DATA SHEET

NGY 10 GbE High Density XM Load Modules

The architectural breakthrough of Ixia's 10 Gigabit Ethernet LSM10GXM test load modules delivers an industry-leading, high-density, affordable layer 2 through 7, 10 Gigabit Ethernet IP test solution. The NGY family supports both low port count layer 2/3 applications with limited project budgets and highest density test lab, QA, and system test applications. NGY is perfect for both high-density converged data center infrastructure testing and high density 10GbE switch test beds. NGY load modules leverage Ixia's converged data center test applications to NGY offer the highest port scalability, virtual scalability, protocol coverage, and the most affordable test solution available for data communications testing.

NGY offers a greener testing alternative when used with Ixia rackmount chassis – it requires one-quarter of the laboratory space, consumes one-half the power, and generates lower heat compared to other test solutions. NGY comes in 2-port, 4-port and 8-port configurations, with extra performance, full performance, and reduced performance models to match your requirements and budget. No other vendor's 10GbE data communications test solution offers a wider range of price options, interfaces, and capabilities.

10GbE NGY with SFP+ and 10GBASE-T Interfaces

Highlights

- 96 ports per 12-slot chassis
- Reduced rack space
- Reduced power consumption, and cooling requirements
- Up to 50% less power consumption than the nearest competitor – less lab cooling required
- Tracks and analyzes up to 1 million flows per port for real-time latency, Inter-arrival time, packet loss, data integrity, sequence checking
- Comprehensive Layer 2-7 testing
- Integrated data plane and control plane traffic generation and analysis
- Layer 2/3 data plane testing
- IPv4/v6 routing protocol emulation
- Bridging protocols: FCoE, 802.1Qbb, MPLS VPNs, MPLS-TP, Multicast 1588v2, Sync-E
- Stateful Application Layer 4-7 testing
- Sophisticated multi-protocol encapsulation and label stacking

The NGY series of load modules delivers higher control plane performance and scalability for both layer 3 routing protocol emulation and upper layer 4-7 stateful traffic testing in both the full performance SFP+ (LSM10GXM8S) and 10GBASE-T (LSM10GXM8GBT)

The NGY series of modules is a high-density 10 Gigabit Ethernet test solution, with up to 96 ports of 10GE test ports in a single XGS12-SD Standard Performance or XGS12-HS High Performance chassis.

Ixia's high density 10 Gigabit Ethernet load modules are available with a reduced performance option. The reduced performance option provides limited layer 3 routing emulation and control plane performance, coupled with complete layer 2 and 3 data plane testing. When physical port scalability and efficient use of lab facilities are critical, the LSM10GXMR8, MR4, and the highly economical MR2 reduced feature load modules are the most affordable 10GbE test solution available for manufacturing and large port count test beds.

A broad portfolio of enterprise, data center Ethernet, storage area networks, metropolitan-edge, and core network test solutions are supported, including performance, scalability, and conformance testing of layer 2-3 devices. Data and control planes may be simultaneously tested, including routing protocols and stateful testing of layer 4-7 content-aware devices and networks.

The 10GbE NGY load module family supports a comprehensive portfolio of service testing solutions for next generation service provider networks, through the IxNetwork test application including:

- **Routing**: RIP, RIPng, OSPFv2/v3, ISISv4/v6, EIGRP, EIGRPv6, BGP-4,BGP+
- **MPLS**: RSVP-TE, RSVP-TE P2MP, LDP, mLDP, PWE, L3 MPLS VPN, 6VPE, MPLS-TP, MPLS-OAM
- **VPLS**: 6PE, BGP Auto-Discovery with LDP FEC 129 Support, VPLS-LDP, VPLS-BGP
- **High-Availability:** BFD
- **IP Multicast**: IGMPv1/v2/v3, MLDv1/v2, PIM-SM/SSM, PIM-BSR, Multicast VPN, VPNv6
- **Switching**: STP/RSTP, MSTP, PVST+/RPVST+, Link Aggregation (LACP)
- **Carrier Ethernet**: Link OAM, CFM, Service OAM, PBT/PBB-TE, ESMC, PTP, E-LMI
- **Broadband**: ANCP, PPPoX, DHCPv4 Client/Server, DHCPv6 Client/Server, L2TPv2, Radius Attributes for L2TP
- **Authentication**: 802.1x, WebAuth, Cisco NAC
- **Data Center Bridging**: Priority Flow Control, FCoE/ FIP, LLDP/DCBX, VNTAG/VIC

Key Features

- 96 ports per Ixia 12-slot rackmount chassis
  - Reduced rack space
  - Reduced power consumption, and cooling requirements
  - Up to 50% less power consumption than the nearest competitor – less lab cooling required
- Tracks and analyzes up to 1 million flows per port for
  - Real-time latency
  - Inter-arrival time
  - Packet loss
  - Data integrity
  - Sequence checking

- Comprehensive layer 2-7 testing
  - Integrated data plane and control plane traffic generation and analysis
    - Layer 2/3 data plane testing
    - IPv4/v6 routing protocol emulation
    - Bridging protocols
    - FCoE, 802.1Qbb
    - MPLS VPNs, MPLS-TP
    - Multicast
    - 1588v2, Sync-E
    - Stateful Application Layer 4-7 testing
- Sophisticated multi-protocol encapsulation and label stacking
  - IPv4/v6, VLANs, QinQ, MAC-in-MAC, GRE, MPLS, and IP over IP

Specifications

Feature	Extra Performance	Reduced Performance
Load Modules	• LSM10GXM8S-01[1] • LSM10GXM4S-01[1] • LSM10GXM2S-01[1] • LSM10GXM8GBT-02[2]	• LSM10GXMR8S-01[1] • LSM10GXMR4S-01[1] • LSM10GXMR2S-01[1]
Number of ports per module	8 / 4 / 2	8 / 4 / 2
Number of chassis slots per module	1	1
Maximum ports per chassis		
• XGS12-SD and XGS12-HS rackmount chassis	96 / 48 / 24	96 / 48 / 24
• XGS2-SD and XGS2-HS 3U chassis	16 / 8 / 4	16 / 8 / 4
• XM2 Desktop	16 / 12 / 8 / 4	16 / 8 / 4
Supported transceivers (optical and copper)[1]	SFP+, RJ-45 10GBASE-T	SFP+, RJ-45 10GBASE-T
Per-port CPU speed and memory	1 GHz, 1 GB[3]	400 MHz / 128 MB
Per-port capture buffer	512 MB	64 MB
Interface protocols	10GbE LAN/WAN	10GbE LAN/WAN

Feature	Extra Performance	Reduced Performance
Layer 2/3 routing protocol emulation	Yes	Yes
Layer 4-7 application traffic testing	Yes	No
Number of transmit flows per port (sequential values)	Billions	Billions
Number of transmit flows per port (arbitrary values)	1 million	32 K
Number of stream definitions per port	512	256
	In packet stream (sequential) or advanced stream (interleaved) mode, each stream definition can generate millions of unique traffic flows.	
Number of trackable receive flows	1 million	64 K
Table UDF	1 million entries	32 K
	Comprehensive packet editing function for emulating large numbers of sophisticated flows. Entries of up to 256 bytes, using lists of values can be specified and placed at designated offsets within a stream. Each list consists of an offset, a size and a list of values in a table format.	
Packet flow statistics	Track 1 million flows	Track 64 K flows
Transmit engine	Wire-speed packet generation with timestamps, sequence numbers, data integrity signature, and packet group signatures	
Receive engine	Wire-speed packet filtering, capturing, real-time latency and inter-arrival time for each packet group, data integrity, and sequence checking	
User defined field features	Fixed, increment or decrement by user-defined step, value lists, range lists, cascade, random, and chained	
Filters	48-bit source/destination address, 2x128-bit user-definable pattern and offset, frame length range, CRC error, data integrity error, sequence checking error (small, big, reverse)	
Data field per stream	Fixed, increment (byte/word), decrement (byte/word), random, repeating, user-specified	

Feature	Extra Performance	Reduced Performance
Statistics and rates (counter size: 64 bits)	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), user-defined stat 5, user-defined stat 6, 8 QoS counters, data integrity frames, data integrity errors, sequence checking frames, sequence checking errors, ARP, and ping requests and replies	
Error generation	CRC (good/bad/none), undersize, oversize	
Latency measurements	10 ns resolution in packet timestamp	
Latency self-calibration	Ability to remove inherent latency from 10GE port electronics when used with MSA-compliant 10GE transceivers	
Transmit line clock adjustment	Ability to adjust the parts per million (ppm) line frequency over a range of: LAN mode: -105 to +105 ppm[4] WAN mode: -30 to +30 ppm	
IPv4, IPv6, UDP, TCP	Hardware checksum generation and verification	
Frame length controls	Fixed, random, weighted random, or increment by user-defined step, random, weighted random	
Operating temp. range	41°F to 95°F (5°C to 35°C), ambient air	

Application Support

Extra Performance	Reduced Performance
IxExplorer: Layer 2-3 wire-speed traffic generation and analysis including FCoE **IxNetwork:** Integrated layer 2-3 data/control plane performance and functional testing. Data Center Ethernet (FCoE), IEEE1588v2 Precision Time Protocol (PTP), Routing/bridging emulation includes: RIP, RIPng, OSPFv2/v3, ISISv4/v6, EIGRP, EIGRPv6, BGP-4,BGP+, RSVP-TE, RSVP-TE P2MP, LDP, mLDP, PWE, L3 MPLS VPN, 6VPE, MPLS-TP, MPLS-OAM, 6PE, BGP Auto-Discovery with LDP FEC 129 Support, VPLS-LDP, VPLS-BGP, BFD, IGMPv1/v2/v3, MLDv1/v2, PIM-SM/SSM, PIM-BSR, Multicast VPN, VPNv6, STP/RSTP, MSTP, PVST+/RPVST+, Link Aggregation (LACP), Link OAM, CFM, Service OAM, PBT/PBB-TE, ESMC, PTP, E-LMI, ANCP, PPPoX, DHCPv4 Client/Server, DHCPv6 Client/Server, L2TPv2, Radius Attributes for L2TP, 802.1x, WebAuth, Cisco NAC, Priority Flow Control, FCoE/ FIP, LLDP/DCBX, VNTAG/VIC **IxLoad:** Layer 4-7 performance testing **Tcl API:** Custom user script development for layer 2-7 testing	**IxExplorer:** Layer 2-3 wire-speed traffic generation and analysis including FCoE **IxNetwork:** Integrated layer 2-3 data/control plane performance and functional testing including Data Center Ethernet. Limitations: ○ 100 emulated protocol sessions ○ 2,000 emulated PPP/L2TP/DHCP sessions ○ 400 emulated 802.1x supplicants ○ 64K traffic flows analysis per test session **Tcl API:** Custom user script development for layer 2-7 testing

Product Ordering Information

NGY 8-port Load Modules with 10GBASE-T and SFP+ interfaces:

944-0078 LSM10GXM8GBT-02

LSM10GXM8GBT-02, 10 Gigabit Ethernet Load Module, 8-Port LAN, 10GBASE-T interface with 1GB RAM per port; 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 (941-0023); NOTE: the minimum version of IxOS for this module is IxOS 6.30EA SP1.

944-0051 LSM10GXM8S-01

LSM10GXM8S-01, 10 Gigabit Ethernet Load Module, 8-Port LAN/WAN, SFP+ interface with 1GB RAM per port. 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 (941-0023); Full L2/7 support; REQUIRES one or more SFP+ transceiver options: 948-0013 10GBASE-SR, 948-0014 SFP+10GBASE-LR, 948-0015 SFP+10GBASE-LRM, or 948-0016 SFP+10GSFP+Cu.

944-0053 LSM10GXMR8S-01

LSM10GXMR8S-01, 10 Gigabit Ethernet Load Module, Reduced L2/3 support with limited L3 routing, 8-Port LAN/WAN, SFP+ interface. 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 (941-0023); REQUIRES one or more SFP+ transceiver options: 948-0013 10GBASE-SR, 948-0014 SFP+10GBASE-LR, 948-0015 SFP+10GBASE-LRM, or 948-0016 SFP+10GSFP+Cu

NGY 4-port Load Modules 10GBASE-T and SFP+ interfaces:

944-0050 LSM10GXM4S-01

LSM10GXM4S-01, 10 Gigabit Ethernet Load Module, 4-Port LAN/WAN, SFP+ interface with 1GB RAM per port. 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 (941-0023); REQUIRES one or more SFP+ transceiver options: 948-0013 10GBASE-SR, 948-0014 SFP+10GBASE-LR, 948-0015 SFP+10GBASE-LRM, or 948-0016 SFP+10GSFP+Cu.

944-0052 LSM10GXMR4S-01

LSM10GXMR4S-01, 10 Gigabit Ethernet Load Module, Reduced L2/3 support with limited L3 routing, 4-Port LAN/WAN, SFP+ interface. 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 (941-0023); REQUIRES one or more SFP+ transceiver options: 948-0013 10GBASE-SR, 948-0014 SFP+10GBASE-LR, 948-0015 SFP+10GBASE-LRM, or 948-0016 SFP+10GSFP+Cu.

NGY 2-port Load Modules 10GBASE-T and SFP+ interfaces:

944-0054 LSM10GXM2S-01

LSM10GXM2S-01, 10 Gigabit Ethernet Load Module, 2-Port LAN/WAN, SFP+ interface with 1GB RAM per port. 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 (941-0023); Full L2/7 support; REQUIRES one or more SFP+ transceiver options: 948-0013 10GBASE-SR, 948-0014 SFP+10GBASE-LR, 948-0015 SFP+10GBASE-LRM, or 948-0016 SFP+10GSFP+Cu.

944-0055 LSM10GXMR2S-01

LSM10GXMR2S-01, 10 Gigabit Ethernet Load Module, Reduced L2/3 support with limited L3 routing, 2-Port LAN/WAN, SFP+ interface. 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 (941-0023); REQUIRES one or more SFP+ transceiver options: 948-0013 10GBASE-SR, 948-0014 SFP+10GBASE-LR, 948-0015 SFP+10GBASE-LRM, or 948-0016 SFP+10GSFP+Cu.

Data Center Ethernet / FCoE Upgrade Options

944-0064 SW-FCoE-OPT8

SW-FCoE-OPT8, Configuration Option, Fibre Channel over Ethernet (FCoE) Option for 8-port NGY, License per module; Supported on Extra Performance, (XP), full-featured, and reduced-feature performance load modules; REQUIRES Purchase of a supported load module [see 944-0051 (LSM10GXM8S-01), 944-0060 (LSM10GXM8XP-01), 944-0040 (LSM10GXM8-01), 944-0053 (LSM10GXMR8S-01), 944-0044 (LSM10GXMR8-01), 944-0078 (LSM10GXM8GBT-01), or 944-0079 (LSM10GXMR8GBT-01)]

944-0063 SW-FCoE-OPT4

SW-FCoE-OPT4, Configuration Option, Fibre Channel over Ethernet (FCoE) Option for 4-port NGY, License per module; Supported on Extra Performance, (XP), full-featured, and reduced-feature performance load modules; REQUIRES Purchase of a supported load module [see 944-0050 (LSM10GXM4S-01), 944-0059 (LSM10GXM4XP-01), 944-0039 (LSM10GXM4-01), 944-0052 (LSM10GXMR4S-01), 944-0043 (LSM10GXMR4-01), 944-0076 (LSM10GXM4GBT-01), or 944-0077 (LSM10GXMR4GBT-01)]

944-0056 SW-FCoE-OPT2

SW-FCoE-OPT2, Configuration Option, Fibre Channel over Ethernet (FCoE) Option for 2-port NGY, License per module; Supported on Extra Performance, (XP), full-featured and reduced-feature performance load modules; REQUIRES purchase of a supported load module [see 944-0054 (LSM10GXM2S-01), 944-0048 (LSM10GXM2XP-01), 944-0055 (LSM10GXMR2S-01), 944-0049 (LSM10GXMR2-01), 944-0074 (LSM10GXM2GBT-01), or 944-0075 (LSM10GXMR2GBT-01)]

NGY SFP+ Transceiver and Direct Attach Cable options:

NGY offers the following SFP+ transceiver and Direct Attach Cable options:

- 948-0013 SFP+10GBASE-SR/SW, Accessory, SFP+ Transceiver for 10 Gigabit Ethernet LAN/WAN load modules with pluggable SFP+ interface, 850nm
- 948-0014 SFP+10GBASE-LR/LW, Accessory, SFP+ Transceiver for 10 Gigabit Ethernet LAN/WAN load modules with pluggable SFP+ interface, 1310nm
- 948-0015 SFP+10GBASE-LRM, Accessory, SFP+ Transceiver for 10 Gigabit Ethernet LAN/WAN load modules with pluggable SFP+ interface, For multimode fiber, 1300nm
- 948-0016 SFP+10GSFP+Cu, Accessory, passive, Direct Attach Cable Assembly for 10 Gigabit Ethernet LAN/WAN load modules with pluggable SFP+ interface, copper twinaxial, 3 meter length

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1 The LSM10GXM8XP/4XP/2XP load modules do not support transceivers that consume more than 2.5 watts of power per port. The LSM10GXM8S/4S/2S load modules do not support transceivers that consume more than 2.0 watts of power per port.
2 All NGY 10GBASE-T load modules with the “-02” model number suffix require IxOS 6.30EA SP1 as the minimum version: LSM10GXM4GBT-02, LSM10GXM8GBT-02, LSM10GXMR8GBT-02.
3 The LSM10GXM8S and LSM10GXM8GBT use a high performance 800MHz processor with additional layer 2 cache.
4 For 10GBASE-T interfaces on NGY the ppm does change the data rate, but does not change the bit period due to phy chip limitations.