Model 6100
Laser Diode and Temperature Controller

Setup and LIV Utility

Version 1.0.2.0

Revision Date: April 5, 2010

Introduction

This document is intended to provide a brief description of the Setup and LIV Utility shipped along with Model 6100 Laser Diode and Temperature Controllers. The Setup and LIV Utility can be used to setup and monitor both Laser Diode Driver and Temperature Controller subsystems in Model 6100 instrument. It can also be used to perform LIV characterization of laser diodes.

Software Installation

The Setup and LIV Utility can be installed on the following Microsoft Windows 32-bit operating systems: Windows 2000 SP4 and later, Windows XP, Windows Vista and Windows 7.

The setup program for the software should start automatically when the CD accompanying the Model 6100 instrument is placed in a PC. If it does not, then run Setup.exe from the Win32 folder on the CD. Follow the on-screen instructions and instructions provided in "6100 Laser Diode and Temperature Controller CD Readme.pdf" file to install the software and USB drivers.

Following a successful installation of the software, you will be able to see a shortcut to the software on your desktop as well as in the Start→Programs→Newport→Newport Laser Diode and Temperature Controller menu.

Software Overview

When the software is launched, it attempts to initialize communication with one or more controllers connected to the PC via USB interface. If there is only one (1) controller connected to the PC, and the software is able to successfully initialize communication with it, the software begins communication with the controller. If it finds more than one controller, a window requesting the user to connect to a desired controller is displayed; the software begins communication with the desired controller following the user selection. If it does not find any controller, a window requesting the user to connect at least one controller and to re-initialize communication is displayed.

The software has four (4) tabs: Monitor, Setup, Terminal and LIV Characterization. It has a status bar at the left-bottom corner of the window indicating the USB communication status. It has two (2) buttons—"About" and "Exit"—at the right-top corner of the window. When the "About" button is pressed, a window with the software and instrument (with which the software is communicating) firmware version is displayed. When the "Exit" button is pressed, communication with the instrument is stopped and the software is terminated.

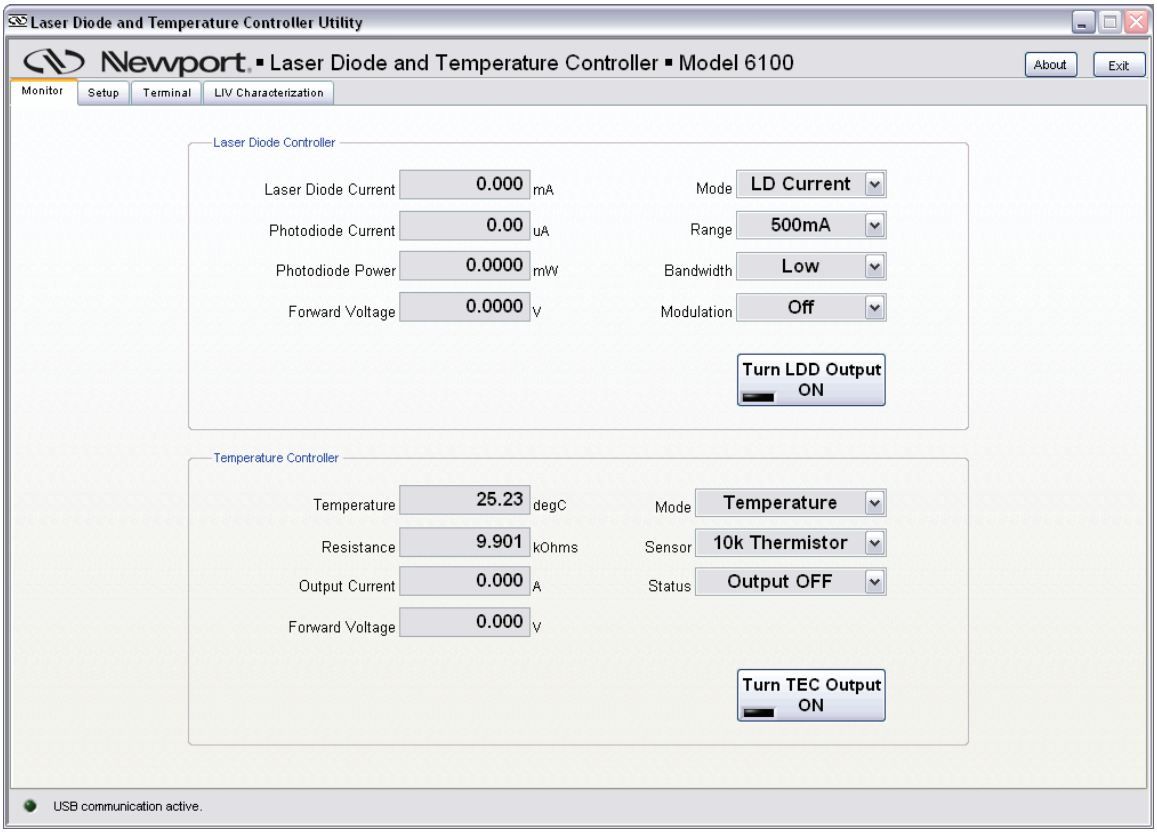
The sections below explain the contents of the four tabs in greater detail.

Monitor Tab

The Monitor tab, as shown in figure below, has two frames—one dedicated to Laser Diode Controller and the other dedicated to Temperature Controller. This is the default tab.

The Laser Diode Controller frame has eight (8) indicators: measured laser diode current, measured photodiode current, measured photodiode power, measured forward voltage, LDD mode of operation, range, bandwidth and modulation state. A button is provided here to turn the LDD output ON/OFF.

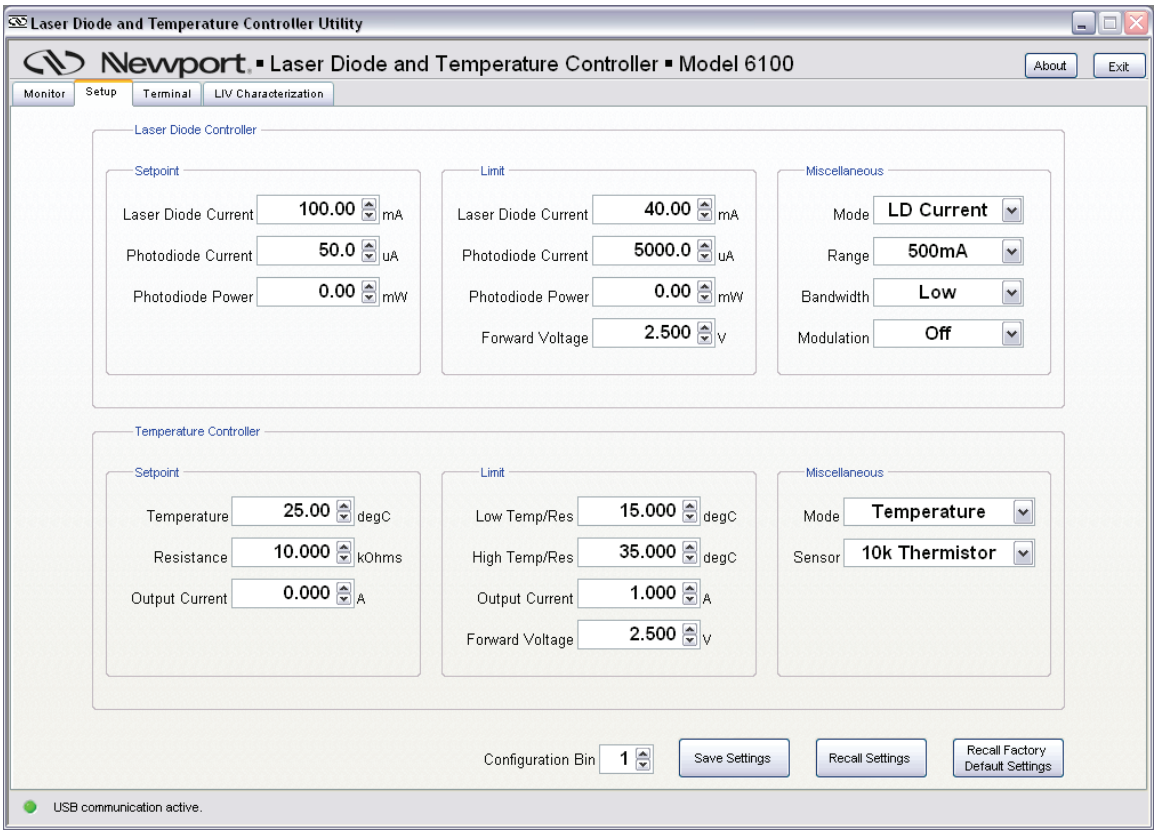
The Temperature Controller frame has seven (7) indicators: measured temperature, measured resistance/reference value, measured output current, measured forward voltage, TEC mode of operation, sensor, and heat/cool state. A button is provided here to turn the TEC output ON/OFF.



Setup Tab

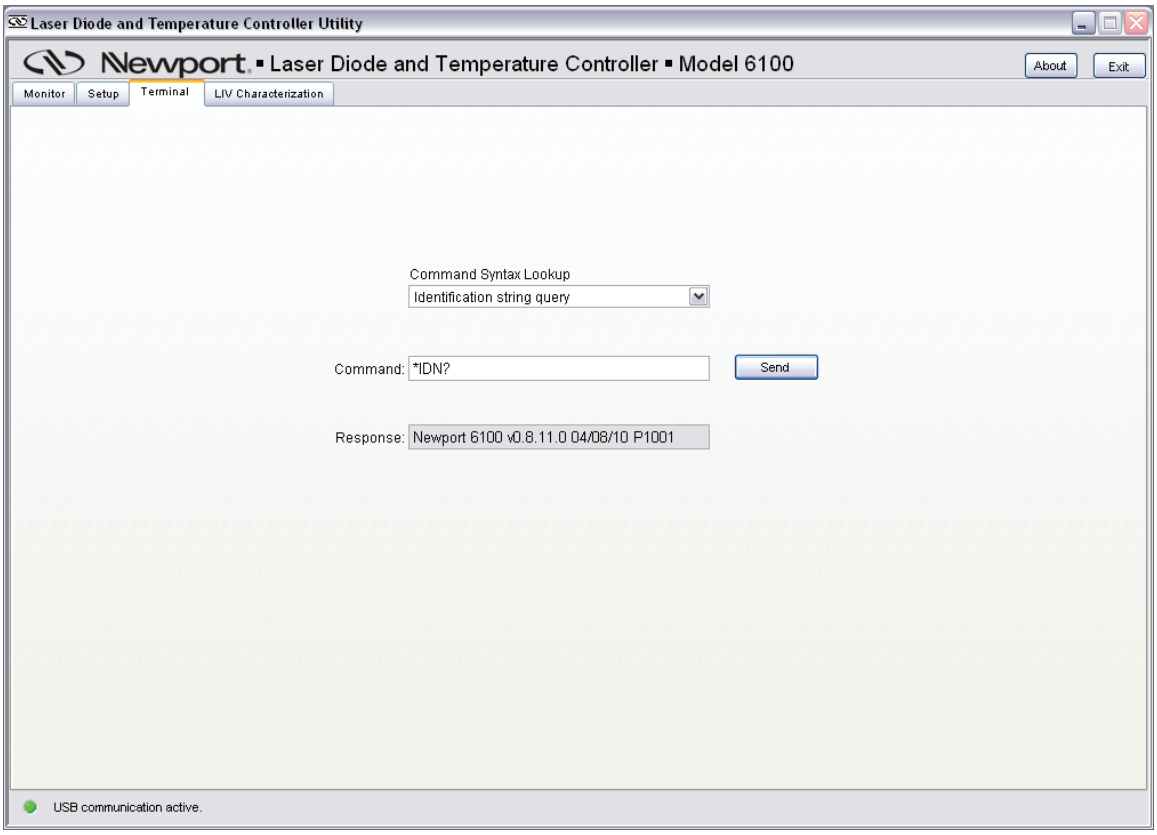
The Setup tab, as shown in figure below, has two frames—one dedicated to Laser Diode Controller and the other dedicated to Temperature Controller. When this tab is selected, the software queries the instrument once for all the parameters displayed on this tab The values displayed here and the actual values used by the instrument can get out of sync if the parameters are modified via the instrument's front panel after selecting this tab. To re-sync the parameters, just select any one of the remaining three tabs and re-select this tab.

Users can modify parameters displayed on this tab by selecting the desired parameter and changing the value. The new value will be sent to controller when the parameter loses focus. To save or recall settings to/from the controller, first select a desired configuration bin and press "Save Settings" or "Recall Settings" button. Press the "Recall Factory Default Settings" button to reset all instrument parameters to factory default settings.



Terminal Tab

The Terminal tab, as shown in figure below, is used to send commands supported by the Model 6100 instrument. Commands can be entered in the "Command" string control in one of two ways: type the command if the command syntax is known or search for desired command using the "Command Syntax Lookup" listbox. Press the "Send" button after entering the desired command. If the command is a query (has "?" character), the software will attempt to read any response generated by the instrument and display it in the "Response" string indicator.



LIV Characterization Tab

The LIV Characterization tab, as shown in figures below, is used to perform LIV characterization of laser diodes. This tab has two views: LIV graph options hidden and LIV graph options shown.

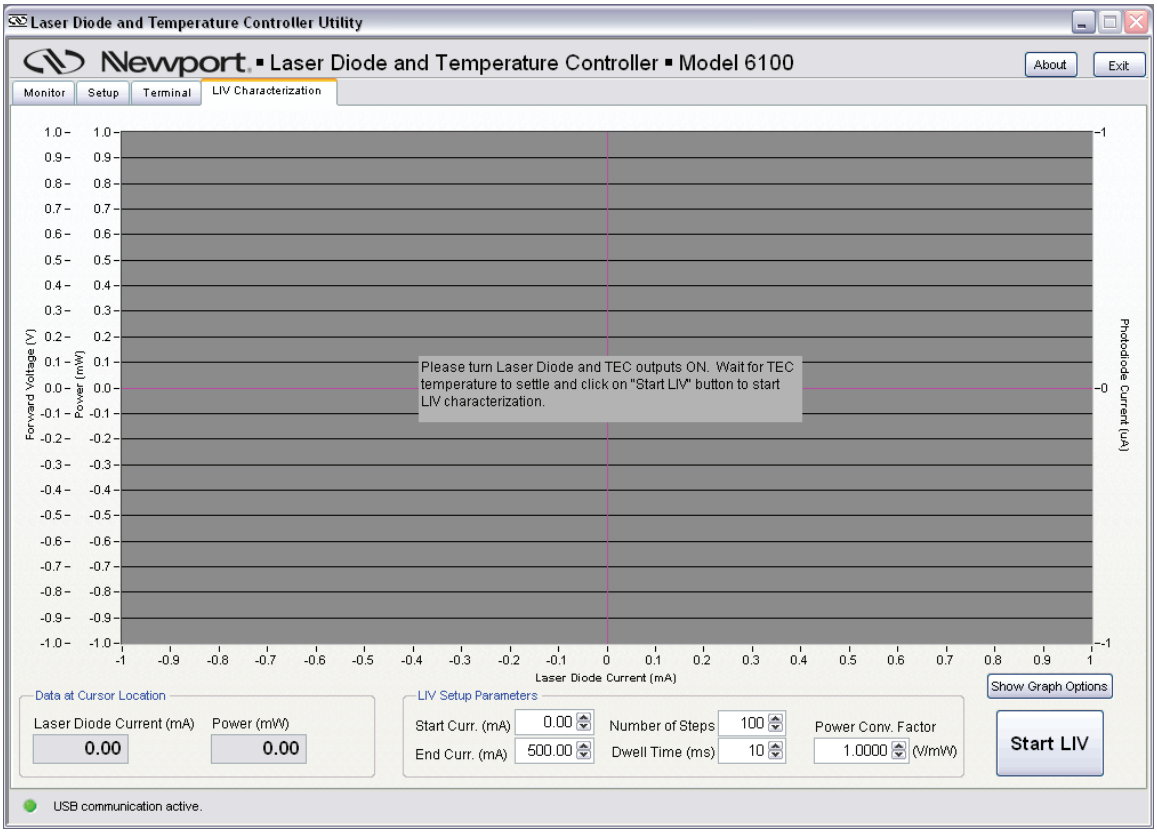
Prior to performing LIV characterization, please make sure that the LDD subsystem is in LD Current mode, and output is turned ON. If the laser diode that is being characterized requires active temperature control, it is recommended that the TEC subsystem be turned ON and temperature be stabilized prior to staring LIV characterization.

LIV Setup

The LIV setup parameters—start current, end current, number of steps, dwell time at each step, and optical power conversion factor—can be specified using appropriate controls found right below the LIV graph. While the first four parameters are used by the Model 6100 instrument to ramp up the LD current and collect data, the fifth parameter is used to convert analog monitor voltage to optical power. For the purpose of LIV characterization, the analog monitor voltage can be the output of an optical power meter.

LIV Process

After specifying the desired LIV setup parameters, press the "Start LIV" button to initiate the LIV characterization process. The LD current is ramped up from the start current to end current. The current step size is determined as follows: (End Current – Start Current)/(Number of Steps). At each step, the Model 6100 instrument waits for the specified dwell time, collects desired data, and increases the current by the calculated step size. Once the end current is reached, the LD current is set to the start current, and the collected data is uploaded to the computer for further analysis. The collected data includes: desired LD current, actual LD current, photodiode current, forward voltage, analog monitor voltage and TE temperature at each current step.



LIV Data Analysis

Once all the data collected by Model 6100 instrument has be uploaded to the computer, the software converts the analog monitor voltage to optical power using the "Power Conv. Factor" specified by user. It then computes the 1st and 2nd derivatives of optical power with respect to actual LD current. The software shows the desired parameters—optical power, forward voltage, photodiode current, and 1st and 2nd derivatives of power versus actual LD current on an X-Y graph.

Press the "Show Graph Options" button to see all the options available to analyze the LIV data. The plots on the X-Y graph can be shown/hidden by making desired selections in the "Select Plot" checkboxes. To see the actual values on a plot, place a cursor on that plot by selecting a "Select Cursor/Zoom" radio button and move the cursor to the desired location on the plot. The actual value at the cursor location is displayed below the graph.

The data collected from the Model 6100 instrument and the 1st and 2nd derivative data calculated by the software can be saved on the computer in MS-Excel file format by pressing the "Save Data" button. The graph displayed along with some relevant information can also be saved in JPG file format by pressing the "Save Graph" button.