

SPIRENT TESTCENTER

HYPERMETRICS™ CM 4/12-PORT GIGABIT ETHERNET TEST MODULE

The HyperMetrics 4- and 12-port Gigabit Ethernet test modules, previously offered as the TestCenter™ EDM-3000 series, combine Spirent TestCenter's network emulation and traffic generation with line rate Avalanche application traffic to deliver the highest performance Layer 2-7 test solution available on a single module.

SOLUTION OVERVIEW

The HyperMetrics 4- and 12-port Gigabit Ethernet test modules combine Spirent TestCenter's network emulation and traffic generation with line rate Avalanche application traffic to deliver the highest performance Layer 2-7 test solution available on a single module. The modules support line rate Layer 2-3 test traffic and Layer 4-7 traffic over 10/100/1000 Mbps Copper or Gigabit Ethernet SFP interfaces. They are ideal for functional, performance and conformance testing of service provider and enterprise networks of all sizes and stages of deployment.

APPLICATIONS

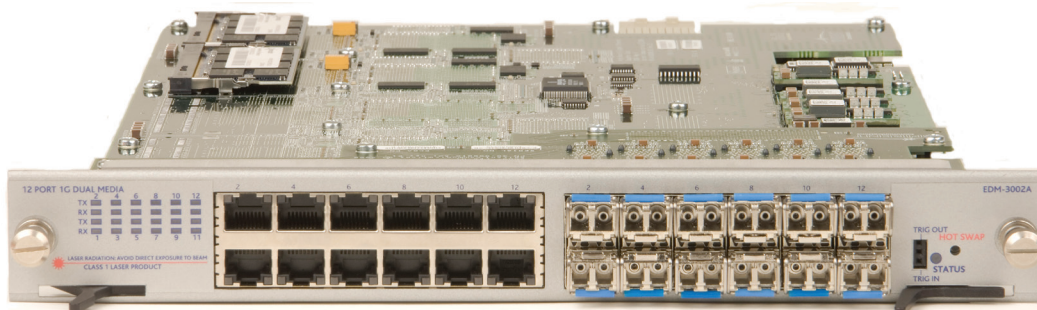
- **Triple Play**—Testing and service validation from the user's point of view (quality of experience) using realistic voice calling, unicast and multicast streaming videos as well as Internet traffic
- **Device Benchmarking**—Test using IETF RFC 2544, RFC 2889 and RFC 3918 methodologies with easy test setup using dynamically bound traffic and automated wizards
- **Carrier Ethernet**—Verify services whether delivered via VPLS, Layer 2 Pseudowires, bridged Ethernet, packet transport protocols or combinations of these technologies
- **Service Provider Routers**—Verify Layer 3, multicast and video services delivered via BGP/MPLS VPN, multicast routing or mVPN

- **Subscriber Emulation**—Emulate thousands of access subscribers using different services across multiple ports under normal or exceptional traffic conditions
- **Advanced Layer 4-7 user emulation**—Perform line rate web, media and security testing for concise content delivery
- **Complete Layer 2-7 testing**—Validate access networks, routers, switches and mobile backhaul

FEATURES & BENEFITS

Traditional test module design fixes CPU resources to specific ports. These 1-dimensional architectures necessitate three hardware designs to achieve the usage goals of high port scalability, virtual network emulation and high-capacity application traffic. HyperMetrics' architecture relegates these design limitations to the past.

- 4- and 12-port 1GbE test modules
- High-density 12-port form factor offers the industry's highest density solution supporting line rate application traffic and network emulation
- 4-port form factor is designed for functional testing and the enterprise test lab, which require high performance network emulation and line rate application traffic



FEATURES & BENEFITS (CONTINUED)

- HyperMetrics multi-core processing architecture
 - Enhanced realism with scalability and performance—HyperMetrics scales in three dimensions: ports, network emulation and application traffic
 - Complete Test Coverage—Generate stateful multi-play traffic over emulated network topologies
 - Dynamic Multi-core Processing—CPU resources can be allocated across the ports to meet the scale, performance and functionality required.
 - Future-Proof Design—Delivers the performance needed today, and the investment protection for testing tomorrow's network
- Multiple CPU cores per port—The HyperMetrics CM series are the first L2-7 test modules with multiple processor cores per port. This enables the modules to offer unparalleled performance in network and user emulation with true line rate Layer 4-7 application traffic. Ideal for testing tomorrow's converged networks and services.
- 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
- Converged Topology Emulation™ (CTE) *
 - Test protocol stacking by accurately emulating multiple network devices
 - Collapses physical test topologies into a single test tool providing more test coverage and determinism using fewer network elements

**Check with your Spirent representative for availability*

Productivity²

- Intelligent Results™
 - The most accurate and comprehensive set of real-time results to validate tests and identify problems, giving engineers the insight they need to eliminate customer found defects
 - Delivers more results, the tightest correlation and more information when bugs are found to provide more coverage in a single pass than can be done in multiple passes with other test tools
 - Interesting Streams uses real-time results data mining to validate test cases and identify issues quicker

SPIRENT SERVICES

Spirent Global Services provides a variety of professional services, support services and education services—all focused on helping customers meet their complex testing and service assurance requirements. For more information, visit the Global Services' Web site at www.spirentcom.com/gs or contact your Spirent sales representative.

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HYPERMETRICS™ CM 4/12-PORT GIGABIT ETHERNET TEST MODULE

TECHNICAL SPECIFICATIONS	
Spirent TestCenter HyperMetrics Gigabit Ethernet Test Modules	
Ports per module	4 ports—CM-1G-D4; 12 ports—CM-1G-D12
Connector type	2 connectors per port 10/100/1000 RJ-45 Copper and 1G SFP Fiber, LC Connector
SFP Fiber Wavelengths	850nm, 1310nm, 1550nm
Cabling	4 pair CAT5 UTP for copper interface Multi-mode or single-mode fiber for SFP interface
Signal Rate	10/100/1000 Mbps and 1Gbps
Port CPU	Multi-core CPU with Dynamic Multi-core Processing
User Reservation	Per port
User Interface	Windows-based GUI and Tcl API
L2/L3 Generator and Analyzer	
Number of streams	32768 transmit and 65535 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
Minimum/Maximum Transmit Rates	1 packet per 2.14 seconds to 104% of line rate
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, re-ordered, 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.
Layer 4-7 Features	
Number of Test Users	1 user per port
Type of Simulation	Client and Server
Network Access Protocol	DHCP, PPPoE, IPSec
Network Realism	Line speed limitation, network latency, packet loss, fragmentation
IP Version Supported	IPv4 and IPv6
Encapsulation Protocol	802.1Q and 802.1 Q-in-Q
Transport	TCP, UDP, SSLv2, TLSv1
Data Protocol	HTTP, HTTPS, FTP (Active/Passive), DNS, TELNET, SMTP, POP3, IMPA4, RADIUS
Authentication	802.1x, Network Access Control (NAC), Radius
Voice Protocol	SIP over TCP and SIP over UDP
Voice Codec Supported	G711A, G711U, G.723.1, G.726-32, G.728 and G.729AB
Voice Quality Measurement	MOS score based on R-Factor
Video Protocol	Unicast Streaming Quicktime RTSP/RTP, unicast Streaming RealNetwork RTSP/RTP, Unicast Streaming Microsoft MMS, Multicast Streaming IGMPv2, IGMPv3 and MLDv2
Video Codec Supported	MPEG-1, H.261, MPEG-2, H.262, MPEG-4, H.264
Video Quality Measurement	MDI:DF and MDI:LR

Layer 4-7 Features (Continued)	
Vulnerability Assessment	L2/L4 DDOS Attacks and 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
Automation	GUI to TCL and Automatic goal seeking using WorkSuite Manager
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 (RFC 4447) • 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: 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 HyperMetrics CM 10/100/1000 Dual Media, 4 Ports	CM-1G-D4
Spirent TestCenter HyperMetrics CM 10/100/1000 Dual Media, 12 Ports	CM-1G-D12
SFP Optical Transceivers	
1000Base-SX GigE SFP Transceiver, MM 850nm, LC connector	ACC-6025A
1000Base-LX GigE SFP Transceiver, SM 1310nm, LC connector	ACC-6026A
1000Base-ZX GigE SFP Transceiver, SM 1550nm, LC connector	ACC-7000A
Spirent TestCenter Chassis	
Spirent TestCenter 2U Chassis (with high speed fans) and Controller —Includes a CHS-2000A-HS chassis, CTL-2002A controller and the Spirent TestCenter system software (licenses sold separately) and documentation	SPT-2000A-HS
Spirent 9U Chassis and Controller —Includes a CHS-9000A chassis, CTL-9002A controller and Spirent TestCenter system software (licenses sold separately) and documentation	SPT-9000A

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