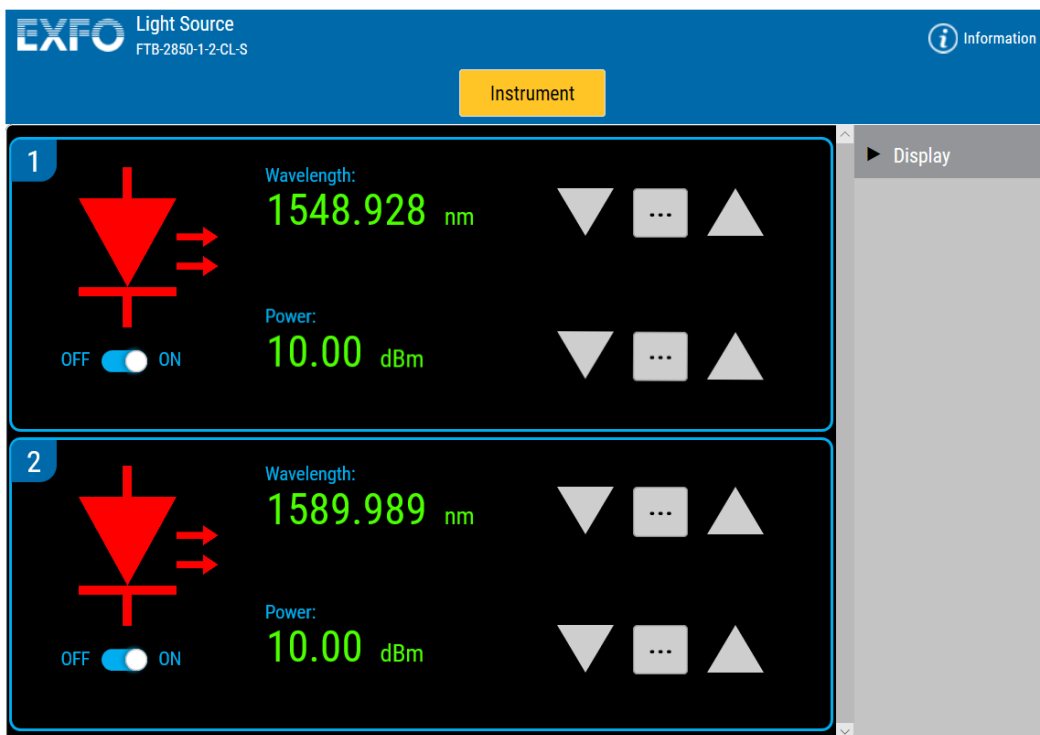


FTBx-2850/FTB-2850

Tunable Light Source



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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: 4.0.0.2

Contents

Regulatory Information v

1 Introducing the FTBx-2850/FTB-2850 Tunable Light Source 1

 Technical Specifications 2

 Conventions 3

2 Safety Information 4

 General Safety Information 4

 Laser Safety Information 6

 Electrical Safety Information 7

3 Operating your Tunable Light Source 8

 Cleaning and Connecting Optical Fibers 8

 Installing the EXFO Universal Interface (EUI) 10

 Selecting a Module from a Web Browser 11

 Displaying Selected Sources 13

 Activating or Deactivating Light Emission 14

 Setting the Wavelength 15

 Setting the Power 18

4 Maintenance 20

 Cleaning Optical Connectors Using a Mechanical Cleaner 21

 Cleaning EUI Connectors 22

 Updating the Firmware of Your Module 24

 Recalibrating the Unit 26

 Recycling and Disposal 27

5 Troubleshooting 28

 Solving Common Problems 28

 Viewing Online Documentation 29

 Contacting the Technical Support Group 30

 Transportation 30

6	Warranty	31
	General Information	31
	Gray Market and Gray Market Products	32
	Liability	33
	Exclusions	34
	Certification	34
	Service and Repairs	35
	EXFO Service Centers Worldwide	36
A	SCPI Command Reference	37
	Programming Conventions	37
	Message Queues	38
	Quick Reference Command Tree	40
	Product-Specific Commands—Description	41
B	REST Command Reference	53

Regulatory Information



CAUTION

Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.



CAUTION

The emissions class and electromagnetic environment of some modules may differ from those specified for your unit. In this case, always ensure that you comply with the most restrictive conditions (either module or unit).

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.

Simplified EU and UK Declaration of Conformity

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

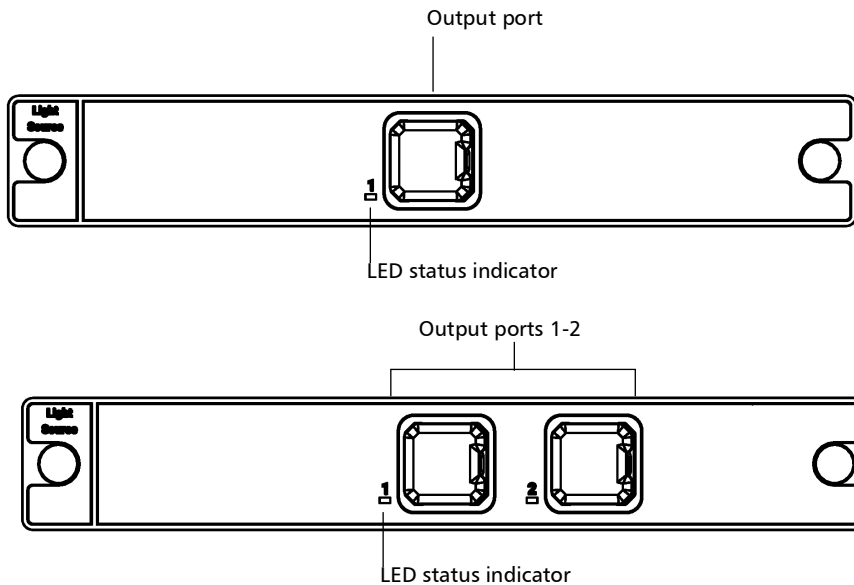
EXFO Solutions SAS
2, rue Jacqueline Auriol,
Saint-Jacques-de-la-Lande,
35091 Rennes Cedex 9
FRANCE

1

Introducing the FTBx-2850/FTB-2850 Tunable Light Source

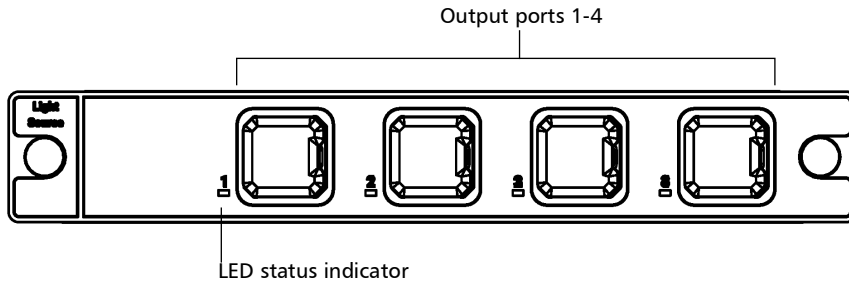
The FTBx-2850/FTB-2850 is a continuous wave (CW) tunable laser source providing high-power output, narrow linewidth and superior power accuracy.

The FTBx-2850/FTB-2850 is available in 1-, 2- and 4-port configurations.



Introducing the FTBx-2850/FTB-2850 Tunable Light Source

Technical Specifications



CAUTION

The FTBx-2850/FTB-2850 modules are sensitive to electrostatic discharge (ESD). In the event of a discharge, the module may enter protection mode, and the user might need to restart the software manually. If the laser was ON before the ESD event, it will turn OFF and you will have to turn it back ON.

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

General 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

If the FTBx-2850/FTB-2850 module is used outside the limits of stable operation, the module will automatically shut down to protect you, the platform, and the module itself.



CAUTION

Always store the modules that are not in use in protective electrostatic packaging.

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 INVISIBLE LASER RADIATION
DO NOT EXPOSE USERS OF TELESCOPIC OPTICS
CLASS 1M LASER PRODUCT

Wavelength: / Longueur d'onde Wavelength: 1550 nm

Pout max.: / Psortie max. Pout max.: ≤ 15 dBm

Electrical Safety Information

The maximum input power for the FTBx-2850/FTB-2850 Tunable Light Source is 12 W. For more information on equipment ratings, refer to the user guide for your specific platform.

3

Operating your Tunable Light Source



CAUTION

The type of optical connectors is specific to each FTBx-2850/FTB-2850 module. The connectors will be of type APC/FC narrow key, UPC/FC narrow key, or UPC/SC. You can find this information on the front panel of the module. Joining mismatched connectors will damage the ferrules.

Cleaning and Connecting Optical Fibers



CAUTION

To ensure maximum power and to avoid erroneous readings:

- Always inspect fiber ends and make sure that they are clean as explained below before inserting them into the port. EXFO is not responsible for damage or errors caused by bad fiber cleaning or handling.
- Ensure that your patchcord has appropriate connectors. Joining mismatched connectors will damage the ferrules.

To connect the fiber-optic cable to the port:

1. Inspect the fiber using a fiber inspection scope (or probe). If the fiber is clean, proceed to connecting it to the port. If the fiber is dirty, clean it as explained below.
2. Clean the fiber ends as follows:
 - 2a. Gently wipe the fiber end with a lint-free swab dipped in optical-grade liquid cleaner.
 - 2b. Use a dry swab to dry the connector completely.
 - 2c. Visually inspect the fiber end to ensure its cleanliness.

3. Carefully align the connector and port to prevent the fiber end from touching the outside of the port or rubbing against other surfaces.

If your connector features a key, ensure that it is fully fitted into the port's corresponding notch.

4. Push the connector in so that the fiber-optic cable is firmly in place, thus ensuring adequate contact.

If your connector features a screw sleeve, tighten the connector enough to firmly maintain the fiber in place. Do not overtighten, as this will damage the fiber and the port.

Note: *If your fiber-optic cable is not properly aligned and/or connected, you will notice heavy loss and reflection.*

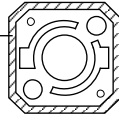
EXFO uses good quality connectors in compliance with EIA-455-21A standards.

To keep connectors clean and in good condition, EXFO strongly recommends inspecting them with a fiber inspection scope (or probe) before connecting them. Failure to do so may result in permanent damage to the connectors and degradation in measurements.

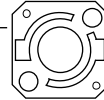
Installing the EXFO Universal Interface (EUI)

The EUI fixed baseplate is available for connectors with angled (APC) or non-angled (UPC) polishing. The type of border around the baseplate indicates which type of connector it is designed for.

Green border
indicates APC
option

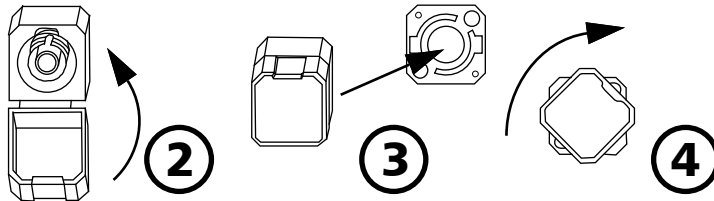


Bare metal, or a
black or dark gray
border indicates
UPC option



To install an EUI connector adapter onto the EUI baseplate:

1. Hold the EUI connector adapter so the dust cap opens downwards.



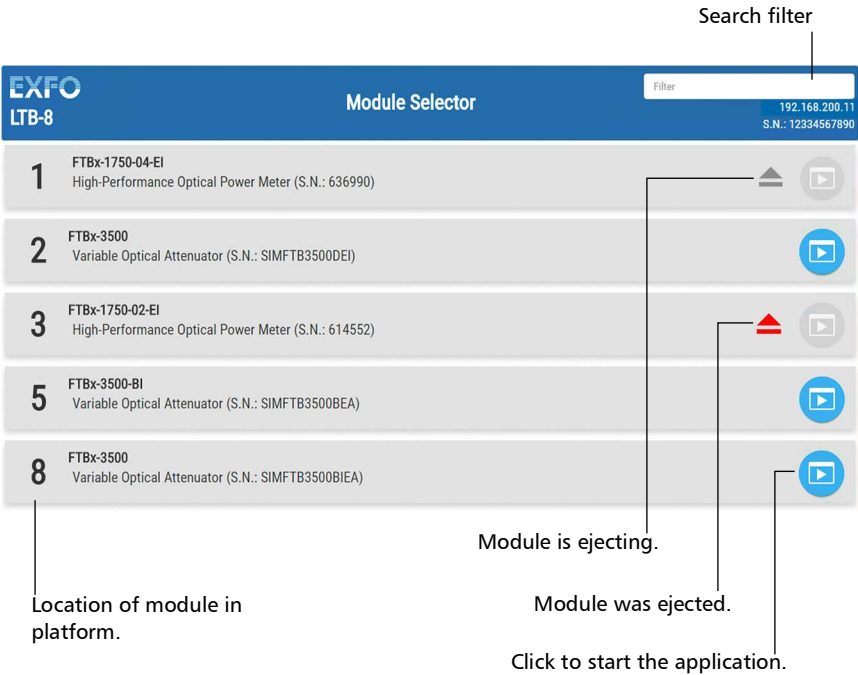
2. Close the dust cap in order to hold the connector adapter more firmly.
3. Insert the connector adapter into the baseplate.
4. While pushing firmly, turn the connector adapter clockwise on the baseplate to lock it in place.

Selecting a Module from a Web Browser

Note: This feature is not necessarily available on all platforms.

If you are accessing your module from a Web browser, you can select which module or application you want to work with. Simply enter `http://[IP address of your platform]` in your browser address box.

To only view the FTBx-2850/FTB-2850 modules, enter `http://[IP address of your platform]/2850`.



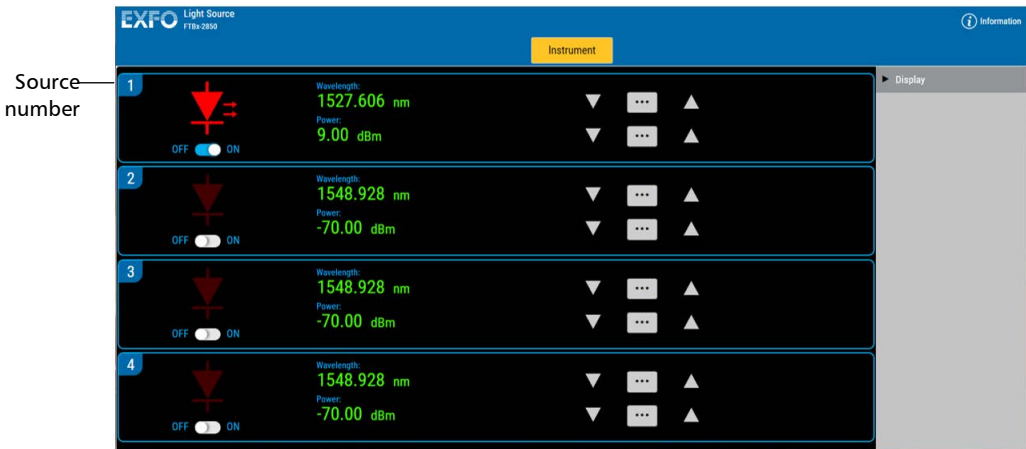
Note: The list you see on-screen will differ depending on which modules are in your platform.

Operating your Tunable Light Source

Selecting a Module from a Web Browser

Your Tunable Light Source is controlled and operated from within the **Instrument** tab. Depending on your source model, some or all of the following operations are available:

- selecting wavelength (for multiple-wavelength modules only)
- setting power

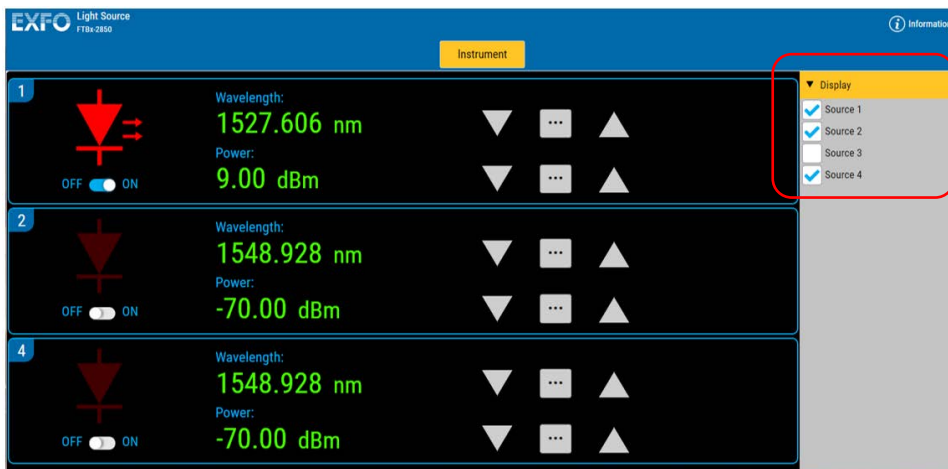


Displaying Selected Sources

If your module features multiple sources, you can select which ones you want to view on screen. You can select one, some or all of them.

To select the sources to display:

From the **Instrument** tab, select **Display**, then the corresponding sources.



Activating or Deactivating Light Emission

Before activating the source, carefully read *Safety Information* on page 4.

To activate or deactivate light emission:

- Select **ON** to activate the light emission.

OR

Click directly on the status indicator.

The ACTIVE LED on the module's front panel lights up, indicating that the source is active. The data display lights up and two red arrows appear beside the status indicator on the data display, indicating that the source is on.

- Select **OFF** to deactivate the light emission. The ACTIVE LED on the module's front panel turns off, indicating that the source is off. The status indicator on the data display is dimmed and the two red arrows disappear from the data display.


Setting the Wavelength

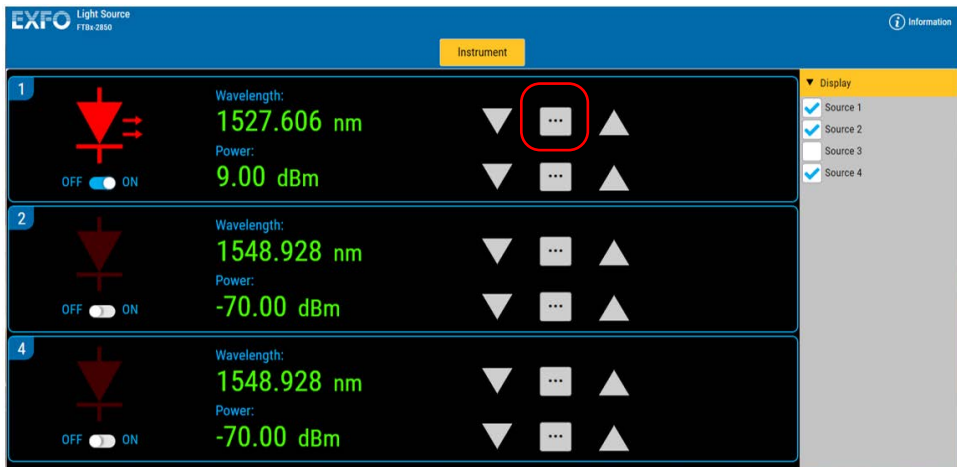
On some models, you can modify the wavelength of the FTBx-2850/FTB-2850 Tunable Light Source.

You can set the wavelength directly by entering a valid value, or by setting the wavelength step and then using the arrow buttons to increment/decrement the wavelength to the desired value.

Note: You do not need to turn on the source or to connect it to a DUT to set its wavelength. To turn on the source, see Activating or Deactivating Light Emission on page 14.

To set the wavelength step value for a source:

1. Select the **Instrument** tab.
2. Under the source you want to modify, click the  button next to the wavelength.



3. Select the wavelength step value you want to use in the list of available choices. This value will be used when you set the wavelength with the arrow buttons.



Set Wavelength

Set Wavelength: 1550.0 nm

Range 1527.6 nm to 1568.8 nm

Wavelength Step: 1

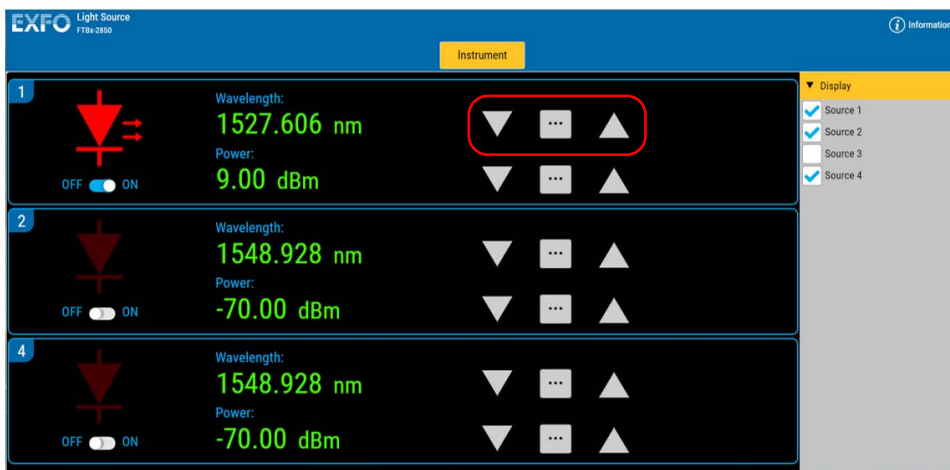
Confirm Cancel

4. Click **Confirm** to start using this value.


Note: *The step value can be different for each source of a same module.*

To set the source wavelength:

1. Select the **Instrument** tab.
2. Adjust the wavelength from the **Wavelength** panel using the arrow buttons.



OR

You can also enter a specific value using the  button and then type the desired number.




Note: If you enter a value outside the acceptable range, the **Confirm** button will not be available.

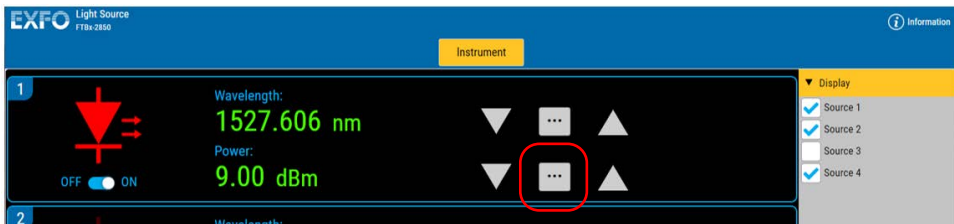
Setting the Power

On some models, you can modify the power of the FTBx-2850/FTB-2850 Tunable Light Source output.

Note: You need to turn on the source to set its power. To turn on the source, see *Activating or Deactivating Light Emission on page 14*.

To set the power step value for a source:

1. Select the **Instrument** tab.
2. Under the source you want to modify, click the  button next to the power value.



3. Select the power step value you want to use in the list of available choices. This value will be used when you set the power using the arrow buttons.



4. Click **Confirm** to start using this value.


Note: The step value can be different for each source of a same module.

To set the source power:

1. Select the **Instrument** tab.
2. Adjust the power of the laser signal emitted by the source from the **Power** panel using the arrow buttons.



OR

You can also enter a specific value using the  button next to the power value, and then the desired number.



Note: If you enter a value outside the acceptable range, the **Confirm** button will not be available.

4

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 Optical Connectors Using a Mechanical Cleaner

Optical connectors are fixed on your unit and can be cleaned using a mechanical cleaner.



WARNING

Verifying the surface of the connector with a fiber-optic microscope WHILE THE UNIT IS ACTIVE WILL result in permanent eye damage.



CAUTION

If you are cleaning an EUI with a mechanical cleaner, do not remove it from your device to clean it.

To clean a connector using a mechanical cleaner:

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 probe (for example, EXFO's FIP).

Cleaning EUI Connectors

Regular cleaning of EUI connectors will help maintain optimum performance. There is no need to disassemble the unit.



WARNING

Looking into the optical connector while the light source is active **WILL** result in permanent eye damage. EXFO strongly recommends to **TURN OFF** the unit before proceeding with the cleaning procedure.

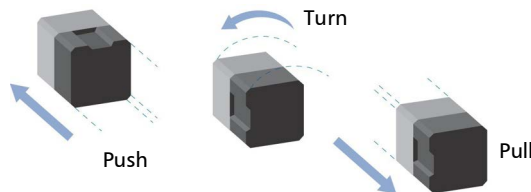


IMPORTANT

If any damage occurs to internal connectors, the module casing will have to be opened and a new calibration will be required.

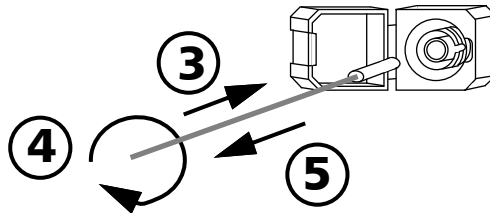
To clean EUI connectors:

1. Turn off the unit. Remove the EUI from the instrument to expose the connector baseplate and ferrule.



2. Moisten a 2.5 mm cleaning tip with *one drop* of optical-grade liquid cleaner.

3. Slowly insert the cleaning tip into the EUI adapter until it comes out on the other side (a slow clockwise rotating movement may help).



4. Gently turn the cleaning tip one full turn, then continue to turn as you withdraw it.
5. Repeat steps 3 to 4 with a dry cleaning tip.

Note: *Make sure you don't touch the soft end of the cleaning tip.*

6. Clean the ferrule in the connector port as follows:
 - 6a. Deposit *one drop* of optical-grade liquid cleaner on a lint-free wiping cloth.



IMPORTANT

Avoid contact between the tip of the bottle and the wiping cloth, and dry the surface quickly.

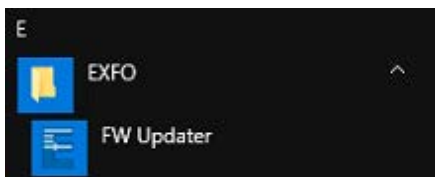
- 6b. Gently wipe the connector and ferrule.
 - 6c. With a dry lint-free wiping cloth, gently wipe the same surfaces to ensure that the connector and ferrule are perfectly dry.
 - 6d. Verify connector surface with a fiber inspection probe (for example, EXFO's FIP).
7. Put the EUI back onto the instrument (push and turn clockwise).
8. Throw out cleaning tips and wiping cloths after one use.

Updating the Firmware of Your Module

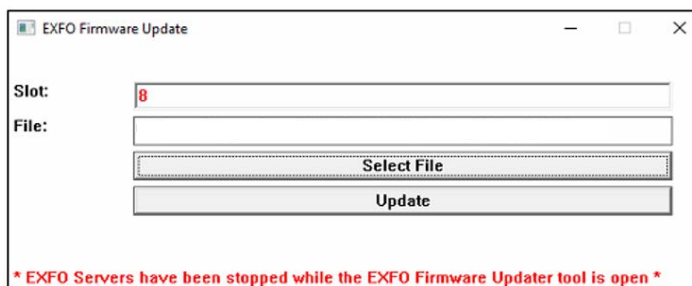
The EXFO Firmware Updater is a tool to simplify the installation of new firmware onto your FTBx-2850/FTB-2850 modules.

To update the firmware of your module:

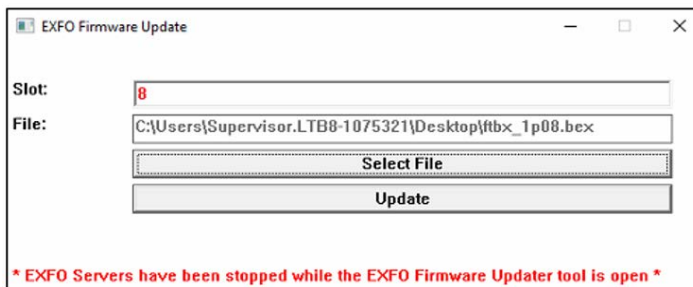
1. Open the **Start** menu and select **EXFO > FW Updater**.



2. If the system prompts you, authorize the operation with **Yes** if you want to use the application.
3. From the application, enter in the slot number of the module to update (slot 8 in the example below).



4. Click the **Select File** button to open the file dialog and browse to the desired new firmware file (ftbx_1p08.bex in the example below). The .bex file is located under *C:\Program Files (x86)\EXFO\EXFOServer*.



5. Click **Update** to start the process. Wait for the tool to display a confirmation message indicating that the update is complete.
6. Close the application to automatically restart the EXFO Server and Web Server services.
7. Restart the platform hosting your module to complete the update process.

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 FTBx-2850/FTB-2850 Tunable Light Source 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.

Note: *You may have purchased a FlexCare plan that covers calibrations. See the Service and Repairs section of this user documentation for more information on how to contact the service centers and to see if your plan qualifies.*

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.

5 Troubleshooting

Solving Common Problems

The following is a list of common problems along with their possible causes and some recommended actions to solve them.

Note: *In all cases, if problem persists after performing the recommended actions, contact EXFO.*

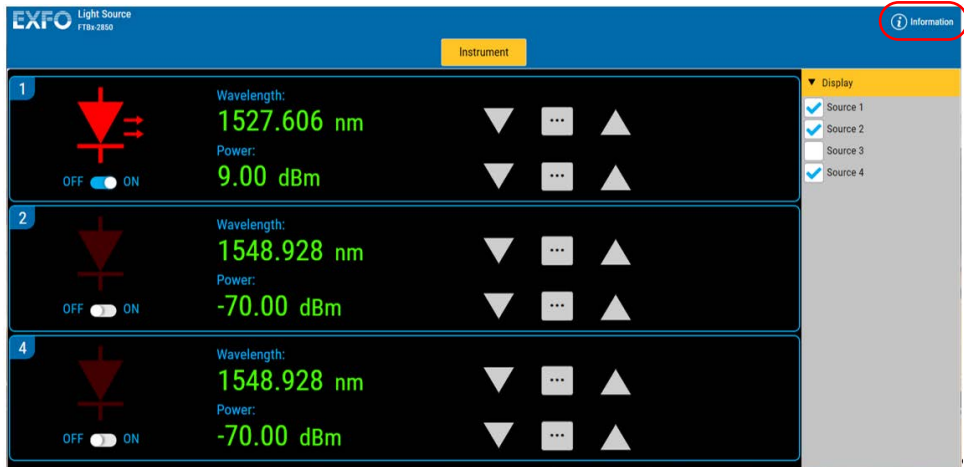
Problem	Possible Cause	Recommended Action
I have just inserted a module in my platform, but I cannot see it in the Module Selector window.	The module has not been detected.	Restart the platform (leave the module in the platform).

Viewing Online Documentation

A PDF version of the user guide is available at all times for your Tunable Light Source.

To view the user guide:

1. From the main window, click **Information**.



2. Select **User Guide**.

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.

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.

6

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 36). 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 36).

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

SCPI Command Reference

This appendix presents detailed information on the commands and queries supplied with your Optical Source.

Programming Conventions

This section details the programming and measurement conventions to follow while executing the commands for the FTBx-2850/FTB-2850 Tunable Light Source.

Valid Units

The table below shows the supported units.

Parameter	Default Units	Alternative Units
Power	DBM	MDBM
Frequency	HZ	THZ, GHZ, MHZ, KHZ
Wavelength	M	NM, PM

Common Elements

The following table shows elements that are commonly used in the commands or queries syntax.

Element	Meaning
<wsp>	Specifies a whitespace character (01 ₁₆ – 09 ₁₆ , 0B ₁₆ – 20 ₁₆).
<value>	Can either correspond to a numerical data (integer, decimal value, exponential value (10e-9 or 5.8e6)) or to a string.
[VALUE1 VALUE2]	<p>This indicates a parameter choice. The ‘ ’ separates the available parameters. Only one of the choices can be used at a time.</p> <p>In the example here, you can use the input parameter [VALUE1] or [VALUE2], not both.</p> <p>Some commands may have more than two choices available.</p> <p>The parameter can be omitted when the command has a default value defined in the command description.</p>

Message Queues

Information is exchanged in the form of messages. These messages are held in input and output queues.

The output queue stores responses to query commands. The module transmits any data in the output queue when a read request is received. Unless explicitly specified otherwise in the command description, all output response data is transmitted in ASCII format.



IMPORTANT

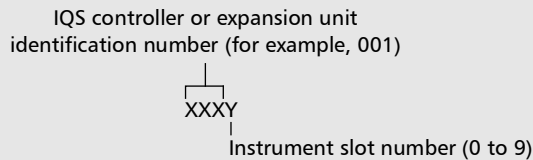
Since the platforms can house many instruments, you must explicitly specify which instrument you want to remotely control.

You must add the following mnemonic *at the beginning of any command or query* that you send to an instrument:

LINstrument<LogicalInstrumentPos>:

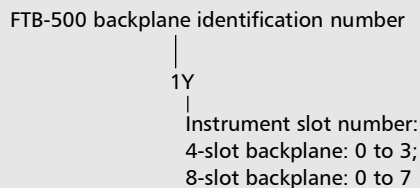
where <LogicalInstrumentPos> corresponds to the identification number of the instrument.

- For instruments usable with IQS-600 platforms:



For information on modifying unit identification, refer to your platform user guide.

- For instruments usable with FTB-500 platforms:



- For instruments usable with other platforms:

Use the LINS value defined in the Remote Control Configuration tool (accessible from System Settings). For information on modifying the LINS value, refer to your platform user guide.

Quick Reference Command Tree

Command						Parameter(s)
SNUMber?						
SOURce[1..n]	COUNt?					
	OPC?					
	POWer?					[MIN MAX DEF SET ACT ALL]
	POWer					<value>
		FREQuency				<value>
		FREQuency?				[MIN MAX DEF SET ACT LOCK ALL]
		STATe				[1 0]
		STATe?				
		WAVelength				<value>
		WAVelength?				[MIN MAX DEF SET ACT LOCK ALL]
	TEMPerature?					

Product-Specific Commands—Description

:SNUMber?	
Description	This query returns a value indicating the serial number of the module.
Syntax	:SNUMber?
Parameter(s)	None
Response Syntax	<SerialNumber>
Response(s)	<i>SerialNumber:</i> The <SerialNumber> response represents a string containing the serial number of the module.
Example(s)	LINS4:SNUM? Returns “CSL-123456”

:SOURce[1..n]:COUNT?

Description	This query returns the number of available sources on the instrument.
Syntax	:SOURce[1..n]:COUNT?
Parameter(s)	None
Response Syntax	<NbSource>
Response(s)	<p><i>NbSource:</i></p> <p>The <NbSource> response is an integer corresponding to the number of sources available on the instrument.</p>
Example(s)	LINS4:SOUR1:COUN? Returns 2

:SOURce[1..n]:OPC?

Description	This query returns the stability status of a specific source (WAV lock).
Syntax	:SOURce[1..n]:OPC?
Parameter(s)	None
Response Syntax	<StabilityStatus>
Response(s)	<p><i>StabilityStatus:</i></p> <p>The <StabilityStatus> response is as follows:</p> <p>0, if the laser is OFF or ON and NOT LOCKed.</p> <p>1, if the laser in the module is ON and LOCKed.</p>
Example(s)	LINS4:SOUR1:OPC? Returns 1

:SOURce[1..n]:POWER?

Description	This query returns the power of the selected laser.
Syntax	:SOURce[1..n]:POWER?[<wsp>MIN MAX DEF SET ACT ALL]
Parameter(s)	<p>The allowed parameter values are as follows:</p> <p><i>MIN</i>: Gets the minimum programmable value.</p> <p><i>MAX</i>: Gets the maximum programmable value.</p> <p><i>DEF</i>: Gets the default value of power.</p> <p><i>SET</i>: Gets the desired set value.</p> <p><i>ACT</i>: Gets the current value (default).</p> <p><i>ALL</i>: Returns all of the above parameters.</p>
Response Syntax	<Power>

:SOURce[1..n]:POWER?

Response(s)

Power:

The <Power> response corresponds to the minimum, maximum, default, set, or actual (current) power for the laser as specified by parameters. The default units are dBm (DBM).

Example(s)

LINS4:SOUR1:POW Returns 13.00 DBM

LINS4:SOUR1:POW? MAX Returns 15.00

LINS4:SOUR1:POW? ALL Returns
10.00,15.00,10.00,13.00,13.00

Note: *The values are returned in the following order:
MIN,MAX,DEF,SET,ACT. When no
parameter is provided, the ACT
value is returned by default.*

See Also

SOURce[1..n]:POWER

:SOURce[1..n]:POWER

Description

This command sets the power of the laser.

Syntax

:SOURce[1..n]:POWer<wsp> <Power>

Parameter(s)

Power:

Valid numerical value which is in the range between the MIN and MAX response queried with the POWER? command, or found in the module specifications. The default units are dBm (DBM).

Example(s)

LINS4:SOUR1:POW 13.00 DBM

See Also

SOURce[1..n]:POWER?



IMPORTANT

If the laser STATE is ON while setting WAVElength or FREQuency, please note that there will be a minimal non-stable output generated during the transition to the new value when the configuration commands are executed.

:SOURce[1..n]:POWER:FREQuency

Description	This command sets the laser frequency.
Syntax	:SOURce[1..n]:POWER:FREQuency<wsp> <Frequency>
Parameter(s)	<i>Frequency:</i> The <Frequency> parameter is a valid numerical value which is in the range between the MIN and MAX response queried with the FREQuency? command, or found in the module specifications. The default units are Hz (HZ).
Example(s)	LINS4:SOUR1:POW:FREQ 1.92e+14 HZ
See Also	SOURce[1..n]:POWER:FREQuency?

:SOURce[1..n]:POWer:FREQuency?

Description	This query returns the laser frequency.
Syntax	:SOURce[1..n]:POWer:FREQuency?[<wsp>MIN MAX DEF SET ACT LOCK ALL]
Parameter(s)	<p>The allowed parameter values are as follows:</p> <p><i>MIN</i>: Gets the minimum programmable value.</p> <p><i>MAX</i>: Gets the maximum programmable value.</p> <p><i>DEF</i>: Gets the default value of frequency.</p> <p><i>SET</i>: Gets the set frequency value.</p> <p><i>ACT</i>: Gets the actual frequency value.</p> <p><i>LOCK</i>: Queries whether the laser is currently at the SET frequency.</p> <p><i>ALL</i>: Returns all of the above parameters.</p>
Response Syntax	<Frequency>

:SOURce[1..n]:POWER:FREQuency?

Response(s)

Frequency:

The <Frequency> response corresponds to the minimum, maximum, default, or currently set frequency for the laser as specified by parameters. The lock parameter will return TRUE or FALSE. Units are Hz (HZ) only.

Example(s)

LINS4:SOUR1:POW:FREQ? Returns
1.92000000e+14

LINS4:SOUR1:POW:FREQ? MAX Returns
1.96249984e+14

LINS4:SOUR1:POW:FREQ? ALL Returns
1.91099960e+14,1.96249984e+14,
1.93548387e+14,1.92000000e+14,
1.92000000e+14,FALSE

Note: *The values are returned in the following order: MIN,MAX,DEF,SET,AC, LOCK. When no parameter is provided, the ACT value is returned by default.*

See Also

SOURce[1..n]:POWER:FREQuency

:SOURce[1..n]:POWer:STATe	
Description	This command turns the optical source on or off. When source is on, the red LED (Active) on the front of the instrument lights up.
Syntax	:SOURce[1..n]:POWer:STATe<wsp>0 1
Parameter(s)	The allowed parameter values are as follows: 0: To set the output state of the laser source to OFF 1: To set the output state of the laser source to ON.
Example(s)	LINS4:SOUR1:POW:STAT 1
See Also	SOURce[1..n]:POWer:STATe?

:SOURce[1..n]:POWer:STATe?	
Description	This query returns a value indicating the state of the optical source (on or off).
Syntax	:SOURce[1..n]:POWer:STATe?
Parameter(s)	None
Response Syntax	<PowerState>
Response(s)	<p><i>PowerState:</i></p> <p>The <PowerState> response corresponds to the power state of the source, as follows:</p> <p>0, the optical source is off.</p> <p>1, the optical source is on.</p>
Example(s)	<p>LINS4:SOUR1:POW:STAT 0</p> <p>LINS4:SOUR1:POW:STAT? Returns 0 (source is off)</p>
See Also	SOURce[1..n]:POWer:STATe

:SOURce[1..n]:POWER:WAVelength

Description	This command sets the laser wavelength.
Syntax	:SOURce[1..n]:POWER:WAVelength<wsp> <Wavelength>
Parameter(s)	<i>Wavelength</i> : The <i>Wavelength</i> parameter is a valid numerical value which is in the range between the MIN and MAX response queried with the WAVelength? command, or found in the module specifications. The default units are meters (M).
Example(s)	LINS4:SOUR1:POW:WAV 1.550000e-06 M
See Also	SOURce[1..n]:POWER:WAVelength?

:SOURce[1..n]:POWER:WAVelength?

Description	This query returns the laser wavelength.
Syntax	:SOURce[1..n]:POWER:WAVelength?[<wsp>MI N MAX DEF SET ACT LOCK ALL]
Parameter(s)	The allowed parameter values are as follows: <i>MIN</i> : Gets the minimum programmable value. <i>MAX</i> : Gets the maximum programmable value. <i>DEF</i> : Gets the default value of wavelength. <i>SET</i> : Gets the set wavelength value. <i>ACT</i> : Gets the actual wavelength value. <i>LOCK</i> : Queries whether the laser is currently at the SET wavelength. <i>ALL</i> : Returns all of the above parameters.
Response Syntax	<Wavelength>

:SOURce[1..n]:POWER:WAVelength?

Response(s)

The <Wavelength> response corresponds to the the minimum, maximum, default, or currently set value for the laser wavelength as specified by the parameters. The default units are meters (M). The lock parameter will return TRUE or FALSE.

Example(s)

LINS4:SOUR1:POW:WAV? Returns 1.550116e-06

LINS4:SOUR1:POW:WAV? MAX Returns
1.568773e-06

LINS4:SOUR1:POW:WAV? ALL Returns
1.527605e-06,1.568773e-06, 1.548928e-06,
1.550000e-06,1.550116e-06,FALSE

Note: *The values are returned in the following order:
MIN,MAX,DEF,SET,ACT,LOCK.
When no parameter is provided to the command, the ACT value is returned by default.*

See Also

SOURce[1..n]:POWER:WAVelength

:SOURce[1..n]:TEMPerature?

Description	This query returns the laser temperature.
Syntax	:SOURce[1..n]:POWER:TEMPerature?
Parameter(s)	None
Response Syntax	<Temperature>
Response(s)	<p><i>Temperature:</i></p> <p>The <Temperature> response is a numerical value corresponding to the temperature in degrees Celcius.</p>
Example(s)	LINS4:SOUR1:TEMP? Returns 49.99

B

REST Command Reference

A complete list of REST commands for your unit is available at all times online. It details the commands with examples and appropriate syntax.

To view the REST command documentation:

From your Web browser, go to the following address:
[http://\[IP address of your platform\]/tls/help](http://[IP address of your platform]/tls/help).

Index

A

activating source	14
after-sales service	30
application	
setting up	12
attenuation setting, light source	17, 19
attenuation step.....	15, 18

C

caution	
of personal hazard.....	3
of product hazard.....	3
cleaning	
connectors.....	21
EUI connectors.....	22
fiber ends	8
front panel.....	20
connector cleaner.....	21
connectors, cleaning	22
conventions, safety	3
customer service.....	35

D

deactivating source	14
---------------------------	----

E

equipment returns	35
EUI	
baseplate	10
connector adapter	10
connectors, cleaning.....	22
EXFO universal interface. see EUI	

F

fiber ends, cleaning.....	8
front panel, cleaning	20

I

identification label.....	30
---------------------------	----

L

label, identification.....	30
light source	
activating/deactivating.....	14
selecting a wavelength	12
setting the attenuation	17, 19
setting up	12

M

maintenance	
EUI connectors.....	22
front panel.....	20
general information	20
mechanical connector cleaning	21
module	
starting from Web browser.....	11
mounting EUI connector adapter	10

P

product	
identification label	30
specifications	2

R

regulatory information	v, vi, ix
remote control	
REST	53
SCPI.....	37
REST command reference	53
return merchandise authorization (RMA)	35

S

safety	
caution.....	3
conventions	3
warning	3

service and repairs.....	35
service centers	36
setting up	
attenuation, light source	17, 19
light source.....	12
shipping to EXFO	35
source. see light source	
specifications, product	2
starting module from Web browser	11
step for attenuation	15, 18
storage requirements	20
symbols, safety.....	3

T

technical specifications.....	2
technical support	30
temperature for storage.....	20
transportation requirements	20, 30
turning off source	14
turning on source.....	14

W

warranty	
certification	34
exclusions	34
general	31
liability	33
null and void.....	31
Web browser, selecting module	11

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。



www.EXFO.com · info@EXFO.com

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