

# Novus 10/1 5-Speed Ethernet Load Modules

Evolve Your Multi-Rate Ethernet Testing

## High-Density 10G/5G/2.5G/1G/100M Multi-Rate Ethernet Test in One Load Module

Keysight's Novus 10/1 5-speed family of load modules offers complete Layer 2-7 and Layer 2/3 network and application testing.

Support for Dual-PHY SFP+ and 10GBASE-T RJ45 copper that provides line-rate L2/3 traffic generation and analysis, high-performance routing/bridging, and host and access protocol emulation. True L4-7 application traffic generation and subscriber emulation is available, with the full feature load modules. With up to 16 Dual-PHY ports per module, you can create ultra-high-density test environments for 10/5/2.5/1/100M Ethernet over copper and for 10/1/100M over fiber. Up to 192 5-speed test ports are supported in a single 12-slot rackmount chassis.



NOVUS10/5/2.5/1/100M16DP 16-port Dual-PHY 5-speed load module

### Highlights

- Industry's only and highest-density Dual-PHY SFP+/10GBASE-T RJ45 solution
- 5-speed 10G/5G/2.5G/1GE/100M ports provide low total cost of ownership and high ROI
- Feature, scale, and performance parity with Keysight's existing 10GE and 1GE load modules
- Broad coverage of L4-7 protocols including video, voice, storage, and access
- Purpose built to test high-performance, low-latency devices

Novus 5-speed load modules are available in four different models to match your L2/3 and/or L2-7 requirements and budget:

- **NOVUS10/5/2.5/1/100M16DP**: A full-featured 16-port, Dual-PHY SFP+ and RJ45 10/5/2.5/1/100M L2-7 load module
- **NOVUS10/5/2.5/1/100M8DP**: A full-featured 8-port, Dual-PHY SFP+ and RJ45 10/5/2.5/1/100M L2-7 load module
- **NOVUS10/5/2.5/1/100M16DP-R**: A reduced-feature 16-port, Dual-PHY SFP+ and RJ45 10/5/2.5/1/100M L2/3 load module
- **NOVUS10/5/2.5/1/100M8DP-R**: A reduced-feature 8-port, Dual-PHY SFP+ and RJ45 10/5/2.5/1/100M L2/3 load module

To support evolving test needs, users can add a field-upgrade option that converts an 8-port, 5-speed, full- or reduced-feature load module to a 16-port 5-speed load module of the same type.

## Key features

- 210G, 5G, 2.5G, 1G, and 100M line-rate hardware packet capture and decode tools to detect and debug data transmission errors
- Full feature L2-7, and reduced L2/3 feature versions, allowing flexibility to choose the desired level of performance
- All models and their speeds support full line-rate traffic generation to evaluate ASIC designs, FPGAs, and networking equipment switch fabrics
- Ultra-high scale and performance for emulating L2/3 protocols to validate performance and scalability of routing/switching and data center test cases by using Keysight's IxNetwork application
- Support for testing SFP+ and 10GBASE-T RJ-45 copper ports at different speeds simultaneously using the same load module
- Industry-standard RFC tests and protocol emulation in large test bed with hundreds of 10G, 5G, 2.5G, 1G, and/or 100M ports in a single test—to benchmark data plane, performance, and scale of ultra-high-density network equipment
- Application support for IxExplorer, IxNetwork, IxLoad and their related Tcl and automation APIs
- IxLoad<sup>i</sup> application for L4-7 testing, including data, video, voice, storage, and access protocols
- Flexible 4:1 CPU and memory aggregation, for ultra-high-scale protocol emulation and performance
- Flexible custom packet generation for all supported frame sizes and speeds
- Real-time latency measurement and statistics with a latency resolution of 2.5ns
- Extensive port and traffic flow statistics
- Advanced sequence checking with duplicate packet detection
- Support for preamble customization is now available on IxNetwork for the Novus 1GE/10GE 5-Speed and 3-Speed load modules. Customization is available for both the preamble length and the preamble data of frames.

Novus 10/1 5-speed brings a new level of performance with a broad range of coverage of the most popular features of IxNetwork and IxLoad<sup>i</sup> applications.

# Specifications

Product description	NOVUS 10/5/2.5/1/100M16DP	NOVUS 10/5/2.5/1/100M8DP	NOVUS 10/5/2.5/1/100M16DP-R	NOVUS 10/5/2.5/1/100M8DP-Rii, iii
Preamble Customization	Available for preamble length and preamble data			
Part Number	944-1148	944-1149	944-1154	944-1155
<b>Hardware Load Module Specifications</b>				
Slot / Number of Ports	1-slot with 16x10/1GE	1-slot with 8x10/1GE	1-slot with 16x10/1GE	1-slot with 8x10/1GE
Physical Interfaces	SFP+ and 10GBASE-T RJ-45			
Supported Port Speeds	<ul style="list-style-type: none"> <li>10G, 1G, and 100Mbps speed support on the fiber and copper RJ45 ports</li> <li>5G, 2.5G speed support on the copper RJ45 ports</li> </ul>			
Number of Users	16-port model: <ul style="list-style-type: none"> <li>Normal mode: Up to 16-users per load module (i.e. non-aggregation mode)</li> <li>Aggregation mode: Up to 4 users per load module</li> </ul> 8-port model: <ul style="list-style-type: none"> <li>Normal mode: Up to 8-users per load module (i.e. non-aggregation mode)</li> <li>Aggregation mode: Up to 2 users per load module</li> </ul>		16-port model: <ul style="list-style-type: none"> <li>Up to 16-users per load module</li> </ul> 8-port model: <ul style="list-style-type: none"> <li>Up to 8-users per load module</li> </ul>	
CPU and Memory	Multicore processor with 2GB of CPU memory per port pair			
Port Aggregation	<ul style="list-style-type: none"> <li>Aggregation mode is set across the entire load module</li> <li>Keysight aggregation mode allows the CPU and memory resources of 4 ports to be assigned to 1 port. This provides for ultra-high scalability for L2/3 protocol emulation and up to 16Gbps of L4-7 stateful traffic.</li> </ul>		Not supported	
IEEE Interface Protocols	<ul style="list-style-type: none"> <li>IEEE P802.3an for 10GBASE-T</li> <li>IEEE P802.3bz for 2.5/5GE</li> </ul>			
Cable Media	<ul style="list-style-type: none"> <li>CAT5e twisted pair</li> <li>CAT6 twisted pair</li> <li>CAT6A twisted pair</li> </ul>			
Load Module Dimensions	<ul style="list-style-type: none"> <li>17.3" (L) x 1.3" (W) x 12.0" (H)</li> <li>440mm (L) x 33mm (W) x 305mm (H)</li> </ul>			
Load Module Weights	<ul style="list-style-type: none"> <li>Module only: 12.9 lbs (5.85 kg)</li> <li>Shipping: 19.7 lbs (8.94 kg)</li> </ul>			
Temperature (Ambient Air)	<ul style="list-style-type: none"> <li>Operating: 41°F to 104°F (5°C to 40°C)</li> <li>Storage: 41°F to 122°F (5°C to 50°C)</li> </ul>			
Humidity (Ambient Air)	<ul style="list-style-type: none"> <li>Operating: 0 % to 85 %, non-condensing</li> <li>Storage: 0 % to 85 %, non-condensing</li> </ul>			

Product description	NOVUS 10/5/2.5/1/100M16DP	NOVUS 10/5/2.5/1/100M8DP	NOVUS 10/5/2.5/1/100M16DP-R	NOVUS 10/5/2.5/1/100M8DP-Rii, iii
<b>Chassis Capacity: Maximum Number of Cards and Ports per Chassis Model</b>				
XGS12-SD Rackmount Chassis (940-0011) iv	12 load modules: 192-ports with 10/5/2.5/1/100M Dual-PHY, 5-speed support	12 load modules: 96-ports with 10/5/2.5/1/100M Dual-PHY, 5-speed support	12 load modules: 192-ports with 10/5/2.5/1/100M Dual-PHY, 5-speed support	12 load modules: 96-ports with 10/5/2.5/1/100M Dual-PHY, 5-speed support
XGS12-SDL Rackmount Chassis (940-0015) iv	12 load modules: 192-ports with 10/5/2.5/1/100M Dual-PHY, 5-speed support	12 load modules: 96-ports with 10/5/2.5/1/100M Dual-PHY, 5-speed support	12 load modules: 192-ports with 10/5/2.5/1/100M Dual-PHY, 5-speed support	12 load modules: 96-ports with 10/5/2.5/1/100M Dual-PHY, 5-speed support
XGS12-HSL Rackmount Chassis (940-0016) iv	12 load modules: 192-ports with 10/5/2.5/1/100M Dual-PHY, 5-speed support	12 load modules: 96-ports with 10/5/2.5/1/100M Dual-PHY, 5-speed support	12 load modules: 192-ports with 10/5/2.5/1/100M Dual-PHY, 5-speed support	12 load modules: 96-ports with 10/5/2.5/1/100M Dual-PHY, 5-speed support
XGS2-SD Rackmount Chassis (940-0010)	2 load modules: 32-ports with 10/5/2.5/1/100M Dual-PHY, 5-speed support	2 load modules: 16-ports with 10/5/2.5/1/100M Dual-PHY, 5-speed support	2 load modules: 32-ports with 10/5/2.5/1/100M Dual-PHY, 5-speed support	2 load modules: 16-ports with 10/5/2.5/1/100M Dual-PHY, 5-speed support
XGS2-SDL Rackmount Chassis (940-0013)	2 load modules: 32-ports with 10/5/2.5/1/100M Dual-PHY, 5-speed support	2 load modules: 16-ports with 10/5/2.5/1/100M Dual-PHY, 5-speed support	2 load modules: 32-ports with 10/5/2.5/1/100M Dual-PHY, 5-speed support	2 load modules: 16-ports with 10/5/2.5/1/100M Dual-PHY, 5-speed support
XGS2-HSL Rackmount Chassis (940-0014)	2 load modules: 32-ports with 10/5/2.5/1/100M Dual-PHY, 5-speed support	2 load modules: 16-ports with 10/5/2.5/1/100M Dual-PHY, 5-speed support	2 load modules: 32-ports with 10/5/2.5/1/100M Dual-PHY, 5-speed support	2 load modules: 16-ports with 10/5/2.5/1/100M Dual-PHY, 5-speed support
<b>Transmit Feature Specifications</b>				
Transmit Engine	Wire-speed packet generation with timestamps, sequence numbers, data integrity signature, and packet group signatures			
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	10G, 5G, and 2.5G: <ul style="list-style-type: none"> <li>49 bytes at full line rate without UDF</li> <li>60 bytes at full line rate with UDF</li> </ul> 1G and 100Mbps: <ul style="list-style-type: none"> <li>49 bytes at full line rate</li> </ul>			
Maximum Frame Size	16,384 bytes			
Maximum Frame Size in Data Center Ethernet	9,216 bytes			

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Priority Flow Control	<ul style="list-style-type: none"> <li>8 line-rate-capable queues, 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 five, 32-bit-wide UDFs are available			
Value Lists (Max.)	2M total entries across 5 User Defined Fields			
Sequence Checking (Max.)	512K maximum PGIDs per port			
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, 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 line frequency over a range of -100 ppm to +100 ppm across all ports on the load module			
<b>Receive Feature Specifications</b>				
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 sequence checking			
Minimum Frame Size	<ul style="list-style-type: none"> <li>64 bytes at full line rate into the capture buffer</li> <li>49 bytes at less than full line rate</li> </ul>			
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 Measurement	Cut-through, store and forward, forwarding delay, up to 16 time bins latency/jitter, MEF jitter, and inter-arrival time			
<b>Layer 2-3 Protocol Support</b>				
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			

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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			
<b>Layer 4-7 Application Traffic Testing Support</b>				
Data	HTTP, HTTPS, TCP Session, FTP, DNS, Mail (SMTP, POP3, and IMAP), TFTP, AppReplay, AppLibrary			
Video	RTSP, IPTV, VoD, Adobe Flash Client, Apple HLS Client, Microsoft Silverlight Client, Adobe HDS Client, DASH Client; includes Video Quality VQMON and TCP Video Quality			
Voice	Advanced VoIP SIP and RTP, Audio and Video Codecs, VoLTE, MSRP, Telepresence, SMS; includes: Voice Quality and Video Quality for conversational video traffic			
Storage	iSCSI, CIFSv1, CIFSv2 (SMB2), SMB3, NFSv3 Client, NFSv4 Client, NFS4.1 Client, Cloud Storage Client			
Access	IPv4, IPv6, IPsec, VLAN, Emulated Routers, DNS, DHCP			

## Application support

### NOVUS10/1GE16DP, NOVUS10/1GE8DP

- **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.
- **IxLoad<sup>!</sup>:** A scalable L4-7 solution for testing converged multiplay services, application delivery platforms, and security devices and systems. IxLoad emulates data, access, storage, voice, and video subscribers and associated protocols to ensure quality of experience (QoE).
- **Tcl API:** Custom user script development for L2-7 testing

### NOVUS10/5/2.5/1/100M16DP-R, NOVUS10/5/2.5/1/100M8DP-R

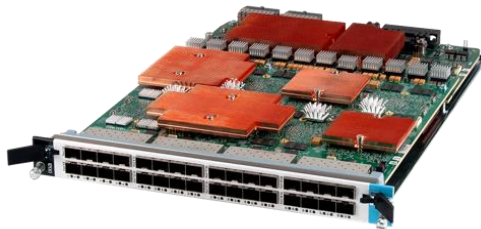
- **IxExplorer:** A full-featured layer 2-3 wire-speed Ethernet traffic generation and analysis test application.
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- **Tcl API:** Custom user script development for layer 2/3 testing

# Ordering Information

## Load modules

### 944-1148

NOVUS10/5/2.5/1/100M16DP, 5-speed, 16-port, SFP+/10GBASE-T Dual-PHY 10G/5G/2.5G/1G/100M full scale and performance, load module load module, 1-slot Dual-PHY with 16-ports each of the SFP+ and 10GBASE-T RJ45 physical interfaces, L2-7 support with complete protocol coverage, and full scale and performance protocol emulation for routing, switching and access protocols. The load module is compatible with the XGS2-SD 2-slot, 3RU standard performance rack-mountable chassis bundle (940-0010), XGS12-SD 12-slot, 11RU standard performance rack-mountable chassis bundle (940-0011), XGS2-SDL 2-slot, 3RU standard performance rack-mountable chassis bundle (940-0013), XGS12-SDL 12-slot, 11RU standard performance rack-mountable chassis bundle (940-0015), XGS2-HSL 2-slot, 3RU high performance rack-mountable chassis bundle (940-0014), and XGS12-HSL 12-slot, 11RU high performance rack-mountable chassis bundle (940-0016).



### 944-1149

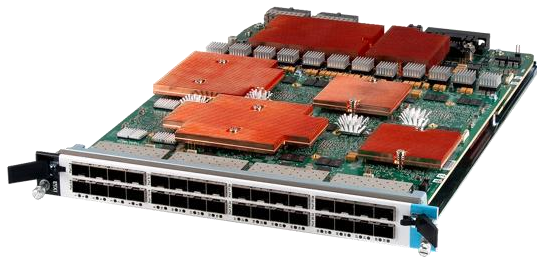
NOVUS10/5/2.5/1/100M8DP, 8-port enablement on the 16-port SFP+/10GBASE-T Dual-PHY 10G/5G/2.5G/1G/100M full scale and performance, load module load module (944-1148), 1-slot Dual-PHY with 8-ports each of the SFP+ and 10GBASE-T RJ45 physical interfaces, L2-7 support with complete protocol coverage, and full scale and performance protocol emulation for routing, switching and access protocols. The load module is compatible with the XGS2-SD 2-slot, 3RU standard performance rack-mountable chassis bundle (940-0010), XGS12-SD 12-slot, 11RU standard performance rack-mountable chassis bundle (940-0011), XGS2-SDL 2-slot, 3RU standard performance rack-mountable chassis bundle (940-0013), XGS12-SDL 12-slot, 11RU standard performance rack-mountable chassis bundle (940-0015), XGS2-HSL 2-slot, 3RU high performance rack-mountable chassis bundle (940-0014), and XGS12-HSL 12-slot, 11RU high performance rack-mountable chassis bundle (940-0016).





#### 944-1154

NOVUS10/5/2.5/1/100M16DP-R, 5-speed, 16-port, SFP+/10GBASE-T Dual-PHY 10G/5G/2.5G/1G/100M reduced scale and performance load module load module, 1-slot Dual-PHY with 16-ports each of the SFP+ and 10GBASE-T RJ45 physical interfaces, L2-3 support with complete protocol coverage, and reduced scale and performance protocol emulation for routing, switching and access protocols. The load module is compatible with the XGS2-SD 2-slot, 3RU standard performance rack-mountable chassis bundle (940-0010), XGS12-SD 12-slot, 11RU standard performance rack-mountable chassis bundle (940-0011), XGS2-SDL 2-slot, 3RU standard performance rack-mountable chassis bundle (940-0013), XGS12-SDL 12-slot, 11RU standard performance rack-mountable chassis bundle (940-0015), XGS2-HSL 2-slot, 3RU high performance rack-mountable chassis bundle (940-0014), and XGS12-HSL 12-slot, 11RU high performance rack-mountable chassis bundle (940-0016).



#### 944-1155

NOVUS10/5/2.5/1/100M8DP-R, 5-speed, 8-port, SFP+/10GBASE-T Dual-PHY 10G/5G/2.5G/1G/100M reduced scale and performance load module load module, 1-slot Dual-PHY with 8-ports each of the SFP+ and 10GBASE-T RJ45 physical interfaces, L2-3 support with complete protocol coverage, and reduced scale and performance protocol emulation for routing, switching and access protocols. The load module is compatible with the XGS2-SD 2-slot, 3RU standard performance rack-mountable chassis bundle (940-0010), XGS12-SD 12-slot, 11RU standard performance rack-mountable chassis bundle (940-0011), XGS2-SDL 2-slot, 3RU standard performance rack-mountable chassis bundle (940-0013), XGS12-SDL 12-slot, 11RU standard performance rack-mountable chassis bundle (940-0015), XGS2-HSL 2-slot, 3RU high performance rack-mountable chassis bundle (940-0014), and XGS12-HSL 12-slot, 11RU high performance rack-mountable chassis bundle (940-0016).





## Port upgrade option

### 905-1006

NOVUS10/1GE/100M-UPGRADE, additional 8-port enablement for FIELD UPGRADE for NOVUS10/1GE16DP, 8-port enabled load module (944-1143) and 8-port enabled Novus One appliance (941-0061). Note1. This creates a total of 16-ports enabled on the load module or appliance. Note2: For the additional 8-port upgrade purchase please provide the serial number of the desired load module or appliance to install the option on at the time of order placement.

## Cables and 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, Xdenisty 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 pluggable optical transceiver, MMF (multimode), 1310nm, 2km reach

# **TAA transceivers**

## **SFP-PLUS-LR-XCVR-T**

Ixia, TAA compliant, SFP+ 10GBASE LR pluggable optical transceiver, 1310nm, SMF (single mode fiber), 10km reach, LC (948-0057). COMPATIBLE NETWORK TEST PRODUCTS: Novus 10/1 3 Speed (944-1141, 944-1142, 944-1143, 944-1146), Novus 10/1 5 Speed (944-1148, 944-1149, 944-1154, 944-1155) and Novus ONE PLUS (941-0063, 941-0064, 941-0065, 941-006,6 941-0067, 941-0068).

## **SFP-PLUS-SR-XCVR-T**

Ixia, TAA compliant, SFP+ 10GBASE SR pluggable optical transceiver, MMF (multimode fiber), 850nm, 300m reach, LC (948-0048). COMPATIBLE NETWORK TEST PRODUCTS: Novus 10/1 3 Speed (944-1141, 944-1142, 944-1143, 944-1146), Novus 10/1 5 Speed (944-1148, 944-1149, 944-1154, 944-1155) and Novus ONE PLUS (941-0063, 941-0064, 941-0065, 941-006,6 941-0067, 941-0068).

## **SFP-LX-I-XCVR-T**

Ixia, TAA Compliant, Industrial temperature rate 1G LX transceiver (995-0060). COMPATIBLE NETWORK TEST PRODUCTS: Novus 10/1 3 Speed (944-1141, 944-1142, 944-1143, 944-1146), Novus 10/1 5 Speed (944-1148, 944-1149, 944-1154, 944-1155) and Novus ONE PLUS (941-0063, 941-0064, 941-0065, 941-006,6 941-0067, 941-0068).

### **SFP-SX-I-XCVR-T**

Ixia, TAA Compliant, Industrial temperature rate 1G SX transceiver (995-0061). COMPATIBLE NETWORK TEST PRODUCTS: Novus 10/1 3 Speed (944-1141, 944-1142, 944-1143, 944-1146), Novus 10/1 5 Speed (944-1148, 944-1149, 944-1154, 944-1155) and Novus ONE PLUS (941-0063, 941-0064, 941-0065, 941-006,6 941-0067, 941-0068).

### **SFP-PLUS-LR-XCVR-D-T**

Ixia, TAA compliant, SFP+ 10/1GBASE Dual Rate LR pluggable optical transceiver, 1310nm, MMF (single mode fiber), 10km reach, LC (948-0070). COMPATIBLE NETWORK TEST PRODUCTS: Novus 10/1 3 Speed (944-1141, 944-1142, 944-1143, 944-1146), Novus 10/1 5 Speed (944-1148, 944-1149, 944-1154, 944-1155) and Novus ONE PLUS (941-0063, 941-0064, 941-0065, 941-006,6 941-0067, 941-0068)

### **SFP-PLUS-SR-XCVR-D-T**

Ixia, TAA compliant, SFP+ 10/1GBASE Dual Rate LR pluggable optical transceiver, 1310nm, MMF (single mode fiber), 10km reach, LC (948-0070). COMPATIBLE NETWORK TEST PRODUCTS: Novus 10/1 3 Speed (944-1141, 944-1142, 944-1143, 944-1146), Novus 10/1 5 Speed (944-1148, 944-1149, 944-1154, 944-1155) and Novus ONE PLUS (941-0063, 941-0064, 941-0065, 941-006,6 941-0067, 941-0068).

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