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Find the *Exfo IQ-2600BT-89* at our website: ***Click HERE***

IQ-2600B

Tunable Laser Source



(Shown with the IQ-203 Mainframe)

Instruction Manual

Second Edition

P/N: MAN-168-I .2ACE

If the equipment described herein bears the CE *symbol, the said equipment complies with the European Community Directive and Standards found in the Declaration of Conformity.*

If the equipment described herein bears an **FCC** *statement, the said equipment complies with the relevant Federal Communications Commission standards.*

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December 2000

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Contents

Certification Information vi

1 Introduction 1
IQ-2600B Front Panel 2
IQ-2600B Product Nameplate 2
IQ-2600B Main Window 3
Title Bar and Menu Bar 4
Parameter Definition Controls 6
Data Display 6
Status Bar 7
Monitor Window 8

2 Safety Information 9
Safety Conventions 9
General Safety Instructions 10

3 Working with the Tunable Laser Source 11
Using the LED Push Button 11
Inserting the Module 11
Removing the Module 12
Turning On the Source 13
Loading the Software 13
Opening the Monitor Window 14
Closing the Monitor Window 14
Exiting the Software 14
Switching between Normal and High Resolution (HR) Modes 15
Selecting the Wavelength Display Unit 15
Activating/Deactivating the Source 16
Selecting a Wavelength 16
Selecting the Power 17
Adding Items on the Current Lists 17
Deleting Items from the Current Lists 18
Setting the Sweep Parameters 18
Starting a Sweep 24

4 Remote Control 25
SCPI Commands 25
General Commands 27
Specific Commands 33
Quick Reference Command Tree 56

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Contents

IQ-2600B Error Messages 60
GPIB Troubleshooting 61

5 Maintenance 63
Transportation and Storage 63
General Maintenance 63
Cleaning the Optical Ports 63
User Calibration Feature 64

6 Troubleshooting 67
Solving Problems 67
Contacting the Customer Service Group 68

7 Technical Specifications 69

8 Warranty 71
General Information 71
Liability 72
Exclusions 72
Certification 72
Service and Repairs 72

Glossary 75

Index 87

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Figures

Figure 1-1. IQ-2600B Front Panel 2
Figure 1-2. Module Nameplate 2
Figure 1-3. Main Window 3
Figure 1-4. Monitor Window (IQ-2600B) 8
Figure 2-1. Class 1 Laser Product Indication 10
Figure 3-1. Removing an IQ Module 12
Figure 3-2. Mode Window 15
Figure 3-3. Units Window 15
Figure 3-4. On/Off Button and Status Indicator 16
Figure 3-5. Sweep Setup Window 18
Figure 3-6. Sweep Delay 19
Figure 3-7. Continuous Mode Options 20
Figure 3-8. Stepped Mode Options 20
Figure 3-9. Synchronization Pattern (Continuous Mode) 22
Figure 3-10. Synchronization Pattern (Step-by-Step Mode) 23
Figure 3-11. Repeat Mode Options 24
Figure 5-1. User Calibration Window 65
Figure 5-2. Offset Value Warning Window 66

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Certification Information

F.C.C. Information to User

This unit has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 (Subpart B) of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the unit is operated in a commercial environment. This unit 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 unit 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.

Warning

Changes or modifications not expressly approved by EXFO Electro-Optical Engineering Inc. could void the user's authority to operate the unit.

Independent Laboratory Testing

This unit has undergone extensive CE certification testing both internally, at EXFO, and externally, at an independent, qualified laboratory. All pre-qualification tests were performed at EXFO while all final tests were performed at UltraTech Engineering Labs Inc., a renowned test laboratory from Mississauga, Canada. This guarantees the unerring objectivity and authoritative compliance of all test results.

CE Information to User

This unit has been tested and found to comply with the limits for a Class A digital device. Please see the Declaration of Conformity.

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1 Introduction

The IQ-2600B is a tunable laser source that will address the testing requirements for dense WDM component testing in C- and L-bands. The 60 dB spontaneous noise suppression ratio provides a better dynamic range than with a traditional external cavity laser, thus allowing you to measure crosstalk at the higher level required for passive component testing. The source is always on when scanning, providing excellent stability throughout the test session. The IQ-2600B's linear and fast sweep will enable a simple and efficient integration in most test system architectures based on tunable lasers and power meters or optical spectrum analyzers.

The IQ-2600B has been designed to test passive components. Its coherence length is suited for detecting parasitic etalon or other interference effect inside components. This medium coherence also avoids problems such as connector-induced interference, which is common when using high-coherence external cavity lasers. The IQ-2600B's relative immunity to vibration makes it perfect for production testing, product qualification, and R&D use.

Main applications include the complete characterization of filters, multiplexers, Bragg gratings, and other DWDM components. For EDFA testing, use the IQ-2600B to check wavelength-dependent gain, noise contribution, and saturation properties. It is also very useful for determining the spectral sensitivity of receivers and detectors. The IQ-2600B can also be controlled with GPIB or RS-232 interfaces.

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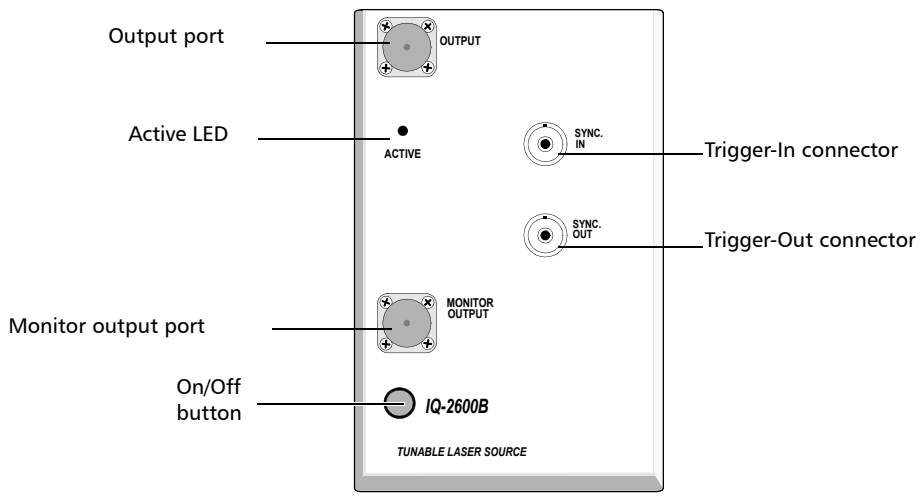


Figure 1-1. *IQ-2600B Front Panel*

IQ-2600B Product Nameplate

The product nameplate, shown in Figure 1-2, is located on a side panel near the rear of the module.

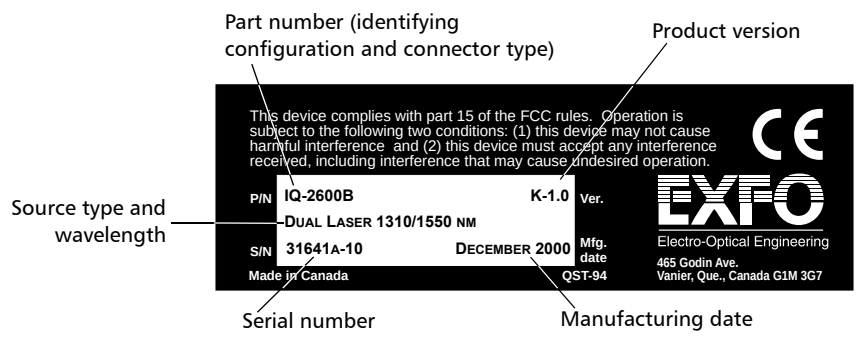


Figure 1-2. *Module Nameplate*

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IQ-2600B Main Window

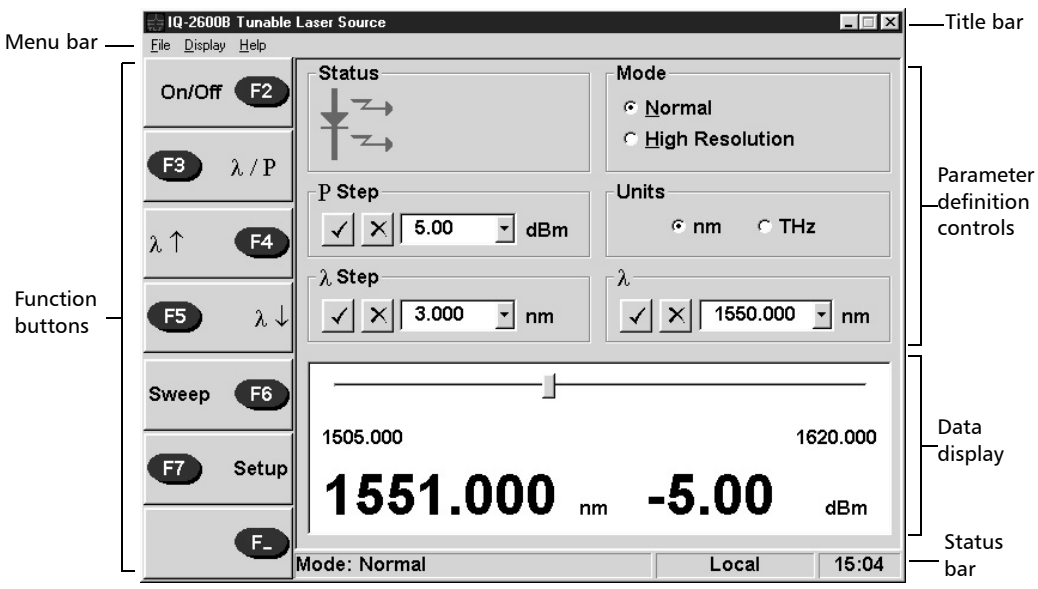


Figure 1-3. *Main Window*

The main window shown in Figure 1-3 can be divided into five sections:

- title and menu bars
- function buttons
- parameter definition controls
- data display
- status bar

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Title Bar and Menu Bar

The title and menu bars are at the top of the main window (see Figure 1-3). The menu bar contains three drop-down menus detailed in Table 1-1.

Menu	Option	Function
File	Open Config...	Opens to a previously saved configuration using a Windows standard Open menu.
	Save Config...	Saves the current configuration using a Windows standard Save menu.
	Exit	Closes the application.
Display	Monitor	Opens the monitor window, which displays basic source data (see *Monitor Window* on page 8 for detailed information).
Help	Online Manual	Opens the application Help file containing the text of this instruction manual.
	Hardware	Opens a window that provides the module name and ID, serial number, minimum version (necessary for module updates) and checksum (verification).
	About...	Opens a window that provides the following: ➤ module model number ➤ corporate headquarters address ➤ technical assistance telephone numbers, e-mail address, and Web site ➤ software version ➤ available IQ-203 mainframe system memory (includes RAM and virtual memory) ➤ remaining hard drive storage space

Table 1-1. *Main Window Menus*

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Function Buttons

The function buttons, located on the left side of the main window, are used for immediate control of the laser source. Table 1-2 provides a quick reference guide to these controls.

Function Button	Description
	Activates/Deactivates light emission (see *Turning On the Source* on page 13).
	Toggles between Power and Wavelength edition modes.
	Increases the selected unit (Power or Wavelength). The units will read *λ Step* or *P Step* depending on the unit currenly in use.
	Decreases the selected unit (Power or Wavelength). The units will read *λ Step* or *P Step* depending on the unit currenly in use.
	Initiates a wavelength sweep, as defined in the Setup window (see *Starting a Sweep* on page 24). Reads *Stop* after being pressed. If a sweep is already in progress when the button is pressed, it will be terminated immediately.
	Opens the Sweep setup window where you set the parameters to perform a sweep.
	Transfers control between software function buttons and IQ-203 front panel hardware function keys (refer to *IQ-200 Optical Test System* instruction manual). When software function buttons are disabled, they will be grayed out.

Table 1-2. *Function Button Description*

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Parameter Definition Controls

Parameter controls unavailable in a particular mode are disabled.

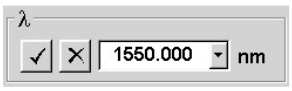
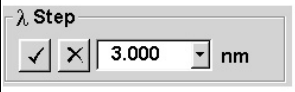
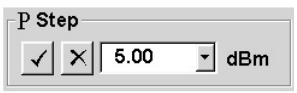
Parameter	Description
	Toggles between the two resolution modes, Normal and High Resolution.
	Toggles between the two units, nm and THz.
	A list of absolute wavelengths. You can also add and delete wavelengths with the buttons on the left.
	A list of available wavelength steps. You can also add and delete steps with the buttons on the left.
	A list of available power steps. You can also add and delete steps with the buttons on the left.

Table 1-3. *Parameter Definition Controls*

Data Display

In addition to the parameter definition controls, the main window contains the source status indicator and data display.

The data display indicates the power level and wavelength selected (See Figure 1-3 on page 3). A slider in the upper part of the display shows where the wavelength lies in the available area.

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While a sweep is in progress, the wavelength limits and the present wavelength are shown. The slider will move, showing the progress of the sweep.

Status Bar

The first part of the status bar displays messages. In addition, it shows the current application mode (Normal or High Resolution).

The second part of the status bar displays the inscription *Local*, *Remote*, or *Lockout*, which indicates if the IQ-2600B is controlled locally or remotely. For more information on how to control the different IQ modules remotely, refer to the *GPIB and Application Development Guide*. Table 1-4 explains the meaning of these inscriptions.

Indication	Meaning
Local	The unit is controlled locally.
Remote	The unit is controlled remotely, but local commands can still be used.
Lockout	The unit is controlled remotely.

Table 1-4. *Module Control Status*

Finally, the status bar displays the time.

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Monitor Window

The monitor window displays basic laser source data. Using the monitor window with other module monitor windows allows the creation of an integrated data display screen (refer to the *IQ-200 Optical Test System* instruction manual). The size and position of the monitor window can be customized.

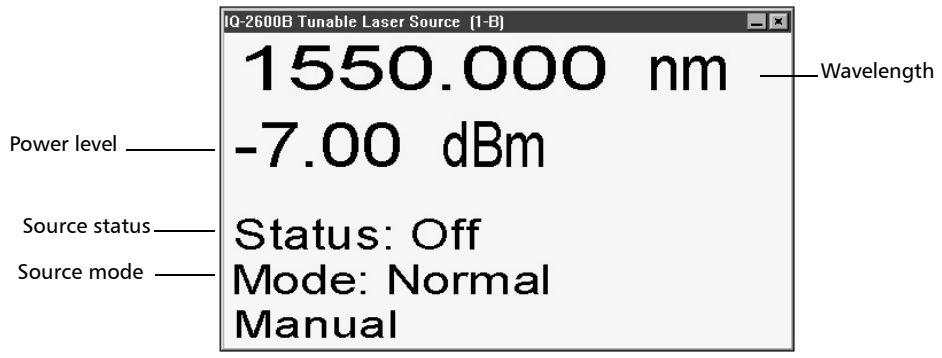


Figure 1-4. *Monitor Window (IQ-2600B)*

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2 Safety Information

Safety Conventions

You should understand the following conventions before using the product described in this manual:

WARNING

Refers to a potential *personal* hazard. It requires a procedure which, if not correctly followed, may result in bodily harm or injury. Do not proceed beyond a **WARNING** unless you understand and meet the required conditions.

CAUTION

Refers to a potential *product* hazard. It requires a procedure which, if not correctly followed, may result in component damage. Do not proceed beyond a **CAUTION** unless you understand and meet the required conditions.

IMPORTANT

Refers to any information regarding the operation of the product which you should not overlook.

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General Safety Instructions

WARNING

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

CAUTION

Use of controls, adjustments, or procedures other than those specified in this manual may result in situations hazardous to the user or equipment.

CAUTION

The use of optical instruments with this product will increase eye hazard.

The IQ-2600B is classified as a Class I laser product complying with 21CFR 1040.10 and 1041.11, as well as IEC 60825-1:1993 +A1:1997. Laser radiation may be encountered at the output and monitor ports.

The level of radiation is below that known to cause eye injury through accidental short-term exposure. However, avoid prolonged exposure to light emitted from the fiber and do not stare directly at a light beam, visible or not.

The Class 1 explanatory label, depicted in Figure 2-1 indicates safety parameters relating to the IQ-2600B.



Figure 2-1. *Class 1 Laser Product Indication*

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3 Working with the Tunable Laser Source

Using the LED Push Button

The LED push button has three functions:

- When system is powered on, the LED will illuminate.
- Pressing the LED push button activates the main window.
- Pressing the LED push button when the main window is open activates the monitor window.

Note: *The monitor window is a compact window displaying basic data and is fully explained in the Introduction section, which describes the module in more details.*

Inserting the Module

CAUTION

Never insert or remove any module when the IQ-203 Mainframe or IQ-206 Expansion Unit are powered on. This will damage the module and the IQ-203/IQ-206.

To insert the module,

1. Power off the IQ-203/IQ-206.
2. Insert the module into any available slot. The IQ-203/IQ-206 will automatically recognize the module.

IMPORTANT

Be sure to insert the module all the way to the back of the IQ-203/IQ-206 to ensure that the backplane connectors are properly mated. The module is correctly inserted when the module front panel is flush with the IQ-203/IQ-206 front panel.

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Removing the Module

CAUTION

Never insert or remove any module when the IQ-203 Mainframe or the IQ-206 Expansion Unit is powered on. This will result in immediate irreparable damage to the module and IQ-203/IQ-206.

To remove module from IQ-203/IQ-206,

1. Make sure the IQ-203 /IQ-206 is powered off.
2. If your module has a locking mechanism, push up the locking mechanism under the front panel of the module, as shown in Figure 3-1. Otherwise, simply place your fingers under the front panel of the module.
3. Firmly pull the module outward.

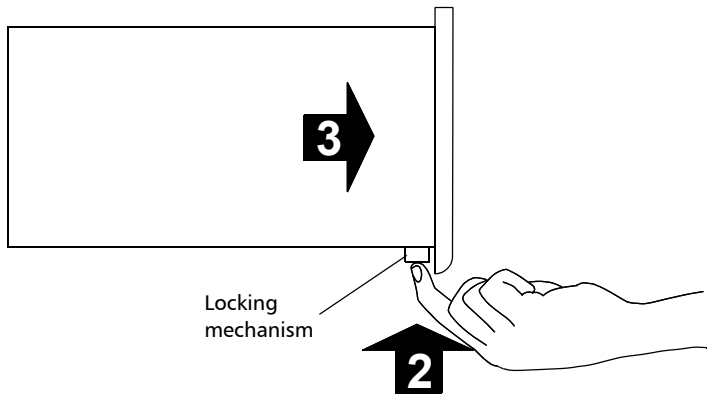


Figure 3-1. *Removing an IQ Module*

4. Put one of the supplied protective covers over the empty slot to prevent dust from entering the module housing.

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Turning On the Source

Before turning on the IQ-2600B, please read the *Safety Information* on page 9.

If the source has been exposed to extreme conditions or if you feel that a calibration would help you achieve better results, you can perform an offset calibration as described in the *User Calibration Feature* section on page 64.

Initializing the Source

The many features of the tunable laser source are controlled using the Windows-compatible IQ software. Please refer to the *IQ-200 Optical Test System* instruction manual for information regarding the IQ-200 Optical Test System, IQ-203 Mainframe, and IQ software conventions.

Loading the Software

There are two ways to load the application software:

- Push the LED push button on the front panel.
- Double-click on the IQ-2600B icon in the IQ-200 Optical Test System main window.

Note: *Pressing the LED push button does not activate the source.*

Once the IQ-2600B software is loaded, the main window opens. The main window contains all the necessary commands to control the laser source. For more information, see Figure 1-3 on page 3.

Note: *It is recommended that you allow the souce to warm up for 60 minutes before using it. During this period, the source will have the time to stabilize and thus give you precise and reliable results afterwards.*

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Opening the Monitor Window

There are two ways of opening the monitor window, which you can see on page 8:

- Choose *Monitor* from the *Display* menu in the main window.
- Push the LED push button on the front panel of the module.

Closing the Monitor Window

There are two ways of closing the monitor window and return to the main window:

- Double-click anywhere in the monitor window.
- Push the LED push button on the front panel of the module.

Exiting the Software

Closing any software that is not in use is a good way to free system memory. The software can be closed either from the main window or monitor window.

From the Main Window

There are three ways of exiting the application software from the main window:

- Click on (in the top right-hand corner of the main window).
- Choose *Exit* from the *File* menu.
- Click on the module icon (in the top left-hand corner of the main window) and select *Close*.

From the Monitor Window

To exit the software from the monitor window, click on (in the top right-hand corner of the monitor window).

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Switching between Normal and High Resolution (HR) Modes

To switch between the Normal and HR modes, select the corresponding radio button on the main display.

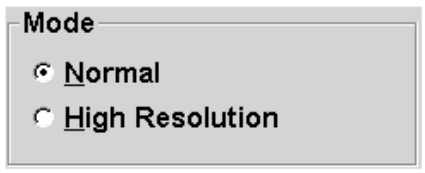


Figure 3-2. *Mode Window*

In HR mode, the laser linewidth is reduced by a factor of 20%. Typically, at 1550 nm, the Normal mode will produce a 1.6 GHz FWHM linewidth, while the HR mode will produce a 1.4 GHz FWHM linewith. The tuning range (or power at extreme wavelength) might be smaller in HR mode than Normal mode.

Selecting the Wavelength Display Unit

To switch between nm and THz as display units, select the corresponding radio button on the main display.



Figure 3-3. *Units Window*

The THz units are only supported in the main window. Settings in the *Setup* menu use nm as units.

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Activating/Deactivating the Source

Choose *On/Off* to activate or deactivate light emission. When the source is active, the LED on the module front panel lights up and the Status indicator blinks and then appears in red with two right-pointing arrows. Once the source is deactivated, the LED on the module front panel will turn off, the Status indicator will blink, then appear in black, and the arrows will disappear.

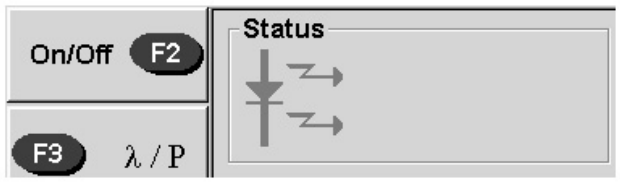


Figure 3-4. *On/Off Button and Status Indicator*

Note: *To obtain optimum stability, a laser source should be allowed to warm up for 60 minutes.*

Selecting a Wavelength

There are four ways of selecting a wavelength for testing. You can make a direct entry, select a wavelength from an already existing list, use the slider or use incremental selection.

Direct Entry

Any desired wavelength within the operational limits of the source can be entered directly by editing the value appearing in the λ field. Pressing *Enter* signals the completion of an entry.

Selection from a Stored List

To select a wavelength in the list of existing wavelengths, simply use the drop-down menu in the λ field and select the desired wavelength.

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Using the Slider

You can select a wavelength using the slider in the data display. The slider uses increments or decrements of 1 nm or 1 THz, depending of the units you are using.

Incremental Selection

Wavelengths may be specified by first selecting an appropriate λ *Step* value from the list in the main window. You can then set the source wavelength by pressing the *Up (F4)* or *Down (F5)* function buttons.

Selecting the Power

The power at which your sweep will be performed may be specified by first selecting an appropriate *P Step* value from the list in the main window. You can then select the source power by pressing the *Up (F4)* or *Down (F5)* function buttons.

You can also select a power value directly by entering it in the Power field.

Note: *The power you select will affect the sweep range available. For example, setting the power at 0 dBm will give you a range from 1515 to 1610 nm, and setting the power at 10 dBm will give you a range of 1510 to 1612 nm. Please keep this in mind as you set the power for your sweep.*

Adding Items on the Current Lists

You can add items to the current λ, λ *Step*, and *P Step* lists.

1. Enter the desired item in the corresponding field.
2. Click on the check button on the left of the field. The item is added to the list.

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Deleting Items from the Current Lists

You can delete items from the current λ, λ *Step,* and *P Step* lists.

1. Select the desired item in the corresponding pull-down menu.
2. Click on the X button on the left of the field to remove it from the list.

Setting the Sweep Parameters

Before performing sweeps, you must set all the necessary parameters in the Setup window. To access the Setup window, press the *Setup* button (F7). The following window appears.

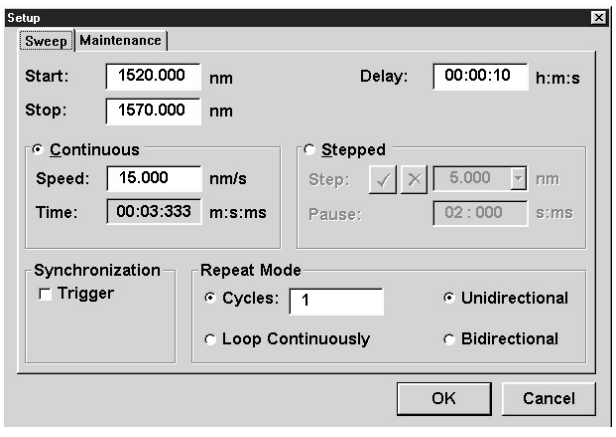


Figure 3-5. *Sweep Setup Window*

The Setup window allows you to choose

- the Start and Stop wavelengths of the sweep
- a delay you want the system to wait before sweeping
- a Continuous- or Stepped-type sweep
- if the Trigger option is activated or not
- the repeat mode

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Setting the Start and Stop Wavelengths

To set the Start and Stop wavelengths for the sweep, simply enter the desired value in the appropriate fields in the top left-hand corner of the screen. The Start value can be lower or higher than the Stop value; the sweep will be performed accordingly. The minimal sweep size is 0.1 nm.

Setting a Delay for the Sweep

If you want the system to wait for a set period of time before starting the sweep, enter the desired time in the Delay field in 99:59:59 format.



Figure 3-6. *Sweep Delay*

If you set the delay to 00:00:00, the sweep will begin immediately upon pressing the *Sweep* button (F6).

Selecting the Sweep Mode

You can select the Sweep mode you want to perform in the *Setup* menu. The source will use either the Continuous or Stepped mode.

Using the Continuous Mode

To select the Continuous sweep mode, select the appropriate radio button in the *Setup* menu. The following part of the screen becomes editable.

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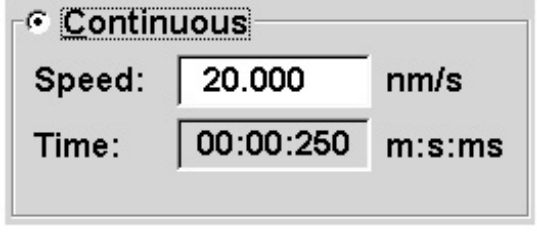


Figure 3-7. *Continuous Mode Options*

You can now select the speed at which the sweep will be performed in nm/s by entering the desired value in the field (minimum of 10 nm/s and maximum of 50 nm/s).

Note: *You cannot edit the duration of the scan. It will be automatically calculated according to the speed and wavelength range. The duration is displayed in 59:59:999 format.*

Using the Stepped Mode

To select the Stepped sweep mode, select the appropriate radio button in the *Sweep Setup* menu. The following part of the screen becomes editable.

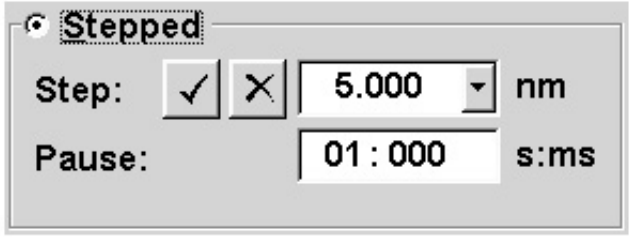


Figure 3-8. *Stepped Mode Options*

You can now set the step at which you want the sweep to be performed by entering the desired value in the field. You can also select a step in the list by using the pull-down menu.

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To add or delete steps from the lists, see *Adding Items on the Current Lists* on page 17 and *Deleting Items from the Current Lists* on page 18.

You can also set the Pause length between the steps by entering the desired value in 59:999 format.

Selecting the Trigger Option

You can toggle the Trigger option on or off by checking the box in the Synchronization area of the Sweep setup menu.

The IQ-2600B features Trigger In and Out connectors. When the trigger option is set to on, the Trigger In will wait for signals. The Trigger Out is always active and emits a signal for each one-way pass (in Continuous mode) or step (in Stepped mode) the system does during the sweep.

The synchronization feature uses a TTL, 5 V signal. The synchronisation is achieved on the signal's rising edge. The pulse width of the Trigger In signal must be larger than 1 μs. The pulse width of the Trigger Out signal is 8 μs.

Trigger Option in Continuous Mode

The sweep will begin when the first synchronization signal is received at the In port. When a pass (one way) is completed, the system waits for another synchronization signal to move again.

If the synchronization signal arrives before the sweep is completed, it is kept in memory to be used on the next pass. The memory keeps only one synchronization signal in advance; if the system receives more than one synchronization signal before the sweep is completed, only the first signal will be kept.

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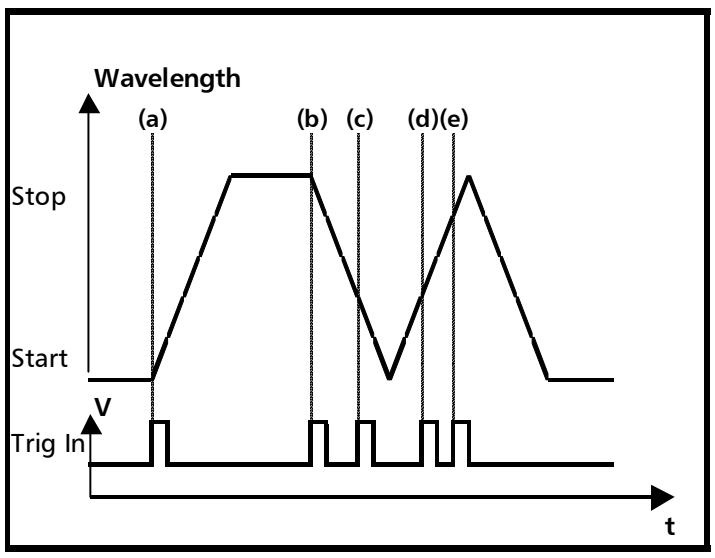


Figure 3-9. *Synchronization Pattern (Continuous Mode)*

(a) sweep start

(b) second sweep trigger

(c) trig received during the second sweep; kept in memory and will trigger the third sweep

(d) trig received during the third sweep kept in memory and will trigger the fourth sweep

(e) lost trig

Trigger Option in Stepped Mode

The sweep will begin when you press the *Sweep* button *(F6)* or use the following remote command: “SOUR:SWE:STAT 1”. The system will position itself at the start wavelength and wait for a synchronization signal. Then, the system will wait for a synchronization signal to go to the next step in the sweep.

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If the synchronization signal arrives before the sweep is completed, it is kept in memory to be used on the next step. The memory keeps only one synchronization signal in advance; if the system receives more than one synchronization signal before the step is completed, only the first signal will be kept.

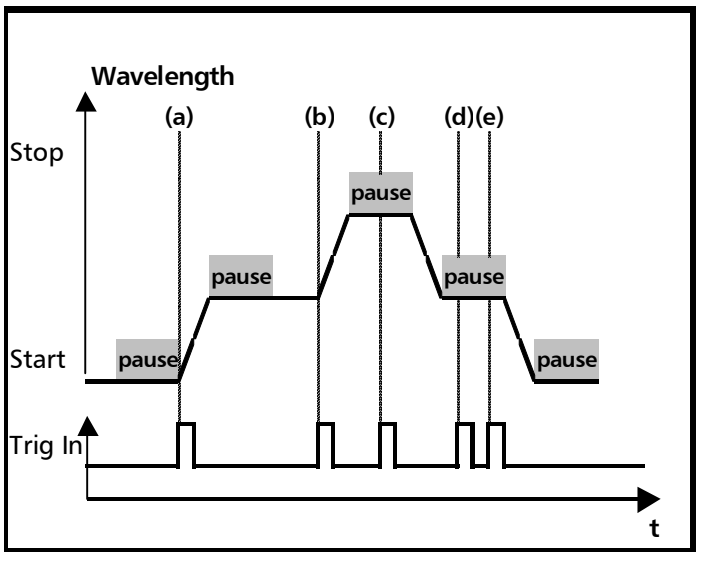


Figure 3-10. *Synchronization Pattern (Step-by-Step Mode)*

(a) first step

(b) trigger of the second step

(c) trig received during the second step pause; will trigger the third step at the end of the pause

(d) trig received during the third step pause; will trigger the fourth step at the end of the pause

(e) lost trig

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Setting the Repeat Mode Options

The Repeat mode options allow you to specify settings in both Continuous and Stepped sweep modes.

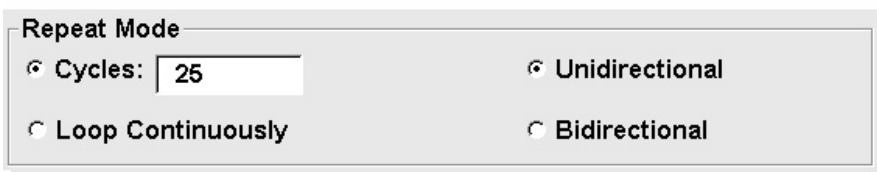


Figure 3-11. *Repeat Mode Options*

Setting the Number of Cycles per Sweep

You can set a precise number of cycles for the sweep to perform. To do so,

1. Select the *Cycles* radio button.
2. Enter the desired number of cycles in the field next to the button (maximum 99).

If you want the sweep to loop continuously, select the *Loop Continuously* radio button.

Setting the Sweep Direction

The sweep can be either *unidirectional*, meaning that it will only go in one direction, or *bidirectional*, sweeping back and forth. Select the desired sweep direction by choosing the appropriate radio button.

Starting a Sweep

To start the sweep, press the *Sweep* button *(F6)*. As the sweep is in progress, the *Sweep* button will change to *Stop*. To stop the sweep before it is completed, press the *Stop* button *(F6)*.

Note: *You can stop the sweep at any time. Shutting the laser off will also stop the sweep.*

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4 Remote Control

The IQ-2600B can be remotely controlled by either the

- GPIB interface (through a GPIB cable connected to the GPIB port), or
- RS-232 interface (through a serial cable connected to the serial port).

The commands used in both protocols are the same and described in the following pages.

Note: *If you have already designed a GPIB program to control a tunable laser source from EXFO's FLS Series (FLS-2600B), you can reuse sections for the IQ-2600B.*

SCPI Commands

Command Structure

The GPIB commands follow the guidelines determined by the Standard Commands for Programmable Instruments (SCPI) consortium. For example, the command syntax:

FORM(0..26):READ[:DATA]<space><digits>

is used to change the measurement display resolution (number of digits after the decimal point) for an IQ-2600B Tunable Laser Source.

In this particular example,

- FORM identifies that the command is a part of the SCPI FORMat subset of commands.
- (0..26) is the module address modifier and identifies the specific module to which the command is addressed.

  For more information about the address modifier and choosing a module, please refer to the *IQ-200 Optical Test System* instruction manual.

Note: *Commands sent to the IQ Optical Test System do not require the address modifier.*

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- READ and DATA are keywords that define the function of the command.
- [ ] indicates that a keyword or a parameter is optional.
- <space> is included to indicate that a space is required.
- <digits> is the command parameter.

All keywords must be CAPITAL characters separated by a colon. A typical command would be:

FORM2:READ:DATA

This command instructs the module, located in IQ-203 position 2, to display a power measurement with one digit after the decimal point.

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General Commands

The IQ-2600B recognizes the main commands identified in IEEE 488.2.

Command	Function
*CLS	Clear status command
*ESE	Standard event status enable command
*ESE?	Standard event status enable query
*ESR?	Standard event status register query
*IDN?	Identification query
*OPC	Operation complete command
*OPC?	Operation complete query
*RST	Reset command
*SRE	Service request enable command
*SRE?	Service request enable query
*STB?	Read status byte query
*TST?	Self-test query

Table 4-1. *Common Commands Summary*

The commands are fully explained hereafter.

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*CLS

Description This command sets the contents of the Standard Event Register (ESR), the Status Byte Register (STB), and the Error Queue (ERR) to zero. This command is commonly used to clear the status registers before enabling SRQ. Note that the output queue, Standard Event Status Enable Register (ESE), and Service Request Enable Register (SRE) are not affected.

Syntax *CLS

*ESE

Description This command is used to set bits in the Standard Event Status Enable Register (ESE) to a new value (initial value is 255). The contents of the ESE register are logically ANDed with the ESR register. A non-zero result will set the Event Summary Bit (ESB) of the Status Byte Register (STB). This command is useful for selecting which events may generate an SRQ.

Syntax *ESE<space><value>

Parameter The <value> parameter must be between 0 and 255.

*ESE?

Description This query reads the contents of the Standard Event Status Enable Register (ESE).

Syntax *ESE?

Response A binary integer between 0 and 255.

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*ESR?

Description	This query reads the contents of the Standard Event Status Register (ESR).
Syntax	*ESR?
Response	A binary integer between 0 and 255.

*IDN?

Description	This query reads the IQ-200 system identification string.
Syntax	*IDN?
Response	“EXFO E.-O. Eng. IQ-200 OTS v1.00”, where v1.00 is the current product version.

*OPC

Description	This command will cause the IQ-2600B to generate the operation complete message in the Standard Event Status Register (ESR) when all pending selected IQ-2600B operations have been completed.
Syntax	*OPC
Example	*OPC;*IDN?

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*OPC?

Description This query puts an ASCII 1 in the output queue when the content of the input queue has been processed. This query is useful to prevent another command from processing until the current command is complete.

Syntax *OPC?

Response “1”

*RST

Description This command empties the step response list. It is only seen when it is part of another multiple command. In the example below, by adding this command after *IDN?, you will not be able to access the answer. The *RST, in this instance, erases the identification string. In addition, this command performs the following operations:

- Return to initial state before command was sent, and not necessarily to previous settings.
- Force the device to enter into an Operation Complete Command Idle State (OCIS).
- Force the device to enter into an Operation Complete Query Active State (OQAS).
- Initialize previous responses unless there has been a program message terminator preceded by an *RST.

Syntax *RST

Example *IDN?;*RST<NL>

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*SRE

Description This command sets bits in the Service Request Enable Register (SRE; initial value is 255), and enables the corresponding bit in the Status Byte Register (STB). The command can be used to select which events can initiate a service request.

Syntax *SRE<space><value>

Parameter The <value> parameter must be between 0 and 255.

*SRE?

Description This query returns the contents of the Service Request Enable Register (SRE).

Syntax *SRE?

Response A binary integer between 0 and 255.

*STB?

Description This query returns the contents of the Status Byte Register (STB).

Syntax *STB?

Response A binary integer between 0 and 255.

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*TST?	
Description	This query initiates an internal self-test and returns a binary value indicating the results of the test.
Syntax	*TST?
Response	A binary value: “0”-test is complete with no errors “1”-test is complete with errors

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Specific Commands

CALibration:WAVElength

Description	This command introduces an offset into the IQ-2600B to correct a wavelength deviation as measured by a wavelength meter.
Syntax	CAL:WAVE<space><wavelength>
Parameters	The <wavelength> parameter is a value indicating the wavelength in nm. The format is 9999.999.
Example	CAL:WAVE 1530.000
Note	This command does not support THz as units.

OUTPut:ASE?

Description	This query returns a value indicating whether the ASE option is available on the tunable laser source.
Syntax	OUT:ASE?
Response	A boolean value indicating whether the ASE option is available on the IQ-2600B Tunable Laser Source: “0”-the ASE option is not available “1”-the ASE option is available
Note	Since the ASE mode is not available with the IQ-2600B, the return value will always be “0”.
See also	OUTP:MODE, OUTP:MODE?, OUTP:STAT and OUTP:STAT?

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OUTPut:MODE

Description	This command is used to set the source mode (tunable or ASE).
Syntax	OUT:MODE<space><mode>
Parameters	The <mode> parameter is a boolean parameter representing the source mode: “0”-set tunable mode “1”-set ASE mode
Note	This command cannot be performed if the IQ-2600B is in Sweep mode. Will return error if ASE is selected but not available.
Example	OUTP:MODE 1
See also	OUTP:ASE?, OUTP:MODE?, OUTP:STAT and OUTP:STAT?

OUTPut:MODE?

Description	This query returns the current source mode (tunable or ASE).
Syntax	OUT:MODE?
Response	A boolean value representing the current source mode: “0” -the source is in tunable mode “1” -the source is in ASE mode
Note	This command cannot be performed if the IQ-2600B is in Sweep mode.
See also	OUTP:ASE?, OUTP:MODE, OUTP:STAT and OUTP:STAT?

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OUTPut:STATe

Description This command is used to activate or deactivate the source.

Syntax OUT:STAT<space><state>

Parameters The <state> parameter is a boolean parameter representing the source state:
“0” -deactivate the source
“1” -activate the source

Example OUTP:STAT 1

See also OUTP:ASE?, OUTP:MODE, OUTP:MODE? and OUTP:STAT?

OUTPut:STATe?

Description This query returns the current source state.

Syntax OUTP:STAT?

Response A boolean value representing the current source state:
“0”-the source is deactivated
“1”-the source is activated

See also OUTP:STAT, OUTP:MODE, OUTP:MODE? and OUTP:ASE?

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SOURce:MODE

Description	This command is used to toggle between the Normal and High Resolution modes.
Syntax	SOUR:MODE<space><mode>
Parameters	The <mode> parameter is a boolean value representing the mode state: “0”-Normal mode “1”-High Resolution mode
Example	SOUR:MODE 1
Note	This command cannot be performed if the IQ-2600B is in Sweep mode.
See also	SOUR:MODE?

SOURce:MODE?

Description	This query returns the current source mode.
Syntax	SOUR:MODE?
Response	A boolean value representing the current mode state: “0”-Normal mode “1”-High Resolution mode
See also	SOUR:MODE

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SOURce:POWer

Description	This command is used to change the output power (in dBm).
Syntax	SOUR:POW<space><power>
Parameters	The current source output power (in dBm) in the format "±99.99"
Example	SOUR:POW 3.5
Note	This command cannot be performed if the IQ-2600B is in Sweep mode.
See also	SOUR:POW?

SOURce:POWer?

Description	This query returns the current output power (in dBm).
Syntax	SOUR:POW?
Response	The current source output power (in dBm) in the format "±99.99"
See also	SOUR:POW

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SOURce:POWer:LIMit:HIGH?

Description	This query returns the maximum source output power.
Syntax	SOUR:POW:LIM:HIGH?
Response	The maximum source output power (in dBm) in the "±99.99" format.
See also	SOUR:POW:LIM:LOW?, and SOUR:POW:LIM:STEP?

SOURce:POWer:LIMit:LOW?

Description	This query returns the minimum source output power (in dBm) that can be set with the SOUR:POW command.
Syntax	SOUR:POW:LIM:LOW?
Response	The minimum source output power (in dBm) in the "±99.99" format.
See also	SOUR:POW:LIM:HIGH?, and SOUR:POW:LIM:STEP?

SOURce:POWer:LIMit:STEP?

Description	This query returns the minimum output power step (in dBm) that can be used when changing the source output power with the SOUR:POW command.
Syntax	SOUR:POW:LIM:STEP?
Response	The minimum output power step (in dBm) in the "±99.99" format.
See also	SOUR:POW:LIM:HIGH?, and SOUR:POW:LIM:LOW?

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SOURce:SWEep:MODE

Description This command allows you to select the sweep mode.

Syntax SOUR:SWE:MODE<space><mode>

Parameters The <mode> parameter is a boolean value representing the mode state:
"0"-Continuous mode
"1"-Step-by-Step Mode

Example SOUR:SWE:MODE 1

See also SOUR:SWE:MODE?, SOUR:SWE:CENT, SOUR:SWE:COUN, SOUR;SWE:COUN?, SOUR:SWE:REP, SOUR:SWE:REP?, SOUR:SWE:REV and SOUR:SWE:REV?

SOURce:SWEep:MODE?

Description This query returns the current sweep mode.

Syntax SOUR:SWE:MODE?

Response A boolean value representing the current sweep mode:
"0"-Continuous mode
"1"-Step-by-Step mode

See also SOUR:SWE:MODE, SOUR:SWE:CENT, SOUR:SWE:COUN, SOUR;SWE:COUN?, SOUR:SWE:REP, SOUR:SWE:REP?, SOUR:SWE:REV and SOUR:SWE:REV?

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SOURce:SWEep:CENTer?

Description This query returns the central wavelength for the current sweep program in the current spectral units (nm or THz).

Syntax SOUR:SWE:CENT?

Response The central wavelength for the current sweep program in the current spectral units in the “9999.999” (nm) or “999.9999” (THz) format.

See also SOUR:SWE:MODE, SOUR:SWE:MODE?, SOUR:SWE:COUN, SOUR;SWE:COUN?, SOUR:SWE:REP, SOUR:SWE:REP?, SOUR:SWE:REV and SOUR:SWE:REV?

SOURce:SWEep:COUNt

Description This command is used to specify how many times you want the sweep program to loop. To specify whether or not you want the sweep program to loop, use the SOUR:SWE:REP command.

Syntax SOUR:SWE:COUN<space><count>

Parameters The <count> parameter represents the new number of loops in the “99” format. For continuous repetition, enter “0”.

Example SOUR:SWE:COUN 32

See also SOUR:SWE:MODE, SOUR:SWE:MODE?, SOUR:SWE:CENT, SOUR;SWE:COUN?, SOUR:SWE:REP, SOUR:SWE:REP?, SOUR:SWE:REV and SOUR:SWE:REV?

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SOURce:SWEep:COUNt?

Description This query returns the number of repetitions set for the sweep program.

Syntax SOUR:SWE:COUN?

Response The number of repetitions set for the sweep program.

See also SOUR:SWE:MODE, SOUR:SWE:MODE?, SOUR:SWE:CENT?, SOUR;SWE:COUN, SOUR:SWE:REP, SOUR:SWE:REP?, SOUR:SWE:REV and SOUR:SWE:REV?

SOURce:SWEep:REPeat

Description This command is used to specify how many times you want the sweep program to repeat.

Syntax SOUR:SWE:REP<space><repeat>

Parameters The <repeat> parameter is a boolean parameter indicating whether or not the sweep program will be repeated:

"1"-the sweep program will be repeated continuously.

"0"-the sweep program will be repeated for the number of times set by the SOUR:SWE:COUN command.

Example SOUR:SWE:REP 1

See also SOUR:SWE:MODE, SOUR:SWE:MODE?, SOUR:SWE:CENT, SOUR:SWE:COUN, SOUR;SWE:COUN?, SOUR:SWE:REP?, SOUR:SWE:REV and SOUR:SWE:REV?

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SOURce:SWEep:REPeat?

Description This query is used to check how the sweep repeat function is activated.

Syntax SOUR:SWE:REP?

Response A boolean value indicating the state of the sweep repeat function:
"1"-the sweep repeat function is continuous.
"0"-the sweep repeat function is set to the number entered with the SOUR:SWE:COUN command.

See also SOUR:SWE:MODE, SOUR:SWE:MODE?, SOUR:SWE:CENT, SOUR:SWE:COUN, SOUR;SWE:COUN?, SOUR:SWE:REP, SOUR:SWE:REV and SOUR:SWE:REV?

SOURce:SWEep:REVerse

Description This command is used to enable and disable the sweep reverse function. When the sweep reverse function is enabled, the sweep program is performed in both directions: in the wavelength ascending and descending order.

Syntax SOUR:SWE:REV<space><sweep>

Parameters The <sweep> parameter is a boolean parameter indicating whether or not the sweep will be done in both directions:
"1"-enable the sweep reverse function
"0"-disable the sweep reverse function

Example SOUR:SWE:REV 1

See also SOUR:SWE:MODE, SOUR:SWE:MODE?, SOUR:SWE:CENT, SOUR:SWE:COUN, SOUR;SWE:COUN?, SOUR:SWE:REP, SOUR:SWE:REP? and SOUR:SWE:REV?

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SOURce:SWEep:REVerse?

Description This query returns a value indicating whether the sweep reverse function is enabled.

Syntax SOUR:SWE:REV?

Response A boolean parameter representing the state of the sweep reverse function:
"1"-the sweep reverse function is enabled
"0"-the sweep reverse function is disabled

See also SOUR:SWE:MODE, SOUR:SWE:MODE?, SOUR:SWE:CENT, SOUR:SWE:COUN, SOUR;SWE:COUN?, SOUR:SWE:REP, SOUR:SWE:REP? and SOUR:SWE:REV

SOURce:SWEep:STARt:WAVElength

Description This command allows you to specify a start wavelength for the sweep.

Syntax SOUR:SWE:STAR:WAVE<space><wavelength>

Parameters The <wavelentgh> parameter indicates the wavelength (9999.999 nm format).

Example SOUR:SWE:STAR:WAVE 1515.500

See also SOUR:SWE:START:WAVE?, SOUR:SWE:STOP:WAVE: and SOUR:SWE:STOP:WAVE:?

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SOURce:SWEep:STARt:WAVElength?

Description	This query returns the start wavelength for the sweep.
Syntax	SOUR:SWE:STAR:WAVE?
Response	Wavelength in 9999.999 nm format.
See also	SOUR:SWE:START:WAVE, SOUR:SWE:STOP:WAVE and SOUR:SWE:STOP:WAVE?

SOURce:SWEep:STOP:WAVElength

Description	This command allows you to specify a stop wavelength for the sweep.
Syntax	SOUR:SWE:STOP:WAVE<space><wavelength>
Parameters	The <wavelentgh> parameter indicates the wavelength (9999.999 nm format).
Example	SOUR:SWE:STOP:WAVE 1610.000
See also	SOUR:SWE:START:WAVE, SOUR:SWE:START:WAVE? and SOUR:SWE:STOP:WAVE?

SOURce:SWEep:STOP:WAVElength?

Description	This query returns the start wavelength for the sweep.
Syntax	SOUR:SWE:STOP:WAVE?
Response	Wavelength in 9999.999 nm format.
See also	SOUR:SWE:START:WAVE, SOUR:SWE:START:WAVE? and SOUR:SWE:STOP:WAVE

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SOURce:SWEep:SPAN?

Description	This query returns the wavelength range to be swept below and above the central wavelength.
Syntax	SOUR:SWE:SPAN?
Response	A value representing the wavelength range to be swept below and above the central wavelength in 9999.999 nm or 999.9999 THz formats.
Example	SOUR:SWE:SPAN?

SOURce:SWEep:SPEed

Description	This command allows you to select the sweep speed for the Continuous mode.
Syntax	SOUR:SWE:SPE<space><speed>
Parameters	The <speed> parameter is set in the 99.999 nm/s format.
Example	SOUR:SWE:SPE 35.455
See also	SOUR:SWE:SPE?

SOURce:SWEep:SPEed?

Description	This query returns the sweep speed for the Continuous mode.
Syntax	SOUR:SWE:SPE?
Response	Speed in 99.999 nm/s format
See also	SOUR:SWE:SPE

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SOURce:SWEep:SPEed:LIMit:HIGH?	
Description	This query returns the highest possible speed for the sweep.
Syntax	SOUR:SWE:SPE:LIM:HIGH?
Response	Speed in 99.999 nm/s format
See also	SOUR:SWE:SPE:LIM:LOW?

SOURce:SWEep:SPEed:LIMit:LOW?	
Description	This query returns the lowest possible speed for the sweep.
Syntax	SOUR:SWE:SPE:LIM:LOW?
Response	Speed in 99.999 nm/s format
See also	SOUR:SWE:SPE:LIM:HIGH?

SOURce:SWEep:STATe	
Description	This function starts or stops the sweep program.
Syntax	SOUR:SWE:STAT<space><state>
Parameters	The <state> parameter is a boolean parameter representing the new state of the sweep program: “1”-start the sweep program “0”-stop the sweep program
Example	SOUR:SWE:STAT 1
See also	SOUR:SWE:STAT?, SOUR:SWE:TIME? and SOUR:SWE:DUR?

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SOURce:SWEep:STATe?

Description This query returns a value indicating the state of the sweep program.

Syntax SOUR:SWE:STAT?

Response A boolean value representing the current state of the sweep program:
"1"-the sweep program is in progress
"0"-the sweep program is not in progress

See also SOUR:SWE:STAT, SOUR:SWE:TIME? and SOUR:SWE:DUR?

SOURce:SWEep:TIME?

Description This query returns the duration currently set for one sweep.

Syntax SOUR:SWE:TIME?

Response A value representing the duration currently set for the sweep in HHHH:MM:SS" format.

See also SOUR:SWE:STAT, SOUR:SWE:STAT and SOUR:SWE:DUR?

SOURce:SWEep:DURation?

Description This query returns the continuous sweep duration.

Syntax SOUR:SWE:DUR?

Response A value representing the duration currently set for the continuous sweep in "99:99:99:999" format.

See also SOUR:SWE:STAT, SOUR:SWE:STAT?, SOUR:SWE:DUR and SOUR:SWE:TIME?

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SOURce:SWEep:STEP

Description	This command allows you to specify the wavelength step for the step-by-step sweep.
Syntax	SOUR:SWE:STEP<space><state>
Parameters	Returns step in 9999.999 nm format.
Example	SOUR:SWE:STEP 5.500
See also	SOUR:SWE:STEP:LIM:LOW?, SOUR:SWE:STEP:LIM:HIGH?, SOUR:SWE:STEP?, SOUR:SWE:PAUS and SOUR:SWE:PAUS?

SOURce:SWEep:STEP?

Description	This query returns the wavelength step for the sweep in the step-by-step mode.
Syntax	SOUR:SWE:STEP?
Response	Wavelength in 9999.999 nm format.
See also	SOUR:SWE:STEP, SOUR:SWE:STEP:LIM:LOW?, SOUR:SWE:STEP:LIM:HIGH?, SOUR:SWE:PAUS and SOUR:SWE:PAUS?

SOURce:SWEep:STEP:LIMit:HIGH?

Description	This query returns the highest possible wavelength step in a step-by-step sweep.
Syntax	SOUR:SWE:STEP:LIM:HIGH?
Response	Maximal wavelength step in nm
See also	SOUR:SWE:STEP, SOUR:SWE:STEP:LIM:LOW?, SOUR:SWE:STEP?, SOUR:SWE:PAUS and SOUR:SWE:PAUS?

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SOURce:SWEep:STEP:LIMit:LOW?

Description	This query returns the lowest possible wavelength step in a step-by-step sweep.
Syntax	SOUR:SWE:STEP:LIM:LOW?
Response	Minimal wavelength step in nm
See also	SOUR:SWE:STEP, SOUR:SWE:STEP:LIM:HIGH?, SOUR:SWE:STEP?, SOUR:SWE:PAUS and SOUR:SWE:PAUS?

SOURce:SWEep:PAUSe

Description	This command allows you to set the minimal length of pause between the steps for the step-by-step sweep.
Syntax	SOUR:SWE:PAUS<space><sec>,<msec>
Parameters	The <state> parameter is the time in the 59:999 ms format.
Example	SOUR:SWE:PAUS 30:500
See also	SOUR:SWE:STEP, SOUR:SWE:STEP:LIM:LOW?, SOUR:SWE:STEP:LIM:HIGH?, SOUR:SWE:STEP?, SOUR:SWE:PAUS?, SOUR:SWE:PAUS:LIM:LOW?, SOUR:SWE:PAUS:LIM:HIGH?, SOUR:SWE:TRIG and SOUR:SWE:TRIG?

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SOURce:SWEep:PAUSe?

Description	This query returns the minimal length of pause between the steps for the step-by-step sweep.
Syntax	SOUR:SWE:PAUS?
Response	Time in 59:999 ms format.
See also	SOUR:SWE:STEP, SOUR:SWE:STEP:LIM:LOW?, SOUR:SWE:STEP:LIM:HIGH?, SOUR:SWE:STEP?, SOUR:SWE:PAUS, SOUR:SWE:PAUS:LIM:LOW?, SOUR:SWE:PAUS:LIM:HIGH?, SOUR:SWE:TRIG and SOUR:SWE:TRIG?

SOURce:SWEep:PAUSe:LIMit:HIGH?

Description	This query returns the highest available pause for a step-by-step sweep.
Syntax	SOUR:SWE:PAUS:LIM:HIGH?
Response	Time in 59:999 ms format.
See also	SOUR:SWE:STEP, SOUR:SWE:STEP:LIM:LOW?, SOUR:SWE:STEP:LIM:HIGH?, SOUR:SWE:STEP?, SOUR:SWE:PAUS, SOUR:SWE:PAUS?, SOUR:SWE:PAUS:LIM:LOW?, SOUR:SWE:TRIG and SOUR:SWE:TRIG?

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SOURce:SWEep:PAUSe:LIMit:LOW?

Description This query returns the lowest available pause for a step-by-step sweep.

Syntax SOUR:SWE:PAUS:LIM:LOW?

Response Time in 59:999 ms format.

See also SOUR:SWE:STEP, SOUR:SWE:STEP:LIM:LOW?, SOUR:SWE:STEP:LIM:HIGH?, SOUR:SWE:STEP?, SOUR:SWE:PAUS, SOUR:SWE:PAUS?, SOUR:SWE:PAUS:LIM:HIGH?, SOUR:SWE:TRIG and SOUR:SWE:TRIG?

SOURce:SWEep:TRIGger

Description This command activates or deactivates the input trigger option.

Syntax SOUR:SWE:TRIG<space><trigger>

Parameters The <trigger> value is a boolean expression indicating the trigger state:
“1” active
“0” inactive

Example SOUR:SWE:TRIG 1

See also SOUR:SWE:STEP, SOUR:SWE:STEP:LIM:LOW?, SOUR:SWE:STEP:LIM:HIGH?, SOUR:SWE:STEP?, SOUR:SWE:PAUS, SOUR:SWE:PAUS?, SOUR:SWE:PAUS:LIM:LOW?, SOUR:SWE:PAUS:LIM:HIGH? and SOUR:SWE:TRIG?

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SOURce:SWEep:TRIGger?

Description This query returns the state of the input trigger option.

Syntax SOUR:SWE:TRIG?

Response A boolean expression indicating the trigger state:
"1" active
"0" inactive

See also SOUR:SWE:STEP, SOUR:SWE:STEP:LIM:LOW?, SOUR:SWE:STEP:LIM:HIGH?, SOUR:SWE:STEP?, SOUR:SWE:PAUS, SOUR:SWE:PAUS?, SOUR:SWE:PAUS:LIM:LOW?, SOUR:SWE:PAUS:LIM:HIGH? and SOUR:SWE:TRIG

SOURce:WAVElength

Description This command selects a new source wavelength. The current spectral units (nm or THz) apply.

Syntax SOUR:WAVE<space><wave>

Parameters The <wave> parameter represents the new wavelength in the "9999.999" (nm) or "999.9999" (THz) format.

Note This function cannot be performed if the application is running in Sweep mode.

Example SOUR:WAVE 1550.000

See also SOUR:WAVE?, SOUR:WAVE:LIM:HIGH?, SOUR:WAVE:LIM:LOW?, SOUR:WAVE:LIM:STEP?, UNIT:WAVE, and UNIT:WAVE?

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SOURce:WAVElength?

Description This query returns the current source wavelength in the current spectral unit (nm or THz).

Syntax SOUR:WAVE?

Response A value representing the current wavelength in the “9999.999” (nm) or “999.9999” (THz) format.

See also SOUR:WAVE, SOUR:WAVE:LIM:HIGH?, SOUR:WAVE:LIM:LOW?, SOUR:WAVE:LIM:STEP?, UNIT:WAVE, and UNIT:WAVE?

SOURce:WAVElength:LIMit:HIGH?

Description This query returns the maximum wavelength that can be set with the SOUR:WAVE command. The return value will be in the current spectral units (nm or THz).

Syntax SOUR:WAVE:LIM:HIGH?

Response A value representing the maximum available wavelength in the “9999.999” (nm) or “999.9999” (THz) format.

See also SOUR:WAVE, SOUR:WAVE?, SOUR:WAVE:LIM:LOW?, SOUR:WAVE:LIM:STEP?, UNIT:WAVE, and UNIT:WAVE?

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SOURce:WAVElength:LIMit:LOW?

Description This query returns the minimum wavelength that can be set with the SOUR:WAVE command. The return value will be in the current spectral units (nm or THz).

Syntax SOUR:WAVE:LIM:LOW?

Response A value representing the minimum available wavelength in the “9999.999” (nm) or “999.9999” (THz) format.

See also SOUR:WAVE, SOUR:WAVE?, SOUR:WAVE:LIM:HIGH?, SOUR:WAVE:LIM:STEP?, UNIT:WAVE, and UNIT:WAVE?

SOURce:WAVElength:LIMit:STEP?

Description This query returns the minimum wavelength step that can be used when changing the wavelength with the SOUR:WAVE command. The return value will be in the current spectral units (nm or THz).

Syntax SOUR:WAVE:LIM:STEP?

Response A value representing the minimum wavelength step available in the “9999.999” (nm) or “999.9999” (THz) format.

See also SOUR:WAVE:LENG, SOUR:WAVE:LENG?, SOUR:WAVE:LIM:HIGH?, SOUR:WAVE:LIM:LOW?, UNIT:WAVE, and UNIT:WAVE?

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UNITe:WAVElength

Description This command changes the spectral measurement units (nm or THz). This command cannot be used in Sweep mode.

Syntax UNIT:WAVE<space><unit>

Parameters The <unit> parameter is a boolean parameter representing the new spectral measurement units:
“1”-use THz
“0”-use nm

Note This command cannot be performed if the Iq-2600B is in Sweep mode.

Example UNIT:WAVE 1

See also SOUR:WAVE, SOUR:WAVE?, SOUR:WAVE:LIM:HIGH?, SOUR:WAVE:LIM:LOW?, SOUR:WAVE:LIM:STEP? and UNIT:WAVE?

UNITe:WAVElength?

Description This query returns the current spectral measurement units.

Syntax UNIT:WAVE?

Response A boolean value representing the current spectral measurement units:
“1”-indicate THz
“0”-indicate nm

See also SOUR:WAVE, SOUR:WAVE?, SOUR:WAVE:LIM:HIGH?, SOUR:WAVE:LIM:LOW?, SOUR:WAVE:LIM:STEP? and UNIT:WAVE

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Quick Reference Command Tree

Command					Parameter/ Response	Description
CAL	WAVE				<9999.999>	Offset to correct wavelength deviation
OUTP	ASE?				(0|1)	Source available?
	MODE				<0|1>	Set source mode
	MODE?				(0|1)	Get source mode
	STAT				<0|1>	Turn source on or off
	STAT?				(1|0)	Source active?
SOUR	MODE				<1|0>	Set source mode
	MODE?				(1|0)	Source mode?
	POW				±99.99	Set source power
	POW?				±99.99	Source power?
		LIM	HIGH?		(±9.9)	Get max. source power
			LOW?		(±9.9)	Get min. source power
			STEP?		(±9.9)	Get min. power step
	SWE	MODE			<0|1>	Set source sweep mode

Table 4-2. *IQ-2600B Quick Reference Commande Tree (Part 1 of 4)*

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Command					Parameter/ Response	Description
	SWE	MODE?			(0|1)	Source sweep mode?
SOUR	SWE	CENT?			(9999.999) [nm] (999.9999) [THz]	Get central wavelength
		COUN			<99>	Set repetitions
		COUN?			(99)	Number of repetitions?
		REP			<0|1>	Set loop
		REP?			(1|0)	Loop active?
		REV			<0|1>	Set reverse function
		REV?			(1|0)	Reverse function active?
		STAR	WAVE		(9999.999) [nm] (999.9999) [THz]	Set start wavelength
		STAR	WAVE?		(9999.999) [nm] (999.9999) [THz]	Start wavelength?
		STOP	WAVE		(9999.999) [nm] (999.9999) [THz]	Set stop wavelength
		STOP	WAVE?		(9999.999) [nm] (999.9999) [THz]	Stop wavelength?
		SPAN?			(9999.999) [nm] (999.9999) [THz]	Get wavelength span
		SPE			(99.999) [nm]	Set sweep speed
		SPE?			(99.999) [nm]	Sweep speed?

Table 4-2. *IQ-2600B Quick Reference Commande Tree (Part 2 of 4)*

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Command					Parameter/ Response	Description
		SPE	LIM	HIGH?	(99.999) [nm]	Maximal sweep speed?
SOUR	SWE	SPE	LIM	LOW?	(99.999) [nm]	Minimal sweep speed?
		STAT			<1|0>	Turn sweep on or off
		STAT?			(1|0)	Sweep active?
		TIME?			(9999:99:99)	Get duration for one sweep
		DUR?			(9999:99:99)	Total sweep duration?
		STEP			(9999.999) [nm]	Set wavelength for step
		STEP?			(9999.999) [nm]	Wavelength for step?
			LIM	HIGH?	(9999.999) [nm]	Maximal wavelength step?
			LIM	LOW?	(9999.999) [nm]	Minimal wavelength step?
		PAUS			(59,999) [s,ms]	Set minimal length of pause
SOUR	SWE	PAUS?			(59:999) [ms]	Minimal length of pause?
			LIM	HIGH?	(59:999) [ms]	Highest available pause?

Table 4-2. *IQ-2600B Quick Reference Commande Tree (Part 3 of 4)*

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Command					Parameter/ Response	Description
			LIM	LOW?	(59:999) [ms]	Lowest available pause?
		TRIG			<1|0>	Set trigger option
		TRIG?			(1|0)	Trigger option on?
	WAVE				(9999.999) [nm] (999.9999) [THz]	Set wavelength
	WAVE?				(9999.999) [nm] (999.9999) [THz]	Get wavelength
		LIM	HIGH?		(9999.999) [nm] (999.9999) [THz]	Get max. wavelength
		LIM	LOW?		(9999.999) [nm] (999.9999) [THz]	Get min. wavelength
		LIM	STEP?		(9999.999) [nm] (999.9999) [THz]	Get min. wavelength step
UNIT	WAVE				<1|0>	Set wavelength unit
	WAVE?				(1|0)	Wavelength unit?

Table 4-2. *IQ-2600B Quick Reference Commande Tree (Part 4 of 4)*

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IQ-2600B Error Messages

Error Number	Description	Probable Cause
1101	“Parameter out of range”	The Tunable Laser Source has received a data parameter outside the valid range.
1102	“Invalid parameter”	The Tunable Laser Source has received an unexpected data parameter.
1103	“Cannot execute command”	A command was sent while unallowed by the application state.
1104	“Query error”	Internal error.

Table 4-3. *IQ-2600B Error Messages*

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GPIB Troubleshooting

Problem	Probable Cause	Solution
Unable to communicate with IQ-203 (No response from *IDN? command).	SCPI Manager is not open.	Open SCPI Manager.
	Incorrect communication type selected.	Select the correct communication type: RS-232, GPIB, or DDE.
	Incorrect communication parameters.	Check the communication parameters: bus address, Baud rate, flow control, etc., as required.
	Incorrect termination characters.	Synchronize termination characters between the GPIB controller and the SCPI Manager.
	Poor bus connection.	Ensure the functioning of the controller card and make sure that the bus cable is properly connected.
	Improper configuration.	Verify that the GPIB interface (IQ settings-Config) is properly configured.
Receive “Undefined header” error.	Missing module address from command.	Ensure that the module address is incorporated in the command.

Table 4-4. *Troubleshooting (Part 1 of 2)*

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Problem	Probable Cause	Solution
Receive “Undefined header” error. *(continued)*	Incorrect module address.	Ensure that the correct module address is being used.
	Incorrect command syntax.	Verify and correct syntax.
Unstable communications.	DMA is enabled.	Try with DMA disabled.
	Incorrect termination character.	Synchronize termination characters between the GPIB controller and the SCPI Manager.
Commands are working fine but the results and measurements are not as expected.	Synchronization problem with commands in program.	Use the *OPC? query after each command.
SCPI Manager unable to communicate with modules.	The module application is not open.	Open the module application.

Table 4-4. *Troubleshooting (Part 2 of 2)*

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5 Maintenance

There are no user-serviceable components in the IQ-2600B notwithstanding the procedure described in this section. The module has been designed to require a minimum of maintenance and provide accurate operation for many years.

Transportation and Storage

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

- Pack the unit in the original packing material when shipping.
- Store unit at room temperature in a clean and dry area. Avoid high humidity or large temperature fluctuations.
- Keep the unit out of direct sunlight.
- Avoid unnecessary shock and vibration.

General Maintenance

To help ensure long, trouble-free operation,

- Keep the IQ module free of dust.
- Be careful not to spill liquids into the unit. If the unit does get wet, turn the power off immediately and let the unit dry completely before turning it on again.
- Clean the IQ module casing with a cloth slightly dampened with water.

Cleaning the Optical Ports

To ensure maximum power output, the fiber end must be kept clean at all times. However, the source port should be cleaned occasionally to ensure minimum insertion loss.

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The cleaning swabs supplied with EXFO test equipment are specially designed to clean inside the ports without having to disassemble the unit. No cleaning solution is required as the tips are used dry.

1. Take a swab from the package without touching the soft end.
2. Slowly insert the swab into the port until it reaches the ferrule inside (A slight clockwise rotating movement may help)
3. Applying moderate pressure, turn the swab one full turn.
4. Continue to turn as you withdraw the swab.
5. Dispose of the used swab after 5 uses or as soon as it is visibly dirty.

IMPORTANT

To help keep the source port clean, it is recommended that the protective cap be installed when the unit is not being used and that the fiber ends are always cleaned before connecting them to the source port.

The cleaning swabs can also be used to clean adapters before inserting connectors.

Note: *Individual connectors still need to be cleaned according to standard cleaning methods.*

If any abnormal power loss is observed, the source port and pigtail behind the front panel of the module may require cleaning. Contact EXFO for further information.

User Calibration Feature

An offset can be introduced into your IQ-2600B to correct a wavelength deviation, as measured by a reference wavelength meter.

Note: *A calibrated wavelength meter is required to perform a user calibration.*

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To adjust your module at a certain wavelength,

1. Access the *Setup* window by pressing the *Sweep* button *(F7)*.

2. Click on the *Maintenance* tab. The following window appears:

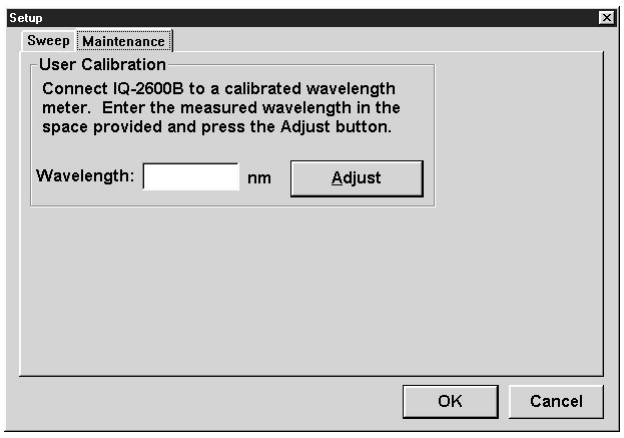


Figure 5-1. *User Calibration Window*

3. Connect your IQ-2600B to a calibrated wavelength meter and enter the measured wavelength in the *Wavelength* field.

4. Click on *Adjust*. Your unit will verify if there is a difference between the value you have entered and its current wavelength position. If there is a difference, it will add an offset to compensate.

The difference between the pre-selected wavelength and the measured wavelength cannot be greater than ±0.200 nm. If the difference between the measured and pre-selected wavelengths is greater than ±0.200 nm (for example, if you have entered the wrong value), the following window will appear:

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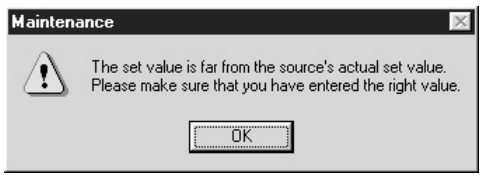


Figure 5-2. *Offset Value Warning Window*

The user calibration feature mentioned above can help you achieve better absolute wavelength accuracy if, for example, you feel that external conditions may have affected the unit's calibration. However, EXFO recommends that you return your IQ-2600B every year for a complete calibration. It will ensure that your unit remains within the published specifications. For more information on annual calibration, please contact EXFO.

IMPORTANT

Note that the offset introduced into the IQ-2600B with this software feature cannot be disabled. To correct for a handling error during the procedure, you must repeat the steps described above with a calibrated wavelength meter.

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6 Troubleshooting

Solving Problems

If you encounter one of the problems listed below, try to solve it first with the given information. In all cases, if the problem persists after performing a recommended action, contact EXFO immediately.

Problem	Probable Cause	Recommended Action
LED push button does not illuminate.	Power not on	➤ Check AC power cord and power ON the IQ-203 and IQ-206. ➤ Refer to *IQ-200 Optical Test System* instruction manual to check fuse.
	Module not properly inserted	➤ Power OFF the IQ-203 and IQ-206. ➤ Remove and reinstall the module.
	Computer locked up	Reboot the IQ-203.
	LED burnt	Contact EXFO.
Pressing the LED push button does not open the module Main window.	Computer locked up	Reboot the IQ-203.

Table 6-1. *Problems, Possible Causes, and Recommended Actions (Part 1 of 2)*

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Problem	Probable Cause	Recommended Action
Source appears unstable.	Insufficient stabilization time	Wait a minimum of 60 minutes for optimum stabilization.
	Reflection destabilizing the source	Connect the source using an optical isolator.
	ambient temperature varying	Control ambient temperature.

Table 6-1. Problems, Possible Causes, and Recommended Actions (Part 2 of 2)

Contacting the Customer Service Group

If you encounter any difficulty while using this product, please call EXFO at one of the offices listed below. Our Customer Service Group is available in North America from 7:30 a.m. to 8:00 p.m. (Eastern Time), Monday to Friday.

EXFO Electro-Optical Engineering Inc.
(Corporate Headquarters)
465 Godin Avenue
Vanier (Quebec) G1M 3G7
CANADA

1 800 663-3936 (USA and Canada)
Tel.: (418) 683-0211
Fax: (418) 683-2170
support@exfo.com
www.exfo.com

EXFO Europe
Centre d'Affaires Les Metz
100, rue Albert Calmette
78353 Jouy-en-Josas
FRANCE

Tel.: +33.1.34.63.00.20
Fax: +33.1.34.65.90.93

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7 Technical Specifications

Wavelength and Power Specifications	
Wavelength range (nm)	1510 to 1612
Wavelength resolution (pm)	<5
Spectral linewidth (FWHM) (GHz)[a]	>1.5
Tuning time - typical (ms)	75
Sweep speed (nm/s) minimum maximum	 2 50
Wavelength repeatability (nm)	±8
Wavelength stability - 1 hour (nm)[b]	±10
Uncertainty (nm)	<±0.05
Output power (dBm) over 1515 to 1610 over 1510 to 1612	 >0 >–10
Power stability (dB)[b] over 15 minutes over 1 hour	 ±0.005 ±0.01
Minimum monitoring output power (dBm)	–10
Repeatability (dB)	±0.02
Signal to SSE (dB)[c] ±1 nm from peak with RBW 0.2 nm[d]	>60
Signal to total SSE (dB)	>40 (typical: 50)

Table 7-1. *Wavelength and Power Specifications*

a. Measured with scanning Fabry-Perot (30 MHz resolution) over 10 seconds integration time in high resolution mode.
b. At constant ambient temperature.
c. SSE: Source Spontaneous Emission.
d. RWB: OSA noise equivalent resolution and witdth.

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Internal Variable Attenuator Specifications	
Attenuation range (dB)	10
Linearity with attenuation - typical (dB)	0.05
Repetability - typical (dB)	±0.005
Response time - typical (s)	0.5

Table 7-2. Internal Variable Attenuator Specifications

Operating Environment	
Operating temperature	-10 to 50°C (14 to 122°F)
Storage temperature	–40 to 70°C (–40 to 158°F)
Degree of polarization (dB)	>35
Relative humidity[a]	0 to 80% non-condensing
Output fiber type	SMF-28
Maximum operation altitude	6150 ft/2000 m

Table 7-3. Operating Environment

a. Measured in 2 to 104°F / 0 to +40°C temperature range.

Mechanical Specifications	
Dimensions (W, H, L)	3 in./7.5 cm, 4.75 in./12.0 cm, 10.3 in./26.2 cm
Weight	3.25 lb./1.5 kg
Number of IQ slots	2

Table 7-4. Mechanical Specifications

Note: *Most specifications are given at 23°C ±3°C, after a one-hour warmup time.*

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8 Warranty

General Information

EXFO Electro-Optical Engineering 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. This warranty also covers recalibration during a two-year period if the equipment is repaired or if the original calibration is erroneous.

IMPORTANT

The warranty can become null and void if

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

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Liability

EXFO shall not be liable for damages resulting from the use of the purchased product, nor shall be responsible for any failure in the performance of other items to which the purchased product is connected or the operation of any system of which the purchased 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, and batteries used with EXFO products are not covered by this warranty.

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 after the date of purchase.

For service or repair of any equipment, follow the procedure below:

1. Call EXFO Customer Service Group. Support personnel will determine if the equipment requires service, repair, or calibration.
2. If the equipment must be returned to EXFO or an authorized service center, support personnel will issue a Return Merchandise Authorization (RMA) and an address for return.

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IMPORTANT

Never send any unit or accessory back to EXFO without a Return Merchandise Authorization (RMA).

3. If the unit has an internal storage device, do a backup of your data before sending the unit for repairs.
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 by the support personnel. Be sure to write the RMA on the shipping slip. EXFO will refuse and return any package that does not bear an RMA.

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, the customer will be invoiced for the cost appearing on this report. Return-to-customer shipping costs will be paid by EXFO for equipment under warranty. Shipping insurance is at the customer's expense.

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Glossary

AC	Alternating current
adapter	A device for coupling two connectors.
amplifier	A device used to boost the strength (dB level) of a signal.
amplitude	The distance between high and low points of a waveform or signal.
ASCII	American Standard Code for Information Interchange. A system used to represent letters, numbers, symbols, and punctuation as bytes of binary signals.
ASE	Amplified Spontaneous Emission. Light emitted from the decay of the upper level of a lasing transition without stimulated emission. In general, this emission is spectrally broad and unpolarized.
attenuation	The diminution of average optical power. Attenuation results from absorption, scattering, and other radiation losses. Attenuation is generally expressed in dB without a negative sign.
attenuation coefficient	A factor expressing attenuation per unit length, expressed in dB/km.
attenuator	An optical device, either fixed or adjustable, that reduces the intensity of light propagating through it.
axis of birefringence	One of two generally orthogonal orientations transverse to the fiber core corresponding to fast and slow propagation of the group velocity of a light beam. In general, these orientations are elliptical and the orientation and amplitude vary along the fiber. In the special case of a HiBi fiber, the axes are linear and constant along the length of the fiber.
$\boldsymbol{B}_{\text{fib}}$	Fiber bandwidth, normally dependent on carrier wavelength and fiber length.
$\boldsymbol{B}_{\text{opt}}$	Optical bandwidth

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Glossary

backscattering	That portion of scattered light that returns in a direction generally opposite to the direction of propagation.
bandwidth	The range of frequencies handled by a device or system.
baud rate	Measurement of data transmission speed, expressed in bits per second or bps.
beamsplitter	A device for dividing an optical beam into two or more separate beams. It is often a partially reflecting mirror.
beat length	In a reasonably uniform, birefringent medium, the distance over which a light wave propagating along the slow axis will accumulate a phase lag of one wavelength (2π) with respect to light propagating along the fast axis. As a rule, the shorter the beat length, the higher the fiber birefringence. Typical HiBi fibers have a beat length of 3 mm at 1550 nm.
BER	Bit error rate. On a transmission link, the number of digital "highs" that are interpreted as "lows", and vice versa, divided by the total number of bits received. In modern networks, BERs much better than 10^{-9} are expected.
birefringence	The property whereby the effective propagation speed of a light wave in a medium depends upon the orientation of the electric field (state of polarization) of the light.
c	Velocity of light in a vacuum = 299 792 458 m/s
°C	Degree Celsius. To convert to Fahrenheit: $F = \frac{9}{5}C + 32$.
center wavelength	For an optical source (e.g., DFB, FP laser, LED), the wavelength corresponding to the weighted average (center of gravity) of the power distribution. Mathematically, $$\lambda_c = \frac{\sum \lambda_c P_i}{\sum P_i},$$ where P_i is the power of the *ith* constituent of the power distribution (e.g., one of the oscillating modes of a Fabry-Perot laser).
CFR	Code of Federal Regulations

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channel	A communication path. For WDM systems, a channel is determined by a wavelength and width.
chromatic dispersion	A phenomenon caused by the wavelength dependence of the group velocity in an optical fiber. Since any practical light source has a certain spectral width, chromatic dispersion results in pulse broadening. The coefficient describing chromatic dispersion per unit length is generally given in units of ps/nm·km
CNR	Carrier-to-noise ratio
coherence	A phenomenon whereby the phases of the photons (or constituent wavetrains) of a light beam maintain a definite relationship with each other. A narrow-linewidth laser is said to exhibit a high “degree of coherence”.
connector	A junction that allows an optical fiber or cable to be repeatedly connected or disconnected to a device such as a source or detector.
core eccentricity	A measure of the displacement of the core center relative to the cladding center.
core ellipticity (non-circularity)	A measure of the departure of the core from roundness.
coupler	A device whose purpose is to distribute optical power among two or more ports or to combine optical power from two or more fibers into a single port.
coupling ratio	Value obtained by measuring the power at both output ports and providing the output ratio between them. Also, CR.
crosstalk	The phenomenon of light leakage or information transmission from one wavelength channel to an adjacent channel, from a waveguide to an adjacent waveguide, or from one modulated carrier frequency to another.
cutoff wavelength	For a singlemode fiber, the wavelength above which the fiber can only support the propagation of the lowest order transverse mode.

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Glossary

CW	Abbreviation for continuous wave. Refers to non-modulated, constant-intensity light.
CR	Coupling ratio
dB	Decibel
dBm	Decibel referenced to a milliwatt.
DC	Direct current
decibel (dB)	The standard unit used to express gain or loss of optical power. A standard logarithmic unit for the ratio of two powers.
DFB	Distributed feedback (laser)
diffraction grating	An optical element that causes a wavelength-dependent reflection, often at one or more wavelength-dependent angles. This element is based upon coherent scattering from an array of fine, parallel, equally spaced reflecting or transmitting lines.
directivity	In a 3-port optical circulator, the ratio of power launched into port 1 that exits via port 2 vs. the fraction that exits via port 3.
distributed feedback laser (DFB)	An injection laser diode that has a Bragg reflection grating in the active region to suppress multiple longitudinal modes and enhance a single-longitudinal mode.
DUT	Device under test
DWDM	Dense wavelength division multiplexing
dynamic range	Another commonly used term for “optical rejection ratio” in an optical system. See this term.
EDFA	Erbium doped fiber amplifier
EDFFA	Erbium doped fluoride fiber amplifier
EDFSA	Erbium doped silica fiber amplifier
EIA	Electronics Industries Association
EL	Excess loss

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electromagnetic interference Any electrical or electromagnetic interference that causes degradation, failure in electronic equipment, or undesirable response. Optical fibers neither emit nor are affected by EMI.

EMI Electromagnetic interference.

excess loss (EL) In relation to multiport components, the excess loss is a measure of the insertion loss over and above that induced by the splitting ratio. Excess loss is normally defined (in dB units) as the ratio of the input power divided by the sum of the powers in the output ports.

f Abbreviation for femto, which indicates 10^{-15} units.

f Frequency, often also designated by ν.

FCC Federal Communications Commission. A U.S. government body overseeing and regulating national electrical and radio communications. The FCC, formed in 1934, also deals with licences, tariffs, and limitations. The members of the commission are appointed by the U.S. president.

FP Fabry-Perot (laser or cavity).

frequency The number of cycles per second, denoted by hertz (Hz).

Fresnel reflection Reflection of a portion of the light incident on a planar interface between two homogeneous media having different refractive indices. For a perpendicularly-cleaved fiber terminated in air, the Fresnel reflection is -14 dB.

FSR Free Spectral Range. Denotes spacing, in frequency units, between resonant modes of a cavity (e.g., FP cavity).

FWHM Full wave half maximum

G Abbreviation for giga, which indicates 10^{9} units.

Ge Germanium

GeX High power germanium

HiBi High birefringence (fiber)

h Mode coupling parameter, normally given in units of meters. A characteristic length over which there is a significant

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	transfer of energy from the light component aligned with one axis of birefringence to the other axis of birefringence, and vice versa. For long fibers, the overall PMD is lowered if h is relatively short (<10 m), on the order of the fiber beat length.
hr	Hour
HWHM	Half wave half maximum
Hz	Hertz. Denotes number of cycles per second.
IEC	International Electrotechnical Commission. A standardization body at the same level as ISO.
IEE	Institute of Electronic Engineering. It is a professional body covering all aspects of electronics and electrical engineering, including software, network, and computer engineering.
IEEE	Institute of Electrical and Electronics Engineering. It is a professional body very active, among other things, in many fiber-optic and opto-electronic related fields.
IL	Insertion loss
index matching material	A material, often a liquid or a cement, whose refractive index is nearly equal to the core index, used to reduce Fresnel reflections from a fiber's endface.
index of refraction	The ratio of the group velocity of light in a vacuum to the group velocity of light in a given medium.
index profile	The refractive index as a function of radius of an optical fiber.
InGaAs	Indium gallium arsenide
insertion loss	The ratio of input power to output power in dB units (for a given output port) for an optical component such as a connector, splice, or coupler. For a multiport device, the insertion loss includes the splitting ratio and the excess loss.
ISO	International Organization for Standardization. Commonly believed to stand for International Standards Organization.

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	In fact, ISO is not an abbreviation—it is intended to signify uniformity (derived from the Greek *iso* meaning “equal”). ISO is responsible for many standards including those for data communications and computing.
ITU	International Telecommunications Union. The ruling body for telecommunications and the source of many network standards.
jumper	Fiber-optic cable that has connectors terminated on both ends. Used to connect two pieces of equipment, modules, or components.
k	Abbreviation for kilo, which indicates 10^3 units.
LoBi	Low birefringence (fiber)
LD	Laser diode
LED	Light emitting diode
M	Abbreviation for mega, which indicates 10^6 units.
m	Abbreviation for milli, which indicates 10^{-3} units.
min	Minute
MFD	Mode field diameter (singlemode fiber)
modal dispersion	Generally used to designate multimode dispersion, which is pulse broadening due to optical power propagating via different waveguide modes. Modal dispersion is the main limitation on the bandwidth of multimode fibers.
mode coupling	The exchange of power among modes.
mode field diameter	The effective diameter of optical energy in a singlemode fiber. Because the mode field diameter is greater than the core diameter, mode field diameter frequently replaces core diameter as a practical parameter.
multiplexing	The process by which two or more signals are transmitted over a single communications channel.
n	Abbreviation for nano, which indicates 10^{-9} units.

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Glossary

n	Refractive index. For the silica glass used in optical fibers, $n \approx 1.465$.
NA	Numerical aperture
NBWDM	Narrow band wavelength division multiplexing
NF	Noise figure
NIST	National Institute of Standards and Technology. U.S. governmental body that provides the assistance in developing standards. It was formerly the National Bureau of Standards.
noise figure	A measure of the quality of an amplifier, defined as the ratio of output to input SNRs.
numerical aperture (NA)	It is the sine of half the maximum angle of acceptance.
OFDR	Optical frequency domain reflectometer
optical channel	An optical wavelength band for wavelength division multiplexing optical communications.
optical rejection ratio (ORR)	For an optical instrument, generally defined as the ratio (in dB) of the smallest signal that can be observed (at a specified wavelength separation) in the presence of a strong, nearly saturating signal.
optical return loss (ORL)	The ratio (expressed in units of dB) of optical power, reflected by a component or an assembly, to the optical power incident on a component or assembly that is introduced into a link or system.
optical time domain reflectometer	A method of characterizing a fiber wherein an optical pulse is transmitted through the fiber and the resulting backscatter and reflections are measured as a function of time and, hence, as a function of distance.
OSA	Optical spectrum analyzer
OTDR	Optical time domain reflectometer
P	Abbreviation for peta, which indicates 10^{15} units.

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p	Abbreviation for pico, which indicates 10^{-12} units
P	Power
PC	In optical schematics, used to designate a polarization controller.
PCS	Plastic-clad silica (fiber)
PDCR	Polarization dependent coupling ratio
PDEL	Polarization dependent excess loss
PDG	Polarization dependent gain
PDL	Polarization dependent loss
peak wavelength	The wavelength at which the optical power of a source is at maximum.
PMF	Polarization maintaining fiber
Poincaré sphere	A three-dimensional graphical representation of the state of polarization of a light beam.
polarization controller	Instrument used to control the polarization state of the light. This type of equipment can produce different polarization states of the input light.
polarization dependent loss	A transmission loss that varies with input polarization state. Normally defined as $T_{max}(dB) - T_{min}(dB)$
polarization mode dispersion (PMD)	Pulse spreading in a singlemode fiber that arises on account of the different group velocities associated with each of the two principal states of polarization of the fiber.
polarizer	Component used to polarize light.
POTDR	Polarization OTDR
principal states of polarization (PSP)	The two generally orthogonal states of polarization of a monochromatic light beam launched into a fiber (input PSP) that will propagate through the fiber without spreading or distortion. The SOP of this light beam as it exits the fiber will be in one of two, generally orthogonal, output PSPs. In general, the output PSPs are not the same as the input PSPs,

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	and the orientation of these PSPs changes with wavelength. Not to be confused with axes of birefringence. Only in the spectral case of a single HiBi fiber are the PSPs and the axes of birefringence the same.
Rayleigh scattering	Scattering by inhomogeneities in the fiber that are small with respect to wavelength. This scattering mechanism is present in all silica-based fibers. The OTDR principle is based upon the measurement of this backscattering.
RIN	Relative Intensity Noise. A useful measure of the inherent noise of an optical source as a function of frequency (relative to the carrier). Given as a ratio of noise power per frequency interval divided by the total power. For a DFB laser, a typical value is -100 dB/Hz at 100 MHz.
RMA	Return merchandise authorization
RNF	Refracted near field
s	Second
sensitivity	For an optical instrument, the smallest signal that can be detected in the absence of any other signal.
Si	Silicon
SMSR	Side mode suppression ratio
SNR	Signal-to-noise ratio. The ratio of the received optical power, divided by the noise floor for the optical system.
SSE	Source spontaneous emission
state of polarization (SOP)	The orientation of the electric field vector of a propagating optical wave. In general, this vector will trace an ellipse as it propagates. In special cases, it will remain oriented in one direction (linear polarization) or will trace out a circle (left or right circular polarization).
t	Time
T	Abbreviation for tera, which indicates 10^{12} units.

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Telcordia	Organization that contains much of the former Bell labs. It specializes in telephone network technology, standards and interfaces.
V	volt
VA	volt-ampere
W	watt
waveguide dispersion	An important constituent of chromatic dispersion in optical fibers. It is determined by the fiber cladding/core geometry and refractive index profile.
wavelength	For monochromatic light, the distance between two successive peaks (or troughs) of the sinusoidally-varying electric-field amplitude. Note that, unlike frequency, the wavelength of light is inversely proportional to the refractive index of the medium through which it propagates. It is for this reason that accurate wavelength measurements are generally specified as being determined in “air” or in “vacuum”.
WDM	Wavelength division multiplexing. A technique whereby two or more carrier wavelengths are transmitted over one optical fiber.
XT	Crosstalk
λ	lambda. Greek letter used to denote wavelength.
μ	Abbreviation for micro, which indicates 10^{-6} units.
ν	nu. Greek letter used to denote frequency. Traditionally, the physics community uses “ν” to denote frequency whereas the engineering community uses “f”.

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Index

A

about window 4
active LED 2
adding items on the current lists 17
available memory 4

B

buttons
- increase wavelength 5
- mode 5
- power/wavelength toggle 5
- source activation/deactivation 5
- start/stop sweep 5
- sweep 5
- sweep setup 5
- transfer 5
- unit increment/decrement 5

C

calibration 64
caution of product hazard 9
certification
- information vi
- warranty 72

cleaning
- optical port 63
- swabs 64

closing monitor window 14
commands
- general 27
- specific 33

continuous mode 19
control
- local 7
- lockout 7
- remote 7

current list
- adding to 17
- deleting items from 17

customer service 72
cycles 24

D

data display 3, 6
decrement unit 5
delay for the sweep 19
deleting items from the current lists 17
direction of the sweep 24
display
- menu 4
- unit 15

E

equipment returns 73
exiting software 14

F

file menu 4
function buttons 3, 5

G

general
- commands 27
- maintenance 63

GPIB compatibility with the IQ Series 25

H

help menu 4
High Resolution (HR) mode 15

I

increment unit 5
incremental selection 17

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initializing the source 13
inserting module 11
IQ Series 25
IQ-2600B error messages 60

K

keys
- increase wavelength 5
- mode 5
- power/wavelength toggle 5
- source activation/deactivation 5
- start/stop sweep 5
- sweep setup 5
- transfer 5
- unit decrement/increment 5

L

laser class 10
LED push button 11
level of radiation 10
loading the software 13
local control 7
lockout control 7

M

main window 3
maintenance, general 63
manufacturing date 2
menu bar 3, 4
menus
- display 4
- file 4
- help 4

mode
- continuous 19
- repeat 24
- stepped 20

module
- description 2
- insertion 11
- removal 12

monitor output port 2
monitor window
- closing 14
- description 8
- opening 14

N

nameplate 2
Normal mode 15
number of cycles per sweep 24

O

on/off button 2
open config 4
opening monitor window 14
optical port, cleaning 63
output port 2

P

parameter definition controls 3
parameters, sweep 18
part number 2
power selection 17
power/wavelength toggle button 5
product
- laser class 10
- nameplate 2
- version 2

Q

quick reference command tree 56

R

radiation level 10
remote control 7

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removing the module 12
repeat mode 24
return merchandise authorization 73

S

safety
  caution 9
  instructions 10
save config 4
selecting
  incremental 17
  power 17
  wavelength 16
serial number 2
service and repair 72
setting
  delay for the sweep 19
  display unit 15
  the wavelength display unit 15
setup, sweep 5
shipping to EXFO 73
slider 17
software
  exiting 14
  loading 13
  version 4
source
  activation/deactivation 16
  initializing 13
  sweep 18
specific commands 33
starting a sweep 5, 24
status bar 3, 7
stepped mode 20
stop sweep 5
storage temperature 63
sweep
  cycles 24
  delay 19
  direction 24
  mode 19
  parameters 18
  setup 5
  start 24
Switching 15
switching between modes 15

T

temperature for storage 63
title bar 3, 4
transportation requirements 63
trigger
  continuous mode 21
  in 21
  option 21
  out 21
  stepped mode 22
trigger-in connector 2
trigger-out connector 2
turning on the source 13

U

UltraTech Engineering Labs Inc. vi
unit
  decrement 5
  increment 5
user calibration 64
using the slider 17

W

warranty
  certification 72
  exclusions 72
  general 71
  liability 72
  null and void 71
wavelength
  direct selection 16
  display unit 15
  selection from a stored list 16
wavelength/power toggle button 5

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