Network bandwidth needs continue to grow at a rapid pace. Network equipment manufacturers are developing highly flexible multi-rate products to support the latest generation of HSE devices. Service Providers and Hyperscale data centers are deploying multi-rate networking infrastructure solutions to meet this growing market.

With these multi-rate requirements, customers demand higher density test equipment. Flexibility is needed to validate the next generation of routers and data center fabrics.

Spirent pX3 400G Appliance was developed to meet these specific needs with its industry-leading 2x density advantage for QSFP-DD from nearest competitor. Spirent’s native QSFP-DD platform is a 1U rack mountable appliance and can be configured to support up to four speeds per port: 400/200/100/50GbE. The pX3 Appliance supports Spirent’s Smart Port Technology, a feature that allows single port upgrades for maximum value and flexibility.

**Applications**

**Cloud Computing/Streaming Services**—Validate data plane QoS on thousands of flows at line rate and test complex routing, data center and access protocols on switches and routers.

**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. This platform will allow synchronized timing of 255 systems with no requirement for external timing devices or specialized cabling.

**Terabit Routers**—Test latest generation of core routers with high-scale, multiprotocol topologies.

**Features**

- 8 400GbE ports per 1U high appliance, delivers the highest density high speed Ethernet solution
- Each port supports 1x400GbE, 2x200GbE, 4x100GbE or 8x50GbE
- Optional 4 port versions
- Available single port upgrades
- Support for optical fiber, active optical cables and direct attach cable
- Support for Ethernet (FEC), (AN) and (LT)
- Protocol testing for L2/3 routing/switching and data center test cases

**Benefits**

- Industry’s highest density QSFP-DD test appliance
- Conduct performance, stress, and industry standard benchmark tests
- Provides large capacity testing for a variety of services
- 4 to 8 port upgrade available via licensing
Spirent pX3 400G Appliance
Native QSFP-DD Test Platform

Productivity

- Intelligent Results™
- User definable Health Indicator views provide real-time health monitoring and error isolation capability that allows engineers to accurately and quickly pinpoint errors, even in the most complex test configurations. Customizable Time Series charts, overlaid with Events, provide correlation between real-time metrics and system events, allowing rapid debugging of problems and accelerating development
- High performance database underneath a modern web UI processes billions of real-time results to validate tests, identify problems, and provide customizable reports
- 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.

<table>
<thead>
<tr>
<th>Technical Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spirent pX3 400G Appliance</td>
</tr>
<tr>
<td>Part Number</td>
</tr>
<tr>
<td>PX3-QSFP-DD-8-750A</td>
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<td>PX3-QSFP-DD-8-700A</td>
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<tr>
<td>MSA Interface</td>
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<tr>
<td>Operational modes</td>
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<tr>
<td>Port CPU</td>
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<tr>
<td>User reservation</td>
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<tr>
<td>Test Port speed config</td>
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</tbody>
</table>
| Line clocking and packet time-stamping | Stratum-3 rated oscillator is the default time source. Transmit line clock is at the precise nominal Ethernet rate ± < 1 PPM on initial shipment. Accurate to ± 4.6 PPM 15 years of operation
- 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 |
| Appliance time synchronization | Appliance Features
- Spirent-patented self-calibrating inter-chassis timing chain using dedicated port on chassis control Appliance delivers precise synchronization ± 20ns
- Ability to daisy chain up to 255 appliances for large density testing
- Synchronization via external GPS or CDMA network
- Using IEEE 1588 or NTP packet-based approaches
- With TIS/EIA-95B timing inputs |
| Operating temperature range | Supported for 41° to 86° F (5° to 30° C) ambient temperature. 20% to 80% relative humidity |
| Max power draw | Maximum of 1600W per rack mount |
| Product Dimensions | 92.62 cm L x 43.4 cm W x 4.28 cm H (1U) |
### Spirent pX3 400G Appliance

**Native QSFP-DD Test Platform**

#### Spirent TestCenter Layer 2-3 Generator and Analyzer

**Number of streams**
- Stats/Streams @400G; Tx=32K Rx=32K
- Stats/Streams @200G; Tx=32K Rx=32K
- Stats/Streams @100G; Tx=32K Rx=32K
- Stats/Streams @50G; Tx=16K Rx=16K
- Stream fields can be varied to create billions of flows
- Stats/Stream: Tx Count (frames), Rx Count (frames), Tx Rate (fps), Rx Rate (fps), Tx Rate (bps), Rx Rate (bps), Rx Sig Count (Frames), Avg Latency (us), Min Latency (us), Max Latency (us)

**Frame transmit modes**
- Port based (rate per port), stream based (rate per stream), burst, timed, step transmission, manual scheduler mode, random frame size with unique seed

**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**
- Tx and Rx frame counts and rates
- Tx and Rx Layer 1 byte counts and rates
- Out of sequence errors
- FCS errors and rate
- Min, Max and Average Latency (4K streams)
- Real Time Dropped Frame count
- Adv Seq Stats

**Flow Control**
- Support Priority Flow Control

**Per-port statistics analyzed in real time**
- Tx and Rx frame counts and rates
- Tx and Rx Layer 1 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**
- 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

**Capture buffer size**
- 8 MB per port

**Capture buffer controls—Spirent TestCenter’s unique capture capability allows maximum effectiveness when debugging hard to find hardware or protocol problems**
- 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.

**Latency modes**
- Benchmark tests support LIFO, LILO, FIFO or FILO latency calculation methods

**Route Insertion Table (RIT) entries per port**
- 32K 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 6 VFD insertions per stream

### Layer 1 Functionality

**QSFP-DD, Interconnects**
- CR, SR, LR, FR, DR, PSM4 at multi-rate (400/200/100/50GBE)

**Media support and FEC options**
- Support varies by speed mode
  - 400G: 400GBASE-SR8, 400GBASE-DR8, 400GBASE-LR8, 400GBASE-FR8 plus additional MSA PMDs
  - 200G: 200GBASE-SR4, 200GBASE-PSM4, 200GBASE-LR/FR4, plus additional MSA PMDs
  - 100G: 100GBASE-SR2, 100GBASE-LR2, 100GBASE-DR2 plus additional MSA PMDs
  - RS-544 (KP4) FEC all speeds
  - Direct Access Copper breakouts

**AN/LT (Enable/Disable)**
- Direct Attach Copper (DAC); AN/LT enabled supports 4x50G

**Layer-1 debug tools & features**
- CR Tx Emphasis settings, Rx Eye view, FEC Counters, PRBS Gen/Check, Front-end L1 Summary Status, Xcvr MDIO access, PCS monitoring, PCS skew, FEC error injection, PCS random error injection
### Technical Specifications (Cont’d)

#### Layer 4-7 Application and Security

- **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
- **Authentication Protocols**: 802.1x
- **Network Access Protocol**: DHCP and PPPoE

#### Layer 4-7 Application and Security (Cont’d)

- **Network Realism Fragmentation**: Line speed limitation, network latency, packet loss and fragmentation
- **Video Protocols**: RTSP/RTP, Multicast streaming, IGMPv2, IGMPv3 and MLDv2
- **Video Codecs**: H.263 and H.264
- **Video Quality Measurements**: MDI measurements along with additional statistics to detect picture quality
- **Voice Codecs**: G711A, G711U, G.723.1, G726-32, G.728 and G729AB
- **Voice Protocols**: SIP over UDP

### Ordering Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PX3-QSFP-DD-8-750A</td>
<td>SPIRENT PX3 400/200/100/50G QSFP-DD 8-PORT</td>
</tr>
<tr>
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<td>SPIRENT PX3 400G ONLY QSFP-DD 8-PORT</td>
</tr>
<tr>
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<td>SPIRENT PX3 200/100/50G QSFP-DD 8-PORT</td>
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<td>SPIRENT PX3 400G ONLY QSFP-DD 4-PORT</td>
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<td>HWO-PX3-QSFP-DD-8-400G</td>
<td>400G HARDWARE SPEED OPTION FOR PX3-QSFP-DD-8</td>
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<td>HWO-PX3-QSFP-DD-8-50G</td>
<td>50G HARDWARE SPEED OPTION FOR PX3-QSFP-DD-8</td>
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<tr>
<td>UPG-8X50-ANLT-8</td>
<td>UPGRADE QSFP-DD-8-ANLT</td>
</tr>
</tbody>
</table>

### Requirements

- 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

### Contact Us

For more information, call your Spirent sales representative or visit us on the web at www.spirent.com/ContactSpirent.

www.spirent.com

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