

User's Guide

Precision Pulsed Current Source
LDP-3811
LabVIEWDriver



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Chapter 1 :

Introduction and Specifications

This chapter is an introduction to the LDP-3811 LabVIEW Instrument Driver. This chapter also includes:

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

LDP-3811 LabVIEW Instrument Driver Overview

The LDP-3811 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 LDP-3811 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 LDP-3811 LabVIEW Instrument Driver. This chapter also includes:

- ✓ Common Instrument Driver Features
- ✓ LDP-3811 Sub-VI Descriptions
- ✓ LDP-3811 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.

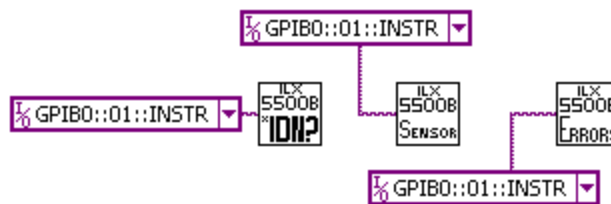


Figure 2.1 Three sub-VIs without VISA Session IN/OUT are controlling the same instrument.



Figure 2.2 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.

LDP-3811 Sub-VI Descriptions

LDP-3811 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.

LDP-3811 Read Errors

Reads the instrument's error queue and returns it as a string. See the LDP-3811 Manual for more information.

LDP-3811 Read Current Limit

Reads the current limit setpoint and returns it as a floating point in mA. Input is an enumerated value signifying whether to read the 200 or 500mA limit. This is the same enumerated value used in the Read Range sub-VI.

LDP-3811 Read Current Setpoint

Reads the current setpoint and returns it as a floating point number in mA.

LDP-3811 Read Duty Cycle Setpoint

Reads the duty cycle setpoint and returns the percentage as a floating point number. A returned value of 1.0 would signify a duty cycle of 1%.

LDP-3811 Read Mode

Reads the current control mode and returns it as an enumerated value. The enum is defined as:

CW	0
CONST %	1
CONST PRI	2
EXT TRIG	3

LDP-3811 Read Output Current

Reads the measured output current and returns it as a floating point number in mA.

LDP-3811 Read Output Duty Cycle

Reads the actual duty cycle and returns the percentage as a floating point number.

LDP-3811 Read Output Enable

Reads the state of the output and returns it as a boolean.

LDP-3811 Read Output PRI

Reads the value of the actual pulse repetition interval and returns the time as a floating point number in microseconds.

LDP-3811 Read PRI Setpoint

Reads the pulse repetition interval setpoint and returns the time as a floating point number in microseconds.

LDP-3811 Read Range

Reads the current range as an enumerated value. The enum is defined as:

200mA Range	0
500mA Range	1

LDP-3811 Set Current

Sets the current setpoint in mA.

LDP-3811 Set Current Limit

Sets the current limit for a specified range. The current limit input is a floating point number in units of mA. The range is specified via the same enum used in the Read Range sub-VI.

LDP-3811 Set Duty Cycle

Sets the duty cycle setpoint. The input is a floating point number percentage.

LDP-3811 Set Mode

Sets the operation mode using the same enum as the Read Mode sub-VI.

LDP-3811 Set Output Enable

Enables or disables the output using a boolean input.

LDP-3811 Set PRI

Sets the pulse repetition interval.

LDP-3811 Set Range

Sets the output range using the same enum as the Read Range sub-VI.

LDP-3811 Example VI Description

LDP-3811 Example

This example allows basic control parameters to be set, and display simple status information such as the output current and this ID string.

Chapter 3 :

Errors and Troubleshooting

This chapter is an introduction to the LDP-3811 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.