Keysight AresONE 800GE Dual Interface Model 4-Port Test System

Challenge: Testing all speeds from 10GE to 800GE

The 800GE component ecosystem has evolved rapidly. Most major networking companies are developing networking equipment that have 800GE front panel and/or upload ports. The same PAM4 encoded signaling and Forward Error Correction (FEC) technologies, that were widely adopted for 400GE ports, are being used with 106.25 Gb/s (namely, 53 Gbaud) electrical lane front panel interfaces for 800GE. Switch ASICs now support up to 106.25 Gb/s lanes with PAM4 modulation and FEC—easing the transition from 400GE to 800GE. Testing new port speeds 1x800GE, 2x400GE, 4x200GE, and 8x100GE is the new challenge, however, testing legacy 400GE and 100GE speed is also essential. Bandwidth requirements for internet applications are driving the need for testing line-rate traffic of 25.6 and 51.2 Tbps networking equipment.

Keysight has extended its industry leading AresONE 800GE platforms to support all the 800GE, 400GE and 100GE PAM4 and NRZ related speeds to address ever-increasing market test needs.

Solution: Dual Interface Model with 800GE, 400GE, and 100GE Speeds, and PAM4 and NRZ Support

AresONE 400GE and 800GE products have many first-to-market accomplishments, the latest is the AresONE Dual Interface Model-M. It is the first integrated Layer 1 through 3 test platform that supports both the QSFP-DD800 and OSFP800 front panel interfaces in the same fixed chassis. Dual Interface Model with 2-ports of QSFP-DD800 and 2-ports of OSFP800 supports all the features of other AresONE 800GE-M platforms with dedicated front panel interfaces. Both PAM4 and NRZ signaling support is available on the Dual Interface Model. Now, AresONE 800GE Dual Interface Model-M is our latest innovation to the AresONE high-speed Ethernet family.

KEYSIGHT

The Dual Interface Model-M is an affordable and efficient test system designed for mixed interface interoperability test of optical transceivers, and active and passive fiber and copper interconnects. It is a highly integrated test system that improves your interoperability, link stability, and robustness testing using Keysight-developed intellectual property for critical testing of 800GE and 400GE: MAC, PCS, FEC symbol error correction distribution, FEC error injection and statistics, and PAM4 Rx Eye Histogram analysis.

AresONE 800GE Dual Interface Model-M enables testing of multiple Ethernet speeds in the same platform with each port capable of the following speeds:

- Built-in PAM4 signaling speeds based on 106.25 Gb/s host electrical lanes: 2x400GE, 4x200GE, and 8x100GE per port
- Built-in PAM4 signaling speeds based on 53.125 Gb/s host electrical lanes: 1x400GE, 2x200GE, 4x100GE and 8x50GE per port
- Optional NRZ signaling based on 26 Gb/s and 10 Gb/s host electrical lanes: 1x200GE, 2x100GE, 4x50GE, 2x40GE, 8x25GE and 8x10GE per port
- 1x800GE is a separate purchasable option with the initial order from the factory or later with a field upgrade

Highlights

- AresONE 800GE Dual Interface Model-M with QSFP-DD800 and OSFP800 ports enables L1–L3 testing of optical transceivers, and active and passive fiber and copper interconnects from 10GE to 800GE in a single platform
- One platform for 800GE, 400GE, and 100GE with PAM4 and NRZ signaling, with 106.25 Gb/s host electrical lane signaling and downshift to the electrical lane speeds to 53 Gb/s and 26 Gb/s for the lower-speed Ethernet speeds. All the required FEC types and a full array of in-depth performance statistics are included on a single platform.
- Each port is independent. So different speeds and signaling modes can be set as required on a per front panel port basis.
- It is reduced performance model that supports IxNetwork with the standard reduced performance support as all other AresONE 400GE and 800GE models with all IxNetwork protocols supported with a limit of 100 routing sessions per port
- Up to 4 users can be on the Dual Interface Model-M, working independently, at the same time
- Dual Interface Model-M chassis optimizes power and cooling requirements with support for optical transceivers that require up to 20 watts per port
- Dual Interface Model-M chassis can synchronize with multiple other AresONE and XGS chassis to test high density 800GE/400GE/100GE switching platforms

Key features

- Line-rate 10GE to 800GE, packet generation per QSFP-DD800 or OSFP800 front panel port, for analysis and capture of received traffic to detect and debug data transmission errors for multiple Ethernet speeds when using PAM4 signaling over 106.25 Gb/s, and 53.125 Gb/s as the built in speeds.
- Built-in multi-rate fan-out speeds to configure the fan-out speeds with PAM4 signaling:
  - **800GE PAM4 speeds:** 2x400, 4x200, 8x100GE (default, built-in speeds)
  - **400GE PAM4 speeds:** 1x400, 2x200, 4x100 and 8x50GE (default, built-in speeds)
  - 1x800GE PAM4 is a purchased speed option in a factory or field upgrade
- 100GE-related speeds are supported with the optional NRZ signaling over 26 Gb/s and 10 Gb/s electrical lanes as required with a factory or a field upgrade
  - 1x200GE, 2x100GE, 4x50GE, 2x40GE, 8x25GE and 8x10GE are available
- Line-rate, at all speeds with per-port and per-flow statistics
- Keysight instrumentation, including floating timestamp, sequence number, flow identification, and data integrity (that is, for the entire packet)
- High-latency measurement resolution at 0.625 ns at the 800GE and at 400GE
- RS-544 (KP4) Forward Error Correction (FEC) support for all PAM4 speeds, 800/400/200 and 100GE over 106.25 Gb/s electrical lanes and 400/200/100 and 50GE over 53.125 Gb/s electrical lanes
  - RS-FEC-Int for 100GBASE-R1 per IEEE802.3 Clause 161 is also supported on PAM4 signaling
- RS-FEC and FC-FEC for all NRZ speeds over 26 Gb/s electrical lanes
- FEC error injection and analysis for 800GE, 400GE and 200GE PAM4 speeds
  - FEC symbol error injection and FEC symbol error density distribution analysis; comprehensive set of FEC corrected and uncorrected counts, rates, and statistics; BER per lane and per port, and pre-FEC BER, frame loss ratio (FLR) analysis is provided
- 400GE, and 200GE PAM4, PCS lanes Transmit, and receive measurement:
  - Per-lane controls and status, FEC and error monitoring, lane mapping and skew insertion; see details in Specification Table in this datasheet, as capabilities may vary per Ethernet speed
- 100GE, and 40GE NRZ, PCS lanes Transmit, and receive measurement:
  - Per-lane controls and status, PCS error injection and lane mapping; see details in Specification Table in this datasheet, as capabilities may vary per Ethernet speed
- Inject packet errors: CRCs, runts, giants, checksum errors, and out of sequence
- Up to 20 watts of power and cooling support for QSFP-DD800 and OSFP800 MSA and specification compatible optical transceivers, active optical cables, and other interconnect media
- Support for active and passive copper direct attached cables (DAC) up to 2.0 meters in length
- Auto-negotiation and Link Training support for passive copper direct attached cables (DAC):
  - **Up to 2.0 meters in length for:** 1x800GE, 2x400GE, 4x200GE and 8x100GE PAM4 speeds over 106.25 Gb/s electrical lanes per port
  - **Up to 3.0 meters in length for:** 1x400GE, 2x200GE, 4x100GE and 8x50GE PAM4 speeds over 53.125 Gb/s electrical lanes per port
  - **Up to 5.0 meters in length for:** 1x200GE, 2x100GE, 1x100GE, 4x50GE, and 8x25GE NRZ speeds over 26 Gb/s electrical lanes per port

- Support for active electrical cables (AEC) and linear amplified copper cables (ACC). Please consult the factory for support of specific cable lengths as it may vary between different manufacturers
- Overall optical and copper interconnect media support with CMIS 5.0 and C-CMIS 1.0 support with IxExplorer GUI and Tcl automation support
- Digital Optical Monitoring (DOM) that automatically provides information from the interconnect device plugged into the test port, along with the device status, electrical power, temperatures, power class, laser power and various LOL and LOS threshold and alarm monitoring information. The DOM also provides feedback when alarms and thresholds are exceeded. This capability is provided with the IxExplorer application
- ± 105 ppm line frequency adjustment that can be adjusted per front panel port for 800GE PAM4 speed mode
- Layer 1 BERT support
    - **106 Gb/s lane mode:** Layer 1 BERT capability with per-lane and per-port BER statistics, ability to send PRBSQ patterns PRBS-13Q and PRBS-31Q. Additional test pattern controls, per lane clock ppm adjustment, and pattern detection are included.
    - **53 Gb/s mode:** Layer 1 BERT with PRBS-7Q, PRBS-9Q, PRBS-11Q, PRBS-13Q, PRBS-15Q, PRBS-20Q, PRBS-23Q, and PRBS-31Q pattern support
    - **26 Gb/s and 10 Gb/s lane mode:** Layer 1 BERT with PRBS-7, PRBS-9, PRBS-11, PRBS-13, PRBS-15, PRBS-20, PRBS-23, and PRBS-31 pattern support

  The BERT capability is only provided with IxExplorer application
- 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 vertical eye measurements. Note that you must have one of the purchasable options 905-1107 or 905-1108. Please see the Ordering section.
- IxNetwork Application support
    - Support for RFC benchmarking of networking devices and equipment by using industry-standard RFC benchmark tests at line-rate from 10GE to 800GE PAM4 and NRZ speeds
    - Mid-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
    - IxNetwork protocol bundles that provide easy ordering and bundled packages specifically designed for AresONE 800GE fixed chassis systems
- Native IxOS and IxExplorer application support with related Tcl automation

Specifications

Product description	AresONE 800GE Dual Interface Model -M Reduced performance, 4-port
Part numbers	944-1412
Hardware fixed chassis system specifications	
RU / number of ports	2 RU / 2-ports of QSFP-DD800 and 2-ports of OSFP800 for a total of -ports
Physical interfaces	Native QSFP-DD800 and OSFP800 physical front panel pluggable ports
Supported per port speeds	Default speeds included with the chassis: • 2x400GE, 4x200GE, and 8x100GE per port, PAM4 over 106 Gb/s electrical lanes • 1x400GE, 2x200GE, 4x100GE, and 8x50GE, PAM4 over 53 Gb/s electrical lanes • Optical transceiver and fiber cable interconnect support for all speeds • Copper cable interconnect support for all speeds
	Optional speeds: • PAM4: 1x800GE over 106 Gb/s electrical lanes • NRZ: 1x200GE, 2x100GE, 1x100GE, 4x50GE, and 8x25GE, over 26 Gb/s electrical lanes, and 2x40GE and 8x10GE over 10 Gb/s electrical lanes • Requires purchase of a factory or a field upgrade NRZ speed option. See the Ordering Section of this datasheet.
CPU and memory	Multicore processor with 4 GB of CPU memory per OSFP800 front panel port
Number of users	1 user per physical front panel port. The user owns all the fan-out ports on the front panel port.
Interface protocols specifications for 800GE/106 Gb/s electrical lane support	IEEE 802.3ck Physical Layer Specifications and Management Parameters for 100 Gb/s, 200 Gb/s, and 400 Gb/s Electrical Interfaces Based on 100 Gb/s Signaling
	Ethernet Technology Consortium 800 Gigabit Ethernet (GbE) v1.1 specification
Interface protocols specifications for 400GE and 100GE for 53 Gb/s, 26 Gb/s and 10 Gb/s electrical lane support	IEEE 802.3bs 200GE and 400GE IEEE 802.3cd 50 Gb/s, 100 Gb/s, and 200 Gb/s Ethernet IEEE 802.3 100GBASE-R LAN, IEEE P802.3bj, IEEE P802.3bm, IEEE P802.3by, IEEE 802.3ba, IEEE 802.3ae
Layer 1 support 800GE PAM4 speeds for 106 Gb/s electrical lanes	PAM4, 800/400/200/100GE speeds: KP4 (RS-544, 514) Ethernet Forward Error Correction, IEEE 802.3 Clause 119: • FEC Correctable and uncorrectable statistics per-port • FEC symbol error injection (800GE, 400GE and 200GE speeds only) • FEC Codeword symbol error correction distribution statistics • Interleave FEC (RS-FEC-Int) for PAM4 100GE(ck) 100BASE-CR1 applications over 106 Gb/s electrical lanes • Pre-FEC BER and Frame Lose Ratio (FLR) measurements • PCS lanes Tx lane map and skew insertion (400GE and 200GE speeds only) • PCS Rx per lane and port statistics • Layer 1 BERT with PRBS-13Q and PRBS-31Q pattern generation support and Rx-side statistics and analysis. Additional test, pattern controls, per lane clock ppm adjustment and pattern detection are included. • Optional Rx Eye Histogram analysis

Layer 1 support 400GE PAM4 speeds for 53 Gb/s electrical lanes	PAM4, 400GE native ports and 200/100/50GE speeds: • KP4 (RS-544,514) Ethernet Forward Error Correction, Clause 119 • All speeds support AN and LT for 1x400GE, 2x200GE, 4x100GE, and 8x50GE speed modes • Correctable and uncorrectable FEC statistics per-port • FEC symbol error injection (400GE and 200GE speeds only) • FEC Codeword error distribution statistics support for all PAM4 speeds • PCS lanes Tx and Rx test and statistics • Layer 1 BERT with PRBS-7Q, PRBS-9Q, PRBS-11Q, PRBS-13Q, PRBS-15Q, PRBS-20Q, PRBS-23Q, and PRBS-31Q pattern support • Optional Rx Eye Histogram analysis
Layer 1 support NRZ speeds for 26 Gb/s electrical lanes	NRZ, 100/50/25GE included in the NRZ speed option: • 2x100, 4x50, and 8x25GE speed support • RS (528,514) Clause 91, BASE-R FEC Cause 74 Forward Error Correction, Clause 91 for applicable speeds • Auto-negotiation and link training support for all 100/50/25GE speeds • Correctable and uncorrectable FEC statistics per-port for applicable speeds • Ability to independently turn ON or OFF AN with Link training, or FEC, or to allow IEEE defaults to automatically manage the interoperability • Layer 1 BERT with PRBS-7, PRBS-9, PRBS-11, PRBS-13, PRBS-15, PRBS-20, PRBS-23, and PRBS-31 pattern support
Layer 1 support NRZ speeds for 10 Gb/s electrical lanes	NRZ, 40/10GE included in the NRZ speed option: • 2x40GE and 8x10GE speed support • Layer 1 BERT with PRBS-7, PRBS-9, PRBS-11, PRBS-13, PRBS-15, PRBS-20, PRBS-23, and PRBS-31 pattern support
QSFP-DD800 and OSFP800 optical transceiver support (800GE and 400GE-rated transceivers)	• Support for QSFP-DD800 and OSFP800 MSA or specification compliant optical transceivers up to 20 watts of consumption (Power Class 8) such as: 800GBASE-DR8, 800GBASE-2xFR4, 800GBASE-SR8, 400GBASE-DR4, 400G-ZR and 400ZR+ coherent optics plus many other MSA compliant optical transceivers, AEC's, ACC's and AOCs. • Please consult the factory for additional transceiver support information from various manufacturers • See Optical Transceivers under the Ordering Information section of this data sheet for purchasable optical transceivers for this product
QSFP-DD800 and OSFP800 Active Electrical Cable support (800GE and 400GE-rated cables)	Active Electrical Cable (AEC) and Active Copper Cable (ACC) support; please consult the factory for specific support information
QSFP-DD800 and OSFP800, passive copper cable support (800GE and 400GE-rated cables)	• QSFP-DD800 and OSFP800 passive copper cable support for up to 2.0 meters in length • OSFP800-to-QSFP-DD800 conversion cable support for up to 2.0 meters in length • Auto-negotiation and Link Training support for passive copper direct attached cables (DAC) for all supported Ethernet speeds per port

Common Management Interface Specification (CMIS)	• Support for the CMIS 4.0 and 5.0 specifications including read/write access to all CMIS pages and registers • Support for C-CMIS 1.0 (Coherent CMIS) • CMIS will operate with optical and copper interconnect media to the extent they are supported by the interconnect manufacturer • CMIS is exposed through the IxExplorer application and Tcl test automation support
Digital Optical Monitoring (DOM)	Automatically provides information from the interconnect device plugged into the test port, along with the device status, electrical power, temperatures, power class, laser power and various LOL and LOS threshold and alarm monitoring information. The DOM also provides feedback when alarms and thresholds are exceeded. This capability is provided with the IxExplorer application.
400G-ZR/ZR+ Coherent Optics Transceiver support	• CMIS 5.0 and C-CMIS 1.0 (Coherent CMIS) provide Read/Write access to all management pages and Versatile Diagnostics Monitoring (VDM) registers via IxExplorer GUI and Tcl test automation programming interface • Coherent optics up to 20 watts of power consumption are supported on the manufacturers that have been qualified by Keysight. Please consult your Keysight Sales Representative for additional information.
Fixed chassis system dimensions	• 30.6” (L) x 17.3” (W) x 3.46” (H) • 778 mm (L) x 440 mm (W) x 88 mm (H)
Fixed chassis system weights	• Hardware only: 58.4 lbs. (26.5 kg) • Shipping: 113 lbs. (51.5 kg) [1]
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 100-120VAC, 9 Amps for each power supply. AresONE fixed chassis is shipped with (3 each) 100-125 VAC power cords. Note all three power supplies must be installed when operating the unit. • Requires (2) power sources when running 200-240 VAC, 7 Amps for each power supply (note, all three power supplies must be installed when operating the unit). 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.
Temperature (ambient air)	• Operating: 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
Safety	• EN 62368-1 / IEC 62368-1+A11, BS EN IEC 62368-1+A11 • UL 62368-1 / CSA C22.2 No. 62368-1:19

1 Approximate (includes rackmount slides, power cords, sync cables, and packaging)

Emissions and immunity	• FCC Part 15B, Class A • ICES-003(A)/NMB-003(A) • EN 55032 Class A, EN 55035, EN 61000-3-2, EN 61000-3-3 • AS/NZS CISPR 32 Class A • KS C 9832 Class A, KS C 9835, KS C 9610-3-2, KS C 9610-3-3 • VCCI – CISPR 32 Class A
Regulatory approvals	• UL (USA, Canada) • CE (Europe) • UKCA (United Kingdom) • RCM (Australia, New Zealand) • KCC (Korea) • VCCI (Japan)
Environmental	• RoHS Directive 2011/65/EU, Directive (EU) 2015/863 • WEEE Directive 2012/19/EU • China RoHS
Chassis synchronization extendibility	
Maximum number of chassis in single test topology	• Each chassis has built-in star topology synchronization ports to connect to five additional compatible chassis systems • The Metronome Timing System (942-0090) is used for synchronizing a total of eight or more chassis at one time. Consult factory for port count requirements beyond five chassis 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 800GE PAM4 speeds	• 1x800GE: 32 (FPP) • 2x400GE: 32 (per fan-out) • 4x200GE: 32 (per fan-out) • 8x100GE: 16 (per fan-out)
Max. streams per port and 400GE PAM4 speeds	• 1x400GE: 128 (per FPP) • 2x200GE: 128 (per fan-out) • 4x100GE: 64 (per fan-out) • 8x50GE: 32 (per fan-out)
Max. Streams per port and NRZ speeds	• 1x200GE:128 (per FPP) • 2x100GE:128 (per fan-out) • 4x50GE: 32 (per fan-out) • 2x40GE: 64 (per fan-out) • 8x25GE: 32 (per fan-out) • 8x10GE: 32 (per fan-out)
Stream controls	• Rate and frame size change on the fly • Advanced stream scheduler support • Optional sequential stream scheduler support (must be ordered as a factory installed option-no field upgrade is available)

Minimum frame size	800GE, 400GE, 200GE and 100GE PAM4 speeds: • 64 bytes at full line rate • 61 bytes at less than full line rate (approximately 90% utilization) • 400GE, 200GE, 100GE and 50GE PAM4 speeds: • 64 bytes at full line rate • 60 bytes at less than full line rate • 100GE, 50GE, 40GE, 25GE, and 10GE NRZ speeds: • 64 bytes at full line rate
Maximum frame size for all speeds	14,000 bytes
Maximum frame size in data center Ethernet	9,216 bytes
Priority flow control (4:1) for 800GE,400GE PAM4 and 100GE NRZ speeds	• 4 line-rate-capable queues, each supporting up to 9,216-byte frame lengths • 1 line-rate-capable queue, non-blocking supporting up to 9,216-byte frame length
Frame length controls	Fixed, increment by user-defined step, weighted pairs (up to 14K in 400/200/100GE, 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 for 800GE PAM4 speeds	• 1x800GE: 64K / port /UDF • 2x400GE: 64K / port /UDF • 4x200GE: 32K /port /UDF • 8x100GE: 64K / 4-ports /UDF
Value lists (max.) per port for 400GE PAM4 speeds	• 1x400GE: 64K /port /UDF • 2x200GE: 32K /port /UDF • 4x100GE: 64K /4 ports /UDF • 8x50GE: 32K /4 ports /UDF
Value lists (max.) per port for NRZ speeds	• 1x200GE: 32K/port/UDF • 2x100GE: 64K /4 ports /UDF • 4x50GE: 32K /4 ports /UDF • 2x40GE: 64K /4 ports /UDF • 8x25GE: 16K /4 ports /UDF • 8x10GE: 16K /4 ports /UDF
Sequence (max.) for 800GE PAM4 speeds	• 1x800GE: 32K / port /UDF • 2x400GE: 32K /port /UDF • 4x200GE: 32K /port /UDF • 8x100GE: 8K / 4-ports /UDF

Sequence (max.) for 400GE PAM4 speeds	• 1x400GE: 32K / port /UDF • 2x200GE: 32K / port /UDF • 4x100GE: 8K / port /UDF • 8x50GE: 4K / port /UDF
Sequence (max.) for NRZ speeds	• 1x200GE: 32K/port/UDF • 2x100GE: 8K / port /UDF • 4x50GE: 4K / port /UDF • 2x40GE: 4K / port /UDF • 8x25GE: 4K / port /UDF • 8x10GE: 4K / port /UDF
Error generation (FEC and standard Keysight L2/3 Ethernet in 800GE PAM4 mode only)	1x800GE, 2x400GE, and 4x200GE 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 800/400/200GE • No FEC error insertion and related statistics for 8x100GE 1x800GE, 2x400GE, 4x200GE, 8x100GE L2/3 Ethernet: • Generate good CRC or force bad CRC, undersize and oversize standard Ethernet frame lengths, and bad checksum
Error generation (FEC and standard Keysight L2/3 Ethernet in 400GE PAM4 mode only)	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
Error generation (FEC and standard Keysight L2/3 Ethernet in 100GE NRZ mode only)	• No FEC error insertion for all NRZ speeds • Generate good CRC or force bad CRC, undersize and oversize standard Ethernet frame lengths, and bad checksum
Physical coding sublayer for 800GE and 400GE PAM4 Ethernet speeds	800GE: 2x400GE and 4x200GE, and 400GE: 1x400GE and 2x200GE • PCS Transmit lane marker re-mapping • PCS lane skew insertion
Physical coding sublayer for NRZ Ethernet speeds	100GE: 1x100GE and 2x40GE: • PCS Transmit lane marker re-mapping
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 for all speeds	• 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 • Option to have the transmit port ignore link faults from a remote link partner and send traffic anyway

Latency measurement resolution for 800GE and 400GE PAM4 Ethernet speeds	• 800GE and 400GE: 0.625 ns • 200GE: 1.25 ns • 100GE and 50GE: 2.5 ns
Latency measurement resolution for 100GE NRZ Ethernet speeds	2.5 ns for all NRZ speeds
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: ± 105 ppm on all the ports of the fixed chassis system for all speeds Ability to adjust the clock ppm over a range of ± 105 ppm in the BERT mode on a per lane basis
Transmit/receive loopback	Internal loopback
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 for 800GE PAM4 Ethernet speeds	• 800GE, 400GE, 200GE: 32K full statistics • 100GE: 4K full statistics and 32K with minimum statistics
Trackable receive flows per Port with and without Sequence checking and no Tx/RX synch for 800GE PAM4 Ethernet speeds	• 800GE, 400GE, 200GE: 32K full statistics • 100GE: 8K full statistics and 32K with minimum statistics
Trackable receive flows per port with and without Sequence Checking with Tx/Rx Synch for 400GE PAM4 and 100GE NRZ Ethernet speeds	• 400GE and 200GE: 32K full statistics • 100GE: 4K full statistics and 32K with minimum statistics • 50GE, 40GE, 25GE, 10GE: 4K full statistics and 16K with minimum statistics
Trackable receive flows per port with and without Sequence Checking and no Tx/RX Synch for 400GE PAM4 and 100GE NRZ Ethernet speeds	• 400GE and 200GE: 32K full statistics • 100GE: 4K full statistics and 32K with minimum statistics • 50GE, 40GE, 25GE, 10GE: 8K full statistics and 16K with minimum statistics
Minimum frame size for all speeds	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	1 MB per front panel OSFP800 port and for fan-out modes on that 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 for 800GE and 400GE PAM4 Ethernet Speeds	800GE and 400GE: • 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

FEC Statistics 100GE NRZ Ethernet speeds	100GE NRZ speeds: • 100GE FEC statistics: ◦ RS-FEC Corrected and uncorrectable codewords 50GE and 25GE FEC statistics: • RS-FEC corrected and uncorrected codeword count • FC-FEC corrected and uncorrected block count • FC-FEC corrected error bits
Latency / jitter measurements	Cut-through, store and forward, forwarding delay, latency/jitter, MEF jitter, and inter-arrival time
Receive-side PCS lanes port statistics counters for all speeds	PCS: Sync Errors, Illegal Codes, Remote Faults, Local Faults, Illegal Ordered Set, Illegal Idle, and Illegal SOF
PCS receive-side statistics and indicators for 800GE and 400GE PAM4 Ethernet speeds	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
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. This version of the feature is only for the AresONE 800GE and AresONE-S 400GE platforms. Support of this feature REQUIRES the purchase of the 905-1107 Factory Installed option, or the 905-1108 Field Upgrade option.

Application Support

All AresONE-M 800GE full and reduced performance models
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. Included with IxNetwork are test automation tools based on TCL, Python, and the Rest/RestPy.
IxTcl API: Custom user script development for Layer 1–3 testing using the IxExplorer features

Ordering Information

Part number	Description
AresONE 800GE Dual Interface Model with optics, AOC, AEC, and passive DAC interconnect support 4-port hardware chassis	
944-1412	Ixia, AresONE Dual Interface Model 800GER-4P-QDD-OSFP-M, 4-port reduced performance chassis model with 2-ports of native OSFP800 800GE and 2-ports of native QSFP-DD800 physical interfaces, L1-3, optical transceiver and copper DAC support (944-1412). Includes installation of the latest production released version of the IxOS software. Includes these default Ethernet speeds per port: 2x400GE, 4x200GE, 8x100GE based on 106.25 Gb/s electrical lanes and these Ethernet speeds 1x400GE, 2x200GE, 4x100GE, and 8x50GE based on 53.125 Gb/s electrical lanes. Includes 3 each 100-125VAC power cords for North American operation, for 200-240VAC operation please order at no charge, the AresONE 200-240VAC Power Cord Option Kit for all AresONE fixed chassis models (942-0110). For 1x800GE speed support please see the factory installed or field upgrade purchasable options (905-1070, or 905-1071).
200-240VAC power cord option kit	
942-0110	Keysight, 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 type, are required to power any of the AresONE fixed chassis. These power cords are compatible with all AresONE 400GE and 800GE 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.
1x800GE speed options	
905-1070	Ixia, UPG-800GE-SPD-F, 1x800GE speed mode option, FACTORY INSTALLED, for all AresONE 800GE and AresONE 800GER chassis, full or reduced performance models, including all AresONE 800GE models with a -C, or -M in the model name.
905-1071	Ixia, UPG-800GE-SPD-FLD, 1x800GE speed mode option, FIELD UPGRADE, for all AresONE 800GE and AresONE 800GER chassis, full or reduced performance models, including all AresONE 800GE models with a -C, or -M in the model name. The upgrade does not change the preexisting installed default speeds of 2x400GE, 4x200GE and 8x100GE.
100GE NRZ speed options	
905-1109	Keysight, NRZ mode and fan-out option, FACTORY INSTALLED option for AresONE 800GE QSFP-DD800-M, OSFP800-M and Dual Interface Model-M chassis (905-1109). This option adds the 1x200GE, 2x100GE, 4x50GE, 8x25GE, and 8x10GE based on 25G and 10G electrical lanes with NRZ encoding. This option supports optical transceivers, active and passive optical and copper interconnects.
905-1110	Keysight, NRZ mode and fan-out option, FIELD UPGRADE option for AresONE 800GE QSFP-DD800-M, OSFP800-M NRZ and Dual Interface Model-M chassis (905-1110). This option adds the 1x200GE, 2x100GE, 4x50GE, 8x25GE, and 8x10GE based on 25G and 10G electrical lanes with NRZ encoding. This option supports optical transceivers, active and passive optical and copper interconnects.

Advanced Rx Histogram options	
905-1107	Keysight, Advanced Rx Eye Histogram Analysis Option, FACTORY installed for all AresONE 800GE QSFP-DD800-C, 800GE QSFP-DD800-M, 800GE OSFP800-C and 800GE OSFP800-M fixed chassis models (905-1107).
905-1108	Keysight, Advanced Rx Eye Histogram Analysis Option, FIELD UPGRADE for all AresONE 800GE QSFP-DD800-C, 800GE QSFP-DD800-M, 800GE OSFP800-C and 800GE OSFP800-M fixed chassis models (905-1108).
Sequential scheduler option	
905-1047	Ixia, Sequential Traffic Scheduler option, FACTORY INSTALLED ONLY. For all AresONE 400GE, AresONE-S 400GE and AresONE 800GE fixed chassis models. REQUIRES NTS Product Management approval to be quoted under NPI and provided to a customer. Note 1: The minimum software for this support on AresONE 400GE chassis is IxOS 8.52 EA. The minimum software support on AresONE-S chassis is IxOS 9.16. Note 2: The minimum software support on AresONE 800GE is IxOS 9.21. Note 3: This option applies to all ports on the fixed chassis. Note 4: This feature is included with the AresONE High Performance chassis model (944-1178). Note 5: In the event this option is required to be added to an existing unit in the field, the unit must be returned to the factory to be installed.
Multiple AresONE/AresONE-S timing and synchronization chassis	
942-0090	IXIA, Metronome Timing System and Metronome Timing Software enabling advanced chassis timing. Includes Sync Cable 5m (942-0096). Compatible with the XGS-SD chassis, XGS-SDL chassis, XGS-HSL chassis, AresONE fixed chassis and Novus ONE PLUS fixed chassis. Note: The Metronome chassis is used when more than 5 AresONE chassis of any model version must be time synchronized.
800GE optical transceivers	
OSFP800-DR8-XCVR	Keysight, OSFP800-DR8-XCVR, 800GBASE-DR8, Single Mode Fiber, 500-meter reach with FEC, 1310nm center wavelength, 100G Lambda, optical transceiver (948-0071). CMIS 4.0 compliant. Compatible with Ixia cables: OSFP800-DR8-CBL MPO16 APC-APC, SMF, 3-meter and OSFP800-DR8-FO-CBL, fan-out, MPO16, APC-UPC, SMF, MPO16-to-8x100GE LC, 3-meter. This transceiver is compatible with all AresONE 800GE OSFP800-C and OSFP800-M fixed chassis models, and with the G800GE-02 800GE OSFP800 and OSFP800-COAX chassis models.
QSFPDD800-DR8-XCVR	Keysight, QSFPDD800-DR8-XCVR, 800GBASE-DR8, Single Mode Fiber, 500-meter reach with FEC, 1310nm center wavelength, 100G Lambda, optical transceiver (948-0068). CMIS 4.0 or higher version compliant. Compatible with Ixia cables: QSFPDD800-DR8-CBL MPO16 APC-APC, SMF, 3-meter and QSFPDD800-DR8-FO-CBL, fan-out, MPO16, APC-UPC, SMF, MPO16-to-8x100GE LC, 3-meter. This transceiver is compatible with all models of AresONE 800GE QSFP-DD800-C, QSFP-DD800-C, QSFP-DD800-M and QSFP-DD800-M fixed chassis. It is compatible with all models of the G800GE QSFP-DD800 and QSFP-DD800-COAX and G800GE-02 QSFP-DD800 and QSFP-DD800-COAX chassis.

800GE fiber point-to-point cables	
OSFP800-DR8-CBL	Keysight, OSFP800-DR8-CBL, point-to-point, MPO16, APC-APC, Single Mode Fiber (SMF) cable, 2-meter length (942-0146) for OSFP-DR8 800GE optical transceiver, part number OSFP800-DR8-XCVR.
QSFPDD800-DR8-CBL	Ixia, QSFPDD800-DR8-CBL, point-to-point, MPO16, APC-APC, Single Mode Fiber (SMF) cable, 2-meter length (942-0144) for QSFPDD-DR8 800GE optical transceiver, part number QSFPDD800-DR8-XCVR.
Optical transceiver fan-out cables	
OSFP800-DR8-FO-CBL	Keysight, QSFP800-DR8-FO-CBL, fan-out, MPO16, APC-UPC, Single Mode Fiber (SMF) cable, MPO16-to-8x100GE LC, 2-meter length (942-0147) for OSFP-DR8 800GE optical transceiver, part number OSFP800-DR8-XCVR.
QSFPDD800-DR8-FO-CBL	Ixia, QSFPDD800-DR8-FO-CBL, fan-out, MPO16, APC-UPC, Single Mode Fiber (SMF) cable, MPO16-to-8x100GE LC, 2-meter length (942-0145) for QSFPDD-DR8 800GE optical transceiver, part number QSFPDD800-DR8-XCVR.
Passive copper Direct Attached Cable (DAC)	
OSFP800-1M-CBL	Keysight, OSFP800 800GE 800GBASE-R passive copper, Direct Attach Cable, 28 AWG, 1-meter length (942-0158). This passive copper conversion DAC is a single point-to-point cable and is compatible with all AresONE 800GE OSFP800-C and OSFP800-M, fixed chassis models.
QSFPDD800-1M-CBL	Keysight, QSFPDD800-1M-CBL 800GE 800GBASE-R passive copper, Direct Attach Cable, 28 AWG, 1-meter length (942-0153). This copper DAC is a single point-to-point cable and is compatible with all models of AresONE 800GE QSFP-DD800-C, QSFP-DD800-C, QSFP-DD800-M and QSFP-DD800-M fixed chassis. It is compatible with all models of the G800GE-02 QSFP-DD800 and QSFP-DD800-COAX chassis.
OSFP800-1-5M-CBL	Keysight, OSFP800 800GE 800GBASE-R passive copper, Direct Attach Cable, 28 AWG, 1.5-meter length (942-0159). This passive copper conversion DAC is a single point-to-point cable and is compatible with all AresONE 800GE OSFP800-C and OSFP800-M, fixed chassis models.
QSFPDD800-1-6M-CBL	Keysight, QSFPDD800-1-6M-CBL 800GE 800GBASE-R passive copper, Direct Attach Cable, 28 AWG, 1.6-meter length (942-0154). This copper DAC is a single point-to-point cable and is compatible with all models of AresONE 800GE QSFP-DD800-C, QSFP-DD800-C, QSFP-DD800-M and QSFP-DD800-M fixed chassis. It is compatible with all models of the G800GE-02 QSFP-DD800 and QSFP-DD800-COAX chassis.
OSFP800-2M-CBL	Keysight, OSFP800-2M-CBL 800GE 800GBASE-R passive copper, Direct Attach Cable (DAC), 25 AWG, 2-meter length (942-0164). This passive copper conversion DAC is a single point-to-point cable and is compatible with all AresONE 800GE OSFP800-M, fixed chassis models.
QSFPDD800-2M-CBL	Keysight, QSFPDD800-2M-CBL 800GE 800GBASE-R passive copper, Direct Attach Cable (DAC), 26 AWG, 2-meter length (942-0163). This passive copper DAC is a single point-to-point cable and is compatible with all AresONE 800GE QSFP-DD800-M, fixed chassis models.

Passive copper conversion Direct Attached Cables (DAC) – OSFP800-to-QSFP-DD800	
Q800G-O800G-1M-CBL	Keysight, QSFPDD800-to-OSFP800-CBL 800GE 800GBASE-R passive copper, conversion Direct Attach Cable (DAC), 26 AWG, 1-meter length (942-0155). This copper conversion DAC is a single point-to-point cable and is compatible with all AresONE 800GE QSFP-DD800-C, AresONE 800GE QSFP-DD800-M, AresONE 800GE OSFP800-C, AresONE 800GE OSFP800-M fixed chassis models.
Q800G-O800G-1-5M-CBL	Keysight, QSFPDD800-to-OSFP800-CBL 800GE 800GBASE-R passive copper, conversion Direct Attach Cable (DAC), 26 AWG, 1.5-meter length (942-0156). This copper conversion DAC is a single point-to-point cable and is compatible with all AresONE 800GE QSFP-DD800-C, AresONE 800GE QSFP-DD800-M, AresONE 800GE OSFP800-C, AresONE 800GE OSFP800-M fixed chassis models.
Q800G-O800G-2M-CBL	Keysight, QSFPDD800-to-OSFP800-CBL 800GE 800GBASE-R passive copper, conversion Direct Attach Cable (DAC), 26 AWG, 2-meter length (942-0162). This copper conversion DAC is a single point-to-point cable and is compatible with all AresONE 800GE QSFP-DD800-M, and AresONE 800GE OSFP800-M fixed chassis models.
IxNetwork AresONE only — software bundle options	
930-2200	Ixia IxNetwork, node-locked perpetual license, 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
930-2201	Ixia IxNetwork, node-locked perpetual license, Basic package for AresONE. INCLUDES: IxNetwork Base, RFC2544/2889/3918 QuickTest.
930-2202	Ixia IxNetwork, node-locked perpetual license, 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 node-locked perpetual license, MPLS and VPN package for AresONE; INCLUDES: Routing, MPLS and VPN Protocols; REQUIRES: 930-2201 IxNetwork Basic package for AresONE.
930-2204	Ixia IxNetwork node-locked perpetual license, SDN package for AresONE; INCLUDES: Routing and SDN Protocols; REQUIRES: 930-2201 IxNetwork Basic package for AresONE.
930-2205	Ixia IxNetwork node-locked perpetual license, 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 node-locked perpetual license, Broadband Access and Authentication package for AresONE; INCLUDES: Broadband Access and Authentication Protocols; REQUIRES: 930-2201 IxNetwork Basic package for AresONE.
930-2207	IXIA IxNetwork, node-locked perpetual license, 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.

More information

https://www.keysight.com/us/en/products/network-test/network-test-hardware/aresone-800ge.html