Product Brochure

Anritsu

Network Master Series

MT9090A
Mainframe

MU909060A1/A2/A3
Gigabit Ethernet Module

Gigabit Ethernet Testing Redefined!

MT9090A with MU909060A1/A2/A3 Overview

The Ethernet technology is widely deployed, and used for carrier class Ethernet and Mobile backhaul. Therefore easy testing of Ethernet links is very important. When outfitted with the Gigabit Ethernet Module, the very compact battery-powered, easy-to-use Anritsu Network Master is a comprehensive solution for Gigabit Ethernet testing and for installation and troubleshooting Ethernet communication lines. The instrument gives the user facilities for easy bandwidth verification, connectivity testing and service availability verification. The small size and low weight of the instrument makes it very easy to carry around for the field technician working with the Ethernet lines and despite the small size the instrument is equipped with a large display. The user can easily read and interpret information from the tested lines off the large color display with easy-to-understand colors and graphical symbols. And the graphical user interface makes it a simple task to configure and operate the instrument.

Key Features

- RJ45 and SFP optical interface are selectable for two ports
- Stacked VLAN(Q-in-Q), MPLS, IPv4, IPv6 supported
- Test Automator simplify operation and ensure proper set-up
- Ping, Traceroute, Ramp data generation, RFC 2544 testing
- Upstream/Downstream individual and simultaneous testing with end-to-end RFC 2544
- Service Disruption Time measurement for VoIP and IPTV
- Shorter testing time of multiple port networks by utilizing MT9090 ports
- Optical power level check and electrical cable test for physical layer testing
- In-band pass through and bidirectional monitoring using two ports
- Channel Stats for identifying error streams, top talkers, network attacks
- PDF and CSV report generation for documentation of test results
- Modular platform ensures maximum return on investment
- Compact and lightweight design for maximum portability in the field

Designed for Field Operations

The Network Master Gigabit Ethernet tester is purpose built for testing Ethernet links in the field. Its hardware and user interface are optimized for simplicity, making it easy to use for any skill level, and it is rugged enough to function in harsh environments.

Quick Startup

The Network Master Gigabit Ethernet tester is ready for measurement in about 15 seconds so productive work can start immediately.

Long Battery Life

Since AC power is not always available where you need it, the Network Master Gigabit Ethernet tester provides up to 3 hours of testing on a single charge, depending on configuration and setup. This coupled with an optional car cigarette lighter cord guarantees the instrument is ready when you are.

Portable

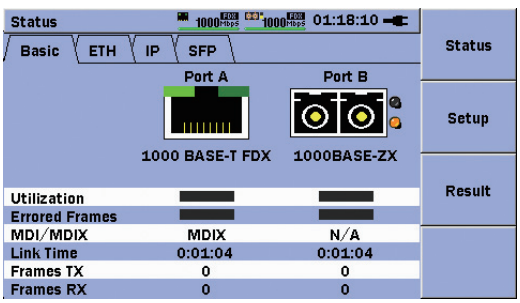
With its lightweight design and user friendly dimensions, the Network Master Gigabit Ethernet tester is perfect for the outside plant environment and can easily be managed with one hand. The standard softcase with shoulder strap further increases portability when traveling from the truck to the testing site.

Rugged

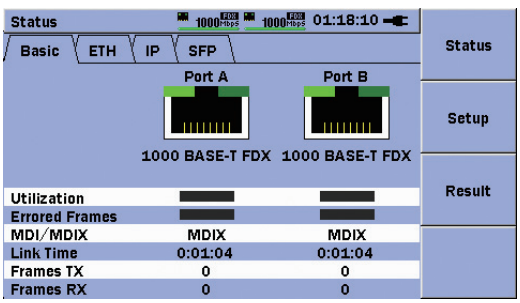
With no fans or vents to allow dust and moisture to enter the unit, the Network Master Gigabit Ethernet tester was designed for the challenging outside plant environment.

4.3-inch Wide Screen Display for Easy Viewing

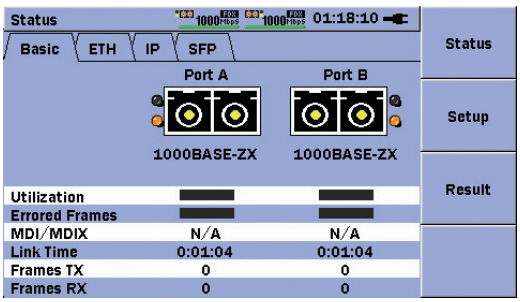
The high resolution, full color, 4.3-inch wide screen display is the perfect format for viewing Ethernet measurement results. It also provides excellent readability both indoors and outdoors.



MU909060A1



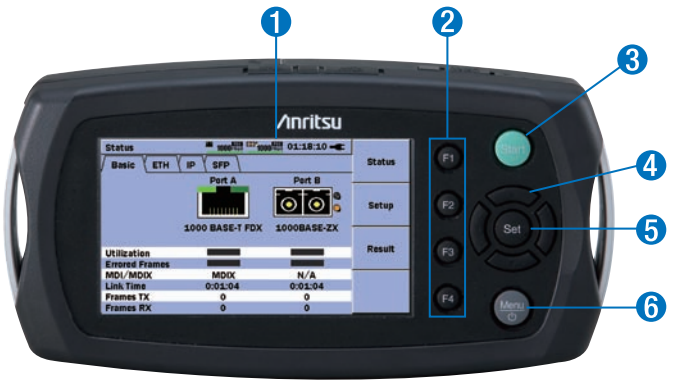
MU909060A2

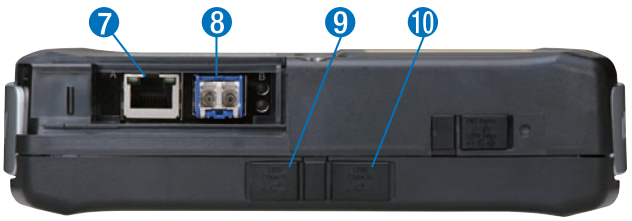


MU909060A3

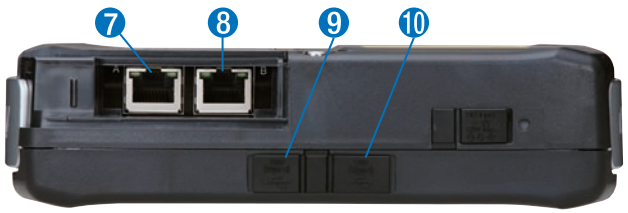
No Experience Required

The expertise is built into the Network Master Gigabit Ethernet tester. With its Test Automator and PASS/FAIL indicators the instrument makes it easy to test and troubleshoot Ethernet connections.

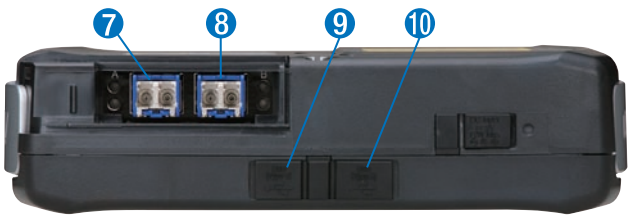




MU909060A1



MU909060A2

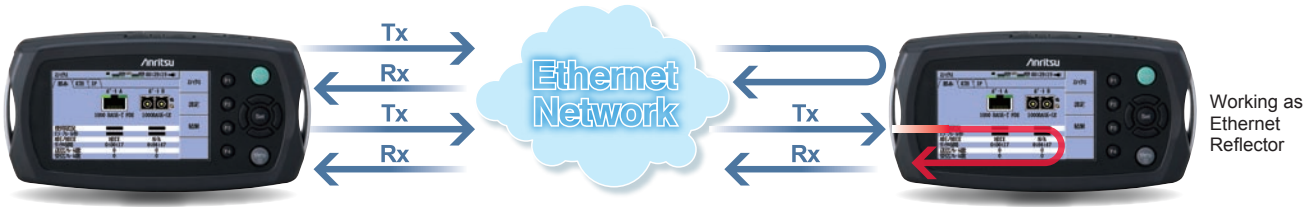


MU909060A3

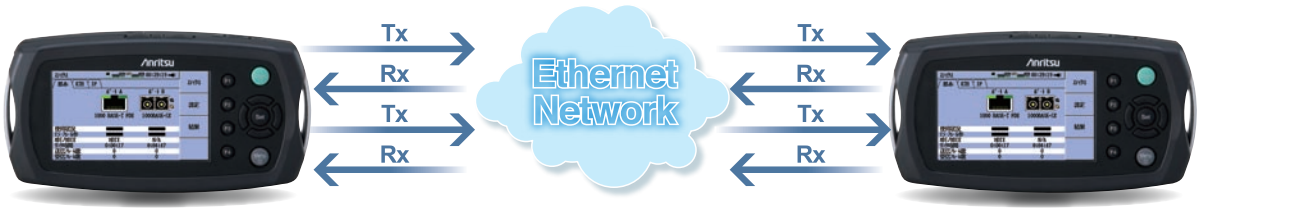
1. 4.3-inch high resolution, Indoor/Outdoor color display
2. Dedicated function keys for performing tasks
3. Start key for fast testing
4. Arrow keys for cursor movement and menu navigation
5. Set to Select/Accept
6. Menu key for easy access to set-ups and mass storage
7. Ethernet test port A
8. Ethernet test port B
9. USB port for connecting to PC Type B (mini USB)
10. USB port for connecting to thumb drive and USB-Ethernet converter Type A

Application 1 Installation

For installation, commissioning and QoS verification the Network Master Gigabit Ethernet tester provides powerful and flexible traffic generation capabilities, allowing you to easily test the network under various conditions, including generation of VLAN tagged traffic. The instrument also provides facilities for BER testing of the lines, performance statistics and QoS statistics.



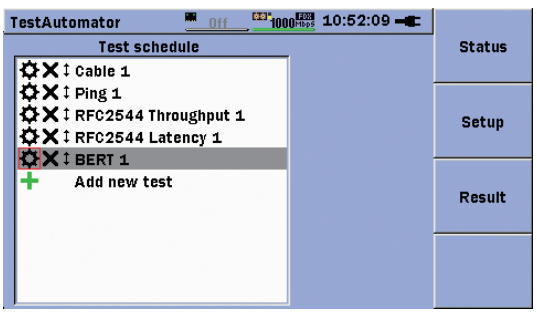
Single end test with Loopback or Using a Ethernet Reflector, Two ports simultaneous testing for multiple ports installation.



Bidirectional performance test with End-to-End RFC 2544, Two ports simultaneous testing for multiple ports installation.

Installation and Maintenance Simplified

Since the Network Master Gigabit Ethernet tester is purposely built for easy testing of Ethernet links in the field, its hardware and user interface are optimized for simplicity. The instrument is easy to setup using its keys and screen. The user can also store setups relevant for a given application and via a USB port distribute the setup to other instruments with the Gigabit Ethernet module. A Test Automator is provided making it easy to set up a sequence of tests.



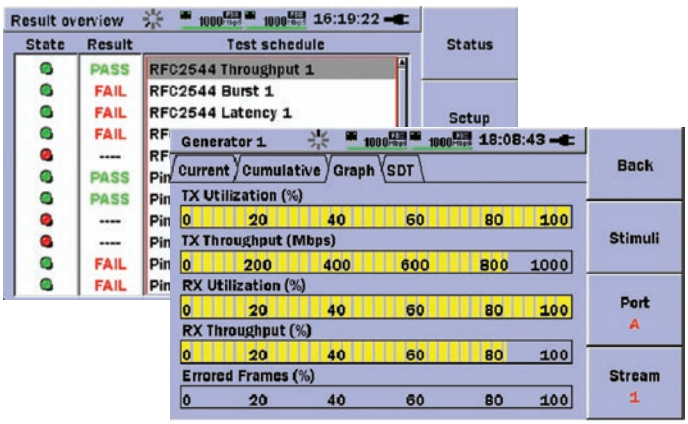
The Test Automator makes it easy to set up a sequence of tests

Report Generation

With the powerful and flexible report generator you can create .pdf or .csv files for selected measurement results. With these files you can provide professional documentation of test results to your customers.

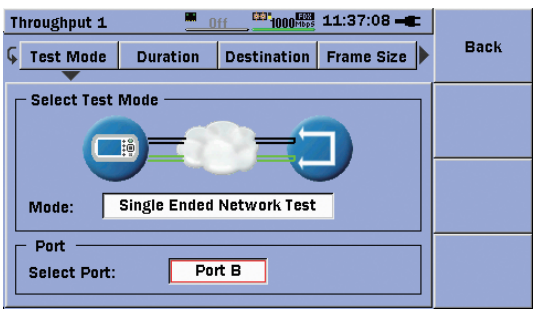
PASS/FAIL indication, Graphical Display

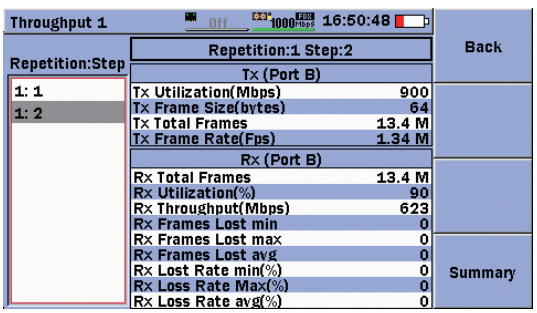
The result can be checked not only value but also PASS/FAIL indicator and Graphical Display



RFC 2544 Test Option

The IETF RFC 2544 “Benchmarking Methodology for Network Interconnect Devices” defines a number of tests to be used for describing the performance characteristics of these network devices. When the instrument is equipped with the RFC 2544 test option, testing of performance parameters, such as throughput and frame loss, latency, packet jitter and burstability in compliance with RFC 2544 is straightforward. The Network Master Gigabit Ethernet tester automates the testing procedure while still allowing you to configure the test to be as thorough as needed. To get full information on the performance of both sides of a line, the end-to-end test mode allows two Network Master Gigabit Ethernet testers to work together in a master-slave setup whereby the user can control both units and inspect the results of the test from both units on the master instrument.





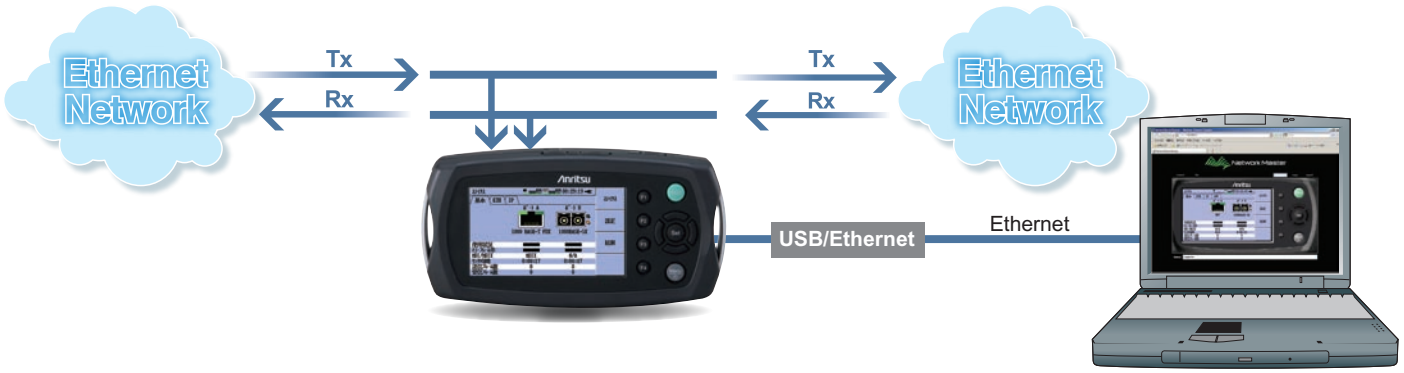
Multistream Option

The Ethernet Multistream option for the Network Master Gigabit Ethernet tester allows testing a congested networks ability to transport high priority traffic rather than lower priority traffic. The user can activate up to 8 streams with different priority settings on the Ethernet line and detect how they are affected by frame loss through the network.

Application 2 Maintenance and Troubleshooting

The Network Master Gigabit Ethernet tester has maintenance and troubleshooting application in 800 g pocketable package.

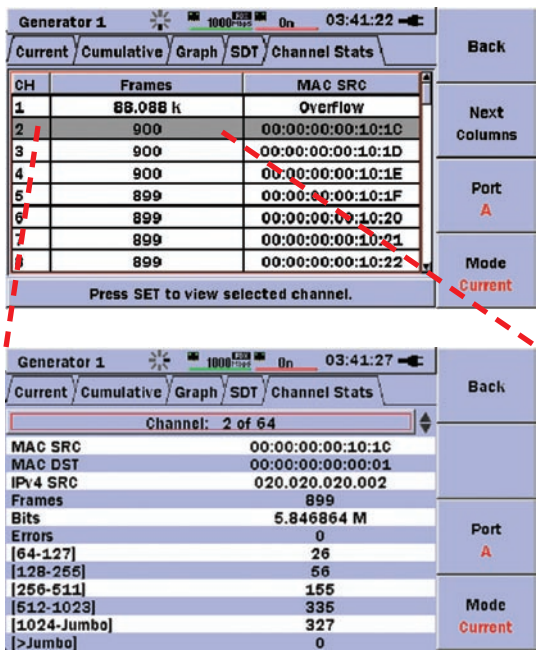
Pass through monitoring by inserting the tester in a network. Tx and Rx of two ports are used for this application.



Bidirectional monitoring by dividing both signals and put them into the tester. Two Rxs are used for this application.

Channel Stats (Option)

Up to 63 streams can be selected by the filter of Source/Destination addresses, VLAN, MPLS. Those streams can be monitored and displayed in detailed information. It's useful to identify the error streams, top talkers and network attack.

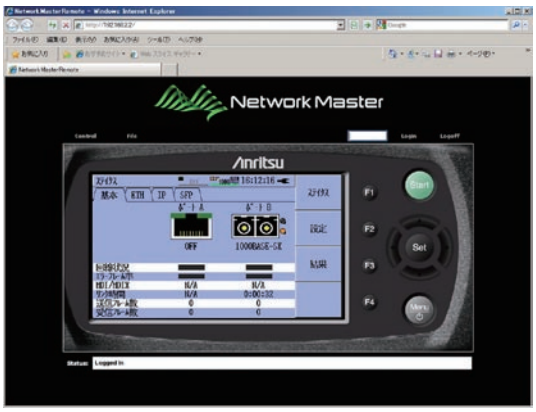


Simultaneous Two Ports Monitoring

Network Master Gigabit Ethernet tester has two ports and they can be used simultaneously. It saves the test time for multiple ports deployment. It is possible to support identification of issues in the network by pass through monitoring and bidirectional monitoring.

Remote GUI Option

Network Master Gigabit Ethernet tester can be operated remotely from the far end operation center using a Web browser. USB-Ethernet Converter (option) connects the Network Master Gigabit Ethernet tester with Ethernet for remote control.

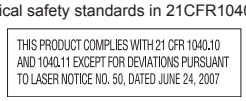


Specifications

The specification table below applies to the Network Master Mainframe equipped with the Gigabit Ethernet Module.

Ethernet Interfaces	Interfaces	• Electrical interfaces: 10/100/1000 Mbps RJ 45 (10BASE-T, 100BASE-TX, 1000BASE-T) • Optical interfaces: 100 or 1000 Mbps LC connector (100BASE-FX, 100BASE-LX, 1000BASE-SX, 1000BASE-LX or 1000BASE-ZX)			
	Interface Configurations	• MU909060A1: Gigabit Ethernet Module with one SFP port and 1 electrical RJ-45 port. One optical module can be installed • MU909060A2: Gigabit Ethernet Module with 2 electrical RJ-45 ports. • MU909060A3: Gigabit Ethernet Module with two SFP ports. Two electrical or optical modules can be installed			
	Duplex Modes	Full duplex. Electrical 10/100 Mbps also half duplex			
	Test Configurations	Monitor/Generate, Pass through, Reflector			
Optical Modules*1	Description	Min. input sensitivity and wavelength		Output power and wavelength	
	1000BASE-SX 850 nm Multi Mode	–17 dBm	770 nm to 860 nm	–9.5 to –1.5 dBm	830 nm to 860 nm
	1000BASE-LX 1310 nm Single Mode	–20 dBm	1260 nm to 1580 nm	–10 to –3 dBm	1285 nm to 1343 nm
	1000BASE-ZX 1550 nm Single Mode	–22 dBm	1260 nm to 1580 nm	–3 to +5 dBm	1480 nm to 1580 nm
	100BASE-FX 1310 nm Multi Mode	–31 dBm	1260 nm to 1570 nm	–20 to –14 dBm	1270 nm to 1335 nm
	100BASE-LX 1310 nm Single Mode	–28 dBm	1260 nm to 1570 nm	–15 to –8 dBm	1261 nm to 1360 nm
Generate	Supported Encapsulations	EtherType II (DIX v.2), IEEE 802.3 with 802.2 (LLC1), IEEE 802.3 with SNAP			
	Traffic Generation/Monitor	• Variable line rate traffic generation, up to full line rate • Traffic shaping: Constant, Burst, Ramped • Frame sizes can be set to Constant, Stepped or Random length • Configurable MAC/IP source and destination addresses (supports IPv4 and IPv6), UDP/TCP address and DSCP/TOS byte • Request IP source address from a DHCP server (On/Off) • Adjustable frame size from 46 to 10,000 bytes • User defined up to 3 level VLAN ID and VLAN priority • User defined up to 3 level MPLS label • User defined traffic mix of unicast and broadcast frames • Generate and respond to pause frames • Answer incoming ARP request (On/Off) • MAC /IP address swapping (reflector configuration) Test Result Current/Cumulative: Total frame, Total bit, Utilization, Throughput, Broadcast frame, Error frame, Frame loss, Frame loss rate Graph: Tx utilization, Tx throughput, Rx utilization, Rx throughput, Error frame Service Disruption Time: Min, Max, Average, Count, Total time, Total SDT (%) , Last frame received (interval) timestamp Channel Stats: Total frame, Total bit, Error, Frame size distribution of up to 63 filtered streams			
Measurements	Status	Link status, Signal and Frames present (utilization), Errored frames, Rx/Tx frame count, Link time, Remote fault, Speed, Full/Half duplex, MDI/MDIX, Interface type, Link partner abilities (Pause capable and Asymmetric pause capable), Local clock (1000 Mbps), DHCP lease time, Optical level for optical interfaces			
	Frame Statistics	Link status, Signal and Frames present (utilization), Error frames, Rx/Tx frame count, Link time, Remote fault, Speed, Full/Half duplex, MDI/MDIX, Interface type, Link partner abilities (Pause capable and Asymmetric pause capable), Local clock (1000 Mbps), DHCP lease time, Optical level for optical interfaces			
	Event Log	The instrument logs major events during a test with a 1 sec. resolution time stamp. Logged events include: Link/No link and Test Start/Stop			
	Report Generation	Generation of test result reports as pdf-files. The report may be customized with a user logo and comments.			
Dedicated Tests	Electrical Cable Test	NB: The electrical cable test is not available when using electrical SFP modules. • Detection of MDI/MDIX mode, Link speed and status, Cable status and distance to fault (if any), Polarity. For 1000 Mbps also skew • Pin mapping: Tx/Rx for 10/100 Mbps, DA, DB, DC, DD for 1000 Mbps			
	BER Test	Generation and detection of test patterns. Count of errors in received test pattern. Pattern generation: Unframed, Framed with IP header or Framed with IP and TCP/UDP header Test patterns supported: FOX, all 0, all 1, 0101, PING, PRBS 9, PRBS 11, PRBS 15, PRBS 20, PRBS 23, PRBS 29, PRBS 31, HF test pattern, CRPAT, JTPAT, SPAT Detection of sequence errors and loss of sequence synchronization.			
	Ping Test	For connectivity and configuration check • Round Trip Time (RTT) • Supports IPv4 and IPv6 addressing • Answer incoming Ping requests (On/Off)			
	Traceroute Test	Setup: Number of Attempts, Max number of hops, Number of ping each host, Timeout Result: Number of hop, Host IP address, Number of Received/Lost replies, Min/Max/Average time			
	RFC 2544 Installation and Commissioning Tests (Option)	Single ended network test and Switch/Router test modes: Throughput and utilization, Frame loss, Latency, Packet jitter, Back-to-back frames (burstability) End-to-End network test mode (two Network Master Gigabit Ethernet testers in a master-slave setup): Throughput and utilization, Frame loss, Back-to-back frames (burstability) Router latency test mode: IP ping based latency, IP ping based packet jitter			
	Multistream Test (option)	Number of streams: Up to 8 streams can be activated on the Ethernet line available information per stream: Frame loss count/rate, Frames and bytes received, Frames and bytes transmitted			
	HTTP/FTP Test	Test mode: HTTP, FTP Setup: Target directory, Download file name, Authentication Result: Received/Total file size, Min/Max/Average throughput			
	Reflector Delay	Maximum internal delay when instrument is in reflector configuration: 2.44 µs @1000 Mbps, 5.16 µs @100 Mbps, 31.93 µs @10 Mbps			
Miscellaneous	Internal Memory	Internal memory for storage of results, setups and screen shots: 40 MB			
	Stored Configurations	The user can save a number of configuration files for later recall. The configuration files can be transferred to other instruments via the instruments USB port.			
	Test Automator	The user can create a macro to run several tests in sequence. The user can also load, save, import and export test macros			
	Service Interface	Two USB 1.1 (One type A for USB memory stick, One type B for USB mass storage)			
	Display	4.3-inch color LCD (480 × 272 pixels), with LED back light, transmissive			
	Language	English, Japanese, Chinese (Simplified, Traditional), Spanish, German, Korean, French			
	Battery	• Dedicated battery pack or 4 AA Ni-MH • Operating time: Up to 3 hours, depending on configuration and test setup • Charging time: 4 hours while power off (typ.), Temperature: +10° to +30°C • Indicator for battery level in display when the unit is turned on			
	Power Supply	AC adapter: 9 V(dc), 100 V(ac) to 240 V(ac), Frequency: 50 Hz/60 Hz			
	Dimensions and Mass	MT9090A: 190 (W) × 96 (H) × 18 (D) mm, <200 g MU909060A1/A2/A3: 190 (W) × 96 (H) × 30 (D) mm, <600 g			
	Environmental	• Operational Temperature Range: 0° to +40°C, humidity ≤85%, No condensation • Storage Temperature Range: –25° to +60°C, humidity ≤80%, No condensation • Vibration: IEC 60 068-2-6 Fc and IEC 60 068-2-64 Fh, Dust and Drip proof: IP 51			
	EMC	EN61326-1, EN61000-3-2			
	Laser Safety*3	IEC 60825-1: 2007 CLASS 1, 21CFR1040.10*2: MU909060A1/A3 with optical modules			

∗1: Correct functioning can only be guaranteed with optical modules from Anritsu for the Network Master Gigabit Ethernet tester. Modules with extended temperature range (up to +85°C) must be used.
∗2: Excludes deviations caused by conformance to Laser Notice No. 50 dated June 24, 2007
∗3: Safety measures for laser products
This product complies with optical safety standards in 21CFR1040.10 and IEC 60825-1; the following descriptive labels are affixed to the product.



Ordering Information

Please specify the model/order number, name and quantity when ordering.
The names listed in the chart below are Order Names. The actual name of the item may differ from the Order Name.

1) Select Mainframe

Includes battery pack, AC charger/adapter, standard soft case and strap

Model/Order No.	Description
MT9090A	Mainframe (with color LCD)

2) Select Base Model

Includes quick start guide in hardcopy and operation manual in CD

Model/Order No.	Description
MU909060A1	Gigabit Ethernet Module (with one SFP slot and one RJ-45 port)
MU909060A2	Gigabit Ethernet Module (with two RJ-45 ports)
MU909060A3	Gigabit Ethernet Module (with two SFP slots)

3) Select Module Option

One module can be installed in MU909060A1. Two modules can be installed in MU909060A3

Model/Order No.	Description
G0240A	1000 Mbps SX SFP [850 nm multimode, LC connector (optical)]
G0241A	1000 Mbps LX SFP [1310 nm single mode, LC connector (optical)]
G0242A	1000 Mbps ZX SFP [1550 nm single mode, LC connector (optical)]
G0243A	100 Mbps FX SFP [1310 nm multimode, LC connector (optical)]
G0244A	100 Mbps LX SFP [1310 nm single mode, LC connector (optical)]
G0246A	10/100/1000 Mbps RJ-45 SFP (electrical)

4) Select Software Option

Model/Order No.	Description
MU909060A1-001	RFC 2544 Test (for MU909060A1)
MU909060A2-001	RFC 2544 Test (for MU909060A2)
MU909060A3-001	RFC 2544 Test (for MU909060A3)
MU909060A1-002	Multistream (for MU909060A1)
MU909060A2-002	Multistream (for MU909060A2)
MU909060A3-002	Multistream (for MU909060A3)
MU909060A1-003	Stacked VLAN (for MU909060A1)
MU909060A2-003	Stacked VLAN (for MU909060A2)
MU909060A3-003	Stacked VLAN (for MU909060A3)
MU909060A1-004	MPLS (for MU909060A1)
MU909060A2-004	MPLS (for MU909060A2)
MU909060A3-004	MPLS (for MU909060A3)
MU909060A1-005	Remote GUI (for MU909060A1)
MU909060A2-005	Remote GUI (for MU909060A2)
MU909060A3-005	Remote GUI (for MU909060A3)
MU909060A1-006	Channel Stats (for MU909060A1)
MU909060A2-006	Channel Stats (for MU909060A2)
MU909060A3-006	Channel Stats (for MU909060A3)

5) Select Accessories

Must be added as separate line items

Model/Order No.	Description
G0202A	NiMH Battery Pack (Replacement)
G0203A	AC Adapter (Replacement)
B0600A	Hard Case
B0601A	Standard Soft Case
B0602A	Deluxe Soft Case (for MT9090A)
Z1023A	Strap
J1402A	Car Plug Cord
W3173AE	Gigabit Ethernet Tester Quick Start Guide
W3166AE	MU909060A1/A2/A3 Operation Manual (Hardcopy – English version)
Z1234A	Network Master Gigabit Ethernet Tester CD (CD – English and Japanese)
J1480A	USB-Ethernet Converter

6) Warranty Service

Model/Order No.	Description
MT9090A-ES210	2 Years Extended Warranty Service (for MT9090A)
MT9090A-ES310	3 Years Extended Warranty Service (for MT9090A)
MU909060A1-ES210	2 Years Extended Warranty Service (for MU909060A1)
MU909060A2-ES210	2 Years Extended Warranty Service (for MU909060A2)
MU909060A3-ES210	2 Years Extended Warranty Service (for MU909060A3)
MU909060A1-ES310	3 Years Extended Warranty Service (for MU909060A1)
MU909060A2-ES310	3 Years Extended Warranty Service (for MU909060A2)
MU909060A3-ES310	3 Years Extended Warranty Service (for MU909060A3)

7) Installed Software Option (Retrofit)

The following software options can be field installed by the customer in already purchased Network Master Gigabit Ethernet testers.

Model/Order No.	Description
MU909060A1-301	RFC 2544 Test Retrofit (for MU909060A1) - field installed by customer
MU909060A2-301	RFC 2544 Test Retrofit (for MU909060A2) - field installed by customer
MU909060A3-301	RFC 2544 Test Retrofit (for MU909060A3) - field installed by customer
MU909060A1-302	Multistream Retrofit (for MU909060A1) - field installed by customer
MU909060A2-302	Multistream Retrofit (for MU909060A2) - field installed by customer
MU909060A3-302	Multistream Retrofit (for MU909060A3) - field installed by customer
MU909060A1-303	Stacked VLAN Retrofit (for MU909060A1)
MU909060A2-303	Stacked VLAN Retrofit (for MU909060A2)
MU909060A3-303	Stacked VLAN Retrofit (for MU909060A3)
MU909060A1-304	MPLS Retrofit (for MU909060A1)
MU909060A2-304	MPLS Retrofit (for MU909060A2)
MU909060A3-304	MPLS Retrofit (for MU909060A3)
MU909060A1-305	Remote GUI Retrofit (for MU909060A1)
MU909060A2-305	Remote GUI Retrofit (for MU909060A2)
MU909060A3-305	Remote GUI Retrofit (for MU909060A3)
MU909060A1-306	Channel Stats Retrofit (for MU909060A1)
MU909060A2-306	Channel Stats Retrofit (for MU909060A2)
MU909060A3-306	Channel Stats Retrofit (for MU909060A3)

Standard Soft Case

Deluxe Soft Case
Full Network Master operation without removal from the case.
Providing excellent protection for use in harsh conditions.

Hard Case

MU909020A OCA Module for MT9090A
Compact CWDM channel analyzer to verify power levels, drift and channel presence of CWDM networks.

Network Master

MU909011A Fault Locator Module for MT9090A
Compact fault locator instrument for an easy and accurate verification of drop cable installation

Network Master

CMA 3000 All-in-one Field Tester
Test of many interfaces including Ethernet

CMA5000a Multi-Layer Network Test Platform
A wide selection of test modules including Gigabit Ethernet and 10 Gbps Ethernet

Anritsu

Specifications are subject to change without notice.

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