

ONE LabPro

HSE-800 8-port QSFP-DD800

Multiport Ethernet Testing

High port count, multi-rate Ethernet network performance test system up to 800GE integrating insightful Physical Layer, FEC and MAC/IP

The HSE-800, a VIAMI ONE LabPro™ platform module, simplifies and accelerates high-speed Ethernet tests in labs and live test bed environments. It is designed for Network Equipment Manufacturers, IC Designers, High Speed Module Suppliers, ICPs and Service Providers who work on high speed Ethernet projects up to 800GE. The HSE-800 is a multiport Ethernet performance validation and debugging test system for R&D, system verification and production providing high speed traffic load testing, system delay performance testing and switch fabric performance testing.

The ONE LabPro accelerates development projects by providing insights into lower layers including PHY, PCS and FEC stability.

This system is unique with its physical layer and Ethernet multi-flow functionality to generate alarms and errors, stress FEC logic and power integrity in one test system.

- Ensures eco-system interoperability
- Enables reliable performance
- Accelerates product validation

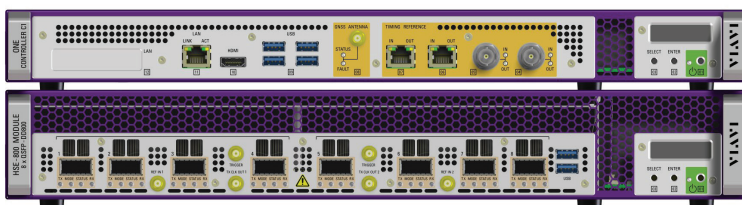


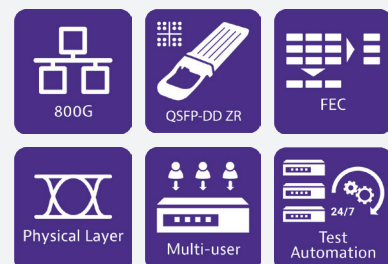
Figure 1 – HSE-800 8-port QSFP-DD800 Module and ONE Controller C1

Features

- HSE-800 Module 8 x QSFP-DD800 in 1.5U
- ONE Controller C1 in 1U – scales up to 128 x 800GE ports
- Ethernet native QSFP-DD800, QSFP-DD QSFP56, QSFP28 and breakout from 50GE to 800GE with PAM4 / NRZ
- Ethernet Multiflow with thousands traceable flows
- Physical Layer, stress FEC logic, MAC/IP insight
- Support for Direct Attached Copper (DAC) and enhanced Optical Module Management
- Nanosecond Precision Delay Test
- Test scenario centric web based graphical user interface
- Controller based Dynamic Licensing

Use Cases and Applications

- Traffic generation and analysis
- Data Plane and Control Plane Testing
- Quality Assurance
- R&D design and validation
- System Verification Testing (SVT)
- Manufacturing test



Hardware Configuration

The VIAVI HSE-800 Module provides 8 x QSFP-DD800 testing covering native and breakout line multi-rates including PAM4 and NRZ SerDes from 50GE to 800GE. The test module is connected and controlled through the ONE Controller C1. The ONE Controller C1 provides Timing Reference and can be augmented with the optional Ultra High Accuracy GNSS Rb Clock.

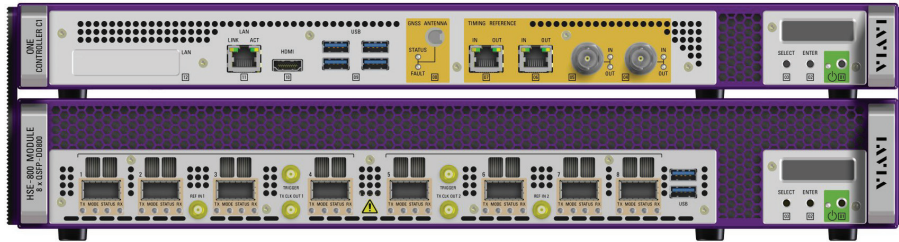


Figure 2 – ONE Controller C1 (top) and HSE-800 8-port QSFP-DD800 Module (bottom)

Scalable Solution – Hardware and Licensing

Each ONE Controller C1 can orchestrate up to 16 x HSE-800 Test Modules with ONE Controller C1 based licensing allows application initiated dynamic allocation of features to any connected test module and port.

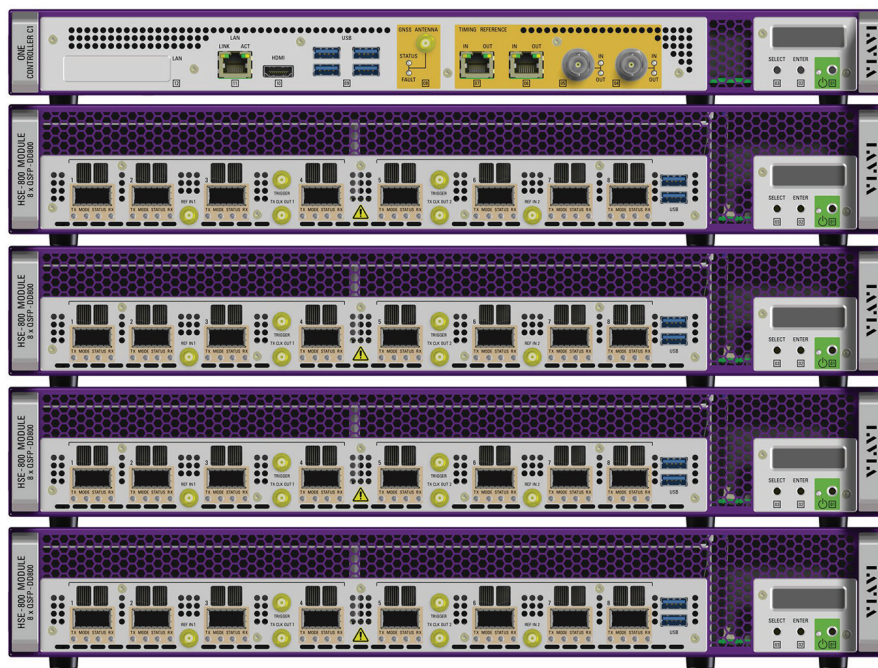


Figure 3 – Configuration example with one ONE Controller C1 (top) and 4 x HSE-800 Test Modules. Dynamic Licensing at port granularity level.

Specifications

Hardware Specifications HSE-800 Module and ONE Controller C1	
HSE-800 Module with 8 x QSFP-DD800 cage	QSFP-DD800 Power Class 1-7, Class 8 up to 25 W Supports also QSFP28, QSFP56, QSFP-DD
Port Line Rates	800GE – PAM4 – 800GAUI8 – QSFP-DD800
	400GE – PAM4 – 400GAUI8 – QSFP-DD
	2x400GE – PAM4 – 400GAUI4 – QSFP-DD800
Licensing	Dynamic Licensing. Licenses with per port granularity hosted by the ONE Controller C1. Licenses are automatically assigned to ports and modules based on the application scenario selected by the user Note: Planned for a Future Release
Number of users	True Multi-User logical port environment with multiple users sharing Physical breakout ports like 2x400GE with 2 users concurrently
User Interface	Web Browser based Test Scenario centric web based graphical user interface with Advanced StackBuilder
Test Automation	Python
Port synchronization	Up to 16 x HSE-800 Test Modules connected, synchronized and managed by ONE Controller C1
Test Module TX synchronization	From Controller, from RX, TX Reference Clock per PHY (625.00 MHz, 156.25 MHz, Host lane baud rate /64, /128, /40, /160)
Test Module Clock Output Frequency	156.25MHz, 625 MHz, 2.048 MHz, 10.000 MHz
	Host lane baud rate /64, /128, /40, /160
System Dimensions	ONE Controller C1 <ul style="list-style-type: none"> • 565 mm (L) x 446 mm (W) x 44 mm (H) • 22.24" (L) x 17.55" mm (W) x 1.73" (H)
	HSE-800 Module <ul style="list-style-type: none"> • 565 mm (L) x 446 mm (W) x 66 mm (H) • 22.24" (L) x 17.55" mm (W) x 2.59" (H)
Weight	ONE Controller C1: 10 kg / 22.04 lbs
	HSE-800 Module: 19 kg / 41.88 lbs
System Electrical Power	Operates on 100-240 VAC, 50/60 Hz
	Product is delivered with powercords for selected country – see Ordering Information
Temperature (Ambient Air)	Operating: 41°F to 95°F (5°C to 35°C)
	Storage: 41°F to 122°F (-20°C to 65°C)
Humidity (Ambient Air)	Operating: 5% to 85%, <=25g/m ³
	Storage: 5% to 95%, <=29g/m ³
Regulatory Compliance Specifications	RE-Directive 2014/53/EU: <ul style="list-style-type: none"> • IEC 61010-1:2010, IEC 61010-1:2010/AMD1:2016 • UL 61010-1:2012/R:2019-07, CSA C22.2 No. 61010-1:2012/A1:2018-11, EN 61010-1:2010/A1:2019, IEC 60825-1:2014, CSA-E60825-1:2015, ETSI EN 303 446-1 V1.2.0 (2019-03), DIN EN IEC 61326-1:2022

Physical Layer

Hardware Specifications HSE-800 Module and ONE Controller C1	
Direct Attach Copper (DAC)	Autonegotiation and Link Training
Active Electrical Cable (AEC)	Support for Active Electrical Cable (AEC) including breakout-out mode
Transponder Management	CMIS 5.2 compatible
	Management Modes: Auto, Manual, Unmanaged
	Transponder State, Optical Power, Temperature, Electrical Power
	Application Code selection
Analog settings	TX pre-emphasis mode <ul style="list-style-type: none">• Auto, Normal, High, Advanced Equalization & Level settings
	RX pre-emphasis mode <ul style="list-style-type: none">• Auto, High Input Level, Low Input Level
Digital Settings	TX/RX Symbol invert
	TX Mute
	TX/RX Gray Encoder
	TX/RX 1/(1+D) Precoder
Port Mapping	Breakout ports can be mapped to hardware ports in arbitrary order
	Breakout ports can be mapped to hardware ports in non-contiguous manner
Frequency Offset	RX ± 100 ppm Note: Increased Frequency Offset is planned in a future release
PHY Status	Link State, Line Rate, TX/RX Optical Power, RX Optical Module Temperature, RX Frequency Offset
PHY Errors and Alarms	TX/RX LOS, RX Frequency out of Range
QoS Delay / Latency	Precision <6ns, Resolution 0.5ns
RX Lane Skew	RX Lane Skew per PCS Lane with current and maximum value
Loopback Modes	Internal Loopback

Transmitter Specification

Hardware Specifications HSE-800 Module and ONE Controller C1	
Transmit Engine	Wire-speed packet generation with timestamps, sequence numbers, flow-id
Number of max Traffic Flow Groups per Port and Speed	32 per full Physical port Note: A higher number of Traffic Flow Groups is planned in a future release
Stream Controls	Bandwidth controlled mode with constant and burst load
	Set Minimum Interpacket Gap size per PHY port
	Rate and frame size change on the fly
	Advanced stream scheduler support
Minimum Frame Size	60 Bytes excluding preamble and IPG, dependent on packet header length
Maximum Frame Size	16,375 Bytes excluding preamble and IPG
Frame Length Control	Fixed, Increment, Decrement, Random
PCS/FEC TX Statistics	Link State
	64B/66B Total, Data, Control Blocks
	FEC Symbol Errors Statistic
PCS/FEC TX Alarms and Errors Insertion	PCS Alarms: LOAMPS
	FEC Alarms: HI SER, Degraded SER, Local degraded SER, Remote degraded SER
	Reconciliation Alarms: Local Fault, Remote Fault
	Invalid Transcoded Block
	FEC Errors: Uncorrected Code Word Error, Corrected Code Word Error
	User defined Alignment Marker, Codeword Shift
MAC/IP TX Statistics	Link State, Frames, Bandwidth
MAC/IP TX Error Generation	FCS, Packet Sequence Gap, Runt, Invalid SFD, IPv4

Receiver Specification

Hardware Specifications HSE-800 Module and ONE Controller C1		
Receive Engine	Wire-speed QoS Measurements with real-time latency, latency variation and sequence checking per flow	
Traceable flows	256 per Physical port with full statistics Note: A higher number of traceable flows is planned in a future release	
Minimum Frame Size	60 Bytes excluding preamble and IPG, dependent on packet header length	
PCS/FEC RX Statistics	Link State	
	64B/66B Total, Data, Control, Good, Errored, Invalid Blocks	
	FEC Symbol Errors Statistic	
	Alignment Marker	
PCS/FEC RX Errors and Alarms	Lane Alarms <ul style="list-style-type: none"> • LOAMPS • LOA • Lane Swap 	
	FEC Alarms <ul style="list-style-type: none"> • HI SER • Degraded SER • Local degraded SER • Remote degraded SER • VoFECM • VoPreFECBERT 	
	Reconciliation Alarms <ul style="list-style-type: none"> • Link Down • Local Fault • Remote Fault 	
	Lane Errors <ul style="list-style-type: none"> • LOAMPS Events • LOA Events 	
	FEC Errors <ul style="list-style-type: none"> • Uncorrected Code Word Error • Corrected Code Word Error • VoFECM Events 	
	64B / 66B ans 256 / 257B Errors <ul style="list-style-type: none"> • Errored Block • Invalid Transcoded Block 	
	Reconciliation Errors <ul style="list-style-type: none"> • Local Fault Event 	
	Remote Fault Event	
	MAC/IP RX Statistics	Link State, Frames, Bandwidth, Errored Frames, Good Frames, PAUSE Frames, VLAN tagged Frames, Q-in-Q Frames, MPLS unicast Frames, MPLS multicast Frames, IPv4 Frames
	Latency / Delay	Store and forward, cut-through, MEF, Forward Latency
RX Packet Jitter	Instantaneous packet Jitter with Current average, Average, Min, Max	
Flow Control	Flow Control IEEE 802.3x: PAUSE Quanta, PAUSE Frame	
MAC/IP QoS	QoS Alarms: Dead Flow Alarm, Unused Flow Alarm	
	QoS Errors: Lost, Duplicated, Small Sequence, Big Sequence	
	Total Sequence, Reverse Sequence, FCS Error	

Receiver Specification continued

Hardware Specifications HSE-800 Module and ONE Controller C1

MAC/IP RX Errors	MAC Errors <ul style="list-style-type: none">• Runt• Oversized• FCS• Errored• Flow-ID Out of Range
	IP Errors <ul style="list-style-type: none">• IPV4 Header Error
	Preamble/SFD <ul style="list-style-type: none">• Invalid Preamble• Invalid SFD

Protocols

L2/L3 encapsulation	IPv4, VLAN, QinQ (stacked VLANs), UDP, TCP (stateless), MPLS traffic
L2/L3 emulation	ARP (IPv4)

Ordering Information

Part Number	Description
410-001.01	HSE-800 8-port QSFP-DD800 Module
490-001.01	ONE Controller C1

Hardware factory options for ONE Controller C1

490-040.01	Ultra High Accuracy GNSS Rb Clock
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Required included configuration choice for HSE-800 Test Module

495-052.02	Power cable - Y - BS1363 - UK - 230VAC - 13A
495-053.02	Power cable - Y - CEE7-7 - EU - 230VAC - 16A
495-054.02	Power cable - Y - GB15934-2008 - China - 220VAC - 16A
495-055.02	Power cable -Y - IS1293 - India - 230VAC - 16A
495-057.02	Power cable - Y - NEMA-L6-20P - US - 250VAC - 20A
495-058.02	Power cable - Y - SI32 - Israel - 230VAC - 16A

Required included configuration choice for ONE Controller C1

495-052.01	Power cable - BS1363 - UK - 230VAC - 13A
495-053.01	Power cable - CEE7-7 - EU - 230VAC - 16A
495-054.01	Power cable - GB15934-2008 - China - 220VAC - 16A
495-055.01	Power cable - IS1293 - India - 230VAC - 16A
495-056.01	Power cable - JIS8303 - Japan - 100VAC - 12A
495-057.01	Power cable - NEMA-5-15P - US - 120VAC - 15A

Optional configuration options

495-082.01	Rackmount Kit 19" Module 1.5U
495-082.02	Rackmount Kit 21" Module 1.5U
495-082.03	Rackmount Kit 19" Controller 1U
495-082.04	Rackmount Kit 21" Controller 1U
495-084.01	Controller and 1 x Module bundle assembly - 2.5U
496-088.01	ONE LabPro Travel Case – adjustable inlays for 1U to 3U with 0.5U steps

Software Options

Application feature licensing is assigned to the ONE Controller C1 as Dynamic License with per port granularity. Licenses are automatically assigned to ports and modules based on the application scenario selected by the user. Licenses are automatically revoked upon test completion (Note: full implementation planned to be available in a future release).

Example: An 8 port license means the application is available on 8-ports concurrently. Additional licenses like a 16 port license can be added at a later stage to the ONE Controller C1 making up a total of 24 port licenses count.

Order #	Description	Included Functionality	Item # per port
410-118.52	800GE - 16 port	800GE - PAM4 - 800GAUI8 - QSFPDD800	410-118.59
410-118.54	800GE - 8 port		
410-118.56	800GE - 4 port		
410-118.59	800GE - 1 port		
410-120.52	400GE - 16 port	400G - PAM4 - 400GAUI8 - QSFPDD	410-120.59
410-120.54	400GE - 8 port		
410-120.56	400GE - 4 port		
410-120.59	400GE - 1 port		
410-245.52	2x400GE - 16 port	2x400GE - PAM - 400GAUI4 - QSFPDD800	410-245.59
410-245.54	2x400GE - 8 port		
410-245.56	2x400GE - 4 port		
410-245.59	2x400GE - 1 port		



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