#6

Choosing the Right Laser Diode Mount for Your Application

APPLICATION NOTE

ILX Lightwave®
A Newport Corporation Brand

Introduction

The multitude of laser diode packages available today make selecting the correct mount for laboratory, development, or production testing appear a daunting task. This application note will help in choosing a suitable laser diode mount for an application.

Laser Diode Mounting Considerations

When selecting a laser diode mount, the first concern is to choose a mount that will accommodate the laser package. In some cases, more than one mount can be used. For example, both the LDM-4405 and the LDM-4986 will accept 5.6 mm can-type lasers, but in very different ways.

Temperature control is another consideration. Many laser packages have internal thermoelectric coolers (TEC) to remove heat from the laser junction, so the mount must provide adequate heat sinking capacity. Some applications require a more stable temperature than is provided by the internal TEC or require testing at different case temperatures. For such applications, case temperature control TEC is optional in most ILX Lightwave laser diode mounts.

ILX Lightwave also offers high power laser diode mounts that accommodate a wide variety of laser packages. When selecting a mount for high power laser diodes, it is not only important to consider the laser package and temperature control requirements, but also the maximum allowable laser diode current and thermal load requirements.

Mount Selection Overview

ILX Lightwave laser diode mounts are divided into five basic categories:

	Free Space			Fiber Coupled		
Low Power	• TO-Can • C-Mount	• COC • QCL Packages	**1**	• DIL • Mini-DIL	• TO-Can • Butterfly Packages	**3**
High Power	• C-Mount • CS Bar • HHL	• TO-3 • Other High Power Packages	**2**	• Butterfly Packages	• 2-pin	**4**

(**5**) **Modular multi-channel laser diode mounts** for butterfly-style lasers

The following sections identify ILX Lightwave laser diode mounts. Notes describing the various features of the mount and the options available are below the picture of the device.

Low Power Free Space Mounts

The mounts available from ILX Lightwave for low power free-space packages are listed in Table 1. Refer to individual product manuals for full details.

Table 1

Model	Package Style	Case Temperature Control	Water Cooling	Nitrogen Purge Connection	Collimating Lens Option
LDM-4405	TO-Can (5.6/9.0 mm)	Yes	No	Yes	No
LDM-4990	TO-Can (5.4/5.6/9.0 mm, flanged)	Yes	Yes	Yes	No
LDM-4872	C-Block, COC and customer proprietary packages	Yes	Yes	Yes	Yes

LDM-4405

The LDM-4405 is an easy-to-use solution for mounting and temperature controlling many TO-Can packages. Devices with up to four pins may be used and the LDM-4405 support 5.6mm and 9mm lasers.

LDM-4990

The LDM-4990 includes an optional mounting post compatible with ILX OMH-67XX power and wavelength heads. Once the head is attached, simply rotate the head over the device under test and it will lock in place with spring loaded detent pins.

LDM-4872

The LDM-4872 offer convenient mounting for quantum cascade lasers (QCLs) in a vacuum or nitrogen purged environment.

High Power Free Space Mounts

The mounts available from ILX Lightwave for high power free-space packages are listed in Table 2. Refer to individual product manuals for full details.

Table 2

Model	Package Style	Case Temperature Control	Case Temperature Range	Case Temperature Control	Max Power	Max Current
LDM-4409	C-block	Yes	10°C to 85°C	TEC	10W	10A
LDM-4415	CS Bar	Yes	20°C to 85°C	TEC/Water	100W	100A
LDM-4442	HHL, TO-3 and other high power packages	No	----	Water	50W	7A

LDM-4409

The LDM-4409 provides a compact, easy-to-use solution for mounting and temperature controlling C-mount laser diodes.

LDM-4415

The LDM-4415 offers a simple solution for mounting and temperature controlling CS packaged conductively cooled high power laser diodes.

LDM-4442

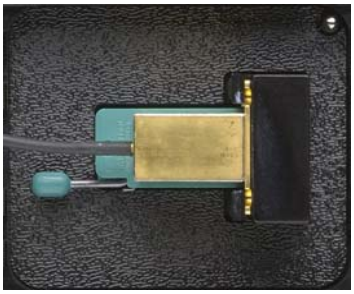
Model LDM-4442 is designed for high power laser diodes with internal TE modules and has water-cooling fittings on the base. All upright mounts can be bolted to optical tables with the standard hole pattern (¼-20 on 1” centers).

Low Power Fiber-Coupled Mounts

The mounts available from ILX Lightwave for low power fiber-coupled packages are listed in Table 3. In most cases, these mounts are highly configurable and can be used with virtually any laser diode pin-out. Refer to individual product manuals for full details.

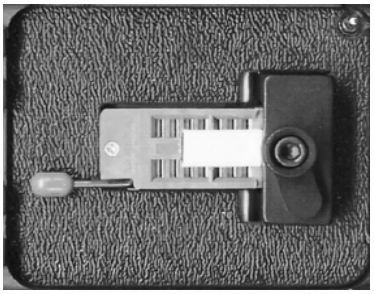
Table 3

Model	Package Style	Case Temperature Control	Bias-T
LDM-4982	DIL	Optional	No
LDM-4982M	Mini-DIL	Yes	No
LDM-4983	7-pin or 13-pin butterfly	Optional	No
LDM-4984	14-pin butterfly	Optional	Optional
LDM-4984RF	14-pin butterfly bias-T modulated	Optional	Yes
LDM-4986	Fiber Coupled TO-Can, Flanged	Yes	No
LDM-4989	20-pin or 26-pin Butterfly	Optional	No



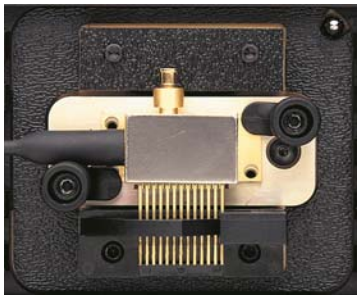
LDM-4982/LDM-4982T
LDM-4982-BTB

Optional Bias-T circuitry allows input current modulation from 10MHz to 800MHz through a 50Ω SMA connector on the mount side with a current voltage transfer function of 20 mA/V.



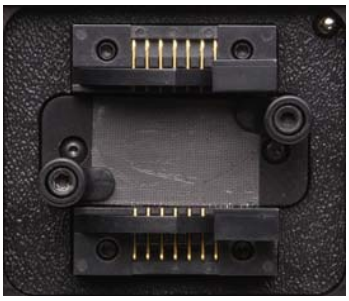
LDM-4982M

Compatible with 8-pin mini-DIL laser modules, the LDM-4982M employs a ZIF and comes standard with case temperature control.



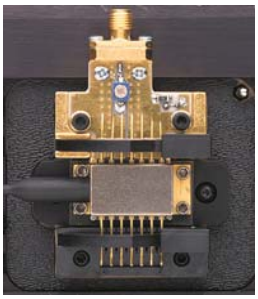
LDM-4983/LDM-4983T

The LDM-4983 is designed for “one-sided butterfly” packages that have the modulation input on one side and seven or thirteen pins on the other side.



LDM-4984/LDM-4984T
LDM-4984-BTB/LDM-4984-TBTB

The LDM-4984 is compatible with 14-pin butterfly laser modules and has optional bias-T circuits that can be ordered.

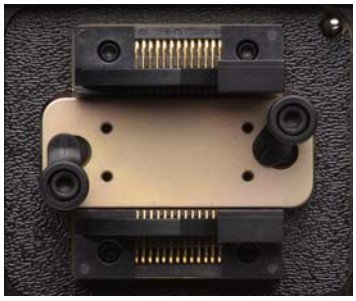


LDM-4984RF/LDM-4984TRF

The LDM-4984RF mounts are designed for 14-pin butterfly packaged lasers that have internal modulation circuitry. These mounts are for lasers with internal bias-T circuitry with 25Ω input impedance on pin 12. The RF input connector on both mounts is a standard 50Ω SMA connector.

LDM-4986

The LDM-4986 mount is ideal for production testing fiber-coupled cans and flanged laser packages. Both horizontal and vertical flange packages are easily installed. This mount comes standard with case temperature control.



LDM-4989/LDM-4989T

The LDM-4989 can be used with 26-pin, 20-pin, and 14-pin laser diode packages by wiring the configuration header appropriately. Three nine-pin D-sub connectors are pre-wired for a total of 27 electrical inputs.

All LDM-4980 Series mounts include a laser diode cover. This cover provides a grounded electrical shield around the laser package to reduce noise, and provides an additional measure of temperature stability. The cover with machined holes provides an exit for fiber pigtails.

The laser case of the LDM-4980 Series is isolated from the mount chassis and is therefore isolated from earth ground. The LDM-4989 can be configured so the case is floating, connected to ground, or configured to any other electrical potential.

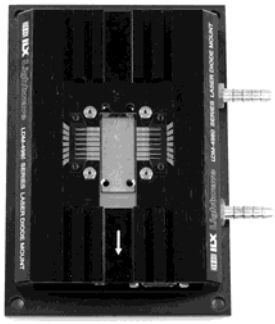
All LDM-4980 Series mounts can be ordered with a temperature case control option. This option allows simultaneous and independent control of laser case temperature, and is ideal for applications requiring extreme temperature stability or range. Maximum power dissipation of the module is 14 Watts. The base plate on this option can be bolted to an optical table with the standard hole pattern (¼-20 on 1” centers) for increased heat sink capacity.

High Power Fiber-Coupled Mounts

The mounts available from ILX Lightwave for high power fiber-coupled packages are listed in Table 4. Refer to individual product manuals for full details.

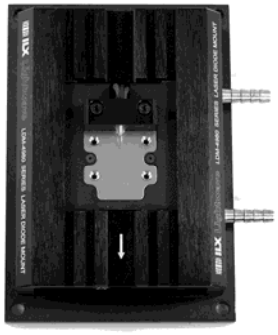
Table 4

Model	Package Style	Case Temperature Control	Max Power	Max Current
LDM-49840	6-pin, 8-pin or 14-pin butterfly	No	60W	12A
LDM-49840T	6-pin, 8-pin or 14-pin butterfly	TEC/Water	60W	12A
LDM-49860	2-pin module	No	40W	20A
LDM-49860T	2-pin module	TEC/Water	40W	20A



LDM-49840/LDM-49840T

The LDM-49840(T) provides convenient mounting for 6-pin, 8-pin, and 14-pin butterfly devices with or without an internal TE module. A water cooled heat sink allows the 49840(T) series to dissipate up to 60W. Terminal blocks accessible from the bottom side allow configuration of the 49840(T) for any butterfly module pin-out.



LDM-49860/LDM-49860T

The LDM-49860(T) is designed to support various manufacturers' high power 2-pin modules with or without an internal TE module. A water cooled heat sink allows the 49860(T) series to dissipate up to 40W.

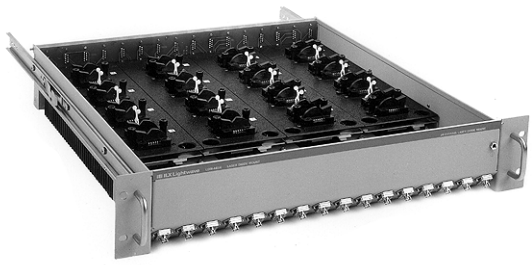
Modular Multi-Channel Mounts

The multi-channel laser diode mounts and module bays in Table 5 are used with DFB or butterfly laser diode packages. Each module bay contains four mounts. Refer to individual product manuals for full details.

Table 5

	Model	Description
Filled Chassis	LDM-4600	Base Chassis – no loaded module bays
	LDM-4616	Chassis and four configurable butterfly mount module bays
	LDM-4616DFB	Chassis and four hardwired DFB laser mount module bays
Module Bays	LDM-4604/BFY	Four configurable butterfly mounts, right and left versions
	LDM-4604/DFB	Four hardwired DFB butterfly mounts, right and left versions

The LDM-4600 is a rack mountable, 16-channel mount that accepts up to sixteen butterfly laser diodes packages. An example is shown below. Modular laser mounts are ideal for high-density source bank or burn-in applications.



Up to four LDM-4604 module bays are installed in the LDM-4600 chassis. The LDM-4616 and LDM-4616DFB, like the LDM-4600, are also rack mountable, 16-channel mounts, but they come with four LDM-4604/BFY butterfly module bays or four LDM-4604/DFB distributed feedback laser module bays, respectively. Each module bay is equipped with four zero-insertion-force (ZIF) sockets. If fewer than four module bays are installed in the LDM-4600 chassis, the empty space can be used to hold EDFA gain blocks or other devices.

The LDM-4604 module bays are designed in right- and left-facing configurations to facilitate heat control of fiber pigtails. Each LDM-4600 chassis holds two right and two left facing mount module bays. Each of the LDM-4604 DFB and LDM-4616DFB mounts are hardwired to the standard DFB pin configuration shown in Table 6. The rest of the mounts can be individually configured to any pin-out configuration.

Table 6
LDM–4600 DFB Pinout

Pin	Function	Notes
1	Thermistor	* Most DFB lasers have some combination of these pins connected to the laser anode and/or case. Typical configurations wire the laser anode to the case, so all these pins are tied together in the LDM–4616 DFB mount.
2	Thermistor	
3	Laser Cathode	
4	PD Anode (-)	
5	PD Cathode (+)	
6	TEC (+)	
7	TEC (-)	
8-11*	Laser Anode /Case Ground	
12	N/C	
13-14*	Laser Anode /Case Ground	

To find out more about ILX Lightwave mounts, or if you have questions about integrating these products into an application, please call 1-800-459-9459 (U.S. and Canada) or 406-556-2481 (International Inquiries).

APPENDIX

LDM–4442 Laser Diode Mount Technical Details

Table A.1 lists the center-to-center hole spacing for each of the laser mounting kits. The X- and Y- Dimensions correspond to the hole pattern in the laser diode mounting flanges.

Table A.1

Option Number	Hole Spacing X	Hole Spacing Y
444201	8-pin max, TO-3 Package	
444202	1.52”	0.75”
444204	Blank (customer-machined)	

LDM–4980 Series Telecom Mounts Technical Details

Table A.2 lists the pin count and dimensions for the butterfly-type mounting sockets of the LDM-4980 Series mounts.

Table A.2

Mount Model	Number of Pins	Pin Pitch	Pin Width*	Pin Span (tip-to-tip)	Module Length	Module Width
LDM–4983(T)	7 or 13	0.10" or 0.05"	0.025" max	n/a	1.50" max	0.85" max
LDM–4984(T)	14	0.10"	0.025" max	1.10" min	1.50" max	0.8" max
LDM–4984(T)RF	14	0.10"	0.025" max	1.05" min	1.50" max	0.5" max
LDM–4989(T)	14, 20, or 26	0.10" or 0.05"	0.025" max	1.20" min	1.50" max	0.8" max
Wide-Pin Socket	7 or 14	0.10"	0.038" max	--	--	--

* If a butterfly laser package has pins wider than 0.025", request the "wide-pin sockets" when ordering. The wide-pin socket will fit all 7 or 14-pin LDM–498X mounts listed above.

LDM–4604 Module Mounts Technical Details

Table A.3 lists the pin count and dimensions for the butterfly-type mounting sockets of the LDM-4604 mounts.

Table A.3

Mount Model	Number of Pins	Pin Pitch	Pin Width**	Pin Span (tip-to-tip)	Module Length	Module Width
LDM–4604/BFY	14	0.10"	0.025"max	1.10" min	1.50" max	0.8" max

** If a butterfly laser package has pins wider than 0.025", request the "wide-pin sockets" when ordering. The LDM-4604 butterfly mounts will accommodate 10 Gbit/s lasers with an RF connector on one side and 7 pins on the other side. The user will have to remove the ZIF sockets from the RF side.

The following publications are available for download at www.newport.com/ilxlightwave

White Papers

- A Standard for Measuring Transient Suppression of Laser Diode Drivers
- Degree of Polarization vs. Poincaré Sphere Coverage
- Improving Splice Loss Measurement Repeatability
- Laser Diode Burn-In and Reliability Testing
- Power Supplies: Performance Factors Characterize High Power Laser Diode Drivers
- Reliability Counts for Laser Diodes
- Reducing the Cost of Test in Laser Diode Manufacturing

Technical Notes

- Automatic Wavelength Compensation of Photodiode Power
- Measurements Using the OMM-6810B Optical Multimeter
- Bandwidth of OMM-6810B Optical Multimeter Analog Output
- Broadband Noise Measurements for Laser Diode Current Sources
- Clamping Limit of a LDX-3525 Precision Current Source
- Control Capability of the LDC-3916371 Fine Temperature Resolution Module
- Determining the Polarization Dependent Response of the FPM-8210 Power Meter
- Four-Wire TEC Voltage Measurement with the LDT-5900 Series Temperature Controllers
- Guide to Selecting a Bias-T Laser Diode Mount
- High Power Linearity of the OMM-6810B and OMH-6780/6790/6795B Detector Heads
- Large-Signal Frequency Response of the 3916338 Current Source Module
- Laser Wavelength Measuring Using a Colored Glass Filter
- Long-Term Output Drift of a LDX-3620 Ultra Low-Noise Laser Diode Current Source
- Long-Term Output Stability of a LDX-3525 Precision Current Source
- LRS-9424 Heat Sink Temperature Stability When Chamber Door Opens
- Measurement of 4-Wire Voltage Sense on an LDC-3916 Laser Diode Controller
- Measuring the Power and Wavelength of Pulsed Sources Using the OMM-6810B Optical Multimeter
- Measuring the Wavelength of Noisy Sources Using the OMM-6810B Optical Multimeter
- Output Current Accuracy of a LDX-3525 Precision Current Source
- Pin Assignment for CC-305 and CC-505 Cables
- Repeatability of Wavelength and Power Measurements Using the OMM-6810B Optical Multimeter
- Stability of the OMM-6810B Optical Multimeter and OMH-6727B InGaAs Power/Wavehead
- Temperature Controlled Mini-DIL Mount
- Temperature Stability Using the LDT-5948
- Thermal Performance of an LDM-4616 Laser Diode Mount
- Triboelectric Effects in High Precision Temperature Measurements
- Tuning the LDP-3840 for Optimum Pulse Response
- Typical Long-Term Temperature Stability of a LDT-5412 Low-Cost TEC
- Typical Long-Term Temperature Stability of a LDT-5525 TEC
- Typical Output Drift of a LDX-3412 Loc-Cost Precision Current Source
- Typical Output Noise of a LDX-3412 Precision Current Source
- Typical Output Stability of the LDC-3724B
- Typical Pulse Overshoot of the LDP-3840/03 Precision Pulse Current Source
- Typical Temperature Stability of a LDT-5412 Low-Cost Temperature Controller
- Using Three-Wire RTDs with the LDT-5900 Series Temperature Controllers
- Voltage Drop Across High Current Laser Interconnect Cable
- Voltage Drop Across High Current TEC Interconnect Cable
- Voltage Limit Protection of an LDC-3916 Laser Diode Controller

Application Notes

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- App Note 2: Selecting and Using Thermistors for Temperature Control
- App Note 3: Protecting Your Laser Diode
- App Note 4: Thermistor Calibration and the Steinhart-Hart Equation
- App Note 5: An Overview of Laser Diode Characteristics
- App Note 6: Choosing the Right Laser Diode Mount for Your Application
- App Note 8: Mode Hopping in Semiconductor Lasers
- App Note 10: Optimize Testing for Threshold Calculation Repeatability
- App Note 11: Pulsing a Laser Diode
- App Note 12: The Differences between Threshold Current Calculation Methods
- App Note 13: Testing Bond Quality by Measuring Thermal Resistance of Laser Diodes
- App Note 14: Optimizing TEC Drive Current
- App Note 17: AD590 and LM335 Sensor Calibration
- App Note 18: Basic Test Methods for Passive Fiber Optic Components
- App Note 20: PID Control Loops in Thermoelectric Temperature Controllers
- App Note 21: High Performance Temperature Control in Laser Diode Test Applications
- App Note 22: Modulating Laser Diodes
- App Note 23: Laser Diode Reliability and Burn-In Testing
- App Note 25: Novel Power Meter Design Minimizes Fiber Power Measurement Inaccuracies

For application assistance or additional information on products or services; contact us at:

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 Rev04.081717