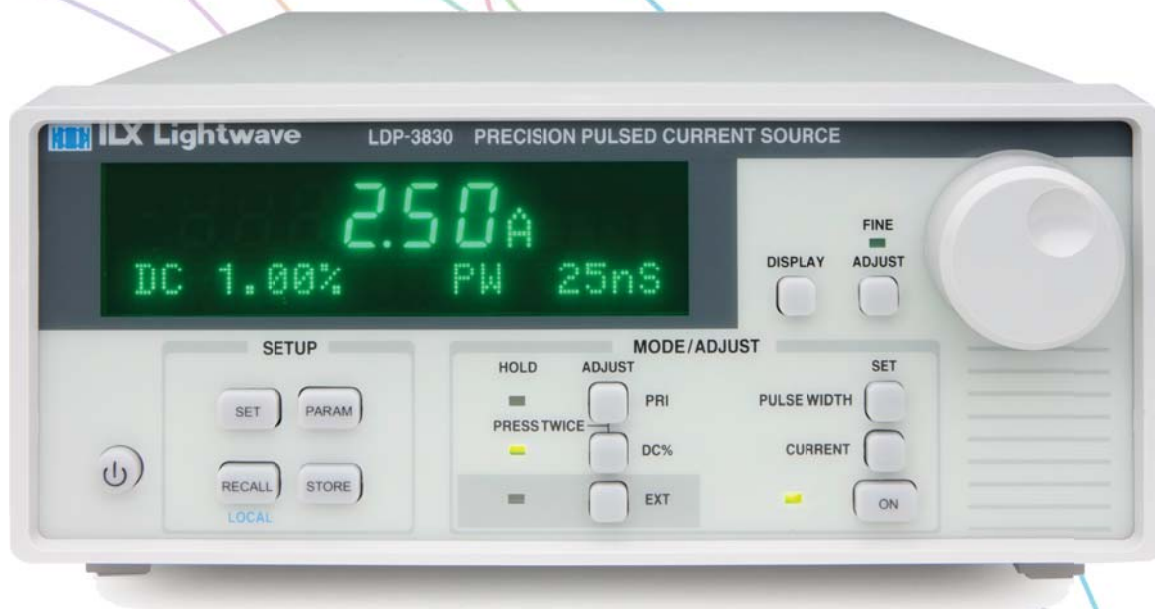


User's Guide

Precision Pulsed Current Source
LDP-3830
LabView Driver



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Chapter 1 :

Introduction and Specifications

This chapter is an introduction to the LDP-3830 LabVIEW Instrument Driver. This chapter also includes:

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

LDP-3830 LabVIEW Instrument Driver Overview

The LDP-3830 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-3830 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-3830 LabVIEW Instrument Driver. This chapter also includes:

- ✓ Common Instrument Driver Features
- ✓ LDP-3830 Sub-VI Descriptions
- ✓ LDP-3830 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.

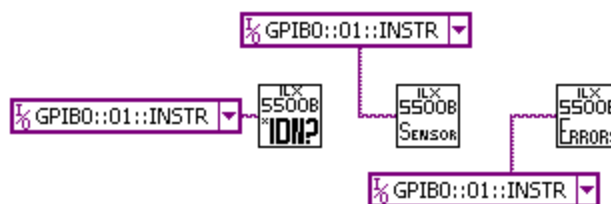


Figure 2.1 Three sub-VIs without VISA Session IN/OUT are controlling the same instrument.



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-3830 Sub-VI Descriptions

LDP-3830 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-3830 Read Errors

Returns the topmost entry in the instrument's error queue as a string. See the LDP-3830 Manual for more information.

LDP-3830 Read Current Limit

Reads the current limit and returns it as a floating point value in Amps

LDP-3830 Read Current Setpoint

Reads the current setpoint and returns it as a floating point value in Amps

LDP-3830 Read Output Current

Reads the latest measured output current and returns it as a floating point value in Amps

LDP-3830 Read Output Enable

Reads the status of the current output and returns it as a Boolean

LDP-3830 Read Pulse Board ID

Reads the Pulse Board ID string. The String is in the format <Manufacturer>,<Model>,<Serial>. Also returns a boolean that signifies the presence of a Pulse Board. This can be useful for logic that depends on the presence of a Pulse Board.

LDP-3830 Read Pulse Timing Parameters

Reads and returns the following parameters:

Parameter	Return Value Type
Duty Cycle	% (1 = 1%, .05 = .05%)
Period/PRI	Seconds
Pulse Width	Seconds
Trigger Source	String ("Immediate" or "External")

LDP-3830 Read Trigger In Delay

Reads and returns the trigger in delay in seconds

LDP-3830 Read Trigger Out Delay

Reads and returns trigger out delay in seconds

LDP-3830 Set Current Limit

Sets the current limit in Amps

LDP-3830 Set Current Setpoint

Sets the pulse current setpoint in Amps

LDP-3830 Set Output Enable

Enables or disables the pulse current output using a Boolean input

LDP-3830 Set Pulse Timing Parameters

Sets the following parameters using the specified units:

Parameter	Return Value Type
Duty Cycle	% (1 = 1%, .05 = .05%)
Period/PRI	Seconds
Pulse Width	Seconds
Trigger Source	Enum: 0 – External, 1 - Immediate

There is a Boolean associated with each parameter except for Trigger Mode. These Booleans enable which parameters are sent to the device, so any number of parameters can be sent at the same time. Note that it is illegal to send all three timing parameters at once.

LDP-3830 Set Trigger In Delay

Sets the trigger in delay in seconds

LDP-3830 Set Trigger Out Delay

Sets the trigger out delay in seconds

LDP-3830 Example VI Description

LDP-3830 Example

Reads parameter information from the LDP-3830 to give a general picture of the status of the instrument. Also allows setting of the current setpoint and output enable.

Chapter 3 :

Errors and Troubleshooting

This chapter is an introduction to the LDP-3830 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.