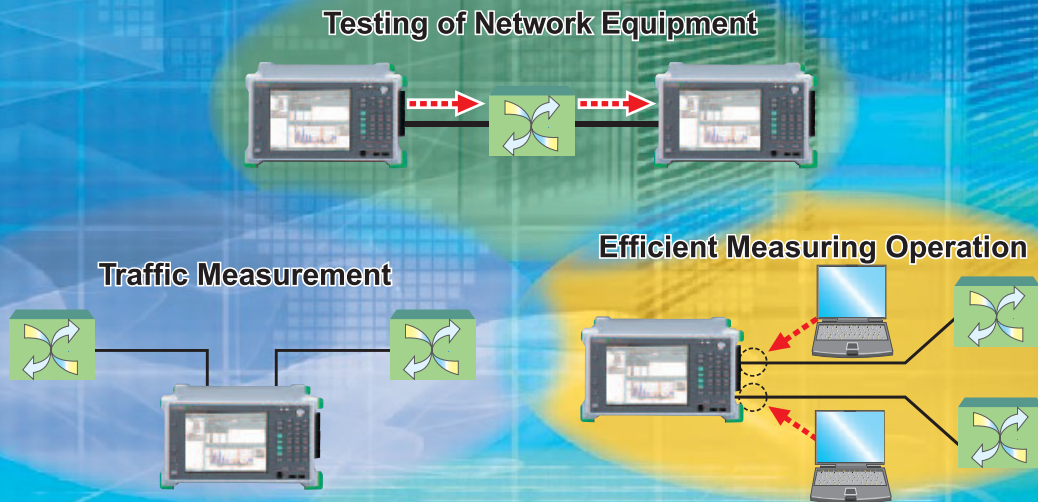# MD1230 Family

MD1230B Data Quality Analyzer
MD1231A1 IP Network Analyzer
MT7407A Multislot Chassis

*IP testing instruments changing in response to new
applications for core, metropolitan area, and access networks*

IP Testing Instruments That Can Efficiently Measure Network Performance

Testing of Network Equipment

Traffic Measurement

Efficient Measuring Operation

MD1230 Family

Anritsu's MD1230 Family can measure network quality.
Evaluating the network quality of service (QoS) based
on various indexes has importance in terms of assuring
the accurate transmission of video, voice, and
mission-critical data.
The MD1230 Family puts together all the functions required
to measure network quality into one unit. These functions
include multi-flow counters useful to measure
the performance of VLANs, packet jitter checking by
measuring the intervals of arriving packets, and packet
transmission at full wire rate.
With its integrated operation, the MD1230 Family provides
highly efficient measurements and cost reduction.

TOLLY TESTED

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

Testing of Network Equipment

Simple automatic measurement of network performance

The MD1230 Family provides testing that conforms to the RFC 2544 standard test. After setting up test conditions in advance, five performance, parameters (throughput, latency, frame loss rate, back-to-back frames, and system recovery) can be measured automatically with a single start button.
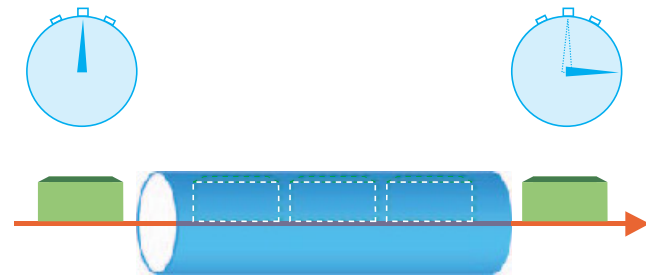
● **Throughput test**
This measures the maximum amount of data that can be processed without packet loss at some frame length by adjusting the inter-frame gap. When done manually, it is a difficult and time-consuming procedure, but using the MD1230 Family, once the frame length, measurement times, etc., have been set, measurement is performed automatically.
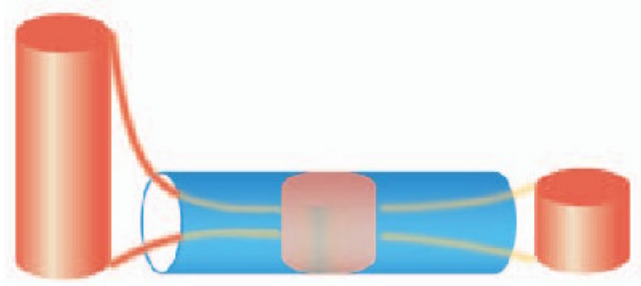
● **Latency measurement**
This appends time data to the frames sent at the throughput rate to indicate time differences in received frames. In the MD1230 Family, measurement can be performed with very high accuracy on the order of a few hundred ns.


● **Option 10: RFC 2889 Benchmarking Test**
RFC 2889 is a specialty benchmark test for LAN switches. It describes 10 types of tests that include a meshed throughput test, a forwarding rates test, an address catching capacity test, and an errored frames filtering test. The MD1230 Family can conduct those tests in conformity with RFC 2889.

Frame counting

The MD1230 Family can count traffic at full wire rate in real time in each of the Ethernet, IP, and TCP/UDP layers.

A log function is provided to record the counting results to indicate long-term changes in traffic (e.g., record of hourly changes for one week).
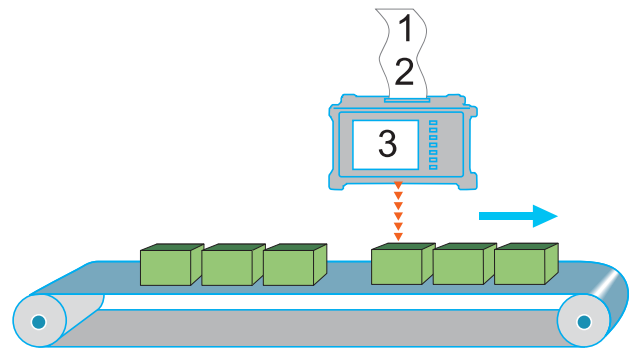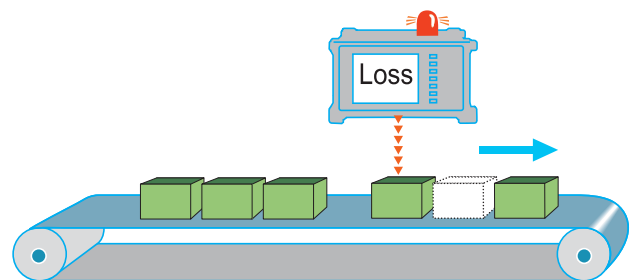

Frame loss can be calculated from the difference between the counts of frames sent and received.

Real-time detection of frame loss

● **Option 11: Packet BER Test**
The MD1230 Family provides a test frame that allows the user to detect frame loss in real time. In addition, the packet level BER Test allows the user to detect single-bit errors.

Protocol emulation

The MD1230 Family supports emulation of various protocols. The emulation function can create pseudo routers and hosts, which can be useful for router testing.

● IPv6
Option 12: IPv6 Expansion
The MD1230 Family supports use of the Ping6 command on NDP and ICMPv6, which is required for an IPv6 network. This option also supports the MLD protocol.

● Multicast protocols
Option 14: IGAP Protocol
Option 21: PIM-SMv2 Protocol
Option 22: MLDA Protocol
The MD1230 Family supports the IGMP, IGAP, MLD, MLDA and PIM-SMv2 protocols. The IGMP, IGAP, MLD and MLDA protocols can emulate up to 255 hosts per port. PIM-SMv2 can emulate up to 2,000 group addresses.

● Routing protocols
Option 07: OSPF Protocol
Option 18: OSPFv3 Protocol
Option 19: BGP4+ Protocol
The MD1230 Family supports OSPF, OSFPv3, BGP-4 and BGP4+ protocols for IPv4/IPv6 dual networks. These protocols can emulate a router that advertises virtual route information in order to load a router being tested. The MD1230 Family can measure the performance of a router receiving a huge amount of route information.

● MPLS
Option 08: LDP/CR-LDP Protocol
Option 09: RSVP-TE Protocol
The MD1230 Family supports RSVP-TE and LDP/CR-LDP as the protocols required for tunneling by MPLS. With these options, the MPLS label values obtained by protocol label switching can be selected on the frame creation screen.

Measurement of physical layer quality

The unframed BER test function can be used to test equipment, including media converters and WDM devices, with emphasis on physical layer quality. For this test, the MD1230 Family can send out PRBS signals and detect error bits on its receiving side.
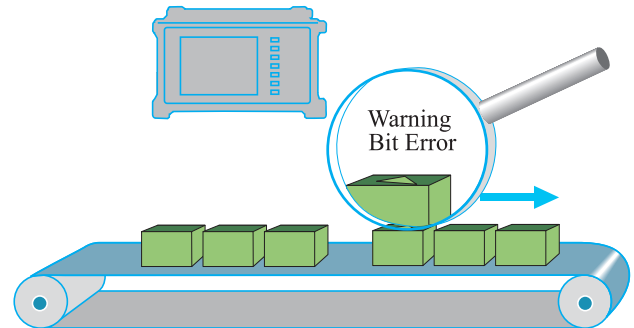
The MU120121A and MU120122A Ethernet modules can shift the standard clock defined by IEEE 802.3 from –100 ppm to +100 ppm, which are the standard allowable limits. The clock accuracy is –4 ppm to +4 ppm.
This capability can be used to check the clock tolerance of the equipment under test.

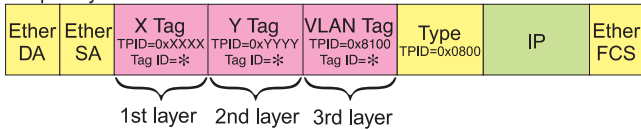# Traffic Measurement

Traffic counting functions

● Multi-layer VLANs

The MU120121A and MU120122A support multi-layer VLANs. Since the user can set the TPID (tag protocol identifier), the traffic count function can be tailored to support the vendor's original specification conforming to the VLAN specification.[*1]

Single-layer VLAN

Ether DA	Ether SA	VLAN TPID=0x8100 Tag ID=✳	Type TPID=0x0800	IP	Ether FCS

Triple-layer VLAN

| Ether DA	Ether SA	X Tag TPID=0xXXXX Tag ID=✳	Y Tag TPID=0xYYYY Tag ID=✳	VLAN Tag TPID=0x8100 Tag ID=✳	Type TPID=0x0800	IP	Ether FCS

1st layer   2nd layer   3rd layer

✳1: A 4-byte tag can be identified only when it contains 2 bytes of TPID.

● Multi-flow counter[*2]

The multi-flow counter feature in the MU120121A and MU120122A provides 65,536 counters that count the occurrences of various ID values in a selected field of received frames. For VLAN analysis, the counters can count the 4,096 kinds of VLAN IDs. This capability is also important to verify flow control mechanisms such as QoS by counting Flow IDs in test frames. In addition, the multi-flow counters can perform real-time measurements of 32 kinds of selected frames.

✳2: Multiflow Counter is available only on Port1 and Port2 of MU120121A/MU120122A modules.

VLAN 1
VLAN 2
VLAN 3
VLAN 4
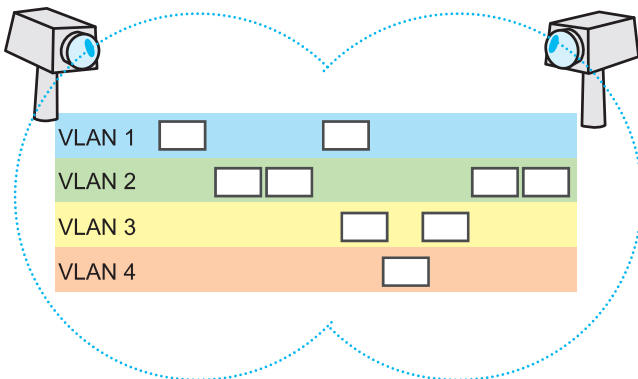
● 1 ms traffic counter
Option 20: Application traffic monitor

The volume of traffic can be measured with a high resolution of 1 ms. Even when the total traffic measured every second is 10 Mbit/s, for example, the total traffic measured every millisecond (ms) may exceed 20 Mbit/s due to the momentary convergence of frames. Bursty traffic such as this can cause missing frames in video delivery services and sound deterioration in voice communications.

Resolution: 1 s   Resolution: 1 ms

10 Mbit/s   20 Mbit/s
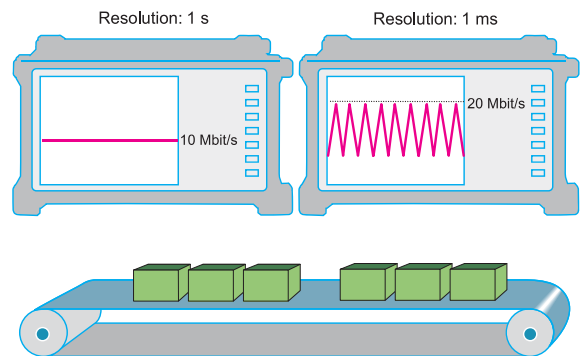
Network connection modes

There are four network connection modes per port as follows:

● Normal mode

In this mode, both frame sending and receiving can be analyzed. It is also possible to select the required response, such as Ping, ARP, NDP, etc.

● Through mode[*3]

In this mode, frames received from each side of two ports are output as is. Since frames are passed through the measurement module, frame counting and capturing can be performed, allowing in-service traffic analysis, etc.

● Monitor mode

This is a special mode in which the send function cannot be used and monitoring is performed using the receive function.

● Address swap mode[*3]

This is a useful mode when measuring delay time by performing remote loop-back. Like the Monitor mode, frame sending cannot be performed but resending can be performed by swapping the received-frame MAC and IP source and destination addresses, respectively. Since the return is performed by hardware, the actual time can be approximated from the round-trip time result (delay due to return trip).

✳3: Usable ports are limited. For details, refer to the specifications.

Frame capturing

This is a function for analyzing frames received by the measurement module port and captured into internal memory. Unlike when capturing frames with a PC network interface card, since it is also possible to capture frames that include layer-2 errors (such as FCS error frames and fragment frames), it is possible to detect bad frames generated by network devices and terminal equipment. Moreover, when performing frame capture simultaneously at 2 ports using the Through mode, it is possible to perform measurements such as send and receive frame exchange, frame switching time, etc. Since it is also possible to capture frames before and after frame loss and at overlapping when sequence capture[*1] is triggered, the route switching time can also be verified.
*1: It requires Option 11 Packet BER Test.

Protocol analysis

The MD1230 Family has standard functions to analyze Ethernet, IP, and TCP/UDP.

● **Ethereal converter**
Ethereal ® is Open Source Software to analyze various protocols. The MD1230 Family can supply captured frames to Ethereal for decoding, but Ethereal must be installed by the customer.

● **Option 04: Decoding function**
● **MX123002A expert analysis function**
The use of optional Sniffer® Technologies allows the user to analyze about 400 types of protocols, including HTTP, FTP, SNMP, SIP, and RTP. The MX123002A Expert Analysis Module can detect the parts where faults or other problems may occur, and display guidance messages.

Option 15: Auto Negotiation Analysis

The Auto Negotiation function has been standardized by IEEE 802.3. However, a compatibility problem may occur between the Auto Negotiation implementations by different vendors. The capture and decode functions of this option can check Auto Negotiation sequences and interoperability. This option includes also a function to estimate the status of each DUT. Thus, the user can recognize the status of every DUT at a glance.

● **Link timer interoperability check**
The link timer value of the Auto Negotiation function can be adjusted to check whether the DUT supports the standard link timer values. The link timer value can be changed not only in the standard range, 10 ms to 20 ms, but also to up to 100 ms.

Control of a remote measuring instrument

● **MX123001A Data Quality Analyzer Control Software**
The MD1230 Family allows the user to control a measuring instrument located at a remote place via the Internet or an intranet. To operate the remote measuring instrument, the same control software installed in the remote measuring instrument can be used on the controlling PC.

Network

MD1230B

PC
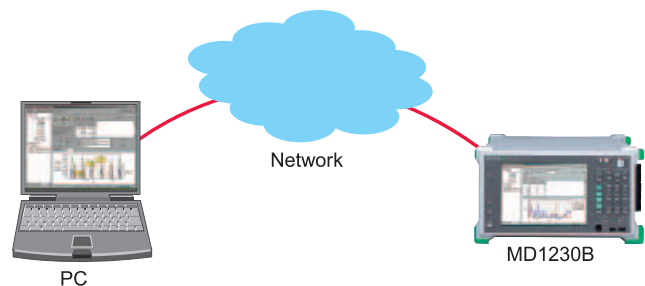
Latency measurement function supporting GPS

● **Option 05: GPS Module**
The MD1230 Family can measure latency at high accuracy of up to 1 µs between remote places. The GPS option enables satellite-synchronized latency measurement between very distant locations, such as between different continents.

MD1230B   Network   MD1230B
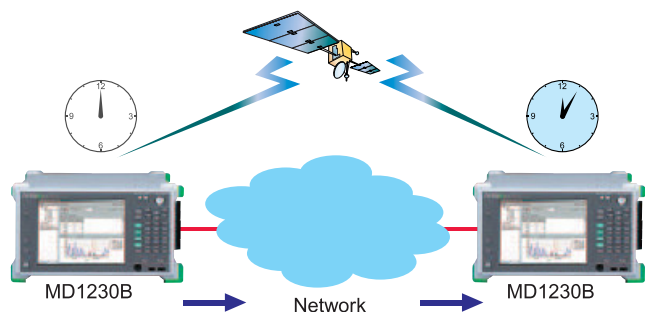
Efficient Measuring Operation

## Highly flexible frame transmission function

It is important to customize frames easily because evaluating a network device requires sending many kinds of frames to test various situations. Using protocol models, the MD1230 Family can do this easily. The MD1230 Family can also re-transmit captured frames and text files, so it can transmit protocols that do not exist in the models.

● **Step 1**
First, select a protocol model. The following models are available for selection:

Standard:
None, ARP, IPv4, IGMP/IPv4, ICMP/IPv4, TCP/IPv4, UDP/IPv4, RIP/UDP/IPv4, DHCP/UDP/IPv4, IPv6, IPv6 Extension Header, IPX, IS-IS, MAC Control Frame (Pause Frame)

IP   ARP   UDP/IP   IPv6
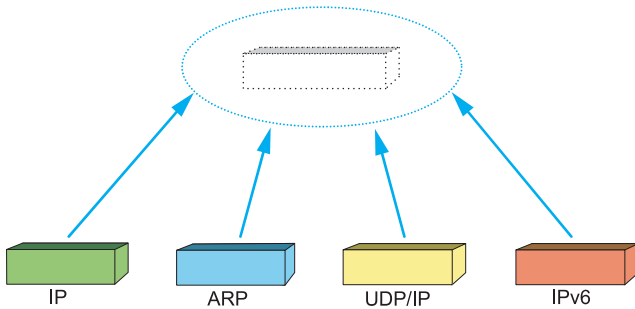
Available models can be increased by adding options.[1]

Option 12: IPv6 Expansion
ICMPv6/IPv6, TCP/IPv6, UDP/IPv6, IPv6 over IPv4, ICMPv6/IPv6 over IPv4, TCP/IPv6 over IPv4, UDP/IPv6 over IPv4

Option 21: PIM-SMv2 Protocol
PIM Register Message

Option 22: MLDA Protocol
ICMPv6 MLDA Type Message

Option 23: Spanning Tree/Link Aggregation
STP Configuration BPDU, STP TCN BPDU, RST BPDU, MST BPDU, LACPDU, Marker PDU, Marker Response PDU

[1]: Not available for the MU120101A/120102A/120103A/120103B/120104A/120104B/120105A/120106A

Either a VLAN tag or MPLS label can be added when it is needed. On the MU120121A/22A, the VLAN tag can be inserted in up to 10 stages. For the value of the MPLS label, the result obtained by label switching by RSVP-TE or LDP/CR-LDP can be used.

To use EoMPLS or any other protocol not available in the selectable models, load a commented text or CSV file.

```
; Ether Header
00 00 91 00 32 01      ; SA
00 00 91 00 32 02      ; DA
08 00        ; Type
; IP Heaser
45 00 00 2E 00 00 40 00
40          ; TTL
00          ; Protocol
26 CE       ; Header Checksum
0A 00 00 01          ; SA
0A 00 00 02          ; DA
.....
```

● **Step 2**
Set up each protocol header based on the model selected in Step 1. For example, when TCP/IP is selected, IP and TCP tabs appear in addition to the Ethernet tab on the transmit setup screen, allowing values in the settable fields to be easily changed for the respective protocols.

● **Step 3**
After setting the header, create the data part. Selectable data values are All 0, All 1, Increment, and Random. When a Test Frame is selected, latency, bit error[2], and sequence error measurements[2] can be performed. A flow ID can be set when a Test Frame is selected. With this setting, frames can be counted separately in each of up to 65,536 flows by the multi-flow counter function of the MU120121A/120122A.

[2]: Requires Option 11 Packet BER Test in the MD1230 Family unit on the receiver side.

● Step 4

The frame format was specified by the setting operation in Step 3 and before. Next, specify how to send frames. A burst means a set of frames; a stream means a set of bursts.
For example, when "3 Frames per Burst" and "2 Bursts per Steam" are specified, a set of three frames will be sent twice in one stream.

The gaps between frames, between bursts, and between streams can be specified as IFG, IBG, and ISG, respectively.


Frame per Burst

Stream

Burst per Stream
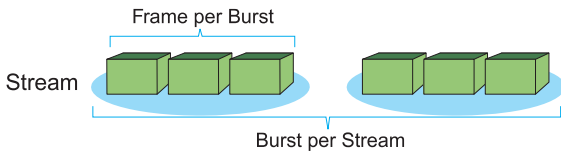
● Step 5

After setting the number of frames in the stream and the gap sizes, specify the relationship of the stream to other streams. Complex sequences of streams can be created by using the Next Stream and Jump to Stream commands.

Stream 1
Stream 2
Stream 3
Stream 4

Stream 1
Stream 2
Stream 3
Stream 4
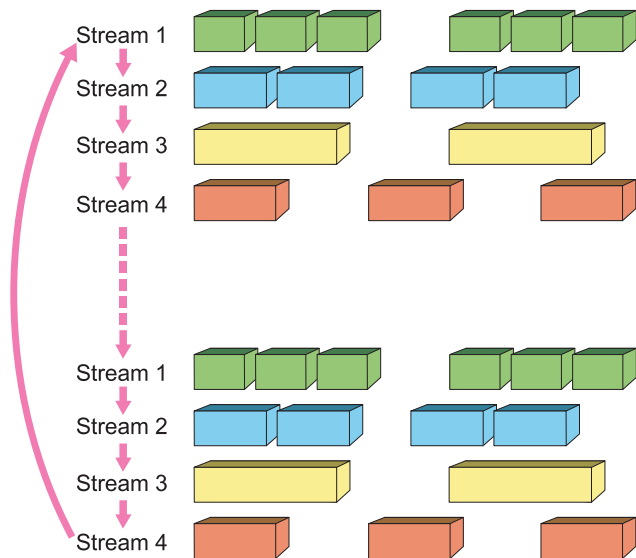
Support of multi-port operation

Up to eight additional MD1230 Family instruments can be connected via Ethernet. Up to 448 ports can be controlled at once.

Ethernet
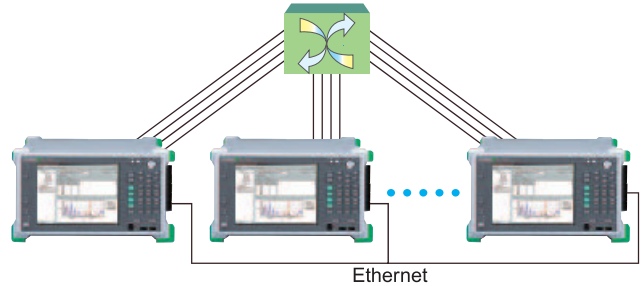
Port sharing

MD1230 Family testers can be shared by up to 8 simultaneous remote users, enabling the most effective use of limited measurement resources. Multi-port modules can be shared so that each port is allocated to a different user.
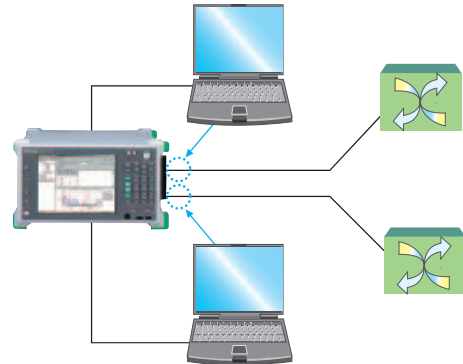
Increased test efficiency by automatic measurement

● Option 01, Option 02, Option 03[*1]

A series of pre-shipment factory inspection operations can be automated by a combination of measurement commands.
The measurement commands can use one of Ethernet, RS-232C, and GPIB on a text basis.

ABCabc
dfedfehij
xxxvvvzzz
yxyxzxzxzxzx

＊1: The MX123001A does not require the Ethernet option.

8

MD1230 Family

Model/Name		
	MD1230B Data Quality Analyzer	MT7407A Multislot Chassis
Features	Windows® XP installed, Remote control via Ethernet, RS-232C and GPIB, FDD, Keyboard, USB (2 ports on the front and 1 port on the back), VGA, Weight: ≤15 kg (excluding modules), No. of slots: 5	Control by external PC Weight: ≤20 kg (excluding modules), No. of slots: 14

Model/Name	
	MD1231A1 IP Network Analyzer
Features	Windows® 98 SE installed, Pointing device, Keyboard, USB (2 ports on the side), Remote control via Ethernet and GPIB, Weight: ≤6 kg (excluding modules), No. of slots: 2

Module Table

Model	Name	MD1230B	MD1230A	MD1231A	MD1231A1	MT7407A*1	Power consumption(A)
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
MU120118B	10 Gigabit Ethernet Module	√	√		√	√	19.0
MU120118C	10 Gigabit Ethernet Module	√	√	√	√	√	10.0
MU120119A	OC-3/12 STM-1/4 Module (1310 nm)	√	√	√	√	√	3.5
MU120120A	OC-3/STM-1 Module (1310 nm)	√	√	√	√	√	3.5
MU120121A	10/100/1000M Ethernet Module	√	√*2				19.0
MU120122A	Gigabit Ethernet Module	√	√*2				19.0
MU740701A	IP Tester Control Module					√	2.0
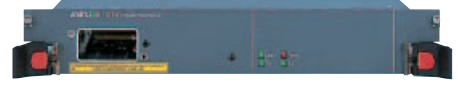
∗1: The total current consumption by the modules mounted in one MU740702A must be 65 A or less.
∗2: The MD1230A-47 can accommodate up to three modules.The total current consumption by the modules mounted in one MD1230A must be 60 A or less.

9
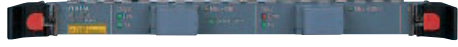
List of Interfaces

Ethernet Module

Model/Name	Appearance	Interfaces				
		10BASE-T	100BASE-TX	1000BASE-T	1000BASE-X	10GBASE-X
MU120101A 10M/100M Ethernet Module		√	√			
MU120111A 10/100M Ethernet Module		√	√			
MU120121A 10/100/1000M Ethernet Module		√	√	√		
MU120102A Gigabit Ethernet Module					√	
MU120112A Gigabit Ethernet Module				√	√	
MU120122A Gigabit Ethernet Module		√	√	√	√	
MU120118B 10 Gigabit Ethernet Module						√
MU120118C 10 Gigabit Ethernet Module						√

Ethernet Module

Model/Name	Appearance	Interfaces				
		OC-3 STM-1	OC-12 STM-4	OC-48 STM-16	OC-192 STM-64	OC-48 STM-16 (EoS)
MU120119A OC-3/12 STM-1/4 Module (1310nm)		√	√			
MU120120A OC-3 STM-1 Module (1310nm)		√				
MU120103A 2.5G (1.31) Module				√		
MU120104A 2.5G(1.55) Module				√		
MU120105A 10G (1.31) Module					√	
MU120106A 10G (1.55) Module					√	
MU120103B 2.5G (1.31) Module				√		√
MU120104B 2.5G (1.55) Module				√		√

10

Selection Guide

Ethernet Modules

Model	MU120101A	MU120111A	MU120121A	MU120102A	MU120112A	MU120122A	MU120118B	MU120118C
Interface	10/100M		10/100/1000M	GbE			10GbE	
Ports(Connector)	8 (RJ-45)	8 (RJ-45)	4 (RJ-45)	2 (GBIC*1)	2 (GBIC)	2 (RJ-45) 2 (SFP)	2 (XENPAK)	1 (XENPAK)
Clock Variation			√			√	√*2	√*2
Auto MDI/MDI-X Detection			√			√		
Frame Generation								
Stream Generation (TxStream)	√	√	√	√	√	√	√	√
Multi-Layer VLAN			√			√		
MAC Address Increment	√	√	√	√	√	√	√	√
IP Address Increment	√	√	√	√	√	√	√	√
TCP/UDP Port Number Increment		√	√	√	√	√	√	√
Spanning Tree / Link Aggregation Frame (opt23)		√	√		√	√	√	√
Test Frame Addition	√*3	√	√	√	√	√	√	√
Hardware Random Pattern			√			√		
Measurement								
Counter	√	√	√	√	√	√	√	√
Multi-Flow Counter			√			√		
Capture	√	√	√	√	√	√	√	√
Decode	√	√	√	√	√	√	√	√
Latency	√	√	√	√	√	√	√	√
Ping	√	√	√	√	√	√	√	√
Ping6 (opt12)		√	√		√	√	√	√
Arrival Time Variation	√	√	√	√	√	√	√	√
Through Mode	√	√	√	√	√	√	√	√
Monitor Mode	√	√	√	√	√	√	√	√
Address Swap Mode		√	√		√	√		
Unframe BER Test		√	√	√	√	√	√*4	√*4
Packet BER Test (opt11)		√	√	√	√	√	√	√
Auto Negotiation Analysis (opt15)*5					√	√		
Application Traffic Monitor (opt20)			√		√	√		
Link Fault Signaling (opt16)							√	√
XENPAK Test (opt13)							√	√
Optical Power Meter								
Automatic Test								
RFC2544	√	√	√	√	√	√	√	√
RFC2889 (opt10)		√	√	√	√	√		
Protocol Emulation								
ARP	√	√	√	√	√	√	√	√
ICMP	√	√	√	√	√	√	√	√
OSPF (opt07)		√	√		√	√	√	√
BGP-4	√*6	√	√	√*6	√	√	√	√
ICMPv6 (opt12)		√	√		√	√	√	√
OSPFv3 (opt18)*7		√	√		√	√	√	√
BGP4+ (opt19)*7		√	√		√	√	√	√
IGMP	√	√	√	√	√	√	√	√
IGAP (opt14)		√	√		√	√	√	√
MLD (opt12)		√	√		√	√	√	√
MLDA (opt22)*7		√	√		√	√	√	√
PIM-SMv2 (opt21)*8		√	√		√	√	√	√
MPLS (LDP/CR-LDP) (opt08)		√	√		√	√	√	√
MPLS (RSVP-TE) (opt09)		√	√		√	√	√	√

*1: 1000BASE-T GBICs are not supported.
*2: Option 13 provides its clock only to the XAUI interface of the XENPAK module.
*3: Packet BER Test is disabled when a test frame is sent to another module.
*4: Option 13 XENPAK Test is required.
*5: This function is implemented by using GBIC devices for SX/LX/LH/ZX and SFP devices for SX/LX/LE/LR.
*6: Only up to eight virtual routers can be emulated.
*7: Option 12 IPv6 Expansion is required.
*8: Option 12 IPv6 Expansion is required when IPv6 addresses are to be used. This option supports only IPv4 addresses.

POS/EoS Modules

Model	MU120120A	MU120119A	MU120103A	MU120104A	MU120105A	MU120106A	MU120103B	MU120104B
Interface	STM-1 OC-3	STM-1/4 OC-3/12	STM-16 OC-48	STM-16 OC-48	STM-64 OC-192	STM-64 OC-192	STM-16 OC-48	STM-16 OC-48
Bit Rate	155.52 M	155.52 M 622.08 M	2,488.32 M	2,488.32 M	9,953.28 M	9,953.28 M	2,488.32 M	2,488.32 M
Wavelength	1,310 nm	1,310 nm	1,310 nm	1,550 nm	1,310 nm	1,550 nm	1,310 nm	1,550 nm
Input Sensitivity (dBm)	–28 to –8	–28 to –8	–18 to 0	–28 to –9	–12 to 0	–14 to –3	–18 to 0	–18 to 0
Output Level (dBm)	–15 to –8	–15 to –8	–5 to 0	–2 to +3	–4 to 0	–1 to +2	–5 to 0	–5 to 0
Ports (Connector)	2 (SC)	2 (SC)	1 (SC)	1 (SC)	1 (SC)	1 (SC)	1 (SC)	1 (SC)
Mapping								
POS	√	√	√	√	√	√	√	√
EoS							√*1	√*2
VCAT							√*3	√*4
Frame Generation								
Stream Generation (TxStream)	√	√	√	√	√	√	√	√
Multi-Layer VLAN								
MAC Address Increment							√	√
IP Address Increment	√	√	√	√	√	√	√	√
TCP/UDP Port Number Increment	√	√	√	√	√	√	√	√
Spanning Tree/Link Aggregation Frame (opt23)								
Test Frame Addition	√	√	√	√	√	√	√	√
Hardware Random Pattern								
Measurement								
Counter	√	√	√	√	√	√	√	√
Multi-Flow Counter								
Capture	√	√	√	√	√	√	√	√
Decode	√	√	√	√	√	√	√	√
Latency	√	√	√	√	√	√	√	√
Ping	√	√	√	√	√	√	√	√
Ping6 (opt12)								
Arrival Time Variation	√	√	√	√	√	√	√	√
Through Mode	√	√	√	√	√	√	√	√
Monitor Mode	√	√	√	√	√	√	√	√
Address Swap Mode								
Unframe BER Test	√	√	√	√	√	√	√	√
Packet BER Test (opt11)	√	√	√	√	√	√	√	√
Auto Negotiation Analysis (opt15)								
Application Traffic Monitor (opt20)								
Link Fault Signaling (opt16)								
XENPAK Test (opt13)								
Optical Power Meter	√*5	√*6	√	√	√	√	√	√
Automatic Test								
RFC2544	√	√	√	√	√	√	√	√
RFC2889 (opt10)								
Protocol Emulation								
ARP							√	√
ICMP	√	√	√	√	√	√	√	√
OSPF (opt07)								
BGP-4	√*7	√*7	√*7	√*7	√*7	√*7	√*7	√*7
ICMPv6 (opt12)								
OSPFv3 (opt18)								
BGP4+(opt19)								
IGMP	√	√	√	√	√	√	√	√
IGAP (opt14)								
MLD (opt12)								
MLDA (opt22)								
PIM-SMv2 (opt21)								
MPLS (LDP/CR-LDP) (opt08)								
MPLS (RSVP-TE) (opt09)								

*1: The module option (MU120103B-01 EOS Mapping) is required.
*2: The module option (MU120104B-01 EOS Mapping) is required.
*3: The module option (MU120103B-02 Virtual Concatenation) is required.
*4: The module option (MU120104B-02 Virtual Concatenation) is required.
*5: The module option (MU120120A-01 Optical Power Meter) is required.
*6: The module option (MU120119A-01 Optical Power Meter) is required.
*7: Only up to eight virtual routers can be emulated.

Ordering Information

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

•MD1230B

Model/Order No.	Name	
	— Main Frame —	
MD1230B	Data Quality Analyzer	
	— Standard Accessories —	
	Power cord, 2.5 m:	1 pc
F0113	Fuse, 15 A:	1 pc
B0329G	Front cover (for 3/4MW4U):	1 pc
B0500A	Side cover:	1 pc
	MD1230/ MP1590 Family Software[1]:	1 pc
	— Main Frame Options[2] —	
MD1230B-01	RS-232C Control[3]	
MD1230B-02	GPIB Control[3]	
MD1230B-03	Ethernet Control[3]	
MD1230B-04	MD1230B Decode Module[4]	
MD1230B-05	GPS Module[5]	
MD1230B-06	Tcl Interface[6]	
MD1230B-07	OSPF Protocol	
MD1230B-08	MPLS (LDP/CR-LDP) Protocol	
MD1230B-09	MPLS (RSVP) Protocol	
MD1230B-10	RFC2889 Benchmarking Test	
MD1230B-11	Packet BER Test	
MD1230B-12	IPv6 Expansion	
MD1230B-13	XENPAK Test	
MD1230B-14	IGAP Protocol	
MD1230B-15	Auto Negotiation Analysis	
MD1230B-16	Link Fault Signaling	
MD1230B-18	OSPFv3 Protocol[7]	
MD1230B-19	BGP4+ Protocol[7]	
MD1230B-20	Application Traffic Monitor	
MD1230B-21	PIM-SMv2 Protocol[8]	
MD1230B-22	MLDA Protocol[7]	
MD1230B-23	Spanning Tree/Ling Aggregation	
MX123002A	MD1230A Expert Analysis Module[9]	

•MD1231A1

Model/Order No.	Name	
	— Main Frame —	
MD1231A1	IP Network Analyzer	
	— Standard Accessories —	
	Power cord, 2.5 m:	1 pc
F0100	Fuse, 6.3 A:	1 pc
B0489	Front cover:	1 pc
	MD1230/ MP1590 Family Software[1]:	1 pc
	— Main Frame Options[2] —	
MD1231A1-02	GPIB Control[10]	
MD1231A1-03	Ethernet Control[10]	
MD1231A1-04	MD1231A1 Decode Module[11]	
MD1231A1-05	GPS Module[5]	
MD1231A1-06	Tcl Interface[12]	
MD1231A1-07	OSPF Protocol	
MD1231A1-08	MPLS (LDP/CR-LDP) Protocol	
MD1231A1-09	MPLS (RSVP) Protocol	
MD1231A1-10	RFC2889 Benchmarking Test	
MD1231A1-11	Packet BER Test	
MD1231A1-12	IPv6 Expansion	
MD1231A1-13	XENPAK Test	
MD1231A1-14	IGAP Protocol	
MD1231A1-15	Auto Negotiation Analysis	
MD1231A1-16	Link Fault Signaling	
MD1231A1-18	OSPFv3 Protocol[13]	
MD1231A1-19	BGP4+ Protocol[13]	
MD1231A1-20	Application Traffic Monitor	
MD1231A1-21	PIM-SMv2 Protocol[14]	
MD1231A1-22	MLDA Protocol[13]	
MD1231A1-23	Spanning Tree/Ling Aggregation	
MX123002A	MD1230A Expert Analysis Module[15]	

•MT7407A

Model/Order No.	Name	
	— Main Frame —	
MT7407A	Multislot Chassis[16]	
	— Standard Accessories —	
	Power Cord, 3 m:	1 pc
F0108	Fuse, 20 A:	1 pc
J1109B	LAN cable (CAT5, cross), 5 m:	1 pc
	MD1230/ MP1590 Family Software[1]:	1 pc
	— Option for MT7407A —	
MT7407A-01	Interface Board for IP Tester[17]	
	— Plug-in Modules for MT7407A —	
MU740701A	IP Tester Control Module[18]	
MU740702A	Power Unit for IP Tester[19]	
	— Standard Accessories for MT7407A-01 —	
J0775I	Coaxial cable, 0.1 m (75) 1 pc	
	— Standard Accessories for MU740701A —	
J1221B	RS-232C cross cable 1 pc	
	— Control Module Options for MU740701A[2] —	
MU740701A-04	MU740701A Decode Module[20]	
MU740701A-05	GPS Module[21]	
MU740701A-07	OSPF Protocol	
MU740701A-08	MPLS (LDP/CR-LDP) Protocol	
MU740701A-09	MPLS (RSVP) Protocol	
MU740701A-10	RFC2889 Benchmarking Test	
MU740701A-11	Packet BER Test	
MU740701A-12	Ipv6 Expansion	
MU740701A-13	XENPAK Test	
MU740701A-14	IGAP Protocol	
MU740701A-15	Auto Negotiation Analysis	
MU740701A-16	Link Fault Signaling	
MU740701A-18	OSPFv3 Protocol[22]	
MU740701A-19	BGP4+ Protocol[22]	
MU740701A-20	Application Traffic Monitor	
MU740701A-21	PIM-SMv2 Protocol[23]	
MU740701A-22	MLDA Protocol[22]	
MU740701A-23	Spanning Tree/Ling Aggregation	
MU740701A-30	MU740701A Expert Analysis Module[24]	

•Common to the MD1230 Family

Model/Order No.	Name
	— Softwares —
MX123001A	Data Quality Analyzer control Software*25
MX123001A-05	Data Quality Analyzer Control Software (5 licenses)*25
MX123001A-08	Data Quality Analyzer Control Software (8 licenses)*25
MX123001A-01	Remote Control Software for MD1230A-04*26
MX123001A-15	Remote Control Software for MD1230A-04 (5 licenses)*26
MX123001A-18	Remote Control Software for MD1230A-04 (8 licenses)*26
MX123003A	Remote Control Software for MX123002A*27
MX123003A-05	Remote Control Software for MX123002A (5 licenses)*27
MX123003A-08	Remote Control Software for MX123002A (8 licenses)*27
	— Software Options —
MX123001A-06	Tcl Interface*28
MX123001A-07	RS-232C Control*29
MX123001A-09	GPIB Control*29
MX123001A-10	Ethernet Control*29
	— Software Upgrade Service —
MD1230B-40	Annual Software Upgrade Service for MD1230B*30
MD1231A1-40	Annual Software Upgrade Service for MD1231A1*30
MT7407A-40	Annual Software Upgrade Service for MT7407A*31
	— Plug-in Modules —
MU120101A	10M/100M Ethernet Module
MU120102A	Gigabit Ethernet Module*32
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*32
MU120118B	10 Gigabit Ethernet Module*33
MU120118C	10 Gigabit Ethernet Module*33
MU120119A	OC-3/12 STM-1/4 Module (1310 nm)
MU120120A	OC-3/STM-1 Module (1310 nm)
MU120121A	10/100/1000M Ethernet Module
MU120122A	Gigabit Ethernet Module*34
	— 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
	— Maintenance Service —
MD1230B-90	Extended Three Year Warranty Service
MD1231A1-90	Extended Three Year Warranty Service
MT7407A-90	Extended Three Year Warranty Service*35
MU740701A-90	Extended Three Year Warranty Service*35
MU740702A-90	Extended Three Year Warranty Service*35
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
MU120118B-90	Extended Three Year Warranty Service
MU120118C-90	Extended Three Year Warranty Service
MU120119A-90	Extended Three Year Warranty Service
MU120120A-90	Extended Three Year Warranty Service
MU120121A-90	Extended Three Year Warranty Service
MU120122A-90	Extended Three Year Warranty Service
	— Hardware Upgrade Service —
MD1230A-47	MD1230A Retrofit for Fan
MD1231A-48	MD1231A1 Upgrade

Model/Order No.	Name
	— Optional Accessories —
G0105A	GBIC SX 850 nm*36
G0106A	GBIC LX 1310 nm*36
G0107A	GBIC LH 1310 nm*36
G0108A	GBIC ZX 1550 nm*36
G0124A	GBIC T (1000BASE-T)*36
G0136	SFP SX 850 nm*37
G0137	SFP LX 1310 nm*37
G0138	SFP LE 1310 nm*37
G0139	SFP LR 1550 nm*37
G0132	XENPAK (10GBASE-SR)*38
G0126A	XENPAK (10GBASE-LR)*38
G0131	XENPAK (10GBASE-ER)*38
J1049A	Fixed Optical Attenuator (SC, 5 dB)*39
J1049B	Fixed Optical Attenuator (SC, 10 dB)*39
J1049C	Fixed Optical Attenuator (SC, 15 dB)*39
MZ1221A	XAUI Extender*40
MZ1222A	XENPAK Interface*41
J1163A	XAUI cable, 0.5 m
J1164A	MDIO cable, 0.5 m
J0660B	Optical fiber cord (SM, SC-SC connector), 2 m
J0773B	Optical fiber cord (GI, SC-SC connector), 2 m
J1119B	Optical fiber cord (Duplex, MM), 2 m
J1271	Optical fiber cord (Duplex, SM, LC-LC connector), 2 m
J1272	Optical fiber cord (Duplex, SM, LC-SC connector), 2 m
J1273	Optical fiber cord (Duplex, GI, LC-LC connector), 2 m
J1274	Optical fiber cord (Duplex, GI, LC-SC connector), 2 m
J0775D	Coaxial cord (BNC-P620・3C-2WS・BNC-P620, 75 Ω), 2 m*42
J1165A	Coaxial cable (27CP-P-1.5-BNC-P-1.5C-CR10), 0.5 m*42
J1166A	Coaxial cable (both ends, 27CP-P-1.5), 0.5 m*42
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 (CAT5, cross), 5 m
J1110B	LAN cable (CAT5, straight), 5 m
J1275	LAN cable (CAT5E, straight), 1 m
J1275B	LAN cable (CAT5E, straight), 5 m
J1275C	LAN cable (CAT5E, cross), 1 m
J1275D	LAN cable (CAT5E, cross), 5 m
Z0321A	Keyboard (PS/2)
Z0541A	USB mouse
B0448	Soft case*43
B0336C	Carrying case (3/4MW4U, 350D)*44
B0530	Carrying case caster for B0336C
B0533	Carrying case (3/4MW4U, 350D)*45
B0510	Soft case*46
B0501B	Blank panel*47
B0531	Blank panel*48
B0532	Rack flange*49
Z0849A	MD1230/ MP1590 Family manual CD
W1927AE	MD1230A/B operation manual
W2096AE	MD1231A/A1 operation manual
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
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
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 operation manuals. Printed versions sold separately.
∗2: Some of these interface modules may not work in certain combinations depending on the modules and software versions. Please see the selection guide (Pages 11, 12).
∗3: The MD1230B-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.
∗4: Purchase MD1230B-04 and the operation manuals (W2107AE) on CD-ROM. Printed versions sold separately.
∗5: An accessory GPS antenna (with a 5 m cable) is bundled together with the module.
∗6: MD1230B-06 is the option to operate the Tcl server. MD1230B-06 can be mounted together with MD1230B-03, but both options cannot be operated at the same time because they are controlled via Ethernet.
∗7: MD1230B-12 IPv6 Expansion is required.
∗8: This module can operate independently when used for an IPv4 network. When this module is used for an IPv6 network, MD1230B-12 IPv6 Expansion is required.
∗9: MD1230B-04 MD1230B Decode Module is required.
∗10: The MD1231A1-02/03 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.
∗11: Purchase MD1231A1-04 and the operation manuals (W2107AE) on CD-ROM. Printed versions sold separately.
∗12: MD1231A1-06 is the option to operate the Tcl server. MD1231A1-06 can be mounted together with MD1231A1-03, but both options cannot be operated at the same time because they are controlled via Ethernet.
∗13: MD1231A1-12 IPv6 Expansion is required.
∗14: This module can operate independently when used for an IPv4 network. When this module is used for an IPv6 network, MD1231A1-12 IPv6 Expansion is required.
∗15: MD1231A1-04 MD1231A1 Decode Module is required.
∗16: One MT7407A can accommodate two MU740701A IP Tester Control Modules, one MT7407A-01 Interface Board for IP Tester, and two MU740702A Power Unit for IP Tester.
∗17: This board is required for time synchronization with another MD1230 Family equipments cabinet or synchronization with an external clock on SONET/SDH.
∗18: Each MU740701A supports 7 slots.
∗19: One MU740702A Power Unit for IP Tester can operate one MU740701A. To mount an additional MU740702A, the cabinet must be modified at the factory.
∗20: A separate MX123001A-01 is required to use the decode module function. The operation manual (W2107AE) is included in MX123001A-01. A printed version is sold separately.
∗21: MT7407A-01 is required. An accessory GPS antenna (with a 5 m cable) is bundled together with the module.
∗22: MU740701A-12 IPv6 Expansion is required.
∗23: This module can operate independently when used for an IPv4 network. When this module is used for an IPv6 network, MU740701A-12 IPv6 Expansion is required.
∗24: Using the expert analysis module function requires a separate MU740701A-04 MU740701A Decode Module, MX123001A Data Quality Analyzer Control Software, MX123001A-01 MD1230A-04 Remote Control Software, and MX123003A MX123002A Remote Control Software.
∗25: Ethernet control options (Option 03) are not required.
∗26: One of the decode module options (Option 04) is required for MX123001A Data Quality Analyzer Control Software and for cabinet control.

∗27: One of the decode module options (Option 04) and MX123002A MD1230A Expert Analysis Module are required for cabinet control. Also, MX123001A Data Quality Analyzer Control Software and MX123001A-01 MD1230A-04 Remote Control Software must be installed on the PC where this software is installed.
∗28: MX123001A-06 is the option to operate the Tcl server on the PC. MX123001A-06 can be mounted together with MX123001A-10, but both options cannot be operated at the same time because they are controlled via Ethernet.
∗29: The 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.
∗30: Option 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.
∗31: 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.
∗32: The GBIC module is sold separately. 1000BASE-T GBIC is not supported. Note that Anritsu supports GBIC modules only which are purchased from Anritsu.
∗33: The XENPAK module is sold separately. Note that Anritsu supports XENPAK modules only which are purchased from Anritsu.
∗34: The SFP module is sold separately. Note that Anritsu supports SFP modules only which are purchased from Anritsu.
∗35: Extended Three Year Warranty Service is divided into three orders for main frame, CPU module and Power Unit. Please choose your need order among them.
∗36: The GBIC module is sold on a per-unit basis. MU120102A/12A has two GBIC interface slots. MU120102A does not support 1000BASE-T.
∗37: The SFP module is sold on a per-unit basis. MU120122A has two SFP interface slots.
∗38: The XENPAK module is sold on a per-unit basis. MU120118B has two XENPAK interface slots. And MU120118C has one XENPAK interface slot.
∗39: Check the optical input power level carefully before use. Incorrect level of optical input may damage the instrument.
∗40: Using the XAUI extender requires the MZ1222A XENPAK interface, J1163A XAUI cable, J1164A MDIO cable, and a separate external power supply (5 V, 4 A)
∗41: MZ1222A supports 1.8 V fixed power supply regarding APS.
∗42: This cable is required for time synchronization between MD1230 Family cabinets. MD1230A/B and MT7407A use BNC connectors, and MD1231A/A1 uses an SMB connector. J0775D is required to connect BNC connectors to each other. J1166A is required to connect SMB connectors to each other. J1165A is required to connect a BNC connector to an SMB connector.
∗43: Soft case for MD1230A/B (See the photograph.)
∗44: Carrying case for MD1230A/B (See the photograph.)
∗45: Carrying case for MD1230A/B (See the photograph.)
∗46: Soft case for MD1231A/A1 (See the photograph.)
∗47: Blank panel for module slot
∗48: Blank panel for MT7407A CPU Module slot
∗49: Flange to fix MT7407A to the rack. Fixing MT7407A to the rack requires separate screws.

∗43: B0448 Soft case   ∗44: B0336C Carrying case   ∗45: B0533 Carrying case   ∗46: B0510 Soft case

Software Upgrade Service

The MD1230 Family permits service upgrades for compatible software. A CD-ROM containing the latest applications can be sent to the user when the MD1230 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.

Option No.	Name	Contents
Option 40	Annual Software upgrade service	An option for ensuring that the MD1230 Family is always using the latest software. In the first year, it is included as standard option. Support of MX123001A is also included. Separate annual purchase is required from the second year onward.

Windows is a registered trademark of Microsoft Corporation of the U.S. in the United States and other countries.
Ethereal is a registered trademark of Ethereal Inc. of the U.S. in the United States.
Sniffer is a registered trademark of Network General Corporation, and/or its affiliates in the U.S. and other countries.

/Anritsu

Specifications are subject to change without notice.

060417