



## Multimode Spectrum Stabilized Laser Module Series – Lab Versions

### Installation and Operation Manual

Document Number LASER-785-LAB-02-0409

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**WARNING**

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

See Important Safety Notices inside.

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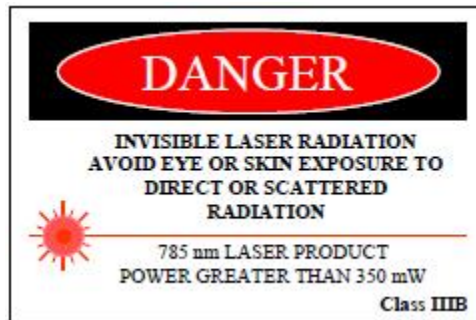
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# Important Safety Notices

The Class IIIB laser described here produces a laser emission of 785 nm with output power levels exceeding 350 mW. All models except the –S are designed to be used in a fiber-coupled configuration (-S is designed for SMA coupling); any other configuration may expose the user to hazardous radiation.



This laser 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 to avoid potentially hazardous exposure to eyes and skin.
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.

**Important Safety Notices**

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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

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# 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: <a href="#">Introduction</a>	Contains a list of product features and package contents.
Chapter 2: <a href="#">Set-up and Operation</a>	Provides instructions for setting up and operating the laser.

## Product-Related Documentation

- [Multimode Spectrum Stabilized Laser Subsystem Installation and Operation Manual](#)

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.





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# Chapter 1

# Introduction

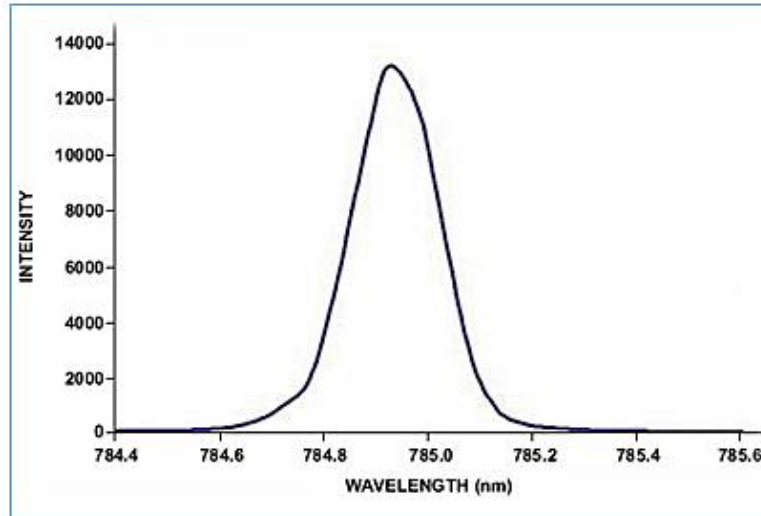
## Overview

The Multimode Spectrum Stabilized Laser Subsystem Series – Lab Versions consists of three models of continuous wave lasers designed specifically for Raman spectroscopy (see [Lab Version Models](#)). These laser models feature an internal 350 mW spectrum stabilized laser module that contains an integral Thermo-Electric Cooler (TEC) and thermistor for monitoring the internal temperature of the laser platform. The laser has narrow spectral lines, is compact and features a hermetically sealed laser component, making it optimal for industrial and medical applications.

The unit comes complete with a laser-enable switch for safety, a safety key lockout, and an emergency shut-off switch.



**Multimode Spectrum Stabilized Laser Subsystem**



**Spectral Output Captured with HR4000 Spectrometer**

## Lab Version Models

This document covers the installation and operation of the following laser models:

- LASER-785-IP-LAB – 785 nm spectrum stabilized multi-mode laser with > 350mW of fiber-coupled output power
- LASER-785-LAB-ADJ – 785 nm spectrum stabilized multi-mode laser with > 350mW of fiber-coupled, adjustable output power. Also features an LED display and an output power control dial.
- LASER-785-IP-ADJ-S – 785 nm spectrum stabilized multi-mode laser with > 350mW of SMA-coupled, adjustable output power. Also features an LED display and an output power control dial.

In addition, the LASER-785-IP-OEM laser is available. This is a single-mode laser with >350mW of fiber-coupled output power. This version is documented in the *Multimode Spectrum Stabilized Laser Subsystem Installation and Operation Manual*. See [Product-Related Documentation](#) for more information.

## Features

The laser provides the following features:

- >350 mW Fiber Coupled or SMA-coupled (-S model) Output Power
- Narrow Spectral Line width of only 0.2 nm
- Thermo-Electric Cooler (TEC)
- Low Power consumption (< 5.5 W)

- Remote Interlock, Safety Key Lock-out and Emergency shut-off
- LED display for output power setting (Models LASER-785-LAB-ADJ and LASER-785-LAB-ADJ-S only)
- Output power control dial (Models LASER-785-LAB-ADJ and LASER-785-LAB-ADJ-S only)

## Package Contents

- ❑ One (1) Ocean Optics Multimode Stabilized Laser
- ❑ One (1) Thermistor
- ❑ One (1) power cord
- ❑ Two (2) Master Power keys
- ❑ One (1) remote plug

## 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)



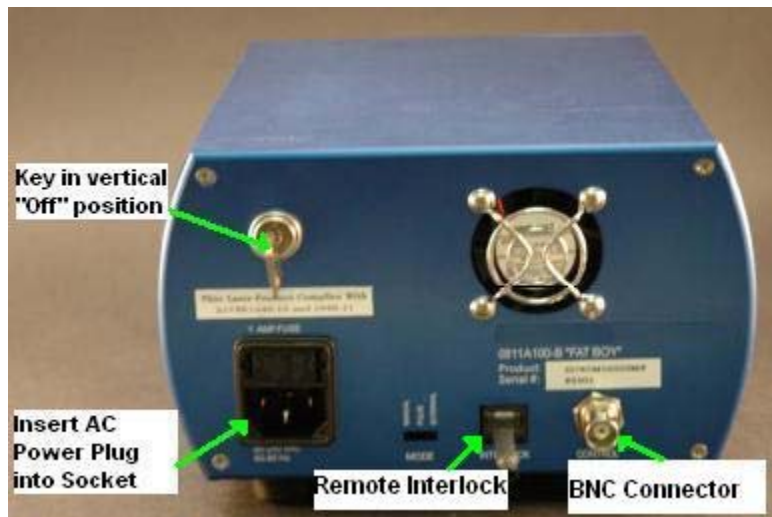
# Set-up and Operation

## 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.

## Set-up

The laser set-up procedure differs, depending on whether you are going to control the output power automatically via the Internal Preset mode (Model LASER-785-IP-LAB), manually through the unit's front panel (Models LASER-785-LAB-ADJ and LASER-785-LAB-ADJ-S), or remotely (all models).



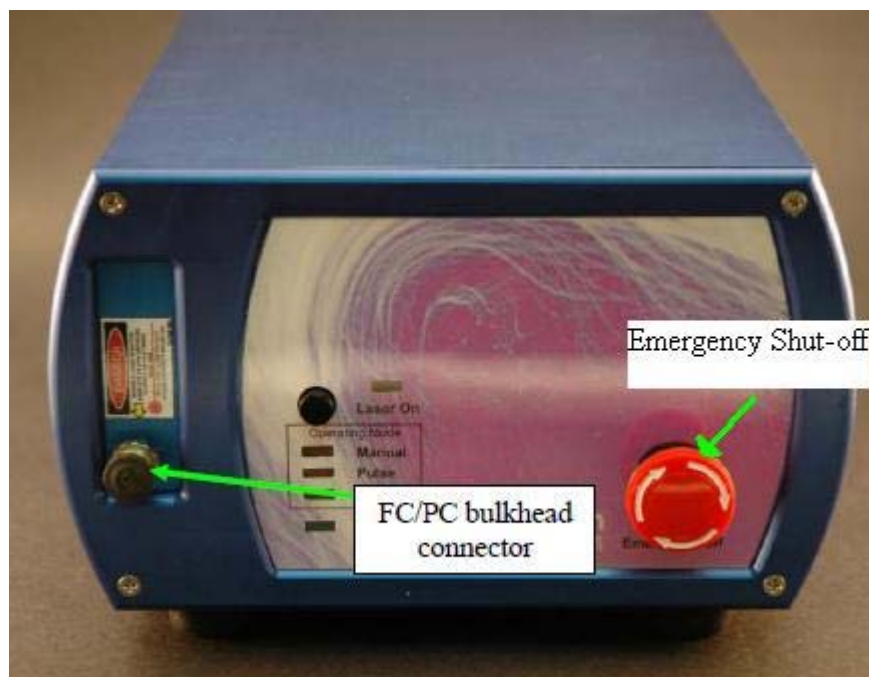
Laser Rear Panel View

## Set-up for Operation in Internal Power Preset Mode

Use these set-up instructions for the Internal Power Preset mode (Model LASER-785-IP-LAB).

### ► Procedure

1. Make sure that the master Power key is in the vertical (“Off”) position.
2. Connect the 120V AC power plug to the power connector on the rear of the unit.
3. Plug the other end of the power cord into a standard 110/120V electrical outlet.
4. Connect a FC/PC Multi-mode fiber patch cord to the FC/PC bulkhead connector on the front panel of the unit.
5. Note that this laser is configured with a remote interlock on the rear panel. The laser has an RJ-11 (4-pin telephone jack) that is prewired to provide a closed loop connection for the interlock. Removal of the RJ-11 connector or a break in the closed loop circuit provided will result in a laser interrupt and the system will be reset to standby mode. You can reconfigure the RJ-11 connector to provide a closed loop that interactively couples with their system or facility by replacing the short length of wire with longer closed loop connections, if desired.
6. Ensure that the **Emergency Shut-off** switch (EMO) is in the “ready” position by turning the red button clockwise until it pops out slightly.
7. You are now ready to turn on the laser module. Go to [Operation in Internal Power Preset Mode](#).

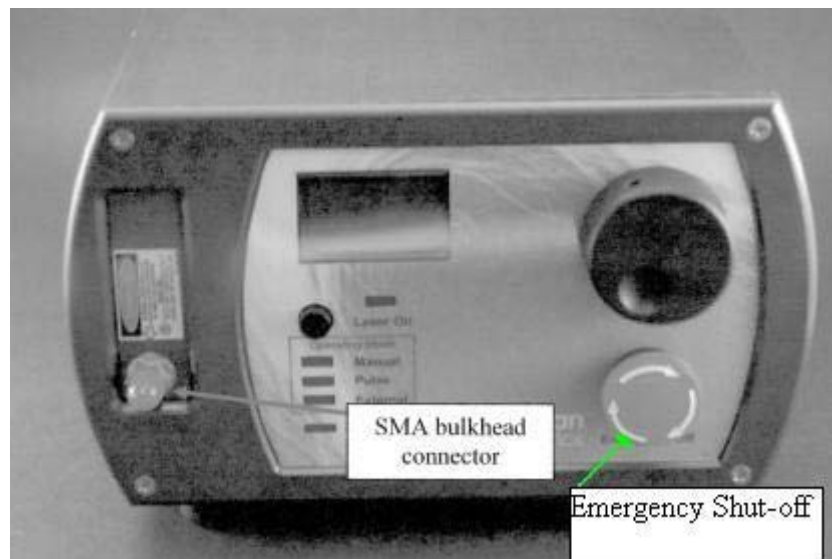


# Set-up for Operation to Control Power Through the Front Panel

Use these set-up instructions when you want to control the laser power through the unit's front panel (Models LASER-785-LAB-ADJ and LASER-785-LAB-ADJ-S).

## ► Procedure

1. Make sure that the master Power key is in the vertical ("Off") position.
2. Connect the 120V AC power plug to the power connector on the rear of the unit.
3. Plug the other end of the power cord into a standard 110/120V electrical outlet.
4. Connect an SMA 905 connectorized multi-mode fiber patch cord to the SMA bulkhead connector on the front panel of the unit.



5. Note that this laser is configured with a remote interlock on the rear panel. The laser has an RJ-11 (4-pin telephone jack) that is prewired to provide a closed loop connection for the interlock. Removal of the RJ-11 connector or a break in the closed loop circuit provided will result in a laser interrupt and the system will be reset to Standby mode. You can reconfigure the RJ-11 connector to provide a closed loop that interactively couples with their system or facility by replacing the short length of wire with longer closed loop connections, if desired.
6. Ensure that the **Emergency Shut-off** switch (EMO) is in the "ready" position by turning the red button clockwise until it pops out slightly.
7. You are now ready to turn on the laser module. Go to [Operation Controlling Power Through the Front Panel](#).

## Set-up for Operation in External Power Control Mode

The Model LASER-785-IP-LAB laser is designed for operation in the Internal Power Preset mode and the Models LASER-785-LAB-ADJ and LASER-785-LAB-ADJ-S are designed for operation through their front panel controls. However, the laser provides you with the capability (via an external port on the back panel) of adjusting the power remotely via computer or signal generator in External Power Control mode. Use these set-up instructions for the External Power Control mode. See for [Operation in External Power Control Mode](#) operation instructions in this mode.

### ► Procedure

1. Make sure that the laser power is not operating by pressing the **Laser On** switch and assuring that the Laser On LED on the front panel is not lit.
2. Set the Mode Selection switch on the rear panel to **External** (the amber Operating Mode LED will light).
3. Connect a BNC cable to the Control port on the rear panel.
4. Go to [Operation in External Power Control Mode](#) to operate the laser in External Power Control mode.

## Operation

Read the following warning before attempting to use the laser:

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### WARNINGS

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

**AVOID DIRECT EXPOSURE TO THE BEAM.**

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## Operation in Internal Power Preset Mode

Use this procedure to operate the Model LASER-785-IP-LAB laser in the Internal Power Preset mode.

### ► Procedure

1. Turn the master Power key (on the rear panel) 90 degrees clockwise to the horizontal “ON” position. The green **System Power** LED (on the front panel) lights indicating that system power is on.



2. Push the **Laser On** switch (on the front panel). The red LED on the front panel lights to indicate that the laser is in operation. The laser turns on approximately 2 seconds after the switch is pressed.

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### Note

Note that the switch returns to the center position after you press it. At this point, it can function as a manual reset.

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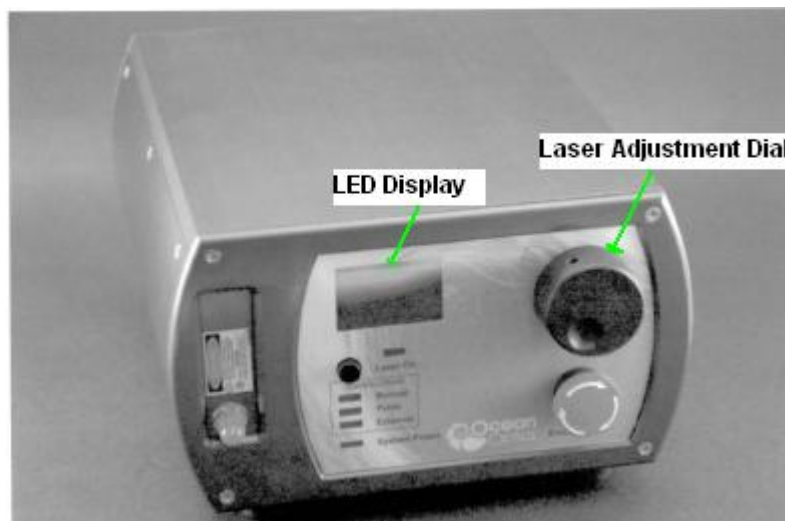
3. In the event of a power interruption, power failure or interlock break, the laser is automatically disabled. To re-enable it, toggle the **Laser On** switch to back to the ON position.

## Operation Controlling Power Through the Front Panel

Use this procedure to control the laser power through the unit's front panel (Models LASER-785-LAB-ADJ and LASER-785-LAB-ADJ-S).

### ► Procedure

1. Turn the master Power key (on the rear panel) 90 degrees clockwise to the horizontal "ON" position. The green System Power LED (on the front panel) lights indicating that system power is on.
2. Turn the laser adjustment dial on the front panel to the desired drive current setting. The setting is displayed on the front panel LED.



3. Push the **Laser On** switch (on the front panel). The red LED on the front panel lights to indicate that the laser is in operation. The laser turns on approximately 2 seconds after the switch is pressed.

### Note

Note that the switch returns to the center position after you press it. At this point, it can function as a manual reset.

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4. In the event of a power interruption, power failure or interlock break, the laser is automatically disabled. To re-enable it, toggle the **Laser On** switch to back to the ON position.

## Operation in External Power Control Mode

The Multimode Spectrum Stabilized Laser provides the capability of adjusting the power remotely via computer or signal generator in External Power Control mode. Use the following procedure:

### ► Procedure

1. Make sure that a BNC cable is connected to the Control port on the rear panel as described in [Set-up for Operation in External Power Control Mode](#).
2. Apply a DC bias between 0 (zero power) and 1 (full power) Volt to modulate the laser or to adjust the laser's output power. The unit can be modulated at rates up to approximately 300 KHz.
3. Push the **Laser On** switch (on the front panel). The laser then outputs a variable amount of output power dependent on the DC bias voltage that has been applied to the Control port on the rear panel.

## Using the Remote Interlock Feature

The Remote Interlock is a safety feature that automatically shuts down the laser when a trigger such as a door or an enclosure opening occurs. You may decide to enable a remote interlock mechanism when integrating the laser into a laboratory or system environment.

The interlock is located on the rear panel and uses an RJ-11 plug. The Remote Interlock is normally an open circuit, so the provided RJ-11 connector or a user-configured closed loop interconnect **MUST** be in place for proper function of the laser module. To enable the Remote Interlock, you must obtain an RJ-11 plug (or modify the plug provided) and create a closed circuit between the two signal terminals of the plug and insert the closed-circuit RJ-11 plug into the Interlock jack.

The laser functions normally when it senses a closed circuit, but it will disable laser output when it detects an open circuit. To re-enable the laser function, you must make sure that the interlock is a closed circuit, and then manually reset the laser by toggling the **Laser On** switch on the front panel to the ON position.

---

# Shutting Down the Laser

Use the following procedure when you are finished using the laser and need to shut it down.

► **Procedure**

1. Push the **Laser On** toggle switch (on the front panel) to turn the laser off. Make sure that the **Laser On** LED goes off.
2. Turn the master Power key (on the rear panel) 90 degrees to the vertical “off” position. The green **System Power** LED (on the front panel) goes off indicating that system power is off.
3. Disconnect the fiber or SMA cords and power cable as needed.



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