

mX3 Dual-speed 8-port Modules

SFP28 Test Modules 25/10G

The Spirent mX3 Ethernet multi-speed test modules combine Spirent'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. These modules deliver the highest performance for Layer 2–3 testing. Reduced power consumption and dual-speed support results in lower CAPEX and OPEX. These modules are ideal for performance testing of data center and service provider network infrastructure where extreme protocol performance is required. They are 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.

These modules are designed with eight SFP28 ports that utilize and support the latest 25G/10G transceivers and interconnects. The dual-speed SFP28 interfaces are combined with Spirent's flexible FPGA logic to allow mode-switching of the mX3 packet generation and analysis engine to operate at 25 and 10 gig speeds. The mX3 module is also available in a single speed version to match your test needs and budget.

Applications

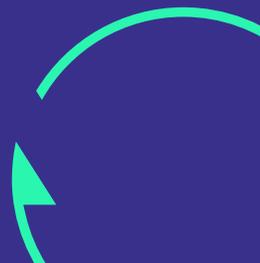
- **Service Provider Core and Edge Routers**—Verify scale, reliability, and performance of Layer 2 & 3 services including IP data and video delivered via unicast routing, multicast routing, switching and MPLS VPN technologies.
- **High-Scale Terabit Routers**—Test 25G Ethernet core routers with high-scale, 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, Server, 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 Pseudowires, bridged Ethernet, packet transport protocols or combinations of these technologies.

Spirent's mX3 family of products are the industry's first native SFP28 form-factor test modules for multispeed Ethernet testing:

- Supporting both 25G and 10G port speeds to test next-generation server and storage solutions
- 25G and 10G copper and fiber media support
- Designed for enterprise and data center switch and router testing

Spirent mX3 Ethernet modules:

- offer the highest available emulation performance
- 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



Features & Benefits

- Dual- and single-speed versions provide flexibility for validating multi-speed switches, Servers and line cards
- Enable and disable Clause 74 BASE-R FEC, Clause 91 RS-FEC, and Clause 108 RS-FEC
- Auto Negotiation and Link Training for 25G
- SFP28 connector form-factor supports the latest 25/10G based copper and optical media
- 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 Spirent'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 downtime in continuous running 24x7 regression test beds
- Spirent TestCenter's industry-leading Layer 2-3 feature set:
 - 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 sub-microsecond latencies with 2.5ns 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 micro-bursts to carefully timed sequences of "killer" frames
- mX3 modules support Spirent TestCenter's deep analysis system:
 - 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

mX3 Dual-speed 8-port Modules

| Maximum support | Speed | Maximum ports per slot | Maximum ports per SPT-N12U chassis | Maximum ports per SPT-N4U chassis |
|---|---|------------------------|------------------------------------|-----------------------------------|
| MX3-25GD-S8 | 25G/10G | 8/8 | 96/96 | 16/16 |
| MX3-25GO-S8 | 25G Only | 8 | 96 | 16 |
| Port density | 8-port SFP28 | | | |
| Media support and FEC options | Support varies by module speed mode <ul style="list-style-type: none"> • 25G: 802.3by 25GBASE-CR, 25GBASE-CRS, 25GBASE-SR • 10G: 10GBASE-SR, 10G Copper DAC • Auto-Negotiation and Link Training for 25G • Clause 74 BASE-R FEC, Clause 91 RS-FEC, and Clause 108 RS-FEC • 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 timestamping from the control modules on the SPT-N12U and SPT-N4U) | <ul style="list-style-type: none"> • Stratum-3 rated oscillator is the default time source • Frame time stamp resolution of 2.5ns • 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: <ul style="list-style-type: none"> • Timing chain synchronization with +/- 20ns accuracy • 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 | TX/ 64K TX and RX/128K for all speeds | | | |
| VFDs and Variable Fields | <ul style="list-style-type: none"> • 6 VFDs available for each 512 (25G/10G) stream templates • 8m route insertion table entries 4m in 25G/10G mode | | | |
| Scheduler Mode Support | <ul style="list-style-type: none"> • 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 | <ul style="list-style-type: none"> • Nearly 50 transmit stats per port reported in real time. Includes L1-3 counters and rates and checksum and CRC errors • Over 40 real-time measurements per stream including advanced sequencing, latency, jitter and data integrity | | | |
| Transmit clock adjustment | +/- 100 PPM in 1 PPM increments for each port or each QSFP28 interface for 25G and 10G | | | |
| Capture | <ul style="list-style-type: none"> • 512MB per 25G/10G port • Capture software includes sophisticated trigger and filtering controls | | | |
| Histograms | Port-level histogram modes for latency, jitter, inter-arrival time, frame length, sequence run length and sequence difference check | | | |
| Operating temperature | 15°C - 35°C, 20% - 80% RH (non-condensing) | | | |

About Spirent

Spirent Communications (LSE: SPT) is a global leader with deep expertise and decades of experience in testing, assurance, analytics and security, serving developers, service providers, and enterprise networks. We help bring clarity to increasingly complex technological and business challenges. Spirent's customers have made a promise to their customers to deliver superior performance. Spirent assures that those promises are fulfilled.

For more information visit: www.spirent.com

Technical Specifications (cont'd)

Spirent TestCenter Protocol Emulation

Spirent TestCenter protocols available as separately licensed packages. Below is a sample list of supported protocols. Contact Spirent for a full list of capabilities and packages.

| | |
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| Enterprise and data center switch protocol support | <ul style="list-style-type: none"> • 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 |
| Service Provider Protocol support | <ul style="list-style-type: none"> • 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 |

Ordering Information

Test Modules

| Description | Part Number |
|---------------------------------|-------------|
| Spirent MX3 25 10G SFP28 8-Port | MX3-25GD-S8 |
| Spirent MX3 25G SFP28 8-Port | MX3-25GO-S8 |