



## Ultra Low Noise Laser – 1550nm

### User Manual

Version 1.01

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## Revision Table

Revision	Description
1.0	Initial release
1.01	Cable update for Standard Power and Optional Interface cables



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## **1. General Warnings and Safety Precautions**

APIC Corporation's Ultra Low Noise Laser – 1550nm, is a high performance laser source that requires special care and handling to ensure optimal results. Failing to follow the procedures and recommendations of this manual could result in injury to the user and/or damage to the laser assembly.

The laser module contains many high performance electronic components that are susceptible to electrostatic discharge (ESD). Caution must be taken in order to protect these components. The laser is shipped in ESD-safe packaging and it is highly recommended to be removed from the ESD safe environment by personnel following standard ESD-safe practices.

The laser has high optical power output. It is an ANSI Class 3b laser source. The optical power through the output fiber can be as high as 100mW at 1550nm. All standard safety procedures regarding Class 3b laser sources should be followed during operation. The laser module provides a safety switch on the front panel. When this switch is in the off position, no light can be emitted. When the switch is in the on position, the laser will transition to normal mode operation, and light will be emitted from the output fiber. This laser source is NOT eye-safe. Failure to follow standard safety precautions could result in personal bodily injury including blindness.



## 2. Quick Start

### a. Connection Requirements

#### i. Power

The laser has a power port on the back of the module as part of a DSUB-9 connector. This port requires a +5V DC +/- 5%, 3A DC source.

#### ii. Control and Monitor

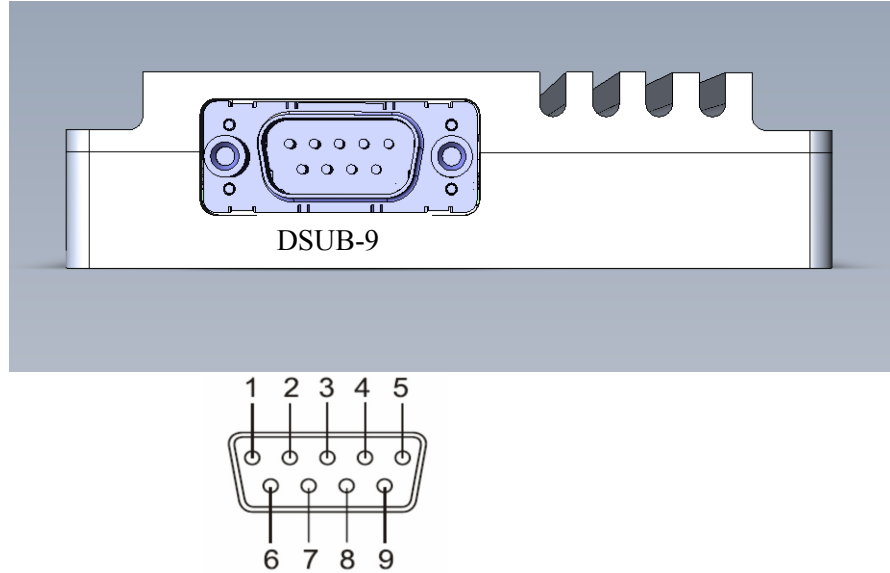
The control method of the laser module is through the unit on/off switch and auxiliary pins of the DSUB-9 connector.

In its basic configuration, with the power source connected, the laser module will turn on and emit light when the unit switch is in the ON position. No other pins of the DSUB-9 connector are required for this function. The laser current is factory set to be 520 mA +/- 5%. For this setting the laser will meet the specified performance for output power and RIN (Relative Intensity Noise).

In its optional configuration, the other pins of the DSUB-9 will allow control the laser functionality as described in Figure 1.

#### iii. Optical

The output fiber of the laser module is mounted on the front panel. This is an FC/PC optical connector. The fiber is polarization maintaining (PM) with laser polarization aligned along the slow axis.



**Figure 1 Back panel DSUB-9 Connector pinout**

Pin	Name	Description	Functionality
1	Vcc	Voltage supply	+5V DC +/- 5% 3A
2	Vcc	Voltage supply	+5V DC +/- 5% 3A
3	GND	Ground connection	Ground connection
4	GND	Ground connection	Ground connection
5	Lsr mon	Monitor Laser Current	Laser current monitor voltage output: 1V/A
6	Temp adj	Temperature Adjust input	Open: 20 degC laser temp; Short to GND: 23 deg C laser temp; Connect to +4V DC: 17 deg C laser temp
7	Reserved	Do not use	Not used. Leave open
8	LE	Laser Enable input	Open: local power switch controls laser power. With local switch = off position, this pin controls remote power; Short to GND: remote power off +5V : remote power on
9	Pwr adj	Power Adjust input	Open: laser current set at 520 mA; Applying +0.2V to +1.6V DC varies laser current ~150 mA to ~520 mA

**Table 1 DSUB9 Connector pin description**

## b. Start up Procedure

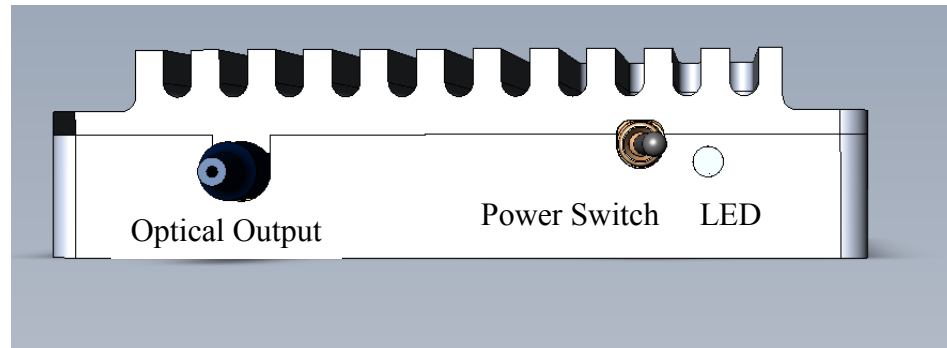
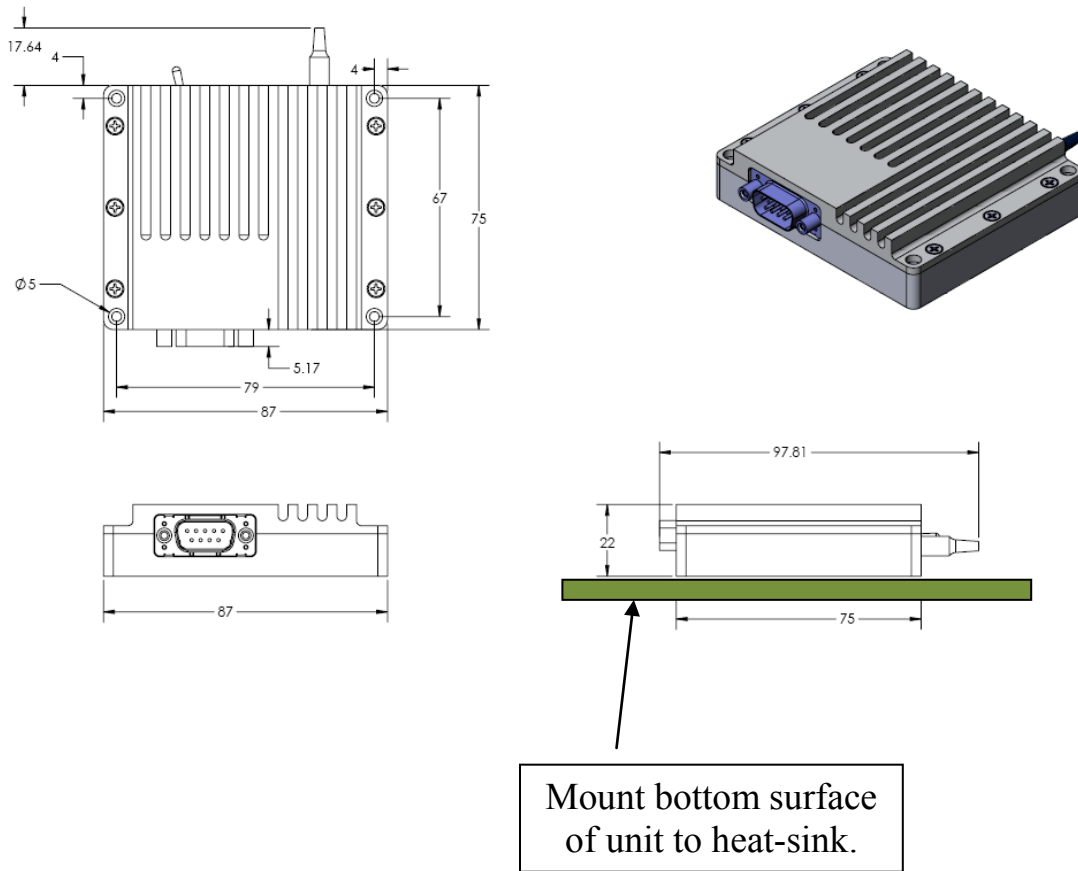


Figure 2 Laser front panel with local power switch in the OFF position

The standard quick start up procedure for the laser is as follows:

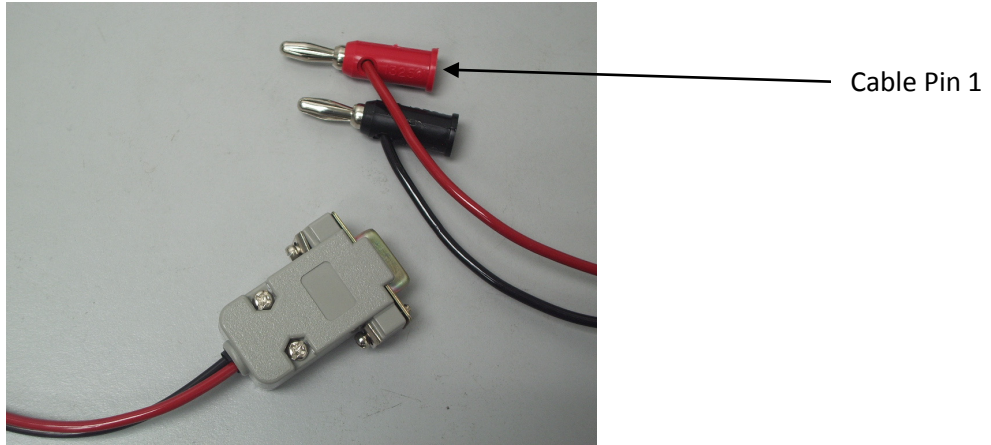
- **Place the laser module on a heat conducting surface.** The laser is designed to heat sink through the bottom plate. Ensure that the bottom surface of the module is clean and making good contact with the heat sink. For example the heat sink could be an aluminum plate of 8 x 8 in and ¼ in thick. The larger the heat-sink the better. Note: Additional air cooling with a 120V 80-up mm muffin fan providing continuous air flow over the unit fins will further improve performance stability.
- With the front panel power switch to the “OFF” position, as illustrated in Figure 2, connect the module to a +5V DC source. The initial current draw should be roughly 25 mA and the LED will glow red.
- **WARNING:** For laser safety purposes, it is advised that the optical output be connected to the desired system prior to enabling the laser, as it will ensure that no laser light escapes from the optical fiber.
- Toggle the front panel power switch to the “ON” position, i.e., to the left. The LED will start with a brief yellow and settle to green as the laser turns on. This is an indication that the board is working as expected. The laser current is factory set to 520 mA +/- 5%. Note: During power turn on there is a supply current surge of up to 2A for 5-10 seconds as the laser TEC sets the internal temperature. The running current will then settle down to below 1A and the temperature stabilizes within 50 seconds. **At this point there is class 3B laser light emitting from the laser, and all necessary precautions must be taken.**
- If there is a need to change the operating bias current or monitor the health of the module, Figure 1 and Table 1 provide the access pins for these functions.



**Figure 3 Mechanical dimensions of laser module**



**c. Standard Power Cable**



**Figure 4 Standard Power Cable**

Cable Pin #	DSUB-9 Connector Pin #	Wire Color	Name	Description	Functionality
1	1	RED	Vcc	Voltage Supply	+5V DC +/- 5% 3A
	2		Vcc	Voltage Supply	+5V DC +/- 5% 3A
2	3	BLACK	GND	Ground Connection	Ground connection
	4		GND	Ground Connection	Ground connection

**Table 2 Standard Power Cable pin description**

#### d. Optional Interface Cable

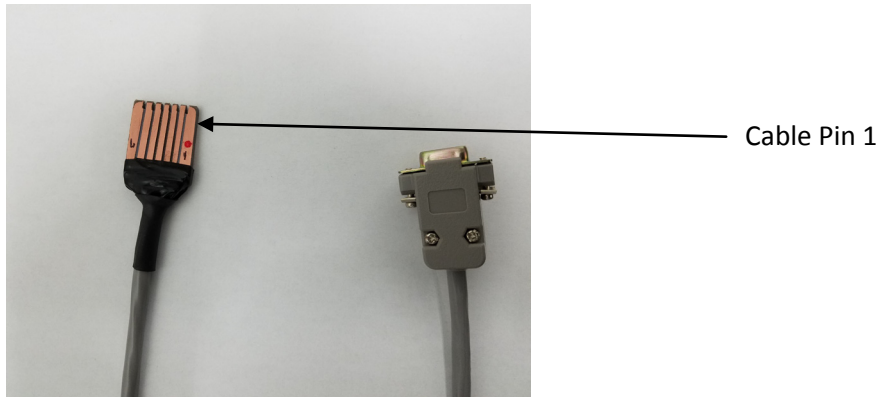


Figure 5 Optional Interface Cable

Cable Pin #	DSUB-9 Connector Pin #	Name	Description	Functionality
1	1	Vcc	Voltage Supply	+5V DC +/- 5% 3A
	2	Vcc	Voltage Supply	+5V DC +/- 5% 3A
2	3	GND	Ground Connection	Ground connection
	4	GND	Ground Connection	Ground connection
3	5	LSR_MON	Monitor Laser Current	Laser current monitor voltage output: 1V/A
4	6	TEMP_ADJ	Temperature Adjust input	Open: 20 deg C laser temp; Short to GND: 23 deg C laser temp; Connect to +4V DC: 17 deg C laser temp
5	7	RESERVED	Do Not Use	Not used. Leave open
6	8	LSR_EN	Laser Enable input	Open: local power switch controls laser power. With local switch = off position, this pin controls remote power; Short to GND: remote power off +5V : remote power on
7	9	LSR_ADJ	Power Adjust input	Open: laser current set at 650 mA; Applying +0.2V to +2.0V DC varies laser current ~150 mA to ~650 mA

Table 3 Optional Interface Cable pin description