



Spirent TestCenter™

10-GIGABIT ETHERNET MULTIPLE MSA TEST SOLUTION

The increased development of 10 Gigabit Ethernet (10GbE) has resulted in it becoming the preferred technology for increasing bandwidth in data centers to interconnect large enterprise networks. This expansion has also brought about deployment of 10GbE interfaces on the customer edge and in all types of service provider networks. Spirent TestCenter helps meet the expanding market needs of 10GbE by providing implementation of the latest protocols and supporting the newest interfaces.

The Spirent TestCenter 10GbE test modules provide functional, performance, system and conformance testing capabilities from Layer 2 through Layer 7 on a single GUI and test automation platform.

These test modules generate realistic traffic from Layer 2 through Layer 7 of the OSI network layers and analyze data frame, packet, stream and protocol metrics for each layer. The test modules can also simultaneously manage data plane tests with control plane traffic required for metropolitan, enterprise and broadband access routing. They provide the most realistic and accurate network device performance measurements in the industry. Features such as real-time capture and decode along with the real-time event logging system allow the user to find the source of more complex multi-protocol problems.

APPLICATIONS

- Spirent TestCenter supports two different levels of MSA modules. The MSA-1001B test module provides affordable and complete Layer 2 and Layer 3 functional and LAN switching along with functional, system, conformance and performance benchmark testing for both 10GbE LAN and WAN protocols. The high performance MSA-2001B test module provides highly scalable Layer 2-7 capability for the 10GbE LAN and WAN protocols. The MSA-2001B also offers high capacity LAN switching functional and performance testing with broadband access, metropolitan and enterprise routing protocol test capability.
- Spirent TestCenter customers can use the 10GbE test modules to evaluate key feature functional and performance parameters of 10GbE switches, link aggregators and routers under typical or extreme traffic load with deliberate error conditions. The modules compare and validate 10GbE network equipment for compliance to product and protocol specifications prior to deployment.
- These test tools ensure the performance of advanced network device features. Such features encompass total host client capacities and throughput, QoS class prioritization, SLA bandwidth verification, VLAN tagging and dozens of routing protocols, scalability protocols and performance metrics. The 10GbE test modules are routinely used to verify routing controls and converged network capabilities.



Left to right: 10GBASE-T, XFP, X2, and CX-4 & XENPAK

FEATURES & BENEFITS

- **New 10GBASE-T:** 10GBASE-T is the latest data center solution for interconnecting switches, servers and routers. It can test and characterize 10Gbps communication over shielded/unshielded twisted pair (UTP) copper according to the 802.3an standard, including connectivity up to 100m on CAT6A and CAT7 copper cables. The standard specifies a short reach mode of 55 meters and a standard reach of 100 meters of CAT6A Class E, Class F and Augmented E (EA) cabling. Note that CX4 copper cabling is limited to 15 meters in reach distance and 10GBASE-T overcomes this limitation by reaching up to 100 meters.
 - **Benefit:** 10GBASE-T operates in 10GbE LAN mode over Cat6A copper cable which is less expensive and easier to install compared to 10GBASE-CX4 copper cables and connector systems. It also allows NEMs to build higher density switches and routers. Over time, as the power consumption of the PHY goes down, 10GBASE-T will become a high port density interface.
- Spirent TestCenter 10GbE test tools are uniquely featured to measure ultra-low latency (down to 10 nanosecond resolution) in these challenging tests, in any topology and with a high degree of realistic network traffic. Testing silicon communications chips and optical transceivers is vital. This is due to significant increases in chip-based functionality, high port density and scalability combined with ultra-low forwarding latency, all at 10GbE line rates (e.g. less than 2 microseconds for 64-byte packets).
- Spirent leads the industry with the highest accuracy 10GbE latency measurement available:
 - Qualified accuracy at all Ethernet speeds
 - Measure with 10 nanosecond resolution and excellent repeatability at all Ethernet speeds
 - Measure latency in any topology and in multiple speed tests: GigE to 10GbE
 - Unlike Spirent's competitors, Spirent's 10GbE requires no post-test results correction
- Increased equipment utilization with hot swappable XENPAK/CX4, X2, XFP and 10GBASE-T network media interfaces.

Up to 24 ports of 10GbE are supported in a 9U rack-mount unit chassis, and up to 4 ports are supported in the portable chassis. Improve test case throughput: Two test engineers may independently run tests on a 2-port, 10GbE Multiple MSA test module.

TECHNICAL SPECIFICATIONS

- Support for Deficit Idle Count (DIC), Link Fault Signaling (LFS), loop line timing, Ethernet preamble editing, Management Data Input/Output (MDIO) and diagnostic loopback
- The RFC 2544 and 2889 test package software options allow the user to rapidly set up and execute tests using industry standard test methodologies
- Traffic wizards allow easy setup of unicast, multicast, RFC-based tests, VLAN tagged, IPv4 and IPv6 test configurations
- Adjust traffic loads in real time and see the affect on the device under test with Spirent TestCenter's real time graphical and statistics reports
- Prioritized scheduling mode allows users to mix constant and bursty traffic on the same port and precisely schedule high priority flows to minimize jitter and other performance parameters
- Critical protocols such as spanning tree, VLAN, DHCP, IGMP, PPP, MPLS, QoS and IPTV are fully integrated, and the system supports a broad selection of unicast and multicast routing protocols
- A graphically driven frame editor allows the user to select from a wide variety of pre-configured frame templates to edit standard fields and to create custom control and data plane packets without manual byte offset calculations
- Concurrently runs advanced measurements in real time such as jitter, packet loss, sequencing, latency and data integrity using PRBS techniques
- An interactive feature allows functional and negative testing, including group join and prune messages, start/stop hellos and start/stop router emulation
- The analyzer supports a combination of 5 HyperFilters™, four 16-bit and one 32-bit that operate on the incoming traffic stream
- Up to 65,535 streams or sub-streams can be analyzed on a single port
- All port counters are 64-bits wide, can be charted and are available in real time

High Density 10-Gigabit Ethernet Test Module Specifications

Feature	MSA-1001B	MSA-2001B
Personality Board Types (interchangeable, 1-port)	<ul style="list-style-type: none"> ■ For XENPAK select part number XEN-4001A ■ For X2 select part number XTO-4001A ■ For XFP select part number XFP-4001A ■ For 10GBASE-T select part number GBT-4001A 	
Optical Transceiver Types	<ul style="list-style-type: none"> ■ XENPAK offers LAN only, or LAN and WAN support ■ X2 offers LAN only support ■ XFP offers LAN and WAN support 	
Laser Wavelengths	<ul style="list-style-type: none"> ■ XENPAK and XFP: 850nm, 1310nm, 1550nm ■ X2: 850nm, 1310nm 	
Copper Transceiver Type	XENPAK format for 10GBASE-CX4	
10GbE IEEE 802.3ae Protocol Modes	Serial LAN and WAN	
Optical Cabling	Multi-mode fiber, single mode fiber	
Copper Cabling	IEEE-compliant 10GBASE-CX4 3ft/1m, 15ft/4m, or 45ft/15m IEEE – TIA-155 Compliant 10GBASE-T CAT6A UTP 3m, CAT6A Shielded 3m	
Signal Rate	10.3125 Gbps LAN or 9.58464 Gbps WAN	
CPU Memory	512MB*	1GB
Maximum Transmit Streams	16,384 per port	32,767 per port
Total Number of Variable Fields per Stream (VFD)	4	6
Maximum Receive Streams	65,535 per port	
Minimum/Maximum Frame Size (w/o CRC)	48-16,367 Bytes	48-16,367 Bytes
Minimum/Maximum Transmit Rates	1 packet per 2.14 seconds to 104% of line rate	
Timestamp Resolution	10 nanoseconds	
Latency Measurement Accuracy and Repeatability	Accuracy depends on transceiver technology and the manufacturer. Please consult Spirent for additional information.	
Loop Line Timing	Transmit test traffic at the DUT's clock rate/Selectable supported on XFP-4001A	
Deficit Idle Count Support	LAN and WAN modes/ON or OFF selectable	
Link Fault Signaling	LAN and WAN modes/ON or OFF selectable	

*Note: Requires Spirent TestCenter v2.15 or higher applications software

SYSTEM REQUIREMENTS

Minimum PC, UNIX or Linux Requirements by System Size

- For Small Port System (2-25 ports)
 - Minimum Requirement – 2.4 GHz Intel Pentium 4 processor (or equivalent), 512 MB RAM and 10 GB of free disk space
 - Recommended System – Intel Core™ 2 Duo E6300 processor (or equivalent), 2 GB of free RAM and 10 GB of free disk space
- For Medium Port System (26-75 ports)
 - Minimum Requirement – 3 GHz Intel Pentium 4 processor (or equivalent), 2 GB of free RAM, 15 GB of free disk space

Recommended System – Intel Core 2 Duo E6400 processor (or equivalent), 4 GB free RAM, 100 GB of free disk space

- For Large System (76 ports and above)
 - Minimum Requirement – Intel Core 2 Duo E6400 processor (or equivalent), 3 GB free RAM, 100 GB free space on hard drive
 - Recommended System – Intel Core 2 Duo E6600 processor (or equivalent), 4 GB of RAM, 100 GB of free disk space

Spirent TestCenter Hardware Requirements

- Pentium® or greater PC running Windows® XP Professional SP2 with mouse/color monitor required for GUI operation (See Minimum PC Requirements section)

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- One Ethernet cable and one 10/100/1000Mbps Ethernet card installed in the PC A SPT-2000A Spirent 2U Chassis and Controller, SPT-5000A Spirent 5U Chassis and Controller or SPT-9000A Spirent 9U Chassis and Controller
- Operating system languages supported: English, French, German, Italian, Japanese, Korean and Chinese (traditional and simplified)
- Operating systems supported: Windows XP SP2, Windows 2003 Server (32 bit and 64 bit), RedHat EL3 and EL5, Solaris 8.0 and 10.0

ORDERING INFORMATION

Description	Part Number
10GbE Multi-MSA Module, 2-Port, Single Slot	MSA-1001B
10GbE Multi-MSA Module, 2-Port, Single Slot	MSA-2001B
XENPAK LAN/WAN Personality Board per port	XEN-4001A
X2 LAN/WAN Personality Board per port	XTO-4001A
XFP LAN/WAN Personality Board	XFP-4001A
10GBASE-T Personality Board	GBT-4001A
XENPAK MSA Optical Transceivers	
1310nm, Single Mode, 10GBASE-LR	ACC-6022A
1550nm, Single Mode, 10GBASE-ER	ACC-6023A
850nm, Multi-Mode, 10GBASE-SR	ACC-6023A
850nm, Multi-Mode, 10GBASE-SR	ACC-6024A
1310nm, Single Mode, LAN-WAN, 10GBASE-LR/LW	ACC-6028A
X2 MSA Optical Transceivers	
Note: X2 transceivers only support the 10GbE LAN mode	
850nm, Multi-Mode, 10GBASE-SR	ACC-6042A
1310nm, Single Mode, 10GBASE-LR	ACC-6043A
XFP MSA Optical Transceivers (with 10GbE LAN/WAN support)	
850nm, Multi-Mode, 10GBASE-SR/SW	ACC-6030A
1310nm, Single Mode, 10GBASE-LR/LW	ACC-6031A
1550nm, Single Mode, 10GBASE-ER/EW	ACC-6032A
10-Gigabit Ethernet over Copper	
Note: 10GBASE-CX4 only supports the 10GbE LAN mode	
10GBASE-CX4 in the XENPAK Transceiver format	ACC-6033A
Cable, CX4 Transceiver, 3ft/1m	ACC-3412A
Cable, CX4 Transceiver, 15ft/3m	ACC-3410A
Cable, CX4 Transceiver, 45ft/15m	ACC-3411A
10GBASE-T Qualified Cables	
Cable, 10GBASE-T CAT6A (Augmented) shielded STP cable, 3m	ACC-0011A
Cable, 10GBASE-T CAT6A (Augmented) 3-meter UTP cable, 3m	ACC-0010A



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