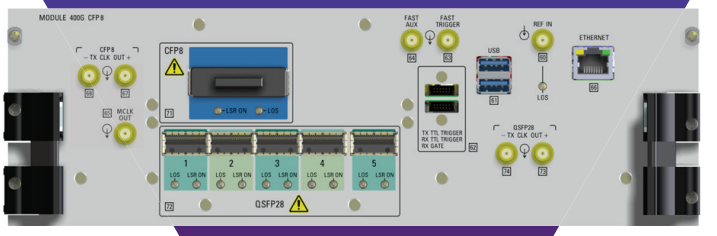

ONT-600
400G CFP8 Module

Enables physical layer and 400GE testing; prepared for OTUC4 and FlexE/FlexO

400G Ethernet is an emerging standard for high performance routers, switches and DWDM transport equipment. As 100G becomes more widespread, the demand to bring 400G products to market intensifies. Scalable test solutions that address the whole development cycle ecosystem, from chips to systems, are needed.

CFP8 is the ideal form factor for first generation 400G interfaces. Multiple 100G QSFP28 ports provide the perfect interface for the Flex Ethernet and Flex OTN applications needed to efficiently provide scalable and service-relevant bandwidth. The ONT 400G is impeccably aligned with all the ecosystem requirements to successfully bring these technologies to market.

The ONT 400G is based on the latest 400G draft standard for 400G Ethernet (802.3 bs).

Key Benefits

- Provides comprehensive applications for troubleshooting signal integrity, unframed PRBS & PRBSxQ, PCS/FEC, Ethernet and future OTUC4 and Flex Ethernet and FlexO using real world signals. Allows performance validation with real signals.
- Helps quickly identify root cause of errors in the physical layer with powerful applications like advanced error analysis and dynamic skew tests; an advantage over expensive pure error counters.
- Enables complete IC validation, from SERDES through PAM-4/FEC up to higher IP-packet verification.
- Provides complete and integrated support for 1st generation CFP8 400G modules including signal path, MDIO and power management. Applications support true traffic as well as basic PRBS/PRBSxQ
- Supports emerging flexible bandwidth applications using 5 x 100G ports based on the industry standard QSFP28. Closely integrated with the needs of 400G the Flex applications allow comprehensive and integrated product development and validation.
- Fully validates and stresses the integrated PCS/FEC layer used in the 400G Ethernet standard.
- FPGA-based test applications evolve with standards and ecosystem challenges without sacrificing performance.

Target Applications

IC Vendors

Powerful flexible electrical interface allows IC vendors to fully validate and test their latest generation ICs required for 400G. This includes the demanding needs of emerging technologies like PAM-4 and FEC mandated in 400G Ethernet. From unframed PRBS and PRBSxQ through FEC/PCS and onto Ethernet and future OTUCn – the ONT 400G can fully validate all aspects of ICs, from SERDES into the fabric and state machines.

Transponder Test

CFP8 will be the form factor for first generation 400G early adopters. With variants supporting 16 x 25G NRZ and 8 x PAM-4 as well as the complexities of PAM-4 optical modulation, innovative and powerful test applications are needed. The ONT has a deep repertoire of applications that accelerate the development and validation of 400G pluggables. Industry reference applications like transponder stress test, dynamic skew, and advanced error analysis are further enhanced to support the challenges of PAM-4 & FEC based technology required for 400G.

System Development

Bringing 400G based systems to market is a tremendous challenge. For example, a completely new ecosystem of modules, ICs, and emerging standards has to be established. Integrating ICs, IP, and high speed signals can be an expensive and painful process. Fortunately the ONT 400G covers all the needs to successfully bring 400G products to market. From evaluating and validating FPGA based IP through physical layer troubleshooting with PAM-4 & FEC and on to full traffic analysis of 400G Ethernet and FlexEthernet, the ONT 400G module delivers all the applications and features needed. Based on Viavi's complete 100G ecosystem leadership the ONT 400G module can truly accelerate 400G product development.

Specification

CFP8 Interface

Based on CDAUI-16 (16 lanes of 25G NRZ)

Bitrate from 400 Gpbs to 524 Gpbs in 5 kpbs increments (0.0125 ppm steps)

Accuracy (as per reference clock on mainframe or user reference clock with an additional +/-0.00625 ppm error)

Power class – supports power dissipation to 16 W at 40° C ambient temperature.

Module power supply – default 3.3 V (hardware validation option allows user variable from 2.5 V to 3.7 V in 50 mV steps)

MDIO modes – normal, relaxed, off

MDIO Functionality

MDIO speed: 4 MHz by default (hardware validation option allows the following MDIO rates : 0.5, 0.8, 1.0, 1.333, 2.0, 2.29, 2.66, 3.2, and 4.0 MHz)

MDIO voltage range: 1.2 V by default (hardware validation option allows the user to vary this from 1.0 to 1.4 V in 50 mV steps)

PCS/FEC Layer Functionality

Support for the latest IEEE 802.3 bs draft implementation

FEC generation and analysis

FEC verification

Skew generation and measurement

Lane shifting/lane rotation

Ethernet Functionality

400G Ethernet/MAC traffic up to 100%

MAC Layer Error/Alarm insertion and analysis

Constant and bursty traffic with different frame sizes

QoS measurements

BERT Testing

Tx patterns	PRBS 2^7–1, 2^9–1, 2^{15}–1, 2^{23}–1, and 2^{31}–1 (normal and inverted), 32-bit data word, square wave
Pattern lane offset	None, auto staggered, user-defined
Bit error insertion	On selected lane, all lanes
Rx patterns	PRBS 2^7–1, 2^9–1, 2^{15}–1, 2^{23}–1, and 2^{31}–1 (normal and inverted), 32-bit data word, square wave
Bit error analysis	Total, errored 1 or 0, ratio
Gating modes	Manual start/stop, predefined duration, intermediate time

Advanced Error Analysis

The advanced error analysis option is a unique set of applications designed to accelerate troubleshooting, fault-finding, and stress testing of 25G+ hardware. It gives valuable insight into the very nature of errors and with clear indications of the patterns and statistics of the errors, it enable root causes to be quickly identified.

Ordering Information

ONT-600 Mainframes

Mainframe Types	Part Number	Slots	Controller Type*
ONT-603D	3076/01	3	with display and high-end controller
ONT-603H	3076/02	3	with high-end controller
ONT-603B	3076/03	3	with basic controller
ONT-606D	3076/04	6	with display and high-end controller
ONT-606H	3076/05	6	with high-end controller
ONT-606B	3076/06	6	with basic controller
ONT-612H	3076/07	12	with high-end controller
ONT-612B	3076/08	12	with basic controller

*Basic Controller: No PC functionality, separate IP address for each application module

*High End Controller: PC functionality; all built-in application modules can be reached via the controller's IP address.

ONT-600 400G Test Module	Part Number	Slots
400G CFP8 Module	3076/92.62	3

Software Options	Part Number
CFP8 Hardware Validation	3076/97.30
CFP8 Advanced Error Analysis (requires 3076/97.30)	3076/97.31
CFP8 Dynamic Skew generation (requires 3076/97.30)	3076/97.32
400G Ethernet FEC Validation	3076/97.41

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