NOVUS™ 32-PORT 10/1 3-SPEED ETHERNET LOAD MODULE

EVOLVE YOUR MULTI-RATE ETHERNET TESTING

THE HIGHEST DENSITY 10G/1G/100M MULTI-RATE ETHERNET LOAD MODULE!

Ixia's Novus 10/1 family of load modules offers comprehensive Layer 2/3 (L2/3) network testing capability.

With 32 ports per module, you can create ultra-high-density test environments, with up to 384 3-speed test ports supported in a single 12-slot rackmount chassis.
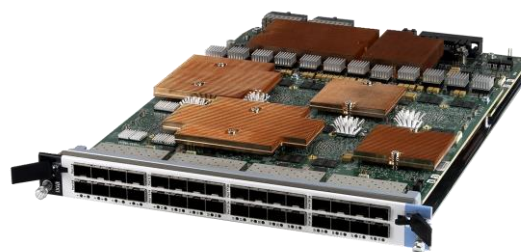
Support for 32 ports of 10/1/100M SFP+ allows up to line-rate traffic generation and analysis, and high-performance routing/bridging, host, and access protocol emulation.

KEY FEATURES

- 32-port full line-rate traffic generation to evaluate and validate the performance of ultra-high-density networking equipment

- Ultra-high scale and performance for emulating L2/3 protocols to validate performance and scalability of L2/3 routing/switching and data center test cases using the Ixia's IxNetwork application

- Perform industry-standard RFC benchmark tests and protocol emulation in large test bed with hundreds of 3-speed ports in a single test

- 10G, 1G, and 100M line-rate hardware packet capture and decode tools to detect and debug data transmission errors

- Application support for IxExplorer, IxNetwork, and related Tcl and automation APIs

- Flexible 4:1 CPU and memory aggregation, for ultra-high-scale protocol emulation and performance

- Flexible custom packet generation

- Real-time latency with latency resolution of up to 2.5ns

- Extensive port and traffic flow statistics

- Advanced sequence checking with duplicate packet detection

HIGHLIGHTS

- Industry's highest-density 10/1/100M SFP+ test solution

- 3-speed 10G/1G/100M ports provide low total cost of ownership and high ROI

- Feature, scale and performance parity with existing Ixia 10GE and 1GE load modules

- Broad coverage of L2/3 protocols including routing, switching, data center, access, and host protocols

- Purpose-built to test ultra-high density, high-performance, low-latency network devices

NOVUS10/1GE32S 32-port 3-Speed load module

Novus 3-speed brings a new level of performance and scalability, with a broad range of coverage of the most popular features of IxExplorer and IxNetwork applications.

SPECIFICATIONS

PRODUCT DESCRIPTION	NOVUS10/1GE32S 10GE/1GE/100M
Part Number	944-1141
Hardware Load Module Specifications	
Slot / Number of Ports	1-slot with 32x10GE/1GE SFP+ ports
Physical Interfaces	32-ports of SFP+
Supported Port Speeds	• 10GESFP+ port: SFP+ 10GE passive, copper Direct Attach Cable (DAC) media • 10GE/1GE-capable fiber media100M/port: SFP 100M-capable fiber media
Number of users	• Normal mode: Up to 16-users per load module (i.e. non-aggregation mode); Each user owns 2-ports at one time • Aggregation mode: Up to 8 users per load module
CPU and Memory	Multicore processor with 2GB of CPU memory per port pair
Port Aggregation	• Aggregation mode is set across the entire load module • Ixia aggregation mode allows the CPU and memory resources of 4 ports to be assigned to 1 port; It provides ultra-high scalability for L2/3 protocol emulation and up to 970 Mbps of L4-7 stateful traffic across the load module via IxNetwork AppLibrary • The number of ports available in aggregation mode on the load module is 8 physical ports • Aggregation mode supports up to 8 different users on the load module at one time
Load Module Dimensions	• 16.4" (L) x 1.3" (W) x 12.0" (H) • 417mm (L) x 33mm (W) x 305mm (H)

PRODUCT DESCRIPTION	NOVUS10/1GE32S 10GE/1GE/100M
Load Module Weights	- Module only: 11.4 lbs (5.15 kg) - Shipping: 18.2 lbs (8.26 kg)
Temperature	- Operating: 41°F to 95°F (5°C to 35°C) - Storage: 41°F to 122°F (5°C to 50°C)
Humidity	- Operating: 0% to 85%, non-condensing - Storage: 0% to 85%, non-condensing
Chassis Capacity: Maximum Number of Cards and Ports per Chassis Model	
XGS12-SD Rackmount Chassis (940-0011)	12 load modules: 384-ports of 10/1/100M 3-speed support
XGS12-SDL Rackmount Chassis (940-0015)	12 load modules: 384-ports of 10/1/100M 3-speed support
XGS12-HSL Rackmount Chassis (940-0016)	12 load modules: 384-ports of 10/1/100M 3-speed support
XGS2-SD Rackmount Chassis (940-0010)	2 load modules: 64-ports of 10/1/100M 3-speed support
XGS2-SDL Rackmount Chassis (940-0013)	2 load modules: 64-ports of 10/1/100M 3-speed support
XGS2-HSL Rackmount Chassis (940-0014)	2 load modules: 64-ports of 10/1/100M 3-speed support
Transmit Feature Specifications	
Transmit Engine	Wire-speed packet generation with timestamps, sequence numbers, data integrity signature, and packet group signatures

PRODUCT DESCRIPTION	NOVUS10/1GE32S 10GE/1GE/100M
Max. Streams per Port	512
Max. Streams per Port in Data Center Ethernet	256
Stream Controls	Rate and frame size change on the fly, sequential and advanced stream scheduler
Minimum Frame Size	10GE: • 49 bytes at full line rate without UDF • 60 bytes at full line rate with UDF 1GE and 100M: • 49 bytes at full line rate
Maximum Frame Size	16,384 bytes
Maximum Fame Size in Data Center Ethernet	9,216 bytes
Priority Flow Control	• 8 line-rate-capable queues, each supporting up to 2,500-byte frame lengths • 1 queue supporting up to 9,216-byte frame lengths
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 five, 32-bit-wide UDFs are available
Value Lists (Max.)	2M across 5 user defined fields
Sequence (Max.)	512
Error Generation	Generate good CRC or force bad CRC, undersize and oversize standard Ethernet frame lengths, and bad checksum

PRODUCT DESCRIPTION	NOVUS10/1GE32S 10GE/1GE/100M
Hardware Checksum Generation	Checksum generation and verification for IPv4, IP over IP, ICMP/GRE/TCP/UDP, L2TP, GTP
Link Fault Signaling	10GE: Reports, no fault, remote fault, and local fault port statistics; ability to select the option to have the transmit port ignore link faults from a remote link partner
Latency Measurement Resolution	2.5 nanoseconds
Transmit Line Clock Adjustment	Ability to adjust the parts-per-million (ppm) line frequency over a range of +/- 100 ppm across all ports on the load module.
Receive Feature Specifications	
Receive Engine	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
Trackable Receive Flows per Port	• 512k with Tx/Rx Sync and sequence checking
Minimum Frame Size	• 64 bytes at full line rate into the capture buffer • 49 bytes at less than full line rate
Filters (User-Defined Statistics, UDS)	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
Hardware Capture Buffer	512MB per port
Statistics and Rates	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
Latency/Jitter Measurements	Cut-through, store & forward, forwarding delay, up to 16 time bins latency/jitter, MEF jitter, and inter-arrival time

PRODUCT DESCRIPTION	NOVUS10/1GE32S 10GE/1GE/100M
Layer 2-3 Protocol Support	
Routing and Switching	BGP4/BGP4+, OSPFv2/v3, ISISv4/v6, EIGRP/EIGRPv6, RIP/RIPng, BFD, IGMP/MLD, PIM-SM/SSM, STP/RSTP/MSTP, PVST+/RPVST+, Link Aggregation (LACP), LISP
Software Defined Network	OpenFlow, Segment Routing, BGP Link State (BGP-LS), PCEP, VXLAN, EVPN VXLAN, OVSDB, GENEVE
MPLS	RSVP-TE P2P/P2MP, LDP/LDPv6/mLDP, LDP L2VPN (PWE/VPLS), BGP VPLS, L3VPN/6VPE, 6PE, BGP RFC3107, MPLS-TP, MPLS OAM, EVPN/PBB-EVPN, Multicast VPN Rosen Draft, NG Multicast VPN
Broadband and Authentication	PPPoX/L2TPv2, DHCPv4/DHCPv6, ANCP, IPv6 Autoconfiguration (SLAAC), IGMP/MLD, IPTV, 802.1x, WebAuth, EAPoUDP, Cisco NAC
Industrial Ethernet	Link OAM (IEEE 802.3ah), CFM/Y.1731, PBB/PBB-TE, ELMI, TWAMP, Sync-E ESMC, IEEE 1588v2 (PTP), gPTP (IEEE 802.1AS), MSRP (IEEE 802.1 Qat), IEEE 1722
Data Center Ethernet	DCBX/LLDP, FCoE/FIP, PFC (IEEE 802.1Qbb), TRILL, Cisco FabricPath, SPBM, VEPA

APPLICATION SUPPORT

NOVUS10/1GE32S
• **IxExplorer:** A full-featured L2/3 wire-speed Ethernet traffic generation and analysis test application.
• **IxNetwork:** 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.
• **Tcl API:** Custom user script development for L2/3 testing.

ORDERING INFORMATION

LOAD MODULES

944-1141

NOVUS10/1GE32S, 32-port, SFP+ 10GE/1GE/100M load module, 1-slot with 32-ports with SFP+ physical interface, L2-3 support. Compatible with the XGS12-SD rack mount chassis (940-0011), XGS12-HSL rack mount chassis (940-0016), XGS2-SD 2-slot standard performance chassis (940-0010), and 2-slot high performance XGS2-HSL Chassis (940-0014).

CABLES & TRANSCEIVERS

988-0011

SFP+10GBASE-SR/SW and 1000BASE-SX Dual-Rate pluggable optical transceiver for 10/1 Gigabit Ethernet LAN/WAN load modules with pluggable SFP+ interface, 850nm. Compatible with all 10/1 Gigabit Ethernet Novus, PerfectStorm and Firestorm load modules and appliances. Note: Multi-mode fiber LC-LC, 3 meter cable included.

988-0012

SFP+10GBASE-LR/LW and 1000BASE-LX Dual-Rate pluggable optical transceiver for 10/1 Gigabit Ethernet LAN/WAN load modules with pluggable SFP+ interface, 1310nm, 10km reach. Compatible with all 10/1 Gigabit Ethernet Novus, PerfectStorm and Firestorm load modules and appliances. Note: Single-mode fiber LC-LC, 10 ft cable included.

948-0013

SFP+10GBASE-SR/SW, Accessory, SFP+ Transceiver for 10 Gigabit Ethernet LAN/WAN load modules with pluggable SFP+ interface, 850nm; Operates with 944-0050 (LSM10GXM4S-01), -- 944-0051 (LSM10GXM8S-01), -- 944-0052 (LSM10GXMR4S-01), -- 944-0053 (LSM10GXMR8S-01), -- 944-0054 (LSM10GXM2S-01), -- 944-0055 (LSM10GXMR2S-01); -- and 944-0022 (LSM10G1-01) with 948-0012 (SFP+ADAP-01); -- or 944-0024 (LSM10GL1-01) with 948-0012 (SFP+ADAP-01).

948-0014

SFP+10GBASE-LR/LW, Accessory, SFP+ Transceiver for 10 Gigabit Ethernet LAN/WAN load modules with pluggable SFP+ interface, 1310nm; Operates with 944-0050 (LSM10GXM4S-01), -- 944-0051 (LSM10GXM8S-01), -- 944-0052 (LSM10GXMR4S-01), -- 944-0053 (LSM10GXMR8S-01), -- 944-0054 (LSM10GXM2S-01), -- 944-0055 (LSM10GXMR2S-01); -- and 944-0022 (LSM10G1-01) with 948-0012 (SFP+ADAP-01); -- or 944-0024 (LSM10GL1-01) with 948-0012 (SFP+ADAP-01).

948-0015

SFP+10GBASE-LRM, Accessory, SFP+ Transceiver for 10 Gigabit Ethernet LAN/WAN load modules with pluggable SFP+ interface, For multimode fiber, 1310nm; Operates with 944-0050 (LSM10GXM4S-01), -- 944-0051 (LSM10GXM8S-01), -- 944-0052 (LSM10GXMR4S-01), -- 944-0053 (LSM10GXMR8S-01), -- 944-0054 (LSM10GXM2S-01), -- 944-0055 (LSM10GXMR2S-01); -- and 944-0022 (LSM10G1-01) with 948-0012 (SFP+ADAP-01); -- or 944-0024 (LSM10GL1-01) with 948-0012 (SFP+ADAP-01); NOTE: SFP+10GBASE-LRM does not support the 10GbE WAN mode in any of the load modules listed above.

948-0016

SFP+10GSFP+Cu, Accessory, passive, copper Direct Attach Cable Assembly for 10 Gigabit Ethernet LAN/WAN load modules with pluggable SFP+ interface, 3 meter length; NGY 10GE SFP+ modules, Xdensity modules, and Xcellon-Flex 10GE SFP+ FE and AP modules

SFP-LX

SFP 1 Gigabit Ethernet Transceiver - 1310nm LX

SFP-SX

SFP 1 Gigabit Transceiver - 850nm SX

SFP-FX-100M-XCVR

SFP 100BASE-FX 100M SGMII pluggable optical transceiver, MMF (multimode), 1310nm, 2km reach. Compatible with NOVUS10/1GE32S (944-1141), NOVUS10/1GE16DP (944-1142), NOVUS10/1GE8DP (944-1143), NOVUS1GE16DP (944-1146), NOVUS-NP10/1GE16DP (944-1162), NOVUS-NP10/1GE8DP (944-1163) load modules, NOVUS ONE 10/1GE/100M 16-port (941-0060) and NOVUS ONE 10/1GE/100M 8-port (941-0061) appliances. Note: This transceiver supports only the 100M speed mode.