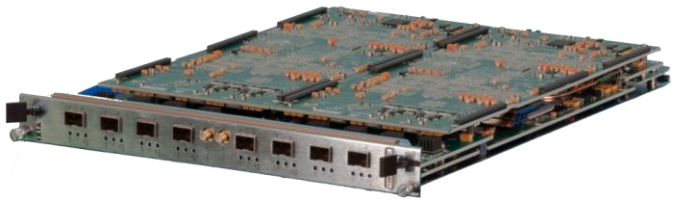
NGY-NP—10GBE APPLICATION NETWORK PROCESSOR LOAD MODULES

DATA SHEET

Ixia's NGY-NP family of load modules is the industry's highest performing density application traffic generation solution. It offers complete layer 2-7 packet generation, and routing and application testing functionality in a single load module.

NGY-NP combines the CPU processing and Ixia's unique NP (network processor) architecture to create a scalable, high-performance application traffic generation platform, emulating up to 40Gbps of data traffic. Each 10GbE port uses multiple network processors, a powerful RISC processor running Linux, and a complete TCP/IP stack – all of which are optimized for layer 4-7 testing. Each test port also supports wire-speed layer 2-3 traffic generation and analysis, and high-performance routing/bridging protocol emulation in conjunction with true layer 4-7 application subscriber emulation and traffic generation.

NGY-NP is available in 2-port, 4-port and 8-port configurations offering a wider range of price points, interfaces densities, and performance capabilities. A single twelve slot XGS12 chassis can generate up to 480Gbps of stateful traffic in a single test system.



NGY-NP8 10GbE Load Module

HIGHLIGHTS

- Extensive support for layer 4-7 protocols including DHCPv4, DHCPv6-PD, PPPoE, IPSec, VLANs, 802.1q, and 802.1p.
- True user emulation with multiple applications per subscriber.
- Realistically simulates dynamic network interface setup and tear-down behavior linked with subscriber emulation.
- Advanced network attachment support to test with any network topology.
- Sets up 802.1x and EAPoUDP sessions and carries out authentication and access control.
- Transmits high-performance multiplay traffic over authenticated sessions for performance benchmarking, while performing web-based HTTP session authentication and running HTTP performance scalability tests.
- HTTP, SSL, FTP, peer-to-peer, RTSP, RTP, SMTP, POP3, IMAP, CIFS, Radius, SSH, Radius, Telnet, DNS, DHCP, LDAP, DDoS,
- vulnerability attacks and application replay for true replay of application flows.
- VoIP, SIP, SCCP (Skinny), H.248, SIP, and MGCP.
- IPTV, video on demand, streaming video, RTSP, RTP, IGMP, and MLD

APPLICATION TRAFFIC CAPABILITIES

APPLICATION FEATURE	DETAILS
Network Protocols	Extensive support for layer 4-7 protocols including DHCPv4, DHCPv6-PD, PPPoE, IPsec, VLANs, 802.1q, and 802.1p. Unique MAC addresses, flexible IP and VLAN mapping, traffic to network associations are available for complex scenarios.
Dynamic Subscriber Behavior	True user emulation with multiple applications per subscriber. Realistically simulates dynamic network interface setup and tear-down behavior linked with subscriber emulation. Advanced network attachment support to test with any network topology.
Layer 2-3 Authentication and Access Control	Sets up 802.1x and EAPoUDP sessions and carries out authentication and access control. Transmits high-performance multiplay traffic over authenticated sessions for performance benchmarking, while performing web-based HTTP session authentication and running HTTP performance scalability tests.
Data Protocol Emulation	HTTP, SSL, FTP, peer-to-peer, RTSP, RTP, SMTP, POP3, IMAP, CIFS, Radius, SSH, Radius, Telnet, DNS, DHCP, LDAP, DDoS, vulnerability attacks and application replay for true replay of application flows.
Voice Protocol Testing	VoIP, SIP, SCCP (Skinny), H.248, SIP, and MGCP.
Video Protocol Testing	IPTV, video on demand, streaming video, RTSP, RTP, IGMP, and MLD.

APPLICATION PERFORMANCE[i]

NGY-NP load modules provide the industry's highest performance in real-world application emulation.

METRIC	NGY-NP8	NGY-NP4	NGY-NP2
L2/3 Throughput	160Gbps	80Gbps	40Gbps
L7 Throughput	40Gbps	20Gbps	10Gbps
Connections/sec	400,000	252,000	125,000
Concurrent Connections	3,200,000	1,600,000	800,000

FLEXIBLE PACKET GENERATION

Each Ixia 10 gigabit Ethernet test port is capable of generating precisely controlled network traffic at wire speed using Ixia's IxExplorer test application. Millions of packet flows, with fully customizable packet header fields, can be configured on each port. Flexible header control is available for Ethernet, IPv4/v6, IPX, ARP, TCP, UDP, VLANs, QinQ, MPLS, GRE, and many others. Payload contents can also be customized with incrementing, decrementing, fixed, random, or user-defined information. Frame sizes can be fixed, varied according to a pattern, or randomly assigned across a weighted range. Rate control can be flexibly defined in frames per second, bits per second, percentage of line rate, or inter-packet gap time.

REAL-TIME LATENCY

Packets representing different traffic profiles can be associated with packet group Identifiers (PGIDs). The receiving port measures the minimum, maximum, and average latency in real time for the packets belonging to different groups. Measurable latencies include:

- Instantaneous latency and inter-arrival time where each packet is associated with one PGID
- Latency bins, where PGIDs can be associated with a latency range
- Latency over time, where multiple PGIDs can be placed in "time buckets" with fixed durations
- First and last time stamps, where each PGID can store the timestamps of first and last received packets

TRANSMIT SCHEDULER

There are two modes of transmission are available - packet stream and advanced stream scheduler:

- **Packet Stream Scheduler**. In packet stream scheduler mode, the transmit engine allows configuration of up to 4000 unique sequential stream groupings on each port. Multiple streams can be defined in sequence, each containing multiple packet flows defined by unique characteristics. After transmission of the first stream, control is passed to the next defined stream in the sequence. After reaching the last stream in the sequence, transmission may either cease, or control may be passed on to any other stream in the sequence. Therefore, multiple streams are cycled through, representing different traffic profiles to simulate real network traffic.
- **Advanced Stream Scheduler**. In advanced stream scheduler mode, the transmission of stream groupings is interleaved per port. For example, assume a port is configured with three streams. If stream 1 is defined with IP packets at 20% of line rate, stream 2 is defined with TCP packets at 50% of line rate, and stream 3 is defined with MPLS packets at 30% of line rate, data on the port will be transmitted at an aggregate utilization of 100% with interleaved IP, TCP, and MPLS packets.

EXTENSIVE STATISTICS

- Real-time 64-bit frame counts and rates
- Spreadsheet presentation format for convenient manipulation of statistics counters

- Eight QoS counters (supporting 802.1p, DSCP, and IPv4 TOS measurements)
- PRBS mode per-PGID statistics:
  - PRBS Bits Received
  - PRBS Errored Bits
- PRBS BERT user-defined statistics with trigger condition
- Extended statistics for ARP, ICMP, and DHCP
- Transmit stream statistics for frame counts and rate
- External logging to file for statistics and alerts
- Audible and visual alerts with user-definable thresholds

DATA CAPTURE

Each port is equipped with 512 MB of capture memory, capable of storing tens of thousands of packets in real time. The capture buffer can be configured to store packets based on user-defined trigger and filter conditions. Decodes for IPv4, IPv6, UDP, ARP, BGP-4, IS-IS, OSPF, TCP, DHCP, IPX, RIP, IGMP, CISCO ISL, VLAN, and MPLS are provided.

DATA INTEGRITY

As packets traverse through networks, IP header contents may change resulting in the recalculation of packet CRC values. To validate device performance, the data integrity function of GbE ports allows packet payload contents to be verified with a unique CRC that is independent of the packet CRC. This ensures that the payload is not disturbed as the device changes header fields. In addition to the data integrity check, NGY-NP offers PRBS testing, which detects errors within encapsulated Ethernet frames and provides errored-bit identification and bit error rate (BERT) calculations.

SEQUENCE AND DUPLICATE PACKET CHECKING

Sequence numbers can be inserted at a user-defined offset in the payload of each transmitted packet. Upon receipt of the packets by the device under test (DUT), out-of-sequence errors or duplicated packets are reported in real time at wire-speed rates. The user can define a sequence error threshold to distinguish between small versus big errors, and the receive port can measure the amount of small, big, reversed, and total errors. Alternatively, the user can use the duplicate packet detection mode to observe that multiple packets with the same sequence number are received and analyzed.

TCL API

Ixia's GbE ports are supported by a comprehensive Tcl application programming interface (API). This API allows users to develop custom scripts, and integrate the modules into automated test environments.

APPLICATION SUPPORT

- IxExplorer: Layer 2-3 wire-speed traffic generation and analysis including FCoE.
- IxAutomate: Automated test environment for layer 2-3 data and control plane testing, includes RFC-based test suites.
- IxNetwork: Integrated layer 2-3 data/control plane performance and functional testing. Data Center Ethernet (FCoE, IxSAN) Routing/bridging emulation includes: BGP4/4+, OSPFv2/v3, IS-ISv4/v6, RIP/RIPng, RSVP-TE, LDP, L2 MPLS VPNs, L3 MPLS VPNs, VPLS, IGMPv1/v2/v3, MLDv1/v2, PIM-SMv4/v6, STP, RSTP, EIGRP, and MSTP.
- IxLoad: Layer 4-7 performance testing.
- IxSAN: Stateful FCoE emulation of storage devices including emulation of initiators and targets.
- Tcl API: Custom user script development for layer 2-7 testing.

SPECIFICATIONS

LOAD MODULE	NGY-NP8, NGY-NP4, AND NGY-NP2
Connector Type	SFP+ for 10GbE port
Number of Ports	8 / 4 / 2
Maximum Ports per Chassis: **- XGS12-HS or XGS12-SD or XM12** **- XGS2-HS or XGS2-SD or XM2**	96 / 48 / 24[ii] 16 / 8 / 4
Layer 2-3 Routing Protocol and Emulation	Yes
Layer 4–7 Application Traffic Testing	Yes
Capture Buffer per Port	512 MB
Number of Transmit Flows per Port (sequential values)	Billions
Number of Transmit Flows per Port (arbitrary values)	1 Million
Number of Trackable Receive Flows per Port	1 Million
Number of Stream Definitions per Port	512 in packet stream mode (sequential) or advanced stream (interleaved) modes. Each stream definition can generate millions of unique traffic flows

LOAD MODULE	NGY-NP8, NGY-NP4, AND NGY-NP2
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 for each packet group, data integrity, and sequence checking
User Defined Field (UDF) Features	Fixed, increment or decrement by user-defined step, value lists, range lists, cascade, random, and chained
Table UDF Feature	Comprehensive packet editing function for emulating large numbers of sophisticated flows. Up to 1 million table UDF entries are supported on the NGY-NP.
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 up to 13K bytes
Statistics and Rates: **Counter Size: 64-Bit**	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
Packet Flow Statistics	Real-time statistics to track up to 1 million packet flows on the NGY-NP with throughput and latency measurements.
Latency Measurements	20ns resolution
IPv4, IPv6, UDP, TCP	Hardware checksum generation
Frame Length Controls	Fixed, random, weighted random, or increment by user-defined step, random, weighted random
Operating Temperature Range	41°F to 86°F (5°C to 30°C)

PRODUCT ORDERING INFORMATION

944-0084

NGY-NP8-01, 10 Gigabit Application Network Processor 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 rack mount 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); 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; NOTE: If OPTIXIAXM12-01 (941-0002) chassis is used with this item, see FRU-OPTIXIAXM12-01 (943-0005).

944-0089

NGY-NP4-01, 10 Gigabit Application Network Processor 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 rack mount 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); 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.

944-0090

NGY-NP2-01, 10 Gigabit Application Network Processor 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 rack mount 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); 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.

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

[i] Numbers in the table represent the performance of two connected, same-version NGY-NP modules.
[ii] For XM12, the XM12 High Performance chassis variant (941-0009) is required for 80 or more ports of 10 GbE NGY XFP or SFP+ 8-port. A field replaceable power supply upgrade kit (943-0005) is available for the XM12 chassis (941-0002) to convert it to the High Performance version.

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