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Find the *Exfo IQS-5320-EI* at our website: ***Click HERE***

Multi-Wavelength Meter

IQS-5320



If the equipment described herein bears the CE symbol, the said equipment complies with the applicable European Union Directive and Standards mentioned in the Declaration of Conformity.

User Guide

P/N: 1035496
June 2002

EXFO

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Certification Information

F.C.C. Information

Electronic test equipment is exempt from Part 15 compliance (FCC) in the United States, but EXFO makes reasonable efforts to ensure this compliance.

CE Information

Electronic test equipment is subject to the EMC Directive in the European Union. The EN61326 standard prescribes both emission and immunity requirements for laboratory, measurement, and control equipment. This unit has been tested and found to comply with the limits for a Class A digital device. Please refer to the Declaration of Conformity.

Independent Laboratory Testing

This unit has undergone extensive testing according to the European Union Directive and Standards. All pre-qualification tests were performed internally, at EXFO, while all final tests were performed externally, at an independent, accredited laboratory. This guarantees the unerring objectivity and authoritative compliance of all test results.

IMPORTANT

Use of shielded remote I/O cables, with properly grounded shields and metal connectors, is recommended in order to reduce radio frequency interference that may emanate from these cables.

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DECLARATION OF CONFORMITY

Application of Council Directive(s):	73/23/EEC - The Low Voltage Directive 89/336/EEC - The EMC Directive
Manufacturer's Name:	EXFO ELECTRO-OPTICAL ENG.
Manufacturer's Address:	465 Godin Avenue Vanier, Quebec Canada G1M 3G7 (418) 683-0211
Equipment Type/Environment:	Industrial Scientific Equipment
Trade Name/Model No.:	IQS-5320 Multiwavelength Meter
Year of Conformity Assessment:	2002

Standard(s) to which Conformity is Declared:

EN 61010-1:1990	**Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use, Part 1: General Requirements.**
EN 55022:1994/ A2: 1997	**Limits and Methods of Measurement of Radio Disturbance Characteristics of Information Technology Equipment.**
EN 60825-1: Ed. 1.1 1998	**Safety of laser products – Part 1: Equipment classifications, requirements and user's guide.**
EN 61326:1997/ A1: 1998 + A2: 2000	**Electrical Equipment for Measurement, Control and Laboratory Use - EMC Requirements**

I, the undersigned, hereby declare that the equipment specified above conforms to the above Directive and Standards.

Manufacturer

Signature: 

Full Name:	Stephen Bull, E. Eng
Position:	Vice-President Research and Development
Address:	465 Godin Avenue Vanier, Quebec, Canada
Date:	March 19, 2002

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1 Introducing the IQS-5320 Multi-Wavelength Meter

Wavelength-division multiplexing (WDM) plays a dominant role in the telecommunications industry. Using multiple data streams over separate channels on the same fiber has created a need for new test procedures and equipment. In fact, WDM had added another dimension to existing test procedures, but in addition to time and power, we now need to be concerned with wavelength.

Main Features

Specifically designed for WDM testing, the IQS-5320 Multi-Wavelength Meter (MWM), used with the IQS-500 Intelligent Test System platform, features wavelength accuracy with a user-friendly graphical interface. The MWM is the perfect tool for system operators who are facing new dense wavelength-division multiplexing (DWDM) testing challenges.

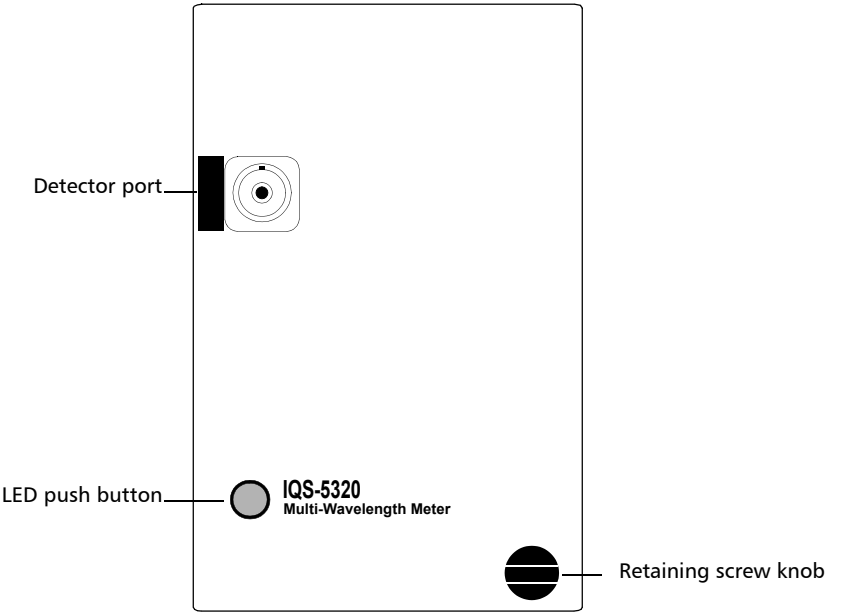
The IQS-5320 Multi-Wavelength Meter is designed for the high-precision measurements required in testing and maintaining DWDM systems.

The MWM's internal reference HeNe laser provides absolute accuracy within a few picometers.

Its software offers a user-friendly interface for flexible control of all your MWM's features. The IQS-5320 MWM's is housed in the IQS-500 Intelligent Test System, which enables it to take advantage of the modularity of the platform and to be used in conjunction with the Optical Spectrum Analyzer, PMD and other modules to meet other testing needs.

The IQS-5320 Multi-Wavelength Meter supports local control (via the IQS Manager software) and remote control (through a GPIB interface—using SCPI commands or LabVIEW drivers available on the installation CD-ROM).

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Typical Applications

By allowing you to perform laser diode spectral characterization, the MWM is ideal for controlling the drift of DWDM sources in transmission system qualification and reliability testing.

The IQS-5320 Multi-Wavelength Meter can also be used for

- characterizing and testing passive components
- stabilizing flatness
- redistributing EDFA spectral gain
- calibrating tunable lasers

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MWM Measurement Principle

The MWM generates results that are similar, but complementary, to those of the optical spectrum analyzer (OSA). As with the OSA, the results are displayed as power versus wavelength. However, despite the similarity to the OSA, the technology used to achieve results in the MWM is fundamentally different: the OSA uses diffraction grating, whereas the MWM uses interferometry.

Interferometric technology allows the MWM to segment a light signal into two equal parts and to monitor the interference patterns that are created between the two signals. These interference patterns cannot be directly interpreted. And therefore, they must undergo signal treatment before becoming recognizable results. The mathematical tool used to treat the interference patterns is called a fast Fourier transform (FFT). The FFT basically changes an interference pattern from a function of time to a list of wavelengths that make up the optical signal measured.

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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 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 unless you understand and meet the required conditions.

IMPORTANT

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

Laser Safety Information

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.

WARNING

Use of controls, adjustments and procedures for operation and maintenance other than those specified herein may result in hazardous radiation exposure.

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WARNING

Use of optical instruments with this product will increase eye hazard.

Your IQS-5320 Multi-Wavelength Meter is a Class 1 laser or LED product in compliance with standards 21 CFR 1040.10 and IEC 60825-1: Edition 1.1 1998. Laser radiation may be encountered at the output port.

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 following labels indicate that a product contains a Class 1 laser or LED light source:





Note: *Class 1 labels are shown above for information purposes only. However, they are not affixed on the actual IQS-5320 Multi-Wavelength Meter modules.*

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3 Getting Started with Your Multi-Wavelength Meter

Inserting and Removing Test Modules

CAUTION

Never insert or remove a module while the controller or expansion unit is powered on. This will result in immediate and irreparable damage to both the module and unit.

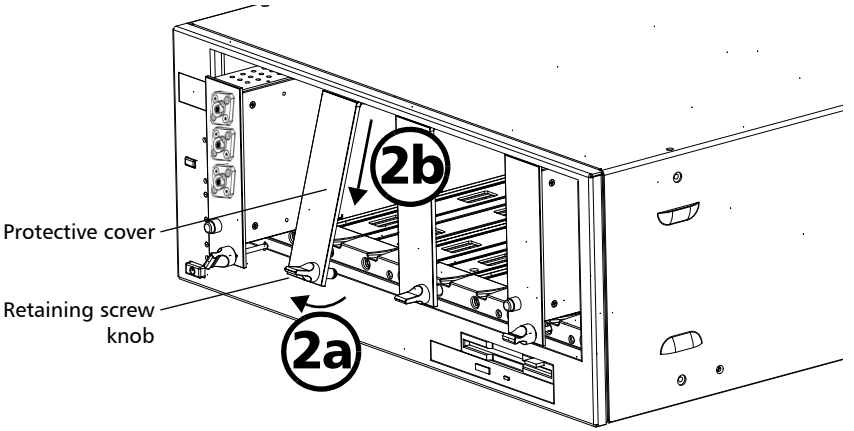
To insert a module into the controller or expansion unit:

1. Exit IQS Manager and power off your unit(s).

2. Remove the protective cover from the desired unused module slot.

2a. Pull the retaining screw knob firmly towards you and release the bottom of the cover.

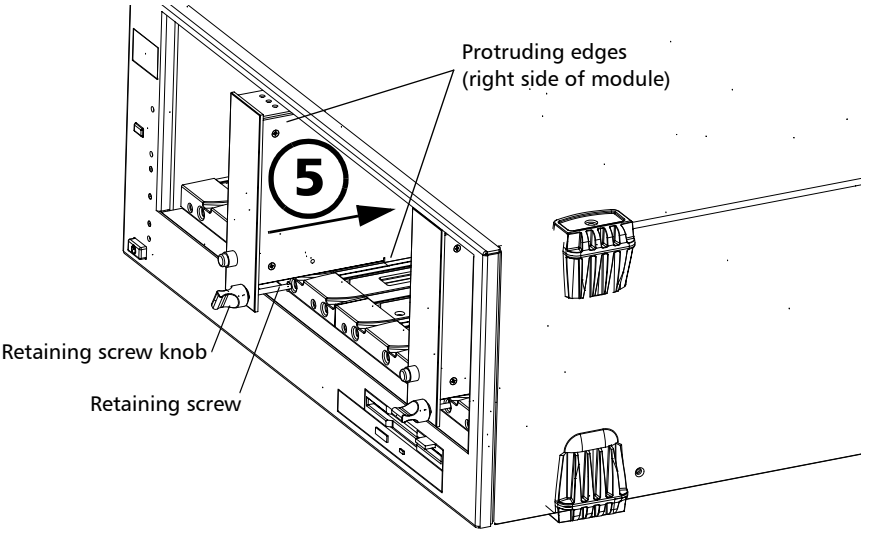
2b. Gently pull the top of the protective cover downwards, to remove it from the unit grooves.



3. Position the module so that its front panel is facing you and the top and bottom protruding edges are to your right.

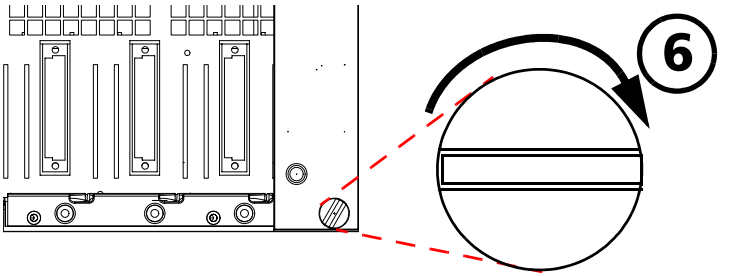
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4. Insert the protruding edges of the module into the grooves of the unit's module slot.



5. Push the module all the way to the back of the slot, until the retaining screw makes contact with the unit casing.

6. While applying slight pressure to the module, turn the retaining screw knob (located at the bottom of the panel) clockwise until the knob is horizontal. This will secure the module into its "seated" position.



The module is correctly inserted when its front panel is flush with the front panel of the controller or expansion unit.

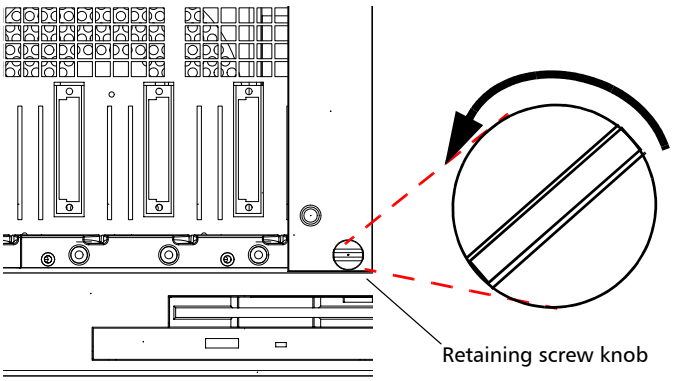
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When you turn on the controller unit, the startup sequence will automatically detect your module.

Note: *You can insert IQ modules into your controller or expansion unit; the IQS Manager software will recognize them. However, the IQS-500 locking mechanism (retaining screw) will not work for IQ modules.*

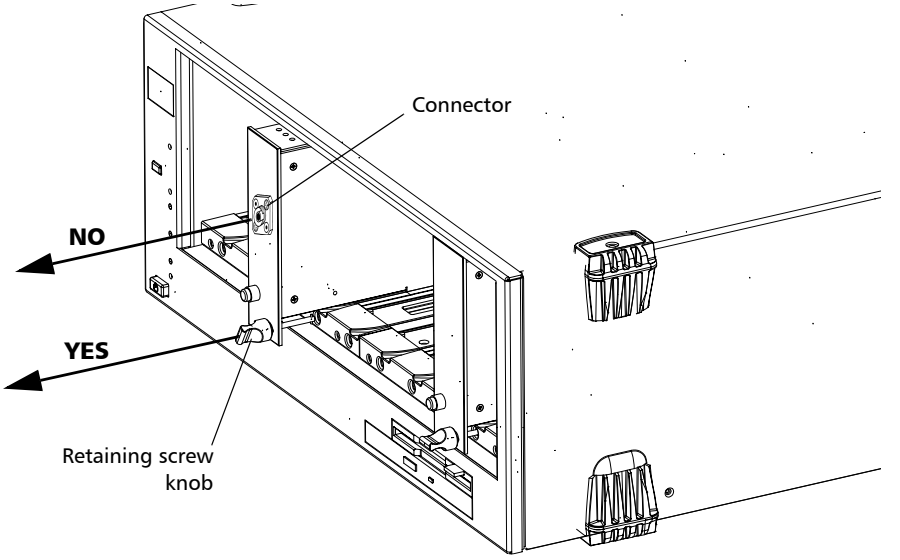
To remove a module from your controller or expansion unit:

1. While pulling gently on the knob, turn it counterclockwise until it stops. The module will slowly be released from the slot.



2. Place your fingers underneath the module or hold it by the retaining screw knob *(NOT by the connector)* and pull it out.

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CAUTION

Pulling out a module by a connector could seriously damage both the module and connector. Always pull out a module by the retaining screw knob.

3. To prevent dust from entering the module housing, cover empty slots with the supplied protective covers. Simply slide the top of the protective cover into the upper grooves of the unit, and then snap into place by pushing the retaining screw knob.

CAUTION

Failure to reinstall protective covers over empty slots may result in ventilation problems.

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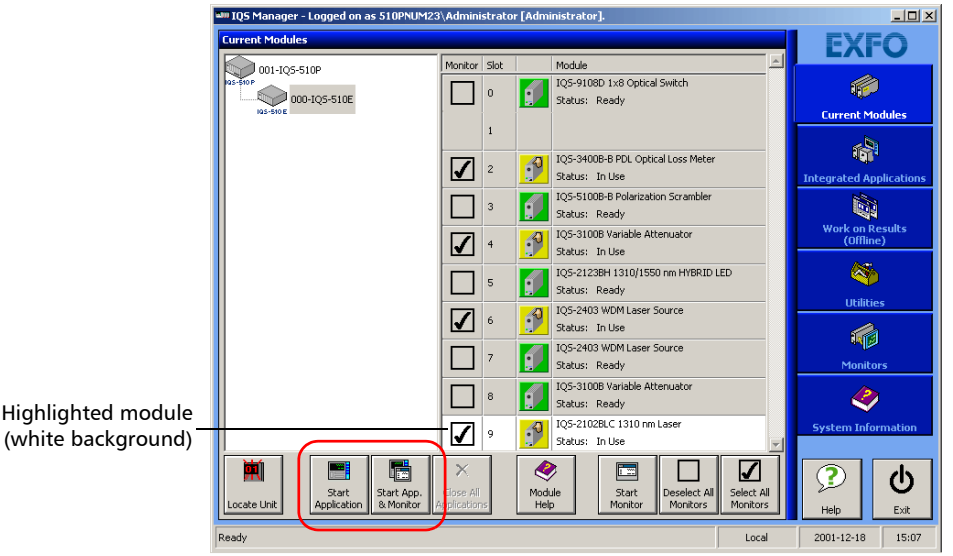
Launching the IQS-5320 Multi-Wavelength Meter Application

Your IQS-5320 Multi-Wavelength Meter module may be fully configured and controlled from its dedicated IQS Manager application.

Note: *For details about IQS Manager, refer to the* IQS-500 Intelligent Test System *user guide.*

To launch the IQS-5320 Multi-Wavelength Meter application:

1. From the **Current Modules** function tab, click on the row corresponding to the module application you wish to launch. It will turn white to indicate that it is highlighted.



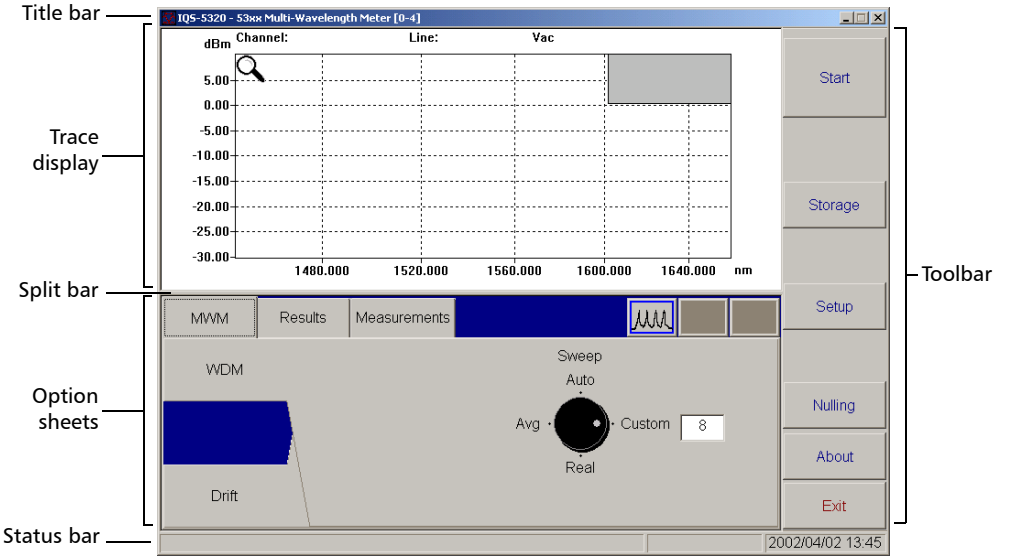
Highlighted module (white background)

2. Click on **Start Application** or press the green LED push button on the front of the corresponding module to start the application in a new window (you can also double-click on its row).

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Note: *Pressing the LED push button will not activate or turn on the module.*

The main window (shown below) contains all the commands required to control the IQS-5320 Multi-Wavelength Meter:



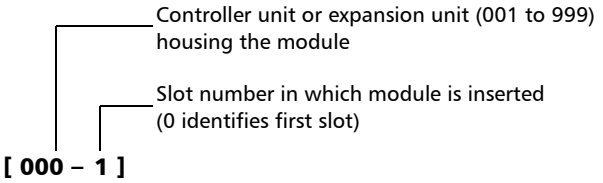
The main window is divided into three main areas:

- *Trace display*: Displays the traces in a graph.
- *Control center*: Presents the application controls, as well as the test results tables in their respective formats.
- *Toolbar*: Gives access to the Storage window, Report window or Setup window functions and parameters, as well as to the **Quick Save**, **Quick Print, About**, and **Exit** commands for the MWM test application.

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Title Bar

The title bar is located at the top of the main window. It displays the module name and its position in the controller or expansion unit. The module position is identified as follows:



Status Bar

The status bar, located at the bottom of the main window, identifies the current operational status of the IQS-5320 Multi-Wavelength Meter.

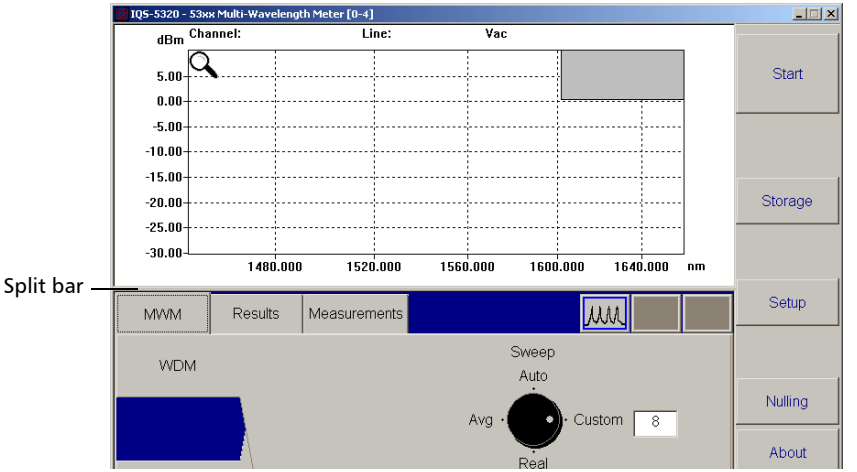


For more information about automating or remotely controlling the IQS-5320 Multi-Wavelength Meter, refer to the *IQS-500 Intelligent Test System* user guide.

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Adjusting Window Height

A split bar divides the trace display region and option sheets. You can move it up or down by dragging it to obtain a larger view of the graph or table display.



Exiting the Application

Closing any application that is not currently being used is a good way to free up system memory.

To close the application from the main window:

➤ Click on ☒ (in the top right corner of the main window).

➤ Click on the **Exit** button located at the bottom of the function bar.

To close all currently running applications:

From IQS Manager, click on **Close All Applications**.

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4 Setting Up Your Multi-Wavelength Meter

The application parameters you define are used throughout the application interfaces and functions and are saved within trace files until you change them.

Note: *The Setup window cannot be accessed when a scan is in progress.*

You can define general parameters for the operation of the IQS-5320 Multi-Wavelength Meter such as power and wavelength units, power reference and detection threshold. You can also choose to display interchannel data with your results, select a tranmission medium, a referenced power or set a power offset.

You an define and manage channel lists, printer and report settings, as well as customize the graphic display.

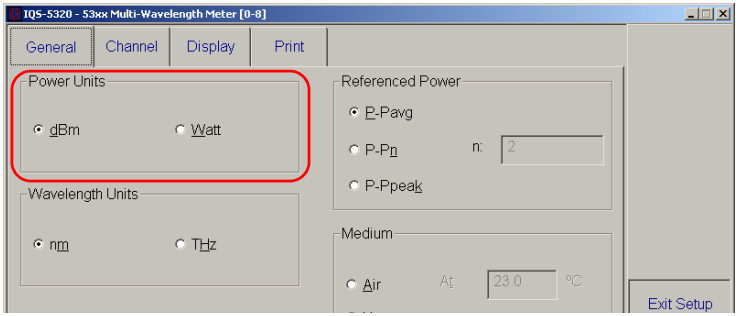
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Setting Power Units

You can display power in decibels referenced to a milliwatt (dBm) or in watts (W).

To set a power unit:

1. Press **Setup** in the toolbar.
2. Select the **General** tab.



3. Under **Power Units**, select the appropriate radio button and set the power unit. By default, the power is set to dBm.
4. Press **Exit Setup** to return to the main window.

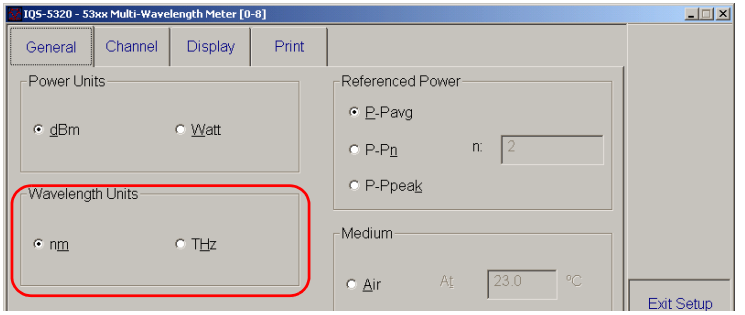
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Setting Wavelength Units

You can display wavelengths in nanometers (nm) or its equivalent frequency in terahertz (THz).

To set a wavelength unit:

1. Press **Setup** in the toolbar.
2. Select the **General** tab.



3. Under **Wavelength Units**, select the appropriate radio button to define the unit. By default the wavelength unit is in nm.
4. Press **Exit Setup** to return to the main window.

Note: *If you select **THz**, the word "Frequency" will be displayed in the interface. If you select **nm**, the word "Wavelength" will be displayed.*

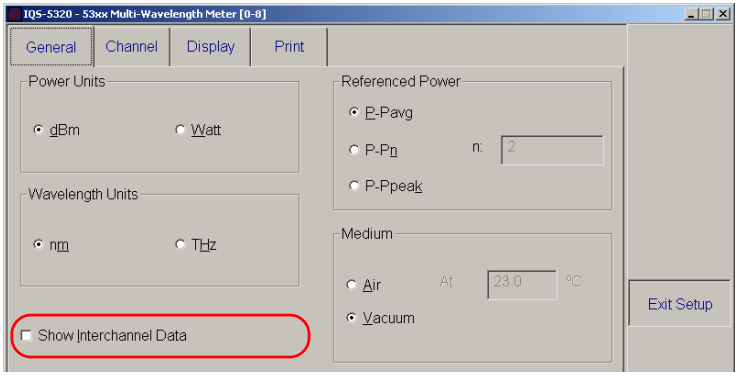
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Displaying Interchannel Data

Interchannel data pertains to areas of the spectrum located between the detected peaks. These peaks are listed in the Results window and can be displayed in WDM mode (see *Viewing WDM Mode Measurement Results* on page 54). Interchannel data includes the distance and power difference between two peaks. By default, this information is hidden.

To display interchannel data:

1. Press **Setup** in the toolbar.
2. Select the **General** tab.



3. Select **Show Interchannel Data** to display interchannel information.
4. Press **Exit Setup** to return to the main window.

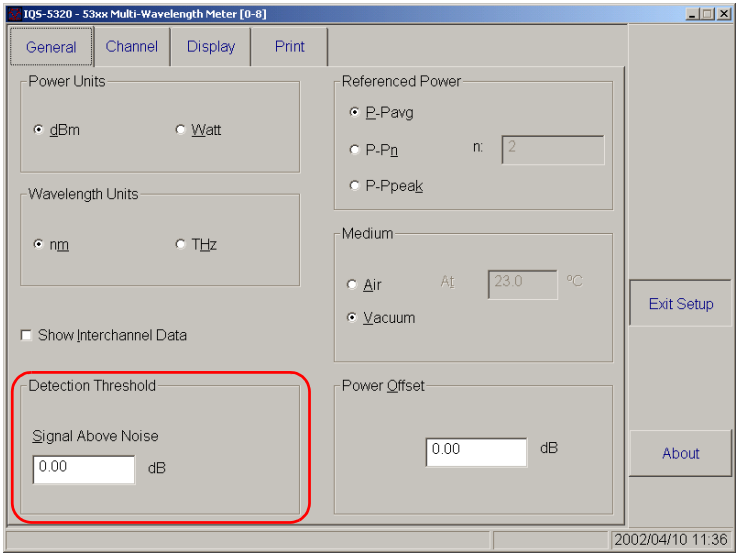
Setting the Detection Threshold

The detection threshold is the gap between the calculated noise level and the minimum level at which peaks will be detected.

To set a detection threshold:

1. Press **Setup** in the toolbar.
2. Select the **General** tab.

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3. Under **Detection Threshold**, enter your detection threshold value. Set it as high as possible to avoid false peak detection, but low enough to detect all peaks.

- ➤ If power is expressed in dBm, the detection threshold is expressed in dB, with acceptable values between 0 dB and 10 dB.
- ➤ If power is expressed in watts, the detection threshold is expressed in %, with acceptable values between 0 % and 900 %.

For example, to increase the default detection threshold by a factor of 2, set this parameter to 3 dB or 100 %.

4. Press **Exit Setup** to return to the main window.

Note: *It is impossible to change the detection threshold for a measurement once data has been acquired.*

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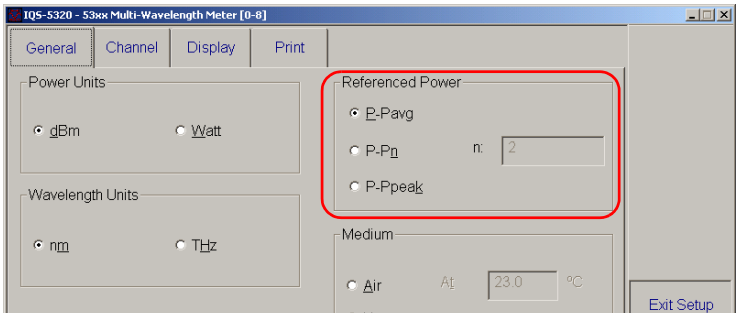
Selecting a Referenced Power

The referenced value of a channel allows you to compare each detected peak to one of three possible power references.

The referenced power is the difference between the channel power, *P*, and the power reference. For example, *P-Pavg* is the referenced power of the peak power *P* using power reference *Pavg*. It is displayed in the last column of the **Results** tab, in the same unit as the power.

To select a referenced power:

1. Press **Setup** in the toolbar.
2. Select the **General** tab.



3. Under **Referenced Power**, select a referenced power:
   - **P-Pavg**: The average power, which is the sum of the peak powers divided by the total number of peaks.
   - **P-Pn**: The power of a specific peak, where *n* represents the number of a specific peak. If you select **P-Pn**, you must enter the number of the peak which will serve as power reference in the text field next to **P-Pn**.
   - **P-Ppeak**: The peak power, which is the power of the strongest peak.
4. Press **Exit Setup** to return to the main window.

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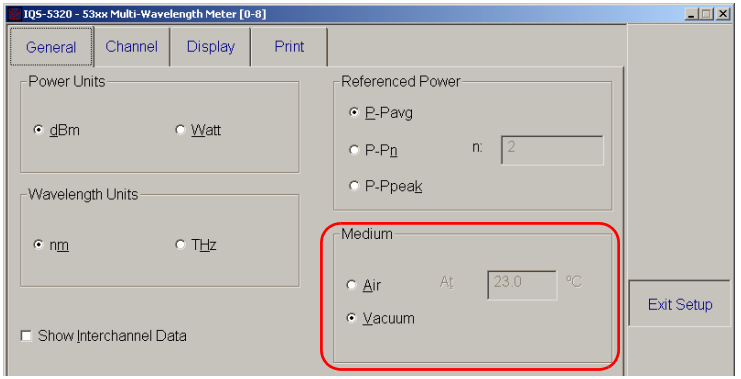
Selecting a Transmission Medium

You can select the transmission medium (air or vacuum) for which wavelengths will be calculated.

The default medium is the vacuum and should be selected for most test situations, like when testing telecommunications components or networks. You should select air as the transmission medium only if you want the vacuum wavelength translated into an air wavelength at some specific temperature.

To select a transmission medium:

1. Press **Setup** in the toolbar.
2. Select the **General** tab.



3. Under **Medium**, select a transmission medium:
   - ➤ Select the **Air** radio button and enter the air temperature (in degrees Celsius) in the text box to its right. Valid temperature values are between 0 °C and 55 °C.

     OR

   - ➤ Select the **Vacuum** radio button, which disables the text box.
4. Press **Exit Setup** to return to the main window.

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The word **Air** or **Vac** will appear in the upper right-hand corner of the trace display in the main window.

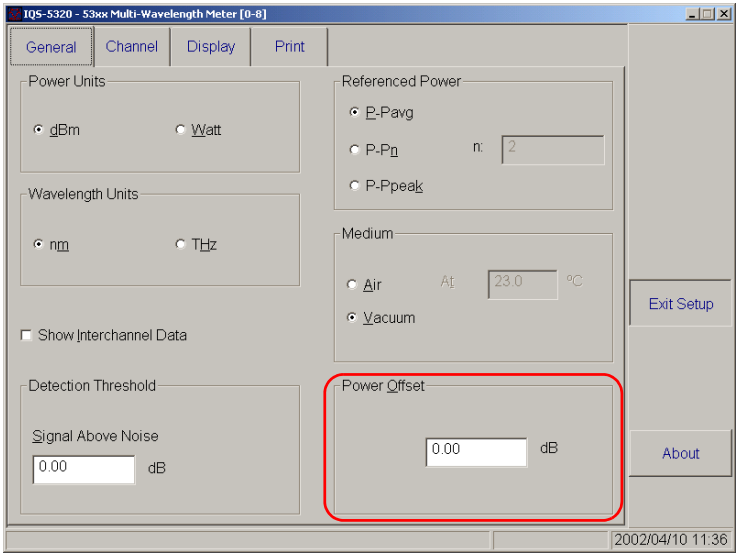
Note: *You can select a transmission medium only when the nanometers (**nm**) wavelength unit is selected in the **Wavelength Units** group box. The **Medium** group box is disabled (grayed out) when **THz** is selected.*

Setting a Power Offset

You can use a power offset to adjust your unit. Note that this does not replace a calibration performed at EXFO, but can help you achieve the specifications if you feel that, for example, external conditions have affected your module.

To set a power offset:

1. Press **Setup** in the toolbar.
2. Select the **General** tab.



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3. Under **Power Offset**, define an offset for the power value by entering a number in the **Power Offset** text box. All displayed data will be automatically updated. The power offset unit depends on the power units as follows:

- ➤ If power is expressed in dBm, the power offset is expressed in dB.
- ➤ If power is expressed in watts, the power offset is expressed as a percentage value.

4. Press **Exit Setup** to return to the main window.

Whenever an offset is specified, the word “Offset” is displayed in the upper right-hand corner of the trace display in the main window.

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Creating Channels and Channel Lists

Testing DWDM systems involves testing numerous channels on the same fiber. The MWM test application allows you to define these channels one at a time or to quickly generate them from current data. You can also rapidly create a list of equally spaced channels.

Most of these channels are related to the standard International Telecommunication Union (ITU) wavelength grid, for which standard ITU channel files are provided with your module. Other channels are defined specifically for components or networks. These channel definitions are necessary to allow drift and alarm tracking.

Once a channel list is created, you can modify it any way you want.

In WDM mode, it is not necessary to define reference channels before taking measurements. For more information about testing in WDM mode, see *Taking Measurements in WDM Mode* on page 49.

In Drift mode, you must define reference channels to view measurement results. This condition has the following effects on the results list:

- If a detected peak falls within a defined channel, it will be monitored and displayed in the results list; otherwise, it is not displayed.
- If two or more peaks fall within a channel, only the strongest peak is shown.

For more information about displaying Drift mode results, see *Performing Drift Mode Measurements* on page 61.

To define the reference channels, you must specify the different parameters in the channel list column titles in the **Channel** tab. The content of each column is described in the following table.

Parameter	Description
Ch	Channel number in the list.
ID	Channel name. Must be eight characters or less.

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Parameter	Description
Center	Expected wavelength of the channel peak. It must be given in the unit in use (nm or THz). The channel center may be located anywhere in the module range.
Width	The length of the interval centered on the expected wavelength. It must be given in GHz. Values from 5.0 to 2000.0 GHz are allowed. If two or more measured channels correspond to one defined channel, parentheses will be added to the ID of all but the strongest peak on the **Results** tab.
Alarm	Alarm is a tolerance interval within which the channel peak must occur. It must be given in GHz. If the channel peak is outside this interval, a beep will be heard and an exclamation mark (!) may appear next to the channel in the various application lists.
P Max	P Max is the upper limit of the peak power. It must be given in the unit being used (W or dBm). If the channel peak power is greater than P Max, a beep will be heard and an exclamation mark (!) may appear next to the channel in the various application lists. Values from –39.9 to +10.0 dBm are allowed. P Max must be greater than P Min.
P Min	P Min is the lower limit of the peak power. It must be given in the unit being used (W or dBm). If the channel peak power is less than P Min, a beep will be heard and an exclamation mark (!) may appear next to the channel in the various application lists. Values from –40.00 to +9.99 dBm are allowed. P Min must also be less than P Max.

For details on defining reference channel parameters, see *Defining New Channels with Equal Spacing* on page 26.

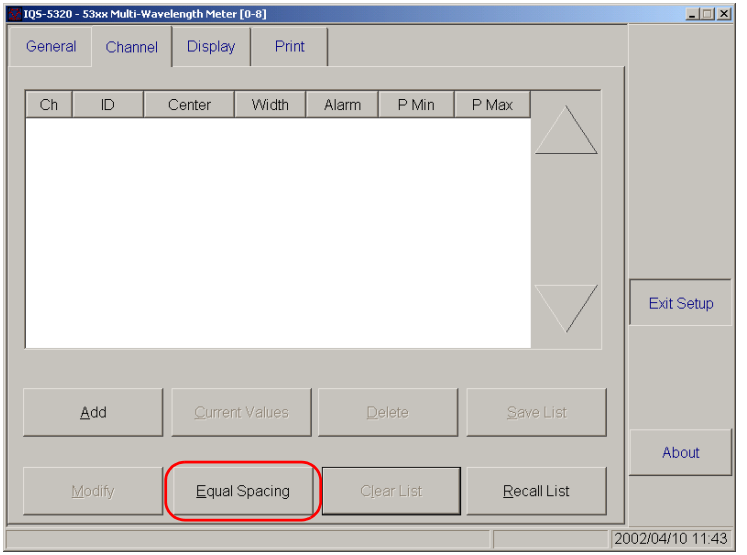
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Defining New Channels with Equal Spacing

Prior to testing, you can define equally spaced channels with uniform characteristics to test actual channels against set standards (to comply with an ITU wavelength grid, or to quickly create a list of equally-spaced channels spaced at higher or fractional multiples of the ITU grid, or with non-ITU channels).

To define a number of channels with the same characteristics:

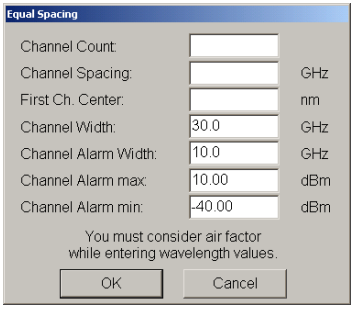
1. Press **Setup** in the toolbar.
2. Select the **Channel** tab.



3. Press **Equal Spacing** at the bottom of the **Channel** tab.

Note: *All existing channels will be deleted from the list before proceeding.*

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4. From the **Equal Spacing** dialog box, set the parameters common to all regularly spaced channels as explained below.

- **Channel Count**: number of channels (between 1 and 100) present in your fiber.
- **Channel Spacing**: space between channels (between 20 GHz and 1000 GHz).
- **First Ch. Center**: central wavelength of the first channel (between 1250 nm and 1650 nm).
- **Channel Width**: width of all the channels in your fiber. A typical value is 10 % of the *channel spacing*. For example, if you have a channel spacing of 100 GHz, the channel width would be 10 GHz.
- **Channel Alarm Width**: width in which the wavelength center is allowed to move within the entire channel width. Generally, this value represents 90 % of the *channel width*. For example, if you have a channel width of 10 GHz, the alarm width would be 9 GHz. The smaller the alarm width, the stricter the controls on the channel movement.
- **Channel Alarm Max.**: upper limit of the peak power. It must be given in the unit being used (W or dBm). Values from –39.9 dBm to +10.0 dBm are allowed. Channel Alarm Max. must also be greater than Channel Alarm Min.

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- **Channel Alarm Min.**: lower limit of the peak power. It must be given in the unit being used (W or dBm). Values from –40.00 dBm to +9.99 dBm are allowed. Channel Alarm Min. must also be less than Channel Alarm Max.

5. Press **OK**. This will generate regularly spaced channels according to given parameters. The channels will appear in the list of the **Channel** tab.
6. Press **Exit Setup** to return to the main window.

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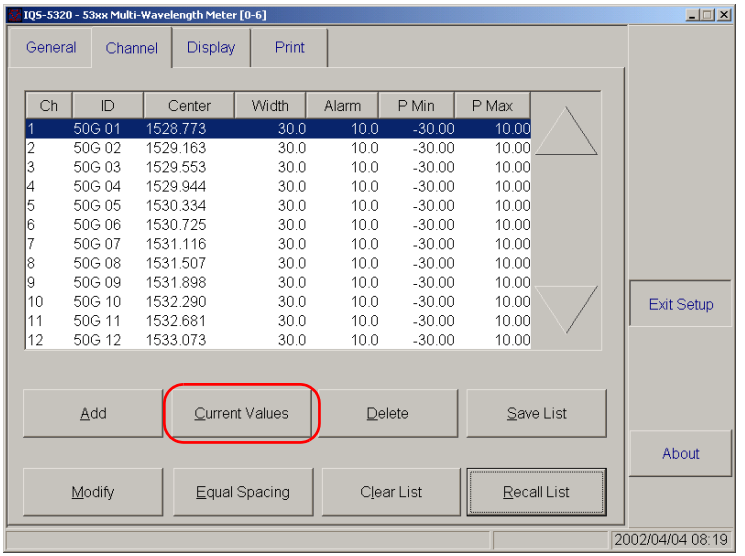
Defining New Channels on Currently Detected Peaks

You can define a set of channels from existing measurements and apply uniform characteristics to them.

Note: *You must take a measurement with the MWM before being able to define channels on currently detected peaks.*

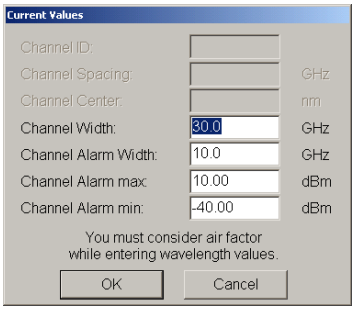
To define channels on all currently detected peaks:

1. Press **Setup** in the toolbar.
2. Select the **Channel** tab.



3. Select **Current Values** at the bottom of the **Channel** tab.

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Note: *__Channel ID__, __Channel Spacing__ and __Channel Center__ text fields are disabled. This is normal because these parameters are included in the acquired data.*

4. From the **Current Values** dialog box, complete the text boxes in order to modify the other parameters of a channel. Set the parameters according to your laser and manufacturing requirements.

   For more information about the meaning of the different values, see *Defining New Channels with Equal Spacing* on page 26.

5. Press **OK**. The new channel will appear as the last item in the list of the **Channel** tab. If a modified channel overlaps another channel, a warning message will be displayed. Press **OK** in the message box and redefine the channel correctly.

6. Press **Exit Setup** to return to the main window.

Note: *If the current spectral unit is in nm, a message appears at the bottom of the __Current Values__ dialog box, indicating that the actual transmission medium must be considered when entering wavelength values.*

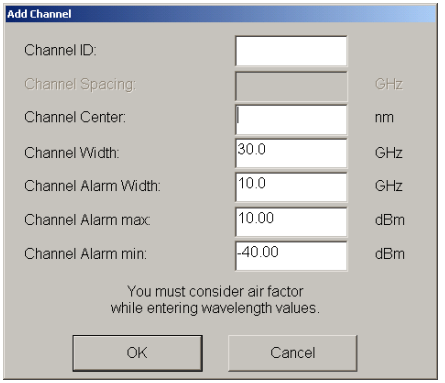
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Adding Channels

It is easy to add channels to the channel list in the MWM test application, for example when your DWDM system is modified to accept more channels or a different ITU grid, or if channel pairs are equally spaced, with members of a pair spaced at half the distance of pairs.

To insert a new channel into the channel list:

1. Press **Setup** in the toolbar.
2. Select the **Channel** tab.
3. Press **Add** at the bottom of the **Channel** tab.



4. From the **Add Channel** dialog box, enter the values of the parameters to be set in the appropriate text boxes. Set the parameters according to your laser and manufacturing requirements.

   For more information about the meaning of the different values, see *Defining New Channels with Equal Spacing* on page 26.

5. Press **OK**. The new channel will appear in the list of the **Channel** page.
6. Press **Exit Setup** to return to the main window.

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Take care to avoid overlapping channels. Two channels are said to overlap when they contain the same part of the spectrum. For example, when the lower limit (center – width/2) of a channel centered on 1552.5 nm is smaller than the upper limit (center + width/2) of a channel centered on 1550 nm, the channels overlap.

Note: *If the current spectral units are in nm, a message appears at the bottom of the **Add Channel** window indicating that the wavelength center value will be taken in the active medium (air or vacuum). EXFO recommends that you define channel and alarm widths in GHz and not nm, because when working in frequency, the medium does not need to be specified.*

Note: *If the current spectral unit is in nm, a message appears at the bottom of the **Add Channel** dialog box, indicating that the actual transmission medium must be considered when entering wavelength values.*

Modifying Channels

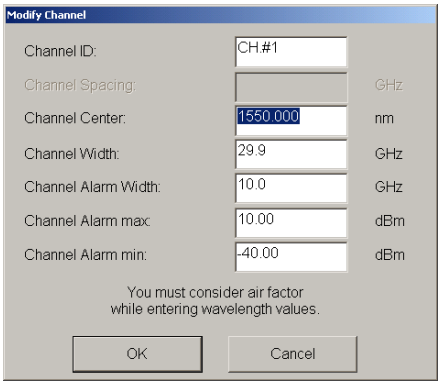
It is easy to modify the channel list in the MWM test application, like when your DWDM system is modified to accept more channels or a different ITU grid, or if you want to change certain parameters of a channel.

To modify a channel listed in the channel list:

1. Press **Setup** in the toolbar.
2. Select the **Channel** tab.
3. Select the channel to modify in the channel list.

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4. Press **Modify** at the bottom of the **Channel** tab.



5. From the **Modify Channel** dialog box, adjust the channel parameters in the appropriate text boxes according to your laser and manufacturing requirements.

   For more information about the meaning of the different values, see *Defining New Channels with Equal Spacing* on page 26.

6. When you are done modifying channel parameters, press **OK**. The modified channel appears in the list on the **Channel** tab.

7. If you modify the channel so that it overlaps another channel, a warning message will be displayed. Press **OK** and modify the channel so it does not overlap.

8. Press **Exit Setup** to return to the main window.

Note: *If the current spectral unit is in nm, a message appears at the bottom of the **Modify Channel** dialog box, indicating that the actual transmission medium must be considered when entering wavelength values.*

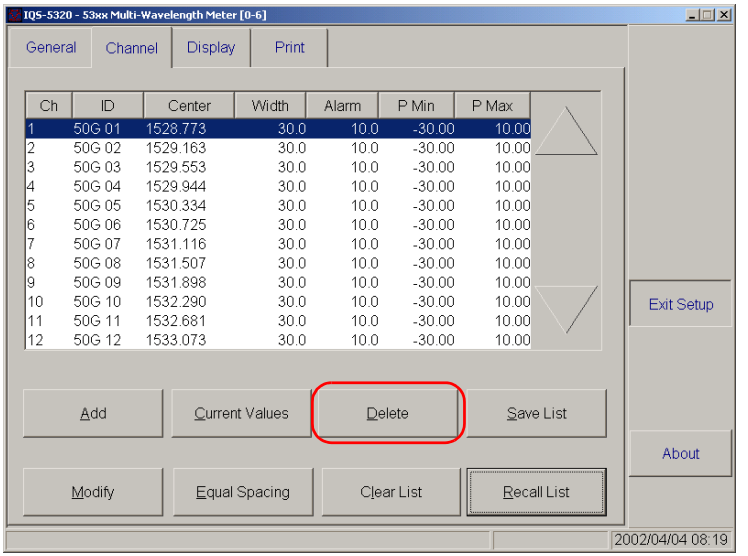
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Deleting Channels

When your DWDM system is modified to reduce the number of channels on a fiber or to accept a different ITU grid, it is easy to delete existing channels.

To delete a channel from the channel list:

1. Press **Setup** in the toolbar.
2. Select the **Channel** tab.



3. Select the channel in the channel list.
4. Press **Delete** at the bottom of the **Channel** tab.
5. To confirm deletion, select **Yes** in the message box. The channel is deleted.
6. Press **Exit Setup** to return to the main window.

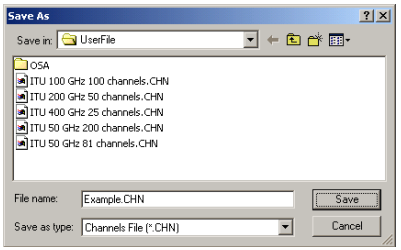
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Saving a Channel List

Once you have created a channel list, you can save it for the next time you test the same component, or one with similar specifications. Also, you can save a channel list that you have modified.

To save the current list of channels onto a disk:

1. Press **Setup** in the toolbar.
2. Select the **Channel** tab.
3. Press **Save List** in the **Channel** tab.



4. From the **Save As** dialog box, enter the name of the list in the **File name** text box.
5. Select the destination path/folder in the **Save in** list box.
6. Press **OK** in the **Save as** dialog box.
7. Press **Exit Setup** to return to the main window.

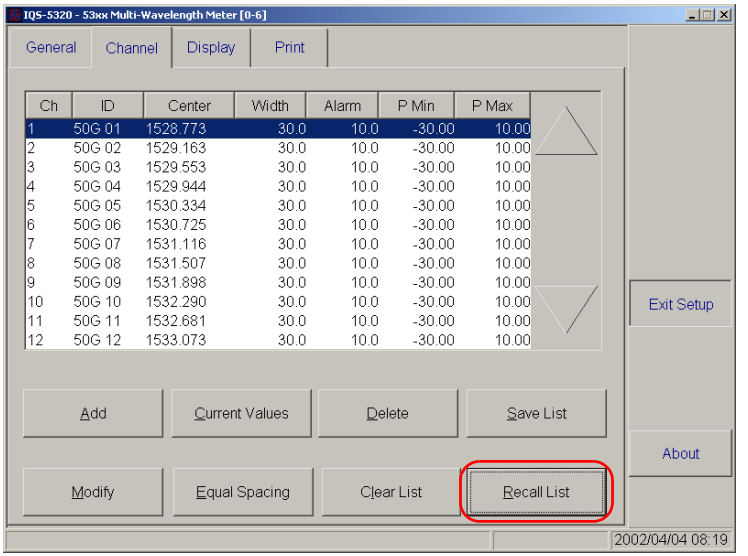
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Recalling a Channel List

When you retest a specific component for which you have already configured a channel list, like a complex one created manually or an ITU grid, you can recall the list instead of configuring it again.

To recall a list of channels from a disk:

1. Press **Setup** in the toolbar.
2. Select the **Channel** tab.



3. Press **Recall List** in the **Channel** tab.
4. From the **Open** dialog box, select the file containing the list to recall. If needed, you can find preset ITU grids at the following storage path: “C:\Program Files\Exfo\IQS Manager\UserfFiles”.
5. Press **OK**.
6. Press **Exit Setup** to return to the main window.

The channels listed in the selected file will appear in the **Channel** tab.

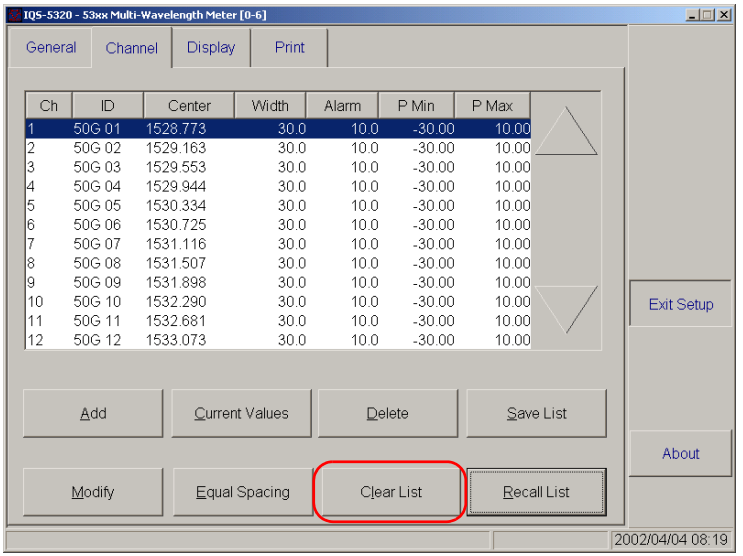
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Clearing a Channel List

You can clear the MWM test application from a loaded channel list to create a new channel list from scratch, for example.

To clear a list of channels from test application:

1. Press **Setup** in the toolbar.
2. Select the **Channel** tab.



3. Press **Clear List** in the **Channel** tab.
4. To confirm deletion, select **Yes** in the message box. The channel is deleted.
5. Press **Exit Setup** to return to the main window.

The channels table in the **Channel** tab is now empty.

Note: *Clearing a channel list from the Channel tab does not delete it from the storage medium.*

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Setting Display Parameters

You can set the colors of the different graph items and select whether or not you want the grid and the alarm notifiers to be displayed.

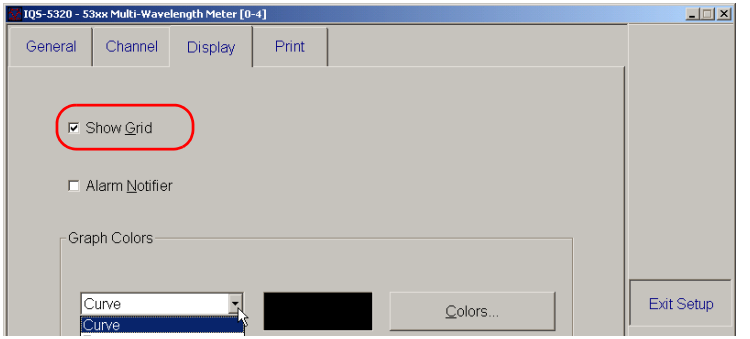
Note: *You can restore the default settings at any time by clicking on* ***Default****.*

Showing or Hiding the Display Grid

You might want to hide or display the grid in the graphic display to highlight or lessen certain elements of your results. This option is selected by default.

To show or hide the grid in the trace display:

1. Press **Setup** in the toolbar.
2. Select the **Display** tab.



3. Select **Show Grid** to show the grid.

   OR

   Deselect **Show Grid** to hide the grid.
4. Press **Exit Setup** to return to the main window.

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Showing or Hiding Alarm Notifiers

You can display the alarm notifier symbol (!) throughout the application lists. By default, this option is not selected.

The (!) symbol identifies when the wavelength and power limits are exceeded. This symbol is displayed beside results in the **Results** tab, the **Measurements** tab, as well as in the **Trace Infos** tab.

To show or hide alarm notifiers:

1. Press **Setup** in the toolbar.
2. Select the **Display** tab.



3. Select **Alarm Notifier** to display the alarm notifier symbol.

   OR

   Deselect **Alarm Notifier** to hide the alarm notifier symbol.
4. Press **Exit Setup** to return to the main window.

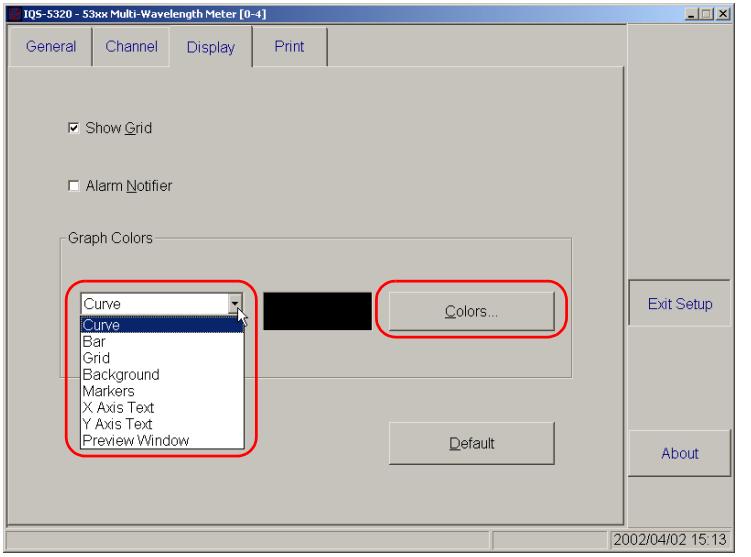
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Setting Graph Item Colors

You can set the color of the following graphical elements: curve, bar, grid, background, markers, X and Y axis text, and preview window.

To set the color of a graph item:

1. Press **Setup** in the toolbar.
2. Select the **Display** tab.



3. Under **Graph Colors**, select the desired item in the list.

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4. Press **Colors**.



5. From the **Color** dialog box, select one of the basic colors by clicking on the appropriate color in the **Basic colors** section.
6. Press **OK** to activate the color change.
7. Press **Exit Setup** to return to the main window.

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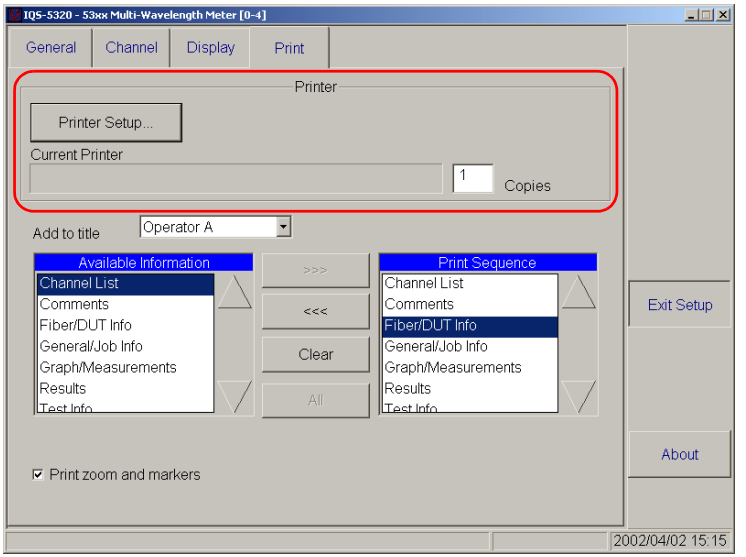
Setting Print Parameters

To adjust printer settings and to select which information to include in a custom printed report, select the **Print** tab in the Setup window.

Note: *You must exit the **Setup** window and use the **Quick Print** button on the toolbar to actually print a report.*

To define printer settings:

1. Press **Setup** in the toolbar.
2. Select the **Print** tab.



3. Press **Printer Settings**. Under **Printer** is displayed the selected printer.

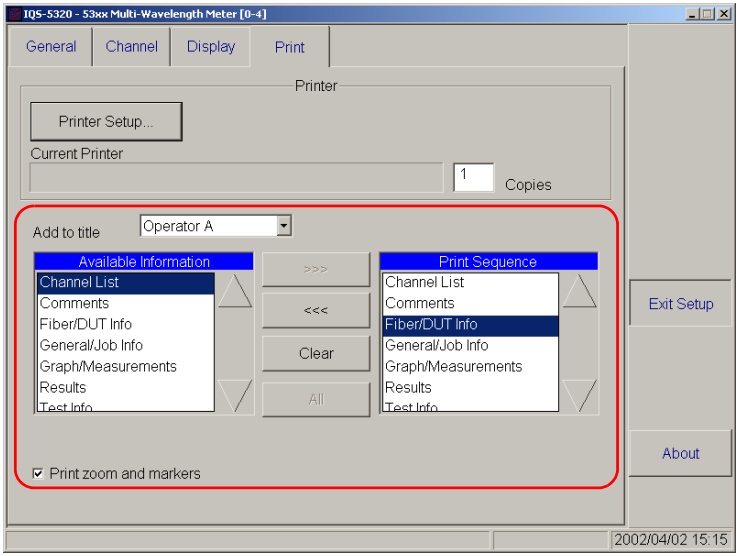
   ➤ To select another printer or to configure the current printer, select **Printer Setup**. The Windows **Print Setup** dialog box is displayed.

   ➤ To change the number of copies to print, enter the desired number (from 1 to 99) in the **Copies** text field.

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To select the contents of the printed report:

1. Press **Setup** in the toolbar.
2. Select the **Print** tab.



3. In the **Add to title** list box, select an item. In the report, it will be displayed directly to the left of the title. By default, nothing will be displayed.
4. Select the information you want to include by transfering items from the **Available Information** list to the **Print Sequence** list. To do so, use the following buttons :
   - **>>>**: to add the selected element to the Print Sequence box.
   - **<<<**: to remove the selected element from the **Print Sequence** list.
   - **Clear**: to remove all elements from the **Print Sequence** list.
   - **All**: to add all available elements to the **Print Sequence** list.

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5. To print the magnified portion of the trace along with the markers and marker information, select **Print zoom and markers**.

   The way the trace display information will appear in the printed report depends on the graph type displayed in the main window at the time printing is launched. However, unless **Print zoom and markers** is selected, the full trace display will be printed regardless of the zoom selected at the time printing is launched.

6. Press **Exit Setup** to return to the main window.

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5 Preparing Your Multi-Wavelength Meter for a Test

Once you have set the parameters for your Multi-Wavelength Meter, you are ready to use it to perform tests.

Before taking measurements, you must perform the following steps:

- Null electrical offsets.
- Connect the MWM to other test components.
- Select a testing mode.

Nulling Electrical Offsets

Nulling is designed to cancel the effects of any internal electronic signal, which may drift over long periods of time or following significant changes in ambient temperature. The Nulling function provides a zero power reference measurement, thus eliminating the effects of electronic dark current.

For best results and accuracy, you must ensure that offsets are nulled before each testing session, as this improves the measurement accuracy of weak signals (–55 dBm and less).

A good time to null offsets is

- each time the IQS-5320 Multi-Wavelength Meter is powered on.
- whenever environmental conditions change while the power meter is operating (temperature and humidity variations affect the performance of optical detectors).

To perform an offset nulling on one channel:

1. Install the protective cap over the detector port.
2. Press **Nulling** in the toolbar to start the nulling. A message prompts you to ensure that the detector cap is properly installed.
3. Select **OK** to perform the offset nulling, or **Cancel** to exit.

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Connecting Optical Fibers

IMPORTANT

To ensure maximum output power and to avoid erroneous readings, always clean fiber ends as explained below before inserting them into the port.

To connect the fiber-optic cable to the port:

1. Clean the fiber ends as follows:

   1a. Gently wipe the fiber end with a lint-free swab dipped in isopropyl alcohol.

   1b. Use compressed air to dry completely.

2. Carefully align the connector and port to prevent the fiber end from touching the outside of the port or rubbing against other surfaces. If your connector features a key, ensure that it is fully fitted into the port's corresponding notch.

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

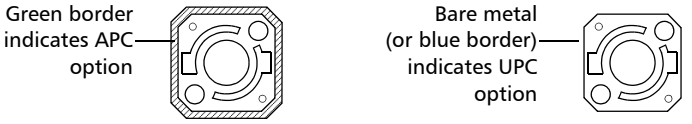
   If your connector features a screwsleeve, tighten the connector enough to firmly maintain the fiber in place. Do not overtighten, as this will damage the fiber and the port.

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

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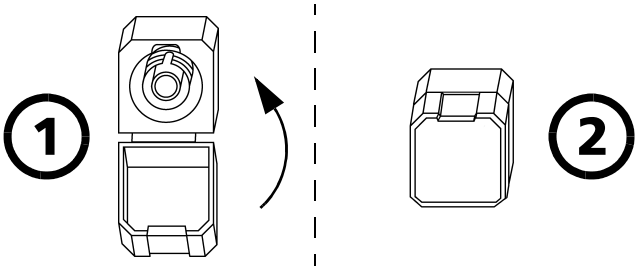
Installing the EXFO Universal Interface (EUI)

The EUI fixed baseplate is available for connectors with angled (APC) or non-angled (UPC) polishing. A green border around the baseplate indicates that it is for APC-type connectors, as shown below:

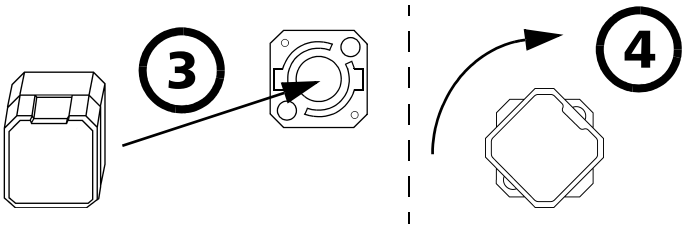


To install an EUI connector adapter onto the EUI baseplate:

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



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



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Selecting a Test Control Mode

The MWM provides the following two different test control modes. These modes allow you to use your MWM to obtain specific data. They are described below:

- *WDM mode* (default) allows you to sweep across the channel spectrum. For more information, see *Taking Measurements in WDM Mode* on page 49.
- *Drift mode* allows you to measure variations over time for every channel on a fiber. For more information, see *Taking Measurements in Drift Mode* on page 61.

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6 Taking Measurements in WDM Mode

The WDM mode can be used in most test situations, except for monitoring channel drift. In that case, you can use the Drift mode.

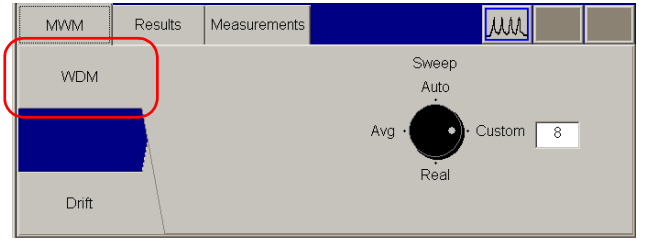
The WDM mode provides you with a graphic display of the channel spectrum in real time, with or without averaging. You can then quickly choose an appropriate threshold setting, in order to be able to view spectral features of interest like side modes, relative peak widths, as well as the amount of ASE background, if any.

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Performing WDM Mode Measurements

To take measurements in WDM mode:

1. Select the **MWM** option sheet.
2. Select the **WDM** mode tab in the main window.



Note: *The **Trace Infos** tab is displayed only when a trace is recalled in the MWM test application memory.*

3. Select the name of the Sweep mode you want to use. The following four modes are available:

   - **Auto**: WDM measurements stop automatically after eight scans, and the average is weighted with these eight scans. This is the default mode.
   - **Custom**: WDM measurements stop automatically after a user-defined number of scans, and the average is weighted with this user-defined number of scans.

Note: *If you select **Custom**, indicate in the adjacent text box the number of scans that you want the module to complete before stopping.*

   - **Real**: continuous WDM measurements that cease only when you press **Stop** in the toolbar; the results are not averaged.
   - **Avg.**: continuous WDM measurements, with the weighted average using the last eight scans.

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In WDM mode, only the last scan is stored in memory. Therefore, there is no way of representing channel drift when taking measurements in WDM mode. For that purpose, you must take measurements in Drift mode.

IMPORTANT

Before the scan actually starts, your Multi-Wavelength Meter must be stabilized to ensure precise measurement. An optical signal must be detected for this stabilization to be correctly completed.

4. Press **Start** to begin taking test measurements. You can interrupt the scanning process at any time by clicking on **Stop**. Once measurements are taken, scanning stops and measurement results are automatically displayed in the main window.
5. Save the acquired data as explained in *Saving a Trace* on page 72.

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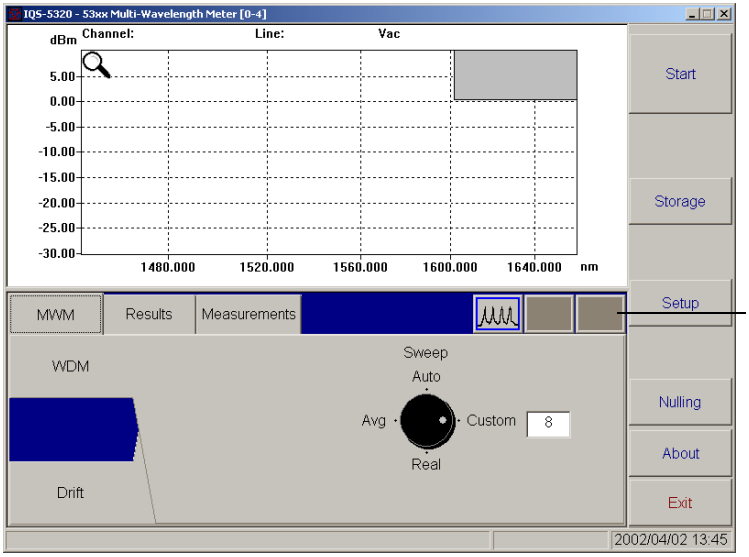
Selecting a Graph Type in WDM Mode

Note: *You can display information about a trace you have previously saved. To open such a trace, see* Recalling a Trace *on page 73.*

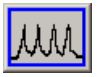
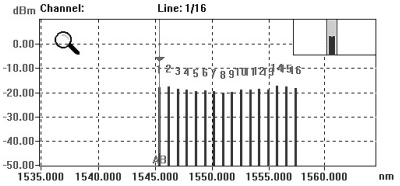
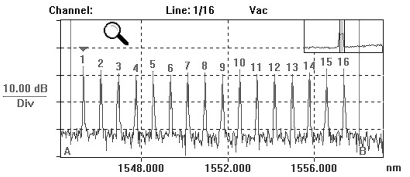
A trace acquired in WDM mode is always represented as a power vs. wavelength graph, but you can view it as either a bar graph or a peak graph.

To select the type of graph:

Select the appropriate graph type button in the upper right-hand corner of the **Results** tab, under the trace display.



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Bar Graph	Peak Graph
Press... 	Press... 
To get something similar to... 	To get something similar to... 

Note: *The Bar Graph button is enabled while scanning is in progress to show you the last acquired trace. Once the acquisition is completed, it becomes disabled, and the Peak Graph button becomes enabled. A third button to the right, the Drift Curve Graph button, is disabled in WDM mode.*

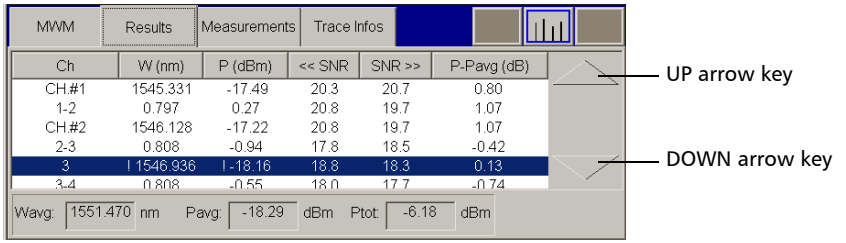
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Viewing WDM Mode Measurement Results

Note: *You can display information about a trace you have previously saved. To open such a trace, see* Recalling a Trace *on page 73.*

To view channel results:

1. Select the **Results** tab.
2. To scroll the channel list, use the UP and DOWN arrow keys. You can also press the keyboard UP and DOWN arrow keys.



The information displayed in the **Results** tab for each channel is explained below:

- **Ch**: channel or peak number or ID.

  The peak number is displayed when no channel list is defined or when a peak cannot be included in any channel.

- **P**: channel peak power (in the current power unit).
- **<<SNR** and **SNR>>**: signal-to-noise ratio to the left (<<) and to the right (>>) of the channel peak (in the unit matching the selected power unit).
- **P-Pavg** (or **P-Pn** or **P-Ppeak**): referenced power (in the same unit as the current power unit).

Note: *For more information about selecting wavelength and power units, see* Setting Up Your Multi-Wavelength Meter *on page 15. For details about channels, see* Creating Channels and Channel Lists *on page 24.*

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The average wavelength (**Wavg**) in nm (**Favg** if unit is THz) and power (**Pavg**) of the detected WDM channels, as well as the total power (**Ptot**) of the fiber under test, are shown at the bottom.

For more information on graph types, see *Selecting a Graph Type in WDM Mode* on page 52.

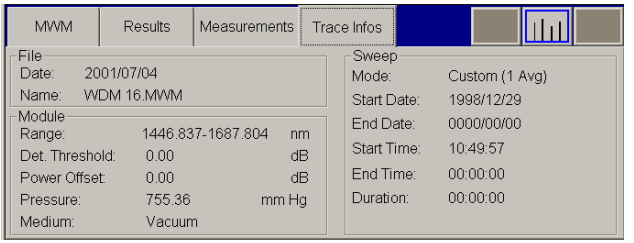
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Viewing Trace Information

Note: *You can display information about a trace you have previously saved. To open such a trace, see* Recalling a Trace *on page 73.*

To view detailed trace information:

Select the **Trace Infos** tab.



Note: *The **Trace Infos** tab is displayed only when a trace is recalled in the MWM test application memory.*

The information displayed in the **Trace Infos** tab is explained below.

- In the **File** group box, the trace file name and acquisition date are displayed. If the file was not saved, the word “Untitled” appears.
- In the **Module** group box, information entered during setup, such as the module’s spectral range, detection threshold, power/wavelength offset and medium are displayed.
- In the **Sweep** group box, you can see the sweep mode selected on the **MWM** mode tab. The date and time of the acquisition start and end, the duration of the acquisition and the sampling frequency are also provided.

More details about the different elements displayed are given in *Creating Channels and Channel Lists* on page 24 and in *Performing WDM Mode Measurements* on page 50.

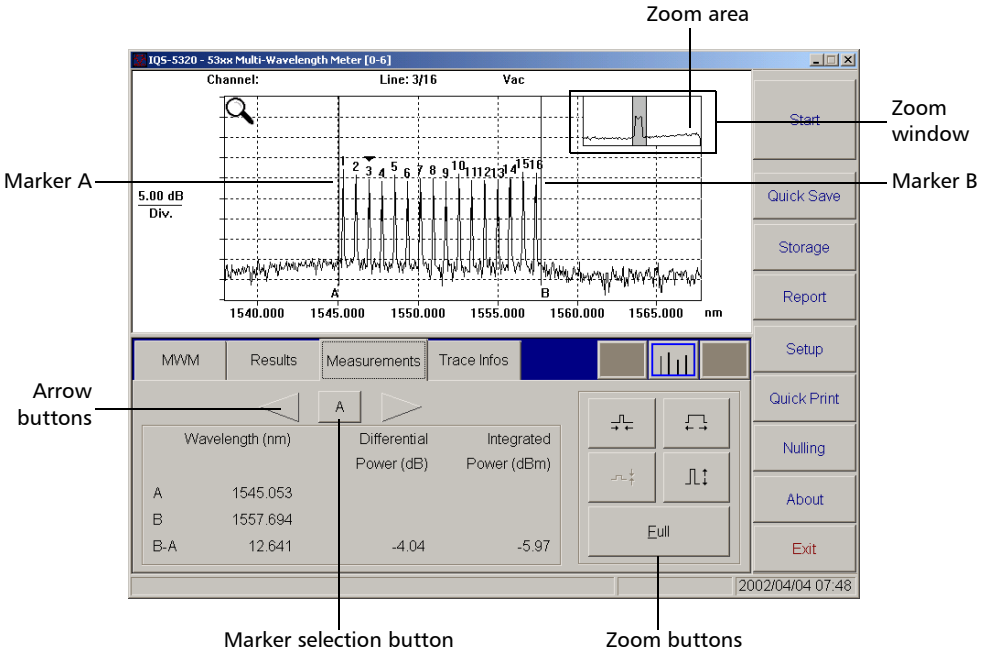
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Viewing Detailed Trace Measurements

Note: *You can display information about a trace you previously saved. To open such a trace, see* Recalling a Trace *on page 73.*

To view detailed trace measurements with the use of the graph:

Select the **Measurements** tab.



The numerical values displayed under the marker selection and arrow buttons apply to the trace portion delimited by markers A and B. The information displayed depends on the selected graph type, as follows:

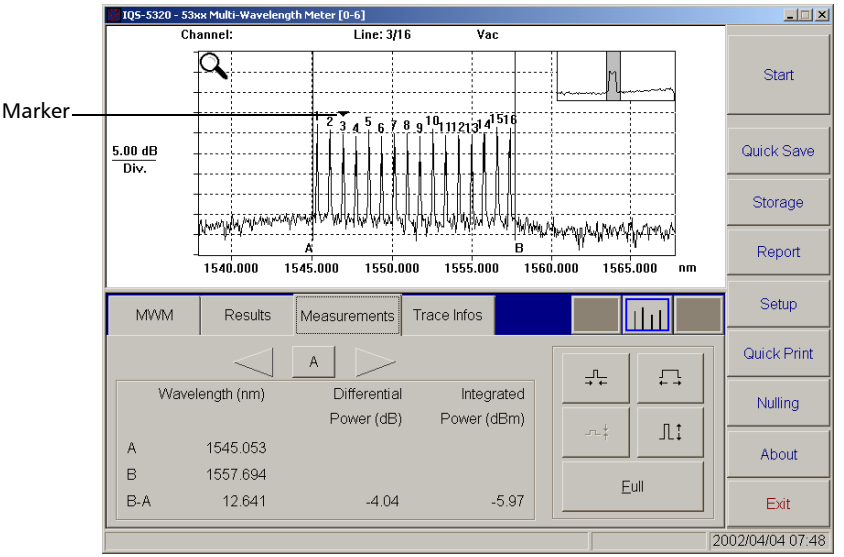
- *Bar graph*: wavelength and absolute power at corresponding marker position.
- *Peaks graph* (shown in preceding figure): wavelength, differential power and integrated power at corresponding marker positions.

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Differential power allows you to determine the SNR of a peak. It is displayed either as a ratio (dB) or as a difference (mW). Integrated power is the sum of powers for all points between the markers, including the defined power offset.

Selecting Individual Channel Results

You can select result lines and locate them more easily by selecting the corresponding peak number on the trace display. A small, triangular black marker will point down at the peak, and the corresponding row in the **Results** tab will be highlighted.



When you select a peak in the **Results** tab, the triangular black marker will move accordingly to indicate the corresponding peak.

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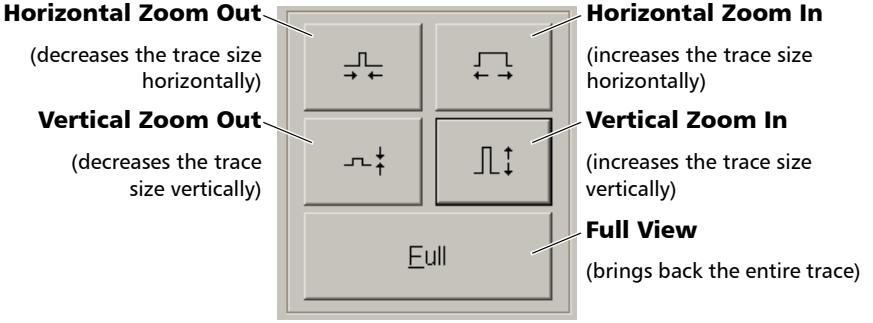
Adjusting Trace Display Resolution

You may need to enlarge or reduce the size of your trace to obtain a better view of your results.

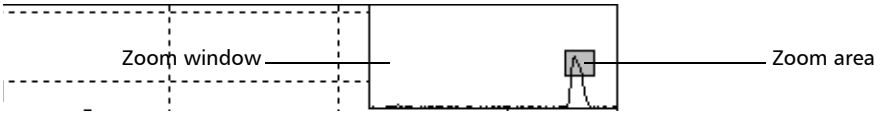
Using the Zoom Buttons

To select the exact center of the area you want to zoom, simply position the magnifying glass on that spot. When you press the zoom buttons, the display remains centered on the area where the magnifying glass is found.

To zoom in on, or out of, a portion of a trace, use the zoom buttons:



The zoom window in the upper right-hand corner of the graphical display section helps you see where you are on the trace. The gray zoom area accurately defines the portion of the trace you see on the screen.



Moving a Trace from the Zoom Window

To move the zoom area in the zoom window, click on it and drag it to the location you want to view.

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7 Taking Measurements in Drift Mode

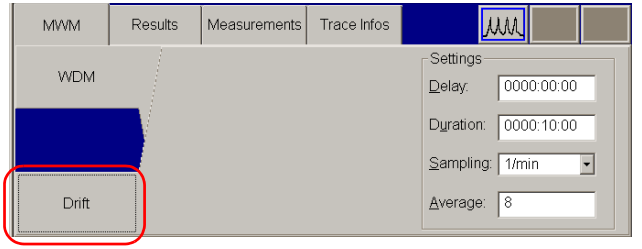
The Drift mode allows you to make time-related WDM measurements to monitor channel peak drift, giving the maximum and minimum peak values for a defined period of time, and represent this graphically.

Note: *Before taking measurements in Drift mode, you must define reference channels to view measurement results. For details, see* Creating Channels and Channel Lists *on page 24.*

Performing Drift Mode Measurements

To start taking measurements in Drift mode:

1. Select the **MWM** option sheet.
2. Select the **Drift** mode tab in the main window.



Note: *The **Trace Infos** tab is displayed only when a trace is recalled in the MWM test application memory.*

3. Fill in the first two time text fields as indicated by the forced time format.
   - **Delay**: time given for the laser source to stabilize (hhhh:mm:ss). By default, no delay is planned. Refer to the user guide of the source in use for appropriate stabilization time value.
   - **Duration**: scan duration (hhhh:mm:ss). By default, the duration is set to 10 minutes.

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4. Select the appropriate value from the **Sampling** list box. The sampling rate determines the frequency of the scans. By default, it is set to 1/min.

5. To edit a sampling rate, click inside the list box and input the rate. It must be expressed as 1/x sec, 1/x min, or 1/x h, where x is an integer. The last edited sampling rate is stored in the list.

Note: *The duration must be greater than the sampling rate. For example, if you are sampling once every 20 minutes, the test duration must be greater than 20 minutes.*

6. In the **Average** text field, enter the number of scans you want to use to average the measurement results. Allowed values range from 1 to 99, and the default value is 1 (no average).

IMPORTANT

Before each sweep actually starts, your Multi-Wavelength Meter must be stabilized to ensure precise measurements. An optical signal must be detected for this stabilization to be correctly completed.

7. Press **Start** to begin taking the measurements.

   If you have not previously defined reference channels, you will obtain a message asking you to do so immediately. This is necessary for detected peaks to be linked with a channel and displayed in the results list.

   For information about defining reference channels and for more details about this requirement, see *Creating Channels and Channel Lists* on page 24.

8. You can stop the scanning process at any time by clicking on **Stop**. Once the measurements are taken, the scanning stops and measurement results are automatically displayed.

9. Save the acquired data as explained in *Saving a Trace* on page 72.

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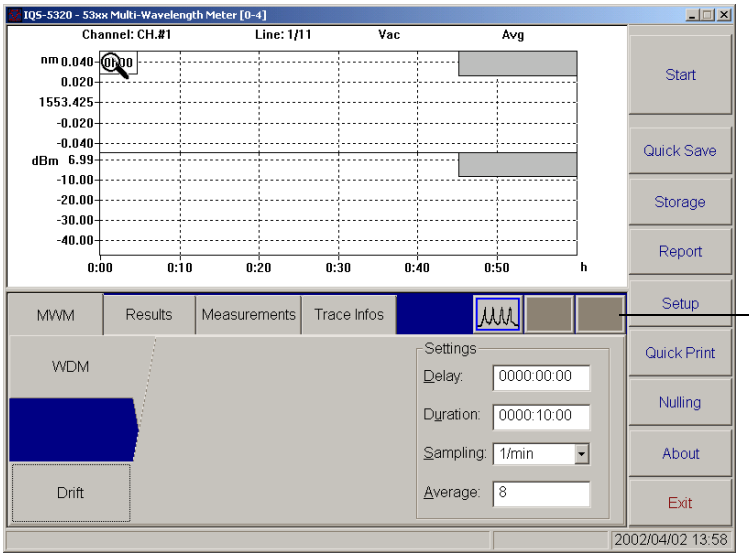
Selecting a Graph Type in Drift Mode

Note: *You can display information about a trace previously saved. To open such a trace, see* Recalling a Trace *on page 73.*

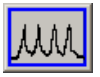
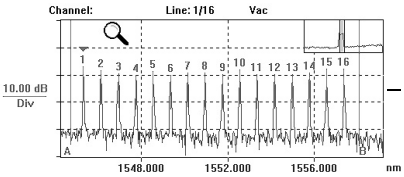
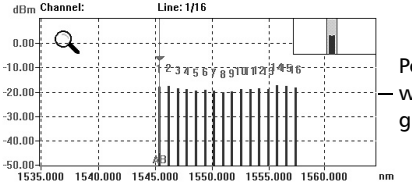
A trace acquired in Drift mode is represented both as a wavelength vs. time graph and as a power vs. time graph. You can view them as curves, one above the other. A power vs. wavelength trace can also be displayed as a bar graph or peaks graph.

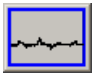
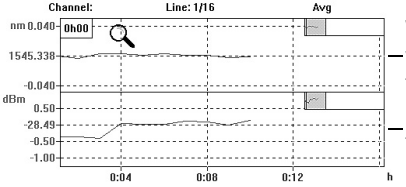
To select the type of graph:

Select the appropriate graph type button in the upper right-hand corner of the **Results** tab, under the trace display.



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Peak Graph	Bar Graph
Press... 	Press... 
To get something similar to...  Power vs. wavelength graph	To get something similar to...  Power vs. wavelength graph

Drift Curves Graph
Press... 
To get something similar to...  Wavelength vs. time graph Power vs. time graph

Note: *The Peaks Graph, Bar Graph and Drift Curves Graph buttons are enabled while scanning is in progress to show you the last acquired trace. When the acquisition is completed the Peaks Graph button is disabled and only the Bar Graph and Drift Curves Graph button are available.*

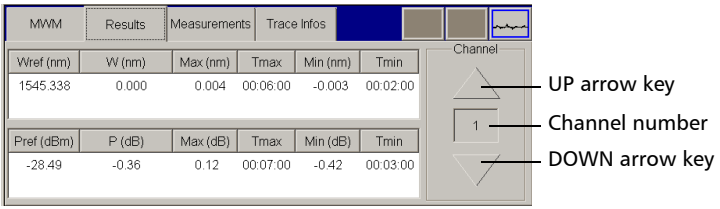
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Viewing Drift Mode Measurement Results

Note: *You can display information about a trace you previously saved. To open such a trace, see* Recalling a Trace *on page 73.*

To view channel results:

1. Select the **Results** tab.
2. To scroll the peaks list, use the UP and DOWN arrow keys. You can also press the keyboard UP and DOWN arrow keys. The number of the channel for which results are displayed appears between the two arrow keys.



The information displayed in the **Results** tab for each channel in the top section is explained below. This section refers to the wavelength vs. time graph.

- **Wref**: peak wavelength at beginning of Drift mode acquisition (in the current wavelength unit).
- **W**: during an acquisition, difference between the peak wavelength (*Wref*) and the wavelength of the last acquisition sweep; after an acquisition, difference between *Wref* and the wavelength at position of marker **A** on the top trace (in the current wavelength unit).

Note: *Marker **A** is only present after the acquisition is completed.*

- **Max**/**Min**: maximum (minimum) relative wavelength (with respect to *Wref*) attained during the whole acquisition, or up to the current time (in the current wavelength unit).

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- **TMax/TMin**: time at which maximum (minimum) wavelength was attained (hh:mm:ss).

The information displayed for each channel in the bottom section is explained below. This section refers to the power vs. time graph. To scroll the peaks list, use the UP- and DOWN-arrow buttons.

- **Pref**: peak power at beginning of drift mode acquisition (in the current power unit).
- **P**: during an acquisition, difference between the peak power (*Pref*) and the power of the last acquisition sweep; after an acquisition, difference between *Pref* and the power at position of marker **A** on the top trace (in the current power unit).

Note: *Marker **A** is only present after the acquisition is completed.*

- **Max/Min**: maximum (minimum) relative power (with respect to *Pref*) attained during the whole acquisition, or up to the current time (in the current power unit).
- **TMax/TMin**: time at which maximum (minimum) power was attained (hh:mm:ss).

Note: *For more information on selecting wavelength and power units, see* Setting Up Your Multi-Wavelength Meter *on page 15. For details about channels, see* Creating Channels and Channel Lists *on page 24.*

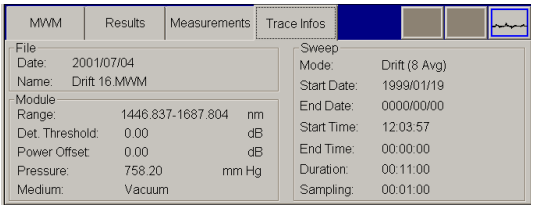
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Viewing Trace Information

Note: *You can display information about a trace you previously saved. To open such a trace, see* Recalling a Trace *on page 73.*

To view detailed trace information:

Select the **Trace Infos** tab.



Note: *The **Trace Infos** tab is displayed only when a trace is recalled in the MWM test application memory.*

The information displayed in the **Trace Infos** tab is explained below.

- In the **File** group box, the trace file name and acquisition date are stored. If the file was not saved, the word “Untitled” appears.
- In the **Module** group box, information entered during setup, such as the module’s spectral range, detection threshold, power/wavelength offset and medium are displayed.
- In the **Sweep** group box, Drift mode is always displayed. The date and time of the acquisition’s start and end, duration of the acquisition, and sampling frequency are also provided.

More details about the different elements displayed are given in *Setting Up Your Multi-Wavelength Meter* on page 15 and in *Performing Drift Mode Measurements* on page 61.

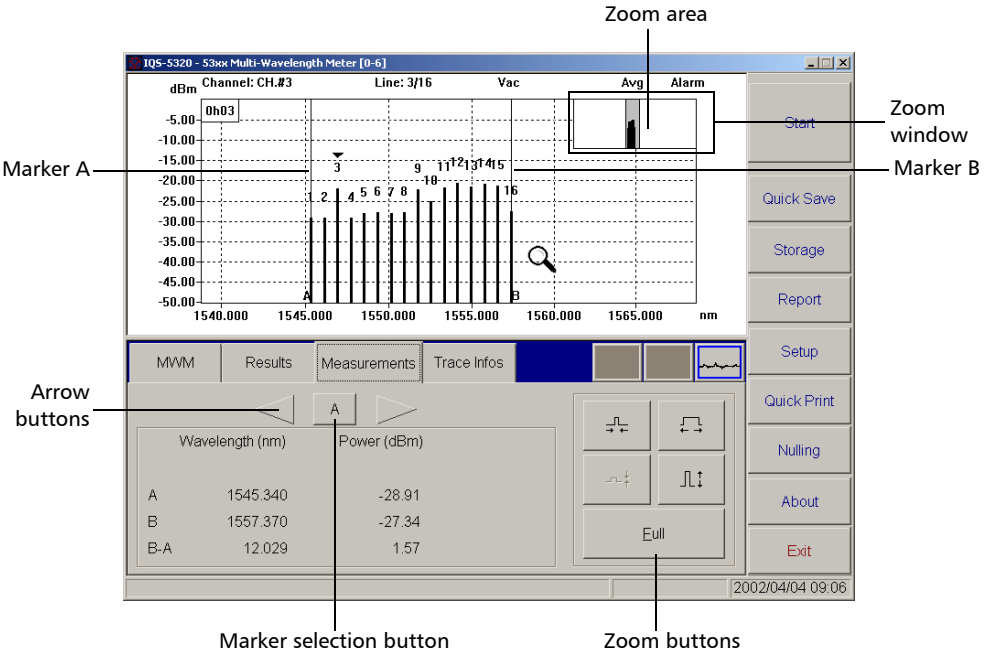
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Viewing Detailed Trace Measurements

Note: *You can display information about a trace you have previously saved. To open such a trace, see* Recalling a Trace *on page 73.*

To view detailed trace measurements with the use of the graph:

Select the **Measurements** tab.



The numerical values displayed under the marker selection and arrow buttons apply to the trace portion delimited by markers **A** and **B**. The information displayed depends on the selected graph type, as follows:

- *Bar graph* (shown above): wavelength and power at the matching marker position.
- *Drift curves graph*: wavelength and power at the matching marker position, and time matching this marker position.

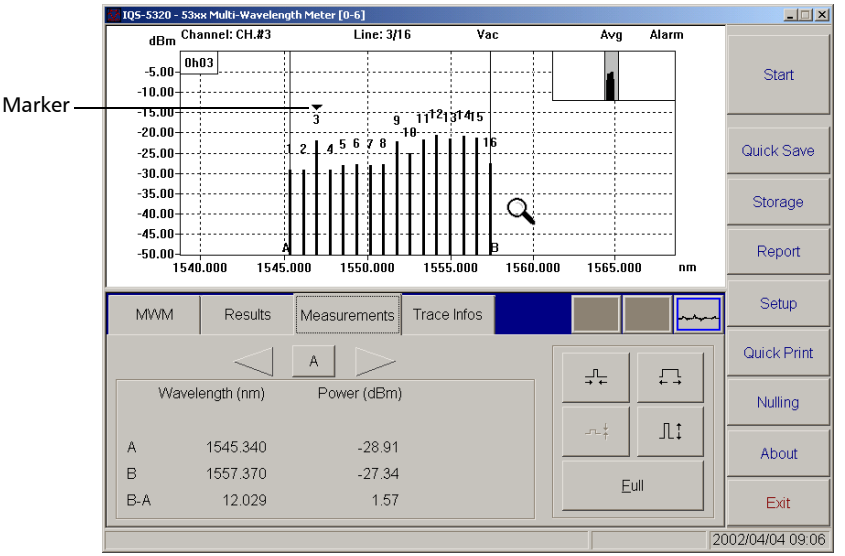
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For more information on graph types, see *Selecting a Graph Type in Drift Mode* on page 63.

Selecting Individual Channel Results

You can select result lines and locate them more easily by selecting the corresponding peak number on the trace display, with Peaks Graph selected. A small, triangular black marker will point down at the peak, and the corresponding row in the **Results** tab will be highlighted.

Note: *You cannot select peaks in a Drift Curve Graph, only from the* ***Results*** option sheet*. For details, see* Viewing Drift Mode Measurement Results *on page 65.*



When you select a peak in the **Results** tab, the triangular black marker will move accordingly to indicate the corresponding peak.

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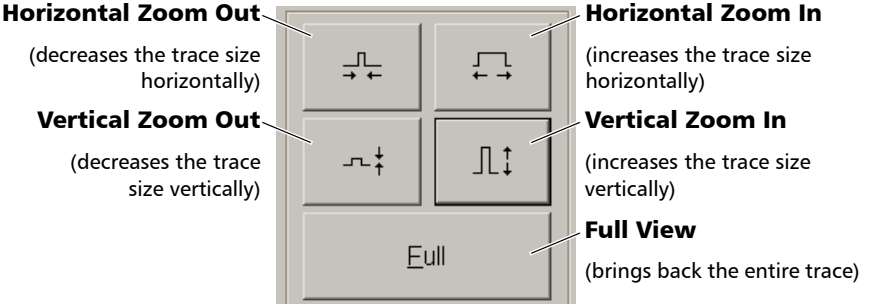
Adjusting Trace Display Resolution

You may need to enlarge or reduce the size of your trace to have a better view of your results.

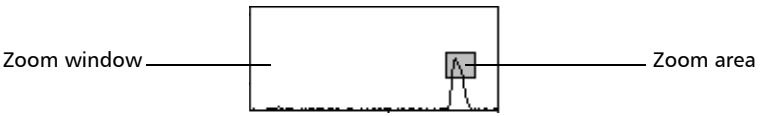
Using the Zoom Buttons

To select the exact center of the area you want to zoom, simply position the magnifying glass on that spot. When you press the zoom buttons, the display remains centered on the area where the magnifying glass is found.

To zoom in on, or out of, a portion of a trace, use the zoom buttons:



The zoom window in the upper right-hand corner of the graphical display section helps you see where you are on the trace. The gray zoom area accurately defines the portion of the trace you see on the screen.



Moving a Trace from the Zoom Window

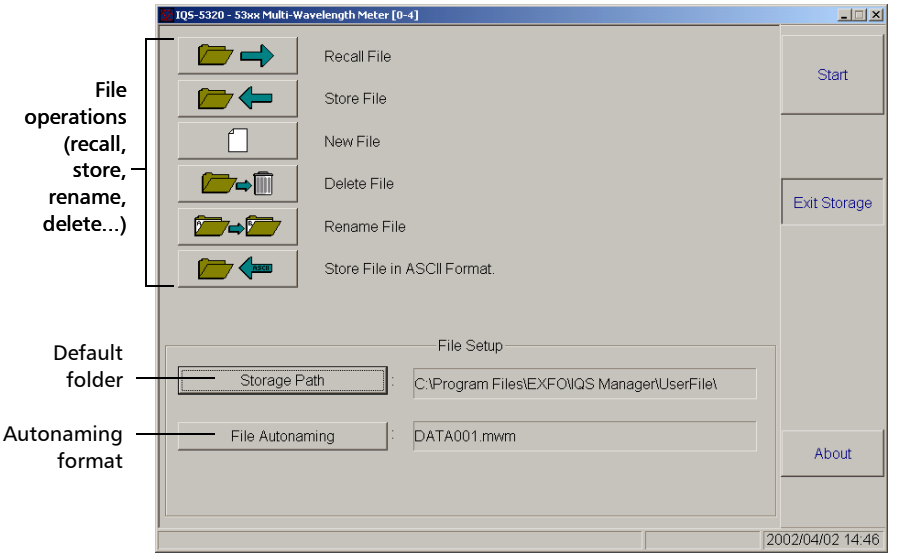
To move the zoom area in the zoom window, click on it and drag it to the location you want to view.

Note: *The tools can only be used on the trace containing the magnifying glass.*

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8 Managing Traces

Trace management operations are performed from the Storage window. Below is an illustration of the different operations available.



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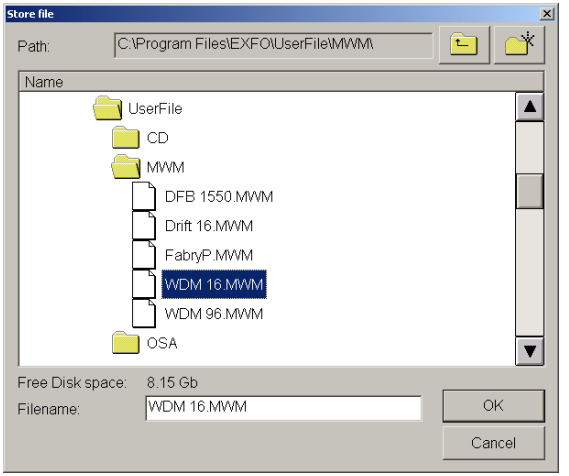
Saving a Trace

It is possible to save traces for further use. To quickly save a trace to the default folder and according to the default autonaming format, press **Quick Save** in the main window toolbar.

Note: *For more information about defining these default settings, see* Defining the Default Storage Location *on page 78, and* Defining a File Autonaming Format *on page 80.*

To save a trace:

1. Press **Storage** in the main window.
2. From the Storage window, select **Store file**.



3. From the **Store File** dialog box, enter the file name in the **Filename** text field.
4. Press **OK**. The trace is saved in the default folder.

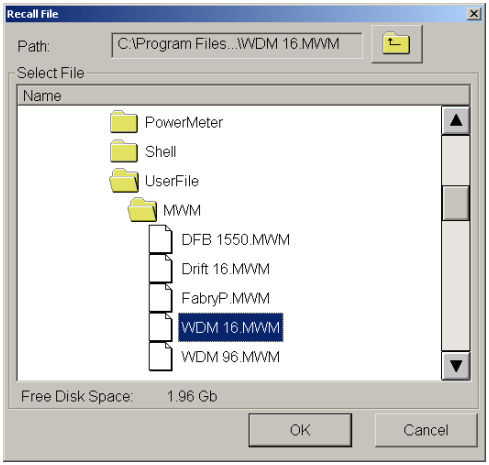
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Recalling a Trace

Recalling a trace file saves you time because you do not need to repeat your acquisition, and you can continue working where you left off.

To recall a trace:

1. From the main window, press **Storage**.
2. From the Storage window, select **Recall file**.



3. From the **Recall Main Trace** dialog box, select the trace file you want to view and press **OK**. The selected trace appears in the main window, ready for viewing.

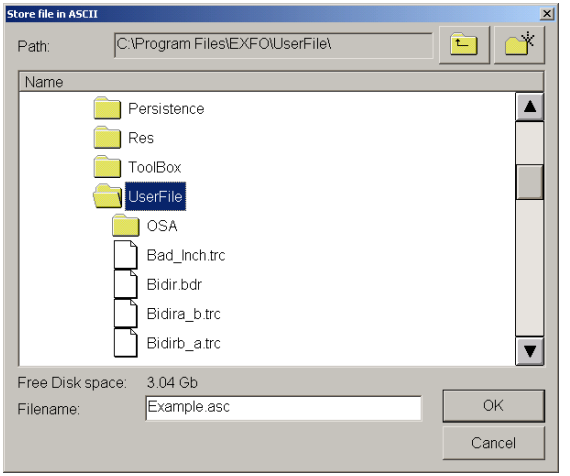
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Exporting a Trace to ASCII Format

Exporting trace files in ASCII format can allow you to consult data in any word processing program.

To save a trace in ASCII format:

1. Press **Storage** in the main window.
2. From the Storage window, select **Store file in ASCII Format**.



3. From the **Store file in ASCII Format** dialog box, enter the file name in the **Filename** text field.
4. Press **OK**. The trace is saved in the default folder.

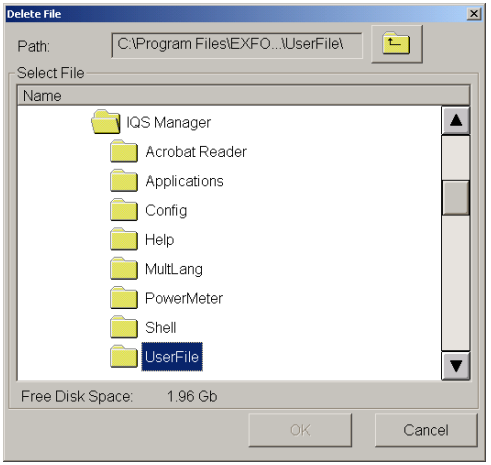
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Deleting a Trace

You might need to delete trace files to free up disk space, or simply because you do not need them anymore.

To delete a trace:

1. Press **Storage** from the main window.
2. From the Storage window, select **Delete file**.



3. From the **Delete file** dialog box, select the file from the scroll list. A preview of the file appears if the application recognizes the file type.
4. Press **OK**. The trace is deleted.

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Clearing a Trace from the Display

Although the test application automatically loads the last traces used, you can clear the screen and start new acquisitions. Also, if a trace (main or reference) you acquired does not meet your requirements, it is possible to clear that trace and start over.

To clear a trace from the display:

1. Press **Storage** in the main window.
2. From the Storage window, select **New file**. You must confirm that you want to discard the current trace from the MWM test application.
3. Press **OK**. The trace is deleted from memory. Press **Exit Storage** to return to the main window. You can now take a new measurement and save the file. For more information, see *Taking Measurements in WDM Mode* on page 49 and *Taking Measurements in Drift Mode* on page 61.

Note: *Deleting a trace from memory does not delete it from the storage media.*

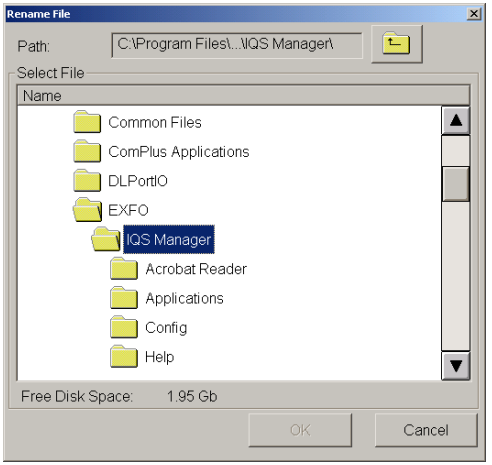
Renaming a Trace

Renaming trace files can help you manage them better.

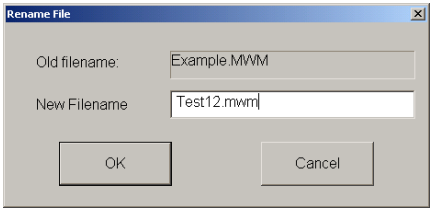
To rename a trace:

1. Press **Storage** in the main window.
2. From the Storage window, select **Rename file**.

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3. From the **Rename file** dialog box, select the file from the scroll list.
4. Press **OK**. The **Rename file** dialog box closes, and a the second **Rename File** dialog box appears, where you can enter the new filename. The current filename is displayed in the **Old filename** text field.



5. Enter the new file name in the **New Filename** text field.
6. Press **OK**. The file name is changed and you return to the main window.

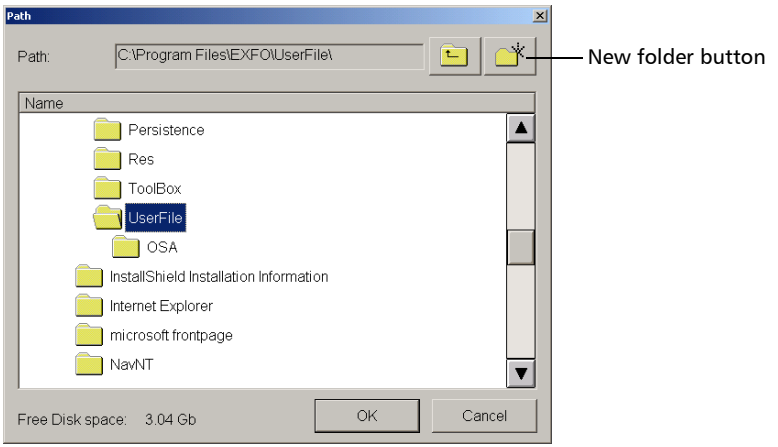
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Defining the Default Storage Location

Defining a default drive and storage path will allow you to save traces to a specific location quickly.

To define the default storage path:

1. Press **Storage**. The Storage window appears.
2. In the **File Setup** group box, select **Storage Path**. The **Path** dialog box appears.



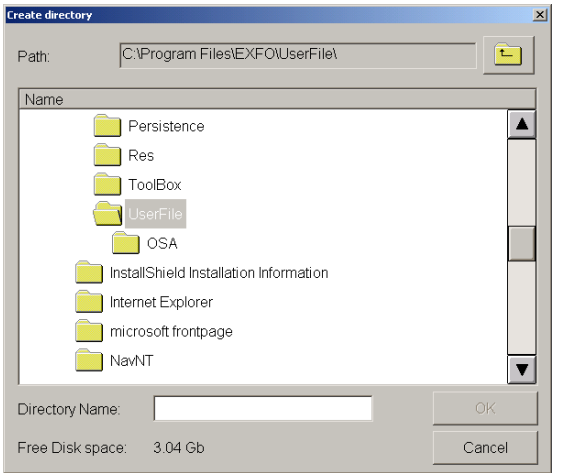
3. Click on the folder names until you reach the level where you want to save the files. To go up one level, select .

Note: *You should create your own folder to avoid storing your files with IQS executables and possibly confusing the two kinds of files when the time comes to manage or remove files.*

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4. If necessary, create a new folder for storing the files.

4a. Press the  to the right of the **Path** dialog box. The **Create Directory** dialog box appears.



4b. In the **Directory Name** text field, enter the name of the folder you want to create and press **OK**. The new folder will appear in the **Path** dialog box.

5. Select the storage path you want and press **OK**. You return to the Storage window and the storage path appears beside the **Storage Path** button.

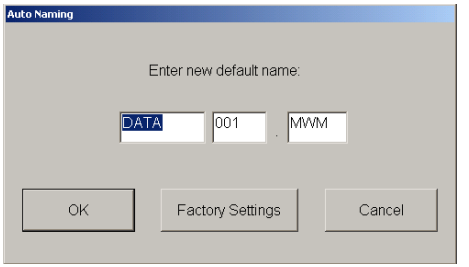
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Defining a File Autonaming Format

Defining a file autonaming format will allow you to quickly and automatically name traces in a sequential order (especially when using the **Quick Save** button).

To define a autonaming format:

1. Press **Storage** in the main window. The Storage window appears.
2. In the **File Setup** group box, select **File Autonaming**.



3. In the **Autonaming** dialog box, complete the three text fields as explained below. You can revert to factory settings at any time by clicking on **Factory Settings**.
   - **3a.** In the first text field, enter the name you want to give to your traces.
   - **3b.** In the second text field, enter the number you want to use to start the auto-numbering incrementation format. This number is automatically increased each time you save a trace.
   - **3c.** In the third text field, enter the extension you want to give to all trace files (we recommend you do not change this field because the file name will not be visible in the dialog boxes).
4. Once you completed the naming format, press **OK**. You return to the Storage window and the naming format you defined appears in the text field beside the **File Auto Naming** button.

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Viewing Results from Existing Trace Files

You can recall stored MWM traces to view test results (see *Recalling a Trace* on page 73).

For this purpose, you can start the MWM test application offline from IQS Manager. For details, refer to the *IQS-500 Intelligent Test System* user guide.

Note: *With the MWM test application, you cannot change measurement results in saved trace files.*

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9 Generating Reports

Trace reports are useful for entering and referring to notes on the location and identification of the tested fiber, type of job performed, test results and general comments related to a trace. Report information is saved with every saved trace.

You, or someone else, can later select part or all of the data to produce printed reports.

You can create a report template to save report information in multiple trace files. For more information, see *Creating a Report Template* on page 88.

IMPORTANT

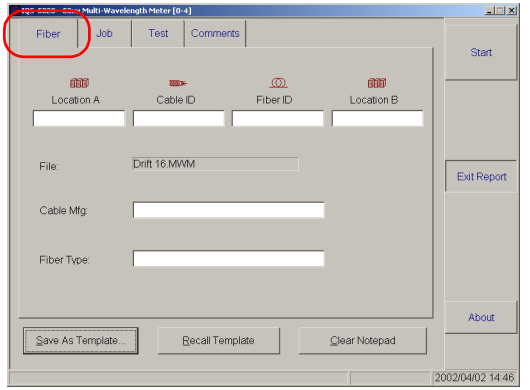
Once you exit from your Multi-Wavelength Meter application, the report information is deleted, unless you have saved it in a template.

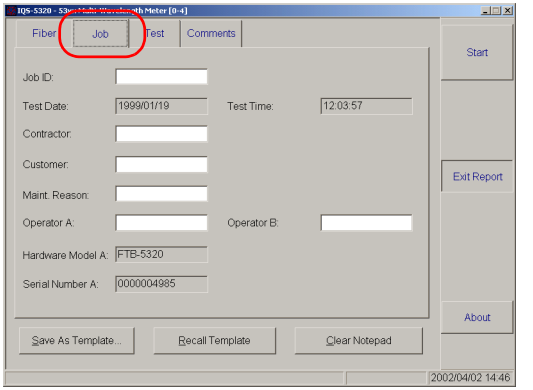
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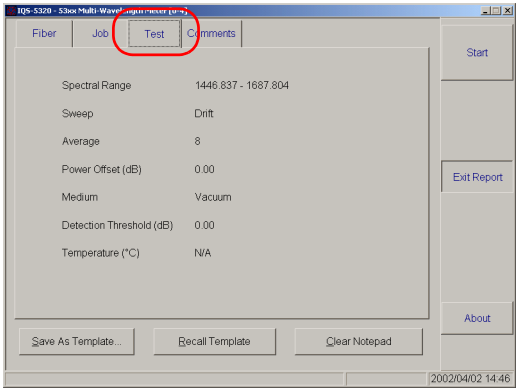
Entering Report Information

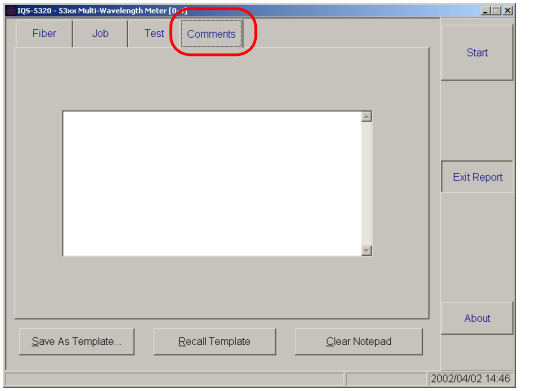
To enter report information:

1. Press **Report**.
2. From the Report window enter the relevant information.









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3. Select the **Fiber** tab to enter information about the fiber tested. In the appropriate fields, enter the following information:

- **Location A/B**: location of the fiber start and end points.
- **Cable ID**: cable identification.
- **Fiber ID**: fiber identification.
- **Cable Mfg**.: name of the fiber manufacturer.
- **Type**: fiber type.

Note: *The **Location A/B** and **Cable Mfg.** entries can have a maximum of 25 characters. All other entries in the **Job** tab can have a maximum of 14 characters.*

The current file name is also displayed automatically on the **Fiber** tab and cannot be edited. This field is disabled (grayed out).

4. Select the **Job** tab to enter information about the job performed. In the appropriate fields, enter the following information:

- **Job ID**: job identification, if any.
- **Contractor**: contractor name.
- **Customer**: customer name.
- **Maint. Reason**: maintenance details.
- **Operator A** or **B**: identification of operators.

Note: *The **Job ID** entry can have a maximum of 9 characters. All other entries in the **Job** tab can have a maximum of 24 characters.*

The test date and time as well as the model and serial numbers of the MWM module used for the test are also displayed automatically in the **Job** tab and cannot be edited. These fields are disabled (grayed out).

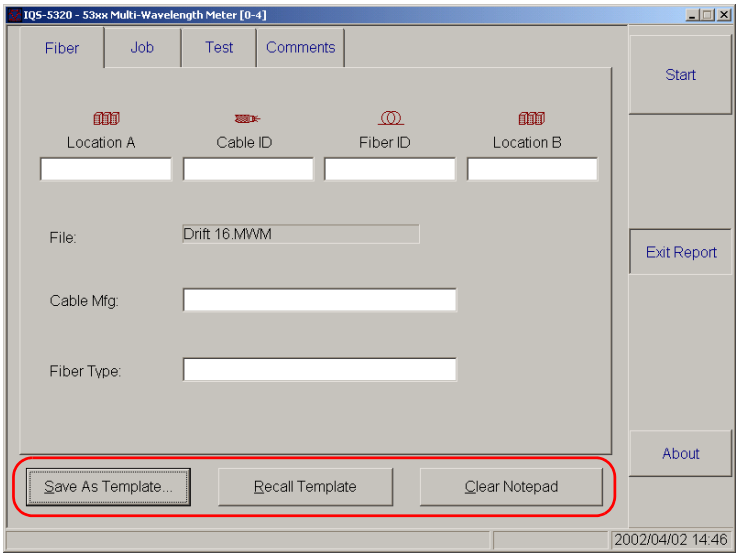
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5. Select the **Test** tab to view test parameters saved in the report. The following information is displayed:
   - **Spectral Range**: defined wavelength range used by the FTB-5320.
   - **Sweep**: Drift mode or WDM mode.
   - **Average**: number of scans used in the average calculation.
   - **Power Offset (dB)**: power offset entered during setup.
   - **Medium**: selected medium defining which calculations will be made.
   - **Detection Threshold (dB)**: peak detection threshold entered during setup.
   - **Temperature (°C)**: temperature selected during setup.
6. Select the **Comments** tab to enter general comments related to a trace. Click anywhere in the text box to enter your comments.
7. Press **Exit Report** to return to the main window.

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Using Report Templates

You can save the information you entered in the report as a template. This will allow you to reuse the same report information for other tests, even if you exit the application.



Note: *Only one template can be saved at any time. Therefore, creating a new template will erase the previous one.*

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Creating a Report Template

You can create a report template to save report information that youintend to use for a number of test sessions.

To create a report template:

1. Press **Report**.
2. Enter the appropriate information in the text fields. For more information, see *Entering Report Information* on page 84.
3. Press **Save as template** at the bottom of the Report window. A message box appears, asking you to confirm the operation.
4. Press **OK**. The report is saved as a template that you can recall at any time.

Recalling a Report Template

You can recall a report template if you wish to insert frequently used report information in the Report window without having to reenter it manually each time you start the MWM test application.

To recall a report template:

1. Press **Report**.
2. Press **Recall template** at the bottom of the Report window. A message box appears, indicating that all the information you entered in the Report window will be lost.
3. Press **OK**. The report template is loaded and the information it contains appears in the appropriate text fields.

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Printing a Report

You cannot print reports from the Report window. You must return to the main window.

To print a report:

1. Set the print parameters as described in *Setting Print Parameters* on page 42.
2. Enter the appropriate information in the text fields. For more information, see *Entering Report Information* on page 84.
3. From the main window, select **Quick Print** in the toolbar.

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10 Maintenance

To help ensure long, trouble-free operation:

- Keep the unit free of dust.
- Clean the unit casing with a cloth slightly dampened with water.
- Store unit at room temperature in a clean and dry area.
- Keep the unit out of direct sunlight.
- Avoid high humidity or significant temperature fluctuations.
- Avoid unnecessary shocks and vibrations.
- If any liquids are spilled on or into the unit, turn off the power immediately and let the unit dry completely.

WARNING

Use of controls, adjustments and procedures for operation and maintenance other than those specified herein may result in hazardous radiation exposure.

Cleaning the Front Panel

Clean the front panel of the IQS-5320 Multi-Wavelength Meter regularly to avoid buildup of dust, dirt, and other foreign substances.

To clean the front panel:

1. Gently wipe the front panel with a cloth dampened with soapy water.
2. Rinse the front panel with a cloth dampened with water.
3. Dry with a clean wiping cloth.

IMPORTANT

To help keep the connectors and adapters clean, EXFO recommends that you install protective caps when the unit is not in use.
You should also clean the fiber ends before every connection.

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Cleaning Fixed Connectors

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

To clean fixed connectors:

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

IMPORTANT

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

3. Gently wipe the connector threads three times with the folded and moistened section of the wiping cloth.

IMPORTANT

Isopropyl alcohol takes approximately ten seconds to evaporate. Since isopropyl alcohol is not absolutely pure, evaporation will leave microscopic residue. Make sure you dry the surfaces before evaporation occurs.

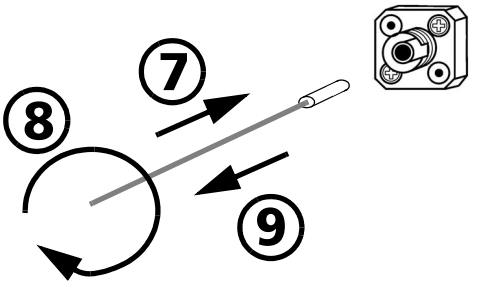
4. With a dry lint-free wiping cloth, gently wipe the same surfaces three times with a rotating movement.
5. Throw out the wiping cloths after one use.
6. Moisten a cleaning tip (2.5 mm tip) provided by EXFO with *only one drop* of isopropyl alcohol.

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IMPORTANT

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

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



8. Gently turn the cleaning tip one full turn.

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

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

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

11. Throw out the cleaning tips after one use.

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Cleaning Connectors Equipped with EUI/EUA Adapters

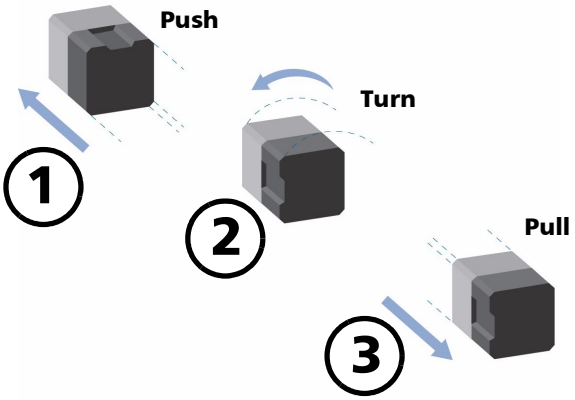
Regular cleaning of connectors equipped with EUI/EUA adapters will help maintain optimum performance. There is no need to disassemble the unit.

IMPORTANT

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

To clean connectors:

1. Remove the EUI/EUA adapter from the module to expose the optical connector baseplate and ferrule.



2. Use a lint-free wiping cloth and deposit *only one drop* of isopropyl alcohol on it.

IMPORTANT

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

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3. Gently wipe the connector and ferrule.

IMPORTANT

Isopropyl alcohol takes approximately ten seconds to evaporate. Since isopropyl alcohol is not absolutely pure, evaporation will leave microscopic residue. Make sure you dry the surfaces before evaporation occurs.

4. With a dry lint-free wiping cloth, gently wipe the same surfaces to ensure that the connector and ferrule are perfectly dry.

5. Throw out the wiping cloths after one use.

6. After having cleaned the connectors and ensuring that the unit is not active, verify the surface of the connector with a small, portable fiber-optic microscope.

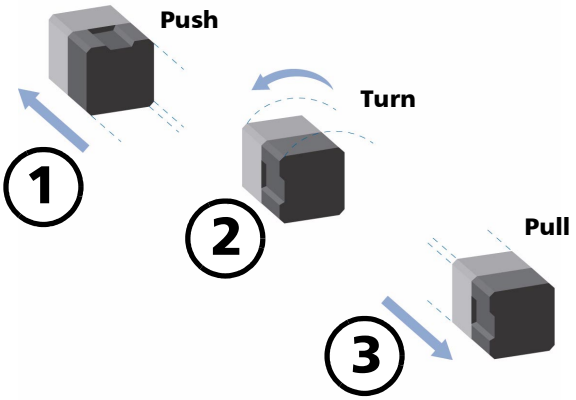
WARNING

DO NOT verify the surface of the connector with a fiber-optic microscope WHILE THE UNIT IS ACTIVE. Doing so WILL result in permanent eye damage.

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To clean EUI/EUA adapters:

1. Remove the EUI/EUA adapter from the module connector.



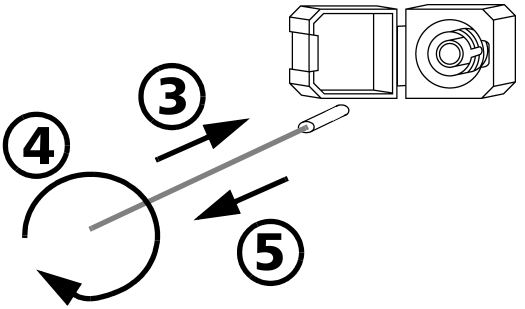
2. Moisten a cleaning tip (2.5 mm tip) provided by EXFO with *only one drop* of isopropyl alcohol.

IMPORTANT

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

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

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4. Gently turn the cleaning tip one full turn.
5. Continue to turn as you withdraw the cleaning tip.
6. Repeat steps 3 to 5, but this time with a dry cleaning tip (2.5 mm tip provided by EXFO).

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

7. Throw out the cleaning tips after one use.

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Cleaning Detector Ports

Regular cleaning of connectors will help maintain optimum performance.

IMPORTANT

To help keep the detectors and adapters clean, EXFO recommends installing protective caps when the unit is not in use. You should also clean the fiber ends before every connection.

To clean detector ports:

1. Remove the detector protective cap and the connector adapter (FOA).
2. If the detector is dusty, remove dirt with compressed air.
3. Take a cleaning tip from the package (supplied with EXFO's power meters) being careful not to touch the soft end of the swab.
4. Moisten the cleaning tip with *only one drop* of isopropyl alcohol.

IMPORTANT

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

5. While applying light pressure, gently rotate the cleaning tip on the detector window.

CAUTION

To avoid breaking the detector window during cleaning, be careful not to apply too much pressure on it.

6. Repeat previous step, but this time with a dry cleaning tip or blow dry with compressed air.
7. Discard the cleaning tips after one use.

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Recalibrating the Unit

If a calibration due date was not indicated by EXFO on the calibration label, this means that the calibration certificate for your IQS-5320 Multi-Wavelength Meter has been modified in conformity with the ISO/IEC 17025 Standard.

EXFO recommends that an annual calibration be performed on your IQS-5320 Multi-Wavelength Meter to ensure that it remains within the published specifications. However, as prescribed by the ISO/IEC 17025 Standard, this date can only be set by you.

You should indicate the calibration due date in the space provided on the calibration label.

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11 Troubleshooting

Viewing Online Documentation

A PDF version of the IQS-5320 Multi-Wavelength Meter user guide is conveniently available at all times.

To access the online user guide:

Go to “D:\Program Files\EXFO IQS Manager\Help”. This folder contains a PDF version of the user guide.

Finding Information on the EXFO Web Site

The EXFO Web site provides answers to frequently asked questions (FAQs) regarding the use of your IQS-5320 Multi-Wavelength Meter.

To access FAQs:

1. Type the following address in your Internet browser: **www.exfo.com**.
2. Click on the **Support** tab.
3. Click on **FAQs** and follow the on-screen instructions. You will be given a list of questions pertaining to your subject.

The EXFO Web site also provides the product’s most recent technical specifications.

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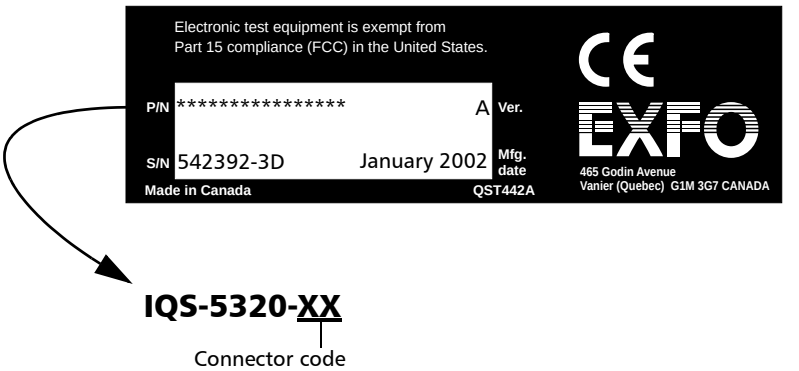
Contacting the Technical Support Group

To obtain after-sales service or technical support for this product, contact EXFO at one of the following numbers. The Technical Support Group is available to take your calls from Monday to Friday, 7:30 a.m. to 8:00 p.m. (Eastern Time in North America).

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

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

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



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You may also be requested to provide software and module version numbers. This information, as well as technical support contact information, can be found by clicking on **About** in the button bar.



Transportation

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

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

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12 Warranty

General Information

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

During the warranty period, EXFO will, at its discretion, repair, replace, or issue credit for any defective product, as well as recalibrate the product free of charge should the equipment need to be 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.

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Service and Repairs

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

To send any equipment for service or repair:

1. Call one of EXFO's authorized service centers (see *EXFO Service Centers Worldwide* on page 108). Support personnel will determine if the equipment requires service, repair, or calibration.
2. If equipment must be returned to EXFO or an authorized service center, support personnel will issue a Return Merchandise Authorization (RMA) number and provide an address for return.
3. If the unit has an internal storage device, perform a data backup 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 to you by support personnel. Be sure to write the RMA number on the shipping slip. *EXFO will refuse and return any package that does not bear an RMA number.*

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

After repair, the equipment will be returned with a repair report. If the equipment is not under warranty, 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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EXFO Service Centers Worldwide

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

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

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

EXFO Europe Service Center
Le Dynasteur
10/12, rue Andras Beck
92366 Meudon la Forêt Cedex
FRANCE

Tel.: +33.1.40.83.85.85
Fax: +33.1.40.83.04.42
europe.service@exfo.com

Beijing OSIC EXFO Service Center
No. 1754-1755 Beijing New Century
Hotel Office Tower
No. 6 Southern Capital Gym Road
Beijing 100044
P.R. CHINA

Tel.: +86 (10) 6849 2738
Fax: +86 (10) 6849 2662
beijing.service@exfo.com

EXFO Asia-Pacific Service Center
151 Chin Swee Road
#03-29 Manhattan House
SINGAPORE 169876

Tel.: +65 333 8241
Fax: +65 333 8242
asiapacific.service@exfo.com

Burleigh Instruments Service Center
7647 Main Street Fishers
Victor, NY 14564
USA

Tel.: 1 585 924-9355
Fax: 1 585 924-9072
service@burleigh.com

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A Technical Specifications

IMPORTANT

The following technical specifications can change without notice. The information presented in this section is provided as a reference only. To obtain this product's most recent technical specifications, visit the EXFO Web site at *www.exfo.com*.

Wavelength Measurement		
Wavelength range (nm)		1450 to 1650
Wavelength uncertainty[2, 3] (nm)		± 0.003
Wavelength repeatability (nm)		± 0.001
Minimum channel spacing (GHz)	Similar power level	≥ 12.5
	Different power level	≥ 25
Power Measurement		
Power uncertainty[2, 4] (dB)		± 0.35
Power repeatability[2] (dB)		± 0.1
Power range (dBm)		+ 10 to –45
Power linearity[5] (dB)	+10 dBm to –20 dBm	± 0.1
	–20 dBm to –30 dBm	± 0.25
Polarization dependence (dB)		± 0.25
OSNR[6] (dB)	Typical	29
	Minimum	> 25
ORL[5] (dB)		> 40

General Specifications

Size (H x W x D)		9.6 cm x 7.6 cm x 26.0 cm	(3 3/4 in x 3 in x 10 1/4 in)
Weight		1.3 kg	(2.8 lb)
Temperature	operating	5 °C to 40 °C	(41 °F to 104 °F)
	storage	–40 °C to 70 °C	(–40 °F to 158 °F)
Relative humidity		0 to 95 % non-condensing	

Notes

1. All specifications are guaranteed above –30 dBm unless specified otherwise, for FC connectors.
2. Specified at room temperature.
3. May degrade ± 0.001 nm over operating temperature range.
4. At 1550 nm, –10 dBm for single peak and excluding connector repeatability.
5. Specified at 1550 nm.
6. Single peak signal, at 50 GHz (0.4 nm) peak.

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B SCPI Command Reference

This appendix presents detailed information on the commands and queries supplied with your IQS-5320 Multi-Wavelength Meter.

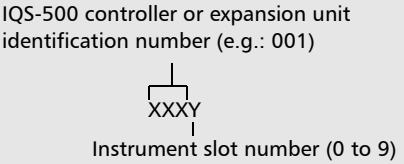
IMPORTANT

Since the IQS-500 controllers and expansion units can house many instruments, you must explicitly specify which instrument you want to remotely control.

You must add the following mnemonic *at the beginning of any command or query* that you send to an instrument (except for IEEE 488.2 and platform commands):

LINStrument<LogicalInstrumentPos>:

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



For information on modifying unit identification, refer to the *IQS-500 Intelligent Test System* user guide.

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Quick Reference Command Tree

Command						Parameter(s)
ABORt[1..n]						
CALCulate[1..n]	PLISt	[PEAK]?				<PeakIndex>
		COUNt?				
	THReshold					<PowerThreshold[<wsp>DB]>|MAXimum|MINimum
	THReshold?					[MINimum|MAXimum]
CALibration[1..n]	ZERO	[AUTO]				ONCE
		[AUTO]?				
INITiate[1..n]	[IMMediate]					
	CONTinuous					<ContinuousAcqState>
	CONTinuous?					
	STATe?					
MMEMory[1..n]	DATA	TYPE				BINary|ASCii
		TYPE?				
	STORe	TRACe	OVERwrite			<Overwrite>
			OVERwrite?			
						TRC1,<Filename>
SENSe[1..n]	CORRection	MEDium	TEMPerature			<Temperature>|MAXimum|MINimum
			TEMPerature?			[MINimum|MAXimum]
						AIR|VACUum
		MEDium?				

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Command						Parameter(s)
	AVERage	COUNt				<AverageCount>|MAXimum|MINimum
		COUNt?				[MINimum|MAXimum]
		COUNt	AUTO			<AverageCountAuto>
			AUTO?			
		[STATe]				<AverageState>
		[STATe]?				
	CORRection	OFFSet	[MAGNitude]			<OffsetMagnitude[<wsp>DB]>
			[MAGNitude]?			[MINimum|MAXimum]
	POWer	[DC]	RANGe	[UPPer]?		
				LOWer?		
		WAVelength				
				[UPPer]?		
TRACe[1..n]	[DATA]	PREamble?				TRC1
	[DATA]?					TRC1
	[DATA]	VALue?				TRC1,<Wavelength[<wsp>M|HZ]>
	POINts?					TRC1
UNIT[1..n]	POWer					DBM|W
	POWer?					
	SPECtrum					M|HZ
	SPECtrum?					

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Command Description

:ABORt[1..n]	
Description	This command is used to stop running scan, measurement or aquisition in progress. At *RST, the equivalent of ABORt command is performed on any acquisition in progress.
Syntax	:ABORt[1..n]
Parameter(s)	None
Example(s)	INIT:IMM ABOR
See Also	INITiate[1..n]:IMMediate INITiate[1..n]:CONTinuous INITiate[1..n]:CONTinuous? INITiate[1..n]:STATe?

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:CALCulate[1..n]:PLISt[:PEAK]?

Description	This query returns the information pertaining to a peak. It returns the spectrum position and the peak power. *RST has no effect on this command.
Syntax	:CALCulate[1..n]:PLISt[:PEAK]?<wsp><PeakIndex>
Parameter(s)	*PeakIndex:* The program data syntax for <PeakIndex> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element. The <PeakIndex> parameter is the peak index from 1 to the value returned by CALC:PLIS:COUN?. This index corresponds to a line in the results analysis table.
Response Syntax	<PeakInfo>

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:CALCulate[1..n]:PLISt[:PEAK]?

Response(s)	*PeakInfo:* The response data syntax for <PeakInfo> is defined as a <DEFINITE LENGTH ARBITRARY BLOCK RESPONSE DATA> element. The peak information gives the wavelength in metesr with the corresponding power in dBm.
Example(s)	Connect fiber to the MWM input connector with a multiple peak signal. SENS:AVER:STAT ON SENS:AVER:COUN:AUTO ON INIT:IMM Wait for the scan to end. CALC:PLIS? 4
See Also	CALCulate[1..n]:PLISt:COUNt?

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:CALCulate[1..n]:PLISt:COUNt?

Description	This query returns the number of peaks in the last analysis. *RST has no effect on this command.
Syntax	:CALCulate[1..n]:PLISt:COUNt?
Parameter(s)	None
Response Syntax	<PeakCount>
Response(s)	*PeakCount:* The response data syntax for <PeakCount> is defined as a <NR1 NUMERIC RESPONSE DATA> element. Number of peaks for the current trace.
Example(s)	CALC:PLIS:COUN?

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:CALCulate[1..n]:THReshold

Description	This command sets the power detection threshold value. The detection threshold is the minimum level above the noise at which the peaks will be detected. At *RST, this value is set to 0.0 dB.
Syntax	:CALCulate[1..n]:THReshold<wsp><PowerThreshold[<wsp>DB]>|MAXimum|MINimum
Parameter(s)	*PowerThreshold:* The program data syntax for <PowerThreshold> is defined as a <numeric_value> element followed by an optional <SUFFIX PROGRAM DATA> element. The allowed <SUFFIX PROGRAM DATA> element is DB. The <PowerThreshold> special forms MINimum and MAXimum are accepted on input. MINimum allows to set the instrument to the smallest supported value. MAXimum allows to set the instrument to the greatest supported value. The <PowerThreshold> parameter is the detection threshold power level.
Example(s)	CALC:THR 5.75DB CALC:THR 4.32

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:CALCulate[1..n]:THReshold?

Description	This query returns the power detection threshold value. The detection threshold is the minimum level above the noise at which the peaks will be detected. At *RST, this value is set to 0.0 dB.
Syntax	:CALCulate[1..n]:THReshold?[<wsp>MINimum|MAXimum]
Parameter(s)	*Parameter 1:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: MINimum|MAXimum. MINimum is used to retrieve the instrument's smallest supported value. MAXimum is used to retrieve the instrument's greatest supported value.
Response Syntax	<PowerThreshold>
Response(s)	*PowerThreshold:* The response data syntax for <PowerThreshold> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Power level of detection threshold.
Example(s)	CALC:THR?
See Also	CALCulate[1..n]:THReshold

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:CALibration[1..n]:ZERO[:AUTO]	
Description	This command performs a nulling measurement. *RST has no effect on this command.
Syntax	:CALibration[1..n]:ZERO[:AUTO]<wsp>ONCE
Parameter(s)	*Parameter 1:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> element for this parameter is ONCE. This parameter with ONCE is used to start the nulling and it is the only valid value.
Example(s)	CAL:ZERO:AUTO ONCE
See Also	CALibration[1..n]:ZERO:AUTO?

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:CALibration[1..n]:ZERO[:AUTO]?

Description	This query returns the automatic nulling measurement state. The return value is always 0 because the instrument doesn't support automatic nulling. *RST has no effect on this command.
Syntax	:CALibration[1..n]:ZERO[:AUTO]?
Parameter(s)	None
Response Syntax	<AutoZero>
Response(s)	*AutoZero:* The response data syntax for <AutoZero> is defined as a <NR1 NUMERIC RESPONSE DATA> element. Automatic nulling state. This value is always 0 because the instrument doesnt support automatic nulling.
Example(s)	CAL:ZERO:AUTO?
See Also	CALibration[1..n]:ZERO:AUTO

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:INITiate[1..n][:IMMediate]

Description	This command completes either one full cycle or several cycles, depending on the settings and returns to IDLE on completion. At *RST, all acquisitions are stopped.
Syntax	:INITiate[1..n][:IMMediate]
Parameter(s)	None
Example(s)	/* These lines start a scan in Auto mode */ SENS:AVER:COUN:AUTO ON INIT:IMM /* These lines start a scan in Custom mode */ SENS:AVER:COUN:AUTO OFF SENS:AVER:COUN 12 INIT:IMM
Notes	This command is used to perform an Auto sweep or Custom sweep.
See Also	ABORt[1..n] INITiate[1..n]:CONTinuous SENSe[1..n]:AVERage:STATe SENSe[1..n]:AVERage:COUNt SENSe[1..n]:AVERage:COUNt:AUTO

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:INITiate[1..n]:CONTinuous

Description	This command starts or stops a continuous acquisition. At *RST, all acquisitions are stopped.
Syntax	:INITiate[1..n]:CONTinuous<wsp><ContinuousAcqState>
Parameter(s)	*ContinuousAcqState:* The program data syntax for <ContinuousAcqState> is defined as a <Boolean Program Data> element. The <ContinuousAcqState> special forms ON and OFF are accepted on input for increased readability. ON corresponds to 1 and OFF corresponds to 0. The <State> parameter changes the continuous acquisition status. OFF- Stops continuous acquisition. ON - Starts continuous acquisition.

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:INITiate[1..n]:CONTinuous	
Example(s)	/* These lines start a scan in Real mode */ SENS:AVER:STAT OFF INIT:CONT ON /* These lines start a scan in Avg mode */ SENS:AVER:STAT ON INIT:CONT ON
Notes	This command is used to perform an Avg sweep or Real sweep.
See Also	ABORt[1..n] INITiate[1..n]:IMMediate SENSe[1..n]:AVERage:STATe

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:INITiate[1..n]:CONTinuous?

Description	This returns the status of Continuous acquisition mode. At *RST, all acquisitions are stopped.
Syntax	:INITiate[1..n]:CONTinuous?
Parameter(s)	None
Response Syntax	<ContinuousAcqState>
Response(s)	*ContinuousAcqState:* The response data syntax for <ContinuousAcqState> is defined as a <NR1 NUMERIC RESPONSE DATA> element. State of continuous acquisition. 0 - No continuous acquisition is running. 1 - Continuous acquisition is running.
Example(s)	INIT:CONT?

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:INITiate[1..n]:STATe?

Description	This query returns a value indicating the scanning state. At *RST, all acquisitions are stopped.
Syntax	:INITiate[1..n]:STATe?
Parameter(s)	None
Response Syntax	<StartStop>
Response(s)	*StartStop:* The response data syntax for <StartStop> is defined as a <NR1 NUMERIC RESPONSE DATA> element. This query returns the scanning status: 1 - The scan is in progress. 0 - The scan is stopped.
Example(s)	INIT:STAT?
See Also	INITiate[1..n]:IMMediate INITiate[1..n]:CONTinuous

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:MMEMory[1..n]:DATA:TYPE

Description	This command is used to set file format when saving a trace file. ASCII format allows you to display all relevant information using a third-party application. Binary format allows you to save a trace and to load it later for analysis. *RST has no effect on this command.
Syntax	:MMEMory[1..n]:DATA:TYPE<wsp>BINary|ASCii
Parameter(s)	*Type:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: BINary|ASCii. This parameter is the file format that can be either ASCII or binary.
Example(s)	MMEM:DATA:TYPE BIN
See Also	MMEMory[1..n]:DATA:TYPE?

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:MMEMory[1..n]:DATA:TYPE?

Description	This query returns a value indicating which file format is used when saving file. Value can be either ASCII or BINARY. At *RST, there is no effect on this command.
Syntax	:MMEMory[1..n]:DATA:TYPE?
Parameter(s)	None
Response Syntax	<Type>
Response(s)	*Type:* The response data syntax for <Type> is defined as a <CHARACTER RESPONSE DATA> element. File format used when saving file: ASCII - for ASCII format BINARY - for binary format.
Example(s)	MMEM:DATA:TYPE?
See Also	MMEMory[1..n]:DATA:TYPE

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:MMEMory[1..n]:STORe:TRACe:OVERwrite

Description	This command is used to set if an existing file will be overwritten when the MMEMory:STORe:TRACe command is used. Attempting to save a file while the value is set to OFF will generate an error if file already exists. *RST has no effect on this command.
Syntax	:MMEMory[1..n]:STORe:TRACe:OVERwrite<wsp><Overwrite>
Parameter(s)	*Overwrite:* The program data syntax for <Overwrite> is defined as a <Boolean Program Data> element. The <Overwrite> special forms ON and OFF are accepted on input for increased readability. ON corresponds to 1 and OFF corresponds to 0. The <Overwrite> parameter enables existing files to be overwritten.
Example(s)	MMEM:STOR:TRAC:OVER ON
See Also	MMEMory[1..n]:STORe:TRACe:OVERwrite?

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:MMEMory[1..n]:STORe:TRACe:OVERwrite?

Description	This query lets you know whether an existing file will be overwritten when MMEMory:STORe:TRACe command is used. *RST has no effect on this command.
Syntax	:MMEMory[1..n]:STORe:TRACe:OVERwrite?
Parameter(s)	None
Response Syntax	<Overwrite>
Response(s)	*Overwrite:* The response data syntax for <Overwrite> is defined as a <NR1 NUMERIC RESPONSE DATA> element. Overwrite state. 1 - Overwrite file if it already exists. 0 - Do not overwrite the file.
Example(s)	MMEM:STOR:TRAC:OVER?
See Also	MMEMory[1..n]:STORe:TRACe:OVERwrite

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:MMEMory[1..n]:STORe:TRACe

Description

This command stores the current displayed trace into a file.

*RST has no effect on this command.

Syntax

:MMEMory[1..n]:STORe:TRACe<wsp>TRC1,<Filename>

Parameter(s)

➤ *Parameter 1:*

The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> element for this parameter is TRC1.

The <Label> parameter is the trace ID.

➤ *Filename:*

The program data syntax for <Filename> is defined as a <STRING PROGRAM DATA> element.

The <Filename> parameter can either be only the filename or the filename and its path.

If no path is specified, the default path is used. The default path name refers to the storage path in the application.

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:MMEMory[1..n]:STORe:TRACe	
Example(s)	A trace must be displayed. MMEM:STOR:TRAC:OVER ON MMEM:STOR:TRAC TRC1, MwmTrace.osw
Notes	With this instrument, the only valid trace index is TRC1.
See Also	MMEMory[1..n]:STORe:TRACe:OVERwrite MMEMory[1..n]:DATA:TYPE

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:SENSe[1..n]:CORRection:MEDium:TEMPerature

Description	This command sets the medium temperature. This temperature is needed the wavelength correction when the transmission medium is the air. At *RST, the temperature is set to 23.0 °C.
Syntax	:SENSe[1..n]:CORRection:MEDium:TEMPerature <wsp><Temperature>|MAXimum|MINimum
Parameter(s)	*Temperature:* The program data syntax for <Temperature> is defined as a <numeric_value> element. The <Temperature> special forms MINimum and MAXimum are accepted on input. MINimum allows to set the instrument to the smallest supported value. MAXimum allows to set the instrument to the greatest supported value. The <Temperature> parameter is the temperature used to set the wavelength correction.
Example(s)	SENS:CORR:MED:TEMP 21.4
See Also	SENSe[1..n]:CORRection:MEDium? SENSe[1..n]:CORRection:MEDium:TEMPerature?

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:SENSe[1..n]:CORRection:MEDium:TEMPerature?

Description	This query returns the medium temperature. At *RST, the temperature is set to 23.0 °C.
Syntax	:SENSe[1..n]:CORRection:MEDium:TEMPerature? [<wsp>MINimum|MAXimum]
Parameter(s)	*Parameter 1:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: MINimum|MAXimum. MINimum is used to retrieve the instrument's smallest supported value. MAXimum is used to retrieve the instrument's greatest supported value.
Response Syntax	<Temperature>
Response(s)	*Temperature:* The response data syntax for <Temperature> is defined as a <NR3 NUMERIC RESPONSE DATA> element. The temperature used for the wavelength correction in air transmission medium.
Example(s)	SENS:CORR:MED:TEMP?
See Also	SENSe[1..n]:CORRection:MEDium:TEMPerature

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:SENSe[1..n]:CORRection:MEDium

Description	This command selects the transmission medium. The medium has to be selected for the wavelength correction. At *RST, the medium is vacuum.
Syntax	:SENSe[1..n]:CORRection:MEDium<wsp>AIR|VACUum
Parameter(s)	*Parameter 1:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: AIR|VACUum. This parameter is the optical transmission medium.
Example(s)	SENS:CORR:MED AIR
See Also	SENSe[1..n]:CORRection:MEDium?

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:SENSe[1..n]:CORRection:MEDium?

Description	This command returns the transmission medium. At *RST, the medium is vacuum.
Syntax	:SENSe[1..n]:CORRection:MEDium?
Parameter(s)	None
Response Syntax	<Medium>
Response(s)	*Medium:* The response data syntax for <Medium> is defined as a <CHARACTER RESPONSE DATA> element. The optical medium transmission: AIR - air medium VACUUM - vacuum or fiber medium
Example(s)	SENS:CORR:MED?
See Also	SENSe[1..n]:CORRection:MEDium

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:SENSe[1..n]:AVERage:COUNt

Description	This command sets the number of scans for averaging. At *RST, this value is 1.
Syntax	:SENSe[1..n]:AVERage:COUNt<wsp><AverageCount>|MAXimum|MINimum
Parameter(s)	*AverageCount:* The program data syntax for <AverageCount> is defined as a <numeric_value> element. The <AverageCount> special forms MINimum and MAXimum are accepted on input. MINimum allows to set the instrument to the smallest supported value. MAXimum allows to set the instrument to the greatest supported value. The <AverageCount> parameter is the number of scans used to obtain the average for the final scan.
Example(s)	/* These lines start a scan in Custom mode */ SENS:AVER:COUN:AUTO OFF SENS:AVER:COUN 12 INIT:IMM
See Also	SENSe[1..n]:AVERage:COUNt?

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:SENSe[1..n]:AVERage:COUNt?

Description	This query returns the number of scans that will be performed for the averaging. At *RST, this value is 1.
Syntax	:SENSe[1..n]:AVERage:COUNt?[<wsp>MINimum|MAXimum]
Parameter(s)	*Parameter 1:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: MINimum|MAXimum. MINimum is used to retrieve the instrument's smallest supported value. MAXimum is used to retrieve the instrument's greatest supported value.
Response Syntax	<AverageCount>
Response(s)	*AverageCount:* The response data syntax for <AverageCount> is defined as a <NR1 NUMERIC RESPONSE DATA> element. The number of scans used to obtain an average for final scan.
Example(s)	SENS:AVER:COUN?
See Also	SENSe[1..n]:AVERage:COUNt SENSe[1..n]:AVERage:COUNt:AUTO

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:SENSe[1..n]:AVERage:COUNt:AUTO

Description	This command sets an automatic number of scans that will be used to compute final trace. At *RST, this value is set to OFF.
Syntax	:SENSe[1..n]:AVERage:COUNt:AUTO<wsp><AverageCountAuto>
Parameter(s)	*AverageCountAuto:* The program data syntax for <AverageCountAuto> is defined as a <Boolean Program Data> element. The <AverageCountAuto> special forms ON and OFF are accepted on input for increased readability. ON corresponds to 1 and OFF corresponds to 0. The <AverageCountAuto> parameter is the state of automatic sweep scan.
Example(s)	/* These lines start a scan in Auto mode */ SENS:AVER:COUN:AUTO ON INIT:IMM
See Also	SENSe[1..n]:AVERage:COUNt:AUTO?

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:SENSe[1..n]:AVERage:COUNt:AUTO?

Description	This query returns the state of the automatic sweep. At *RST, this value is set to OFF.
Syntax	:SENSe[1..n]:AVERage:COUNt:AUTO?
Parameter(s)	None
Response Syntax	<AverageCountAuto>
Response(s)	*AverageCountAuto:* The response data syntax for <AverageCountAuto> is defined as a <NR1 NUMERIC RESPONSE DATA> element. State of automatic sweep scan.
Example(s)	SENS:AVER:COUN:AUTO?
See Also	SENSe[1..n]:AVERage:COUNt:AUTO

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:SENSe[1..n]:AVERage[:STATe]

Description	This command selects the averaging state for the acquisitions. At *RST, this value is set to OFF.
Syntax	:SENSe[1..n]:AVERage[:STATe]<wsp><AverageState>
Parameter(s)	*AverageState:* The program data syntax for <AverageState> is defined as a <Boolean Program Data> element. The <AverageState> special forms ON and OFF are accepted on input for increased readability. ON corresponds to 1 and OFF corresponds to 0. The <AverageState> parameter sets the state of averaging with the acquisitions.
Example(s)	These lines start a scan in Avg sweep mode. SENS:AVER:STAT ON INIT:CONT ON These lines start a scan in Real sweep mode. SENS:AVER:STAT OFF INIT:CONT ON
See Also	SENSe[1..n]:AVERage?

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:SENSe[1..n]:AVERage[:STATe]?	
Description	This query returns the averaging state of the acquisitions. At *RST, this value is set to OFF.
Syntax	:SENSe[1..n]:AVERage[:STATe]?
Parameter(s)	None
Response Syntax	<AverageState>
Response(s)	*AverageState:* The response data syntax for <AverageState> is defined as a <NR1 NUMERIC RESPONSE DATA> element. State of averaging of the acquisitions.
Example(s)	SENS:AVER?
See Also	SENSe[1..n]:AVERage

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:SENSe[1..n]:CORRection:OFFSet[:MAGNitude]

Description	This command sets a power offset value that is applied to the scan. At *RST, the value is set to 0.00 dB.
Syntax	:SENSe[1..n]:CORRection:OFFSet[:MAGNitude] <wsp><OffsetMagnitude[<wsp>DB]>
Parameter(s)	*OffsetMagnitude:* The program data syntax for <OffsetMagnitude> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element followed by an optional <SUFFIX PROGRAM DATA> element. The allowed <SUFFIX PROGRAM DATA> element is DB. The <OffsetMagnitude>parameter applies an offset to the trace.
Example(s)	SENS:CORR:OFFS -2.55DB SENS:CORR:OFFS:MAGN 1.62DB
See Also	SENSe[1..n]:CORRection:OFFSet?

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:SENSe[1..n]:CORRection:OFFSet[:MAGNitude]?

Description	This query returns the power offset value applied to the scan. At *RST, the value is set to 0.00 dB.
Syntax	:SENSe[1..n]:CORRection:OFFSet[:MAGNitude]?[<wsp>MINimum|MAXimum]
Parameter(s)	*Parameter 1:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: MINimum|MAXimum. MINimum is used to retrieve the instrument's smallest supported value. MAXimum is used to retrieve the instrument's greatest supported value.
Response Syntax	<OffsetMagnitude>
Response(s)	*OffsetMagnitude:* The response data syntax for <OffsetMagnitude> is defined as a <NR3 NUMERIC RESPONSE DATA> element. The power offset that will be applied to the trace in dB.
Example(s)	SENS:CORR:OFFS?
See Also	SENSe[1..n]:CORRection:OFFSet

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:SENSe[1..n]:POWer[:DC]:RANGe[:UPPer]?

Description	This query returns the maximum power that can be read by the instrument. *RST has no effect on the command.
Syntax	:SENSe[1..n]:POWer[:DC]:RANGe[:UPPer]?
Parameter(s)	None
Response Syntax	<UpRange>
Response(s)	*UpRange:* The response data syntax for <UpRange> is defined as a <NR3 NUMERIC RESPONSE DATA> element. The upper range represents the maximum measurable power by the instrument in dBm or watts.
Example(s)	SENS:POW:RANG?
See Also	SENSe[1..n]:POWer:RANGe:LOWer?

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:SENSe[1..n]:POWer[:DC]:RANGe:LOWer?

Description	This query returns the minimum power that can be read by the instrument. *RST has no effect on the command.
Syntax	:SENSe[1..n]:POWer[:DC]:RANGe:LOWer?
Parameter(s)	None
Response Syntax	<LowRange>
Response(s)	*LowRange:* The response data syntax for <LowRange> is defined as a <NR3 NUMERIC RESPONSE DATA> element. The lower range represents the minimum measurable power by the instrument in dBm or watts.
Example(s)	SENS:POW:RANG:LOW?
See Also	SENSe[1..n]:POWer:RANGe?

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:SENSe[1..n]:POWer:WAVelength:RANGe:LOWer?

Description	This query returns the minimum wavelength for the acquisition. *RST has no effect on this command.
Syntax	:SENSe[1..n]:POWer:WAVelength:RANGe:LOWer?
Parameter(s)	None
Response Syntax	<Start>
Response(s)	*Start:* The response data syntax for <Start> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Minimum wavelength for acquisition range in meters or in hertz.
Example(s)	SENS:POW:WAV:RANG:LOW?
See Also	SENSe[1..n]:POWer:WAVelength:RANGe:UPPer?

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:SENSe[1..n]:POWer:WAVelength:RANGe[:UPPer]?

Description	This query returns the maximum wavelength for the acquisition. *RST has no effect on this command.
Syntax	:SENSe[1..n]:POWer:WAVelength:RANGe[:UPPer]?
Parameter(s)	None
Response Syntax	<Stop>
Response(s)	*Stop:* The response data syntax for <Stop> is defined as a <NR3 NUMERIC RESPONSE DATA> element. Maximum wavelength for acquisition range in meters or in hertz.
Example(s)	SENS:POW:WAV:RANG:UPP?
See Also	SENSe[1..n]:POWer:WAVelength:RANGe:LOWer?

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:TRACe[1..n][:DATA]:PREamble?

Description	This query returns the trace header. This header contains some characteristics of the trace. *RST has no effect on this command.
Syntax	:TRACe[1..n][:DATA]:PREamble?<wsp>TRC1
Parameter(s)	*Parameter 1:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> element for this parameter is TRC1. This parameter is the trace index. In the case of MWM, this ID is always TRC1.
Response Syntax	<TraceHeader>
Response(s)	*TraceHeader:* The response data syntax for <TraceHeader> is defined as a <DEFINITE LENGTH ARBITRARY BLOCK RESPONSE DATA> element. Some header information related to the loaded trace: - number of points in the current trace - first spectrum value in cm -1 - last spectrum value in cm -1 - total power
Example(s)	TRAC:DATA:PRE?

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:TRACe[1..n][:DATA]?

Description	This query returns the points of a trace. *RST has no effect on this command.
Syntax	:TRACe[1..n][:DATA]?<wsp>TRC1
Parameter(s)	*Parameter 1:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> element for this parameter is TRC1. This parameter is the trace index. In the case of MWM, this ID is always TRC1.
Response Syntax	<TraceData>
Response(s)	*TraceData:* The response data syntax for <TraceData> is defined as a <DEFINITE LENGTH ARBITRARY BLOCK RESPONSE DATA> element. Trace points data from a list. The values are in dBm. Each power value represents a point in the trace and is always returned in dBm. The number of values on a list can be queried with TRACe:POINt.
Example(s)	TRAC:DATA? TRC1

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:TRACe[1..n][:DATA]:VALue?

Description

This query returns the power corresponding to a wavelength.

*RST has no effect on this command.

Syntax

:TRACe[1..n][:DATA]:VALue?<wsp>TRC1,<Wavelength[<wsp>M|HZ]>

Parameter(s)

➤ *Parameter 1:*

The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> element for this parameter is TRC1.

This parameter is the trace index. In the case of MWM, this ID is always TRC1.

➤ *Wavelength:*

The program data syntax for <Wavelength> is defined as a <DECIMAL NUMERIC PROGRAM DATA> element followed by an optional <SUFFIX PROGRAM DATA> element. The allowed <SUFFIX PROGRAM DATA> elements are: M|HZ.

The <Wavelength> parameter is the spectrum location where the power is read.

Response Syntax

<TraceValue>

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:TRACe[1..n][:DATA]:VALue?

Response(s)	*TraceValue:* The response data syntax for <TraceValue> is defined as a <NR3 NUMERIC RESPONSE DATA> element.
Example(s)	TRAC:DATA:VAL? TRC1,1549.217NM
See Also	SENSe[1..n]:CORRection:OFFSet?

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:TRACe[1..n]:POINts?

Description	This query returns the number of points in a trace. *RST has no effect on this command.
Syntax	:TRACe[1..n]:POINts?<wsp>TRC1
Parameter(s)	*Parameter 1:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> element for this parameter is TRC1. This parameter is the trace index. In the case of MWM, this ID is always TRC1.
Response Syntax	<PointsCount>
Response(s)	*PointsCount:* The response data syntax for <PointsCount> is defined as a <NR1 NUMERIC RESPONSE DATA> element. Number of points in the trace.
Example(s)	TRAC:POIN? TRC1

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:UNIT[1..n]:POWer

Description	Sets the power unit. At *RST, the power unit is set to watts.
Syntax	:UNIT[1..n]:POWer<wsp>DBM|W
Parameter(s)	*Parameter 1:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: DBM|W. Power unit.
Example(s)	UNIT:POW DBM
See Also	UNIT[1..n]:POWer?

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:UNIT[1..n]:POWer?

Description	This query returns the current power unit. At *RST, the power unit is set to watts.
Syntax	:UNIT[1..n]:POWer?
Parameter(s)	None
Response Syntax	<PowerUnit>
Response(s)	*PowerUnit:* The response data syntax for <PowerUnit> is defined as a <CHARACTER RESPONSE DATA> element. Current power unit.
Example(s)	UNIT:POW?
See Also	UNIT[1..n]:POWer

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:UNIT[1..n]:SPECtrum	
Description	Sets the spectrum unit. At *RST, the spectrum unit is set to meters.
Syntax	:UNIT[1..n]:SPECtrum<wsp>M|HZ
Parameter(s)	*Parameter 1:* The program data syntax for the first parameter is defined as a <CHARACTER PROGRAM DATA> element. The allowed <CHARACTER PROGRAM DATA> elements for this parameter are: M|HZ. Spectral unit.
Example(s)	UNIT:SPEC M
See Also	UNIT[1..n]:SPECtrum?

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:UNIT[1..n]:SPECtrum?

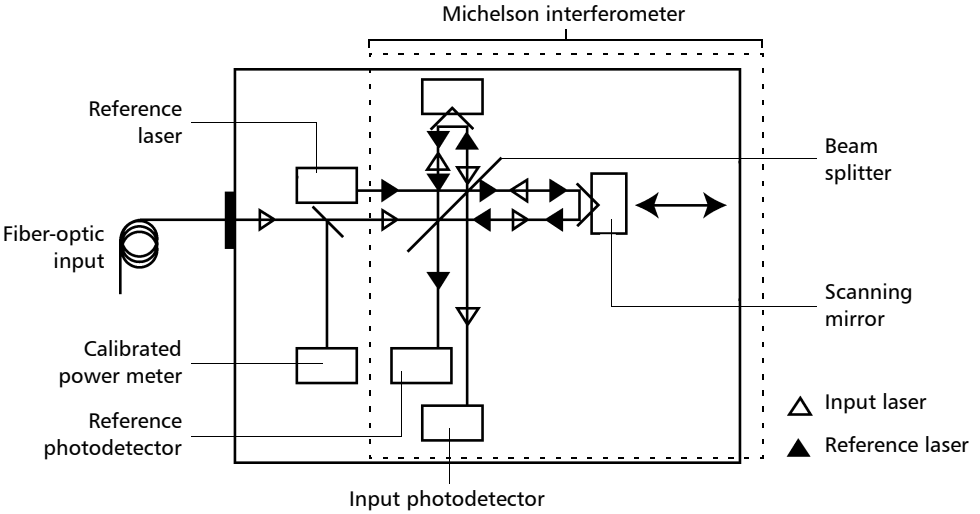
Description	This query returns the current spectrum unit. At *RST, the spectrum unit is set to meters.
Syntax	:UNIT[1..n]:SPECtrum?
Parameter(s)	None
Response Syntax	<SpectralUnit>
Response(s)	*SpectralUnit:* The response data syntax for <SpectralUnit> is defined as a <CHARACTER RESPONSE DATA> element. Current spectral unit.
Example(s)	UNIT:SPEC?
See Also	UNIT[1..n]:SPECtrum

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C Interferometric Wavelength Measurement Theory

The IQS-5320 Multi-Wavelength Meter consists of a Michelson interferometer assembly mounted on two printed circuit boards with a fiber-optic connector at one end and electrical connections at the other. A built-in HeNe reference laser is also fiber-coupled to the interferometer assembly for continuous absolute wavelength calibration.



Laser light to be analyzed enters your MWM module through a fiber-optic connector. The incoming beam is split into two paths, with one path directed to a laser power detector, and the other to an interferometer. In the interferometer, the beam is again split into two paths, with one path length varied by a scanning mechanism. The two paths are recombined, producing interference fringes that are detected by a photodiode.

The reference laser passes through the interferometer along the same optical path and also produces fringes. These reference laser fringes are detected and used to sample the amplitude of the fringes from the input laser source. The sampled data points are stored in memory from which an on-board digital signal processor (DSP) generates the spectrum by computing the Fast Fourier Transform (FFT) of the input signal.

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The resulting spectral data is transmitted to the host computer for further analysis and display via a communications interface connector on the end of the module. The measurement is performed and available for output every 1000 milliseconds.

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