User's Guide

High Power Precision Current Source
LDX-32420
LabView Driver

ILX Lightwave
Photonic Test and Measurement

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Chapter 1 :
Introduction and Specifications

This chapter is an introduction to the LDX-32420 LabVIEW Instrument Driver. This chapter also includes:

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

LDX-32420 LabVIEW Instrument Driver Overview

The LDX-32420 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 LDX-32420 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 LDX-32420 LabVIEW Instrument Driver. This chapter also includes:

- ✓ Common Instrument Driver Features
- ✓ LDX-32420 Sub-VI Descriptions
- ✓ LDX-32420 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.
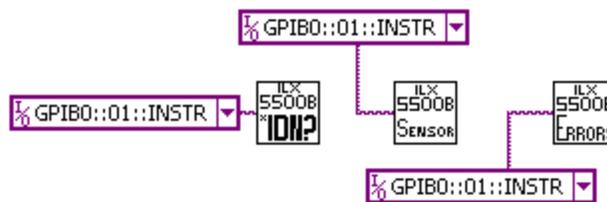
Figure 2.1 Three sub-VIs without VISA Session IN/OUT are controlling the same instrument.

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 <u>Errors</u>.

LDX-32420 Sub-VI Descriptions

LDX-32420 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.

LDX-32420 Read Errors
Reads the instrument's error queue and returns it as a string. See the LDX-32420 Manual for more information.

LDX-32420 Read Laser Condition Status Registers
Reads all conditions from the Laser Condition Status Register (Power Limit, Laser Current Limit, Voltage Limit, Interlock Error, Open Circuit, Output Shorted, Out of Tolerance, Output On, Ready for Cal Data) and returns them as a set of booleans.

LDX-32420 Set/Read Laser Control Mode
Sets the Laser Control Mode (IHBW, I, or MDP) using an enumerated value, or reads the control mode and returns it as an enumerated value.

LDX-32420 Set/Read Laser Current Limit
Reads the Laser Current Limit in Amps. There is an enumerated value input to select which Limit to read, since there are limits both 10A and 20A output ranges.

LDX-32420 Set/Read Laser Current Setpoint
Sets or reads the setpoint for the laser control current in Amps.

LDX-32420 Read Laser Current
Reads the most recent laser current measurement in Amps.

LDX-32420 Set/Read Laser Output Enable
Turns the laser on or off, or queries the status of the laser output and returns it as a boolean.

LDX-32420 Set/Read Laser Output Range
Sets or reads the output range (10A or 20A) using an enumerated value.

LDX-32420 Set/Read Laser Photodetector Current Setpoint
Sets or reads the laser photodetector current setpoint in µA.

LDX-32420 Read Laser Photodetector Current
Reads the most recent laser photodetector current measurement in µA.

LDX-32420 Set/Read Laser Photodetector Power Limit
Sets or reads the laser photodetector power limit in W.

LDX-32420 Set/Read Laser Photodetector Power Setpoint
Sets or reads the laser photodetector power setpoint in W.

LDX-32420 Read Laser Photodetector Power
Reads the most recent laser photodetector power measurement in W.

LDX-32420 Set/Read Laser Voltage Limit
Sets or reads the laser compliance voltage limit value in Volts.

LDX-32420 Read Laser Voltage
Reads the most recent laser voltage measurement in Volts.

LDX-32420 Set/Read Monitor Responsivity
Sets or reads the photodetector responsivity cal factor in µA/mW.

LDX-32420 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.

LDX-32420 Example VI Description

LDX-32420 Example VI
The example VI uses the sub-VI's to allow the user to set and read various parameters of the device using a simple interface.

Chapter 3 :
Errors and Troubleshooting

This chapter is an introduction to the LDX-32420 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.