SPIRENT TESTCENTER

ENABLING THE MOBILE BROADBAND EXPERIENCE

HYPERMETRICS MX 2, 4 AND 8-PORT 10G ETHERNET TEST MODULE

The Spirent TestCenter 10G Ethernet HyperMetrics mX test module with Cloud Core processing enables maximum performance and scale without disabling test ports. When testing converged, multi-service devices, the HyperMetrics mX ensures delivery of the mobile multiplay experience by combining high performance stateful traffic, high scale routing, access and mobile control plane on a single module. With 96 x 10G ports in a single Spirent TestCenter chassis, the HyperMetrics mX scales to 960 Gbps of stateful data performance, 6 million mobile subscribers and 1 million BGP sessions.

SOLUTION OVERVIEW

The Spirent TestCenter HyperMetrics neXt™ modules use the highest performance Intel processors designed for cloud and high performance computing. These processors are a fundamental building block of Spirent TestCenter Cloud Core™ processing, which intelligently distributes resources across ports. This architecture is the foundation of the HyperMetrics neXt family of test modules, which support line-rate, stateful application traffic to extreme scale on all ports and to line-rate data capacity on 32 ports.

The Spirent TestCenter HyperMetrics™ mX module is available in 2, 4 and 8 port 10GbE variants for both SFP+ and 10GBase-T. Enabling the mobile broadband experience, the module is designed to test converged devices that combine stateful features like DPI and firewall with Any-G mobile gateways, high-scale MPLS mobile backhaul and terabit forwarding planes. With the combination Cloud Core™ processing and the deep real-time analysis that Spirent TestCenter is known for, the HyperMetrics mX delivers enhanced realism with scale and performance.

APPLICATIONS

- **Converged Mobile Routers**—Test firewall and DPI, mobile gateway capacity and performance, and mobile backhaul throughput, timing and resilience all from a single module
- **Mobile Gateways**—Validate IP throughput and AnyG mobility with millions of subscribers and per port line-rate data with minimum sized packets and detailed per mobile statistics
- **Cloud Infrastructure & Applications**—Ensure security devices, IDS/IPS, load balancers and applications meet their performance, availability, security and scale requirements
- **High Scale Terabit Routers**—Test convergence and scalability of complex, multi-protocol topologies with unprecedented scale and realism

Spirent TestCenter HyperMetrics mX 10G Ethernet Test Module

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HYPERMETRICS MX 2, 4 AND 8 PORT 10 GIGABIT ETHERNET TEST MODULE

FEATURES & BENEFITS

Testing converged networks and devices requires a tester that can emulate multiple layers of network protocols, scale sufficiently, and run real-time cause and effect analysis on millions of statistics while putting the system through realistic scenarios, such as failovers. With Cloud Core processing and real-time cause/effect analysis, the Spirent TestCenter HyperMetrics mX module are the industry's only test modules capable of meeting these demands.

Spirent TestCenter Cloud Core™ is based on patent pending technologies all designed to add native elastic computing to the Spirent TestCenter L2-7 performance software platform. Cloud Core optimizes testing across parallel processing, pooling resources across multiple test ports. Tests beds built on the Cloud Core architecture provide an exceptional combination of scalable performance and realism, and are ideal for testing the most complex converged IP systems, such as the cloud data centers and 4G/LTE mobile networks.

- Spirent TestCenter Cloud Core™ combined with Intel® maximizes performance and scale of emulated topologies and stateful application traffic
- Enables HyperMetrics to scale to meet the requirements of IP/ Ethernet mobile networks while maintaining enhanced realism and Performance to the scale of mobile
- Benchmark cloud data centers, mobile broadband and application experience
- Available test packages and integrated configuration wizards simplify and accelerate configuration of ultra-high scale mobility, mobile backhaul, routing, access and application test cases

Productivity

- Intelligent Results™
  - When creating test beds at the scale that Spirent HyperMetrics mX can achieve, the amount of data that is produced is astronomical. An advanced and highly efficient distributed database processes billons of real-time results to validate tests and identify problems, giving engineers the immediate feedback they need to debug problems and accelerate development
  - Spirent TestCenter delivers more results with tight correlation, and more information to find those obscure bugs. With more coverage and more information, answer questions faster, using a single test run where multiple runs are necessary with other test tools
  - Interesting Streams uses real-time results data mining to dynamically filter through mountains of data and display the results that matter
- NoCode™ Automation with Command Sequencer and GUI to Script

Visual programming empowers the test operator to:

- Construct sophisticated, stressful, automated test cases without programming experience
- Combine numerous individual test cases into a single run to save regression test time
- Develop a catalog of broad automated test cases in a fraction of the time
- Export automated test cases to run from a command line for headless test execution that can be integrated with any automated regression system

Avalanche Layer 4-7 user Quality of Experience testing

- Compatible with industry leading high-performance multiprotocol application layer testing
- Provides full client/server capability for self-contained deep session layer 4-7 testing
- Provides line rate (up to 40Gbps per module) of stateful traffic and millions of emulated users capacity
- Provides hyper-realistic web, media, security/encryption, attack and business traffic emulation
- Provides extensive high-performance HTTPS/SSL capabilities
- Provides comprehensive IPsec tunnel and encrypted traffic capabilities allowing you to test ANY traffic over IPsec tunnels

Authentic testing: Avalanche for Spirent TestCenter emulates actual user transactions and provides control over TCP/ IP stack characteristics such as maximum segment size, delayed ACKs, IP fragmentation and TCP time-out behavior. Avalanche for Spirent TestCenter can emulate browsers, decompress gzips, encode URLs and apply realistic user level attributes.

Extensive, flexible reporting: Real-time statistics for critical variables across all protocols. SNMP statistics can be gathered from the components under test and correlated with statistics from Spirent TestCenter.

Flexible load specifications: Flexibility to specify load variables such as user sessions, new user sessions per second, transactions, transactions per second, connectionsor connections per second.

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REQUIREMENTS

- Spirent TestCenter Chassis and Controller (see table below)
- Windows-based workstation with 10/100/1000 Mbps Ethernet NIC; mouse and color monitor required for GUI operation
- Linux or Windows-based workstation for Tcl automationFor complete GUI requirements, please refer to Spirent TestCenter Packet Generator and Analyzer Base Package A data sheet (P/N 79-000028)
- For complete test automation system requirements, refer to the Spirent TestCenter Extreme Automation Package data sheet
- Requires BPK-1001A for packet generation and analysis.

TECHNICAL SPECIFICATIONS	
Spirent TestCenter HyperMetrics neXt 10 Gigabit Ethernet Test Modules	
Optical transceiver (for MX-10G-S2/S4/S8)	SFP+, 10GBASE-SR/SW or 10GBASE-LR/LW Passive Copper option [ACC-6060A (1-meter), ACC-6061 (3-meter)]
10G Base-T (for MX-10G-C2/C4/C8)	• RJ-45 connector • CAT6A up to 100m (tested to 110m) • CAT6 up to 55m (tested to 70m) • 1G operation capability***
Operational modes	LAN/WAN on MX-10G-S2/S4/S8, LAN only on MX-10G-C2/C4/C8, with DIC support
Timing	Common tx clock synchronized to chassis-based source, adjustable by ±100 ppm; optionally synchronized to GPS or CDMA timing source for inter-chassis synchronization Highly accurate module timestamp for clock synchronized to chassis; inter-chassis timestamp clock synchronized via direct cable, or GPS or CDMA timing source
Port CPU	Stackable multi-core CPU
User reservation	Per port
User Interface	Windows-based GUI and Tcl API
Layer 2/3 Generator and Analyzer	
Number of streams	65,536 transmit and 65,535 trackable receive streams; stream fields can be varied to create billions of flows
Frame transmit modes	Priority-based scheduler generates realistic traffic profiles per priority level, including mixed constant and bursty rate traffic to accurately simulate end user applications Modes include: continuous, single burst, multi-burst, timed burst, continuous multi-burst
Min/max frame size (w/CRC)	58-16384
Min/max Tx rates	1 packet per 3.43 seconds to 101% of line rate
Real-time Tx stream adjustments	Change rate, frame length and priority settings without stopping the generator or analyzer for truly interactive, cause and effect analysis
Advanced per-stream statistics available in real time	Over 40 measurements tracked in real-time for each received stream including: • Advanced sequencing: In-order, lost, reordered, late and duplicate • Latency: Avg, min, max and short-term avg; first/last frame arrival timestamp • Latency modes: LILO (forwarding delay per RFC 4689), LIFO (store and forward devices per RFC 1242) and FIFO (bit forwarding devices per RFC 1242) • Data integrity: IP checksum, TCP/UDP checksum, frame CRC, embedded CRC and PRBS bit errors • Histograms: Jitter, Inter-arrival, Latency, Sequence
Measurement timestamp resolution	10 ns with intra-chassis and inter-chassis synchronization
Supported encapsulations	• Layer 2: 802.3, Ethernet II, 802.1Q, 802.1ad, 802.1ah, 802.1Qay, FCoE, PPP • Layer 3/4: IPv4, IPv6, TDP, LDP • Tunneled: GRE, L2TP, MPLS, PWE3
Advanced per-stream statistics available in real time	Identify, display and filter by: transmit stream ID, IPv4/v6 SA/DA, MAC SA/DA, IP TOS/DiffServ, TCP/UDP port, VLAN ID, VLAN priority, MPLS label, MPLS exp plus more
Capture triggers/filters	• Oversize, jumbo, undersize, CRC error, checksum error, sequence number error, PRBS bit error • Trigger, oversize, jumbo, undersize, CRC error, checksum error, sequence number error, PRBS error
Capture memory	4MB per port
Layer 4-7 Application and Security	
IP Version Supported	IPv4 and IPv6
Encapsulation Protocols	802.1Q and 802.1 Q-in-Q
Transport Protocols	TCP, UDP, SSLv2, SSLv3 and TLSv1

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TECHNICAL SPECIFICATIONS (CONTINUED FROM PAGE 3)	
Layer 4-7 Application and Security	
Data Protocols	HTTP, HTTPS, FTP (Active/Passive), DNS, DNSTCP, DNSSEC, TELNET, SMTP, POP3, IMAP4, CIFS, RADIUS,NFS, MM4, RTMP, ICMP and Capture/Replay
Authentication Protocols	802.1x, Network Access Control (NAC), Radius
Extended Protocols	BitTorrent, Gnutella, MSN, Yahoo, SKYPE, SQL, MYSQL, Oracle, SMB, NFS, Remote Desktop,Exchange, LDAP
Voice Protocols	SIP over TCP and SIP over UDP
Voice Codecs	G711A, G711U, G.723.1, G726-32, G.728 and G729AB
Voice Quality Measurement	MOS R-factor
Video Protocols	Flash Streaming using RTMP/RTMPT, Unicast Streaming Quicktime RTSP/RTP, Unicast Streaming RealNetwork RTSP/RTP, Unicast Streaming Microsoft MMS, MulticastStreaming IGMPv2, IGMPv3 and MLDv2 HTTP Adaptive Bitrate Streaming (coming soon)
Video Codecs	MPEG-1, H.261, MPEG-2. H.262, MPEG-4. H.264
Encryption Assessment	SSL, TLS 1.0/1.1, IPsec remote Access, IPsec Site to Site, IKE V1/V2, deep cipher support
Video Quality Measurement	MDI measurements along with additional stats to detect picture quality
Vulnerability Assessment	L2/L4 DDOS Attacks and 3500+ L4/L7 Application Attacks including SANs Top-20 Internet Security Attacks
Reporting	Integrated CSV test results analyzer fully customizable with report generation in PDF and HTML
Protocol Emulations	
Enterprise and data center switch protocol support*	• Routing, multicast and bridging: All major IPv4 and IPv6 unicast and multicast routing protocols, IGMPv1/v2/v3, MLDv1/v2, LACP, STP, RSTP and MSTP • Data center: DCBX, FCoE, FIP, 802.1Qbb • Stateful L4-7: HTTP, SIP and FTP
Service Provider protocol support*	• Routing and MPLS: All major IPv4 and IPv6 unicast and multicast routing protocols, RSVP-TE, LDP, VPLS-LDP, VPLS-BGP, BGP/MPLS-VPN, Fast Re-route, mVPN, P2MP-TE, BFD, TWAMP and PWE3 (RFC4447) • Access: ANCP, PPPoE, DHCP, L2TP, IGMPv1/v2/v3, MLDv1/v2, DHCPv6 and PPPoEv6 • Carrier Ethernet and bridging: LACP, STP, RSTP and MSTP, 802.1ag CFM, Y.1731, PBB, PBB-TE, Link OAM • Stateful L4-7: HTTP, SIP and FTP, Unicast/Multicast RTSP and RAW TCP • Mobile Backhaul: MPLS-TP, 1588v2 and Synchronous Ethernet as supported protocols

* Protocol emulation requires optional base packages. Please contact your Spirent sales representative for a complete list of supported protocols.

ORDERING INFORMATION

Description	Part Number	Spirent TestCenter Chassis Support			Spirent TestCenter Applications		
		SPT-11U	SPT-9U*	SPT-3U	Spirent TestCenter	Avalanche	Landslide
HyperMetrics mX 10GBE SFP+ 2-Ports	MX-10G-S2	X	X	X	X	X	
HyperMetrics mXP 10GBE SFP+ 2-Ports	MXP-10G-S2**	X		X	X	Max Scale	
HyperMetrics mX 10GBE SFP+ 4-Ports	MX-10G-S4	X		X	X	X	
HyperMetrics mXP 10GBE SFP+ 4-Ports	MXP-10G-S4**	X		X	X	Max Scale	Max Scale
HyperMetrics mX 10GBE SFP+ 8-Ports	MX-10G-S8	X		X	X	X	
HyperMetrics mXP 10GBE SFP+ 8-Ports	MX-10G-S8**	X		X	X	Max Scale	Max Scale
HyperMetrics mX 10GBE 10GBase-T 2-Ports	MX-10G-C2	X	X	X	X		
HyperMetrics mX 10GBE 10GBase-T 4-ports	MX-10G-C4	X		X	X		
HyperMetrics mX 10GBE 10GBase-T 8-ports	MX-10G-C8	X		X	X		

* Requires the revision 2 backplane

** The design of the HyperMetrics mX+ (MXP) modules support ultra-high capacity mobile and application layer performance and scale

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