

Freya-800G-4S-1P

4-speed 800G (112Gbps SerDes) dual-media test module

The Freya-800G-4S-1P test module supports four different Ethernet network speeds - 800GE, 400GE, 200GE and 100GE using 112G SerDes (PAM4 112G).

This flexibility is provided via two physical transceiver cages – one supporting QSFP-DD800 compatible transceivers, and the other supporting QSFP112 compatible transceivers.

The QSFP-DD800 cage supports the following ports and speeds: 1x800GE, 2x400GE, 4x200GE and 8x100GE. The QSFP112 cage supports 1x400GE, 2x200GE and 4x100GE.

The newest addition to Xena’s Valkyrie product line, Freya-800G-4S-1P is a highly versatile solution for performance and functional testing of network infrastructure and Ethernet equipment including switches, routers, NICs, TAPs, packet-brokers, and backhaul platforms.

Freya-800G-4S-1P is unique on the market with its ability to test up to 800GE with 112G SERDES (PAM4 112G) on optics and DACs and perform Auto-Negotiation and Link Training (AN/LT). Received signals can be analyzed the advanced signal integrity view, which provides visual information on the quality of the signal.

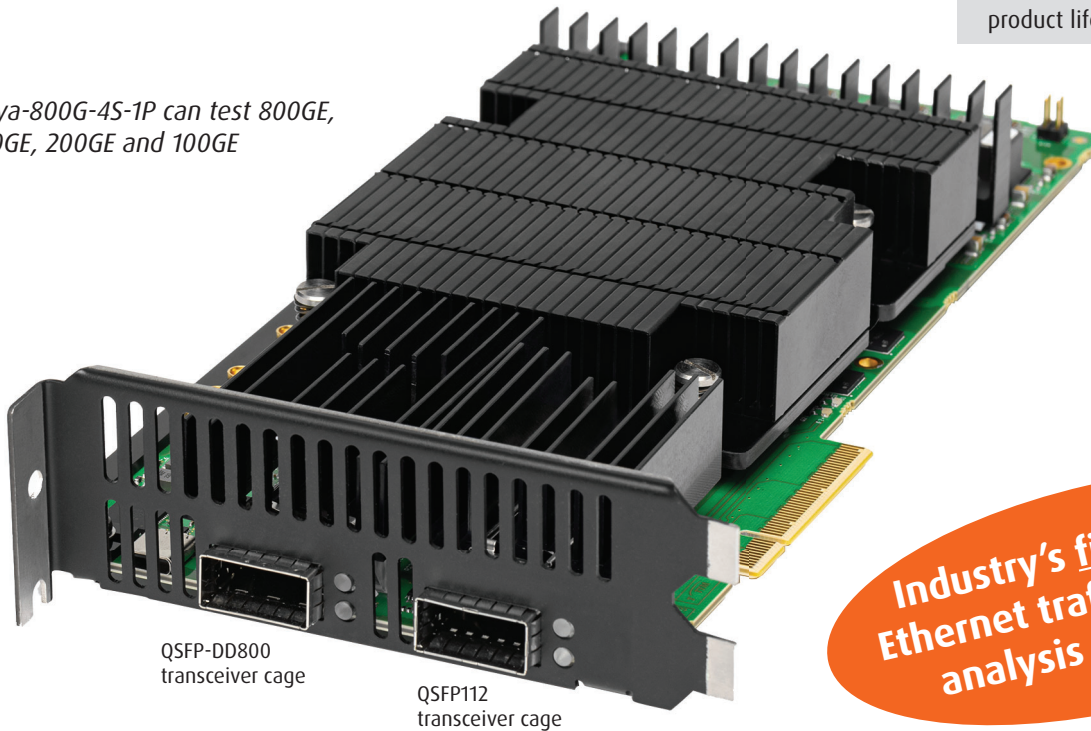
TOP FEATURES

- 4-speeds: 800GE, 400GE, 200GE, & 100GE
- Dual media: QSFP-DD800 & QSFP112
- Supports 112G SerDes (PAM4 112G)
- Test with optics and DACs
- Auto-Negotiation & Link Training (AN/LT)
- Advanced signal integrity view
- Price/performance
- Ease of use

XENA VALUE PACK

- Included with every Freya-800G-4S-1P:
- User-friendly software (ValkyrieManager, ValkyrieCLI and ValkyrieREST-API, Valkyrie2544, Valkyrie2889, Valkyrie3918, Valkyrie1564)
 - Three years’ software updates
 - Three years’ hardware warranty
 - Free tech support & training for the product lifetime

Freya-800G-4S-1P can test 800GE, 400GE, 200GE and 100GE



Industry's first 800Gbps Ethernet traffic generation analysis test module

PORT LEVEL FEATURES

Interface category	QSFP-DD800	• 800G, 400G, 200G, 100G Ethernet
	QSFP112	• 400G, 200G, 100G Ethernet
Total number of test ports (software configurable)	1x800G, 2x400G, 4x200G and 8x100G Ethernet	



Interface options	<p>QSFP-DD800 cage</p> <ul style="list-style-type: none"> • 1 x 800GE or PAM4 Consortium** • 2 or 1 x 400GE or PAM4 802.3ck • 4 or 2 x 200GE or PAM4 802.3ck • 8 or 4 x 100GE or PAM4 802.3ck <p>QSFP-DD112 cage</p> <ul style="list-style-type: none"> • 1 x 400GE or PAM4 802.3ck • 2 x 200GE or PAM4 802.3ck • 4 x 100GE PAM4 802.3ck <p>Both cages must run with the same base interface configuration (e.g. 4 x 100G). Power capacity per cage: 15W (ValkyrieBay) / 25W (ValkyrieCompact).</p> <p>** As defined by Ethernet Technology Consortium</p>
Auto Negotiation and Link Training	IEEE 802.3 Clause 73, Consortium 800G specification, Auto-negotiation IEEE 802.3 Clause 72, Link training
Forward Error Correction (FEC)	RS-FEC (Reed Solomon) (544,514,t=15), IEEE 802.3 Clause 119, Clause 134
Number of transceiver module cages	1 x QSFP-DD800 and 1 x QSFP112
Port statistics	Link state, FCS errors, pause frames, ARP/PING, error injections, training packet All traffic: RX and TX Mbit/s, packets/s, packets, bytes Traffic w/o test payload: RX and TX Mbit/s, packets/s, packets, bytes
Adjustable Inter Frame Gap (IFG)	Configurable from 16 to 56 bytes, default is 20B (12B IFG + 8B preamble)
Transmit line rate adjustment	Ability to adjust the effective line rate by forcing idle gaps equivalent to -1000 ppm (increments of 10 ppm)
Transmit line clock adjustment	From -400 to 400 ppm in steps of 1 ppm (shared across all ports)
ARP/PING	Supported (configurable IP and MAC address per port)
Field upgradeable	System is fully field upgradeable to product releases (FPGA images and software)
Tx disable	Enable/disable of optical laser or copper link
IGMPv2 multicast join/leave	IGMPv2 continuous multicast join, with configurable repeat interval
Histogram statistics	Two real-time histograms per port. Each histogram can measure one of RX/TX packet length, IFG, or Latency distribution for all traffic, a specific stream, or a filter
Loopback modes	<ul style="list-style-type: none"> • L1RX2TX – RX-to-TX, transmit byte-by-byte copy of the incoming packet • TXON2RX – TX-to-RX, packet is also transmitted from the port • TXOFF2RX – TX-to-RX, port's transmitter is idle
Oscillator characteristics	<ul style="list-style-type: none"> • Initial Accuracy is 3 ppm • Frequency drift over 1st year: +/- 3 ppm (over 15 years: +/- 15 ppm) • Temperature Stability: +/- 20 ppm (Total Stability is +/- 35 ppm)

PCS/PMA LAYERS TESTING

Payload Test pattern	PRBS-31Q
Alarms	PRBS pattern loss, link sync loss
Error analysis	Bit-errors: seconds, count, rate
PCS virtual lane configuration	User-defined skew insertion per Tx virtual lane, and user defined virtual lane to SerDes mapping for testing of the Rx PCS virtual lane re-order function
PCS virtual lane statistics	Relative virtual lane skew measurements (up to 2048 bits) Corrected Bit error, PreFEC BER
FEC Total statistics	Total corrected FEC symbols, Total uncorrected FEC symbols, Estimated Pre-FEC BER, Estimated Post-FEC BER, Pre-FEC Error Distribution Graph
Link Flap	Single short or repeatable link down events with ms precision
Error Injection (PMA Layer)	Repeatable error inject periods at PMA layer with ms precision

PHY/TRANSCEIVER ETHERNET TESTING

Programmable Pattern Generator	Ethernet frames with FCS Traffic load: up to 100% Configurable Frame Size distribution and content Transmit and Receive Statistics
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ADVANCED PHY FEATURES

Equalization Controls	<p>Tx Transmit Equalization Controls</p> <ul style="list-style-type: none"> • Pre-emphasis • Attenuation • Post-emphasis <p>Auto-Tune of Rx equalizer/CTLE</p>
Signal Integrity Analysis	<ul style="list-style-type: none"> • FEC error correction chart • Advanced signal integrity view



TRANSMIT ENGINES

Number of transmit streams per port	256 (wire-speed) Each stream can generate millions of traffic flows using field modifiers
Test payload insertion per stream	Wire-speed packet generation with timestamps, sequence numbers, and data integrity signature optionally inserted into each packet.
Stream statistics	TX Mbit/s, packets/s, packets, bytes, FCS error
Bandwidth profiles	Burst size and density can be specified. Uniform and bursty bandwidth profile streams can be interleaved
Field modifiers	16-bit or 32-bit header field modifiers with inc, dec, or random mode. Each modifier has configurable bit- mask, repetition, min, max, and step parameters. Eight 16-bit modifiers per stream or four 32-bit modifiers per stream
Packet length controls	Fixed, random, butterfly, and incrementing packet length distributions from 56 to 12288 bytes
Packet payloads (basic)	Repeated user specified 1 to 18B pattern, an 8-bit incrementing pattern
Error generation	Undersize length (56 bytes min) and oversize length (12288 bytes max.) packet lengths, injection of sequence, disorder, payload integrity, and FCS errors
TX packet header support and RX autodecodes	Ethernet, Ethernet II, VLAN, ARP, IPv4, IPv6, UDP, TCP, LLC, SNAP, GTP, ICMP, RTP, RTCP, STP, MPLS, PBB, or fully specified by user
Packet scheduling modes	<ul style="list-style-type: none"> • Normal (stream interleaved mode) – standard scheduling mode, precise rates, minor variation in packet inter-frame gap. • Strict Uniform – new scheduling mode, with 100% uniform packet inter-frame gap, minor deviation from configured rates. • Sequential packet scheduling (sequential stream scheduling). Streams are scheduled continuously in sequential order, with configurable number of packets per stream. • Burst. Packets in a stream are organized in bursts. Bursts from active streams form a burst group. The user specifies time from start of one burst group till start of next burst group.

RECEIVE ENGINE

Number of traceable Rx streams per port	2016 (wire-speed)
Automatic detection of test payload for received packets	Real-time reporting of statistics and latency, loss, payload integrity, sequence error, and disorder error checking
Jitter measurement	Jitter (Packet Delay Variation) measurements compliant to MEF10 standard with 8ns accuracy Jitter can be measured on up to 32 streams
Stream statistics	<ul style="list-style-type: none"> • RX Mbit/s, packets/s, packets, bytes. • Loss, payload integrity errors, sequence errors, disorder errors • Min latency, max latency, average latency • Min jitter, max jitter, average jitter
Latency measurements accuracy	±32ns
Latency measurement resolution	8ns (<i>Latency measurements can calibrate and remove latency from transceiver modules</i>)
Number of filters:	<ul style="list-style-type: none"> • 6 x 64-bit user-definable match-term patterns with mask, and offset • 6 x frame length comparator terms (longer, shorter) • 6 x user-defined filters expressed from AND/OR'ing of the match and length terms
Filter statistics	Per filter: RX Mbit/s, packets/s, packets, bytes

CAPTURE

Capture criteria	All traffic, stream, FCS errors, filter match, or traffic without test payloads
Capture limit per packet	16 – 12288 bytes
Wire-speed capture buffer per port	96 kB for 100GE
Low speed capture buffer per port (10Mbit/s speed)	4096 packets (any size)

HW SPECIFICATIONS

Max. Power	• TBA
Weight	• 2.32 lbs (1.05 kg)
Environmental	<ul style="list-style-type: none"> • Operating Temperature: 10 to 35° C • Storage Temperature: -40 to 70° C • Humidity: 8% to 90% non-condensing
Regulatory	• FCC (US), CE (Europe)
Notes	<ul style="list-style-type: none"> • This module is only supported by the Val-C12-2400 chassis • This module requires two slots in the Val-C12-2400 chassis

PRODUCT NUMBER (P/N)

- Freya-800G-4S-1P - test module for ValkyrieBay chassis
- C-Freya-800G-4S-1P - mounted in ValkyrieCompact chassis

