

# XCELLON-MULTIS® CFP4 ENHANCED 100GBE LOAD MODULE

## INTRODUCING THE EVOLUTION OF XCELLON HSE TESTING

### EVOLVE YOUR HIGHER SPEED ETHERNET TESTING

Bandwidth requirements for enterprises, service providers, and global data centers are growing rapidly, straining 10GbE and 40GbE technologies. Service providers and data centers are looking at high density 100GbE networking infrastructure solutions to meet these demands, and equipment manufacturers are rapidly increasing port densities to remain competitive.

With Ixia's support of native CFP4 interface technology, equipment manufacturers can use Ixia's high-density 100GbE load module to assist the move to higher density 100GbE with four ports per blade. For service provider data centers, native CFP4 support provides a smaller form factor to increase 100GbE port density, the ability to have legacy CFP management controls, and optics with up to 10 kilometers reach range. CFP4 reduces overall rack space and power consumption requirements for 100GbE test solutions – all while delivering greater network bandwidth.

Xcellon-Multis is the world's first native CFP4 100GbE test solution to satisfy network equipment maker test needs that range from basic interoperability and functional test, to high-port-count performance tests. As service providers and large enterprises implement this same high-density equipment in their own networks, they need this same test solution to verify performance and functionality prior to deployment.

## KEY FEATURES

Xcellon-Multis CFP4 XM100GE4CFP4+ENH is an enhanced high density, native CFP4 4-port load module for 100GbE operation, enabling key features:

- Mid-range-to-high-scale protocol testing for L2/3 routing/switching and data center test cases with Ixia's IxNetwork application

## HIGHLIGHTS

- **Do more with less:** more ports, bandwidth, flexibility, capability, and horsepower in a single high density test load module
- **Cost effective:** reduces total cost of ownership with up to 40-ports of 100GbE in a single 11RU rackmount chassis
- **Excellent test platform** for the new 100GBASE-SR4, Auto-Negotiation, FEC, and 100GBASE-LR4 interoperability, functional, and performance testing
- **Usability:** a broad feature set common to other Xcellon-Multis 100GbE products, such as CXP and QSFP28



World's first Native CFP4 100GbE test module:  
**Xcellon-Multis native CFP4 4x100GbE,  
1-slot load module**

- Multi-vendor interoperability between different CFP4 and QSFP28 multimode (100GBASE-SR4) and single mode (100GBASE-LR4) optical transceiver solutions, and cable media such as Active Optical Cables
- Traffic and protocol scale and performance stress tests to ensure error-free network data transmission with long-term stability and high reliability
- 100Gb/s line rate packet capture and decode tools to detect and de-bug data transmission errors
- An excellent test platform for full line rate 100Gb/s to evaluate the new 100GbE ASIC designs, FPGAs, and hardware switch fabrics that use the 4x25Gb/s electrical interface
- Supports benchmarking of the data plane and protocol emulation performance and scale of ultra-high-density 100GbE network equipment using industry-standard RFC benchmark tests in test beds with hundreds of 100GbE ports in a single test
- The highest ROI of any test and measurement load module:
  - High density 4-ports of 100GbE with native CFP4 physical interfaces supported by the 4x25Gb/s electrical interface
  - A balanced feature set for both performance and scale testing
  - Greater test case coverage due to broad range of available protocols
  - Enhanced hardware that has underlying capability for advanced features such as Ethernet Forward Error Correction (Clause 91, RS-FEC) and Auto-Negotiation.
- A broad range of application support including: IxExplorer, IxNetwork, IxLoad and related Tcl APIs

## SPECIFICATIONS

MODEL NAME	XM100GE4CFP4+ENH
Part Number	944-1111
<b>Hardware Load Module Specifications</b>	
Slot / Number of Ports	1-slot / 4x100GbE native CFP4 ports
Physical Interfaces	Native CFP4 (with 4x25Gb/s electrical interface)
CPU and Memory	Multicore processors with 4GB of memory per processor
IEEE Interface Protocols	<ul style="list-style-type: none"> <li>• IEEE 802.3 100GBASE-R</li> <li>• IEEE 802.3bj</li> <li>• IEEE P802.3bm</li> </ul>
Transceiver Support	<ul style="list-style-type: none"> <li>• 100GBASE-LR4 CFP4 for single mode fiber               <ul style="list-style-type: none"> <li>○ Pluggable transceiver</li> </ul> </li> <li>• 100GBASE-SR4 CFP4 for multimode fiber               <ul style="list-style-type: none"> <li>○ Pluggable transceiver</li> </ul> </li> </ul>

MODEL NAME	XM100GE4CFP4+ENH
<b>Advanced Layer 1 support</b>	<ul style="list-style-type: none"> <li>• 100GE:               <ul style="list-style-type: none"> <li>○ Auto-negotiation (AN, Clause 73 copper cable assembly)</li> <li>○ Ethernet Forward Error Correction (FEC , Clause 91)</li> <li>○ FEC statistics: RS-FEC Corrected and Uncorrected Codeword Counts</li> <li>○ Ability to independently turn ON or OFF AN and FEC, or to allow IEEE defaults to manage the interoperability</li> </ul> </li> </ul>
<b>Operating Temperature Range</b>	<ul style="list-style-type: none"> <li>• 41°F to 95°F (5°C to 35°C), ambient air</li> <li>• 0% to 85%, non-condensing</li> </ul>
<b>Load Module Dimensions</b>	<ul style="list-style-type: none"> <li>• 16.1" (L) x 1.3" (W) x 12.0" (H)</li> <li>• 409mm (L) x 33mm (W) x 305mm (H)</li> </ul>
<b>Load Module Weights</b>	<ul style="list-style-type: none"> <li>• Module only: 13.15 lbs. (5.96 kg)</li> <li>• Shipping: 16.95 lbs. (7.69 kg)</li> </ul>
<b>Chassis Capacity: Maximum Number of Cards and Ports per Chassis Model</b>	
<b>XGS12-SD Chassis (940-0011)</b>	10 cards: 40-ports of 100GbE
<b>XGS12-HS Chassis (940-0006)</b>	10 cards: 40-ports of 100GbE
<b>XG12 Chassis<sup>i</sup> (940-0005)</b>	10 cards: 40-ports of 100GbE
<b>XGS2-SD Chassis (940-0010)</b>	2 cards: 8-ports of 100GbE
<b>XGS2-HS Chassis (940-0012)</b>	2 cards: 8-ports of 100GbE
<b>XM2 Chassis<sup>ii</sup> (941-0023)</b>	1 card: 4-ports of 100GbE
<b>Transmit Feature Specifications</b>	
<b>Transmit Engine</b>	Wire-speed packet generation with timestamps, sequence numbers, data integrity signature, and packet group signatures
<b>Max. Streams per Port</b>	100GbE: 128
<b>Max. Streams per Port in Data Center Ethernet</b>	100GbE: 128
<b>Stream Controls</b>	Rate and frame size change on the fly, sequential and advanced stream scheduler

MODEL NAME	XM100GE4CFP4+ENH
Minimum Frame Size	100GbE: <ul style="list-style-type: none"> <li>• 60 bytes and greater at full line rate</li> <li>• 49 bytes at less than full line rate</li> </ul>
Maximum Frame Size	14,000 bytes
Maximum Frame Size in Data Center Ethernet	9,216 bytes
Priority Flow Control	<ul style="list-style-type: none"> <li>• 8 line-rate-capable queues with each supporting up to 2,500 byte frame lengths</li> <li>• 1 queue supporting up to 9,216 byte frame lengths</li> </ul>
Frame Length Controls	Fixed, increment by user-defined step, weighted pairs, uniform, repeatable random, IMIX, and Quad Gaussian
User Defined Fields (UDF):	Fixed, increment or decrement by user-defined step, sequence, value list, and random configurations. Up to ten 32-bit wide UDFs are available.
Value Lists (Max.)	4 million / UDF
Sequence (Max.)	256K / UDF
Error Generation	Generate good CRC or force bad CRC, undersize and oversize standard Ethernet frame lengths, and bad checksum
Hardware Checksum Generation	Checksum generation and verification for IPv4, IP over IP, IGMP/GRE/TCP/UDP, L2TP, GTP
Link Fault Signaling	Reports, no fault, remote fault, and local fault port statistics. Generate local and remote faults with controls for the number of faults and order of faults, plus the ability to select the option to have the transmit port ignore link faults from a remote link partner.
Latency Measurement Resolution	100GbE: 2.5 nanoseconds
Intrinsic Latency Compensation	Removes inherent latency error from the 100GbE port electronics
Transmit Line Clock Adjustment	Ability to adjust the parts per million line frequency over a range of -100 ppm to +100 ppm per port or resource group

MODEL NAME	XM100GE4CFP4+ENH
<b>Receive Feature Specifications</b>	
<b>Receive Engine</b>	Wire-speed packet filtering, capturing, real-time latency and inter-arrival time for each packet group, with data integrity, sequence and advanced sequence checking capability
<b>Trackable Receive Flows per Port</b>	100GbE: 512K
<b>Minimum Frame Size</b>	100GbE: <ul style="list-style-type: none"> <li>• 60 bytes and greater at full line rate</li> <li>• 49 bytes at less than full line rate</li> </ul>
<b>Filters (User-Defined Statistics, UDS)</b>	2 SA/DA pattern matchers, 2x16-byte user-definable patterns with offsets capability for start of: frame, IP, or protocol. Up to 6 UDS counters are available.
<b>Hardware Capture Buffer per Port or Resource Group</b>	100GbE: 2GB per port
<b>Statistics and Rates</b>	Link state, line speed, frames sent, valid frames received, bytes sent/received, fragments, undersize, oversize, CRC errors, VLAN tagged frames, 6 user-defined stats, capture trigger (UDS 3), capture filter (UDS 4), 8 QoS counters, data integrity frames, data integrity errors, sequence and advanced sequence checking frames, sequence checking errors, ARP, and PING requests and replies, FEC statistics: RS-FEC Corrected and Uncorrected Codeword Counts
<b>PCS Lanes Port Statistics</b>	PCS Sync Errors, Illegal Codes, Remote Faults, Local Faults, Illegal Ordered Set, Illegal Idle, Illegal SOF, Out Of Order SOF, Out Of Order EOF, Out Of Order Data, Out Of Order Ordered Set
<b>Latency / Jitter Measurements</b>	Cut-through, store & forward, forwarding delay, up to 16 time bins latency/jitter, MEF jitter, and inter-arrival time
<b>Layer 2-7 Protocol Support</b>	
<b>IxNetwork: L2/3 Routing, Bridging, and Timing</b>	<ul style="list-style-type: none"> <li>• <b>Routing / Switching:</b> BGP4/BGP4+, OSPFv2/OSPFv3, ISISv4/v6, RIP/RIPng, EIGRP/EIGRPv6, PIM-SM/SSM, BFD, STP/RSTP/MSTP, PVST+/RPVST+, LACP, PoLACP, LISP</li> <li>• <b>MPLS:</b> RSVP-TE/P2MP, LDP/MLDP, LDP6, L3 MPLS VPN/6VPE, LDP L2VPN (PWE/VPLS), BGP VPLS, Multicast VPN Rosen Draft, NG Multicast VPN, EVPN / PBB-EVPN, MPLS OAM, MPLS-TP</li> <li>• <b>Carrier Ethernet:</b> Link OAM, CFM/Y.1731, PBB/PBB_TE, E-LMI, 1588v2 (PTP), ESMC, TWAMP</li> </ul>

MODEL NAME	XM100GE4CFP4+ENH
<b>IxNetwork: Data Center Ethernet/SDN</b>	<ul style="list-style-type: none"> <li>Priority Class-Based Flow Control (IEEE802.1Qbb), FCoE/FIP, LLDP/DCBX, VNTAG/VNIC, VEPA, FabricPath, TRILL, SPBM, OpenFlow, VXLAN, Segment Routing ISIS</li> </ul>
<b>IxNetwork: Broadband Access</b>	<ul style="list-style-type: none"> <li><b>Broadband:</b> DHCPv4/v6, PPPoX / L2TP, ANCP, IPv6 Autoconfiguration, DHCPv4/v6 over EoGRE, IGMP/MLD, IPTV One-time (IGMP / MLD Join / Leave latency), AMT</li> <li><b>Authentication:</b> 802.1x, WebAuth, EAPoUDP, Cisco NAC</li> </ul>
<b>IxLoad: Layer 4-7 Application Traffic Testing Support</b>	<ul style="list-style-type: none"> <li>Data protocol support for HTTP, SSL, FTP/TFTP, email (SMTP, POP3, IMAP), IPv4, IPv6, VLAN, ER</li> </ul>

## APPLICATION SUPPORT

Xcellon-Multis CFP4+ENH Load Module
<ul style="list-style-type: none"> <li><b>IxExplorer:</b> Layer 2-3 wire-speed traffic generation and analysis and Layer 1 BERT and IEEE 802.3ba HSE PCS Lanes testing.</li> <li><b>IxNetwork:</b> Wire-rate traffic generation with service modeling that builds realistic, dynamically controllable data-plane traffic. IxNetwork offers the industry's best test solution for functional and performance testing by using comprehensive emulation for routing, switching, MPLS, IP multicast, broadband, authentication, Carrier Ethernet, and data center Ethernet protocols.</li> <li><b>IxLoad:</b> A scalable solution for testing converged multiplay services, application delivery platforms, and security devices and systems. IxLoad emulates data, voice, and video subscribers and associated protocols to ensure quality of experience (QoE).<sup>iii</sup></li> <li><b>Tcl API:</b> Custom user script development for layer 1-7 testing.</li> </ul>

## ORDERING INFORMATION

### LOAD MODULE

#### 944-1111

Xcellon-Multis XM100GE4CFP4+ENH 100-Gigabit Ethernet, enhanced load module, 1-slot with 4-ports of the native CFP4 physical interface with L2-7 support, and enhanced support of Ethernet Forward Error Correction (RS-FEC), Auto-negotiation and Link Training. The load module is compatible with the XGS12-SD 12-slot, standard performance rack mount chassis bundle (940-0011), XGS12-HS 12-slot, high-speed performance rackmount chassis bundle (940-0006), XG12 12-slot, rackmount chassis (940-0005), XGS2-SD 2-slot, 3RU standard performance chassis bundle (940-0010), XGS2-HS 2-slot, 3RU high-speed performance chassis bundle (940-0012) and the XM2 desktop chassis (941-0003). Optional: CFP4 100GBASE-LR4 100GE pluggable optical transceiver, SMF (single mode), 1310nm, 10km reach (948-0035).

## TRANSCEIVERS

**948-0034**

CFP4-SR4 100GBASE-SR4 100GE pluggable optical transceiver, MMF (multimode), 850nm, 100 meter reach on OM4 fiber. Compatible with the Xcellon-Multis XM100GE4CFP4+ENH 100-Gigabit Ethernet, Enhanced load module (944-1111).

**948-0035**

CFP4 100GBASE-LR4 100GE pluggable optical transceiver, SMF (single mode), 1310nm, 10km reach. Compatible with the Xcellon-Multis XM100GE4CFP4+ENH 100-Gigabit Ethernet, Enhanced load module (944-1111).

**IXIA WORLDWIDE  
HEADQUARTERS**

26601 AGOURA RD.  
CALABASAS, CA 91302

**(TOLL FREE NORTH AMERICA)**

1.877.367.4942

**(OUTSIDE NORTH AMERICA)**

+1.818.871.1800

(FAX) 818.871.1805

[www.ixiacom.com](http://www.ixiacom.com)

**IXIA EUROPEAN  
HEADQUARTERS**

IXIA TECHNOLOGIES EUROPE LTD  
CLARION HOUSE, NORREYS DRIVE  
MAIDENHEAD SL6 4FL  
UNITED KINGDOM

**SALES +44.1628.408750**

(FAX) +44.1628.639916

**IXIA ASIA PACIFIC  
HEADQUARTERS**

101 THOMSON ROAD,  
#29-04/05 UNITED SQUARE,  
SINGAPORE 307591

**SALES +65.6332.0125**

(FAX) +65.6332.0127

<sup>i</sup> The Xcellon-Multis load modules may not be placed into slots 1 and 12 of the XGS12-HS, XGS12-SD, and XG12 chassis. Please consult your factory sales representative for further information.

<sup>ii</sup> Slot 1 (the lower slot) of the XM2 chassis provides optimal cooling for an Xcellon-Multis load module. Only one Xcellon- Multis load module may be installed in the XM2 chassis. No other load module may be installed while an Xcellon-Multis load module is installed.

<sup>iii</sup> The IxLoad application supports only the set of protocols listed in the Load Module Specification Table.