The LDC-3916 Laser Diode Controller offers 16 channels of laser diode current source and temperature control in a space-saving, rack-mountable instrument for simultaneous control of both current and temperature of up to 16 laser diodes in one mainframe. ILX Lightwave developed the LDC-3916 for multiple pump control in optical amplifier testing. The high stability, low noise, current, and temperature controllers also make the 3916 suitable for low-channel count burn-in systems.

A wide variety of laser control modules are available, including laser controller modules, dual channel laser current source, and dual channel temperature control modules. Controller modules source up to 1.5A of laser current with an integrated 9W temperature controller. Dual laser current source modules, with two isolated outputs, source up to 1A per channel, while dual temperature control modules provide two independent 9W outputs for control of up to 32 laser diodes per mainframe.

Remote operation for independent control of all 16 channels is provided through the IEEE488 GPIB port or RS-232 serial interface.

Specifications

- 16 independent, isolated channels for laser and TEC control
- Wide variety of laser controller modules (current and temperature) with up to 3A available per channel
- Dual channel laser current or temperature control modules for control of up to 32 laser diodes with one mainframe
- Laser current sources feature low noise and high stability and operate in constant current or constant power operating modes with direct modulation up to 1MHz
- Temperature controllers operate in constant temperature or constant resistance mode with expanded gain setting from 1 to 127
- GPIB / IEEE488 or RS-232 remote control interface
16-Channel Laser Diode Controller

**F R O N T  P A N E L  I N T E R F A C E  P R O V I D E S  S I M P L E  O P E R A T I O N**

The bright vacuum fluorescent display is readable from almost any angle. Status screens show four channels at once and scroll both directions to view any channel easily. Monitoring operations, changing setpoints, and switching any output on or off can be done from the status menu. Plus, you can define any two parameters to be displayed on the status screen for each channel.

For initial or detailed setup, simple and intuitive menus supported by screen-specific soft keys quickly configure and operate each channel. Menu depths have been limited to keep the front panel operation concise, while more sophisticated operations are reserved for the GPIB interface. An “All Channel” menu facilitates initial setup, and ten storage bins allow you to save and recall all instrument settings. Setpoints and other values can be entered through a numeric keypad, up/down arrow keys, or the rotary adjustment knob.

**P O W E R F U L  G P I B  I N T E R F A C E**

A powerful master processor platform drives the LDC-3916 controller, communicating with all sixteen microprocessor-controlled modules. When coupled with the HS488TNT chipset GPIB technology from National Instruments®, the LDC-3916 provides all of the necessary processing capabilities for automated production testing. With microprocessors on each module, the mainframe master manages 16 independent control channels quickly and reliably. Free LabVIEW® instrument drivers are available upon request or online at www.newport.com/ilxlightwave.

**S U P P O R T  F U T U R E  S Y S T E M  E X P A N S I O N**

Designed to provide the most efficient and safest control available for multiple laser diodes, each module’s control functions are managed locally and communicated to the master processor. On-board intelligence simplifies future addition of modules since all operational and calibration data is stored in the module. Simply plug in the new module and power up the system. The mainframe never needs to leave the rack.

**S T A T E - O F - T H E - A R T  L A S E R  D I O D E  C U R R E N T  S O U R C E**

The LDC-3916 current source topology uses an innovative, proprietary control loop and incorporates the latest techniques for signal filtering and circuit board shielding. Adjustable voltage limit and faster shutoff help prevent dangerous reconnect transients that can occur from intermittent connections between controller and laser diode. Investment in this instrument provides assurance for safe, worry-free testing and control of a variety of laser diodes.

Operational modes including constant current in low or high bandwidth or constant optical power are selectable from the front panel or via the remote interface. Measurement of the laser diode forward voltage is provided with 4-wire accuracy for protection environments where longer cable runs are common. A single, rear panel modulation port provides direct modulation of each channel’s laser current and supports external modulation bandwidths of up to 1MHz (lower current modules). Individual channel modulation ports are available on request.

**H I G H  S T A B I L I T Y  T E C  C O N T R O L**

Achieve up to +0.007°C temperature stability with the low noise temperature controller modules. The temperature control circuits optimize temperature setting times with a smart integrator control loop with expanded gain setting ranges. All TEC control modules for the LDC-3916 include voltage measurement capabilities and internal thermistor current selection via front panel or remotely for control over a wide temperature range.

**F L E X I B L E  C O N T R O L  O V E R  A  W I D E  R A N G E  O F  A P P L I C A T I O N S**

By combining true modularity and high channel density, the LDC-3916 easily adapts to a wide variety of applications. This system can be used for controlling multiple pump lasers in amplifier test or low channel count burn-in applications.


The LDC-3916 provides all of ILX Lightwave’s proven laser protection features like independent current limits, slow start turn-on circuits, and isolated power supplies.
FRONT PANEL INTERFACE PROVIDES SIMPLE OPERATION

The bright vacuum fluorescent display is readable from almost any angle. Status screens show four channels at once and scroll both directions to view any channel easily. Monitoring operations, changing setpoints, and switching any output on or off can be done from the status menu. Plus, you can define any two parameters to be displayed on the status screen for each channel.

For initial or detailed setup, simple and intuitive menus supported by screen-specific soft keys quickly configure and operate each channel. Menu depths have been limited to keep the front panel operation concise, while more sophisticated operations are reserved for the GPIB interface. An “All Channel” menu facilitates initial setup, and ten storage bins allow you to save and recall all instrument settings. Setpoints and other values can be entered through a numeric keypad, up/down arrow keys, or the rotary adjustment knob.

POWERFUL GPIB INTERFACE

A powerful master processor platform drives the LDC-3916 controller, communicating with all sixteen microprocessor-controlled modules. When coupled with the HS488TNT chipset GPIB technology from National Instruments®, the LDC-3916 provides all of the necessary processing capabilities for automated production testing. With microprocessors on each module, the mainframe master manages 16 independent control channels quickly and reliably. Free LabVIEW® instrument drivers are available upon request or online at www.newport.com/ilxlightwave.

SUPPORT FUTURE SYSTEM EXPANSION

Designed to provide the most efficient and safest control available for multiple laser diodes, each module’s control functions are managed locally and communicated to the master processor. On-board intelligence simplifies future addition of modules since all operational and calibration data is stored in the module. Simply plug in the new module and power up the system. The mainframe never needs to leave the rack.

STATE-OF-THE-ART LASER DIODE CURRENT SOURCE

The LDC-3916 current source topology uses an innovative, proprietary control loop and incorporates the latest techniques for signal filtering and circuit board shielding. Adjustable voltage limit and faster shutoff help prevent dangerous reconnect transients that can occur from interconnections between controller and laser diode. Investment in this instrument provides assurance for safe, worry-free testing and control of a variety of laser diodes.

Operational modes including constant current in low or high bandwidth or constant optical power are selectable from the front panel or via the remote interface. With microprocessor on each module, the mainframe master manages 16 independent control channels quickly and reliably. Free LabVIEW® instrument drivers are available upon request or online at www.newport.com/ilxlightwave.

HIGH STABILITY TEC CONTROL

Achieve up to +0.007°C temperature stability with the low noise temperature controller modules. The temperature control circuits optimize temperature settling times with a smart integrator control loop with expanded gain setting ranges. All TEC control modules for the LDC-3916 include voltage measurement capabilities and internal thermistor current selection via front panel or remotely for control over a wide temperature range.

FLEXIBLE CONTROL OVER A WIDE RANGE OF APPLICATIONS

By combining true modularity and high channel density, the LDC-3916 easily adapts to a wide variety of applications. This system can be used for controlling multiple pump lasers in amplifier test or low channel count burn-in applications.

The adjustable laser voltage limit brings even greater levels of protection. If a temperature limit is reached, the TEC temperature control modules can be programmed to turn off any or all lasers in a mainframe. Designed for production testing, the LDC-3916 will satisfy higher power multiple laser diode operation with reliable and secure control.

PROTECT YOUR INVESTMENT WITH THE LEADERS IN LASER DIODE PROTECTION

The LDC-3916 provides all of ILX Lightwave’s proven laser protection features like independent current limits, slow start turn-on circuits, and isolated power supplies.

The back panel of the LDC-3916 instrument, with 16-channel full capacity module loading. Offering secure and flexible module population, customized to fit your testing needs. Standard 1 MHz modulation port and GPIB / RS232 remote terminals expand upon its application and control.
The LDC-3916 Laser Diode Controller offers 16 channels of laser diode current source and temperature control in a space-saving, rack-mountable instrument for simultaneous control of both current and temperature of up to 16 laser diodes in one mainframe. ILX Lightwave developed the LDC-3916 for multiple pump control in optical amplifier testing. The high stability, low noise, current, and temperature controllers also make the 3916 suitable for low-channel count burn-in systems.

A wide variety of laser control modules are available, including laser controller modules, dual channel laser current source, and dual channel temperature control modules. Controller modules source up to 1.5A of laser current with an integrated 9W temperature controller. Dual laser current source modules, with two isolated outputs, source up to 1A per channel, while dual temperature control modules provide two independent 9W outputs for control of up to 32 laser diodes per mainframe.

Remote operation for independent control of all 16 channels is provided through the IEEE488 GPIB port or RS-232 serial interface.
TEMPERATURE CONTROL MODULES (CONTINUED)

3916550 DUAL 9W
3916558 SINGLE 2.4W (3A)

TEMPERATURE SENSOR
Types: Thermistor (2-wire NTC) Thermistor (2-wire NTC)
Thermistor Sensing Current:* 10µA/100µA 10µA/100µA
Usable Thermistor Range: 25-450,000Ω, typical 25-450,000Ω, typical
User Calibration: Steinhart-Hart, 3 constants Steinhart-Hart, 3 constants

TEC MEASUREMENT (DISPLAY)
Temperature Range:* -99°C to 199°C -99°C to 199°C
Temperature Accuracy: ±0.5°C ±0.5°C
Thermistor Resistance Range (10µA setting): 0.01-45.000Ω 0.01-45.000Ω
Accuracy (100µA setting): ±0.05% ±0.05% ±0.01% ±0.01%
TEC Current Range: 1.50 to 1.50A 1.50 to 1.50A
TEC Current Accuracy: ±0.04A ±0.04A
Voltage Range: 7.999 to 9.999V 7.999 to 9.999V
Voltage Resolution: 100mV (1mV in GPIB) 100mV (1mV in GPIB)
Voltage Accuracy: ±10µV (20µV in GPIB) ±10µV (20µV in GPIB)

CURRENT SOURCE NOTES
* 25°C, 10kΩ thermistor, 10mA current setting.
1. All values after a one-hour warm-up period.
2. Over any one-hour period, half-scale output.
3. Over any 24-hour period, half-scale output.
4. Measured optical power, not the power incident on the photodiode.
5. Maximum output current transistored from normal operational situations (e.g. power on/off, current on/off), as well as accidental situations (e.g. power line plug removal).
7. Maximum monitor photodiode current drift over any 30-minute period. Assumes zero drift in responsivity of photodiode.
8. Software limits of display range.
9. Using a 10kΩ thermistor, controlling an LDM-4412 mount at 25°C with 100µA thermistor on a 100mA setting.
10. Using a 10kΩ thermistor, controlling an LDM-4412 mount over -10°C to 85°C (~200-10kΩ to 650-10kΩ).
11. 1mV through GPIB.
12. Four-wire voltage measurement while driving calibration load. Specifications are valid for values above 10mV. Accuracy is ±0.5% of reading.

TEMPERATURE CONTROL NOTES
1. All values after a one-hour warm-up period.
2. Software limits of range. Actual range possible depends on the physical load, thermistor type, and TEC module.
3. Accuracy figures quoted for a typical 10kΩ thermistor and 10mA current setting for 25°C to 50°C and typical 10kΩ thermistor and 10mA current setting for 30°C to 1°C. Accuracy figures are relative to the calibration standard. Both resolution and accuracy are dependent upon the user-defined configuration of the instrument.
4. Over any one-hour period, half-scale output. Controlling an LDM-4412 mount at 50°C with 10mA on a 100mA setting.
5. Over any 24-hour period, half-scale output. Controlling an LDM-4412 mount at 25°C with 10kΩ thermistor on a 10mA setting.
6. Measured 1A output over a bandwidth of 10Hz to 1MHz. 3916558 module measured as 2A output over a bandwidth of DC to 25kHz.
7. Thermistor current range software selectable by front panel or GPIB.
8. Software limits of display range.
9. Using a 10kΩ thermistor, controlling an LDM-4412 mount over -50°C to 60°C (~200-2kΩ to 2-450-10kΩ) or a 10kΩ thermistor controlling an LDM-4412 mount over -10°C to 65°C (~200-10kΩ to 450-10kΩ).
10. Using a 10kΩ thermistor, controlling an LDM-4412 mount over -5°C to 90°C (~200-5kΩ to 450-20kΩ).
11. 1mV through GPIB.
12. Voltage measurement accuracy while driving calibration load. Specifications are valid for values above 10mV. Accuracy is ±0.5% of reading.

Laser Diode Notes
1. All values after a one-hour warm-up period.
2. Actual range possible depends on the physical load, thermistor type, and TEC module.
3. Accuracy figures quoted for a typical 10kΩ thermistor and 10mA current setting for 25°C to 50°C and typical 10kΩ thermistor and 10mA current setting for 30°C to 1°C. Accuracy figures are relative to the calibration standard. Both resolution and accuracy are dependent upon the user-defined configuration of the instrument.
4. Over any one-hour period, half-scale output. Controlling an LDM-4412 mount at 50°C with 10mA on a 100mA setting.
5. Over any 24-hour period, half-scale output. Controlling an LDM-4412 mount at 25°C with 10kΩ thermistor on a 10mA setting.
6. Measured 1A output over a bandwidth of 10Hz to 1MHz. 3916558 module measured as 2A output over a bandwidth of DC to 25kHz.
7. Thermistor current range software selectable by front panel or GPIB.
8. Software limits of display range.
9. Using a 10kΩ thermistor, controlling an LDM-4412 mount over -50°C to 60°C (~200-2kΩ to 2-450-10kΩ) or a 10kΩ thermistor controlling an LDM-4412 mount over -10°C to 65°C (~200-10kΩ to 450-10kΩ).
10. Using a 10kΩ thermistor, controlling an LDM-4412 mount over -5°C to 90°C (~200-5kΩ to 450-20kΩ).
11. 1mV through GPIB.
12. Voltage measurement accuracy while driving calibration load. Specifications are valid for values above 10mV. Accuracy is ±0.5% of reading.

Specifications

CURRENT SOURCE MODULES
3916332 3916334 3916338
DUAL 500mA DUAL 1A SINGLE 3A

Laser Current Output
Output Current Range: 0.500 mA 0.1000 mA 0.0300mA
Setpoint Resolution: 10µA 20µA 20µA
Setpoint Accuracy: ±0.1% of FS ±0.1% of FS ±0.1% of FS
Compliance Voltage: 6V (adjustable voltage limit) 6V (adjustable voltage limit) 4.5V (adjustable voltage limit)
Temperature Coefficient: <50ppm/°C <50ppm/°C <100ppm/°C
Short Term Stability (1 hr.): 0.002ppm 0.002ppm 0.005ppm
Long Term Stability (24 hrs.): 0.005ppm 0.005ppm 0.010ppm
Noise and Ripple:
High Bandwidth: <10µA rms <12µA rms <36µA rms
Low Bandwidth: <5µA rms <8µA rms <26µA rms

Laser Drive Limit Settings
Current Limit Range: 0.500 mA 0.1000 mA 0.0300mA
Current Limit Resolution: 0.4mA 1.0mA 3.0mA
Current Limit Accuracy: ±1.7mA ±4mA ±9mA
Voltage Limit Range: 0.75V 0.75V 0.75V
Voltage Limit Resolution: 0.1V 0.1V 0.1V
Voltage Limit Accuracy: ±0.1V ±0.1V ±0.2V

Photodiode Feedback
Type: Differential 10Ω input, Selectable Zero-Bias, or 5V Reverse Bias
Photodiode Current Range: 0.5000µA 0.5000µA 0.5000µA
Output Stability:* 0.01% 0.01% 0.01%
Setpoint Accuracy: ±0.1% of FS ±5% of FS ±1% of FS

External Analog Modulation
Input: 0-10V, 50Ω 0-10V, 50Ω 0-8.0V, 50Ω
Transfer Function: 50mV/µA 100mV/µA 375mV/µA 1% 1%

Laser Current Measurement (Display)
Output Current Range: 0.500 0.1000 0.0300mA
Output Resolution: 0.1µA 0.1µA 0.1µA
Output Current Accuracy: ±0.05% of FS ( @ 25°C) ±0.05% of FS ( @ 25°C) ±0.05% of FS ( @ 25°C)
Photodiode Current Range: 0.5000µA 0.5000µA 0.5000µA
Resolution: 0.1µA 0.1µA 0.1µA
Accuracy: ±5% of FS ( @ 25°C) ±5% of FS ( @ 25°C) ±5% of FS ( @ 25°C)

Photodiode Responsivity
Type: 0.00-1000.00µA/W 0.00-1000.00µA/W 0.00-1000.00µA/W
Resolution: 0.01µA/W 0.01µA/W 0.01µA/W
Accuracy: ±5% of FS ( @ 25°C) ±5% of FS ( @ 25°C) ±5% of FS ( @ 25°C)

Optical Power Range: 0.0-5000.00mW 0.0-5000.00mW 0.0-5000.00mW
Optical Power Resolution: 100µW 100µW 100µW
Optical Power Accuracy: ±200mW ±200mW ±200mW

In keeping with our commitment to continuous improvement, ILX Lightwave reserves the right to change specifications without notice and without liability for such changes.
# Laser Diode Controller Module

## Specifications

### Laser Current Output

<table>
<thead>
<tr>
<th>Spec</th>
<th>3916572</th>
<th>3916574</th>
<th>3916576</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output Current Range</td>
<td>0-500 mA</td>
<td>0-1000 mA</td>
<td>0-1500 mA</td>
</tr>
<tr>
<td>Setpoint Resolution</td>
<td>100 mA</td>
<td>200 mA</td>
<td>400 mA</td>
</tr>
<tr>
<td>Compliance Voltage: 6V (adjustable voltage limit)</td>
<td>100 % of FS</td>
<td>100 % of FS</td>
<td>100 % of FS</td>
</tr>
<tr>
<td>Temperature Coefficient:</td>
<td>±50 ppm/°C</td>
<td>±50 ppm/°C</td>
<td>±50 ppm/°C</td>
</tr>
<tr>
<td>Short Term Stability (1 hr.)</td>
<td>±20 ppm</td>
<td>±10 ppm</td>
<td>±10 ppm</td>
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<tr>
<td>Noise and Ripple*</td>
<td>3 mA</td>
<td>3 mA</td>
<td>3 mA</td>
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<tr>
<td>High Bandwidth:</td>
<td>&lt;10 mA rms</td>
<td>&lt;10 mA rms</td>
<td>&lt;12 mA rms</td>
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<tr>
<td>Low Bandwidth:</td>
<td>&lt;1 mA rms</td>
<td>&lt;1 mA rms</td>
<td>&lt;1 mA rms</td>
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<tr>
<td>Temperature Control Range</td>
<td>2°C to 99°C to 150°C</td>
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### Laser Drive Limit Settings

<table>
<thead>
<tr>
<th>Spec</th>
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<th>3916574</th>
<th>3916576</th>
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<tbody>
<tr>
<td>Current Limit Range</td>
<td>0-500 mA</td>
<td>0-1000 mA</td>
<td>0-1500 mA</td>
</tr>
<tr>
<td>Current Limit Accuracy</td>
<td>±7 mA</td>
<td>±4 mA</td>
<td>±2 mA</td>
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<tr>
<td>Voltage Range</td>
<td>0-7.5V</td>
<td>0-7.5V</td>
<td>0-7.5V</td>
</tr>
<tr>
<td>Voltage Limit Resolution</td>
<td>0.1V</td>
<td>0.1V</td>
<td>0.1V</td>
</tr>
<tr>
<td>Temperature Setpoint Resolution</td>
<td>0.1°C</td>
<td>0.1°C</td>
<td>0.1°C</td>
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</table>

### Laser Current Measurement (Display)

<table>
<thead>
<tr>
<th>Spec</th>
<th>3916572</th>
<th>3916574</th>
<th>3916576</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output Current Range</td>
<td>0-500.0 mA</td>
<td>0-1000.0 mA</td>
<td>0-1500.0 mA</td>
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<tr>
<td>Output Resolution</td>
<td>0.01 mA</td>
<td>0.01 mA</td>
<td>0.01 mA</td>
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<tr>
<td>Output Current Accuracy:</td>
<td>±0.5% of FS (at 25°C)</td>
<td>±0.5% of FS (at 25°C)</td>
<td>±0.7% of FS (at 25°C)</td>
</tr>
<tr>
<td>Photodiode Current Range</td>
<td>0-5000 µA</td>
<td>0-5000 µA</td>
<td>0-5000 µA</td>
</tr>
<tr>
<td>Photodiode Resolution</td>
<td>0.1 µA</td>
<td>0.1 µA</td>
<td>0.1 µA</td>
</tr>
<tr>
<td>Photodiode Accuracy:</td>
<td>±50 µA (at 25°C)</td>
<td>±50 µA (at 25°C)</td>
<td>±50 µA (at 25°C)</td>
</tr>
<tr>
<td>Photodiode Responsivity Range</td>
<td>0.00-1000 µA/mW</td>
<td>0.00-1000 µA/mW</td>
<td>0.00-1000 µA/mW</td>
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<tr>
<td>Resolution</td>
<td>0.01 µA/mW</td>
<td>0.01 µA/mW</td>
<td>0.01 µA/mW</td>
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<tr>
<td>Optical Power Range</td>
<td>0.0-500.000 mW</td>
<td>0.0-500.000 mW</td>
<td>0.0-500.000 mW</td>
</tr>
<tr>
<td>Optical Power Resolution</td>
<td>0.001 mW</td>
<td>0.001 mW</td>
<td>0.001 mW</td>
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<tr>
<td>Optical Power Accuracy:</td>
<td>±20 µA (at 25°C)</td>
<td>±20 µA (at 25°C)</td>
<td>±20 µA (at 25°C)</td>
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<tr>
<td>Forward Voltage Range</td>
<td>0.00-7.5V</td>
<td>0.00-7.5V</td>
<td>0.00-7.5V</td>
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<tr>
<td>Forward Voltage Resolution</td>
<td>10 mV</td>
<td>10 mV</td>
<td>10 mV</td>
</tr>
<tr>
<td>Forward Voltage Accuracy:</td>
<td>±7 mV</td>
<td>±7 mV</td>
<td>±7 mV</td>
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</table>

### Laser Temperature Control Output

<table>
<thead>
<tr>
<th>Spec</th>
<th>3916572</th>
<th>3916574</th>
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</thead>
<tbody>
<tr>
<td>Temperature Control Range</td>
<td>-90°C to 150°C</td>
<td></td>
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</tr>
<tr>
<td>Temperature Setpoint Resolution</td>
<td>1°C to 20°C: ±0.1°C</td>
<td>2°C to 20°C: ±0.2°C</td>
<td>2°C to 20°C: ±0.2°C</td>
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<tr>
<td>Accuracy (20°C to 50°C):</td>
<td>±0.1°C</td>
<td>±0.1°C</td>
<td>±0.1°C</td>
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<tr>
<td>Short Term Stability (1 hr.):</td>
<td>±20 ppm</td>
<td>±20 ppm</td>
<td>±20 ppm</td>
</tr>
<tr>
<td>Long Term Stability (24 hrs.):</td>
<td>±50 ppm</td>
<td>±50 ppm</td>
<td>±50 ppm</td>
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<tr>
<td>Output Type:</td>
<td>Bipolar current source</td>
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<td></td>
</tr>
<tr>
<td>Compliance Voltage:</td>
<td>±7 V DC</td>
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<td></td>
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<tr>
<td>Maximum Output Current:</td>
<td>1.5 A</td>
<td></td>
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<tr>
<td>Maximum Output Power:</td>
<td>9 W</td>
<td></td>
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<tr>
<td>Current Noise and Ripple*</td>
<td>&lt;1 mA rms</td>
<td>&lt;1 mA rms</td>
<td>&lt;1 mA rms</td>
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<tr>
<td>Current Limit Range:</td>
<td>0-1.5 A</td>
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<tr>
<td>Current Limit Accuracy:</td>
<td>±0.05 A</td>
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### Temperature Sensor

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<tbody>
<tr>
<td>Type:</td>
<td>Thermistor Sensing Current</td>
<td>Thermistor Sensing Current</td>
<td>Thermistor Sensing Current</td>
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<td>User Calibration:</td>
<td>Steinhart-Hart, 3 constants</td>
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### Temperature Measurement (Display)

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<th>Spec</th>
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</thead>
<tbody>
<tr>
<td>Temperature Range:</td>
<td>-99.9°C to 199.9°C</td>
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<tr>
<td>Temperature Accuracy:</td>
<td>±0.5°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thermistor Resistance Range:</td>
<td>100-1000 Ω</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature Limit (setting):</td>
<td>±0.05 kΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accuracy (0°C to 50°C):</td>
<td>±0.01%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Short-Term Stability (1 hr.):</td>
<td>&lt;±0.01°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long-Term Stability (24 hrs.):</td>
<td>&lt;±0.01°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TEC Current Range:</td>
<td>1.5 A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TEC Current Accuracy:</td>
<td>±0.04 A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TEC Current Resolution:</td>
<td>±0.01 A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage Range:</td>
<td>9.9 V to 9.999 V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage Resolution:</td>
<td>±0.1 mV (through GPIB)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage Accuracy:</td>
<td>±0.01 mV (through GPIB)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Temperature Control Modules

<table>
<thead>
<tr>
<th>Spec</th>
<th>3916572</th>
<th>3916574</th>
<th>3916576</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature Control Range:</td>
<td>99.9°C to 150°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature Setpoint Resolution</td>
<td>0.1°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accuracy (20°C to 50°C):</td>
<td>±0.2°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resolution (20°C to 50°C):</td>
<td>±0.1°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accuracy (0°C to 50°C):</td>
<td>±0.2°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Short Term Stability (1 hr.):</td>
<td>±20 ppm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long Term Stability (24 hrs.):</td>
<td>±50 ppm</td>
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<td></td>
</tr>
<tr>
<td>Output Type:</td>
<td>Bipolar current source</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compliance Voltage:</td>
<td>+6 V DC</td>
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<td></td>
</tr>
<tr>
<td>Maximum Output Power:</td>
<td>3 A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current Noise and Ripple*</td>
<td>&lt;1 mA rms</td>
<td></td>
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</tr>
<tr>
<td>Current Limit Range:</td>
<td>0-1.5 A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current Limit Accuracy:</td>
<td>±0.05 A</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Controller Algorithm:

- Smart Integrator, Hybrid PI, Gain adjustable from 1-127
Specifications

LASER DIODE CONTROLLER MODULE

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Current Range</th>
<th>Voltage Range</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>3916572</td>
<td>500mA/9W</td>
<td>0-500 mA</td>
<td>0-1000 mA</td>
<td>0.01 mA</td>
</tr>
<tr>
<td>3916574</td>
<td>1A/9W</td>
<td>0-1000 mA</td>
<td>0-1500 mA</td>
<td>0.02 mA</td>
</tr>
<tr>
<td>3916576</td>
<td>1.5A/9W</td>
<td>0-1500 mA</td>
<td>0-2000 mA</td>
<td>0.05 mA</td>
</tr>
</tbody>
</table>

TEMPERATURE CONTROL OUTPUT

Temperature Control Range: -96°C to 150°C
Temperature Setpoint: Resolution (±0°C to 20°C): 0.1°C
Accuracy (±20°C to ±50°C): ±0.2°C
Accuracy (±50°C to ±90°C): ±0.5°C
Accuracy (±90°C to ±200°C): ±0.7°C
Short-Term Stability (1 hr): ±0.005°C
Long-Term Stability (24 hrs): ±0.007°C
Output Type: Bipolar current source
Compliance Voltage: ±7V DC
Maximum Output Current: 1.5A
Maximum Output Power: 9W
Current Noise and Ripple: <1mA rms
Current Limit Range: 0-1.5A
Current Limit Accuracy: ±0.05A
Control Algorithm: Smart Integrator, Hybrid PI, Gain adjustable from 1-127

PHOTODIODE FEEDBACK

Photodiode Current Range: 0-5000 μA
Photodiode Responsivity Range: 0.00-1000 μA/mW
Resolution: 0.01 μA/mW
Accuracy (±25°C): ±0.05% FS
Accuracy (±10°C to ±50°C): ±0.1% FS
Accuracy (±50°C to ±90°C): ±0.2% FS
Accuracy (±90°C to ±200°C): ±0.5% FS

EXTERNAL ANALOG MODULATION

Input: 0-10V, 50kΩ
Transfer Function: DC to 1.2MHz
Small Signal Bandwidth: DC to 200 kHz
Large Signal Bandwidth: DC to 1MHz
Low Bandwidth Mode: DC to 30kHz

LASER CURRENT MEASUREMENT (DISPLAY)

Output Current Range: 0-500 mA
Output Resolution: 0.01 mA
Output Current Accuracy: ±0.00% of FS (±25°C)
Photodiode Current Range: 0-500μA
Photodiode Current Resolution: 0.1μA
Photodiode Current Accuracy: ±0.1% (±25°C)
Photodiode Responsivity Range: 0.00-1000 μA/mW
Photodiode Responsivity Resolution: 0.01μA/mW
Photodiode Responsivity Accuracy (±25°C): ±0.05% FS
Photodiode Responsivity Accuracy (±10°C to ±50°C): ±0.1% FS
Photodiode Responsivity Accuracy (±50°C to ±90°C): ±0.2% FS
Photodiode Responsivity Accuracy (±90°C to ±200°C): ±0.5% FS

TEMPERATURE SENSOR

Types: Thermistor Sensing, 2-wire NTC
Thermistor Sensing Current: 10/100μA
User Calibration: Steinhart-Hart, 3 constants

TECHNOLOGICAL SPECIFICATIONS

Temperature Control Module: 3916550 DUAL 9W
3916558 SINGLE 24W (3A)

TEMPERATURE CONTROL OUTPUT

Temperature Control Range: -99°C to 150°C
Temperature Setpoint: Resolution (±0°C to 20°C): 0.1°C
Accuracy (±20°C to ±50°C): ±0.2°C
Accuracy (±50°C to ±90°C): ±0.5°C
Accuracy (±90°C to ±200°C): ±0.7°C
Short-Term Stability (1 hr): ±0.007°C
Long-Term Stability (24 hrs): ±0.007°C
Output Type: Bipolar current source
Compliance Voltage: ±7V DC
Maximum Output Power: 1.5A
Maximum Output Power: 9W
Current Noise and Ripple: <1mA rms
Current Limit Range: 0-1.5A
Current Limit Accuracy: ±0.05A
Control Algorithm: Smart Integrator, Hybrid PI, Gain adjustable from 1-127
Specifications

3916550 DUAL 9W
3916558 SINGLE 2.4W (3A)

TEMPERATURE SENSOR

Types:
Thermistor (2-wire NTC)
Thermistor Sensing Current: 10μA/100μA
Usable Thermistor Range: 25-450.000°C, typical
User Calibration: Steinhart-Hart, 3 constants

TEC MEASUREMENT (DISPLAY)

Temperature Range: -99.9°C to 199.9°C
Temperature Accuracy: ±0.1°C

Thermistor Resistance Range (10μA setting):
Accuracy (10μA setting): ±0.05% ±0.05% ±0.18%

TEC Current Range: 1.0 to 1.50A
TEC Current Accuracy: ±0.04A ±0.04A ±0.04A
Voltage Range: 0.999 to 9.999V
Voltage Resolution: 10μV (1mV in GPIB)
Voltage Accuracy: ±70μV (±20mV in GPIB)

CURRENT SOURCE NOTES

1. All values after a one-hour warm-up period.
2. Over any one-hour period, half-scale output.
3. Over any 24-hour period, half-scale output.
4. Measured on a 1kHz bandwidth.
5. Maximum output current transistior resulting from normal operational situations (e.g. power on/off, current on/off), as well as accident situations (e.g. power line power feed-back).
7. Request ILX Application Note #7 "Protecting Your Laser Diode."
8. Maximum laser diode current over one minute period. Assumes zero drift in responsivity of photodiode.
10. Maximum laser diode current over one minute period. Assumes zero drift in responsivity of photodiode.
11. Responsivity value is user-defined and used to calculate the optical power.
12. Responsivity value is user-defined and used to calculate the optical power.
13. Voltage measurement accuracy while driving calibration load. Specifications are valid for values above 10mV. Accuracy is ±2mV through GPIB.
14. Accuracy is ±15% above 2.5A after a one-hour warm-up period.

TEMPERATURE CONTROL NOTES

1. All values after a one-hour warm-up period.
2. Software limits of range. Actual range possible depends on the physical load, thermistor type, and TEC module.
3. Accuracy figures are quoted for a typical 10kΩ thermistor and 10μA current setting. 4°C to 5°C and typical 10kΩ thermistor and 10μA current setting for 5°C to 1°C. Accuracy figures are relative to the calibration standards. Both resolution and accuracy are dependent upon the user-defined configuration of the instrument.
4. Over any one-hour period, half-scale output, controlling an LDM-4412 mount at 50°C with 10μA thermistor on a 10μA setting.
5. Over any 24-hour period, half-scale output, controlling an LDM-4412 mount at 25°C with 10μA thermistor on a 10μA setting.
6. Measured at 1A output over a bandwidth of 1Hz to 50MHz. 3916558 module measured as 2A output over a bandwidth of 50Hz to 25kHz.
7. Thermistor current range software selectable by front panel or GPIB.
8. Software limits of display range.
9. Using a 10μA thermistor, controlling an LDM-4412 mount over -30°C to 65°C (-200-2kΩ) and 10μA thermistor controlling an LDM-4412 mount over 10°C - 85°C (100-10kΩ).
10. Using a 10μA thermistor, controlling an LDM-4412 mount over -5°C to 90°C (45-45kΩ).
12. Voltage measurement accuracy while driving calibration load. Accuracy is dependent upon load used. Accuracy of ±20mV through GPIB.

LDC 3916
16-Channel Laser Diode Controller

For information call 1-800-459-9459

www.newport.com/ilxlightwave
Rev08.071019

3916332* DUAL 9W 3916358 SINGLE 3A

LASER CURRENT OUTPUT

Output Current Range: 0-500 mA 0-1000 mA 0-3000 mA
Setpoint Resolution: ±0.1% of FS ±0.1% of FS ±0.1% of FS
Setpoint Accuracy: ±0.1% of FS ±0.1% of FS ±0.1% of FS

Photodiode Current Range: 0-500μA 0-500μA 0-500μA
Setpoint Accuracy: ±0.1% of FS ±0.1% of FS ±0.1% of FS

EXTERNAL ANALOG MODULATION

Input*: 0-10V 0-10V 0-8.0V
Transfer Function: 50mA/V 100mA/V 375mA/V +10%

PHOTODIODE FEEDBACK

Photodiode Current Range: 0-500μA 0-500μA 0-500μA
Setpoint Accuracy: ±0.1% of FS ±0.1% of FS ±0.1% of FS

LASER DRIVE LIMIT SETTINGS

Current Limit Range: 0.2mA 0.4mA 2mA
Current Limit Resolution: 0.2mA 0.4mA 1mA
Voltage Limit Range: 0-5.2V 0-5.7V
Voltage Limit Resolution: 0.1V 0.1V 0.2V
Voltage Limit Accuracy: ±200mV ±200mV ±200mV

LASER CURRENT MEASUREMENT (DISPLAY)

Output Current Range: 0-500μA 0-1000μA 0-3000μA
Output Resolution: 0.1μA 0.1μA 0.1μA
Output Current Accuracy: ±0.05% of FS (+20°C) ±0.05% of FS (+20°C) ±0.05% of FS (+20°C)

LASER CURRENT MEASUREMENT (DISPLAY)

Photodiode Current Range: 0-500μA 0-500μA 0-500μA
Setpoint Accuracy: ±1% of FS ±1% of FS ±1% of FS

Photodiode Responsivity Range: 0.00-1000.00μA/mW 0.00-1000.00μA/mW 0.00-1000.00μA/mW
Resolution: 0.01μA/mW 0.01μA/mW 0.01μA/mW

In keeping with our commitment to continuous improvement, ILX Lightwave reserves the right to change specifications without notice and without liability for such changes.