

# OPTILAB EDFA-C-24-PM-B USER'S MANUAL

C-Band Erbium-Doped Fiber Amplifier Rackmount

**Caution:** The user must read this manual before operating the EDFA-C-24-PM-B unit. Operations other than those described in this manual may result in personal injury and damage to the unit.

**Note that any attempt to open or fix the equipment without prior approval by Optilab, LLC. voids the warranty.**

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## 1. General Information

### 1.1. Introduction

This manual contains information on the installation and operation of the EDFA-C-24-PM-B Rackmount erbium doped fiber amplifier (EDFA) unit.

### 1.2. Product Overview

The Optilab EDFA-C-24-PM-B Erbium-Doped Fiber Amplifier (EDFA) is a high-gain, versatile amplifier designed for CATV networks, optical communication and other general-purpose optical applications. By using a dual stage amplifier design, EDFA-C-24-PM-B provides optical gain of up to 30dB. The EDFA-C-24-PM-B amplifier produces optical output level +24dBm with an input power level range from -10dBm to +6dBm. Featuring adjustable output level power via ACC through the front panel and software control through USB.

### 1.3. Features

- +24dBm output power
- Dual stage pump design
- Reliable 1530nm to 1565nm lasers
- Input power level range: -10dBm to +6dBm
- Optical gain up to +30 dB
- Automatic Current Control (ACC) standard
- Touchscreen and Remote Interface
- Software control through USB

### 1.4. User Safety

1. The EDFA-C-24-PM-B unit emits high intensity invisible light from the optical output receptacle. Avoid direct exposure to skin and eyes.
2. The benchtop chassis is fully certified for EMS protection. The user should never open the benchtop chassis; any attempt will void the warranty and may result in electric shock and EMS attack to equipment in the vicinity.
3. The user should avoid using any solvent or vaporizing chemical to clean the exterior. It may result in damage to the surface and internal circuits.

## 2. Operation

### 2.1. Introduction

This chapter describes how to operate the EDFA-C-24-PM-B unit and discusses the location and function of the controls and connectors.

### 2.2. Initial Inspection

Your EDFA-C-24-PM-B was carefully inspected before it left the manufacturer. It should be in proper working order upon receipt. You should, however, inspect the unit for any damage that may have occurred in transit. If the shipping container or the packing material is damaged, keep it until the contents of the shipment have been checked to be free of mechanical and electrical damages. Notify Optilab, LLC promptly if any notable damage is found.

## 2.3. Controls

### **EDFA-C-24-PM-B – Front and Rear Panels**

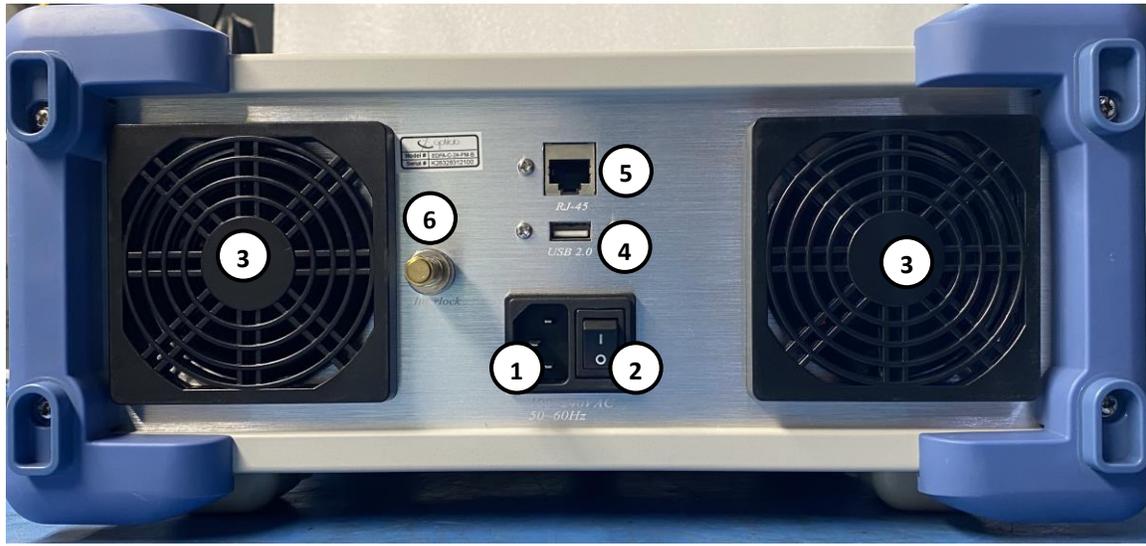


FEATURE	FUNCTION
① TOUCH LCD SCREEN	Displays the current features and functions of the rackmount EDFA system.
② OPTICAL INPUT AND OUTPUT FIBER PORTS	The optical input (left) and output (right) fiber ports for the EDFA unit. The fiber ports shown are FC/APC type.
③ ENABLE KEY SWITCH	This key is used to enable/disable the EDFA output..

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FEATURE	FUNCTION
① AC Power Socket	The AC power socket is the input for the AC power source. A three-pin standard power cord should be used to connect this equipment to any 110 or 220 V main supply.
② MAIN AC POWER SWITCH	This switch enables the electrical power to the EDFA unit.
③ VENTILATION FANS	The ventilation fans ensure proper ventilation inside the unit. The back panel of this equipment should be placed at least 3 inches from the wall to dissipate heat effectively.
④ USB 2.0 PORT	Using a standard USB cable, this port allows for remote control and monitoring through a PC workstation. This feature is not enabled on all units.
⑤ LAN PORT	This terminal is used allow for Ethernet connection to the EDFA-I-22-B for remote operation and monitoring. This feature is not enabled on all units.
⑥ INTERLOCK	This BNC female connector is a safety interlock. It must be shorted in order for the pump lasers to enable. Use the provided accessory to short this port or connect it to a compatible interlock device. If the interlock is open during normal operation, the pump lasers will be turned off. To re-enable the pump laser output, after the interlock connection has been re-established, turn the output switch on the front panel to “OFF” position first and start over.

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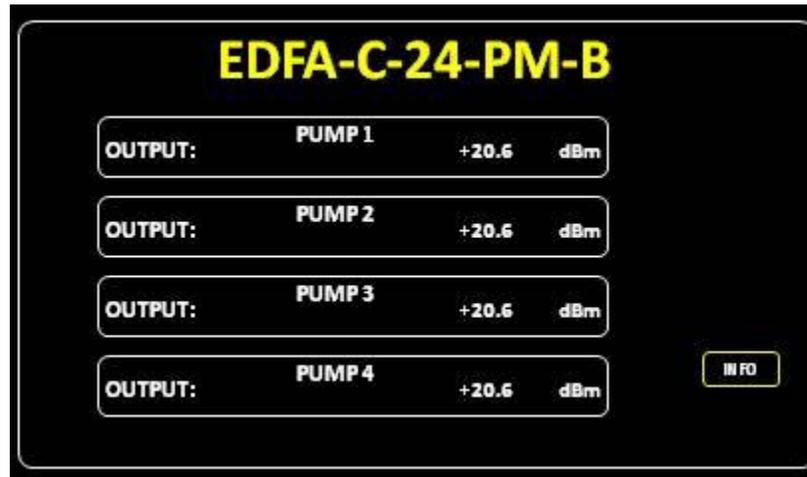
## 2.4. Operation Instructions

### Start-up Procedure

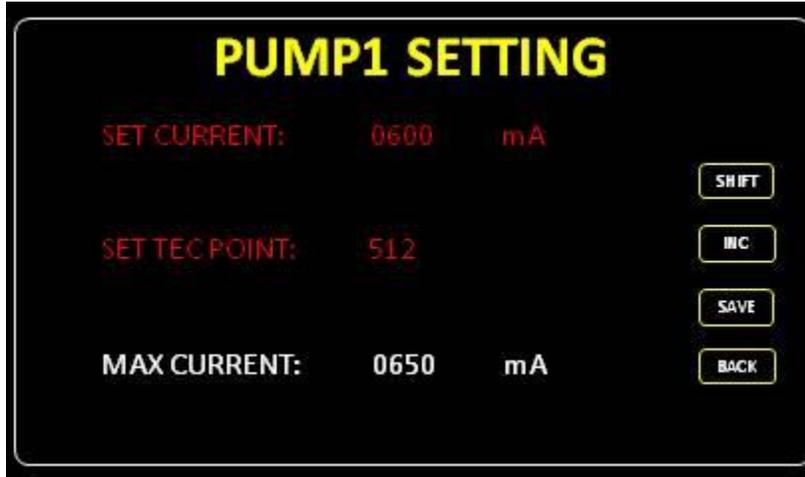
1. After plugging in the appropriate power plug into the AC input port, toggle the main AC switch to the ON position to enable electrical power to the unit. The front panel LCD will enable.
2. Ensuring the input signal is turned OFF, connect the optical signal for amplification via the optical input port using the indicated connector patchcords.
3. Connect the optical output port using the indicated connector patchcords to the appropriate signal destination to utilize the amplified optical output signal(s).
4. After checking all physical patchcord connections, turn the input signal laser source ON.
5. Turn the EDFA Enable Key switch to the ON position.
6. The EDFA-C-24-PM-B is now enabled.

### Front Panel Navigation

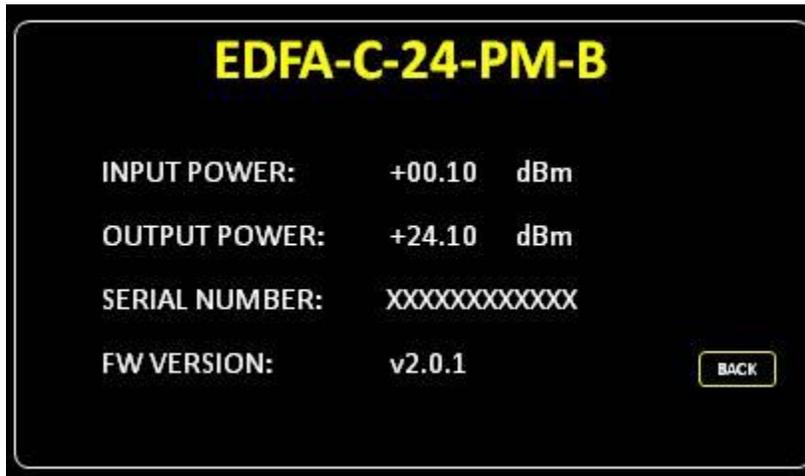
1. The main menu displays status of pump power output, to modify pump power touch anywhere inside desired pump outline on touchscreen display. Once desired pump has been selected the sub menu will appear.



- In the sub menu changes to pump current and TEC point is attainable, to toggle between SET CURRENT and SET TEC POINT press the SHIFT button. To change values press INC button then press SAVE for benchtop to acknowledge modifications, press BACK to return to main menu.



- To monitor INPUT POWER/ OUTPUT POWER press the INFO selector on main menu, to return to main menu press BACK button



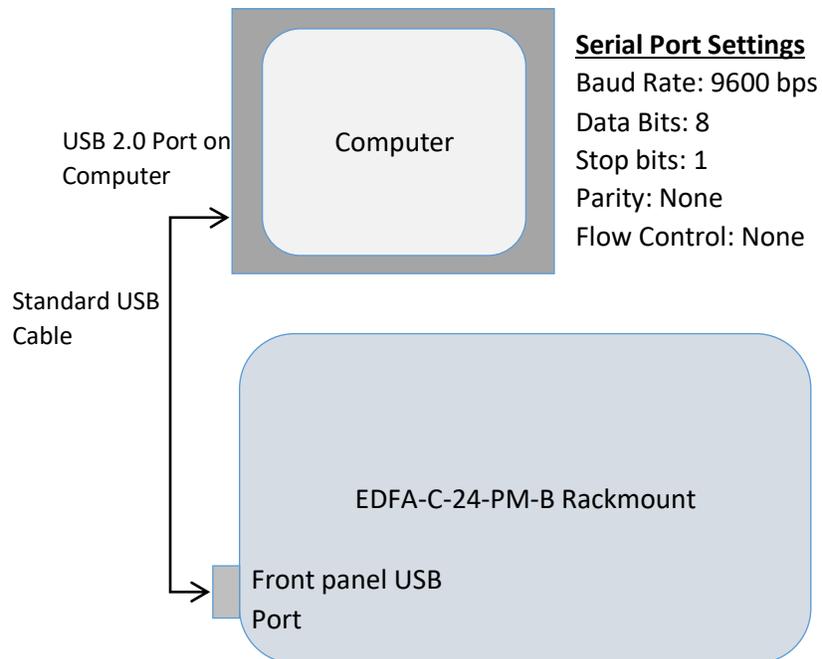
### **Patchcord Swapping Procedure**

1. Turn the Enable Key switch to the OFF position to disable the EDFA-C-24-PM-B output.
2. Swap patchcords as desired. Only connect the indicated connector patchcords to the optical input/output receptacles, cleaning them as necessary.
3. Turn the EDFA Enable Key switch back to the ON position; normal operation will resume after a few seconds.

### 2.5. PC Connection Mode

For the standard EDFA-C-24-PM-B, connecting the rackmount unit to an external PC will allow for parameter monitoring and adjustments of the parameters mentioned in the previous section.

Using the front panel USB 2.0 port and an appropriate serial terminal communication program (such as Termit), connect the EDFA to a PC using the following connection diagram and serial port settings:



## 2.6. Remote Command Set

When the electrical connections have been made, and the software settings for serial port transmission are set correctly, you are now able to send commands to the EDFA-C-24-PM-B unit.

### QUERY COMMANDS

**READ{CR/LF}** – Read the device information.

### SET COMMANDS

**SETLD1:XXXX{CR/LF}** – Set pump 1 drive current; Range: CHECK TEST REPORT.

e.g. SETLD1:0400{CR/LF}

**SETLD2:XXXX{CR/LF}** – Set pump 2 drive current; Range: CHECK TEST REPORT.

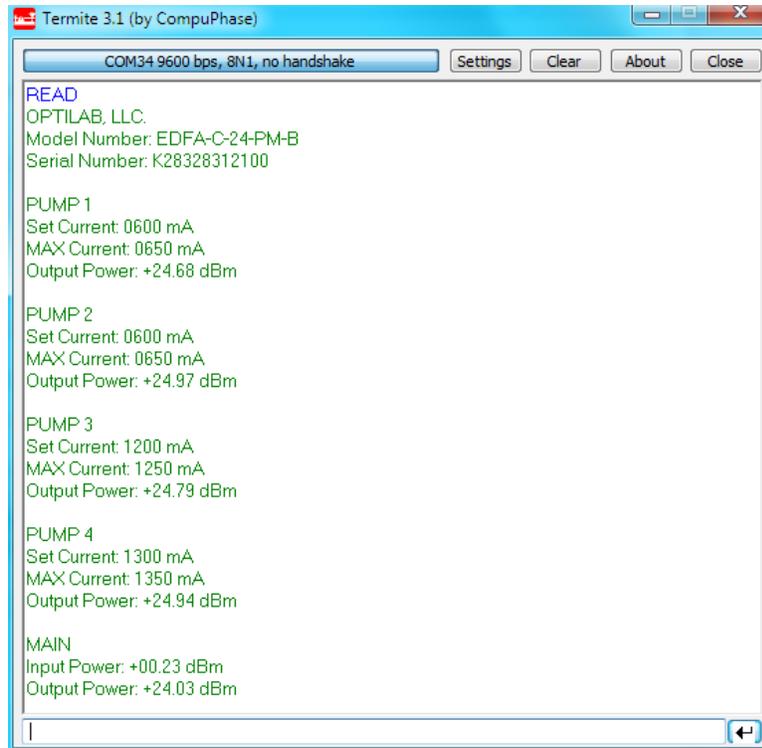
e.g. SETLD2:0700{CR/LF}

**SETLD3:XXXX{CR/LF}** – Set pump 3 drive current; Range: CHECK TEST REPORT.

e.g. SETLD3:0800{CR/LF}

**SETLD4:XXXX{CR/LF}** – Set pump 4 drive current; Range: CHECK TEST REPORT.

e.g. SETLD4:1000{CR/LF}



*[Remote Command Example]*

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## Troubleshooting

SYMPTOM	POSSIBLE CAUSE AND SOLUTION
OPTICAL OUTPUT POWER NOT HIGH ENOUGH	<p><b>C:</b> No optical input or optical input power too small.  <b>S:</b> Check optical input present or check optical input power is correct.</p>
	<p><b>C:</b> Optical input/output connectors dirty.  <b>S:</b> Disable optical output and clean optical connectors.</p>
	<p><b>C:</b> Use of incorrect optical adapters or connectors.  <b>S:</b> Use only the indicated optical adapters and connectors. If measurement instruments accept different connector type, then use hybrid patchcords.</p>
	<p><b>C:</b> Optical output connector damaged.  <b>S:</b> Measure optical output power with power meter and compare with readout on PC connection 'READ' command. Return to Optilab for repair if the difference is high (&gt;4 dB) and cannot be corrected by cleaning or replacing the optical connectors. Always apply dust cover plugs to unused optical ports to prevent the damage of optical connectors.</p>
	<p><b>C:</b> Pump current setting is too low  <b>S:</b> Check the front panel or remote read command for the current pump current setting, making adjustments as necessary.</p>
OPTICAL OUTPUT POWER UNSTABLE	<p><b>C:</b> Insufficient optical output isolation.  <b>S:</b> Connect isolator of corresponding wavelength to optical output connector.</p>
UNIT DOES NOT POWER UP	<p><b>C:</b> Insufficient electrical voltage.  <b>S:</b> Check that the electrical supply is at least 110 VAC.</p>
	<p><b>C:</b> AC Power cord is loose.  <b>S:</b> Plug power cord firmly into the unit.</p>
UNIT RESETS OR BLINKS ON AND OFF	<p><b>C:</b> Insufficient electrical voltage.  <b>S:</b> Check that the electrical supply is at least 110 VAC.</p>

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## 3. Service and Support

### 3.1. Warranty

Optilab, LLC guarantees its EDFA-C-24-PM-B unit is guaranteed to be free of defects for 1 year from the date of shipment. The guarantee does not cover any damages resulting from the misuse or improper handling of the equipment, or any incidental or consequential loss. Note that the warranty will be void upon any attempt to open or to fix the equipment by the user without prior approval of Optilab, LLC.

### 3.2. Service and Calibration

Your EDFA-C-24-PM-B unit has been designed to provide years of trouble-free operation. No internal maintenance is required provided that the equipment is properly handled, operated and kept away from contamination. For any questions regarding the operation and performance of the unit, please contact Optilab, LLC at:

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## 4. Care of Fiber-optic Connectors

Damage to optical connectors account for more than 70 percent of equipment performance degradation. To avoid such damage, the user should use only industrial grade 99% pure isopropyl alcohol and follow the procedures below to keep the connectors, adaptors and receptacles clean.

### **Cleaning Optical Connector End-face with Wipe and Alcohol**

To properly clean optical connectors utilizing lens tissue grade wipes and alcohol follow the procedure below. The moist wipe removes dust particles, oil and contaminants that may damage or blot the end-face of the connector during connection. The dry wipe removes residual alcohol that may be ignited by optical emission.

1. Disable the optical output and turn off unit to prevent accidental exposure or damage to the optical connector by optical emission.
2. Moisten a wipe with alcohol by placing on top of the alcohol dispenser and push down to saturate the wipe.
3. Place the moist wipe on a work surface, and place a second dry wipe next to it.
4. Wipe the optical connector, end-face down on the moist wipe 3 times and then repeat on the dry wipe.
5. Visually inspect the end-face of the optical connector with an optical microscope to verify cleanliness. Repeat steps 2 to 5 as needed.

### **Cleaning Optical Connector Sides, Receptacles, Adaptors with Swab and Alcohol**

Dust or particles can adhere to the insides of receptacles and adaptors or the sides of the optical connector ferrule. Their presence can affect the alignment of the optical fiber connectors and increase connection loss. To properly clean optical connectors, receptacles, and adaptors utilizing a swab and alcohol follow the procedure below:

1. Disable the optical output and turn off unit to prevent accidental exposure or damage to the optical connector by optical emission.
2. Moisten the swab by placing it on top of the alcohol dispenser and push down to saturate the swab.
3. For receptacles, adapters, or other connection points, insert the moistened swab and rotate the tip 1/2 turn clockwise and counter-clockwise 6 times while applying light but firm pressure.
4. For fiber connectors, rotate the tip of the moistened swab 5 revolutions around the connector while applying light but firm pressure.
5. Visually inspect the end face of the connector with an optical microscope to verify cleanliness. Clean end-face as needed.