Keysight AresONE-400GE QSFP-DD High-Performance 4-Port

Challenge: Scalability Testing in 400GE Devices and Networks

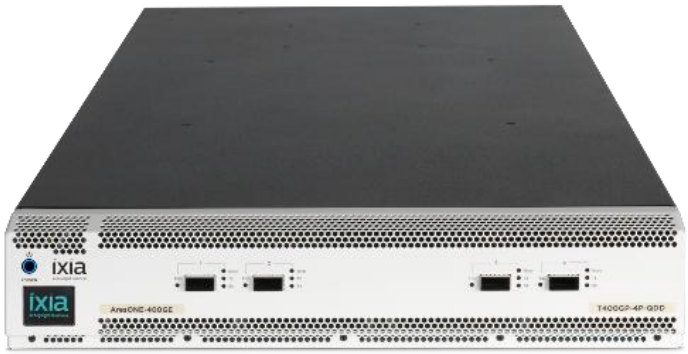
400 Gigabit Ethernet (GE) technology is proliferating with many new 400GE-capable networking products already introduced to the industry. The deployment of 400GE promises more bandwidth in the datacenter at lower cost per gigabit compared to 100GE. 400GE hardware brings better economies of scale and denser configurations, especially of the lower speeds 2x200GE, 4x100GE and 8x50GE per 400GE physical port.

These critical factors save costs in operations. When it comes to testing new 400GE equipment, the same is true using Keysight's Ixia AresOne-400GE High Performance test product.

Solution: Unprecedented Traffic and Protocol Emulation Performance

The Keysight AresONE-400GE High Performance fixed chassis provides the world's highest-scale 400GE traffic generation, and network protocol emulation. AresONE High Performance goes beyond just performance and benchmark testing of your high-density 12.8Tbps networking devices—it delivers massive protocol scale on every fan-out port for unparalleled traffic generation performance and receive-side measurement scale over its supported 8x200GE, 16x100GE, and 32x50GE ports.

AresONE High Performance is the only test solution that does not lose transmit stream capability and receive-side measurement tracking and measurement capability due to fan-out to 2x200GE and 4x100GE. Even the 8x50GE per-port transmit and receive capacities vastly surpass the competition.



AresONE-400GE QSFP-DD High Performance, 4-port, system

KEYSIGHT

Highlights

- Keysight's AresONE High Performance, 4-port 400GE QSFP-DD is the world's highest traffic generation and protocol emulation scale and performance test solution available for 400/200/100/50GE QSFP-DD interfaces.
- Validate high protocol scale devices for performance and scalability with AresONE multi-speed 400/200/100/50GE test capabilities and Keysight's IxNetwork Layer 2/3 test application.
- Test on massive scale, even in 400GE to 2x200GE, 4x100GE fan-out mode with no reduction in number of transmit streams and receive-side tracking per flow with full line-rate traffic and multi-protocol test scenarios.
- Simplify testing of transceivers and cables during testbed bring-up using L1 BERT, KP4 FEC, and PAM4 Rx Eye Histogram test features.
- Rely on proven IxNetwork test solution for validating mission-critical network infrastructure and IxSuiteStore for Layer 1 BERT and PCS lanes Tx/Rx test capability.

Massive Scale, Even in Fan-Out Mode

It enables many transmit stream counts per port with full line-rate traffic generation functionality for transmit, receive, and capture — even with fan-outs. This facilitates high-scale mixed protocol tests, large system-under-test (SUT) scenarios, and fail-over and convergence testing at large subscriber scales. The solution accommodates testing of pre-designed full-scale networks with multi-service protocol configurations. Those multi-day, highly complex RFC benchmark tests you want to run, are now a reality. AresONE High Performance excels at reliability and stress testing in high-port-count test beds. Plus, with the IxNetwork application, Keysight offers the broadest and highest-performance Layer 2/3 routing protocol emulation coverage available in the industry.

Before you run a large-scale test, use AresONE High Performance to validate the interoperability and robustness of your optics and cables — not after an error has occurred on interconnects, and potentially, days of testing are lost.

Field Upgradeable

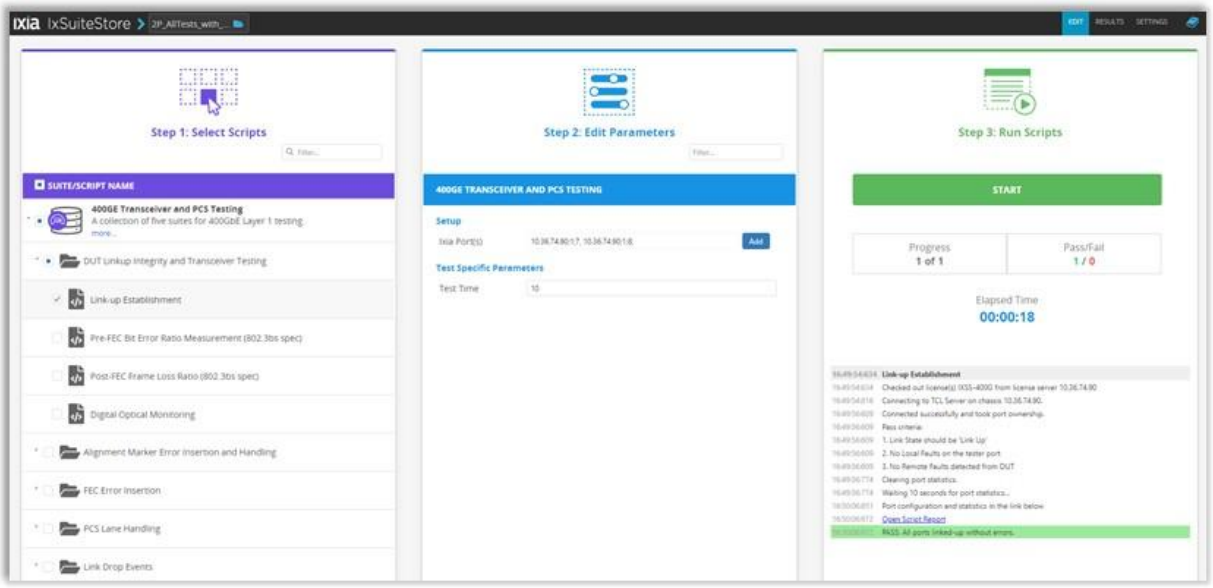
AresONE offers a factory and a field-upgrade Ethernet speed option that provides 2x200GE, 4x100GE, and 8x50GE test capabilities. This provides your development teams the speeds and test options they need to create the networking technologies of the future.

Key Features

- Line-rate 400Gbps packet generation, capture, and analysis of received traffic to detect and debug data transmission errors for multiple speeds, including 2x200GE, 4x100GE, and 8x50GE.
- Multi-rate speed option that includes 2x200GE, 4x100GE, and 8x50GE speed modes with fan-out support; these speed modes are compliant with the IEEE 802.3cd specification.
- New IxNetwork protocol bundles that provide easy and flexible pricing designed for fixed chassis systems.
- IxSuiteStore 400GE Transceiver and PCS Testing suite, the industry's first fully automated IEEE 802.3bs-based test suite that enables validation of 400GE implementations; includes testing of physical coding sublayer (PCS) lanes, bit error rate (BER), KP4 FEC bit-error distribution with error insertion and link stability.
- Line-rate, at all speeds with per-port and per-flow statistics
- High-latency measurement resolution: 0.625ns at 400GE speed and 1.25 ns at 200GE speed
- RS-544 (KP4) forward error correction (FEC) support for all speeds (400/200/100/50GE)
- An excellent test platform for full line-rate 400/200/100/50 Gb/s with high stream count requirements to evaluate 400GE ASIC designs, FPGAs, and hardware switch and router fabrics that use the new 8x56Gb/s electrical interface with PAM4 encoding that is IEEE 802.3bs and IEEE 802.3cd compliant.
- Auto-negotiation (AN) and link training (LT) support (Note: With AN and LT turned on 50GE fan-out operation becomes 4x50GE per port. With AN and LT turned OFF the 50GE operation is 8x50GE per port)
- 400GE and 2x200GE FEC symbol error injection and FEC symbol error density distribution; Comprehensive set of FEC corrected and uncorrected counts, rates, and statistics; BER statistics per lane and per port, and pre-FEC BER, frame loss ratio (FLR) analysis is provided to name a few.
- Keysight instrumentation including floating timestamp, sequence number and flow identification, and data integrity.
- 400G PCS lanes transmit, error injection testing and receive measurement:
  - Per-lane controls and status, FEC and error monitoring, error insertion, lane mapping and skew insertion; see details in Specification Table in this datasheet, as capabilities may vary per Ethernet speed.
- Layer 1 BERT capability with per-lane and per-port BER statistics, ability to send PRBS patterns and inject bit errors per lane under user control.
- Advanced Rx Eye Histogram Analysis Option that provides in-depth, user-selected, per lane PAM4 signal shape analysis, Symbol Error Rate (SER) statistics, comparison of signal quality between lanes and an array of eye measurements.
- +/- 100 PPM line frequency adjustment
- Inject packet errors: CRCs, runts, giants, alignments, checksum errors, and out of sequence.
- Ultra-high-range L2/3 networking protocol emulation to validate performance and scalability of L2/3 routing/switching and data center test cases by using Keysight's IxNetwork protocol emulation application.
- Supports RFC benchmarking of networking devices and equipment using industry-standard RFC benchmark tests at line-rate 400/200/100/50GE speeds.
- Supported with the Native IxOS software.
- Application support: backwards compatible with existing chassis and software with IxExplorer and IxNetwork.
- Supports IxExplorer, IxNetwork, and related Tcl and automation APIs.

IxSuiteStore — Fast and Efficient Standards-Based Test Methodology for 400GE PAM4

The automated 400GE Transceiver and PCS Testing suite enables developers of 400GE equipment to accelerate testing and gain significant time to market advantage. Quality assurance teams can benefit from front-loading testing, flagging implementation issues more quickly, and reducing manual test time. Consumers of 400GE equipment like data center and service provider equipment validation teams can use the test suite to automate 400GE equipment and optical transceiver and copper cable validation during initial stages of qualification, to ensure quality of upgrades and avoid future interoperability issues.



The 400GE test suite is available by using Keysight's IxSuiteStore framework. The test suite validates key aspects of a 400GBASE-R PCS and supported physical media dependents (PMDs) per IEEE 802.3bs. Following are more details on this test suite.

- A set of Keysight-provided scripts exercising most of the Layer1 test capabilities of Keysight AresONE hardware.
- It is also compatible with Keysight's K400 QSFP-DD 400GE load modules.
- Enables quick start testing with basic steps and progressively guides to more advanced cases.
- Customers can configure these tests to support regression testbeds.
- Currently 25 tests are available, covering key validations required in a 400GE implementation.
- Requires IxOS version 9.00 or later.

Specifications

Description	AresONE-400GE high performance fixed chassis
	Hardware fixed chassis system specifications
Part number	944-1178, 944-1179
RU / number of ports	2 RU, 4-port fixed chassis system, with 2-port configuration option
Physical interfaces	Native QSFP-DD physical port
Supported port speeds	• 400GE/port: 400GE-capable fiber and passive copper cable media • 2x200, 4x100, 4x50GE, 8x50GE with the purchase of a factory or a field upgrade speed option. See the Ordering Section of this datasheet
CPU and memory	Multicore processor with up to 8GB of CPU memory per port depending on the speed mode set on the port
IEEE interface protocols for 400GE	• IEEE 802.3bs 200GE & 400GE, 400GBASE-R • IEEE 802.3cd 50 Gb/s, 100 Gb/s, and 200 Gb/s Ethernet
Layer 1 support	400GE native ports and 200/100/50GE speed option: • KP4 (RS-544, 514) Ethernet Forward Error Correction, Clause 119 • Auto-negotiation (AN) and link training (LT) support ◦ All speeds support AN and LT for 1x400GE, 2x200GE, 4x100GE, and 4x50GE speed modes ◦ 8x50GE speed mode does not support AN and LT • Correctable and uncorrectable FEC statistics per-port • FEC symbol error injection (400GE and 200GE speeds only) • FEC symbol error density distribution analysis • Pre-FEC BER and FLR measurements • Extensive FEC BER and rate related statistics • PCS lanes Tx and Rx BER test and statistics • Layer 1 BERT testing with PRBS patterns
Optical transceiver support	Support for all QSFP-DD MSA compliant optical transceivers up to Power Class 7 with 14 watts of power consumption such as: 400GBASE-DR4, 400GBASE-FR4, and 400GBASE-SR8 other optical transceiver types (e.g., QSFP56), and AOCs. Please consult the factory for specific transceiver support information. See Optical Transceivers under the Ordering Information section of this datasheet.
Copper cable media	400GBASE-CR8, passive, copper Direct Attached Cable (DAC) up to 3 meters in length. Please consult the factory for longer lengths and information on Active Electrical Cable information. See Cables and Transceivers under the Ordering Information section of this datasheet.
Active Electrical Copper (AEC) cable media	This cable is designed for 400GE-to-4x100GE fan-out application. The 400GE AEC 3-meter copper cable breaks out 1x400GE (8x50G-PAM4) QSFP-DD into 4x100GE (4x25G-NRZ) QSFP28 ends with built-in gearbox feature. See Cables and Transceivers under the Ordering Information section of this datasheet.
Fixed chassis system dimensions	• 30.3” (L) x 17.3” (W) x 3.46” (H) • 770 mm (L) x 438.2 mm (W) x 88 mm (H)
Fixed chassis system weights	• Hardware only: 74.6 lbs. (33.84 kg) • Shipping: 94.5 lbs. (42.86 kg) Note: Shipping weight is approximate (includes rackmount slides, power cords, sync cables and packaging)

Description	AresONE-400GE high performance fixed chassis
Fixed chassis system electrical power	• Operates on 100–240 VAC, 50/60 Hz • 200–240 VAC is single phase • Requires (3) power sources when running 100-120 VAC, 9 Amps for each power supply. AresONE fixed chassis is shipped with (3 each) 100-125 VAC power cords. • Requires (2) power sources when running 200–240 VAC, 7 Amps for each power supply. For 200–240 VAC power cords, order part number 942-0110 from the Ordering Section of this datasheet. The kit is provided at no charge with the purchase of an AresONE fixed chassis when 200–240 VAC is required. Note: Power specifications are for reference for facility planning purposes
Temperature (ambient air)	• Operating: 41° F to 95° F (5° C to 35° C), see the exception note below: • Note: When operating the MACsec Enablement FACTORY INSTALLED Option (905-1061) or the FIELD UPGRADE Option (905-1062), the Ambient Air Operating Temperature range is reduced to 41° F to 86° F (5° C to 30° C) • Storage: 41° F to 122° F (5° C to 50° C)
Humidity (ambient air)	• Operating: 0 % to 85 %, non-condensing • Storage: 0 % to 85 %, non-condensing
Regulatory compliance specifications	IEC 60950-1, UL 60950-1, CSA C22.2 No.60950-1, CE (LVD, EMC, RoHS), EN/IEC 55032, EN/IEC 55024, CFR 47, FCC Part 15B, ICES-003, AS/NZ CISPR 32/24, KN32/35
Chassis capacity: maximum number of chassis and ports per model	
T400GD-4P-QDD (944-1178) T400GD-2P-QDD (944-1178)	4-port fixed chassis system: • 4-port, 2RU fixed chassis with built-in star topology synchronization ports to connect up to 5 additional fixed chassis systems • 2-port configuration option, and upgrade option from 2-port to 4-port • Total single system capacity is 24-ports of 400GE in a single configuration with support for the following total port counts: ◦ 8 x 200GE ◦ 16 x 100GE ◦ 16 x 50GE with AN and LT ◦ 32 x 50GE without AN and LT • Consult factory for port count requirements beyond 24-ports of 400GE physical ports in a single configuration
Transmit feature specifications	
Transmit engine	• Wire-speed packet generation with timestamps, sequence numbers, data integrity, and packet group signatures
Max. Streams per port and speed (including in Data Center Ethernet)	• 400GE: 512 • 2x200GE: 512 • 4x100GE: 512 • 8x50GE: 256
Stream controls	• Rate and frame size change on the fly • Advanced and Sequential stream scheduler support
Minimum frame size	400GE and 200GE: • 60 bytes at full line rate

Description	AresONE-400GE high performance fixed chassis
	• 56 bytes at less than full line rate 100GE and 50GE: • 60 bytes at full line rate • 56 bytes at less than full line rate
Maximum frame size	• 16,000 bytes
Maximum frame size in Data Center Ethernet	• 9,216 bytes
Priority flow control	• 8 line-rate-capable queues, each supporting up to 9,216-byte frame lengths for 400G / 200G speed modes. • 8 line-rate-capable queues, each supporting up to 2,500-byte frame lengths for all other speeds.
Frame length controls	• Fixed, increment by user-defined step, weighted pairs (up to 16K in 400/200/100GE and 8K in 50GE), uniform, repeatable random, IMIX, and Quad Gaussian
User-Defined Fields (UDF)	• Fixed, increment or decrement by user-defined step, sequence, value list, and random configurations; up to 10, 32-bit-wide UDFs are available
Value lists (max.) per port	• 400GE: 1M / UDF • 2x200GE: 1M / UDF • 4x100GE: 1M / UDF • 8x50GE: 512K / UDF
Sequence (max.)	• 400GE: 1M / UDF • 2x200GE: 1M / UDF • 4x100GE: 1M / UDF • 8x50GE: 512K / UDF
Error generation (FEC and standard Keysight L2/3 Ethernet)	400GE and 2x200GE FEC • FEC symbol error-injection allows the user to inject FEC symbol errors using various weighted methods to achieve specific bit error rates (BER) for 400/200GE • No FEC error insertion and related statistics for 4x100GE and 8x50GE 400GE, 2x200GE, 4x100GE, 8x50GE L2/3 Ethernet: • Generate good CRC or force bad CRC, undersize and oversize standard Ethernet frame lengths, and bad checksum
Physical coding sublayer	• PCS lane marker error injection • PCS lane re-mapping • PCS lane marker error injection • PCS bit error generation
Hardware checksum generation	Checksum generation for IPv4, IP over IP, ICMP/GRE/TCP/UDP, L2TP, GTP, and multilayer checksum; support for protocol verification for control plane traffic
Link fault signaling	• Reports, no fault, remote fault, and local fault port statistics. • Generate local and remote faults with controls for the number of faults and order of faults.

Description	AresONE-400GE high performance fixed chassis
	• Option to have the transmit port ignore link faults from a remote link partner and send traffic anyway
Latency measurement resolution	• 400GE: 0.625 nanoseconds • 2x200GE: 1.25 nanoseconds • 4x100GE: 2.5 nanoseconds • 8x50GE: 2.5 nanoseconds
Intrinsic latency compensation	Removes inherent latency error from the port electronics for all speeds
Transmit line clock adjustment	Ability to adjust the parts-per-million (ppm) line frequency over a range of +/- 100 ppm on all the ports of a 400GE fixed chassis system
Transmit/receive loopback	• Internal loopback support • Line loopback support
Receive feature specifications	
Receive engine	Wire-speed packet filtering, capturing, real-time latency, and inter-arrival time for each packet group, with data integrity, and sequence checking capability
Trackable receive flows per port	Without sequence checking and with Tx/Rx synch • 400/200/100GE: 1M • 50GE: 512K With and without sequence checking and no Tx/RX synch • 400/200/100GE: 1M • 50GE: 512K
Minimum frame size	• 400GE and 2x200GE: 60 bytes • 4x100GE and 8x50GE: 64 bytes
Filters (User-Defined Statistics, UDS)	2 SA/DA pattern matchers, 2x16-byte user-definable patterns. 6 UDS counters are available with offsets for start of frame.
Hardware capture buffer	400GE: 1 GB per physical port • 2x200GE port fan-out: 1 GB for each 200GE port • 4x100GE port fan-out: 1 GB for each 100GE port • 8x50GE port fan-out: 512 MB for each 50GE port
Standard statistics and rates	Link state, line speed, frames sent, valid frames received, bytes sent/received, fragments, undersize, oversize, CRC errors, 6 user-defined stats, capture trigger (UDS 3), capture filter (UDS 4), data integrity frames, data integrity errors, sequence checking frames, sequence checking errors, ARP, and PING requests and replies
FEC statistics	400GE and 2x200GE: • FEC port statistics: Total Bit Errors, Max Symbol Errors, Corrected Codewords, Total Codewords, Uncorrectable Codewords, Frame Loss Ratio, Pre-FEC Bit Error Rate, and Codeword error distribution analysis • FEC per lane Rx statistics: FEC Symbol Error Count, Corrected Bits Count, Symbol Error Rate, Corrected Bit Rate 4x100GE and 8x50GE: • Corrected and uncorrectable codewords Note: This is a minimum specification; consult factory for more information
Latency / jitter measurements	Cut-through, store and forward, forwarding delay, latency/jitter, MEF jitter, and inter-arrival time.

Description	AresONE-400GE high performance fixed chassis
Receive-side PCS lanes port statistics counters	PCS: Sync Errors, Illegal Codes, Remote Faults, Local Faults, Illegal Ordered Set, Illegal Idle, and Illegal SOF
400GE PCS receive-side statistics and indicators	Per-lane PCS receive capabilities include: • Receive—per-lane PCS receive statistics; Physical Lane assignments, Lane Marker Lock, Lane Market Map, Relative Lane Skew, Lane Marker Error Count. • Receive—per-lane FEC receive statistics; FEC Symbol Error Count, FEC Corrected Bits Count, FEC Symbol Error Rate, FEC Corrected Bit Rate.
Basic Rx eye histogram analysis	Basic Rx Eye Histogram analysis is provided for basic PAM4 signal quality analysis per lane that includes SER statistics.
Advanced Rx eye histogram analysis	Advanced Rx Eye Histogram Analysis Option provides in-depth, user-selected, per lane PAM4 signal shape analysis, SER statistics, comparison of signal quality between lanes and an array of eye measurements.
Layer 2-3 protocol support	
Basic	IxNetwork Base, RFC2544/2889/3918 QuickTest
Routing, switching, and carrier Ethernet	BGP4/BGP4+, OSPFv2/v3, ISISv4/v6, RIP/RIPng, EIGRP, BFD, Seamless BFD, IGMP/MLD, PIM-SM/SSM, STP/RSTP/MSTP/PVST, LACP/Protocol over LACP, GRE and Protocol over GRE, LISP, CFM/Y.1731, Link-OAM, PBB-TE, ELMI, 1588v2/SyncE ESMC, Y.1564QT, TWAMP, NTP; REQUIRES: 930-2201 IxNetwork Basic package for AresONE
Software defined network	BGP4/BGP4+, OSPFv2/v3, ISISv4/v6, RIP/RIPng, BFD; EVPN, VXLAN, GENEVE, Segment Routing (MPLS and IPv6), BGP-LS, PCEP, BGP SR-TE Policy, BGP FlowSpec, OVSDB, Netconf, BIER, OpenFlow; GRE and Protocol over GRE, LACP/Protocol over LACP, eCPRI; REQUIRES: 930-2201 IxNetwork Basic package for AresONE
MPLS and VPN	BGP4/BGP4+, OSPFv2/v3, ISISv4/v6, RIP/RIPng, EIGRP, BFD, RSVP-TE P2P/P2MP, LDP/LDPv6/mLDP, LDP L2VPN (PWE/VPLS), BGP VPLS/VPWS, L3VPN/6VPE, BGP RFC3107, PIM-SM/SSM, Multicast VPN, MPLS-TP, MPLS OAM, EVPN/PBB-EVPN; REQUIRES: 930-2201 IxNetwork Basic package for AresONE
Broadband access and authentication	PPPoX/L2TPv2, DHCPv4/DHCPv6, ANCP, IGMP/MLD, IPv6 Autoconfiguration (SLAAC), 802.1x, Bonded GRE HG, GRE/Protocol over GRE, LACP/Protocol over LACP, Session Aware Traffic, Service over MPLS, Broadband Control Plane QT, Asymmetric Data Performance QT; REQUIRES: 930-2201 IxNetwork Basic package for AresONE
Data Center Ethernet	BGP4/BGP4+, OSPFv2/v3, ISISv4/v6, RIP/RIPng, BFD; EVPN, VXLAN, GENEVE, OVSDB, DCBX, FCoE, Fabric Path, SPBM, VEPA, TRILL, FCoE QT, IxCloudPerf QT, RFC7747 BGP Convergence QT, LACP/Protocol over LACP; REQUIRES: 930-2201 IxNetwork Basic package for AresONE

Application Support

AresONE T400GP-4P-QDD

- IxExplorer: Layer 1-3 wire-speed traffic generation, capture, and analysis with Forward Error Correction and error injection with statistics, PCS Lanes Tx/Rx with statistics. and reporting capability.
- IxNetwork: Wire-rate traffic generation with service modeling that builds realistic, dynamically controllable data-plane traffic. IxNetwork offers the industry's best test solution for functional and performance testing by using comprehensive emulation for routing, switching, MPLS, IP multicast, broadband, authentication, Carrier Ethernet, and data center Ethernet protocols.
- IxSuiteStore: 400GE Transceiver and PCS Testing suite for functional validation of PCS lanes BER, KP4 FEC bit-error distribution with error insertion and link stability based on IEEE 802.3bs specification (at 400GE speed only)
- Tcl API: Custom user script development for Layer 1-3 testing

Ordering Information

Fixed chassis system

944-1178

Ixia, AresONE T400GP-4P-QDD, 4-port, 400GE high performance fixed chassis model with native QSFP-DD 400GE physical interfaces, and L1-3 support (944-1178). Includes installation of the latest production released version of the IxOS software. Includes 3 each 100-125VAC power cords for North American operation. NOTE: For 200-240VAC operation, please order, at no charge, the AresONE 200-240VAC Power Cord Option Kit for AresONE QSFP-DD fixed chassis models (942-0110).

944-1179

IXIA, AresONE T400GP-2P-QDD, 2-port enablement on AresONE T400GP-4P-QDD high performance fixed chassis model (944-1178), with native QSFP-DD 400GE physical interfaces, L1-3 support (944-1179); Includes installation of the latest production released version of the IxOS software. Includes 3 each 100-125VAC power cords for North American operation. NOTE: For 200-240VAC operation, please order, at no charge, the AresONE 200-240VAC Power Cord Option Kit for AresONE QSFP-DD fixed chassis models (942-0110).

200-240VAC power cord option

942-0110

Ixia, AresONE 200-240VAC Power Cord Option Kit includes 2 each C13 to 6-20P, 8 feet in length, and 2 each C13 to L6-20P, 10 feet in length. Two cord types are provided that accommodate the most common 200-240VAC power receptacle types. Two of either cord types are required to power the AresONE fixed chassis. These power cords are compatible with all AresONE-S QSFP-DD, AresONE High Performance QSFP-DD, and AresONE QSFP-DD fixed chassis systems. The kit is optional and is sold at no charge. It is REQUIRED only when a AresONE fixed chassis must be connected to 200-240VAC single phase power sources. Note: Requires (2) power sources when running single phase 200-240VAC drawing 7 Amps for each power supply.

Fan-out options

905-1044

Ixia, AresONE T400GD/T400GDR/T400GP Fan-out option: 2x200GE, 4x100GE, 8x50GE fan-out FACTORY INSTALLED option for the QSFP-DD T400GD/T400GDR/T400GP 8-port and 4-port, high performance, full and reduced performance, fixed chassis systems. One option is required for each fixed chassis system for all 8x400GE or 4x400GE physical ports depending on the model.905-1045

Ixia, AresONE T400GD/T400GDR/T400GDP Fan-out option: 2x200GE, 4x100GE, 8x50GE fan-out FIELD UPGRADE option for the QSFP-DD and OSFP T400GD/T400GDR/T4000GP 8-port and 4-port, high performance, full and reduced performance, fixed chassis systems. One option is required for each fixed chassis system for all 8x400GE or 4x400GE physical ports depending on the model. Port count upgrade options

905-1097

IXIA, AresONE UPG-T400GP-2P-to-T400GP-4P FIELD UPGRADE for the 2-port high performance T400GP-2P-QDD (944-1179) to the 4-port high performance T400GP-4P-QDD (944-1178), (905-1097). Note: At the time of order placement of the purchase of the upgrade, please provide the serial number of the desired T400GP-2P-QDD high performance model to install the upgrade.

Advanced histogram analysis option

905-1067

Advanced Rx Eye Histogram Analysis Option, FACTORY installed for AresONE QSFP-DD . This option is supported on all AresONE 400GE fixed chassis

905-1068

Advanced Rx Eye Histogram Analysis Option, FIELD UPGRADE for AresONE QSFP-DD models. This option is supported on all AresONE 400GE fixed chassis.

MACsec enablement options

905-1061

IXIA, MACsec Enablement for AresONE T400GP-4P-QDD 400GE high performance fixed chassis system (944-1178) with FACTORY INSTALLED Option (905-1061); One option is required for each fixed chassis system to enable MACsec capability for 100GE ports; REQUIRES: 905-1044 AresONE T400GD/GDR/GP 2x200GE, 4x100GE, 8x50GE FAN-OUT FACTORY INSTALLED option; REQUIRES: 930-2207 IxNetwork Encryption Test package for AresONE.

905-1062

IXIA, MACsec Enablement for AresONE T400GP-4P-QDD 400GE high performance fixed chassis system (944-1178) with FIELD UPGRADE Option (905-1062); One option is required for each fixed chassis system to enable MACsec option for 100GE ports; REQUIRES: 905-1044 AresONE T400GD/GDR/GP 2x200GE, 4x100GE, 8x50GE FAN-OUT FACTORY INSTALLED option OR 905-1045 AresONE T400GD/GDR/GP 2x200GE, 4x100GE, 8x50GE FAN-OUT FIELD UPGRADE option; REQUIRES: 930-2207 IxNetwork Encryption Test package for AresONE.

IxNetwork AresONE-only—software bundle options

930-2200

IxNetwork, All Inclusive package for AresONE. Supports all IxNetwork software features with exclusion; Excludes: 930-3461 IxNetwork AppLibrary Slot Bundle, Layer 4-7 Performance Test Application; 930-2207 IxNetwork Encryption test package for AresONE. Any optional script package or IxSuiteStore optional test suite is not considered as part of IxNetwork software features.[1]

1. Note: AresONE does not support traditional IxNetwork a la carte license, bundle license, and tier licenses.

930-2201[2]

Ixia IxNetwork, Basic package for AresONE. INCLUDES: IxNetwork Base, RFC2544/2889/3918 QuickTest.

2. Note: Recommended for AresONE 400GE products.

930-2202

Ixia IxNetwork Routing, Switching and Carrier Ethernet package for AresONE; INCLUDES: Routing, Switching and Carrier Ethernet Protocols; REQUIRES: 930-2201 IxNetwork Basic package for AresONE.

930-2203

Ixia IxNetwork MPLS and VPN package for AresONE; INCLUDES: Routing, MPLS and VPN Protocols; REQUIRES: 930-2201 IxNetwork Basic package for AresONE.

930-2204

Ixia IxNetwork SDN package for AresONE; INCLUDES: Routing and SDN Protocols; REQUIRES: 930-2201 IxNetwork Basic package for AresONE.

930-2205

Ixia IxNetwork Data Center package for AresONE; INCLUDES: Routing, Data Center Overlay and Data Center Ethernet Protocols; REQUIRES: 930-2201 IxNetwork Basic package for AresONE.

930-2206

Ixia IxNetwork Broadband Access and Authentication package for AresONE; INCLUDES: Broadband Access and Authentication Protocols; REQUIRES: 930-2201 IxNetwork Basic package for AresONE.

930-2207

IxNetwork, Encryption Test package for AresONE (930-2207); INCLUDES: MACsec Emulation; REQUIRES: 930-2201 IxNetwork Basic package for AresONE; Recommend with: 930-3461 IxNetwork AppLibrary Slot Bundle, Optional Software, Layer 4-7 Performance Test Application for additional encryption/decryption capability in Static MACsec emulation.

IxSuiteStore software option

930-6001

IXIA IxSuiteStore optional test suite for functional validation of PCS lanes BER, KP4 FEC Bit-error distribution with error insertion and Link stability based on IEEE 802.3bs specification (at 400GE speed only). This software is compatible with the following hardware platforms with the native QSFP-DD 400GE interfaces: K400 QSFP-DD-400GE (944-1152), K400 QSFP-DD-R400GE (944-1153); and all AresONE QSFP-DD and OSFP models: T400GD-8P-QDD (944-1170), T400GDR-8P-QDD (944-1171), T400GD-4P-QDD (944-1172), T400GDR-4P-QDD (944-1173), T400GD-8P-OSFP (944-1174), T400GDR-8P-OSFP (944-1175), T400GD-4P-OSFP (944-1176), T400GDR-4P-OSFP (944-1177) and T400GP-4P-QDD (944-1178).

Passive copper point-to-point cables

QSFP-DD-1M-CBL

Ixia, QSFP-DD-1M-CBL 400GE 400GBASE-R passive copper, Direct Attach Cable (DAC), point-to-point cable, 1-meter length (942-0106). This copper DAC is compatible with all AresONE QSFP-DD fixed chassis models. This fanout cable supports PAM4 and NRZ signaling. Consult the 400GE Optics and Cables Guide for the specific Ethernet speed support with the PAM4 or NRZ signaling.

QSFP-DD-2M-CBL

Ixia, QSFP-DD-2M-CBL 400GE 400GBASE-R passive copper, Direct Attach Cable (DAC), point-to-point cable, 2-meter length (942-0109). This copper DAC is compatible with all AresONE QSFP-DD fixed chassis models. This fanout cable supports PAM4 and NRZ signaling. Consult the 400GE Optics and Cables Guide for the specific Ethernet speed support with the PAM4 or NRZ signaling.

QSFP-DD-2-5M-CBL

Ixia, QSFP-DD-2-5M-CBL 400GE 400GBASE-R passive copper, Direct Attach Cable (DAC), point-to-point cable, 2.5-meter length (942-0108). This copper DAC is compatible with all AresONE QSFP-DDfixed chassis models. This fanout cable supports PAM4 and NRZ signaling. Consult the 400GE Optics and Cables Guide for the specific Ethernet speed support with the PAM4 or NRZ signaling.

Passive copper fan-out cables

QSFPDD4XQ56-1-5M-CBL

Ixia, QSFPDD4XQ56-1-5M-CBL QSFP-DD-to-4xQSFP56 400GBASE-R Direct Attached Copper cable (DAC) fan-out cable, 1.5-meter length (942-0140). This copper, fan-out DAC is compatible with all AresONE QSFP-DD fixed chassis models. This fanout cable supports PAM4 and NRZ signaling. Consult the 400GE Optics and Cables Guide for the specific Ethernet speed support with the PAM4 or NRZ signaling.

QSFPDD2XQ56-2-5M-CBL

Ixia, QSFPDD2XQ56-2-5M-CBL QSFP-DD-to-2xQSFP-DD 400GBASE-R Direct Attached Copper (DAC) fan-out cable, 2.5-meter length (942-0141). This copper, fan-out DAC is compatible with all AresONE QSFP-DD fixed chassis models. This fanout cable supports PAM4 and NRZ signaling. Consult the 400GE Optics and Cables Guide for the specific Ethernet speed support with the PAM4 or NRZ signaling.

QSFPDD8XQ56-1-5M-CBL

Ixia, QSFPDD8XQ56-1-5M-CBL QSFP-DD-to-8xSFP56 400GBASE-R Direct Attached Cable (DAC) fan-out cable, 1.5-meter length (942-0142). This copper, fan-out DAC is compatible with all AresONE QSFP-DD fixed chassis models. This fanout cable supports PAM4 and NRZ signaling. Consult the 400GE Optics and Cables Guide for the specific Ethernet speed support with the PAM4 or NRZ signaling.

Active electrical fan-out cable

QSFPDD-4XQ28-AEC-CBL

Ixia, QSFP-DD-to-4xQSFP28 400GBASE-R Active Electrical Fan-out Cable (AEC), for 400GE to 4x100GE fan-out, 3-meter length (942-0139). This Active Electrical Copper (AEC) cable is compatible with all AresONE QSFP-DD This cable converts 400GE PAM4 signaling to 100GE NRZ signaling.Optical transceivers

QSFP-DD-DR4-XCVR

Ixia, QSFP-DD-DR4-XCVR QSFP-DD 400GE 400GBASE-DR4 pluggable optical transceiver, SMF (singlemode), 1310 nm, 500-meter reach (948-0050). This optical transceiver is compatible with allAresONE QSFP-DD fixed chassis models. This optical transceiver supports PAM4 signaling output.

QSFP28-DR1-XCVR

Ixia, QSFP28-DR1-XCVR QSFP28 100GE 100GBASE-DR1 pluggable optical transceiver, SMF (singlemode), 1310 nm, 500-meter reach (948-0055). This optical transceiver is compatible with all This QSFP28 transceiver converts PAM4 optical signaling to NRZ electrical signaling. It is used with the QSFP-DD-DR4-XCVR optical transceiver (948-0050) and the QSFP-DD-DR4-CBL MT-to-4x100GE LC fan-out, fiber cable (942-0138) for 4x100GE fan-out applications for AresONE QSFP-DD 400GE ports for Nx100GE connections to NRZ-based QSFP28 network devices.

QSFP-DD-FR4-XCVR

Ixia, QSFP-DD-FR4-XCVR QSFP-DD 400GE 400GBASE-FR4 pluggable optical transceiver, SMF (singlemode), 1310 nm, 2-kilometer reach (948-0052). This optical transceiver is compatible with all AresONE QSFP-DDfixed chassis models. This optical transceiver supports PAM4 signaling output.

QSFP-DD-LR4-XCVR

Ixia, QSFP-DD-LR4-XCVR QSFP-DD 400GE 400GBASE-LR4 pluggable optical transceiver, SMF (singlemode), 1310 nm, 10-kilometer reach (948-0054). This optical transceiver is compatible with all AresONE QSFP-D fixed chassis models. Note: This optical transceiver supports PAM4 signaling output.

QSFP-DD-SR8-XCVR

Ixia, QSFP-DD-SR8-XCVR 400GE 400GBASE-SR8 pluggable optical transceiver, MMF (multimode), 850 nm, 100-meter reach (948-0051). This optical transceiver is compatible with all AresONE QSFP-DDfixed chassis models. This optical transceiver supports PAM4 signaling output.

Optical transceiver point-to-point cables

QSFP-DD-MPO16-CBL

Ixia, QSFP-DD-MPO16-CBL MT-to-MT, MPO16, OM4, MMF, APC, 2-meter fiber point-to-point cable (942-0124) for the 400GE QSFP-DD-SR8-XCVR. REQUIRES QSFP-DD-SR8-XCVR pluggable optical transceiver, 850 nm, MMF (Multimode Fiber), 100-meter reach (948-0051). This cable supports 1x400GE, 2x200GE, 4x100GE and 8x50GE logical fan-out speed modes from a QSFP-DD physical port with the QSFP-DD-SR8-XCVR optical transceiver.

Optical transceiver fan-out cables

QSFP-DD-DR4-CBL

Ixia, QSFP-DD-DR4-CBL MT-to-4x100GE LC fan-out, SMF, 3-meter fiber cable for 4x100GE fan-out (942-0138). REQUIRES QSFP-DD-DR4-XCVR pluggable optical transceiver, 1310 nm, SMF (Single Mode Fiber), 500-meter reach (948-0050).

QSFP-DD-SR8-CBL

Ixia, QSFP-DD-SR8-CBL MT-to-8x50GE LC fan-out, OM4 MMF, MPO16, APC, 2-meter fan-out cable (942-0125) for 8x50GE fan-out speed mode. REQUIRES QSFP-DD-SR8-XCVR pluggable optical transceiver, 850 nm, MMF (Multimode Fiber), 100-meter reach (948-0051). This cable supports 8x50GE physical fan-out from a QSFP-DD physical port with the QSFP-DD-SR8-XCVR optical transceiver.