SPEC SHEET

MAX-840

400G ETHERNET TESTER, WITH 100G-START OPTION

- The ultimate in flexibility with a journey-to-400G design. Go with 400G now, or start with up-to-100G testing and upgrade to 400G later.

COMPATIBLE WITH EXchange iOptics

KEY FEATURES AND BENEFITS

- 1G to 400G Ethernet testing capabilities based on IEEE standards
- Go with 400G now or start with up-to-100G testing and upgrade to 400G later, only when needed
- Complete Ethernet 1G to 400G test suite including EtherBERT, RFC2544, EtherSAM Y.1564, Smart Loopback, traffic generation and monitoring, RFC 6349 (up to 100G) and Fibre Channel
- Validate pluggable optics fast, including AOC and DAC cables, with EXFO's iOptics automated intelligent test application
- Automatic plug-and-play transceiver detection with the iOptics test application
- Support for the most popular pluggables (QSFP-DD and OSFP) and the latest QSFP112 transceivers
- Modular Open Transceiver System (OTS) supports testing of SFP28 or QSFP28 form factors
- Very intuitive and easy-to-use GUI for a quick ramp-up and rapid results interpretation
- Built-in cloud-hosted solution EXFO Exchange for test results upload and activity collaboration

RELATED PRODUCTS

EXchange

Cloud-hosted solution for test results upload and activity collaboration
EXFO Exchange

1G to 100G network tester
FTBx-88260

Compact, dual-port 400G testers
FTBx-88480

EXFO

START YOUR 400G JOURNEY WITH THE MAX-840

The MAX-840 Ethernet tester is a go-anywhere compact, upgradeable solution including 1G to 400G Ethernet testing capabilities based on the latest IEEE standards. It features a journey-to-400G design for ultimate flexibility; go with 400G immediately, or start with up-to-100G testing and upgrade to 400G later. Covering the basics, the MAX-840 includes EtherBERT, TGEN, Y.1564, RFC2544, Fibre Channel (1X – 32X) and other core testing requirements. It supports a wide range of pluggable transceiver form factors, including SFP28, QSFP28, QSFP-DD, QSFP112, and OSFP. The MAX-840 includes, an intelligent pluggable optics test application that can quickly validate any pluggable transceiver from 1G to 400G, as needed. Applications for the MAX-840 include turn-up troubleshooting and maintenance of core, metro-edge, data center, and 4G/5G backhaul networks, as well as service activation testing in enterprise and carrier labs.

PRODUCT CONFIGURATIONS

MAX-840-100

- Up to 100G (400G ready)
- Dual-port testing up 100G

MAX-840-400

- All rates up to 400G
- Dual-port testing up 100G

DESIGNED FOR FLEXIBILITY

The MAX-840 is built with the innovative Open Transceiver System (OTS) design which allows users to customize the type of interfaces on the module according to their needs, without using adapters, while also ensuring the future-proof capacity to test new transceivers as they become available, by simply changing the transceiver system instead of having to purchase a new test unit.

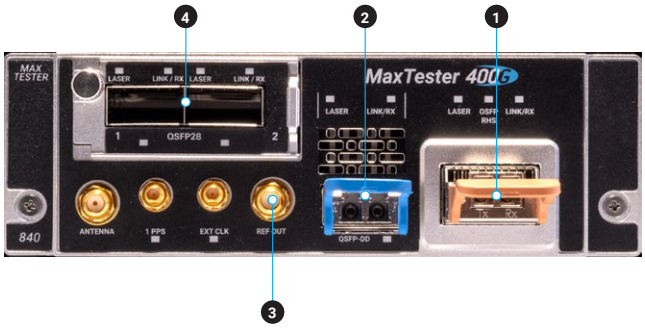
OTS		SUPPORTED INTERFACES	FEATURES	NUMBER OF TEST PORTS
	**SFP28**	SFP, SFP+, tunable SFP+, SFP28 and bidirectional SFP	1G to 25G data rates Dual-port capability	2
	**QSFP28**	QSFP+, QSFP28	40G/100G data rates Dual-port capability AOC cables	2

The MAX-840 also includes integrated transceiver testing ports, as detailed in the table below.

SUPPORTED TRANSCEIVERS		SUPPORTED INTERFACES	FEATURES	NUMBER OF TEST PORTS
	**QSFP-DD**	QSFP-DD	100G, 200G and 400G data rates	1
	**OSFP**	OSFP	400G data rate	1

Rapid evolution of transceivers

The OTS design provides enhanced flexibility and CAPEX protection to the end user; one test module can support various types of transceivers. A flexible solution that can adapt and adjust to the fast evolution of transceivers while providing multirate support.



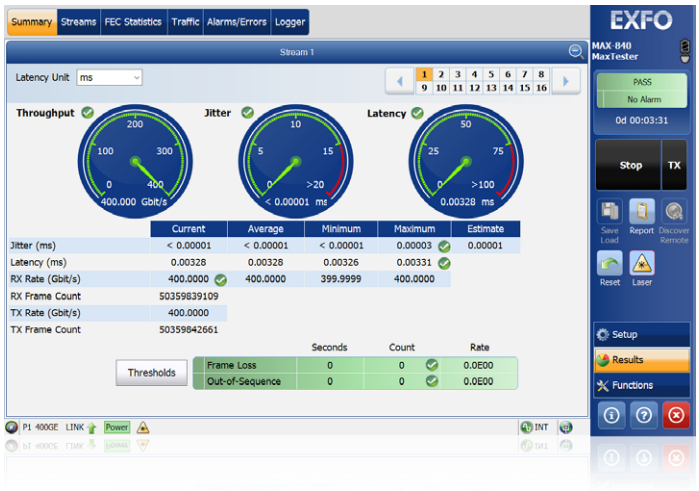
1. OSFP port supporting 400G Ethernet rates
2. QSFP-DD port supporting 400G/200G/100G Ethernet rates (same port is used for QSFP112)
3. REF CLOCK OUT SMA interface
4. OTS module interface, supporting SFP, SFP+, SFP28, QSFP+ and QSFP28

HIGH SPEED ETHERNET TESTING

400G is the next step up from 100G Ethernet, and it's taking its place in the field as the industry ramps up to handle the massive demands of hyperscale data centers, 5G applications, service providers and business users. The MAX-840 offers the main Ethernet testing capabilities, including forward error correction monitoring and validation.

1G to 400G testing capabilities

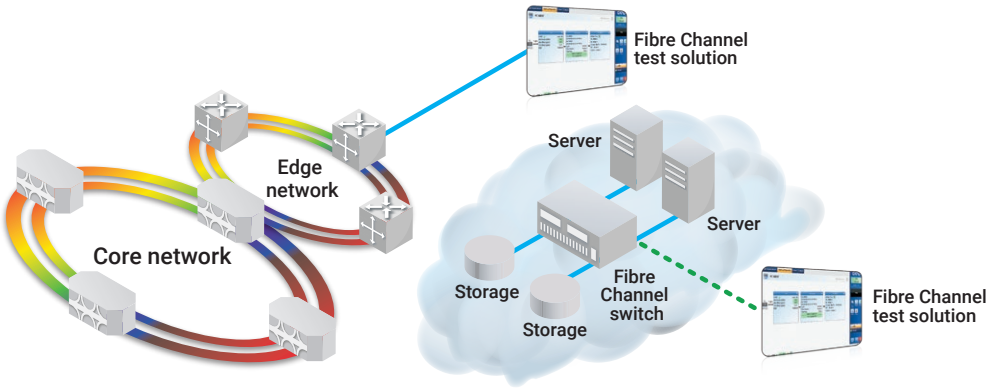
- 1G to 400G framed/unframed BERT
- Per lanes PRBS testing with pass/fail verdict
- CMIS support with loopback testing
- Service disruption test and latency measurement
- Throughput, frame loss
- ITU-T Y1564 methodology testing
- Loopback tool
- RFC6349 TCP testing: include Iperfv3 server mode and enhanced TCP mode
- Troubleshooting tools: ping and traceroute, I2C/MDIO read/write, etc.



FIBRE CHANNEL TESTING

Data centers and other bandwidth-heavy environments that process and store large amounts of transactional data, are upgrading their Fibre Channel storage area networks (SAN) from 1G to 32G Fibre Channel. Given Fibre Channel's strict performance requirements for latency, BER and other measurements, it's imperative to test new deployments thoroughly.

EXFO's Fibre Channel test solution helps ensure that new switches and transceivers are up and running reliably. Technicians can use this solution to address FC testing needs at every stage—from service turn-up to troubleshooting. Available on the MAX-840.



Storage area network (SAN)

SOFTWARE TEST TOOLS

Remote control

The Windows-based design enables remote operation through TeamViewer, Remote Desktop (RDP), Virtual Network Computing (VNC), Microsoft Teams and the free remote software, EXFO Remote Toolbox:

- Perform tests and evaluations remotely
- Enjoy easy remote access by connecting to a fixed/wireless Ethernet network or hotspot—no need to connect to the customer network

SUMMARY OF KEY FEATURES	
Detailed compliance testing	IEEE 802.3ba and IEEE 802.3bs standard and IEEE 802.3ck standard
Multi-interface support	Pluggable MSA-compliant 2×QSFP28 transceivers AOC QSFP28/QSFP-DD/OSFP cable support QSFP-DD MSA revision 6.3, 4×100G 400G DAC cables support Pluggable, MSA-compliant 2×QSFP+ transceivers Pluggable, MSA-compliant 2×SFP28 optical transceiver Pluggable, MSA-compliant 2×SFP/SFP+ optical transceivers Pluggable, MSA-compliant 1×OSFP optical transceiver
Line rate	425/212.5/106.25 (single lambda)/103.125/53.125/41.25 Gbit/s, 100G SRBD, 40G, 25G, 10G, and 1G
Robust physical-layer validation	400GAUI lane-error generation and monitoring PCS lane mapping and monitoring capability Per-lane skew generation and measurement PCS error generation and monitoring per lane Full MDIO/I2C read/write access
Transceiver and cable validation	SFP, SFP+, SFP28, QSFP+, QSFP28, QSFP56, QSFP-DD, QSFP112 and OSFP. Also AOC and DAC cables.
iOptics	Optical-device I/O interface quick check Optical Tx power-level test Optical Rx signal-presence and level test Stress test Excessive skew test Temperature and power consumption monitoring Host and media loopback
Power measurement	Optical channel power measurement with color indicators per lane
Frequency measurements	Allow users to measure the received frequency per wavelength (in Hz) in the used of parallel optics
Frequency offset	Offsetting of the transmitted signal's clock on a selected interface, and monitoring
Transceiver non-blocking analysis	Enables a step-by-step monitoring of the transceiver boot-up sequence
BERT	BERT framed and unframed testing using different parameters and different frame sizes, including EMIX. The Ethernet BERT application also allows LLDP neighbor validation which displays the most important information forwarded by the LLDP protocol.
Service disruption time (SDT)	Service disruption time measurements based on no-traffic mode, with statistics including longest disruption time, shortest, last, average, count, total and pass/fail thresholds
Latency measurements in BERT	High-resolution delay measurements integrated in the BER with statistics including current, average, maximum, minimum, count, total and pass/fail thresholds
Error injection mode	Manual, rate and continuous (maximum rate)
Layer 2	MAC address and Ether type edition available Q-in-Q capability with the ability to go up to three layers of stacked VLANs
Layer 3/4	Source and destination IP address configuration available IP TOS/DSP configuration available UDP source and destination port configuration available
RFC 2544	Throughput, back-to-back, frame loss and high-resolution latency measurements according to RFC 2544; frame size: RFC-defined or user-configurable
EtherSAM	Simplified ITU-T Y.1564 test that performs service configuration and service performance tests using remote loopback or dual test set mode for bidirectional results
Traffic generation and monitoring	Traffic generation and shaping of up to 16 streams of Ethernet and IP traffic, including the simultaneous monitoring of throughput, frame loss, packet jitter, latency and out-of-sequence frames, including MAC flooding for source and destination MAC addresses
RFC 6349	RFC 6349 with enhanced algorithm: performs TCP testing with single or multiple TCP connections from 10BASE-T up to 100G; discovers the MTU, RTT, actual and ideal TCP throughput; user can apply suggested window size boost factor to optimize test results or perform multiple client iPerf tests against the RFC 6349 (v2 and v3) iPerf Server mode of operation
Through mode	For monitoring Ethernet traffic between two endpoints, as transparently as possible. This enables online monitoring without the use of external tapping modules, switch mirror ports or other traffic redirection schemes.
Smart loopback	Return Ethernet traffic to the local unit by swapping packet overhead up to layer 4

SUMMARY OF KEY FEATURES (CONTINUED)	
Rx frame-size analysis	< 64, 65 - 127, 128 - 255, 256 - 511, 512 - 1023, 1024-1518 and > 1518
Rx rate	Line utlization (%), Ethernet BW (Mbit/s), frame rate (frame/s), and frame count
Ethernet alarms	Link down, local fault detected, local fault received, remote fault, LOA
Ethernet errors	FCS, jabber, runt, undersize and oversize
Higher layer error analysis	UDP checksum
PCS lane alarms and errors	LOS, LOC-lane, LOAML, excessive skew, Inv. Marker, Pre-FEC SYMB and Pre-FEC-bit
Skew insertion	Per-lane skew generation and measurement range 0 to 10550
PCS logical lane mapping	Manual and random
Pre-emphasis	Pre-/main-/post- cursor options to improve electrical waveform including gray encoding and precoding
FEC	Generation and analysis of FEC correctable and uncorrectable errors, local and remote degraded SER monitoring
FEC statistics	Number of symbol errors per correctable codeword, number of pre-FEC symbol errors and bit statistics, codeword count (error-free and uncorrectable) and percentage
IP tools	Performs ping and traceroute functions
IPv4 and IPv6 testing	Performs the following tests up to 400G over IPV4 and IPv6, RFC 2544, BERT, traffic generation and monitoring, EtherSAM, ping and traceroute
Advanced filtering	Configure up to 10 filters, each with four fields that can be combined with AND/OR/NOT operations; a mask is also provided for each field value with IPv4 or IPv6 capabilities
Remote access	Supported via EXFO Remote ToolBox, Remote Desktop and VNC
Automation	Wide range of commands available per application to allow test automation
Reporting	Test results are included in a report that can be generated in different formats: pdf, html and json

FIBRE CHANNEL SPECIFICATIONS

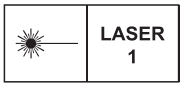
FIBRE CHANNEL FUNCTIONAL SPECIFICATIONS	
BERT	Framed Fibre Channel
Patterns (BERT)	PRBS 2E31-1, 2E23-1, 2E20-1, 2E15-1, 2E11-1, 2E9-1, one user-defined pattern and the capability to invert patterns
Error injection	Bit error and FCS
Error measurement	Bit error, 66B block, invalid marker, FCS, oversize error, undersize error, FEC-COR-CW, FEV-UNCOR-CW and Pre-FEC-SYMB
Alarm detection	LOS, frequency, LOC, no traffic, pattern loss, link down, LOCWS, LOAML
Buffer-to-buffer credit testing	Buffer-to-buffer credit estimation based on latency
Latency	Round-trip latency
Service disruption time (SDT)	Measures: last disruption, shortest disruption, longest disruption, average disruption, total disruption, and service disruption count

SPECIFICATIONS

MECHANICAL AND ENVIRONMENTAL SPECIFICATIONS		
Size (H × W × D)		210 mm x 254 mm x 122 mm (8 ¼ in x 10 in x 4 ¾ in)
Weight		4.2 kg (9.3 lb)
Temperature	Operating Storage	0 °C to 40 °C (32 °F to 104 °F) −40 °C to 70 °C (−40 °F to 158 °F)

REF-OUT INTERFACE	
Tx pulse amplitude	210 mVpp to 1300 mVpp, depending on frequency
Transmission frequency	155 MHz to 3.50 GHz
Output configuration	AC-coupled
Load impedance	50 Ω
Connector type	SMA
External cable	Maximum 1 meter cable length (RG178 cable with 3.1 dB/m attenuation at 3.5 GHz)

LASER SAFETY



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