports for call processing
   These are 15-pin Mini D-Sub connectors for call processing.
4. Call Proc Serial I/O A to D Serial I/O ports for call processing
   These are 9-pin D-Sub connectors for call processing.
5. 10MHz Ref Input Reference signal input connector
   This is a BNC connector for inputting an external reference signal.
6. 10MHz Buff Output Reference signal output connector
   This is a BNC connector for outputting a reference signal built into the MD8470A.
7. Freq Adj Frequency adjustment
   This is a trimmer for adjusting a reference oscillation frequency.

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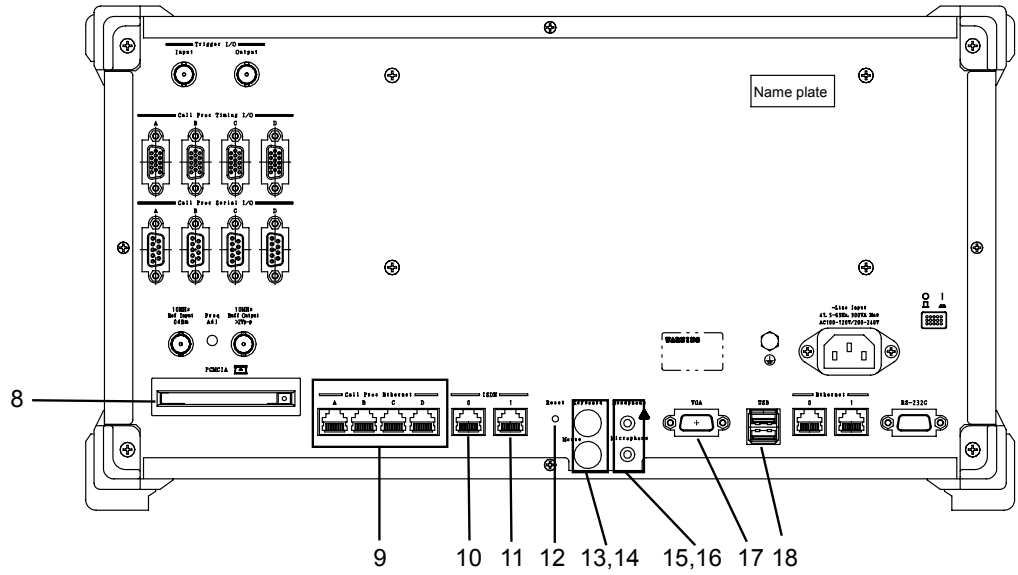


Fig. 2.1.3-2 Rear panel (2)

8. PCMCIA PCMCIA slot
   Used to insert a PCMCIA compatible (Type I, II) memory card.
9. Call Proc Ethernet A to D Ethernet I/O ports for call processing
   These are RJ-45 connectors for call processing.
10. ISDN0 ISDN0 port
    This is a connector for ISDN (BRI).
11. ISDN1 ISDN1 port
    This is a connector for ISDN (PRI). This is currently unavailable.
12. Reset Reset
    This is a button for resetting the MD8470A. Press with a fine-tipped item.
13. Keyboard Keyboard
    This is a connector for connecting the standard accessory keyboard.
14. Mouse Mouse
    This is a connector for connecting the standard accessory mouse.
15. Headphone Headphone
    This is a jack for inserting the 3.5-mm diam headphone terminal.
16. Microphone Microphone
    This is a jack for inserting the 3.5-mm diam microphone terminal.
17. VGA VGA connector
    This is a 15-pin Mini D-Sub connector for external monitor connection.
18. USB USB connectors
    This is a connector for inserting a USB device conforming to USB2.0/USB1.1.

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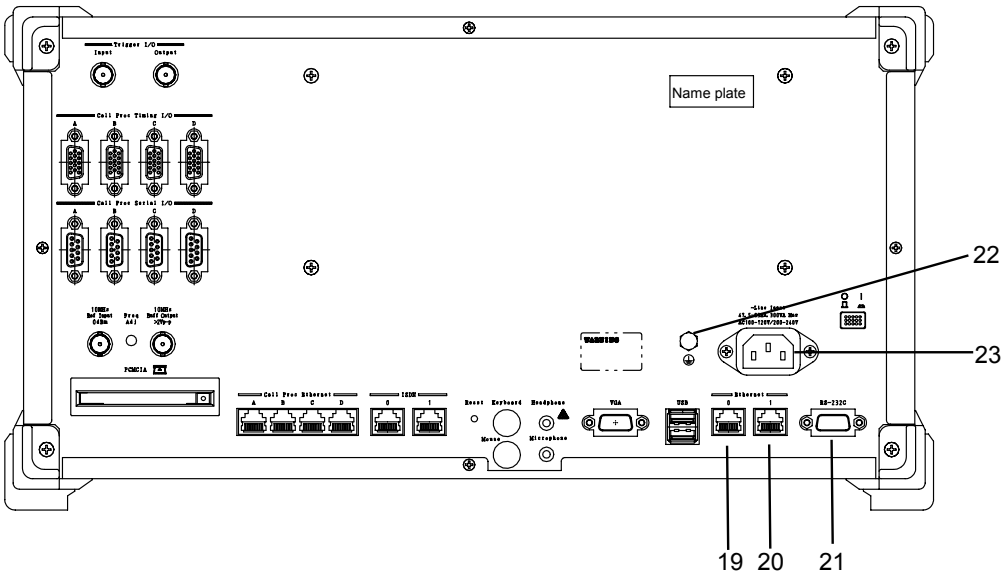


Fig. 2.1.3-3 Rear panel (3)

19. Ethernet0 Ethernet0 port
    This is an RJ-45 connector for connecting to an external PC, etc.
20. Ethernet1 Ethernet1 port
    This is an RJ-45 connector for connecting to an external PC, etc.
21. RS-232C RS-232C port
    This is a 9-pin D-Sub connector for connecting to an external PC, etc.
22. Grounding terminal
    This connects a grounding wire for grounding to an earth potential.
23. Power inlet
    This is an outlet for the power cable. The available power source does not need to be set to 100 or 200 V system since the range is 100 to 120 Vac and 200 to 240 Vac (50 to 60 Hz). Power must be 300 VA or less.

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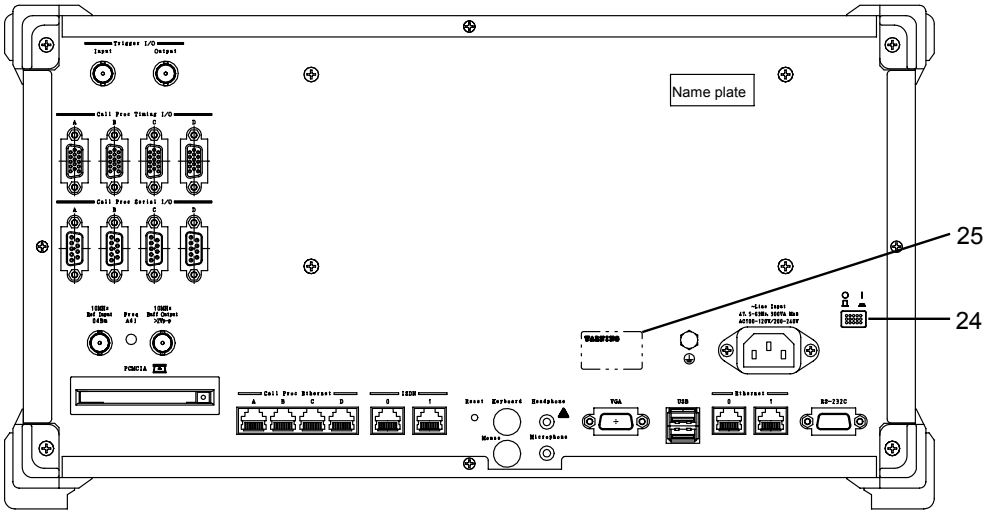


Fig. 2.1.3-4 Rear panel (4)

24. Main power switch
    This switch is for turning the main power supply ON or OFF. The power switch on the front panel will be at standby (Stby) when the main power supply is turned ON.

25. Safety label
    This is a WARNING label for safely using the MD8470A. Follow the contents written on it.

WARNING ⚠
NO OPERATOR SERVICE-ABLE PARTS INSIDE.
REFER SERVICING TO QUALIFIED PERSONNEL.

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2.2 Installation

Install the MD8470A after taking out it from the packing box and checking its contents. This section describes how to install the MD8470A and other caution notes.

2.2.1 Transport

Hold the grips attached on the right and left, and keep the device level when transporting it.

CAUTION

1. **Do not move when the power is ON. Internal circuits may be damaged and cause a fire, electric shock or accidents to occur.**
2. **Hold the grips attached on the right and left and keep the device level when transporting it. Holding the grip on only one side when transporting this equipment places excessive force on internal precision components and may result in damage.**

2.2.2 Install location environment conditions

Install the MD8470A in a stable location with a temperature of +5 to +40°C. Install rear and sides in a location with more than 10 cm separating it from obstructions such as walls and peripheral devices so as not to block the area around the exhaust air opening.

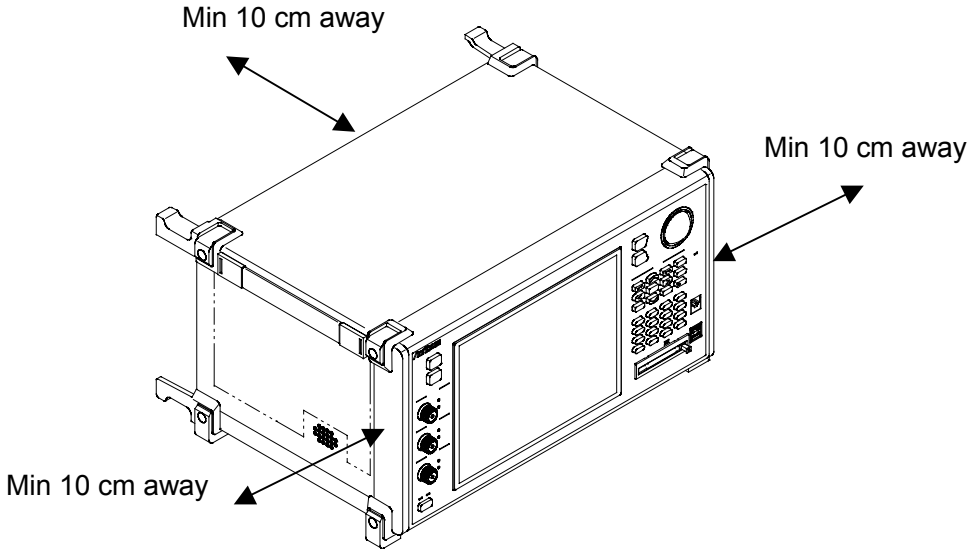


Fig. 2.2.2-1 Installation location

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See Fig. 2.2.2-2 when attaching a tilt stand to the MD8470A.

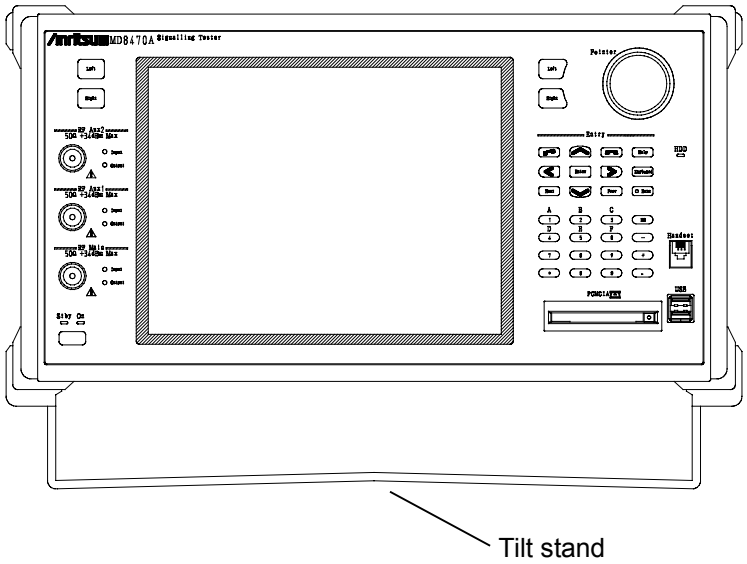


Fig. 2.2.2-2 MD8470A with tilt stand

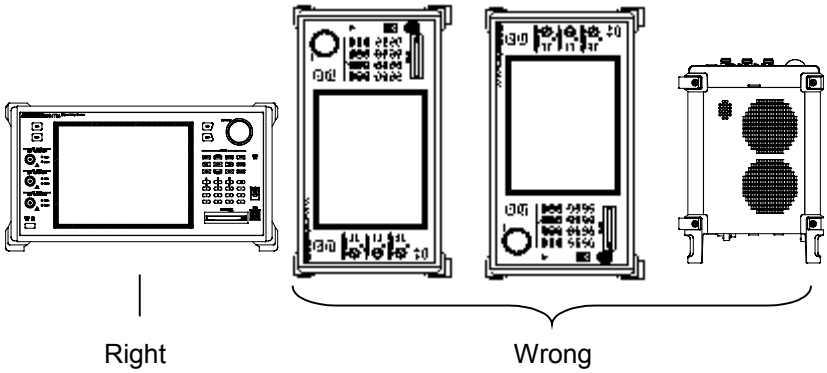


Fig. 2.2.2-3 Installation orientation

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CAUTION ⚠

Avoid using the MD8470A in the following locations in order to avoid fire, personal injuries or equipment failures.

- **Unstable locations**
  Do not place it in unstable locations where there is vibration, on top of shaky stands or where there is an incline. Doing so may cause the MD8470A to collapse and fall down, or be dropped and cause injury.

- **Humid and dusty locations**
  Do not place it in humid and dusty locations. Circuits may short due to water droplets and dust adhering to the MD8470A, etc., and may cause fire, electric shock or accidents to occur.

- **Locations with high temperatures**
  Do not place it in locations that are exposed to direct sunlight or locations with high temperatures. Internal temperatures may rise and cause fire or accidents to occur.

- **Locations where exposed to active gasses**
  Do not place it in locations where the MD8470A may be exposed to active gasses. This may cause fire or accidents due to damage to the device, etc.

- **Locations with Severe Temperature Changes**
  Do not place it in locations with severe temperature changes. Add power after sufficiently drying the MD8470A when using it in locations above room temperature after having used it in a location with low temperatures for a long period of time. Circuits may short due to water droplets and dust adhering to the MD8470A, etc., and may cause fire, electric shock or accidents to occur.

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CAUTION

Do not block the aperture of this equipment. Internal temperatures may rise and cause a fire to occur. Avoid the following methods of use.

- **Use in upright positions.**
- **Use while the equipment is covered.**
- **Use with dust accumulated on the fan.**

2.2.3 Stack installation

When installing with one MD8470A unit stacked on top of another, align the four feet located at the corners on the bottom side of the MD8470A that will go on top and the four adjusters located on the corners of the top side of the equipment that will go on the bottom. Do not stack three or more units on top of each other.

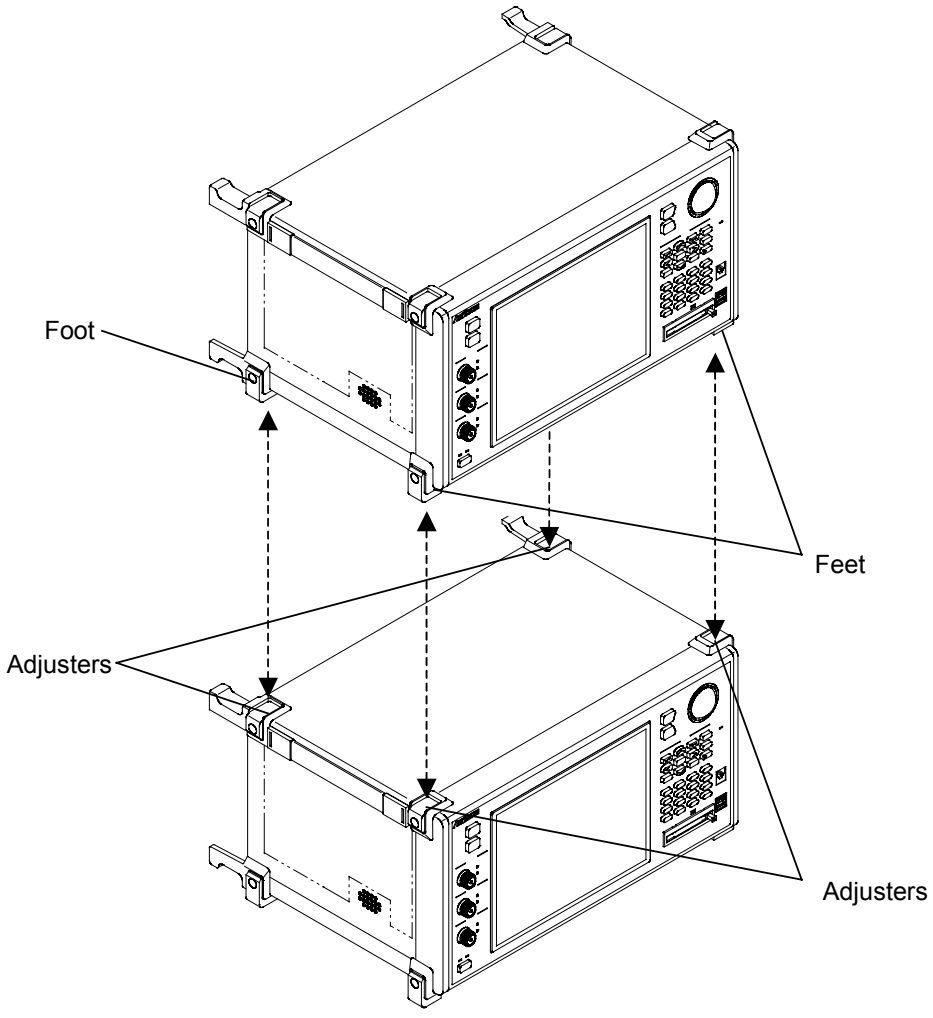


Fig. 2.2.3-1 For stacked installation

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2.3 Connection

This section describes the protective grounding method and how to install each cord.

2.3.1 Connecting power cable

Check that the main power switch located on the rear panel is turned off before connecting the power cord.

[Procedure]

1. Check that the main power switch located on the rear panel is turned off.
2. Insert the power cord into the power inlet on the rear panel.
3. Insert the power-cord plug into the power outlet.

2.3.2 Checking power voltage

CAUTION ⚠

Use the MD8470A in the power voltage range indicated below to operate the MD8470A normally. Electric shock, fire, accidents and malfunctions may occur when power voltages other than the following are used.

Table 2.3.2-1 Power voltage range

Power	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

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2.3.3 Protective grounding

Perform protective grounding in order to prevent fire and electric shock when connecting the power cord.

- For 3-pole power outlet
  Insert it into the outlet as is. Protective grounding is completed in this state.
- For 2-pole power outlet
  Insert the accompanying 3-pole-to- 2-pole conversion adapter to the 3-pole plug then plug the 2-pole plug for the adapter into the 2-pole power outlet after converting to 2-poles.
  Next, connect the tip of the green-colored grounding hanging from the adapter to the earth potential. Connect the grounding terminal located on the rear panel to the direct earth potential when grounding is unavailable for the green-colored grounding wire that is hanging from the adapter.

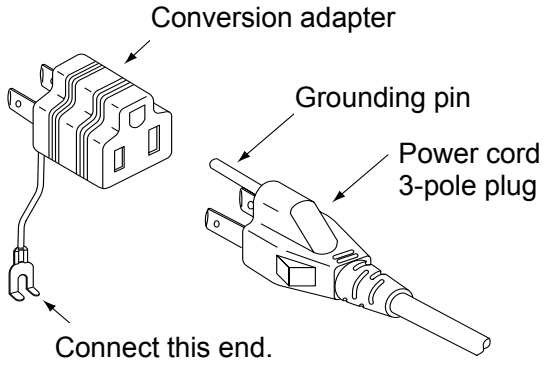


Fig. 2.3.3-1 3-pole plug and conversion adapter

- Protective grounding via grounding terminal
  Ground the grounding terminal located on the rear panel of the main unit when there is no 3-pole (2-pole grounding type) power outlet and the green-color wired of the conversion adapter cannot be grounded.

WARNING

Accidents resulting in injury or death caused by electric shock may occur if the power is switched on without protective grounding. Ground the tip of the green-colored wire of the conversion adapter or the grounding terminal on the rear panel before adding power to the MD8470A when there is no 3-pole (2-pole grounding type) power outlet.

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2.3.4 Connecting to UE

The connection method of the MD8470A to user equipment (UE) varies according to types and assignments of UE connectors. The following describes the basic connection method.

(Example) When connecting UE via RF main I/O connector

Connect the RF signal I/O of UE and the RF Main connector located on the front panel of the MD8470A using the RF cable. Prepare separate adapters when direct connection is not available.

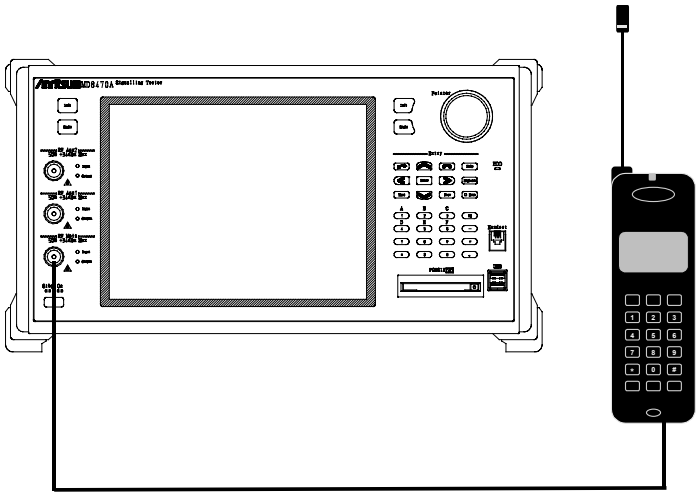


Fig. 2.3.4-1 Example of connection to UE

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2.3.5 Connecting handset

The Handset connector on the front panel of the MD8470A is a connector for connecting the handset (standard accessory) used for the voice call testing of the UE.

Refer to the Operation Manual of the simulation kit for detailed test methods using the handset.

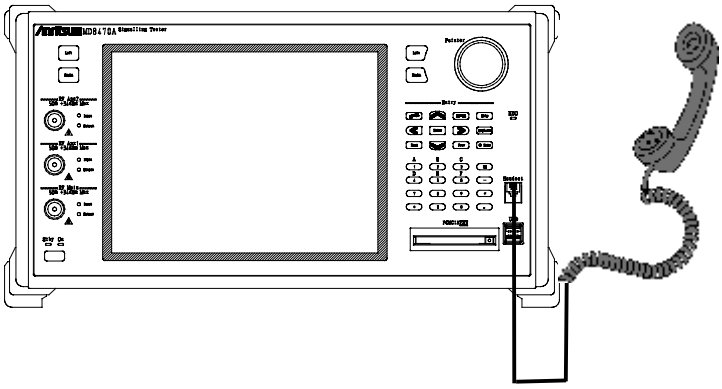


Fig. 2.3.5-1 Connection to handset

CAUTION

The handset (standard accessory) is only for the MD8470A. The handsets for MD8480A/B and MT8820A cannot be used.

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2.3.6 Reference signal I/O connectors

The BNC type 10MHz Ref Input connector on the rear panel of the MD8470A is used for inputting external reference signals. Input a frequency within ±0.5 ppm and at a level of 0 dBm or higher.

Set whether to use the reference signal built into the MD8470A or an external reference signal with the utility. Refer to Section 3.3.2 "Switching reference signal" for details.

The BNC type 10MHz Buff Output connector outputs a 10-MHz reference signal built into the MD8470A at TTL level.

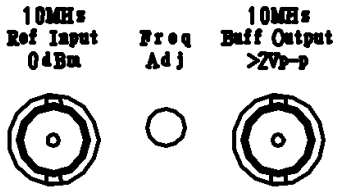


Fig. 2.3.6-1 10MHz Ref Input and 10MHz Buff Output connectors

2.3.7 Trigger connectors

The Trigger I/O Output connector on the rear panel of the MD8470A is a BNC connector for outputting a trigger signal to an external device. The trigger signal is output at LVCMOS level.

The Trigger I/O Input connector is a BNC connector for inputting the trigger signal from external devices and performing transmission measurements for UE synchronized with external devices. Input the trigger signal at LVCMOS level.

Refer to the Operation Manual of the simulation kit for detailed use of the Trigger I/O connector.

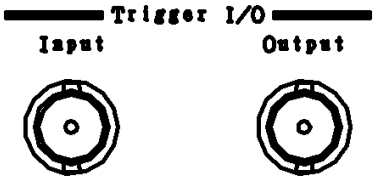


Fig. 2.3.7-1 Trigger connectors

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2.3.8 Call processing timing connectors

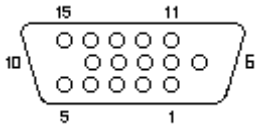
The Call Proc Timing I/O A to D connectors located on the rear panel of the MD8470A are 15-pin Mini D-Sub connectors used for inputting/outputting a signal related to call processing testing. The bit data input for bit error rate measurement and demodulation data output are available. The MD8470A comes with Slots A to D for attaching a signalling unit, and each A to D connector corresponds to Slots A to D of the MD8470A, respectively.

Refer to the Operation Manual of the simulation kit for detailed use of the Call Proc Timing I/O A to D connectors.

The rear panel of the MD8470A has the VGA connector, which is an identical 15-pin Mini D-Sub connector. Check the connector labels when connecting and be careful so as not to connect to the wrong connection point.

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Table 2.3.8-1 Call Proc I/O connector and signal assignment



Pin	Signal Name	Function
1	BER_DAT_IN	Data input for BER measurement. Inputs data where the test terminal is demodulated at TTL or CMOS level.
2	BER_DAT_OUT	Outputs demodulation data at CMOS level.
3	DSUB15_RSV1	Reserved
4	DSUB15_RSV4	Reserved
5	(NC)	Not connected
6	FRAME_TRG_OUT	The trigger signal output at frame cycle. It outputs at CMOS level.
7	BER_CLK_IN	Clock signal for BER measurement. Inputs data clock where test terminal is demodulated at TTL or CMOS level.
8	BER_CLK_OUT	Outputs demodulation data clock at CMOS level.
9	(NC)	Not connected
10	(NC)	Not connected
11	SYNC IN	Inputs the synchronized signal from the master side at LVCMOS level when two MD8470A units are synchronous operated.
12	SYNC OUT	Outputs the synchronizing signal to the slave side at LVCMOS level when two MD8470A units are synchronized.
13	GND	Grounding
14	DSUB15_RSV3	Reserved
15	(NC)	Not connected

In addition, the MN8110B I/O adapter (sold separately) is provided as an applicable part for these call processing ports.

The MN8110B is a unit that converts from a 15-pin Mini D-Sub connector to a BNC connector. The input/output signal for the Call Proc Timing I/O connector of the MD8470A can be input and output from the MN8110B BNC connector by connecting the Call Proc I/O connector (15-pin Mini D-Sub) on the MN8110B rear panel to the Call Proc Timing I/O connector of the MD8470A using the connection cable supplied with the MN8110B.

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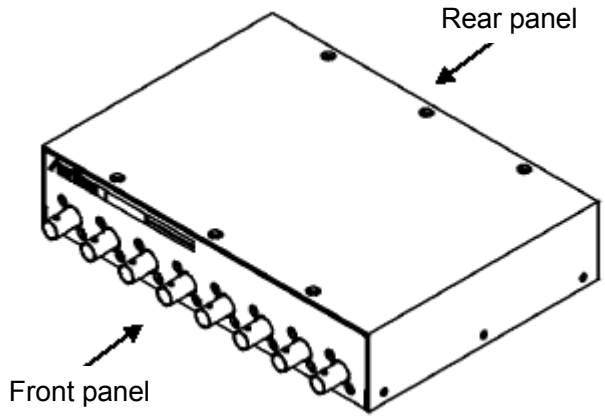


Fig. 2.3.8-1 MN8110B external appearance

CAUTION ⚠

Connect by positioning the label description of the connection cable "inch" on the MD8470A side, and the "mm" on the MN8110B side.

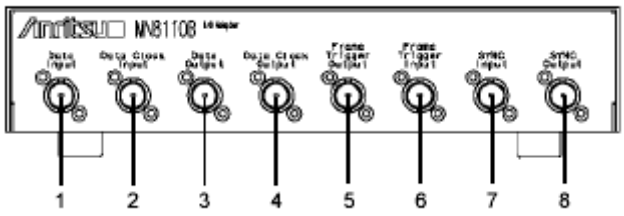


Fig. 2.3.8-2 MN8110B front panel

1.	Data Input	Data input connector
2.	Data Clock Input	Data clock input connector
3.	Data Output	Data output connector
4.	Data Clock Output	Data clock output connector
5.	Frame Trigger Output	Trigger signal output connector
6.	Frame Trigger Input	Trigger signal input connector
7.	Sync Input	Synchronized signal input connector
8.	Sync Output	Synchronized signal output connector

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Table 2.3.8-2 Correspondence between front panel connectors and MD8470A Call Proc Timing I/O signals

MN8110B Front Panel	MD8470A Call Proc Timing I/O
Connector Name	**Signal Name**
Data Input	BER_DAT_IN
Data Clock Input	BER_CLK_IN
Data Output	BER_DAT_OUT
Data Clock Output	BER_CLK_OUT
Frame Trigger Output	FRAME_TRG_OUT
Frame Trigger Input	None
SYNC Input	SYNC IN
SYNC Output	SYNC OUT

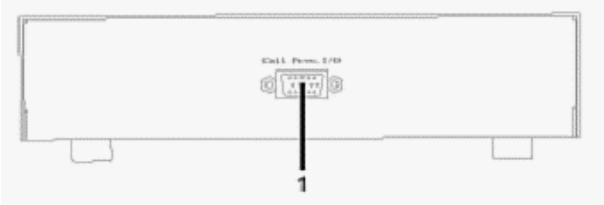


Fig. 2.3.8-3 MN8110B rear panel

1. Call Proc I/O
   Connect to the MD8470A Call Proc Timing I/O connector.

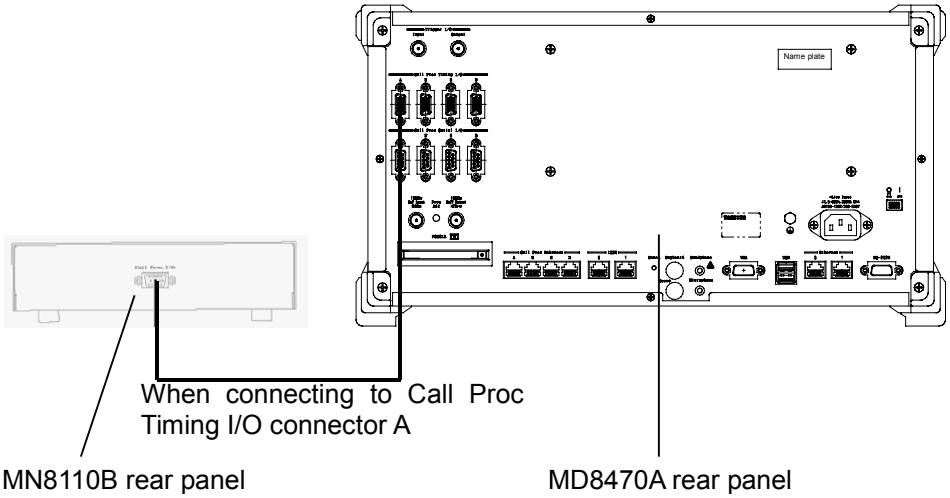


Fig. 2.3.8-4 Connecting MD8470A to MN8110B

Table 2.3.8-3 MN8110B specifications

Dimensions	213 (W) × 44 (H) × 150 (D) mm (excluding protrusions)
Weight	≤1 kg

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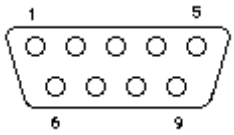
2.3.9 Call processing serial connectors

The Call Proc Serial I/O A to D connectors located on the rear panel of the MD8470A are 9-pin D-Sub (female) connectors to execute communication tests between the MD8470A and UE. The MD8470A comes with Slots A to D for attaching a signalling unit, and each A to D connector corresponds to Slots A to D of the MD8470A, respectively.

Refer to the Operation Manual of the simulation kit for detailed use of the Call Proc Serial I/O A to D connectors.

The rear panel of the MD8470A has the RS-232C connector, which is an identical 9-pin D-Sub connector (female). Check the connector labels when connecting and be careful so as not to connect to the wrong connection point.

Table 2.3.9-1 Call Proc Serial I/O connector and signal assignment



Pin	Signal Name	Function
1	CF(DCD)	Carrier detection (input to the MD8470A)
2	BB(RXD)	Reception data (input to the MD8470A)
3	BA(TXD)	Transmission data (output from the MD8470A)
4	CD(DTR)	Data terminal ready (output from the MD8470A)
5	AB(GND)	Grounding
6	CC(DSR)	Data set ready (input to the MD8470A)
7	CA(RTS)	Signal request (output from the MD8470A)
8	CB(CTR)	Transmit enabled (input to the MD8470A)
9	CE(R)	Ring indicator (input to the MD8470A)

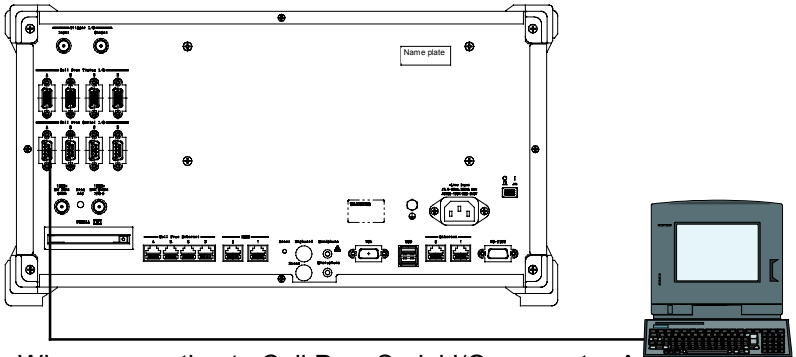


Fig. 2.3.9-1 Example of connection to PC

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2.3.10 Call processing Ethernet connectors

The Call Proc Ethernet A to D connectors located on the rear panel of the MD8470A are RJ-45 connectors to perform communication tests between the MD8470A and the test terminal. The MD8470A comes with Slots A to D for attaching a signalling unit to the MD8470A, and each A to D connector corresponds to Slots A to D of the MD8470A, respectively. 10BASE-T is supported. Use a cable with shielding in order to observe radiation interference specifications.

Refer to the Operation Manual of the simulation kit for detailed use of the Call Proc Ethernet A to D connectors.

The rear panel of the MD8470A has ISDN connectors and Ethernet connectors, which are identical RJ-45 connectors. Check the connector labels when connecting and be careful so as not to connect to the wrong connection point.

Table 2.3.10-1 Call Proc Ethernet I/O A connector and signal assignment



Pin	Signal Name
1	TD+
2	TD–
3	RD+
4	NC
5	NC
6	RD–
7	NC
8	NC

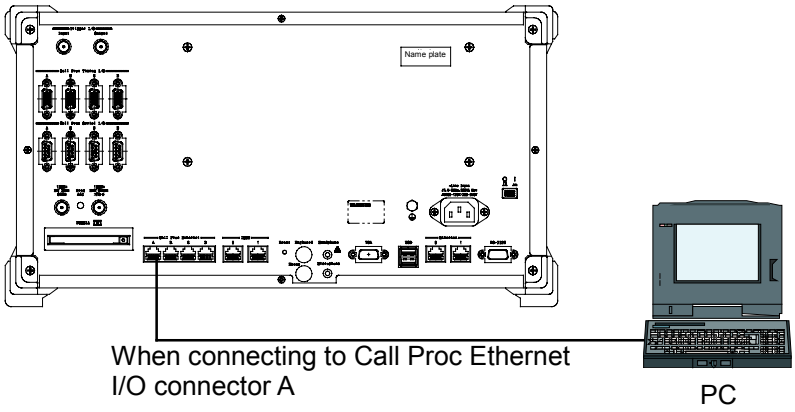


Fig. 2.3.10-1 Example of connection to PC

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CAUTION ⚠

Do not connect Call Proc Ethernet I/O A to D connectors to the networks such as the Internet.
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2.3.11 ISDN connectors

The ISDN0 connector on the rear panel of the MD8470A main unit is a connector for connecting to an ISDN device (BRI). Use a cable with shielding in order to observe radiation interference specifications.

The ISDN1 connector on the rear panel of the MD8470A main unit is a connector for connecting to an ISDN device (PRI). It is currently unavailable.

The ISDN connector can be used only when the MU847090A/B ISDN Interface Unit is installed. Refer to the Operation Manual of the simulation kit for detailed test methods using ISDN devices.

The rear panel of the MD8470A has Call Proc Ethernet connectors and Ethernet connectors, which are identical RJ-45 connectors. Check the connector labels when connecting and be careful so as not to connect to the wrong connection point.

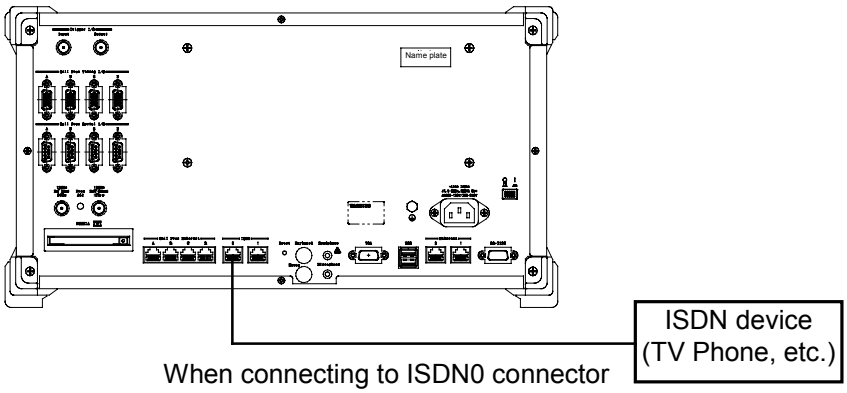
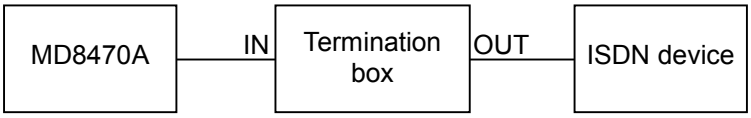


Fig. 2.3.11-1 Example of connection to ISDN device

For the MU847090A ISDN Interface Unit, terminate the line on the network side externally. If the line is not terminated at a connected ISDN device, use the marketed termination box, etc.



In addition, the MU847090B ISDN Interface Unit terminates the line internally.

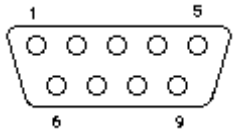
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2.3.12 RS-232C connector

The RS-232C connector located on the rear panel of the MD8470A is a 9-pin D-Sub (female) connector for connecting to an external PC, etc.

The rear panel of the MD8470A has the Call Proc Serial I/O connectors which are identical 9-pin D-Sub connectors (female). Check the connector labels when connecting and be careful so as not to connect to the wrong connection point.

Table 2.3.12-1 RS-232C connector



Pin	Signal Name	Function
1	CF(DCD)	Carrier detection (input to the MD8470A)
2	BB(RXD)	Reception data (input to the MD8470A)
3	BA(TXD)	Transmission data (output from the MD8470A)
4	CD(DTR)	Data terminal ready (output from the MD8470A)
5	AB(GND)	Grounding
6	CC(DSR)	Data set ready (input to the MD8470A)
7	CA(RTS)	Signal request (output from the MD8470A)
8	CB(CTR)	Transmit enabled (input to the MD8470A)
9	CE(R)	Ring indicator (input to the MD8470A)

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2.3.13 Ethernet connectors

The Ethernet0 and Ethernet1 connectors located on the rear panel of the MD8470A are RJ-45 connectors for connecting to external PCs, etc. 10BASE-T/100BASE-TX is supported. Use a cable with shielding in order to observe radiation interference specifications.

The rear panel of the MD8470A has Call Proc Ethernet connectors and ISDN connectors, which are identical RJ-45 connectors. Check the connector labels when connecting and be careful so as not to connect to the wrong connection point.

Table 2.3.13-1 Ethernet0, Ethernet1 connectors and signal assignments



Pin	Signal Name
1	TD+
2	TD–
3	RD+
4	NC
5	NC
6	RD–
7	NC
8	NC

CAUTION

Do not connect Ethernet0 and Ethernet1 connectors to networks such as the Internet. Anritsu is not responsible for any damage caused by connection to a network.

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2.3.14 Mouse and Keyboard connectors

The Keyboard connector located on the rear panel of the MD8470A is a connector for connecting to a keyboard (standard accessory). Connect the keyboard to the Keyboard connector on the rear panel before turning on the power switch for the MD8470A.

The Mouse connector located on the rear panel of the MD8470A is a connector for connecting to a mouse (standard accessory). Connect the mouse to the Mouse connector on the rear panel before turning on the power switch for the MD8470A.

Refer to Sections 3.2.4 "Using mouse/trackball" and 3.2.5 "Using keyboard/on-screen keyboard" for details.

2.3.15 USB connectors

The USB connector on the front panel of the MD8470A can connect to USB1.1 compatible USB devices.

The USB connector on the rear panel of the MD8470A can connect to USB2.0/USB1.1 compatible USB devices.

Refer to Section 3.2.8 "Using USB devices" for details.

2.3.16 PCMCIA slots

The PCMCIA slots on the front and rear panels of the MD8470A permit PCMCIA compatible (Type I, II) memory card to be inserted.

Refer to Section 3.2.9 "Using PCMCIA" for details.

2.3.17 Headphone and Microphone jacks

The Headphone jack on the rear panel of the MD8470A is a jack for inserting the 3.5-mm diam headphone terminal.

The Microphone jack on the rear panel of the MD8470A is a jack for inserting the 3.5-mm diam microphone.

Refer to Section 3.2.10 "Using headphone/microphone" for details.

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2.3.18 External monitor

The VGA connector located on the rear panel of the MD8470A is a 15-pin Mini D-Sub connector for connecting to an external monitor. An external display can be used if the external display designation is set to enabled. Refer to Section 3.2.11 "Using external monitor" for details.

The rear panel of the MD8470A has Call Proc Timing I/O connectors, which are identical 15-pin Mini D-Sub connectors. Check the connector labels when connecting and be careful so as not to connect to the wrong connection point.

2.3.19 Allowable maximum power to input into the connector

Do not input power beyond the allowable maximum power into the input connector of the MD8470A. In addition, do not input a signal into the output-only connector. The internal circuits may be damaged if a signal is input into the output-only connector.

Table 2.3.19-1 Allowable maximum power

Connector Name	Allowable Maximum Power
RF Main / RF Aux1 / RF Aux2	+34 dBm
10MHz Ref Input	+20 dBm
Trigger I/O Input	LVCMOS Level
Call Proc. Timing I/O	LVCMOS Level

CAUTION

The MD8470A has no circuit that protects the internal circuit from power above the allowable maximum power. Do not input power beyond the allowable maximum power. Doing so may damage the internal circuits, which may cause a fire or accident to occur.

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Section 3 Getting Started

This section describes how to use power ON/OFF, basic operations method, how to use the utility and error displays. Refer to the Operation Manual of the simulation kit for detailed test operation methods.

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3.2 Basic Operations 3-4
3.2.1 Basic use 3-4
3.2.2 Operating Windows 3-5
3.2.3 Using help functions 3-5
3.2.4 Using mouse/trackball 3-6
3.2.5 Using keyboard/on-screen keyboard 3-6
3.2.6 Using RS-232C connector 3-6
3.2.7 Using Ethernet connectors 3-7
3.2.8 Using USB devices 3-7
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3.1 Power On

CAUTION

Switch power on when this equipment is sufficiently dry. Use of this equipment at room temperature immediately after having used it in a low temperature environment for a long period of time causes water droplets to form on it, resulting in short circuits, and may result in breakdowns.

Turn both main power switch on the rear panel and the power switch on the front panel On to turn the MD8470A on.

[Procedure]

1. First, press the main power switch located on the rear panel to turn to On. The standby lamp (Stby) on the front panel lights up. The standby lamp means that the main power switch is turned on.

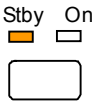


Fig. 3.1-1 Standby status (power switch Stby lamp lights up)

2. When using the keyboard and mouse (standard accessory), connect them to the rear panel of the MD8470A before turning the MD8470A On.
3. Press the power switch on the front panel for one second or longer to switch On. Turning the power on shuts the standby lamp (Stby) Off and lights up the power on (On) lamp.

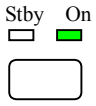


Fig. 3.1-2 Power On state (power-switch power-on lamp lights up)

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4. Wait a moment after the power On lamp lights up. Windows XP Professional will start and "MD8470A Signalling Tester" will be displayed (see Fig. 3.1-3).



Fig. 3.1-3 Screen displayed at startup

5. The "MD8470A Signalling Tester" display disappears, then an icon as shown in Fig. 3.1-4 is displayed in the taskbar at the lower right of the screen. The MD8470A has now started up normally.



Fig. 3.1-4 Icon displayed in taskbar

CAUTION

Although you can switch to the BIOS Setup Screen by pressing the F2 key on the keyboard while Windows is starting up with the MD8470A, do not switch to the BIOS Setup screen. In addition, avoid making any BIOS setting changes. Changes of BIOS settings may prevent the MD8470A from starting.

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3.2 Basic Operations

3.2.1 Basic use

Right-click on the icon displayed in the taskbar on the lower right of the screen  to open the pop-up menu as shown in Fig.3.2.1-1

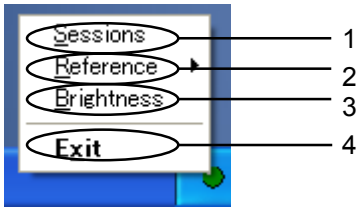


Fig. 3.2.1-1 Pop-up menu opened by right-click

1. When "Sessions" is selected:
   The Sessions window is displayed (the Sessions window is also displayed by double-clicking the icon). Refer to Section 3.3.1 "Sessions" for details.
2. When "Reference" is selected:
   The reference signal settings are switched to built-in signals of the MD8470A or external signals. Refer to Section 3.3.2 "Switching reference signal" for details.
3. When "Brightness" is selected:
   The brightness adjustment dialog-box is displayed. For details, refer to Section 3.3.3 "Adjusting screen brightness."
4. When "Exit" is selected:
   The icon is no longer displayed. Do not select "Exit" normally. Restart the MD8470A when "Exit" is selected by mistake.

The  icon currently displayed in the taskbar at the lower right of the screen changes color according to the operating conditions of the MD8470A as shown in Table 3.2.1-1.

Table 3.2.1-1 Operating conditions

Icon Color	Example of Operating Conditions
Dark Green	The MD8470A is started and before start up of simulation kit.
Yellow	Simulation kit is started and program is being downloaded.
Bright Green	Simulation kit is started and after program download is completed.
Red	When a reference signal error occurred. Refer to Section 3.3.2 "Switching reference signal" for details.

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3.2.2 Operating Windows

Windows XP Professional is installed in the MD8470A. Refer to Windows help functions when something is unclear in Windows operations.

A password of Administrator is set to "xst" at shipment.

A default user is set to "xstuser" at shipment.

Note the following when installing computer anti-virus software in the MD8470A.

- The MD8470A checks operations with Symantec Norton AntiVirus. Setting changes may be required when using other computer anti-virus software.
- Setting changes may be required when using computer anti-virus software with Firewall functions.

CAUTION

1. **It is recommended to take back-up of data contents when saving data to the hard disk of the MD8470A. Anritsu is not responsible for data loss in the hard disk.**

2. **S-drive of the MD8470A is defaulted so as not to be displayed on your PC by My Computer, etc. Do not change settings for the S-drive. Changing the S drive settings may prevent the MD8470A from starting.**

3.2.3 Using help functions

Press the F1 on the keyboard or he Help on the front panel while the application window, where help is to be displayed, is active. Note that it is not displayed with applications that do not support the Help functions.

Press the F1 on the keyboard or the Help on the front panel on the desktop for Windows help.

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3.2.4 Using mouse/trackball

When using the mouse, connect it to the Mouse connector on the rear panel before turning the power switch of the MD8470A On.

The trackball (Left key, Right key, Pointer) on the front panel of the MD8470A can operate just as the mouse does. The trackball can be used even if the mouse is connected to the rear panel of the MD8470A.

Table 3.2.4-1 Trackball description

Designation	Description
Left	Equivalent to the left-click of the mouse. Either Left key on the left or right may be used.
Right	Equivalent to the right-click of the mouse. Either Right key on the left or right may be used.
Pointer	Used to move the pointer on the screen.

The trackball pointer may stop moving smoothly when dust, dirt and hand grime are adhering to it. Clean it with cloth in this event.

3.2.5 Using keyboard/on-screen keyboard

When using the keyboard, connect it to the Keyboard connector on the rear panel before turning the power switch of the MD8470A On.

Press the Keyboard on the front panel of the MD8470A to display the on-screen keyboard on the screen. Characters can be entered by using the on-screen keyboard, mouse or trackball even when the keyboard is not connected to the rear of the MD8470A.



Fig. 3.2.5-1 On-screen keyboard

3.2.6 Using RS-232C connector

An external PC, etc., can be connected to the MD8470A via the RS-232C connector on the rear panel using a serial cable.

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3.2.7 Using Ethernet connectors

An external PC, etc., can be connected to the MD8470A via the Ethernet0 or Ethernet1 connector on the rear panel using an Ethernet cable. 10BASE-T/100BASE-TX is supported.

The IP address is set as follows at factory shipment settings.

Table 3.2.7-1 IP address settings at factory shipment

Connector	IP Address	Subnet mask
Ethernet0	192.168.1.2	255.255.255.0
Ethernet1	Obtains an IP address automatically.	

CAUTION

Do not connect to networks such as the Internet via the Ethernet connector (Ethernet0, Ethernet1). Anritsu is not responsible for problems generated by connecting to a network.

3.2.8 Using USB devices

The USB devices available for the MD8470A are as follows. Note that only the USB connectors on the rear panel side conform to USB 2.0.

Table 3.2.8-1 Connectable USB devices

Connector	Connectable USB Specification
Front Panel × 2	Conforms to USB 1.1
Rear Panel × 2	Conforms to USB 2.0/USB 1.1

[Connectable USB devices examples]

- DVD/CD drive
- USB memory

Halt access to USB devices before removing these devices.

CAUTION

Do not connect USB devices while power is On and Windows is starting up. The device may freeze as a result.

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3.2.9 Using PCMCIA

Memory cards available for the MD8470A conform to PCMCIA (Type I, II). Install a PC card adapter when using Compact Flash cards.

A memory card can be inserted into the PCMCIA slot on the front panel and the rear panel.

When inserting a memory card, make sure that the notch, which is provided on the memory card (PC card adapter) to prevent incorrect insertion, is in the direction as shown in the following figure. Only one memory card can be inserted into each slot.

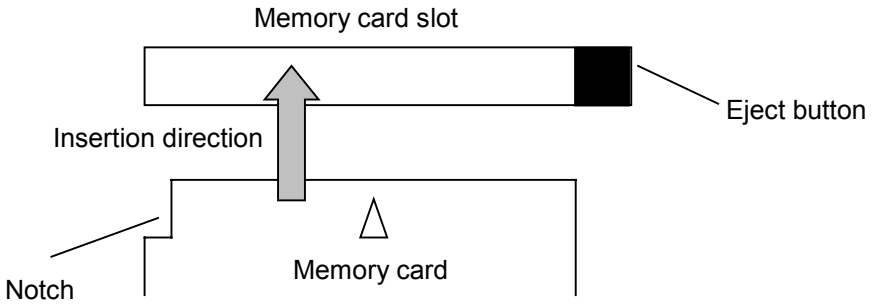


Fig. 3.2.9-1 Memory card insertion

Press the eject button located besides the PCMCIA slot after halting access to the memory card for memory card removal.

CAUTION

1. **Do not remove a memory card while the MD8470A is accessing it. Doing so will cause saved data to be lost and may damage the memory card.**
2. **It is recommended to take back-up of data contents when saving data to a memory card. Anritsu is not responsible for memory card data loss.**

3.2.10 Using headphones/microphone

The MD8470A can insert the 3.5-mm diam headphone terminals to the Headphone jacks on the rear panel. Connect the headphones to output speaker sound for the headphone for the MD8470A.

The MD8470A can insert the 3.5-mm diam microphone terminals to the Microphone jacks on the rear panel. Connect the microphone to record sound with the sound recorder included with Windows, etc.

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3.2.11 Using external monitor

The MD8470A can connect an external monitor to the VGA connector on the rear panel. Follow the steps shown below when using an external monitor.

[Procedure]

1. Connect the external monitor to the VGA connector on the rear panel of the MD8470A using the display cable, then turn external monitor power On.
2. Open the "Display Properties" window using either of the following methods:
   - Right-click on the desktop to open the pop-up menu and select "Properties".
   - Select "Display" from the control panel.
3. Select the "Settings" tab on the Screen Properties window, then click "Advanced" in the lower right.
4. Select the "Lynx3DM+" tab and set "ON" for "CRT:" in the Display Switching field. When display of the MD8470A is unnecessary, set "OFF" for "LCD:" in the Display Switching field.
5. The screen is displayed on the external monitor.

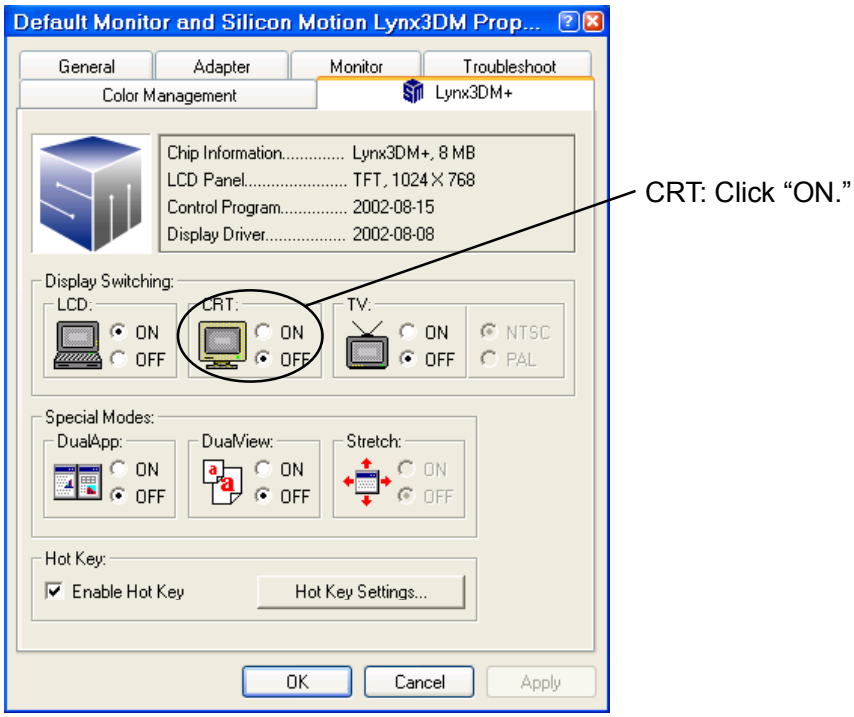


Fig. 3.2.11-1 Display change screen

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3.3 Using Utility

3.3.1 Sessions

Right-click on the icon to open the pop-up menu as shown in Fig. 3.3.1-1, then select "Sessions" or double-click the icon to display the Sessions window as shown in Fig.3.3.1-2. Note that this screen is provided as a display example, and the actual screen varies according to signalling unit installation conditions, etc.



Fig. 3.3.1-1 Displaying sessions window

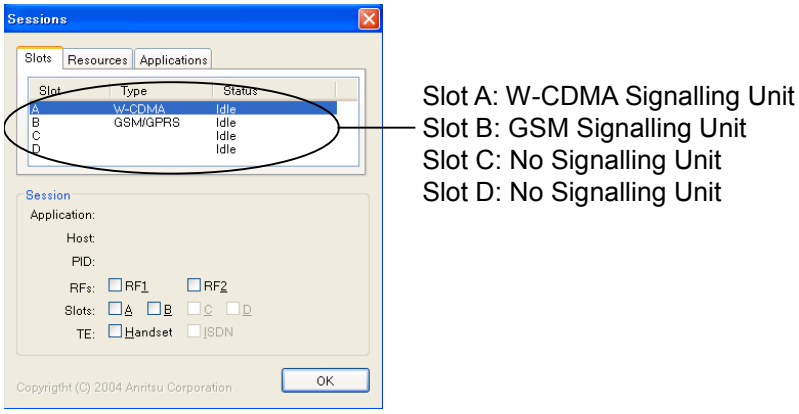


Fig. 3.3.1-2 Example of Sessions window

The MD8470A is equipped with four slots (Slots A to D) for installing a signalling unit. What signalling unit is installed to each slot can be viewed and checked on the Session window.

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3.3.2 Switching reference signal

The reference signal can be switched between the signal built into the MD8470A and the external signal. The signal built into the MD8470A is set as the reference signal by initial settings at startup. When using the external signal as the reference signal, switch the reference signal using the procedure shown below.

[Procedure]

1. Input an external reference signal to the 10MHz Ref Input connector on the rear panel of the MD8470A. Input the external reference signal frequency within 10 MHz ±0.5 ppm and at a level of 0 dBm or higher.
2. Right-click on the icon to open the pop-up menu as shown in Fig. 3.3.2-1, and select "Reference" → "External."

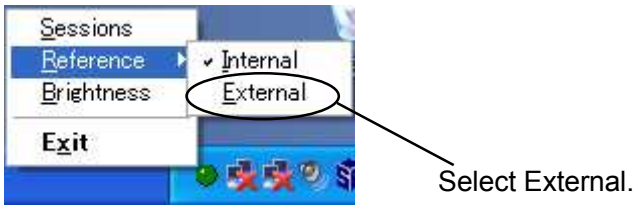


Fig. 3.3.2-1 Reference signal switching

When switching the reference signal to the built-in signal, select "Reference" → "Internal" from the pop-up menu shown above.

The icon may turn red when the reference signal is switched. Move the pointer onto the icon, and check the following points when "Reference is not locked." is displayed as shown in Fig.3.3.2-2.



Fig. 3.3.2-2 When the icon turns red

- Is the signal input to the 10MHz Ref Input connector when "External" is set?
- Is the signal input to the 10MHz Ref Input connector within 10 MHz ±0.5 ppm and 0 dBm or higher when "External" is set?

The MD8470A may have failed when error is displayed, even when the check items above are passed. Contact Anritsu Service and Sales office in this event.

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3.3.3 Adjusting screen brightness

The MD8470A can adjust screen brightness. When screen brightness is adjusted, perform the following procedure.

[Procedure]

1. Right-click on the icon as shown in Fig. 3.3.3-1 to select "Brightness." The Brightness dialog-box as shown in Fig. 3.3.3-2 appears is displayed.
2. Perform adjustment with a brightness knob. Drag up a knob for increasing brightness, while down for decreasing.
3. When the place except the brightness dialog is clicked, the dialog-box is closed.



Fig. 3.3.3-1 Display method of Brightness dialog-box

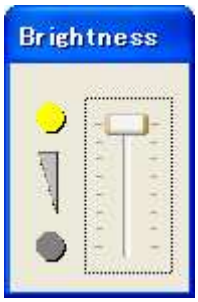


Fig. 3.3.3-2 Brightness dialog-box

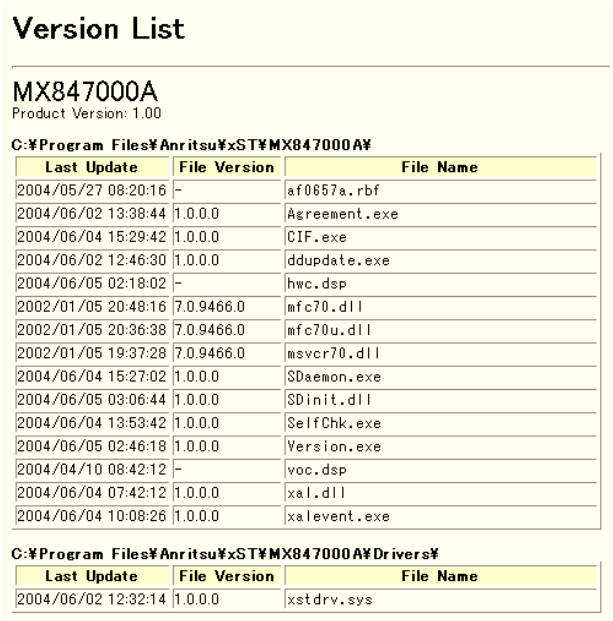
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3.3.4 Checking software version

Version information for the software installed in the MD8470A can be checked. Follow the procedure shown below for software version check.

[Procedure]

1. Open the C:\Inetpub\wwwroot\Version.htm file with Internet Explorer or other browsers. (Selecting "Program" → "Anritsu" → "MX847000A" → "Version" from the Start menu on the Windows taskbar)



Version List

MX847000A
Product Version: 1.00

C:¥Program Files¥Anritsu¥xST¥MX847000A¥

Last Update	File Version	File Name
2004/05/27 08:20:16	-	af0657a.rbf
2004/06/02 13:38:44	1.0.0.0	Agreement.exe
2004/06/04 15:29:42	1.0.0.0	CIF.exe
2004/06/02 12:46:30	1.0.0.0	ddupdate.exe
2004/06/05 02:18:02	-	hwc.dsp
2002/01/05 20:48:16	7.0.9466.0	mfc70.dll
2002/01/05 20:36:38	7.0.9466.0	mfc70u.dll
2002/01/05 19:37:28	7.0.9466.0	msvcr70.dll
2004/06/04 15:27:02	1.0.0.0	SDaemon.exe
2004/06/05 03:06:44	1.0.0.0	SDinit.dll
2004/06/04 13:53:42	1.0.0.0	SelfChk.exe
2004/06/05 02:46:18	1.0.0.0	Version.exe
2004/04/10 08:42:12	-	voc.dsp
2004/06/04 07:42:12	1.0.0.0	xal.dll
2004/06/04 10:08:26	1.0.0.0	xalevent.exe

C:¥Program Files¥Anritsu¥xST¥MX847000A¥Drivers¥

Last Update	File Version	File Name
2004/06/02 12:32:14	1.0.0.0	xstdrv.sys

Fig. 3.3.4-1 Version information

The version information has been updated at startup of the MD8470A.

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3.3.5 Using self check

Self-check can be executed for the system (CPU, memory storage, hard disk) of the MD8470A. Follow the procedure shown below to execute a self-check.

The results of self-check are saved as C:\Inetpub\wwwroot\SelfChk.htm.

[Procedure]

1. From the Start menu on the Windows taskbar, select "Program" → "Anritsu" → "MX847000A" → "SelfChk."
2. The SelfChk screen is displayed. Click the Check button.
3. When the message dialog box shown in Fig. 3.3.5-2 appears to notify the self check is complete, click the OK button on the message dialog box and check results.

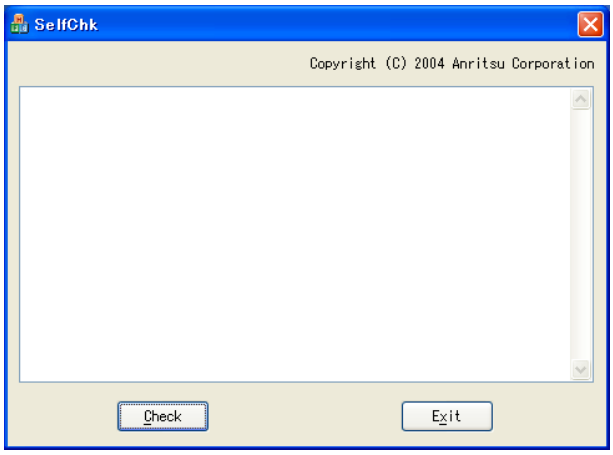


Fig. 3.3.5-1 Self check screen (before check)

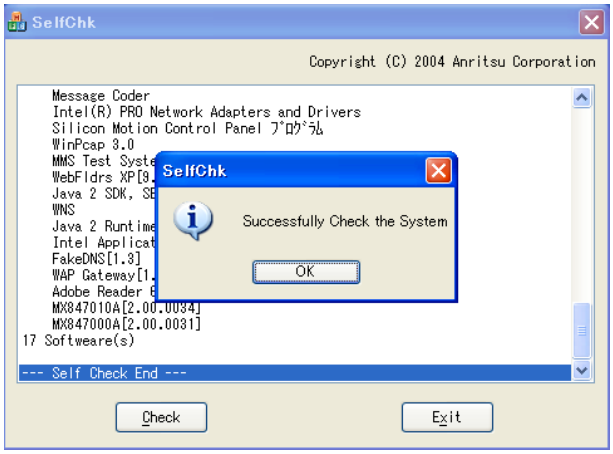


Fig. 3.3.5-2 Self-check screen (after check)

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Table 3.3.5-1 Self-check item

Item
Windows Version
MMI-CPU Board Information
MMI-CPU MAC Address
CPU
DISK
Installed COM Board
Option(s)
Serial Number
Running Time
Installed Software

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3.3.6 License management

The license of the simulation kit installed in the MD8470A can be managed by using the License Management Tool. When using the License Management Tool, perform the following procedure.

[Procedure]

1. Select "Program" → "Anritsu" → "MX847000A" → "License Management Tool" from the Start menu on the Windows taskbar to start up the License Management Tool.
2. The License Management Tool screen is displayed. In this screen, the license expiration date for the simulation kit support service can be checked and license data can be imported and exported.

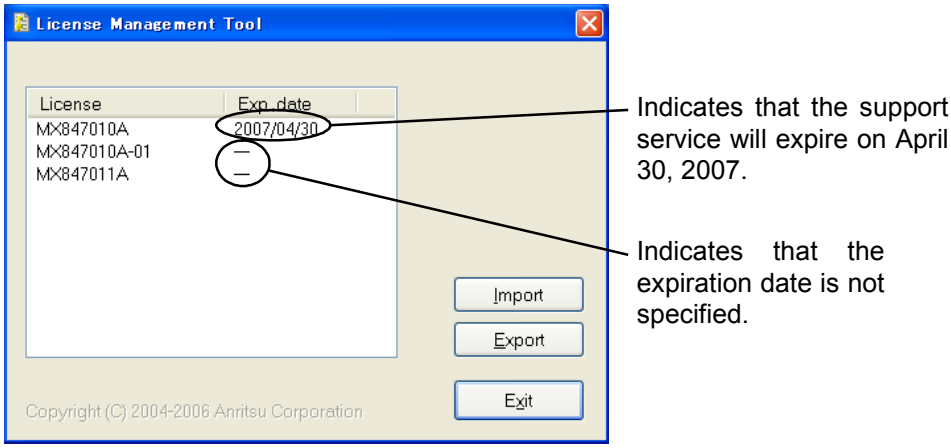


Fig. 3.3.6-1 Example of License Management Tool screen display

Table 3.3.6-1 Details of License Management Tool screen items

License	Displays the simulation kit model names.
Exp. date	Displays the license expiration date for the simulation kit support service. "–" indicates that no expiration date is specified for that simulation kit.
Import	Click this button to import a license file (*.lic) that was exported by the MD8470A. When the simulation kit support service is renewed, import the newly-issued license file to update the expiration date.
Export	Click this button to export a license file (*.lic). This button is used to restore the settings to the state at factory shipment. Refer to Appendix B "Returning to the State at Factory Shipment" for details.
Exit	Click this button to exit the License Management Tool.

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CAUTION ⚠

1. **Each simulation kit can be upgraded and used, including major version updates, until the expiration date of the license.**
2. **If you want to upgrade your simulation kit to a version that is released after the expiration date of the license, you must renew the contact for the simulation kit support service.**
3. **Minor version updates are allowed even after the expiration date of the license.**

The major and minor versions of each simulation kit can be checked on the version information (see Fig. 3.3.6-2 below). Refer to Section 3.3.4 "Checking software version" for details on the version information.

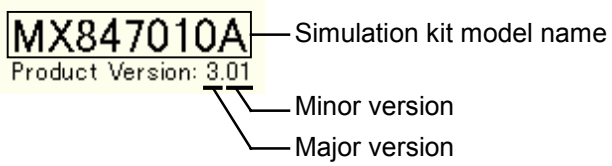


Fig. 3.3.6-2 Major and minor version

CAUTION ⚠

Since the license data is uniquely provided for each simulation kit, no exported license file may be used in other MD8470A units.

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3.4 When System Error Is Displayed

3.4.1 When temperature error is displayed

A system error display screen as shown in Fig.3.4.1-1 will be displayed if the internal temperature of the MD8470A rises abnormally.

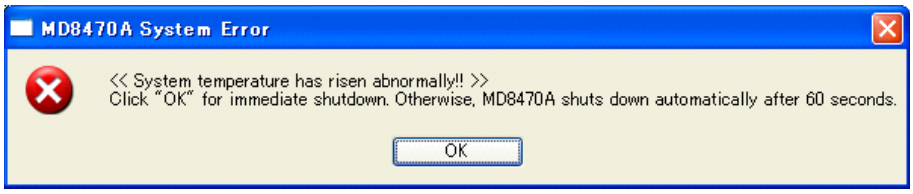


Fig. 3.4.1-1 System error (temperature) display screen

When the OK button on the screen is clicked or 60 seconds has elapsed after the error display screen is displayed, the MD8470A is forcibly set to the standby state (Windows enters the turn off state).

When the MD8470A enters the standby state, check whether there is any problem in the environment for the MD8470A.

- Is the MD8470A being used in an environment out of the operating temperature range (+5 to +40°C)?
- Is the fan exhaust air opening located on the side of the MD8470A plugged up?

The MD8470A may have failed if the error display screen is displayed again, even when the operating environment has been improved. Contact Anritsu Service and Sales office in this event.

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3.4.2 When power fan error is displayed

When the fan attached to the power supply unit of the MD8470A is stopped, the system error screen as shown in Fig.3.4.2-1 is displayed.

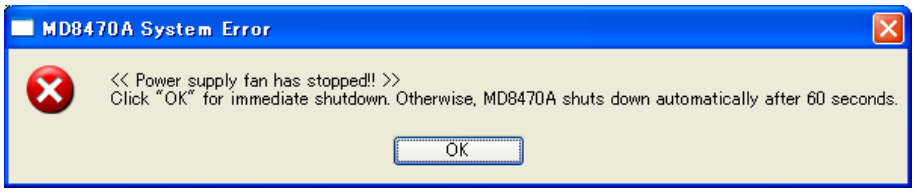


Fig. 3.4.2-1 System error (power fan) display screen

When the OK button on the screen is clicked or 60 seconds has elapsed after the error display screen is displayed, the MD8470A is forcibly set to the standby state (Windows enters the turn off state).

The MD8470A may have failed when the system error display screen is displayed. Contact Anritsu Service and Sales office in this event.

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3.5 Power Off

Shut off the power when not using the MD8470A. Turn off both the main power switch on the rear panel and the power switch on the front panel.

[Procedure]

1. End Windows using the method shown below.
   - From the Start menu on the Windows taskbar, select "Turn Off Computer" → "Turn Off."
   - Press the power switch on the front panel for one second or longer.

   The power ON lamp (On) goes out and the standby lamp (Stby) lights up. Keep this state when using the MD8470A immediately after this.

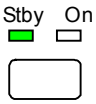


Fig. 3.5-1 Standby status (power switch standby lamp lights up)

If Windows cannot be ended using the method described above (when Windows freezes, etc.), hold the power switch on the front panel pressed 5 seconds or longer. The power ON lamp (On) goes out and the standby lamp (Stby) lights up.

2. When not using the MD8470A for a long time, press the main power switch on the rear panel to turn the MD8470A Off (O side). The standby lamp (Stby) goes out and the main power turns Off.

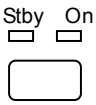


Fig. 3.5-2 Main power Off status (Stby and On lamps go off)

Power to the MD8470A is now fully turned Off. Remove the power plug from the outlet for safety.

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CAUTION ⚠

Be sure to turn off main power at standby status. Turning off main power while the hard disk is being accessed (the HDD lamp on the front panel of this equipment is lit) may damage the hard disk. If the main power is turned off at power On, power will be turned on when the main power is turned on the next time, even if the power switch on the front panel is not pressed.

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Section 4 Maintenance

This section describes performance test, calibration method, cleaning and other maintenance. Accurate tests can be maintained by always keeping this equipment at optimal conditions.

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4.1 Performance Test

4.1.1 Purpose and when to implement

Perform a performance test in order to check performance after acceptance inspection, periodic inspections and repairs. Always keep performance of the MD8470A within the specifications by performing a performance test periodically. Periodical tests should be performed once or twice a year. If the performance test result does not meet the standard requirements, contact Anritsu Service and Sales office.

4.1.2 Performance test item

The following test item is described.

(1) Reference oscillator frequency stability

4.1.3 Required measuring instruments

The following table lists the equipment required for performance test along with the test item.

CAUTION

If not otherwise specified, turn on the UE Signalling Tester and measuring instruments at least thirty minutes before starting the performance test to make their performance stable. To achieve the highest accuracy, the test should be performed at room temperature with little AC voltage fluctuation in an environment free from noise, vibration, dust and humidity.

Table 4.1.3-1 List of performance test equipment

Test Item	Recommended Test Equipment (ANRITSU Model Name)	Performance Required for Equipment
Reference oscillator frequency stability	Frequency counter (MF2412B)	Frequency: 5 to 15 MHz Resolution: 0.1 Hz External reference input (10 MHz)
	Frequency standard instrument	Frequency: 10 MHz Stability: $\pm 1 \times 10^{-9}$ or less

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4.1.4 Reference oscillator frequency stability

The following describes frequency stability test methods of the 10 MHz crystal oscillator being used as the reference oscillator. Evaluate the stability by measuring the frequency change after 24-hour operation, and the frequency change at ambient temperatures of 5°C and 40°C.

(1) Performance test specifications

Table 4.1.4-1 Reference oscillator specification

Item	Specification
Frequency	10 MHz
Starting characteristics	$\leq \pm 5 \times 10^{-8}$ (5 minutes after power application, based on the frequency after 24-hour operation as reference)
Aging rate	$\leq \pm 1 \times 10^{-8}$/day, $\pm 1 \times 10^{-7}$/year (after power application, based on the frequency after 24-hour operation as reference)
Temperature stability	$\leq \pm 2 \times 10^{-8}$ (25°C reference)

(2) Setup

Set up the performance test equipment as shown in Fig. 4.1.4-1. Connect the 10MHz Buff Output reference signal output connector on the rear panel of the MD8470A and the input connector of the frequency counter.

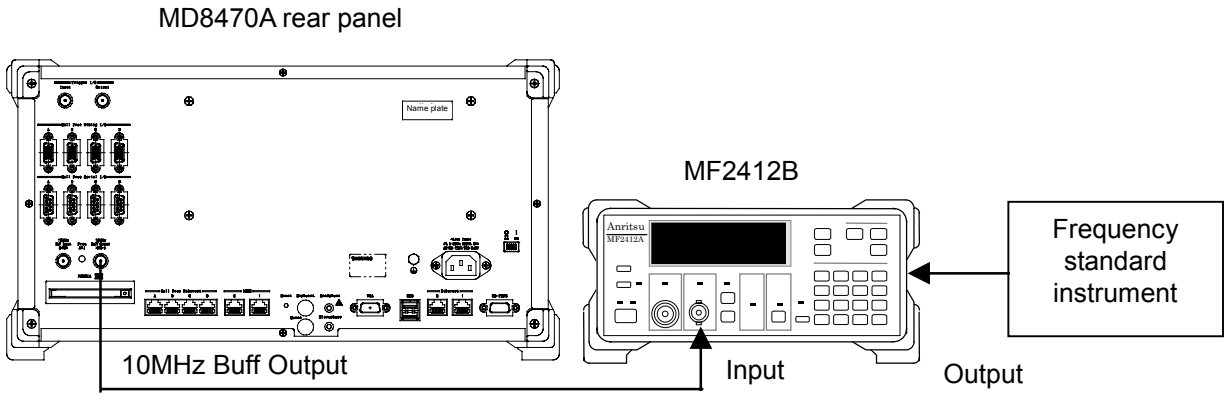


Fig. 4.1.4-1 Setup of reference oscillator frequency stability test

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(3) Starting characteristics test

Note:

Perform this test in a place free from vibration and where the ambient temperature fluctuation is within ±2°C.

[Procedure]

1. Set the frequency counter to use an external frequency standard instrument.
2. After 24 hours from turning the power on, measure the output frequency of the 10MHz Buff Output connector on the MD8470A using the frequency counter. Read values to the 0.1 Hz digit (same for other measurements below).
3. Turn off the power, wait 12 hours then turn on again.
4. Wait 10 minutes, then measure the output frequency of the 10MHz Buff Output connector on the MD8470A using the frequency counter.
5. Calculate stability with the equation below.

$$\text{Frequency stability} = \frac{\text{(2nd frequency counter value)} - \text{(1st frequency counter value)}}{\text{(1st frequency counter value)}}$$

(4) Aging rate Test

Note:

Perform this test in a place free from vibration and where the ambient temperature fluctuation is within ±2°C.

[Procedure]

1. Set the frequency counter to use an external frequency standard instrument.
2. After 24 hours from turning the power on, measure the output frequency of the 10MHz Buff Output connector on the MD8470A using the frequency counter. Read values to the 0.1 Hz digit (same for other measurements below).
3. After another 24 hours from the first measurement, measure the output frequency of the 10MHz Buff Output connector on the MD8470A again using the frequency counter.
4. Calculate stability with the equation below.

$$\text{Frequency stability} = \frac{\text{(2nd frequency counter value)} - \text{(1st frequency counter value)}}{\text{(1st frequency counter value)}}$$

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(5) Temperature stability test

Note:

Perform this test in a constant temperature tank free from vibration.

[Procedure]

1. During setup, set only the MD8470A in the constant temperature tank (see the connection diagram shown in Fig. 4.1.4-1). Set the tank temperature to 25°C.
2. Turn on the MD8470A and wait until the temperature inside the MD8470A is stabilized. (It takes about 1.5 hours until the tank temperature becomes stable.)
3. After the temperature inside the MD8470A becomes stable, measure the output frequency of the 10MHz Buff Output connector on the MD8470A using the frequency counter. Read values to the 0.1 Hz digit (same for other measurements below).
4. Set the tank temperature to 40°C.
5. When the temperatures inside the tank and for the MD8470A become stable, measure the output frequency of the 10MHz Buff Output connector on the MD8470A using the frequency counter.
6. Calculate stability using the equation below.

$$\text{Frequency stability} = \frac{(\text{Frequency counter value at } 40°C) - (\text{Frequency counter value at } 25°C)}{(\text{Frequency counter value at } 25°C)}$$

7. Set the tank temperature to 5°C.
8. When the temperatures inside the tank and for the MD8470A become stable, measure the output frequency of the 10MHz Buff Output connector on the MD8470A using the frequency counter.
9. Calculate stability using the equation below.

$$\text{Frequency stability} = \frac{(\text{Frequency counter value at } 5°C) - (\text{Frequency counter value at } 25°C)}{(\text{Frequency counter value at } 25°C)}$$

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4.2 Calibration

4.2.1 Purpose and when to implement

Perform a calibration periodically to prevent performance deterioration of the MD8470A. Calibration should be performed once or twice a year. If your unit does not meet the calibration specifications, contact Anritsu Service and Sales office.

4.2.2 Required measuring instruments

The following table lists the equipment required for calibration along with the calibration item.

CAUTION

If not otherwise specified, turn on the UE Signalling Tester and measuring instruments at least thirty minutes before starting the calibration to make their performance stable. To achieve the highest accuracy, the calibration should be performed at room temperature with little AC voltage fluctuation in an environment free from noise, vibration, dust and humidity.

Table 4.2.2-1 List of calibration equipment

Calibration Item	Recommended Calibration Equipment (ANRITSU Model Name)	Performance Required for Equipment
Reference oscillator frequency calibration	Frequency counter (MF2412B)	Frequency: 5 to 15 MHz Resolution: 0.1 Hz External reference input (10 MHz)
	Frequency standard instrument	Frequency: 10 MHz Stability: $\pm 1 \times 10^{-8}$ or less

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4.2.3 Reference oscillator frequency calibration

This section describes the calibration method for the reference oscillator frequency using the frequency counter. The 10 MHz reference oscillator stability for the MD8470A is $\pm 2 \times 10^{-8}$/day. For frequency standard instrument, use a standard signal generator, which receives standard radio wave of higher stability or sub-carrier of color TV broadcasting (signal locked to the rubidium atomic standard instrument) and generates signals locked to this frequency standard instrument.

(1) Calibration specifications

Table 4.2.3-1 Reference oscillator specification

Item	Specification
Frequency	10 MHz
Starting characteristics	$\leq \pm 5 \times 10^{-8}$ (5 minutes after power application, based on the frequency after 24-hour operation as reference)
Aging rate	$\leq \pm 1 \times 10^{-8}$/day, $\pm 1 \times 10^{-7}$/year (after power application, based on the frequency after 24-hour operation as reference)
Temperature stability	$\leq \pm 2 \times 10^{-8}$ (25°C reference)

(2) Setup

Set up the calibration equipment as shown in Fig. 4.2.3-1. Connect the 10MHz Buff Output reference signal output connector on the rear panel of the MD8470A and the input connector of the frequency counter.

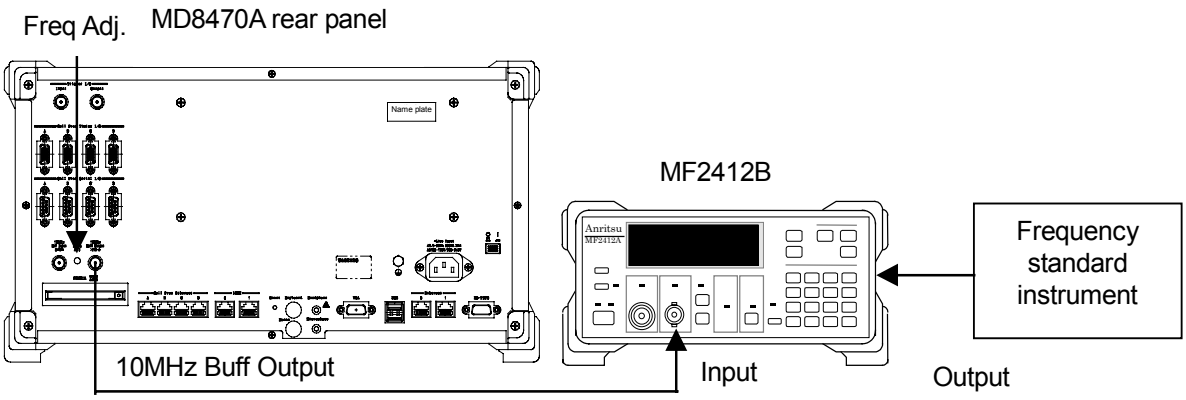


Fig. 4.2.3-1 Setup of reference oscillator frequency calibration

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(3) Calibration method

[Procedure]

1. To warm-up the reference oscillator for the MD8470A, turn on the power of the MD8470A , leaving it for 24 hours.
2. Input the standard frequency into the external reference input of the frequency counter.
3. Adjust the calibration trimmer for the crystal oscillator (Freq Adj on the rear panel of the MD8470A) so that the frequency counter displays 10.000000 MHz ±0.2 Hz.

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4.3 Cleaning

Turn off the main power supply on the rear panel and pull out the power plug before cleaning the MD8470A.

4.3.1 Cleaning the cabinet

Follow the methods shown below when cleaning the exterior of the cabinet.

- Wipe with a soft, clean cloth.
- When dust or dirt is stuck to it or when it is to be stored for a long time, wipe it with a cloth moistened in a neutral detergent. Then wipe it with a soft, dry cloth.
- If you find any loose screws or other parts, tighten them with the appropriate tool.

CAUTION

Never use solvents like benzine, thinner or alcohol to clean the cabinet. They may deteriorate or discolor the coating, or distort the cabinet.

4.3.2 Cleaning others

Ensure that dust and dirt do not accumulate on or around this equipment. In addition, shut off the main power and wipe water droplets, etc. adhering to the power plug or connector with a dry cloth when they are adhering to it.

WARNING

1. **Clean the power inlet regularly. If dust accumulates around the power pins, there is a risk of fire caused by a tracking phenomenon.**
2. **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.**

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4.4 Storage and Transportation

4.4.1 Packaging

When re-packing the MD8470A, use the packing materials that were used at shipment. If you use any other packing materials, perform the following steps:

[Procedure]

1. Wrap the MD8470A with a plastic bag, etc.
2. Prepare a cardboard box, wooden box, or aluminum case large enough to contain cushioning material around all sides of the MD8470A.
3. Put the MD8470A inside the container or carton with cushioning material on each side of the MD8470A to absorb impact during transportation and keep it from moving inside of the container.
4. Firmly seal the container or carton with packing string, adhesive tape, bands, etc.

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4.4.2 Precautions on storage and transportation

It is recommended to store or transport the MD8470A in the following environmental conditions:

- Little vibration
- Temperatures: 0 to 30°C
- Humidity: 40 to 80%
- Little temperature/humidity changes throughout the day

Avoid storing or transporting the MD8470A in any of the following environmental conditions:

- Where it is exposed to strong vibration
- Where it is exposed to direct sunlight
- Dusty environments
- Where the temperature falls out of the –20 to +60°C range
- Where the humidity is 95%
- Very humid environments where water droplets adhere or are formed
- Where it is exposed to active gasses
- Where the components may be oxidized

CAUTION ⚠

1. **Do not move the MD8470A with the power turned On. This may damage the internal circuits and result in fire, electric shock and/or failure.**

2. **Carry the MD8470A with the grips provided on both sides of it, and keep it in a horizontal position while you are transporting it. Carrying the MD8470A with only one of the grips while inclining it, may cause excessive force on the internal precision parts, which may be damaged as a result.**

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4.5 Troubleshooting

Refer to this section if the MD8470A does not work properly. When your trouble is not described in this section or not solved even if an action is taken, contact Anritsu or an authorized agents. Refer to the operation manual of each simulation kit for simulation details.

Problem	Possible Cause	Action
The power is not turned on.	The power cord is not connected properly, or pulled out of the plug or inlet.	Connect the power cord correctly.
	The main power switch on the rear panel is not turned on.	Press the main power switch to turn on.
	The power switch is not being pressed correctly.	Press the power switch for more than one second.
Windows cannot end.	Windows froze.	Press the power switch for more than 5 seconds. Windows will forcibly end.
External monitor does not display anything.	CRT is off by the display switch setting.	Refer to Section 3.2.11 "Using external monitor" and set CRT to On by the display switch setting.
Keyboard and/or mouse cannot be used.	The keyboard and/or the mouse are connected after power is ON.	Restart the MD8470A after connecting the keyboard and mouse.
A call cannot be connected.	The RF signal output connector is wrong.	Connect to the RF connector with the lit lamp beside it. Refer to the Operation Manual of the simulation kit for how to set the connector.
	The parameter setting for the MD8470A is wrong.	Refer to the Operation Manual of the simulation kit.
	UE is not ready.	Refer to the Operation Manual of the UE for call connection.
Signal cannot be input/output to/from the Call Proc Timing I/O connector.	The Call Proc Timing I/O connector or VGA connector in a different slot is used.	Check the slot where the signalling unit is installed with the Sessions window or the simulation kit, and connect the signalling unit to the correct Call Proc Timing I/O connector.
Cannot connect with the Call Proc Serial I/O connector.	The Call Proc Serial I/O connector or RS-232C connector in a different slot is used.	Check the slot where the signalling unit is installed with the Sessions window or the simulation kit, and connect the signalling unit to the correct Call Proc Serial I/O connector.
Cannot connect with the Call Proc Ethernet I/O connector.	The Call Proc Ethernet I/O, Ethernet0, Ethernet1, or ISDN connector in a different slot is used.	Check the slot where the signalling unit is installed with the Sessions window or the simulation kit, and connect the signalling unit to the correct Call Proc Ethernet I/O connector.

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Problem	Possible Cause	Action
Cannot connect with the RS-232C connector.	The Call Proc Serial I/O connector is used.	Connect to the RS-232C connector.
Cannot connect with Ethernet0 and Ethernet1 connectors.	The Call Proc Ethernet I/O connector or the ISDN connector is used.	Connect to the Ethernet0 and Ethernet1 connectors.
ISDN device cannot be connected.	The ISDN1 connector is used.	The ISDN1 connector is currently unavailable.
	The Call Proc Ethernet I/O, Ethernet0, or Ethernet1 connector is used.	Connect to the ISDN0 connector.
	The MU847090A/B ISDN Interface Unit (option) is not installed.	The MU847090A/B ISDN interface unit is sold separately. Specify this when you order your device.
Inappropriate handset volume.	The handset for the MD8480A/B or MT8820A is used.	Use the standard accessory handset supplied with the MD8470A.
System error is displayed.	The temperature inside the MD8470A rose abnormally.	Refer to Section 3.4 "When System Error Is Displayed."
	The power fan of the MD8470A halted.	
The icon on the taskbar turns read and "Reference not locked" is displayed when moving the pointer onto the icon.	Although the external reference input is set for the reference oscillator, the external reference signal is not input to the 10MHz Ref Input connector.	Input the external reference signal to the 10MHz Ref Input connector.
	Although the external reference input is set for the reference oscillator, the signal input to 10MHz Ref Input connector is outside specifications.	Input the external reference signal prescribed in Section 1.4 "Specifications."

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Appendix

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Appendix A Performance Test Result Form

A.1 Performance Test Result Form..... A-2

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A.1 Performance Test Result Form

This section provides an example of the form to record and assemble the results of a performance test. Copy this form to use when executing a performance test.

Test location: _____ Report No. _____

_____ Date _____

_____ Person in charge _____

Equipment name: MD8470A Signalling Tester

Serial No. _____ Ambient temperature _____ °C

Power frequency _____ Hz Relative humidity _____ %

Remarks:

_____

_____

_____

_____

■ Reference Oscillator Frequency Stability

Item	Valid Lower Limit	Stability	Valid Upper Limit	Measurement accuracy
Starting characteristics	-5×10^{-8}		$+5 \times 10^{-8}$	$\pm 1 \times 10^{-9}$
Aging rate	-1×10^{-8}		$+1 \times 10^{-8}$	
Temperature characteristics (at 40°C)	-2×10^{-8}		$+2 \times 10^{-8}$	
Temperature characteristics (at 5°C)				

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Appendix B Returning to the State at Factory Shipment

B.1 Returning to the State at Factory Shipment B-2

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B.1 Returning to the State at Factory Shipment

In the MD8470A, pre-installation image is backed up at factory shipment. Using FirstWare Recover™ enables you to return to the setting state at factory shipment. The following describes the procedures.

Note:

If a "Recovery kit" seal is not attached on the rear panel of the MD8470A, pre-installation image is not backed up.

When you want to get the version upgrade including the backup, contact our Service and Sales office described in the last page of the printed version of this manual, and in a separate file on the CD version.

CAUTION ⚠

FirstWare Recover™ is booted by the dedicated Mater Boot Record (MBR).
Do not install software (other OS bootloader, etc.) that overwrites the MBR because FirstWare Recover™ cannot be booted.

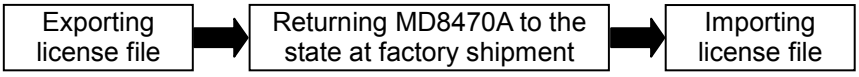
CAUTION ⚠

Be sure to back-up and reconfigure the license data before returning your MD8470A unit to the setting state at factory shipment. Backup of the license data is necessary because the simulation kit may be disabled if the license data is lost. Re-configuration of the license file makes it possible to resume the expiration date of the license to that before the MD8470A was returned to the setting state at factory shipment.

Refer to Section 3.3.6 "License management" for backing up and reconfiguring the license file.

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[Procedure Outline]



1. Export the license file (*.lic, *: arbitrary name) using the License Management Tool. Save the exported license file to other than the MD8470A hard disk.
2. Return the MD8470A to the state at factory shipment, by referring to [Procedure for returning MD8470A to state at factory shipment] provided below.
3. Import the license file (*.lic) saved by using the License Management Tool.

[Procedure for returning MD8470A to state at factory shipment]

1. Startup
   Boot the MD8470A. Then press "F4" key on the keyboard while the following message is displayed after BIOS screen appears.

```
Initializing Intel(R) Boot Agent FE v4.1.09
PXE 2.1 Build 083 (WfM 2.0)
_
```

   Only when it is booted initially, the following EULA (End User License Agreement) screen appears.

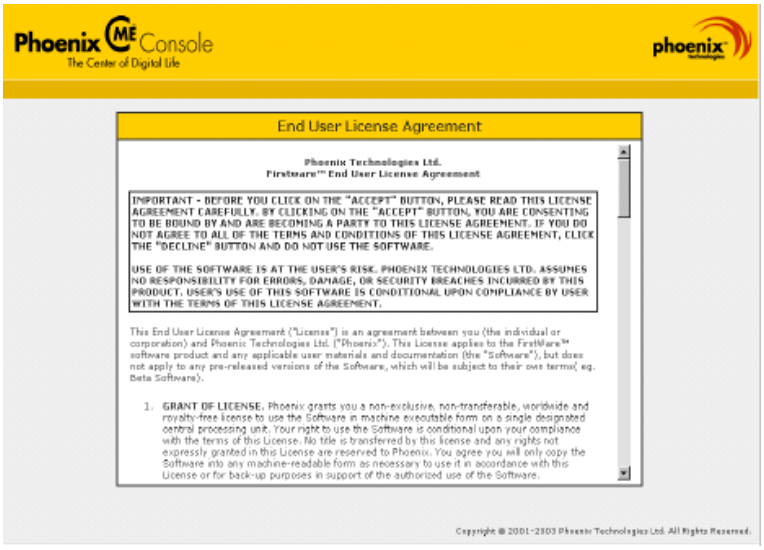


Fig. B.1-1 EULA screen

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Read EULA comments and press the Accept button at the end.

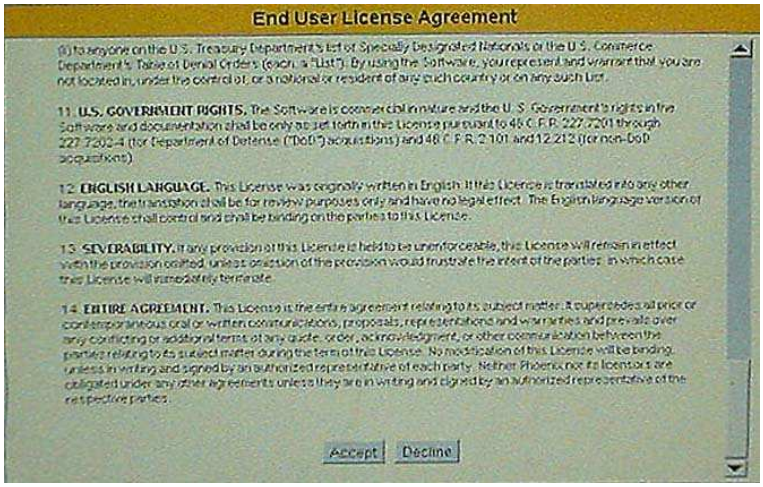


Fig. B.1-2 EULA screen (2)

In EULA screen, pressing the Accept button displays the following screen.



Fig. B.1-3 cME Console screen

[1] SYSTEM RESTART	Reboots system without recovery.
[2] LAUNCH	Boots FirstWare Recover™.

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2. Execution

   In the above screen, pressing "[2] LAUNCH" boots FirstWare Recover™.

   The following screen appears and then FirstWare Recover™ screen is displayed.



Fig. B.1-4 FirstWare Recover™ splash screen



Fig. B.1-5 FirstWare Recover™ screen

[1] Recovers Entire Drive	Recovers entire drives in hard disk.
[2] Cancel and Exit	Reboots system without recovery.

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Only when FirstWare Recover™ is booted initially, the following EULA screen appears.
Read EULA and press the Accept button at the end.

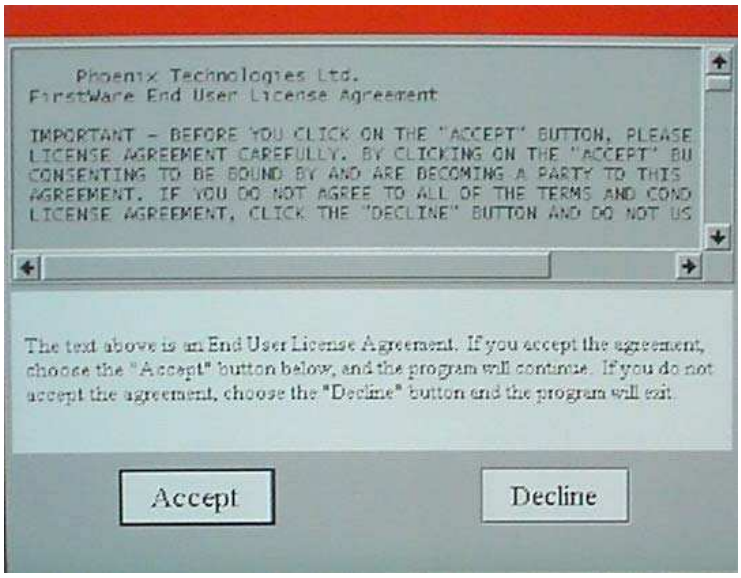


Fig. B.1-6 EULA screen of FirstWare Recover™

Select "[1] Recover Entire Drive," and then the following dialog appears.

Press "YES" for recovery. After recovery is completed, the system is automatically rebooted.

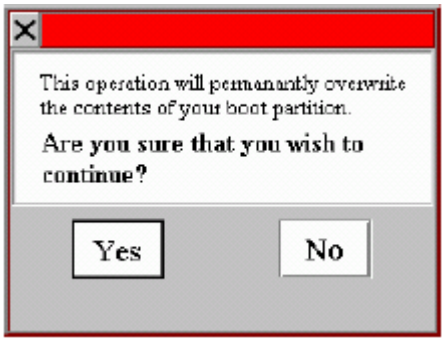


Fig. B.1-7 Confirmation dialog

CAUTION ⚠

Executing FirstWare Recover™ returns to the state at factory shipment.
Therefore, backup the important data (file) on another disk in advance.

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