User Guide

Optical Source

www.EXFO.com
Telecom Test and Measurement

EXPERTISE REACHING OUT

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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.

Units of Measurement

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

Version number 1.0.0.3

Contents

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Regulatory Information

Electromagnetic Interference and Compatibility Regulatory Information

For Electromagnetic Interference and Compatibility Regulatory information on your product, refer to the user documentation of your platform.

European Declaration of Conformity

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

1 Introducing the Optical Source

The Optical Source Series is designed for scientific and industrial applications and includes a choice of singlemode versus multimode LEDs and singlemode DFB laser emitters. The singlemode sources are offered in single-, dual- and quad-wavelength configurations, whereas multimode sources are available in dual-wavelength configurations.

A single-operation display screen lets you activate sources and select signal wavelength, power, and modulation characteristics. For easy repeat access, the software stores multiple power level and modulation configurations. Its open and versatile software architecture allows the Optical Source to integrate easily into any test system.

The Optical Source supports manual control or automation (remote control) using SCPI commands or the REST API.

You can also use the IVI drivers you can find on the EXFO Website at www.exfo.com. The drivers have their own specific documentation to help you use them with your application.

FTBx-2150 Series

The FTBx-2150 series feature broadband LED or IL/ORL optimized DFB laser sources covering the bands of interest for the telecommunications industry. They are offered in single, dual, or multiwavelength models with an output power that can be continuous or modulated. In the case of singlemode fibers, this output power is variable to simulate power losses with precision. The LED models feature two sources on a single output. This is particularly useful for insertion loss, optical return loss or network loading tests.

FTBx-2250 Series

The FTBx-2250 series is designed for optimal stability. All models use a superluminescent light-emitting diode (SLED) source covering bands needed for telecommunications applications. Steady drive circuitry maximizes optical output power and maintains excellent stability.

This highly stable source is ideal for broadband applications, coarse wavelength-division multiplexing (CWDM) network testing and passive optical networks (PON) component manufacturing and testing, as well as fiber-optic sensing and spectroscopy.

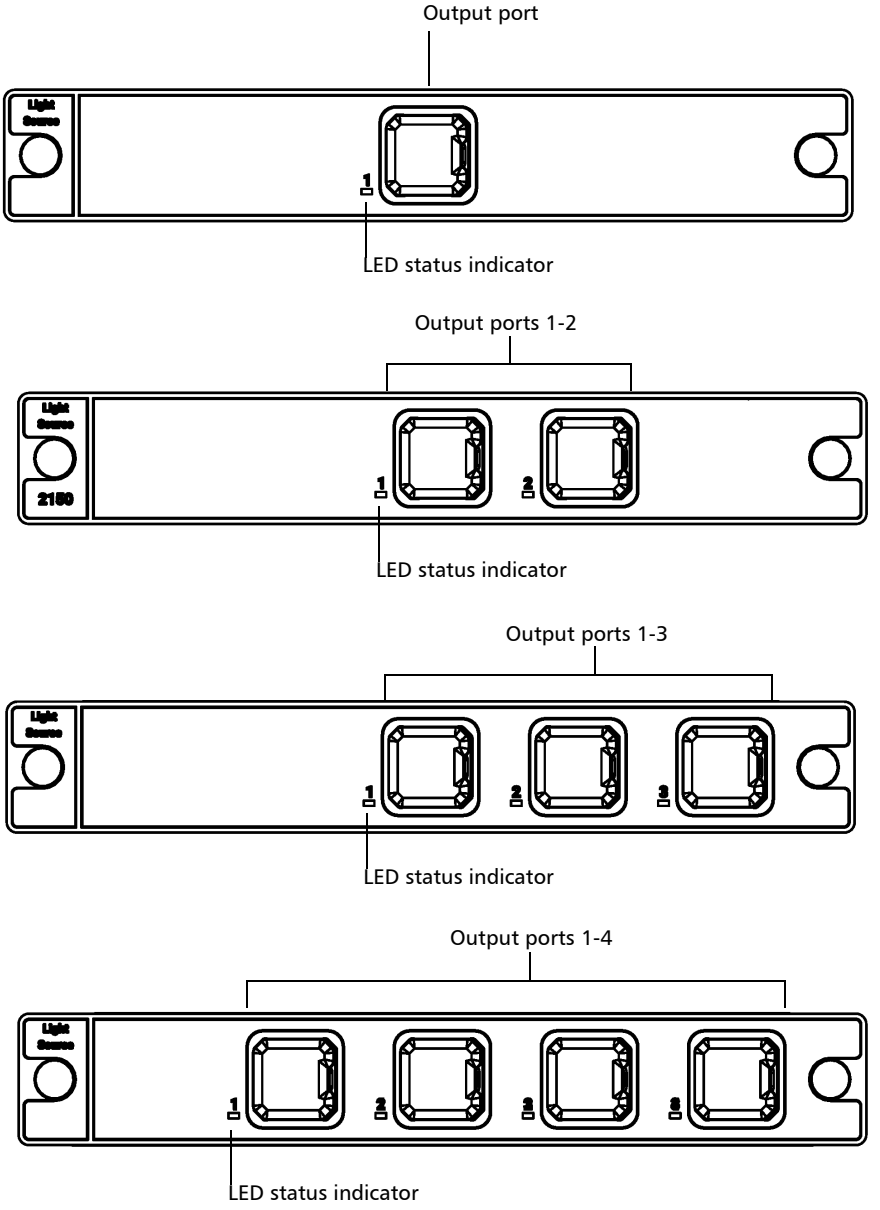
Available Models

The Optical Source offers different models, which are distinguished by characteristics such as the type of LED or laser used. Some of the available models are listed below:

- FTB-2150-0012C-1 (LED)
- FTB-2150-0023B-1 (Laser)
- FTB-2150-2346B-1 (Laser)
- FTBx-2150-0012C-1 (LED)
- FTBx-2150-0023B-2 (Laser)
- FTBx-2150-0236B-3 (Laser)
- FTBx-2150-0234B-3 (Laser)
- FTBx-2150-2346B-4 (Laser)
- FTB-2250-1-SCLI-1 (SLED)
- FTBx-2250-SCLI-1 (SLED)

Note: *Refer to the Optical Source Series specifications sheet at www.exfo.com for a complete list of available models.*

Depending on the model you have purchased, your module can feature up to four output ports.


Output port
Light Source
1
LED status indicator
Output ports 1-2
Light Source
2150
1
2
LED status indicator
Output ports 1-3
Light Source
1
2
3
LED status indicator
Output ports 1-4
Light Source
1
2
3
4
LED status indicator

Typical Applications

Your Optical Source is suited for different tasks depending on the series it is part of:

Series	Tasks
2150	➤ Quality control ➤ Acceptance testing ➤ Insertion loss and return loss testing in laboratory and manufacturing environments. ➤ High-accuracy polarization mode dispersion (PMD) measurements. ➤ Spectral attenuation measurements in fibers ➤ FTTx component characterization ➤ Splicing test stations ➤ Stability measurements
2250	➤ High-accuracy PMD measurements ➤ Quality control ➤ Calibration ➤ Acceptance testing ➤ Loss and return loss testing.

Technical Specifications

To obtain this product's technical specifications, visit the EXFO Web site 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.

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.

Laser Safety Information

Your instrument is in compliance with standards IEC 60825-1: 2007 and 2014.

WARNING

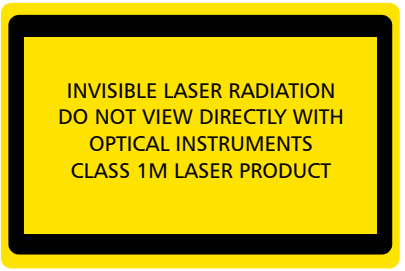
(IEC 60825-1: 2007) Viewing the laser output with certain optical instruments designed for use at a distance (for example, telescopes and binoculars) may pose an eye hazard.

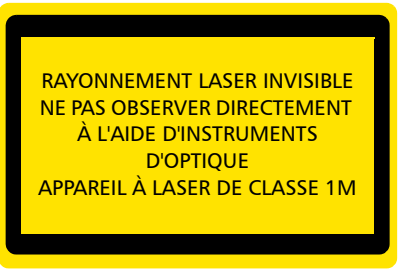
WARNING

(IEC 60825-1: 2014) 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.

Laser radiation may be encountered at the optical output port.

The following label(s) indicate that the product contains a Class 1M source:





Model	Laser Safety Information
➤ FTB-2150-0012C-1 (LED) ➤ FTBx-2150-0012C-1 (LED)	Wavelengths: / Longueurs d'onde : 850 nm, 1310 nm Pout max.: / Psortie max. : ≤ –14.5 dBm
➤ FTB-2150-0023B-1 (Laser) ➤ FTBx-2150-0023B-2 (Laser) ➤ FTBx-2150-0234B-3 (Laser) ➤ FTBx-2150-0236B-3 (Laser) ➤ FTB-2150-2346B-1 (Laser) ➤ FTBx-2150-2346B-4 (Laser)	Wavelengths: / Longueurs d'onde : 1310 nm, 1490 nm, 1550 nm, 1625 nm Pout max.: / Psortie max. : ≤ 5.5 dBm
➤ FTB-2250-SCLI-1 (SLED) ➤ FTBx-2250-SCLI-1 (SLED)	Wavelength: / Longueur d'onde : 1460 nm to 1625 nm Pout max.: / Psortie max. : ≤ 9.5 dBm

Complies with standards 21 CFR 1040.10, except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007.

Electrical Safety Information

The maximum input power for the FTBx Series Optical Source is 12 W. For more information on equipment ratings, refer to the user guide for your platform.

3 Operating your Optical Source

Cleaning and Connecting Optical Fibers

IMPORTANT

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 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.

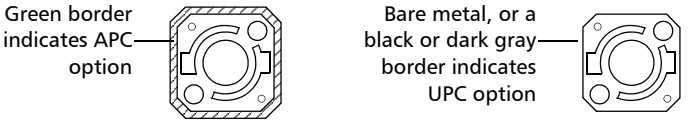
Note: *If your fiber-optic cable is not properly aligned and/or connected, you will notice heavy loss and reflection.*

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 probe before connecting them. Failure to do so will result in permanent damage to the connectors and degradation in measurements.

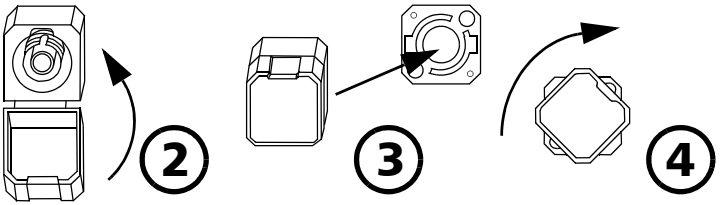
Installing the EXFO Universal Interface (EUI)

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.



To install an EUI connector adapter onto the EUI baseplate:

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

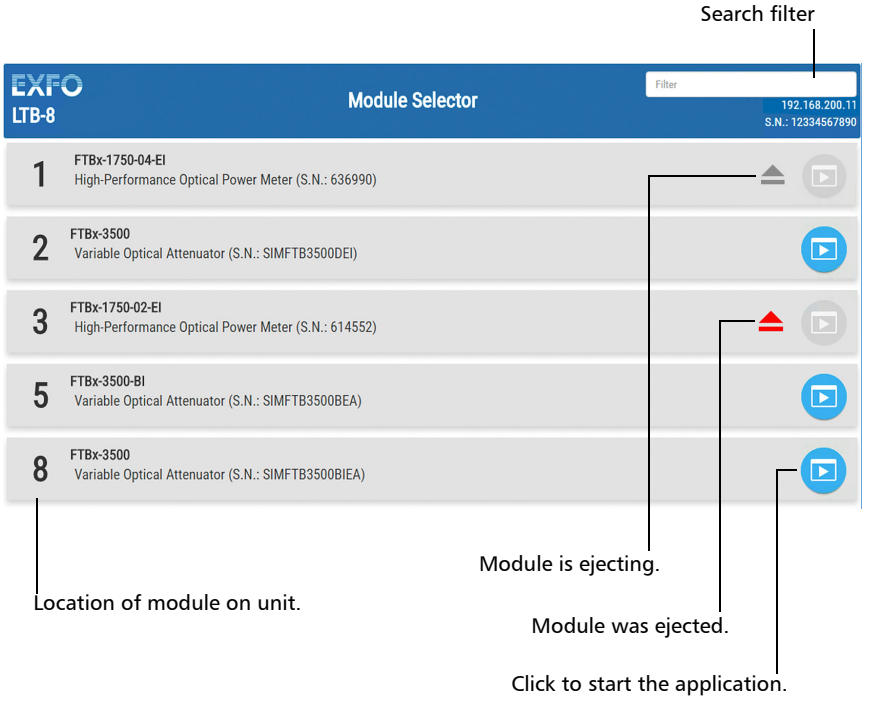


2. Close the dust cap in order to hold the connector adapter more firmly.
3. Insert the connector adapter into the baseplate.
4. While pushing firmly, turn the connector adapter clockwise on the baseplate to lock it in place.

Selecting a Module from a Web Browser

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 unit] in your browser address box.

To only view the Optical Source modules, enter http://[IP address of your unit]/2150.



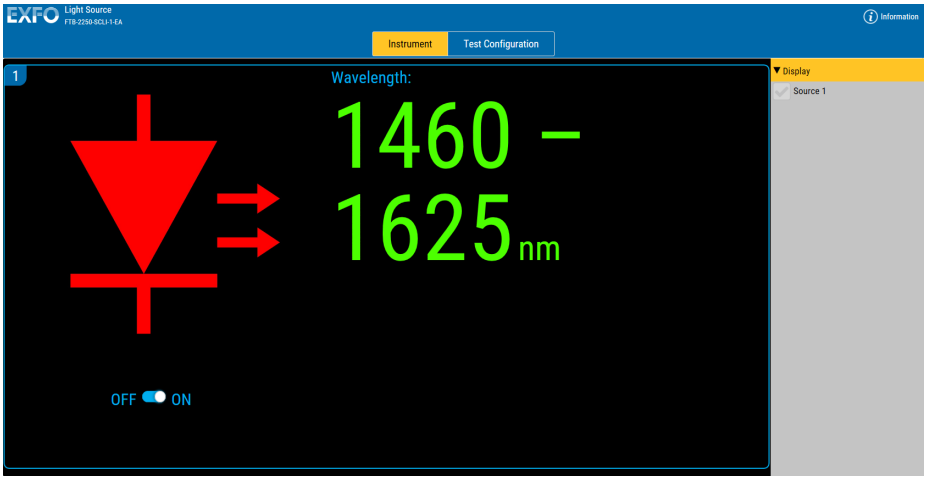
Note: *The list you see on-screen will differ depending on which modules are in your unit.*

Your Optical 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 attenuation
- selecting modulation

2150 Series

2250 Series



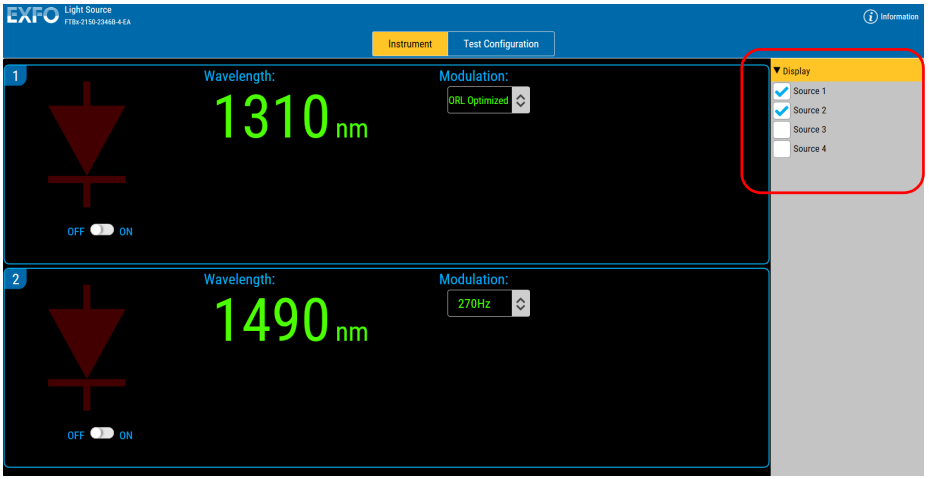
Note: *You do not need to turn on the Optical Source or connect it to a DUT to set it up. To turn on the source, see* Activating or Deactivating Light Emission *on page 22.*

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.



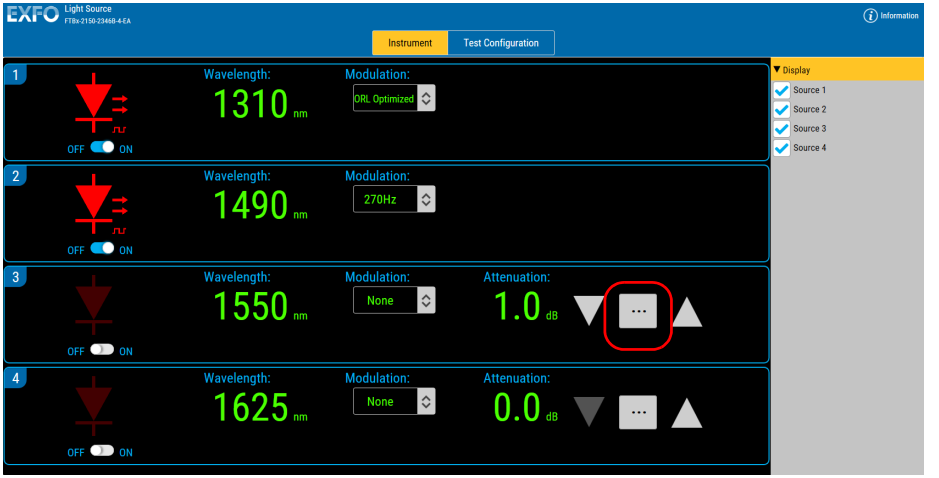
Setting the Attenuation

On some models, you can modify the power of the Optical Source output by attenuating the emitted signal.

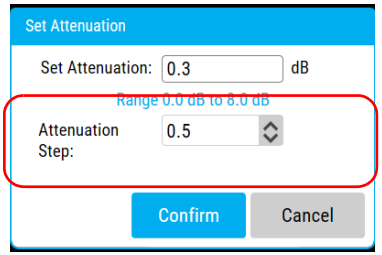
With some Optical Source models, the **Attenuation** control is grayed out during the stabilization period, which occurs after you have selected a wavelength if the source is activated.

To set the attenuation step value for a source:

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



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

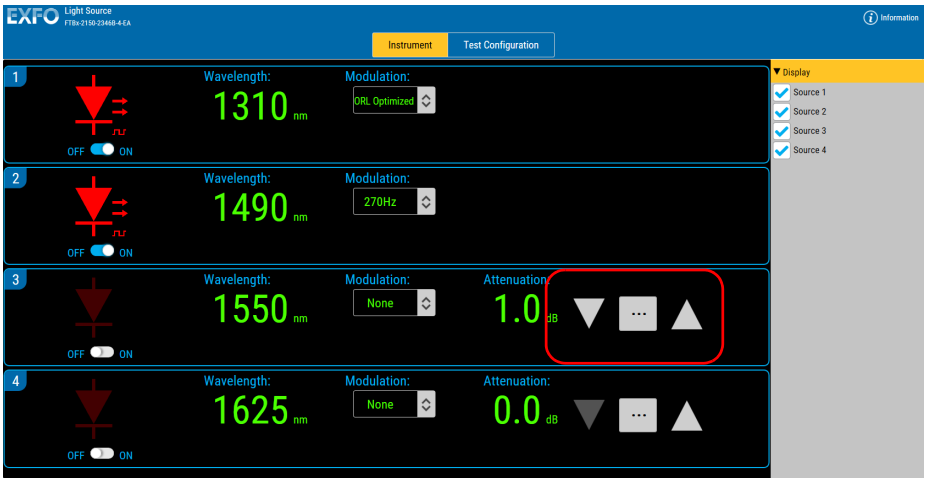


4. Click **Confirm** to start using this value.

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

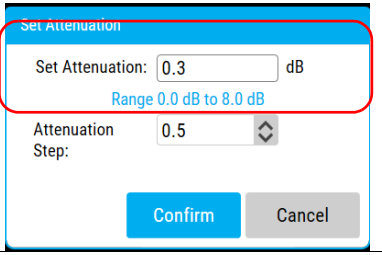
To set the source attenuation:

1. Select the **Instrument** tab.
2. Adjust the attenuation of the laser signal emitted by the source from the **Attenuation (dB)** panel using the arrow buttons.



OR

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



Note: *If you enter something outside the acceptable range, the value turns red.*

Note: *The attenuation is not possible when the modulation mode is used.*

The attenuation value in the data display will then indicate the increased or decreased attenuation, in dB, selected using the attenuation controls.

Note: *To obtain maximum output power, attenuation should be set to* 0.0 dB *and modulation should be set to* None.

Selecting a Modulation Frequency

You can modulate the laser output of the Optical Source to simulate data transfer. A number of modulation frequencies are available.

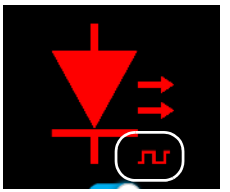
The modulation can be set to different values to better suit your testing needs.

Note: *When the modulation is set to ORL Optimized, it activates the dither mode so the FTBx-2150 can be used to perform ORL measurements. Dithering broadens the source spectrum and reduces light coherence and will therefore improve measurement stability. The dither mode is available in singlemode only.*

To select a modulation frequency:

Select a modulation frequency by choosing a value in the **Modulation** list.

The **Modulation** value indicator in the data display lights up to indicates the source modulation is currently active.



Note: *The internal modulation is full on/off modulation at a 50 % duty cycle.*

Activating or Deactivating Light Emission

Before activating the source, read carefully *Safety Information* on page 7. Upon source activation, the set parameter values are used. Therefore, make sure the source setup is correct before activation.

Note: *You should let the source warm up for 30 minutes to obtain better wavelength stability.*

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.

Viewing Results

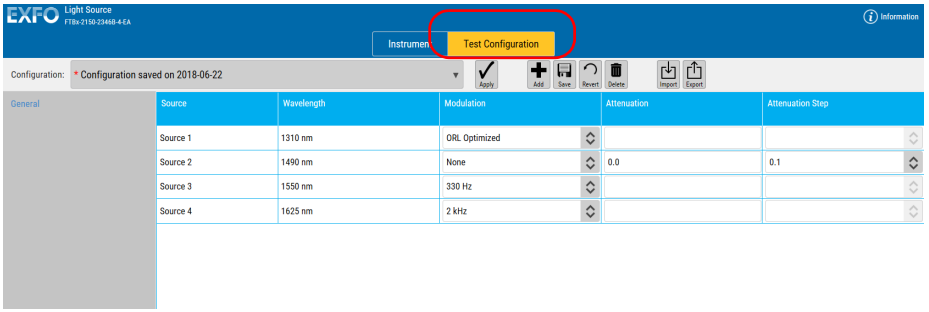
You cannot view results directly using the Optical Source software. To view results, you must use modules and systems which perform tests. For more information, refer to test modules or system user guides, or call EXFO.

Managing Configurations

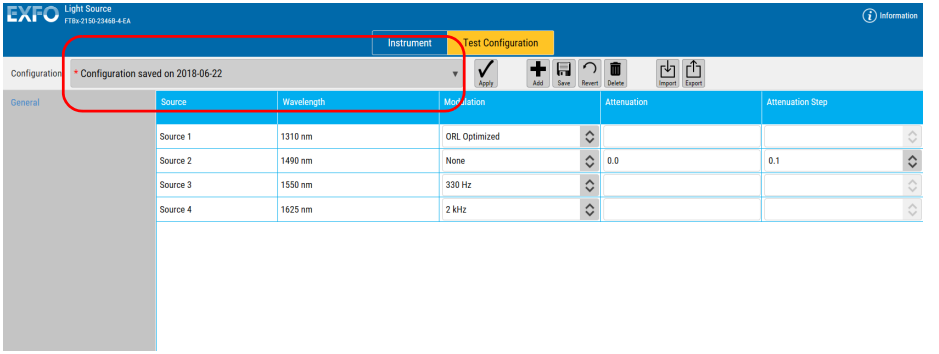
Your Optical Source does not have any editable parameters. However, you can generate a configuration to set a state (for example, the attenuation step, modulation mode, wavelength). By saving the configuration, this state will be readily available for future use.

To save changes in an existing configuration:

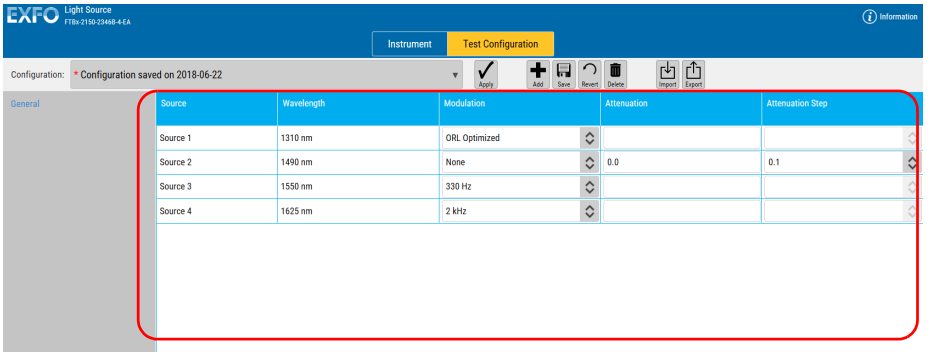
1. Select the **Test Configuration** tab.



2. Select a configuration in the list.



3. Change the configuration as needed for the attenuation and modulation values.



4. Click 

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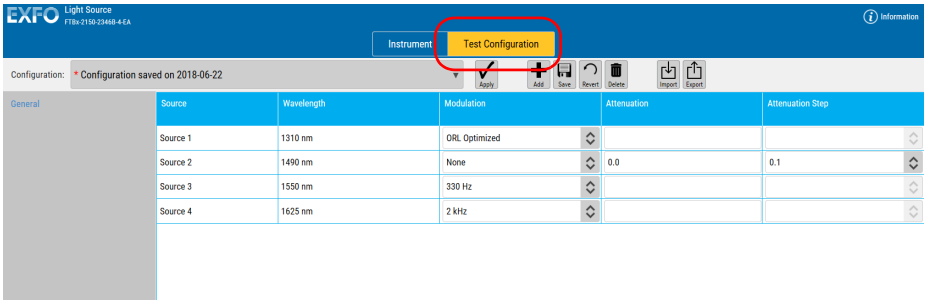
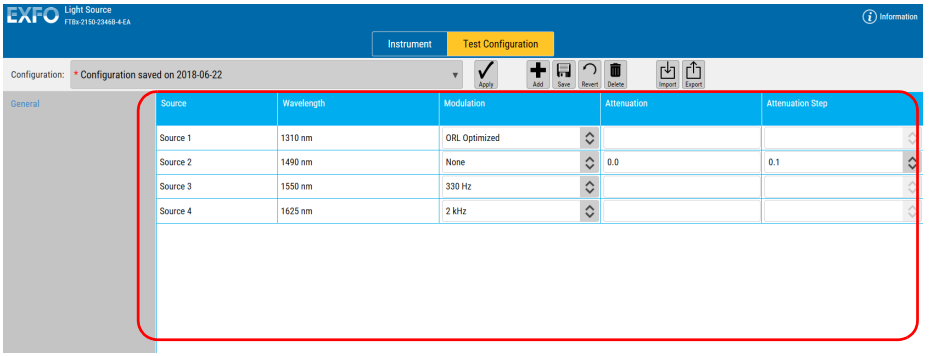
To create a configuration:

1. Select the **Test Configuration** tab.



2. Change the settings as needed.



3. Click 

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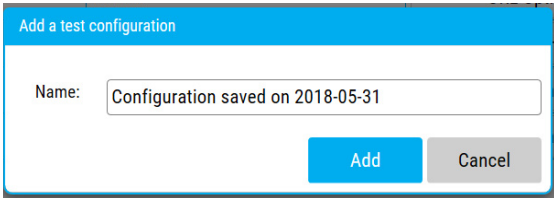
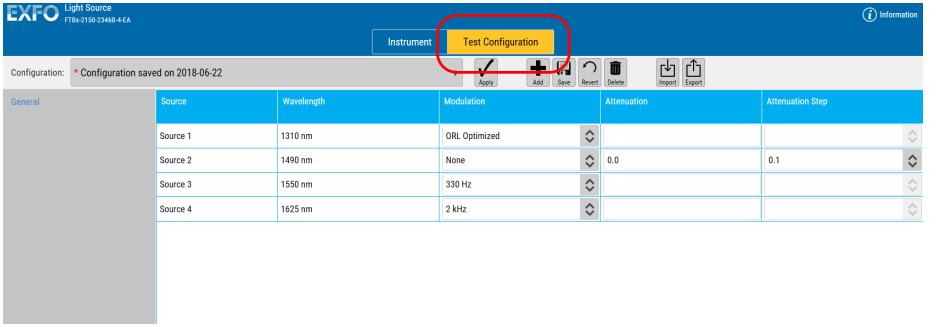
4. Enter a name for the configuration.



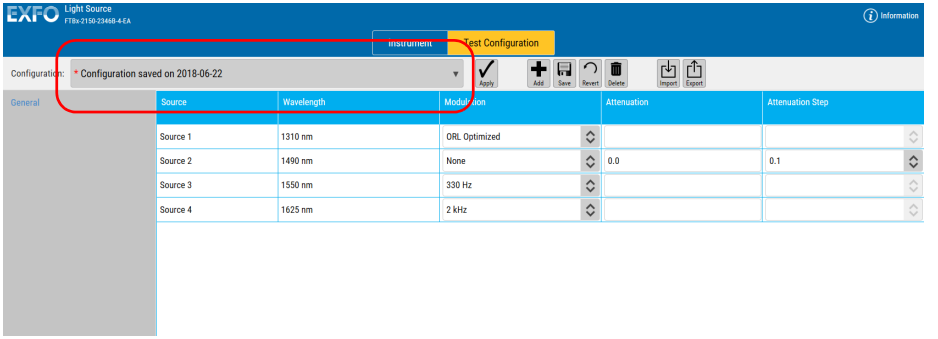
5. Click **Add**.

To delete a configuration:

1. Select the **Test Configuration** tab.



2. Select the configuration you want to delete.



3. Click 

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4. Confirm your choice.

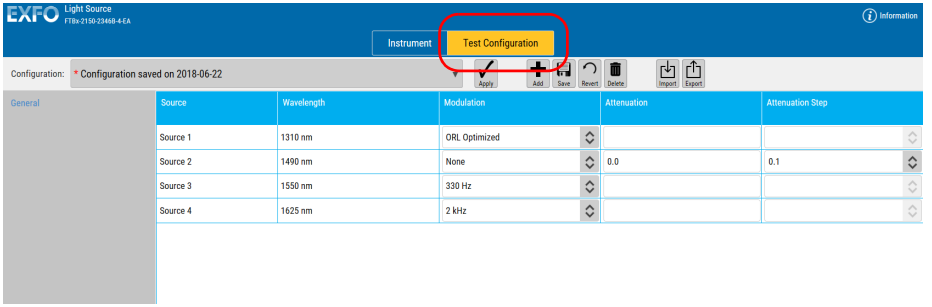
To revert to the current configuration and erase changes:

1. While in the **Test Configuration** tab, click 

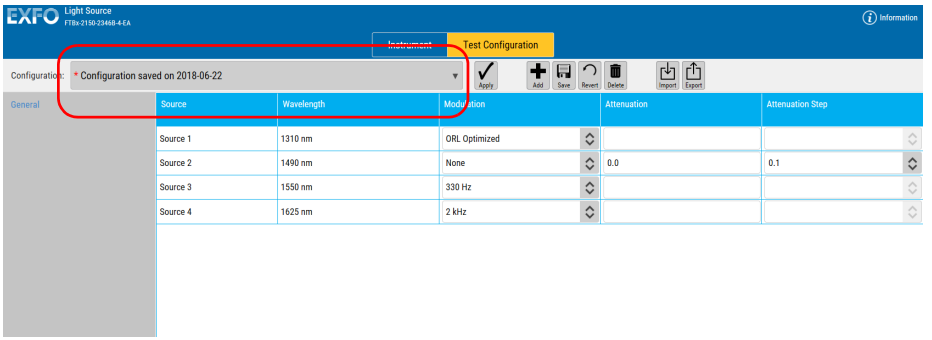
.
2. Confirm your choice.

To export a configuration:

1. Select the **Test Configuration** tab.



2. Select the configuration you want to export.



3. Click 

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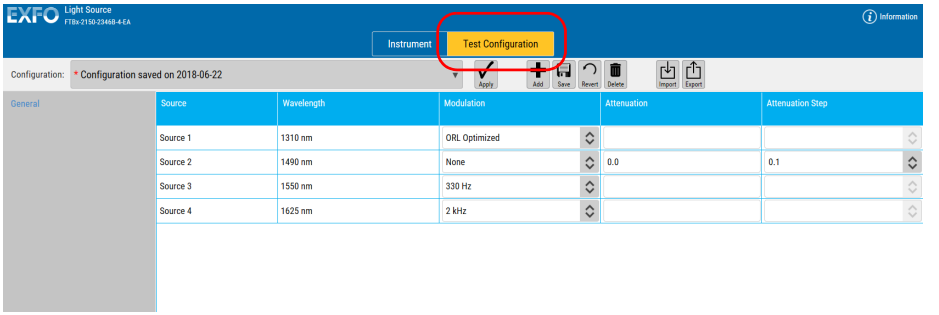
4. Select whether you want to save the file as if, or select **Save as** to rename it or change the location if needed.

To import a configuration:

1. Select the **Test Configuration** tab.



2. Click 

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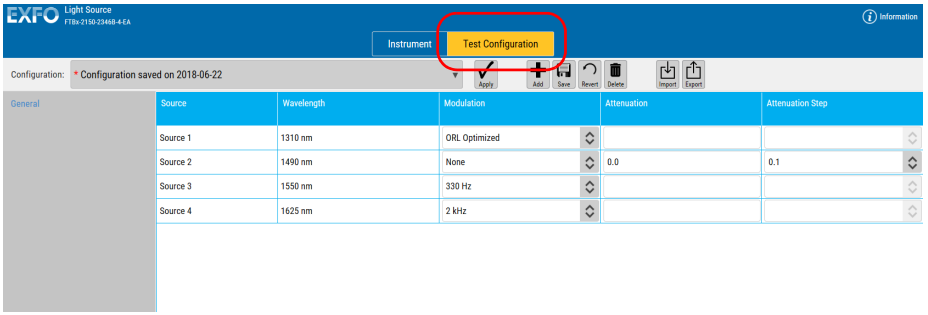
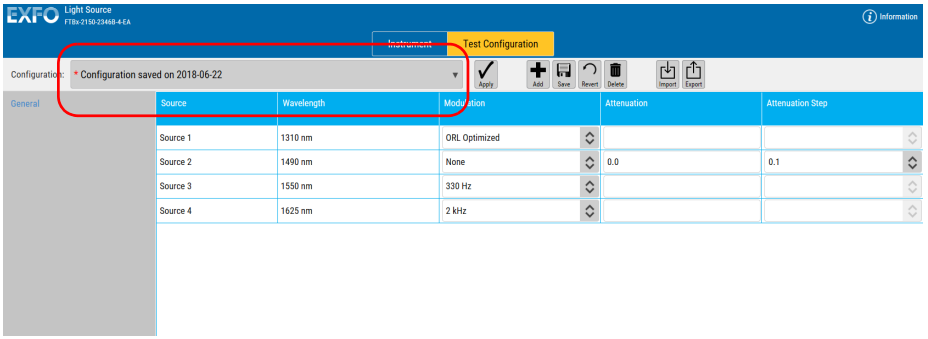
3. Locate the configuration files that you want to add and click **Open**.

To apply a configuration to your module:

1. Select the **Test Configuration** tab.



2. Select the configuration you want to apply.



3. Click 

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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 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.
- If any liquids are spilled on or into the unit, turn off the power immediately, disconnect from any external power source, remove the batteries and let the unit dry completely.

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 Fixed Connectors

Regular cleaning of connectors will help maintain optimum performance. *Do not try to disassemble the unit. Doing so would break the connector.*

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.

To clean fixed connectors:

1. Fold a lint-free wiping cloth in four to form a square.
2. Moisten the center of the lint-free wiping cloth with *only one drop* of optical-grade liquid cleaner.

IMPORTANT

Some cleaners may leave traces if used abundantly. Avoid contact between the tip of the bottle and the wiping cloth, and do not use bottles that distribute too much liquid at a time.

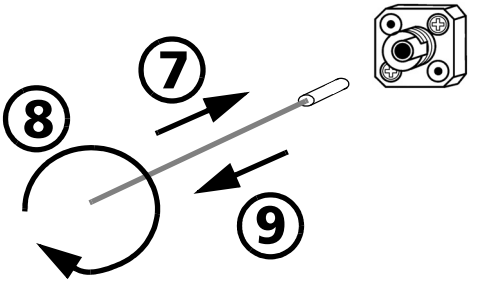
3. Gently wipe the connector threads three times with the folded and moistened section of the wiping cloth.
4. With a dry lint-free wiping cloth, gently wipe the same surfaces three times with a rotating movement.
5. Throw out the wiping cloths after one use.

6. Moisten a cleaning tip (2.5 mm tip) with *only one drop* of optical-grade liquid cleaner.

IMPORTANT

Some cleaners may leave traces if used abundantly. Avoid contact between the tip of the bottle and the cleaning tip, and do not use bottles that distribute too much liquid at a time.

7. Slowly insert the cleaning tip into the connector until it reaches the ferrule inside (a slow clockwise rotating movement may help).



8. Gently turn the cleaning tip one full turn.

9. Continue to turn as you withdraw the cleaning tip.

10. Repeat steps 7 to 9, but this time with a dry cleaning tip (2.5 mm tip provided by EXFO).

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

11. Throw out the cleaning tips after one use.

Cleaning EUI Connectors

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

IMPORTANT

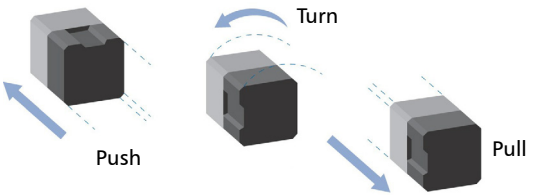
If any damage occurs to internal connectors, the module casing will have to be opened and a new calibration will be required.

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.

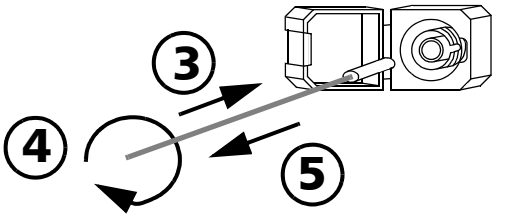
To clean EUI connectors:

1. 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.

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 interval of this particular EXFO unit.

Under normal use, the recommended interval for your Optical Source is: one year.

For newly delivered units, EXFO has determined that the storage of this product for up to six months between calibration and shipment does not affect its performance (EXFO Policy PL-03).

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. Unless you have already established a specific calibration interval based on your own empirical data and requirements, EXFO would recommend that the next calibration date be established according to the following equation:

Next calibration date = Date of first usage (if less than six months after the calibration date) + Recommended calibration period (one year)

To ensure that your unit conforms to the published specifications, calibration may be carried out at an EXFO service center or, depending on the product, at one of EXFO's certified service centers. Calibrations at EXFO 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
Impossible to open a window.	Too many windows are open at the same time.	Close unused windows, then try to open the needed window again.
The power level of the source is low.	➤ The connectors could be dirty. ➤ The patchcord is of the wrong diameter. ➤ The internal fiber of the patchcord is damaged.	➤ Inspect and clean all connectors along the optical path. ➤ Make sure to use a fiber with the appropriate diameter. ➤ Replace the damaged patchcords. ➤ Make sure attenuation parameter of the source is set to the minimum value (0.0 dB).

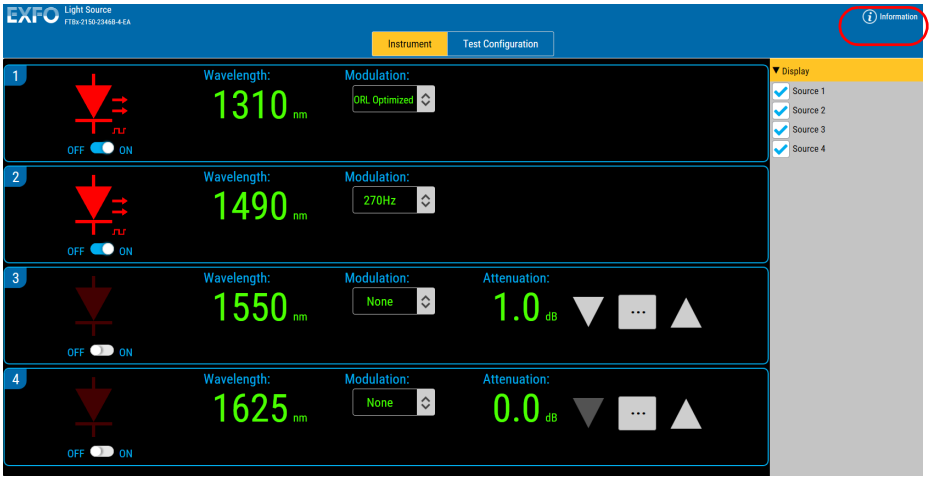
Problem	Possible Cause	Recommended Action
Source appears unstable.	➤ Insufficient stabilization time.	➤ Wait a minimum of 30 minutes for optimum stabilization.
	➤ Reflection destabilizing the source.	➤ Connect the source using an optical isolator.
	➤ Ambient temperature is varying.	➤ Control ambient temperature.

Viewing Online Documentation

A PDF version of the user guide is available at all times for your Optical 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 two years 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.

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 46). 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 46).

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:
http://www.exfo.com/support/services/instrument-services/exfo-service-centers.

A SCPI Command Reference

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

IMPORTANT

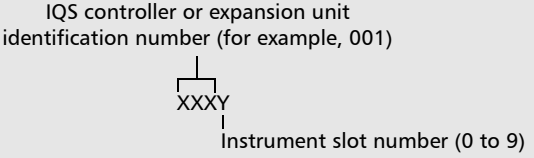
Since the platforms can house many instruments, you must explicitly specify which instrument you want to remotely control.

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

LINStrument<LogicalInstrumentPos>:

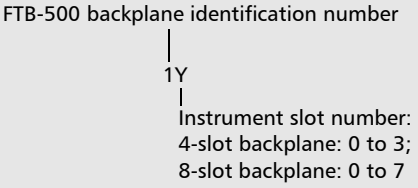
where *<LogicalInstrumentPos>* corresponds to the identification number of the instrument.

➤ **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]	AM	INTernal	FREQuency			<ModulationFreq[<wsp>HZ]>
			FREQuency?			
			MODulation			FREQuency|NONE|ORLOptimized
			MODulation?			
	COUNt?					
	POWer	ATTenuation				<Attenuation[<wsp>DB]>|MAXimum|MINimum|DEFault
		ATTenuation?				[DEFault|MAXimum|MINimum]
		STATe				<PowerState>
		STATe?				
		WAVelength				FIRSt|FOURth|LOWer|SECond|THIRd|UPPer
		WAVelength?				
		WAVelength	COUNt?			
			FIRSt?			
			FOURth?			
			LOWer?			
			SECond?			
			THIRd?			
			UPPer?			
STATus?						

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)	*SerialNumber:* The response data syntax for <SerialNumber> is defined as a <STRING RESPONSE DATA> element. The <SerialNumber> response represents a string containing the serial number of the module.
Example(s)	SNUM? Returns "123456-AB"

:SOURce[1..n]:AM:INTernal:FREQuency

Description

This command selects the internal modulation frequency. The internal modulation is 50 % duty cycle at the selected frequency.

*RST sets the modulation frequency to 0 Hz (CW).

Syntax

:SOURce[1..n]:AM:INTernal:FREQuency<wsp><ModulationFreq[<wsp>HZ]>

Parameter(s)

ModulationFreq:

The program data syntax for <ModulationFreq> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element followed by an optional <SUFFIX PROGRAM DATA> element. The allowed <SUFFIX PROGRAM DATA> element is HZ.

The <ModulationFreq> parameter is the new modulation frequency: 270, 330, 1000, 2000, or 0 (CW), or 1000000 (ORL OPTIMIZED).

Example(s)

SOUR:POW:STAT ON
SOUR:AM:INT:FREQ 2000Hz

See Also

SOURce[1..n]:AM:INTernal:FREQuency?
SOURce[1..n]:AM:INTernal:MODulation
SOURce[1..n]:AM:INTernal:MODulation?

:SOURce[1..n]:AM:INTernal:FREQuency?

Description	This query returns a value indicating the current internal modulation frequency. If the source is in CW mode, the function will return 0. if the source is in ORLOPTIMIZED mofe the function will return 1000000. *RST sets the modulation frequency to 0 Hz (CW).
Syntax	:SOURce[1..n]:AM:INTernal:FREQuency?
Parameter(s)	None
Response Syntax	<ModulationFrequency>
Response(s)	*ModulationFrequency:* The response data syntax for <ModulationFrequency> is defined as a <NR3 NUMERIC RESPONSE DATA> element. The <ModulationFrequency> response is the internal modulation frequency of the source, in Hz. If the source is in CW mode, the returned value is 0. If the source is in ORL Optimized mode, the returned value is 1000000.
Example(s)	SOUR:POW:STAT ON SOUR:AM:INT:FREQ 270 SOUR:AM:INT:FREQ?
See Also	SOURce[1..n]:AM:INTernal:FREQuency SOURce[1..n]:AM:INTernal:MODulation SOURce[1..n]:AM:INTernal:MODulation?

:SOURce[1..n]:AM:INTernal:MODulation

Description

This command selects the internal modulation.

*RST sets the modulation to None (CW).

Syntax

:SOURce[1..n]:AM:INTernal:MODulation<wsp>FREQuency|NONE|ORLOptimized

Parameter(s)

Parameter 1:

The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: FREQuency|NONE|ORLOptimized.

This parameter represents the newly selected modulation.

NONE: There is no modulation.
FREQuency: The modulation frequency is activated and set by the SOURce[1..n]:AM:INTernal:FREQuency command.
ORLOptimized: The modulation is optimized for ORL measurements.

Example(s)

SOUR:POW:STAT ON
SOUR:AM:INT:MOD ORLO

See Also

SOURce[1..n]:AM:INTernal:FREQuency?
SOURce[1..n]:AM:INTernal:FREQuency
SOURce[1..n]:AM:INTernal:MODulation?

:SOURce[1..n]:AM:INTernal:MODulation?

Description	This query returns a value indicating the current modulation. If the source is in CW mode, the function will return None. *RST sets the modulation to None (CW).
Syntax	:SOURce[1..n]:AM:INTernal:MODulation?
Parameter(s)	None
Response Syntax	<Modulation>
Response(s)	*Modulation:* The response data syntax for <Modulation> is defined as a <STRING RESPONSE DATA> element. The <Modulation> response is the internal modulation of the source. If the source is in CW mode, the returned value is NONE. If the modulation of the source is set to ORL Optimized, the returned value is ORLOPTIMIZED. For other modulations, the returned value is FREQUENCY.
Example(s)	SOUR:POW:STAT ON SOUR:AM:INT:MOD None SOUR:AM:INT:MOD?
See Also	SOURce[1..n]:AM:INTernal:FREQuency SOURce[1..n]:AM:INTernal:MODulation SOURce[1..n]:AM:INTernal:FREQuency?

:SOURce[1..n]:COUNt?

Description	This query returns the number of available sources on the instrument. *RST has no effect on this command.
Syntax	:SOURce[1..n]:COUNt?
Parameter(s)	None
Response Syntax	<NbSource>
Response(s)	*NbSource:* The response data syntax for <NbSource> is defined as a <NR1 NUMERIC RESPONSE DATA> element. The <NbSource> response is the number of sources available on the instrument: 1, one source available 2, two sources available 3, three sources available 4, four sources available
Example(s)	SOUR:COUN?
Notes	A source can contain more than one wavelength. Each source is associated with one and only one output port. Please use the SOURce[1..n]:POWer:WAVelength:COUNt? command to get the wavelength count for each source.
See Also	SOURce[1..n]:POWer:WAVelength:COUNt?

:SOURce[1..n]:POWer:ATTenuation

Description

This command changes the internal attenuation of the source. The source power is at its maximum when the attenuation is set to 0.0 dB.

*RST sets the attenuation to 0 dB.

Syntax

:SOURce[1..n]:POWer:ATTenuation<wsp><Attenuation[<wsp>DB]>|MAXimum|MINimum|DEFault

Parameter(s)

Attenuation:

The program data syntax for <Attenuation> is defined as a <numeric_value> element followed by an optional <SUFFIX PROGRAM DATA> element. The allowed <SUFFIX PROGRAM DATA> element is DB. The <Attenuation> special forms MINimum, MAXimum and DEFault are accepted on input.

MINimum allows to set the instrument to the smallest supported value.
MAXimum allows to set the instrument to the greatest supported value.

DEFault allows the instrument to select a value for the <Attenuation> parameter.

The <Attenuation> parameter is the new power attenuation in dB. The power attenuation is always a positive value.

:SOURce[1..n]:POWer:ATTenuation	
Example(s)	SOUR:POW:STAT ON SOUR:POW:ATT 2
Notes	Attenuation can be changed only if the modulation is at 0 (SOUR:AM:INT:FREQ 0).
See Also	SOURce[1..n]:POWer:ATTenuation?

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

Description	This query returns a value corresponding to the internal power attenuation of the source. *RST sets the attenuation to 0 dB.
Syntax	:SOURce[1..n]:POWer:ATTenuation?[<wsp>DEFault|MAXimum|MINimum]
Parameter(s)	*Parameter 1:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: DEFault|MAXimum|MINimum. MINimum is used to retrieve the instrument's smallest supported value. MAXimum is used to retrieve the instrument's greatest supported value. DEFault is used to retrieve the instrument's default value.
Response Syntax	<Attenuation>

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

Response(s)	*Attenuation:* The response data syntax for <Attenuation> is defined as a <NR3 NUMERIC RESPONSE DATA> element. The <Attenuation> response is the power attenuation of the source, in dB.
Example(s)	SOUR:POW:STAT ON SOUR:POW:ATT 3 SOUR:POW:ATT?
See Also	SOURce[1..n]:POWer:ATTenuation

: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. *RST sets the optical source to OFF.
Syntax	:SOURce[1..n]:POWer:STATe<wsp><PowerState>
Parameter(s)	*PowerState:* The program data syntax for <PowerState> is defined as a <Boolean Program Data> element. The <PowerState> special forms ON and OFF are accepted on input for increased readability. ON corresponds to 1 and OFF corresponds to 0. The <PowerState> parameter is the new power state of the source.
Example(s)	SOUR:POW:STAT ON
Notes	Instrument must be in the Ready state to execute this command. In the case that two or more wavelengths are available for one output, you must select the desired wavelength before or after using this command to activate the laser. For example, SOUR:POW:WAV UPP then SOUR:POW:STAT ON or SOUR:POW:STAT ON then SOUR:POW:WAV SEC.
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). *RST sets the optical source to OFF.
Syntax	:SOURce[1..n]:POWer:STATe?
Parameter(s)	None
Response Syntax	<PowerState>
Response(s)	*PowerState:* The response data syntax for <PowerState> is defined as a <NR1 NUMERIC RESPONSE DATA> element. The <PowerState> response corresponds to the power state of the source, as follows: 0, the optical source is off. 1, the optical source is on.
Example(s)	SOUR:POW:STAT OFF SOUR:POW:STAT?
See Also	SOURce[1..n]:POWer:STATe

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

Description

This command selects a wavelength when using a dual-wavelength source instrument.

*RST sets the selected wavelength to the FIRSt value.

Syntax

:SOURce[1..n]:POWer:WAVelength<wsp>FIRSt|FOURth|LOWer|SECond|THIRd|UPPer

Parameter(s)

SelectedSources:

The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: FIRSt|FOURth|LOWer|SECond|THIRd|UPPer.

FIRSt, switches to the first wavelength.
FOURth, switches to the fourth wavelength(if available)
LOWer, switches to the lowest wavelength.
SECond, switches to the second wavelength (if available)

THIRd, switches to the third wavelength (if available)
UPPer, switches to the highest wavelength.

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

Example(s)	SOUR:POW:WAV LOW Wait 3 seconds. SOUR:POW:STAT ON
Notes	Instrument must be in the Ready state to execute this command. This command can cause the instrument to enter the Stabilizing state.
See Also	SOURce[1..n]:POWer:WAVelength? SOURce[1..n]:POWer:WAVelength:LOWer? SOURce[1..n]:POWer:WAVelength:UPPer? SOURce[1..n]:POWer:WAVelength:FIRSt?

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

Description	This query returns a value indicating which wavelength is currently selected. *RST sets the selected wavelength to the FIRSt value.
Syntax	:SOURce[1..n]:POWer:WAVelength?
Parameter(s)	None
Response Syntax	<SelectedWavelength>
Response(s)	*SelectedWavelength:* The response data syntax for <SelectedWavelength> is defined as a <NR3 NUMERIC RESPONSE DATA> element. The <SelectedWavelength> response is the selected source wavelength value in meters.
Example(s)	SOUR:POW:WAV?
See Also	SOURce[1..n]:COUNt? SOURce[1..n]:POWer:WAVelength SOURce[1..n]:POWer:WAVelength:LOWer? SOURce[1..n]:POWer:WAVelength:UPPer? SOURce[1..n]:POWer:WAVelength:FIRSt?

:SOURce[1..n]:POWer:WAVelength:COUNt?

Description	This query returns the number of available wavelengths on the instrument. *RST has no effect on this command.
Syntax	:SOURce[1..n]:POWer:WAVelength:COUNt?
Parameter(s)	None
Response Syntax	<NbWavelength>
Response(s)	*NbWavelength:* The response data syntax for <NbWavelength> is defined as a <NR1 NUMERIC RESPONSE DATA> element. The <NbWavelength> response is the number of wavelengths available on the instrument: 1, one wavelength available 2, two wavelengths available 3, three wavelengths available 4, four wavelengths available
Example(s)	SOUR:POW:WAV:COUN?
Notes	A source can contain more than one wavelength. Please use SOURce[1..n]:COUNt? command to get the number of available sources.
See Also	SOURce[1..n]:COUNt?

:SOURce[1..n]:POWer:WAVelength:FIRSt?

Description	This query returns a value indicating the first wavelength. *RST has no effect on this command.
Syntax	:SOURce[1..n]:POWer:WAVelength:FIRSt?
Parameter(s)	None
Response Syntax	<FirstWavelength>
Response(s)	*FirstWavelength:* The response data syntax for <FirstWavelength> is defined as a <NR3 NUMERIC RESPONSE DATA> element. The <FirstWavelength> response is the first source wavelength value in meters.
Example(s)	SOUR:POW:WAV:FIRS?
See Also	SOURce[1..n]:POWer:WAVelength SOURce[1..n]:POWer:WAVelength? SOURce[1..n]:POWer:WAVelength:LOWer? SOURce[1..n]:POWer:WAVelength:SECond?

:SOURce[1..n]:POWer:WAVelength:FOURth?

Description	This query returns a value indicating the fourth wavelength. *RST has no effect on this command.
Syntax	:SOURce[1..n]:POWer:WAVelength:FOURth?
Parameter(s)	None
Response Syntax	<FourthWavelength>
Response(s)	*FourthWavelength:* The response data syntax for <FourthWavelength> is defined as a <NR3 NUMERIC RESPONSE DATA> element. The <FourthWavelength> response is the fourth source wavelength value in meters.
Example(s)	SOUR:POW:WAV:FOUR?
Notes	Not available on single-, dual-, and tri-wavelength sources.
See Also	SOURce[1..n]:POWer:WAVelength SOURce[1..n]:POWer:WAVelength? SOURce[1..n]:POWer:WAVelength:LOWer? SOURce[1..n]:POWer:WAVelength:FIRSt?

:SOURce[1..n]:POWer:WAVelength:LOWer?

Description	This query returns a value indicating the lower wavelength. *RST has no effect on this command.
Syntax	:SOURce[1..n]:POWer:WAVelength:LOWer?
Parameter(s)	None
Response Syntax	<LowerWavelength>
Response(s)	*LowerWavelength:* The response data syntax for <LowerWavelength> is defined as a <NR3 NUMERIC RESPONSE DATA> element. The <LowerWavelength> response is the lowest source wavelength value in meters.
Example(s)	SOUR:POW:WAV:LOW?
Notes	If you have a single-wavelength source, use this query to get the wavelength of your source.
See Also	SOURce[1..n]:POWer:WAVelength SOURce[1..n]:POWer:WAVelength? SOURce[1..n]:POWer:WAVelength:UPPer? SOURce[1..n]:POWer:WAVelength:FIRSt?

:SOURce[1..n]:POWer:WAVelength:SECond?

Description	This query returns a value indicating the second wavelength. *RST has no effect on this command.
Syntax	:SOURce[1..n]:POWer:WAVelength:SECond?
Parameter(s)	None
Response Syntax	<SecondWavelength>
Response(s)	*SecondWavelength:* The response data syntax for <SecondWavelength> is defined as a <NR3 NUMERIC RESPONSE DATA> element. The <SecondWavelength> response is the second source wavelength value in meters.
Example(s)	SOUR:POW:WAV:SEC?
Notes	Not available on single-wavelength sources.
See Also	SOURce[1..n]:POWer:WAVelength SOURce[1..n]:POWer:WAVelength? SOURce[1..n]:POWer:WAVelength:LOWer? SOURce[1..n]:POWer:WAVelength:FIRSt?

:SOURce[1..n]:POWer:WAVelength:THIRd?

Description	This query returns a value indicating the third wavelength. *RST has no effect on this command.
Syntax	:SOURce[1..n]:POWer:WAVelength:THIRd?
Parameter(s)	None
Response Syntax	<ThirdWavelength>
Response(s)	*ThirdWavelength:* The response data syntax for <ThirdWavelength> is defined as a <NR3 NUMERIC RESPONSE DATA> element. The <ThirdWavelength> response is the third source wavelength value in meters.
Example(s)	SOUR:POW:WAV:THIR?
Notes	Not available on single- and dual-wavelength sources.
See Also	SOURce[1..n]:POWer:WAVelength SOURce[1..n]:POWer:WAVelength? SOURce[1..n]:POWer:WAVelength:LOWer? SOURce[1..n]:POWer:WAVelength:FIRSt?

:SOURce[1..n]:POWer:WAVelength:UPPer?

Description	This query returns a value indicating the upper wavelength. *RST has no effect on this command.
Syntax	:SOURce[1..n]:POWer:WAVelength:UPPer?
Parameter(s)	None
Response Syntax	<UpperWavelength>
Response(s)	*UpperWavelength:* The response data syntax for <UpperWavelength> is defined as a <NR3 NUMERIC RESPONSE DATA> element. The <UpperWavelength> response is the highest source wavelength value in meters.
Example(s)	SOUR:POW:WAV:UPP?
Notes	Not available on single-wavelength sources.
See Also	SOURce[1..n]:POWer:WAVelength SOURce[1..n]:POWer:WAVelength? SOURce[1..n]:POWer:WAVelength:LOWer? SOURce[1..n]:POWer:WAVelength:FIRSt?

:STATus?

Description	This query returns a value indicating the status of the module (READY, BUSY, etc.).
Syntax	:STATus?
Parameter(s)	None
Response Syntax	<Status>
Response(s)	*Status:* The response data syntax for <Status> is defined as a <CHARACTER RESPONSE DATA> element. The <Status> response represents the module state, where: BUSY, means the module is busy, DEFECTIVE, means the module is defective, DISCONNECTED, means the module is disconnected, INITINPROGRESS, means the module initialization is in progress, READY, means the module is ready, UNCONFIGURED, means the module is not configured and UNINITIALIZED, means the module is not initialized.
Example(s)	STAT? Returns READY (Module is ready.)

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]/FTBx2150/help.

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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: 1074417

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