

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 one or hundreds of test ports

MAIN 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

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

PART OF THE FG-700 FIBER GUARDIAN SERIES



Test Access
Module Kit



Node Optical
Test Access Unit

UNMATCHED FIBER MONITORING SOLUTION

- › Truly scalable from one stand-alone unit to a centrally managed system, without the hassle of any upgrades
- › Adaptive technology that sets the best possible fault detection thresholds while reducing false positives; requires no OTDR experience or previous knowledge of the fiber under test
- › 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.

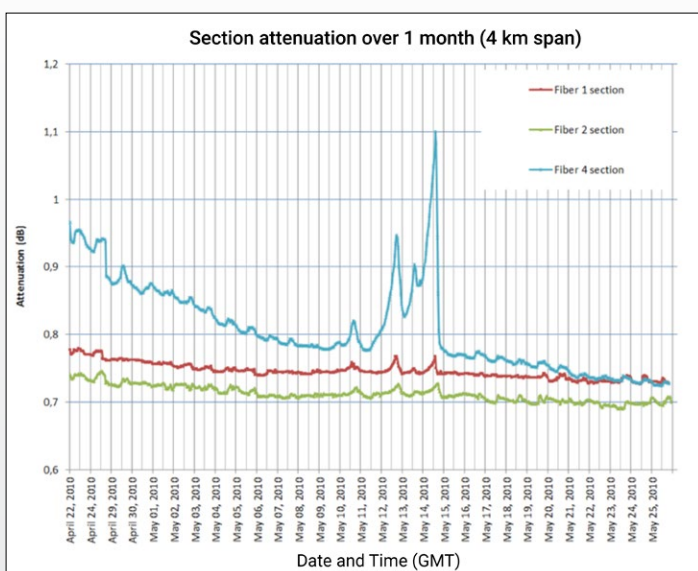
If you have limited knowledge of the fault-detection thresholds required for a new fiber, simply select the appropriate sensitivity level desired—fine, normal or coarse—and Fiber Guardian will take care of the rest. A diagnostic process with adaptive learning algorithms optimally determines where your 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 condition.
- › 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 set for predefined times and at repeated 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.

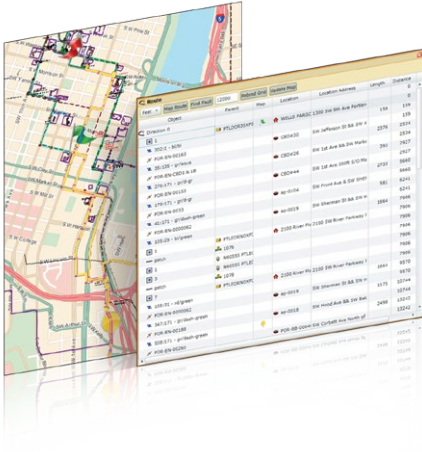


Example of a real-life cable-attenuation trend analysis created from a cable template test function using one four-port Fiber Guardian unit placed at one end of the cable span for a period of 30 days.

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, thus reaching out to the most demanding of your 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.

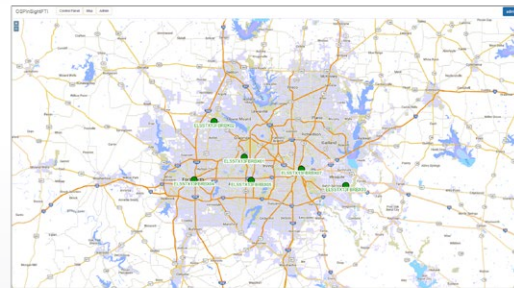


OSPIInSight: GIS-based physical-network inventory tool that is fully integrated with NQMSfiber, and used for planning, construction and maintenance of the cable and fiber network.



NQMSfiber: Fully centralized operation with unified views of the network status, alarms and users, in addition to performance reports for your fiber network availability.

Fiber Test InSight: Automatic mapping of the fiber fault over the Web and Internet maps. Look it up with Google, and then drive to point of failure; can be used with one or multiple Fiber Guardian units.



Fiber Guardian: Stand-alone, rack-mounted, 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 out on various channels, namely emails, SMS and SNMP.

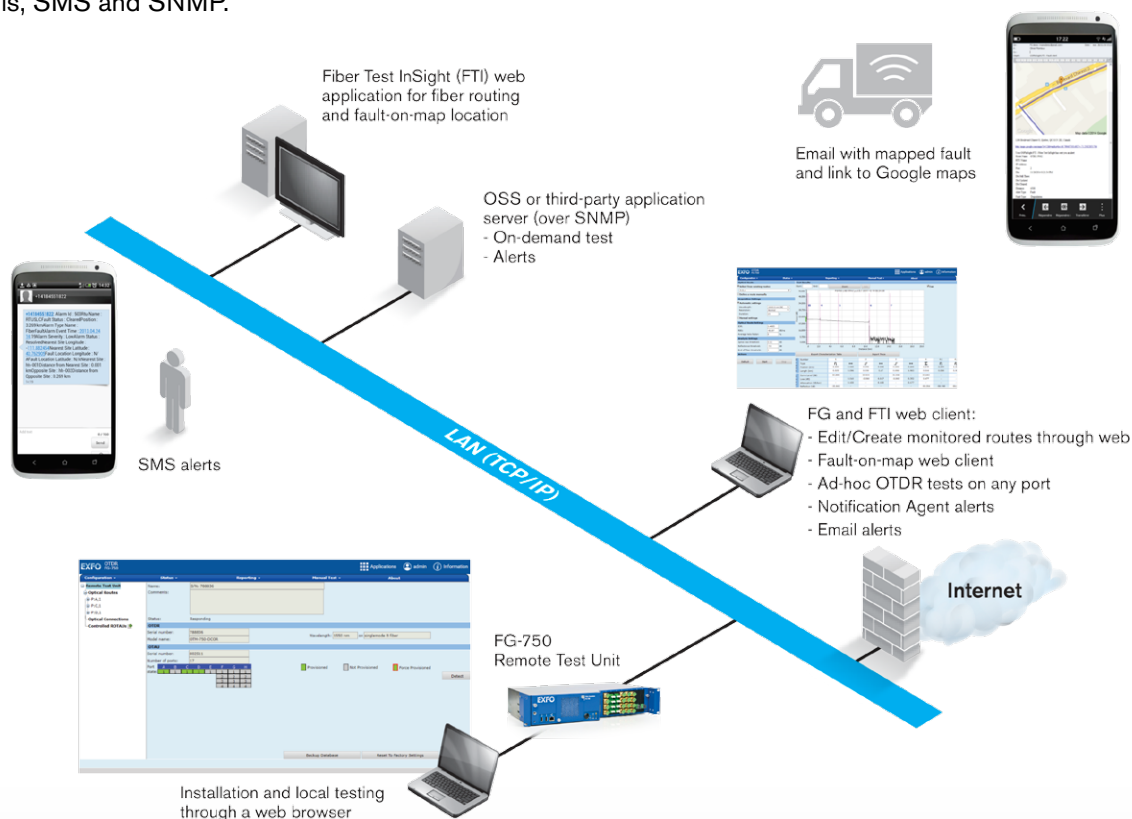


Figure 2. Functional diagram of Fiber Guardian with optional Fiber Test InSight for light and easy fault-on-map capability

FIBER TEST INSIGHT—AUTOMATION AND SIMPLIFIED OTDR FAULT MAPPING

Fiber Test InSight is a software option that automatically converts an optical-length-to-fault measurement into a physical location on a network map, within just seconds. The software is a web application leveraging internal maps and cloud services such as Google Maps. Drawing and setup of new fiber routes is as easy as using Google or Bing maps. Splice location and span (optical length) are set up directly on the map, enabling the highest level of precision possible with minimum effort. With the ability to support one or multiple Fiber Guardian units, the software is truly scalable. Features include email alert (running on all tablets and smartphones) with a URL/hyperlink to Google Maps software, export/import fiber-route capabilities, color coding, multilingual Web UI, and much more.

ENHANCED SECURITY MODULE

The FG-750 contains an Identity and Authentication Module (IAM) that is hosted locally or can be hosted on an external server to facilitate Users 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 to your LDAP or Active Directory servers as well as Corporate Identity Provider such as SAML, OpenID, Facebook, etc.

This module allows you to have a single-sign on capability once the user is authenticated. Additionally, it allows you to track opened sessions and lock-out or finish user sessions.

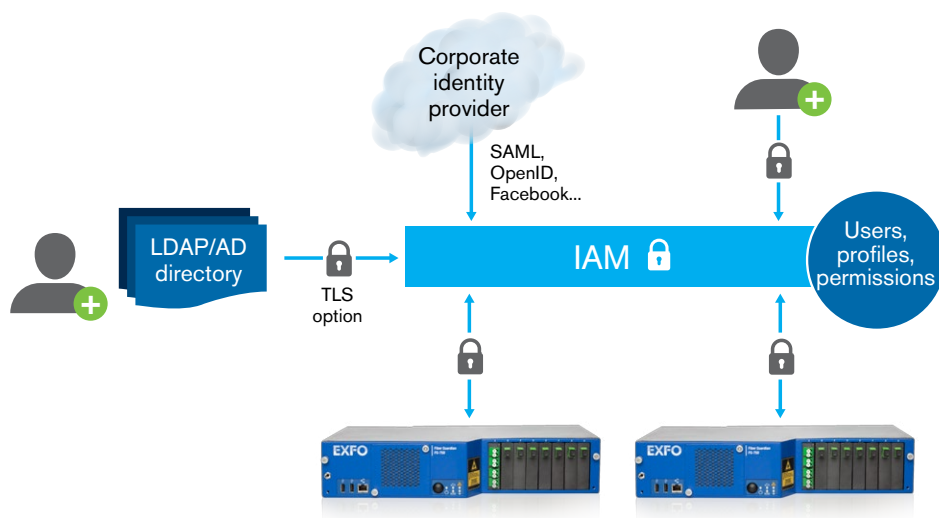


Figure 3. The Identity and Authentication Module (IAM) can be hosted locally or on an external server

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

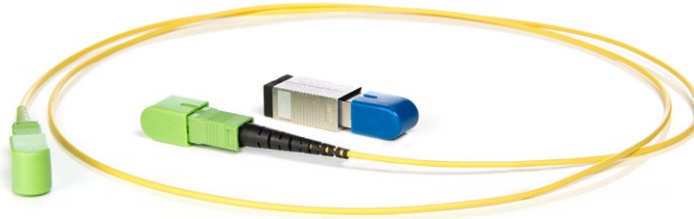
| OTDR TEST MODULE FOR FG-750 | | | | | | |
|--|--------------|--------------|--|--------------|--|-----------------------|
| Models ^a | OTM-740-DMET | OTM-750-DCOR | OTM-740-AMET | OTM-740-ACOR | OTM-740-CDxx | OTM-700-NODE |
| Central wavelength(s) (nm) ^b | 1550 ± 20 | 1550 ± 20 | 1625 ± 10 | 1650 ± 5 | xx: 03 – 1310 xx: 10 – 1490 xx: 11 – 1510 xx: 13 – 1550 xx: 16 – 1610 All ± 3 | 1625 ± 3/ 1650 ± 4 |
| Acquisition mode | OTDR | OTDR | OTDR | OTDR | OTDR | OTDR or iOLM |
| Internally filtered (live port) | – | – | Y | Y | Y | Y |
| Internal filter width (nm) | | | ± 15 | ± 7 | ± 6.5 | 1620 to 1670 |
| Event dead zone (m) ^{b, c} | | | 0.8 | | | 0.5 |
| Attenuation dead zone (m) ^{b, c} | | | 3.5 | | | 2 |
| Sampling points (pts) | | | 256 000 | | | |
| Sampling resolution (m) | | | 0.04 to 10 | | | |
| Pulse width (ns) ^d | | | 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, e} | 42 | 46 | 42 | 43 | 41 40@1610 | 35/33 |
| Distance accuracy (m) ^f | | | ±(0.75 + 0.0025% x distance + sampling resolution) | | | |
| Minimum attenuation when measured with HRD (dB) ^{b, g} | | | | | | 10 |
| Maximum attenuation for HRD detection (5 km/20 km ranges) (dB) ^{b, g, i} | | | | | | 32/30.5 |
| Maximum measurable attenuation with HRD (dB) ^{b, g} | | | | | | 35 |
| Attenuation measurement uncertainty (dB) ^{b, h} | | | | | | 0.6 |
| Attenuation measurement repeatability (dB) | | | | | | 0.1 |
| Attenuation measurement display resolution (dB) | | | | | | 0.01 |
| Minimum optical separation for HRD (m) ^{b, i} | | | | | | 0.5 |

Notes

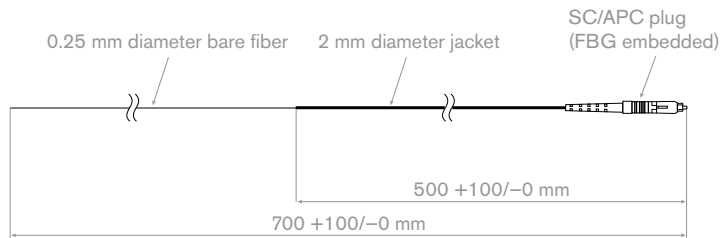
- All modules are LinkAware™-ready; only OTM-700-Node works as an iOLM (Intelligent Optical Link Mapper) product. OTDR mode is the classical way of acquiring, presenting and filing test results.
- Typical.
- For reflectance below –55 dB, using the smallest pulse width available. Attenuation dead zone for reflectance below –45 dB is 3 m for OMT-700-NODE and 4.5 m for all other OTM models.
- 3 ns available on OTM-700-NODE module, otherwise minimum pulse width is 5 ns.
- Dynamic range at 20 µs pulse width, with a three-minute averaging at SNR = 1.
- Does not include uncertainty due to fiber index or cable characteristics (e.g., helix).
- From OTDR port.
- For attenuation levels between 15 and 30 dB with EXFO-qualified HRD filters.
- For two HRDs connected to the same splitter or at similar attenuation points.
- Guaranteed specification for maximum measurable attenuation for new HRD placement/detection is 30.4 dB for a 5 km (or less) range from the OTDR.

HIGH-REFLECTANCE DEMARCATION FILTERS

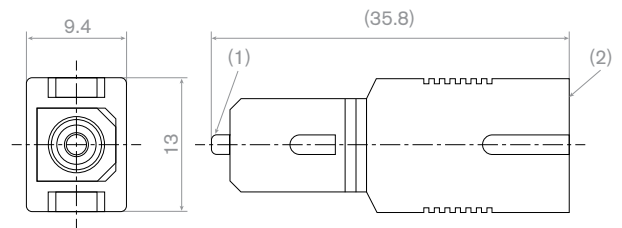
Two models are available: pigtail and adapter. In both cases, the filters must be inserted in the proper direction in order to measure attenuation. Pigtails are bare fiber on the network side (upstream), whereas high-reflectance demarcation (HRD) is in an SC connector, inside ferrule, on the customer side. For plug type or adapter type, the male side connects toward the optical network terminal (ONT). HRDs are also available on request in a field-assembly connector type.



Pigtail type:



Plug jack/adapter type:



HRD FILTER SPECIFICATION (PIGTAIL TYPE)^a

| | | |
|----------------------------------|------------------------------------|--------------|
| Passband (nm) | 1260 to 1630 | |
| Reflect band (nm) | 1645 to 1655 | |
| Fiber type | Corning SMF-28 | |
| Insertion loss (dB) ^b | 1310 nm ± 20 nm 1550 nm ± 20 nm | ≤ 1.3 |
| Isolation (dB) | 1650 nm ± 5 nm | ≥ 21 |
| Return loss (dB) | 1310 nm ± 20 nm 1550 nm ± 20 nm | ≥ 35 ≥ 33 |
| Reflectance (dB) | 1650 nm ± 5 nm | ≥ -1.1 |

Notes

a. Specification valid at an operating temperature of 23 °C ± 2 °C.

b. Including one connector with a nominal loss of 0.4 dB.

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 |
| Large external/remote optical switch (1 x n) ^d | High number of ports | 576/720 ports |
| Wired network interfacing | 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 | 32 |
| 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 °C to 50 °C (23 °F to 122 °F) -40 °C to 70 °C (-40 °F to 158 °F) |
| Relative humidity | Non-condensing | 0% to 95% |
| Maximum operation altitude ^e | | 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 ^f | |
| 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 |

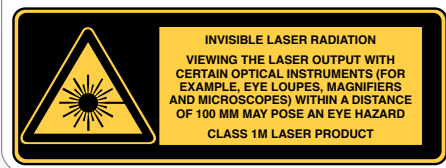
SOFTWARE OPTIONS AND OPTIONAL ACCESSORIES

| Ordering | Description |
|---------------|---|
| NQMS-SERV-STD | Connect to NQMS <i>fiber</i> Element Management Server application; Standard Edition |
| NQMS-SERV-ENT | Connect to NQMS <i>fiber</i> Element Management Server application; Enterprise Edition |
| SW-FTI | Fiber Test InSight for Google Maps and Open Street Maps; fault-on-map web-server application software |
| SW-FTIA | Additional Fiber Test Insight for Google Maps & Open Street Maps |
| 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-3061 | High-reflectance demarcation filter in a SC-APC bulkhead adapter |
| GP-3062 | High-reflectance demarcation filter in a SC-UPC bulkhead adapter |
| GP-3063 | High-reflectance demarcation filter—SC-APC pigtail |
| GP-3064 | High-reflectance demarcation filter—SC-UPC pigtail |
| GP-3065 | Test jumper management tray (attach to unit front) |

Notes

- One port is without internal MEMs switch for connection to external OTAU.
- 96 ports with MTP-type OSCs.
- Micro-electromechanical system.
- Optomechanical-type optical switch.
- Operation at higher elevations is possible but restricts the maximum temperature at which the unit can operate; consult the factory for more details.
- The equipment is NEBS-compliant based on Verizon VZ.TPR.9303 Issue 1, March 2007 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

LASER SAFETY



STANDARD RTU ACCESSORIES

- Notification agent software tool
- User guide
- Rackmount kit
- Relay outputs

ORDERING INFORMATION

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

Model

FG-750ST-NODE-iOLM
 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

XG1 = Internal 3G broadband interface
 For LTE, works on B2, B4, B5, B13, B25 bands
 XG2 = Internal 3G broadband interface
 For LTE, works on B1, B3, B7, B8, B20 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
 STD = Connect to a NQMS*fiber* Standard edition application server
 ENT = Connect to a NQMS*fiber* Enterprise edition application server

Option

RK19-2U = 2U rack-mount kit 19-inch
 RK23-2U = 2U rack-mount kit 23-inch
 RKET-2U = 2U rack-mount 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-XG1-AC-RK19-2U-SA

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

Model

FG-750EX

OTDR option

NODE-iOLM
 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 | |

Communication interface

XG1 = Internal 3G broadband interface
 For LTE, works on B2, B4, B5, B13, B25 bands
 XG2 = Internal 3G broadband interface
 For LTE, works on B1, B3, B7, B8, B20 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
 STD = Connect to a NQMS*fiber* Standard edition application server
 ENT = Connect to a NQMS*fiber* Enterprise edition application server

Option

RK19-2U = 2U rack-mount kit 19-inch
 RK23-2U = 2U rack-mount kit 23-inch
 RKET-2U = 2U rack-mount 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-750EX-AMET-88-SC17-XG1-AC-RK19-2U-SA

EXFO Headquarters > Tel.: +1 418 683-0211 | Toll-free: +1 800 663-3936 (USA and Canada) | Fax: +1 418 683-2170 | info@EXFO.com | www.EXFO.comEXFO serves over 2000 customers in more than 100 countries. To find your local office contact details, please go to www.EXFO.com/contact.

EXFO is certified ISO 9001 and attests to the quality of these products. EXFO has made every effort to ensure that the information contained in this specification sheet is accurate. However, we accept no responsibility for any errors or omissions, and we reserve the right to modify design, characteristics and products at any time without obligation. Units of measurement in this document conform to SI standards and practices. In addition, all of EXFO's manufactured products are compliant with the European Union's WEEE directive. For more information, please visit www.EXFO.com/recycle. Contact EXFO for prices and availability or to obtain the phone number of your local EXFO distributor.

For the most recent version of this spec sheet, please go to www.EXFO.com/specs.

In case of discrepancy, the Web version takes precedence over any printed literature.