

“ To learn more about how to manage **10G to 40G/100G** network expansion through **upgrades** and **fiber characterization**, go to [www.EXFO.com/hub](http://www.EXFO.com/hub) ”



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## 40G Test Modules Simple Facts

Description	Multiservice Modules	
	FTB-8120NGE	FTB-8130NGE
Electrical interfaces: DS1, E1/2M, E2/8M, E3/34M, DS3/45M, E4/140M, STM-1e/STM-0e/52M, STS-3e/STM-1e/155M	•	•
Optical interfaces: OC-3/12/48, STM-1/4/16, OTU1 (2.7G) 100M/ Gigabit Ethernet, 1G/2G/4G FC	•	•
OC-192/STM-64, OTU2, OTU1e, OTU2e, OTU1f, OTU2f 10G Ethernet, 10G FC		•
10/100/1000BaseT Ethernet add/drop and test port	•	•
Optical Gigabit Ethernet add/drop port	•	•
Next-generation SONET/SDH (GFP, VCAT, LCAS) (on FTB-500)	•	•
OTN (ITU-T G.709) standard compliance	•	•
Over-clocked OTN compliance		•
Ethernet-over-OTN		•
ODU1 into ODU2 multiplexing		•
OTN OH manipulation/analysis (on FTB-500)	•	•
SONET/SDH and OTN Intrusive Through mode (on FTB-500)	•	•
OTN service disruption time (SDT)	•	•
OTN round-trip delay (RTD)	•	•
SONET/SDH block and replace		•
10/100M and Gigabit Ethernet BERT, RFC 2544 and frame analysis	•	•
10 Gigabit Ethernet BERT, RFC 2544 and frame analysis		•
Smart loopback	•	•
Dual test set (bidirectional RFC)	•	•
1/2/4G FC BERT, latency and buffer-to-buffer credit testing	•	•
10G FC BERT, latency and buffer-to-buffer credit testing	•	•
ITU-T Y.156sam (EthersAM)	•	•

Description	40G/43G SONET/SDH and OTN Testing Module
	Module FTB-8140
OC-768/STM-256 testing with STS-1/AU4 granularity	•
OTN testing including FEC as per ITU-T G.709	•
Compatible with multiple optical transmission protocols, including NRZ, ODB, DPSK and DQPSK	•
SONET/SDH and OTN Intrusive Through mode	•
SONET/SDH and OTN overhead manipulation/analysis	•
OTN service disruption time (SDT)	•
OTN round-trip delay (RTD)	•
SONET/SDH block and replace	•
ODU multiplexing (ODU13, ODU23, ODU123)	•
SONET/SDH and 10 GigE mapping over OTN	•

Description	DWDM Commissioning Modules	
	FTB-5240S	FTB-5240S-P
Power, wavelength and OSNR measurement	•	•
All transmission bands, CWDM and DWDM capability	•	•
50 GHz transmission DWDM commissioning	•	•
EDFA qualification and balancing	•	•
Long-term DWDM monitoring	•	•
In-band OSNR capability		•

Description	Physical-Layer Modules			
	FTB-5500B	FTB-5600	FTB-5700	FTB-5800
End-to-end chromatic dispersion (CD) qualification up to 100G			•	•
End-to-end PMD qualification up to 100G	•	•	•	
Single-ended CD qualification (ideal for metro mesh networks)			•	
Single-ended PMD qualification (ideal for metro mesh networks)		•	•	
CD and PMD qualification of long-haul, ultra-long-haul and submarine networks	•			•
PMD mitigation for link upgrades (distributed PMD measurement)		•		

## EXFO's 40G Testing Solution: Unique Advantages

### › Shape it as you see fit

Take advantage of the FTB-500 Platform's modular architecture by complementing the FTB-8140 Transport Blazer (40G/43G) module with either:

- › a CD or PMD analyzer for physical-layer testing
- › a standard or in-band OSA for network commissioning
- › a multiservice test module (FTB-8130NGE Power Blazer) for service turn-up up to 10G

### › Protect your investment

A true field-upgradeable solution, thanks to software options including OTU3, Intrusive Through mode, ODU MUX, Ethernet and Fibre Channel—without any hardware upgrade

### › Maximize efficiency with fast and simultaneous testing

Running 40G and CD/PMD/OSNR or SONET/SDH/Ethernet/Fibre Channel up to 10G tests simultaneously, for quick network commissioning and service turn-up

### › 40G mappings with STS-1/AU-4 granularity even within OPU3 payload

Covering all possible 40G ROADM commissioning configurations and lower-rate SONET/SDH services within 40G pipes

### › Complete OTN testing solution for newly converged networks

Supporting OTU1/OTU2/OTU3, OTU1e/OTU2e and OTU1f/OTU2f line rates, ODU MUX, decoupled mode, round-trip delay and service disruption time measurements, Intrusive Through mode as well as SONET/SDH and Ethernet mapping over OTN

### › In-service testing of ROADM-based networks

Uses SONET/SDH/OTN Through mode and Intrusive Through mode to monitor live traffic when needed for troubleshooting purposes as well as block and replace capability

### › Ideal field testing solution

EXFO's FTB-500 platform provides remote management capability, integrated optical tools, reporting, power-up and restore, battery operation up to 40G and pre-configured test "favorites"—all for simplified field testing

### › 40G-compatible solution with different line-coding schemes

Compatible solution with NRZ, ODB and DPSK line codes addresses a wide range of 40G line side implementations

Are you ready to meet **40G** roll-out challenges?





## 40G Network Realities

Internet traffic is growing exponentially, due in large part to the increasing demand for triple-play and other high-bandwidth services. Some heavily loaded networks already have hot spots where links are approaching full capacity—not to mention the extra IP and Ethernet traffic that service providers must accommodate.

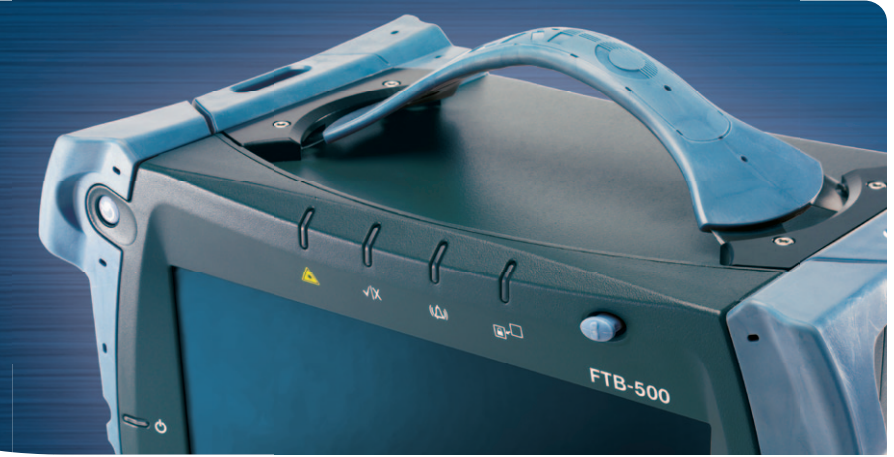
Implementing higher bit rates therefore seems inevitable, especially with the cost reductions made possible by packet-based optical transport network (P-OTN) deployments. P-OTNs contain fewer network elements, require less space and power, and minimize the failures to troubleshoot.

The drive for increased capacity introduces network complexities that necessitate advanced test solutions. EXFO offers a complete and integrated 40G testing solution—from the fiber through link commissioning and service turn up—enabling NSPs to meet 40G roll-out challenges and achieve seamless expansion, while maximizing revenue from existing infrastructure and ensuring efficient provisioning of new services.

Stéphane Chabot  
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Line Management  
Optical Business Unit



## Follow the next simple steps and make sure you are up to the challenge



- › Can your fiber support a 40G upgrade?
- › Have you conducted CD/PMD fiber characterization?

### Total Fiber Characterization Testing Solution

- › Fast and accurate CD and PMD testing through amplifiers
- › PMD testing using the general interferometric approach; the only recommended method for unmatched precision in all network environments
- › Highly optimized OTDRs delivering lightning-fast trace acquisitions and enabling multiwavelength test routines in 45 seconds
- › Bidirectional link loss and ORL measurement in less than 7 seconds



FTB-3930  
MultiTest Module  
(OLTS)

FTB-5800 Chromatic  
Dispersion Analyzer

FTB-5500  
PMD Analyzer



FTB-7500E  
Metro/Long-Haul OTDR

FIP-400  
Fiber Inspection Probe

- › Looking for seamless integration of existing 2.5G/10G services over 40G links?
- › Is your network fully compliant with OTN standard?

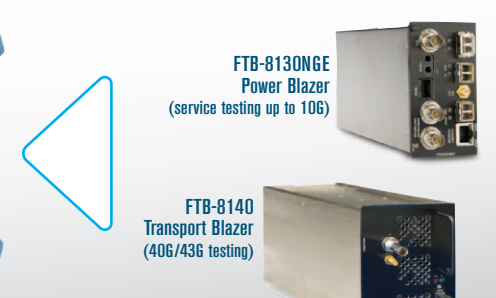
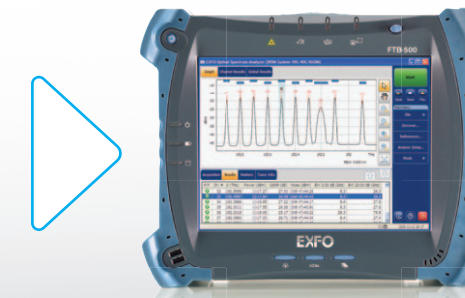
### 40G/43G Network Commissioning Testing Solution

- › Combined 40G/43G and OSNR testing solution in a portable unit; ideal for field testing
- › Simultaneous testing of OSNR and 40G BERT to speed up the commissioning process and reduce OPEX
- › OC-768/STM-256 mapping with STS-1/AU-3 granularity; covering all possible configurations in 40G networks
- › OTU3 with FEC testing and advanced capabilities including ODU MUX, Intrusive Through mode, overhead manipulation/monitoring and decoupled mode; all as software options where no additional hardware is required
- › SONET/SDH mapping into OTN with STS-1/AU-3 granularity; matching all ROADM mapping structures
- › Remote management, integrated optical tools, reporting capability, power up and restore, battery operation and “favorites”; for simplified field testing
- › Compatibility with multiple line codes; NRZ, duo-binary and DPSK



FTB-5240S-P  
(spectral solution for 40G and  
ROADM in-band OSNR)

FTB-8140  
Transport Blazer  
(40G/43G testing)



FTB-8130NGE  
Power Blazer  
(service testing up to 10G)

FTB-8140  
Transport Blazer  
(40G/43G testing)

- › Turning up SONET/SDH and packet-based services over OTN?
- › Looking to validate and benchmark Ethernet services for SLAs?

### 40G/43G Service Turn-Up Solution

- › Combined transport and packet testing solution; ideal for service turn-up in 40G ROADM-based networks
- › Simultaneous testing of 10G and 40G BERT to speed up the service turn-up process and reduce OPEX
- › T1/E1 to OC-768/STM-256 testing in one box; covering all low- and high-speed interfaces in the network
- › OTU1/2/3, OTU1e/2e and OTU1f/OTU2f with FEC testing day one through software option; for seamless integration and convergence of the network
- › 10M to 10G LAN/WAN Ethernet and 1x/2x/4x/10x Fibre Channel through software options; offering the required qualifying tools for SLAs
- › Optional next-generation SONET/SDH (GFP, VCAT and LCAS) over OTN; required for turning up EoS and into OTN
- › Remote management, integrated optical tools, reporting capability, power up and restore, battery operation and “favorites”; for simplified field testing