1550nm CATV Erbium Doped Fiber Amplifier · EDFA-4429 Series

USER MANUAL

CONTENTS

1.0 PRODUCT SUMMARY

EDFA-4429 series high power single mode EDFA is characterized by low noise and high linearity. It offers a flexible, low-cost solution for CATV large area coverage of metropolitan areas and medium-sized cities. EDFA-4429 series amplifiers are equipped with complete APC, AGC and ATC controls and have an excellent design for heat-dissipation, guaranteeing long MTBF values for the laser pump. RS232 and RJ45 interfaces on the front panel offer serial communication and SNMP network access for local or remote management. The wide LCD screen displays all the operating parameters and any alarms. Laser will be automatically switched off if optical input power is missing, protecting the laser and automatically resuming operation when new input is detected. All optical outputs are located on the front panel (optional order for back panel is available).

EDFA-4429: 1RU chassis, total output power >1000mW, offers maximum 16 optical outputs.

2.0 INSTALLATION

2.1   Unpacking

Please inspect the shipping boxes for any obvious damages.
Unpack the unit from all packaging boxes.
Inspect the appearance of the unit for any shipping damages.
Document and inform the shipping company and your local representative, if any damage was found.
Save the shipping boxes and their inserts for future reshipment in case the products need any upgrade or repair.

NOTE: When reshipping products (returning them back to the vendor, distributor or manufacturer), warranty will be void if products are damaged due to use of non-original protection packaging. The EDFA units contain sensible mechanical parts that can be damaged by improper handling.

2.2   EDFA Mounting and Power Connection

1. Place the unit into a 19-inch wide rack or cabinet. Make sure to leave a 1.75-inch (about 4.5cm) space above and below the unit.

2. The EDFA-4429 series 1550nm can work between 0°C~50°C（32°F~122°F）temperature range. We recommend 25°C（77°F）environment temperature. Humidity should not exceed 95%（under non-condensing

conditions）. If necessary, should keep the equipment working in the suitable temperature & humidity (within the restrained scope). We recommend operating unit in a dust free environment.

3. EDFA equipment can be powered by AC or steady DC voltage. In both of AC & DC, AC is the main power supply.

Request of power supply:

AC input	94-245VAC, 50-60Hz
DC input	36-60VDC, (48V source recommended)
Power consumption	Maximum 50W

4. The DC power supply of the equipment must be the SELV supply type as stipulated in the CAN/CSA C22.2 No.950-95 standard.

5. Unit should have good grounding with grounding resistance ＜ 4Ω. According to common international standards, AC plugs must be tri-wire with the middle wire being the grounding wire.

Before connecting power circuit, please use appropriate (#20AWG or more) electric wire to connect the grounding screw on the bottom to the grounding frame. When using DC input power supply, the equipment chassis must be grounded following the appropriate procedures for the respective location.

2.3   Optical connectivity

1. Clean all fiber patch cords before connecting to the EDFA unit.

Cleaning Guidelines:

Fiber Patch cord connectors

- Remove the dust cap of the fiber connectors and wipe the fiber connector tip with a dry lint-free cloth. Check if there are scratches or debris on the connector surface by using a microscope (ie.100x or 200x).

- If no scratch or debris are found, the connector is ready for connection. If scratches or debris are found, repeat the fiber patch cord connector cleaning guidelines.

Fiber Bulkhead connectors

- Compressed air may be used to clean fiber bulkhead connectors. Use compressed air according to the following specifications (at least):

    - Non-residue, inert gas for precision dust removal

    - Ultra-filtered to < 0.2 microns

    - Recommended for optical systems

    - Using compressed air as listed above, remove the bulkhead dust cover and hold the can of compressed air about 6 inches away from the connector. After spraying a few short bursts into the bulkhead,

the connector is clean and ready for connection.

- If compressed air is not available, the transmitter fiber bulkhead connector may be cleaned by 2.5 mm alcohol sponge, or the connector plate may be removed to clean the internal fiber patch cords.

CAUTION: The use caution when handling fibers. Do not exceed fiber manufacturer's pulling tension or bend radius specifications when removing fiber bulkhead connector plate.

-To remove the transmitter optical connector plate, remove the screw on the far left of the optical plate and remove the screw on the far right of the optical plate. Do not remove the screws on the optical bulkhead connector.

- Slowly remove the optical connector plate from the rear panel and disconnect each fiber connector from the bulkhead mounted on the plate.

- Clean each fiber connector according to the fiber cleaning guidelines.

2. Make sure the laser key switches on the front panel of the transmitter are in the OFF position.

3. Connect the fiber patch cord from the output of the transmitter to the optical power meter.

4. Turn the transmitter laser key switch to the ON position.

5. Use the optical power meter to verify that the transmitter optical power follows the specifications.

6. Turn the transmitter laser key switch to the OFF position.

3.0 EDFA CONTROLS, INDICATORS, AND ALARMS

This section of the manual will give an overview of the available menus in the EDFA-4429 series EDFA and their descriptions. All instructions in this section 3.0 refer to the representation of the front panel shown in the diagram below. The user can scroll through the EDFA menus by using the push buttons that are on the front panel on the right of the LCD screen.

3.1   Operation of the panel

3.1.1   Open menu

A.   Connect 48V power supply

B.   Turn on power switch in the back panel,

Front panel displays "KEY OFF"

Laser Status lamp is Red

C.   Input power, then press laser start-up key switch

Front panel shows "**KEY ON...**", Laser status lamp turns green from red.

3.1.2   Start-up main menu

Press ▲/▼ buttons and the following menu will be displayed in a sequence cycle.

Menu #1 -   Model
Read-only menu, tells the type of this equipment

Menu #2 -   S/N
Read-only menu, tells the serial number of this equipment

Menu #3 -   Input
Read-only menu, tells the input optical power of EDFA

Menu #4 -   Set Output

Adjustable list, set the output power in dBm

Menu #5 -   Total Output
Read-only menu, tells the output optical power of EDFA in dBm.

Menu #6 -   Each Output

Read-only menu, tells the each output of EDFA in dBm.

Menu #7 -   PA Current

Read-only menu, tells the pre pump current of EDFA

Menu #8 -   PA TEC

Read-only menu, tells the pre pump tec

Menu #9 -   PA Temp

Read-only menu, tells the pre pump temperature of EDFA

Menu #10 - BA Current

Read-only menu, displays the amplifier current of EDFA

Menu #11 - Power1

Read-only menu, tells the status of power1

Menu #12 - Power2

Read-only menu, tells the status of power2

Menu #13 - Unit Temp

Read-only menu, tells the case temperature

Menu #14 - IP

Adjustable list, displays the IP address

Menu #15 - SUB

Adjustable list, displays the address of net mask

Menu #16 - GW

Adjustable list, displays the gateway address

Menu #17 - TR1

Adjustable list, displays the TRAP1 address

Menu #18 - TR2

Adjustable list, displays the TRAP2 address

Menu #19 - LCD Contrast Level

Adjustable list, displays the LCD contrast level adjustment

Menu #20 - Reset Settings

Adjustable list, displays the reset settings

3.1.3 Assistant manual

1. Set output power
   Under the menu of Set Output, press the ▲▼ button at the same time to enter the modified menu, press ▲/▼ button to increase or decrease value, press the ▲▼ button at the same time to save and exit.

2. Set IP, Sub-mask, Gateway, Trap1, Trap2 menu

   Under the menu of IP, Sub-mask, Gateway, Trap1, Trap2, press the ▲▼ button at the same time to enter into modified menu, press ▲/▼ button to select the menu that need to modify, press the ▲▼ button at the same time to select the modified key position, press ▲/▼ button to modify the value on this position, and then press ▲▼ button at the same time to save and exit.

   For example: modify IP: 192.168.000.015; if value needs change from 5 to 6, press ▲▼ button at same time to enter into IP address menu, press ▲▼ button at same time to select 5 this position, then press ▲/▼ button to change 5 to 6, and then press ▲▼ button at same time to save, the modified IP is 192.168.000.016.

3. LCD Contrast Level (Set LCD Contrast Level)
   Select this menu, press the button ▲/▼ at the same time to enter the modified status, press the button ▲/▼ to set the brightness of the LCD, last press the button ▲/▼ at the same time to save.

4. Set Reset Settings menu
   Choose Reset Setting menu, press ▲▼ button at same time to enter modify status, press ▲/▼ button to select the restore factory setting, press the ▲▼ button at the same time to save and exit.

4.0 PORT AND CABLE ASSIGNMENTS

EDFA-4429 series has the following management ports:

RS232 port: suitable for examining EDFA-4429 parameters and some system configuration by serial RS232 port (PC with console/terminal software, such as PuTTY).

SNMP: Simple network management protocol.

Before connecting the EDFA-4429 by the RJ45 port, please read the following instructions and port connectivity requirements.

4.1 Management Port (RJ-45)

4.1.1 Port Description

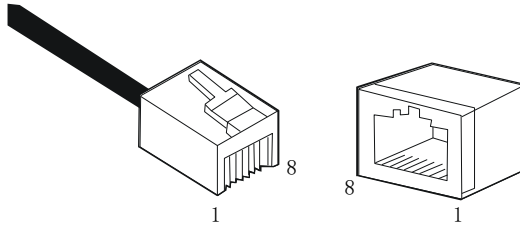The EDFA-4429 series management port connector type is RJ-45.

Figure 4.1.1 RJ–45 Connector Plug and Socket

The Management port (RJ-45) can be connected to any device that uses a standard network interface (e.g., a workstation, server, bridge or router). RJ-45 MDI can connect with similar network equipment (such as other EDFA-4429 or network Hub). Use unshielded twisted-pair (UTP) or shielded twisted-pair (STP) cable for RJ-45 connections: 100-ohm Category 3, 4 or 5 cable for 10 Mbps connections or 100- ohm Category 5e cable for 100 Mbps connections. Please make sure that the cable length does not exceed 100 meters (305 feet).

4.1.2 Pin assignment

For network management connectivity (RJ-45 connector in each side, NMS PC to EDFA-4429 series direct connection) a straight cable should be used. See Figure 4.1.2.
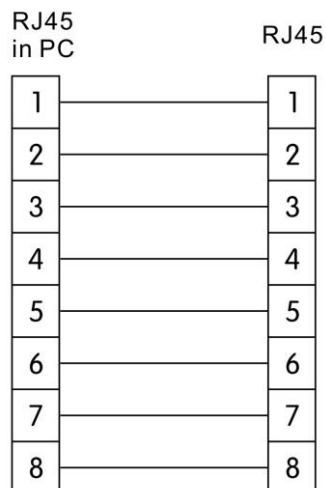

Figure 4.1.2 RJ-45 connector straight through connecting

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

Table 4-1 RJ-45 Pin assignment

Straight		Cross	
(EDFA-4429)	(Adapter)	(EDFA-4429)	(HUB/ EDFA-4429)
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-	

Table 4-2 Straight and cross cable connecting

4.1.3   Port Connection

EDFA-4429 series can automatically detect the Ethernet cable type (Straight-though or Crossover), so either type can be used. An Ethernet twisted pair cable should be connected between the RJ-45 connector (MDI-X) of the EDFA-4429 series and any device with a standard network interface (such as a work station or server), or to a network interconnection device (such as a bridge or router).

1) Ensure that the device to be connected has a 10BASE-T or 100BASE-TX network interface card (NIC).

2) Prepare a twisted pair Ethernet cable with RJ-45 plugs on each end. Use Cat 3, 4 or 5 cable for standard 10Mbps Ethernet connections, or Cat 5e cable for 100Mbps Fast Ethernet connections.

3) Plug one end of the cable into the PC's NIC and plug the other end into any RJ-45 port of the EDFA-4429 series. All the EDFA-4429 RJ-45 port supports both 10Mbps and 100Mbps Ethernet connections. Ensure that the plug's locking tab clicks into proper position to make good access.

Caution: Do not plug a phone jack connector into the RJ-45 port. This may damage the EDFA. Instead, use only twisted-pair cables with RJ-45

connectors that conforms to FCC standards.

Note:

1) Connect other compatible EDFA-4429 series or network hub, adopt direct or across cable to connect MDI port in other device.

2) Ensure that the twisted pair cable length does not exceed 100 meters.

3) Cat 5 cable is recommended for all network connections to avoid confusion or inconvenience, when upgrading to Fast Ethernet devices in the future.

4) Cascade length provision: IEEE 802.3 standard prescribes that through twisted pair at most 4 hub (such as repeaters) can be cascade, and IEEE 802.3u standard has more strict order for high-speed Ethernet. So, when cascade device except for this EDFA-4429 series, please follow the above connection regulation. But, please don't reckon in the EDFA-4429 series or connected cable related device in cascade length, because EDFA-4429 series divide the connected path into unattached port.

4.1.4   Connection Management (Out-Band)

Remote management can be performed through the dedicated Management port (10/100BASE-TX port) on the front of the EDFA-4429 or any 10/100BASE port of EDFA-4429.

Before the Management port is accessed through LAN port, please configure the IP address and subnet mask by serial port according to network configuration requirement.

4.2   RS232 Console port (DB9)

8   1
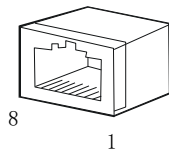
4.2.1   Port Description

Figure 4-2.1 DB9 interface

DB9 interface is a standard connector used in RS232 in series communication connects. EDFA adopts 9 pin standard connector which is same as the connector of PC Com interface.
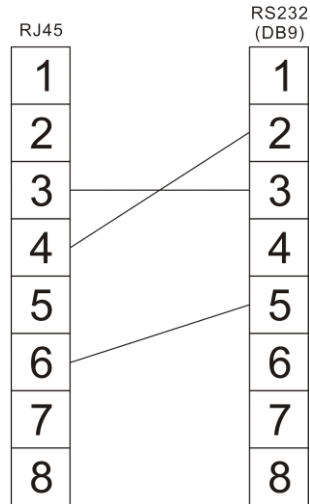
4.2.2   Pin assignment

Figure 4-2.2 DB9/RS232 pin assignment

Pin	Distribution
2	RXD: accepting of data
3	TXD: transmitter data
5	SG: signal

Table 4-3 Pin information

4.3   Power Connection

4.3.1   Connection Description

The power module provides stable operating power for the system, to meet the power supply requirements of all the components in the system.

5.0 FAULT MESSAGES

EDFA-4429 series FTTP EDFA can monitor system operation and generate brief warning notes, taking corrective actions regarding system parameters, equipment tolerance, laser aging, RF level changing, and temperature changing. The laser

PUMP will continue to operate during warnings and some alarms. Warnings and alarms may disappear if the unit is detecting that system parameters recover into normal range. Some of the critical warnings can be eliminated by restarting the power supply. All warnings will disappear automatically if parameters recover to normal range.

Most of warnings will be sent out when the correction ability is close to or exceed the permitted range. At most situation, user cannot modify these statuses. Status modification needs special equipment & available facility, so the modification can only be processed in the factory.

5.1   Warning status

When pump laser is on warning status, the status LED will turn red and the brief note of status will be displayed on the screen. The warning will not make the EDFA stop running, and it only shows the relative parameter exceeding to normal scope slightly. If the warning is stopped, it shows that the relative parameter is returned into permitted scope. The screen & LBD will return to their normal status and there is no need for user to interfere. But what should emphasize is that the problem showed by alarm cannot be ignored, because there may be some serious system faults.

Work status	Status display	LED color	Explanation
Present laser deflection is low	Key Off	Red	The EDFA isn't working. It's shut down.
Present case temp	-	Red	Warning when the temp ≥60°C.
Input	Input Low	Red	Optical output power is low.
Output	Output Low	Red	Optical output power is low.

Table 5-1 Warning status

5.2   Alarm status

When the pump laser sends out warning, it will stop working generally. The alarm is because some relative parameter exceeds its safety working scope or some situation causes damage to the laser. The alarm can be eliminated by restarting the power supply or resetting the key switch. If the user cannot eliminate the alarm, please contact our company immediately.

5.3   Fault troubleshooting

Please read the below information to prevent some potential problems.

1. Please place equipment under environment temperature of 0°C ~50°C, and other conditions follows the requested running range. We suggest placing the EDFA in low dust environment.

2.   Ensure the rear panel fan & front panel sockets are clear and with

adequate space for proper ventilation.

3.   Check the power supply connectivity and proper wiring of power supply lines.

4.   Check RF gain value adjustment and make sure is within the proper range.

5.   Always keep the optic fiber connectors clean. Prevent the output optical power decrease caused by optic leakage.

6.0 WARRANTY AND REPAIRING UNITS

1. Each unit is packaged with<Product QA> and serial number. We do provide two years warranty for the product.

2. The software CPU has the purpose of monitoring laser status, digital display, alarms and network management. In case of red LED blinking (Alarm), please return the equipment for repairing. User should not open the top cover for repairing; opening the cover of the EDFA unit will void the warranty, maintenance and material fees will be charged for repair if the unit has been tampered.

3. Lifetime maintenance and upgrade for all EDFA products is provided after warranty period has expired.

4. If components are damaged by user tampering or mishandling factors, repairing fees will be charged.