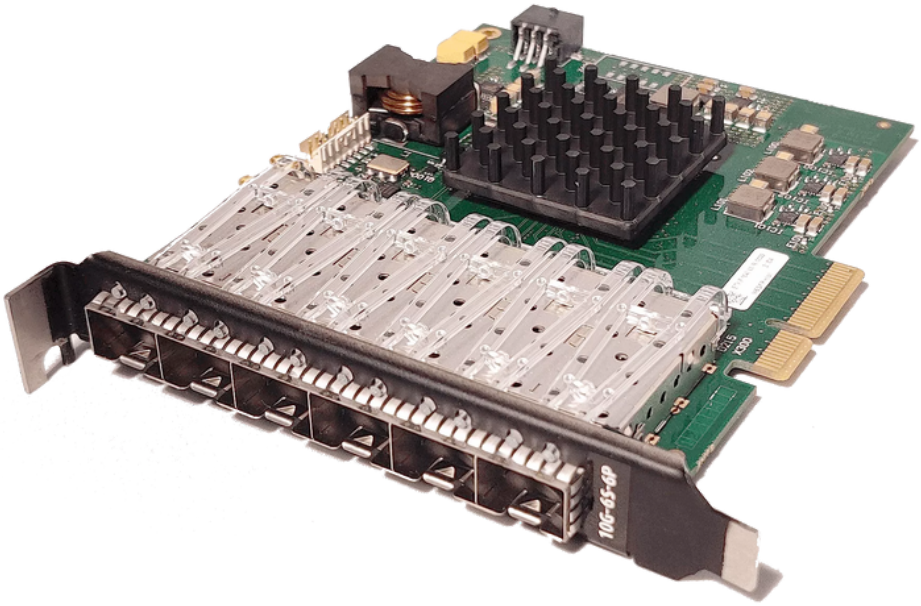
DATASHEET

Odin-10G-6S-6P

6 speed, 6-port 10Gbps Ethernet Test module



All 6 ports on the Odin-10G-6S-6P can be quickly configured to individually test any of the 6 speeds – 10M, 100M, 1GE, 2.5GE, 5GE 10GE.

TOP FEATURES

- 6-speeds: 10M, 100M, 1GE, 2.5GE, 5GE, 10GE
- Port speed can be configured individually pr. port on the module
- Integration with WireShark for additional packet analysis
- Price/performance
- Ease of use

XENA VALUE PACK

Included with Odin-10G-6S-6P:

- User-friendly software (ValkyrieManager ValkyrieCLI, Valkyrie2544, Valkyrie2889, Valkyrie3918, Valkyrie1564)
- Test automation with XOA
- Three years' software updates
- Three years' hardware warranty
- Free tech support & training for the product lifetime

VIEW THE PRODUCT ON OUR WEBSITE:

SCAN

OR CLICK ON THIS LINK

Flexible 10G 6-port Ethernet test module
The Odin-10G-6S-6P test module has 6 ports and supports testing of 6 speeds up to 10G Ethernet using NRZ modulation.

Based on Xena's advanced architecture this test module is a powerful and flexible solution that allows independent configuration of speeds on all ports, so users can configure 100M on one port, 1G on another port, and so on, providing the highest port/speed flexibility for customers.

It can be installed in our 12-slot 4U ValkyrieBay chassis for multi-module setup, or delivered in the 1U ValkyrieCompact chassis, making it a quiet and lightweight Ethernet test solution, with a customized flightcase available for safe, easy transportation.

Includes easy-to-use software and rich automation options
Xena's ValkyrieManager software is included with every Valkyrie system. This robust multi-user management software lets customers generate advanced traffic streams and analyze traffic patterns via its easy-to-use GUI.

For customers preferring to configure their systems via CLI, the same configurations can be applied using ValkyrieCLI.

Also included is Xena OpenAutomation (XOA), an open-source test automation framework featuring a Python API that runs on any OS. Fast, easy to use and extremely flexible, XOA can quickly create tailored tests, as well as run standardized test methodologies like RFC2544, Y.1564, RFC3918 and RFC2889.

PORT LEVEL FEATURES

Interface category	10G Ethernet
Total number of test ports (software configurable)	6 x 10G
Interface options	6 x 10GBASE-SR / LR / ER / T* / Direct Attached Cable (DAC) *Requires SFP-10G-T-NC Prolabs 10G SFP+ 10GBASE-T
Number of physical interface form factor	6 x SFP+
Port statistics (counter size: 64 bits)	• Link state, FCS errors, pauseframes, 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, defaultis 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)
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 (counter size: 64 bits)	Two real-time histograms per port. Each histogram can measure one of RX/TX packet length, IFG, jitter, or Latency distribution for all traffic, a specific stream, or a filter
Oscillator characteristics	• 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)
Loopback modes	• Off: Traffic flows naturally out of the port • L1 RX-to-TX: Any received packet is bounced back through TX • L2 RX-to-TX: Same as L1 RX-to-TX yet it also swaps MAC SRC<>DST • L3 RX-to-TX: Same as L2 RX-to-TX yet it also swaps IP SRC<>DST • TX(on)-to-RX: Packet goes out of TX but also internally direct to RX • TX(off)-to-RX: Packet goes directly to RX. Port's transmitter is idle (No link sync needed) • Port-to-port: Any RX packet goes out through TX on the neighbor port (L1´)

TRANSMIT ENGINES

Number of transmit streams per port	256 (wire-speed) Each stream can generate millions of traffic flows using field modifiers
Test payloadinsertion per stream	Wire-speed packet generation with timestamps, sequence numbers, and data integrity signature optionally inserted into each packet.
Stream statistics (counter size: 64 bits)	TX Mbit/s, packets/s, packets, bytes, FCS error, Pause
Bandwidth profiles	Burst size and density can be specified. Uniform and bursty bandwidth profile streams can be interleaved
Field modifiers	24-bit header field modifiers with inc, dec, or random mode. Each modifier has configurable bitmask, min, max, and step parameters. Up to 5 24-bit modifiers can be applied per stream
Packet length controls	Fixed, random, butterfly, and incrementing packet length distributions. Packet length from 60B to 16384 bytes
Packet payloads	Repeated user specified 1 to 18B pattern, 8-bit incrementing or decrementing pattern, 16-bit incrementing or decrementing pattern, PRBS-31, Random
Extended payload	Fixed full custom payloads can be generated for each stream with payload sizes up to 16384 bytes
Error generation	Undersize length (56B min) and oversize length (16384 max.) packet lengths,injection of sequence, misorder, 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
Pause frames	Responds to incoming pause and PFC (Priority-based Flow Control) frames

Packet scheduling modes	• 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.ifiers

RECEIVE ENGINE

Number of traceable Rx streams per port	2016 (wire-speed)
Automatic detection of testpayload for received packets	Real-time reporting of statistics and latency, loss,payload integrity, sequence error, and misorder 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	• RX Mbit/s, packets/s, packets, bytes. • Loss, payload integrity errors, sequence errors ,misorder errors • Min latency, max latency, average latency • Min jitter, max jitter, average jitter
Latency measurements accuracy	±8ns
Latency measurement resolution	8ns (Latency measurements can calibrate and remove latency from transceiver modules)
Number of filters:	• 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, filtermatch, or traffic without test payloads
Capture start/stop triggers	Capture start and stop trigger: none, FCS error, filter match
Capture limit per packet	16 – 16384 bytes
Wire-speed capture buffer per port	64 kB
Low speed capture buffer per port (10Mbit/s speed)	4096 packets (anysize)

HW SPECIFICATIONS

Max. Power	10 W
Weight	0.34 lbs (0.155 kg)
Environmental	• Operating Temperature: 10 to 35° C • Storage Temperature: -40 to 70° C • Humidity: 8% to 90% non-condensing
Regulatory	FCC (US),CE (Europe)

PRODUCT NUMBER (P/N)

- Odin-10G-6S-6P - test module for ValkyrieBay chassis (not included)
- C-Odin-10G-6S-6P - mounted in ValkyrieCompact chassis (included)

www.xenanetworks.com
Sales contact: sales@xenanetworks.com

Odin-10G-5S-6P-CU

5-speed 6-port 10G L2-3 test module

The Odin-10G-5S-6P-CU is a wire-speed 6 port 10GBASE-T/5GBASE-T/ 2.5GBASE-T/1000BASE-T/100BASE-TX Ethernet test module.

The test module is available for the 4U 12-slot ValkyrieBay chassis and the robust transportable 1U ValkyrieCompact chassis. It comes complete with Xena's free ValkyrieManager software - an easy-to-use GUI for handling both routine and advanced test schedules. Also included is Xena OpenAutomation (XOA), an open-source test automation framework featuring a Python API that runs on any OS. Fast, easy to use and extremely flexible, XOA can quickly create tailored tests, as well as run standardized test methodologies like RFC2544, Y.1564, RFC3918 and RFC2889.

TOP FEATURES

- Multiple speeds: 10GE, 5GE, 2.5GE, 1GE & 100MB
- Advanced architecture
- Ease of use

Includes Xena Value Pack

- User-friendly software (ValkyrieManager, Valkyrie3918, Valkyrie2544, Valkyrie1564 Valkyrie2889, XOA, ValkyrieCLI & ValkyrieREST-API)
- Three years' free software updates
- Three years' free hardware warranty
- Free tech support & training for the product lifetime

PORT LEVEL FEATURES

Interface category	100 /1000 /2500 / 5000 / 10000M Ethernet
Number of test ports	6 x 100 / 1000 / 2500 / 5000 / 10000M
Interface options	10GBASE-T (IEEE 802.3an)/ 5GBASE-T (IEEE 802.3bz)/ 2.5GBASE-T (IEEE 802.3bz)/ 1000BASE-T (IEEE 802.3ab) / 100BASE-T (IEEE 802.3u)
Interface Characteristics	10GBASE-T operating at 300ft (100m) over CAT6a and CAT7 UTP cable. 5GBASE-T operating on standard Category 6 UTP cable. 2.5GBASE-T, 1000BASE-T and 100BASE-T operating on standard Category 5e UTP cable.
Port statistics [1)]	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 -50 to 50 ppm in steps of 0.001 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)
Histogram statistics [1)]	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
Tx disable	Enable/disable of copper link
IGMPv2 multicast join/leave	IGMPv2 continuous multicast join, with configurable repeat interval
Oscillator characteristics	Odin-10G-5S-6P-CU: • 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)

TRANSMIT ENGINE

Number of transmit streams per port	256 (wire-speed) Each stream can generate millions of traffic flows through the use of 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 [1)]	TX Mbit/s, packets/s, packets, bytes, FCS error, ARP
Bandwidth profiles	Burst size and density can be specified. Uniform and bursty bandwidth profile streams can be interleaved
Field modifiers	16-bit header field modifiers with inc, dec, or random mode. Each modifier has configurable bit-mask, repetition, min, max, and step parameters. 4 modifiers per stream
Packet length controls	Fixed, random, butterfly, and incrementing packet length distributions. Packet length from 56 to 12288 bytes
Packet payloads	Repeated user specified 1 to 18B pattern, a 8-bit incrementing pattern
Error generation	Undersize length (56B min) and oversize length (12288 max.) packet lengths, injection of sequence, misorder, 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
Pause Frames	Responds to incoming pause frames
Packet scheduling modes	• 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 misorder error checking
Jitter measurement	Jitter (Packet Delay Variation) can be measured on up to 32 streams. Jitter measurements compliant to MEF10 standard with 8 ns accuracy.
Stream statistics [1)]	• RX Mbit/s, packets/s, packets, bytes. • Loss, payload integrity errors, sequence errors, misorder errors • Min latency, max latency, average latency • Min jitter, max jitter, average jitter
Latency measurements accuracy	±8 ns
Latency measurement resolution	8 ns *(Latency measurements can calibrate and remove latency from transceiver modules)*
Number of filters:	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 [1)]	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 start/stop triggers	Capture start and stop trigger: none, FCS error, filter match
Capture limit per packet	16 – 12288 bytes
Wire-speed capture buffer per port	64 kB
Low speed capture buffer per port (10Mbit/sec)	4096 packets (any size)

ENERGY EFFICIENT ETHERNET (EEE)

Energy Efficient Ethernet	- Enable/Disable EEE for 10G, 5G, 2,5G, 1G and 100M speeds - Enable/Disable low-power mode in the TX direction (independently of the RX direction) - Monitor active/low-power mode transition activity in both TX and RX direction
Signal-to-noise ratio (SNR)	Read out the SNR for each of the four electrical channels (measured on cable-insert).

HW SPECIFICATIONS

Max. Power	• 56 W
Weight	• 0.67 lbs (0.305 kg)
Environmental	• Operating Temperature: 10 to 35° C • Storage Temperature: -40 to 70° C • Humidity: 8% to 90% non-condensing
Regulatory	• FCC (US), CE (Europe)

1) Counter size: 64 bits

PRODUCT NUMBERS (P/N)

- Odin-10G-5S-6P-CU - test module for ValkyrieBay chassis
- C-Odin-10G-5S-6P-CU - mounted in ValkyrieCompact chassis

XENA™
Test. Improve. Repeat.

ODIN-10G-1S-6P

Wire-speed 6-port 10G L2-3 test module

Advanced 1U Gigabit Ethernet tester with six 10G ports.

The Odin-10G-1S-6P is a wire-speed 6 port 10 Gigabit Ethernet test module. Based on Xena's advanced architecture, the Odin-10G-1S-6P is a proven solution for testing 10G Ethernet at Layers 2-3. It is available for both the 4U 12-slot ValkyrieBay chassis and the robust transportable 1U ValkyrieCompact chassis.

The Odin-10G-1S-6P comes complete with Xena's free ValkyrieManager software - an easy-to-use GUI for handling both routine and advanced test schedules. Also included is Xena OpenAutomation (XOA), an open-source test automation framework featuring a Python API that runs on any OS. Fast, easy to use and extremely flexible, XOA makes it easy to create tailored tests, as well as run standardized test methodologies like RFC2544, Y.1564, RFC3918 and RFC2889.

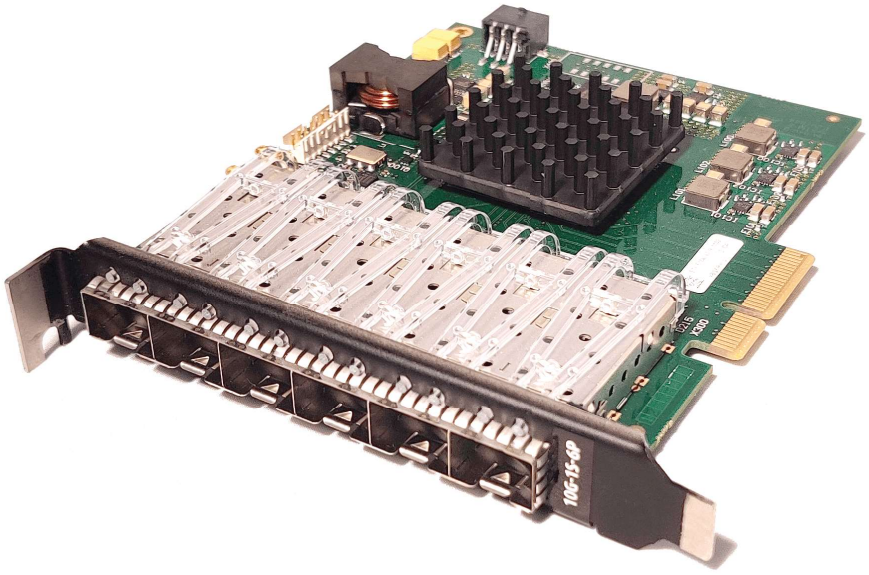
TOP FEATURES

- Price/performance
- Ease of use
- Advanced architecture

XENA VALUE PACK*

Included with every Odin-10G-1S-6P:

- User-friendly software (ValkyrieManager & ValkyrieCLI)
- Test automation with XOA
- Three years' software updates
- Three years' hardware warranty
- Free tech support & training for product lifetime



PORT LEVEL FEATURES

Interface category	10G Ethernet
Number of test ports	6 x 10G
Interface options	6 x 10GBASE-SR / LR / ER / T [3] / Direct Attached Cable (DAC) [1]
Number of transceiver module cages	6 x SFP+
Port statistics [2]	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 0.001 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)
Histogram statistics [2]	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
Tx disable	Enable/disable of optical laser or copper link
IGMPv2 multicast join/leave	IGMPv2 continuous multicast join, with configurable repeat interval
Oscillator characteristics	• 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)

TRANSMIT ENGINE

Number of transmit streams per port	256 (wire-speed) Each stream can generate millions of traffic flows through the use of 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 [2]	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 header field modifiers with inc, dec, or random mode. Each modifier has configurable bit-mask, repetition, min, max, and step parameters. 5 modifiers per stream
Packet length controls	Fixed, random, butterfly, and incrementing packet length distributions. Packet length from 56 to 16384 bytes
Packet payloads	Repeated user specified 1 to 18B pattern, a 8-bit incrementing pattern
Error generation	Undersize length (56B min) and oversize length (16384 max.) packet lengths, injection of sequence, misorder, 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
Pause Frames	Responds to incoming pause and PFC (Priority-based Flow Control) frames
Packet scheduling modes	• 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 misorder error checking
Jitter measurement	Jitter (Packet Delay Variation) measurements compliant to MEF10 standard with 8 ns accuracy Jitter can be measured on up to 32 streams
Stream statistics [2]	• RX Mbit/s, packets/s, packets, bytes. • Loss, payload integrity errors, sequence errors, misorder errors • Min latency, max latency, average latency • Min jitter, max jitter, average jitter
Latency measurements accuracy	±8 ns
Latency measurement resolution	8 ns *(Latency measurements can calibrate and remove latency from transceiver modules)*
Number of filters:	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 [2]	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 start/stop triggers	Capture start and stop trigger: none, FCS error, filter match
Capture limit per packet	16 – 16384 bytes
Wire-speed capture buffer per port	64 kB
Low speed capture buffer per port (10Mbit/sec)	4096 packets (any size)

1. *The interface implements discrete PHY devices with built in EDC support that employs sophisticated signal processing techniques to recover a 10 Gbps signal that has travelled over a dispersive Copper Direct attach cable and restore a bit-error rate of 10-12 or better.*
2. *Counter size: 64 bits*
3. *Requires SFP-10GTNC Prolabs 10G SFP+ 10GBASE-T*

HW SPECIFICATIONS

Max. Power	• 10 W
Weight	• 0.34 lbs (0.155 kg)
Environmental	• Operating Temperature: 10 to 35° C • Storage Temperature: -40 to 70° C • Humidity: 8% to 90% non-condensing
Regulatory	• FCC (US), CE (Europe)

PRODUCT NUMBERS (P/N)

- Odin-10G-1S-6P - test module for ValkyrieBay chassis
- C-Odin-10G-1S-6P - mounted in ValkyrieCompact chassis

XENA™ NETWORKS

DATASHEET

Odin-1G-3S-6P-T1-RJ45

1Gbps 6-port Automotive Ethernet Test module

TOP FEATURES

- Designed for testing Automotive Ethernet
- Native 1000BASE-T1 and 100BASE-T1 interfaces
- Flexible choices of chassis '
- Predefined test suites
- Industry's best automation options

XENA VALUE PACK

Included with Odin-1G-3S-6P-T1-RJ45:

- User-friendly software (ValkyrieManager ValkyrieCLI, Valkyrie2544, Valkyrie2889, Valkyrie3918, Valkyrie1564)
- Three years' software updates
- Three years' hardware warranty
- Free tech support & training for the product lifetime

VIEW THE PRODUCT ON OUR WEBSITE:

SCAN

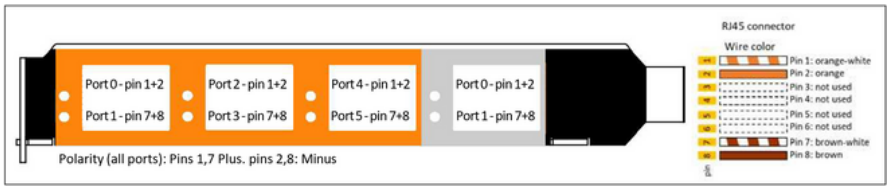
OR CLICK ON THIS LINK

The Odin-1G-3S-6P-T1-RJ45 is a 6-port 1 Gbps/100Mbps Ethernet test module designed for Automotive Ethernet test applications.

The module has native 1000BASE-T1 and 100BASE-T1 interfaces. Based on Xena's advanced architecture, the Odin-1G-3S-6P-T1-RJ45 is the obvious choice for testing Automotive Ethernet up to 1G at Layers 2-3.

The module is available for Xena's 4U 12-slot ValkyrieBay chassis or in the robust transportable 1U ValkyrieCompact chassis. It comes complete with a full range of test software (as part of the Xena Value Pack*) which includes predefined test suites, and comprehensive test automation options.

RJ45 connector pin out:



PORT LEVEL FEATURES

Interface category	100/1000M Ethernet
Total number of test ports (software configurable)	6 x 100/1000M
Interface options	1000BASE-T1 or 100BASE-T1
Number of physical interface form factor	6 x RJ45 (100/1000M) - see graphic above
Port statistics (counter size: 64 bits)	• Link state, FCS errors, pauseframes, 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, defaultis 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)
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 copper link
IGMPv2 multicast join/leave	IGMPv2 continuous multicast join, with configurable repeat interval
Histogram statistics (counter size: 64 bits)	Two real-time histograms per port. Each histogram can measure one of RX/TX packet length, IFG, jitter, or Latency distribution for all traffic, a specific stream, or a filter
Oscillator characteristics	Odin-1G-3S-6P-T1-RJ45: • 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)

TRANSMIT ENGINES

Number of transmit streams per port	256 (wire-speed) Each stream can generate millions of traffic flows using field modifiers
Test payloadinsertion per stream	Wire-speed packet generation with timestamps, sequence numbers, and data integrity signature optionally inserted into each packet.
Stream statistics (counter size: 64 bits)	TX Mbit/s, packets/s, packets, bytes, FCS error, Pause
Bandwidth profiles	Burst size and density can be specified. Uniform and bursty bandwidth profile streams can be interleaved
Field modifiers	16-bit header field modifiers with inc, dec, or randommode. Each modifierhas configurable bit-mask, repetition, min, max, and step parameters. 6 modifiers per stream
Packet length controls	Fixed, random, butterfly, and incrementing packet length distributions from 56 to 16384 bytes
Packet payloads	Repeated user specified 1 to 18B pattern, an 8-bit incrementing pattern
Error generation	Undersize length (56B min) and oversize length (16384 max.) packet lengths,injection of sequence, misorder, 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
Pause frames	Responds to incoming pause and PFC (Priority-based Flow Control) frames
Packet scheduling modes	• 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.ifiers

RECEIVE ENGINE

Number of traceable Rx streams per port	2016 (wire-speed)
Automatic detection of testpayload for received packets	Real-time reporting of statistics and latency, loss,payload integrity, sequence error, and misorder 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	• RX Mbit/s, packets/s, packets, bytes. • Loss, payload integrity errors, sequence errors ,misorder errors • Min latency, max latency, average latency • Min jitter, max jitter, average jitter
Latency measurements accuracy	±32ns
Latency measurement resolution	8ns (Latency measurements can calibrate and remove latency from transceiver modules)
Number of filters:	• 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 (counter size: 64 bits)	Per filter: RX Mbit/s, packets/s, packets, bytes

CAPTURE

Capture criteria	All traffic, stream, FCS errors, filtermatch, or traffic without test payloads
Capture start/stop triggers	Capture start and stop trigger: none, FCS error, filter match
Capture limit per packet	16 – 16384 bytes
Wire-speed capture buffer per port	16 kB
Low speed capture buffer per port (10Mbit/s speed)	4096 packets (anysize)

HW SPECIFICATIONS

Max. Power	TBA W
Weight	0.33 lbs (0.15 kg)
Environmental	• Operating Temperature: 10 to 35° C • Storage Temperature: -40 to 70° C • Humidity: 8% to 90% non-condensing
Regulatory	FCC (US),CE (Europe)

PRODUCT NUMBER (P/N)

- Odin-1G-3S-6P-T1-RJ45 - test modulefor ValkyrieBay chassis (not included)
- C1-Odin-1G-3S-6P-T1-RJ45 - mounted in ValkyrieCompact chassis (included)

www.xenanetworks.com
Sales contact: sales@xenanetworks.com

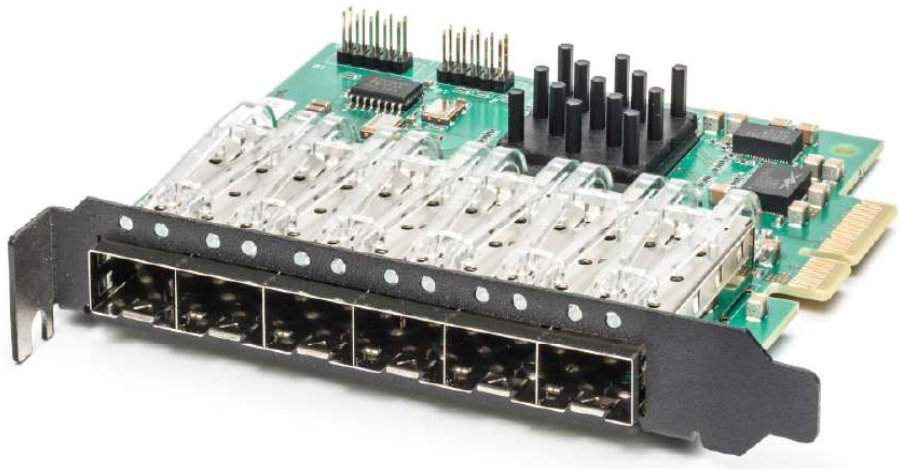
ODIN-1G-3S-6P-E

Enhanced 6-port 1Gbps test module

A 1GE test module with six ports and enhanced performance

The Odin-1G-3S-6P-E is a 6 port 1 Gigabit Ethernet test module. An enhanced version of Xena's entry level Odin-1G-3S-6P test module, the Odin-1G-3S-6P-E offers more transmit streams (256 instead of 32) six modifiers per stream (instead of 2) as well as support for Priority Flow Control.

The Odin-1G-3S-6P-E is available for both the 4U 12-slot ValkyrieBay chassis and the robust transportable 1U ValkyrieCompact chassis, and is provided with Xena's full range of complimentary software.



TOP FEATURES

- Supports Priority Flow Control (PFC)
- 256 tx streams
- 6 modifiers per stream

XENA VALUE PACK*

Included with every Odin-1G-3S-6P-E

- User-friendly software (ValkyrieManager, Valkyrie3918, Valkyrie2544, Valkyrie1564 Valkyrie2889 and ValkyrieCLI, ValkyrieREST-API)
- Three years' free software updates
- Three years' free hardware warranty
- Free tech support & training for the product lifetime

PORT LEVEL FEATURES

Interface category	10/100/1000M Ethernet
Number of test ports	6 x 10/100/1000M
Interface options	10/100/1000BASE-T* or 1000BASE-X (SFP-MSA) or 100BASE-FX** or 100BASE-BX** * Requires Finisar SFP transceivers FCLF-8521-3 with sgmii host interface ** Requires Source Photonics SFP transceivers with sgmii host interface
Number of physical interface form factor	6 x SFP
Port statistics (Counter size: 64 bits)	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 63 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 cock adjustment	From -400 to 400 ppm in steps of 0.001 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)
Histogram statistic (Counter size: 64 bits)	Two real-time histograms per port. Each histogram can measure one of RX/TX packet length, IFG, jitter, or latency distribution for all traffic, a specific stream, or a filter
Tx disable	Enable/disable of optical laser or copper link
IGMPv2 multicast join/leave	IGMPv2 continuous multicast join, with configurable repeat interval
Oscillator characteristics	• 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)

TRANSMIT ENGINE

Number of transmit streams per port	256 (wire-speed) continuous Each stream can generate millions of traffic flows through the use of 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 (Counter size: 64 bits)	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 inter-leaved
Field modifiers	16-bit header field modifiers with inc, dec, or random mode. Each modifier has configurable bit-mask, repetition, min, max, and step parameters. 6 modifiers per stream.
Packet length controls	Fixed, random, butterfly, and incrementing packet length distributions. Packet length from 56 to 16384 bytes (10M: 6500)
Packet payloads	Repeated user specified 1 to 18B pattern, a 8-bit incrementing pattern
Error generation	Undersize length (56B min) and oversize length (16384 max. (10M: 6500)) packet lengths, injection of sequence, misorder, 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
Pause Frames	Responds to incoming pause and PFC (Priority-based flow control) frames
Packet scheduling modes	• 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 misorder error checking
Jitter measurement	Jitter (Packet Delay Variation) measurements compliant to MEF10 standard with 8 ns accuracy. Jitter can be measured on up to 32 streams.
Stream statistics (Counter size: 64 bits)	• RX Mbit/s, packets/s, packets, bytes. • Loss, payload integrity errors, sequence errors, misorder errors • Min latency, max latency, average latency • Min jitter, max jitter, average jitter
Latency measurements accuracy	±16/32 ns (opto/elec)
Latency measurement resolution	8 ns (Latency measurements can calibrate and remove latency from transceiver modules)
Number of filters:	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 (Counter size: 64 bits)	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 start/stop triggers	Capture start and stop trigger: none, FCS error, filter match
Capture limit per packet	16 – 16384 bytes
Wire-speed capture buffer per port	16 kB
Low speed capture buffer per port (3Mbit/sec)	4096 packets (any size)

HW SPECIFICATIONS

Max. Power	• 5.5 W
Weight	• 0.37 lbs (0.165 kg)
Environmental	• Operating Temperature: 10 to 35° C • Storage Temperature: -40 to 70° C • Humidity: 8% to 90% non-condensing
Regulatory	• FCC (US), CE (Europe)

PRODUCT NUMBERS (P/N)

- Odin-1G-3S-6P-E: test module for ValkyrieBay chassis (not included)
- C-Odin-1G-3S-6P-E: test module mounted in ValkyrieCompact chassis (included)

XENA™
Test. Improve. Repeat.

ODIN-1G-3S-6P

6-port 1Gbps test module

Robust 1U Gigabit Ethernet tester with six 1G ports

Odin-1G-3S-6P is a low-cost 6 port 1 Gigabit Ethernet test module. Based on Xena's advanced architecture, the Odin-1G-3S-6P is a proven solution for testing up to 1G Ethernet at Layers 2-3. It is available for both the 4U 12-slot ValkyrieBay chassis and the robust transportable 1U ValkyrieCompact chassis.

Odin-1G-3S-6P comes complete with Xena's free ValkyrieManager software - an easy-to-use GUI for handling both routine and advanced test schedules that includes ValkyrieCLI, Valkyrie2544, Valkyrie1564, Valkyrie3918 and Valkyrie2889.

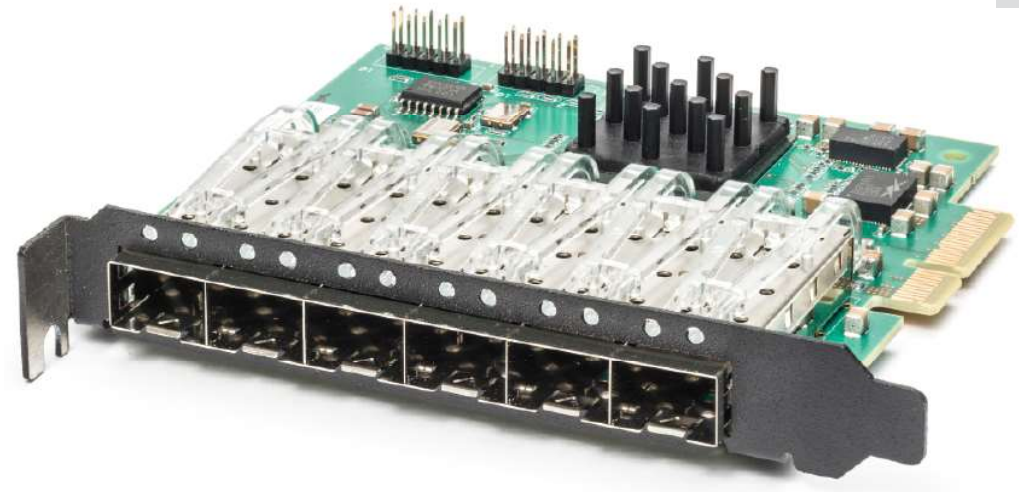
TOP FEATURES

- Price/performance
- Robust form factor
- Ease of use

XENA VALUE PACK*

Included with every Odin-1G-3S-6P

- User-friendly software (ValkyrieManager, Valkyrie3918, Valkyrie2544, Valkyrie1564 Valkyrie2889, ValkyrieCLI, and Valkyrie REST-API)
- Three years' free software updates
- Three years' free hardware warranty
- Free tech support & training for the product lifetime



PORT LEVEL FEATURES

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Oscillator characteristics	• 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)

XENA™ NETWORKS

TRANSMIT ENGINE

Number of transmit streams per port	32 (wire-speed) continuous
	Each stream can generate millions of traffic flows through the use of 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 (Counter size: 64 bits)	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 inter-leaved
Field modifiers	16-bit header field modifiers with inc, dec, or random mode. Each modifier has configurable bit-mask, repetition, min, max, and step parameters. 2 modifiers per stream.
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RECEIVE ENGINE

Number of traceable Rx streams per port	2016 (wire-speed)
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HW SPECIFICATIONS

Max. Power	• 5W
Weight	• 0.36 lbs (0.165kg)
Environmental	• Operating Temperature: 10 to 35° C • Storage Temperature: -40 to 70° C • Humidity: 8% to 90% non-condensing
Regulatory	• FCC (US), CE (Europe)

PRODUCT NUMBERS (P/N)

- Odin-1G-3S-6P - test module for ValkyrieBay chassis
- C-Odin-1G-3S-6P - mounted in ValkyrieCompact chassis