

Spirent

High Density 40 GbE and 10 GbE Test Modules



The Spirent dX2 40 GbE and 10 GbE Ethernet test module series offers high density and flexibility for testing next-generation data center multi-terabit fabrics. With support for Ethernet, VLAN, FCoE, IPv4, IPv6, multi-cast traffic generation, and full mesh RFC 2544 latency analysis on thousands of ports, the dX2 module is the industry's high-density and cost-efficient solution for testing switch fabrics to full capacity.

Solutions Overview

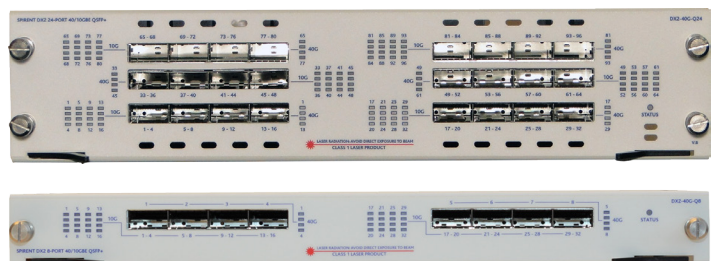
The Spirent dX2 test module series combines 40 GbE and 10 GbE functionality in multiple speed form-factors to provide the highest density and most cost-effective solution for testing high-performance Top of Rack (ToR), End of Row (EoR), and high-scale switch and router fabrics. Modern switch and router fabrics span multiple chassis and can be expanded to build systems supporting hundreds or thousands of ports.

The Spirent dX2 series is capable of fully loading those systems to maximum bandwidth capacity. Combining Spirent's Cloud Core enabled hardware architecture with the Spirent TestCenter software platform, dX2 modules enable traffic scaling to more than 22 terabits in a single rack. With Spirent's advanced setup wizards and Intelligent Results, test engineers can quickly assess fabric performance and reliability at full load before deploying large mission-critical environments where failure could impact millions of users.

The Spirent dX2 module comes in dual-speed 40 GbE/10 GbE, 40 GbE only and 10 GbE only versions and is fully compatible with the industry-leading Layer 2-7 traffic generation and deep analysis capabilities of the Spirent fX2 and mX and dX HyperMetrics modules. A solution combining Spirent dX2 modules, other Spirent modules, and Spirent's virtual test ports delivers unparalleled possibilities for designing the highest capacity and most flexible test beds at a cost-effective price point.

Applications

- **Data Center ToR and EoR Switches and Fabrics**—Validate forwarding performance, latency, MAC capacity and functional capabilities of ultra high-scale, next-generation SPB and TRILL enabled multi-terabit cloud data center fabrics
- **Terabit Routers**—Emulate ISIS, OSPF and BGP- validate IP throughput and multicast performance by emulating hundreds of thousands of clients. Understand system architecture efficiency, performance, and reliability
- **Subscriber Access Gateways**—Emulate millions of access subscribers using different services over many ports under realistic full load traffic conditions
- **Device Benchmarking**—Benchmark devices using IETF RFC 2544, RFC 2889 and RFC 3918 methodologies with easy test setup that uses dynamically bound traffic setup by automated wizards
- **Power Efficiency**—Evaluate real power usage and efficiency of router and switch blades and fabrics at low and full capacity load



Features & Benefits

- When scaling to tests with hundreds or thousands of test ports, several challenges arise. Configuring those ports and analyzing the data produced can be a formidable task. Spirent has been the industry leader in large scale testing for the last decade by architecting software and hardware that is built to scale
- Dual-speed modules support 40 GbE and 10 GbE operation from each port adding flexibility and cost savings for users needing high density test solutions at multiple port speeds
- Multiple interface speed and port-density versions to choose from to match your test application, budget and scale
- Up to 8 simultaneous users per module optimizes port utilization
- Protocol emulation support for all key fabric and access protocols including: ISIS, OSPF, BGP, MPLS, LACP, xSTP, IGMP, MLD, SPB, TRILL, FCoE, FIP, DCBX and 1588
- The highest density 40 GbE and 10 GbE solution optimizes lab space and minimizes power consumption. Supports up to 144 40 GbE or 576 10 GbE ports per 11U chassis
- Supports the advanced Spirent test signature for full compatibility with the complete line of Spirent test modules. This provides a solution enabling full backplane traffic loading with many dX2 modules transmitting traffic to be analyzed with the advanced deep analysis capabilities of the Spirent mX, fX2 and HyperMetrics modules
- Full compatibility with Spirent TestCenter Virtual—enabling high-density testing throughout the physical and virtual data center infrastructure
- Available test packages and integrated configuration wizards simplify and accelerate configuration of multi-terabit traffic patterns across hundreds or thousands of ports

Productivity

- Intelligent Results™
 - ▶ High-scale test beds produce an overwhelming amount of data. The dX2's results are incorporated into Spirent's advanced and highly efficient distributed database that processes billions of real-time results to validate tests and identify problems, giving engineers the immediate feedback they need to debug problems and accelerate development
 - ▶ Spirent TestCenter delivers more results with tighter correlation to find obscure bugs quickly. A single test run with Spirent provides more coverage and information where multiple runs are necessary with other test tools.
 - ▶ Interesting Streams uses real-time results data mining to dynamically filter through mountains of data and display the results that matter
- Simplify automation with a built in graphical Command Sequencer and GUI to Script

Visual Programming Empowers the Test Operator to:

- Construct sophisticated, stressful, automated test cases without programming experience
- Combine numerous individual test cases into a single run to save regression test time
- Develop a catalog of broad automated test cases in a fraction of the time
- Export automated test cases to run from a command line for headless test execution that can be integrated with any automated regression system

Requirements

- SPT-N11U or SPT-N4U Chassis and Controller
- Windows-based workstation with 10/100/1000 Mbps Ethernet NIC; mouse and color monitor required for GUI operation
- Linux or Windows-based workstation for Tcl and other API automation
- For complete GUI requirements, please refer to Spirent TestCenter Packet Generator and Analyzer Base Package A data sheet (P/N 79-000028)
- Minimum required base package BPK-1001A for packet generation and analysis

Technical Specifications

		dX2 40/100 GBE dual speed module	dX2 40GBE module	dX2 10GBE module
Ports per Module	High-Density	<ul style="list-style-type: none"> Twenty-four 40 GBE ports per module, configurable for ninety-six 10 GBE ports One hundred forty-four 40 GBE or five hundred seventy-six 10 GBE ports per 11U Chassis 	<ul style="list-style-type: none"> Twenty-four 40 GBE ports per module One hundred forty-four 40 GBE ports per 11U chassis 	<ul style="list-style-type: none"> Ninety-six 10 GBE ports per module Five hundred seventy-six 10 GBE ports per 11U chassis
	Standard-Density	<ul style="list-style-type: none"> Eight 40 GBE ports per module, configurable for thirty-two 10GBE ports Ninety-six 40 GBE or three hundred eighty-four 10 GBE ports per 11U chassis 	<ul style="list-style-type: none"> Eight 40 GBE ports per module Ninety-six 40 GBE ports per 11U chassis 	<ul style="list-style-type: none"> Thirty-two 10 GBE ports per module Three hundred eighty-four 10 GBE ports per 11U chassis
Supported Interface Media		<ul style="list-style-type: none"> 40GBASE-SR4 (QSFP+) 40 GBE Copper Direct Attached (QSFP+), 40GBASE-CR4 Auto Negotiaation supported on 24-port modules and rev. B 8-port modules 10GBASE-SR (QSFP+ to 4 x 10GBE breakout) 10GBASE-LR (QSFP+ to 4 x 10GE breakout) 10GBE Copper Direct Attached Cable (QSFP+ to 4 x 10GBE SFP+ breakout) 		
Operational Modes		LAN, with DIC support		
Timing		<ul style="list-style-type: none"> Common Tx clock Synchronization to chassis-based source, adjustable by+ 100 ppm; optionally synchronized to PTP, GPS, CDMA, or master chassis timing source for intra-chassis synchronization Highly accurate chassis-to-chassis synchronization for large-scale test bed latency and RFC bechmanrk testing 		
User Reservations		<ul style="list-style-type: none"> Per QSFP+ port (standard-density module), per three QSFP+ ports (high-density module) 		
Layer 2/3 Generator and Analyzer				
Number of Streams		4095 transmit and 8191 trackable recieve streams; stream fields can be varied to create billions of flows		
Frame Transmit Modes		Port based (rate per port), stream based (rate per stream), burst, timed		
Min/Max Frame Size (w/CRC)		60 to 16,004		
Min/Max Tx Rates		One packet per 3.43 seconds to 101% of line rate		
Real-time Tx stream Adjustments		Change rate and frame length settings without stopping the generator or analyzer for truly interactive, cause and effect analysis		
Per-stream Statistics Analyzed in Real Time		<ul style="list-style-type: none"> Tx and Rx frame counts and rates Tx and Rx L1 byte counts and rates Out of sequence errors FCS errors and rate Min, Max and Average Latency (2048 streams) 		
Per-port Statistics Analyzed in Real Time		<ul style="list-style-type: none"> Tx and Rx frame counts and rates Tx and Rx L1 byte counts and rates Out of sequence errors PRBS errors FCS errors and rate 		
Transmit Timestamp Resolution		2.5 ns Tx timestamp resolution with intra-chassis and inter-chassis synchronization		
Supported Encapsulations		<ul style="list-style-type: none"> Layer 2: Ethernet II, 802.1Q, 802.1ad, FCoE Layer 3/4: IPv4, IPv6, TDP, UDP 		
Supported Tx Signature Capability		Fully compatible with Spirent hardware; contains sequence number and highly accurate timestamp		

Ordering Information

Description	Part Number
SPIRENT DX2 24-PORT 40 GBE QSFP+. DUAL-SPEED SUPPORTS 24-PORTS OF 40G OR 96-PORTS OF 10 GbE	DX2-40G-Q24
SPIRENT DX2 24-PORT 40 GBE-ONLY QSFP+	DX2-40GO-Q24
SPIRENT DX2 96-PORT 10 GBE QSFP+. SUPPORTS 96-PORTS OF 10 GbE	DX2-10G-Q24
SPIRENT DX2 8-PORT 40 GBE QSFP+. DUAL-SPEED SUPPORTS 8-PORTS OF 40 GbE OR 32-PORTS OF 10 GbE	DX2-40G-Q8
SPIRENT DX2 8-PORT 40 GBE-ONLY QSFP+	DX2-40GO-Q8
SPIRENT DX2 32-PORT 10 GBE QSFP+. SUPPORTS 32-PORTS OF 10 GbE	DX2-10G-Q8
Spirent Chassis	
SPIRENT N11U CHASSIS AND CONTROLLER WITH 110V AC POWER SUPPLIES	SPT-N11U-110
SPIRENT N11U CHASSIS AND CONTROLLER WITH 220V AC POWER SUPPLIES	SPT-N11U-220
SPIRENT N4U CHASSIS AND CONTROLLER WITH 110V AC POWER SUPPLIES	SPT-N4U-110
SPIRENT N4U CHASSIS AND CONTROLLER WITH 220V AC POWER SUPPLIES	SPT-N4U-220
Accessories	
Optical Transceiver, QSFP+, Dual-rate, 40GBASE-SR4 / 4 x 10GBASE-SR, 850nm MMF	ACC-6089A
Copper Direct-Attach Cable, QSFP+ to QSFP+, 3-Meter*	ACC-6085A
Optical Fiber Breakout MPO to 4 LC Pairs, MMF 3M	ACC-1016A
Optical Fiber Breakout MPO to 4 LC Pairs, MMF 10M	ACC-1017A
Optical Fiber Ribbon MPO to MPO 12-fiber Crossover, MMF 5M	ACC-1021A
Copper Breakout Cable Assembly, QSFP+ to 4 x SFP+, 3-Meter	ACC-6087A
Optical Transceiver QSFP+ to 4x10GBASE-LR	ACC-6090A
Optical Fiber Breakout MPO to 4 LC Pairs SM 3M	ACC-1018A
Optical Fiber Breakout MPO to 4 LC Pairs SM 10M	ACC-1019A
Optical Transceiver QSFP+ 40GBASE-LR4 1310NM SMF	ACC-6077A

*40GBASE-CR4 Auto Negotiation supported on 24-port modules and rev. B 8-port modules

Ordering Information

Due to the wide range of available system configurations, please contact your regional Spirent sales representative for detailed ordering information.

Spirent Global Services

Spirent Global Services provides a variety of professional services, support services and education services—all focused on helping customers meet their complex testing and service assurance requirements. For more information, visit the Global Services website at www.spirent.com/gs or contact your Spirent sales representative.

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