High Performance Specs
Ultra stable, high precision, patented low noise drivers and controllers enable you to focus on your development or research.

Accelerate Prototyping
Feature-rich with varied packaging options, our drivers and controllers make it easy to integrate high performance core elements quickly.

Hassle-free Orders
Rigorous manufacturing processes ensure short lead time, on-time delivery, and industry-leading low RMA rate (<0.1%).

Responsive Tech Support
At Wavelength, you get an experienced Applications Engineer who is dedicated to your success.
1. LAB Series Instruments
2. QCL OEM Modules
3. Laser Diode Drivers
4. Integrated Laser & Temp Control
5. Temperature Controllers
6. USBKIT – Board & Software
7. Accessories for OEM Integration:
   - Cables,
   - Power Supplies,
   - Thermistors,
   - Heatsinks
TC LAB Instrument

**Temperature stability better than 0.0009°C**

**Compatible with Thermistors, 2-, 3-, or 4-wire RTDs, Linear voltage sensors, Linear current sensors**

**Touchscreen with intuitive user interface**

**Adjustable current limit, with Brick-Wall Never-Exceed circuitry**

**Password protection available to lock out a selectable control set**

**Over-temperature protection circuit**

**Temperature limits on the load**

**Shutdown signal to the QCL/laser driver load to protect against over or under temperature situations.**

**IntelliTune® sets ideal control parameters for optimal time to temperature or disturbance rejection**

**Complete command set for remote control from computer**

**LabVIEW™ Virtual Instrument interface**

**AC input 115/230 ±15% VAC 50/60 Hz**

Size: 17.7 x 8.9 x 3.5 in (450 x 225 x 88 mm)
TC LAB Instrument

ULTRA-STABLE TEMPERATURE CONTROLLER
The TC LAB series of temperature controllers integrates high-end Digital Control with a precision output current drive stage to offer better than 0.0009°C temperature stability. Many different sensors can be used in the feedback loop.

Models are available driving 5 A or 10 A maximum with 15 V compliance or 15 A maximum with 20 V compliance to the thermoelectric or resistive heater. Safety features protect the thermoelectric [TE] and it’s load. Over and under temperature limits as well as positive and negative current limits can be set. If the sensor signal is lost or a short is detected at the TE, output current is disabled. If temperature limits are exceeded, a signal to the active load can be sent to disable its current.

INTUITIVE USER INTERFACE AND SUPERIOR SOFTWARE CONTROL
With Wavelength’s plug and play instrument, you have the ability to quickly set the controls using either the instrument touchscreen or a remote computer.

INTELLITUNE
Instead of long, manual calculations to derive the optimal Proportional, Integral, and Derivative [PID] control terms for a load, press the IntelliTune icon to characterize the load. IntelliTune automatically responds to changes in setpoint or tuning goals, optimizing PID control.

<table>
<thead>
<tr>
<th>TEMPERATURE CONTROLLER SPECIFICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRIVER OUTPUT CURRENT</td>
</tr>
<tr>
<td>Output Current</td>
</tr>
<tr>
<td>Compliance Voltage</td>
</tr>
<tr>
<td>Stability, 1 Hour</td>
</tr>
<tr>
<td>Stability, 24 Hours</td>
</tr>
<tr>
<td>Temperature Coefficient</td>
</tr>
</tbody>
</table>
QCL LAB Instrument

FEATURES

Output current of 500 mA, 1 A, 1.5 A, or 2 A

Low noise: < 0.4 µA RMS up to 100 kHz (typical)

Compliance voltage up to 20 V

USB and Ethernet interfaces with LabVIEW™ VI

5 V output for alignment LED

CE compliant, compatible with CDRH laser regulations

All software and instrument documentation provided on a USB flash drive

Optional rack mount kit: 2 U height, ½ rack width

AC input switch selectable from 115/230 ±15% VAC with a 50/60 Hz power-line frequency

Safety features protect your QCL investment

  _ Adjustable soft-clamp current limit, with Brick-Wall Never-Exceed circuitry
  _ Driver over-temperature protection circuit

Size: 17.7 x 8.9 x 3.5 in (450 x 225 x 88 mm)
**INTUITIVE USER INTERFACE**

With Wavelength’s plug and play instrument, you have the ability to quickly set the controls using the instrument touchscreen - Setpoint, Limit Current, Supply Voltage, Cable Resistance, and more.

**CONTROL THE INSTRUMENT VIA REMOTE COMPUTER**

The QCL Laboratory Series instruments can be controlled remotely from a computer using a LabVIEW™ virtual instrument application or the remote command set.

**APPLICATIONS**

Due to their unique construction, QCLs operate with high power in the near-IR through terahertz ranges. These wavelengths are particularly suited to detection of molecules significant to humans. Applications include: remote detection of explosive materials, medical diagnosis using the breath, non-invasive glucose testing, emissions monitoring, and pharmaceutical process quality control, anesthesia and hospital air quality monitoring, leak detection, and remote imaging.

---

**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>MIN</th>
<th>TYP</th>
<th>MAX</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compliance Voltage</td>
<td></td>
<td></td>
<td>20</td>
<td>V</td>
</tr>
<tr>
<td>Max Output Current</td>
<td>0.5, 1.0, 1.5, 2.0</td>
<td></td>
<td></td>
<td>A</td>
</tr>
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<td>1.3</td>
<td>μA RMS</td>
</tr>
<tr>
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<td>2</td>
<td>4</td>
<td>nA / √Hz</td>
</tr>
<tr>
<td>Long Term Stability, 24 hr</td>
<td>5</td>
<td>10</td>
<td>15</td>
<td>ppm</td>
</tr>
<tr>
<td>Temperature Coefficient</td>
<td>5</td>
<td>10</td>
<td>18</td>
<td>ppm / °C</td>
</tr>
<tr>
<td>Modulation Bandwidth (sinewave)</td>
<td>2</td>
<td>3</td>
<td></td>
<td>MHz</td>
</tr>
<tr>
<td>Rise Time / Fall Time</td>
<td>250</td>
<td>200</td>
<td></td>
<td>nsec</td>
</tr>
</tbody>
</table>
**QCL OEM Module**

Output current of 500 mA, 1 A, 1.5 A, or 2 A
Low noise: < 0.4 µA RMS up to 100 kHz (typical)
Compliance voltage up to 20 V

Feature-rich for OEM applications
- On-board power and enable switches
- Analog current setpoint input
- TTL-compatible Power-On & Output Enable
- Status outputs can drive front-panel LEDs
- Optional 5 V output drives alignment LEDs
- Small Package 6.55” x 5.5” x 2.3”

±24 VDC power supply required
Adjustable soft-clamp current limit, with Brick-Wall Never-Exceed circuitry
Brown-out, reverse-voltage, & over-voltage protection
Reverse polarity models available: QCL OEM(+)

Size: 5.5 x 6.55 x 2.3 in (140 x 166 x 59 mm)
**LOW NOISE FOR ULTRA-NARROW LINEWIDTHS**

Two key characteristics of quantum cascade lasers make them popular for precision sensing and spectroscopy applications: 1) the wavelength can be custom-tailored to mid- and long-wavelength IR, and 2) the extremely narrow linewidth allows for faster, higher-precision, and more repeatable measurements than competing technologies.

Laser emission wavelength and linewidth are both partly a function of current density, and therefore drive current noise and jitter manifest directly as broadened linewidth and wavelength jitter. Broadening the center wavelength by a fraction of a cm$^{-1}$ can reduce measurement sensitivity by an order of magnitude or more, so it is critical to eliminate electronic noise.

**ULTRA-STABLE OUTPUT CURRENT**

With trace gas and chemical detection systems, overall repeatability hinges on the stability of the current source. The QCL achieves stability on the order of ±10 ppm over 1 hour, tested with the unit on a bench and subject to ambient temperature fluctuations. The QCL driver maintains this level of stability even over a 24-hour test cycle.

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**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>MIN</th>
<th>TYP</th>
<th>MAX</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driver Supply Voltage, Bipolar</td>
<td>± 22</td>
<td>± 25</td>
<td></td>
<td>VDC</td>
</tr>
<tr>
<td>Compliance Voltage</td>
<td>11 *</td>
<td>16</td>
<td>20 *</td>
<td>V</td>
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<tr>
<td>Max Output Current</td>
<td>0.5, 1.0, 1.5, 2.0</td>
<td>A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RMS Noise Current</td>
<td>0.4</td>
<td>1</td>
<td>1.3</td>
<td>μA RMS</td>
</tr>
<tr>
<td>Noise Current Density</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>nA / VHz</td>
</tr>
<tr>
<td>Long Term Stability, 24 hr</td>
<td>5</td>
<td>10</td>
<td>15</td>
<td>ppm</td>
</tr>
<tr>
<td>Temperature Coefficient</td>
<td>5</td>
<td>10</td>
<td>18</td>
<td>ppm / °C</td>
</tr>
<tr>
<td>Modulation Bandwidth (sinewave)</td>
<td>2</td>
<td>3</td>
<td>MHz</td>
<td></td>
</tr>
<tr>
<td>Rise Time / Fall Time</td>
<td>250</td>
<td>200</td>
<td></td>
<td>nsec</td>
</tr>
</tbody>
</table>

* Ask for Product Variation PV055 for 20 V compliance or PV048 for the 11 V option.

The QCL is available with integrated temperature control. This hybrid unit pairs a PTC10K-CH with a QCL OEM module.

For more information contact the factory.
LDxCHA Series Laser Diode Driver

**FEATURES**

- Models: 2.5 A, 5 A, 10 A, and 15 A
- Single supply operation at +5 VDC for single emitters (3 V maximum to laser)
- Dual supply operation up to +30 VDC (28 V maximum to laser)
- Constant Current or Constant Power modes
- Safety features protect your laser
  - » Adjustable clipping current limit
  - » Slow-start and delay circuitry
  - » Brownout protection
  - » Over-voltage protection
- Bandwidth 280 kHz to 1 MHz in Constant Current mode (model dependent)
- RMS Noise Current as low as 7 μA at 100 kHz

Size: 1.125 x 2.1 x 4.5 in (28.6 x 53.3 x 114.3 mm)
MEETING LASER REQUIREMENTS
The LDxCHA product family has current levels from 2.5 A up to 15 A. These drivers meet laser compliance requirements from 3 V with a single +5 V supply, and up to 28 V with an additional 30 V power supply, supporting applications such as materials processing, industrial laser cutting, and laser diode bars/stacks. This product family supports A & B type laser diodes.

WORRY-FREE SETUP
The new circuitry in the LDxCHA allows for the laser diode current limit and the laser diode current setpoint to be fine-tuned without output current enabled to the laser. This allows users to set the specific safety and output levels required without risk of overdriving the laser during initial configuration.

DESIGNED FOR EASY INTEGRATION
The LDxCHA drivers, with their small size and easy mountability, can be attached directly to an optics table or designed into a system. Two trimpots set the current limit and current setpoint, while five spring loaded terminal blocks allow for simple wiring.

LASER SAFETY FEATURES
Built-in safety features ensure robust designs for real world operating conditions: clipping current limit ensures that the output current will never exceed the setpoint; and slow start circuit ramps the output current. Long-term reliability means better up-time, fewer service calls, and more satisfied customers.
PLD-CH Series Laser Driver

Models driving up to 5 A, 10 A, or 12.5 A
Single 5 V supply operation up to 10 A
Compliance voltage up to 28 VDC with separate power supply
Slow-start laser diode protection
Constant Current or Constant Power mode
Latching current limit
Mechanical relay protection
Remote Enable / Disable pin
Onboard setpoint and limit trimpots
Parallel two units to drive up to 25 A

Size: 2.9 x 2.4 x 1.1 in (74 x 60 x 28 mm)
PLD-CH Series Laser Driver

CHASSIS-MOUNT FLEXIBILITY
The compact PLD-CH Series are our most popular laser diode controllers. The mount-anywhere modular package style and cabled connections give you the flexibility to place the laser driver at the ideal location within your system chassis.

Using a single 5 VDC power supply you can drive lasers up to 3 V compliance. Lasers with higher compliance voltage—up to 28 V—can be accommodated by using separate supplies for the laser and electronics.

The photodiode feedback input range is selectable in order to maximize control sensitivity, and the outstanding constant power stability makes this high-power driver ideal for industrial applications where continuous stable laser output power is required.

SAFETY FEATURES MAKE FOR ROBUST OEM SYSTEMS
Remote control inputs and status monitor outputs streamline design and integration of OEM laser control systems, ensuring your system design is robust to real-world conditions and providing long-term reliability that you can trust. The latching current limit protects the laser diode by disabling the output when the current limit is reached, and the mechanical output shorting relay provides additional protection against conditions that might damage the laser diode. This driver is ideal for applications where current stability is critical and space is tight, such as benchtop inspection instruments and medical diagnostic equipment.

<table>
<thead>
<tr>
<th>SPECIFICATIONS</th>
<th>PLD5K</th>
<th>PLD10K</th>
<th>PLD12.5K</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driver Supply Voltage</td>
<td>5 to 5.5</td>
<td>VDC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laser Supply Voltage, High Compliance</td>
<td>4.5 to 30</td>
<td>VDC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compliance Voltage</td>
<td>3 to 28</td>
<td>V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max Output Current</td>
<td>5</td>
<td>10</td>
<td>12.5</td>
<td>A</td>
</tr>
<tr>
<td>Constant Current Short Term Stability, 1 hr</td>
<td>&lt; 100</td>
<td>ppm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant Power Stability, 1 hr</td>
<td>&lt; 0.02</td>
<td>%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature Coefficient</td>
<td>&lt; 200</td>
<td>ppm / °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modulation Bandwidth (CC, sinewave)</td>
<td>120</td>
<td>80</td>
<td>50</td>
<td>kHz</td>
</tr>
<tr>
<td>Rise / Fall Time</td>
<td>4.8 / 9.4</td>
<td>5.9 / 10</td>
<td>8 / 9</td>
<td>μsec</td>
</tr>
</tbody>
</table>
Two models: 10 A and 12.5 A output current

PLD10000 can be operated from a 5 VDC supply

Separate power supply can be used to drive high-compliance lasers, up to 27.5 V

Constant Current or Constant Power modes

Safety features protect your laser
- Adjustable latching current limit
- Slow-start circuitry

Remote Enable controls

Optimized heatsink and fan simplifies integration

Size: 3.35 x 3.20 x 1.93 in (85.1 x 81.3 x 49.0 mm)
RELIABILITY YOU CAN TRUST
The PLD Series Laser Diode Drivers deliver the reliability and performance you expect from a Wavelength Electronics laser driver in a compact and easy-to-integrate package. Tens of thousands of PLD drivers are deployed in laser systems around the world, proving beyond doubt the reliability and stability of the design.

PLD Series drivers are used for fiber laser pumping, materials processing, pyrotechnic ignition, industrial applications, and laser diode LIV testers.

DESIGNED FOR EASY INTEGRATION
The PLD10000 is powered by a 5 V supply, and the laser can be driven from the same supply. High-compliance lasers can be driven by using a separate supply up to 30 V. The PLD12500 requires two separate supplies.

LASER SAFETY FEATURES
Built-in safety features make your product more robust to real world operating conditions: latching current limit switches off the output if the current limit is reached; a slow start circuit ramps the output current; and a mechanical shorting relay protects the laser from ESD events while the output is switched off. Long-term reliability means better up-time, fewer service calls, and more customers who are satisfied with your products.
PLD PCB Series Laser Driver

FEATURES

Models driving from 200 mA to 6.5 A
Single 5 V power supply operation
Compliance voltage up to 28 VDC with separate power supply
Slow-start laser diode protection
Constant Current or Constant Power mode
Latching current limit
Mechanical relay output protection
Onboard or remote setpoint and limit controls
Remote Enable / Disable input
Integrated heatsink and fan

Size (PLD200/500): 1.5 x 2.7 x 0.8 in (39 x 67 x 21 mm)
(PLD1250/5000/6500): 1.5 x 2.7 x 1.8 in (39 x 67 x 45 mm)
PLD PCB Series Laser Driver

RELIABILITY YOU CAN TRUST
The PLD Series Laser Diode Drivers deliver the reliability and performance you expect from a Wavelength Electronics laser driver in a compact and easy-to-integrate PCB-mountable package. Tens of thousands of PLD drivers are deployed in laser systems around the world, proving beyond doubt the reliability and stability of our most popular laser diode controllers.

Lasers with forward voltage drop up to 3 V can be driven using a single 5 V power supply. Lasers with a high compliance voltage—up to 28 V—can be accommodated by separating the electronics and laser power supplies. PLD Series drivers are found in particle counters, manufacturing vision systems, photovoltaic quantum efficiency testers, wavefront scanners, fiber aligners, and laser diode LIV testers.

DESIGNED FOR EASY INTEGRATION
Onboard controls simplify prototyping and benchtop use, especially when used with the PLDEVAL evaluation circuit board. Remote control inputs and external monitors allow the PLD controllers to be integrated into an automated control system, ensuring your system design is robust to real-world operating conditions. The latching current limit protects the laser diode by disabling the output when the current limit is reached, and the mechanical output shorting relay provides additional protection against potentially damaging ESD events.

<table>
<thead>
<tr>
<th>SPECIFICATIONS</th>
<th>PLD200</th>
<th>PLD500</th>
<th>PLD1250</th>
<th>PLD5000</th>
<th>PLD6500</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driver Supply Voltage</td>
<td>5 to 5.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VDC</td>
</tr>
<tr>
<td>Laser Supply Voltage, High Comp.</td>
<td>3 to 30</td>
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<td></td>
<td></td>
<td></td>
<td>VDC</td>
</tr>
<tr>
<td>Compliance Voltage</td>
<td>3 to 28</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>Max Output Current</td>
<td>0.2</td>
<td>0.5</td>
<td>1.25</td>
<td>5.0</td>
<td>6.5</td>
<td>A</td>
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<td>Constant Current Short Term Stability, 1 hr</td>
<td>&lt; 100</td>
<td>&lt; 100</td>
<td>&lt; 100</td>
<td>&lt; 200</td>
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<td>Constant Power Stability, 1 hr</td>
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</tr>
<tr>
<td>Modulation Bandwidth (CC, sinewave)</td>
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<td>200</td>
<td>200</td>
<td>150</td>
<td>100</td>
<td>kHz</td>
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<tr>
<td>Rise / Fall Time</td>
<td>3 / 5</td>
<td>3 / 5</td>
<td>3 / 5</td>
<td>3 / 12</td>
<td>5 / 12</td>
<td>µsec</td>
</tr>
</tbody>
</table>
WLD3343 Series Drivers & Board

**FEATURES**

- Up to 3 A Output Current
- Slow-start laser diode protection
- TTL-compatible shutdown pin
- Adjustable current limit and current range
- Over-temperature shutdown
- 14-Pin DIP PCB Mount
- Constant Current or Constant Power mode
- Voltage controlled setpoint
- 2 MHz Bandwidth (CC, sinewave)

Size (WLD3343):
- 1.3 x 1.3 x 0.3 in (33 x 33 x 8 mm)
- (with heatsink): 1.3 x 1.3 x 0.87 in (33 x 33 x 22 mm)
- (with heatsink & fan): 1.3 x 1.3 x 1.3 in (33 x 33 x 33 mm)
COMPACT LASER DIODE DRIVER
The WLD3343 is a compact DIP-packaged laser diode driver that operates in Constant Current or Constant Power mode, and can be modulated up to 2 MHz. No leakage current makes it ideal for low current VCSELs.

A number of safety features are built-in to protect the laser: adjustable current control range and limit, slow-start, and a TTL-compatible shutdown pin. The over-temperature protection circuit safely switches off the laser if the driver reaches an unsafe operating temperature.

When driving up to 500 mA the WLD3343 does not need a heatsink—the slim metal-backed case is sufficient for self-cooling. For higher current requirements the heatsink and fan are available.

Minimal external electronics are required to operate the WLD3343. An online circuit calculator speeds selection of component values. The WLD3393 evaluation board makes setup and configuration even easier.

APPLICATIONS
This laser diode driver is ideal for applications where space is tight. It is widely used in electro-optic instrumentation, spectrometers, medical diagnostic equipment, range finders, and on research benches.

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>MIN</th>
<th>TYP</th>
<th>MAX</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driver Supply Voltage</td>
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<td>8.2</td>
<td>12</td>
<td>VDC</td>
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<td>Compliance Voltage</td>
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<td>4.0</td>
<td>10</td>
<td>V</td>
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<tr>
<td>Max Output Current</td>
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<td>2.2</td>
<td>3</td>
<td>A</td>
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<td>CC Stability, 1 hr</td>
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<tr>
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<td>0.05</td>
<td>0.01</td>
<td>%</td>
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<td>Constant Current Bandwidth (sinewave)</td>
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<td></td>
<td></td>
<td>MHz</td>
</tr>
<tr>
<td>Rise / Fall Time</td>
<td>460</td>
<td>480</td>
<td>520</td>
<td>nsec</td>
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<tr>
<td>Leakage Current</td>
<td>0</td>
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<td></td>
<td>mA</td>
</tr>
</tbody>
</table>
FL500 SMT Laser Diode Driver

**Features**

- Low Cost
- Two 250 mA outputs or one 500 mA output
- Single Supply Operation: 3 to 12 V
- 12-pin SMT package, reflow compatible
- Laser slow start, brownout protection
- Voltage controlled setpoint
- TTL-Compliant shutdown pin
- Multiple FL500s can be paralleled to provide higher drive current
- FL591FL Evaluation Board available

Size (FL500): 0.75 x 0.45 x 0.26 in (19 x 12 x 7 mm)
SMT LASER CONTROL MADE EASY
The FL500 is ideal for driving laser diodes when you are designing your own electronics control system to suit exactly your application requirements. The FL500 is nearly a drop-in laser driver and requires very little external circuitry.
The wide supply voltage range—from 3 to 12 VDC—allows it to be operated from portable Li+ battery power systems.

REMARKABLY EASY TO INTEGRATE
The FL500 can be configured as two independent 250 mA drivers or a single 500 mA driver. The only external components required are a power supply, an analog voltage signal to control the output setpoint, and the laser. Additional output filters can be added to reduce noise further.

EASY TO PROTOTYPE
The FL591FL evaluation board allows you to configure the FL500 in minutes. The FL591FL features low-noise electronics and low quiescent current, and the feedback and monitor signals allow you to accurately characterize the included FL500. It also allows the FL500 to be configured to operate in Constant Power or Constant Current mode.

APPLICATIONS
Because of its compact size and light weight the FL500 is commonly used in hand-held, portable, space-constrained, and airborne applications. The dual-channel output is ideal for sighting-and-detection applications.
LDD P Series Laser Diode Driver

FEATURES

- Low Noise — Up to 400 mA drive current
- Single Supply Operation: 5 to 12 V
- Onboard control trimpots
- 8-Pin DIP Package
- Slow Start & Current Limit protection
- Constant Current operation
- 2 MHz Bandwidth (CC, sinewave)
- Buffered measurement outputs

Size: 1.3 x 2.1 x 0.4 in (33 x 52 x 11 mm)
LOW NOISE, HIGH STABILITY
When it is essential to have high performance in your application, these low noise drivers offer excellent current stability in Constant Current mode.

Precisely control the laser diode setpoint current with the onboard output current adjustment trimpot or via a remote voltage to the modulation input. Adjust the limit current trimpot to protect the laser diode from exceeding its maximum current rating even when modulating your laser diode. Measure laser diode current from a buffered monitor output.

An evaluation board (LDDEVALP) and cable are available to speed implementation of the LDD in your application.

Very low leakage current (15 µA) makes the LDD ideal for driving most VCSELs using the remote modulation setpoint input. It operates from +5 to +12 V. Just add an external power supply and your laser diode to this simple 8-pin driver.

The LDD Series is excellent for laser spectroscopy, electro-optical systems, and contamination control devices.
LDTC Series Integrated Driver

FEATURES

Laser Current: 500 mA, 1 A, or 2.2 A
Temperature Control up to 2.2 A
Single supply operation or separate supplies
   Laser driver 3 to 12 VDC
   Temperature controller 5 to 30 VDC
Laser diode driver features
   Slow start protection
   Constant Current or Constant Power mode
   Adjustable laser diode current limit
   Remote TTL shutdown / interlock
Failsafe setpoint default for temperature setpoint
All cables included

Size (LDTCxx20): 2.4 x 2.9 x 1.1 in (60 x 74 x 28 mm)
(LDTC 2/2 E): 4.8 x 2.7 x 1.14 in (122 x 69 x 29 mm)
(LDTC 2/2 O): 4.2 x 2.5 x 1.0 in (107 x 64 x 25 mm)
INTEGRATED CONTROL MADE SIMPLE
These combination controllers integrate the FL500 or WLD3343 Laser Diode Driver with the ultra-stable WTC3243 Temperature Controller. We make these modules easy to use by providing onboard controls for every key parameter needed for complete laser diode and temperature control. The control parameters are also accessible via connectors so you can easily integrate the module into your OEM laser system.

STABLE AND RELIABLE
The LDTCxx20 includes one or two FL500s to drive up to 1 A to the laser diode. The LDTC 2/2 includes the WLD laser driver with up to 2.2 A drive current. All models include the ultra-stable WTC3243 that provides up to 2.2 A of bipolar current for operating a thermoelectric cooler, or unipolar current for a resistive heater.

CRITICAL SAFETY FEATURES
Important safety features protect the laser and TEC, and make the entire laser control system more robust to real-world operating conditions: adjustable current limits, slow-start and brown-out protection, and a special failsafe feature that drives the TEC to a safe temperature if the external temperature setpoint signal is lost.

---

**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>LDTC 0520</th>
<th>LDTC 1020</th>
<th>LDTC 2/2</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laser Driver Supply Voltage</td>
<td>3 to 12</td>
<td>5 to 12</td>
<td></td>
<td>VDC</td>
</tr>
<tr>
<td>Compliance Voltage, LD V_{DD,FL} - (0.5 x V_{SET})</td>
<td>5-10</td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>Laser Output Current</td>
<td>0.5</td>
<td>1</td>
<td>2.2</td>
<td>A</td>
</tr>
<tr>
<td>Constant Current Stability, 1 hr</td>
<td>35-40</td>
<td>50-75</td>
<td></td>
<td>ppm</td>
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<tr>
<td>Constant Power Stability, 1 hr</td>
<td>0.019</td>
<td>0.01</td>
<td></td>
<td>%</td>
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<tr>
<td>Modulation Bandwidth (CC, sinewave)</td>
<td>0.5</td>
<td>1.6</td>
<td></td>
<td>MHz</td>
</tr>
<tr>
<td>Rise / Fall Time</td>
<td>300 / 300</td>
<td>460 / 320</td>
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<td>nsec</td>
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<tr>
<td>Leakage Current (Laser Control)</td>
<td>0.3</td>
<td>1</td>
<td>0</td>
<td>mA</td>
</tr>
<tr>
<td>Temp Controller Power Supply</td>
<td>5 to 12</td>
<td></td>
<td></td>
<td>VDC</td>
</tr>
<tr>
<td>Output Power Supply</td>
<td>5 to 30</td>
<td>5 to 30</td>
<td></td>
<td>VDC</td>
</tr>
<tr>
<td>Compliance Voltage, TC V_s - 0.5</td>
<td></td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>Temperature Controller Output Current</td>
<td>± 2.2</td>
<td></td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>Temperature Stability, 1 hr (10 kΩ thermistor @ 25°C)</td>
<td>0.002</td>
<td></td>
<td></td>
<td>°C</td>
</tr>
</tbody>
</table>
PTC-CH Series Temp Controller

FEATURES

Drive ±2.5 A, ±5 A or ±10 A current
Single Supply Operation from 5 to 30 VDC
Linear Stability: 0.0012°C
Onboard and remote controllable
  - Remote or onboard temperature setpoint control
  - Remote or onboard enable / disable
  - Adjustable current limit
  “Smart Integrator” quickly settles to temperature even on large thermal loads
Selectable sensor bias current
Failsafe setpoint default circuit

Size: 3 x 3 x 1.1 in (76 x 76 x 28 mm)
PTC-CH Series Temp Controller

STABLE EVEN ACROSS AMBIENT
The PTC-CH Series Precision Temperature Controllers are compact, chassis-mount modules that provide excellent temperature stability—even across ambient. The linear bipolar output drives TECs, and it can be easily configured for unipolar heater operation. PTC-CH controllers are found in such diverse applications as particle and droplet measurement, manufacturing machine vision systems, biomolecular interaction analysis, and more.

FLEXIBLE AND EASY TO USE
The PTC-CH controllers are designed to be integrated into your laser control system. With onboard trimpots for current limit, temperature setpoint, and proportional gain, it’s also easy to use the controller on your benchtop, too.

An LED indicates when output current is enabled. An external voltage can be used for remote setpoint operation, and if the setpoint signal is lost the controller automatically reverts to a “safe” temperature setpoint.

PRACTICAL FEATURES FOR REAL-WORLD CONDITIONS
- The PTC10K-CH can be linked with the PTC10K-SL to increase the output current up to 20 A.
- Sensor bias currents can be configured to maximize feedback sensitivity with a variety of sensors.
- Low temperature coefficient design remains stable across a wide range of ambient conditions.
- Remote limit capability allows a DAC to set the current limit.

<table>
<thead>
<tr>
<th>SPECIFICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>PARAMETER</td>
</tr>
<tr>
<td>Controller Supply Voltage</td>
</tr>
<tr>
<td>Compliance Voltage</td>
</tr>
<tr>
<td>Max Output Current</td>
</tr>
<tr>
<td>Temperature Stability, 1 hr (10 kΩ thermistor @ 25°C)</td>
</tr>
<tr>
<td>Temperature Coefficient</td>
</tr>
</tbody>
</table>
PTC PCB Series Temp Controller

**Features**

- Drive ±5 or ±10 A of TEC or heater current
- Single supply operation: 5 to 30 VDC
- Remote Output Enable
- Remote Temperature Setpoint
- Short term stability of 0.0012°C (off-ambient)
- Long term stability 0.002°C
- Selectable sensor bias current
- Adjustable current limit
- PI Control with “Smart Integrator”
- Failsafe Setpoint default in case of remote temperature setpoint signal error

Size: 2.32 x 2.15 x 3.85 in (97.7 x 54.7 x 58.9 mm)
TIME-TESTED RELIABILITY
The PTC Series PCB-Mount Temperature Controllers are based on our long-proven PTC-CH controllers, and deliver the same stable performance and long-term reliability.

PTC Series controllers are found in such diverse applications as particle and droplet measurement, communication systems, manufacturing test systems, and more.

POWERFUL AND EASY TO USE
The PTC controllers operate from a single power supply between 5 V and 30 V, and two models drive ± 5 A or ± 10 A to a Peltier thermoelectric cooler or a resistive heater. These controllers mount directly to your circuit board.

PTC controllers interface with a variety of temperature sensors, and the bias current is adjustable in order to maximize controller sensitivity and stability for your application.

You can use the PTCEVAL board to quickly configure the PTC controller for prototyping. Using the same controller for development and production helps guarantee there are no surprises when it’s time to release the final design.
LFI3751 Temp Control Instrument

FEATURES

PID Autotune quickly optimizes Temperature Controller for any thermoelectric load.

24-hour Temperature Stability: 0.003°C

Max Thermoelectric Current Output: ± 5 Amps

Proportional Gain Range: 1 to 100

Integrator Time Constant Range: 1 to 10 seconds

Differential Time Constant Range: 1 to 100 seconds

Supply Voltage: +115 VAC to +230 VAC

Addressable RS-232 Interface

Digital PID Improves Stability with RTDs by as much as a factor of five

Digital PID Improves Overshoot Suppression

50% Faster Settling Times with Digital PID

Size: 4.25 x 12 x 6.5 in. (108 x 305 x 165 mm)
TEMPERATURE CONTROL WITH AUTOTUNE
The LFI3751 with Autotune PID is a high-performance temperature control instrument. Drive up to ±5 A to either thermoelectrics (TECs) or resistive heaters (RH) with up to 8 V compliance. This instrument operates from AC (115 / 230, 50 or 60Hz). Expect stability as good as 0.001°C with thermistors. Even across ambient, this PID controller maintains precision temperature.

From the front panel, adjust temperature limits, current limits, setpoint, PID control values, sensor calibration data, and enable or disable output current. The 4-digit display shows actual or setpoint temperature or resistance, output current and voltage.

Sensor calibration is easy with a reference right on the front panel. Also, view Thermoelectric current and voltage and limit current settings.

UNIQUE FEATURES
**Autotune PID** is a sophisticated algorithm for optimizing the PID control parameters to your load. With the touch of a button, the LFI3751 automatically optimises control settings for most thermal loads, reducing overshoot or improving temperature stability.

**Autoranging** sensor bias currents keep your sensor voltage in the optimal range for maximum signal to noise ratio.

**Addressable RS232** and **USB** control is available. **Benchlink** software simulates the front panel control from your PC. **LabVIEW** drivers simplify computer control.

The LFI3751 Digital option provides better setpoint resolution and stability with low-resolution sensors such as RTDs. This option also offers improved overshoot suppression, 50% faster settling times, and faster calibration.
RHM5K-CH Unipolar Temp Control

**FEATURES**

- Compact, 5 A unipolar drive current
- Single supply operation 5 to 30 VDC
- > 27 V compliance with 30 V input
- < 0.002°C stability
- Adjustable output voltage limit
- Supports thermistors, IC sensors, or RTDs
- PID control
- Temperature setpoint, proportional gain, and limit voltage are user adjustable
- Easy operation for resistive heater or TECs

Size: 2.1 x 2.1 x 0.8 in  (55 x 55 x 20 mm)
The RHM5K-CH Temperature Controller is for applications that require a unidirectional current to either heat or cool a load at off-ambient temperatures. The RHM is very compact, drives up to 5 A, and controls with a high degree of stability.

Nearly any kind of temperature sensor can be used with the RHM controller, and onboard 12-turn trimpots control temperature setpoint, proportional gain, and output voltage limit.

A 10-pin terminal strip provides easy access to the DC supply, sensor, heater or TEC, and monitor connections. The minimal number of external connections means you can configure and run the RHM in a matter of minutes.

The RHM5K-CH is suited for applications where either heating or cooling—but not both—is required.

Made for applications where temperature stability is critical and space is tight, such as heated optics (non-condensing), CCDs, preheated liquids and chamber stabilization.
Drive up to ±5 A at 5 V to TEC
Compatible with Thermistors
High Efficiency Pulse-Width Modulated controller
PCB-mounted 22-pin module
Single 5 VDC supply operation
Short term stability 0.001°C
Adjustable voltage and current limits
Highly functional and easy-to-use evaluation board simplifies prototyping and saves money

Size: 1.3 x 1.3 x 0.3 in (33 x 33 x 8 mm)
WTCP PWM Temperature Controller

COMPACT, POWERFUL, AND EFFICIENT
The WTCP5V5A Temperature Controller delivers all the advantages of Pulse Width Modulated (PWM) control in a PCB-mounted package. Compact and efficient, the WTCP usually does not require any additional heatsinking, even when operated at full output current.

The temperature operating range of the WTCP can be fine-tuned to maximize stability around the operating point, and built-in safety features help make your system robust to real-world operational conditions.

A feature-packed evaluation board lets you explore the WTCP, and streamlines your system characterization. We also offer an OEM system board that is customized at the factory with the discrete component values you specify, and is easily integrated into your product.

The WTCPOEM board condenses the adjustable functions of the WTCPEVAL board into a compact, fixed-value board, perfect for system integration. At 2.1” x 2.0”, it includes a monitor/output connector, either a setpoint trimpot for a variable setpoint or a resistor pair for a fixed setpoint, resistors to set cooling and heating limits, and all the tuning parameters.

APPLICATIONS
The WTCP is perfectly suited for applications requiring high efficiency, low power dissipation, and high stability. Portable, airborne, and space-constrained temperature control applications benefit from the performance boost delivered by the WTCP5V5A.

<table>
<thead>
<tr>
<th>SPECIFICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>PARAMETER</td>
</tr>
<tr>
<td>Power Supply Voltage</td>
</tr>
<tr>
<td>Compliance Voltage</td>
</tr>
<tr>
<td>Max Output Current</td>
</tr>
<tr>
<td>Temperature Stability, 1 hr (10 kΩ thermistor @ 25°C)</td>
</tr>
<tr>
<td>Temperature Coefficient</td>
</tr>
<tr>
<td>Efficiency</td>
</tr>
</tbody>
</table>

WTCP-OEM Board  WTCPEVAL Board
HTC Series Temperature Controller

Drive ±1.5 A, ±3 A, or ±4 A to a TEC or heater
Single Supply Operation 5 to 30 VDC
Ultra-stable PI Control
Linear Stability: 0.0009°C
Heat and cool current limits
20-pin SIP PCB mount
Adjustable sensor bias current
Monitor Actual and Setpoint Temperature
Supports thermistors, RTDs, and IC sensors

Size: 3.2 x 2.8 x 1.2 in
LOW PROFILE
The advanced and reliable circuitry of the HTC Series achieves 0.0009°C temperature stability. The slim profile package is ideal for designs with space constraints, and can either be circuit board-mounted or fixed to a chassis heatsink and connected via cable.

External discrete components are used to set the limit current, proportional gain, integrator time constant, and sensor bias current. The output current can be controlled by adding a trimpot, or by a voltage signal on the analog input pin. Setpoint and actual temperature can be monitored with a digital voltmeter via buffered monitor outputs.

The HTCEVALPCB evaluation board simplifies prototyping, and can be integrated directly into some OEM applications. Wavelength also provides a direct-mount heatsink sized for the HTC controllers.

The HTC can be operated with up to 30 VDC power supply voltage; contact the factory for information on simple product variations. The HTC has proven reliable in such diverse fields as medical, defense, communications and manufacturing.

<table>
<thead>
<tr>
<th>SPECIFICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>PARAMETER</td>
</tr>
<tr>
<td>Power Supply Voltage (Vₚ)</td>
</tr>
<tr>
<td>Compliance Voltage</td>
</tr>
<tr>
<td>Max Output Current</td>
</tr>
<tr>
<td>Temperature Stability, 1 hr, (10 kΩ thermistor @ 25°C)</td>
</tr>
</tbody>
</table>
WTC Series Temperature Control

FEATURES

Drive ±2.2 A TEC or RH Current
Single supply operation: 5 to 30 V
Ultra-stable PI control
Stability of 0.0009°C
Separate heat and cool current limits
Supports thermistors, RTDs, and IC sensors
Adjustable sensor bias current
14-pin DIP PCB mount
Monitor actual temperature sensor voltage

Size (WTC3243): 1.3 x 1.3 x 0.3 in (33 x 33 x 8 mm)
(with heatsink): 1.3 x 1.3 x 0.87 in (33 x 33 x 22 mm)
(with heatsink & fan): 1.3 x 1.3 x 1.3 in (33 x 33 x 33 mm)
The ultrastable and compact WTC3243 Temperature Controller is particularly suited to applications where temperature is scanned across ambient. The award-winning package can drive up to 500 mA with no additional heatsinking, and it will drive up to 2.2 A with our specially-designed heatsink and fan combination. The WTC3243HB operates on 3.6 V Lithium-ion batteries, and integrates perfectly with the WLD3343HB laser driver for portable use.

The WTC3243 is easily configured for virtually any type of temperature sensor and the built-in sensor bias current source simplifies use with resistive temperature sensors. The proportional gain and integrator time constant are set by external resistors and can be modified to minimize temperature overshoot and maximize stability. Our online circuit calculator tool speeds selection of external components.

Use the WTC3293 Evaluation Board to simplify operation of the WTC3243 Temperature Controller. Onboard switches, connectors, and trimpots provide fast, simple local control and the screw terminal connectors also allow for remote operation.
WHY5640 Temperature Controller

**Low Cost**
Master / Slave multiple units for more current
Drive up to ±2.2 A load current
Single supply operation: 5 to 26 VDC
Linear PI control
Heat and cool current limits
14-pin DIP PCB mount

**Features**

Size (WHY5640): 1.3 x 1.3 x 0.3 in (33 x 33 x 8 mm)
(with heatsink): 1.3 x 1.3 x 0.87 in (33 x 33 x 22 mm)
(with heatsink & fan): 1.3 x 1.3 x 1.3 in (33 x 33 x 33 mm)
WHY5640 Temperature Controller

GENERAL PURPOSE TEMPERATURE CONTROLLER
The WHY5640 is a general purpose analog controller driving up to ±2.2 Amps for use with thermoelectric or resistive heater applications.

The WHY5640 uses an active resistor bridge circuit that operates directly with thermistors or RTD temperature sensors. A single resistor or trimpot sets the temperature setpoint, and with additional circuitry an external voltage signal can be used.

Multiple WHY5640 units can be tied together to drive higher output currents. Independent heat and cool current limits are set by single resistors. A single resistor sets proportional gain and a resistor/capacitor in series sets the integrator time constant.

The WTC3243 is sometimes a better choice for particular applications. This table highlights the differences between the two units. If you have additional questions, or need help deciding which is ideal for you, contact an Applications Engineer.

<table>
<thead>
<tr>
<th>SPECIFICATIONS</th>
<th>MIN</th>
<th>TYP</th>
<th>MAX</th>
<th>UNIT</th>
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</thead>
<tbody>
<tr>
<td>Controller Supply Voltage</td>
<td>5 to 24</td>
<td></td>
<td></td>
<td>VDC</td>
</tr>
<tr>
<td>Load Supply Voltage ($V_s$)</td>
<td>5 to 28</td>
<td></td>
<td></td>
<td>VDC</td>
</tr>
<tr>
<td>Compliance Voltage</td>
<td>$V_s - 1.6$</td>
<td>$V_s - 1$</td>
<td>$V_s - 0.5$</td>
<td>V</td>
</tr>
<tr>
<td>Max Output Current</td>
<td>± 2.2</td>
<td></td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>Temperature Stability, 1 hr (10 kΩ thermistor @ 25°C)</td>
<td>0.001</td>
<td>0.005</td>
<td>0.01</td>
<td>°C</td>
</tr>
</tbody>
</table>

QUICK COMPARE

<table>
<thead>
<tr>
<th>WTC3243</th>
<th>WHY5640</th>
</tr>
</thead>
<tbody>
<tr>
<td>Built-in remote setpoint capability</td>
<td>Additional circuitry required for remote setpoint control</td>
</tr>
<tr>
<td>Supports thermistors, RTD, AD690, LM335</td>
<td>Supports resistive sensors; other sensors require additional circuitry</td>
</tr>
<tr>
<td>Single-unit operation only</td>
<td>Multiple units can be tied together for higher output current</td>
</tr>
<tr>
<td>Minimal external electronics</td>
<td>Requires more external electronic components than the WTC3243</td>
</tr>
</tbody>
</table>

WHY5690 Evaluation Board
USBKIT Software Interface

**FEATURES**

USB 2.0 full-speed compatible interface allows you to remotely control one Wavelength Electronics laser diode driver and one temperature controller

QuickConnect™ software included

Software-configurable safety limits

Graph and log data in real-time

Save and recall multiple instrument setups

Auxiliary differential 14-bit A/D input

Connect multiple USBKITs to one PC

USB cable included

Size: 2.9 x 2.4 x 1.1 in (74 x 60 x 28 mm)
USBKIT Software Interface

**COMPUTERIZE THE WAVELENGTH ADVANTAGE**
Expand your Wavelength controller’s capabilities with the USBKIT and QuickConnect™ software. The USBKIT provides computer control of most Wavelength chassis-mount controllers and evaluation boards.

**BIG FEATURES IN A SMALL PACKAGE**
Multifunction I/O card includes D/As for remote setpoint control, and auxiliary A/Ds for monitoring actual temperature or current.

Control a laser diode driver and a temperature controller, and configure the two to operate together to take advantage of the built-in laser safety features. Use several USBKITs on the same computer for control of complex systems and set up multiple configurations for repeating experiments or manufacturing testing routines. The QuickConnect™ software includes on-screen wiring diagrams, making set-up a snap.

Two strip charts graph laser and temperature data as a function of time. Selected data can be continuously logged.

**PLUG-IN CONVENIENCE FOR OEMS**
OEMs can build the USBKIT into your laser system and enjoy the convenience of closed-cover system calibration.

---

**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>USBKIT SPECIFICATIONS</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>A/D Resolution</td>
<td>13 or 14 bits</td>
</tr>
<tr>
<td>D/A Resolution</td>
<td>12 bits</td>
</tr>
<tr>
<td>Power Supply Voltage</td>
<td>USB Bus powered</td>
</tr>
<tr>
<td>USB Interface</td>
<td>USB 2.0 Full-Speed</td>
</tr>
<tr>
<td>Size</td>
<td>3.2 x 2.8 x 1.2 in</td>
</tr>
</tbody>
</table>

**QuickConnect™ SPECIFICATIONS**

| Memory Requirement | 256 MB |
| .NET Framework     | 2.0 or higher |
| Operating System   | Windows 2000, XP, Vista, Windows 7 32-bit, English Versions |

**USBKIT Features by Product**

<table>
<thead>
<tr>
<th>USBKIT Specifications</th>
<th>Remote Setpoint</th>
<th>Remote Enable</th>
<th>Actual Monitor 1</th>
<th>Actual Monitor 2</th>
<th>Limit Monitor</th>
<th>Limit Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTC-CH Family</td>
<td>X</td>
<td>X</td>
<td>X Sensor Temp</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PTC PCB Family</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X Sensor Temp</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PLD-CH Family</td>
<td>X</td>
<td>X</td>
<td>X Photodiode Current</td>
<td>Laser Diode Current</td>
<td></td>
<td>X X</td>
</tr>
<tr>
<td>PLDEVALPCB</td>
<td>X</td>
<td>X</td>
<td>X Photodiode Current</td>
<td>X Laser Diode Current</td>
<td></td>
<td>X X</td>
</tr>
<tr>
<td>PLD10EV</td>
<td>X</td>
<td>X</td>
<td>X Photodiode Current</td>
<td>X Laser Diode Current</td>
<td></td>
<td>X X</td>
</tr>
<tr>
<td>LDTC2/2</td>
<td>X</td>
<td>X</td>
<td>X Photodiode Current</td>
<td>X Laser Diode Current</td>
<td></td>
<td>X X</td>
</tr>
<tr>
<td>LDTCxx20</td>
<td>X</td>
<td>X</td>
<td>X Photodiode Current</td>
<td>X Laser Diode Current</td>
<td></td>
<td>X X</td>
</tr>
</tbody>
</table>

Other Wavelength products can be interfaced to the USBKIT. Contact the factory for details.
The TCS10K5 10 kΩ thermistor is a 1% cylindrical head option. 0.5 mm by 3 mm with 3-inch Teflon-coated leads.

The remaining thermistors are 1% bead head options — 5, 10, 20, 50 and 100 kΩ. 2 mm by 3 mm long with 3-inch Teflon-coated leads.

<table>
<thead>
<tr>
<th>MODEL</th>
<th>R @ 25 °C</th>
<th>10 μA RANGE</th>
<th>100 μA RANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCS610</td>
<td>10 kΩ</td>
<td>-45 to +13 C</td>
<td>-8 to +50 C</td>
</tr>
<tr>
<td>TCS10K5</td>
<td>10 kΩ</td>
<td>-45 to +13 C</td>
<td>-8 to +50 C</td>
</tr>
<tr>
<td>TCS620</td>
<td>20 kΩ</td>
<td>-35 to +28 C</td>
<td>+6 to +69 C</td>
</tr>
<tr>
<td>TCS650</td>
<td>50 kΩ</td>
<td>-18 to +49 C</td>
<td>+25 to +92 C</td>
</tr>
<tr>
<td>TCS651</td>
<td>100 kΩ</td>
<td>-4 to +87 C</td>
<td>+41 to +114 C</td>
</tr>
</tbody>
</table>
These low profile AC/DC switching supplies provide 1% Noise & Ripple, short circuit protection, 1-3% line regulation (depending upon model), 0.04% temperature coefficient, and up to 85% efficiency.
Laser Diode & Rack Mounts

Laser mount to support the most common butterfly style laser diodes. LED ON indicator, DSUBs for easy connection to a temperature controller and laser driver. Make your system plug-n-play with our 5A laser mount.

Mount one or two QCL LAB instruments, which have a 2 U height, in a standard 19" rack. Dual instruments can be mounted side-by-side. A single instrument mounts on either the left or right side.
Thermal Management

The Multi-Product Heat Sinks support many Wavelength Electronics products with excellent thermal conductivity during product evaluation. Also available in a High Power option for products with drive currents over 10 A. Mounting hardware and thermal paste are included. Product specific heatsinks and thermal management kits are also available.
Online Design Tools

The Safe Operating Area Calculators (SOA Calculators) are used to ensure a thermally robust, reliable system using your input voltage, load size, and ambient temperature.

The WTC3243 Circuit Calculator calculates gain resistor values based on thermoelectric or resistive heater currents, PI loop configuration based on load type, and sensor gain and bias current.

The WLD3343 Circuit Calculator calculates the limit resistor, PD sense resistor, and LD sense resistor values based on laser diode current limit and operating mode.
Applications

- QCLs for Gas Sensing in the Mid-IR
- Optoelectronic Qualification: NASA Goddard
- Raman Spectroscopy: Complete Laser Control
- Telecomm Manufacturing
- Medical Lasers
- Portable Shifted Excitation Raman Difference Spectrometer For In-Situ Field Measurements
- Methane Detection Using Unmanned Aerial Systems
- Utilizing Quantum Dots to Label DNA
- Trace Atmospheric Gas Sensing with QCLs