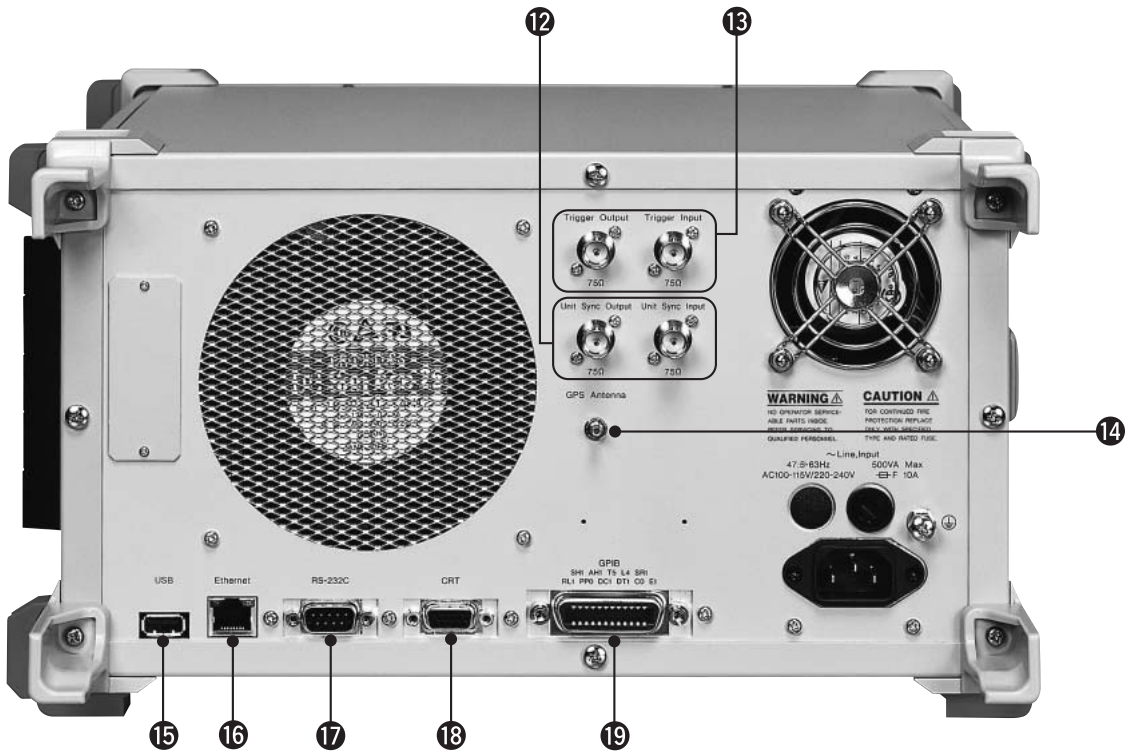# MD1230A Family

## MD1230A Data Quality Analyzer
## MD1231A IP Network Analyzer
## MT7407A Multislot Chassis

**Specifications**
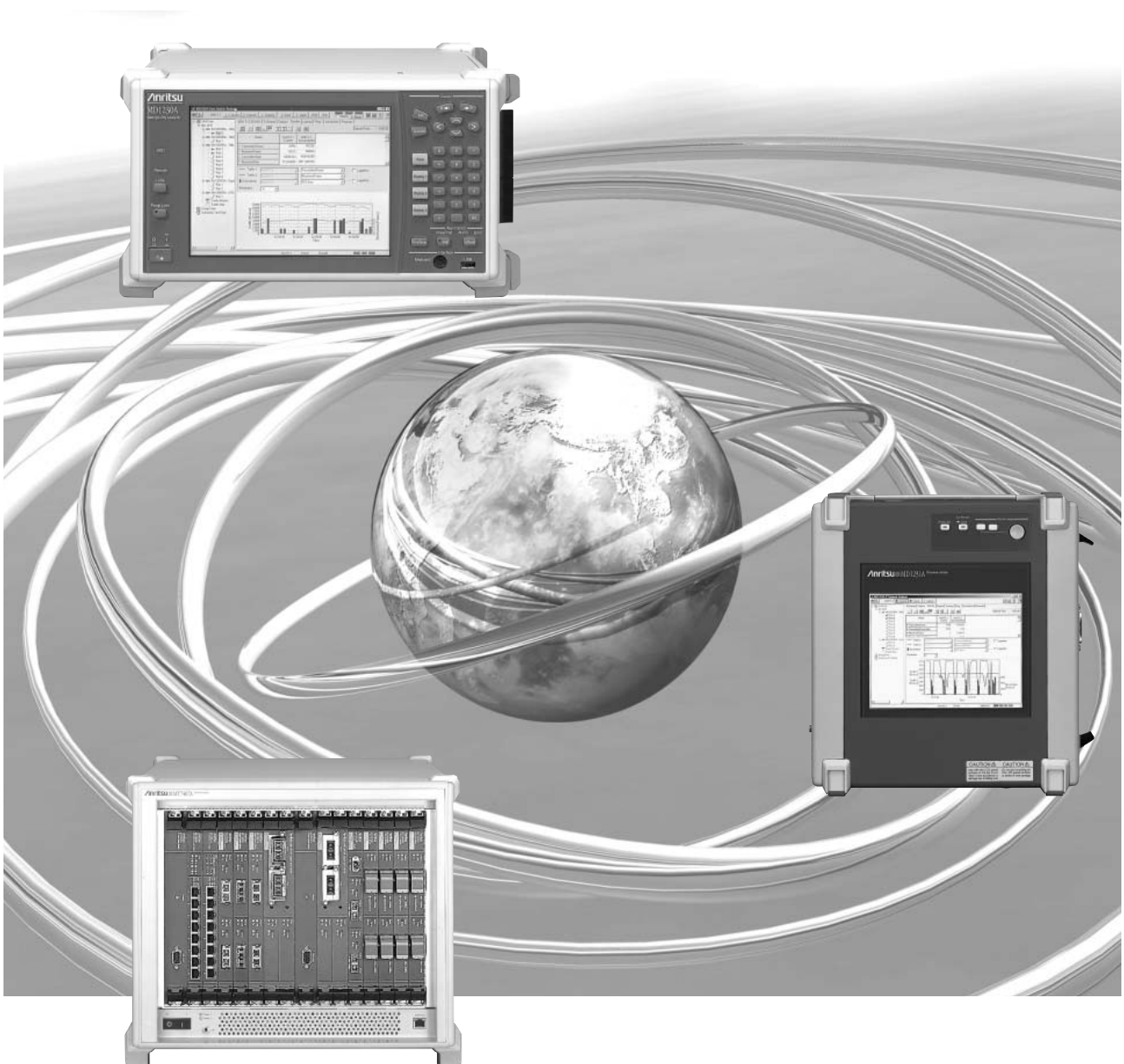
*A Total Communications Test Solution from Devices to Networks*

# MD1230A Data Quality Analyzer





**The Tolly Group Certifies MD1230A**

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

**Anritsu Eco Product**
Lightweight
Power saving
Small size

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.

⑪ **Front USB:** For connecting USB devices such as an USB mouse

⑫ **Unit Sync Input/Unit Sync Output:** Clock signal I/O for time synchronizing several MD1230A Family connected in a daisy chain

⑬ **Trigger Input, Trigger Output:** External trigger I/O

⑭ **GPS Antenna:** For connecting a GPS antenna

⑮ **Rear USB:** For connecting any Windows®98-compatible USB devices

⑯ **Ethernet:** Ethernet connector for control software, for linking multiple MD1230A Family, and for GPIB commands

⑰ **RS-232C:** RS-232C interface for GPIB Commands

⑱ **CRT:** VGA connector for external monitor

⑲ **GPIB:** GPIB bus interface when GPIB option installed.

⑳ **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
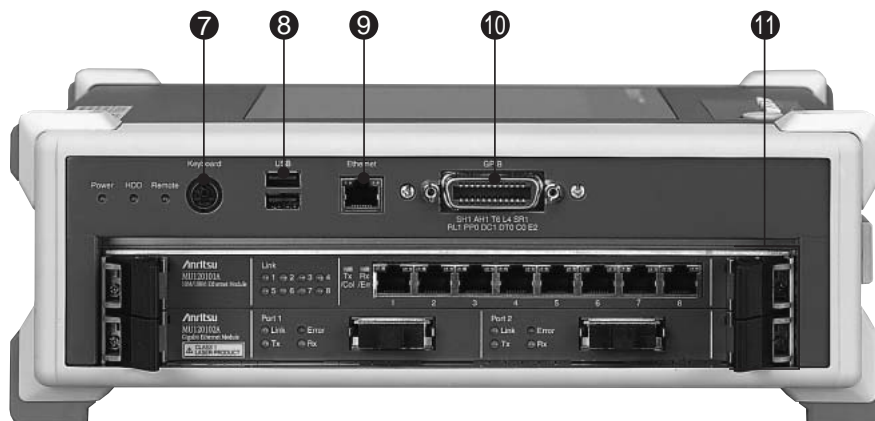
❶ **Display:** 8.4-inch TFT-LCD, SVGA (800 x 600)

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**
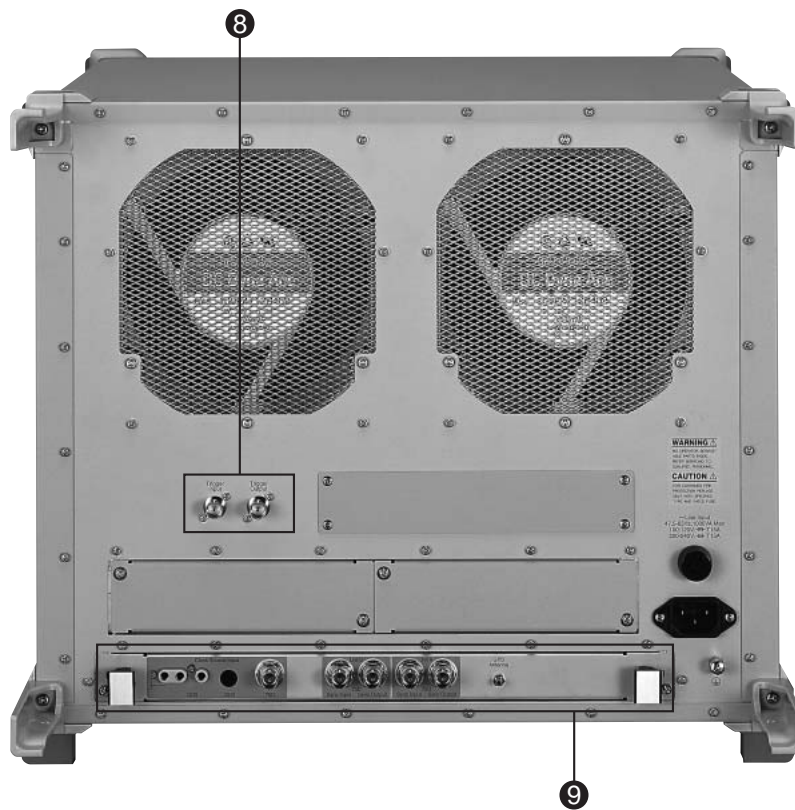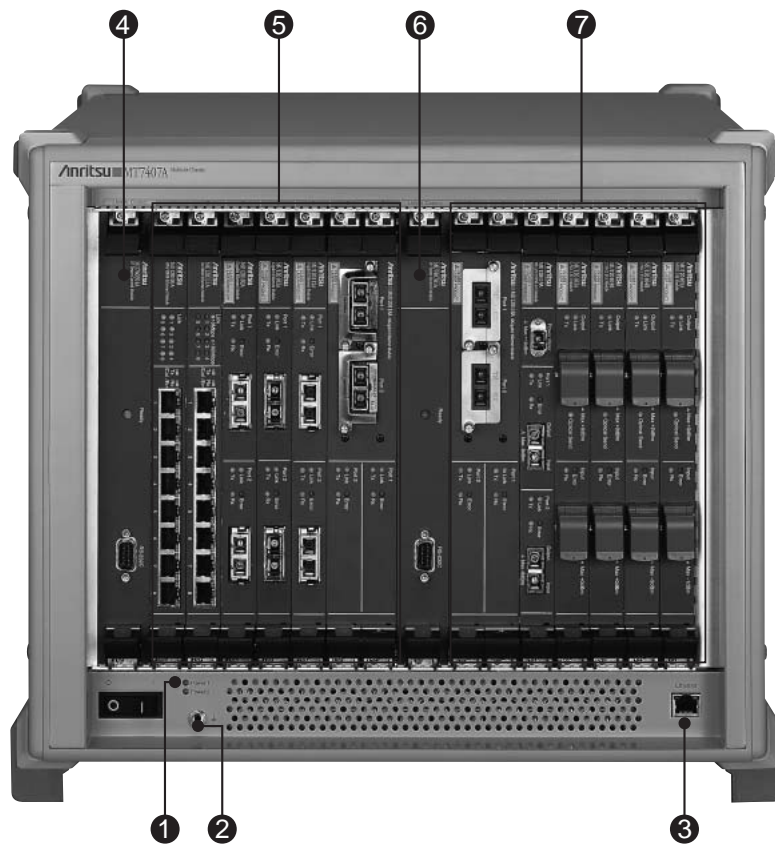
❶ **Power LED:** The light is switched on when the power supply is ON.

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.



Notice          Notice
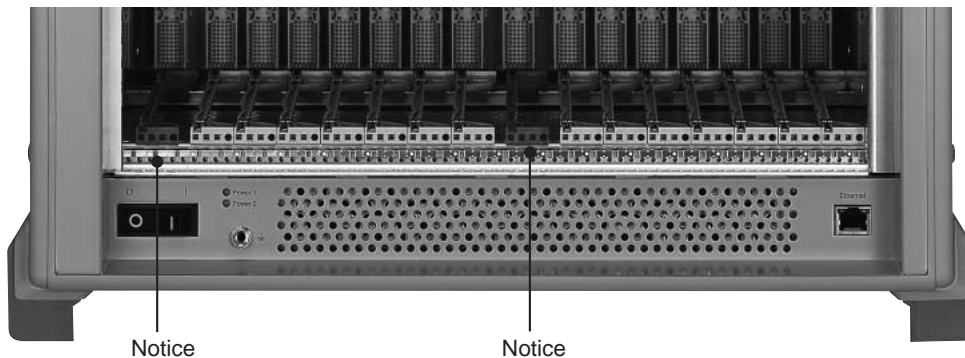

# MT7407A-01 Interface Board for IP Tester
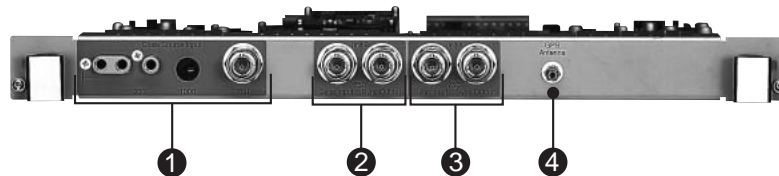


❶ **DCS Input:** The input for SONET/SDH synchronization data and clock.

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

| Module / Function | 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<br>Interface<br>  2M: ITU-T G.703 Table 10, HDB3<br>  1.5M: B8ZS, AMI ANSI T1.403<br>Level (64k): 0.63 to 1.1 Vo-p<br>Code (64k): AMI 8 kHz with violation<br>Connector<br>  BNC (75 Ω): 2 MHz, 2Mbit/s<br>  Siemens (120 Ω balanced): 2 MHz, 2 Mbit/s, 64 kHz + 8 kHz<br>  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 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<br>Number of ports: 8<br>Connector: RJ-45<br>Link speed: 10 Mbit/s, 100 Mbit/s<br>Duplex mode: Full, Half<br>Auto negotiation: On/Off<br>Flow control: On/Off | 1000BASE-SX/LX/LH/ZX[*1]<br>Number of ports: 2<br>Connector: GBIC interface (SC connector)<br>Link speed: 1 Gbit/s<br>Duplex mode: Full<br>Auto negotiation: On/Off<br>Flow control: On/Off | 10GBASE-LR[*2]<br>Number of ports: 2<br>Connector: XENPAK interface<br>(SC connector)<br>Link speed: 10 Gbit/s<br>Duplex mode: Full<br>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)<br>VLAN tag[*3]: Fixed, Increment, Decrement, Random<br>MPLS label[*3]: Up to 10 MPLS labels can be appended. Fixed setting<br>Protocol editing: IPv4, IPv6, TCP/IPv4, UDP/IPv4, IGMP/IPv4, ICMP/IPv4, RIP/UDP/IPv4, DHCP/UDP/IPv4, IPX, ARP, MAC control, IS-IS<br>Data field<br>  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<br>  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) | | |

| | | MU120101A | MU120102A | MU120118A |
|---|---|---|---|---|
| Stream Gap Setting | Inter Frame Gap | 10BASE-T: Resolution of 800 ns<br>  8 µs to 1700 s, Settable as fixed, Random<br>100BASE-TX: Resolution of 80 ns<br>  800 ns to 170 s, Settable as fixed, Random | Resolution of 8 ns<br>64 ns to 120 s, Settable as fixed, Random | Resolution of 0.8 ns<br>7.2 ns to 120 s, Settable as fixed, Random |
| | Inter Burst Gap | 10BASE-T: Resolution of 800 ns<br>  8 µs to 1700 s, Settable as fixed<br>100BASE-TX: Resolution of 80 ns<br>  800 ns to 170 s, Settable as fixed | Resolution of 8 ns<br>64 ns to 120 s, Settable as fixed | Resolution of 0.8 ns<br>7.2 ns to 120 s, Settable as fixed |
| | Inter Stream Gap | 10BASE-T: Resolution of 800 ns<br>  8 µs to 1700 s, Settable as fixed<br>100BASE-TX: Resolution 80 ns<br>  800 ns to 170 s, Settable as fixed | Resolution of 8 ns<br>64 ns to 120 s, Settable as fixed | Resolution of 0.8 ns<br>64 ns to 120 s, Settable as fixed |
| Number of Streams | | 256 Streams/Port | | |

| | | MU120101A | MU120102A | MU120118A |
|---|---|---|---|---|
| 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:<br> All 0, All 1, User-defined 16-bit pattern, PRBS23, PRBS31, CJPAT, CRPAT<br>Error insertion: Bit error<br>Error insertion timing:<br> Single error, Single rate (1E-3, 4, 5, 6, 7, 8, 9),<br> 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:<br> 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:<br> 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<br>Number of ports: 8<br>Connector: RJ-45<br>Link speed: 10 Mbit/s, 100 Mbit/s<br>Duplex mode: Full, Half<br>Auto negotiation: On/Off<br>Flow control: On/Off | 1000BASE-SX/LX/LH/ZX[*1], Electrical: 1000BASE-T[*1]<br>Number of ports: 2<br>Connector: GBIC interface (GBIC: SC, RJ-45)<br>Link speed: 1 Gbit/s<br>Duplex mode: Full<br>Auto negotiation: On/Off<br>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)<br>VLAN tag[*2]: Fixed, Increment, Decrement, Random<br>MPLS label[*2]: Up to 10 MPLS labels can be appended (fixed setting)<br>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<br>Option 12[*3, *4]:<br>  TCP/IPv6, UDP/IPv6, ICMPv6/IPv6, IPv6 over IPv4, ICMPv6/IPv6 over IPv4, TCP/IPv6 over IPv4, UDP/IPv6 over IPv4<br>Data field<br>  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<br>  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

| | MU120111A | MU120112A |
|---|---|---|
| Inter Frame Gap | 10BASE-T: Resolution of 800 ns<br>  8 µs to 1700 s, Settable as fixed, Random<br>100BASE-TX: Resolution of 80 ns<br>  800 ns to 170 s, Settable as fixed, Random | Resolution of 8 ns<br>64 ns to 120 s, Settable as fixed, Random |
| Inter Burst Gap | 10BASE-T: Resolution of 800 ns<br>  8 µs to 1700 s, Settable as fixed<br>100BASE-T: Resolution of 80 ns<br>  800 ns to 170 s, Settable as fixed | Resolution of 8 ns<br>64 ns to 120 s, Settable as fixed |
| Inter Stream Gap | 10BASE-T: Resolution of 800 ns<br>8 µs to 1700 s, Settable as fixed<br>100BASE-TX: Resolution 80 ns<br>800 ns to 170 s, Settable as fixed | Resolution of 8 ns<br>64 ns to 120 s, Settable as fixed |

| Number of Streams | 256 Streams/Port | |
|---|---|---|

### Error Insertion

| | MU120111A | MU120112A |
|---|---|---|
| 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

| | MU120111A | MU120112A |
|---|---|---|
| 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) | |

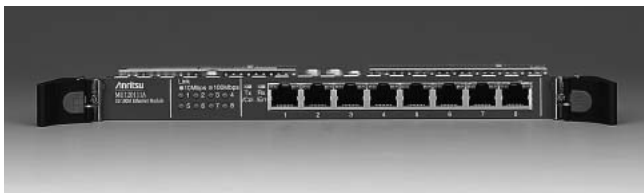| Model | MU120111A | MU120112A |
|---|---|---|
| Latency | Maximum, Minimum, Average | |
| Frame Arrival Time Variation Measurement | Time resolution: 1 µs, 10 µs, 100 µs, 1 ms, 10 ms, 100 ms, 1 s | |
| QoS Counter Setting | Using QoS described below, 8-level priority frame count: IEEE802.1D VLAN tag user priority field, 3 LSB of RFC2474 DSCP field | |
| Unframe BER Test*5 | Test pattern:<br>  All 0, All 1, User-defined 16-bit pattern, PRBS23, PRBS31<br>Error insertion: Bit unit<br>Error insertion timing:<br>  Single error, Single rate (1E-3,4, 5, 6, 7, 8, 9),<br>  Programmable rate (9.9 E-3 to 1.0 E-10) | Test pattern: All 0, All 1, User-defined 16-bit pattern,<br>  PRBS23, PRBS31, CJPAT, CRPAT<br>Error insertion: Bit unit<br>Error insertion timing:<br>  Single error, Single rate (1E-3, 4, 5, 6, 7, 8, 9),<br>  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:<br>  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:<br>  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<br>Wavelength: 1260 to 1360 nm<br>Number of ports: 1<br>Connector: SC<br>Bit rate: 2488.320 Mbit/s (NRZ)<br>Output level: −5 to 0 dBm<br>Input sensitivity: −18 to 0 dBm | OC-48/STM-16<br>Wavelength: 1500 to 1580 nm<br>Number of ports: 1<br>Connector: SC<br>Bit rate: 2488.320 Mbit/s (NRZ)<br>Output level: −2 to +3 dBm<br>Input sensitivity: −28 to −9 dBm | OC-192/STM-64<br>Wavelength: 1290 to 1330 nm<br>Number of ports: 1<br>Connector: SC<br>Bit rate: 9953.280 Mbit/s (NRZ)<br>Output level: −4 to +0 dBm<br>Input sensitivity: −12 to 0 dBm | OC-192/STM-64<br>Wavelength: 1530 to 1565 nm<br>Number of ports: 1<br>Connector: SC<br>Bit rate: 9953.280 Mbit/s (NRZ)<br>Output level: −1 to +2 dBm<br>Input sensitivity: −14 to −3 dBm |
| LEDs | Link, Tx, Rx, Error, Optical send | | | |
| Clocks | Internal (±50 ppm variable), Receive signal,<br>Lock (64 kHz + 8 kHz, 1.5 MHz, 2 MHz, 1.5 Mbit/s, 2 Mbit/s) | | Internal (±100 ppm variable), Receive signal,<br>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<br>Scramble: On/Off<br>Alarm addition: LOS, LOF, MS-AIS, MS-RDI, MS-TIM, AU-AIS, AU-LOP, HP-SLM, HP-TIM, HP-RDI, HP-UNEQ<br>Alarm addition timing: Single, Single burst frame (1 to 64000), Alternative [Alarm frame (0 to 8000), Normal frame (1 to 8000)], All<br>Error insertion: FAS, Bit all, B1, B2, B3, MS-REI, HP-REI, HP-IEC<br>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),<br>                            Programmed rate [AE-B ∗A: 1.0 to 9.9 (step 0.1), B: 3 to 10], All<br>APS (K1/K2) sequence generation: 2 to 64 words, Repeat (8000 frames) | | | |
| Mapping | OC-48c, STM-16c — VC4∗16c ← MAPOS Version1, MAPOS 16, PPP, CiscoHDLC, Bulk; Unframed | | OC-192c, STM-48c — VC4∗64c ← MAPOS Version1, MAPOS 16, PPP, CiscoHDLC, Bulk; Unframed | |
| Frame Settings | FCS: CRC32<br>MPLS label: Up to 10 MPLS labels can be appended (fixed setting)<br>Protocol editing: PPP, IPv4, IPv6, TCP/IP, UDP/IP, IGMP/IP, ICMP/IP, RIP/UDP/IP, DHCP, IS-IS<br>Data field<br>  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,<br>                        Decrement, Random, Single PRBS9<br>    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<br>3.3 ns to 120 s, Settable as fixed, Random | | Resolution of 0.8 ns<br>0.8 ns to 120 s, Settable as fixed, Random | |
| Stream Gap Setting — Inter Burst Gap | Resolution of 3.3 ns<br>3.3 ns to 120 s, Settable as fixed | | Resolution of 0.8 ns<br>13.4 ns to 120 s, Settable as fixed | |
| Stream Gap Setting — Inter Stream Gap | Resolution of 3.3 ns<br>427.4 ns to 120 s, Settable as fixed | | Resolution of 0.8 ns<br>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 | | | |
| Error Insertion — Packet Error | IPv4 header checksum error, TCP/UDP checksum error | | | |
| Error Insertion — 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<br>Error insertion: Bit unit<br>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:<br>  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:<br>  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.
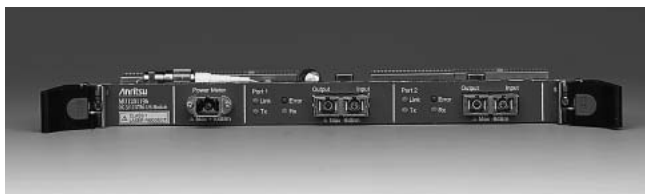


MU120103A



MU120104A



MU120105A



MU120106A

| Model | MU120119A | MU120120A |
|---|---|---|
| Ports | OC-3/12 STM-1/4<br>Wavelength: 1300 nm band<br>Number of ports: 2<br>Connector: SC<br>Bit rate: 155.52/622.08 Mbit/s (NRZ)<br>Output level: −15 to −8 dBm<br>Input sensitivity: −28 to −8 dBm | OC-3 STM-1<br>Wavelength: 1300 nm band<br>Number of ports: 2<br>Connector: SC<br>Bit rate: 155.52 Mbit/s (NRZ)<br>Output level: −15 to −8 dBm<br>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<br>Scramble: On/Off<br>Alarm addition: LOS, LOF, MS-AIS, MS-RDI, MS-TIM, AU-AIS, AU-LOP, HP-SLM, HP-TIM, HP-RDI, HP-UNEQ<br>Alarm addition timing: Single, Single burst frame (1 to 64000), Alternative [Alarm frame (0 to 8000), Normal frame (1 to 8000)], All<br>Error insertion: FAS, Bit all, B1, B2, B3, MS-REI, HP-REI, HP-IEC<br>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),<br>　　　　　　　　　　Programmed rate [AE-B *A: 1.0 to 9.9 (step 0.1), B: 3 to 10], All<br>APS (K1/K2) Sequence generation: 2 to 64 words, Repeat (8000 frames) | |
| Mapping | OC-12c, STM-4c → VC4*4c; OC-3c, STM-1c → VC-4; Unframed → MAPOS Version1, MAPOS 16, PPP, CiscoHDLC, Bulk | OC-3c, STM-1c → VC-4; Unframed → MAPOS Version1, MAPOS 16, PPP, CiscoHDLC, Bulk |
| Frame Settings | FCS: CRC32<br>MPLS label: Up to 10 MPLS labels can be appended (fixed setting)<br>Protocol editing: PPP, IPv4, IPv6, TCP/IP, UDP/IP, IGMP/IP, ICMP/IP, RIP/UDP/IP, DHCP, IS-IS<br>Data field<br>　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),<br>　　　　　　　　　　Increment, Decrement, Random, Single PRBS9<br>　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<br>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<br>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<br>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<br>Error insertion: Bit unit<br>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:<br>  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:<br>  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<br>  Maximum input level: +10 dBm<br>  Optical power measurement range: –40 to +5 dBm<br>  Optical power measurement accuracy: ±0.5 dBm | |

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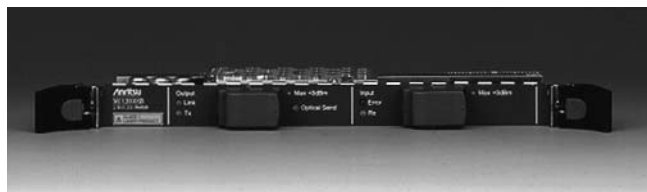*2: Main frame option is required.
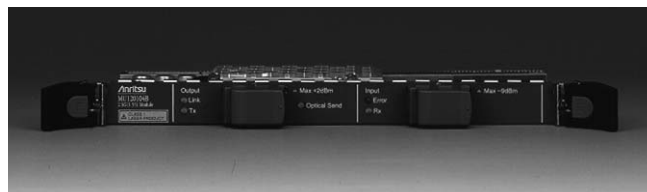


MU120119A



MU120120A

**EOS Module**

| Model | MU120103B | MU120104B |
|---|---|---|
| Ports | OC-48/STM-16<br>Wavelength: 1260 to 1360 nm<br>Number of ports: 1<br>Connector: SC<br>Bit rate: 2488.320 Mbit/s (NRZ)<br>Output level: –5 to 0 dBm<br>Input sensitivity: –18 to 0 dBm | OC-48/STM-16<br>Wavelength: 1500 to 1580 nm<br>Number of ports: 1<br>Connector: SC<br>Bit rate: 2488.320 Mbit/s (NRZ)<br>Output level: –2 to +3 dBm<br>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<br>Scramble: On/Off<br>Alarm addition: LOS, LOF, MS-AIS, MS-RDI, MS-TIM, AU-AIS, AU-LOP, HP-SLM, HP-TIM, HP-RDI, HP-UNEQ<br>Alarm addition timing: Single, Single burst frame (1 to 64000), Alternative [Alarm frame (0 to 8000), Normal frame (1 to 8000)], All<br>Error insertion: FAS, Bit all, B1, B2, B3, MS-REI, HP-REI, HP-IEC<br>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),<br>      Programmed rate [AE-B *A: 1.0 to 9.9 (step 0.1), B: 3 to 10], All<br>APS (K1/K2) sequence generation: 2 to 64 words, Repeat (8000 frames) | |
| Mapping | OC-48c / STM-16c → VC4*16c / (a) → MAPOS Version1, MAPOS 16, PPP, CiscoHDLC, Bulk, (b)<br>(a): VC4*Xc [*1,*2], VC4 [*1,*2], VC3 [*1,*2], VC4*Xv [*2], VC3*Xv [*2]<br>(b): F-GFP [*1], LEX [*1], LAPS [*1] | |
| Frame Settings | FCS: CRC32, CRC16<br>MAC address: Fixed, Increment, Decrement, Random (changeable portions specified in 4 bits units)<br>VLAN tag[*3]: Fixed, Increment, Decrement, Random<br>MPLS label[*3]: Up to 10 MPLS labels can be appended. Fixed setting<br>Protocol editing: Ethernet, IPv4, IPv6, TCP/IPv4, UDP/IPv4, IGMP/IPv4, ICMP/IPv4, RIP/UDP/IPv4, DHCP/UDP/IPv4, IPX, ARP,<br>      MAC control, IS-IS, LEX Control Packet[*4], GFP, PPP<br>Data field<br>  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),<br>      Increment, Decrement, Random, Single PRBS9<br>  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]<br>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<br>(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<br>(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 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) | 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<br>Error insertion: Bit unit<br>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:<br> 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:<br> 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<br> Mapping: T-GFP, LAPS, LEX<br> Concatenation: [SDH] VC-4-Xc (X = 16, 8, 4, 3, 2), VC-4, VC-3<br> [SONET] STS-Xc (X = 48, 24, 12, 9, 6, 3), STS-1<br>MU120103B-02/MU120104B-02<br> 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)<br> [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)<br>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<br>Interface<br>  2M: ITU-T G.703 Table 10, HDB3<br>  1.5M: B8ZS, AMI ANSI T1.403<br>Level (64k): 0.63 to 1.1 Vo-p<br>Code (64k): AMI 8 kHz violation<br>Connector<br>  BNC (75 Ω): 2 MHz, 2 Mbit/s<br>  Siemens (120 Ω balanced): 2 MHz, 2 Mbit/s, 64 kHz + 8 kHz<br>  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, 75 Ω), 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<br>MD1231A-40<br>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<br>MD1231A-41<br>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<br>MD1231A-42<br>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.