

FG-750 Access (P2P)/Metro/Core

OTDR-BASED REMOTE FIBER TEST SYSTEM

- Scalable test solution for fiber network monitoring and management, from one stand-alone unit to centrally managed systems with anywhere from one to hundreds of test ports



KEY FEATURES

- Up to 46 dB dynamic range on dark fiber and 43 dB on lit fiber
- Narrow band CWDM OTDRs
- Redundant and hot-swappable power supply modules
- Scalable from one to 96 ports in 2U height
- Local storage on solid-state disks
- IPV4- and IPV6-compliant

APPLICATIONS

- Continuous 24/7 fiber network monitoring
- Dark-fiber SLA management
- Network fault correlation and analysis
- Automation of OTDR testing for network operation and maintenance

PART OF THE FG-700 FIBER GUARDIAN SERIES



Test Access
Module Kit

NOVA Fiber

NOVA Fiber

UNMATCHED FIBER MONITORING SOLUTION

- Truly scalable from one stand-alone unit to a centrally managed system, without the upgrade hassles
- Adaptive technology that sets the best possible fault detection thresholds while reducing false positives; requires no OTDR experience or previous knowledge of the fiber being tested
- Add test ports without adding rack space
- System is compliant with NEBS™ for 24/7 permanent installations
- Fiber can be put on surveillance with just two clicks, upon commissioning or after repair
- System remote diagnosis and management, as found in server equipment (baseboard management controller - BMC)
- High OTDR performance throughout all operation ranges, as opposed to just the longest pulse width

Self-learning, plug-and-play unit

Fiber Guardian is a plug-and-play solution that is simple enough for beginners, yet powerful and flexible enough for experts. The unit does not require any additional infrastructure, i.e., no server or external PC—just a LAN/WAN connection and a web browser for remote access.

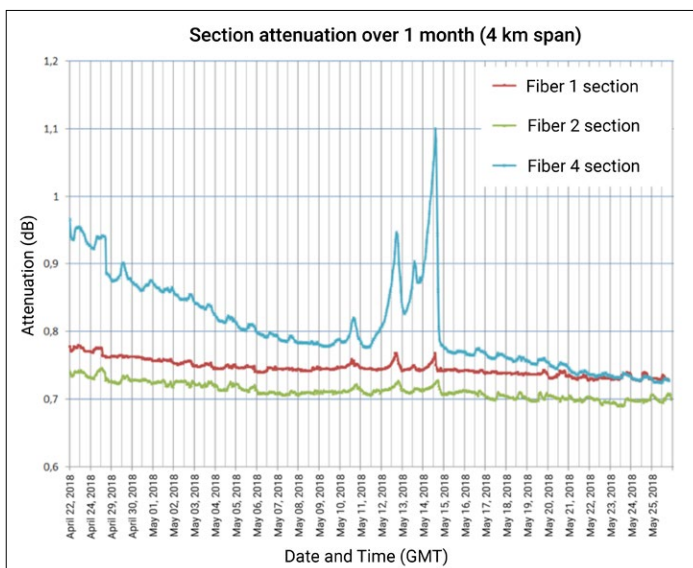
If you have limited knowledge of the fault-detection thresholds required for new fiber, simply select the appropriate sensitivity level desired—fine, normal or coarse—and Fiber Guardian will take care of the rest. A diagnostic process with adaptive learning algorithms optimally determines where your selected level of fault-detection thresholds can and cannot be applied on the trace.

If you own a competing solution and are tired of it producing alarms for no reason, or annoyed by its lengthy and fully manual event-by-event threshold-setting process, Fiber Guardian is for you.

Take the more preventive approach

Fiber Guardian is a multiport OTDR unit with the capability to first record a reference condition on each connected fiber, and then execute further tests to detect and precisely locate any deviation from the initial condition. Testing can be executed on demand, continuously, or on a programmed schedule. The types of tests supported range from simple, remotely executed OTDR tests to trend analysis spanning days or months on complete cable systems.

- OTDR testing: Performs unplanned and fully manual tests with a results download.
- On-demand testing: A test can be triggered manually over the web UI, or automatically using a simple network management protocol (SNMP) command in the case of any management system reporting a link down or service interruption.
- 24/7 monitoring: All fibers are checked one at a time for any degradation, in repeated cycles typically ranging from 10 seconds to 45 seconds. Only fault-related events are stored, and short-message service (SMS), email or SNMP traps are sent out immediately.
- Scheduled testing: Tests can be scheduled for predefined times and at fixed intervals (daily, weekly, etc.), with all results stored for historical analysis.
- Cable analysis (template): Same as scheduled testing, but will force testing on every splice/section of a cable, then assemble all test results into a single organized .csv file.



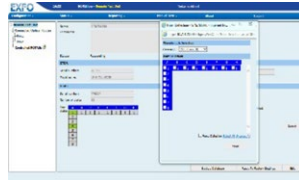
Example of a real-life cable-attenuation trend analysis created from a cable template test function using one four-port Fiber Guardian unit placed at one end of the cable span for a period of 30 days.

Figure 1. Section attenuation over one-month period, 4 km span.

GROW YOUR SOLUTION STEP BY STEP

Fiber Guardian is a truly scalable solution that can be leveraged with one probe with just a few test ports in one central office, and can be expanded with up to hundreds of centrally connected remote test units, each with up to 96 ports in a very dense rack space. You can therefore build as you grow a fully monitored dark-fiber infrastructure, satisfying your most demanding customers. Whether you are looking for a simple installation capable of monitoring one specific link, or to create a complete view of all important cable spans in space and in time, Fiber Guardian will give you all the flexibility you need to help improve your operational efficiency.

INTEGRATION



FG-750 Client API

Features and functions over an open REST API



FG-750 Stand-alone operation

- 100% stand-alone
- System in a box
- Web UI
- Alarms and notifications



FG-750 Central management software (Nova Fiber FMS)

Configure and monitor, firmware update, alarms and notifications, RTU monitoring, "phone home" approach

CAPACITY



Fiber Guardian: Stand-alone, rackmount, remote OTDR with fault detection and analysis, local storage and basic reporting.



Add ports on expandable model (FG-750EX) so that you can buy as you grow from a given node.



Add extra Fiber Guardian units to cover wider (new) regions, or go deeper into the network.

A SYSTEM IN A BOX

Fiber Guardian can interface with mobile or fixed users, fault management systems, physical inventory systems, and other equipment, including element management systems (EMS) and network management systems (NMS).

Network setup is done locally using the host web UI. Fibers to be monitored are connected to the Fiber Guardian—from this point, any authorized user can log in and start testing and monitoring the network. Fiber Guardian can be run over an IPV4 or IPV6 network. A wireless network interface supporting most types of technologies and bands is also available as an option.

On-demand testing over the SNMP interface is supported, which interrupts the multiport round-robin monitoring sequence in order to execute—on a high-priority basis—an OTDR test comparing a baseline or reference with an actual trace. In the event of deviation, a fault status is triggered, after which one or multiple notifications will be immediately sent via email, SMS and SNMP.

ENHANCED SECURITY MODULE

The FG-750 contains a locally hosted Identity and Authentication Module (IAM). It can also be hosted on an external server to facilitate user administration and management when multiple FG-750s are involved.

The IAM runs on a secure protocol (HTTPS) to enhance security and encrypt data between users and FG-750s. The IAM can be integrated with your LDAP or Active Directory servers as well as corporate identity providers such as SAML, OpenID, Facebook, etc.

This module provides single signon capability once the user is authenticated. Additionally, it allows you to track open sessions and lock out or terminate user sessions.

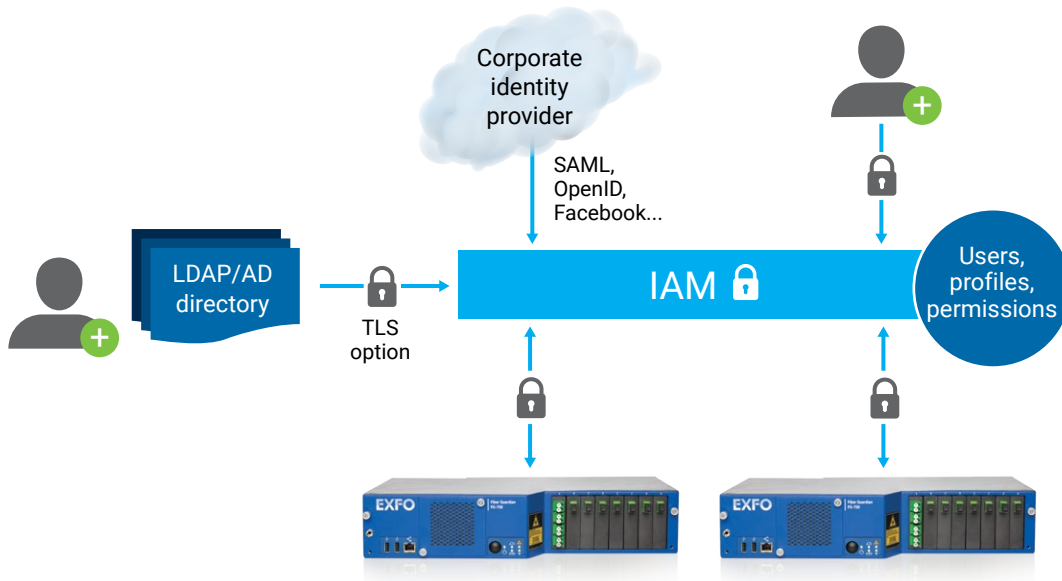


Figure 3. IAM can be hosted locally or on an external server

All specifications valid at 23° C ± 2° C, unless otherwise specified.

OTDR TEST MODULE FOR FG-750					
Models ^a	OTM-740-DMET	OTM-750-DCOR	OTM-740-AMET	OTM-740-ACOR	OTM-740-CDxx
Central wavelength(s) (nm) ^b	1550 ± 20	1550 ± 20	1625 ± 10	1650 ± 5	xx: 03 – 1310 xx: 10 – 1490 xx: 11 – 1510 xx: 13 – 1550 xx: 16 – 1610 All ± 3
Acquisition mode	OTDR	OTDR	OTDR	OTDR	OTDR
Internally filtered (live port)	–	–	Y	Y	Y
Internal filter width (nm)			± 15	± 7	± 6.5
Event dead zone (m) ^{b, c}			0.8		
Attenuation dead zone (m) ^{b, c}			3.5		
Sampling points (pts)			256 000		
Sampling resolution (m)			0.04 to 10		
Pulse width (ns)			3 to 20 000		
Distance range (km)			1 to 320		
Display resolution (dB)			0.001 – Attenuation/loss 0.01 – Reflectance		
Reflectance/ORL accuracy (dB) ^b			± 2		
Linearity (dB/dB) ^b			0.03		
Dynamic range (dB) ^{b, d}	42	46	42	43	41 40 at 1610
Distance accuracy (m) ^e	±(0.75 + 0.0025% x distance + sampling resolution)				

a. All modules are LinkAware™-ready. OTDR mode is the classical way of acquiring, presenting and filing test results.

b. Typical.

c. For reflectance below –55 dB, using the smallest pulse width available.

d. Dynamic range at 20 μs pulse width, with a three-minute averaging at SNR = 1.

e. Does not include uncertainty due to fiber index or cable characteristics (e.g., helix).

REMOTE TEST UNIT PLATFORM		
Standard model—number of optical ports ^a	SC-APC or FC-APC	1/4/8/12/24/32 ports
Expandable model—number of optical ports	4-port SC-APC optical switch cassette (OSC) 8-port LC-APC OSC 12-port MTP-APC OSC Maximum eight (8) OSCs per unit Scalable, modular construction Field-configurable	8 to 96 ports ^b
Internal optical switch type	MEMs ^c	
Internal optical switch lifetime (minimum number of cycles)		1 000 000 000 (10 ⁹)
MEMs external/remote optical switch	Refers also to M-OTAs or MEMs-based optical test access units (SC-APC); DC or AC powered	1U size: 1x8, 1x16, 1x32 2U size: 1x48, 1x72 4U size: 1x96
Wired network interfaces	10/100/1000 Base-T Ethernet IP-V4 and V6, one dedicated to local access	2
Unit status front LEDs		5
Storage type and data storage (GB)	Solid state drive	64
Dual, hot-swappable and redundant power supplies	Rear swap, AC or DC	VAC 100 to 240, 50/60 Hz VDC -40/-72
Power consumption steady state (fully loaded with 96 ports)	Over entire operating temperature range	35 W
Fan	Field replaceable; front loading	1
Rack type	Drawer on rail	
Supported browsers for unit configuration and status view	MS Internet Explorer™, Mozilla Firefox®, Google Chrome™	
Temperature	Operating Storage	-5 oC to 50 oC (23 °F to 122 °F) -40 oC to 70 oC (-40 °F to 158 °F)
Relative humidity	Non-condensing	0% to 95%
Maximum operation altitude ^d		3000 m (9850 ft)
Size (for 19-in, ETSI or 23-in racks) (H x W x D)	Fits in 300 mm deep ETSI rack with cabling (DC model) connected	88 mm (2U) x 435 mm x 270 mm (3 7/16 in (2U) x 17 1/8 in x 10 5/8 in)
Maximum weight (with 8 OSCs)		8.7 kg (19.1 lb)
Product Compliance	CE, CSA, RoHS, NEBS ^e	
Wireless network interface option	Integrated wireless communication module with external antenna (SIM not included; some conditions such as level of signal inside premises apply)	HSPA+, GSM/GPRS/EDGE and CDMA 1x RTT

STANDARD RTU ACCESSORIES	
Notification agent software tool	
User guide	
Rackmount kit	
Relay outputs	

LASER SAFETY

SOFTWARE OPTIONS AND OPTIONAL ACCESSORIES	
Ordering	Description
OSC-4-SC	1x4 optical switch cassette in SC-APC
OSC-8-LC	1x8 optical switch cassette in LC-APC
OSC-12-MTP	1x12 optical switch cassette in MTP-APC
GP-3059	17-foot wired antenna for wireless interface option
GP-3065	Test jumper management tray (attach to unit front)

a. One port is without internal MEMs switch for connection to external OTAU.
 b. 96 ports with MTP-type OSCs.
 c. Micro-electromechanical system.
 d. Operation at higher elevations is possible but restricts the maximum temperature at which the unit can operate; consult the factory for more details.
 e. The equipment is NEBS-compliant based on Verizon VZ.TPR.9303 for test and measurement equipment—permanent installation, and AT&T ATT-TP-76200 (Carrier Grade Level 1). Contact factory or visit the following URL for more details about this certification: www.verizonnebs.com/TPRs/VZ-TPR-9303.pdf



ORDERING INFORMATION

FG-750ST-XX-XX-XX-XX-XX-XX-XX

Model

- FG-750ST-DMET
- FG-750ST-DCOR
- FG-750ST-AMET
- FG-750ST-ACOR
- FG-750ST-CD03
- FG-750ST-CD10
- FG-750ST-CD11
- FG-750ST-CD13
- FG-750ST-CD16

Port option

- 01 = 1 port
- 04 = 4 ports
- 08 = 8 ports
- 12 = 12 ports
- 24 = 24 ports
- 32 = 32 ports

Connectors

- 58 = FC-APC
- 88 = SC-APC

Communication interface

- XG2** = Internal 3G broadband interface
For LTE, works on B1, B3, B5, B7, B8, B18, B19, B21, B28, B38-41 bands
- XG3** = Internal 3G broadband interface
For LTE, works on B1-B5, B7, B8, B12, B13, B20, B25, B26, B29, B41 bands

Software option

- CLT** = Stand-alone operation. Client API for integrated solution to third party or SDN
- SA** = Stand-alone operation. Web UI for configuration, operation and maintenance

Option

- RK19-2U** = 2U rackmount kit 19-inch
- RK23-2U** = 2U rackmount kit 23-inch
- RKET-2U** = 2U rackmount kit ETSI size

Power

- AC** = Dual (2) 100–240 VAC power supply
- DC** = Dual (2) –48 VDC power supply
- HC** = –48 VDC power supply (1) and 100–240 VAC –50/60 Hz (1)

Example: FG-750ST-DMET-04-58-XG2-AC-RK19-2U-SA

FG-750EX-XX-XX-XX-XX-XX-XX-XX

OTDR option

- DMET
- DCOR
- AMET
- ACOR
- CD03
- CD10
- CD11
- CD13
- CD16

Kit connectors

- 88 = SC-APC mounted kit
- 104 = LC-APC mounted kit
- 92F = MTP-APC mounted kit

Cassette port

- | | | |
|-----------------------|-----------------------|------------------------|
| For SC-APC Kit | For LC-APC Kit | For MTP-APC Kit |
| SC08 = 8 ports | LC08 = 8 ports | MTP12 = 12 ports |
| SC17 = 17 ports | LC16 = 16 ports | MTP24 = 24 ports |
| SC20 = 20 ports | LC24 = 24 ports | MTP48 = 48 ports |
| SC26 = 26 ports | LC32 = 32 ports | MTP72 = 72 ports |
| SC32 = 32 ports | LC48 = 48 ports | MTP96 = 96 ports |
| | LC64 = 64 ports | |

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Example: FG-750EX-AMET-88-SC17-XG2-AC-RK19-2U-SA

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