MD1230 Family

Data Quality Analyzer

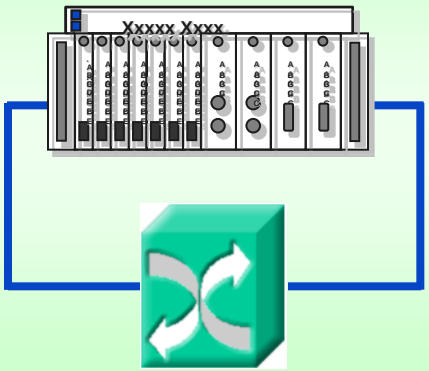
MD1230B
Product Introduction

Version 4.00

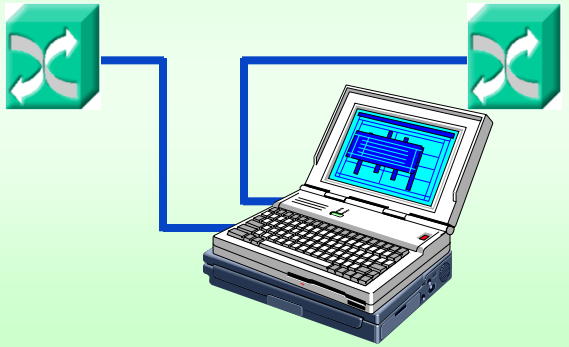
Anritsu Corporation

What is the MD1230B Family?

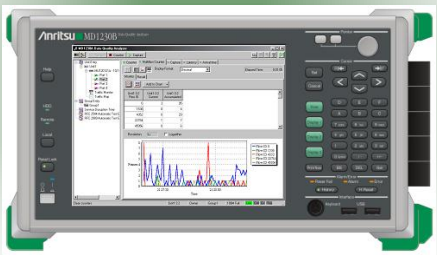
Performance Tests



Network Monitoring



Dual Use



MD1230B

MD1230B Overview

External Specifications

320 (W) x 350 (D) x 170 (H) mm, 15 kg

OS

Windows® XP professional

Front Panel

Pointing device

More USB ports (2)

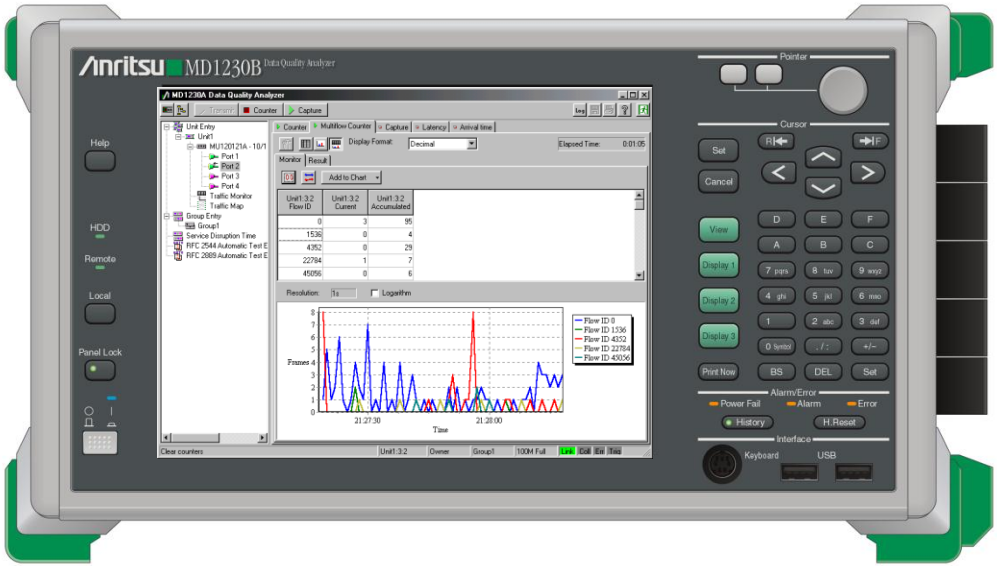
Alphabetic input keys

Bigger Power Supply

650 VA

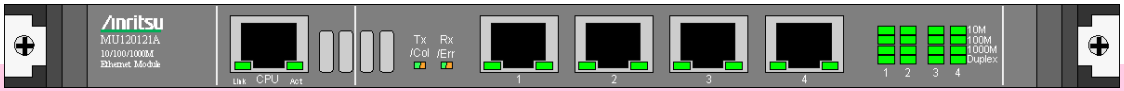
Five interface module slots

- Ethernet (10/100/1000 M, 1 GbE, 10 GbE)

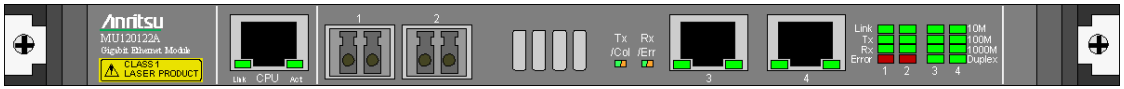


Interface Modules

Power Protocol Modules



MU120121A 10/100/1000M Ethernet Module



MU120122A Gigabit Ethernet Module

Express Flow Modules

MU120131A 10/100/1000M Ethernet Module

MU120132A Gigabit Ethernet Module

MU120138A 10 Gigabit Ethernet Module

Application Tests

Traffic Impairment Emulator
Routing Protocol (OSPFv2/v3, BGP4+, MPLS, PIM-SMv2)
Multicast (IGMP/IGAP, MLD/MLDA)

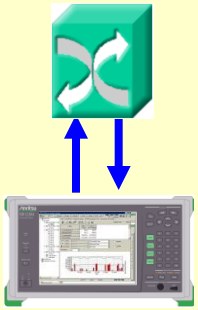
Enhanced Performance Tests

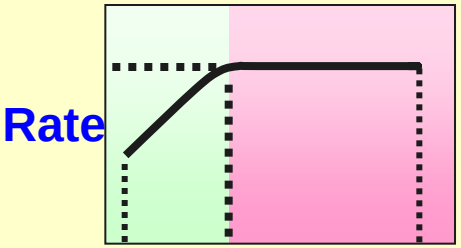
10M/100M/1000M I/F(MU120131A),
Multi-flow Counter, Multiple VLAN,
Clock Tolerance, 1 ms
Traffic Monitor(excludes 10GbE I/F), PON, Multiport

Applications

- **Four Major Functions in One Tester**

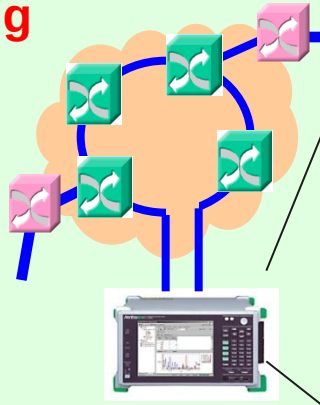
Traffic Generation and Performance Testing

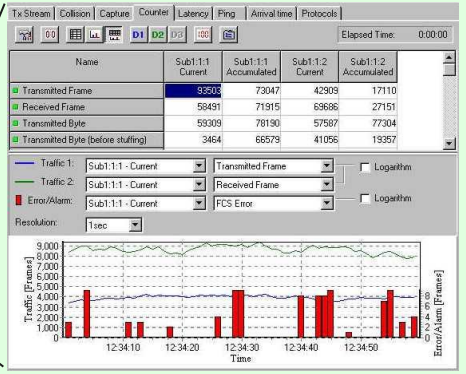




RFC2544, RFC2889 Frame Length

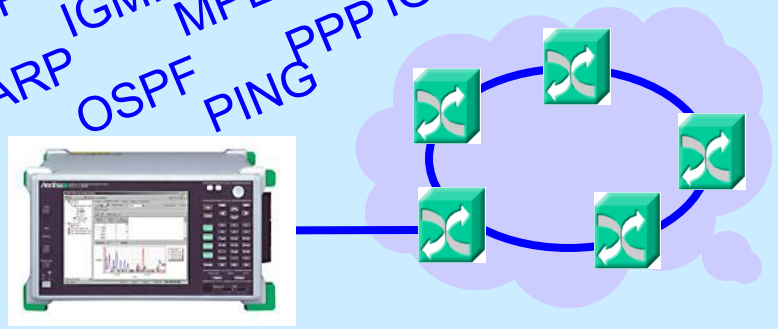
Network Monitoring





Protocol Emulation

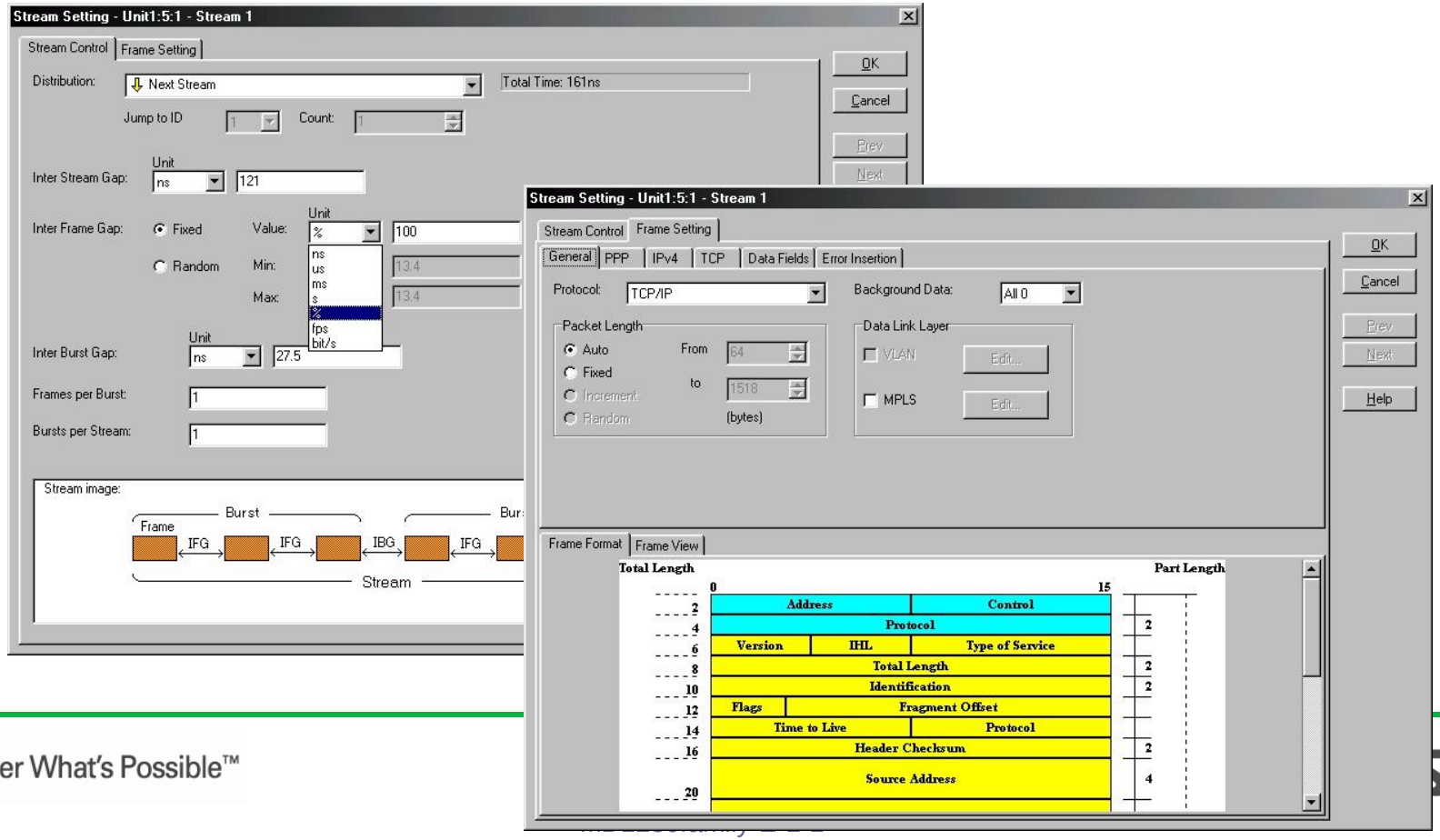
BGP4 IGMP MPLS PPP IGAP ARP OSPF PING



Features—Full-Wire-Speed Packet Generation

Layer 2/3/4 Traffic Generation

- Full-wire-speed measurements
- Packet lengths: Supports both Short and Jumbo frames

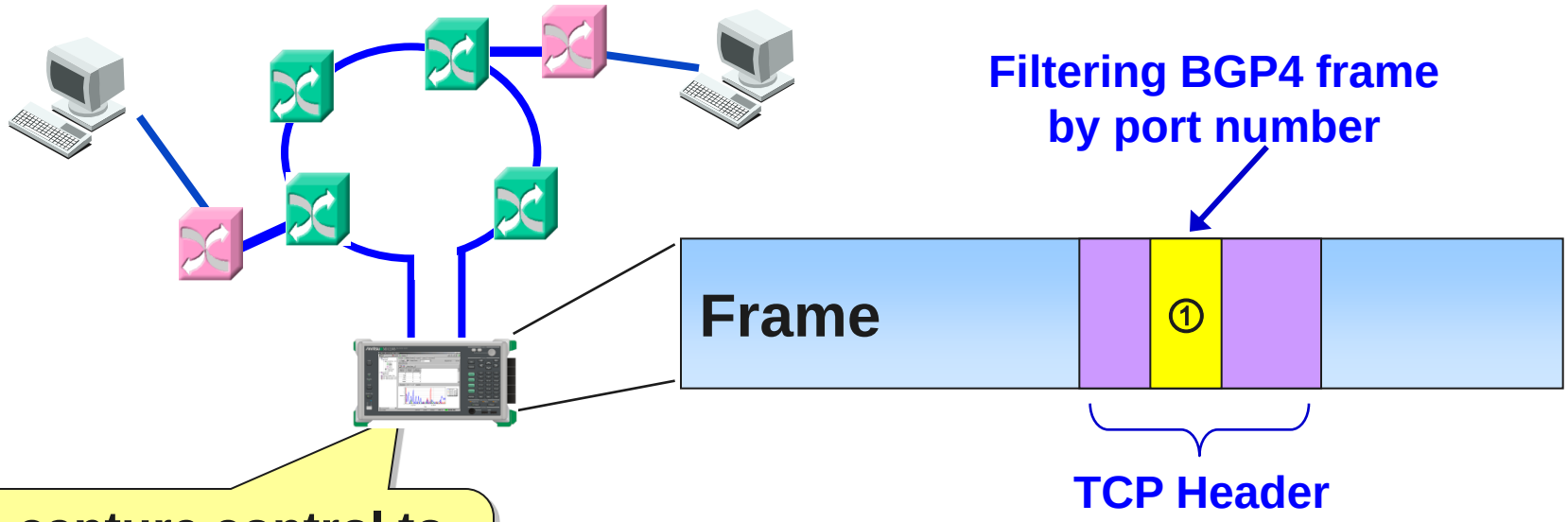


Real-time Counting and Monitoring

- **Packet inter-arrival time (Packet Jitter)/Packet Latency**
- **Many packet counters**
  - 8 levels of QoS counters (VLAN, DiffServ)
  - Transmitted Frame/Byte, Received Frame/Byte
  - Errors (Fragments, Undersize, Oversize, FCS, Collision, IP/TCP header checksum, etc.)
  - Multi-flow Counter (Up to 255 flows)
- **User-edited filter counters**
  - Filtered traffic measured using two user-edited 32/128-bit data pattern filters per port

Filter and Capture Controls

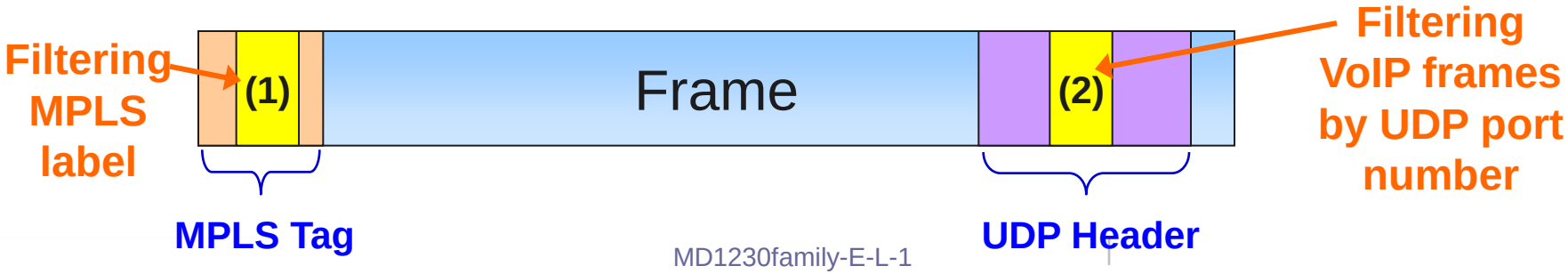
- **Extensive controls for data capture and filter**
  - Example: Troubleshooting network routing problems



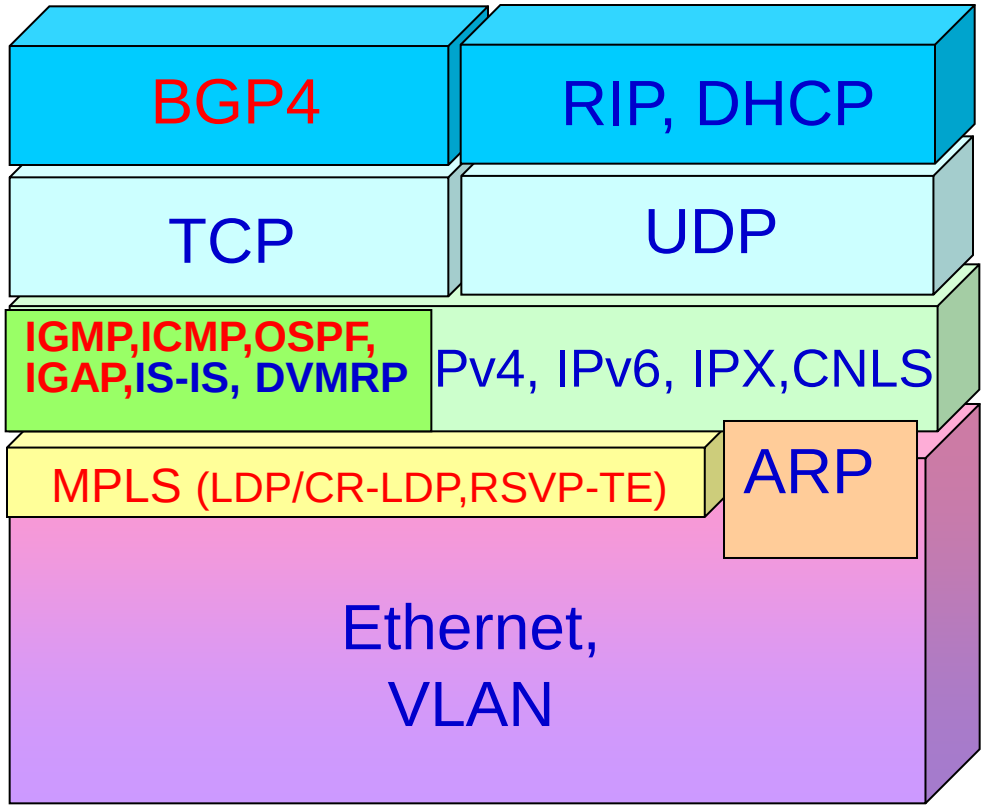
Filter and Trigger Conditions for Data Capture

- **Independent settings for each port**
  - Source IP/MAC address
  - Destination IP/MAC address
  - Two user-defined 32-/128-bit patterns at any offset
  - Various errors
  - Latency overflow (Trigger function only)
  - Traffic overflow (Trigger function only)
  - External trigger input (Trigger function only)

Example: Monitoring only VoIP frames in MPLS networks



Layer 2 to 4 Protocols Captured and Decoded



Standard Protocol Decode Table

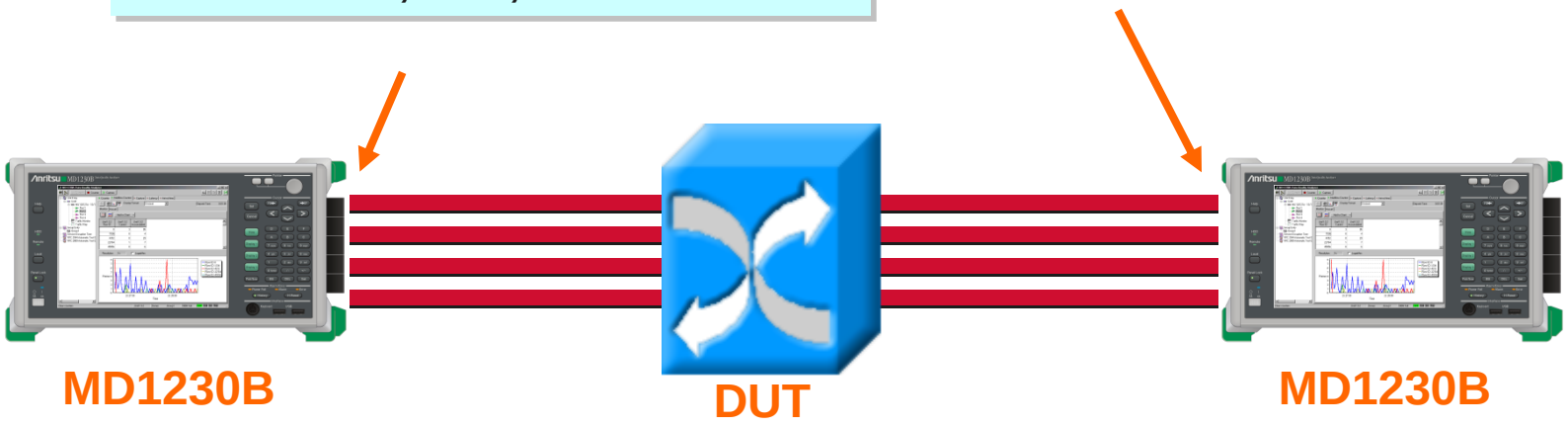
\+ **Ethereal/Wireshark 300 + Decode**

Module	Capture Buffer (per Port)
10/100/1000M Ether	16 MB
1 GbE	16 MB
10 GbE	256 MB

Performance Testing

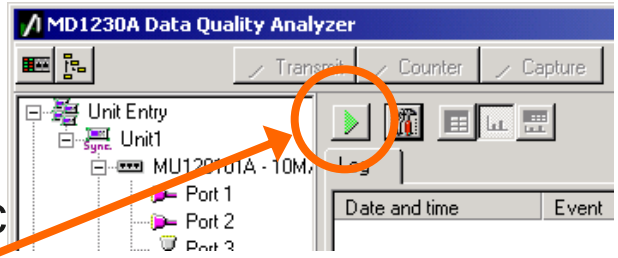
Tx
10/100/1000M, GbE, 10 GbE module

Rx
10/100/1000M, GbE, 10 GbE module



- Throughput
- Latency
- Counter and Capture
- Protocol analysis

Automatic Testing (RFC2544)



RFC2544

- Standard benchmark test for networking devic
  - Sequence testing for up to 8 hours

One-click Operation

- Greatly improved testing efficiency
  - No need to start each test separately

- Throughput
- Frame Loss Rate
- Latency
- Back to Back Frames
- System Recovery
- Reset

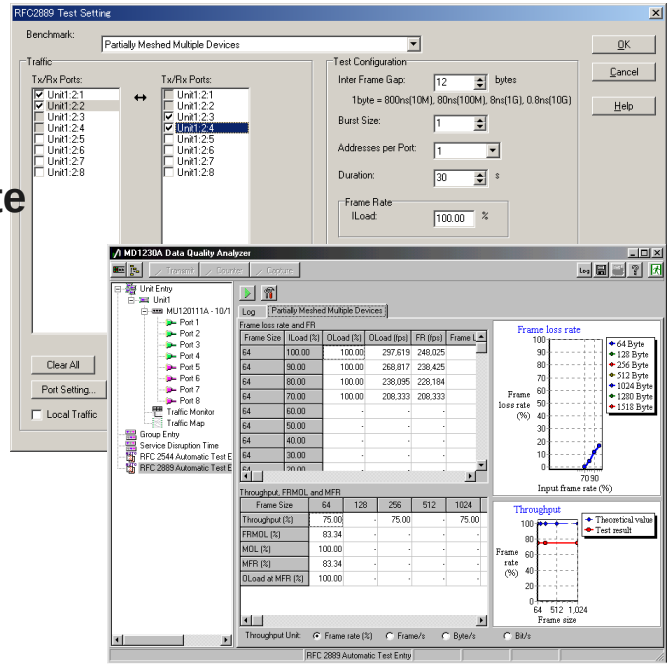
Number of Frames

Frame size	Average	1	2	3	4	5
64	1190476	1190476	1190476	1190476	1190476	1190476
128	675676	675676	675676	675676	675676	675676
256	362320	362320	362320	362320	362320	362320
512	187972	187972	187972	187972	187972	187972
1024	95788	95788	95788	95788	95788	95788
1280	76924	76924	76924	76924	76924	76924
1518	65020	65020	65020	65020	65020	65020

Measurement Items

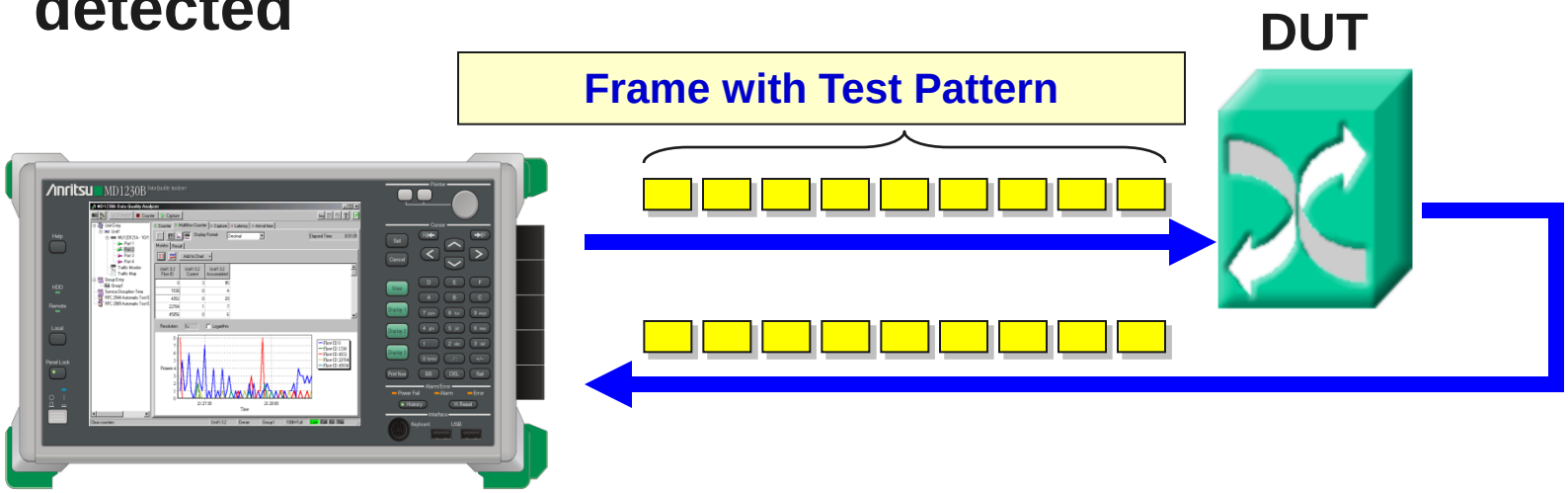
- **Extends methodology defined for benchmarking network interconnecting devices in RFC 2544 to switching devices**

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



Packet BER Measurement Function

- PRBS pattern filled into data field of Ethernet frame at Tx side
- BER calculated at Rx side
- Measurement incremented when Packet Loss, Transmission in Reverse Order, or Double Delivery detected



Unframe BER Measurement Function

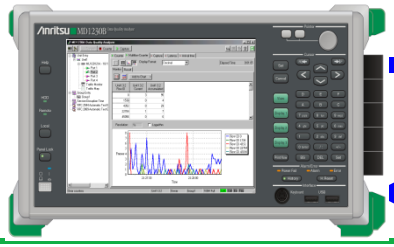
- **Carriers prefer to measure BER of communication line**
  - ✧ Ethernet Module: Preamble and inter-frame gap inserted in unframe test pattern

- **Error insertion function: Single Error and Rate Error**

Transmitted Pattern

All0, All1, USER16, PRBS23, PRBS31, CRPAT*2, CJPAT*2

*2: Only Gigabit and 10 Gb Ethernet



Unframe Pattern Data

···01010010110···

···01101001010···

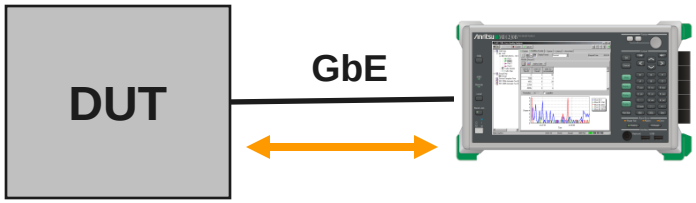
WDM line

Variable Clock

Power Protocol Modules with Variable Clock

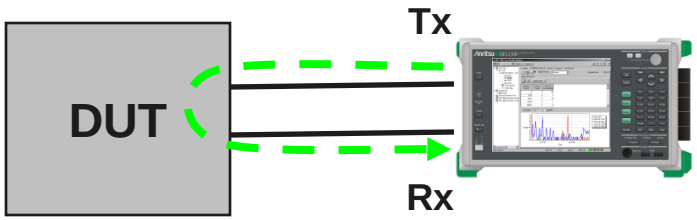
- Range: –100 to +100 ppm (clock accuracy: –4 to +4 ppm)

Link Test



Manually Link Test
–100 ppm OK?
+100 ppm OK?

Frame Forwarding Test



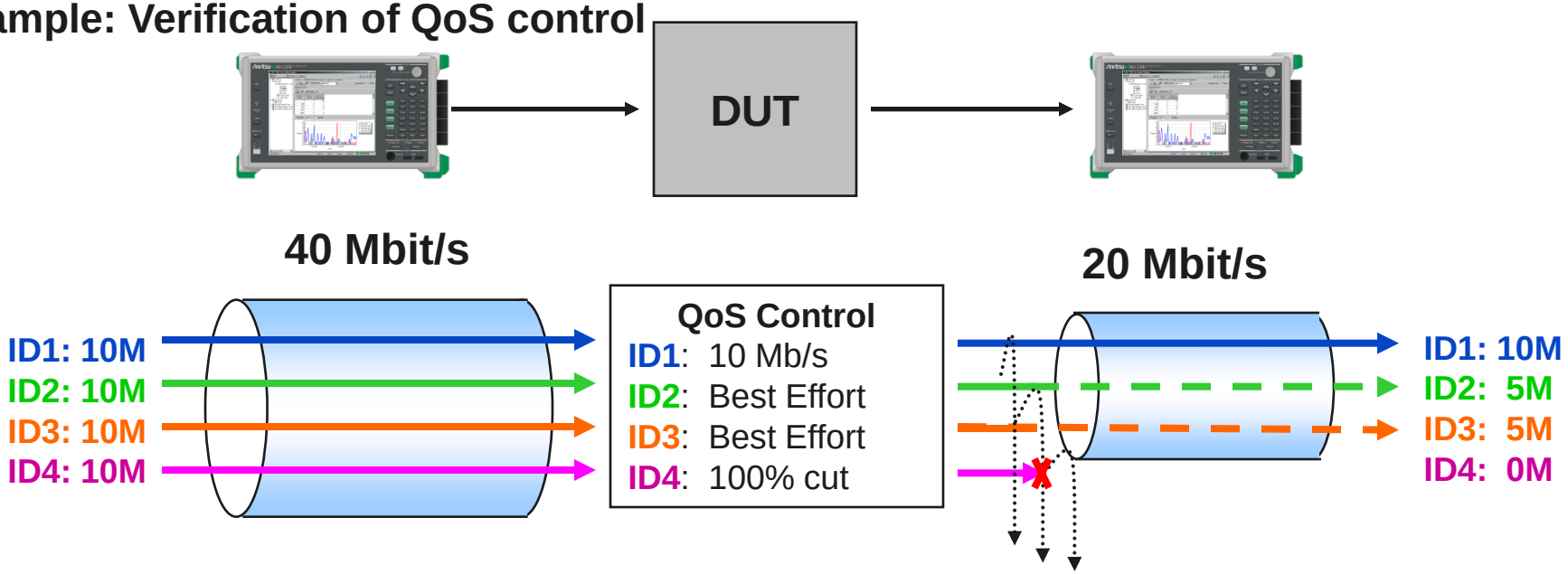
Manually Forwarding Test
Tx –100ppm Rx –100 ppm OK?
Tx +100ppm Rx –100 ppm OK?
Tx –100ppm Rx +100 ppm OK?
Tx +100ppm Rx +100 ppm OK?

Clock tolerance checks from –100 to +100 ppm

Flow Verification with Multi-flow Counter

Real-time counting at each individual ID using multi-flow counter

Example: Verification of QoS control

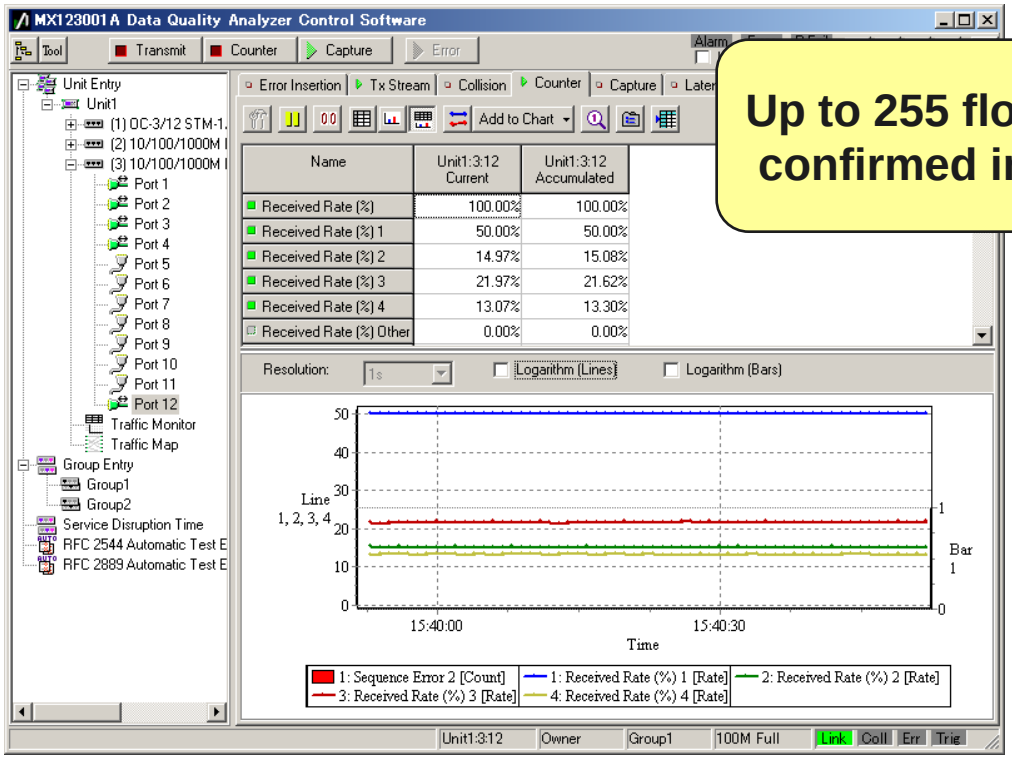


Totaling for specific ID, such as VLAN ID, and measurement by putting up Flow ID when transmitting according to Flow ID

Note: Only supports Ports 1, 2

Multi-flow Counter Screen

255 flow real-time count function*



Up to 255 flows confirmed in real time

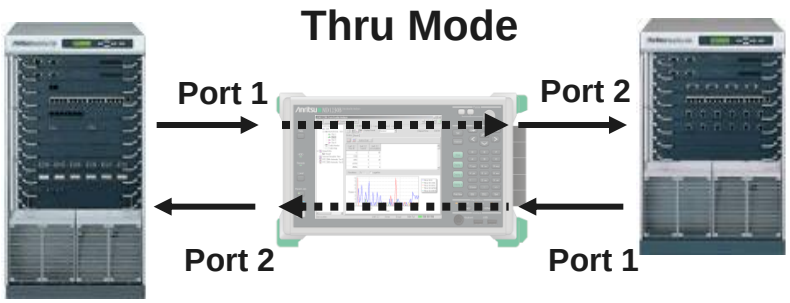
Flow confirmation after QoS controlled

*: MU120131A/32A/38A

Option-15

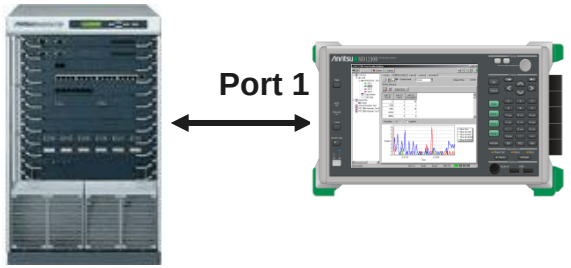
Auto Negotiation Analysis

Auto negotiation analysis



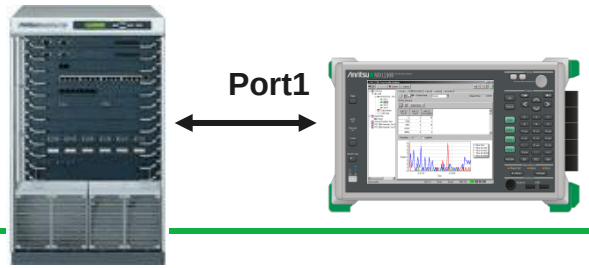
- Confirming auto negotiation sequence
- Confirming interoperability
- Troubleshooting

Code data transmission function



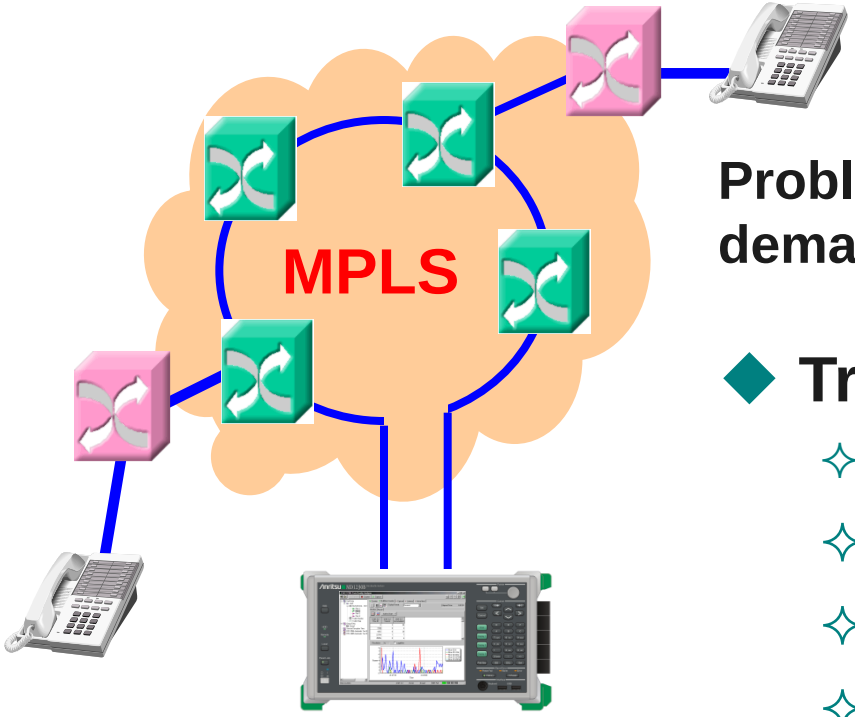
- Confirming auto negotiation sequence
- Checking illegal code reception

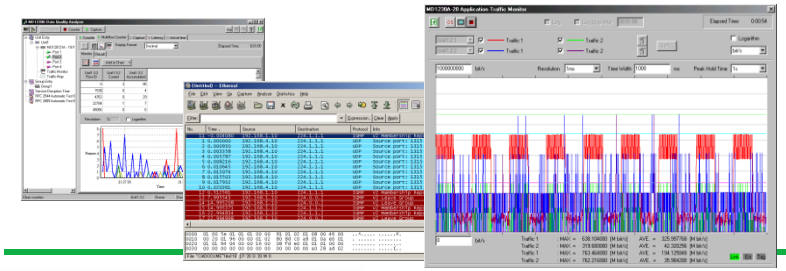
Link timer test



- Confirming operation by changing auto negotiation time

Real-Time Monitoring of In-Service Traffic





Problems on an in-service network demand quick detection and repair

- **Troubleshooting applications**
  - Through mode
  - Monitor mode
  - Traffic monitoring
  - High-Resolution Traffic monitoring
  - Capture and analysis

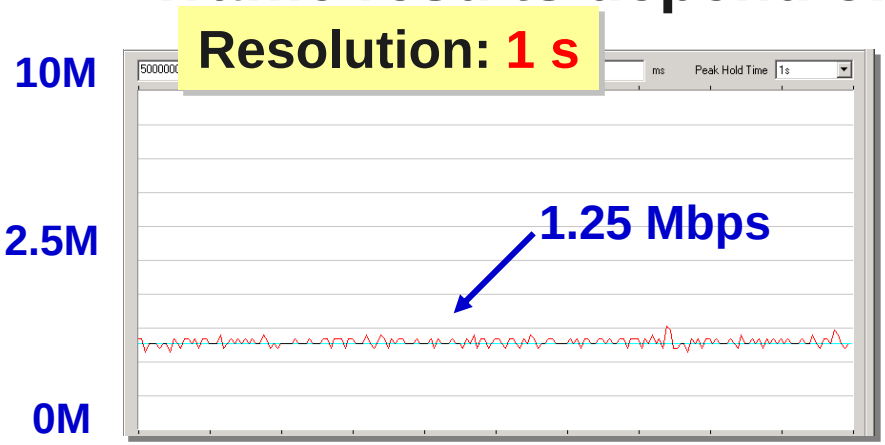
Enhanced IPv6 Support

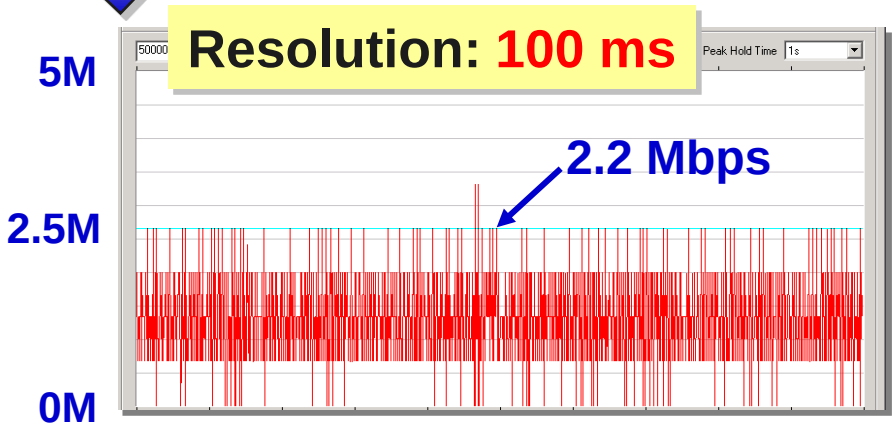
- **Added following IPv6 functions**
  - Support for ICMPv6 response to NS, echo reply, router detection, etc.
  - MLD Emulation
  - Communication confirmation using ping6
  - IPv6 support for RFC2544
  - IPv6 support for Torahiccmonita/map (traffic monitoring/mapping)
  - Following combinations added to transmission stream:
    - IPv6 over IPv4
    - TCP/IPv6
    - UDP/IPv6
    - ICMPv6/IPv6
    - ICMPv6/IPv6 over IPv4
    - TCP/IPv6 over IPv4
    - UDP/IPv6 over IPv4

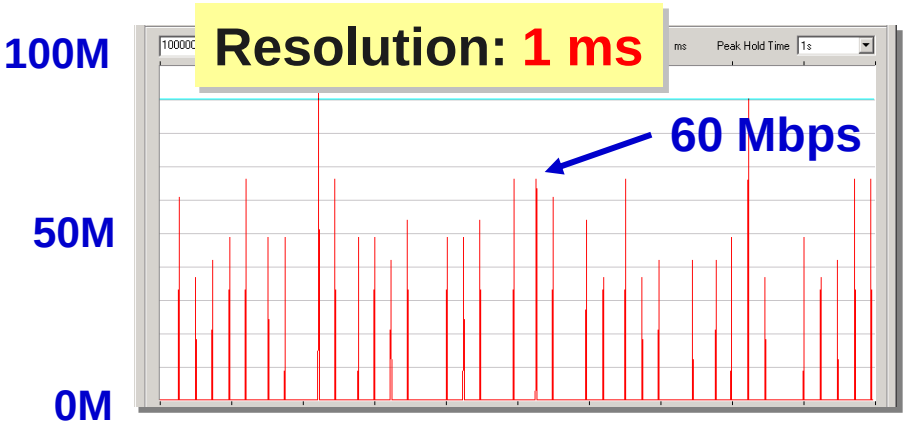
High-Resolution Traffic Monitoring

Option-20

Traffic results depend on measurement resolution



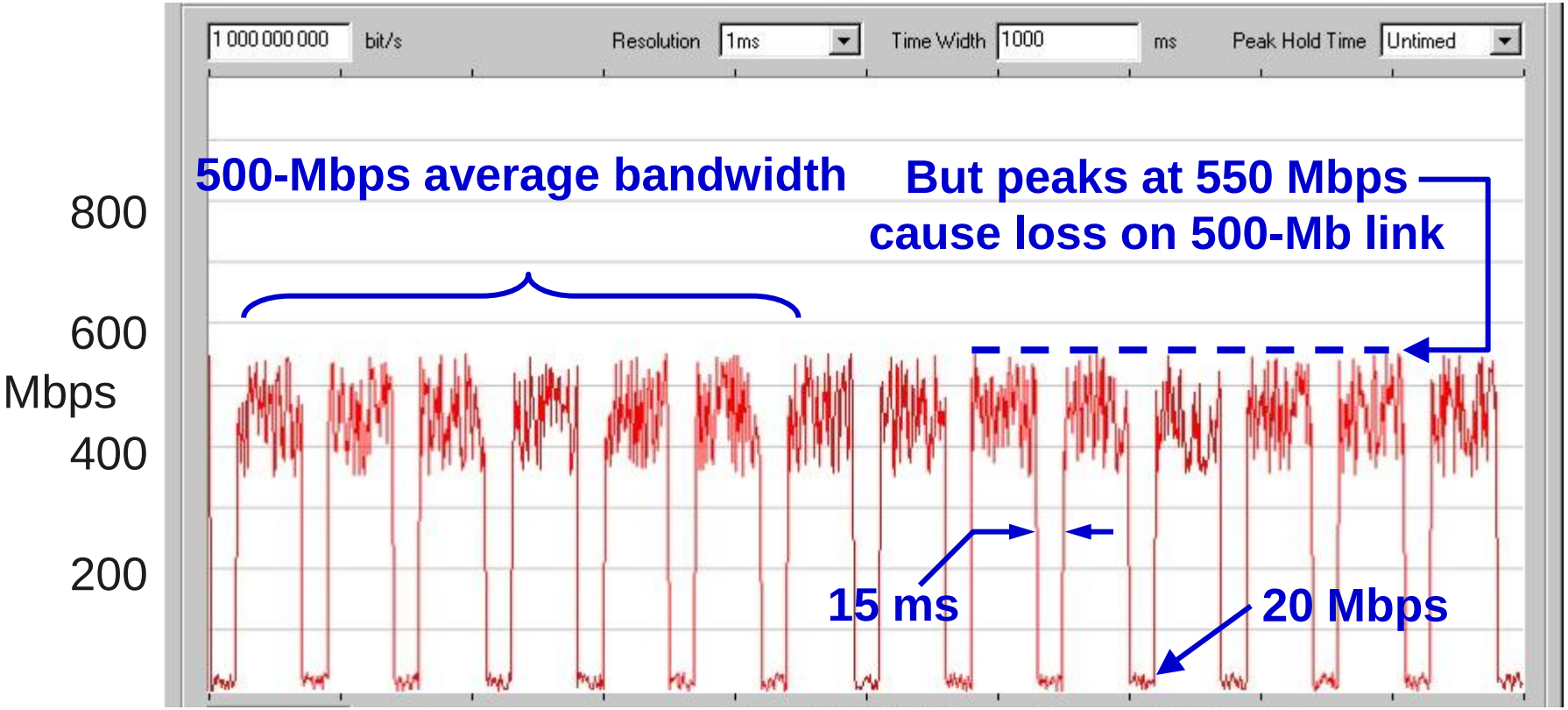




Large difference in measurement results at different resolution even when all screens show same data

⇒Detailed traffic measurement at 1-ms resolution!

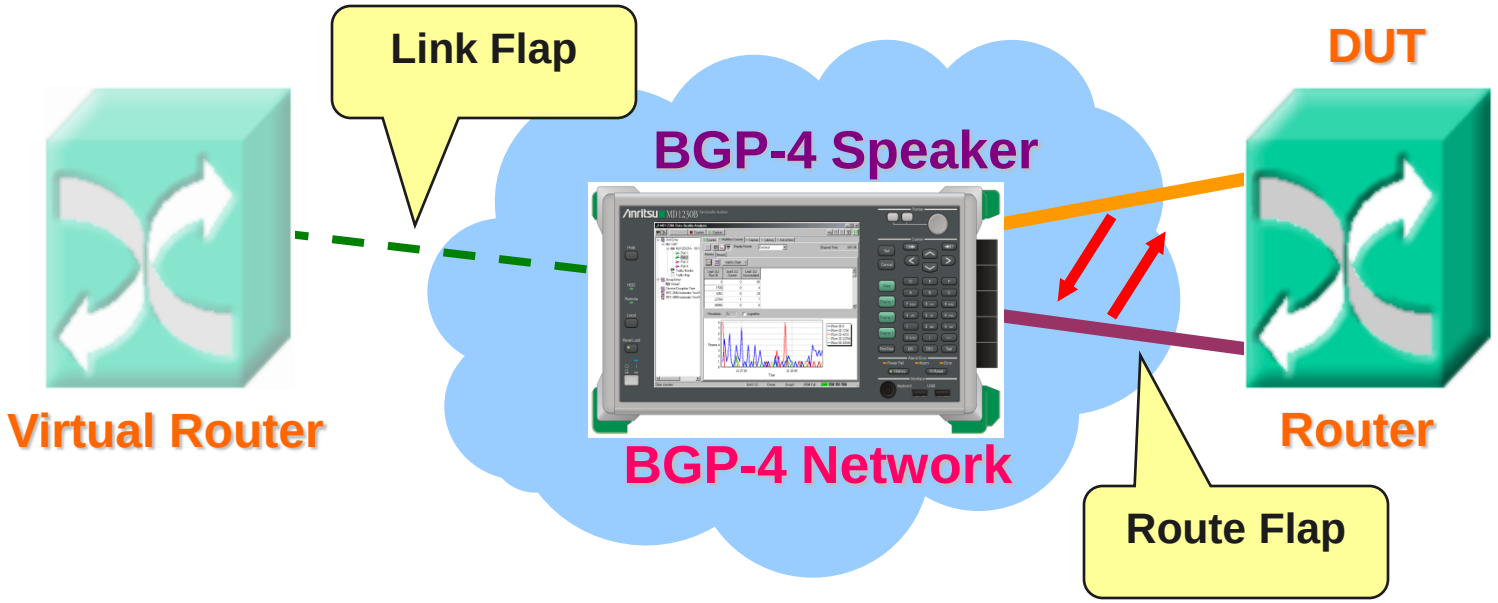
Example: Average bandwidth measurements inadequate for time-sensitive data



Protocol Emulation

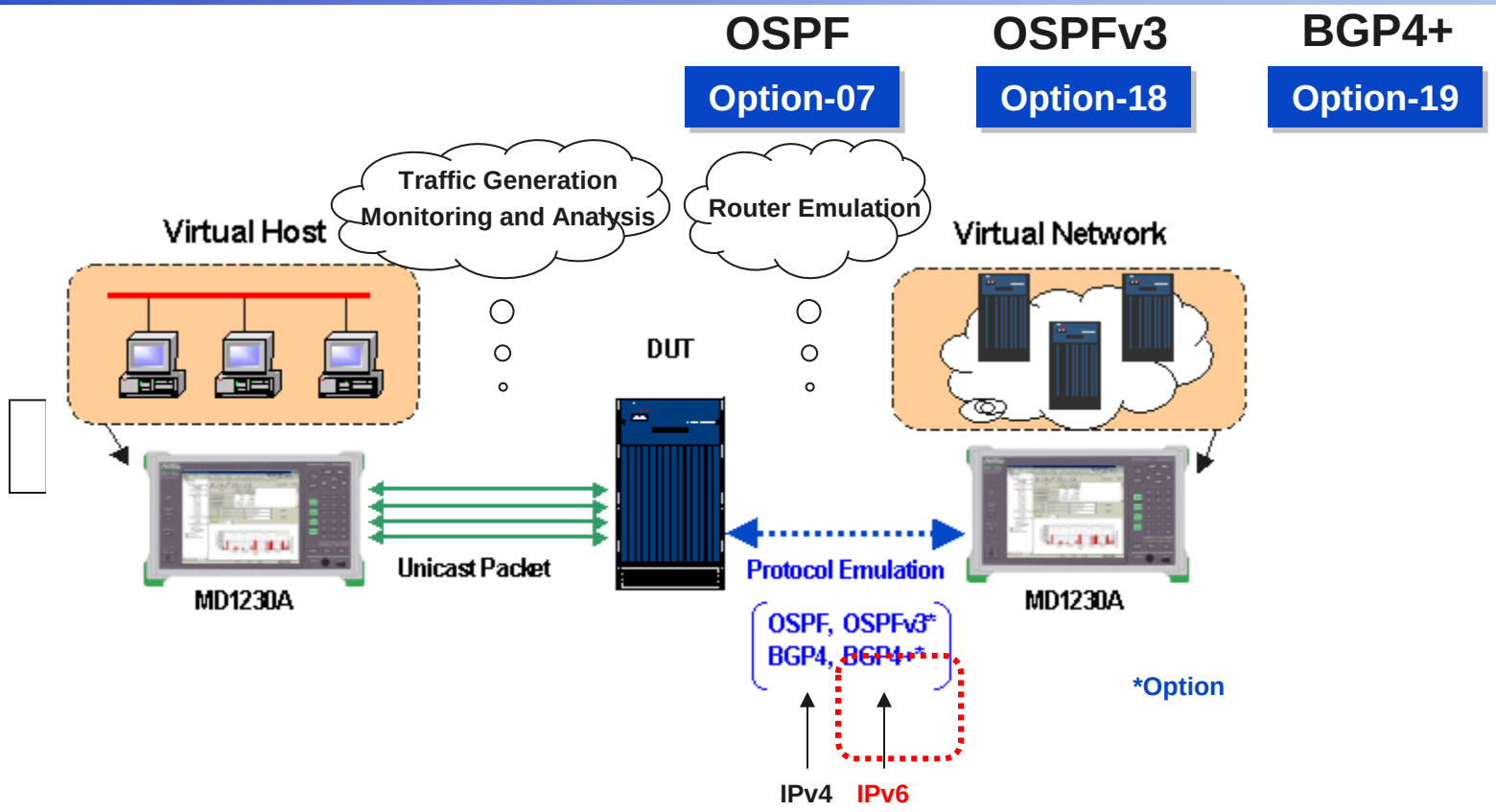
- **Supported protocols**

  PPP, ARP, PING (ICMP for IPv4/IPv6), IGMP, BGP-4, OSPF*1, MPLS (LDP/CR-LDP)*1, MPLS (RSVP)*1, MLD*1



*1: OSPF, MPLS (LDP/CR-LDP), MPLS (RSVP), MLD are options

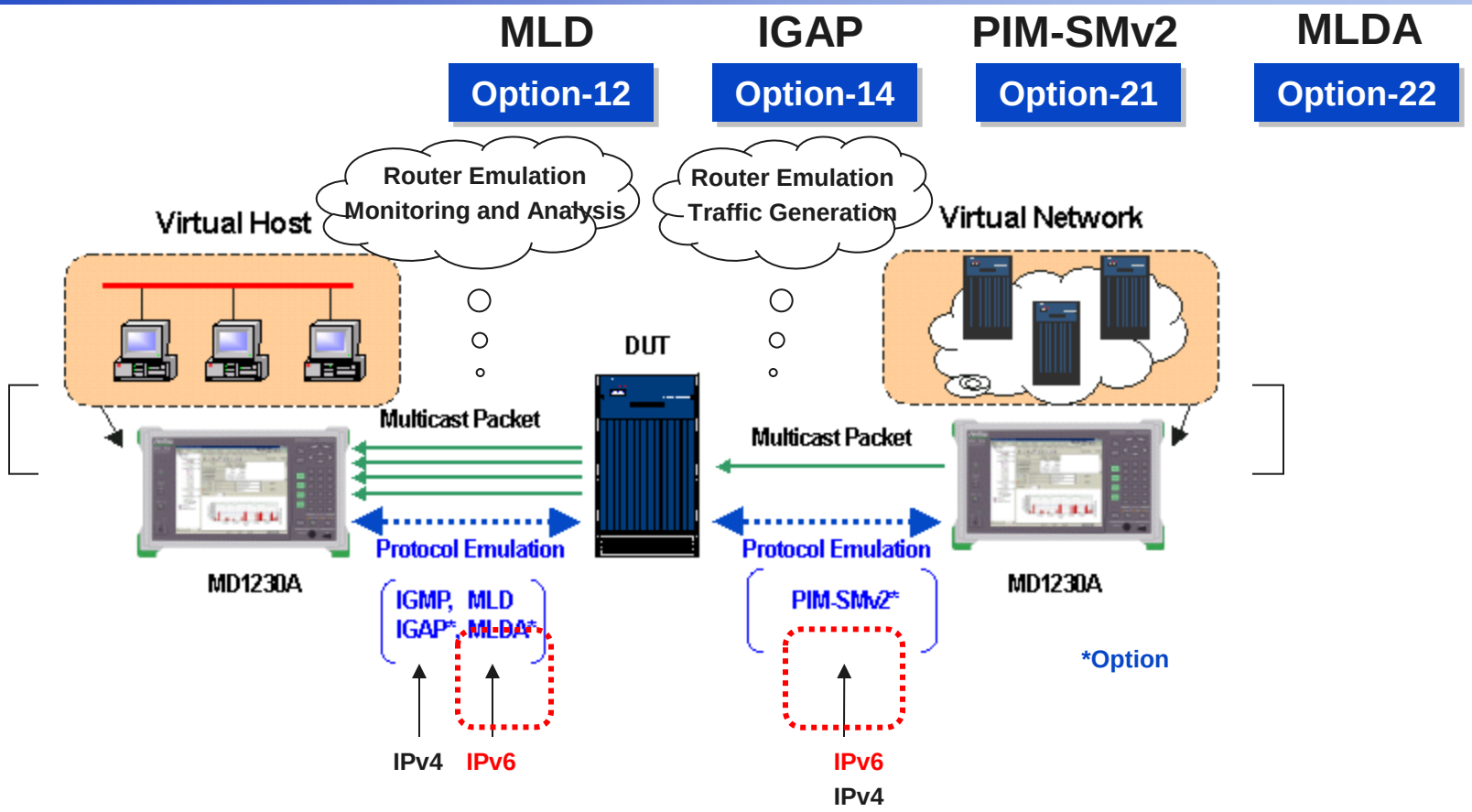
Routing Protocol Emulation



Added OSPFv3/BGP4+ Routing Protocol Option for IPv6 in addition to OSPF/BGP4. IPv6 Router Performance Test achieved by Emulation of Virtual Network and Virtual Host.

*Option-12 IPv6 Enhancing Option required for IPv6 evaluation

Multicast Protocol Emulation

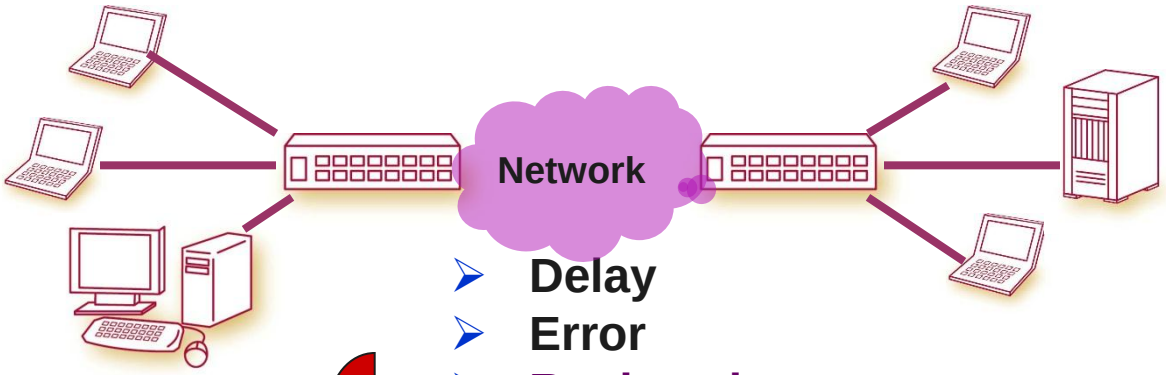


Added MLD/MLDA and PIM-SMv2 Protocol Option for IPv6 in addition to IGMP/IGAP. IPv6 Multicast Network Performance Test achieved by Emulation of Virtual Network and Virtual Host.

* "Option-12 IPv6 enhancing option" is necessary for the evaluation of IPv6.

Traffic Impairment Emulator

Option-17



- Delay
- Error
- Replaced Frames

Simulate

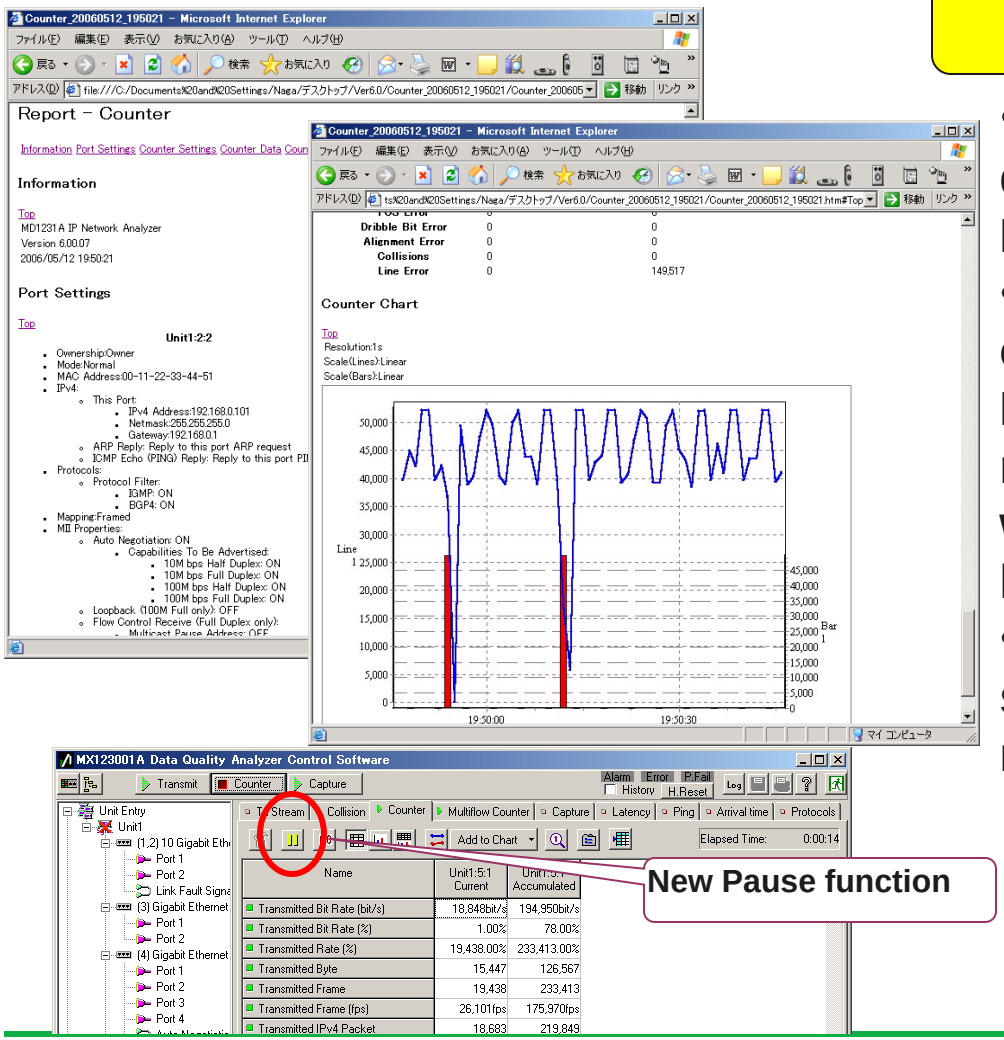
Through Mode

✓Delay and Jitter
✓Frame Loss
✓Overwrite & Error Insertion

Simulate actual network phenomena, such as Delay and Error.

* MU120121A/22A is required for the Traffic Impairment Emulator.

Report Function



HTML-format report file

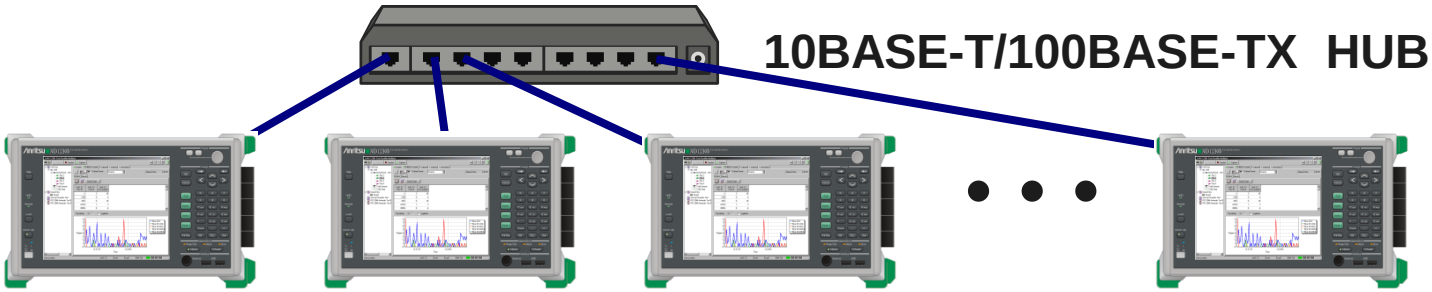
- HTML-format report file (can be displayed and printed at external PC)
- Supports Counter, Multi-flow counter, Latency, Capture, RFC2544, RFC2889 (Measurement results can be saved as a graph with measurement conditions for later analysis.)
- A new Pause function assists saving of results during measurement.

Interface Extendibility

Port Extendibility

- **Any interface module can be installed at any position in any combination.**
  - MD1230B: 5 slots

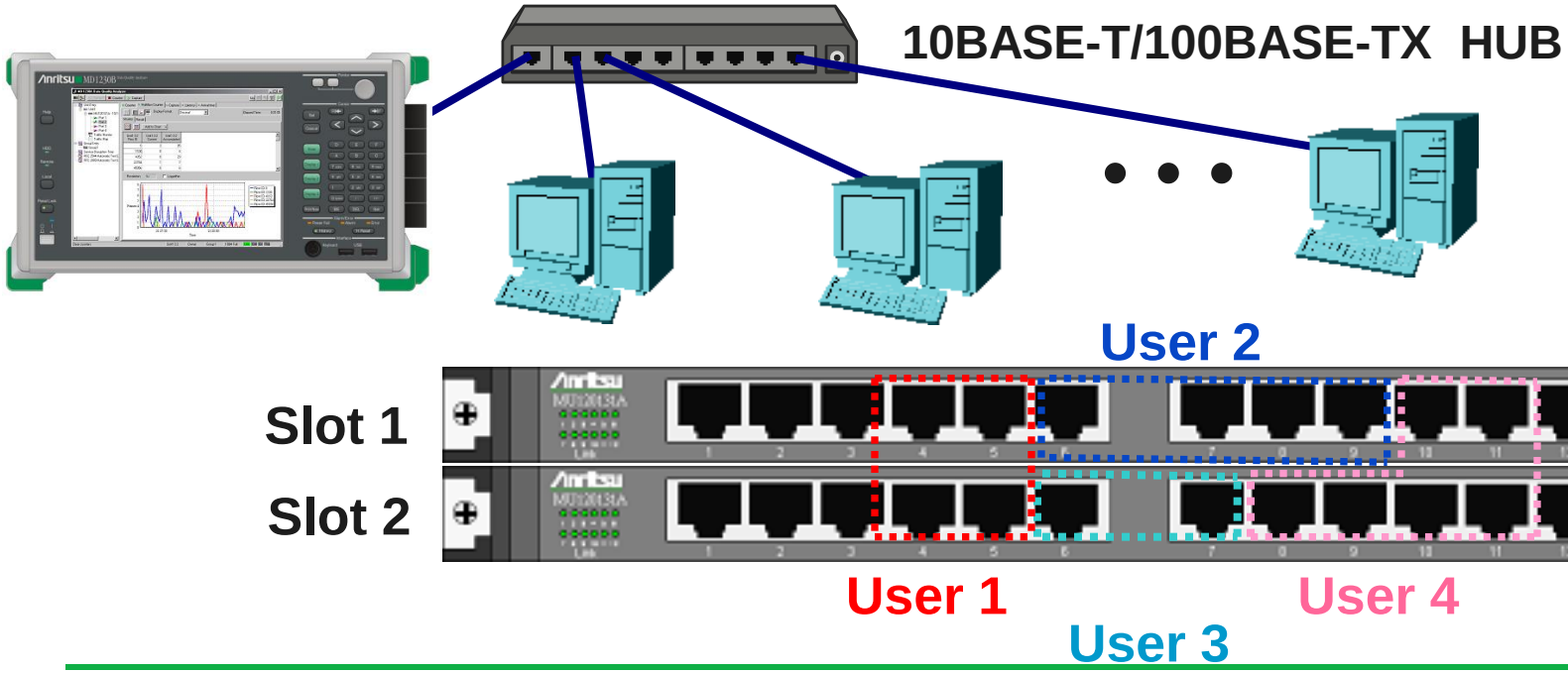
- **One MD1230B can control up to 8 Ethernet-linked testers.**



User Access

Remote Control

- **Simultaneous access from 8 remote users**
  - Remote PCs linked to MD1230A via Ethernet
  - All running same Windows GUI (MX123001A)
  - Independent settings for each port



Appendix A—Plug-in modules

Type	Module Name
MU120121A*	10/100/1000M Ethernet Module
MU120122A*	Gigabit Ethernet Module
MU120131A	10/100/1000M Ethernet Module
MU120132A	Gigabit Ethernet Module
MU120138A	10 Gigabit Ethernet Module

*: MU120121A and MU120122A are custom-made products.

Appendix A—Options

Option Name	MD1230B	MX123001A
RS-232C Control	MD1230B-01	MX123001A-07
GPIB Control	MD1230B-02	MX123001A-09
Ethernet Control	MD1230B-03	MX123001A-10
OSPF Protocol	MD1230B-07	
MPLS(LDP/CR-LDP) Protocol	MD1230B-08	
MPLS(RSVP) Protocol	MD1230B-09	
RFC2889 Benchmarking Test	MD1230B-10	
Packet BER Test	MD1230B-11	
IPv6 Expansion	MD1230B-12	
IGAP Protocol	MD1230B-14	
Auto Negotiation Analysis	MD1230B-15	
Traffic Impairment Emulator	MD1230B-17	
OSPFv3 Protocol	MD1230B-18	
BGP4+ Protocol	MD1230B-19	
Application Traffic Monitor	MD1230B-20	
PIM-SMv2 Protocol	MD1230B-21	
MLDA Protocol	MD1230B-22	
Spanning Tree/Link Aggregation	MD1230B-23	
Ethernet OAM	MD1230B-28	

Appendix A—Module Options

Option Name	MU120131A	MU120132A	MU120138A
Clock Measurement	MU120131A-01	MU120132A-01	MU120138A-01
PoE	MU120131A-02		
Link Fault Signalling			MU120138A-03

Control Software (Sold Separately)

- **MX123001A Data Quality Analyzer Control Software**
  - With Windows® 2000/XP/7 OS installed
  - Up to eight remote PCs can control up to 8 Ethernet-linked units in MD1230B
  - 5 and 8 licenses

Anritsu

Specifications are subject to change without notice.

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