



## USBKIT

Hardware and Software to control  
WEI Laser Diode Drivers and  
Temperature Controllers via USB

### DESCRIPTION:

The USBKIT works with a variety of Wavelength Laser Diode Drivers and Temperature Controllers. Their high stability performance now can be operated under USB control. A chart of features available with each model is on page 2. This full speed USB controller comes with customized National Instruments™ hardware and driver and WEI's Quick Connect Software, a Windows™ control interface. It is based on the .NET framework, allowing you to rapidly build custom applications.

One laser diode driver and one temperature controller can be simultaneously operated with the USBKIT. Multiple USBKITS can be attached to the same computer, allowing for control of complex systems.

Program customization is available.



### FEATURES:

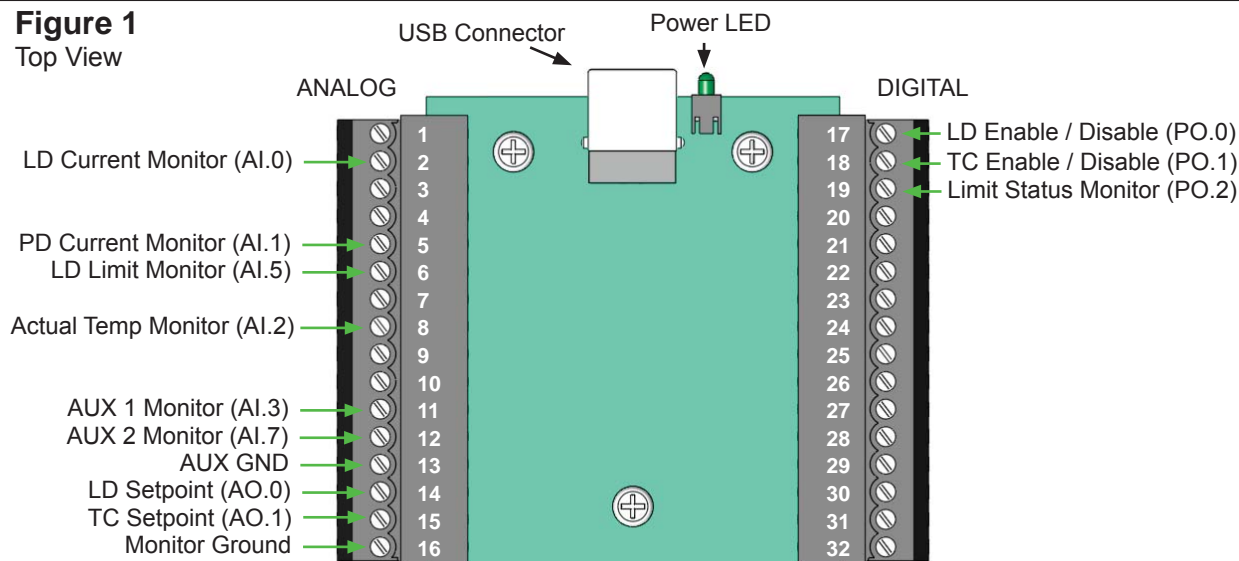
- Hardware includes D/A for remote setpoint control, A/Ds for monitoring actual temperature or laser diode current
- Software includes control of one laser diode driver, one temperature controller, an auxiliary monitor, and full graphing and datalogging.
- Setup configuration can be saved for repeatable experiments or manufacturing testing



### ORDERING INFORMATION:

USBKIT	Customized National Instruments D/A and A/D card plus WEI Quick Connect Software
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**Figure 1**  
Top View



Connections are to detachable screw terminal blocks. Standard Wavelength cables (stripped back 5") are recommended.

## SPECIFICATIONS

Description	Value
Size	3.2 x 2.8 x 1.2 inches
Weight	2 ounces
Supply Voltage	USB Bus Powered
USB Interface	Full Speed, Self-powered USB 2.0
Operating Temperature	0°C to 55°C
Storage Temperature	-40°C to 85°C
A/D Resolution	13 or 14 bits
D/A Resolution	12 bits
Operating System	Windows 2000, XP or Vista, US English Edition
Memory	256 MB minimum
.NET Framework	2.0 or higher

## PIN DESCRIPTIONS

	NI PIN	NI NAME	DESCRIPTION
INPUTS	2	<b>AI.0</b>	Actual LD Current Monitor - Analog, 14 bit, referenced to ground
	5	<b>AI.1</b>	Actual PD Current Monitor - Analog, 13 bit, referenced to ground
	6	<b>AI.5</b>	Actual LD Limit Current Monitor - Analog, 13 bit, referenced to ground
	19	<b>PO.2</b>	Limit Status Monitor - Digital
	8	<b>AI.2</b>	Actual Temperature Monitor - Analog, 14 bit, referenced to ground
OUTPUTS	17	<b>PO.0</b>	LD Enable - Digital
	14	<b>AO.0</b>	LD Setpoint - Analog, 12 bit
	18	<b>PO.1</b>	TC Enable - Digital
	15	<b>AO.1</b>	TC Setpoint - Analog, 12 bit
AUX Monitors	11	<b>AI.3</b>	Auxiliary Monitor 1 - Analog (13 or 14 bit) <sup>(1)</sup>
	12	<b>AI.7</b>	Auxiliary Monitor 2 - Analog (13 bit) <sup>(1)</sup>
	13	<b>GND</b>	

<sup>(1)</sup> Range of monitors is 0 - 5 VDC. The DAQ card clamps signals below 0 V or above 5 V. Damage threshold is  $\pm 35$  VDC.

## USBKIT Features Product by Product

	Feature					
Product	Remote Setpoint	Remote Enable	Actual Monitor 1	Actual Monitor 2	Limit Monitor	Limit Status
PTC-CH family PTC2.5K-CH PTC5K-CH PTC10K-CH	x	x	x - Sensor Temp			
PLD-CH family PLD5K-CH PLD10K-CH PLD12.5K-CH	x	x	x - Photodiode Current	x - Laser Diode Current	x	x
PLDEVALPCB PLD200 + Eval PLD500 + Eval PLD1250 + Eval PLD5000 + Eval PLD6500 + Eval	x	x	x - Photodiode Current	x - Laser Diode Current	x	x
PLD10EV PLD10000 + Eval PLD12500 + Eval	x	x	x - Photodiode Current	x - Laser Diode Current	x	x

x = Feature supported by product and USBKIT

## QUICK START

The following is an overview of the steps required to connect the USBKIT hardware and install the QuickConnect software. Specific detail on each step can be found at the page referenced. Wiring is specific to the Wavelength controller you will be operating. Wiring Diagrams start on page 20. Please review the entire datasheet before operating the USBKIT and the Quick Connect Software.

### 1. Install Software - pg. 4

Follow the installation instructions to load the National Instruments NI-DAQ software, the Microsoft .NET Framework, and Wavelength's QuickConnect™ application (QCA).

### 2. Connect USBKIT to PC- pg. 6

Connect the USB cable to the appropriate port on the PC. Connect the USB cable to the USBKIT.

### 3. Run WEI Quick Connect- pg. 6

Open a device and name the window (especially if you're using more than one USBKIT.)

### 4. Set up Temperature Controller - pg. 8

Select the model of temperature controller you'll use and wire it according to the onscreen diagram. Choose and calibrate sensor. Set up optional temperature limits.

### 5. Set up Laser Diode Driver - pg. 13

Select the model of laser diode driver you'll use and wire it according to the onscreen diagram. Choose how to interact with temperature limits.

### 6. Auxiliary Monitor(s) - pg. 15

OPTIONAL: Wire one signal differentially (14 bit resolution) or two signals in single-ended mode (13 bits) for auxiliary monitors.

### 7. Graph Data - pg. 17

Select which fields to display in the onscreen strip charts.

### 8. Data Logging - pg. 17

Select which fields to log and what file to save them to.

### 7. Save and Load Configuration - pg. 18

If you'll use this set up repeatedly, you can save the settings to a Configuration file and easily reload it at the next power up.

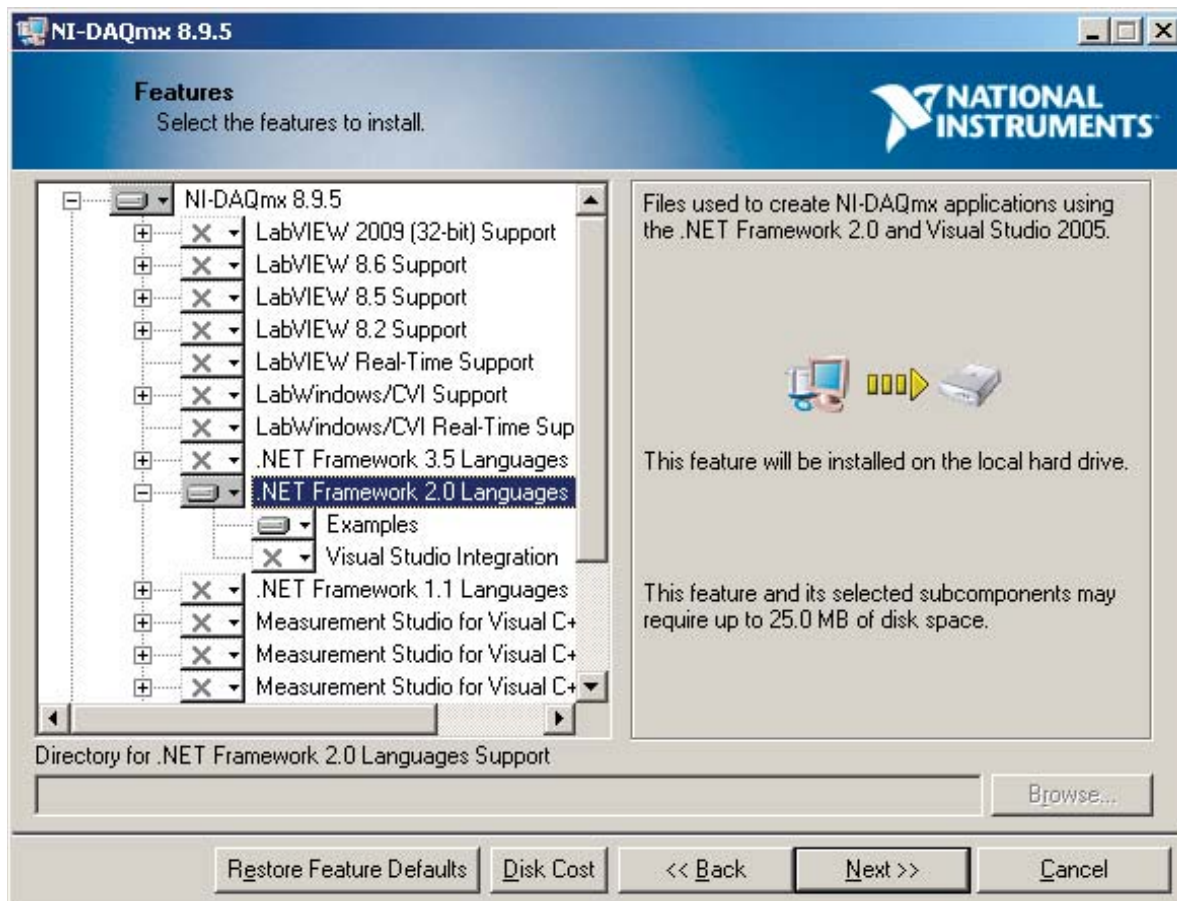
## OPERATING INSTRUCTIONS -- SOFTWARE INSTALLATION

PAGE 4

Follow these steps to assure proper setup. Exit all programs before starting the installation. A single reboot after all steps are complete is sufficient. Your computer needs internet access to download files.

### 1. Install National Instruments NI-DAQ software

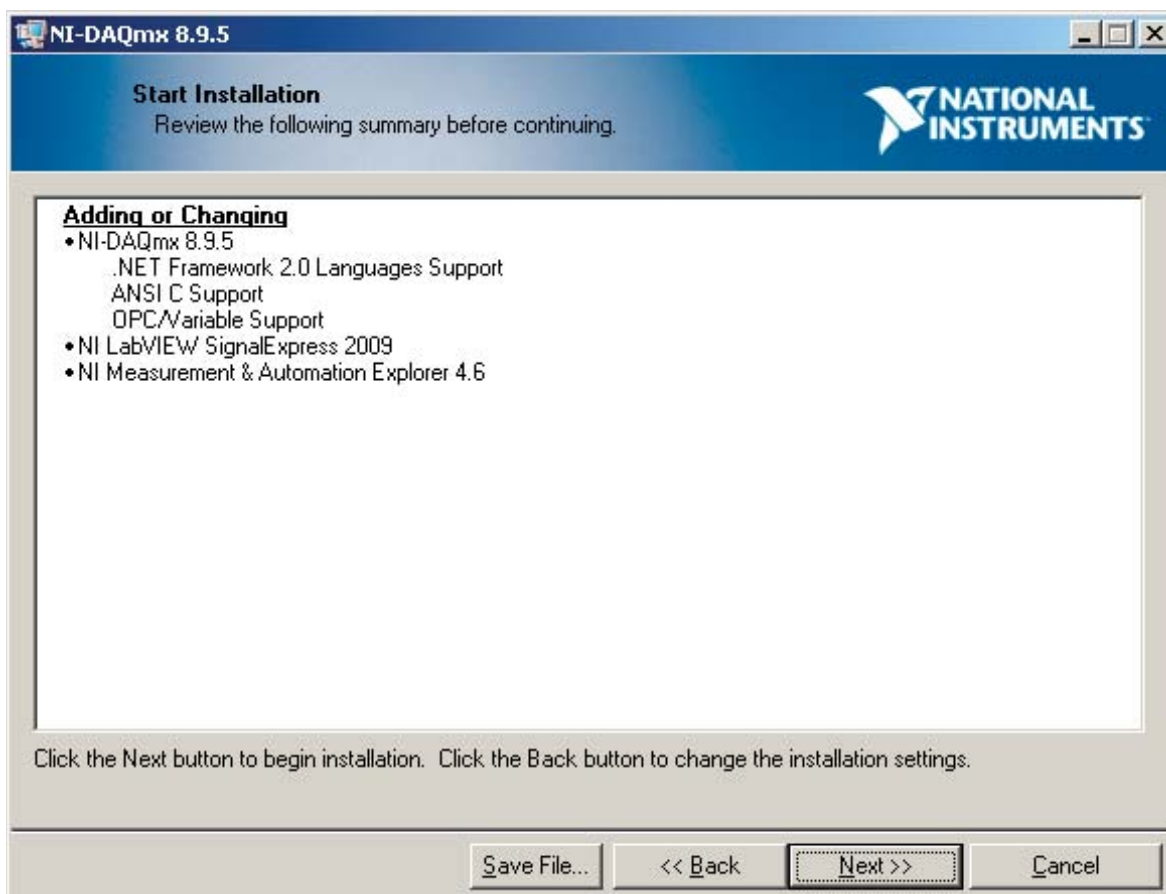
- Insert the NI-DAQ DVD and choose "Install Software" when the distribution dialog appears.
- The introductory screen reminds you to close all programs. Choose "NEXT."
- Release Notes appear. Choose "NEXT."
- Choose an appropriate installation directory. Choose "NEXT."
- Choose which options to install. The QCA requires installation of the .NET Framework 2.0 Languages. Click the "X" icon next to this option to change it to the install icon. Suboptions of Examples and Visual Studio Integration are optional. Choose "NEXT" to continue.



- License Agreements: One for National Instruments, and three for Microsoft. Accept and choose "NEXT" through these two screens.

## OPERATING INSTRUCTIONS -- SOFTWARE INSTALLATION (continued)

- Installation Review. If not present, the following elements should be added. Choose “NEXT” to begin installation.



- An installation status dialog is followed by an Installation Complete window. When asked to restart, you can wait until the overall installation is complete.

### 2. Install Microsoft .NET Framework

- Insert the Wavelength Electronics CD.
- If the .NET Framework 2.0 is already present, skip to Step 3.
- Microsoft License Agreement: Choose Accept.
- Two files are downloaded then installed with progress checks displayed throughout.
- Request for reboot. You can wait and manually reboot after Step 3.

### 3. Install Wavelength Electronics' Quick Connect Application

- Run Setup.exe from the Wavelength CD. The Setup Wizard screen opens. Choose “NEXT.”
- Choose the installation folder. It can be anywhere on the local computer.
- Choose whether the program is available to everyone or only your log in. Choose “NEXT.”
- Confirmation: Choose “NEXT” to start installation.
- At the Installation Complete Screen, choose to close the window.
- Reboot your computer.

## OPERATING INSTRUCTIONS -- Open Device

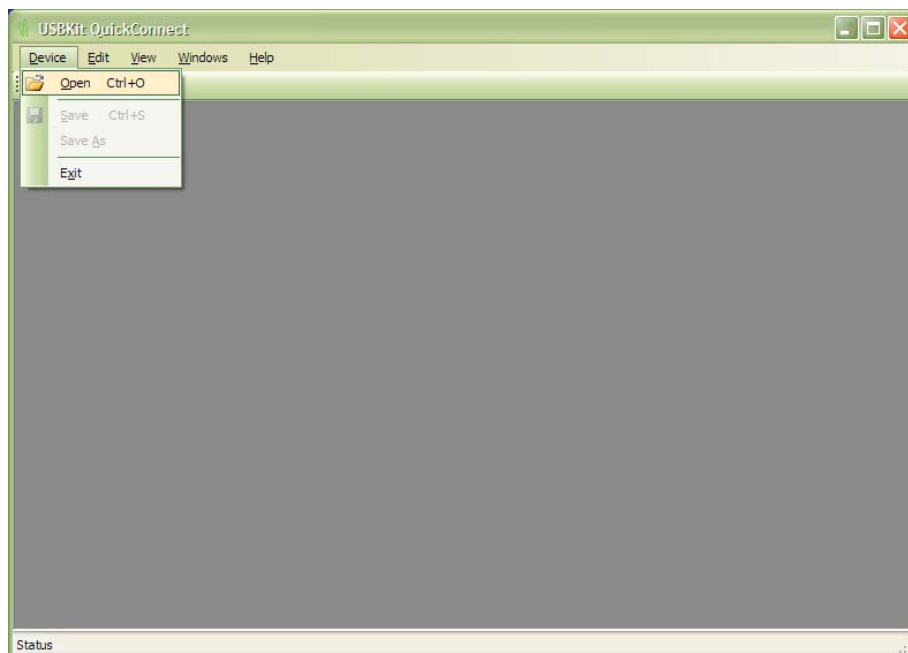
### 1. Plug the USB cable into the USBKIT and your computer

A National Instruments Dialog will come up. Cancel out of it.

### 2. Run the Quick Connect Software

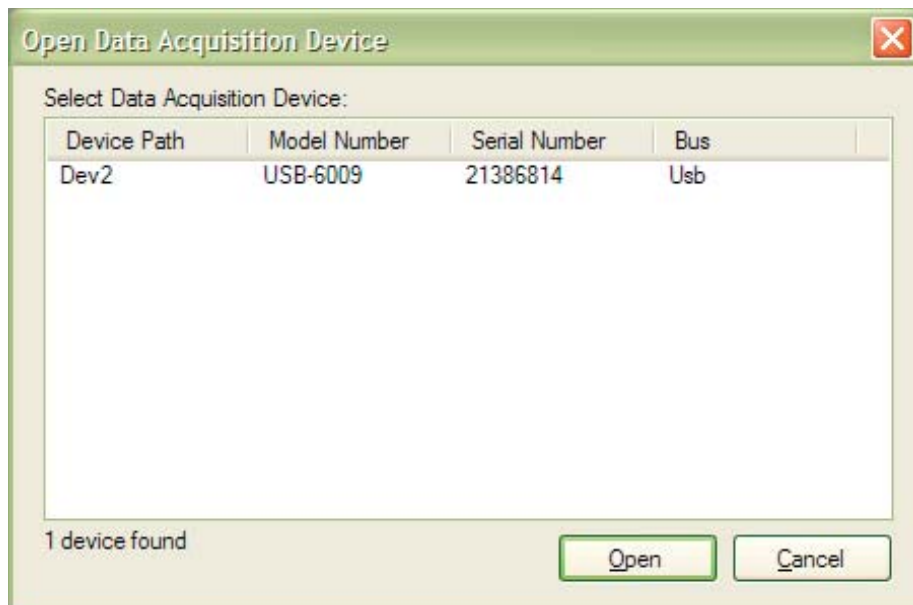
From the Start Menu, choose Programs ⇒ Wavelength Electronics ⇒ USBKit QuickConnect.

### 3. Choose Device -> Open



Any devices found will show on the following screen:

- Highlight the device and choose Open.

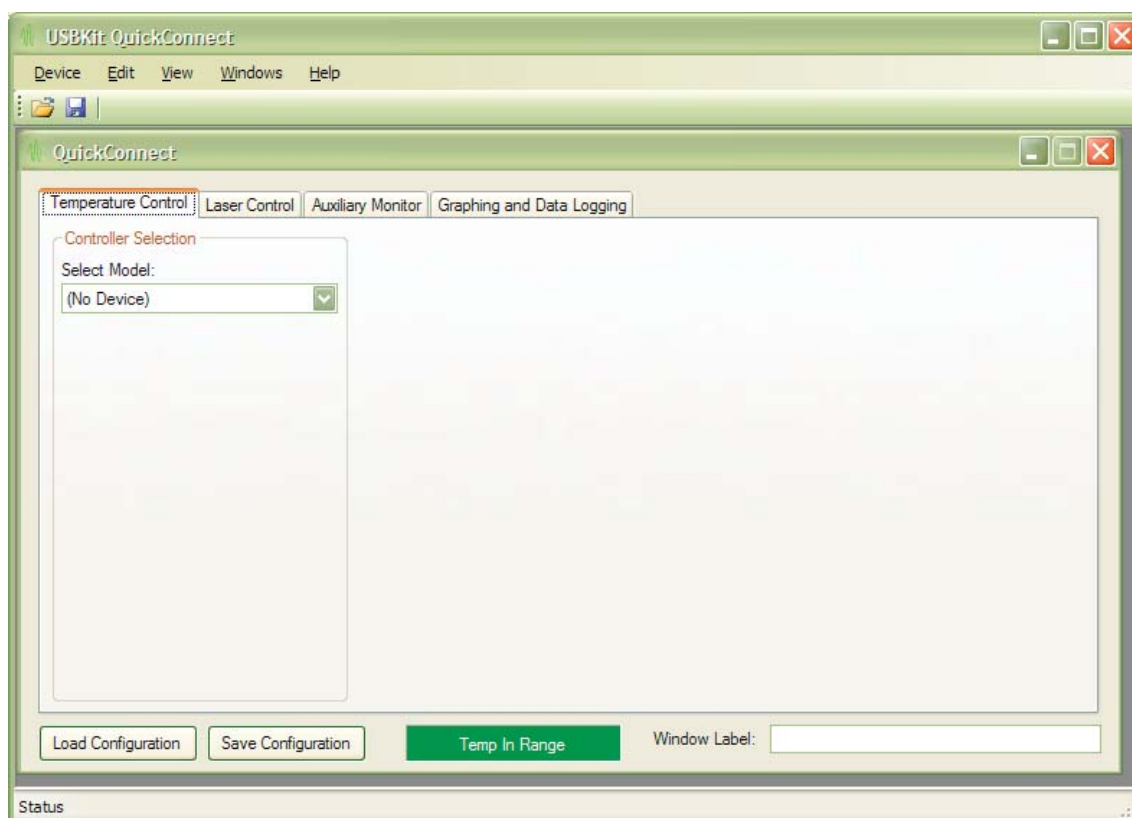




## OPERATING INSTRUCTIONS -- Open Device (continued)

The QCA window opens to display four tabs:

- Temperature Control
- Laser Control
- Auxiliary Monitor
- Graphing and Data Logging



These screens are detailed in the following sections.

Across the bottom of the screen are the Load and Save Configuration buttons, the Temperature Limit indicator, and the Window Label.

To simplify repeat operation of your system, you can save settings from the four tabs using the SAVE CONFIGURATION button. Details are found in the Save & Load Configuration section.

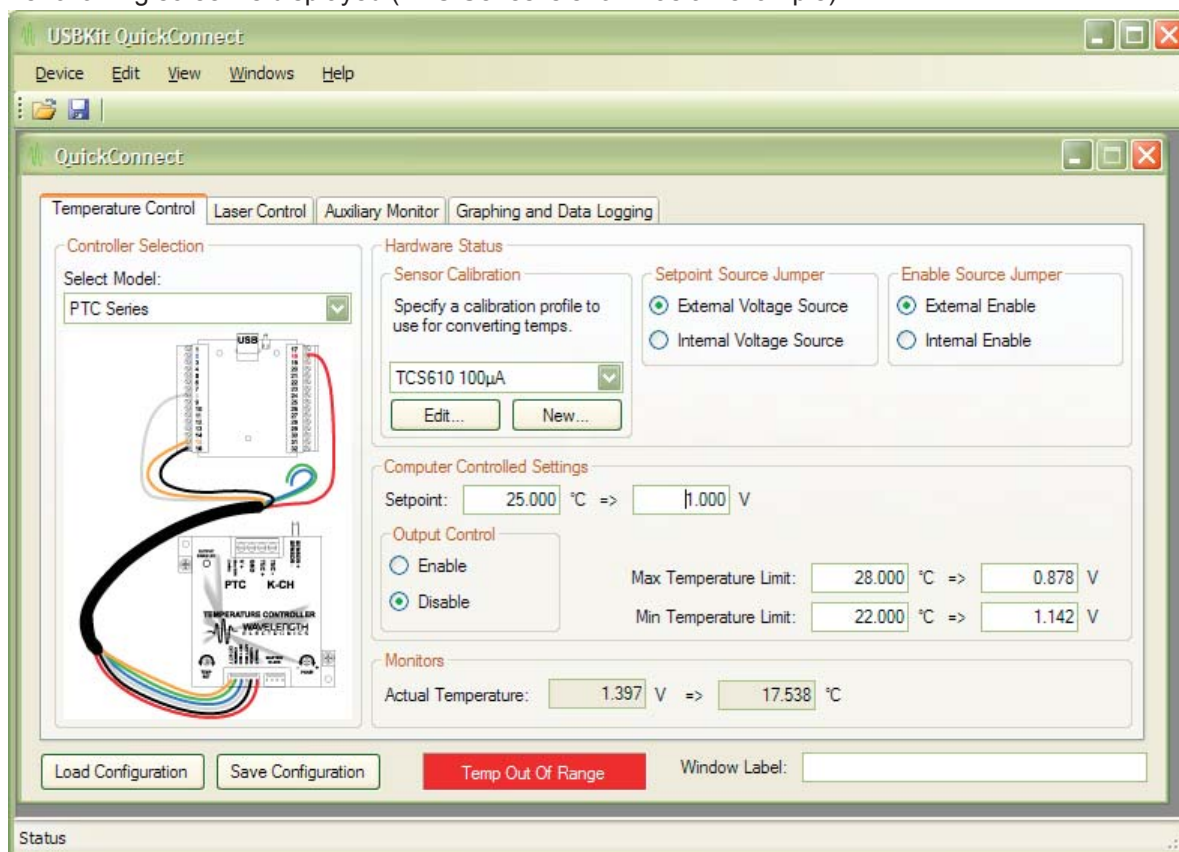
The Temperature Limit indicator is based on Temperature Limits you enter in the Temperature Control tab. If the temperature sensor exceeds the maximum limit or is below the minimum limit, the indicator will change to read "Temp Out Of Range" on a red background. Details are found in the Temperature Control section.

The Window label is helpful if you have more than one National Instruments card operating. Type in a name and it will replace the "QuickConnect" label at the top of the device window.

## OPERATING INSTRUCTIONS -- Temperature Control

### 1. Choose the WEI model number for your Temperature Controller

The following screen is displayed (PTC Series is shown as an example):



This tab is divided into four sections

#### **Controller Section:**

This is where you choose which WEI module you have installed. It provides a wiring diagram specific to that module. You can click on the picture to bring up a larger image.

#### **Hardware Status Section:**

This is where you indicate the active hardware settings. The QCA software can't affect them, but needs to know the status to display values properly. Content of this section varies with product. For the PTC:

- **Sensor Calibration:** What sensor is installed? Choose the sensor and the bias current. You can edit a sensor or create a new one. The Sensor Calibration Section is discussed in detail on page 10.
- **Setpoint Source Jumper:** The PTC includes a jumper to choose between using the onboard trimpot circuit or an external setpoint signal. Choose which position is active.
- **Enable Source Jumper:** The PTC includes a jumper to accept the onboard switch as the enable signal or to respond to an external enable signal.

#### **Computer Controlled Settings Section:**

If External Voltage Source is chosen for the setpoint input, a field for Setpoint is displayed. You can enter the desired setpoint voltage for your sensor. If a calibrated sensor is chosen (see Hardware section), you can enter the voltage or temperature in degree Celcius.

If External Enable Signal is chosen, an Output Control Enable / Disable radio button appears. The current out of the PTC will flow if Enable is chosen. It will not power the thermoelectric if Disable is chosen.

Maximum and Minimum Temperature Limits can be entered in this section. Either specify a sensor voltage, or if you have a calibrated sensor, the temperature in degree Celcius.

#### **Monitors Section:**

The voltage from the temperature sensor is displayed. If you have chosen a calibrated sensor (see Hardware section), the voltage will be converted to degree Celcius.



## OPERATING INSTRUCTIONS -- Temperature Control (continued)

### 2. Verify Wiring

Verify that the WEI Temperature Control module is wired according to the onscreen diagram (also included at the end of this datasheet). Note that this diagram does not show wiring to the power supply, thermoelectric (or resistive heater) and sensor. Refer to the module datasheet for complete operating instructions.

### 3. Enter Hardware Status data

The available fields depend on which controller you have chosen from the dropdown menu. Sensor Calibration is detailed on the following page. You may have a choice to use a remote or local enable / disable signal (on PTC Temperature Controllers). You may have a choice to use a remote or local setpoint signal. These choices determine what is displayed under the Computer Controlled Settings.

### 4. Enter Setpoint and Temperature Limit information

In the Computer Controlled Settings section, you can enter the setpoint voltage for the sensor the temperature controller is using for feedback. Once you provide Sensor Calibration information, the setpoint can also be entered in degrees Celcius.

Temperature Limits are optional. On the Laser Control tab, you can choose to shutdown the laser diode current if temperature limits are exceeded. Enter the sensor voltage at the Maximum Temperature and the Minimum Temperature you would like to use. Once you provide Sensor Calibration information, the limits can also be entered in degrees Celcius. Note that the Measurement Period on the Graphing / Data Logging tab controls how frequently Limits are checked.

### 5. Enable Current from the Temperature Control module

Two radio buttons in the Output Control section set the enable / disable state of the current. If the Enable button is active, current can flow from the module into the load (thermoelectric or resistive heater) up to the level of the limit set in the module hardware. If the Disable button is active, current cannot flow to the load.

### 6. Watch the Actual Sensor Temperature in the Monitor Section

In the Monitors section, Actual Sensor voltage is displayed. If you provide Sensor Calibration information, the sensor voltage will also be displayed in degrees Celcius.

## OPERATING INSTRUCTIONS - Sensor Calibration

In the Hardware Section of the Temperature Control tab, use the dropdown menu to select a sensor and bias current.

Wavelength sensor products are pre-loaded in the dropdown menu list. They are calibrated across the typical ranges listed in their data sheets. You can optimize the calibration to a narrower range or a different bias current. Choose to edit an existing sensor or create a new one.

### THERMISTORS:

The "TCS-610 100  $\mu$ A" sensor was selected and the Edit button was pressed to display the following screen. This is a 10 k $\Omega$  thermistor using a 100 $\mu$ A bias current.

**Edit Temperature Sensor Profile**

Thermistor RTD Linear

The software uses resistance/temperature pairs to curve fit to the Steinhart-Hart equation. You can either enter three data pairs or use the Steinhart-Hart tool on the bottom of the screen to generate these resistance/temperature pairs.

**Calibration Pairs**

	Pair 1	Pair 2	Pair 3	Bias Current:
Temperature:	10.00	25.00	40.00	100.00 $\mu$ A
Resistance:	1.9900e+004	1.0000e+004	5.3260e+003	

**Steinhart-Hart Calibration Parameters**

Coefficient A: 1.1279e-003  
 Coefficient B: 2.3429e-004  
 Coefficient C: 8.7298e-008

**Conversion**

☐ Temperature  
☐ Resistance

Use as:  
 Pair 1  
 Pair 2  
 Pair 3

Description: 10K@25°C Thermistor, 100 $\mu$ A Bias  
 Sensor Name: TCS610 100 $\mu$ A

OK Cancel

The software uses Resistance / Temperature Pairs to curve fit to the Steinhart-Hart equation. You can either enter three data pairs or use the Steinhart-Hart tool on the bottom of the screen to generate these Resistance / Temperature pairs. Since the sensor response varies with bias current, it is also entered as part of the calibration. The Sensor Name will be listed in the drop down menu on the Temperature Control page (Hardware section) and about the first 22 characters will display. The Description field allows you more space to further define the conditions for this calibration.

#### Steinhart-Hart tool:

If you know the A, B, and C coefficients of your thermistor, but don't have resistance / temperature data pairs, enter the A, B, and C coefficients on the screen. In the Conversion sub-section, choose to enter a temperature or resistance and enter that value above the radio buttons. Press CONVERT and the matching resistance or temperature will be displayed. You can then choose to save it to the upper part of the screen as Resistance / Temperature data pair 1, 2, or 3. Ideally, choose a temperature band that encompasses your Temperature Limits.

## RTDs:

**Edit Temperature Sensor Profile**

Thermistor **RTD** Linear

The software uses a simplified Callender/Van Dusen equation to convert the RTD's resistance to temperature. You can specify resistance/temperature pairs in the Calibration Pairs group to derive the Callender/Van Dusen coefficients or enter them directly in the Calibration Parameters group at the bottom.

**Calibration Pairs**

	At 0°C	Pair 2	Pair 3	
Temperature:				Bias Current: 10.00 mA
Resistance:				

**Callendar-Van Dusen Calibration Parameters**

R at 0°C: 100.00

Beta 1: 3.9080e-003

Beta 2: -5.8019e-007

Description: RTD Sensor

Sensor Name: 100 RTD

OK Cancel

The software uses a simplified Callender/Van Dusen equation to convert the RTDs resistance to temperature. You can specify resistance/temperature pairs in the Calibration Pairs group to derive the Callender/Van Dusen coefficients or enter them directly in the Calibration Parameters group at the bottom. These are Resistance at 0°C and two  $\beta$  coefficients. Since the sensor response can vary with bias current, it is also entered as part of the calibration. The Sensor Name will be listed in the drop down menu on the Temperature Control page (Hardware section) and about the first 22 characters will display. The Description field allows you more space to further define the conditions for this calibration.

## OPERATING INSTRUCTIONS - Sensor Calibration (continued)

### LINEAR SENSORS:

**Edit Temperature Sensor Profile**

Thermistor RTD **Linear**

The software uses slope-intercept linear calculation to convert the measured sensor voltage to temperature. You can enter the slope and offset into the Calibration Parameters section or enter two points on the sensor's response curve and the slope and offset will be computed by the software.

**Calibration Pairs**

	Pair 1	Pair 2
Temperature:		
Voltage:		

**Calibration Parameters**

Slope: 1.0000e-002

Offset: 0.00

Description: AD590 1uA/K

Sensor Name: AD590

OK Cancel

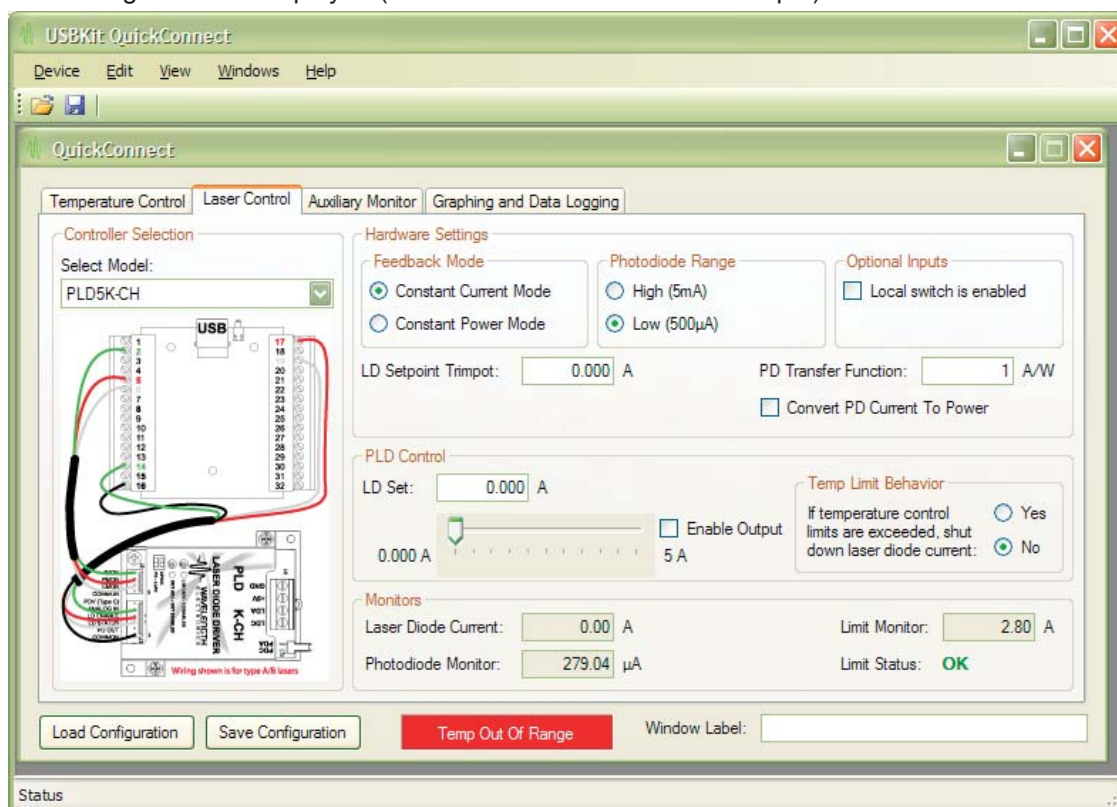
The software uses slope-intercept linear calculation to convert the measured sensor voltage to temperature. You can enter the slope and offset into the Calibration Parameters section or enter two points on the sensor's response curve and the slope and offset will be computed by the software. For example, an AD590 current sensitivity is 1  $\mu\text{A} / \text{K}$  over 10 k $\Omega$  resistor. This produces a 10 mV / K slope.

The Sensor Name will be listed in the drop down menu on the Temperature Control page (Hardware section) and about the first 22 characters will be displayed. The Description field allows you more space to further define the conditions for this calibration.

## OPERATING INSTRUCTIONS - Laser Control tab

### 1. Choose the WEI model number for your Laser Diode Driver

The following screen is displayed (PLD5K-CH is shown as an example):



This tab is divided into four sections

#### Controller Section:

This is where you choose which WEI module you have installed. It provides a wiring diagram specific to that module. You can click on the picture to bring up a larger image.

#### Hardware Status Section:

This is where you indicate the active hardware settings. The QCA software can't affect them, but needs to know the status to display values properly. Content of this section varies with product. For the PLD5K-CH:

- **Feedback Mode:** Is the switch set to Constant Current (CC) or Constant Power (CP) mode?
- **Photodiode Range:** Is the switch set to HI or LO range?
- **Optional Inputs:** If the onboard Enable / Disable switch is disabled, the computer control enable cannot override it. This section is included simply as a reminder.
- **LD Setpoint Trimpot:** This DC bias will be the minimum value for the computer controlled laser diode setpoint.
- **PD Transfer Function:** If you would like to convert photodiode current to power, you can enter a transfer function and enable its use. (Only visible if CP mode is chosen.)

#### Computer Controlled Settings Section:

A numeric entry field is available if you know exactly what setpoint you want. A slider is also available. If CC mode is chosen, the setpoint is Laser Diode Current. If CP mode is chosen, Photodiode Current is the setpoint.

A checkbox allows you to Enable or Disable current to the laser diode. Note that if the onboard Enable / Disable switch is set to DISABLE, it will override the computer enable signal.

Maximum and Minimum Temperature Limits can be entered in the Temperature Control Tab. Here, you can decide whether or not Laser Diode Current is disabled if Temperature Limits are exceeded.

#### Monitors Section:

Laser Diode Current, Photodiode Current, as well as Laser Diode Limit Current are displayed. If the Active Current Limit is not triggered, a green "OK" is displayed in Limit Status. [Note: these fields are specific to the PLD family of Laser Diode Drivers. Other modules will have different items displayed.]



## OPERATING INSTRUCTIONS - Laser Control tab (continued)

### 2. Verify Wiring

Verify that the WEI Laser Diode Driver module is wired according to the onscreen diagram (also included at the end of this datasheet). Note that this diagram does not show wiring to the power supply, Laser Diode or Photodiode. Refer to the module datasheet for complete operating instructions. We recommend that you operate with a “dummy” laser diode load until you are comfortable with the software interface.

### 3. Enter Hardware Status data

The available fields depend on which controller you have chosen from the dropdown menu. Operating mode (Constant Current or Constant Power feedback) is a choice. In some modules, you have a choice between HI and LO Photodiode Current Range. The DC setpoint value set by an onboard trimpot will be the minimum value for the Computer Controlled Setpoint. If you want an estimate of power out (instead of Photodiode Current), you can enter a transfer function (mW / mA). Note that laser diode specification sheets usually have a wide tolerance on this transfer function unless the photodiode is calibrated.

### 4. Set up Laser Diode Limit Current

Follow the limit set up process in the specific product datasheet. If a Limit Monitor is available with that product and you have wired it up, the value will be displayed in the monitor section. Note that the Measurement Period on the Graphing / Data Logging tab controls how frequently Limit Status is checked.

### 5. Enter Laser Diode (LD) or Photodiode (PD) Current Setpoint and Choose Temperature Limit Response

In the Computer Controlled Settings section, you can enter the operating current under Setpoint. If you are in Constant Current mode, the Laser Diode Current Setpoint is displayed. If you are in Constant Power mode, the Photodiode Current Setpoint is displayed. The lowest value you can enter is the DC level set in the Setpoint Trimpot field in the Hardware Section.

Temperature Limits are optional. On the Laser Control tab, you can choose to shutdown the laser diode current if temperature limits are exceeded. Enter the sensor voltage at the Maximum Temperature and the Minimum Temperature you would like to use on the Temperature Control tab. [Once you provide Sensor Calibration information on the Temperature Control tab, the limits can also be entered in degrees Celcius.]

### 6. Enable Current from the Laser Diode Control module

A checkbox allows you to Enable or Disable current to the laser diode. Note that if the onboard Enable / Disable switch is set to DISABLE, it will override the computer enable signal. If the Enable box is checked, current can flow from the module into the Laser Diode up to the level of the limit set in the module hardware. If the box is not checked, current cannot flow to the Laser Diode.

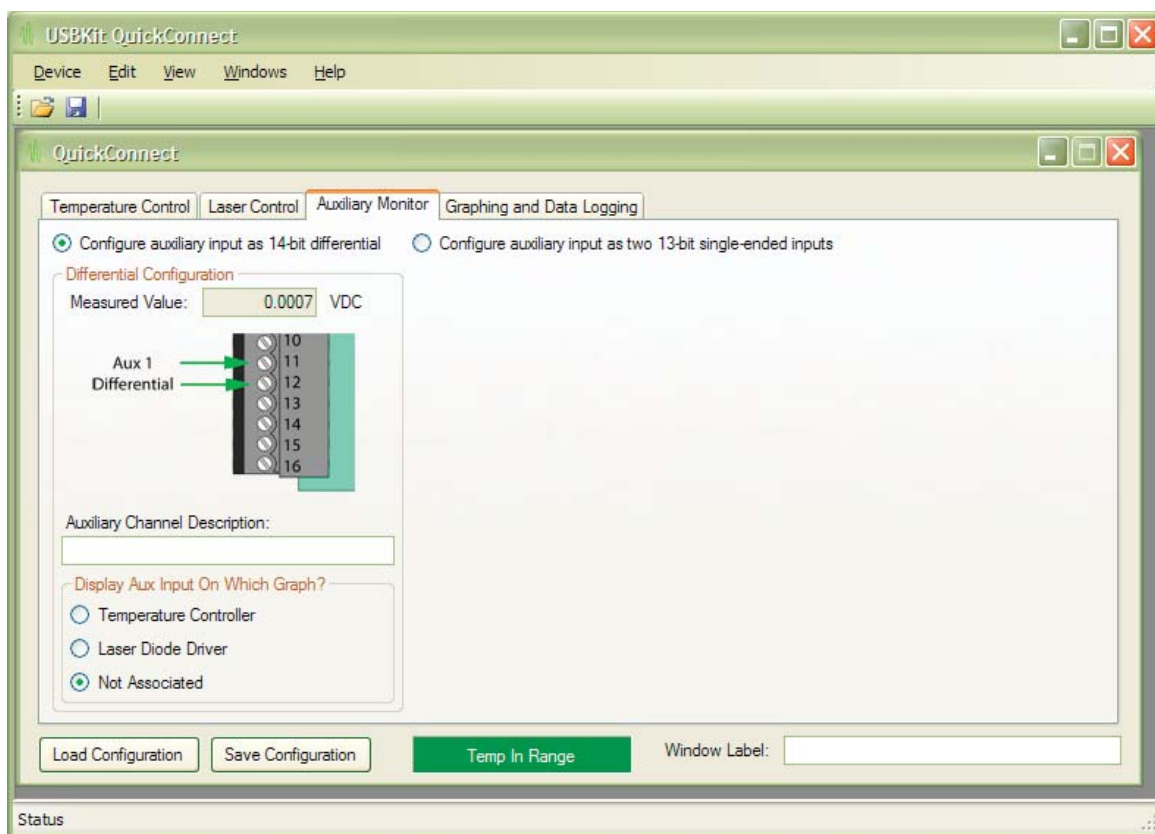
### 7. Watch the Actual Laser Diode or Photodiode Current in the Monitor Section

In the Monitors section, Actual current is displayed. If monitors are available from the selected Laser Diode Module and you have wired them in, both Laser Diode and Photodiode Current will display, no matter the operating mode.



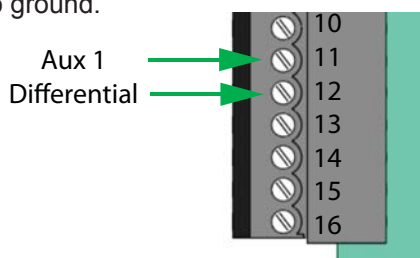
## OPERATING INSTRUCTIONS - Auxiliary Monitors

### 1. Indicate which wiring you have chosen with the radio buttons.

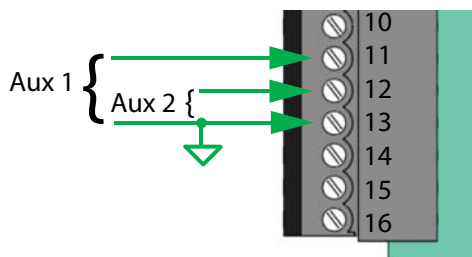


One or two voltages will be displayed based on your choice. This is the raw voltage from your auxiliary input. It can range from 0 - 5 VDC. If the value exceeds 5 V or is lower than 0 V, the value will clamp at those limits. Damage can occur to the device if your input exceeds  $\pm 35$  VDC.

The Differential Wiring gives you 14 bit resolution. Wire the signal between pins 11 and 12. Neither pin 11 or pin 12 are internally tied to ground.



Using Single Ended inputs gives you two auxiliary inputs that are 13 bit resolution. Wire the AUX 1 signal between pins 11 & 13 (internally grounded). Wire the AUX 2 signal between pins 12 and 13 (internally grounded).



## OPERATING INSTRUCTIONS - Auxiliary Monitor (continued)

### 2. Enter Auxiliary Channel Description

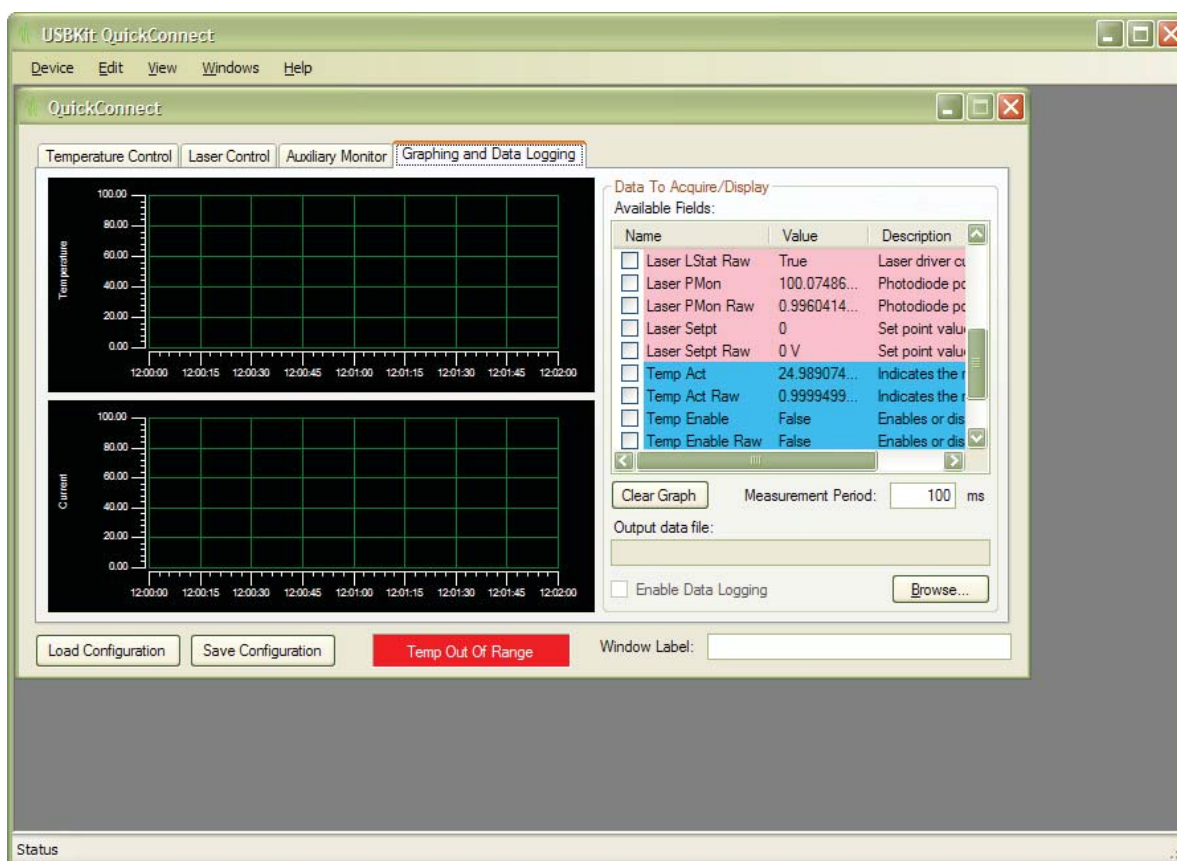
This will be the name in the data graphing and logging list. About the first thirty characters will display.

### 3. Choose to group AUX input with Temperature Control tab data or Laser Control tab data on the graphing window.

If you indicate Temperature Controller, it will be grouped with those data choices on the graphing and data logging tab. Likewise, if you indicate Laser Diode Driver, it will be grouped with the Laser Control tab choices on the graphing and data logging tab. If you choose "Not Associated" you will not be able to graph the data, but you will be able to log it to a file. The default setting is "Not Associated".

## OPERATING INSTRUCTIONS - Graphing & Data Logging

### 1. Choose which values to graph or log



### Graphing

Two strip charts graph data as a function of time. Check the box next to the Name to display it on the graph. Raw voltages, as well as translated current and temperature values are listed.

The top graph is associated with data from the Temperature Control Tab. Available values are displayed on a blue background. This list varies with the Temperature Control Module you have connected.

The lower graph is associated with data from the Laser Diode Control Tab. Available values are displayed on a red background. This list varies with the Laser Diode Module you have connected.

The Auxiliary Monitor(s) can be associated with either graph [see Auxiliary tab section].

The Measurement Period determines how frequently data is acquired. This cadence determines how frequently the Temperature Limits or Laser Diode Limit Status are checked. Minimum is 100 msec. Maximum is 10 seconds. Default is 100 msec.

### Data Logging

- Check the box next to the Name to choose to save that data field to a file.
- Select an output data file path and name.
- Check the Enable Data Logging box to begin writing to file.
- Uncheck the Enable Data Logging box to stop writing data to the file.
- File format is a tab-delimited text file. The first column is always date and time in OLE Date/Time format.

## OPERATING INSTRUCTIONS - Save & Load Configuration

### SAVE CONFIGURATION

If you want to recall the current settings on all four tabs the next time you open a device, choose the SAVE CONFIGURATION button. You will save a configuration file. The default path is My Documents. The file extension is .ucf. You can use Device ⇒ Save or Device ⇒ Save As instead of the SAVE CONFIGURATION button.

### LOAD CONFIGURATION

When you open a device, if you have saved a prior configuration, you can reload that configuration. Choose the LOAD CONFIGURATION button and open the saved .ucf file.

**CAUTION: If your saved configuration has the Laser Diode Current Enabled, immediately upon loading this configuration, the Laser Diode Current will be enabled.**

### PROGRAM SHUTDOWN BEHAVIOR

Click “X” on the device window to safely shutdown current to the laser diode. The signal to the temperature controller will be maintained until the USBKit is disconnected from the computer.

### COMPUTER SHUTDOWN BEHAVIOR

Behavior is undefined as the power to the USBKit is removed.

### LICENSE AGREEMENT

The USBKit QuickConnect™ Application is copyrighted by Wavelength Electronics Inc. By purchasing the USBKit from Wavelength Electronics the user has not purchased, nor do they own, the QuickConnect software or any of its components, but is granted permission to freely install the software on as many computers as are required for use with the Wavelength Electronics USBKit product. Decompiling, disassembling or reverse engineering this software by any other means is expressly forbidden. The user is NOT granted a license to reuse subsets of the technology (e.g. modules or components of this application) in any other custom application without the express, written permission of Wavelength Electronics Inc. The QuickConnect application and its components and modules may not be redistributed by the user except when distributed with the USBKit hardware from Wavelength Electronics, and may not be rebranded or resold under any other name. Wavelength Electronics makes no claims as to the fitness of this software for use in any specific application. The user is subject to the end user license agreements for software components from National Instruments for the NI-DAQmx and NI-MAX software components, and to the end user license agreement from Microsoft Corporation for the installation of the .NET 2.0 framework.

This software is provided “as-is” by Wavelength Electronics for use with the USBKit hardware and Wavelength Electronics’ temperature controller and laser driver modules.

## ADDITIONAL INFORMATION

### FLOATING INPUTS

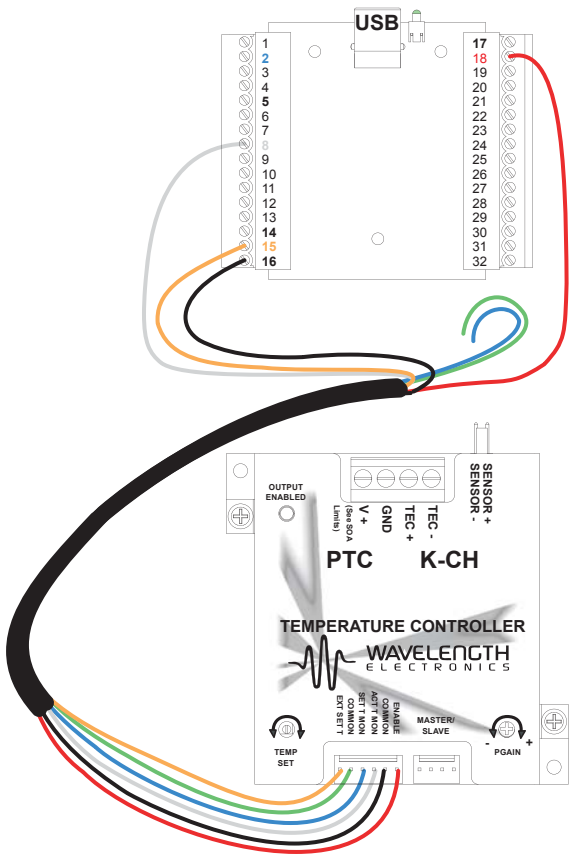
If you choose a tab where no controller is connected, some fields will display random readings because the NI-DAQ card inputs / outputs are floating.

### GROUNDING

Note that the USBKIT hardware is grounded to the computer via the USB connection. If the power supplies used on the WEI modules are not grounded properly, noise can be introduced into the system. Separate supplies (ground floating) may be necessary.

WIRING DIAGRAMS

PTC-CH Family of Temperature Controllers

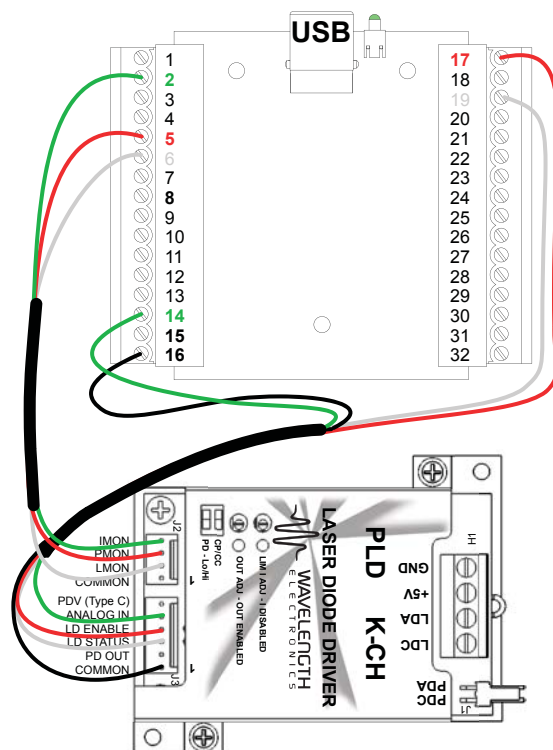


PTC-CH PIN	WIRE COLOR	USB ADD-ON PIN
1 - ENABLE	Red	18
2 - COMMON	Black	16
3 - ACT T MON	White	8
4 - SET T MON	Blue	NO CONNECT
5 - COMMON	Green	NO CONNECT
6 - EXT SET T	Orange	15



## WIRING DIAGRAMS

### PLD-CH Family of Laser Diode Drivers

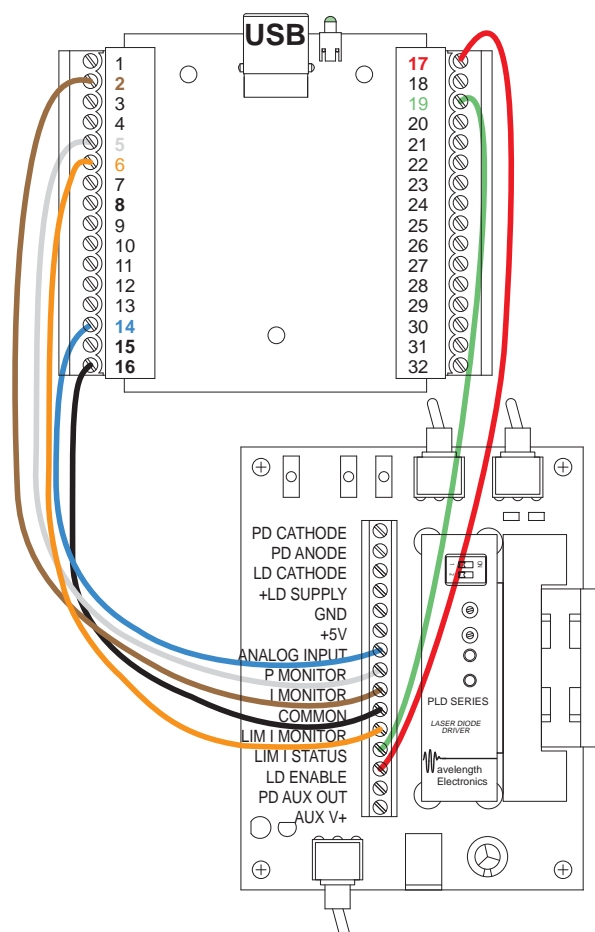


Wiring shown is for type A/B lasers

PLDK-CH PIN	WIRE COLOR	USB PIN
<b>J2</b>		
1 - COMMON	BLACK	No Connect
2 - LMON Limit Current Monitor	WHITE	6
3 - PMON Photodiode Current Monitor	RED	5
4 - IMON Current Monitor	GREEN	2
<b>J3</b>		
1 - COMMON	BLACK	16
2 - PD OUT (Type C) Photodiode Output	ORANGE	No Connect
3 - LD STATUS Enabled Status	WHITE	19
4 - LD ENABLE Output Enable	RED	17
5 - ANALOG IN Modulation Input	GREEN	14
6 - PDV (Type C) Photodiode Voltage	BLUE	No Connect

## WIRING DIAGRAMS

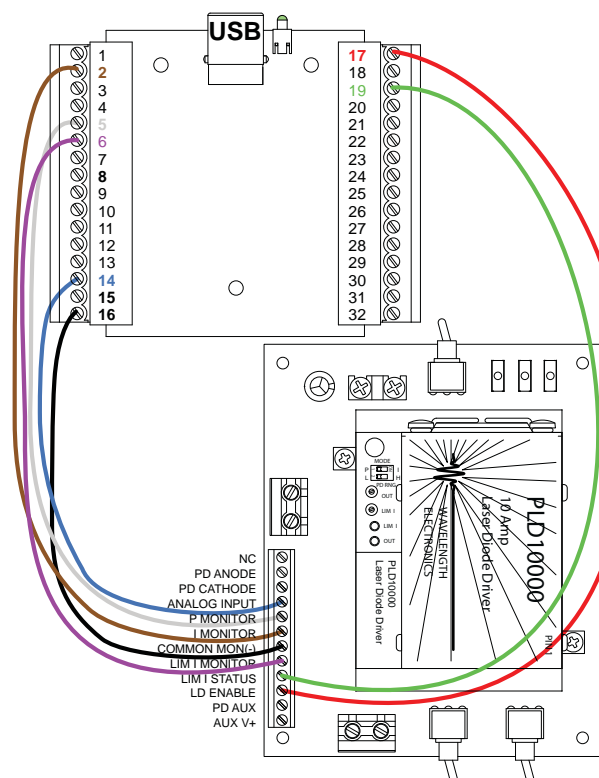
### PLD Series Laser Diode Drivers with PLDEVAL PCB Evaluation Board



PLDEVAL PCB PIN	USB ADD-ON PIN
1 - PD CATHODE	
2 - PD ANODE	
3 - LD CATHODE	
4 - +LD SUPPLY	
5 - GND	
6 - +5V	
7 - ANALOG INPUT	14
8 - P MONITOR	5
9 - I MONITOR	2
10 - COMMON	16
11 - LIM I MONITOR	6
12 - LIM I STATUS	19
13 - LD ENABLE	17
14 - PD AUX OUT	
15 - AUX V+	

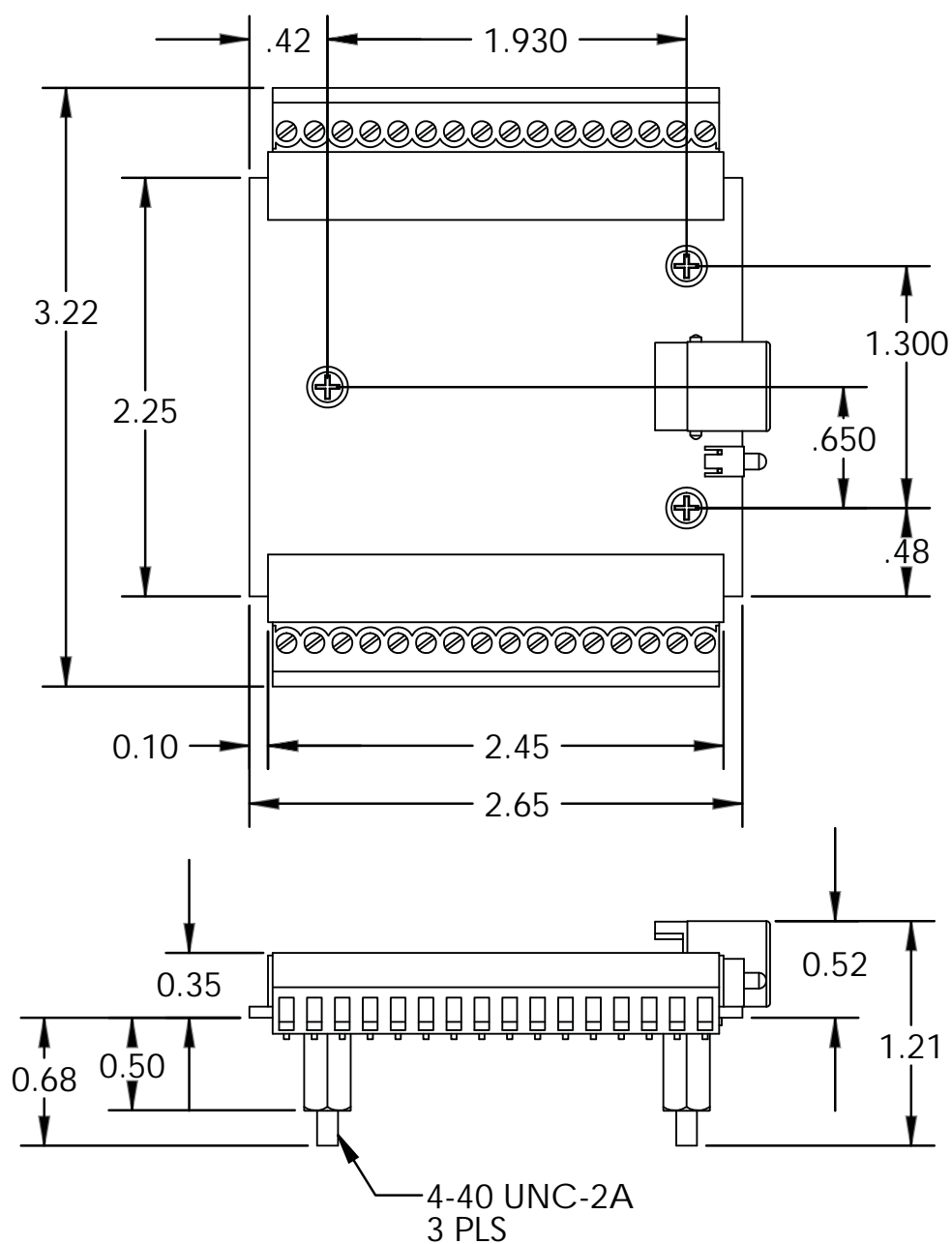
## WIRING DIAGRAMS

### PLD10000 Series Laser Diode Drivers with PLD10EV Evaluation Board



PLD10EV PIN	USB ADD-ON PIN
1 - NC	
2 - PD ANODE	
3 - PD CATHODE	
4 - ANALOG INPUT	14
5 - P MONITOR	5
6 - I MONITOR	2
7 - COMMON MON(-)	16
8 - LIM I MONITOR	6
9 - LIM I STATUS	19
10 - LD ENABLE	17
11 - PD AUX OUT	
12 - AUX V+	

## MECHANICAL SPECIFICATIONS\*



Dimensions are in Inches  
 \*All Tolerances are +/- 5%

**CERTIFICATION AND WARRANTY**

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**CERTIFICATION:**

Wavelength Electronics (Wavelength) certifies that this product met it's published specifications at the time of shipment. Wavelength further certifies that its calibration measurements are traceable to the United States National Institute of Standards and Technology, to the extent allowed by that organization's calibration facilities, and to the calibration facilities of other International Standards Organization members.

**WARRANTY:**

This Wavelength product is warranted against defects in materials and workmanship for a period of 90 days from date of shipment. During the warranty period, Wavelength will, at its option, either repair or replace products which prove to be defective.

**WARRANTY SERVICE:**

For warranty service or repair, this product must be returned to the factory. An RMA is required for products returned to Wavelength for warranty service. The Buyer shall prepay shipping charges to Wavelength and Wavelength shall pay shipping charges to return the product to the Buyer upon determination of defective materials or workmanship. However, the Buyer shall pay all shipping charges, duties, and taxes for products returned to Wavelength from another country.

**LIMITATIONS OF WARRANTY:**

The warranty shall not apply to defects resulting from improper use or misuse of the product or operation outside published specifications.

No other warranty is expressed or implied. Wavelength specifically disclaims the implied warranties of merchantability and fitness for a particular purpose.

**EXCLUSIVE REMEDIES:**

The remedies provided herein are the Buyer's sole and exclusive remedies. Wavelength shall not be liable for any direct, indirect, special, incidental, or consequential damages, whether based on contract, tort, or any other legal theory.

**REVERSE ENGINEERING PROHIBITED:**

Buyer, End-User, or Third-Party Reseller are expressly prohibited from reverse engineering, decompiling, or disassembling this product.

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**SAFETY:**

There are no user serviceable parts inside this product. Return the product to Wavelength Electronics for service and repair to ensure that safety features are maintained.

**LIFE SUPPORT POLICY:**

As a general policy, Wavelength Electronics, Inc. does not recommend the use of any of its products in life support applications where the failure or malfunction of the Wavelength product can be reasonably expected to cause failure of the life support device or to significantly affect its safety or effectiveness. Wavelength will not knowingly sell its products for use in such applications unless it receives written assurances satisfactory to Wavelength that the risks of injury or damage have been minimized, the customer assumes all such risks, and there is no product liability for Wavelength. Examples of devices considered to be life support devices are neonatal oxygen analyzers, nerve stimulators (for any use), auto transfusion devices, blood pumps, defibrillators, arrhythmia detectors and alarms, pacemakers, hemodialysis systems, peritoneal dialysis systems, ventilators of all types, and infusion pumps as well as other devices designated as "critical" by the FDA. The above are representative examples only and are not intended to be conclusive or exclusive of any other life support device.

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**REVISION HISTORY**

REVISION	DATE	NOTES
REV. A	22-Jan-10	Beta release
REV. B	2-May-11	Support for more PLD modules



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