mX3 Quint-speed 4-port Module

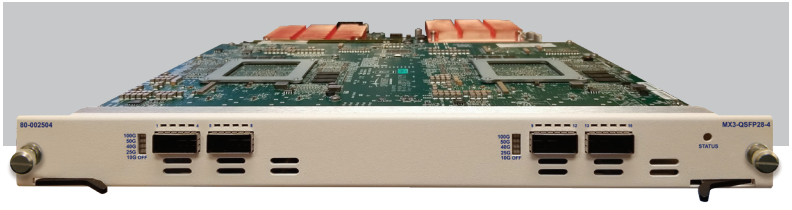
QSFP28 Test Module
100/50/40/25/10G

The VIAVI mX3 multi-speed High Speed Ethernet (HSE) test module is the industry's first capable of quint-speed operation.

The VIAVI mX3 Ethernet multi-speed test module combines VIAVI's industry-leading Layer 2–3 traffic generation and analysis with powerful network emulation and application layer protocols for emulating a wide range of device types, users and protocols. This module delivers the highest performance for Layer 2–3 testing.

Reduced power consumption and quint-speed support results in lower CapEx and OpEx. This module is ideal for performance testing of data center and service provider network infrastructure where extreme protocol performance is required. It is targeted for testing multi-terabit routers and high-scale cloud infrastructure, ensuring dataplane QoS with high performance traffic and verifying the scalability of routing, access, application and security protocols.

This module is designed with four QSFP28 ports that utilize four 25G electrical lanes each to support the latest QSFP form factor transceivers and interconnects. The multi-speed QSFP28 interfaces are combined with VIAVI's flexible FPGA logic to allow mode-switching of the mX3 packet generation and analysis engine to operate at 100, 50, 40, 25 and 10G speeds. The mX3 module supports hardware options to allow customization for speeds and features.



Benefits

- Support for software-based MACsec across all ports
- Offer the highest stateful protocol performance
- Offer the most feature-rich stateless traffic
- Are ideal for testing core/edge service provider routers, application gateways and firewalls
- Autonomous Flow Tracking (AFT) is supported on mX3 4-port 100G Module (only 100G speed mode)

Application

- **Service Provider Core and Edge Routers** — Verify scale, reliability, and performance of Layer 2 & 3 services including IP data and video delivered via unicast routing, multicast routing, switching and MPLS VPN technologies. Support MACsec to provide security for the transmission of data between network elements.
- **High Scale Terabit Routers** — Test 100G Ethernet core routers with high scale, multi-protocol topologies.
- **High Capacity Multiservice Routers** — Validate IP throughput with millions of subscribers and per-port line-rate data with minimum-sized packets.
- **Data Center Top of Rack, Spine and Core Switches** — Benchmark capacity of high-density and capacity fabrics using IETF RFC 2544, RFC 2889 and RFC 3918 methodologies with easy test setup using dynamically bound traffic and automated wizards.
- **Carrier Ethernet** — Verify scale, reliability, performance of Ethernet services delivered via Ethernet OAM, MPLS-TP, VPLS, PWE3 Psuedowires, bridged Ethernet, packet transport protocols or combinations of these technologies.

Features and Benefits

- Hardware options available to allow customers to customize module testing needs for speeds and features
- Enable and disable Clause 74 BASE-R FEC, Clause 91 RSFEC, and Clause 108 RS-FEC
- Auto negotiation and link training
- QSFP28 connector form-factor supports the latest optical transceivers and copper interconnects
- Low total cost of ownership compared to other test modules in its class:
  - Excellent price-performance ratio that delivers faster time-to-market by combining leading-edge technical innovation with VIAVI's extensive testing experience
  - Intelligent power control to shut down unused test modules and allows faster boot time to bring capacity back on-line quickly
  - More total throughput than the competition for a given power footprint
  - Enhanced chassis software license value — two to four times the device or end-user emulation per chassis with no increase in software costs
  - Topology emulation lowers CapEx by eliminating the need for multiple DUTs in multiprotocol tests
  - Intelligent results gets answers in a fraction of the test time required by competitive products
  - Faster boot and firmware upgrade times mean less down-time in continuous running 24x7 regression test beds
- TestCenter's industry-leading Layer 2–3 feature set:
  - "Hardened" system proven for testing from a single port up to 2,100 ports
  - Stress ASIC and backplane designs with live traffic changes. The number of emulated devices, the traffic they emanate and the rate at which they send it can all be changed "on the fly" making for more realistic tests and faster troubleshooting

  - Best-in-industry for measuring ultra-low submicrosecond latencies with 2.5 ns precision and resolution. Latency accuracy up to 10 times better than the competition.
  - 19 different scheduling algorithms available for finding the right traffic to emulate the real world or tax the device's ability to handle any traffic pattern — from microbursts to carefully timed sequences of "killer" frames
- mX3 module supports TestCenter's deep analysis system:
  - AFT is available for mX3 4-Port module (100G mode) and offers massive flow visualization and tracking for faster and more effective modeling and troubleshooting
  - Port counts, rates, errors and protocol summaries provide a high-level view for quick drilldown to specific issues
  - Broadest set of per stream metrics with simultaneous control and data plane results allows most tests to be run in a single pass
  - Real-time traffic filters allow analysis down to specific fields. Multiple metrics can be simultaneously collected and instantly analyzed
  - Dynamic views feature multi-metric extraction, sorting and operation in real-time or post-test
  - Full packet capture enables timing, sequencing and content analysis for individual packets
  - Powerful filters ensure the capture buffer is filled with relevant data
- High performance protocol testing:
  - Each module features two, multi-core, Intel Xeon Class CPUs for the highest levels of stateful router and host traffic emulation

Technical Specifications

Maximum Support	Speed	Maximum Ports Per Slot	Maximum Ports Per N12U Chassis	Maximum Ports Per N4U Chassis
mX3 Quint-speed 4-port Module				
MX3-QSFP28-4-50A	50G Only	8	96	16
MX3-QSFP28-4-100A	100G Only	4	48	8
MX3-QSFP28-4-125A	100/25G	4/16	48/192	8/32
MX3-QSFP28-4-175A	100/50/25G	4/8/16	48/96/192	8/16/32
MX3-QSFP28-4-150A	100/40/10G	4/4/16	48/48/192	8/8/32
MX3-QSFP28-4-225A	100/50/40/25/10G	4/8/4/16/16	48/96/48/192/192	8/16/8/32/32

Technical Specifications

Product Feature	Description
mX3 Quint-speed 4-port Module	
Port Density	4-port QSFP28 module options
Media Support and FEC Options See accessory table below for part numbers.	Support varies by module speed mode: — 100G: 100GBASE-SR4, 100GBASE-CR4, 100GBASE-LR4, plus additional MSA PMDs — 50G: 25/50G Consortium 50GBASE-CR2, — 40G: 40GBASE-SR4, 40GBASE-CR4, 40GBASE-LR4 — 25G: 802.3by 25GBASE-CR, 25GBASE-CRS, 25GBASE-SR — 10G: 10GBASE-SR, 10G Copper DAC • QSFP28 to SFP28 breakout cable options • Auto-Negotiation and Link Training for 100G, 50G, 40G and 25G • Clause 74 BASE-R FEC, Clause 91 RS-FEC, and Clause 108 RS-FEC • 25/50G Consortium 50GBase-R FEC CL74, 25/50G Consortium 50GBase RS-FEC CL91 • IEEE 25GBASE CR CL74, CL108, CR-S CL74, SR FEC CL108 • 25/50G Consortium 25GBase-R FEC CL74, 25/50G Consortium 25GBase RS-FEC CL91
Line Clocking and Packet Time Stamping (modules get their transmit line clocking and time-stamping from the control modules on the N12U and N4U Chassis)	• Stratum-3 rated oscillator is the default time source • Frame time stamp resolution of 2.5 ns • GPS and CDMA-based external time sources are supported • IEEE 1588v2 and NTP packet-based external time sources are supported • TIA/EIA-95B-based external time sources are supported
Inter-Module and Inter-chassis Time Synchronization	Ports in the same chassis are locked to the internal timing source For separate systems: • Timing chain synchronization with ± 20ns • Synchronized via GPS or CDMA network • Using NTP or PTP packet-based approaches (requires supporting controller version)
User Reservation	Per-port reservation
Transmit / Receive Streams Per Port	64k TX and 128k RX for all speeds
VFDs and Variable Fields	• 6 VFDs available for each 1k (100G) and 512 (50/40/25/10G) stream templates • 4 m route insertion table entries for all speeds

Technical Specifications continued

Product Feature	Description
Scheduler Mode Support	• Port Based – traffic scheduling handled at the port level • Rate Based – key parameters determined at the port level with division among the individual stream blocks • Priority Based – scheduling determined at the stream block level using user-assigned priorities. Precise scheduling of CBR and bursty traffic for QoS testing • Manual Mode – manual control of stream sequence
Frame Length Range and Controls	100% line rate for frames of 58-16383 bytes controlled by fixed, increment, decrement, random and IMIX modes
Statistics	• Nearly 50 transmit stats per port reported in real time. Includes L1-4 counters and rates and checksum and CRC errors • Over 40 real-time measurements per stream including advanced sequencing, latency, jitter and data integrity
Capture	• 1 MB per 100G or 40G port • 512 kB per 50G port • 256 kB per 25G port • Capture software includes sophisticated trigger and filtering controls
Histograms	Port-level histogram modes for latency, jitter, interarrival time, frame length, sequence run length and sequence difference check
Operating Temperature	15°C - 35°C, 20% - 80% RH (non-condensing)
TestCenter Protocol Emulation	
TestCenter protocols available as separately licensed packages. Below is a sample list of sup-ported protocols. Contact VIAVI for a full list of capabilities and packages.	
Enterprise and Data Center Switch Protocol Support	• OpenFlow 1.3 / 1.0: OpenFlow switch and controller emulation and switch conformance testing • Routing, multicast and bridging: All major IPv4 and IPv6 unicast and multicast routing protocols, IGMPv1/v2/v3, MLDv1/v2, LACP, STP, RSTP and MSTP • Data center: DCBX, FCoE, FIP, 802.1Qbb

Technical Specifications continued

Product Feature	Description
Service Provider Protocol Support	• SDN/NFV: PCE and Segment Routing • Routing and MPLS: All major IPv4 and IPv6 unicast and multicast routing protocols, RSVP-TE, LDP, VPLS-LDP, VPLS-BGP, BGP/MPLS-VPN, Fast Reroute, EVPN, mVPN, P2MP-TE, BFD, TWAMP and PWE3 (RFC4447) • Access: ANCP, PPPoE, DHCP, L2TP, IGMPv1/v2/v3, MLDv1/v2, DHCPv6 and PPPoEv6 • Carrier Ethernet and bridging: LACP, STP, RSTP and MSTP, 802.1ag CFM, Y.1731, PBB, PBB-TE, Link OAM • Mobile Backhaul: MPLS-TP, 1588v2 and Synchronous Ethernet
MACsec Support	Same MACsec feature set on MX3-QSFP28-4 module that is present on other VIAVI hardware

Ordering Information

Part Number	Base Package Description[1]
MX3-QSFP28-4-40A	VIAVI mX3 40G only QSFP28 4-Ports
MX3-QSFP28-4-50A	VIAVI mX3 50G only QSFP28 4-Ports
MX3-QSFP28-4-100A	VIAVI mX3 100G only QSFP28 4-Ports
MX3-QSFP28-4-125A	VIAVI mX3 100/25G QSFP28 4-Ports
MX3-QSFP28-4-150A	VIAVI mX3 100/40/10G QSFP28 4-Ports
MX3-QSFP28-4-175A	VIAVI mX3 100/50/25G QSFP28 4-Ports
MX3-QSFP28-4-225A	VIAVI mX3 100/50/40/25/10G QSFP28 4-Ports
Accessories for QSFP28 Interfaces	
ACC-6095A	Optical Transceiver QSFP28 100GBASE-SR4 MMF 850NM
ACC-6096A	Optical Transceiver QSFP28 100GBASE-LR4 SMF 1310NM ACC-6096A
Speed Upgrades[2]	
HWO-MX3-QSFP28-4-100G	100G Hardware Speed Option for MX3-QSFP28-4
HWO-MX3-QSFP28-4-50G	50G Hardware Speed Option for MX3-QSFP28-4
HWO-MX3-QSFP28-4-40G	40G Hardware Speed Option for MX3-QSFP28-4
HWO-MX3-QSFP28-4-25G	25G Hardware Speed Option for MX3-QSFP28-4
HWO-MX3-QSFP28-4-10G	10G Hardware Speed Option for MX3-QSFP28-4
SWO-MX3-QSFP28-4-MACSEC	MACsec Software on MX3-QSFP28-4 100G Test Modules
Autonomous Flow Tracking (AFT)	
BPK-1407	Autonomous Flow Tracking (AFT) Package[3]

1. Additional Base Packages can be created on request, based on any desired speed combinations.
2. For when you buy a Base Package and later decide to add a new speed to it.
3. Only supported on mX3 4-port 100G speed mode only.

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