D2 1.6T 4-port Appliance

OSFP Test Module 1.6T/800G/400G/200G/100G

As High-Speed Ethernet technologies continue to advance, Service Providers and Hyperscale data centers are rapidly transitioning to multi-rate infrastructures to support exponential growth of AI-driven traffic and bandwidth-intensive workloads. The rise of large-scale AI fabrics, LLM training, inference, and disaggregated compute, along with the emergence of 1.6T Ethernet, is driving demand for ultra-high-density, versatile test solutions that can keep pace with increasingly complex network environments. To ensure reliable performance, low-latency operation, and seamless scalability, customers require flexible test equipment capable of validating next-generation AI data center fabrics across a wide range of speeds, protocols, and deployment scenarios.

The D2 4-port 1.6T appliance for VIAVI TestCenter is purpose-built to meet these evolving demands, delivering up to 6.4 Tbps of test traffic. D2 appliance supports 1x1600G, 2x800G, 4x400G, and 8x200G in 224 Gbps PAM4 mode in compliance with IEEE 802.3dj 1.6TBASE-R, and 1x800G, 2x400G, 4x200G and 8x100G in 112 Gbps PAM4 mode in compliance with IEEE 802.3ck and 802.3df 800GBASE-R to help validate these deployments.

Additionally, the D2 appliance supports Auto Negotiation and Link Training (AN/LT) in compliance with IEEE 802.3dj and IEEE 802.3df for all the supported speed modes.



D2 1.6T 4-Port Appliance

Features

- High-density OSFP test platform available in IHS and RHS variants, supporting speeds from 100G to 1.6T.
- Supports RS-FEC, Auto-Negotiation (AN), and Link Training (LT) in compliance with IEEE 802.3dj.
- Supports advanced GPU emulation, RoCEv2, CCL, and AI workload validation for next-generation AI infrastructures.
- Supports UEC 1.0 Ultra Ethernet testing along with comprehensive Layer 2/3, routing, switching, and data center protocol validation.
- TestCenter MCP Server, part of the VIAVI NITRO® AI portfolio, enables conversational test configuration, execution, and analysis.

Benefits

- Assess resiliency and performance using realistic AI workloads and traffic patterns.
- Extensive Layer-1 visibility with RS-FEC analysis and interconnect monitoring.
- Compatible with optical transceivers, AOC, DAC, and AEC interconnects.
- MACsec support on all ports.
- Validate performance, interoperability, and reliability before production rollout.

Applications

- **AI Data Center** — Provides comprehensive and high-scale GPU and NIC emulation for the testing and assessment of AI back-end fabrics, GPUs, AI accelerators, and AI NICs using full stack RoCEv2 transport and Ultra Ethernet Transport (UET), with AI workload emulation at scale.
  - **AI Workload Testing:** Emulates up to 128 GPUs and NICs per port and supports a series of native CCL algorithms, mixed CCL algorithms and LLM training traffic emulation: Chat GPT, llama, DeepSeek, RestNet, and AlexNet at production level scale
  - **CCL Performance Modeling:** The Automatic Benchmark tool greatly simplifies performance setup enabling each port to simultaneously generate CCL workload and background traffic, creating realistic, complex test scenarios
  - **RoCEv2 Transport:** Supports 16K Queue Pairs (QP), RC, UD and UC mode of transport and precise DCQCN and congestion control validation
  - **UEC Support:** Validate next-generation Ethernet with UET support, featuring stateful Transport (RUD and ROD) with congestion avoidance, congestion control and Link Layer emulation, including Link Layer error insertion capability, and support for the UEC conformance test suite
  - **Extensive AI Test Metrics:** For AI Fabric benchmarking and network impact validation statistics include: JCT, Tail Latency (P95/P99/P99.9), RTT, Retransmission Rate, Packet Loss, Out of Sequence, Packet Rate, Packet Latency, load balancing validation and performance isolation
- **Cloud Computing/Streaming Services** — Validate data plane QoS on thousands of flows at line rate and test complex routing, data center, and access protocols on switches and routers
- **Data Center ToR and EoR Switches and Fabrics** — Validate forwarding performance, latency, MAC capacity and functional capabilities of ultra-high-scale, multi-terabit cloud data center fabrics
- **Terabit Routers** — Test the latest generation of core routers with high-scale, multiprotocol topologies.
- **Chipset Verification** — Accelerate chipset and silicon verification at 1.6T, multi-speed Ethernet validation and repeatable Layer 2–3 test coverage for next-generation switching, routing, and AI fabric silicon
- **Full L2-3 Testing** — Validate and optimize Layer 2–3 network infrastructures with comprehensive testing for routing, switching, MPLS, multi-cast, SDN, SD-WAN, and more including a complement of RFC tests: RFC 2544, 2889, 3918, 8239, 6349, ensuring performance, scale, resiliency, and service readiness.

Productivity

- Accurate Results — Purpose-built hardware delivers repeatable test execution and precise statistics
- User definable Health Indicator views provide real-time health monitoring and error isolation capability that allows engineers to accurately and quickly pinpoint errors, even in the most complex test configurations. Customizable Time Series charts, overlaid with Events, provide correlation between real-time metrics and system events, allowing rapid debugging of problems and accelerating development
- TestCenter Model Context Protocol (MCP) Server — Part of VIAVI's NITRO® AI portfolio, this framework lets AI agents configure, execute, monitor, and analyze TestCenter tests via natural language greatly increasing user productivity
- High performance database underneath a modern web UI processes billions of real-time results to validate tests, identify problems, and provide customizable reports
- Delivers more results with tight correlation, and more information to find those obscure bugs. With more coverage and more information, VIAVI answers questions faster, and in a single test run, where multiple runs are necessary with other test tools
- Interesting streams use real-time results data mining to dynamically filter through mountains of data and display the results that matter
- Powerful automation with Command Sequencer (Visual Programming) and GUI to Script empowers the test operator to:
  - Construct sophisticated, stressful, automated test cases without programming experience
  - Combine numerous individual test cases into a single run to save regression test time
  - Develop a catalog of broad automated test cases in a fraction of the time
  - Export automated test cases to run from a command line for headless test execution that can be integrated with any automated regression system

Technical Specifications

D2 1.6T Appliance	
MSA Interface	OSFP1600
Line Clocking And Packet Time-Stamping	Stratum-3 rated oscillator is the default time source. Transmit line clock is at the precise nominal Ethernet rate ± < 1 PPM on initial shipment. Accurate to ± 4.6 PPM 15 years of operation. • GPS and CDMA-based external time sources are supported • IEEE 1588v2 and NTP packet-based external time sources are supported • TIA/EIA-95B-based external time sources are supported
Appliance Time Synchronization	Appliance features • VIAVI-patented self-calibrating inter-chassis timing chain using dedicated port on appliance • Appliance delivers precise synchronization ± 20 ns • Ability to daisy chain up to 255 appliances for large density testing • Synchronization via external GPS or CDMA network • Using IEEE 1588 or NTP packet-based approaches • With TIA/EIA-95B timing inputs
Operating Temperature Range	Supported for 41° to 95°F (5° to 35°C) ambient temperature. 20% to 80% relative humidity
Power Draw Range	2000 W to 3200 W at 180-240 VAC
Optical Power Support	Support for up to 40 W optical transceivers for IHS
	Support for up to 40 W optical transceivers for RHS
Product Dimensions	30.5"D x 17.1"W x 3.5"H (43.4 cm x 8.9 cm x 77.47 cm)
Product Weight	Unit installed weight: 53 lb. (24.0 kg)
Safety Certifications	IEC 62368-1, UL 62368-1, CSA STD C22.2
EMC/Emissions	FCC PART 15, SUBPART B, ICES-003, EN55032 CLASS A, EN 61000-3-2, EN 61000-3-3 and EN55035
Regulatory Approvals	UL, Intertek, CE
Environmental Compliance	RoHS 2011/65/EU, WEEE 2012/19/EU

Technical Specifications

VIAVI TestCenter Layer 2-3 Generator and Analyzer	
Number of Streams	Default Mode: • Stats/Streams (Tx/Rx): 1.6T: (4K/32K) 800G (4K/32K), 400G (16K/32K), 200G (8K/16K)
Number of Paths / Raw Streamblocks	127 (1.6T/800G), 255 (400G/200G)
Frame Transmit Modes	Port based (rate per port), stream based (rate per stream), burst, timed, random frame size with unique seed and IMIX
Min/max Frame Size (w/CRC)	64 / 16383 bytes
Min/max Tx Rates	1 packet per 1.37 seconds to 101% of line rate
Real-time Tx Stream Adjustments	Change rate and frame length settings without stopping the generator or analyzer for truly interactive, cause and effect analysis
Per-stream Statistics Analyzed In Real Time	Tx and Rx frame counts and rates • Tx and Rx Layer 1 byte counts and rates • FCS errors and rates • Min, Max, and Average Latency (32K streams) • Real Time Dropped Frame count • Advance Sequence Tracking: Duplicate, reordered, late, and inordered
Priority Flow Control (PFC)	Support Priority Flow Control for 8 queues
Per-Port Statistics Analyzed In Real Time	Tx and Rx frame counts and rates • Tx and Rx Layer 1 byte counts and rates • PRBS errors • Data Integrity Check (DIC) • FCS errors and rates
Transmit Timestamp Resolution	1600G: 2.5 ns Tx timestamp resolution with intra-chassis and inter-chassis synchronization
Supported Encapsulations	• Layer 2: Ethernet II, 802.1Q, 802.1ad • Layer 3/4: IPv4, IPv6, TCP, UDP
Supported Tx Signature Capability	Fully compatible with VIAVI hardware; contains sequence number and highly accurate timestamp
Capture Buffer Size	1.28 MB per port (Max)

Technical Specifications continued

VIAVI TestCenter Layer 2-3 Generator and Analyzer (cont'd)	
Capture Buffer Controls—VIAVI Testcenter's Unique Capture Capability Allows Maximum Effectiveness When Debugging Hard To Find Hardware Or Protocol Problems	• Several modes of operation include: Filter by protocol fields, Filter by byte offset and range; store full-frames; store full frame with signature; store Tx/Rx control plane with data plane; real- time mode for control plane traffic; wrap or stop buffer at end • User defined pattern definitions can logically combine 8 filters of up to 32 total bytes • Patterns can be applied to start, filter (quality), or stop capture • In addition to user-patterns, filtering, starting, and stopping capture contains the following pre-defined events: FCS, IPv4 checksum, and TCP/UDP/IGMP checksum; undersize, oversize, jumbo, and user-defined frame length; IPv4, and IPv6 packets; test signature present and test stream ID match. Each event can be independently set to ignore, include or exclude. • Support UDC (user-defined counters), Capture byte offset mode, and Capture pattern matching
Latency Modes	Benchmark tests support LIFO, LILO, FIFO or FILO latency calculation methods
Route Insertion Table (RIT) Entries Per Port	• 128K (1.6T,800G/400G/200G), 4-byte entries for dynamic label or random IP/MAC address assignments
RIT or List VFD Entries Per Stream	• 8 RIT insertions per stream (1.6T/800G/400G/200G) • 4 VFD insertions per stream for all supported speeds
QoS	• L2 - VLAN based 8 priority values • L3 – DSCP based 64 priority values

Technical Specifications continued

AI Testing	
GPU/NIC Emulation	• 128 GPUs/NICs emulated per port
CCL Traffic Patterns	• AlltoAll with PXN • All to ALL without PXN • RingAllReduce • Halving and Doubling • Dual Tree • RingReduceScatter • RingAllGather • Alternating Ring • Point to Point • Mixed Traffic Patterns and Background Traffic
LLM Model Emulation	• Chat GPT, llama, DeepSeek, RestNet, and AlexNet to emulate training traffic models
RoCEv2 Configuration	• RoCEv2 profile applied per port • Up to 16K Queue Pairs per port • RC, UD, and UC transport mode • DCQCN congestion control • Traffic mode – Continuous and Bursty • Full mesh, One-to-One, ALLtoALL, • Bi-direction and Uni- direction traffic

Technical Specifications continued

AI Testing	
UET Configuration	• State full Link Layer • Link Layer Retry (LLR) • Credit-Based Flow Control (CBFC) • Link Layer Error insertion • State full Transport layer • Reliable ordered delivery (ROD) • Reliable un-ordered delivery (RUD) • High number of Fabric End Point (FEP) • NSSC Congestion control • RCC Congestion Control • Packet trimming • Dynamic entropy change • Traffic mode – Continuous and Bursty • Full mesh, One-to-One, ALLtoALL, • Bi-direction and Uni-direction traffic
RoCEv2 Throughput	• 1.6T and 800G, 400G, 200G, 100G
UET - Throughput	• 1.6T and 800G, 400G, 200G, 100G
Congestion Avoidance	• Packet Trimming support • Multi pathing support
Congestion Control	• ECN, PFC combination for lossy and lossless fabric • ECN detection, CNP notification • CNP interval • QoS priority for CNP notification • DCQCN • NSSC and RCC

Technical Specifications continued

AI Testing	
Key Results and Statistics (Available on Web and Windows GUI)	• JCT, Ideal JCT • Tail latency (P95/P99/P99.9) Algorithm bandwidth (algbw) and Bus bandwidth (busbw) based on JCT • CCL Traffic Chart algbw and busbw based on transmission time • Total Transmission Time, Total Training Time • Average Iteration Time, Max Iteration Time, Min Iteration Time • Throughput, packet loss, out of sequence packets, packet latency • ECN, CNP TX/RX • Receiver Window Size • Packet loss • Packet Rate • RTT • Retransmission Rate • Packet Latency
Layer 1 Functionality	
OSFP Interconnects	CR8, SR8, LR8, FR8, DR8 at multi-rate (1.6T/800G/400G/200G)
Media support and FEC options	• RS (544,514) FEC supported for all PAM4 speed modes • CMIS 5x and Coherent C-CMIS 1.2 support • Other supports vary by speed modes — 224 Gbps PAM4 mode • Optical Transceivers — 1x1.6T: 1.6TBASE-SR8, 1.6TBASE-DR8, 1.6TBASE-FR8 — 2x800G: 1.6TBASE-SR8, 1.6TBASE-DR8, 1.6TBASE-FR8,1.6TBASE-2FR4 — 4x400G: 1.6TBASE-SR8, 1.6TBASE-DR8, 1.6TBASE-FR8,1.6TBASE-2FR4 — 8x200G: 1.6TBASE-SR8, 1.6TBASE-DR8, 1.6TBASE-FR8,1.6TBASE-2FR4 — Copper Cable • 1x1.6T/2x800G/4x400G/8x200G: 1.6TBASE-CR8 — 112 Gbps PAM4 mode • Optical Transceiver — 1x800G: 800GBASE-SR8, 800GBASE-DR8, and 800GBASE-FR8 — 2x400G: 800GBASE-SR8, 800GBASE-2FR4, 400GBASE-DR4, 400GBASE-FR4 — 4x200G: 800GBASE-SR8 — 8x100G: 800GBASE-SR8 — Copper Cable — 1x800G/2x400G/4x200G/8x100G: 800GBASE-CR8 *COPPER CABLE TYPES LISTED ABOVE INCLUDE DIRECT ATTACHED COPPER CABLE (DAC), ACTIVE ELECTRICAL CABLE (AEC), AND BREAKOUT CABLE. OUT OF THE BOX SUPPORT, NO NEED TO SEND APPLIANCE BACK TO FACTORY FOR DAC SUPPORT.

Technical Specifications continued

Layer 1 Functionality	
Auto-Negotiation /Link Training (AN/LT)(IEEE 802.3 Compliant)	• AN/LT support — 224G: 1x1.6T, 2x800G, 4x400G, 8x200G — 112G:1x800G, 2x400G, 4x200G, 8x100G
Latency Compensation	Supported - eliminates inherent latency on the transmission path
Multi-User Support	Per-port (front panel port) user reservation up to 4 users per appliance
Layer-1 Debug Tools and Features	Pre/Post FEC Codeword statistics, Tx Emphasis settings, Rx Eye view, FEC Counters, PRBS Gen/Check, Front-end L1 Summary Status, Xcvr MDIO access, PCS monitoring, Inter-sublayer Link Training (ILT)
Digital Optical Monitoring (DOM)	Yes - device status, electrical power, temperature, power class, laser power and numerous LOL and LOS threshold and alarm monitoring information.
PRBS Pattern Support	PRBS-7Q, PRBS-9Q, PRBS-11Q, PRBS-13Q, PRBS-15Q, PRBS-19Q, PRBS-20Q, PRBS-23Q, PRBS-31Q PRBS-49Q, PRBS-58Q, and SSPRQ (Tx only) pattern generation support and Rx-side statistics and analysis

Ordering Information

Part Number	Description
Hardware	
D2-1600-OSFP-4-T1S	D2 4-PORT OSFP1600 IHS 1.6T 800G 400G 200G APPLIANCE
D2-1600R-OSFP-4-T1S	D2 4-PORT OSFP1600 RHS 1.6T 800G 400G 200G APPLIANCE
Hardware Speed Options (available as add-on after purchase of initial base package or bundle)	
HWO-D2-1600-OSFP-4-200G	200G 224G PAM4 HW Speed Option D2-1600 OSFP IHS and RHS
HWO-D2-1600-OSFP-4-400G	400G 224G PAM4 HW Speed Option D2-1600 OSFP IHS and RHS
HWO-D2-1600-OSFP-4-800G	800G 224G PAM4 HW Speed Option D2-1600 OSFP IHS and RHS
HWO-D2-1600-OSFP-4-1600G	1.6T 224G PAM4 HW Speed Option D2-1600 OSFP IHS and RHS
HWO-D2-1600-OSFP-4-PORT	D2-1600-OSFP-4 Single Port Enablement IHS and RHS
Hardware Bundles with Speed Options	
D2-1600-OSFP-4-1600A	D2 4-Port OSFP1600 IHS 1.6T Only Bundle
D2-1600-OSFP-4-3000A	D2 4-Port OSFP1600 IHS 1.6T/800G/400G/200G Bundle
D2-1600R-OSFP-4-1600A	D2 4-Port OSFP1600 RHS 1.6T Only Bundle
D2-1600R-OSFP-4-3000A	D2 4-Port OSFP1600 RHS 1.6T/800G/400G/200G Bundle

Ordering Information continued

Part Number	Description
Software Options - MACSEC	
SWO-D2-1600-OSFP-4-MACSEC	MACsec Software on D2-1600-OSFP-4 Appliance
Software Options - UET Transport and Link Layer Individual Speeds	
HWO-D2-UET-200-32	UET Transport Layer and Link Layer for D2 200G 32 Port Suite
HWO-D2-UET-400-16	UET Transport Layer and Link Layer for D2 400G 16 Port Suite
HWO-D2-UET-800-8	UET Transport Layer and Link Layer for D2 800G 8 Port Suite
HWO-D2-UET-1600-4	UET Transport Layer and Link Layer for D2 1.6T 4 Port Suite
HWO-D2-UET-LL-200-32	UET Link Layer for D2 200G 32 Port Suite
HWO-D2-UET-LL-400-16	UET Link Layer for D2 400G 16 Port Suite
HWO-D2-UET-LL-800-8	UET Link Layer for D2 800G 8 Port Suite
HWO-D2-UET-LL-1600-4	UET Link Layer for D2 1.6T 4 Port Suite
Software Options - UET Transport and Link Layer Speed Bundles	
HWO-D2-UET-600A	UET Transport Layer and Link Layer for D2 400G 16/200G 32 Port Suite
HWO-D2-UET-1000A	UET Transport Layer and Link Layer for D2 800G 8/200G 32 Port Suite
HWO-D2-UET-1200A	UET Transport Layer and Link Layer for D2 800G 8/400G 16 Port Suite
HWO-D2-UET-1800A	UET Transport Layer and Link Layer for D2 1.6T 4/200G 32 Port Suite
HWO-D2-UET-2000A	UET Transport Layer and Link Layer for D2 1.6T 4/400G 16 Port Suite
HWO-D2-UET-2400A	UET Transport Layer and Link Layer for D2 1.6T 4/800G 8/Port Suite
HWO-D2-UET-2800A	UET Transport Layer and Link Layer for D2 1.6T 4/800G 8/ 400G 16 Port Suite
HWO-D2-UET-3000A	UET Transport Layer and Link Layer for D2 1.6T 4/800G 8/400G 16/ 200G 32 Port Suite
AON-D2-UET-3000A	AION UET Transport Layer and Link Layer for D2 1.6T 4/800G 8/400G 16/200G 32 Bundle
Software Options - UET Link Layer Speed Bundles	
HWO-D2-UET-LL-600A	UET Link Layer for D2 400G 16/200G 32 Port Suite
HWO-D2-UET-LL-1000A	UET Link Layer for D2 800G 8/200G 32 Port Suite
HWO-D2-UET-LL-1200A	UET Link Layer for D2 800G 8/400G 16 Port Suite
HWO-D2-UET-LL-1800A	UET Link Layer for D2 1.6T 4/200G 32 Port Suite
HWO-D2-UET-LL-2000A	UET Link Layer for D2 1.6T 4/400G 16 Port Suite
HWO-D2-UET-LL-2400A	UET Link Layer for D2 1.6T 4/800G 8/ Port Suite

Ordering Information continued

Part Number	Description
HWO-D2-UET-LL-2800A	UET Link Layer for D2 1.6T 4/800G 8/400G 16 Port Suite
HWO-D2-UET-LL-3000A	UET Link Layer for D2 1.6T 4/800G 8/400G 16/200G 32 Port Suite
AON-D2-UET-LL-3000A	AION UET Link Layer for D2 1.6T 4/800G 8/400G 16/200G 32 Bundle
Software Options - RoCEv2 Individual Speeds	
HWO-D2-4-ROCE-ECN-200-32	RoCE ECN-1600G FOR D2 32X 200G ports total per test module
HWO-D2-4-ROCE-ECN-400-16	RoCE ECN-1600G FOR D2 16X 400G ports total per test module
HWO-D2-4-ROCE-ECN-800-8	RoCE ECN-1600G FOR D2 8X 800G ports total per test module
HWO-D2-4-ROCE-ECN-1600-4	RoCE ECN-1600G FOR D2 4X 1600G ports total per test module
Software Options Bundles - RoCEv2 Speed Bundles	
HWO-D2-4-ROCE-ECN-2400A	RoCE ECN 1.6T/800G SUITE FOR D2 4 X 1.6T or 8 X 800G
HWO-D2-4-ROCE-ECN-2800A	RoCE ECN 1.6T/800G/400G SUITE FOR D2 4 X 1.6T or 8 X 800G or 16 X 400G
HWO-D2-4-ROCE-ECN-3000A	RoCE ECN 1.6T/800G/400G/200G SUITE FOR D2 4 X 1.6T or 8 X 800G or 16 X 400G or 32 X 200G
Software Options - CCL	
HWO-D2-4-CCL-4	CCL for D2-1600-OSFP-4 all speeds supported

Requirements

- Windows-based workstation with 10/100/1000 Mbps Ethernet NIC; mouse and color monitor required for GUI operation
- Linux- or Windows-based workstation for automation scripting
- Mac-, Linux, or Windows-based workstation for Rest API support

TestCenter L2-3 Software Options

- Optional TestCenter software licenses are available for a wide variety of protocol and feature support, please contact your VIAVI sales representative for more information

Contact Us: +1 844 GO VIAVI | (+1 844 468 4284). To reach the VIAVI office nearest you, visit viavisolutions.com/contact

© 2026 VIAVI Solutions Inc. Product specifications and descriptions in this document are subject to change without notice. Patented as described at viavisolutions.com/patents

d2-1.6t4port-ds-hse-nse-ae
30194660 905 0826