

SPIRENT TESTCENTER

HIGH PERFORMANCE AND SCALABILITY FOR HIGH SPEED ETHERNET TEST

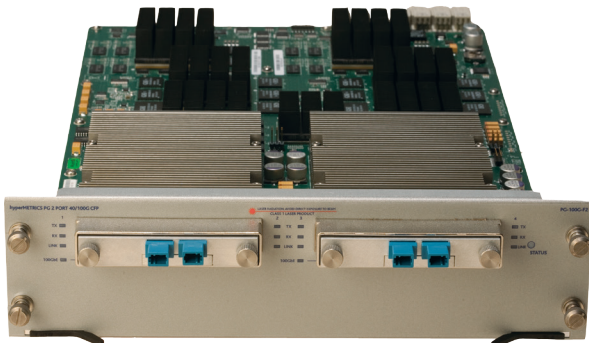
HYPERMETRICS NEXT 40/100 GIGABIT TEST MODULES

The Spirent TestCenter 40/100G Ethernet HyperMetrics neXt test module with Cloud Core processing enables maximum performance and scale over high-speed Ethernet. Targeting testing of multi-terabit routers and high-scale cloud infrastructure, HyperMetrics neXt ensures dataplane QoS with high performance traffic and verifies the scalability of routing, access, application and security protocols. With four 40G ports and two 100G ports per module, the HyperMetrics neXt 40/100G delivers the highest density high-speed Ethernet test solution per rack unit.

SOLUTION OVERVIEW

Spirent TestCenter™ HyperMetrics™ neXt modules use the most advanced Intel® processors designed for 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 extreme scale on all ports.

The Spirent TestCenter HyperMetrics neXt 40/100G Ethernet modules are available in two levels of performance: mX for the highest available emulation performance and fX for cost-effective mid-level emulation performance. They are available in 2-port 40G/ 1-port 100G, 4-port 40G/ and 2-port 100G variants. Also available are versions that support only 100G operation and only 40G operation for those applications that do not require dual speed capability. With the combination of Cloud Core processing and the deep real-time analysis that Spirent TestCenter is known for, these modules deliver enhanced realism with scale and performance.



APPLICATIONS

- **High Scale Terabit Routers:** Test 40G and 100G Ethernet core routers with high scale, multi-protocol topologies
- **High Capacity Multiservice Routers:** Validate IP throughput and Any G mobility with millions of subscribers and per-port line-rate data with minimum-sized packets and detailed per-mobile statistics
- **Data Center Fabrics:** Validate the forwarding performance and functional capabilities of ultra-high scale, next-generation multi-terabit cloud data center fabrics

FEATURES & BENEFITS

Testing 40G or 100G Ethernet-enabled routers or data center switches requires a tester that can emulate multiple layers of network protocols and scale to perform real-time cause/effect analysis on millions of statistics while putting the system through realistic scenarios, such as dynamic topology changes and fail-overs. The Spirent TestCenter HyperMetrics mX 40/100G module's Cloud Core processing and real-time cause/effect analysis enables testing highly- scaled terabit networks and devices.

Cloud Core is based on several patent pending technologies designed to add elastic computing to the Spirent TestCenter Layer 2-7 performance software platform. Cloud Core optimizes testing tasks across parallel processes, pooling processes across multiple X86 processor cores and threads. Tests beds built on Cloud Core provide an exceptional combination of scalable performance and realism and are ideal for testing the most complex converged IP systems, such as cloud data centers and high-performance mobile networks.

- Spirent TestCenter Cloud Core combined with Intel Inside 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
- Benchmark Cloud Data Centers, Mobile Broadband and Application Experience
- Available test packages and integrated configuration wizards simplify and accelerate configuration, 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 neXt 40/100G can achieve, the amount of data that is produced is astronomical. An advanced and highly efficient distributed database processes billions of real-time results to validate tests and identify problems, giving engineers the immediate feedback they need to debug problems and accelerate development
 - Delivers more results with tight correlation, and more information to find those obscure bugs. With more coverage and more information, Spirent TestCenter answers questions faster and in 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 (Visual Programming) and GUI to Script 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, connections or connections per second.

REQUIREMENTS

- Spirent TestCenter Chassis and Controller (see table)
- 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 automation For 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

HYPERMETRICS NEXT 40/100 GIGABIT TEST MODULES

TECHNICAL SPECIFICATIONS	
Spirent TestCenter HyperMetrics neXt 40/100 Gigabit Ethernet Test Modules	
Optical transceiver	CFP MSA Optical. QSFP with ACC-6069A 2-Port QSFP to CFP adapter. CXP with ACC-6068A CXP to CFP adapter
Operational modes	40 Gigabit Ethernet, 100 Gigabit Ethernet
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	100G per Port, 40G per Port Pair
User Interface	Windows-based GUI and Tcl API
Max Ports Per Chassis	12 100G Ports or 24 40G Ports
Layer 1	
Layer 1 Features	MDIO register access with CFP optics support; PMA PRBS test pattern generation and detection; PCS skew injection and measurement for each lane; PCS lane swapping and sweep detections; PCS lane alignment verification
	Adjustable PPM
	Internal or external clock
Layer 2/3 Generator and Analyzer	
Number of streams	16384 transmit and 131071 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: LIFO (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	2.5ns generator/analyzer
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	36** MB
**Future release.	

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TECHNICAL SPECIFICATIONS (CONTINUED FROM PAGE 3)	
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
Data Protocols	HTTP, SIP and FTP, Unicast/Multicast RTSP and RAW TCP
Authentication Protocols	802.1x
Voice Protocols	SIP
Voice Quality Measurement	MOS R-factor
Video Protocols	RTSP/RTP, Multicast Streaming, IGMPv2, IGMPv3 and MLDv2
Video Quality Measurement	MDI measurements along with additional statistics to detect picture quality
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
Service Provider	- 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 - Mobile Backhaul: MPLS-TP as supported protocols
* Protocol emulation requires optional base packages. Please contact your Spirent sales representative for a complete list of supported protocols.	
**Future release.	

ORDERING INFORMATION				
Description	Part Number	Spirent TestCenter Chassis Support		
		SPT-11U	SPT-9000A	SPT-2U
1-Port 100G / 2-Port 40G (Ports per Module)	MX-100G-F1	X	X	X
2-Port 100G / 4-Port 40G (Ports per Module)	MX-100G-F2	X		
1-Port 100G (100G operation only)	MX-100GO-F1	X	X	X
2-Port 100G (100G operation only)	MX-100GO-F2	X		
2-Port 40G (40G operation only)	MX-40G-F1	X	X	X
4-Port 40G (40G operation only)	MX-40G-F2	X		
1-Port 100G / 2-Port 40G (Ports per Module)	FX-100G-F1	X	X	X
2-Port 100G / 4-Port 40G (Ports per Module)	FX-100G-F2	X		
1-Port 100G (100G operation only)	FX-100GO-F1	X	X	X
2-Port 100G (100G operation only)	FX-100GO-F2	X		
2-Port 40G (40G operation only)	FX-40G-F1	X	X	X
4-Port 40G (40G operation only)	FX-40G-F2	X		
Accessories				
Description	Part Number			
Optical Transceiver CFP 100GBASE-LR10 155NM SMF	ACC-6067A			
100G CXP to CFP Adapter	ACC-6068A			
40G 2-Port QSFP to CFP Adapter	ACC-6069A			

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