

Spirent **Flex Ethernet (FlexE) Solution**

PX3-QSFP28-12-225A-FLEXE | QSFP28 Test Module

Features

- Industry's highest density FlexE test solution
- 12x 100GBASE-R PHY test ports per module
- 10 Clients over 12x100GbE PHY's
- Client MAC rates ranging from 5GbE, 10GbE, n x 25GbE, 40GbE, 100GbE in 5GbE increments
- FlexE Overhead Alarms and Errors status/conditions
- FlexE Overhead block visibility and configuration
- Supports L2/3 data/control plane ethernet testing
- Support for optical fiber, and direct attach cable interconnects

Benefits

- FlexE bonded, sub-rating and channelization scenarios
- Affordable high-density testing, 12x 100GBASE-R PHY interfaces in a single slot
- Orchestrate large scale FlexE and traditional ethernet testing in a single module
- FlexE Shim Calendar Functional testing
- Conduct performance, stress, and industry standard benchmark tests

Flex Ethernet (FlexE) provides a generic mechanism for supporting a variety of Ethernet MAC rates that may or may not correspond to any existing Ethernet PHY rate. This includes MAC rates that are both greater than (through bonding) and less than (through sub-rate and channelization) the Ethernet PHY rates used to carry FlexE. FlexE dissociates the Ethernet rate on the client end from the actual physical interface by introducing a new shim through the IEEE defined MAC and PCS layers.

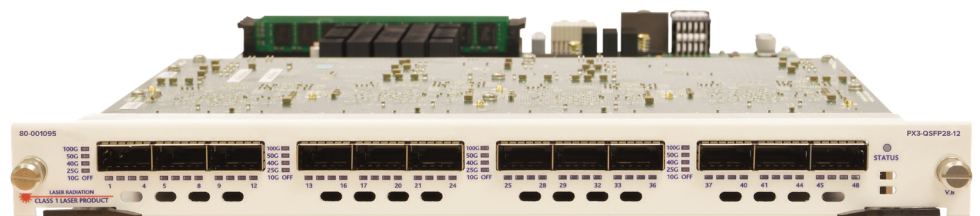
Spirent's PX3-QSFP28-12-225A-FLEXE module architecture was developed to meet these specific needs. The PX3-QSFP28-12-225A-FLEXE delivers the highest port density FlexE 100GBASE-R PHY solution module in the industry. Each of the 12, QSFP28 interface ports can support 5GbE, 10GbE, n x 25GbE, 40GbE, 100GbE Client MAC rates. This test module also supports an optional feature to test "standard" Ethernet testing. The ability to test both standard and Flex Ethernet traffic offers maximum value and flexibility to meet today's complex testing needs.

Data Center and Service Providers—FlexE is a key technology for Service Providers and Data Centers high density requirements to deliver faster network speeds vs emerging ethernet solutions. A single Spirent SPT-N11U mainframe chassis can support 144 ports, while the compact Spirent SPT-N4U chassis offers 24 ports of QSFP28 100GBASE-R PHY.

Flexible Client Layer—Validate IP throughput targeted at decoupling the rates of interfaces connecting routers to transport boxes. Verify scale, reliability, and performance of Layers 1- 3.

Decouple Transport Dependency—Maximize PHY to Bandwidth flexibility, decouple control and data plane from physical PHY.

Ethernet control in a Data Center environment—Provisioning of Ethernet traffic in a DCI scenario. Evaluate FlexE use cases topologies and network efficiency.



Cost Effective, High Density and Performance Testing

The Spirent PX3 FlexE module has a lower cost of ownership compared to other test modules in its class:

- Industry-leading port density to provide a cost-effective platform for testing the next generation Flex Ethernet supported routers and data center fabrics.
- More total throughput than the competition for a given power footprint.
- One test solution to test both traditional and FlexE test cases
- Faster boot and firmware upgrade times mean less downtime in continuous running 24x7 regression test beds

Technical Specifications				
Spirent PX3 Flex Ethernet Solution				
Module	MAC Rate Clients	Maximum ports per slot	Maximum ports per SPT-N11U chassis	Maximum ports per SPT-N4U chassis
PX3-QSFP28-12-225A-FLEXE	100/50/40/25/10/5G	12	144	24
MSA interface	QSFP28			
FlexE client MAC rates	100G, 40G, nX 25G, 10G, 5G configurable in 5GbE increments			
User reservation	Per QSFP28 port			
Test port speed config	(Per 1x3 QSFP28 cage group); 4 test port speed groups per blade			
FlexE calendar	<ul style="list-style-type: none"> • Tx/Rx calendar status • PHY selection, Group number, enable disable • Edit PHY/Group numbers • Calendar A/B switch • Tx/Rx Client ID status and modifier 			
FlexE overhead alarms/status	<ul style="list-style-type: none"> • PHY status indicators • Overhead error injection • Group ID status • Local PCS Fault • Loss of OH Lock • Loss of Multiframe lock • Remote PHY Fault • Group number mismatch • PHY number mismatch • PHY number invalid • PHY map mismatch • Calendar configuration mismatch • Active Calendar Mismatch • Active Calendar Changed • Calendar switch mismatch 			
FlexE PHY's	<ul style="list-style-type: none"> • 4 available port groups over 12 PHY's • Available 10 Clients per PHY • Tx C, Tx CR, Rx CA • PHY status: OH Detect, CH Lock, MF Lock, Remote PHY Fault • Rx C, Rx CR, Tx CA • Client rates per PHY 100G,40G,nx25G, 10G, 5GbE in 5GbE increments for maximum flexibility of mixed client types 			
Transmit timestamp resolution	2.5 ns Tx timestamp resolution with intra-chassis and inter-chassis synchronization			
Supported feature set	Spirent PX3 (100,50,40,25,10GbE) feature set available for "standard" Ethernet testing			
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 $\pm < 1$ PPM on initial shipment. Accurate to ± 4.6 PPM 15 years of operation. <ul style="list-style-type: none"> • 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 			

Technical Specifications (cont'd)

Inter-module and inter-chassis time synchronization	<p>Modules in the same chassis are phased-locked to the timing source of the control module. For more modules in separate chassis:</p> <ul style="list-style-type: none"> • Spirent-patented self-calibrating inter-chassis timing chain using dedicated port on chassis control module delivers precise synchronization ± 20ns • Synchronization via external GPS or CDMA network • Using IEEE 1588 or NTP packet-based approaches • With TIS/EIA-95B timing inputs
Module weight	2.5 kg, 5.45lbs.
Operating temperature range	Supported for 41° to 95° F (5° to 35° C) ambient temperature. 20% to 80% relative humidity
Max power draw per module	Maximum of 420W per slot

Layer 1 Functionality

QSFP28 Interconnects	<ul style="list-style-type: none"> • Optical, Copper
Layer-1 FlexE Debug Tools & Features	<ul style="list-style-type: none"> • PCS lane to Virtual lane mapping • Block Lock, Synced, MF Error, MF length Error, MF Request Error status • Frame Error and BIP Error counts • PCS status per PHY • PCS status align/align error, misaligned, Hi BER, FIFO error

Ordering Information

Test Modules		Spirent Application	
Part Number	Hardware Description	Spirent TestCenter	Avalanche Commander
PX3-QSFP28-12-225A-FLEXE	SPIRENT PX3 100 50 40 25 10GBE FLEXE QSFP28 12-PORT	X	

Spirent Chassis	
SPT-N11U-110	Spirent N11U chassis and controller with 110VAC power supplies
SPT-N11U-220	Spirent N11U chassis and controller with 220VAC power supplies
SPT-N4U-110	Spirent N4U chassis and controller with 110VAC power supplies
SPT-N4U-220	Spirent N4U chassis and controller with 220VAC power supplies

About Spirent Communications

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.

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