

# Spirent dX2 8 Port 100 GbE

## Native QSFP28 & CFP4 Test Module

The Spirent dX2 8 port 100 GbE test module offers high density, high performance and the flexibility that is needed to validate the next-generation data center fabrics and service provider routers. The dX2 is now available with native QSFP28 and CFP4 interfaces. The dX2 is used to validate data plane QoS on thousands of flows at line rate and test complex routing, data center, and access protocols on switches and routers. With 8 100 GbE ports per dX2 module, the Spirent dX2 delivers the highest density high speed Ethernet solution per module, chassis or rack unit.

### Applications

- **Data Center ToR and EoR Switches and Fabrics**—validate forwarding performance, latency, MAC capacity and functional capabilities of ultra high-scale, next-generation enabled multi-terabit cloud data center fabrics
- **Terabit Routers**—test 100 GbE core routers with high-scale, multi-protocol topologies

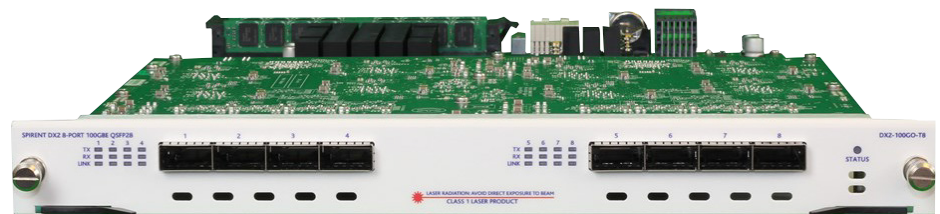
The Spirent dX2 100 GbE test modules deliver a high density solution with the lowest total cost of ownership. It supports QSFP28 and CFP4 optical modules which use a smaller form factor, and uses less power than comparable 100 GbE interfaces available today. The modules also support smart power control and fast boot to reduce test time and eliminate wasted power. With the combination of processing and the deep real-time analysis that Spirent is known for, these modules deliver enhanced realism with scale and performance.



### Features & benefits

Testing 100 GbE enabled routers or data center switches requires a tester that can emulate multiple layers of network protocols and scale to perform real-time cause/effect analysis on millions of statistics while putting the system through realistic scenarios, such as dynamic topology changes, microburst and fail-overs. The Spirent dX2 100 GbE module's processing and real-time cause/effect analysis enables testing of highly-scaled terabit networks and devices in real-time.

- Spirent combined with Intel Inside® maximizes performance and scale of emulated topologies and stateful application traffic
- Enables scalability to meet the requirements of IP/Ethernet mobile networks while maintaining enhanced realism and performance
- Allows for benchmarking, mobile broadband and application experience
- Available test packages and integrated configuration wizards simplify and accelerate configuration, ultra-high scale mobility, mobile backhaul, routing, access and application test cases



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## Productivity

- Intelligent Results™
  - When creating test beds at the scale that Spirent 100 GbE can achieve, the amount of data that is produced is astronomical. An advanced, highly efficient distributed database 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
- Delivers more results with tight correlation, and more information to find those obscure bugs. With more coverage and more information, Spirent answers questions faster, and in a single test run, 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
- Powerful automation with Command Sequencer (Visual Programming) and GUI to Script 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

Extensive, flexible reporting—real-time statistics for critical variables across all protocols. Using Spirent’s iTest platform, your device under test results can easily be correlated and compared with Spirent’s results.

### Technical specifications

#### Spirent dX2 module

Maximum support	Speed	Maximum ports per slot	Maximum ports per STP-N11U chassis	Maximum ports per SPT-N4u chassis
dX2-100 G0-T8	100 G	8	96	16
dX2-100 G0-R8	100 G	8	96	16
Optical transceiver	QSFP28 (DX2-100GO-T8); CFP4 (DX2-100GO-R8)			
Operational modes	100 GbE			
Port CPU	Stackable multi-core CPU			
User reservation	Per 100 GbE port			
User interface	Windows-based GUI and Tcl API			
Line clocking and packet time-stamping Spirent modules get their transmit line clocking and time-stamping from the control modules on the SPT-N11U and SPT-N4U	Stratum-3 rated oscillator is the default time source. Transmit line clock is at the precise nominal Ethernet rate $\pm < 1$ PPM on initial shipment. Accurate to $\pm 4.6$ PPM 15 years of operation <ul style="list-style-type: none"><li>▪ Frame time-stamp resolution of 2.5ns</li><li>▪ GPS and CDMA-based external time sources are supported</li><li>▪ IEEE 1588v2 and NTP packet-based external time sources are supported</li><li>▪ TIA/EIA-95B-based external time sources are supported</li></ul>			
Inter-module and inter-chassis time synchronization	Modules in the same chassis are phased-locked to the timing source of the control module. For more modules in separate chassis: <ul style="list-style-type: none"><li>▪ Spirent-patented self-calibrating inter-chassis timing chain using dedicated port on chassis control module delivers precise synchronization <math>\pm 20</math>ns</li><li>▪ Synchronization via external GPS or CDMA network</li><li>▪ Using IEEE 1588 or NTP packet-based approaches</li><li>▪ With TIS/EIA-95B timing inputs</li></ul>			

## Technical Specifications (continued)

### Video Quality

Module weight	3.219 kg, 5.45lbs.
Module predicted MTBF	56,330 hours. Hours of continuous operation
Operating temperature range	Supported for 59° to 95° F (15° to 35° C) ambient temperature. 20% to 80% relative humidity.
Max power draw per module	Maximum of 420W per slot.

### Spirent TestCenter Layer 2-3 generator and analyzer

Number of streams	8191 transmit and 16383 trackable receive 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	1 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	<p>Tx and Rx frame counts and rates</p> <ul style="list-style-type: none"> <li>• Tx and Rx Layer 1 byte counts and rates</li> <li>• Out of sequence errors</li> <li>• FCS errors and rate</li> <li>• Min, Max and Average Latency (16383 streams)</li> </ul>
Per-port statistics analyzed in real time	<p>Tx and Rx frame counts and rates</p> <ul style="list-style-type: none"> <li>• Tx and Rx Layer 1 byte counts and rates</li> <li>• Out of sequence errors</li> <li>• PRBS errors</li> <li>• FCS errors and rate</li> </ul>
Transmit timestamp resolution	2.5 ns Tx timestamp resolution with intra-chassis and inter-chassis synchronization
Supported encapsulations	<ul style="list-style-type: none"> <li>• Layer 2: Ethernet II, 802.1Q, 802.1ad, FCoE</li> <li>• Layer 3/4: IPv4, IPv6, TDP, UDP</li> </ul>
Supported Tx signature capability	Fully compatible with Spirent hardware; contains sequence number and highly accurate timestamp
Capture buffer size	256 MB per port
Capture buffer controls—Spirent TestCenter's unique capture capability allows maximum effectiveness when debugging hard to find hardware or protocol problems.	<p>Several modes of operation that include: Filter by protocol fields, filter by byte offset and range; store slices or full-frames; store signature or all frames; store tx/rx control plane with data plane; real-time mode for control plane traffic; wrap or stop buffer at end. User defined pattern definitions can logically combine 8 filters of up to 32 total bytes. Patterns can be applied to start, filter (quality) or stop capture. In addition to user-patterns, filtering, starting and stopping capture contains the following pre-defined events: FCS, PRBS, IPv4 checksum, TCP/UDP/IGMP checksum, and sequence errors; undersize, oversize, jumbo, and user-defined frame length; IPv4, IPv6, TCP, UDP and IGMP packets; test signature present and test stream ID match. Each event can be independently set to ignore, include or exclude.</p>
Latency modes	Benchmark tests support LIFO, LIFO, FIFO or FILO latency calculation methods.
Route Insertion Table (RIT) Entries per port	8K 4-byte entries for dynamic label or random IP/MAC address assignments
RIT or List VFD Entries per Stream	8 RIT insertions per stream and 4 VFD insertions per stream
<b>Layer 4-7 application and security</b>	
IP Version Supported	IPv4 and IPv6
Encapsulation Protocols	802.1Q and 802.1 Q-in-Q
Transport Protocols	TCP, UDP
Data Protocols	HTTP, SIP and FTP, Unicast/Multicast RTSP and RAW TCP

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## Requirements

- Spirent chassis and controller (see table)
- Windows-based workstation with 10/100/1000 Mbps Ethernet NIC; mouse and color monitor required for GUI operation
- Linux or Windows-based workstation for scripting
- Mac, Linux or Windows based workstation for Rest API support

## Spirent 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](http://www.spirent.com) or contact your Spirent sales representative.

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### Technical specifications (continued)

#### Layer 4-7 application and security

<i>Authentication Protocols</i>	802.1x
<i>Network Access Protocol</i>	DHCP and PPPoE
<i>Network Realism</i>	Line speed limitation, network latency, packet loss and fragmentation
<i>Video Protocols</i>	RTSP/RTP, Multicast streaming, IGMPv2, IGMPv3 and MLDv2
<i>Video Codecs</i>	H.263 and H.264
<i>Video Quality Measurement</i>	MDI measurements along with additional statistics to detect picture quality
<i>Voice Codecs</i>	G711A, G711U, G.723.1, G726-32, G.728 and G729AB
<i>Voice Protocols</i>	SIP over UDP

(See Accessory Table Below for Part Numbers)

- 100GBASE-CR4
- COPPER DAC QSFP28 1M
- COPPER DAC QSFP28 3M
- ACTIVE OPTICAL CABLE (CFP4)
- 100GBASE-SR4 (CFP4)
- 100GBASE-LR4 (CFP4)

### Ordering information

Part number	Description	Spirent application		
		Spirent TestCenter	Avalanche Commander	Landslide

#### Test modules

<b>DX2-100GO-T8</b>	Spirent DX2 100 GbE only QSFP28 8-Ports	X
<b>DX2-100GO-R8</b>	Spirent DX2 100 GbE only CFP4 8-Ports	X

#### Accessories for QSFP interfaces

<b>ACC-6095A</b>	Optical transceiver QSFP28 100 GBASE-SR4 MMF 850NM
<b>ACC-1034A</b>	Copper DAC QSFP28 100 GBASE-CR4 1M
<b>ACC-1035A</b>	Copper DAC QSFP28 100 GBASE-CR4 3M

#### Accessories for CFP4 interfaces

<b>ACC-6097A</b>	Optical transceiver CFP4 100GBASE-SR4
<b>ACC-6098A</b>	Optical transceiver CFP4 100GBASE-LR4
<b>ACC-1037A</b>	Active optical cable CFP4 100GBASE-SR4

#### Spirent chassis

<b>SPT-N11U-110</b>	Spirent N11U chassis and controller with 110VAC power supplies
<b>SPT-N11U-220</b>	Spirent N11U chassis and controller with 220VAC power supplies
<b>SPT-N4U-110</b>	Spirent N4U chassis and controller with 110VAC power supplies
<b>SPT-N4U-220</b>	Spirent N4U chassis and controller with 220VAC power supplies