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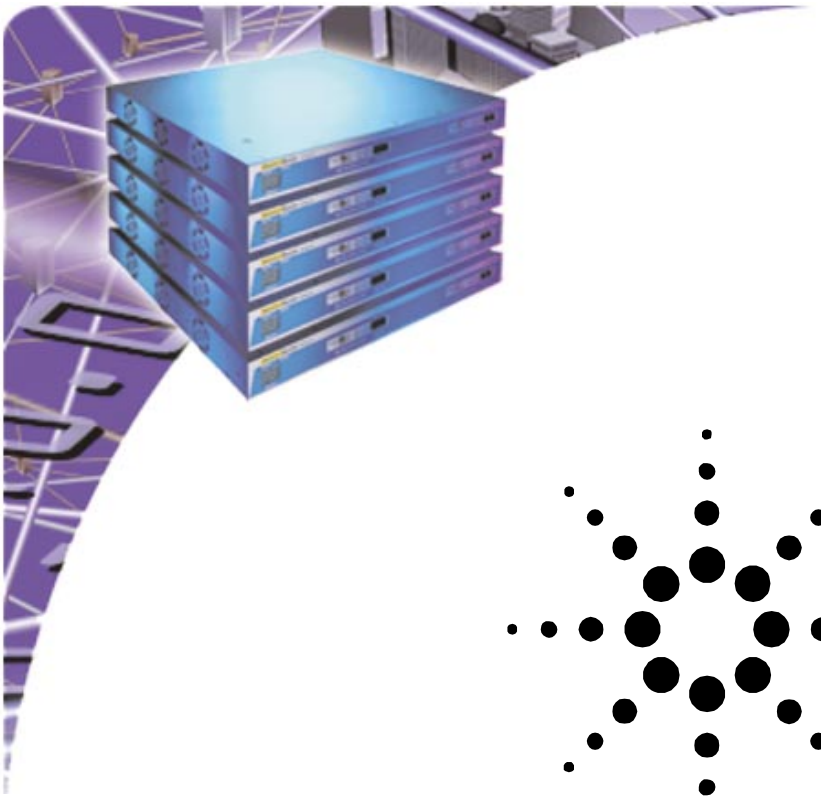
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RouterTester GbE/4 (SX/LX) Test Module

Agilent Technologies RouterTester

E7904/7914A

Product Features

- Four 1 Gb Ethernet interfaces per test module
- Generates and analyzes IP packets at wire-speed
- Multi-access networks are emulated using RouterTester's BGP-4, OSPF or IS-IS emulation software
- Realistic Internet-scale routing simulation of BGP-4, OSPF and IS-IS for the comprehensive verification and stressing of routers and networks
- Modular/stackable multi-port system
- Multi-user remote access
- Comprehensive capture and analysis tools

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Overview

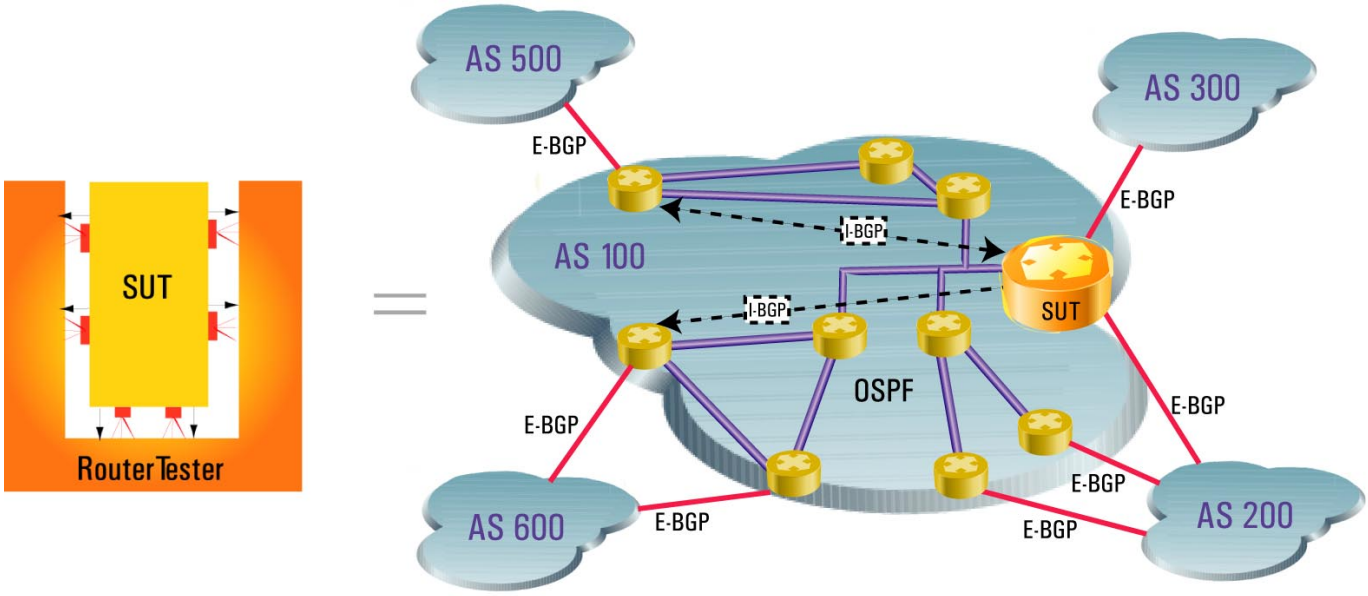
The RouterTester's ability to emulate multiple E-BGP, I-BGP, OSPF and IS-IS sessions creates a realistic network cloud around the System under Test (SUT), providing unprecedented realism to router testing.

Any number of routes with a flexible range of attributes can be advertised into the router (or network) under test, building immense and complex forwarding tables within these devices, which will stress the data forwarding abilities of the router under test.

Working in conjunction with the IP performance application, the data forwarding performance of a router can be measured while simultaneously advertising and withdrawing routes. The ability of a router to withstand route flap "storms" as well as the time it takes for a router to converge on new routes can be precisely measured. How much user data is lost when a route changes? By benchmarking a network or router with realistic tests, a router will function and perform reliably when deployed in the real world.

When using the Gigabit Ethernet module on RouterTester, multi-access networks can be simulated, allowing the creation of multiple peer sessions, making it possible for the data forwarding ability of the Router under test to be measured on an Ethernet segment.

The RouterTester GbE/4 Test module has four 1Gb 1000-base-SX/LX optical interfaces. Each full-duplex port can generate IP packets encapsulated within an Ethernet frame and analyzes every received frame in real-time at wire speed. Up to 32 modules can be utilized in a single system, providing an unparalleled Internet-scale test solution.



RouterTester can simulate a realistic autonomous system around a router under test

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Key Features

Routing Emulation software

RouterTester emulates the entire core routing protocols that are currently used in networks, enabling a realistic network cloud to be created around the router under test. Working in conjunction with the IP performance software, data forwarding performance is measured while routes are added and removed.

Provides rapid configuration of network addresses

Network addresses are easily defined through the graphical user interface. The user can assign a specific route/routes over a single prefix or automatically assign a number of routes evenly over a range of prefixes. The BGP-4, OSPF and IS-IS Attributes can be easily manipulated to generate 'preferred' and 'alternative' routes.

IP Analysis Software

Each Gigabit Ethernet Port comes with 64 MB of line rate capture. Capture can be started and stopped manually or automatically based on specific events, pattern matches, thresholds or error conditions, allowing the RouterTester's off-line analysis tools to investigate the packets of interest. IP Analysis comes with an extensive suite of protocol decodes (including BGP-4, OSPF, IS-IS).

Statistics

While network instabilities or a route advertisements/withdrawals are simulated, IP packet measurements are monitored using RouterTester's comprehensive and real-time statistics.

Flexible, Powerful Scripting

Automated scripts are quickly created using RouterTester's Tcl/Tk scripting environment. With only a few lines of code, thousands of networks are easily advertised from simulated peers on any or all of RouterTester's ports.

QBOL Support

QBOL Scripts developed for the Agilent Technologies QARobot are fully portable to RouterTester.

Protocol Conformance Suites

Conformance test suites are available to ensure compliance to the relevant IETF RFCs and Internet-drafts.

Multi User Remote Access

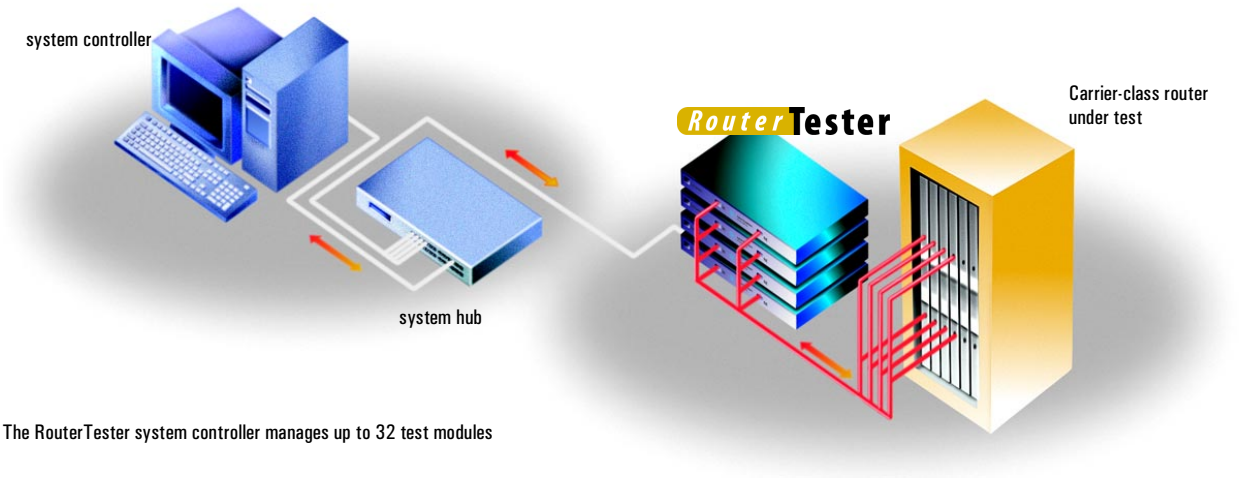
RouterTester can be controlled via the local system controller, or multiple sessions can be controlled remotely from any PC attached to a corporate LAN.

Online Help

An extensive online help system provides complete descriptions and detailed usage instructions for every component of RouterTester. Dialog-level context-sensitive help provides rapid access to the relevant sections of the online help. A technology reference section provides a complete library of background information pertaining to gigabit and terabit router performance testing.



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The RouterTester system controller manages up to 32 test modules

Configuration

Up to 32 RouterTester Test Modules can be connected together. RouterTester modules can be stacked on top of each other, or can be mounted within a 19-inch rack.

The RouterTester System Controller manages the test modules and provides the common point of control for the multi-port test system.

Test modules are connected to the system controller through a Fast Ethernet hub. For test systems comprised of more than 23 modules, two system hubs can be daisy-chained together.

RouterTester applications include test control and user interface software that runs on the System Controller and real-time software that runs on each Test Module.

Warranty and Support

Hardware

RouterTester modules are warranted for a period of 3 years. If a defect is found in any RouterTester module, Agilent will ship a permanent replacement. The module must then be returned to Agilent.

Software

Agilent RouterTester software and firmware products are supplied on transportable media such as disk, CD-ROM or integrated circuits. The warranty covers physical defects in the media, and defective media is replaced at no charge during the warranty period.

Support

Measurement Assistance is provided for the lifetime of the product. Measurement Assistance provides phone, fax, email or web-based support from Agilent's call-center and support personnel. Support is available to assist in making measurements, operating, and verifying the correct operation of the product.

Product Numbers

E7914A	RouterTester GbE/4 LX (Single-mode Fiber Interface)
E7904A	RouterTester GbE/4 SX (Multi-mode Fiber Interface)

Ordering Information

To order and configure the test system consult your local Agilent field engineer.

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Technical Specifications

System Specifications

Physical Interface

Connector	• 4 duplex SC connectors
Optical Interface	• SX Multi-mode – 850 nm receiver – 850 nm Class 1 laser – compliant with specifications for IEEE 802.3z Gigabit Ethernet • LX Single-Mode – 1310 nm receiver – 1310 nm class 1 laser – compliant with specifications for IEEE 802.3z Gigabit Ethernet
Input Sensitivity	• –18.5 dBm (min)
Average Output Power	• –9.5 dBm (min)

Measurement System

Result Types	• Cumulative: measurements are reported from the start of the measurement interval • Sampled: measurements are reported from the most recently completed sampling interval
Measurement Interval	• Range: 1 second to 7 days
Sampling Interval	• Range: 1 second to 1 hour
Measurement Clock	• 10 ns resolution • +/- 0.5 ppm/year clock drift • 3 ppm max. difference between systems
Module Synchronization	• All measurements are synchronized across all modules within the test system

Negative Testing Frames Transmit (Single shot only)

Runt (Ethernet Frame size)	• 9 to 63 bytes
Jumbo (Ethernet Frame Size)	• Up to 65,535 bytes

Real-time Statistics

Real-time receive statistics

Frames received	• Count of all frames received, including FCS errors, aborted and invalid frames
Octets received	• Counts of all octets received
Oversize frame	• Count of all frames > 1,528 bytes that were received
MAC control frames	• Count of all MAC control frames received
FCS errors	• Count of all frames received with an invalid FCS
Short frames	• Count of all frames < 64 bytes that were received

Real-time transmit statistics

Frames transmitted	• Count of all frames transmitted

Mechanical Specifications

Size	• 441 mm (width) x 390 mm (depth) x 44 mm (height)
Weight	• 4.8 kg
Supply voltage	• 100 - 240 Volts AC
Supply frequency	• 50- 60 Hz
Power consumption	• 100 watts maximum
Input current	• < 3.0 amps RMS, measured at 85 VAC
Input protection	• Non-user serviceable, internally located 5 amp, anti-surge AC input line fuse
Inrush current	• 35 amps peak (Vin = 230 VAC, one cycle, 25° C) • current internally limited by thermistor
Power factor	• 0.95 W/VA (per EN61000-3-2)
Rear connectors	• Ethernet: – RJ-45 clock line connectors (input/output) – SMA event lines (input/output) – Twin BNC external trigger (input/external trigger) • Output – BNC

Front panel LED indicators

Power	• Green when module has power
Status	• Yellow to indicate module start-up • Green to indicate that a test application is running • Red to indicate a module error
Module	• Numerical module indentifier

Port LED indicators

Link	• Green when a valid optical receive signal is detected
Tx	• Green when an Ethernet Frame is transmitted
Rx	• Green when an Ethernet Frame is received



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Environmental Operating Conditions

Operating temperature	• 0^0 C - 55^0 C
Storage temperature	• -40^0 C - 70^0 C
Humidity	• 50% to 95% relative humidity from 25^0 C - 40^0 C

Regulatory Compliance

Electrical (Electromagnetic Compliance -EMC)

- As per EN 61326-1:1997: Electrical equipment for measurement control and laboratory use.

Emission standards

- CISPR 11:1992 + A2: 1996 (electrical disturbance): Limits and methods of measurements of electromagnetic disturbance characteristics of industrial, scientific and medical radio frequency equipment. This equipment meets Group 1, Class A limits.
- EN 61000-3-2:1995 / IEC 1000-3-2:1995, Section 2:Limits for harmonic current emissions.
- EN61000-3-3: 1994 / IEC 1000-3-3:1994, Section 3: Limitation of voltage fluctuations and flicker.

Immunity standards

- EN 61000-4-2:1997 / IEC 1000-4-2:1995, Section 2: Electrostatic discharge test.
- EN 61000-4-3:1995 / IEC 1000-4-3:1995, Section 3: Radiated electromagnetic field test.
- EN 61000-4-4:1995 / IEC 1000-4-4:1995, Section 4: Electrical fast transient/burst test.
- EN 61000-4-5:1995 / IEC 1000-4-5:1995, Section 5: Surge immunity test.
- EN 61000-4-6:1996 / IEC 1000-4-6:1996, Section 6: Radiated electromagnetic field test.
- EN 61000-4-8:1993 / IEC 1000-4-8:1993, Section 8:Power frequency magnetic field immunity test.
- Electrical (safety)
- CSA22.2 No. 1010.1, NRTL/C, EN 61010-1:1993 + A2: 1995/IEC 1010-1:1990 + A1: 1992 + A2: 1995 Safety requirements for electrical equipment for measurement, control and laboratory use.
- Optical (Safety)
- Complies with IEC 825/CDRH Class 1, and 21 CFR 1040 - Class 1 Laser Products

Applicable Standards

Optical Transmitter and Receiver	• IEEE-802z Gigabit Ethernet

IP over Ethernet/MAC Layer Specification

Address Resolution Protocol	• IETF RFC 826 An Ethernet Address Resolution Protocol (ARP)

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Acronyms

AS	Autonomous System
ARP	Address resolution protocol
BGP	Border Gateway Protocol
FCS	Frame Check Sequence
IP	Internet Protocol
IS-IS	Intermediate System to Intermediate System
MAC	Media Access Control
OSPF	Open Shortest Path First
PPP	Point to Point Protocol
SUT	System Under Test
Tcl	Tool Command Language
Tk	Toolkit



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Agilent Technologies RouterTester

RouterTester provides true Internet-scale testing through realistic routing protocol support, multi-stream wire-speed traffic generation and real-time analysis, and multi-port scalability. RouterTester is set to grow as the testing needs of the carrier class router industry evolve to meet the challenges of scale and Quality of Service within the Internet.

www.Agilent.com/comms/RouterTester

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