Multimode Spectrum Stabilized Laser Subsystem

Installation and Operation Manual

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WARNING

Protective Eye Wear Should Be Worn When Using This Instrument - Intense Radiation Present

See Important Safety Notices inside.

A HALMA GROUP COMPANY

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Important Safety Notices

The laser described here is safe to operate, provided the user pays attention to all safety warnings:

1. Post warnings in the area of the laser beam to alert those present.
2. Keep all unauthorized personnel out of the area where the laser is operated.
3. Whenever the laser is running and the beam is not in use, it is good operating practice to mechanically block the path.
4. Never look directly into the laser source or scattering laser light from any reflective surface. Never sight down the beam into the source.
5. Maintain experimental setup at low heights to prevent inadvertent beam-eye contact.
6. As a precaution against accidental exposures to the output beam or its reflection, operators should wear laser safety glasses attenuated to the wavelength being generated.

Sources for additional information and assistance on laser safety are the following:

Center for Device and Radiological Health
Office of Compliance
2098 Gaither Rd.
Rockville, MD 20850
Tel: 301 594 4654
Fax: 301 594 4672

Laser Institute of America
12424 Research Parkway, Suite 125
Orlando, FL 32826
Tel: 407 380 1553
Fax: 407 380 5588

Notice for OEM Laser Part: This laser module is designed for use as a component (or replacement) part and is thereby exempt from 21 CFR1040.10 and 1040.11 provisions.

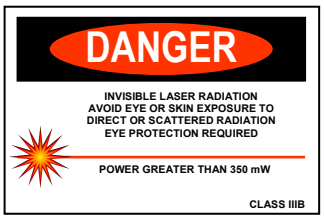


Table of Contents

About This Manual

Document Purpose and Intended Audience

This document provides you with information to get your laser set up and operating.

Document Summary

Chapter	Description
Chapter 1: *Introduction*	Contains a list of product features and package contents.
Chapter 2: *Set-up and Operation*	Provides instructions for setting up and operating the laser.
Appendix A: *Specifications*	Provides a list of product specifications.

Product-Related Documentation

You can access documentation for Ocean Optics products by visiting our website at **http://www.oceanoptics.com**. Select *Technical → Operating Instructions*, then choose the appropriate document from the available drop-down lists. Or, use the **Search by Model Number** field at the bottom of the web page.

You can also access operating instructions for Ocean Optics products on the *Software and Technical Resources* CD included with the system.

Engineering-level documentation is located on our website at *Technical → Engineering Docs.*

Upgrades

Occasionally, you may find that you need Ocean Optics to make a change or an upgrade to your system. To facilitate these changes, you must first contact Customer Support and obtain a Return Merchandise Authorization (RMA) number. Please contact Ocean Optics for specific instructions when returning a product.

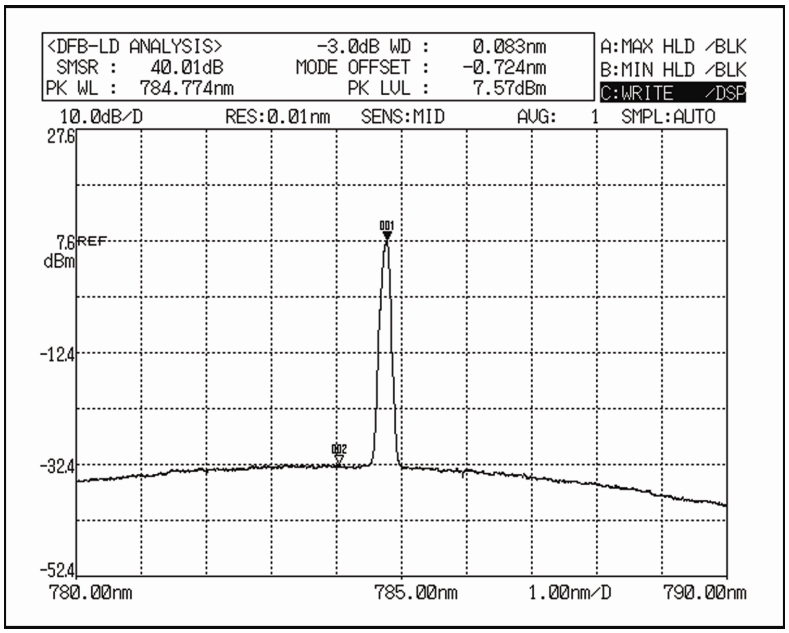
Chapter 1

Introduction

Overview

The Multimode Spectrum Stabilized Laser Subsystem features high output power with narrow spectral bandwidth. The laser's stabilized peak wavelength remains "locked" regardless of case temperature (–10 to +55 degrees C). Devices can be spectrally tailored to suit application needs and offer side mode suppression ratios (SMSRs) better than 40 dB, thereby providing extremely high signal to noise ratio and making these sources ideal for Raman spectroscopy and pump laser applications. The laser is integrated with high performance laser drive and temperature control electronics in a compact package weighing less than 113.4 grams.

Multimode Spectrum Stabilized Laser Subsystem



Typical 785 nm Laser Spectrum (SMSR > 40 dB)

Features

The laser provides the following features:

- Up to 400 mW Fiber Coupled Output Power
- Spectral Linewidth < 0.15 nm
- Temperature Stabilized Spectrum (< 0.007 nm/0C)
- Low Power consumption (< 5.5 W)
- 40 dB SMSR Typical
- 7.6 cm x 6.4 cm x 1.8 cm package weighing less than 113.4 g

Additional Equipment Required

The following equipment, available from Ocean Optics, is also required to use your laser:

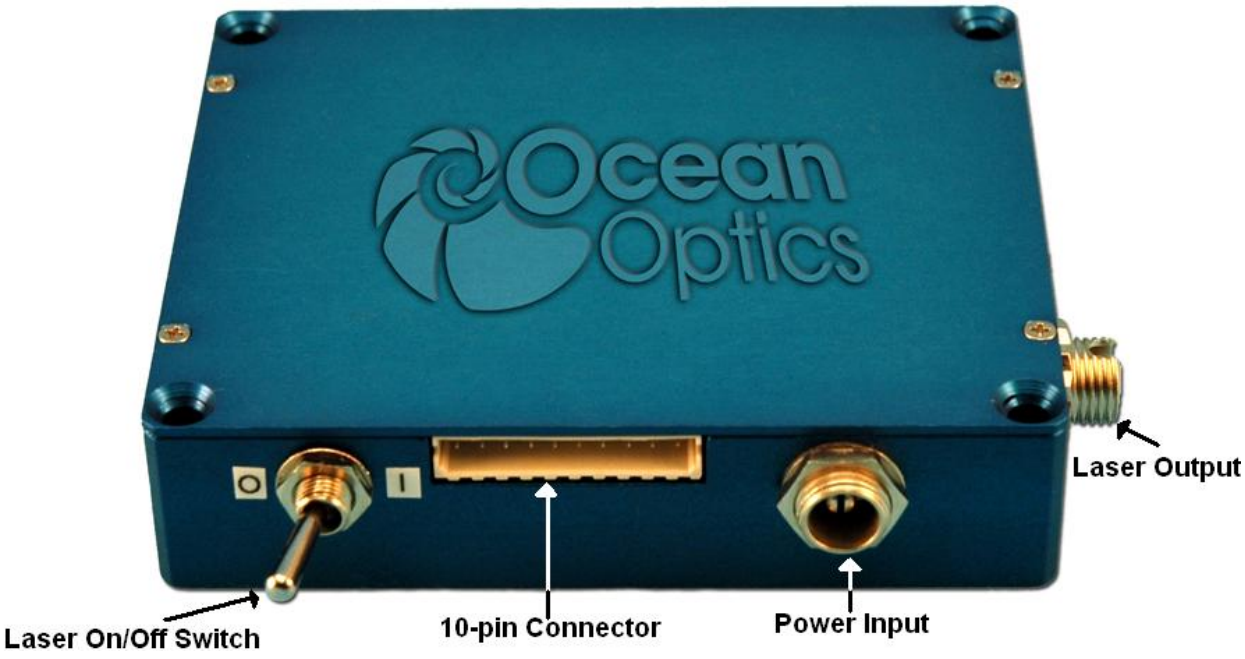
- ❑ Safety goggles (R-2001-GL goggles from Ocean Optics are recommended)

Chapter 2

Set-up and Operation

Overview

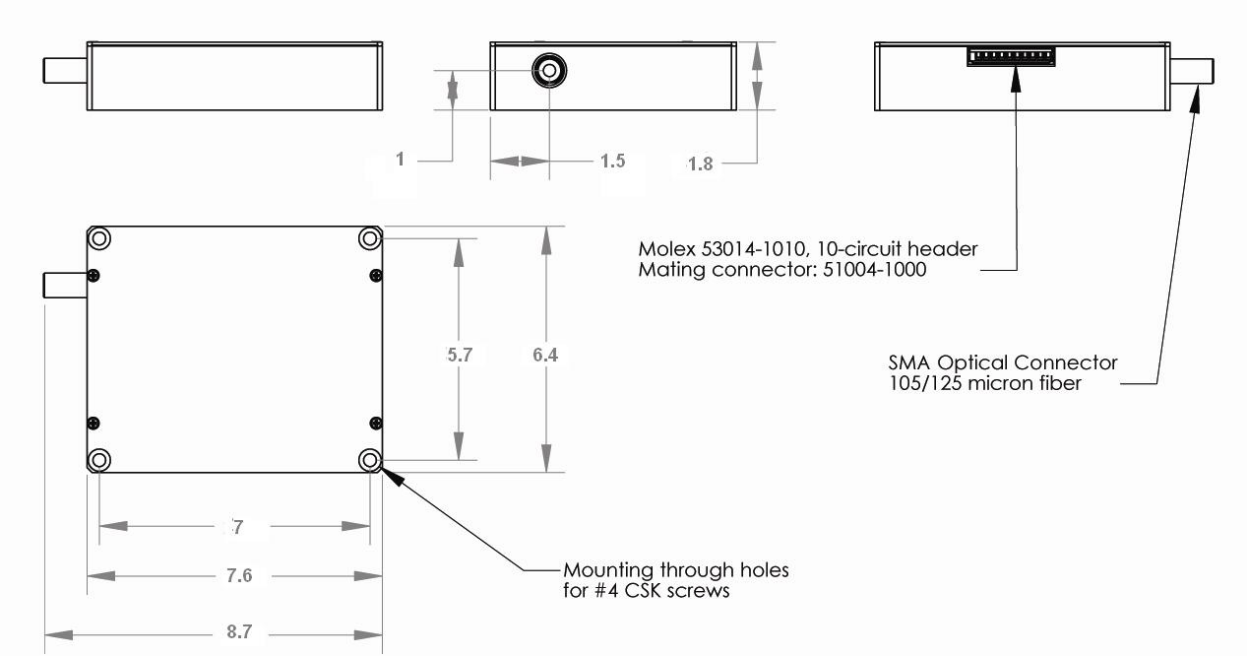
This section provides instructions for setting up and operating the laser. Read all instructions and warnings carefully before attempting to install and operate your laser.



Laser Rear View

Set-up

Refer to the following figure and table of pinouts while setting up your laser.



Laser Mechanical Drawing

Module Pinouts

Pin #	Symbol	Description
1	NC	Not connected
2	V set ENABLE	Enables “LD SET” on Pin 8 when connected to Ground. If left open or set to 3 – 5 Volt, output power defaults to internally preset value.
3	T SENS	1000 Ohm RTD sensor (with reference to Ground) to monitor module case.
4	T SENS	
5	GND	Ground
6	+ 5V	4.9 to 5.1 Volt; 1 Ampere
7	ENABLE	Tie to GND to disable laser output. Keep unconnected or apply 3 – 5 Volt to enable laser output.
8	LD SET	Apply 0 to 1 Volt to control optical output power. Pin 2 must be grounded to enable this option.
9	PD+	Photodiode anode
10	PD-	Photodiode cathode

Set-up for Manual Operation

► ***Procedure***

1. Mount laser module onto a suitable heat sink using corner mounting holes.
2. Ensure that external laser enable switch on sidewall of laser module is in the Off (O) position.
3. Plug 5 V DC power supply into wall outlet and then into 5 V DC power input jack on back of module.

Set-up for Remote Operation

► ***Procedure***

1. Mount laser module onto a suitable heat sink using corner mounting holes.
2. Ensure that external laser enable switch on sidewall of laser module is in the Off (O) position.
3. Plug the prewired 10 pin Molex connector into the laser module.
4. Ensure that external 5 V DC power to the module is off (pin 6) and the Laser enable (Pin 7) is tied to ground.

Note

To use the remote modulation option on this module, connect Pin 2 to Ground and bias LD SET on Pin 8 between 0 and 1 V to adjust laser output power from 0 to max.

Operation

Read the following warning before attempting to use the laser:

WARNINGS

DO NOT LOOK DIRECTLY INTO THE LASER. LASER RADIATION IS HAZARDOUS TO THE EYES.

AVOID DIRECT EXPOSURE TO THE BEAM.

Manual Operation

To turn laser on: Flip the external laser toggle switch mounted on the module to the ON (I) position.

To turn laser off: Flip the external laser toggle switch mounted on the module to the Off (I) position.

Remote Operation

To Turn Laser ON

► ***Procedure***

1. Toggle external laser enable switch mounted on side wall of module to the ON (I) position.
2. Apply power (5 V DC) to Pin 6.
3. Break connection to ground on Pin 7

To Turn Laser Off

► ***Procedure***

4. Tie Pin 7 (Enable) to Ground.
5. Turn off 5 V power supply to Pin 6.

To Adjust Power

This allows you to smoothly adjust the laser's output power levels from 0 to max power by applying the appropriate voltage bias onto Pin 8.

► ***Procedure***

1. Ground Pin 2.
2. Apply a 0 - 1 V DC voltage bias onto Pin 8.

Appendix A

Specifications

Specifications	Criteria
Optical	
Optical Power Output	> 350mW (375 mW typical)
Output Power Stability	+/- 1%
Wavelength	785 nm (+/- 1 nm)
3 dB Bandwidth (FWHM)	Typical: 0.12 nm Max: 0.20 nm
Spectral Line Width	<0.2nm, FWHM
Wavelength Stability	+/- 0.1 nm (-20 to 55ºC) over temperature range and lifetime
Optical Signal-to-Noise Ratio (SMSR)	Typical: 45 dB Min: 35 dB
Output Fiber	100-105/125 μm@ 0.22NA (or Free Space output)
Connector	SMA 905 (FC/PC optional)
Electrical	
Supply Voltage	Typical: 5V Min: 4.9V Max: 5.1V
Power Consumption	Typical: 3.5W Max: 5.5W
Photodiode Current	30 μA
Case Temperature Sensor	1000 Ohm at 0º C (RTD)
Laser Setpoint Control (LD SET)	Typical: 0.9V Min: 0 V Max: 1.0 V (when Pin 2 is grounded)
Warm-up Time	10 sec. from cold start; 1.5 sec. from warm start
Connector	10-pin, Molex #53014-1010 (mating connector: 51004-1000)
Mechanical	
Physical Dimensions	7.6 cm x 6.4 cm x 1.8 cm
Weight	100 grams
Case Material	Anodized aluminum

Specifications	Criteria
Environmental	
Cooling Airfllow	100 LFM with attached heatsink
Operating Temperature	–10 to 55°C case temperature
Storage Temperature	-20 to 80 °C

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