



TOPSTAR TECHNOLOGY INDUSTRIAL CO., LIMITED

TOP-STAR 1RU EDFA

EDFA-WDM-BA-22
(Erbium Doped Fiber Amplifier)

User Manual



Product Details:

Amplifier Type: 1RU EDFA

Input Power: -10~+7dBm

Output Power: 5~22dBm

Operation Modes : AGC/APC circuit

Operating Wavelength: 1527.9nm~1565.6nm

Noise Figure Typical: <5.5dB

Connector: LC/UPC

Operation Temperature: -5°C~ +55°C

Safety Notification



You may find this symbol affixed to the product and in this document. This symbol warns of an infrared laser radiation from the 1U EDFA which is classified as Class 3B laser Product.

Viewing the laser output with certain optical instruments (for example, eye loupes, magnifiers and microscopes) within a distance of 100mm may pose an eye hazard.

Laser power up to 100mW at 1550nm could be accessible if optical connector is open

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or fiber is broken.

CAUTION: Use of controls, adjustments, and procedures other than those specified herein may result in hazardous laser radiation exposure.

Important Safeguards

We strongly advise you to read following safety instructions before installing and operating this equipment.

- **Read These Instructions First-** All safety and operating instructions should be read before installing or operating this equipment.
- **Retain This Instruction Manual-** Safety and operating instructions must be retained for future reference.
- **Follow Instructions and Warning-** Follow all operating and use instructions. Pay attention to all warnings and cautions in the operating instructions, as well as those that are affixed to this equipment.
- **Mechanical Mounting-** Mounting this equipment in the rack should be such that a hazardous condition is not caused due to uneven mechanical loading. Avoid personal injury and damage to this equipment.
- **Environmental Condition-** The installation site should be dry, clean, and ventilated. Do not use this equipment where it could be at risk of contact with water.
- **Moisture-** Do not allow moisture to enter this equipment.
- **EMC Requirements-** Do not expose the product in a strong electromagnetic field. Use correctly shield cables of good quality for all external connections, except the power source, when installing this equipment.
- **Ventilation-** Do not block or cover openings in this equipment. These are provided for ventilation and protection from overheating. **Maximum operating ambient temperature is 131°F (°C55°C).**
- **Safe Operation For The Product-** Ensure that all optical connections are complete or terminated before using this equipment. The laser device may pose a hazard to personal nearby.
- **Power Source –** This equipment can be DC-powered or AC-powered. User can



choose either one of them.

Request of power supply:

- AC input 48VAC
- **Cleaning-** Use a damp cloth for cleaning.
- **Covers-**Do not open the Cover of this equipment and attempt service unless instructed to do so in the instructions. Refer all servicing to qualified service personal only.
- **Labels-**Do not remove any warning labels. Replace damaged or illegible warning labels with new ones.
- **Optical In/Out fiber ends protection-** Keep the optical fiber ends form any stain with endcaps. Use Lint-free swabs to clean the optical In/Out ports.
- **Safety checks-** After service, assemble this equipment and perform safety checks to ensure it is safe to use before putting it back into operation.



1. Introduction

This manual describes the operation guidelines for the 1RU EDFA. The safety and operating instructions must be carefully read to ensure the product be well installed and operated.

1.1 Production Description

The 1RU EDFA comprises one EDFA module, packaged within a rack mountable 1RU unit. This unit can be operated as a fully independent network element using a comprehensive and user-friendly RS232 communications, and is an excellent solution for immediate deployment of EDFA-based systems. The EDFA module in 1RU unit is low noise C-band WDM optical amplifier is designed to amplify multi-channel optical signals to increase the optical transmission distance over fiber.

1.2 Configuration description

1.2.1 The Front Panel

Optical Amplifier Illustration

The front panel of the 1RU EDFA is shown in Fig.1.



Fig.1 The front Panel of 1RU EDFA

1.2.2 The Back Panel

Optical Amplifier Illustration



Fig.2 The back Panel of 1RU EDFA



The back and sides Panels of the 1RU EDFA is shown in Fig.3.

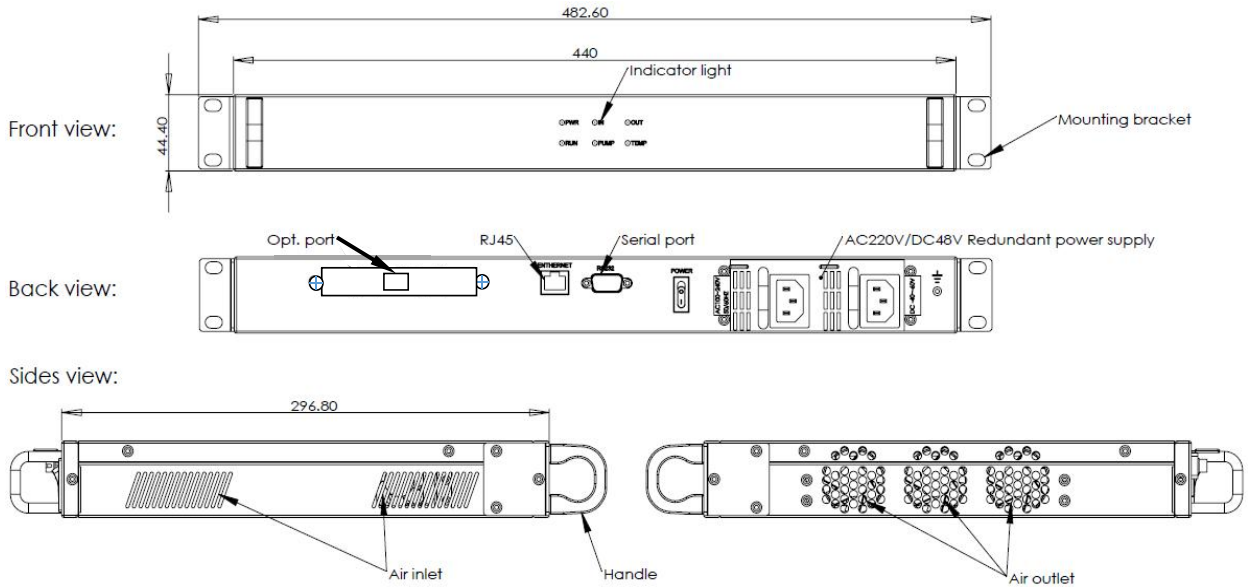


Fig.3 The back and sides Panels of 1RU EDFA

2. Key Specifications

2.1 Mechanical Specifications

Dimensions (W×H×D): **482.6mm×*44.4mm×*296.8mm**

2.2 Operating conditions

Parameter	Specifications		
	Min.	Max.	Unit
Operating Environment Temperature	-5	+55	°C
Relative Humidity (+25°C)	10	95	%
Power supply	AC input 48VAC		
ambient air	No corrosive and solvent gas, no dust		



2.3 Optical Specifications

Parameter	Specifications			
	Min.	Typ.	Max.	Unit
Wavelength Range	1527.9	-	1565.6	nm
Input Power Range	-10	-	7	dBm
Saturated Output Power	5	-	22	dBm
Gain	-	15	-	dB
Noise Figure	-	5.5	6	dB
Input/Output Return Loss	45	-	-	dB
Gain Flatness	-	1	2	dB

3. Installation and Operation

4. 3.1 Accessories and Attachments

Please check the accessories and attachments the first time you open the product package.

Accessories	Quantity
1RU EDFA	1 PCS
User manual	1 PCS
Test report	1 PCS
AC Power supply line	2 PCS
Software CD	1 PCS
Product certification	1 PCS

3.2 Installation

1. Place the unit into a 19-inch wide rack or cabinet. Make sure leaving sufficient



space above or below the unit for airflow heat-transfer purpose.

2. 1RU EDFA is designed to work between -5°C ~ 55°C (23°F ~ 131°F) temperature range.
Humidity should not exceed 95%. Installation is recommended in a temperature & humidity controlled, dust-free environment.

3. The equipment is designed to be powered by steady voltage AC 48V. Request of power supply:

AC input Power	48V
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4. The machine must have good grounding with grounding resistance $<4\Omega$. Before connecting circuit, use #20AWG and higher electric wire to connect the grounding screw on the bottom and the grounding frame. When using DC input power supply the equipment chassis must be grounding.

3.3 Operation

1. Plug in the AC 48V redundant Power Supplies.
2. Connect optical cables to the optical In/Out connectors.

Note: Before connect the In/Out optical cables, it is recommended to clean fiber-optic connectors. It can help prevent interconnect problems and therefore aid system performance. When optical connectors are disconnected and reconnected, the fiber surface can become dirty or scratched. The goal of cleaning the fiber optic connectors is to remove all dust and contaminants without leaving any residue. When the optical connectors are disconnected, mate the connector with an adapter or cover with an end cap.

3. Turn on power switch in the back panel, the power indicators in the front panel is lighted.

Power status lamp	Green
Run status lamp	Green
In status lamp	Red
Pump status lamp	Red
Out status lamp	Red
Temp status lamp	Red

Note: It is recommended to make all connections with the optical power off. This will reduce the risk of damage to the fiber.

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4. Input optical signal power, then press laser start-up key switch
Laser status lamp turns green from Red.

Note: Observe laser safety precautions. Refer to Laser Safety earlier in this guide.

5. Turn on power switch in the back panel, the power indicators in the front panel is lighted.

3.4 Software Operating Instructions

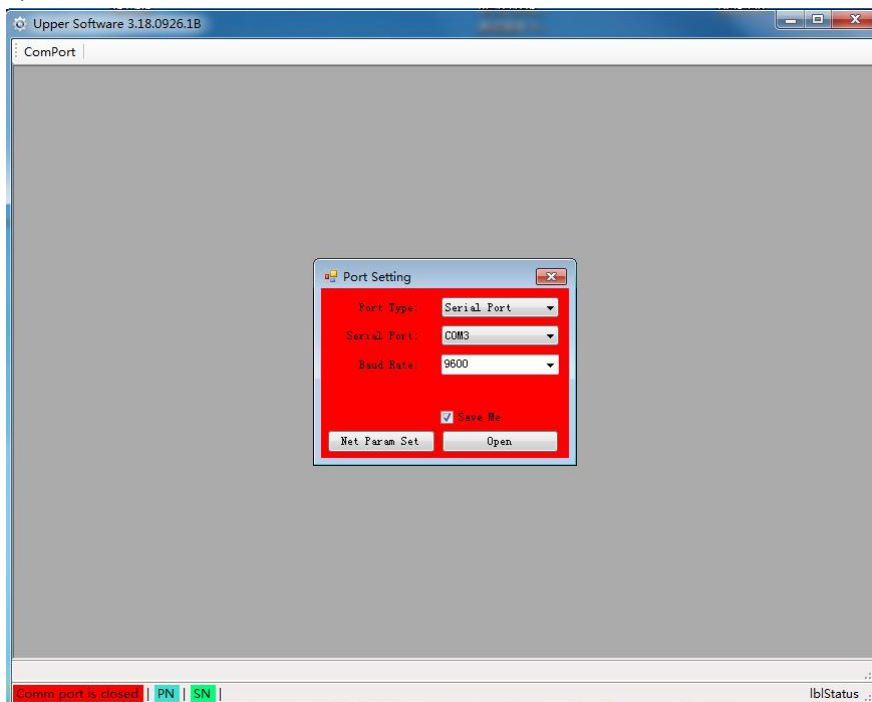
1. The product supports RS232 serial communication, and the working status and related parameters of the product can be monitored and set in real time through upper computer software.

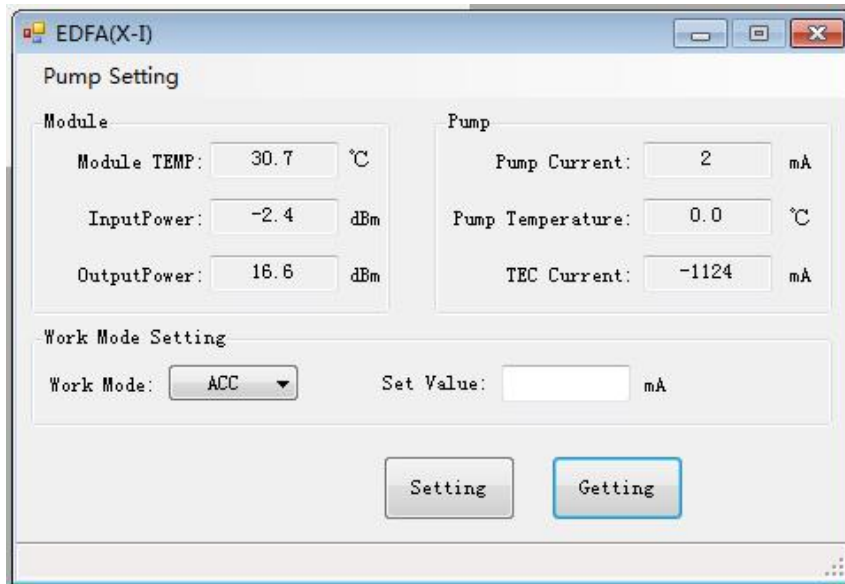
2. The software is stored in the attached CD, copy the "PC software" on the CD to the desktop of the computer.



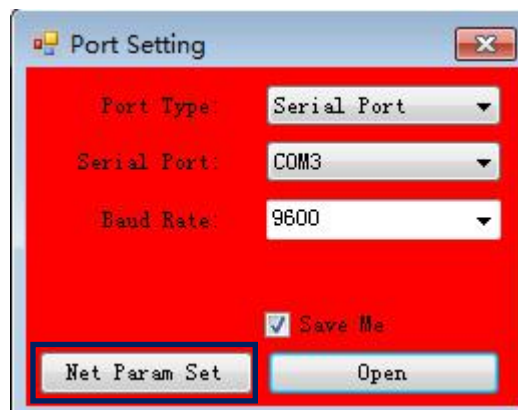
3. Double-click the PC software to open the host computer interface and select the right serial port:

- (1) If you click "Open", you can directly read the module information through the serial port, as shown below:

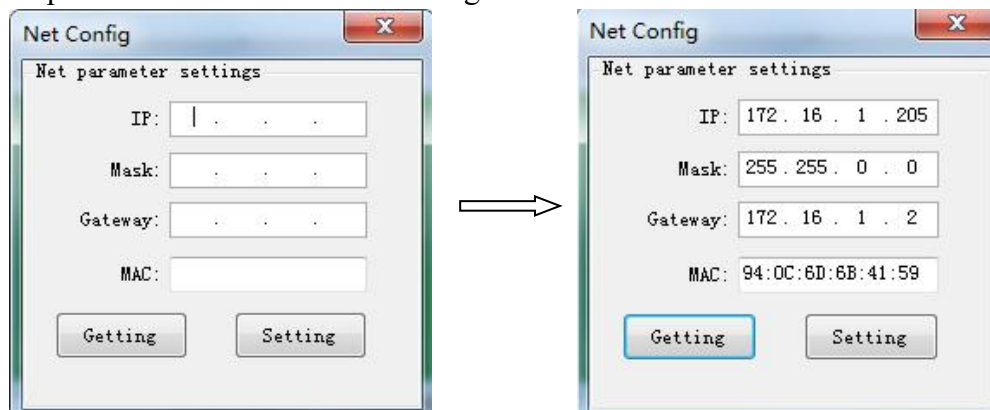


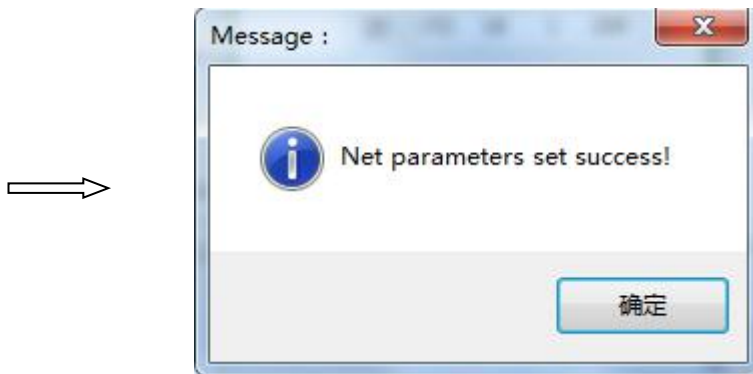


(2) Click "Net Param Set" to set the network address of the rack, as shown below:

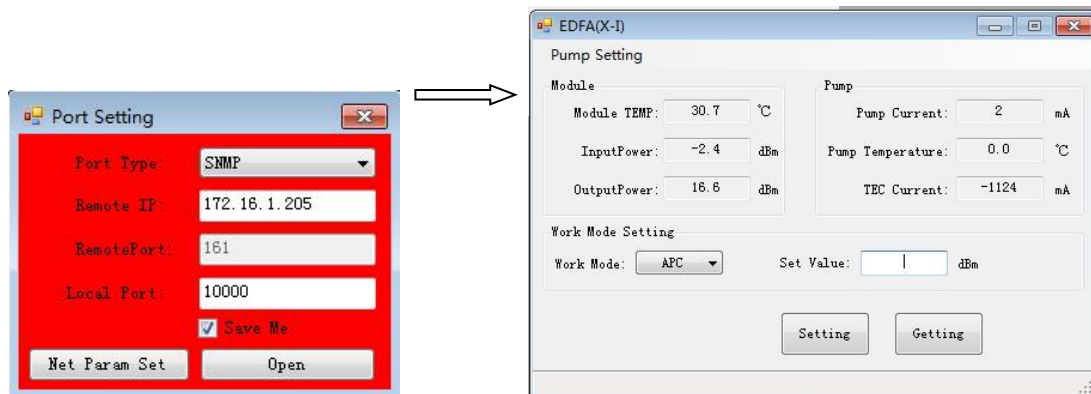


a. When the serial cable is connected, the current network address of the rack can be obtained. Do not change the MAC address. Other addresses can be set according to the network environment. After the network is set up successfully, the rack needs to be powered off and restarted. See figure below:





b. Close the communication settings, select SNMP in the Port Type drop-down menu; write the network address set in the previous step in Remote IP, and click "Open" to check the module information through the network port, as shown in the figure:



4. Working mode settings:

The product can work in APC or AGC mode, and the APC mode adjusts the output power of the EDFA module by setting the APC.

Select APC as "Working Mode", set the required output power, click "Setting", and "APC Parameters set success!" prompted, click "OK". Click "Read" to read the working information of the module. The AGC mode adjusts the output gain of the EDFA module by setting the AGC with same process.

3.5 Port and Cable Assignments

The 1RU EDFA provides the following manage ports:

RS232	Suitable for examining EDFA parameters and system configuration
SNMP	Simple Network Management Protocol. Before connection EDFA read the following instructions for port connectivity requirements. Default setting of Rack mounting Network management address.



IP address:172.16.1.210 Subnet mask:255.255.255.0 Default gateway:172.16.1.2 MAC addresses:95:0C:6D:6B:41:59

3.5.1 RJ-45 Port Description

The 1RU EDFA management port connector type is RJ-45. Connecting the DB9 male-USB serial line and DB9 Female-RJ45 serial line from PC to 1RU EDFA directly using straight through pin assignment. See table 3.4.1.

Table 3.4.1

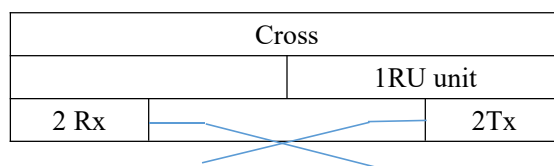
PIN		Workstation port		MDI	
1		Input receive data+		Output transmit data+	
2		Input receive data-		Output transmit data-	
3		Output transmit data+		Input receive data+	
6		Output transmit data-		Input receive data-	
4,5,7,8		Nonuse		Nonuse	
Straight			Cross		
Adapter					
1 IRD+		1 OTD+	1 IRD+		1 IRD+
2 IRD-		2 OTD-	2 IRD-		2 IRD-
3 OTD+		3 IRD+	3 OTD+		3 OTD+
6 OTD-		6 IRD-	6 OTD-		6 OTD-

3.5.2 RS232 Port Description

The 1RU EDFA management port connector type is RS232. Connecting the DB9 male-USB serial line from PC to 1RU EDFA directly using Cross through pin assignment. See table 3.4.2.

Table 3.4.2

PIN	Workstation port	MDI
2	RX	TX
3	TX	RX
5	GND	GND
1,4,5,7,8,9	Nonuse	Nonuse





3Tx	—	3 Rx
5GND	—	5 GND

3.6 Warning and Alarms

3.6.1 Alarm status

When the pump laser is in alarm, the status LED will turn red and be displayed the alarm status on the front panel. The alarm will not stop the EDFA but indicates the parameter is out of range. If the alarm stops, the parameter is within range.

When the Pump& Run LED is green, the device is working properly and the laser is on.

1RU EDFA monitors system operation and adjusts to the majority of power fluctuations. The PUMP laser will continue to work when in alarm. The alarm will disappear if the system parameter recovers into normal range. Some serious alarms can be eliminated by restarting the unit's power supply.

Most alarms are sent when the parameter is close to or exceeds the permitted range. In most situations the user cannot modify this status. Status modification needs special equipment and can only be modified in the factory.

In the case of an alarm, the unit's microprocessor will shut off the laser automatically.

3.7 Operation Notice

- Use only Single Mode Fiber (SMF) optic cable (9/125 μ M). Multi - Mode Fiber (MMF) is incompatible with the equipment and will result in unacceptable performance and possible damage to the equipment.
- In order to ensure return loss is maximum, use only LC/UPC connectors. Clean and inspect connectors and fiber end faces prior to installation, and every plug in/out cycle.
- Use only industry approved methods, materials, and solutions for cleaning.
- Do not turn on the EDFA alone or without a protector cover at the unit connector end, otherwise the laser can do harm, especially to eyes. This is especially critical because the laser is invisible.
- Always turn off the laser prior to making connections to the EDFA. Failure to do



so may cause irreparable damage to the laser and EDFA.

4. Maintenance and Troubleshooting

5. 4.1 Maintaining the 1RU EDFA unit

To ensure optimal performance, the following maintenance is recommended.

Frequency	Maintenance Required
Yearly	<ul style="list-style-type: none">● Check all parameters and test points● Make sure all cables are mated properly● Inspect cables for stress and chafing● Make sure all retaining screws are tight● Clean the chassis air filter with soft cloth that dampened with Optical-grade (91%) isopropyl alcohol
When needed	<ul style="list-style-type: none">● Mate the connector with an adapter or cover with an end caps when the connectors are disconnected.● Carefully clean the module with a soft cloth that is dampened with mild detergent

4.2 General Troubleshooting Information

This troubleshooting information describes the most common alarms and gives typical symptoms, causes, and items to check before contacting Customer Service.

4.2.1 Troubleshooting Alarm Conditions

Alarm	Parameter	Possible Causes	Possible Solutions
Run	Pump Laser on	Internal problem	Contact sales for help.
Pump	Laser temperature	Dirty or loose connector, or Low input	Check input source.
TEMP	Unit temperature	Internal problem, Fan Tray failure, Ambient Temperature, or chassis air filter requires changing	Contact sales for help.
In	Optical Input	Dirty or loose connector, or Low input	Check input source.
Out	Optical Output	Low input, Internal problem	Check input. Contact sales for help.
		Module disabled	Enable Module.



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PWR	Input power supply	Internal problem	Contact sales for help.
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⚠ WARNING:

Avoid electric shock and damage to this product! Do not open the enclosure of this product. There are no user-serviceable parts inside. Refer servicing to qualified service personnel. If you need additional assistance contact manufacturer Services.



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