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IQ-1200 4-Channel Power Meter

Instruction Manual

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Table of Contents

Page

1 INTRODUCTION 1-1

1.1 IQ-200 Product Line 1-1
1.2 List of Abbreviations 1-2
1.3 Unpacking and Inspection 1-2
1.4 Safety Conventions 1-3
1.5 Safety Information 1-3
1.6 Getting Help 1-4

2 PRODUCT OVERVIEW 2-1

2.1 Description of the IQ-1200 2-1
2.2 Front Panel Description 2-3
2.2.1 Detector Ports 2-4
2.2.2 LED Push button 2-4

3 MODULE SETUP 3-5

3.1 Module Installation 3-5
3.2 Optical Connections 3-6
3.3 Module Removal 3-7

4 SOFTWARE CONVENTIONS 4-1

4.1 Mouse Operation 4-1
4.2 Software Items 4-2
4.3 Front Panel Hardware Key Operation 4-4
4.4 Optional Hardware Keyboard Operation 4-5
4.5 Entering Numeric Values 4-7
4.6 Entering Alphanumeric Values 4-8

5 OPERATION 5-1

5.1 IQ-1200 Main Window Activation 5-1
5.2 IQ-1200 Main Window Description 5-2
5.2.1 Title Bar and Menu Bar 5-3
5.2.2 Function Buttons 5-7
5.2.3 Parameter Definition Window Buttons 5-8

9.3 Exclusions 9-2
9.4 Certification 9-3
9.5 Service and Repairs (Under Warranty or Other) 9-3
9.6 Transportation and Storage 9-5

10 CUSTOMER COMMENTS 10-1

10.1 IQ Comments 10-1

11 INDEX 11-1

Figure 6-2. Setup for Taking a Reference Measurement 6-3
Figure 6-3. Testing Insertion Loss 6-4
Figure 6-4. Multi-device Insertion Loss Testing 6-5

Table 5-1. IQ-1200 - Function Buttons 5-7
Table 5-2. IQ-1200 - Parameter Definition Window Buttons 5-8
Table 5-3. IQ-1200 - Data and Status Boxes 5-10
Table 5-4. Data Acquisition Triggers 5-32

1 INTRODUCTION

1.1 IQ-200 Product Line

EXFO E.O. Engineering Inc. (EXFO) is pleased to introduce the IQ-1200 4-Channel Power Meter module as part of the IQ-200 Integrated PC/WINDOWS™ modular test system family. The IQ-200 product line consists of the IQ-203 Optical Test System mainframe, the IQ-206 Expansion Unit, and the IQ Series modules such as the IQ-1200 4-Channel Power Meter.

Refer to the IQ-203 and IQ-206 instruction manuals for specific operating instructions on these products.

EXFO's commitment to superior design in all its fiber-optic instrumentation is respected throughout the industry and is based on four goals:

1. Simple operation.
2. Extensive features.
3. Reliable performance.
4. Dedicated interest in customer needs.

The IQ-1200 4-Channel Power Meter will provide many years of reliable operation. In order to benefit fully from the many features offered by the IQ-1200, it is important to read the contents of this instruction manual carefully.

1.4 Safety Conventions

WARNING, CAUTION, and IMPORTANT

The following conventions should be clearly understood before operating the unit:

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

CAUTION Refers to a potential product hazard. It requires a procedure which, if not correctly followed, may result in irreparable component damage. Do not proceed beyond a **CAUTION** unless the required conditions are fully understood and met.

IMPORTANT Refers to any information regarding the operation of the product which should not be overlooked.

1.5 Safety Information

Although the IQ-1200 does not contain a fiber-optic source, laser radiation may be encountered while connecting fiber-optic cables and test jumpers.

WARNING

Never look directly into a live fiber and ensure that your eyes are protected at all times.

2 PRODUCT OVERVIEW

2.1 Description of the IQ-1200

The IQ-1200 is a four independent channel sensitive and accurate optical power meter that is available with either, Silicon (Si), Indium Gallium Arsenide (InGaAs), Germanium (Ge), or high power Germanium (GeX) optical detectors.

It is designed for laboratory and industry applications using the IQ-203 Optical Test System mainframe (or IQ-206 Expansion Unit).

The operation of the IQ-1200 is controlled using the WINDOWS compatible software already installed on the IQ-203. This software provides a user-friendly interface offering flexible 4 channel power meter operation. The following features are offered by the IQ-1200 power meter and its associated software:

- Four optical channels plus a virtual channel
- Channel identification and selection
- Independent channel configuration
- Power displayed in dB, dBm, or watt (pW, nW, μW, or mW) at a user-defined or automatic resolution
- Absolute, reference, and offset display modes
- Multiple operating wavelengths at 1 nm resolution
- Timed and conditional (trigger) data acquisition and storage
- Ability to save multiple customized configurations

2.2 Front Panel Description

Figure 2-2 illustrates the front panel of the IQ-1200 4-Channel Power Meter module.

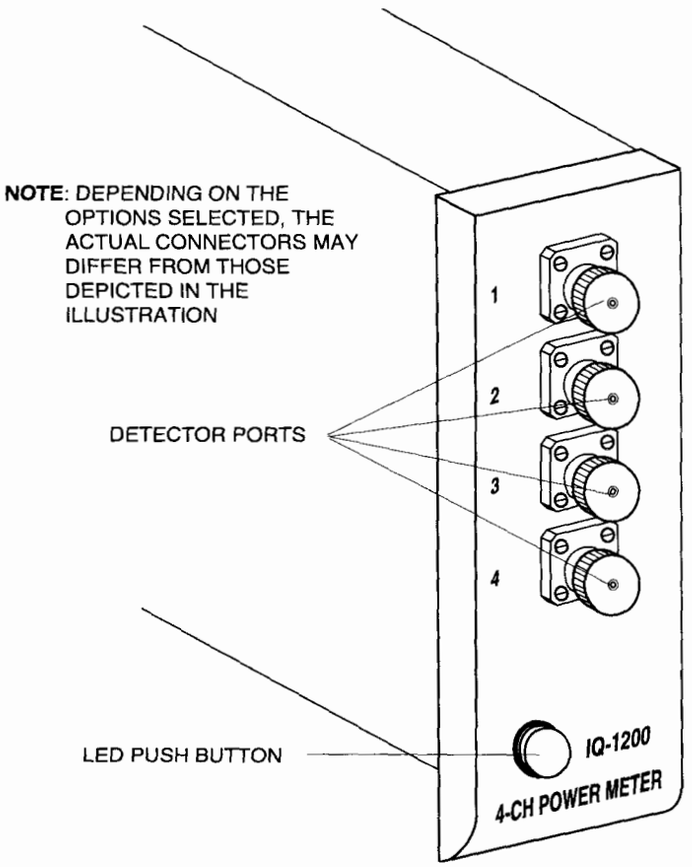


Figure 2-2. IQ-1200 Power Meter

3 MODULE SETUP

3.1 Module Installation

CAUTION

NEVER INSERT OR REMOVE ANY MODULE WHEN THE IQ-203/ IQ-206 MAINFRAME/EXPANSION UNIT IS POWERED ON. THIS WILL RESULT IN IMMEDIATE IRREPARABLE DAMAGE TO THE MODULE AND THE IQ-203/IQ-206.

To install the module:

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

IMPORTANT

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

3.3 Module Removal

CAUTION

NEVER INSERT OR REMOVE ANY MODULE WHEN THE IQ-203/ IQ-206 IS POWERED ON. THIS WILL RESULT IN IMMEDIATE IRREPARABLE DAMAGE TO THE MODULE AND THE IQ-203/IQ-206.

To remove the module:

1. Power OFF the IQ-203/IQ-206.
2. Place fingers under the bottom groove (Figure 3-1) of the module front panel and firmly pull module outward.

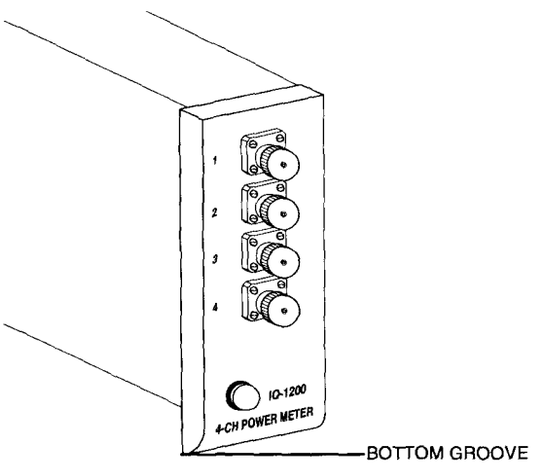


Figure 3-1. IQ-1200 Bottom Groove

4 SOFTWARE CONVENTIONS

4.1 Mouse Operation

"Click," "Choose," and **"Double Click"** are used throughout this manual when referring to software operation.

- **"Click"** signifies that, after placing the cursor on the desired object using the desktop or IQ-203 front panel mouse (see IQ-203 instruction manual) or keyboard, the user shall press once on the left mouse key to begin the specific operation related to the object.

- **"Choose"** signifies that, after placing the cursor on the desired software button using the mouse or keyboard, the user shall press once on the left mouse key to begin the specific operation related to the button.

- **"Double-click"** signifies that, after placing the cursor on the desired object using the mouse or keyboard, the user shall press twice on the left mouse key to begin the specific operation related to the object.

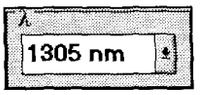


Figure 4-3. List Box

Radio Buttons

Radio buttons are grouped in boxes and provide a choice between two or more options. Only one radio button may be selected at any time. Figure 4-4 illustrates a typical example where three possible options are available.



Figure 4-4. Radio Buttons

Check Boxes

Check boxes offer the possibility of selecting multiple options at once. Figure 4-5 illustrates an example of a check box.

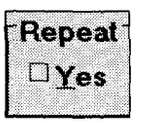


Figure 4-5. Check Box

To select a radio button:

1. Press  until the desired radio button box is highlighted.
2. Using the  or  key, select the new radio button.

To select a check box option:

1. Press  until the desired check box is highlighted.
2. Press  to select the option.

4.4 Optional Hardware Keyboard Operation

The optional hardware keyboard can also be used to access the software items.

To choose a software button:

1. Press < TAB> until the desired button is highlighted.
2. Press <SPACE BAR> or <ENTER> to press the button.

To change the value inside an edit box:

1. Press < TAB> until the cursor is in the desired edit box.
2. Type the new value.
3. Press < ENTER > to confirm the value.

4.5 Entering Numeric Values

To enter a numeric value into any edit box:

1. Double-click the edit box, using the **right** mouse key, to open the **KEYPAD** window shown in Figure 4-6.

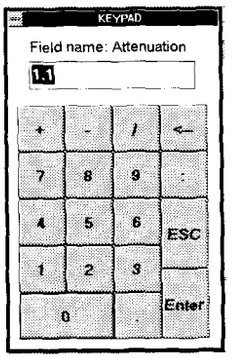


Figure 4-6. Keypad Window

2. Choose the appropriate buttons corresponding to the desired value.
   - Enter a positive or negative value using the [+] or [-] keys.
   - Choose [<-] to erase a digit.
   - Choose [:] to enter time indications.
3. Choose [Enter] to confirm the selection and return to the previous window.

***Note**: Choose [ESC] to leave the **KEYPAD** window without updating the value.*

5 OPERATION

The many features of the IQ-1200 4-Channel Power Meter are controlled using the WINDOWS compatible software already installed on the IQ-203. Please refer to the IQ-203 Instruction Manual for information regarding the IQ-203 operating system and front panel operation.

5.1 IQ-1200 Main Window Activation

In order to operate or control the power meter, the IQ-1200 Main window must be open.

To open the IQ-1200 Main window:

- Press the LED push button on the front face of the module,

or

- Double-click on the IQ-1200 icon in the EXFO Optical Test System main window.

or

- Use <TAB> to choose the IQ-2100 icon in the IQ-203 Optical Test System main window and press <ENTER> to open the IQ-2100 Main window.

Activating the window loads the IQ-1200 application software.

5.2.1 Title Bar and Menu Bar

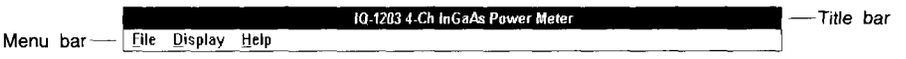


Figure 5-2. IQ-1200 - Title Bar and Menu Bar

Title Bar:

The Title Bar shown in Figure 5-2 indicates power meter type.

Menu Bar:

Three pull down menus are accessible from the menu bar:

- **File**
- **Display**
- **Help**

To return to the IQ-1200 Main window, double-click anywhere in the monitor window or push the IQ-1200 push button.

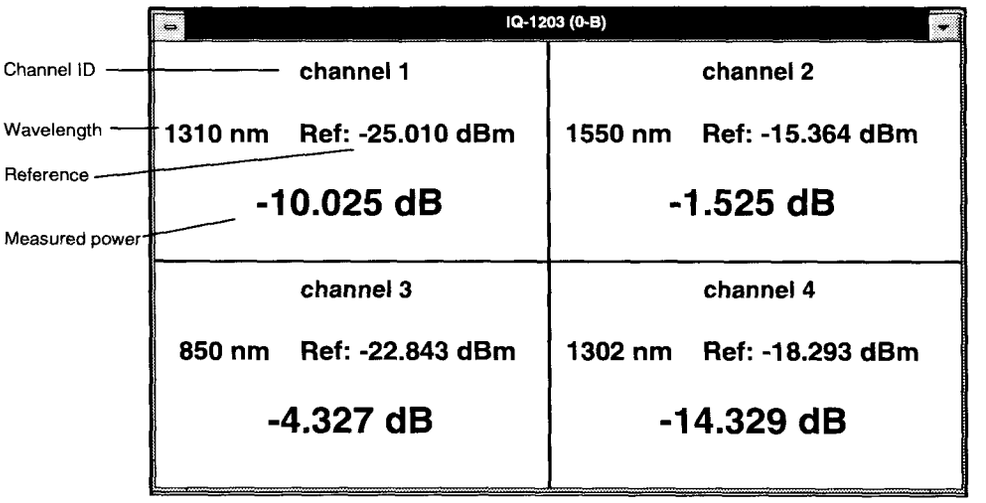


Figure 5-5. IQ-1200 Monitor Window

***Note**: IQ-1200 function buttons can be accessed, while in monitor window mode, by positioning the cursor inside the monitor window and clicking the right mouse key. The function button keypad will appear to the left of the monitor window.*

Help menu:



Figure 5-6. Help Menu

- Select **Contents...** to open the IQ-1200 application Help file.

5.2.2 Function Buttons

The function buttons, located on the left side of the IQ-1200 Main window, are used for direct control of the IQ-1200 Power Meter. Table 5-1 provides a quick reference guide to these controls.

BUTTON	DESCRIPTION
λ F2	• For the selected channel, switches to the next wavelength as defined by the contents of the λ list box (refer to Section 5.6, *Setting Wavelength*).
F3 Ref	• For the selected channel, takes a reference power measurement for the current wavelength (refer to Section 5.7.2, *Setting a Reference / Relative Display* Mode).
dB F4	• For the selected channel, switches to Relative display mode where the value displayed is equal to the absolute power minus the reference power. (refer to Section 5.7.2, *Setting a Reference / Relative Display* Mode).
F5 dBm	• For the selected channel, switches to Absolute mode displaying power values in dBm (refer to Section 5.7.1, *Absolute Mode*).
Watt F6	• For the selected channel, switches to Absolute mode displaying power values in pW, nW, μW, or mW (refer to Section 5.7.1, *Absolute Mode*).
F7 Chan	• Switches to the next channel.
F_	• Transfers control to the IQ-203 front panel function keys (refer to the IQ-203 Instruction Manual).

Table 5-1. IQ-1200 - Function Buttons

5.2.4 Data and Status Display

The Data and Status display portion of the IQ-1200 Power Meter Main window, shown in Figure 5-8, is comprised of list boxes, edit boxes, and display boxes.

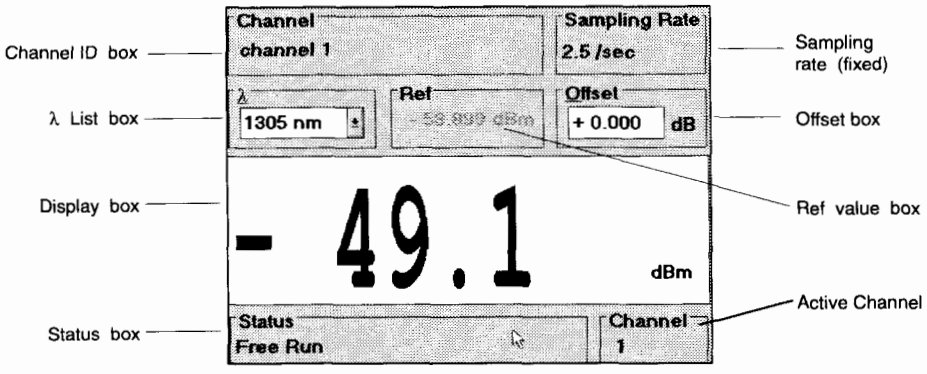


Figure 5-8. IQ-1200 - Data and Status Display

A description of these various screen components is provided, on the following page.

5.3 Exiting the IQ-1200 Main Window

To exit the IQ-1200 Main window and close the software application:

1. From the IQ-1200 window, click on **Display**.
2. From the **Display** menu, Click on **Monitor**. This switches to the monitor window.
3. Click on the control-menu box (in the upper left of the monitor window) and select **Close** or,

   Double-click on the control-menu box.

   Choose **Exit** in the **File** menu.

This procedure closes the software application, frees system memory, and decreases IQ system load.

5.4 Offset Nulling

Before proceeding with optical power measurements, the IQ-1200 electronic offset null measurement should be performed for each channel.

IMPORTANT

The null measurement should be performed with the protective cap fitted over the detector.

Offset nulling provides a zero power reference measurement. It is designed to nullify the effects of any internal electronic signals, which may drift over long periods of time or with changes in ambient temperature. For optimum performance, it is recommended that a null measurement be performed prior to



Figure 5-10. Nulling in Progress

To perform the null measurement for a specific channel:

1. Install a protective cap on the detector port of the channel being calibrated.
2. Choose the Channel button. The **Channel Setup** window, as shown in Figure 5-9, will open.
3. From the **Channel #** list box in the upper left corner of the **Channel Setup** window, select the channel to be calibrated.
4. Choose the Null button. The null measurement will take approximately 10 seconds. During this time the message "**Nulling in progress...**" will be displayed.

To select a channel from the Channel Setup window:

1. From the **Channel Setup** window, choose the ▼ button to open the **Channel #** list box as shown in Figure 5-11.

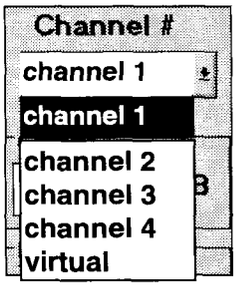


Figure 5-11. Channel Selection

2. Click on the desired channel.
3. Choose OK to close the **Channel Setup** window.

***Note**: To close the **Channel Setup** window without recording the current changes, choose* Cancel.

5.5.3 Entering a Channel Name

A name can be given to each channel, including the virtual channel. Text entered in the **Name** box will be displayed in the IQ-1200 window. Any alphanumeric text may be entered. The channel name should be as descriptive as possible.

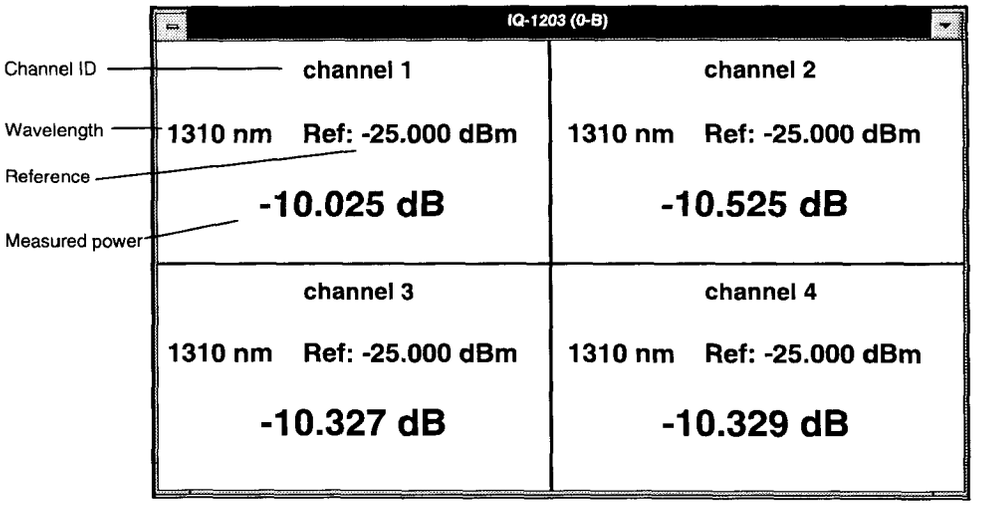


Figure 5-13. IQ-1200 Monitor Window

To add a channel to the Monitor window:

1. From within the **Channel Setup** window, select the desired channel (refer to Section 5.5.2, *Channel Selection*).
2. Click on the **Monitor Display** check box, as shown in Figure 5-14.

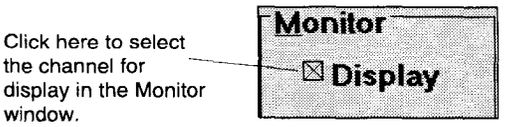


Figure 5-14. Adding a Channel to the Monitor Window

5.5.5 Selecting Display Units

Power measurements can be displayed in dB, dBm, or watt. When units are in watt, the software automatically selects pW, nW, µW, or mW, depending on the measured power.

Note: *Display units can also be selected using the IQ-1200 window function keys (i.e.* dB F4, F5 dBm, *or* Watt F6*)*

To select channel display units:

1. From within the **Channel Setup** window, select the desired channel (refer to Section 5.5.2, *Channel Selection*).
2. Choose the ▼ button to open the **Units** list box as shown in Figure 5-15.

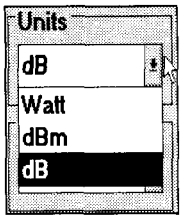


Figure 5-15. Selecting Channel Units

3. Click on the desired units.
4. Choose OK to close the **Channel Setup** window.

Note: *To close the* ***Channel Setup*** *window without recording the current changes, choose* Cancel.

5.5.7 Setting an Offset Value

When a non-zero offset value is defined, the displayed power is equal to the actual power plus the offset value. The offset value can be positive or negative, and is always expressed in dB. Offsetting measured power is useful when compensating for known power losses.

***Note**: The offset value is applied only when units of dB or dBm are selected..*

To set a channel offset value:

1. From within the **Channel Setup** window, select the desired channel (refer to Section 5.5.2, *Channel Selection*).
2. Double-click (right mouse key) on the **Offset** edit box.

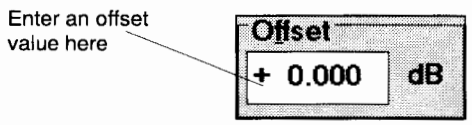


Figure 5-17. Offset Edit Box

3. Using the software keypad, enter the offset value.
4. Choose OK to close the **Channel Setup** window.

***Note**: To close the **Channel Setup** window without recording the current changes, choose* Cancel.

***Note**: The offset value can also be modified from the main IQ-1200 display window.*

5. Once all values have been added, choose the OK button to close the **Channel Setup** window.

To delete a value from the λ list box:

1. From within the **Channel Setup** window, select the desired channel (refer to Section 5.5.2, *Channel Selection*).
2. Highlight the wavelength to be deleted.
3. Choose the Delete button.
4. Choose the OK button to close the **Channel Setup** window.

*Note: To close the **Channel Setup** window without recording the current changes, choose the Cancel button.*

5.5.9 Virtual Channel Definition

The **Virtual channel** is generated by the IQ-1200 software. Measurement values from any two optical channels are either added or subtracted to produce the **Virtual channel** value. This feature provides an extremely flexible data display channel. The virtual channel is used and controlled in the same way as the four optical channels.

To define the virtual channel:

1. From within the **Channel Setup** window, select the virtual channel (refer to Section 5.5.2, *Channel Selection*).

5.6 Setting Wavelength

When performing accurate optical power measurements, it is important that the power meter be set to the correct wavelength. Ideally, the channel wavelength should be as close as possible to the wavelength of the optical source being used. As previously mentioned, the contents of the λ list box determine which wavelengths are available during operation. Refer to Section 5.5.8, *Adding and Deleting Wavelengths*, for a procedure outlining how to customize the list of available wavelengths.

To set a channel wavelength:

1. Select the desired channel.
2. From the IQ-1200 window, choose the button to open the λ list box as shown in Figure 5-20.

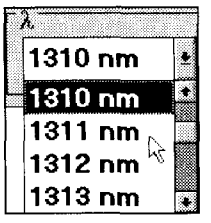


Figure 5-20. Setting Wavelength

3. Click on the desired value. The list box will close and the selected value will be displayed.

4. Depending on the desired display units, choose either F5 dBm or Watt F6.

***Note**: When displaying absolute power, the **Ref** value appears gray.*

5.7.2 Setting a Reference / Relative Display Mode

Relative power can be positive or negative, and is equal to absolute power minus a previously defined reference power. Figure 5-22 illustrates an example where the measured power is equal to the reference value (-45.654 dBm). In this particular example, the relative power is 0.0 dB.

***Note**: Relative power is always displayed in dB.*

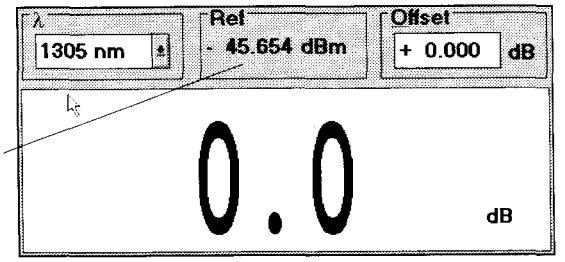


Figure 5-22. Relative Display Mode

In order to display meaningful relative power values, it is important that an appropriate reference power be established.

***Note**: A reference value is a power measurement (i.e. the reference cannot be entered by editing the value).*

5.7.3 Offset Mode

An offset can be applied to any measurement that is displayed in either dB or dBm. The offset value, which can be positive or negative, is added to the measured power. This feature provides additional flexibility that can be useful when compensating for a power gain or loss.

To use offset display mode:

1. Select the desired channel.
2. Select the appropriate wavelength.
3. Choose either F5 dBm or dB F4, depending on the desired display units.
4. Double-click on the **Offset** edit box.

Note: The offset value can also be set from within the ***Channel Setup*** *window.*

5. Using the software keypad, enter the offset value. Offset values between -99.999 dB and 99.999 dB can be entered.

IMPORTANT

When the display units are in watt, the offset is not applied, and the Offset value appears gray.

Three acquisition modes are provided:

- Timer mode
- Trigger mode
- Delay mode

***Note**: During acquisition, data is recorded for all four optical channels plus the virtual channel (if it has been defined).*

5.8.1 Timer Acquisition

Timer acquisition starts as soon as **Start** is chosen, and continues for the time specified in the **Duration** box.

To use timer acquisition:

1. From the IQ-1200 window, choose the **Acquisition** button to open the Acquisition Setup window.
2. Select the appropriate wavelength.
3. Click on the **Timer** radio button.
4. Double-click (right mouse key) on the **Duration** edit box.
5. Using the software keypad, enter the duration. The format for duration is HH:MM:SS. Acquisition duration between 00:00:01 and 99:59:59 may be entered.
6. Choose the **File name** button. In the dialog box, enter the filename (and subdirectory) to which the data is to be saved.
7. Choose the **Start** button. The Acquisition Setup window will close and data recording will begin. During acquisition, **Acquiring** is displayed in the **Status** box.

***Note**: The trigger defines the condition for starting data acquisition. Once begun, acquisition will continue for the specified duration regardless of measured power.*

➤ ***Tip**: Any channel, including the Virtual channel, can be used to define the trigger condition.*

To use trigger acquisition:

1. From the IQ-1200 window, choose the Acquisition button to open the Acquisition Setup window.

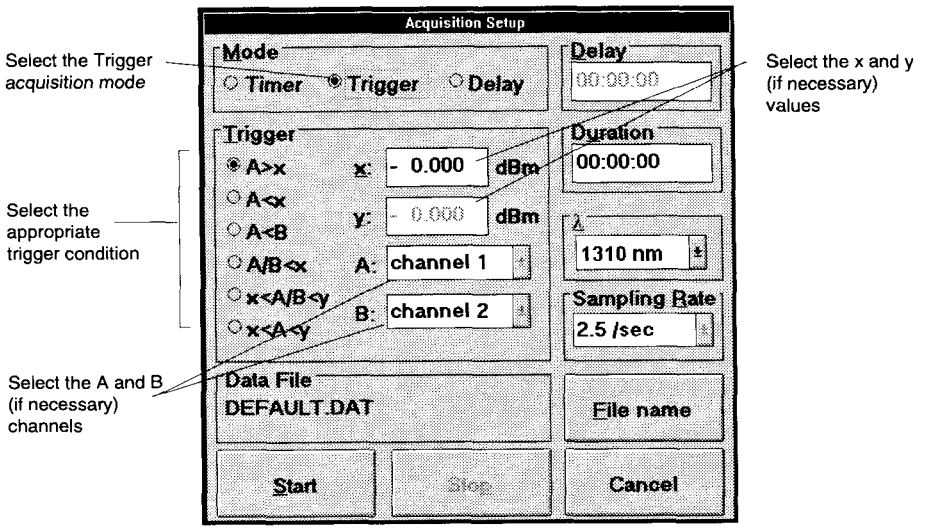


Figure 5-25. Using Trigger Acquisition

2. Select the appropriate wavelength.

5.8.3 Delay Acquisition

Delay acquisition starts a specified time (the delay) after **Start** is chosen, and continues for the time specified in the **Duration** box.

To use delay acquisition:

1. From the IQ-1200 window, choose the **Acquisition** button to open the Acquisition Setup window.
2. Select the appropriate wavelength.
3. Click on the **Delay** radio button, as shown in Figure 5-24.

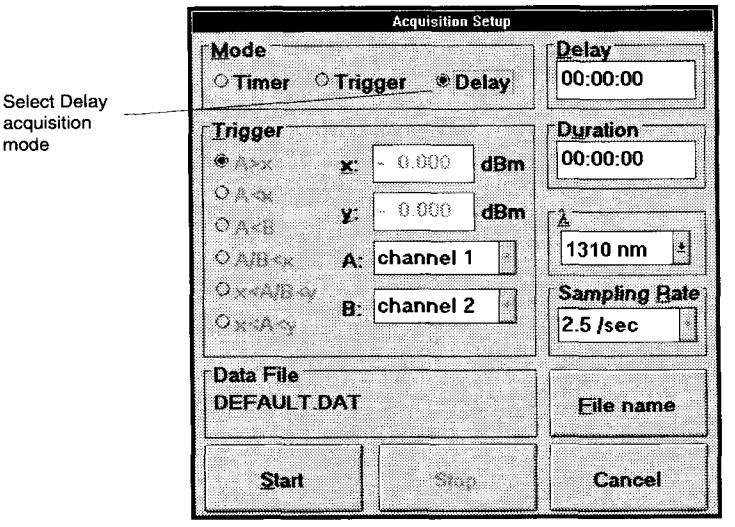


Figure 5-24. Selecting Delay Trigger

5.8.4 Viewing Acquisition Data

Acquisition files are saved in text format. Data may be viewed or printed using any text editor or word processor. The text format is designed (field delimiter is the **Tab** character) so that the file can be easily imported into most popular spreadsheet programs. Figure 5-25 and Figure 5-26 illustrate an example.

***Note**: The IQ-203 operating system has three text editors; WINDOWS Write, WINDOWS Notepad, and MS-DOS Editor.*

```
EXFO_FILE: ACQFILE PM  4 CHAN.
VERSION: 1.0

DATE: Tue Oct 10 1995
TIME: 16:09:28

CHANNEL: Channel 1  Channel 2  Channel 3 Channel 4
NAME:  channel 1 channel 2 channel 3 channel 4
LAMBDA: 1305 nm 1305 nm 1305 nm 1305 nm
OFFSET[dB]:  +12.000  +02.000 +06.000 +00.000
REF.[dBm]:  -30.000  -30.000  -30.000  -30.000
RATE:  2.5 /sec    2.5 /sec    2.5 /sec    2.5 /sec
UNITS:   dBm   Watt  dBm   dB
DIGITS:  2  2 1 2
AVRG: Off

Time[sec.]  channel 1   channel 2   channel 3   channel 4

0.800  -036.50E+00  +015.06E-09  -042.1E+00  -018.32E+00
1.200  -036.50E+00  +015.06E-09  -042.1E+00  -018.31E+00
1.600  -036.50E+00  +015.07E-09  -042.1E+00  -018.31E+00
2.000  -036.50E+00  +015.07E-09  -042.1E+00  -018.31E+00
2.400  -036.51E+00  +015.07E-09  -042.1E+00  -018.31E+00
2.800  -036.51E+00  +015.08E-09  -042.1E+00  -018.30E+00
3.200  -036.53E+00  +015.02E-09  -042.1E+00  -018.32E+00
3.600  -036.53E+00  +015.01E-09  -042.1E+00  -018.32E+00
4.000  -036.53E+00  +015.01E-09  -042.1E+00  -018.33E+00
```

Figure 5-25. Acquisition Data displayed by Text Editor

6 SUGGESTED APPLICATIONS

6.1 Introduction

The IQ-1200 is available with the following detector types.

- Silicon (Si)
- Germanium (Ge)
- High power Germanium (Ge)
- Indium Gallium Arsenide (InGaAs)

The spectral range and power sensitivity for each detector type is different. Depending on the specific application (i.e. power level and wavelength), it is important that the appropriate detector be used. Please refer to Chapter 8, *Technical Specifications*, for the recommended usable range of each detector type.

When making accurate, meaningful and repeatable power measurements it is important to consider the following points.

- Connectors, ports, fiber ends, and detector windows should be clean at all times. Appropriate test jumpers, connectors, and adapters must be used.
- A null measurement should be performed prior to each user session or whenever there is a significant change in ambient temperature.
- Since optical losses vary, depending on the launch and receive conditions and fiber type, controlling these conditions with mode filters and strippers is essential.
- Once a reference power has been taken, minimize the number of disturbed connections.
- The optical source should be stable.

4. The absolute optical power can now be monitored and recorded for each of the channels.

➤ ***Tip**: The virtual channel is an excellent tool for comparing two optical channels. For example, if two devices (connected to channels 1 and 2) are supposed to have identical power levels, displaying a virtual channel (defined as channel 1 minus channel 2) provides easy monitoring of both devices, and will quickly highlight any power fluctuations.*

6.3 Measuring Insertion Loss

It is often necessary to accurately measure the insertion loss of a fiber-optic component. Using the IQ-203 with a light source (IQ-2100) and IQ-1200 power meter, this is a simple procedure.

To measure insertion loss:

1. Using two appropriate test jumpers and a bulkhead adapter, connect as shown in Figure 6-2.

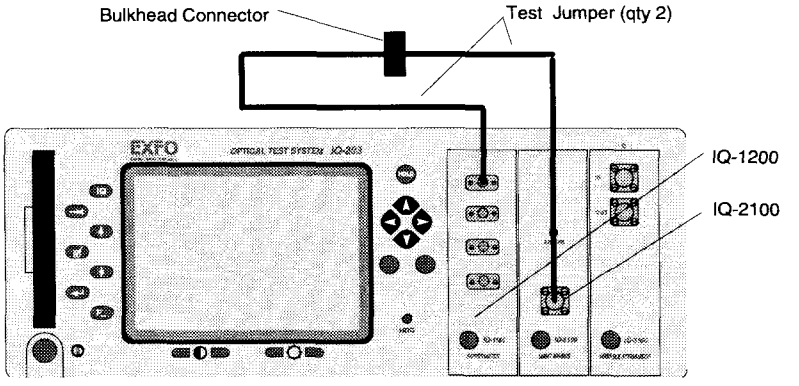


Figure 6-2. Setup for Taking a Reference Measurement

6. The relative power displayed by the IQ-1200 is the insertion loss of the device under test.

Since the IQ-1200 is a 4 channel power meter, the above procedure could be used to perform 4 simultaneous insertion loss measurements as shown in Figure 6-4.

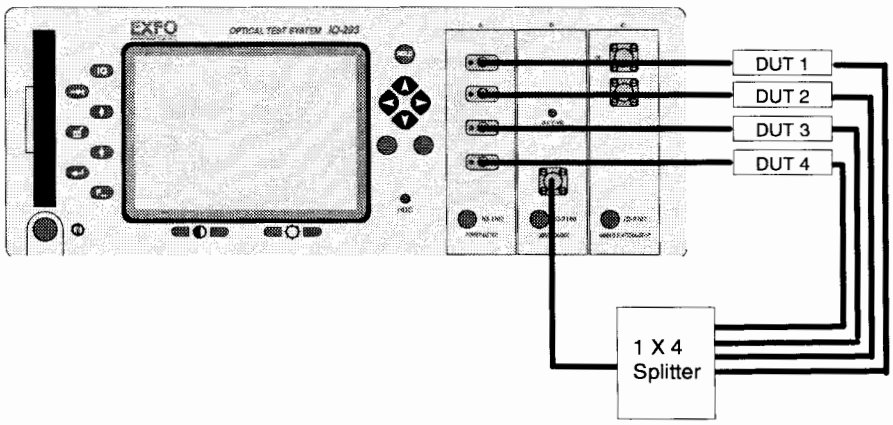


Figure 6-4. Multi-device Insertion Loss Testing

7 MAINTENANCE AND TROUBLESHOOTING

7.1 Maintenance

There are no user-serviceable components inside the IQ-1200. The module has been designed to require minimum maintenance and to provide reliable operation for many years to come.

The fiber ends must be kept clean at all times, as explained in Section *Module Setup*, to ensure a proper measurement.

The only recommended internal maintenance is regular cleaning of the optical detector ports.

IMPORTANT

When the IQ-1200 is not being used, the protective caps should be fitted over the detector ports.

To clean an IQ-1200 detector port:

1. Remove the protective cap.
2. Gently wipe the port with a lint-free swab dipped in isopropyl alcohol.
3. Dry using a bottle of clean compressed air.

7.3 Troubleshooting

Problem	Probable Cause	Recommended Action
LED push button does not illuminate	- Power not on	- Check AC power cord and power ON the IQ-203 and IQ-206. - Refer to IQ-203 manual to verify fuse
	- Module is not properly inserted	- Power OFF the IQ-203 and IQ-206, remove and reinstall the module
	- Computer crashes	- Reboot the IQ-203
	- LED is burnt	- Call EXFO
Pushing the LED push button does not open the module Main window	- Computer crashes	- Reboot the IQ-203
IQ-1200 is not responding to new commands	- IQ-203 is still processing old commands (**Processing...** is displayed in status box)	- New commands will be executed on completion of current processing
Dashed line displayed as power value (----------)	- Power level is below the minimum detectable power	- No action required
Questionable power measurements	- Dirty optical connectors	- Clean all optical connections
	- Incorrect offset nulling	- Perform an offset nulling with protective cap installed
	- Improper wavelength selected	- Switch to the correct wavelength on all instruments being used
	- Optical source is unstable	- Wait for source to stabilize

- In all cases, if problem persists after performing recommended action, call EXFO (see *Getting Help*).

8 IQ-1200 TECHNICAL SPECIFICATIONS

8.1 Specifications Page

MODEL	IQ-1211	IQ-1202	IQ-1212X	IQ-1213
Detector Type	Si	Ge	Ge X	InGaAs
Detector Size - mm	1	1	2	1
Dynamic Range - dBm	+10 to -85	+10 to -77	+25 to -65	+10 to -85
Spectral Range - nm	450 to 1100	750 to 1700	750 to 1700	800 to 1700
Accuracy - dB	± 0.2 (5%)			
Resolution - dB	0.001			
Linearity - dB	±0.015 to -55 (from 0 dBm)	±0.015 to -47 (from 0 dBm)	±0.015 to -35 (from 0 dBm)	±0.015 to -55 (from 0 dBm)
Spectral Resolution - nm	1			

Operating Environment	
Operating temperature	32 to 122 °F (0 to +50 °C)
Storage temperature	-40 to 158 °F (-40 to +70 °C)
Relative humidity[1]	0 to 80 % non-condensing

Mechanical Specifications	
Dimensions	Width: 1.5" (3.8 cm) Height: 4.75" (12.0 cm) Length: 10.3" (26.2 cm)
Weight	1.40 lb (0.63 kg)

1. Measured in 0°- 40°C temperature range.

9 GENERAL INFORMATION

9.1 Warranty

EXFO E.O. Engineering (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. This warranty also covers recalibration during the first year if the equipment is repaired or if the original calibration is erroneous.

IMPORTANT

The warranty can become null and void if:

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

9.4 Certification

EXFO certifies that this equipment met its published specifications at the time of shipment from the factory. EXFO further certifies that its calibration measurements are traceable to the U.S. National Institute of Standards and Technology (NIST) laboratories. If this equipment requires regular recalibration, a Certificate of Calibration will be included with the unit, replacing the standard Certificate of Quality. The Certificate of Calibration contains the date of the equipment's last calibration and the recommended interval for recalibration.

9.5 Service and Repairs (Under Warranty or Other)

To obtain service or repair for any equipment, follow the procedure below.

- Call the EXFO Product Support Group. Support personnel will determine if the equipment requires service, repair, or calibration.

Product Support Group:

USA and Canada
Tel.: 1-800-663-EXFO
Fax: 1-418-683-2170

International
Tel.: 1-418-683-0211
Fax: 1-418-683-2170

EXFO Europe
Tel.: 33-1-34.63.00.20
Fax: 33-1-34.65.90.93

9.6 Transportation and Storage

Stay within a temperature range of -35 to +70°C when transporting or storing the unit. Transportation damage can occur from improper handling. Therefore, the following steps are recommended to minimize the possibility of damage.

- If the unit is to be shipped, pack it in the original packing material for best protection.
- When not in use, store unit at room temperature in a clean and dry area. Avoid high humidity or large temperature fluctuations.
- Keep the unit out of direct sunlight.
- Avoid unnecessary shock and vibration.

10 CUSTOMER COMMENTS

10.1 IQ Comments

At EXFO, we are continuously looking for ways to improve our products. We would appreciate any comments or suggestions that you may have concerning the operation and service of the IQ Product Line. Please contact our Product Support Group at 1-800-663-EXFO (fax: 1-418-683-2170). When calling, please provide the following information:

1) Part Number: IQ-_____ Serial Number: _____

2) Product/Software Version: _____
(indicated in **About** IQ-203 window)

3) User Name: _____

Company Name: _____
Address: _____
_____
_____

Telephone: _____ Fax: _____

4) Brief description of the product application.
_____
_____
_____

5) Comments or description of problems (if any).
_____
_____
_____
_____

11 INDEX

—A—

abbreviations....1-2
about IQ-3200 window....5-6
absolute mode....5-26
absolute power, measuring....6-2
acquisition....5-30
  delay....5-35
  timer....5-31
  trigger....5-32
  viewing data....5-37
alphanumeric keypad....4-8
applications....6-1

—C—

calibration, annual....7-2
calibration, offset....5-11
certification....9-3
Channel button....5-7
channel configuration....5-14
channel name....5-15
channel selection....5-14
check boxes....4-3
cleaning
  fiber end....3-6
cleaning detector ports....7-1
comments....10-1
conventions
  CAUTION....1-3
  choose....4-1
  click....4-1
  double-click....4-1
  IMPORTANT....1-3
  WARNING....1-3

—D—

data acquisition....5-30
date of manufacture....2-2
dB button....5-7
dBm button....5-7
description, front panel....2-3
detector ports....2-4
display, data and status....5-9

—E—

edit box....4-2
exiting....5-11

—F—

F_ button....5-7
features offered....1-1
file menu....5-4
front panel hardware key operation....4-4
function buttons....5-7
function buttons, with monitor window....5-5

—H—

hard disk storage space....5-6
help menu....5-5

—W—

warranty information 9-1
Watt button 5-7
wavelength, adding and deleting 5-22
wavelength, setting 5-25
window activation 5-1
window description 5-2

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