

# User's Guide

Fiber Optic Power Meter  
FPM-8220  
LabView Driver



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# Chapter 1:

## Introduction

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This chapter is an introduction to the FPM-8220 Fiber Optic Power Meter LabVIEW Instrument Driver. This chapter also includes:

- ✓ LabVIEW Instrument Driver Overview
- ✓ USB Communication Overview
- ✓ GPIB Communication Overview

### FPM-8220 LabVIEW Instrument Driver Overview

The FPM-8220 LabVIEW Instrument Driver is a collection of Virtual Instruments (VIs) that allow for remote control of the instrument. These VI's can be used either independently or as building blocks for a larger, more complex VI. Remote control can be accomplished using VISA sessions over either of the two communication channels listed below.

### USB Communication

The USB connector is located on the rear panel of the instrument. This USB connector is the square "B"-style connector. A standard USB A/B cable is required.

### Configuring the COM Port

With the connected instrument powered on, open National Instruments Measurement & Automation Explorer and select the port to which the instrument is connected. The correct port will be listed under **My System → Devices and Interfaces → Serial & Parallel**. If the instrument is connected to a remotely accessed computer, please see the troubleshooting section of Chapter 3.

When the correct port is highlighted, the Baud rate, Data bits, Parity, Stop bits and Flow control can be adjusted. From the drop down menu, select the following values:

Baud: 115,200  
Data Bits: 8  
Parity: None  
Stop Bits: 1  
Flow Control: None

After the correct values are selected, click **Validate** and then **Save**. The COM port is now configured.

### GPIB Communication

The GPIB connector is also located on the rear panel of the instrument. See the FPM-8220 Product Manual for instructions on setting the GPIB address using the front panel controls.



# Chapter 2: Operation

This chapter is an introduction to the LabVIEW software and the FPM-8220 Fiber Optic Power Meter LabVIEW Instrument Driver. This chapter also includes:

- ✓ Common Instrument Driver Features
- ✓ FPM-8220 Sub-VI Descriptions
- ✓ FPM-8220 VI Descriptions

## Front Panel vs. Block Diagram

The Front Panel appears when a sub-VI is opened. The Front Panel for every sub-VI includes VISA session IN and OUT ports, as well as error IN and OUT ports. Additionally, there are inputs and outputs relating to the specific operation the VI.

To open the Block Diagram of the sub-VI, select **Window** in the toolbar of the Front Panel and choose **Show Block Diagram**. The Block Diagram displays the code that communicates with the instrument. The information required by the code appears as a labeled icon in the Block Diagram and is input by the user on the Front Panel. The information output by the code also appears as a labeled icon and is displayed on the Front Panel. The Front Panel and the Block Diagram of a sub-VI are two different views of the same code.

## VISA Session IN and OUT

The VISA Session box on the Front Panel provides a drop down menu of the remote addresses available. The VISA Session OUT outputs the VISA Session address that was input to the sub-VI. Although this seems redundant inside of the sub-VI, it creates flow between sub-VIs. See the example below.

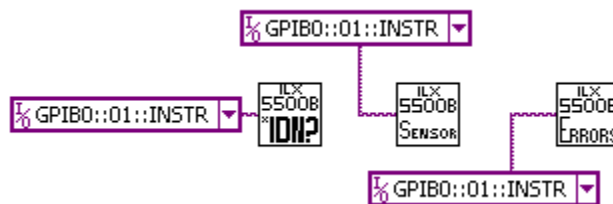


Figure 1: Three sub-VIs without VISA Session IN/OUT are controlling the same instrument.



Figure 2: Three sub-VIs with VISA Session IN/OUT are controlling the same instrument. The VISA Sessions OUT make it possible to input the address once and reduce the clutter.

## Updating the Sub-VI

Press the white arrow located in the toolbar of the Front Panel and the Block Diagram to execute the sub-VI. To execute a sub-VI means to update the instrument with values input by the user or query the instrument. If there is not a white arrow, but a broken gray arrow, see the [Errors](#).

## FPM-8220 Sub-VI Descriptions

### FPM-8220 Read Instrument ID

Queries the instrument with the IEEE 488.2 command \*IDN? and returns the manufacturer, model number, serial number and firmware version number as a string.

### FPM-8220 Read Errors

Reads the instrument's error queue and returns it as a string. See the FPM-8220 Manual for more information.

### FPM-8220 Read Head ID

Queries the instrument with the command SLOT:HEAD:IDN? and returns the connected measurement head manufacturer, model number, serial number and firmware version number as a string. If no head is connected, the returned string will be "No Head Connected". There is also a boolean return value that indicates whether or not a head is connected. This value can be useful for control logic that depends on the presence of a head.

### FPM-8220 Set/Read Brightness

Sets or read the brightness of the instrument's physical front panel display. The brightness is an integer, range 1-10.

### FPM-8220 Set/Read Display Enable

Sets or reads the display enable control using a boolean. This will turn on/off the instrument's physical front panel display.

### FPM-8220 Set/Read Filter

Sets or reads the instrument's filter rate. The input to Set Filter is an enumerated value that can be either SLOW, MEDIUM, or FAST. Read filter returns the filter rate as a string.

### FPM-8220 Read GPIB Address

Reads the GPIB address and returns it as an integer.

### FPM-8220 Set/Read Mode

Sets or reads the instrument's current measurement mode. The input to Set Mode is an enumerated value that can be W, DB, or DBM. Read Mode returns the measurement mode as a string.

### FPM-8220 Read Power

Reads the current measured power as a floating point number.

### FPM-8220 Set/Read Radix

Sets or reads the current radix for remote number entry and display. The input to Set Radix is an enumerated value that can be DEC, HEX, BIN, or OCT. Read Radix returns the radix as a string.



### FPM-8220 Set/Read Range

Set Range sets either the power measurement range or puts the instrument into auto-ranging mode. The Range input is an integer from 0 to 7. The auto-range input is a boolean. If Auto is set to true, it will take precedence over the Range input. Read Range returns the current power measurement range (0-7) and whether or not the device is in auto-ranging mode (boolean).

### FPM-8220 Set/Read Reference

Sets or reads the power reference value using a floating point number.

### FPM-8220 Set/Read Wavelength

Sets or reads the measurement wavelength. The wavelength is an integer that can range from 800-1650 (nm).

### FPM-8220 Zero Instrument

This VI performs the instrument zeroing process. If there is an error during the zeroing process, the boolean output "Zeroing error" is asserted.

## FPM-8220 Example VI Description

### FPM-8220 Example VI

This VI uses a number of sub-VI's to get the instrument and head IDs, as well as read the power in Watts and dBm at a specified wavelength.



# Chapter 3:

## Errors and Troubleshooting

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This chapter is an introduction to the FPM-8220 Fiber Optic Power Meter LabVIEW Instrument Driver's common errors. This chapter also includes:

- ✓ Troubleshooting
- ✓ NI Spy

### Errors

**Broken Gray Arrow:** If a broken gray arrow appears in the toolbar (where the white arrow should be) and the white arrow is not there, this indicates an error in the code. Click on the broken arrow to see a list of the errors in the sub-VI. Enter the Block Diagram to correct these errors.

### Troubleshooting

***I want to configure the COM port, but the correct port is not appearing in Measurement & Automation Explorer.***

In Measurement & Automation Explorer (MAX), select **View** and then **Refresh**. The COM port to which the instrument is connected will appear.

***The instrument that I want to configure is connected to a computer that I am remotely accessing.***

The COM port needs to be configured on the computer to which the instrument is connected.

***The VISA address that I want to select in a sub-VI does not appear in the drop down menu of the Front Panel.***

Select **Refresh** at the bottom of the drop down list and the VISA address will appear.

### NI Spy

NI Spy is a free program that is available on the National Instruments website. When the application is opened and the capture is started, every interaction between the computer and the instrument is recorded. All errors are documented and explained.