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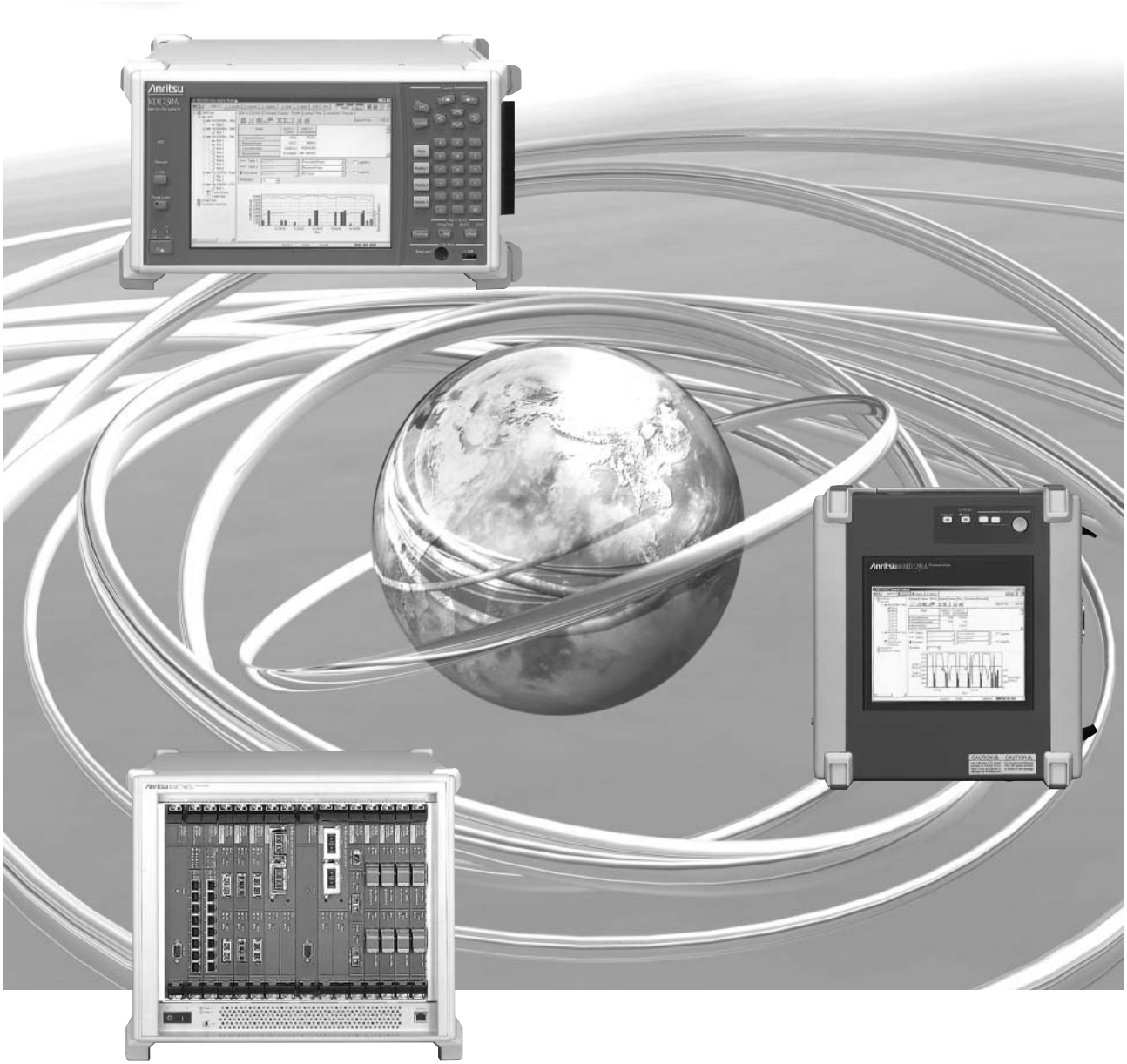
Anritsu

MD1230A Family

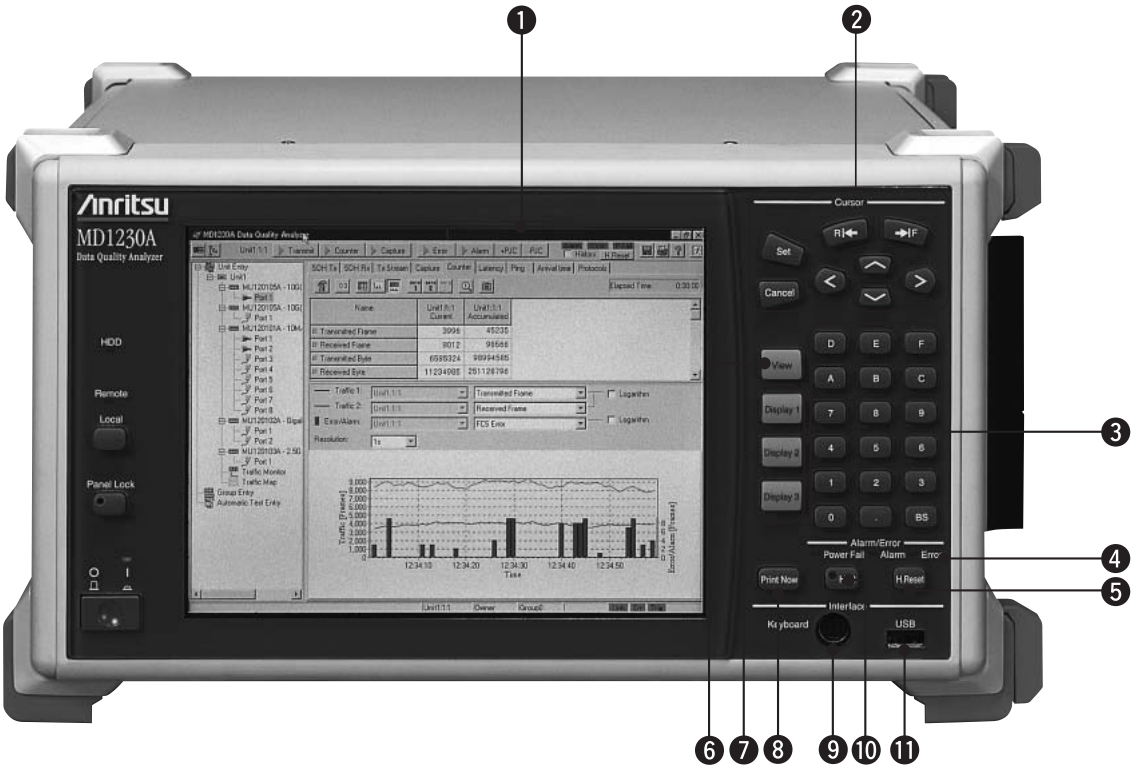
MD1230A Data Quality Analyzer
MD1231A IP Network Analyzer
MT7407A Multislot Chassis

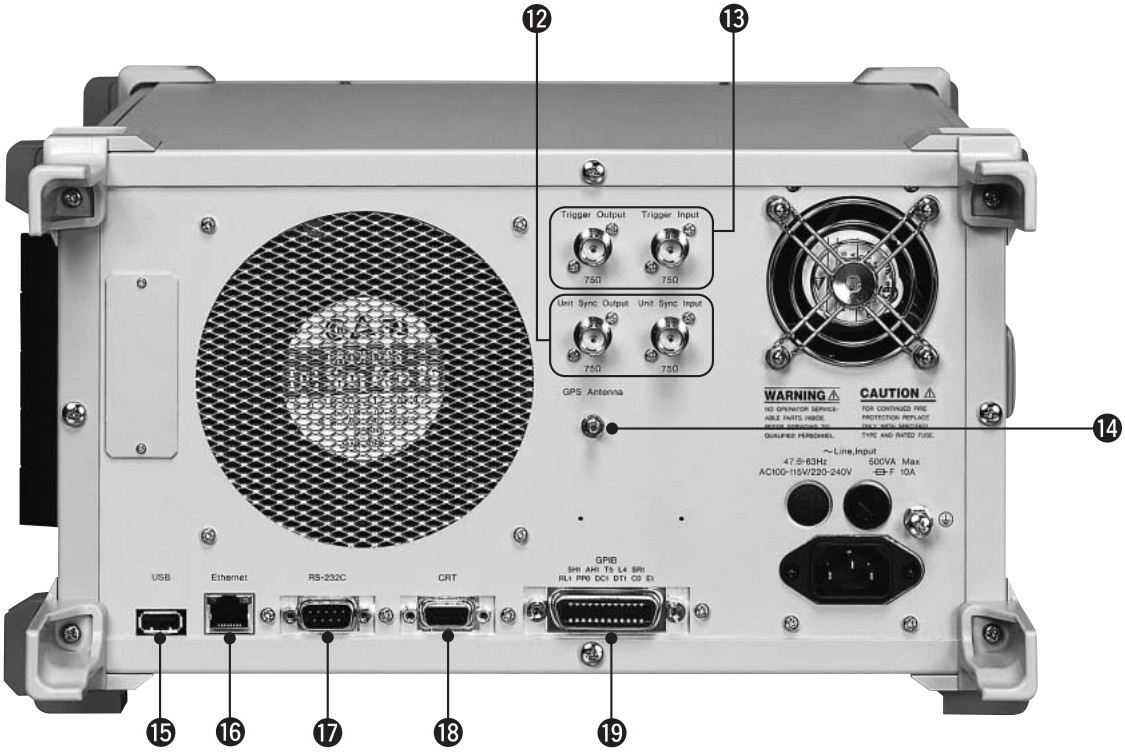
Specifications



A Total Communications Test Solution from Devices to Networks

MD1230A Data Quality Analyzer





Anritsu Eco Product
Lightweight
Power saving
Small size

The Tolly Group Certifies MD1230A
The Tolly Group is an independent test lab in the networking industry.

❶ **Display:** 8.4-inch TFT-LCD, SVGA (800 x 600)

❷ **Cursor keys**

Set: Sets data

Cancel: Cancel data setting

R|←　→|F: Fetches setting screen

∧∨<>**:** Scrolls screen cursor and setting items

❸ **Input keys:** Input numeric data

❹ **Alarm/Error:** Displays receiver alarms, errors and power failure

❺ **H. Reset:** Resets history function

❻ **View:** Switches between tree view (showing ports as a tree) and graphical view (showing interface module panel)

❼ **Display 1 to 3:** A maximum of three screens can be saved. Pressing the Display 1 to 3 keys fetches the pre-set screen composition.

❽ **Print Now:** Prints screen contents at external printer

❾ **Keyboard:** For connecting PS/2 keyboard

❿ **Hist:** When on, each LED lights whenever an alarm or error occurs after power-on. When off, each LED displays current alarm and error conditions.

⓫ **Front USB:** For connecting USB devices such as an USB mouse

⓬ **Unit Sync Input/Unit Sync Output:** Clock signal I/O for time synchronizing several MD1230A Family connected in a daisy chain

⓭ **Trigger Input, Trigger Output:** External trigger I/O

⓮ **GPS Antenna:** For connecting a GPS antenna

⓯ **Rear USB:** For connecting any Windows®98-compatible USB devices

⓰ **Ethernet:** Ethernet connector for control software, for linking multiple MD1230A Family, and for GPIB commands

⓱ **RS-232C:** RS-232C interface for GPIB Commands

⓲ **CRT:** VGA connector for external monitor

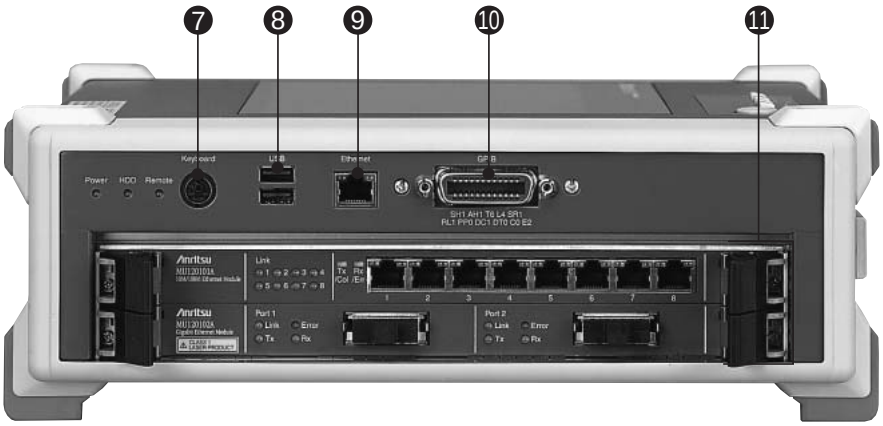
⓳ **GPIB:** GPIB bus interface when GPIB option installed.

⓴ **Module slots:** For installing up to five interface modules

㉑ **3.5” Floppy Disk Drive**

㉒ **DCS Input:** Input for SONET/SDH sync data and clock

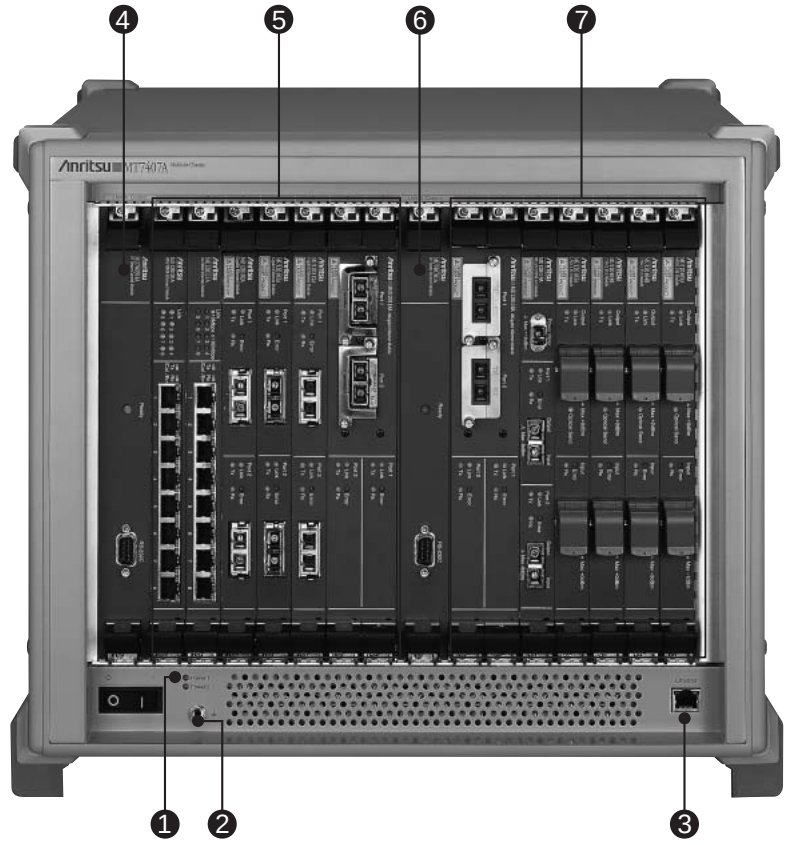
MD1231A IP Network Analyzer

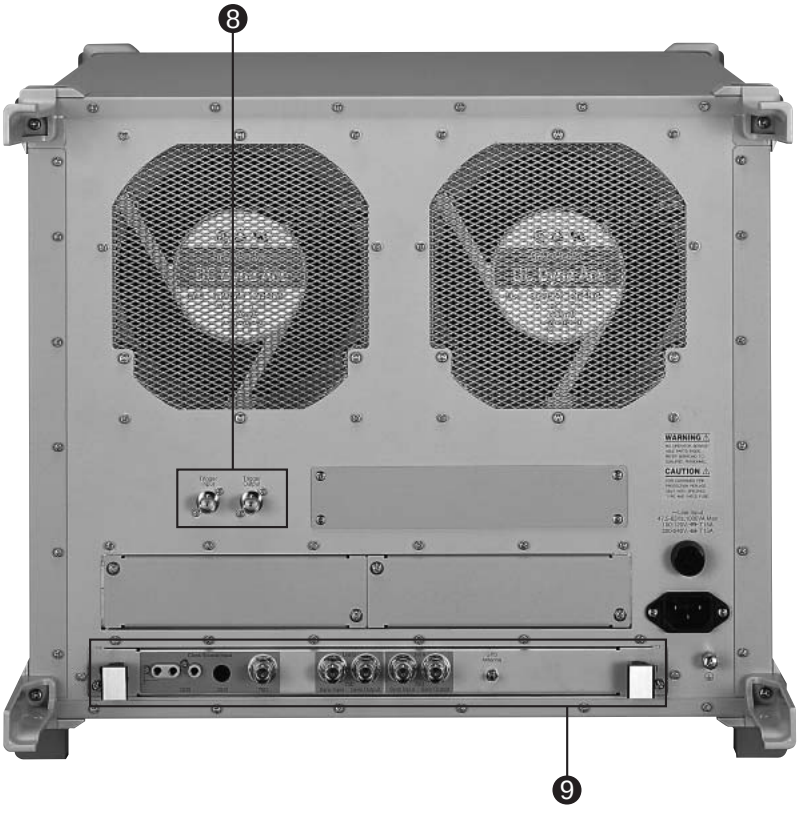


Anritsu Eco Product
Lightweight
Power saving
Small size

❶ **Display:** 8.4-inch TFT-LCD, SVGA (800 x 600)
❷ **Panel Lock:** Disables the keypad and pointing device.
❸ **Local:** Switches between local and remote control
❹ **Pointing Device Left clik**
❺ **Pointing Device Right clik**
❻ **Pointing Device:** For manipulation of corsor on the screen
❼ **Keyboard:** For connecting PS/2 keyboard
❽ **USB:** For connecting two USB devices
❾ **Ethernet:** Ethernet connector for control software (It is required only for remote control using GPIB commands.)
❿ **GPIB:** GPIB interface when MD1231A Option 02 is installed.
⓫ **Module slots:** For installing up to two interface modules
⓬ **GPS Antenna:** For connecting a GPS antenna when MD1231A Option 05 is installed.
⓭ **Trigger Input/Trigger Output:** External trigger I/O
⓮ **Unit Sync Input/Unit Sync Output:** Clock signal I/O for time synchronizing several MD1230A Family connected in a daisy chain

MT7407A **Multislot Chassis**



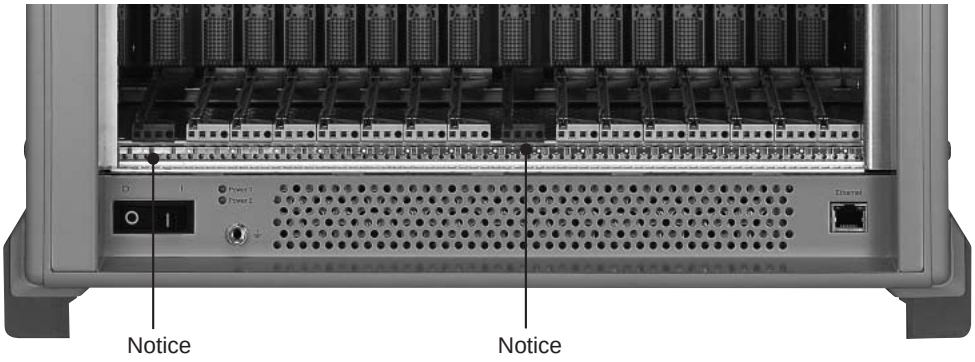


❶ **Power LED:** The light is switched on when the power supply is ON.
❷ **Earth connector:** A connector for grounding.
❸ **Ethernet:** Used or connection with an external PC.
❹ **Control module slot for Side A:** The MU740701A module that controls Side A is inserted here.
❺ **Module slots for Side A:** A maximum of seven interface modules can be inserted.
❻ **Control module slot for Side B:** The MU740701A module that controls Side B is inserted here.
❼ **Module slots for Side B:** A maximum of seven interface modules can be inserted.
❽ **Trigger Input/Trigger Output:** External trigger input and output.
❾ **Option module slot:** An MT7407-01A option module can be inserted.

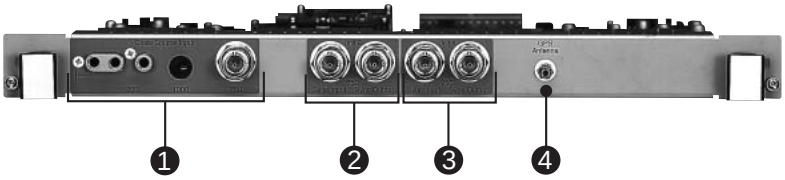
MU740701A IP Tester Control Module

❶ **LED:** The light will be switched on when configuration is completed.
❷ **RS-232C connector:** Used when performing program download to the control

Note: Always insert a MT740701A control module in a red slot of MT7407A; otherwise it will cause a failure.



MT7407A-01 Interface Board for IP Tester



❶ **DCS Input:** The input for SONET/SDH synchronization data and clock.
❷ **Sync Input/Sync Output for Side B:** Clock signal I/O for time synchronizing several MD1230A Family connected in a daisy chain.
❸ **Sync Input/Sync Output for Side A:** Clock signal I/O for time synchronizing several MD1230A Family connected in a daisy chain.
❹ **GPS Antenna:** For connecting a GPS antenna when Option 05 is installed.

Module Table/Option Table

MD1230A Family Module Table

Model	Name	Power consumption*1	MD1230A	MD1231A	MT7407A
MU120101A	10M/100M Ethernet Module	4.5	√	√	√
MU120102A	Gigabit Ethernet Module	3.5	√	√	√
MU120103A	2.5G (1.31) Module	5.0	√		√
MU120103B	2.5G (1.31) Module	8.0	√		√
MU120104A	2.5G (1.55) Module	5.0	√		√
MU120104B	2.5G (1.55) Module	8.0	√		√
MU120105A	10G (1.31) Module	10.0	√		√
MU120106A	10G (1.55) Module	10.0	√		√
MU120111A	10/100M Ethernet Module	5.5	√	√	√
MU120112A	Gigabit Ethernet Module	5.5	√	√	√
MU120118A	10 Gigabit Ethernet Module	17.0	√		√
MU120119A	OC-3/12 STM-1/4 Module (1310 nm)	3.5	√	√	√
MU120120A	OC-3/STM-1 Module (1310 nm)	3.5	√	√	√
MU740701A*2, *3	IP Tester Control Module	2.0			√
MU740702A*2, *4	Power Unit for IP Tester	*1			√

∗1: The maximum output current of each MU740702A is 65A. The requirements of total power consumption of module installed should not exceed 65A for each side.
∗2: It is a module only for MT7407A. Up to two modules are inserted for one MT7407A.
∗3: One MU740701A supports up to 7 slots.
∗4: One MU740701A requires one MU740702A. When adding MU740702A, chassis hardware modification is required.

MD1230A Family Option Table

Name	MD1230A	MD1231A	MU740701A	MX123001A
RS-232C Control	MD1230A-01			MX123001A-07*1
GPIB Control	MD1230A-02	MD1231A-02		MX123001A-09*1
Ethernet Control	MD1230A-03	MD1231A-03		MX123001A-10*1
Decode Module	MD1230A-04	MD1231A-04	MU740701A-04*2,*4	MX123001A-01*2,*4
GPS Module	MD1230A-05	MD1231A-05	MU740701A-05*3	
Tcl Interface	MD1230A-06	MD1231A-06		MX123001A-06*1
OSPF Protocol	MD1230A-07	MD1231A-07	MU740701A-07	
MPLS (LDP/CR-LDP) Protocol	MD1230A-08	MD1231A-08	MU740701A-08	
MPLS (RSVP) Protocol	MD1230A-09	MD1231A-09	MU740701A-09	
RFC2889 Benchmarking Test	MD1230A-10	MD1231A-10	MU740701A-10	
Packet BER Test	MD1230A-11	MD1231A-11	MU740701A-11	
IPv6 Expansion	MD1230A-12	MD1231A-12	MU740701A-12	
XENPAK Test	MD1230A-13		MU740701A-13	
IGAP Protocol	MD1230A-14	MD1231A-14	MU740701A-14	
Auto Negotiation Analysis	MD1230A-15	MD1231A-15	MU740701A-15	
Link Fault Signaling	MD1230A-16		MU740701A-16	
Application Traffic Monitor	MD1230A-20	MD1231A-20		MX123001A-20
Expert Analysis Module	MX123002A	MX123002A	MU740701A-30*4	MX123003A*4

∗1: PC on which MX123001A is installed can be operated by another PC.
∗2: When using a decode module with MT7407A, MU740701A-04 and MX123001A-01 are required. Each MU740701A module require one MU740701A-04 when using Decode module in both Side A and Side B.
∗3: When using GPS module with MT7407A, it is required MT7407A-01. However two MU740701A-05 can be inserted to MT7407A, it is enough only one MU740701A-05 for one MT7407A.
∗4:When using a Expert Analysis module with MT7407A, MX123001A-01, MX123003A, MU740701A-04 and MU740701A-30 are required. Each MU740701A module require one MU740701A-04 and one MU740701A-30 when using Expert Analysis module in both Side A and Side B.

Selection Guide

MD1230A Family Selection Guide

Function \ Module		10M/100MbE		GbE		10 GbE	POS			EOS
		MU120101A	MU120111A	MU120102A	MU120112A	MU120118A	MU120103A /120104A	MU120105A /120106A	MU120119A /120120A*1	MU120103B /120104B
Bit Rate		10/125 Mbps		1.25 Gbps		Depends on XENPAK	2488.320 Mbps	9953.280 Mbps	155.52/622.08 Mbps	2488.320 Mbps
Optical Input Level (dBm)				Depends on GBIC		Depends on XENPAK	–18 to 0/ –28 to –9	–12 to 0/ –14 to –3	–28 to –8	–18 to 0/ –28 to –9
Optical Output Level (dBm)							–5 to 0/ –2 to +3	–4 to 0/ –1 to +2	–15 to –8	–5 to 0/ –2 to +3
Options (sold separately)	OSPF Protocol		√		√					
	MPLS (LDP/CR-LDP) Protocol		√		√					
	MPLS (RSVP) Protocol		√		√					
	RFC2889 Benchmarking Test		√	√	√					
	Packet BER Test		√	√	√	√	√	√	√	√
	IPv6 Expansion		√		√					
	XENPAK Test					√				
	IGAP Protocol		√		√					
	Auto Negotiation Analysis				√*2					
	Link Fault Signaling					√				
	Application Traffic Monitor				√					
	MU120119A/120120A Optical Power Meter								√	
	MU120103B/120104B EOS Mapping									√
	MU120103B/120104B Virtual Concatenation									√
Standard functions	1000BASE-T GBIC				√					
	RFC2544 Automatic Test	√	√	√	√	√	√	√	√	√
	BGP-4 Emulation Function	√	√	√	√	√	√	√	√	√
	BGP-4 Emulation Route Expansion		√		√					
	IGMP	√	√	√	√	√	√	√	√	√
	Through Mode Function	√	√	√	√	√	√	√	√	√
	Monitor Mode Function	√	√	√	√	√	√	√	√	√
	Address Swap Function		√		√					
	Unframe BER Measurement Function		√	√	√	*3	√	√	√	√
	TCP/UDP Port Number Increment		√	√	√	√	√	√	√	√
	CRC32						√	√	√	√
	CRC16									√

∗1: For MU120120A, only 155.52 Mbps is supported.
∗2: Supported optical interfaces are 1000BASE-SX/LX/LH/ZX.
∗3: XENPAK Test Option supports Unframe BER Measurement Function.

Specifications

• MD1230A Data Quality Analyzer

LCD	8.4 Type, TFT
LED	Power fail, Errors, Alarms, Remote, Local, HDD, Power, FDD
User Interface	0 to 9, ".", A to F, Cursor (↑, ↓, →, ←, →|F, R|←), Set, Cancel, View, Display 1 to 3, Hist., H.Reset, Print now, Local, Panel Lock, Power
External Interface Connector	RS-232C, GPIB, Ethernet (10BASE-T/100BASE-TX), USB port x 2, PS/2 keyboard connector, GPS antenna, Video output (VGA)
Trigger Input Connector	Usable as capture buffer trigger, Level: TTL (active high), Impedance: 75 Ω (BNC)
Trigger Output Connector	Usable as capture buffer trigger, Level: TTL (Active high), Impedance: 75 Ω (BNC)
Sync I/O	MD1230A/MD1231A/MT7407A time sync signal, Impedance: 75 Ω (BNC)
SONET/SDH Sync Clock Input	Frequency: 64 kHz + 8 kHz ±50 ppm, 2.048 MHz ±50 ppm, 1.544 MHz ±50 ppm, 2.048 Mbit/s ±50 ppm, 1.544 Mbit/s ±50 ppm Interface 2M: ITU-T G.703 Table 10, HDB3 1.5M: B8ZS, AMI ANSI T1.403 Level (64k): 0.63 to 1.1 Vo-p Code (64k): AMI 8 kHz with violation Connector BNC (75 Ω): 2 MHz, 2Mbit/s Siemens (120 Ω balanced): 2 MHz, 2 Mbit/s, 64 kHz + 8 kHz Bantam (100 Ω balanced): 1.5 MHz, 1.5 Mbit/s
OS	Windows®98 (Second Edition)
Built-in Memory	Measurement conditions: 10 sets, Measurement results: 10 sets, HDD
External Storage	3.5" FDD
Power Supply	AC 85 to 132 V/170 to 250 V (auto switching) , 47.5 to 63 Hz, ≤530 VA
Operating Temperature	0˚ to +40 ˚C (except when HDD or FDD are active.)
Storage Temperature	–20˚ to +60 ˚C
Dimensions and Mass	320 (W) x 177 (H) x 350 (D) mm, ≤15 kg (excluding options and modules)
EMC	EN61326: 1997/A1: 1998 (Class A), EN61000-3-2: 1995/A2: 1998 (Class A), EN61326: 1997/A1: 1998 (Annex A)
LVD	EN61010-1: 1993/A2: 1995 (Installation Category Ⅱ, Pollution degree 2)
Corresponding Options	MD1230A-01: RS-232C Control*1, MD1230A-02: GPIB Control*1, MD1230A-03: Ethernet Control*1, *2, *3, MD1230A-04: MD1230A Decode Module*4, MD1230A-05: GPS Module, MD1230A-06: Tcl Interface*3, MD1230A-07: OSPF Protocol*5, MD1230A-08: MPLS (LDP/CR-LDP) Protocol*5, MD1230A-09: MPLS (RSVP) Protocol*5, MD1230A-10: RFC2889 Benchmarking Test*5, MD1230A-11: Packet BER Test*5, MD1230A-12: IPv6 Expansion*5, MD1230A-13: XENPAK Test*6, MD1230A-14: IGAP Protocol*5, MD1230A-15: Auto Negotiation Analysis*7, MD1230A-16: Link Fault Signaling*6, MD1230A-20: Application Traffic Monitor*7, *8, MD1230A-40: Software Upgrade Service for MD1230A*9
Number of Slots	5
Corresponding Module	MU120101A: 10M/100M Ethernet Module, MU120102A: Gigabit Ethernet Module, MU120103A: 2.5G (1.31) Module, MU120103B: 2.5G (1.31) Module, MU120104A: 2.5G (1.55) Module, MU120104B: 2.5G (1.55) Module, MU120105A: 10G (1.31) Module, MU120106A: 10G (1.55) Module, MU120111A: 10/100M Ethernet Module, MU120112A: Gigabit Ethernet Module, MU120118A: 10 Gigabit Ethernet Module, MU120119A: OC-3/12 STM-1/4 Module (1310 nm), MU120120A: OC-3 STM-1 Module (1310 nm)

∗1: The MD1230A-01/02/03 options are required only for remote control using GPIB commands.
Note that these options may be installed together, although only one of them can be used at a time.
∗2: The MD1230A-03 option is required for remote control using GPIB remote commands via Ethernet interface. The MD1230A-03 option is not required for external PC control using MX123001A.
∗3: MD1230A-03 and MD1230A-06 may be implemented together, although only one of them can be used at a time.
∗4: Purchase MD1230A-04 and the operation manuals (W2107AE) on CD-ROM. Printed versions sold separately.
∗5: Some of these interface modules may not work in certain combinations depending on the modules and software versions. Please see the selection guide (pages 8, 9).
∗6: MD1230A-13 and MD1230A-16 support only MU120118A.
∗7: MD1230A-15 and MD1230A-20 support only MU120112A.
∗8: Purchase MD1230A-20 and the operation manuals (W2134AE) on CD-ROM. Printed versions sold separately.
∗9: MD1230A-40 is provided free for the first year after purchase. It is required to receive software upgrade service starting with the second year after purchase.

• MD1231A IP Network Analyzer

LCD	8.4 Type, TFT
LED	Remote, Local, HDD, Power
User Interface	Pointing device, Mouse SW, Local, Panel Lock, Power
External Interface Connector	GPIB, Ethernet (10BASE-T/100BASE-TX), USB port x 2, PS/2 keyboard connector, GPS antenna, Pointing device
Trigger Input Connector	Usable as capture buffer trigger, Level: TTL (Active HIGH), Impedance: 75 Ω (SMB)
Trigger Output Connector	Usable as capture buffer trigger, Level: TTL (Active HIGH), Impedance: 75 Ω (SMB)
Sync I/O	MD1230A/MD1231A/MT7407A time sync signal, Impedance: 75 Ω (SMB)
OS	Windows®98 (Second Edition)
Built-in Memory	Measurement conditions: 10 sets, Measurement results: 10 sets, HDD
Power Supply	AC 85 to 132 V/170 to 250 V (auto switching), 47.5 to 63 Hz, ≤150 VA
Operating Temperature	0˚ to +40 ˚C (except when HDD are active.)
Storage Temperature	–20˚ to +60 ˚C
Dimensions and Mass	320 (W) x 100 (H) x 300 (D) mm, ≤5 kg (excluding options and modules)
EMC	EN61326: 1997/A1: 1998 (Class A), EN61000-3-2: 1995/A2: 1998 (Class A), EN61326: 1997/A1: 1998 (Annex A)
LVD	EN61010-1: 1993/A2: 1995 (Installation Category Ⅱ, Pollution degree 2)
Corresponding Options	MD1231A-02: GPIB Control*1, MD1231A-03: Ethernet Control*1, *2, *3, MD1231A-04: MD1231A Decode Module*4, MD1231A-05: GPS Module, MD1231A-06: Tcl Interface*3, MD1231A-07: OSPF Protocol*5, MD1231A-08: MPLS (LDP/CR-LDP) Protocol*5, MD1231A-09: MPLS (RSVP) Protocol*5, MD1231A-10: RFC2889 Benchmarking Test*5, MD1231A-11: Packet BER Test*5, MD1231A-12: IPv6 Expansion*5, MD1230A-14: IGAP Protocol*5, MD1231A-15: Auto Negotiation Analysis*6, MD1231A-20: Application Traffic Monitor*6, *7, MD1231A-40: Annual Software Upgrade Service for MD1231A*8
Number of Slots	2
Corresponding Module	MU120101A: 10M/100M Ethernet Module, MU120102A: Gigabit Ethernet Module, MU120111A: 10/100M Ethernet Module, MU120112A: Gigabit Ethernet Module, MU120119A: OC-3/12 STM-1/4 Module (1310 nm), MU120120A: OC-3/STM-1 Module (1310 nm)

∗1: The MD1231A-02/03 options are required only for remote control using GPIB commands.
Note that these options may be installed together, although only one of them can be used at a time.
∗2: The MD1231A-03 option is required for remote control using GPIB remote commands via Ethernet interface. The MD1230A-03 option is not required for external PC control using MX123001A.
∗3: MD1231A-03 and MD1231A-06 may be implemented together, although only one of them can be used at a time.
∗4: Purchase MD1231A-04 and the operation manuals (W2107AE) on CD-ROM. Printed versions sold separately.
∗5: Some of these interface modules may not work in certain combinations depending on the modules and software versions. Please see the selection guide (pages 8, 9).
∗6: MD1231A-15 and MD1231A-20 support only MU120112A.
∗7: Purchase MD1231A-20 and the operation manuals (W2134AE) on CD-ROM. Printed versions sold separately.
∗8: MD1231A-40 is provided free for the first year after purchase. It is required to receive software upgrade service starting with the second year after purchase.

• MT7407A Multislot Chassis

LED	For Power Module
External Interface Connector	Ethernet (10BASE-T/100BASE-TX)
Trigger Input Connector	Usable as capture buffer trigger, Level: TTL (Active HIGH), Impedance: 75 Ω (BNC)
Trigger Output Connector	Usable as capture buffer trigger, Level: TTL (Active HIGH), Impedance: 75 Ω (BNC)
Power Supply*1	AC 85 to 132 V/170 to 250 V (auto switching), 47.5 to 63 Hz, ≤1100 VA*2
Operating Temperature	0˚ to +40 ˚C
Storage Temperature	–20˚ to +60 ˚C
Dimensions and Mass	426 (W) x 355 (H) x 501 (D) mm, ≤20 kg (excluding options and modules)
EMC	EN61326: 1997/A1: 1998 (Class A), EN61000-3-2: 1995/A2: 1998 (Class A), EN61326: 1997/A1: 1998 (Annex A)
LVD	EN61010-1: 1993/A2: 1995 (Installation Category Ⅱ, Pollution degree 2)
Corresponding Options	MT7407A-01: Interface Board for IP Tester, MT7407A-40: Annual Software Upgrade Service for MT7407A*3
Number of Slots	14 (except slot for control module)
Exclusive Module	MU740701A: IP Tester Control Module, MU740702A: Power Unit for IP Tester
Corresponding Module	MU120101A: 10M/100M Ethernet Module, MU120102A: Gigabit Ethernet Module, MU120103A: 2.5G (1.31) Module, MU120103B: 2.5G (1.31) Module, MU120104A: 2.5G (1.55) Module, MU120104B: 2.5G (1.55) Module, MU120105A: 10G (1.31) Module, MU120106A: 10G (1.55) Module, MU120111A: 10/100M Ethernet Module, MU120112A: Gigabit Ethernet Module, MU120118A: 10 Gigabit Ethernet Module, MU120119A: OC-3/12 STM-1/4 Module (1310 nm), MU120120A: OC-3/STM-1 Module (1310 nm)

∗1: Power supply is MU740702A
∗2: MT7407A include two MU740702A.
∗3: MT7407A-40 is provided free for the first year after purchase. It is required to receive software upgrade service starting with the second year after purchase. One license supports two MU740701A.

• Standard Ethernet Module

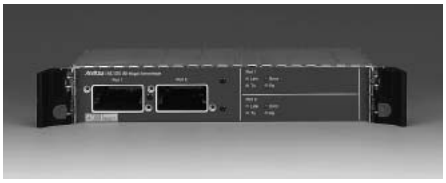
Model		MU120101A	MU120102A	MU120118A
Ports		10BASE-T/100BASE-TX Number of ports: 8 Connector: RJ-45 Link speed: 10 Mbit/s, 100 Mbit/s Duplex mode: Full, Half Auto negotiation: On/Off Flow control: On/Off	1000BASE-SX/LX/LH/ZX[*1] Number of ports: 2 Connector: GBIC interface (SC connector) Link speed: 1 Gbit/s Duplex mode: Full Auto negotiation: On/Off Flow control: On/Off	10GBASE-LR[*2] Number of ports: 2 Connector: XENPAK interface (SC connector) Link speed: 10 Gbit/s Duplex mode: Full Flow control: On/Off
LEDs		Link, Tx/Collision, Rx/Error	Link, Tx, Rx, Error	
Frame Settings		MAC address: Fixed, Increment, Decrement, Random (changeable portions specified in 4 bits units) VLAN tag[*3]: Fixed, Increment, Decrement, Random MPLS label[*3]: Up to 10 MPLS labels can be appended. Fixed setting Protocol editing: IPv4, IPv6, TCP/IPv4, UDP/IPv4, IGMP/IPv4, ICMP/IPv4, RIP/UDP/IPv4, DHCP/UDP/IPv4, IPX, ARP, MAC control, IS-IS Data field Can set any 4 portions of data field: All 1, All 0, Alternate1/0 (Each bit, Each 2 bits, Each 4 bits, Each byte, Each 2 bytes), Increment, Decrement, Random, Single PRBS9 Data field 1 only: Time stamp, Sequence number, User defined, Test frame		
Frame Length		12 to 10000 byte (Settable as auto, Fixed, Increment[*4], or Random[*4])	48 to 65280 byte (Settable as auto, Fixed, Increment[*4], or Random[*4])	
Stream Transport Mode		Continuous, Continuous burst, Stop after this stream, Next stream, Jump to stream, Jump to stream for count (Loop count: 1 to 16,000,000, Frame count per burst: 1 to 16,777,215, Burst count per stream: 1 to 16,777,215)		
Stream Gap Setting	Inter Frame Gap	10BASE-T: Resolution of 800 ns 8 µs to 1700 s, Settable as fixed, Random 100BASE-TX: Resolution of 80 ns 800 ns to 170 s, Settable as fixed, Random	Resolution of 8 ns 64 ns to 120 s, Settable as fixed, Random	Resolution of 0.8 ns 7.2 ns to 120 s, Settable as fixed, Random
	Inter Burst Gap	10BASE-T: Resolution of 800 ns 8 µs to 1700 s, Settable as fixed 100BASE-TX: Resolution of 80 ns 800 ns to 170 s, Settable as fixed	Resolution of 8 ns 64 ns to 120 s, Settable as fixed	Resolution of 0.8 ns 7.2 ns to 120 s, Settable as fixed
	Inter Stream Gap	10BASE-T: Resolution of 800 ns 8 µs to 1700 s, Settable as fixed 100BASE-TX: Resolution 80 ns 800 ns to 170 s, Settable as fixed	Resolution of 8 ns 64 ns to 120 s, Settable as fixed	Resolution of 0.8 ns 64 ns to 120 s, Settable as fixed
Number of Streams		256 Streams/Port		
Error Insertion	Frame Error	FCS error, Undersize error, Oversize error, Fragments error, Oversize & FCS error, Alignment error, Dribble bit error, Collision	FCS error, Undersize error, Oversize error, Fragments error, Oversize & FCS error	
	Packet Error	IPv4 header checksum error, TCP/UDP checksum error		
	Packet BER Test (Option 11)[*5]	—	PRBS bit error	
Counter	Common	Transmitted frame count/rate, Received frame count/rate, Transmitted bit count/rate, Received bit count/rate, Transmitted byte/rate, Received byte/rate, Capture trigger, Capture filter, User defined 1 count/rate, User defined 2 count/rate		
	Ethernet	Transmitted ARP reply, Received ARP reply, Transmitted ARP request, Received ARP request, Flow control, Dribble bit error, Line error, Fragment, Undersize, Oversize, Oversize & FCS error, FCS error, Alignment error, Collision	Transmitted ARP reply, Received ARP reply, Transmitted ARP request, Received ARP request, Flow control, Line error, Fragment, Undersize, Oversize, Oversize & FCS error, FCS error, Byte alignment error	Transmitted ARP reply, Received ARP reply, Transmitted ARP request, Received ARP request, Flow control, Fragment, Undersize, Oversize, Oversize & FCS error, FCS error
	IP/TCP/UDP	Transmitted IPv4 packet count/rate, Received IPv4 packet count/rate, IPv4 header checksum error, Transmitted PING reply, Received PING reply, Transmitted PING request, Received PING request, Fragments, Received TCP packet count/rate, TCP checksum error, Received UDP packet count/rate, UDP checksum error, QoS 0 to 7 frame count/rate		
	Unframe	—	Bit error count/rate, Pattern Sync Loss count/second	Option 13[*6]
	Packet BER Test (Option 11)[*5]	—	Transmitted test frame, Received test frame, Sequence error, Received PRBS bit error count/rate, Received PRBS error frame count/rate	
	XENPAK Test (Option 13)[*6]	—		Bit error count/rate, Pattern sync loss count/rate, Bit error count lane 0 to 3, Bit error rate lane 0 to 3, Pattern sync loss lane 0 to 3, Pattern sync loss second lane 0 to 3
	Link Fault Signaling (Option 16)[*7]	—		Transmitted LFS, Received LFS

Model	MU120101A	MU120102A	MU120118A
Latency	Maximum, Minimum, Average		
Frame Arrival Time Variation Measurement	Time resolution: 1 µs, 10 µs, 100 µs, 1 ms, 10 ms, 100 ms, 1 s		
QoS Counter Setting	Using Qos described below, 8-level priority frame count: IEEE802.1D VLAN tag user priority field, 3 LSB of RFC2474 DSCP field		
Unframe BER Setting*6	—	Test pattern: All 0, All 1, User-defined 16-bit pattern, PRBS23, PRBS31, CJPAT, CRPAT Error insertion: Bit error Error insertion timing: Single error, Single rate (1E-3, 4, 5, 6, 7, 8, 9), Programmable rate (9.9 E-3 to 1.0 E-10)	
Capture Buffer	8 Mbyte/port	32 Mbyte/port	256 Mbyte/port
Capture Filter	At following conditions for each port, capture filter condition settings: Destination MAC address, Source MAC address, 32-bit pattern (settable bit length and offset) x 2, Error conditions		
Capture Trigger	At following conditions for each port, capture trigger condition settings: Destination MAC address, Source MAC address, 32-bit pattern (settable bit length and offset) x 2, Error conditions, Traffic over, Latency over, External trigger input		
Protocol Decode	ARP, BGP-4, DHCP, DVMRP, Ethernet, ICMP, ICMPv6, IGAP, IGMP, IPCP, IPv4, IPv6, IPv6CP, IPX, IS-IS, LCP, LDP, MAC Control Frame, MPLS, MPLSCP, OSPFv2, RIP, RSVP, SNAP, TCP, UDP, VLAN, MD1230A Test Frame		
Protocol Emulation	ARP, PING, IGMP, BGP-4		
Traffic Monitor	Ethernet frame count for up to 64 flows, IP packet count for up to 64 flows, Frame count for up to 64 protocols		
Traffic Map	Ethernet data flow for up to 256 flows, IP data flow for up to 256 flows		
Service Disruption Time	Time of frame disruption		
RFC2544 Automatic Test	Throughput, Latency, Frame Loss Rate, Back to Back Frame, System Recovery, Reset		
RFC2889 Automatic Test (Option 10)*5	—	[1] Fully Meshed Throughput, Frame Loss and Forwarding Rates, [2] Partially Meshed one-to-Many/Many-to-One, [3] Partially Meshed Multiple Devices, [4] Partially Meshed Unidirectional Traffic, [5] Congestion Control, [6] Forward Pressure and Maximum Forwarding Rate, [7] Address Caching Capacity, [8] Address Learning Rate, [9] Errored Frames Filtering, [10] Broadcast Frame Forwarding and Latency	—
Link Fault Signaling (Option 16)*7	–		LFS pattern transmit function, LFS transmitted counter function, Received counter function, LFS data capture, LFS emulation function

∗1: 1000BASE-SX/LX/LH/ZX/T can be selected by changing the GBIC module.
∗2: 10GBASE-LR can be selected by changing the XENPAK module.
∗3: VLAN tag and MPLS labels cannot both be used simultaneously.
∗4: Increment and random of frame length can be used only when choosing None as a protocol.
∗5: Main frame option is required.
∗6: Unframe BER Test (MU120118A) requires main frame option (Option 13).
∗7: Main frame option is required (Option 16).


MU120101A


MU120102A

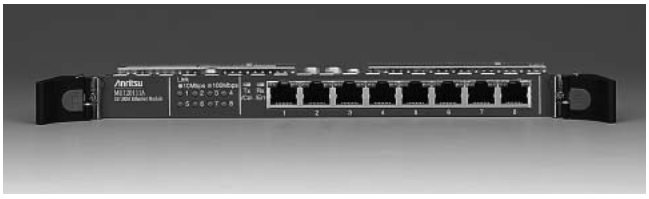

MU120118A

• Advanced Protocol Ethernet Module

Model		MU120111A	MU120112A
Ports		10BASE-T/100BASE-TX Number of ports: 8 Connector: RJ-45 Link speed: 10 Mbit/s, 100 Mbit/s Duplex mode: Full, Half Auto negotiation: On/Off Flow control: On/Off	1000BASE-SX/LX/LH/ZX[*1], Electrical: 1000BASE-T[*1] Number of ports: 2 Connector: GBIC interface (GBIC: SC, RJ-45) Link speed: 1 Gbit/s Duplex mode: Full Auto negotiation: On/Off Flow control: On/Off
LEDs		Link (10/100M), Tx/Collision, Rx/Error	Link, Tx, Rx, Error
Frame Settings		MAC address: Fixed, Increment, Decrement, Random (changeable portions specified in 4 bits units) VLAN tag[*2]: Fixed, Increment, Decrement, Random MPLS label[*2]: Up to 10 MPLS labels can be appended (fixed setting) Protocol editing: Ethernet, IPv4, IPv6, TCP/IPv4, UDP/IPv4, IGMP/IPv4, ICMP/IPv4, RIP/UDP/IPv4, DHCP/UDP/IPv4, IPX, ARP, MAC control, IS-IS Option 12[*3, *4]: TCP/IPv6, UDP/IPv6, ICMPv6/IPv6, IPv6 over IPv4, ICMPv6/IPv6 over IPv4, TCP/IPv6 over IPv4, UDP/IPv6 over IPv4 Data field Can set any 4 portions of data field: All 1, All 0, Alternate1/0 (Each bit, Each 2 bits, Each 4 bits, Each byte, Each 2 bytes), Increment, Decrement, Random, Single PRBS9 Data Field 1 only: Time stamp, Sequence number, User defined, Test frame	
Frame Length		12 to 10000 byte (Settable as auto, Fixed, Increment[*3], or Random[*3])	48 to 65280 byte (Settable as auto, Fixed, Increment[*3], or Random[*3])
Stream Transport Mode		Continuous, Continuous burst, Stop after this stream, Next stream, Jump to stream, Jump to stream for count (Loop count: 1 to 16,000,000, Frame count per burst: 1 to 16,777,215, Burst count per stream: 1 to 16,777,215)	
Stream Gap Setting	Inter Frame Gap	10BASE-T: Resolution of 800 ns 8 µs to 1700 s, Settable as fixed, Random 100BASE-TX: Resolution of 80 ns 800 ns to 170 s, Settable as fixed, Random	Resolution of 8 ns 64 ns to 120 s, Settable as fixed, Random
	Inter Burst Gap	10BASE-T: Resolution of 800 ns 8 µs to 1700 s, Settable as fixed 100BASE-T: Resolution of 80 ns 800 ns to 170 s, Settable as fixed	Resolution of 8 ns 64 ns to 120 s, Settable as fixed
	Inter Stream Gap	10BASE-T: Resolution of 800 ns 8 µs to 1700 s, Settable as fixed 100BASE-TX: Resolution 80 ns 800 ns to 170 s, Settable as fixed	Resolution of 8 ns 64 ns to 120 s, Settable as fixed
Number of Streams		256 Streams/Port	
Error Insertion	Frame Error	FCS error, Undersize error, Oversize error, Fragments error, Oversize & FCS error, Alignment error, Dribble bit error, Collision	FCS error, Undersize error, Oversize error, Fragments error, Oversize & FCS error
	Packet Error	IPv4 header checksum error, TCP/UDP checksum error	
	Packet BER Test (Option 11)[*4]	PRBS error	
Counter	Common	Transmitted frame count/rate, Received frame count/rate, Transmitted bit count/rate, Received bit count/rate, Transmitted byte/rate, Received byte/rate, Capture trigger, Capture filter, User defined 1 count/rate, User defined 2 count/rate	
	Ethernet	Transmitted ARP reply, Received ARP reply, Transmitted ARP request, Received ARP request, Flow control, Dribble bit error, Line error, Fragments, Undersize, Oversize, Oversize & FCS error, FCS error, Alignment error, Collision	Transmitted ARP reply, Received ARP reply, Transmitted ARP request, Received ARP request, Flow control, Line error, Fragments, Undersize, Oversize, Oversize & FCS error, FCS error, Byte alignment error
	IP/TCP/UDP	Transmitted IPv4 packet count/rate, Received IPv4 packet count/rate, Transmitted PING reply, Received PING reply, Transmitted PING request, Received PING request, QoS 0 to 7 frame count/rate, Received TCP packet count/rate, Received UDP packet count/rate, IPv4 header checksum error, TCP checksum error, UDP checksum error	
	Unframe[*5]	Bit error count/rate, Pattern sync loss count/second	
	Packet BER Test (Option 11)[*4]	Transmitted test frame, Received test frame, Sequence error, PRBS bit error count/rate, PRBS frame error count/rate	
	IPv6 Expansion (Option 12)[*4]	Transmitted IPv6 packet count/rate, Received IPv6 packet count/rate, Transmitted ICMPv6 echo request, Received ICMPv6 echo request, Transmitted ICMPv6 echo reply, Received ICMPv6 echo reply, Transmitted ICMPv6 (NA), Received ICMPv6 (NA), Transmitted ICMPv6 (NS), Received ICMPv6 (NS)	

Model	MU120111A	MU120112A
Latency	Maximum, Minimum, Average	
Frame Arrival Time Variation Measurement	Time resolution: 1 µs, 10 µs, 100 µs, 1 ms, 10 ms, 100 ms, 1 s	
QoS Counter Setting	Using QoS described below, 8-level priority frame count: IEEE802.1D VLAN tag user priority field, 3 LSB of RFC2474 DSCP field	
Unframe BER Test*5	Test pattern: All 0, All 1, User-defined 16-bit pattern, PRBS23, PRBS31 Error insertion: Bit unit Error insertion timing: Single error, Single rate (1E-3,4, 5, 6, 7, 8, 9), Programmable rate (9.9 E-3 to 1.0 E-10)	Test pattern: All 0, All 1, User-defined 16-bit pattern, PRBS23, PRBS31, CJPAT, CRPAT Error insertion: Bit unit Error insertion timing: Single error, Single rate (1E-3, 4, 5, 6, 7, 8, 9), Programmable rate (9.9 E-3 to 1.0 E-10)
Capture Buffer	8 Mbyte/port	32 Mbyte/port
Capture Filter	At following conditions for each port, capture filter condition settings: Destination MAC address, Source MAC address, 128-bit pattern (settable bit length and offset) x 2, Error conditions	
Capture Trigger	At following conditions for each port, capture trigger condition settings: Destination MAC address, Source MAC address, 128-bit pattern (settable bit length and offset) x 2, Error conditions, Traffic over, Latency over, External trigger input	
Protocol Decode	ARP, BGP-4, DHCP, DVMRP, Ethernet, ICMP, ICMPv6, IGAP, IGMP, IPCP, IPv4, IPv6, IPv6CP, IPX, IS-IS, LCP, LDP, MAC Control Frame, MPLS, MPLSCP, OSPFv2, RIP, RSVP, SNAP, TCP, UDP, VLAN, MD1230A Test Frame	
Protocol Emulation	ARP, ICMP for IPv4, IGMP, BGP-4, OSPF (Option 07), MPLS LDP/CR-LDP (Option 08), MPLS RSVP (Option 09), ICMP for IPv6 (Option 12), IGAP (Option 14)	
Traffic Monitor	Ethernet frame count for up to 64 flows, IP packet count for up to 64 flows, Frame count for up to 64 protocols	
Traffic Map	Ethernet data flow for up to 256 flows, IP data flow for up to 256 flows	
Service Disruption Time	Time of frame disruption	
RFC2544 Automatic Test	Throughput, Latency, Frame Loss Rate, Back-to-Back Frame, System Recovery, Reset	
RFC2889 Automatic Test (Option 10)*4	[1] Fully Meshed Throughput and Frame Loss, Forwarding Rate, [2] Partially Meshed one-to-Many/Many-to-One, [3] Partially Meshed Multiple Devices, [4] Partially Meshed Unidirectional Traffic, [5] Congestion Control, [6] Forward Pressure and Maximum Forwarding Rate, [7] Address Caching Capacity, [8] Address Learning Rate, [9] Errored Frames Filtering, [10] Broadcast Frame Forwarding and Latency	
Auto Negotiation Analysis (Option 15)*4	—	Code data transmitted function, Auto negotiation sequence capture function, Link timer value variable function

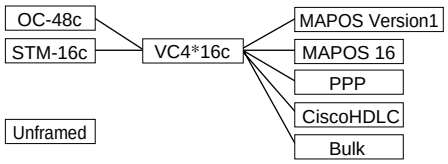
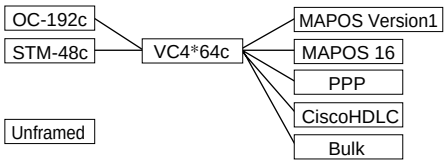
∗1: 1000BASE-SX/LX/LH/ZX/T can be selected by changing the GBIC module.
∗2: VLAN tag and MPLS labels cannot both be used simultaneously.
∗3: Increment and random of frame length can be used only when choosing None as a protocol.
∗4: Main frame option is required.
∗5: Unframe BER Test (MU120111A) requires port 1 or port 5.



MU120111A

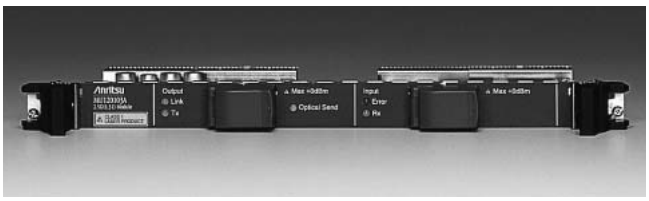
MU120112A

• POS Module

Model		MU120103A	MU120104A	MU120105A	MU120106A
Ports		OC-48/STM-16 Wavelength: 1260 to 1360 nm Number of ports: 1 Connector: SC Bit rate: 2488.320 Mbit/s (NRZ) Output level: –5 to 0 dBm Input sensitivity: –18 to 0 dBm	OC-48/STM-16 Wavelength: 1500 to 1580 nm Number of ports: 1 Connector: SC Bit rate: 2488.320 Mbit/s (NRZ) Output level: –2 to +3 dBm Input sensitivity: –28 to –9 dBm	OC-192/STM-64 Wavelength: 1290 to 1330 nm Number of ports: 1 Connector: SC Bit rate: 9953.280 Mbit/s (NRZ) Output level: –4 to +0 dBm Input sensitivity: –12 to 0 dBm	OC-192/STM-64 Wavelength: 1530 to 1565 nm Number of ports: 1 Connector: SC Bit rate: 9953.280 Mbit/s (NRZ) Output level: –1 to +2 dBm Input sensitivity: –14 to –3 dBm
LEDs		Link, Tx, Rx, Error, Optical send			
Clocks		Internal (±50 ppm variable), Receive signal, Lock (64 kHz + 8 kHz, 1.5 MHz, 2 MHz, 1.5 Mbit/s, 2 Mbit/s)		Internal (±100 ppm variable), Receive signal, Lock (64 kHz + 8 kHz, 1.5 MHz, 2 MHz, 1.5 Mbit/s, 2 Mbit/s)	
Power Meter		Standard			
SDH/SONET Setting		Frame select: SONET/SDH Scramble: On/Off Alarm addition: LOS, LOF, MS-AIS, MS-RDI, MS-TIM, AU-AIS, AU-LOP, HP-SLM, HP-TIM, HP-RDI, HP-UNEQ Alarm addition timing: Single, Single burst frame (1 to 64000), Alternative [Alarm frame (0 to 8000), Normal frame (1 to 8000)], All Error insertion: FAS, Bit all, B1, B2, B3, MS-REI, HP-REI, HP-IEC Error insertion timing: Single, Single burst bit (1 to 64000), Rate (1E-3, 1E-4, 1E-5, 1E-6, 1E-7, 1E-8, 1E-9), Programmed rate [AE-B ∗A: 1.0 to 9.9 (step 0.1), B: 3 to 10], All APS (K1/K2) sequence generation: 2 to 64 words, Repeat (8000 frames)			
Mapping					
Frame Settings		FCS: CRC32 MPLS label: Up to 10 MPLS labels can be appended (fixed setting) Protocol editing: PPP, IPv4, IPv6, TCP/IP, UDP/IP, IGMP/IP, ICMP/IP, RIP/UDP/IP, DHCP, IS-IS Data field Can set any 4 parts in data field: All 1, All 0, Alternate 1/0 (Each bit, Each 2 bits, Each 4 bits, Each byte, Each 2 bytes), Increment, Decrement, Random, Single PRBS9 Data field 1 only: Time stamp, Sequence number, User defined, Test frame			
Frame Length		8 to 65536 byte (Settable as auto, Fixed, Increment[*1], or Random[*1])			
Stream Transport Mode		Continuous, Continuous burst, Stop after this stream, Next stream, Jump to stream, Jump to stream for count (Loop count: 1 to 16,000,000, Frame count per burst: 1 to 1,099,551,627,775, Burst count per stream: 1 to 1,099,551,627,775)			
Stream Gap Setting	Inter Frame Gap	Resolution of 3.3 ns 3.3 ns to 120 s, Settable as fixed, Random		Resolution of 0.8 ns 0.8 ns to 120 s, Settable as fixed, Random	
	Inter Burst Gap	Resolution of 3.3 ns 3.3 ns to 120 s, Settable as fixed		Resolution of 0.8 ns 13.4 ns to 120 s, Settable as fixed	
	Inter Stream Gap	Resolution of 3.3 ns 427.4 ns to 120 s, Settable as fixed		Resolution of 0.8 ns 106.8 ns to 120 s, Settable as fixed	
Number of Streams		256 Streams/Port			
Error Insertion	Frame Error	FCS error, Abort frame, Fragment, Undersize, Oversize, Oversize & FCS error			
	Packet Error	IPv4 header checksum error, TCP/UDP checksum error			
	Packet BER Test (Option 11)[*2]	PRBS bit error			
Counter	SONET/SDH/ Bulk	B1 count/rate, B2 count/rate, B3 count/rate, HP-IEC count/rate, MS-REI count/rate, HP-REI count/rate, LOS count/second, LOF count/second, OOF count/second, MS-AIS count/second, MS-RDI count/second, AU-AIS count/second, AU-LOP count/second, HP-SLM count/second, HP-RDI count/second, HP-UNEQ count/second, Bit Info count/rate, Pattern Sync Loss count/second, Abort frame, Sequence error count			

Model		MU120103A	MU120104A	MU120105A	MU120106A
Counter	Justification	NDF count/rate, +PJC count/rate, –PJC count/rate, Consecutive count/rate, PPM			
	Common	Transmitted frame count/rate, Received frame count/rate, Transmitted bit count/rate, Received bit count/rate, Transmitted byte/rate, Received byte/rate, Capture trigger, Capture filter, User defined 1 count/rate, User defined 2 count/rate			
	PPP/IP/TCP/UDP	Transmitted bytes (after stuffing), Received bytes (before destufing), Transmitted IPv4 packet count/rate, Received IPv4 packet count/rate, Transmitted PING reply, Received PING reply, Transmitted PING request, Received PING request, QoS 0 to 7 frame/rate, Received TCP packet count/rate, Received UDP packet count/rate, IPv4 header checksum error, TCP checksum error, UDP checksum error			
	Unframe	Bit Info count/rate, Pattern Sync Loss count/second			
	Packet BER Test (Option 11)*2	Transmitted test frame, Received test frame, Sequence error, Received PRBS frame error count/rate, Received PRBS bit error count/rate			
Latency		Maximum, Minimum, Average			
Alarm Arrival Time Variation Measurement		Time resolution: 1 µs, 10 µs, 100 µs, 1 ms, 10 ms, 100 ms, 1 s			
QoS Counter Settings		Using QoS described below, 8-level priority frame count: 3 LSB of RFC2474 DSCP field			
Unframe BER Setting		Test pattern: PRBS23, PRBS31 Error insertion: Bit unit Error insertion timing: Single error, Single rate (1E-3, 4, 5, 6, 7, 8, 9), Programmable rate (9.9 E-3 to 1.0 E-10)			
Capture Buffer		256 Mbyte/port			
Capture Filter		At following conditions for each port, capture filter condition settings: Destination IP address, Source IP address, 32-bit pattern (settable bit length and offset) x 2, Error conditions			
Capture Trigger		At following conditions for each port, capture trigger condition settings: Destination IP address, Source IP address, 32-bit pattern (settable bit length and offset) x 2, Error conditions, Traffic over, Latency over, External trigger input			
Protocol Decode		BGP-4, Cisco HDLC, DHCP, DVMRP, ICMP, ICMPv6, IGAP, IGMP, IPCP, IPv4, IPv6, IPv6CP, IPX, IS-IS, LCP, LDP, MAPOS, MPLS, MPLSCP, OSPFv2, PPP, RIP, RSVP, SNAP, TCP, UDP, MD1230A Test Frame			
Protocol Emulation		PPP, PING, IGMP, BGP-4			
Traffic Monitor		IP packet count for up to 64 flows, Frame count for up to 64 protocols			
Traffic Map		IP data flow for up to 256 flows			
Service Disruption Time		Time of frame disruption			
RFC2544 Automatic Test		Throughput, Latency, Frame Loss Rate, Back-to-Back Frame, System Recovery, Reset			

∗1: Increment and random of frame length can be used only when choosing None as a protocol.
∗2: Main frame option is required.

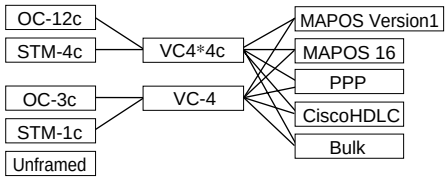
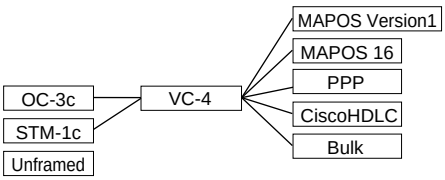


MU120103A

MU120104A

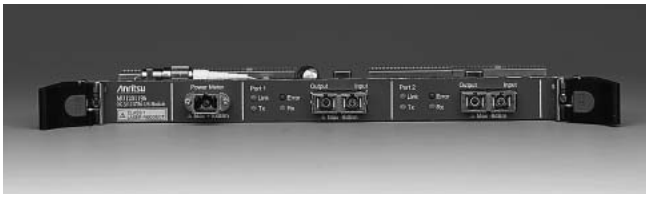
MU120105A

MU120106A

Model		MU120119A	MU120120A
Ports		OC-3/12 STM-1/4 Wavelength: 1300 nm band Number of ports: 2 Connector: SC Bit rate: 155.52/622.08 Mbit/s (NRZ) Output level: –15 to –8 dBm Input sensitivity: –28 to –8 dBm	OC-3 STM-1 Wavelength: 1300 nm band Number of ports: 2 Connector: SC Bit rate: 155.52 Mbit/s (NRZ) Output level: –15 to –8 dBm Input sensitivity: –28 to –8 dBm
LEDs		Link, Tx, Rx, Error	
Clocks		Internal (±50 ppm variable), Receive signal, Lock (64 kHz + 8 kHz, 1.5 MHz, 2 MHz, 1.5 Mbit/s, 2 Mbit/s)	
Power Meter		Option	
SDH/SONET Setting		Frame select: SONET/SDH Scramble: On/Off Alarm addition: LOS, LOF, MS-AIS, MS-RDI, MS-TIM, AU-AIS, AU-LOP, HP-SLM, HP-TIM, HP-RDI, HP-UNEQ Alarm addition timing: Single, Single burst frame (1 to 64000), Alternative [Alarm frame (0 to 8000), Normal frame (1 to 8000)], All Error insertion: FAS, Bit all, B1, B2, B3, MS-REI, HP-REI, HP-IEC Error insertion timing: Single, Single burst bit (1 to 64000), Rate (1E-3, 1E-4, 1E-5, 1E-6, 1E-7, 1E-8, 1E-9), Programmed rate [AE-B ∗A: 1.0 to 9.9 (step 0.1), B: 3 to 10], All APS (K1/K2) Sequence generation: 2 to 64 words, Repeat (8000 frames)	
Mapping			
Frame Settings		FCS: CRC32 MPLS label: Up to 10 MPLS labels can be appended (fixed setting) Protocol editing: PPP, IPv4, IPv6, TCP/IP, UDP/IP, IGMP/IP, ICMP/IP, RIP/UDP/IP, DHCP, IS-IS Data field Can set any 4 parts in data field: All 1, All 0, Alternate 1/0 (Each bit, Each 2 bits, Each 4 bits, Each byte, Each 2 bytes), Increment, Decrement, Random, Single PRBS9 Data field 1 only: Time stamp, Sequence number, User defined, Test frame	
Frame Length		8 to 65536 byte (Settable as auto, Fixed, Increment[*1], or Random[*1])	
Stream Transport Mode		Continuous, Continuous burst, Stop after this stream, Next stream, Jump to stream, Jump to stream for count (Loop count: 1 to 16,000,000, Frame count per burst: 1 to 16,000,000, Burst count per stream: 1 to 16,000,000)	
Stream Gap Setting	Inter Frame Gap	156M: 53.4 ns to 120 s, Resolution of 53.4 ns, Settable as fixed, Random 622M:13.4 ns to 120 s, Resolution of 13.4 ns, Settable as fixed, Random	
	Inter Burst Gap	156M: 53.4ns to 120 s, Resolution of 53.4 ns, Settable as fixed 622M:13.4 ns to 120 s, Resolution of 13.4 ns, Settable as fixed	
	Inter Stream Gap	156M: 427.4 ns to 120 s, Resolution of 53.4 ns, Settable as fixed 622M:106.8 ns to 120 s, Resolution of 13.4 ns, Settable as fixed	
Number of Streams		256 streams/port	
Error Insertion	Frame Error	FCS error, Abort frame, Fragment, Undersize, Oversize, Oversize & FCS error	
	Packet Error	IPv4 header checksum error, TCP/UDP checksum error	
	Packet BER Test (Option 11)[*2]	PRBS bit error	
Counter	SONET/SDH/Bulk	B1 count/rate, B2 count/rate, B3 count/rate, HP-IEC count/rate, MS-REI count/rate, HP-REI count/rate, LOS count/second, LOF count/second, OOF count/second, MS-AIS count/second, MS-RDI count/second, AU-AIS count/second, AU-LOP count/second, HP-SLM count/second, HP-RDI count/second, HP-UNEQ count/second, Bit Info count/rate, Pattern Sync Loss count/second, Abort frame, Sequence error count	
	Justification	NDF count/rate, +PJC count/rate, –PJC count/rate, Consecutive count/rate, PPM	

Model		MU120119A	MU120120A
Counter	Common	Transmitted frame count/rate, Received frame count/rate, Transmitted bit count/rate, Received bit count/rate, Transmitted byte/rate, Received byte/rate, Capture trigger, Capture filter, User defined 1 count/rate, User defined 2 count/rate	
	PPP/IP/TCP/UDP	Transmitted bytes (after stuffing), Received bytes (before destufing), Transmitted IPv4 packet count/rate, Received IPv4 packet count/rate, Transmitted PING reply, Received PING reply, Transmitted PING request, Received PING request, QoS 0 to 7 frame/ rate, Received TCP packet count/rate, Received UDP packet count/rate, IPv4 header checksum error, TCP checksum error, UDP checksum error	
	Unframe	Bit Info count/rate, Pattern Sync Loss count/second	
	Packet BER test (Option 11)*2	Transmitted test frame, Received test frame, Sequence error, Received PRBS frame error count/rate, Received PRBS bit error count/rate	
Latency		Maximum, Minimum, Average	
Frame Arrival Time Variation Measurement		Time resolution: 1 µs, 10 µs, 100 µs, 1 ms, 10 ms, 100 ms, 1 s	
QoS Counter Settings		Using QoS described below, 8-level priority frame count: 3 LSB of RFC2474 DSCP field	
Unframe BER Setting		Test pattern: PRBS11, PRBS15, PRBS20, PRBS23, PRBS31 Error insertion: Bit unit Error insertion timing: Single error, Single rate (1E-3,4, 5, 6, 7, 8, 9), Programmable rate (9.9 E-3, 1.0 E-10)	
Capture Buffer		32 Mbyte/port	
Capture Filter		At following conditions for each port, capture filter condition settings: Destination IP address, Source IP address, 32-bit pattern (settable bit length and offset) x 2, Error conditions	
Capture Trigger		At following conditions for each port, capture trigger condition settings: Destination IP address, Source IP address, 32-bit pattern (settable bit length and offset) x 2, Error conditions, Traffic over, Latency over, External trigger input	
Protocol Decode		BGP-4, Cisco HDLC, DHCP, DVMRP, ICMP, ICMPv6, IGAP, IGMP, IPCP, IPv4, IPv6, IPv6CP, IPX, IS-IS, LCP, LDP, MAPOS, MPLS, MPLSCP, OSPFv2, PPP, RIP, RSVP, SNAP, TCP, UDP, MD1230A Test Frame	
Protocol Emulation		PPP, PING, IGMP, BGP-4	
Traffic Monitor		IP packet count for up to 64 flows, Frame count for up to 64 protocols	
Traffic Map		IP data flow for up to 256 flows	
Service Disruption Time		Time of frame disruption	
RFC2544 Automatic Test		Throughput, Latency, Frame Loss Rate, Back-to-Back Frame, System Recovery, Reset	
Module Options		MU120119A-01/MU120120A-01 Maximum input level: +10 dBm Optical power measurement range: –40 to +5 dBm Optical power measurement accuracy: ±0.5 dBm	

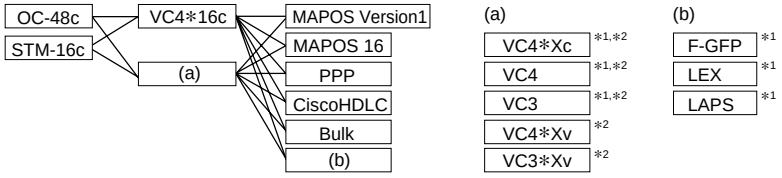
*1: Increment and random of frame length can be used only when choosing None as a protocol.
*2: Main frame option is required.



MU120119A

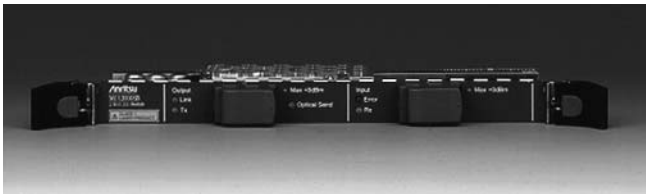
MU120120A

EOS Module

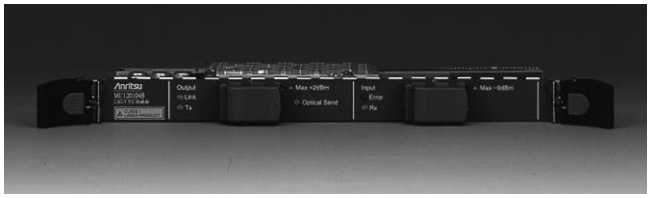
Model		MU120103B	MU120104B
Ports		OC-48/STM-16 Wavelength: 1260 to 1360 nm Number of ports: 1 Connector: SC Bit rate: 2488.320 Mbit/s (NRZ) Output level: –5 to 0 dBm Input sensitivity: –18 to 0 dBm	OC-48/STM-16 Wavelength: 1500 to 1580 nm Number of ports: 1 Connector: SC Bit rate: 2488.320 Mbit/s (NRZ) Output level: –2 to +3 dBm Input sensitivity: –28 to –9 dBm
LEDs		Link, Tx, Rx, Error, Optical send	
Clocks		Internal (±50 ppm variable), Receive signal, Lock (64 kHz + 8 kHz, 1.5 MHz, 2 MHz, 1.5 Mbit/s, 2 Mbit/s)	
Power Meter		Standard	
SDH/SONET Setting		Frame select: SONET/SDH Scramble: On/Off Alarm addition: LOS, LOF, MS-AIS, MS-RDI, MS-TIM, AU-AIS, AU-LOP, HP-SLM, HP-TIM, HP-RDI, HP-UNEQ Alarm addition timing: Single, Single burst frame (1 to 64000), Alternative [Alarm frame (0 to 8000), Normal frame (1 to 8000)], All Error insertion: FAS, Bit all, B1, B2, B3, MS-REI, HP-REI, HP-IEC Error insertion timing: Single, Single burst bit (1 to 64000), Rate (1E-3, 1E-4, 1E-5, 1E-6, 1E-7, 1E-8, 1E-9), Programmed rate [AE-B ∗A: 1.0 to 9.9 (step 0.1), B: 3 to 10], All APS (K1/K2) sequence generation: 2 to 64 words, Repeat (8000 frames)	
Mapping			
Frame Settings		FCS: CRC32, CRC16 MAC address: Fixed, Increment, Decrement, Random (changeable portions specified in 4 bits units) VLAN tag[*3]: Fixed, Increment, Decrement, Random MPLS label[*3]: Up to 10 MPLS labels can be appended. Fixed setting Protocol editing: Ethernet, IPv4, IPv6, TCP/IPv4, UDP/IPv4, IGMP/IPv4, ICMP/IPv4, RIP/UDP/IPv4, DHCP/UDP/IPv4, IPX, ARP, MAC control, IS-IS, LEX Control Packet[*4], GFP, PPP Data field Can set any 4 parts in data field: All 1, All 0, Alternate 1/0 (Each bit, Each 2 bits, Each 4 bits, Each byte, Each 2 bytes), Increment, Decrement, Random, Single PRBS9 Data field 1 only: Time stamp, Sequence number, User defined, Test frame	
Frame Length		8 to 65536 byte (Settable as auto, Fixed, Increment[*5], or Random[*5])	
Stream Transport Mode		Continuous, Continuous burst, Stop after this stream, Next stream, Jump to stream, Jump to stream for count (Loop count: 1 to 16,000,000, Frame count per burst: 1 to 16,000,000, Burst count per stream: 1 to 16,000,000)	
Stream Gap Setting	Inter Frame Gap	GFP: 0 ns to 120 s, Resolution of 13.4 ns, Settable as fixed, Random[*6] PPP/LEX/LAPS: 3.3 ns to 120 s, Resolution of 3.2 ns, Settable as fixed, Random[*6]	
	Inter Burst Gap	51.4 ns to 120 s, Resolution of 3.2 ns, Settable as fixed (IFG <51.4 ns or Frame length <63 bytes) IFG + 51.4ns to 120 s	
	Inter Stream Gap	427.4 ns to 120 s, Resolution of 3.2 ns, Settable as fixed (IFG <51.4 ns or Frame length <63 bytes) IFG + 427.4 ns to 120 s	
Number of Streams		256 streams/port	
Error Insertion	GFP[*7]	cHEC error, Correctable cHEC error, tHEC error, Correctable tHEC error, eHEC error, Correctable eHEC error, FCS error	
	LAPS[*7]	FCS error, Abort sequence	
	LEX[*7]	FCS error, Fragment error, Undersize error, Oversize, Oversize & FCS error, Abort sequence	
	Frame Error	FCS error, Abort frame, Fragment, Undersize, Oversize, Oversize & FCS error	
	Packet Error	IPv4 header checksum error, TCP/UDP checksum error	
	Packet BER Test (Option 11)[*8]	PRBS bit error	
Counter	SONET/SDH/Bulk	B1 count/rate, B2 count/rate, B3 count/rate, HP-IEC count/rate, MS-REI count/rate, HP-REI count/rate, LOS count/second, LOF count/second, OOF count/second, MS-AIS count/second, MS-RDI count/second, AU-AIS count/second, AU-LOP count/second, HP-SLM count/second, HP-RDI count/second, HP-UNEQ count/second, Bit Info count/rate, Pattern Sync Loss count/second, Sequence error count	
	Justification	NDF count/rate, +PJC count/rate, –PJC count/rate, Consecutive count/rate, PPM	

Model		MU120103B	MU120104B
Counter	Common	Transmitted frame count/rate, Received frame count/rate, Transmitted bit count/rate, Received bit count/rate, Transmitted byte/rate, Received byte/rate, Capture trigger, Capture filter, User defined 1 count/rate, User defined 2 count/rate	
	GFP/LEX/LAPS*7	Transmitted bytes (after stuffing), Transmitted bytes (after adaptation), cHEC error, Correctable cHEC error, tHEC error, Correctable tHEC error, eHEC error, GFP FCS error, Server signal fail interval, Client loss of sync frame, Client loss of sync interval, Client loss of signal frame, Client loss of signal interval, Fragment, Undersize, Oversize, Oversize & FCS error, Abort frame	
	Ethernet*7	Transmitted Ethernet frame, Received Ethernet frame, Transmitted Ethernet byte, Received Ethernet byte, Ethernet FCS error, Flow control, Ethernet fragment error, Ethernet undersize error, Ethernet oversize error, Ethernet oversize & FCS error, Transmitted ARP request, Received ARP request, Transmitted ARP reply, Received ARP reply	
	PPP/IP/TCP/UDP	Transmitted bytes (after stuffing), Received bytes (before destuffing), Transmitted IPv4 packet count/rate, Received IPv4 packet count/rate, Transmitted PING reply, Received PING reply, Transmitted PING request, Received PING request, QoS 0 to 7 frame/rate, Received TCP packet count/rate, Received UDP packet count/rate, IPv4 header checksum error, TCP checksum error, UDP checksum error	
	Unframe	Bit info count/rate, Pattern Sync Loss count/second	
	Packet BER Test (Option 11)	Transmitted test frame, Received test frame, Sequence error, Received PRBS frame error count/rate, Received PRBS bit error count/rate	
Latency		Maximum, Minimum, Average	
Frame Arrival Time Variation Measurement		Time resolution: 1 µs, 10 µs, 100 µs, 1 ms, 10 ms, 100 ms, 1 s	
QoS Counter Settings		Using QoS described below, 8-level priority frame count: IEEE802.1D VLAN tag user priority field, 3 LSB of RFC2474 DSCP field	
Unframe BER Setting		Test pattern: PRBS23, PRBS31 Error insertion: Bit unit Error insertion timing: Single error, Single rate (1E-3, 4, 5, 6, 7, 8, 9), Programmable rate (9.9 E-3, 1.0 E-10)	
Capture Buffer		256 Mbyte/port	
Capture Filter		At following conditions for each port, capture filter condition settings: Destination MAC address*9, Source MAC address*9, Destination IP address, Source IP address, 32-bit pattern (settable bit length and offset) x 2, Error conditions	
Capture Trigger		At following conditions for each port, capture trigger condition settings: Destination MAC address*9, Source MAC address*9, Destination IP address, Source IP address, 32-bit pattern (settable bit length and offset) x 2, Error conditions, Traffic over, Latency over, External trigger input	
Protocol Decode		ARP, BGP-4, Cisco HDLC, DHCP, DVMRP, Ethernet, GFP, ICMP, ICMPv6, IGAP, IGMP, IPCP, IPv4, IPv6, IPv6CP, IPX, IS-IS, LAPS (X.86), LCP, LDP, LEX, LLC, MAC Control Frame, MAPOS, MPLS, MPLSCP, OSPFv2, PPP, PPP-LEX, RIP, RSVP, SNAP, TCP, UDP, VLAN, MD1230A Test Frame	
Protocol Emulation		ARP, PPP, ICMP(PING), IGMP, BGP-4	
Traffic Monitor		IP packet count for up to 64 flows, Frame count for up to 64 protocols	
Traffic Map		IP data flow for up to 256 flows	
Service Disruption Time		Time of frame disruption	
RFC2544 Automatic Test		Throughput, Latency, Frame Loss Rate, Back-to-Back Frame, System Recovery, Reset	
Module Options		MU120103B-01/MU120104B-01 Mapping: T-GFP, LAPS, LEX Concatenation: [SDH] VC-4-Xc (X = 16, 8, 4, 3, 2), VC-4, VC-3 [SONET] STS-Xc (X = 48, 24, 12, 9, 6, 3), STS-1 MU120103B-02/MU120104B-02 Virtual concatenation: [SDH] VC-4-Xv (X = 8, 7, 6, 5, 4, 3, 2), VC-3-Xv (X = 24, 21, 18, 15, 12, 9, 6, 3) [SONET] STS3c-Xv (X = 8, 7, 6, 5, 4, 3, 2), STS1-Xv (X = 24, 21, 18, 15, 12, 9, 6, 3)	

∗1: Settable while using the Option 01.
∗2: Settable while using the Option 02.
∗3: VLAN tag and MPLS labels cannot be used simultaneously.
∗4: LEX Control Packet can be chosen only when choosing LEX mapping.
∗5: Increment and random of frame length can be used only when choosing None as a protocol.
∗6: Random setting is effective only when frame length is more than 64 bytes.
∗7: Settable only while using the Option 01.
∗8: Main frame option is required.
∗9: Settable as only GFP/LAPS/LEX mapping.



MU120103B

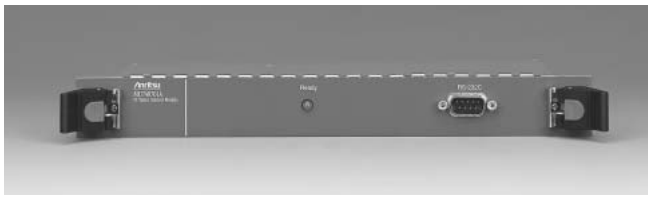


MU120104B

• MU740701A IP Tester Control Module

Control Slot Number*1	7
Interface	RS-232C
Automatic Test	Standard: RFC2544 Test (Throughput, Latency, Frame Loss Rate, Back-to-Back Frame, System Recovery, Reset) Option: RFC2889 Benchmarking Test ([1] Fully Meshed Throughput, Frame Loss and Forwarding Rates, [2] Partially Meshed One-to-Many/Many-to-One, [3] Partially Meshed Multiple Devices, [4] Partially Meshed Unidirectional Traffic, [5] Congestion Control, [6] Forward Pressure and Maximum Forwarding Rate, [7] Address Caching Capacity, [8] Address Learning Rate, [9] Errored Frames Filtering, [10] Broadcast Frame Forwarding and Latency)
LED	For configuration check
Operating Temperature	0˚ to +40 ˚C
Storage Temperature	–20˚ to +60 ˚C
Corresponding Options	MU740701A-04: MU740701A Decode Module*2, MU740701A-05: GPS Module*3, MU740701A-07: OSPF Protocol*4, MU740701A-08: MPLS (LDP/CR-LDP) Protocol*4, MU740701A-09: MPLS (RSVP) Protocol*4, MU740701A-10: RFC2889 Benchmarking Test*4, MU740701A-11: Packet BER Test*4, MU740701A-12: IPv6 Expansion*4, MU740701A-13: XENPAK Test*5, MU740701A-14: IGAP Protocol*4, MU740701A-15: Auto Negotiation Analysis*6, MU740701A-16: Link Fault Signalling*5, MU740701A-30: MU740701A Expert Analysis Module*7, MT7407A-40: Annual Software Upgrade Service for MT7407A*8

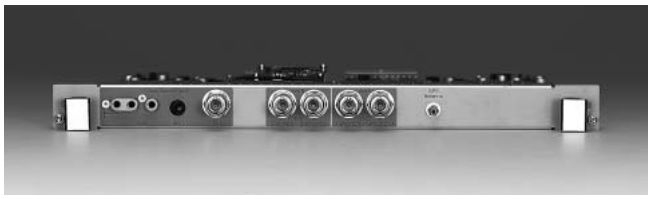
∗1: MU740701A is controllable a maximum of 7 modules.
∗2: Purchase MU740701A-04 on FD. The Decode Module function doesn't operate with only MU740701A-04. MX123001A-01 (sold separately) is required.
∗3: When using MU740701A-05, MT7407A-01 (sold separately) is required. With one MU740701A-05 can support an entire MT7407A chassis with one MU740701A module installed.
∗4: Some of these interface modules may not work in certain combinations depending on the modules and software versions. Please see the selection guide (Pages 8, 9)
∗5: MU740701A-13 and MU740701A-16 support only MU120118A.
∗6: MU740701A-15 supports only MU120112A.
∗7: Purchase MU740701A-30 on FD. The Expert Analysis module function doesn't operate with only MU740701A-30. MU740701A-04 MU740701A Decode Module, MX123001A-01 Remote Control Software for MD1230A-04, and MX123003A Remote Control Software for MX123002A are required.
∗8: MT7407A-40 is provided free for the first year after purchase. It is required to receive software upgrade service starting with the second year after purchase. One license supports two MU740701A.



MT7407A-01 IP Tester Interface∗1

SONET/SDH sync Clock Input	Frequency: 64 kHz + 8 kHz ± 50 ppm, 2.048 MHz ± 50 ppm, 1.544 MHz ± 50 ppm, 2.048 Mbit/s ± 50 ppm,1.544 Mbit/s ± 50 ppm Interface 2M: ITU-T G.703 Table 10, HDB3 1.5M: B8ZS, AMI ANSI T1.403 Level (64k): 0.63 to 1.1 Vo-p Code (64k): AMI 8 kHz violation Connector BNC (75 Ω): 2 MHz, 2 Mbit/s Siemens (120 Ω balanced): 2 MHz, 2 Mbit/s, 64 kHz + 8 kHz Bantam (100 Ω balanced): 1.5 MHz, 1.5 Mbit/s
Sync I/O	MD1230A/1231A time sync signal, Impedance: 75 Ω (BNC)
External Interface Connector*2	GPS Antenna

∗1: This option is required when synchronizing SONET/SDH with MT7407A, or when synchronizing two or more sets of MT7407A, MD1230A, and MD1231A.
∗2: When using MU740701A-05, MT7407A-01 (sold separately) is required.



Ordering Information

Please specify model/order number, name and quantity when ordering.

• MD1230A

Model/Order No.	Name	
	Main Frame	
MD1230A	Data Quality Analyzer	
	Standard Accessories	
	Power cord, 2.5 m:	1 pc
F0079	Fuse, 10 A:	1 pc
B0329G	Front cover (for 3/4MW4U):	1 pc
B0500A	Side cover:	1 pc
W2306AE	MD1230A Family operation manual CD-ROM[*1]:	1 pc
	Main Frame Options	
MD1230A-01	RS-232C Control[*2]	
MD1230A-02	GPIB Control[*2]	
MD1230A-03	Ethernet Control[*2,*3]	
MD1230A-04	MD1230A Decode Module[*4]	
MD1230A-05	GPS Module	
MD1230A-06	Tcl Interface[*3]	
MD1230A-07	OSPF Protocol[*5]	
MD1230A-08	MPLS (LDP/CR-LDP) Protocol[*5]	
MD1230A-09	MPLS (RSVP) Protocol[*5]	
MD1230A-10	RFC2889 Benchmarking Test[*5]	
MD1230A-11	Packet BER Test[*5]	
MD1230A-12	IPv6 Expansion[*5]	
MD1230A-13	XENPAK Test[*6]	
MD1230A-14	IGAP Protocol[*5]	
MD1230A-15	Auto Negotiation Analysis[*7]	
MD1230A-16	Link Fault Signaling[*6]	
MD1230A-20	Application Traffic Monitor[*7,*8]	
MX123002A	MD1230A Expert Analysis Module[*14]	
	Plug-in Modules	
MU120101A	10M/100M Ethernet Module	
MU120102A	Gigabit Ethernet Module[*9]	
MU120103A	2.5G (1.31) Module[*10]	
MU120103B	2.5G (1.31) Module[*10]	
MU120104A	2.5G (1.55) Module[*10]	
MU120104B	2.5G (1.55) Module[*10]	
MU120105A	10G (1.31) Module	
MU120106A	10G (1.55) Module	
MU120111A	10/100M Ethernet Module	
MU120112A	Gigabit Ethernet Module[*9]	
MU120118A	10 Gigabit Ethernet Module[*11]	
MU120119A	OC-3/12 STM-1/4 Module (1310 nm)	
MU120120A	OC-3/STM-1 Module (1310 nm)	
	Plug-in Module Options	
MU120103B-01	EOS Mapping	
MU120103B-02	Virtual Concatenation	
MU120104B-01	EOS Mapping	
MU120104B-02	Virtual Concatenation	
MU120119A-01	Optical Power Meter	
MU120120A-01	Optical Power Meter	
	Softwares	
MX123001A	Data Quality Analyzer Control Software	
MX123001A-05	Data Quality Analyzer Control Software (5 licenses)	
MX123001A-08	Data Quality Analyzer Control Software (8 licenses)	
MX123001A-01	Remote Control Software for MD1230A-04[*12]	
MX123001A-15	Remote Control Software for MD1230A-04 (5 licenses)[*12]	
MX123001A-18	Remote Control Software for MD1230A-04 (8 licenses)[*12]	
MX123001A-20	Application Traffic Monitor Option[*13]	
MX123003A	Remote Control Software for MX123002A[*15]	
MX123003A-05	Remote Control Software for MX123002A (5 licenses)[*15]	
MX123003A-08	Remote Control Software for MX123002A (8 licenses)[*15]	
	Software Options	
MX123001A-06	Tcl Interface[*3]	
MX123001A-07	RS-232C Control[*2]	
MX123001A-09	GPIB Control[*2]	
MX123001A-10	Ethernet Control[*2, *3]	

Model/Order No.	Name
	Software Upgrade Service
MD1230A-40	Annual Software Upgrade Service for MD1230A[*16]
MD1230A-41	Annual Software Maintenance for MD1230A-04[*17]
MD1230A-42	Annual Software Maintenance for MX123002A[*17]
	Maintenance Service
MD1230A-90	Extended Three Year Warranty Service
MU120101A-90	Extended Three Year Warranty Service
MU120102A-90	Extended Three Year Warranty Service
MU120103A-90	Extended Three Year Warranty Service
MU120103B-90	Extended Three Year Warranty Service
MU120104A-90	Extended Three Year Warranty Service
MU120104B-90	Extended Three Year Warranty Service
MU120105A-90	Extended Three Year Warranty Service
MU120106A-90	Extended Three Year Warranty Service
MU120111A-90	Extended Three Year Warranty Service
MU120112A-90	Extended Three Year Warranty Service
MU120118A-90	Extended Three Year Warranty Service
MU120119A-90	Extended Three Year Warranty Service
MU120120A-90	Extended Three Year Warranty Service
	Optional Accessories
G0105A	GBIC SX 850 nm[*19]
G0106A	GBIC LX 1310 nm[*19]
G0107A	GBIC LH 1310 nm[*19]
G0108A	GBIC ZX 1550 nm[*19]
G0124A	GBIC T (1000BASE-T)[*20]
G0126A	XENPAK (10GBASE-LR)[*21]
J1049A	Fixed Optical Attenuator (SC, 5 dB)[*22]
J1049B	Fixed Optical Attenuator (SC, 10 dB)[*22]
J1049C	Fixed Optical Attenuator (SC, 15 dB)[*22]
MZ1221A	XAUI Extender
MZ1222A	XENPAK Interface
J1163A	XAUI cable, 0.5 m
J1164A	MDIO cable, 0.5 m
J0660B	Optical fiber cord (SM, SC-SC connector both ends), 2 m
J0773B	Optical fiber cord (GI, SC-SC connector both ends), 2 m
J1119B	Optical fiber cable (Duplex, MM), 2 m
J0775D	Coaxial cord (BNC-P620 · 3C-2WS · BNC-P620, 75 Ω), 2 m
J1165A	Coaxial cord (27CP-P-1.5-BNC-P-1.5C-CR10)[*23]
J0845A	Balanced cable (BANTAM 3P/BANTAM 3P), 6 ft
J0162B	Balanced cable (Siemens 3p-Siemens 3p), 2 m
J0008	GPIB cable, 2 m
J1109B	LAN cable (Cross), 5 m
J1110B	LAN cable (Straight), 5 m
Z0321A	Keyboard (PS/2)
Z0541A	USB mouse
B0448	Soft case[*24]
B0336C	Carrying case (for 3/4MW4U, 350D)[*25]
B0530	Carrying case caster for B0336C[*26]
B0533	Carrying case (for 3/4MW4U, 350D)[*27]
B0501B	Blank panel
W1927AE	MD1230A Data Quality Analyzer operation manual
W1928AE	MX123001A Data Quality Analyzer Control Software operation manual
W1929AE	MD1230A-01/02/03 Remote Control operation manual
W2107AE	MD1230A-04 MD1230A Decode Module MX123001A-01 Remote Control Software for MD1230A-04 operation manual
W2122AE	MD1230A-06 Tcl Interface operation manual
W2134AE	MD1230A-20/MD1231A-20/MX123001A-20 Application Traffic Monitor operation manual
W2108AE	MX123002A MD1230A Expert Analysis Module MX123003A Remote Control Software for MX123002A operation manual

Model/Order No.	Name
W1931AE	MU120101A/11A 10M/100M Ethernet Module MU120102A/12A Gigabit Ethernet Module MU120118A 10 Gigabit Ethernet Module operation manual
W1932AE	MU120103A/B 2.5G (1.31) Module MU120104A/B 2.5G (1.55) Module MU120105A 10G (1.31) Module MU120106A 10G (1.55) Module operation manual
W2121AE	MU120119A OC-3/12 STM-1/4 Module (1310 nm) MU120120A OC-3/STM-1 Module (1310 nm) operation manual

∗1: Includes W1927AE, W1928AE, W1929AE and W2122AE operation manuals. Printed versions sold separately.
∗2: The MD1230A-01/02/03 options and MX123001A-07/09/10 options are required only for remote control using GPIB commands. Note that these options may be installed together, although only one of them can be used at a time.
∗3: MD1230A-03 and MD1230A-06, MX123001A-06 and MX123001A-10 may be installed together, although only one of them can be used at a time.
∗4: Purchase MD1230A-04 and the operation manuals (W2107AE) on CD-ROM. Printed versions sold separately.
∗5: Some of these interface modules may not work in certain combinations depending on the modules and software versions. Please see the selection guide (Pages 8, 9)
∗6: MD1230A-13 and MD1230A-16 support only MU120118A.
∗7: MD1230A-15 and MD1230A-20 support only MU120112A.
∗8: Purchase MD1230A-20 and the operation manuals (W2134AE) on CD-ROM. Printed versions sold separately. MD1230A-20 supports only two MU120112A.
∗9: MU120102A/12A require GBIC modules (sold separately).
∗10: MU120103A/04A support POS mapping. MU120103B/04B support POS mapping and EOS mapping.
However, EOS mapping is an option.
∗11: MU120118A requires XENPAK modules (sold separately).
∗12: MX123001A Data Quality Analyzer Control Software and MD1230A-04 MD1230A Decode Module are required.
∗13: Software for external control of MD1230A-20 and MD1231A-20. It can be used even if there is no MX123001A.
∗14: MD1230A-04 MD1230A Decode Module is required.
∗15: MX123001A Data Quality Analyzer Control Software, MX123001A-01 Remote Control Software for MD1230A-04,
MD1230A-04 MD1230A Decode Module and MX123002A MD1230A Expert Analysis Module are required.
∗16: MD1230A-40 is provided free for the first year after purchase. It is required to receive software upgrade service starting with the second year after purchase.
∗17: Annual Maintenance Service for MD1230A-04 and MX123001A-01. You have to purchase this software maintenance simultaneously with MD1230A-04 and MX123001A-01. Moreover, when continuing this software maintenance, annual renewal is required each year.
∗18: Annual Maintenance Service for MX123002A and MX123003A. You have to purchase a this software maintenance simultaneously with and MX123002A and MX123003A. Moreover, when continuing this software maintenance, annual renewal is required each year.
∗19: The GBIC module is sold on a per-unit basis. MU120102A/12A has two GBIC interfaces slots.
∗20: The GBIC-T module is sold on a per-unit basis. MU120112A has two GBIC interfaces slots.
∗21: The XENPAK module is sold on a per-unit basis. MU120118A has two XENPAK interfaces slots.
∗22: Please check the optical power level.
∗23: For connecting MD1231A Unit Sync (SMB connector).

∗24: Soft case

∗25: B0336C Carrying case
Dimensions and mass: 600 (W) x 805 (H) x 365 (D) mm, 8 kg

∗26: The caster only for B0336C, 4 pcs/set
∗27: B0533 Carrying case
Dimensions and mass: 413 (W) x 605 (H) x 420 (D) mm, 13 kg
Two spaces which contain the box of standard accessories are provided.

• MD1231A

Model/Order No.	Name	
	Main Frame	
MD1231A	IP Network Analyzer	
	Standard Accessories	
J0134	Power cord, 2.5 m:	1 pc
F0101	Fuse, 2 A:	1 pc
B0489	Front cover:	1 pc
W2306AE	MD1230A Family operation manual CD-ROM*1:	1 pc
	Main Frame Options	
MD1231A-02	GPIB Control*2	
MD1231A-03	Ethernet Control*2,*3	
MD1231A-04	MD1231A Decode Module*4	
MD1231A-05	GPS Module	
MD1231A-06	Tcl Interface*3	
MD1231A-07	OSPF Protocol*5	
MD1231A-08	MPLS (LDP/CR-LDP) Protocol*5	
MD1231A-09	MPLS (RSVP) Protocol*5	
MD1231A-10	RFC2889 Benchmarking Test*5	
MD1231A-11	Packet BER Test*5	
MD1231A-12	IPv6 Expansion*5	
MD1231A-14	IGAP Protocol*5	
MD1231A-15	Auto Negotiation Analysis*6	
MD1231A-20	Application Traffic Monitor*6,*7	
MX123002A	MD1230A Expert Analysis Module*11	
	Plug-in Modules	
MU120101A	10M/100M Ethernet Module	
MU120102A	Gigabit Ethernet Module*8	
MU120111A	10/100M Ethernet Module	
MU120112A	Gigabit Ethernet Module*8	
MU120119A	OC-3/12 STM-1/4 Module (1310 nm)	
MU120120A	OC-3/STM-1 Module (1310 nm)	
	Plug-in Module Options	
MU120119A-01	Optical Power Meter	
MU120120A-01	Optical Power Meter	
	Softwares	
MX123001A	Data Quality Analyzer Control Software	
MX123001A-05	Data Quality Analyzer Control Software (5 licenses)	
MX123001A-08	Data Quality Analyzer Control Software (8 licenses)	
MX123001A-01	Remote Control Software for MD1230A-04*9	
MX123001A-15	Remote Control Software for MD1230A-04 (5 licenses)*9	
MX123001A-18	Remote Control Software for MD1230A-04 (8 licenses)*9	
MX123001A-20	Application Traffic Monitor Option*10	
MX123003A	Remote Control Software for MX123002A*12	
MX123003A-05	Remote Control Software for MX123002A (5 licenses)*12	
MX123003A-08	Remote Control Software for MX123002A (8 licenses)*12	
	Software Options	
MX123001A-06	Tcl Interface*3	
MX123001A-07	RS-232C Control*2	
MX123001A-09	GPIB Control*2	
MX123001A-10	Ethernet Control*2,*3	
	Software Upgrade Service	
MD1231A-40	Annual Software Upgrade Service for MD1231A*13	
MD1231A-41	Annual Software Maintenance for MD1231A-04*14	
MD1231A-42	Annual Software Maintenance for MX123002A*15	
	Maintenance Service	
MD1231A-90	Extended Three Year Warranty Service	
MU120101A-90	Extended Three Year Warranty Service	
MU120102A-90	Extended Three Year Warranty Service	
MU120111A-90	Extended Three Year Warranty Service	
MU120112A-90	Extended Three Year Warranty Service	
MU120119A-90	Extended Three Year Warranty Service	
MU120120A-90	Extended Three Year Warranty Service	

Model/Order No.	Name
	Optional Accessories
G0105A	GBIC SX 850 nm*16
G0106A	GBIC LX 1310 nm*16
G0107A	GBIC LH 1310 nm*16
G0108A	GBIC ZX 1550 nm*16
G0124A	GBIC T (1000BASE-T)*17
J1049A	Fixed Optical Attenuator (SC, 5 dB)*18
J1049B	Fixed Optical Attenuator (SC, 10 dB)*18
J1049C	Fixed Optical Attenuator (SC, 15 dB)*18
J0660B	Optical fiber cord (SM, SC-SC connector both ends), 2 m
J0773B	Optical fiber cord (GI, SC-SC connector both ends), 2 m
J1119B	Optical fiber cable (Duplex, MM), 2 m
J0775D	Coaxial cord (BNC-P620 · 3C-2WS · BNC-P620, 75 Ω), 2 m
J1165A	Coaxial cord (27CP-P-1.5-BNC-P-1.5C-CR10)*19
J1166A	Coaxial cord (27CP-P-1.5)*20
J0845A	Balanced cable (BANTAM 3P/BANTAM 3P), 6 ft
J0162B	Balanced cable (Siemens 3p-Siemens 3p), 2 m
J0008	GPIB cable, 2 m
J1109B	LAN cable (Cross), 5 m
J1110B	LAN cable (Straight), 5 m
Z0321A	Keyboard (PS/2)
Z0541A	USB mouse
B0510	Soft case*21
B0501B	Blank panel
W2096AE	MD1231A Data Quality Analyzer operation manual
W1928AE	MX123001A Data Quality Analyzer Control Software operation manual
W1929AE	MD1230A-01/02/03 Remote Control operation manual
W2107AE	MD1230A-04 MD1230A Decode Module, MX123001A-01 Remote Control Software for MD1230A-04 operation manual
W2122AE	MD1230A-06 Tcl Interface operation manual
W2134AE	MD1230A-20/MD1231A-20/MX123001A-20 Application Traffic Monitor operation manual
W2108AE	MX123002A MD1230A Expert Analysis Module, MX123003A Remote Control Software for MX123002A operation manual
W1931AE	MU120101A/11A 10M/100M Ethernet Module, MU120102A/12A Gigabit Ethernet Module, MU120118A 10 Gigabit Ethernet Module operation manual
W2121AE	MU120119A OC-3/12 STM-1/4 Module (1310 nm), MU120120A OC-3/STM-1 Module (1310 nm) operation manual

∗1: Includes W2096AE, W1928AE, W1929AE and W2122AE operation manuals. Printed versions sold separately.
∗2: The MD1231A-02/03 options and MX123001A-07/09/10 options are required only for remote control using GPIB commands. Note that these options may be installed together, although only one of them can be used at a time.
∗3: MD1231A-03 and MD1231A-06, MX123001A-06 and MX123001A-10 may be installed together, although only one of them can be used at a time.
∗4: Purchase MD1231A-04 and the operation manuals (W2107AE) on CD-ROM. Printed versions sold separately.
∗5: Some of these interface modules may not work in certain combinations depending on the modules and software versions. Please see the selection guide (Pages 8, 9).
∗6: MD1231A-15 and MD1231A-20 support only MU120112A.
∗7: Purchase MD1231A-20 and the operation manuals (W2134AE) on CD-ROM. Printed versions sold separately. MD1231A-20 supports only two sets MU120112A.
∗8: MU120102A/12A require GBIC modules (sold separately).
∗9: MX123001A Data Quality Analyzer Control Software and MD1231A-04 MD1231A Decode Module are required.
∗10: Software for external control of MD1230A-20 and MD1231A-20. It can be used even if there is no MX123001A.
∗11: MD1231A-04 MD1231A Decode Module is required.
∗12: MX123001A Data Quality Analyzer Control Software, MX123001A-01 Remote Control Software for MD1230A-04, MD1231A-04 MD1231A Decode Module and MX123002A MD1230A Expert Analysis Module are required.

∗13: MD1231A-40 is provided free for the first year after purchase. It is required to receive software upgrade service starting with the second year after purchase.
∗14: Annual Maintenance Service for MD1231A-04 and MX123001A-01. You have to purchase this software maintenance simultaneously with MD1230A-04 and MX123001A-01. Moreover, when continuing this software maintenance, annual renewal is required each year.
∗15: Annual Maintenance Service for MX123002A and MX123003A. You have to purchase this software maintenance simultaneously with MX123002A and MX123003A. Moreover, when continuing this software maintenance, annual renewal is required each year.
∗16: The GBIC module is sold on a per-unit basis. MU120102A/12A has two GBIC interfaces slots.
∗17: The GBIC-T module is sold on a per-unit basis. MU120112A has two GBIC interfaces slots.
∗18: Please check the optical power level.
∗19: For connecting MD1230A main frames or MT7407A.
∗20: For connecting MD1231A main frames.

∗21: B0510 Soft case

• MT7407A

Model/Order No.	Name	
	Main Frame	
MT7407A	Multislot Chassis	
	Standard Accessories for MT7407A	
J1211	Power Cord, 3 m:	1 pc
F0108	Fuse, 20 A:	1 pc
J1109B	LAN cable (cross), 5 m:	1 pc
W2306AE	MD1230A Family operation manual CD-ROM∗1:	1 pc
	Option for MT7407A	
MT7407A-01	Interface Board for IP Tester∗2	
	Standard Accessories for MT7407A-01	
J0775I	Coaxial cable, 0.1 m:	1 pc
	Plug-in Modules for MT7407A	
MU740701A	IP Tester Control Module∗2	
MU740702A	Power Unit for IP Tester∗2, ∗3	
	Standard Accessories for MU740701A	
J1221B	RS-232C cross cable:	1 pc
	Control Module Options	
MU740701A-04	MU740701A Decode Module∗4	
MU740701A-05	GPS Module∗5	
MU740701A-07	OSPF Protocol∗6	
MU740701A-08	MPLS (LDP/CR-LDP) Protocol∗6	
MU740701A-09	MPLS (RSVP) Protocol∗6	
MU740701A-10	RFC2889 Benchmarking Test∗6	
MU740701A-11	Packet BER Test∗6	
MU740701A-12	IPv6 Expansion∗6	
MU740701A-13	XENPAK Test∗7	
MU740701A-14	IGAP Protocol∗6	
MU740701A-15	Auto Negotiation Analysis∗8	
MU740701A-16	Link Fault Signaling∗7	
MU740701A-30	MU740701A Expert Analysis Module∗9	
	Plug-in Modules	
MU120101A	10M/100M Ethernet Module	
MU120102A	Gigabit Ethernet Module∗10	
MU120103A	2.5G (1.31) Module∗11	
MU120103B	2.5G (1.31) Module∗11	
MU120104A	2.5G (1.55) Module∗11	
MU120104B	2.5G (1.55) Module∗11	
MU120105A	10G (1.31) Module	
MU120106A	10G (1.55) Module	
MU120111A	10/100M Ethernet Module	
MU120112A	Gigabit Ethernet Module∗10	

Model/Order No.	Name
MU120118A	10 Gigabit Ethernet Module∗12
MU120119A	OC-3/12 STM-1/4 Module (1310 nm)
MU120120A	OC-3/STM-1 Module (1310 nm)
	Plug-in Module Options
MU120103B-01	EOS Mapping
MU120103B-02	Virtual Concatenation
MU120104B-01	EOS Mapping
MU120104B-02	Virtual Concatenation
MU120119A-01	Optical Power Meter
MU120120A-01	Optical Power Meter
	Softwares
MX123001A	Data Quality Analyzer Control Software
MX123001A-05	Data Quality Analyzer Control Software (5 licenses)
MX123001A-08	Data Quality Analyzer Control Software (8 licenses)
MX123001A-01	Remote Control Software for MD1230A-04∗13
MX123001A-15	Remote Control Software for MD1230A-04 (5 licenses)∗13
MX123001A-18	Remote Control Software for MD1230A-04 (8 licenses)∗13
MX123003A	Remote Control Software for MX123002A∗14
MX123003A-05	Remote Control Software for MX123002A (5 licenses)∗14
MX123003A-08	Remote Control Software for MX123002A (8 licenses)∗14
	Software Options
MX123001A-06	Tcl Interface∗15
MX123001A-07	RS-232C Control∗16
MX123001A-09	GPIB Control∗16
MX123001A-10	Ethernet Control∗15,∗16
	Software Upgrade Service
MT7407A-40	Annual Software Upgrade Service for MT7407A∗17
MU740701A-41	Annual Software Maintenance for MU740701A-04∗18
MU740701A-42	Annual Software Maintenance for MU740701A-30∗19
	Maintenance Service
MT7407A-90	Extended Three Year Warranty Service∗20
MU740701A-90	Extended Three Year Warranty Service∗20
MU740702A-90	Extended Three Year Warranty Service∗20
MU120101A-90	Extended Three Year Warranty Service
MU120102A-90	Extended Three Year Warranty Service
MU120103A-90	Extended Three Year Warranty Service
MU120103B-90	Extended Three Year Warranty Service
MU120104A-90	Extended Three Year Warranty Service
MU120104B-90	Extended Three Year Warranty Service
MU120105A-90	Extended Three Year Warranty Service
MU120106A-90	Extended Three Year Warranty Service
MU120111A-90	Extended Three Year Warranty Service
MU120112A-90	Extended Three Year Warranty Service

Model/Order No.	Name
MU120118A-90	Extended Three Year Warranty Service
MU120119A-90	Extended Three Year Warranty Service
MU120120A-90	Extended Three Year Warranty Service
	Optional Accessories
G0105A	GBIC SX 850 nm*21
G0106A	GBIC LX 1310 nm*21
G0107A	GBIC LH 1310 nm*21
G0108A	GBIC ZX 1550 nm*21
G0124A	GBIC T (1000BASE-T)*22
G0126A	XENPAK (10GBASE-LR)*23
J1049A	Fixed Optical Attenuator (SC, 5 dB)*24
J1049B	Fixed Optical Attenuator (SC, 10 dB)*24
J1049C	Fixed Optical Attenuator (SC, 15 dB)*24
MZ1221A	XAUI Extender
MZ1222A	XENPAK Interface
J1163A	XAUI cable, 0.5 m
J1164A	MDIO cable, 0.5 m
B0532	Rack flange
B0531	Blank panel*25
B0501B	Blank panel
J0660B	Optical fiber cord (SM, SC-SC connector both ends), 2 m
J0773B	Optical fiber cord (GI, SC-SC connector both ends), 2 m
J1119B	Optical fiber cable (duplex, MM), 2 m
J0775D	Coaxial cord (BNC-P620 · 3C-2WS · BNC-P620, 75Ω), 2 m
J1165A	Coaxial cord (27CP-P-1.5-BNC-P-1.5C-CR10)*26
J0845A	Balanced cable (BANTAM 3P/BANTAM 3P), 6 ft
J0162B	Balanced cable (Siemens 3p-Siemens 3p), 2 m
J0008	GPIB cable
J1109B	LAN cable (Cross), 5 m
J1110B	LAN cable (Straight), 5 m
W2238AE	MT7407A operation manual
W1928AE	MX123001A Data Quality Analyzer Control Software operation manual
W1929AE	MD1230A-01/02/03 Remote Control operation manual
W2107AE	MD1230A-04 MD1230A Decode Module MX123001A-01 Remote Control Software for MD1230A-04 operation manual
W2122AE	MD1230A-06 Tcl Interface operation manual
W1931AE	MU120101A/11A 10M/100M Ethernet Module MU120102A/12A Gigabit Ethernet Module MU120118A 10 Gigabit Ethernet Module operation manual
W1932AE	MU120103A/B 2.5G (1.31) Module MU120104A/B 2.5G (1.55) Module MU120105A 10G (1.31) Module MU120106A 10G (1.55) Module operation manual
W2121AE	MU120119A OC-3/12 STM-1/4 Module (1310 nm) MU120120A OC-3/STM-1 Module (1310 nm) operation manual

∗1: Includes W2238AE, W1928AE, W1929AE and W2122AE operation manuals. Printed versions sold separately.
∗2: Maximum two sets for one MT7407A. When two MU740701A modules are used, MT7407A requires two MU740702A units. Each MU740701A supports 7 slots.
∗3: One MU740702A supports one MU740701A. When adding MU740702A, chassis hardware modification is required.
∗4: The Decode Module function doesn't operate with only MU740701A-04. MX123001A-01 (sold separately) is required.
∗5: When using GPS module with MT7407A, it is required MT7407A-01. However two MU740701A-05 can be inserted to MT7407A, it is enough only one MU740701A-05 for one MT7407A.
∗6: Some of these interface modules may not work in certain combinations depending on the modules and software versions. Please see the selection guide (Pages 8, 9).
∗7: MU740701A-13 and MU740701A-16 supports only MU120118A.
∗8: MU740701A-15 supports only MU120112A.
∗9: The Expert Analysis module function doesn't operate with only MU740701A-30. MU740701A-04 MU740701A Decode Module, MX123001A Data Quality Analyzer Control Software, and MX123001A-01 Remote Control Software for MD1230A-04 are required.
∗10: MU120102A/12A require GBIC modules (sold separately).
∗11: MU120103A/04A support POS mapping. MU120103B/04B support POS mapping and EOS mapping. However, EOS mapping is an option.
∗12: MU120118A requires XENPAK modules (sold separately).
∗13: MX123001A Data Quality Analyzer Control Software and MU740701A-04 MU740701A Decode Module are required.
∗14: MX123001A Data Quality Analyzer Control Software, MX123001A-01 Remote Control Software for MD1230A-04, MU740701A-04 MU740701A Decode Module and MU740701A-30 MU740701A Expert Analysis Module are required.
∗15: MX123001A-06 and MX123001A-10 may be installed together, although only one of them can be used at a time.
∗16: MX123001A-07/09/10 options are required only for remote control using GPIB commands. Note that these options may be installed together, although only one of them can be used at a time.
∗17: MT7407A-40 is provided free for the first year after purchase. It is required to receive software upgrade service starting with the second year after purchase. One license supports two MU740701A.
∗18: Annual Maintenance Service for MU740701A-04 and MX123001A-01. You have to purchase software maintenance simultaneously with MU740701A-04 and MX123001A-01. Moreover, when continuing this software maintenance, annual renewal is required each year.
∗19: Annual Maintenance Service for MU740701A-30 and MX123003A. You have to purchase this software maintenance simultaneously with MU740701A-30 and MX123003A. Moreover, when continuing this software maintenance, annual renewal is required each year.
∗20: Extended Three Year Warranty Service is divided into three order for main frame, CPU module and Power Unit. Please choose your need order among them.
∗21: The GBIC module is sold on a per-unit basis. MU120102A/12A has two GBIC interfaces slots.
∗22: The GBIC-T module is sold on a per-unit basis. MU120112A has two GBIC interfaces slots.
∗23: The XENPAK module is sold on a per-unit basis. MU120118A has two XENPAK interfaces slots.
∗24: Please check the optical power level.
∗25: For CPU module slot.
∗26: For connecting MD1231A Unit Sync (SMB connector).

■ Software Upgrade Service

The MD1230A Family permits service upgrades for compatible software. A CD-ROM containing the latest applications can be sent to the user when the MD1230A Family is upgraded if the software upgrade (maintenance) option is purchased. The user can then perform measurements using the latest applications.

The following software upgrades are supported .

Model	Name	Contents
MD1230A-40 MD1231A-40 MT7407A-40	Annual Software upgrade service	An option for ensuring that the MD1230A Family is always using the latest software. The first year is free. Support of MX123001A is also included. Separate annual purchase is required from the second year onward.
MD1230A-41 MD1231A-41 MU740701A-41	Annual Software maintenance	An option for ensuring that the MD1230A Family Decode Module option is always using the latest protocol translation information. Support of MX123001A-01 is also included. Separate annual purchase is required starting with the first year and cannot be started mid-year.
MD1230A-42 MD1231A-42 MU740701A-42	Annual Software maintenance	An option for ensuring that the MD1230A Family Expert Analysis Module software is always using the latest applications. Support of MX123003A is also included. Separate annual purchase is required starting with the first year, and cannot be started mid-year.

Anritsu

Specifications are subject to change without notice.

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030930

Catalog No. MD1230A-F-E-A-1-(1.00) Printed in Japan 2003-11 W