User Guide

OTH-7000

OTH Remote Test Unit

www.EXFO.com

EXFO's Commerce And Government Entities (CAGE) code under the North Atlantic Treaty Organization (NATO) is 0L8C3.

The information contained in this publication is subject to change without notice.

Trademarks

EXFO's trademarks have been identified as such. However, the presence or absence of such identification does not affect the legal status of any trademark.

Where applicable, the Bluetooth® word mark and logos are registered trademarks owned by Bluetooth SIG, Inc. and any use of such marks by EXFO Inc. is under license. Where applicable, the MTP® mark is a registered trademark of US Conec Ltd. Other third party trademarks and trade names are those of their respective owners.

Units of Measurement

Units of measurement in this publication conform to SI standards and practices.

Patents

The exhaustive list of patents is available at EXFO.com/patent.

Version number: 12.0.0.1

Contents

Regulatory Information

USA Electromagnetic Interference Regulatory Statement

Electronic test and measurement equipment is exempt from FCC part 15, subpart B compliance in the United States of America. However, EXFO Inc. makes reasonable efforts to ensure compliance to the applicable standards.

The limits set by these standards are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the user documentation, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Canada Electromagnetic Interference Regulatory Statement

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference.

Cet équipement génère, utilise et peut émettre de l'énergie radio-fréquence et, s'il n'est pas installé et utilisé conformément à la documentation de l'utilisateur, il peut occasionner une interférence néfaste aux communications radio. L'utilisation de cet équipement dans une zone résidentielle est susceptible d'occasionner une interférence néfaste.

Caution: This equipment is not intended for use in residential environments and may not provide adequate protection to radio reception in such environments.

Attention : Cet appareil n'est pas destiné à être utilisé dans des environnements résidentiels et peut ne pas assurer la protection adéquate à la réception radioélectrique dans ce type d'environnements.

This is a class A, group 1 product.

Ceci est un produit de classe A, groupe 1.

- Class A equipment: Equipment that is, by virtue of its characteristics, highly unlikely to be used in a residential environment, including a home business shall be classified as class A and shall comply with the class A limits specified in the applicable ICES standard. Characteristics considered in this assessment include price, marketing and advertising methodology, the degree to which the functional design inhibits applications suitable to residential environments, or any combination of features that would effectively preclude the use of such equipment in a residential environment.

  Classe A : Matériel qui, en raison de ses caractéristiques, ne sera fort probablement pas utilisé dans un milieu domiciliaire ni par des entreprises établies à domicile. Parmi les caractéristiques considérées dans cette évaluation, il y a le prix, les méthodes de commercialisation et de publicité, la mesure dans laquelle les fonctions de l'appareil font qu'il ne se prête pas à des applications convenant au milieu domiciliaire ou toute combinaison de ces caractéristiques qui aurait pour conséquence d'en prévenir effectivement l'utilisation à domicile. Utilisé également pour indiquer les limites d'émission correspondantes qui s'appliquent à un tel matériel.

- Class B equipment: Equipment that cannot be classified as Class A shall comply with the Class B limits specified in the applicable ICES standard.

  Classe B : Matériel qui ne peut pas être inclus dans la classe A. Utilisé également pour indiquer les limites d'émission correspondantes qui s'appliquent à un tel matériel.

➤ Group 1 equipment: group 1 contains all equipment which is not classified as group 2 equipment, and includes equipment such as laboratory and scientific equipment, industrial process, measurement and control equipment.

Group 2 equipment: group 2 contains all ISM RF equipment in which radio-frequency energy in the frequency range 9 kHz to 400 GHz is intentionally generated and used or only used locally, in the form of electromagnetic radiation, inductive and/or capacitive coupling, for the treatment of material for inspection/analysis purposes, or for transfer of electromagnetic energy.

Appareils du groupe 1 : le groupe 1 réunit tous les appareils compris dans le domaine d'application de la présente Norme, qui ne sont pas classés comme étant des appareils du groupe 2. Le groupe 1 inclut les appareils scientifiques et de laboratoire, les processus industriels, appareils de mesure ou de contrôle.

Appareils du groupe 2 : le groupe 2 réunit tous les appareils ISM à fréquences radioélectriques dans lesquels de l'énergie à fréquences radioélectriques dans la plage de fréquences comprises entre 9 kHz et 400 GHz est produite et utilisée volontairement ou uniquement utilisée localement sous forme de rayonnement électromagnétique, de couplage inductif et/ou capacitif, pour le traitement de la matière, à des fins d'examen ou d'analyse ou pour le transfert d'énergie électromagnétique.

Supplier's Declaration of Conformity (SDoC)

The SDoC for your product is as follows:

CAN ICES-001 (A) / NMB-001 (A)

Electromagnetic Compatibility Regulatory Statement

Warning: This is a class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures. Your product is suitable for use in industrial electromagnetic environments.

General Wireless Compliance Related Information

Your unit comes with an internal wireless module (adapter) and antenna for which the information hereafter applies:

This product does not contain any wireless user-serviceable components. Any unauthorized product changes or modifications will invalidate warranty and all applicable regulatory certifications and approvals.

Canada and USA Wireless Compliance Related Information

Your unit comes with an internal wireless module (adapter) and antenna for which the information hereafter applies:

- This device complies with Part 15 of the FCC Rules.
- This device complies with Innovation, Sciences and Economic Development Canada license-exempt RSS standards.
- Operation is subject to the following two conditions:
  (1) This device may not cause harmful interference

  and

  (2) this device must accept any interference received, including interference that may cause undesired operation.

Use in Specific Environments:

- The use of wireless products in hazardous locations is limited by the constraints posed by the safety directors of such environments.
- The use of wireless products on airplanes is governed by the Federal Aviation Administration (FAA).
- The use of wireless products in hospitals is restricted to the limits set forth by each hospital.
- Do not operate a portable transmitter near unshielded blasting caps or in an explosive environment.

Radiation Exposure Statement:

- The product complies with the US/Canada portable RF exposure limit set forth for an uncontrolled environment and is safe for intended operation as described in this user documentation.
- Further RF exposure reduction can be achieved if the device can be kept as far as possible from the user's body.

RF Function and Frequency Range:

Your unit is designed to operate in the Bluetooth 2.4 GHz band, between the frequencies 2400 MHz – 2483.5 MHz.
The output power is 7.0 dBm typical.

EU and UK Wireless Compliance Related Information

Your unit is designed to operate in the Bluetooth 2.4 GHz band.

The information about the Bluetooth band is 2400 MHz – 2483.5 MHz.

The output power is 7.0 dBm typical.

This device is a 2.4 GHz wideband transmission system (transceiver), intended for use in all EU member states, United Kingdom, and EFTA countries, except in France and Italy where restrictive use applies.

In Italy, the end-user should apply for a license at the national spectrum authorities in order to obtain authorization to use the device for setting up outdoor radio links and/or for supplying access to telecommunications and/or network services.

This device may not be used for setting up radio links in France, and in some areas the RF output power may be limited to 10 mW EIRP in the frequency range of 2454 - 2483.5 MHz. For detailed information, the end-user should contact the national spectrum authority in France.

Simplified EU and UK Declaration of Conformity

Hereby, EXFO declares that the radio equipment type “OTH-7000” is in compliance with European Directive 2014/53/EU and the UK legislation S.I. 2017/1206 Radio Equipment Regulations 2017.

The full text of the declaration of conformity is available at the following Internet address: *www.exfo.com/en/resources/legal-documentation*.

EU Economic Operator

EXFO Solutions SAS
2, rue Jacqueline Auriol,
Saint-Jacques-de-la-Lande,
35091 Rennes Cedex 9
FRANCE

1 Introducing the OTH-7000 Optical Test Head

The OTH-7000 Optical Test Head is a remote test unit with an integrated OTDR and optical switch.

You can use the OTH-7000 to perform ad-hoc OTDR tests or in conjunction with EXFO RFTM (Remote Fiber Testing & Monitoring).

When you work with the FMS (Fiber Monitoring System), you can program tests or perform them on demand. The FMS is the central management software for all EXFO's fiber monitoring probes such as the OTH-7000, FG-750, and RTU-2.

Main Features

Your unit offers the following:

- One, four, sixteen, thirty-two, forty-eight or sixty-four optical output ports, depending on the purchased configuration
- Four USB host ports
- One LAN/WAN Ethernet port (10/100/1000 Base-T)
- One management Ethernet port (10/100/1000 Base-T) for local access
- One port to connect an SFP transceiver module
- Installation in 19-inch, ETSI racks or cabinets (with the provided brackets)
- Possibility to use with the RTUe-9120 external switches
- 24/7 surveillance of dark (no traffic) or live (with traffic) optical fibers
- Possibility of integration into a third-party monitoring system with the provided API

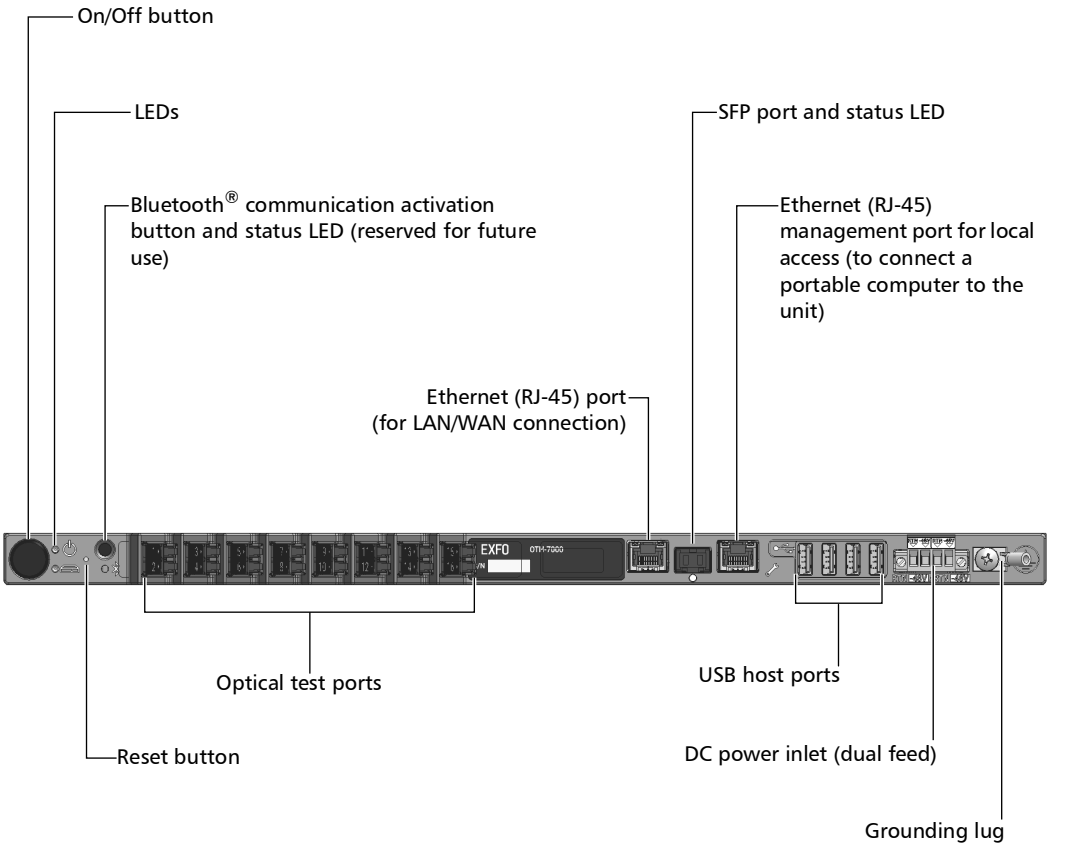
Available Configurations

Several configurations are available for the OTH-7000 Optical Test Head.

Configuration	Features
AWAT-1	➤ Remote test unit (RTU) with integrated OTDR ➤ One SC-APC output port ➤ Ideal for P2P live and dark fiber links
AWAT-4	➤ RTU with integrated OTDR and optical switch ➤ Four SC-APC output ports ➤ Ideal for P2P live and dark fiber links
AWAT-16	➤ RTU with integrated OTDR and optical switch ➤ Sixteen LC-APC output ports ➤ Ideal for P2P live and dark fiber links
AWAT-48	➤ RTU with integrated OTDR and optical switch ➤ Forty-eight LC-APC output ports ➤ Ideal for P2P live and dark fiber links
UBRD-1	➤ Remote test unit (RTU) with integrated OTDR ➤ One SC-APC output port ➤ Ideal for P2P live fiber links with traffic or supervisory operations on the L band ➤ Also ideal for PON dark and live fiber links with mid to low port density (128 or 256 ports when combined with an external RTUe-9120 switch)

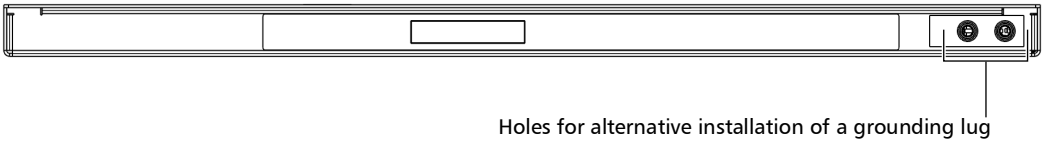
Configuration	Features
UBRD-4	➤ RTU with integrated OTDR and optical switch ➤ Four SC-APC output ports ➤ Ideal for P2P live fiber links with traffic or supervisory operations on the L band ➤ Also ideal for PON dark and live fiber links with mid to low port density (32 to 512 ports when combined with an external RTUe-9120 switch)
UBRD-32	➤ RTU with integrated OTDR and optical switch ➤ Two MPO-APC ports containing 16 fibers each (two rows of eight fibers) ➤ Ideal for P2P live fiber links with traffic or supervisory operations on the L band ➤ Also ideal for PON dark and live fiber links with mid to low port density
UBRD-64	➤ RTU with integrated OTDR and optical switch ➤ Four MPO-APC ports containing 16 fibers each (two rows of eight fibers) ➤ Ideal for P2P live fiber links with traffic or supervisory operations on the L band ➤ Also ideal for PON dark and live fiber links with mid to low port density

Front panel (16-port model shown)



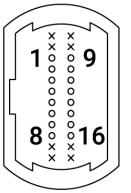
Note: *You can also connect the unit to AC power with the AC/DC power adapter sold by EXFO.*

Back panel



Correspondence Between Port Numbers and Fiber Numbers (Units With MPO Connectors)

Your unit is equipped with unpinned MPO connectors. Only the sixteen central fibers are used as shown below.



The table below lists the fiber numbers associated with each MPO port for easier identification.

Note: *The number of ports varies with the configuration of the unit that you have purchased.*

Port Number	Fiber Numbers
1	1 to 16
2	17 to 32
3	33 to 48
4	49 to 64

LED Indicators Description

There are LED indicators located on the front panel of your unit, providing you with information about the power and system statuses.

The table below presents the possible statuses once the initial startup sequence is complete.

LED	Status	Meaning
Power	Green	Unit is on.
	Off	Unit is off.
System[a]	Green	The unit is working properly and is ready.
	Green, slow blinking[b]	The initialization of the unit is underway.
	Green, fast blinking[c]	The unit is being restored to its original state at time of purchase (factory state).
	Yellow	Non-critical hardware error detected. The temperature of the room where the unit is located could be slightly too high or there could be a hardware malfunction. Ensure that the temperature falls within the specified operating temperature range (see *Electrical Safety Information* on page 16). If the problem persists, contact EXFO.

LED	Status	Meaning
System (continued)	Red, slow blinking[b]	The unit is waiting for the temperature to return to the specified operating temperature range (see *Electrical Safety Information* on page 16) before attempting to restart.
	Red	Critical hardware error detected. The temperature of the room where the unit is located is critically too high or there could be a hardware malfunction. Ensure that the temperature falls within the specified operating temperature range (see *Electrical Safety Information* on page 16). If the problem persists, contact EXFO.
	Off	Unit is off.
SFP port LED	Green	A communication link has been established through the SFP transceiver module.
	Off	No SFP transceiver module is connected to the port or no communication link is currently established with the SFP transceiver module.
Bluetooth®	Blue	Reserved for future use.
	Blue, blinking	

a. If more than one error is detected at the same time, the color of the LED will be set according to the most severe error (red as the most severe, followed by yellow).
b. The LED flashes every second.
c. The LED flashes eight times per second.

Product Registration

You can register your new EXFO products online and benefit from every possible opportunity to optimize their performance. By doing so, you will always be notified of the latest software updates, key product enhancements and up-to-date support information related to your products.

To register your product online:

1. From a computer, open a Web browser and go to www.exfo.com.
2. Log in to your EXFO account.
3. Click **Support** > **Product registration**.
4. Under **My Products**, click **Register**.
5. Follow the on-screen instructions.

Technical Specifications

To obtain this product's technical specifications, visit the EXFO website at *www.exfo.com*.

Conventions

Before using the product described in this guide, you should understand the following conventions:

WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in *death or serious injury*. Do not proceed unless you understand and meet the required conditions.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in *minor or moderate injury*. Do not proceed unless you understand and meet the required conditions.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in *component damage*. Do not proceed unless you understand and meet the required conditions.

IMPORTANT

Refers to information about this product you should not overlook.

2 Safety Information

WARNING

Do not install or terminate fibers while a light source is active. Never look directly into a live fiber and ensure that your eyes are protected at all times.

WARNING

The use of controls, adjustments and procedures, namely for operation and maintenance, other than those specified herein may result in hazardous radiation exposure or impair the protection provided by this unit.

WARNING

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

WARNING

Use only accessories designed for your unit and approved by EXFO. For a complete list of accessories available for your unit, refer to its technical specifications or contact EXFO.

CAUTION

This product does not contain any user-serviceable components, except if indicated otherwise in this document. Any unauthorized product changes or modifications will invalidate warranty and all applicable regulatory certifications and approvals.

IMPORTANT

Refer to the documentation provided by the manufacturers of any accessories used with your EXFO product. It may contain environmental and/or operating conditions limiting their use.

IMPORTANT

When you see the following symbol on your unit  , make sure that you refer to the instructions provided in your user documentation. Ensure that you understand and meet the required conditions before using your product.

IMPORTANT

When you see the following symbol on your unit  , it indicates that the unit is equipped with a laser source, or that it can be used with instruments equipped with a laser source. These instruments include, but are not limited to, modules and external optical units.

IMPORTANT

Other safety instructions relevant for your product are located throughout this documentation, depending on the action to perform. Make sure to read them carefully when they apply to your situation.

WARNING

Use only the pluggable transceivers specified for your product and approved by EXFO. Refer to the technical specifications of your product for the list of approved transceivers and ordering codes.

Other Safety Symbols on Your Unit

One or more of the following symbols may also appear on your unit.

Symbol	Meaning
	Direct current
	Alternating current
	The unit is equipped with an earth (ground) terminal.
	The unit is equipped with a protective conductor terminal.
	The unit is equipped with a frame or chassis terminal.
	On (Power)
	Off (Power)
 OR 	On/off (Power)
	Fuse

Laser Safety Information

Your instrument is in compliance with standard IEC 60825-1: 2014 + A11: 2021 and IEC 60825-1 Ed. 3.

WARNING

Viewing the laser output with telescopic optical instruments (for example, telescopes and binoculars) may pose an eye hazard and thus the user should not direct the beam into an area where such instruments are likely to be used.

ATTENTION

L'observation de la sortie optique avec certains instruments d'optique télescopiques (par exemple, des télescopes et des jumelles) peut présenter un danger pour les yeux; il convient donc que l'utilisateur ne dirige pas le faisceau dans une zone où ce type d'instrument est susceptible d'être utilisé.

Laser radiation may be encountered at the optical output port.

The following label indicates that the product contains a Class 1M source:

Label affixed to the back of your product.

INVISIBLE LASER RADIATION
DO NOT EXPOSE USERS OF TELESCOPIC OPTICS
CLASS 1M LASER PRODUCT
RAYONNEMENT LASER INVISIBLE
NE PAS EXPOSER LES UTILISATEURS DE DISPOSITIF OPTIQUE TÉLESCOPIQUE
APPAREIL À LASER DE CLASSE 1M

- Wavelength: / Longueur d'onde : 1600 nm – 1700 nm
- Pulse width: / Largeur de l'impulsion : $\leq 20\ \mu s$
- Max. peak power: / Puissance crête maximum : ≤ 150 mW
- Duty cycle: / Cycle de service : <= 1 %
- Fiber type: / Type de fibre : Single-mode / Monomode
- Fiber core: / Cœur de la fibre : 9 μm
- Fiber numerical aperture: / Ouverture numérique de la fibre : 0.14

Electrical Safety Information

WARNING

- **A readily accessible disconnecting device must be installed on the mains (AC or DC circuits). The power cord of the AC/DC power adapter can be considered the disconnecting device to the main power.**
- **If you intend to connect your OTH-7000 to AC power, use only the listed and certified AC/DC power adapter provided by EXFO with your unit. It provides reinforced insulation between primary and secondary, and is suitably rated for the country where the unit is sold.**
- **Once the unit is installed in its final position, the disconnecting device must be clearly identified as the disconnecting device.**
- **DO NOT connect the unit interfaces metallically to OSP (Outside Plant) wiring. The unit interfaces are designed for use as intra-building surfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE) and require isolation from the exposed OSP cabling. The addition of Primary Protectors is not sufficient protection in order to connect these interfaces metallically to OSP wiring.**
- **Use only the certified power cord that is suitably rated for the country where the unit is used.**
- **Replacing detachable MAINS supply cords by inadequately RATED cords may result in overheating of the cord and create a risk of fire.**

CAUTION

Position the unit so that the air can circulate freely around it.

Equipment Ratings	
Temperature	
➤ Operation	➤ unit connected to DC power: 0 °C to 45 °C (32 °F to 113 °F) ➤ unit connected to AC power (with AC/DC power adapter): 0 °C to 40 °C (32 °F to 104 °F)
➤ Storage	➤ –40 °C to 70 °C (–40 °F to 158 °F)
Relative humidity[a]	0 % to 95 % non-condensing
Maximum operation altitude	➤ unit connected to DC power: 3000 m (9843 ft) ➤ unit connected to AC power (with AC/DC power adapter): 2000 m (6562 ft)
Pollution degree	2
Overvoltage category	I
Measurement category	Not rated for measurement categories II, III, or IV
Input power[b]	➤ unit: –48 V ⎓;2 A[c] ➤ AC/DC power adapter (units connected to AC power only): 100 - 240 V ∼; 50/60 Hz; 1 - 0.5 A

a. Measured in 0 °C to 31 °C (32 °F to 87.8 °F) range, decreasing linearly to 50 % at 40 °C (104 °F).
b. Not exceeding ± 10 % of the nominal voltage.
c. Range: –38.5 - –70 V.

CAUTION

The use of voltages higher than those indicated on the label affixed to your unit may damage the unit.

3 Getting Started with Your Unit

Preparing for Installation

WARNING

- **Your unit is designed to be installed in a limited access area, for example, Central Offices, Telecommunication Centers, computer rooms, wiring closet, Outside Plant/CELL-Site class 1, and similar type locations and in accordance with local codes.**
- **Only trained personnel can perform the unit installation and configuration tasks. These people have appropriate technical training and experience to be aware of the hazards to which a person can be exposed when performing these installation tasks.**

IMPORTANT

To ensure compliance with GR-1089-CORE, use only shielded cables for Ethernet connections to the unit. The shielded cables must be grounded at both ends.

Before installing your unit, you should take the following into consideration:

- The chosen location provides adequate clearance for maintenance procedures.
- The location is an environmentally-controlled area that meets the minimum operating parameters.
- The location is isolated from strong electromagnetic fields produced by electrical devices.
- The power cable and power supply are compatible with your power service.
- The power source is properly grounded and falls within the internal power supply rating.

Installing Your Unit in a Rack

Your OTH-7000 unit is designed to be installed in 19-inch racks or in ETSI (21-inch) racks with the corresponding provided mounting brackets. It will not fit into 23-inch racks.

- The default value for the height of the unit is half a rack unit (0.5U) high or 22,2 mm (0.87 in.).
- When operating the unit, select a location that provides at least 75 mm (3 in.) of clearance on the front.

The OTH-7000-AWAT-48 unit comes with 1RU 19-inch brackets. If ETSI brackets are required, then ETSI bracket extenders must be ordered separately (P/N GP-3170).

- The value for the height of the 48 port model unit is one rack unit (1U) high or 44 mm (1.74 in). For more information, see *OTH-7000-AWAT-48 with brackets - Front and side view* on page 24 for the corresponding mounting.

CAUTION

Failure to provide adequate clearance from hot surfaces may result in an excessive internal temperature, thus reducing the reliability of your OTH-7000 unit.

Note: *There is no need to leave an empty slot between units when you stack them one on top of the other inside a rack.*

WARNING

- **The equipment rack must be anchored to an unmovable support to prevent it from falling over when one or more units are extended in front of the rack on slides. You must also consider the weight of any other device installed in the rack. A crush hazard exists if the rack tilts forward, which could cause serious injury.**
- **Mounting of the unit in a rack or cabinet should be such that a hazardous condition is not achieved due to uneven mechanical loading.**

To install your unit in a rack:

1. Ensure that your unit is turned off.
2. Ensure that no USB or electrical cables are connected to the unit.
3. Position the unit so that its bottom panel rests on a flat surface such as a table.

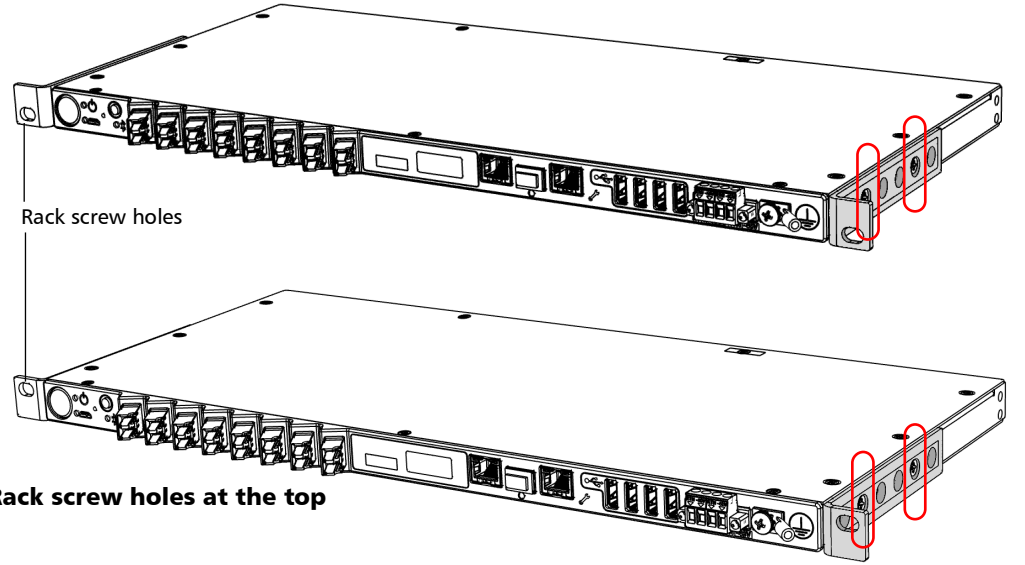
IMPORTANT

The OTH-7000 is only half or one unit high.
To maximize the utilization of rack space in 19-inch racks, EXFO recommends to alternate the position of the brackets for each unit. The brackets should be placed with their rack screw holes at the bottom for the first unit, at the top for the second, at the bottom for the next unit, and so on (see illustrations hereafter).

4. Align the holes of the first bracket with the holes of the unit's casing at the position that best suits your installation needs. You can even invert position of the mounting bracket if necessary.

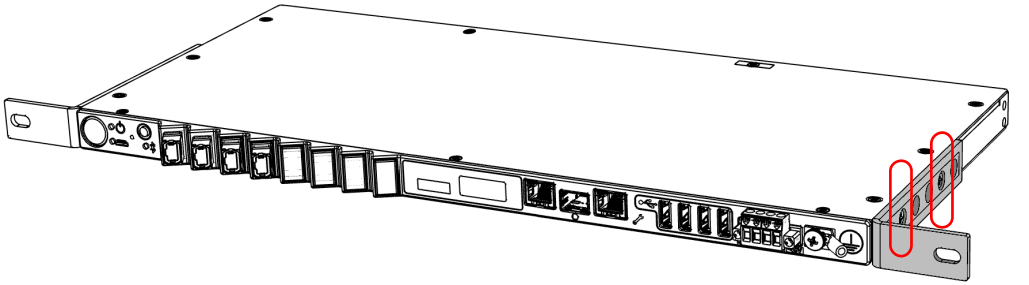
Brackets in standard position - 19-inch racks

Rack screw holes at the bottom

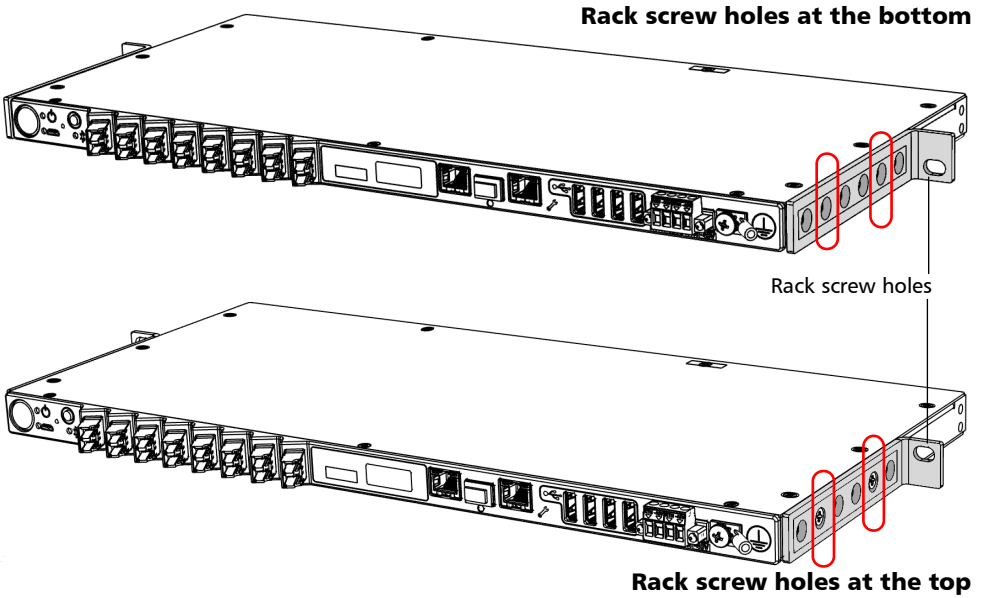


Rack screw holes at the top

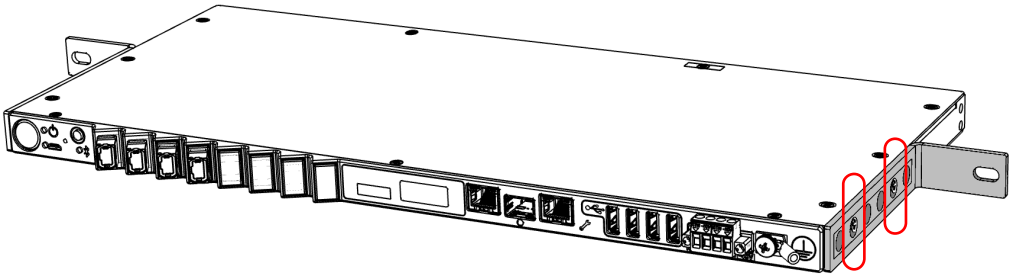
Brackets in standard position - ETSI racks



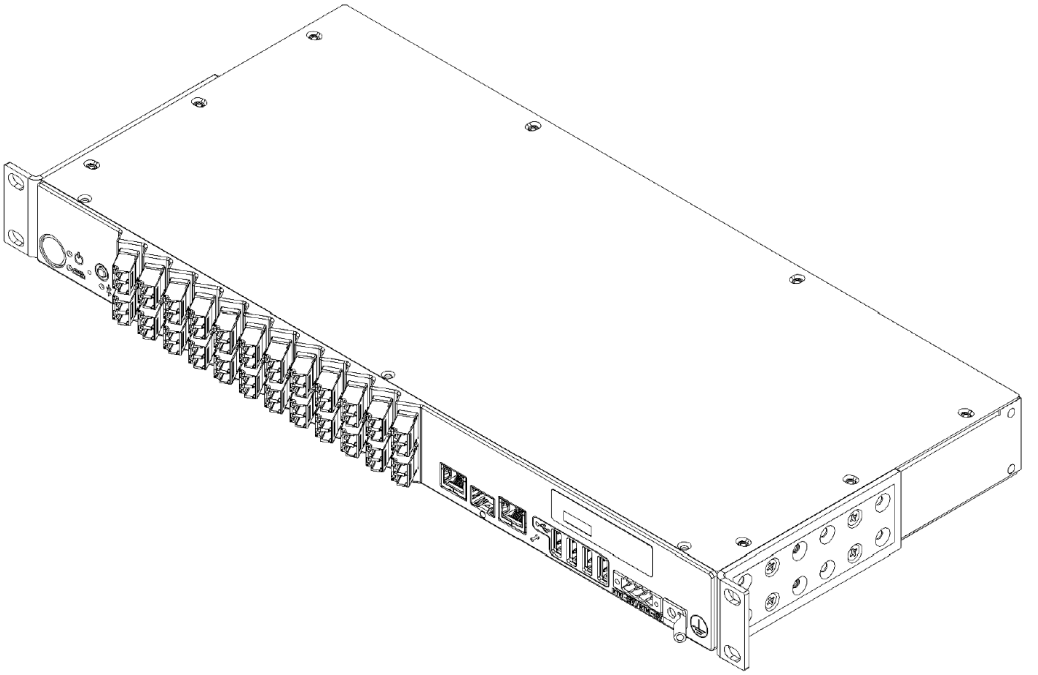
Brackets in inverted position - 19-inch racks

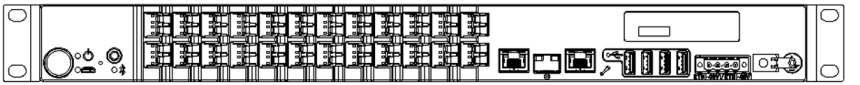


Brackets in inverted position - ETSI racks



OTH-7000-AWAT-48 with brackets - Front and side view

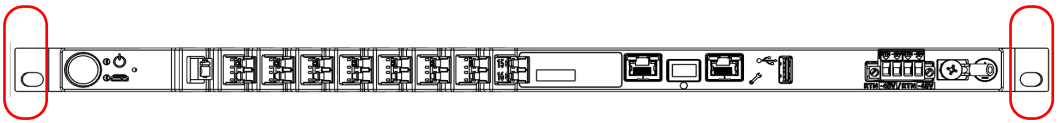




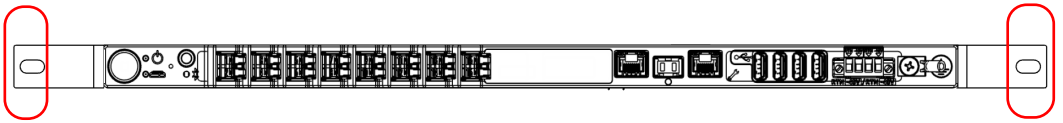
5. Fix the first bracket on the unit with the supplied screws (two screws per bracket).
6. Repeat steps 4 and 5 with the other bracket, ensuring that you place the bracket at the exact same position (orientation of the bracket, set of holes on the bracket and on the unit's casing).
7. Place the unit in the rack at the desired height.
8. Fix the unit in place using the hardware supplied with the rack. Use one screw per side.

   To ground your unit properly, you must ensure that there is a metal-to-metal contact between the rack and the mounting hardware. For this reason, EXFO recommends to use thread-forming screws, star (tooth) lock washers, or similar hardware that remove any paint or non-conductive coatings. For more information, see *Grounding Your Unit* on page 26.

19-inch rack



ETSI rack



Grounding Your Unit

To avoid the potential for an electrical shock hazard, you must reliably connect an earth grounding conductor to the unit.

Note: *The DC units are intended for installation with an isolated DC return (DC-I) and are to be installed in a Common Bonding Network (CBN) per GR-1089-CORE.*

WARNING

All wiring and installation must be in accordance with local building and electrical codes acceptable to the authorities in the countries where the equipment is installed and used.

If you are not sure on how to proceed, consult a certified electrician.

To ground your unit:

1. Remove the Phillips screw and the grounding lug from the front panel of your unit.

2. Prepare the ground wire (#14 AWG, green), and attach one of its ends to the unit's grounding lug using a crimping tool.
3. Use the Phillips screw to attach the grounding lug and wire assembly to the font panel of your unit.
4. Ground the other end of the wire as per your local regulation.

   Your unit is now grounded properly.

Note: *For particular installation needs, you can attach your own grounding lug and wire to the back panel of the unit (to the corresponding holes) instead.*

Connecting RTUe-9120 External Switches to Your Unit

Depending on your testing needs, you may want to connect external switches to your unit to increase the number of optical ports available.

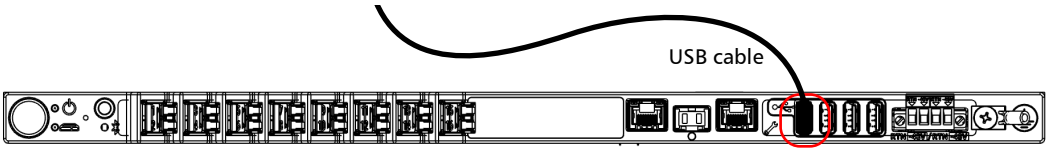
If you want to remove an external switch from the system, ensure that no test is underway, and then simply disconnect the optical fibers and the USB cable.

Note: *Once you have connected or disconnected an external switch, you need to update your test setup in the FMS. You must first detach and reattach the corresponding OTH-7000 unit, and then select the desired switch and ports when applicable. For more information on how to attach or detach units, refer to the user documentation of the FMS.*

To connect a single switch to your unit:

1. Connect the provided USB cable to the USB port (B type) located on the front panel of the RTUe-9120 switch.

2. Connect the other end of the USB cable to one of the USB ports located on the font panel of the unit.



Note: *For more information on how to connect several switches to your unit, refer to the Optical Switch user guide.*

Working With an SFP Transceiver Module

You can connect an SFP transceiver module to your unit using the corresponding port located on the front of your unit.

IMPORTANT

Ensure that your unit is off before inserting the SFP transceiver module. Otherwise, the transceiver module will not be recognized and you will have to restart your unit to force its detection.

Note: *You will be able to configure the related settings such as the network addresses from the web interface (see* Working With Your Unit for the First Time *on page 39).*

To insert an SFP transceiver module into your unit:

1. Ensure that your unit is off.
2. Slide the transceiver module into the corresponding port.

Connecting Your Unit to a Power Source

Before starting to work with your unit, you must connect it to a power source (AC or DC). There is a specific procedure for each of these types of power sources.

WARNING

- **A certified over-current protecting device that is suitably rated must be installed at the source.**
- **All electrical installation and accessories must be done and selected as per local electrical code and regulation.**
- **To avoid fire hazards and ensure your safety, when you intend to connect your unit to DC power, always select a wire gauge according to the OTH-7000 unit's ratings, cable length, and local electrical code.**

CAUTION

For optimum performance and safety, you must either crimp a terminal (ferrule) onto the stranded conductors, or tin them before installing them in the terminal block.

Note: *The AC/DC power adapter is not covered by the NEBS certification.*

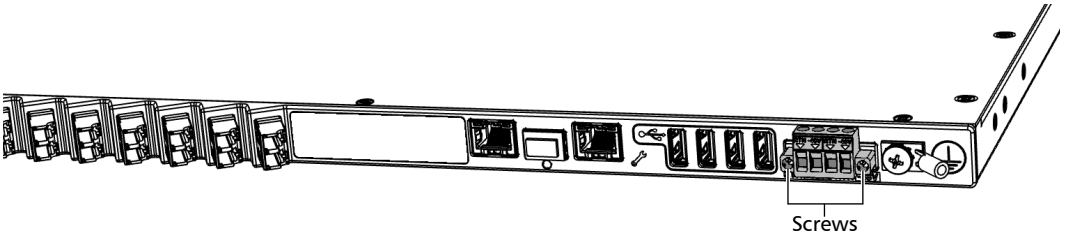
To connect your unit to DC power:

1. Ensure all power is off or disconnected at the source.

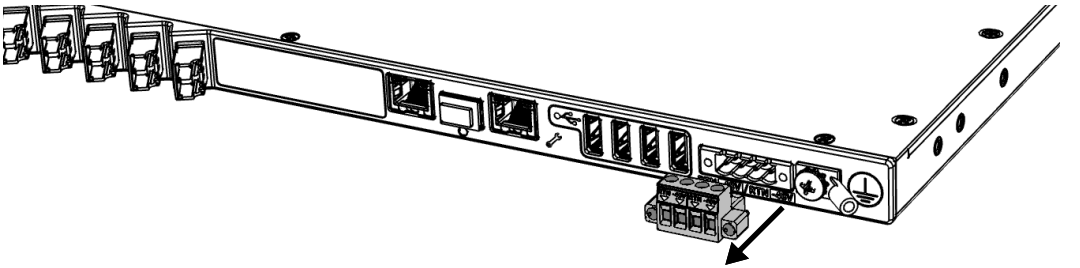
Note: *A certified over-current protection, suitable for your particular setup, must be installed at the power secondary distribution. If you are not sure on how to proceed, consult a certified electrician.*

2. Ensure that the unit is grounded properly. For more information, see *Grounding Your Unit* on page 26.

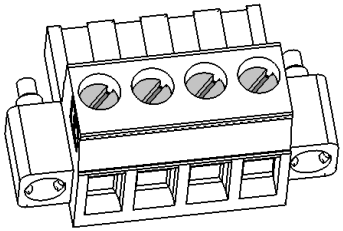
3. Unscrew the two screws holding the terminal block in place.



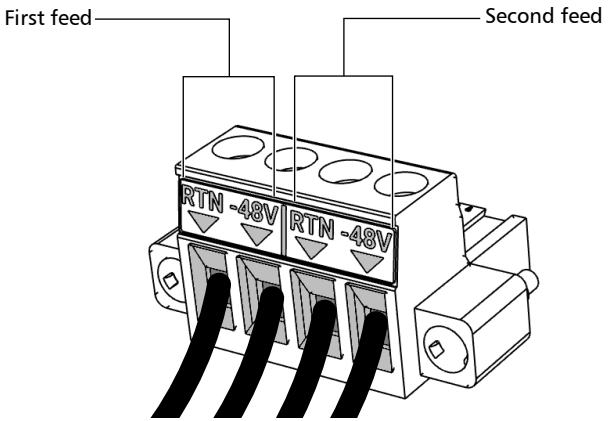
4. When the terminal block is loose, gently pull it toward you to remove it, exposing the electrical connectors.



5. Crimp each power lead (maximum 14 AWG) with a terminal (ferrule) or tin each of them. Unscrew the four screws (shown in gray) located at the top of the terminal block.

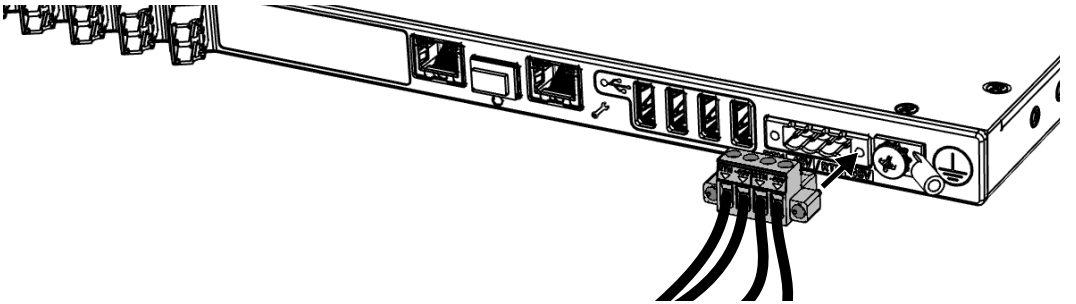


6. Pair the power leads with the appropriate power terminal for each of the feed, respecting the polarity as indicated on the terminal block.



7. Tighten the four screws located at the top of the terminal block to secure the wires in place.

8. Ensure that the terminal block is aligned properly with the bay containing the electrical connectors.



9. Slide the terminal block all the way into the bay until it stops.

10. Screw the two screws to secure the terminal block in place.

11. Turn on the disconnect device that is connected to the unit.

The unit will start automatically.

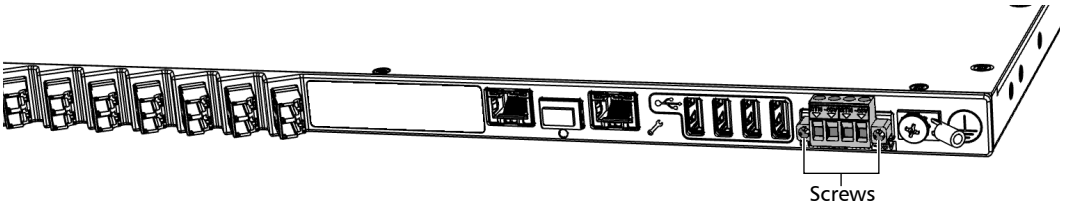
To connect your unit to AC power:

1. Ensure all power is off or disconnected at the source.

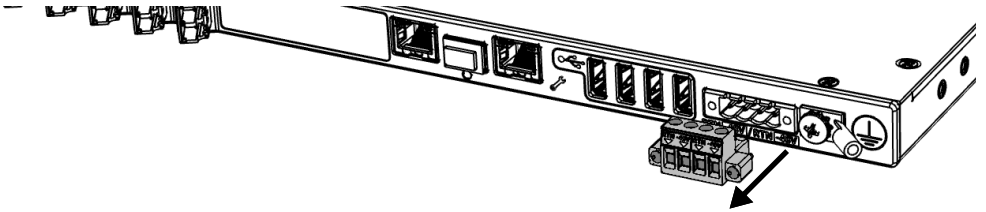
2. Ensure that the unit is grounded properly. For more information, see *Grounding Your Unit* on page 26.

3. If necessary, remove the block terminal (shown in gray below) as follows:

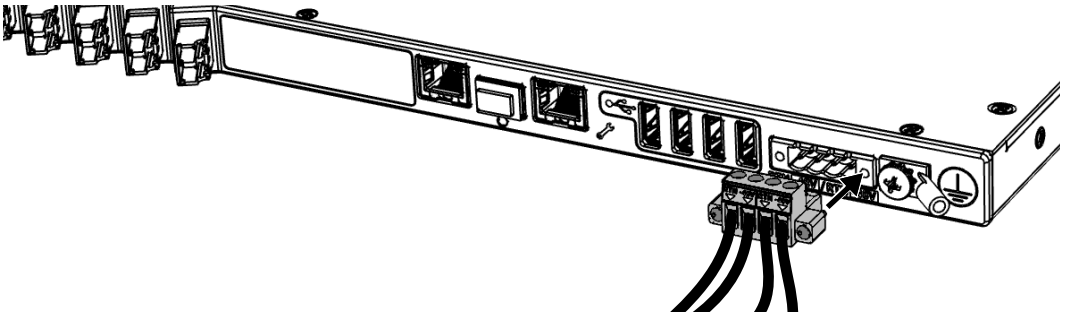
3a. Unscrew the two screws holding the terminal block in place.



3b. When the terminal block is loose, gently pull it toward you to remove it, exposing the electrical connectors.



4. Ensure that the connector of the AC/DC power adapter is aligned properly with the bay containing the electrical connectors.



5. Slide the connector of the AC/DC power adapter all the way into the bay until it stops.
6. Screw the two screws to secure the connector of the AC/DC power adapter in place.
7. Ensure that the removable power cord is connected to the other end of the AC/DC power adapter, and then connect the adapter to the power outlet.
8. If necessary, turn on the disconnect device.

   The unit will start automatically.

Turning on Your Unit

Before you turn on the unit for the very first time, EXFO recommends that you read the safety and installation instructions, including how to connect the unit to AC or DC power.

To turn on the unit:

Press the on/off button. For more information about working with your unit for the very first time, see the corresponding section in this documentation.

Note: *You will know that your unit is ready when its*  *(System) LED is steady green. The startup process may take a few minutes to complete.*

Turning off Your Unit

Your unit will shut down when you press the power button. It will perform a complete restart routine the next time you use it.

Note: *Should the unit ever stop responding, you can force a hardware reset by pressing and holding down the on/off button for at least 10 seconds. To restart your unit, release the on/off button, and then press it again as you would normally do to start your unit.*

In the event of a power outage, your unit is configured to automatically restart when the power comes back.

CAUTION

To avoid damaging your unit when you need to disconnect it from its external power source, first turn the unit off.

To turn off the unit completely from the unit itself:

Press the on/off button.

To restart the unit or turn it off completely from the web interface:

1. If it is not already done, connect one end of a network cable to the management port of your unit and the other end to an Ethernet port on the computer.

2. Ensure that the (System) LED is steady green.
3. From your computer, open a web browser and type 169.254.10.10 in the address bar to access the web interface.

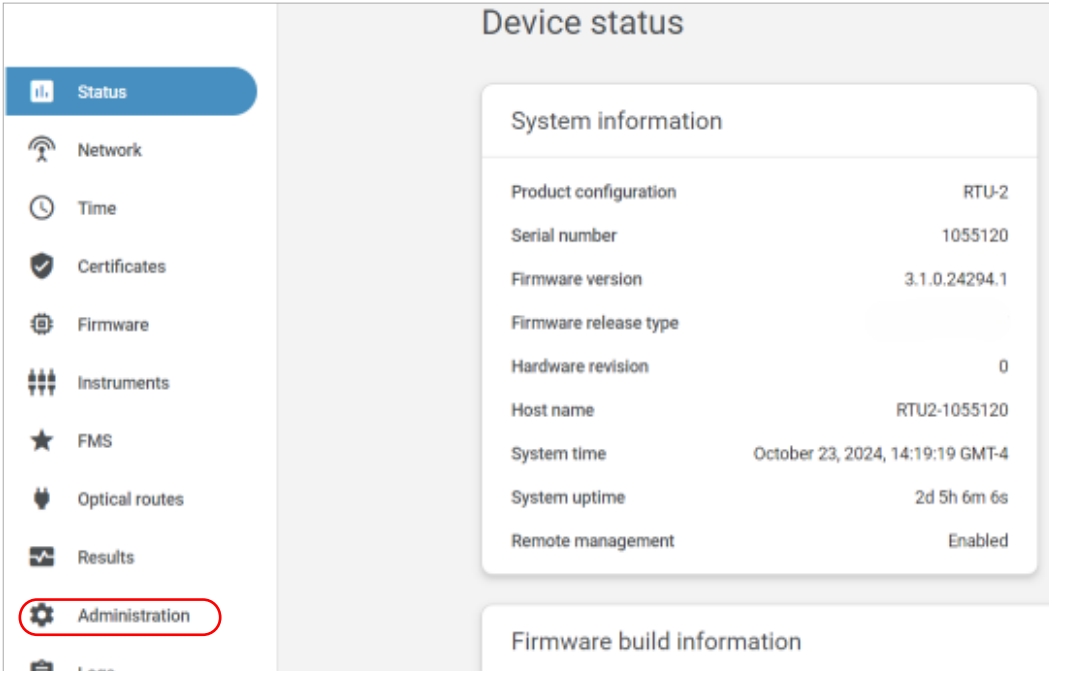
Note: *It may take a few seconds before you can see the web interface if your computer needs to reconfigure its network to a link-local address first.*

4. When the application prompts you, enter the connection information.
   - The default user name is: localadmin
   - The default password is: admin

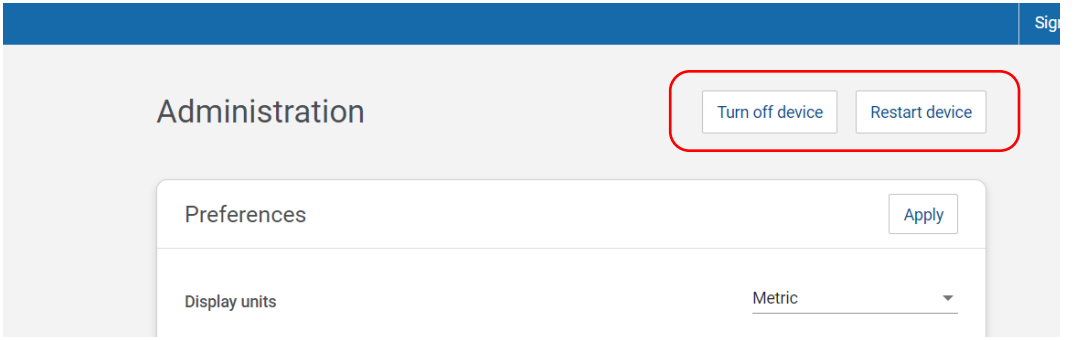
IMPORTANT

The application will lock your account after a certain number of unsuccessful connection attempts. Before entering your connection information again, you will have to wait a few minutes. The waiting time starts increasing after the fifth unsuccessful connection attempt up to a maximum of fifteen minutes.

5. From the list, select **Administration**.



6. Click the **Restart device** or the **Turn off device** button, depending on the operation that you want to perform.



Working With Your Unit for the First Time

By starting to use your unit, you implicitly agree to the EXFO and third-party EULAs related to your unit and instruments.

You will need a computer (laptop) and a network cable to connect to your OTH-7000 unit.

By default, the management of your unit is done locally by connecting a laptop to your unit. However, if you prefer to be able to manage your unit remotely (via LAN or WAN) after the first connection, you can enable a feature allowing you to do so. For more information on how to connect remotely to your unit, see *Accessing Your Unit Remotely* on page 68.

The following procedure takes into account that you have already mounted your unit in a rack, grounded it, inserted an SFP transceiver module if applicable, etc. For more information, see the corresponding sections presented earlier in this chapter.

To start working with your unit:

1. Connect your unit to a LAN/WAN network (LAN/WAN Ethernet port or SFP transceiver module, depending on your setup).

2. If it is not already done, turn on the unit (see *Turning on Your Unit* on page 35).
3. Wait for your unit to be ready (its (System) LED will be steady green).

Note: *The startup process may take a few minutes to complete.*

4. Connect one end of a network cable to the management port of your unit and the other end to an Ethernet port on the computer.

5. From your computer, open a Web browser and type 169.254.10.10 in the address bar to access the web interface.

Note: *It may take a few seconds before you can see the web interface if your computer needs to reconfigure its network to a link-local address first.*

6. When the application prompts you, enter the connection information.

- ➤ The default user name is: localadmin
- ➤ The default password is: admin

IMPORTANT

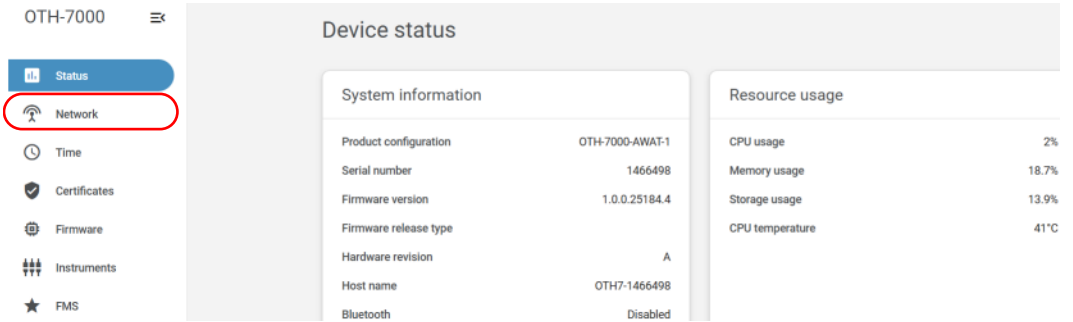
The application will lock your account after a certain number of unsuccessful connection attempts. Before entering your connection information again, you will have to wait a few minutes. The waiting time starts increasing after the fifth unsuccessful connection attempt up to a maximum of fifteen minutes.

7. For security reasons, when the application prompts you, change the password. The password must have a minimum of eight characters and include characters from at least three of the following categories:

- ➤ Lowercase letters (‘a’ - ‘z’)
- ➤ Uppercase letters (‘A’ - ‘Z’)
- ➤ Numbers (0 - 9)
- ➤ Special characters

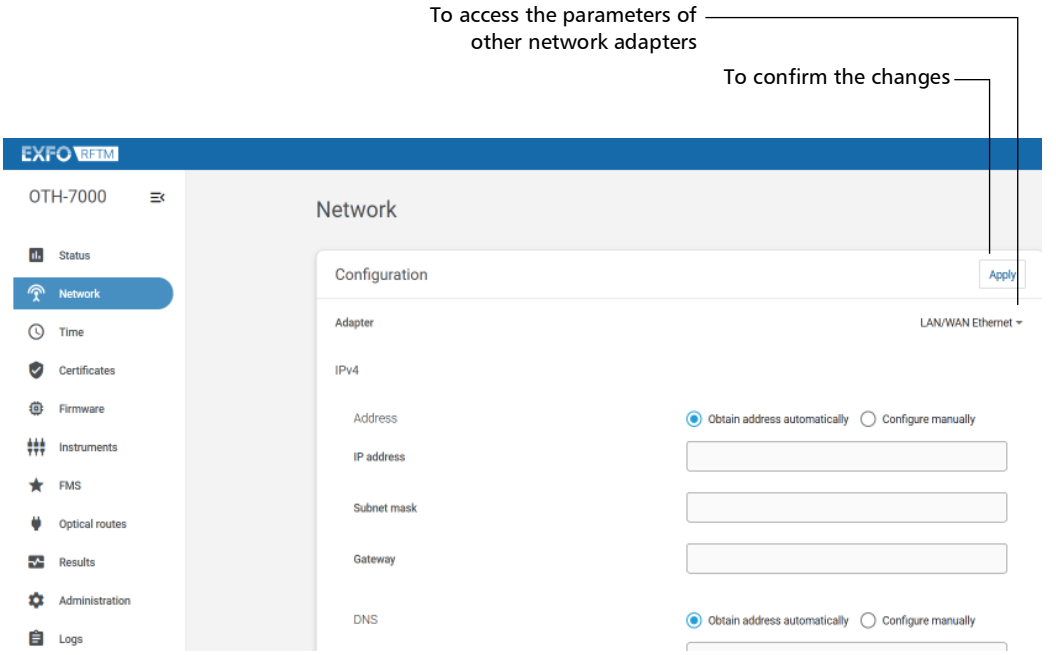
8. Configure the network as follows:

8a. From the list, select **Network**.



8b. Set the IP address and various parameters as needed, and then click **Apply** to confirm.

Note: *You can access the SFP parameters by clicking the arrow next to the currently displayed adapter.*



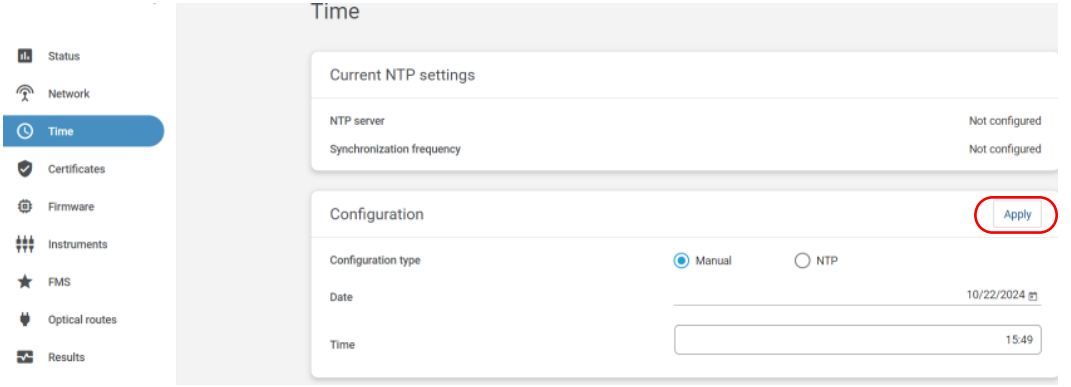
Note: *You can view detailed information about network connectivity under* ***Connection details****.*

IMPORTANT

To avoid connection problems between your unit and the FMS, ensure that the date and time set on your unit correspond to the current date and time.

9. Configure the date and time as follows:

9a. From the list, select **Time**.

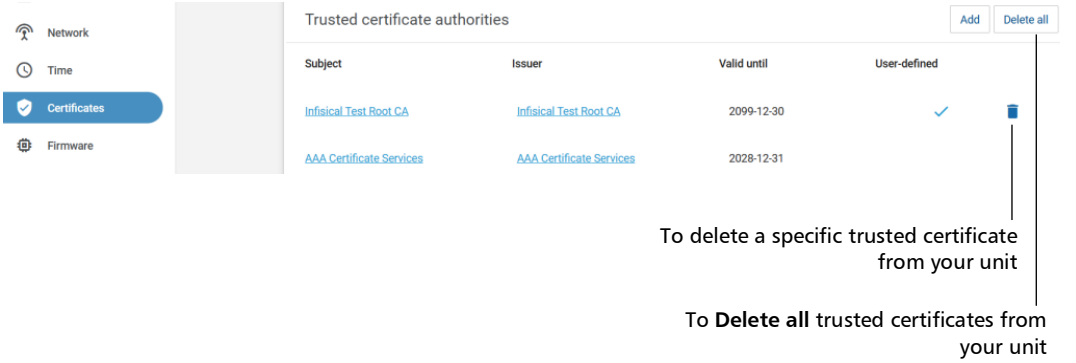


9b. By default, the application sets the date and time values to those of the Web browser you are currently using, but you can change them as needed. You can set the date and time manually or use an NTP server. You can also determine the frequency of the synchronization with the NTP server. Click **Apply** to confirm.

10. Configure the list of trusted certificates as follows:

10a. From the list, select **Certificates**.

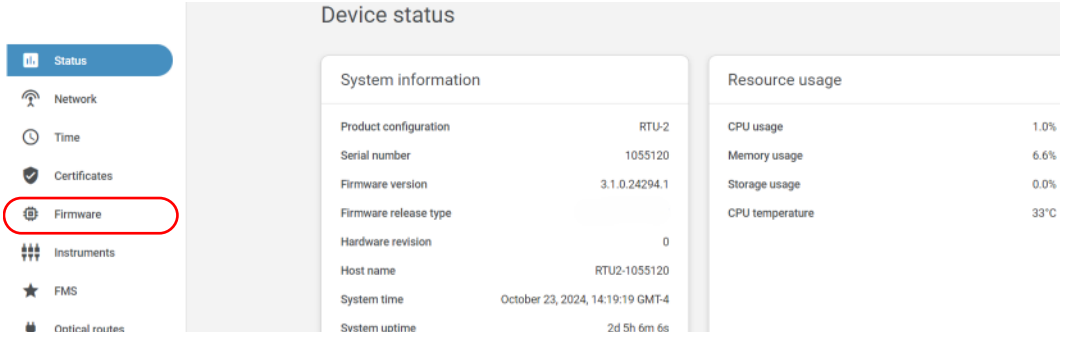
10b. Click **Add** to add a trusted certificate to the list. The certificate file that you provide must be in PEM format.



10c. Follow the instructions on screen.

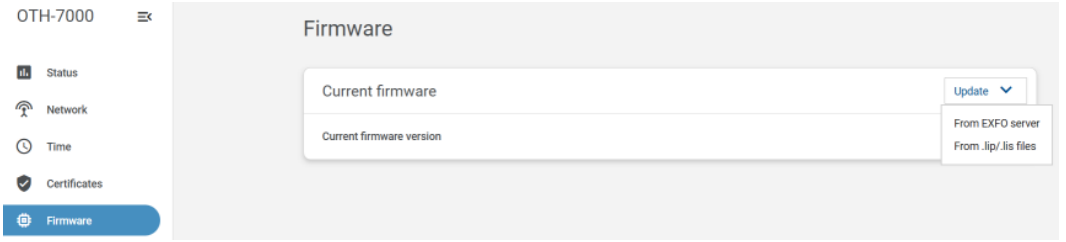
11. If desired, ensure that your unit is up to date as follows:

11a. From the list, select **Firmware**.



The **Current firmware version** is displayed.

11b. From the **Update** drop-down menu, select either **From EXFO server** or **From .lip/.lis files**.



11c. **From EXFO server**: If there are updates available, you will be notified via a popup window and then have the option to proceed with the **Update** or **Close** to cancel.

If no updates are available, the popup window will prompt you to **Close** the window.

Note: *Your unit must have access to an Internet connection to be able to download updates and install them.*

11d. **From .lip/.lis files**: Select the .LIP and .LIS files that you want to use. The upgrade starts automatically and your unit will restart at the end of the operation.

IMPORTANT

You must select both the .LIP and .LIS files to be able to start the upgrade.

Note: *In both cases, the operation may take a few minutes to complete.*

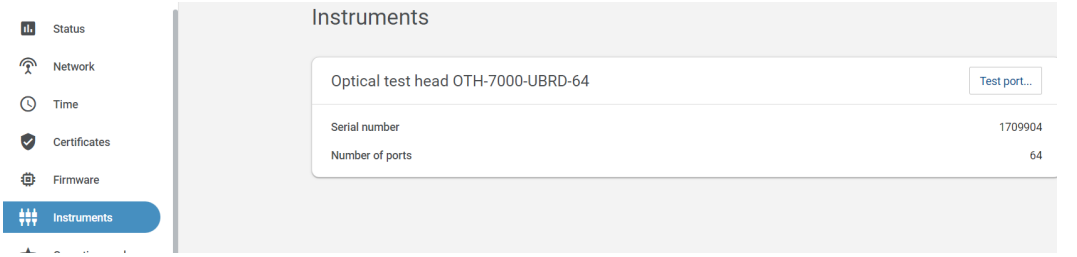
11e. Wait for your unit to be ready (its (System) LED will be steady green), and then connect again to the Web application.

CAUTION

- **For a trouble-free upgrade, ensure that your unit remains on during all the process.**
- **Turning off your unit (or disconnecting it from its power source) could result in unexpected behavior of the test applications, instability of the system, or even severely damage your unit, depending on the operation underway when the unit is turned off.**
  Damaged units will need to be sent back to EXFO for repair.

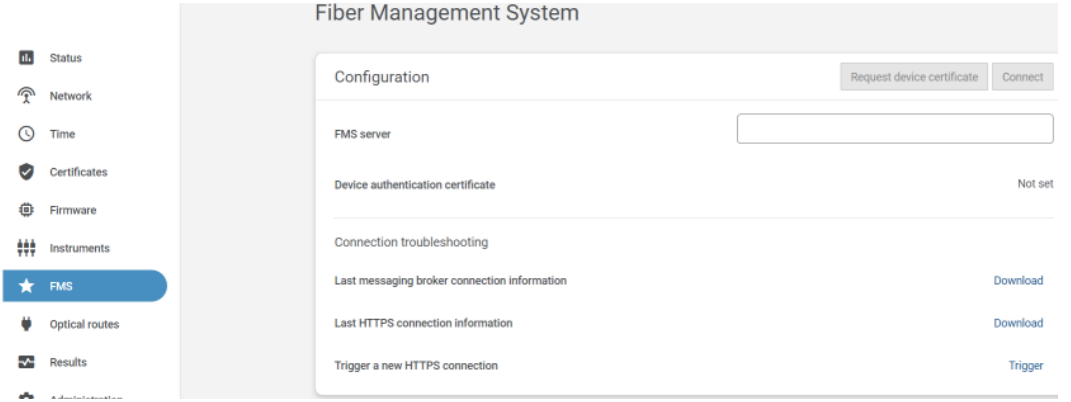
Note: *After a successful connection between the FMS and your unit, the FMS will provide the updates if your unit is running a compatible version. Refer to the RFTM FMS Readme for the complete compatibility information.*

12. From the **Instruments** page, ensure that the external switches have been detected as expected.

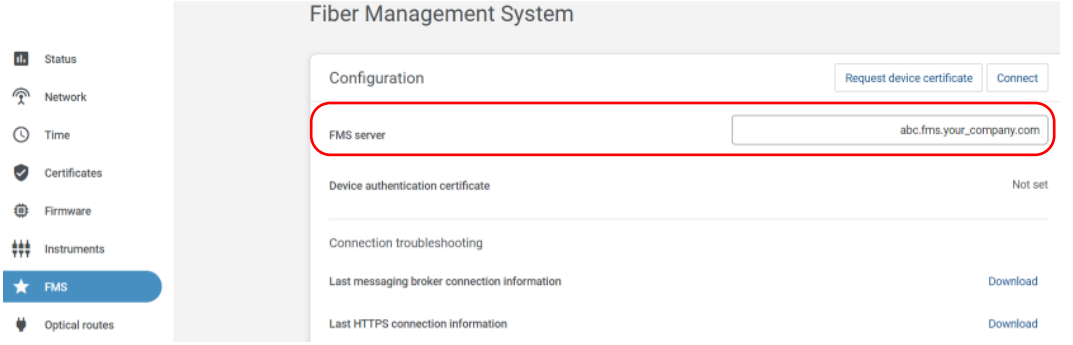


13. Connect your unit to the **Fiber management System** as follows:

13a. From the list, select **FMS**.



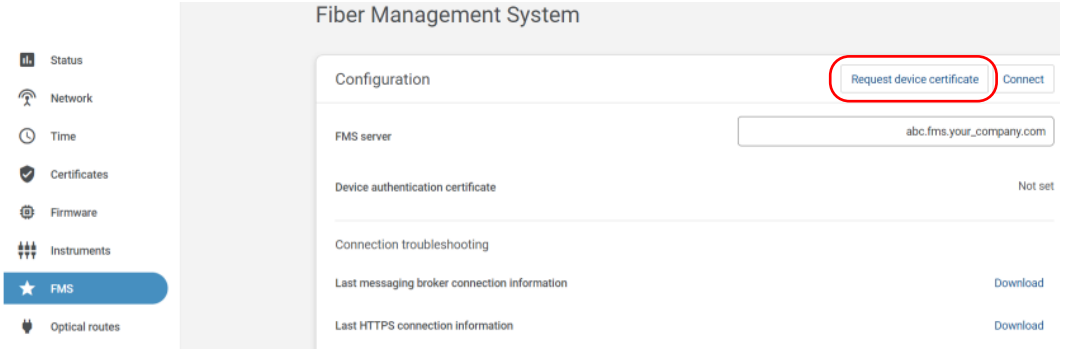
13b. In the **FMS server** box, enter the name of your server (for example: *abc.fms.your_company.com*).



13c. If your system is configured so that the FMS requires the authentication of all OTH-7000 units, click **Request device certificate**.

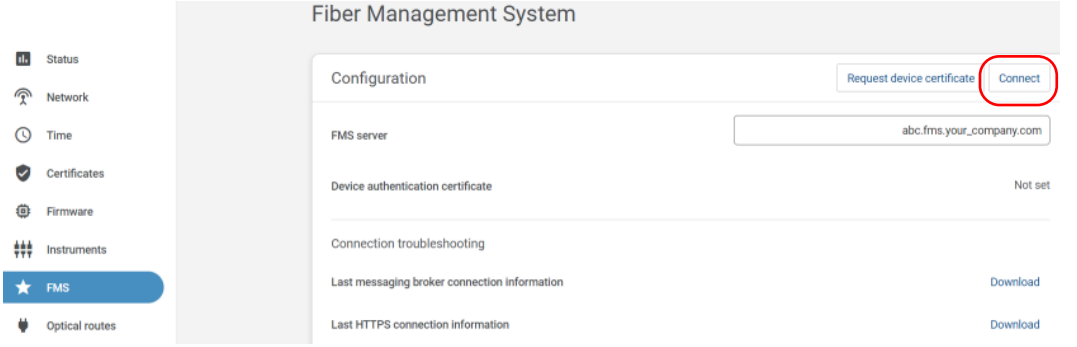
OR

If the FMS does not require the authentication of the OTH-7000 units, go directly to step 13e.



13d. When the application prompts you, enter the username and password for certificate retrieval that was provided by your system administrator. As soon as the application notifies you that the certificate has been updated, you are ready for the connection.

13e. Click **Connect** to establish the connection with the FMS.



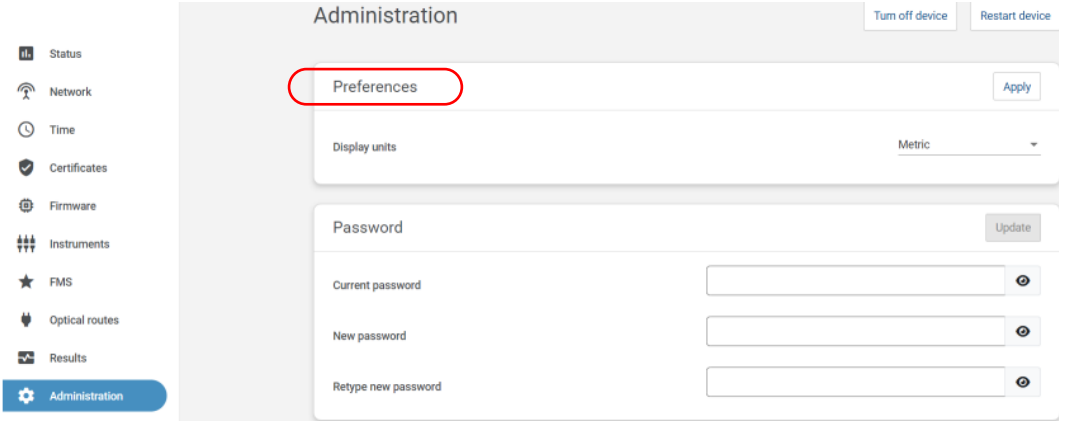
Note: *The status of the connection is visible from the **Status** page. The status goes from "Not configured" to "Connecting" to "Established". If any connection problem occurs, the application will display "Connecting" along with the last error, and the OTH-7000 will periodically try to reconnect to the FMS server.*

Note: *The log streaming status shows whether logs are sent or not to the FMS server. This information is visible from **Status** > **Fiber Management System**, next to **Log streaming status**.*

Note: *If you need to detach your unit from the link, you can click **Disconnect**. At this point, since there are no monitoring data acquired so far, no data can be lost.*

14. To select the measurement units to be displayed in the **Results** and **result viewer** windows:

14a. From the list, select **Administration**.

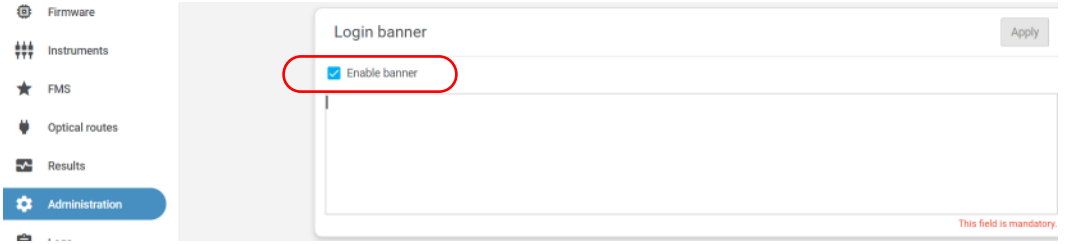


14b. Under **Preferences**, select either **Metric** or **Imperial**.

14c. Click **Apply** to confirm your selection.

15. If you need to define a **Login banner**, you can do so as follows:

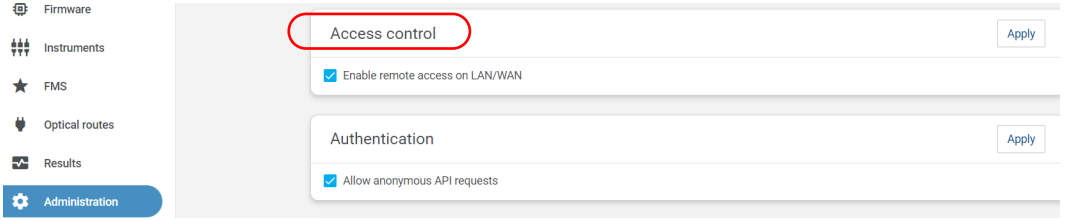
15a. In the **Administration** window, select the **Enable banner** check box.



15b. Enter the desired text, and then click **Apply** to confirm.

16. If you want to be able to access your unit remotely, proceed as follows:

16a. Under **Access control**, select the **Enable remote access on LAN/WAN** check box.



16b. Click **Apply** to confirm.

Your OTH-7000 Optical Test Head unit is now configured properly.

4 Performing Tests

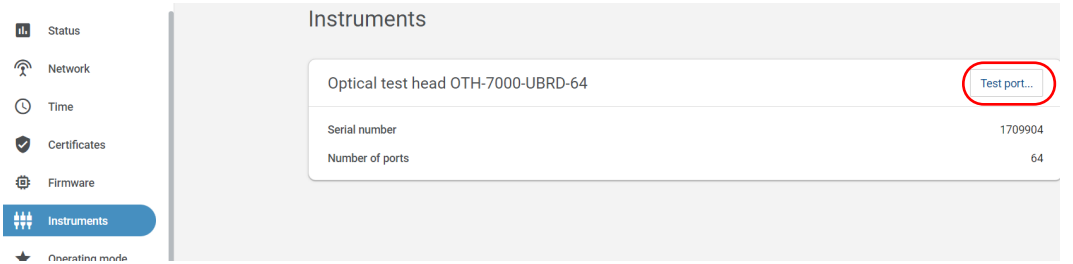
The application allows you to test the optical ports as well as manage optical routes.

Optical Ports

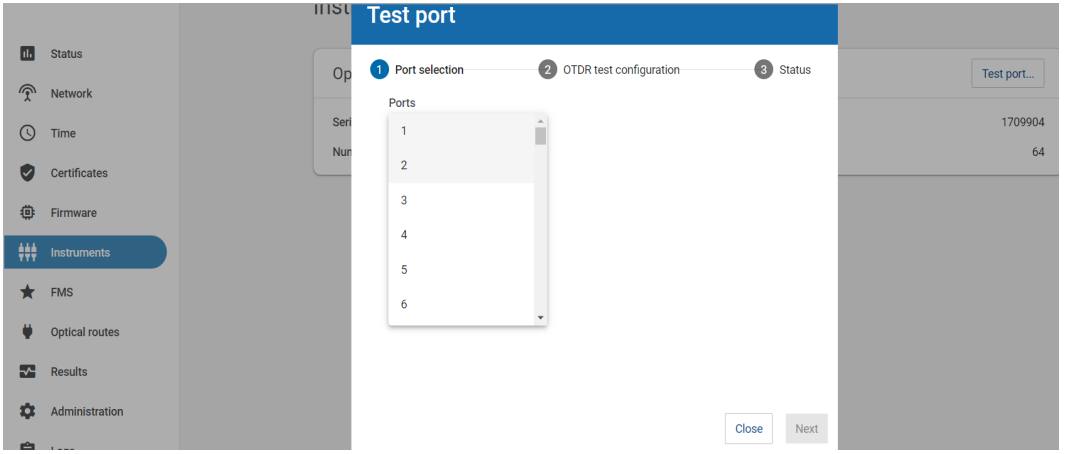
You can test optical ports on the OTH-7000 without creating optical routes.

To perform a test on an optical port:

1. Go to the **Instruments** page.
2. Select **Test port...**.

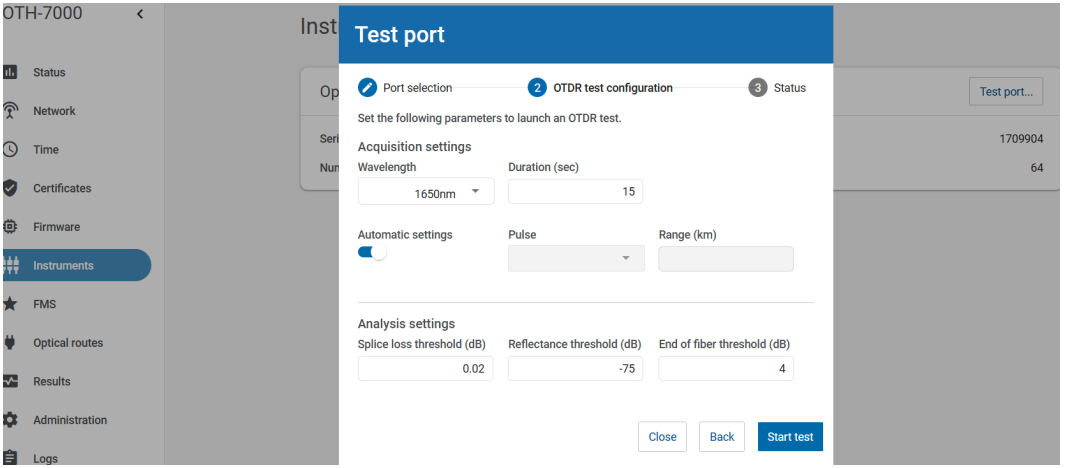


3. Select the port to be tested from the scroll down menu.



4. Click **Next** to configure the OTDR test settings.

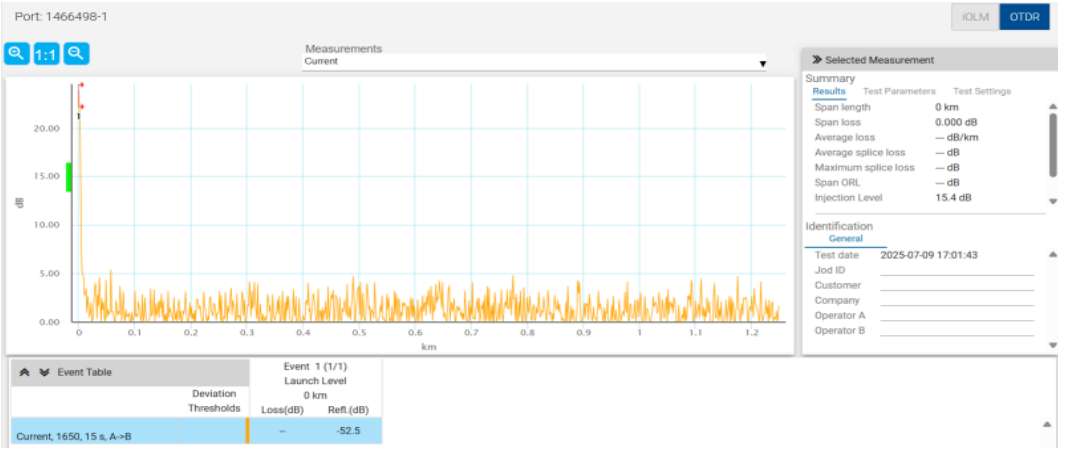
5. You can either configure the settings manually or let the application configure them automatically. You can manually change **Duration**, **Pulse**, and **Range** accordingly.



6. Click **Start test**.

7. When the test is completed, click **View** to open the OTDR trace and display the **Measurements** and **Event Table**.

8. To view the **Summary** and **Identification** of measurements, click **Selected Measurements**.



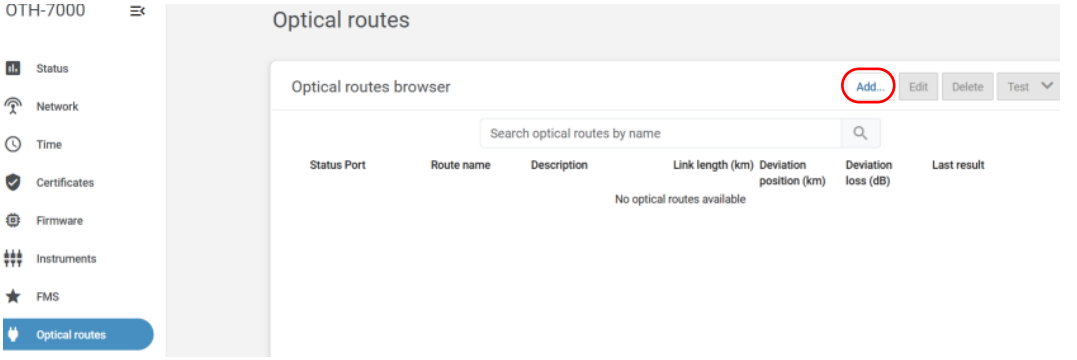
9. To save the trace, see *Saving Results* on page 61.

Managing Optical Routes

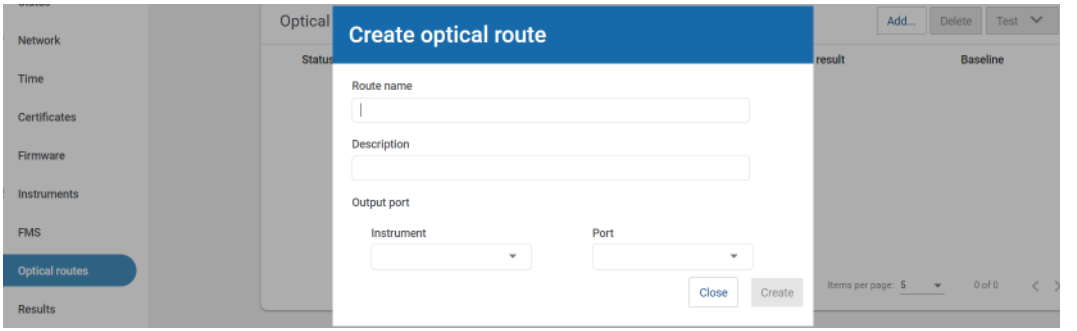
You can add optical routes to quickly view results or trigger optical tests. Once routes are created, you can modify their name and description if necessary.

To add a route:

1. Go to **Optical routes** page, then go to **Add...**.



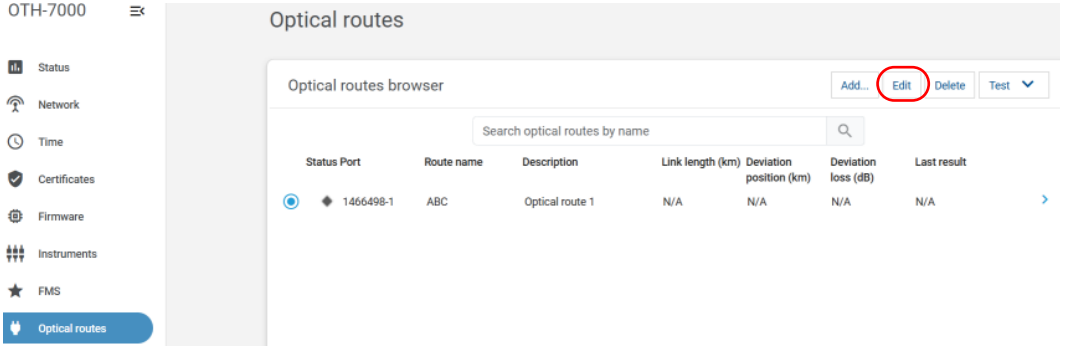
2. Type in the **Route name** and select the appropriate **Port** (and **Instrument**, if applicable) to which it is associated.



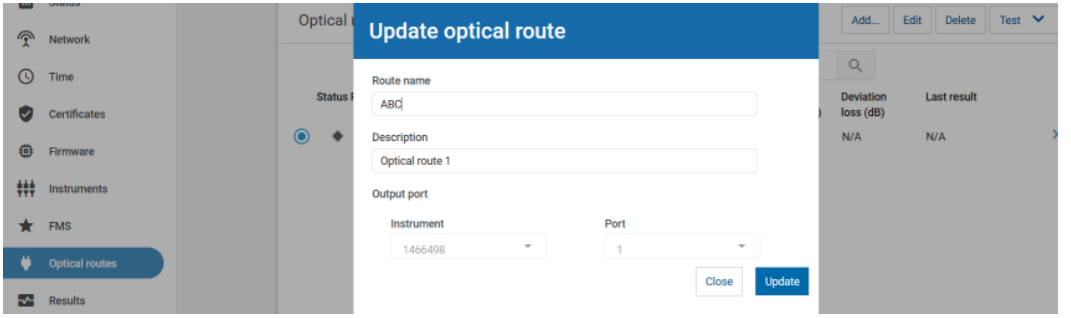
3. Click **Create** or **Close** (to cancel the action).

To rename a route or modify its description:

1. Go to the **Optical routes** page and select a **Route name**. You can also **Search optical routes by name** in the browser window.



2. Click **Edit**.

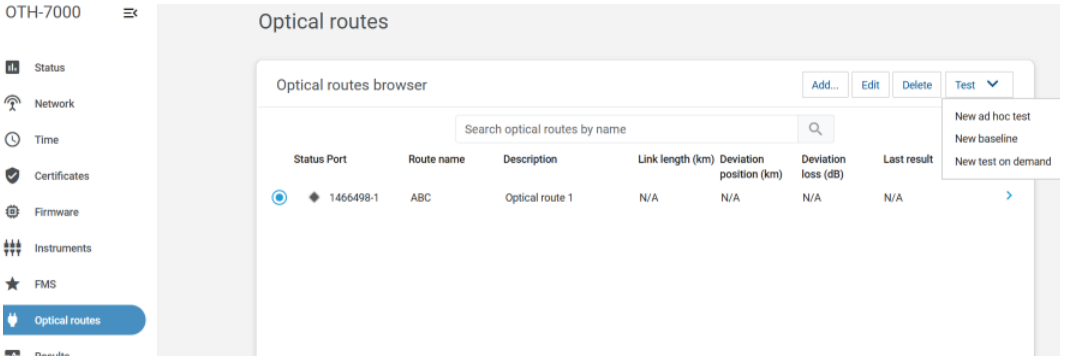


3. Edit the **Route name** and **Description**.
4. Click **Update** or **Close** (to cancel the action).

Performing Tests on Optical Routes

To perform a test on an optical route:

1. Go to **Optical routes** page.
2. Select a route.
3. Select **Test** scroll down menu.
4. Click on the desired test:
   - ➤ **New ad hoc test**
   - ➤ **New** or **Renew baseline**
   - ➤ **New test on demand**



If you have already created a **New baseline** test, you can click **Renew baseline**.

Performing tests on an optical route updates its status. The result's final verdict would be the iOLM analysis combined to its deviation state. The route's status is the final verdict of its latest test on demand or **None** by default. For a final deviation verdict, it is the same whether the verdict is **None** or **Pass**.

Note: *You can only trigger a test on demand if a **Baseline** has been performed for the same Port/Optical route.*

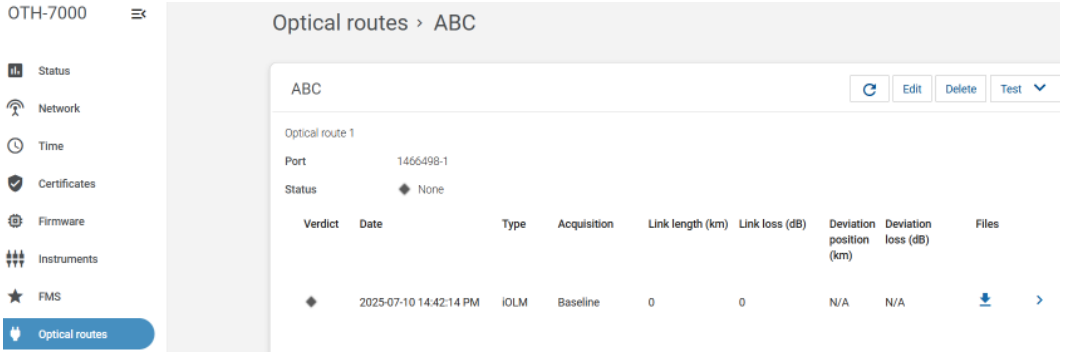
Note: *Naturally, a baseline cannot have a deviation.*

Note: *Renewing a baseline clears the test on demand results made with the baseline being replaced.*

iOLM Analysis	Deviation from Baseline	Result Final Verdict	Icon
None	No	**None**	
	Yes	**Deviation**	
Pass	No	**Pass**	
	Yes	**Deviation**	
Fail	No	**Fail**	
	Yes	**Deviation**	
Error	N/A	**Error**	

Working with a Single Route

You can view the measurement history of an optical route by opening the optical route details. To do so, use the arrow at the end of the optical route's row in the **Optical routes browser**. You can also choose to open the optical route details in a new tab/window with right-click.



The **Optical route** details screen also allows editing the route name or description as well as launching tests and deleting the route.

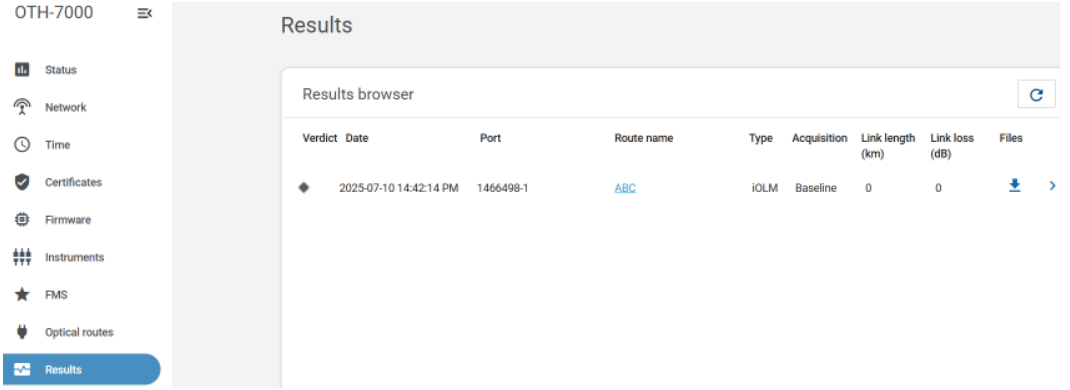
5 Working with Results

Viewing Results

To view all the results stored on the device:

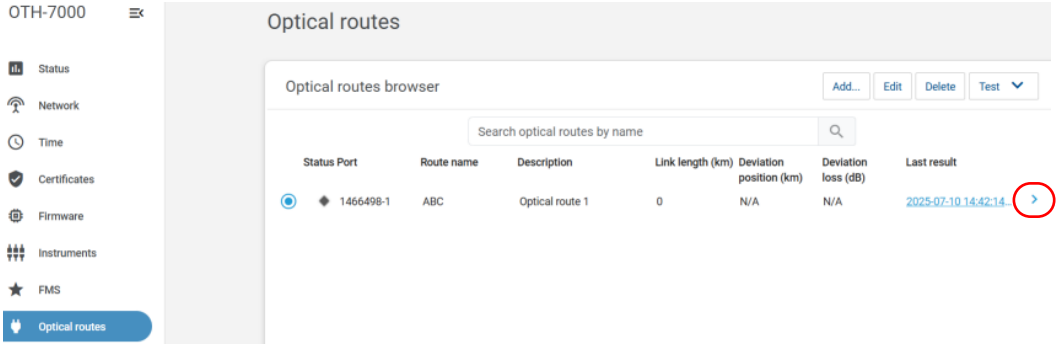
Click on the **Results** page.

The **Results browser** will show past results by **Date**, **Route name**, **Port** as well as the **link length/loss**.



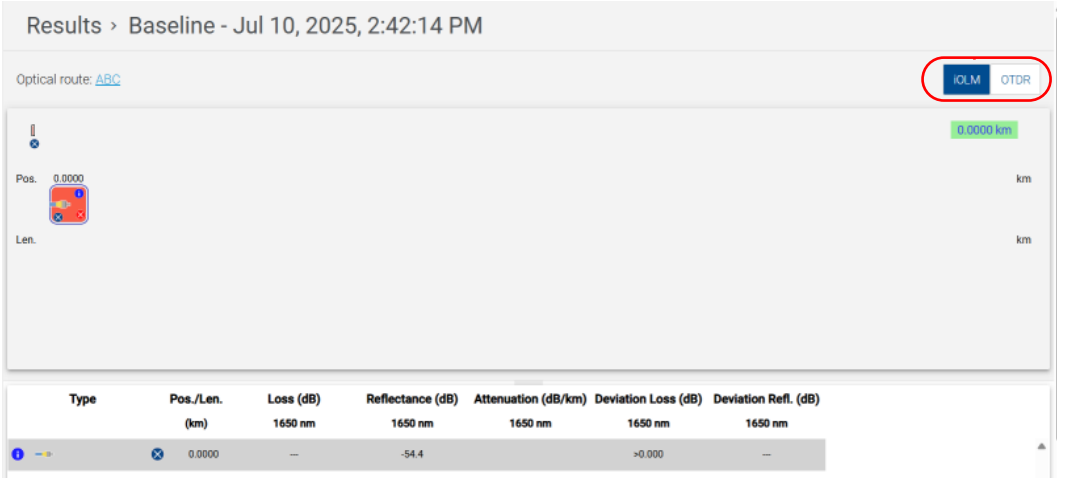
To view the results of a single route:

1. Open the optical route details using the **Optical routes** page.



2. By right-clicking on the right arrow, you can **Open link in new tab/window**.

When viewing results from an optical route, you can toggle through the **iOLM** and **OTDR** view.

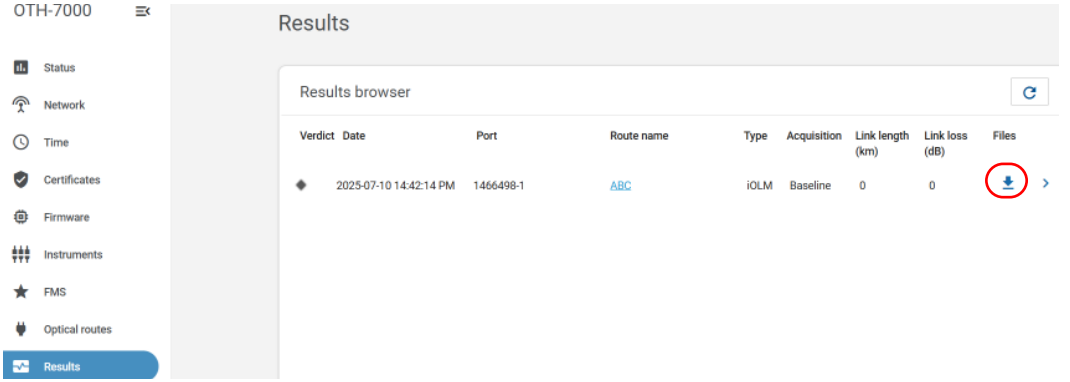


Saving Results

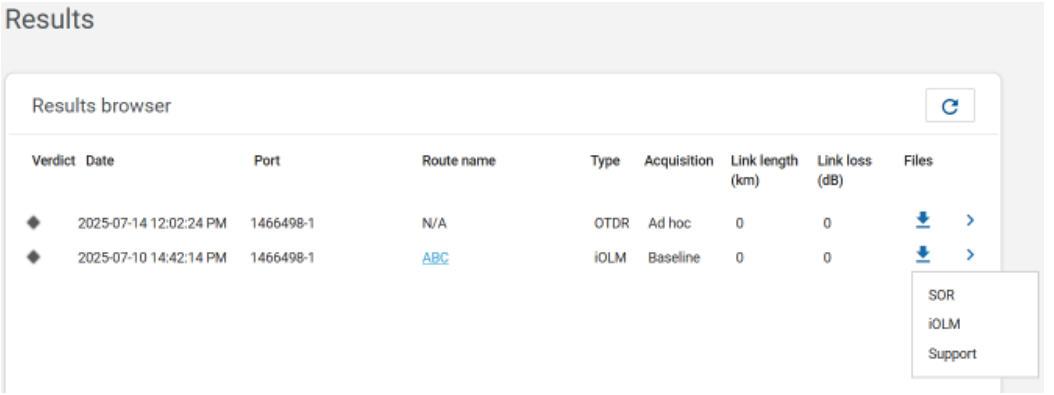
You can save the results locally on a computer.

To save the results:

1. Go to **Results/Results browser** page.
2. Click on the download arrow for the desired result.



Different types of files can be downloaded locally on the computer: Support, iOLM, or SOR files.



6 Maintenance

To help ensure long, trouble-free operation:

- Always inspect fiber-optic connectors before using them and clean them if necessary.
- Keep the unit free of dirt and dust.
- Clean the unit casing and front panel with a cloth slightly dampened with water.
- Store unit at room temperature in a clean and dry area. Keep the unit out of direct sunlight.
- Avoid high humidity or significant temperature fluctuations.
- Avoid unnecessary shocks and vibrations.

WARNING

The use of controls, adjustments and procedures, namely for operation and maintenance, other than those specified herein may result in hazardous radiation exposure or impair the protection provided by this unit.

Cleaning SC or LC Connectors

You can clean the connectors of your unit using a mechanical cleaner.

WARNING

Never look directly into a live fiber. It could cause serious eye damage. Always use a Fiber Inspection Probe.

WARNING

Before cleaning the connectors, you should suspend the tests to avoid hazardous radiation exposure.

To clean a connector using a mechanical cleaner:

1. Insert the mechanical cleaner into the optical adapter, and push the outer shell into the cleaner.

Note: *The cleaner makes a clicking sound that indicates that the cleaning is done.*

2. Verify connector surface with a fiber inspection probe (for example, EXFO's FIP).

Cleaning and Inspecting MPO-Type Connectors

Your unit may be equipped with unpinned MPO ports (connectors) that can be cleaned using a multifiber mechanical cleaner.

You can inspect these connectors using a Fiber Inspection Scope supporting MPO connector configurations (for example, EXFO's FIP-500). Each of the switch's MPO connector has 16 fibers (two rows of eight fibers).

WARNING

Never look directly into a live fiber. It could cause serious eye damage. Always use a Fiber Inspection Probe.

WARNING

Before cleaning the connectors, you should suspend the tests to avoid hazardous radiation exposure.

To clean and inspect an MPO-type connector:

1. Insert the cleaning tip into the optical adapter, and push the outer shell into the cleaner.

Note: *The cleaner makes a clicking sound to indicate that the cleaning is done.*

2. Verify connector surface with a Fiber Inspection Scope. From the dedicated FIP-500 application, ensure to select either a 2 x 8 configuration or a 2 x 12 configuration if no 2 x 8 configuration is available.

Note: *For the exact inspection procedure, refer to the FIP-500 Fiber Inspection Scope user guide.*

Note: *If you have selected a 2 x 12 configuration and the dedicated application returns a Fail status, you may want to have a closer look at the exact fibers with a Fail status. Since the four fibers at each end of the connector are not used, a Fail status on these fibers can be disregarded. If the sixteen central fibers all have a Pass status, you can then consider the whole connector to have a Pass status.*

Note: *If you have selected a 2 x 12 configuration, the fiber numbers shown in the dedicated FIP-500 application* will not *correspond to the actual fiber numbers on your unit.*

Accessing Your Unit Locally

You will need a computer (laptop) and a network cable to connect to your OTH-7000 unit.

To access your unit locally:

1. If it is not already done, connect one end of a network cable to the management port of your unit and the other end to an Ethernet port on the computer.

2. Ensure that the (System) LED is steady green.
3. From your computer, open a web browser and type 169.254.10.10 in the address bar to access the web interface.

Note: *It may take a few seconds before you can see the web interface if your computer needs to reconfigure its network to a link-local address first.*

4. When the application prompts you, enter the connection information.
   - The default user name is: localadmin
   - The default password is: admin

IMPORTANT

The application will lock your account after a certain number of unsuccessful connection attempts. Before entering your connection information again, you will have to wait a few minutes. The waiting time starts increasing after the fifth unsuccessful connection attempt up to a maximum of fifteen minutes.

Accessing Your Unit Remotely

By default, the management of your unit is done locally by connecting a laptop to your unit. However, if you prefer to be able to manage your unit remotely (via LAN or WAN) after the first connection, you can enable a feature allowing you to do so.

The following procedure takes into account that you have already configured your unit for remote access. If it is not the case, you will need to connect locally to your unit, and then, from the web interface ensure you have enabled the remote access (**Administration** page).

To access your unit remotely:

1. Ensure that the unit is reachable with your computer.
2. On your computer, open a Web browser of your choice.
3. Type *https://<IP_address_of_your_unit>*.

Note: *The unit uses a self-signed certificate, which could cause Web browsers to display a message about security issues.*

Changing the Administrator Password

By default, the administrator user account (user name: localadmin), is protected with the *admin* password.

For security reasons, EXFO recommends that you change the default password for a password of your choice after the first connection, and then periodically, according to your own security policy.

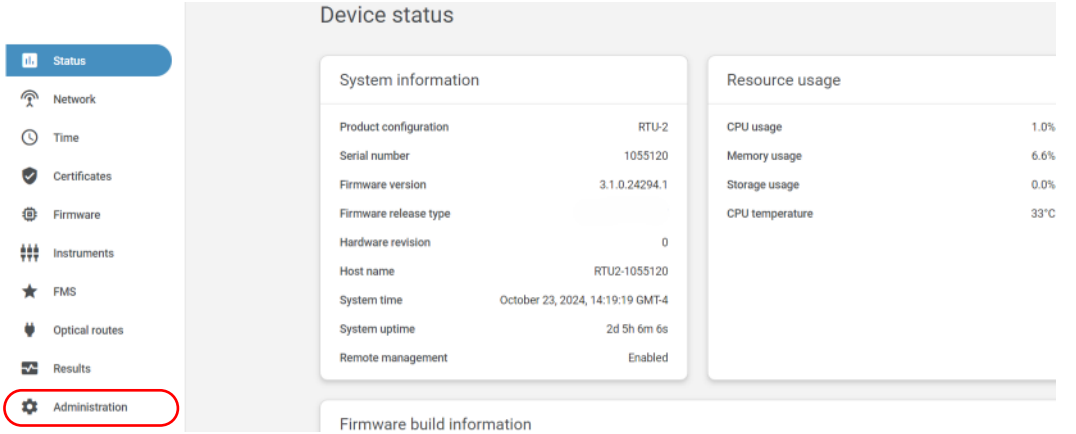
To change the administrator password:

1. Connect to your unit, either locally or remotely. For more information, see *Accessing Your Unit Locally* on page 67 or *Accessing Your Unit Remotely* on page 68.
2. When the application prompts you, enter the connection information.
   - The default user name is: localadmin
   - The default password is: admin

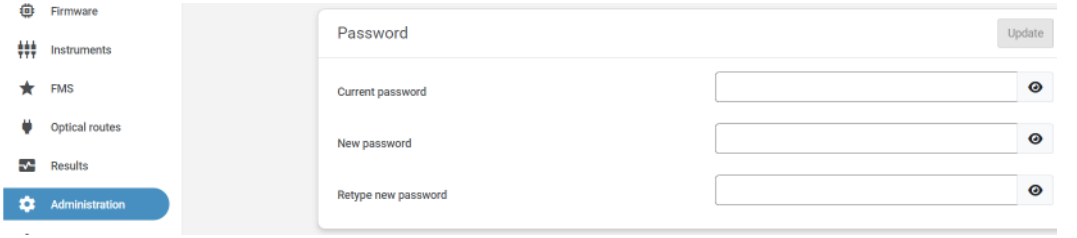
IMPORTANT

The application will lock your account after a certain number of unsuccessful connection attempts. Before entering your connection information again, you will have to wait a few minutes. The waiting time starts increasing after the fifth unsuccessful connection attempt up to a maximum of fifteen minutes.

3. From the list, select **Administration**.



4. Under **Password,** enter the information.



The new password must have a minimum of eight characters and include characters from at least three of the following categories:

- Lowercase letters (‘a’ - ‘z’)
- Uppercase letters (‘A’ - ‘Z’)
- Numbers (0 - 9)
- Special characters

5. Click **Update** to confirm.

The new password is taken into account immediately.

Upgrading the Firmware

The required firmware has been preinstalled at the factory. However, you may have to upgrade it when new versions become available. Keeping both the FMS and the firmware (on your unit) up to date ensures the optimum performance of your system.

After a successful connection between the FMS (Fiber Management System) and your unit, the FMS will provide the updates if your unit is running a compatible version. The updates will be performed automatically. Refer to the RFTM FMS Readme for the complete compatibility information and to the FMS user documentation for more information.

Note: *Your unit must have access to an Internet connection to be able to download updates from the EXFO server and install them manually.*

CAUTION

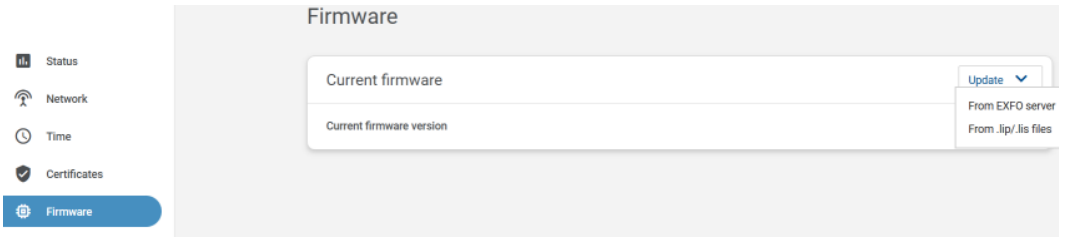
- **For a trouble-free upgrade, ensure that your unit remains on during all the process.**
- **Turning off your unit (or disconnecting it from its power source) while doing the update could result in unexpected behavior of the test applications, instability of the system, or even severely damage your unit, depending on the operation underway when the unit is turned off.**
  Damaged units will need to be sent back to EXFO for repair.
- **The upgrade could take several minutes to complete. Your unit could restart several times during the operation. You will know that the upgrade is finished when the (System) LED turns steady green again.**

IMPORTANT

- **If the manual firmware update results in a downgrade of versions, some data could be lost in the process. You may want to back up your data before the update.**
- **Performing a manual firmware update DOES NOT update the image used to revert the unit to its factory state. For this reason, if you revert your unit to its factory state after performing a manual firmware update, the compatibility between the FMS and the unit's firmware will be lost again. You will need to perform a new update.**

To upgrade the firmware:

1. For updates from the EXFO server, ensure that your unit has access to the Internet.
2. Connect to your unit, either locally or remotely. For more information, see *Accessing Your Unit Locally* on page 67 or *Accessing Your Unit Remotely* on page 68.
3. When the application prompts you, enter your connection information.
4. From the list, select **Firmware**.The **Current firmware version** is displayed.



5. From the **Update** drop-down menu, select either **From EXFO server** or **From .lip/.lis files**.

5a. **From EXFO server**: If there are updates available, you will be notified via a popup window and then have the option to proceed with the **Update** or **Close** to cancel.

If no updates are available, the popup window will prompt you to **Close** the window.

5b. **From .lip/.lis files**: Select the .LIP and .LIS files that you want to use. The upgrade starts automatically and your unit will restart at the end of the operation.

IMPORTANT

You must select both the .LIP and .LIS files to be able to start the upgrade.

Note: *In both firmware update cases, the operation may take a few minutes to complete.*

5c. Wait for your unit to be ready (its  (System) LED will be steady green), and then connect again to the Web application.

Recalibrating the Unit

EXFO manufacturing and service center calibrations are based on the ISO/IEC 17025 standard (*General Requirements for the Competence of Testing and Calibration Laboratories*). This standard states that calibration documents must not contain a calibration interval and that the user is responsible for determining the re-calibration date according to the actual use of the instrument.

The validity of specifications depends on operating conditions. For example, the calibration validity period can be longer or shorter depending on the intensity of use, environmental conditions and unit maintenance, as well as the specific requirements for your application. All of these elements must be taken into consideration when determining the appropriate calibration validity period of this particular EXFO unit.

Until you collect the required empirical data to support your own calibration interval strategy, EXFO recommends that the next calibration (due) date of an instrument be established according to the following equation:

Next calibration date = Date of first usage + Recommended calibration period (three years)

Note: *You can use the date of first usage only if the product was stored in proper conditions (23 °C ± 5 °C (73,4 °F ± 9 °F)). If it is not the case or if you do not know the date of first usage, you can use the date at which you received the product, as long as the product was sourced from an official EXFO distribution channel.*

Restriction:

Next calibration date ≤ calibration date on certificate + recommended calibration period (three years)+ maximum storage period (six months)

Under normal use, the recommended calibration period for your OTH-7000 Optical Test Head is: three years.

For newly delivered units, EXFO has determined that the maximum storage period for this product is up to six months.

EXFO guarantees that proper storage at room temperature for up to the maximum storage period between calibration and shipment will not affect the performance of the test and measurement instruments and will not reduce the recommended validity period before requiring a new calibration.

To help you with calibration follow-up, EXFO provides a special calibration label that complies with the ISO/IEC 17025 standard and indicates the unit calibration date and provides space to indicate the due date.

To ensure that test and measurement instruments conform to the published specifications, calibration must be carried out at the relevant EXFO plant, or, depending on the product, at an EXFO service center, or at one of EXFO's certified service centers. All calibrations are performed using standards traceable to national metrology institutes.

Recycling and Disposal

This symbol on the product means that you should recycle or dispose of your product (including electric and electronic accessories) properly, in accordance with local regulations. Do not dispose of it in ordinary garbage receptacles.

For complete recycling/disposal information, visit the EXFO Web site at www.exfo.com/recycle.

7 Troubleshooting

Solving Common Problems

Before calling EXFO's technical support, you may want to consider the following solutions to problems that could occur.

Problem	Possible Cause	Solution
My unit does not start. Its power LED ( ) remains off when I press the on/off button.	There is a problem related to electrical power.	➤ If your unit is connected to DC power, ensure that the disconnect device is turned on. If your unit is connected to AC power, ensure that the external power supply is connected at both ends, and that the disconnect device is turned on. ➤ If the unit is connected to DC power, ensure that the wires are connected properly, respecting polarity (see *Connecting Your Unit to a Power Source* on page 29).
The RTUe-9120 external switch that I have just connected is not working.	The switch has not been detected.	Disconnect, then reconnect the switch.
		Ensure that the OTH-7000 unit is on and that its System LED ( ) is green and not blinking.

Problem	Possible Cause	Solution
I cannot sign in to my account with my user name and password.	The application locked your account after five or more unsuccessful connection attempts.	Wait a few minutes before attempting a new connection. After eight unsuccessful attempts, you will have to wait 15 minutes before trying again.
	You forgot or lost your password.	Create a new password with the FMS. For more information about the FMS, refer to its user documentation.
The dedicated FIP-500 application now returns a Fail status for one of the MPO port (connector) of my unit.	There is at least one dirty or damaged fiber inside the MPO connector.	From the dedicated FIP-500 application, verify which fibers have a Fail status. If you have used a 2 x 12 configuration for the inspection, you can disregard the Fail status of the four fibers at each end of the connector as they are not used. If the sixteen central fibers all have a Pass status, you can then consider the whole connector to have a Pass status. If some of the sixteen central fibers have a Fail status, try cleaning the connector again (see *Cleaning and Inspecting MPO-Type Connectors* on page 65). If the problem persists, contact EXFO.

Problem	Possible Cause	Solution
I cannot connect remotely to my unit.	Wrong IP address.	➤ Check if the IP address that you have specified for your unit is valid. ➤ Connect to your unit by using the host (computer) name of your unit. By default, the host name corresponds to: OTH7000-<serial_number>
	No network cable is connected to your unit.	Ensure that a network cable is properly connected to your unit.
	The OTH-7000 unit is restarting.	Wait for the unit to complete the restart operation.
	The OTH-7000 unit is not reachable.	Contact your network administrator for network-related troubleshooting.
I am having difficulty connecting with the FMS.	The firmware on your unit may be old.	Perform a manual firmware update.

Restoring Your Unit to Normal Operation

If you ever encounter major problems with your unit (for example, the unit does not behave the way it used to), you can revert it to its initial state (as it was at time of purchase).

When you reset your unit to its factory settings:

- All data files will be lost once the operation is complete.
- If you have installed products and updates since you purchased your unit, you will have to reinstall them.

IMPORTANT

Resetting your unit to its factory settings will disable the remote management if it was enabled. This means that, once the operation is complete, you will no longer be able to connect remotely to your unit.

CAUTION

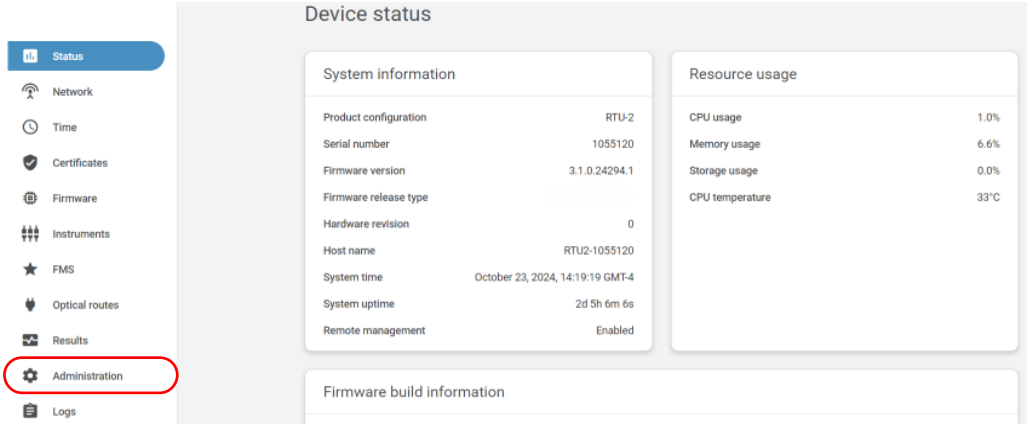
DO NOT TURN OFF your unit while the recovery operation is underway. Doing so may severely damage your unit. Damaged units will need to be sent back to EXFO for repair.

You can perform this operation from the web interface or manually, especially if you cannot access the web interface.

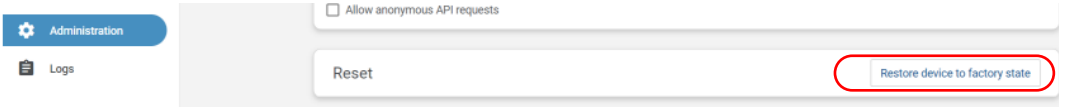
To restore your unit to factory state with the web interface:

1. Connect to your unit, either locally or remotely. For more information, see *Accessing Your Unit Locally* on page 67 or *Accessing Your Unit Remotely* on page 68.
2. When the application prompts you, enter your connection information.

3. From the list, select **Administration**.



4. Click **Restore device to factory state**.



5. Follow the on-screen instructions.

The restoring process is now underway and the (System) LED will keep blinking rapidly. Your unit will restart automatically.

Once your unit has restarted, its (System) LED will blink slowly during the whole initialization. You will know that the operation is complete when the LED becomes steady green.

Note: *The restoring process may take a few minutes to complete.*

6. Configure your unit as you did when you first received it. However, use the following credentials to establish a connection:

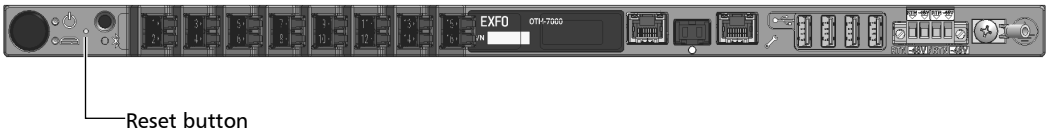
- User name: admin
- Password: admin

Note: *Depending on when your unit was manufactured, the default user name could be* admin *or* localadmin.

For more information, see *Working With Your Unit for the First Time* on page 39.

To restore your unit to its factory state without the web interface:

1. Turn off you unit.
2. Insert the end of an unbent paper clip into the tiny hole to access the reset button.



3. While you keep pushing on the paper clip, turn on the unit. Do not remove the paper clip yet.
4. As soon as the (System) LED starts blinking rapidly, remove the paper clip.

   The restoring process is now underway and the (System) LED will keep blinking rapidly. Your unit will restart automatically.

   Once your unit has restarted, its (System) LED will blink slowly during the whole initialization. You will know that the operation is complete when the LED becomes steady green.

Note: *The restoring process may take a few minutes to complete.*

5. Configure your unit as you did when you first received it (see *Working With Your Unit for the First Time* on page 39).

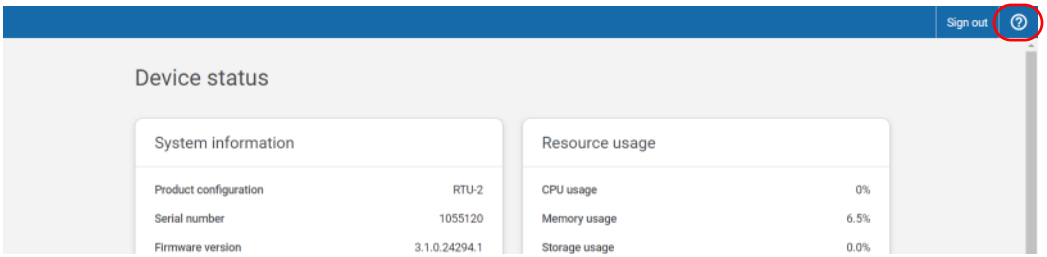
Accessing the User Documentation

You can access the user documentation in PDF format at all times from your unit.

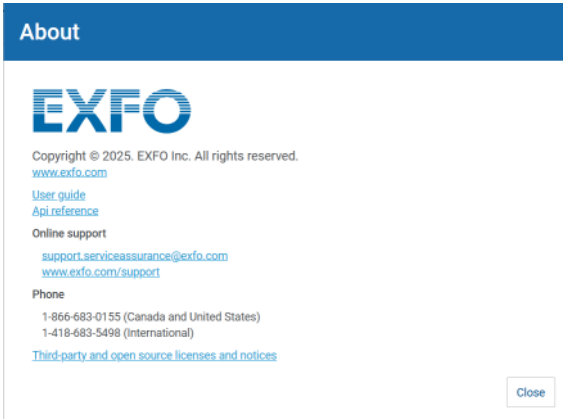
Note: *The user guides of all products are also available from the Resources section of the EXFO Web site (www.exfo.com) for download in PDF format.*

To view the user documentation:

1. From the title bar of the web interface, click  to open the **About** window.



2. Click on the desired link.



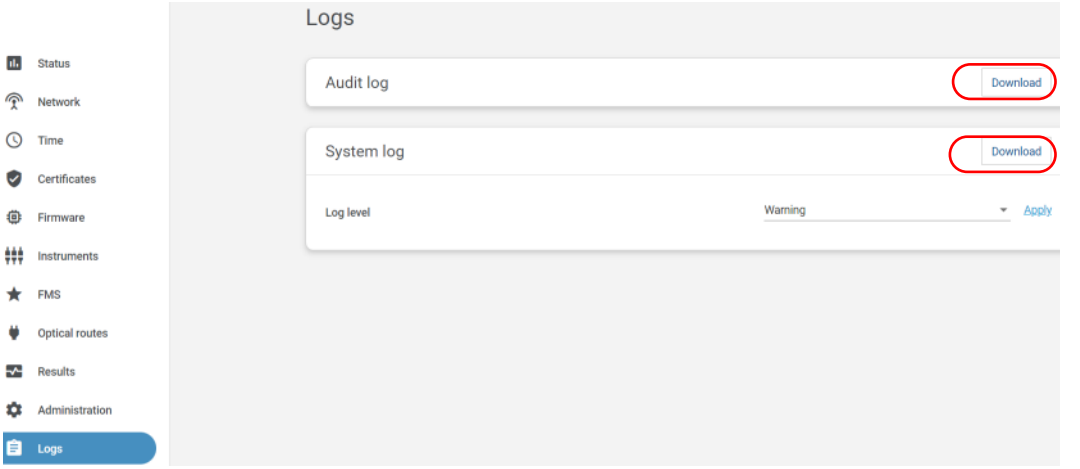
Retrieving Logs

There are two types of logs that you can retrieve from the web interface:

- The audit log that lists events and changes that occurred on the OTH-7000 unit.
- The system log that provides special information that you can send to the technical support team at EXFO for further analysis.

To retrieve logs:

1. Connect to your unit, either locally or remotely. For more information, see *Accessing Your Unit Locally* on page 67 or *Accessing Your Unit Remotely* on page 68.
2. From the web interface, go to the **Logs** page.
3. Go to the section corresponding to the type of log that you want to retrieve, and then click the corresponding **Download** link.



Note: *If necessary, the technical support team will ask you to change the level to another value for subsequent actions. The* Debug *level should be used temporarily as it can slow down the system. EXFO recommends to set the level back to* Warning *once the debug operation is complete.*

Note: *The time necessary to retrieve a log will vary with its size.*

Contacting the Technical Support Group

To obtain after-sales service or technical support for this product, contact EXFO at one of the following numbers. The Technical Support Group is available to take your calls from Monday to Friday, 8:00 a.m. to 7:00 p.m. (Eastern Time in North America).

Technical Support Group
400 Godin Avenue
Quebec (Quebec) G1M 2K2
CANADA

1 866 683-0155 (USA and Canada)
Tel.: 1 418 683-5498
Fax: 1 418 683-9224
support@exfo.com

For detailed information about technical support, and for a list of other worldwide locations, visit the EXFO Web site at www.exfo.com.

If you have comments or suggestions about this user documentation, you can send them to customer.feedback.manual@exfo.com.

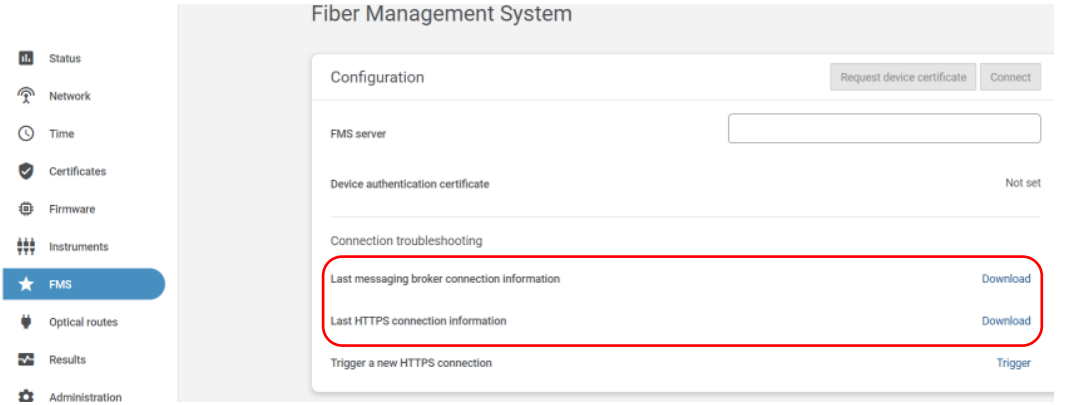
To accelerate the process, please have information such as the name and the serial number (see the product identification label), as well as a description of your problem, close at hand.

Sharing the FMS Connection Information With the Technical Support Group

After contacting EXFO for support, you may need to share connection information to the FMS (Fiber Management System) server with the technical support group for further investigation.

To share information with the technical support group:

1. Connect to your unit, either locally or remotely. For more information, see *Accessing Your Unit Locally* on page 67 or *Accessing Your Unit Remotely* on page 68.
2. From the web interface, go to the **FMS** page.



3. Click the **Download** link corresponding to the type of information that the technical support requires for investigation. The application generates a text file and sends it to the download folder of your computer automatically.
4. Provide the downloaded file(s) to the technical support group.

Note: *If someone from the technical group ask you to trigger a new HTTPS connection, simply click the **Trigger** link. You will then need to download a new HTTPS connection information file.*

Transportation

Maintain a temperature range within specifications when transporting the unit. Transportation damage can occur from improper handling. The following steps are recommended to minimize the possibility of damage:

- Pack the unit in its original packing material when shipping.
- Avoid high humidity or large temperature fluctuations.
- Keep the unit out of direct sunlight.
- Avoid unnecessary shocks and vibrations.

8 Warranty

General Information

EXFO Inc. (EXFO) warrants this equipment against defects in material and workmanship for a period of one year from the date of original shipment. EXFO also warrants that this equipment will meet applicable specifications under normal use.

During the warranty period, EXFO will, at its discretion, repair, replace, or issue credit for any defective product, as well as verify and adjust the product free of charge should the equipment need to be repaired or if the original calibration is erroneous. If the equipment is sent back for verification of calibration during the warranty period and found to meet all published specifications, EXFO will charge standard calibration fees.

IMPORTANT

The warranty can become null and void if:

- **unit has been tampered with, repaired, or worked upon by unauthorized individuals or non-EXFO personnel.**
- **warranty sticker has been removed.**
- **case screws, other than those specified in this guide, have been removed.**
- **case has been opened, other than as explained in this guide.**
- **unit serial number has been altered, erased, or removed.**
- **unit has been misused, neglected, or damaged by accident.**

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESSED, IMPLIED, OR STATUTORY, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL EXFO BE LIABLE FOR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES.

Gray Market and Gray Market Products

Gray market is a market where products are traded through distribution channels that are legal but remain unofficial, unauthorized, or unintended by the original manufacturer. Intermediaries using such channels to distribute products are considered to be part of the gray market (hereafter unauthorized intermediary).

EXFO considers that a product originates from the gray market (hereafter gray market product) in the following situations:

- A product is sold by an unauthorized intermediary.
- A product is designed and destined for a particular market and sold on a second market.
- A product is resold, despite being reported lost or stolen.

When products are purchased on the gray market, rather than through an authorized EXFO distribution channel, EXFO is unable to guarantee the source and quality of those products nor the local safety regulations and certifications (CE, UL, etc.).

EXFO will not honor warranty, install, maintain, repair, calibrate, provide technical support nor make any support contracts available for gray market products.

For complete information, refer to EXFO's policy regarding gray market products at www.exfo.com/en/how-to-buy/sales-terms-conditions/gray-market/

Liability

EXFO shall not be liable for damages resulting from the use of the product, nor shall be responsible for any failure in the performance of other items to which the product is connected or the operation of any system of which the product may be a part.

EXFO shall not be liable for damages resulting from improper usage or unauthorized modification of the product, its accompanying accessories and software.

Exclusions

EXFO reserves the right to make changes in the design or construction of any of its products at any time without incurring obligation to make any changes whatsoever on units purchased. Accessories, including but not limited to fuses, pilot lamps, batteries and universal interfaces (EUI) used with EXFO products are not covered by this warranty.

This warranty excludes failure resulting from: improper use or installation, normal wear and tear, accident, abuse, neglect, fire, water, lightning or other acts of nature, causes external to the product or other factors beyond the control of EXFO.

IMPORTANT

In the case of products equipped with optical connectors, EXFO will charge a fee for replacing connectors that were damaged due to misuse or bad cleaning.

Certification

EXFO certifies that this equipment met its published specifications at the time of shipment from the factory.

Service and Repairs

EXFO commits to providing product service and repair for five years following the date of purchase.

To send any equipment for service or repair:

1. Call one of EXFO's authorized service centers (see *EXFO Service Centers Worldwide* on page 93). Support personnel will determine if the equipment requires service, repair, or calibration.
2. If equipment must be returned to EXFO or an authorized service center, support personnel will issue a Return Merchandise Authorization (RMA) number and provide an address for return.
3. If possible, back up your data before sending the unit for repair.
4. Pack the equipment in its original shipping material. Be sure to include a statement or report fully detailing the defect and the conditions under which it was observed.
5. Return the equipment, prepaid, to the address given to you by support personnel. Be sure to write the RMA number on the shipping slip. *EXFO will refuse and return any package that does not bear an RMA number.*

Note: *A test setup fee will apply to any returned unit that, after test, is found to meet the applicable specifications.*

After repair, the equipment will be returned with a repair report. If the equipment is not under warranty, you will be invoiced for the cost appearing on this report. EXFO will pay return-to-customer shipping costs for equipment under warranty. Shipping insurance is at your expense.

Routine recalibration is not included in any of the warranty plans. Since calibrations/verifications are not covered by the basic or extended warranties, you may elect to purchase FlexCare Calibration/Verification Packages for a definite period of time. Contact an authorized service center (see *EXFO Service Centers Worldwide* on page 93).

EXFO Service Centers Worldwide

If your product requires servicing, contact your nearest authorized service center.

EXFO Headquarters Service Center
400 Godin Avenue
Quebec (Quebec) G1M 2K2
CANADA

1 866 683-0155 (USA and Canada)
Tel.: 1 418 683-5498
Fax: 1 418 683-9224
support@exfo.com

EXFO Europe Service Center
Winchester House, School Lane
Chandlers Ford, Hampshire S053 4DG
ENGLAND

Tel.: +44 2380 246800
Fax: +44 2380 246801
support.europe@exfo.com

EXFO Telecom Equipment (Shenzhen) Ltd.
3rd Floor, Building C,
FuNing Hi-Tech Industrial Park, No. 71-3,
Xintian Avenue,
Fuhai, Bao'An District,
Shenzhen, China, 518103

Tel: +86 (755) 2955 3100
Fax: +86 (755) 2955 3101
support.asia@exfo.com

To view EXFO's network of partner-operated Certified Service Centers nearest you, please consult EXFO's corporate website for the complete list of service partners:
https://www.exfo.com/en/services/field-network-testing/exfo-service-centers.

A API

You can configure and operate your unit using an API available on the management port, and optionally on the LAN/WAN port if the remote access is enabled (see *Working With Your Unit for the First Time* Procedure Step 16).

A complete list of commands allowing you to remotely control your unit is available at all times from a Swagger UI. It details the commands with examples and appropriate syntax.

Accessing the API and Its Documentation

The API and the related documentation are accessible as follows:

- API base path: <device address>/api
- Swagger UI: <device address>/help/api

  The Swagger UI is also available using the **API reference** link in the **About** box.

Using the API Without Authentication

You can use the API without authentication by allowing anonymous API requests.

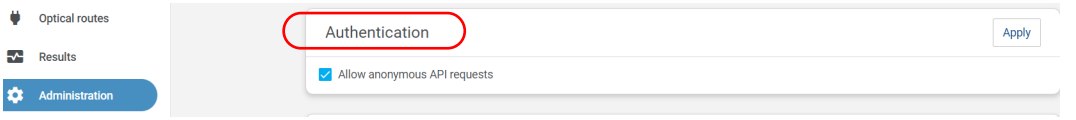
IMPORTANT

The setting will also be applied to the LAN/WAN port if the remote access is enabled.

To use the API without authentication:

1. Ensure that your computer is connected to your unit.
2. If it is not already done, from your computer, open a Web browser and type 169.254.10.10 in the address bar to access the web interface.

3. From the list, select **Administration**.
4. Select the **Allow anonymous API requests** check box.



5. Click **Apply**.

The API can now be used without authentication.

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CHINESE REGULATION ON RESTRICTION OF HAZARDOUS SUBSTANCES (RoHS)
中国关于危害物质限制的规定

NAMES AND CONTENTS OF THE TOXIC OR HAZARDOUS SUBSTANCES OR ELEMENTS CONTAINED IN THIS EXFO PRODUCT
包含在本 EXFO 产品中的有毒有害物质或元素的名称及含量

Part Name 部件名称	Lead 铅 （Pb）	Mercury 汞 （Hg）	Cadmium 镉 （Cd）	Hexavalent Chromium 六价铬 （Cr(VI)）	Polybrominated biphenyls 多溴联苯 （PBB）	Polybrominated diphenyl ethers 多溴二苯醚 （PBDE）
Enclosure 外壳	O	O	O	O	O	O
Electronic and electrical sub-assembly 电子和电气组件	X	O	X	O	X	X
Optical sub-assembly[a] 光学组件 [a]	X	O	O	O	O	O
Mechanical sub-assembly[a] 机械组件 [a]	O	O	O	O	O	O

Note:
注：
This table is prepared in accordance with the provisions of SJ/T 11364.
本表依据 SJ/T 11364 的规定编制。
O: Indicates that said hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement of GB/T 26572.
O：表示该有害物质在该部件所有均质材料中的含量均在 GB/T 26572 标准规定的限量要求以下。
X: indicates that said hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement of GB/T 26572. Due to the limitations in current technologies, parts with the “X” mark cannot eliminate hazardous substances.
X：表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 标准规定的限量要求。
标记“X”的部件，皆因全球技术发展水平限制而无法实现有害物质的替代。
a. If applicable.
如果适用。

MARKING REQUIREMENTS
标注要求

Product 产品	Environmental protection use period (years) 环境保护使用期限 （年）	Logo 标志
This EXFO product 本 EXFO 产品	10	
Battery[a] 电池	5	

a. If applicable.
如果适用。

P/N: 1089790

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