User's Guide

Laser Diode Temperature Controller
LDX-3500B
LabView Driver

ILX Lightwave LDX-3525B PRECISION CURRENT SOURCE

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Chapter 1 :
Introduction and Specifications

This chapter is an introduction to the LDX-3500B Laser Diode Temperature Controller LabVIEW Instrument Driver. This chapter also includes:

- ✓ LabVIEW Instrument Driver Overview
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LDX-3500B LabVIEW Instrument Driver Overview

The LDX-3500B 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: 19,200
> 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.

Chapter 2 :
Operation

This chapter is an introduction to the LabVIEW software and the LDX-3500B Laser Diode Temperature Controller LabVIEW Instrument Driver. This chapter also includes:

- ✔ Common Instrument Driver Features
- ✔ LDX-3500B Sub-VI Descriptions
- ✔ LDX-3500B 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.
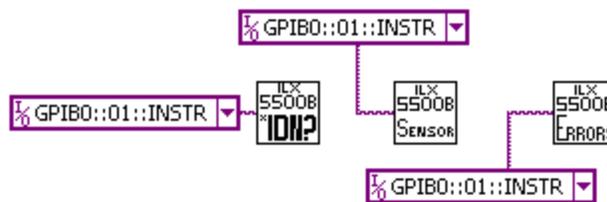
Figure 2.1 Three sub-VIs without VISA Session IN/OUT are controlling the same instrument.

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.

LDX-3500B Sub-VI Descriptions

All sub-VIs that are not labeled with a model number can be used for any model in the series. The sub-VIs that are labeled with a model number should be used for the specified model. When using a model specific sub-VI, be sure to check that the limits and setpoints are within the specifications for the instrument and the driven device.

Read Current Setpoint
Reads the current setpoint in mA.

Read Current
Reads the measured current in mA. If the output is disabled, this sub-VI will return 0.0.

Read Error Indicators
Queries the instrument for errors such as current limit, I_LIM?, open circuit or voltage limit, OPEN?, optical power limit, P_LIM? and un-shorted interlock, INTLCK?.

Read I High Range Limit
Reads the current limit, in mA, of the high output range.

Read I Low Range Limit
Reads the current limit, in mA, of the low output range.

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.

Read Mode
Reads the instrument's mode and returns ILBW for low bandwidth constant current mode, IHBW for high bandwidth constant current mode and P for constant optical power mode.

Read Optical Power Limit
Reads the optical power limit in mW.

Read Optical Power Setpoint
Reads the optical power setpoint in mW.

Read Optical Power
Reads the optical power, in mW, calculated by the instrument using the photodiode current measurement.

Read Output Range
Reads the range of the output and returns a "1" for low range and a "0" for high range.

Read Output Status
Reads the status of the output and returns a "1" for enabled and a "0" for disabled.

Read PD Cal Value
Reads the photodiode calibration value.

Set 3525B Current Setpoint
Sets the current setpoint, in mA, of the LDX-3525B, but does not enable the output. Make sure to check the selected output range and the current limit for the range.

Set 3525B I1 Current Limit
Sets the current limit, in mA, of the LDX-3525B for the low output range, but does not switch to that range.

Set 3525B I2 Current Limit
Sets the current limit, in mA, of the LDX-3525B for the high output range, but does not switch to that range.

Set 3525B Power Setpoint
Sets the optical power setpoint, in mW, for use only in the constant optical power mode of the LDX-3525B. The output is not enabled.

Set 3545B Current Setpoint
Sets the current setpoint, in mA, of the LDX-3545B, but does not enable the output. Make sure to check the selected output range and the current limit for the range.

Set 3545B I1 Current Limit
Sets the current limit, in mA, of the LDX-3545B for the low output range, but does not switch to that range.

Set 3545B I2 Current Limit
Sets the current limit, in mA, of the LDX-3545B for the high output range, but does not switch to that range.

Set 3545B Power Setpoint
Sets the optical power setpoint, in mW, for use only in the constant optical power mode of the LDX-3545B. The output is not enabled.

Set 3565B Current Setpoint
Sets the current setpoint, in mA, of the LDX-3565B, but does not enable the output. Make sure to check the selected output range and the current limit for the range.

Set 3565B I1 Current Limit
Sets the current limit, in mA, of the LDX-3565B for the low output range, but does not switch to that range.

Set 3565B I2 Current Limit
Sets the current limit, in mA, of the LDX-3565B for the high output range, but does not switch to that range.

Set 3565B Power Setpoint

Sets the optical power setpoint, in mW, for use only in the constant optical power mode of the LDX-3565B. The output is not enabled.

Set Mode

Set the instrument's operating mode to ILBW for low bandwidth constant current mode, IHBW for high bandwidth constant current mode and P for constant optical power mode.

Set Optical Power Limit

Sets the optical power limit in mW.

Set Output Range

Sets the output range of the instrument by sending "1" for the low range and "0" for the high range.

Set Output Status

Enable or disable the output by sending a "1" to enable and a "0" to disable. Be sure to set all limits and setpoints prior to enabling the output.

Set PD Cal Value

Sets the photodiode calibration value in mA/mW.

WriteThenRead

Used to easily and quickly create sub-VIs that read from the instrument.

LDX-3500B Example VI Description

Example VI

Uses the Set Mode, Set Output Range, Set 3545B I1 Current Limit, Set 3545B Current Setpoint and Set Output Status to demonstrate a well constructed VI. With this VI, the user can set the mode, range, current limit, current setpoint and output status. This VI was developed as a working example and can be imitated, altered or ignored by the user.

Chapter 3 :
Errors and Troubleshooting

This chapter is an introduction to the <P/N or Series #> 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.