



**1550nm Erbium Ytterbium  
Co-doped Amplifier**

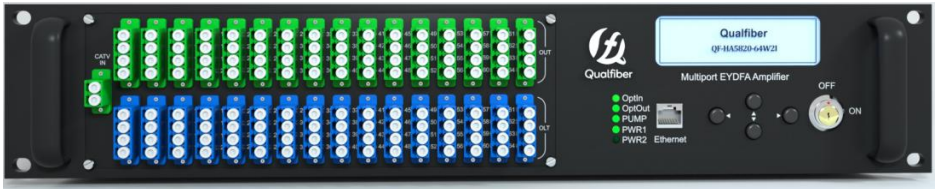
**QF-HA5820-64W2I**

**USER MANUAL**

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1.0 PRODUCTS IMAGE



Front view



Rear view

## 2.0 PRPDUCT SUMMARIZE

QF-HA5820-64W2I series is a low noise, high performance, FTTP high power multi-ports amplifier .The device has a built-in CWDM wavelength division multiplexer, which will enable the 1490 / 1310nm data stream of the OLT and ONU to be combined into a single fiber transmission through EDFA, thereby reducing the number of devices and improving the system index and reliability. Provides a flexible and low-cost solution for triple play and fiber-to-user.

QF-HA5820-64W2I series is equipped with perfect APC, AGC, ATC control, good heat dissipation and ventilation design, to ensure the long life and high reliability of pump Laser. The front panel provides the SNMP network management RJ45 interface, and the full dot matrix LCD provides the working parameters and alarms of the whole machine. The laser is automatically turned off when the light is lost, providing laser safety protection. All optical ports can be installed on the front panel and also be installed on the rear panel according to user requirements.

Excellent low noise figure, can be used for high-quality transmission of video, audio and digital signals.

2RU rack,input optical ports:64 for OLT. Output optical ports:64 for multiplexing 1310/1490nm.

## 3.0 FEATURES

- 1540~1563nm operating bandwidth for optical amplifier
- 500~10000mW (27~40mW) high output power
- Low noise figure ( Typ  $\leq 4.5\text{dB}$ , Max  $\leq 5.0\text{dB}$  )
- High performance and high reliability
- 64 up-link ports, which used in OLT
- 64 output optical ports, multiplex the 1310/1490nm data stream.
- Optional dual optical input, built-in 2  $\times$  1 optical switch
- credit time function (lock and password)
- Can compatible with any FTTx PON technology: EPON/GEAPON, GPON, BPON, DPON
- Comprehensive SNMP management, and can by phone with IPV6 network.
- Efficient space, simple and reliable in construction/maintenance
- The industry's best performance-price ratio

## 4.0 TECHNICAL PARAMETERS

Performance			Index			Supplement
			Min.	Typ.	Max.	
Optical feature	CATV operation wavelength	(nm)	1540		1563	CATV
	OLT pass wavelength	(nm)		1310/1490		
	CATV pass wavelength loss	(dB)			0.8	1550nm
	OLT pass wavelength loss	(dB)			0.8	1310/1490nm
	CATV & OLT optical isolation	(dB)	40			
	Number of uplink optical ports (for OLT)	(pcs)			64	2U
	CATV input power (Pi)	(dBm)	-10	≥ +3	+10	
	Total output power	(dBm)	27		40	2U
	Number of output ports	(pcs)			64	2U
	Each port output power	(dBm)			20	
	Connector			LC/APC		
	Difference of each output power	(dB)	-0.5		+0.5	
	Output power adjustable range	(dBm)	-10		0	
	Noise figure (Pin=0dBm)	(dB)		4.5	5.0	
	Polarization dependence loss (PDL)	(dB)			0.3	
	Polarization dependence gain (PDG)	(dB)			0.4	
	Polarization mode dispersion (PMD)	(ps)			0.3	
	Input/output isolation	(dB)	30			
	Pump power leakage	(dBm)			-30	
	Echo loss	(dB)	55			APC
General feature	SNMP		RJ45			
	Power supply	(V)	90		265	220VAC
			30		72	-48VDC

	Power consumption	(W)			150	
	Operation temp.	(°C)	-5		65	
	Storage temp.	(°C)	-40		80	
	Relative humidity	(%)	5		95	
	Size (W)×(D)×(H)	mm	485*430*90			2RU (19")

## 5.0 INSTALLATION

### 5.1 Unpacking

1. Inspect the shipping boxes for any obvious damages.
2. Unpack the unit from all packaging boxes.
3. Inspect the appearance of the unit for any shipping damages.
4. Document and inform the shipping company and your local representative if any damages.
5. Save the shipping boxes and their inserts for any future reshipment for upgrade or repair.

NOTE: In the event of a reshipment back to the manufacturer, any additional damages caused by not using the original boxes will be considered as responsibility of the customer.

### 5.2 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. According to the design request, HA5800B series 1550nm EDFA can work under 0°C~50°C (32°F~122°F) temperature range. We recommend 25°C (77°F) environment temperature. Humidity should not bigger than 95%(under non-coagulation condition). If necessary, the equipment should keep the suitable temperature & humidity in the restrained scope. We recommend to operating in the environment without dust.
3. Equipment powered by AC or steady voltage DC. In both of AC & DC, AC is the chief power supply.

Request of power supply:

AC input	94-245VAC, 50-60Hz
DC input	36-60VDC, floating
Power consumption	Maximum 84W

4. The DC power supply of the equipment must be the SELV supply stipulated as CAN/CSA C22.2 No.950-95 standard.
5. The machine should have good grounding, grounding resistance<4Ω. According to the international standard, 220V plug in adopts tri-wire rule, the middle wire is the grounding wire.

Before connecting circuit, please use big spec (#20AWG or bigger) electric wire to connect the grounding screw on the bottom and the grounding frame. When use DC input power supply, the equipment chassis must be grounding.

### 5.3 Optic connection

1. Clean all fiber patch cords before connecting to the transmitter.

#### Cleaning Guidelines:

- Remove the fiber connectors dust cap and wipe the fiber connector tip with a dry lint-free cloth (such as Kimwipes). Inspect for scratches or debris on connector surface by using a microscopes (ie.100x or 200x).
- If no scratches or debris are found the connector is now clean and ready for connection. If debris or scratches are found then repeat the fiber patch cord connector cleaning guidelines.

#### Optic fiber connector in the back panel of transmitter

- Compressed air may be used to clean fiber bulkhead connectors. Use compressed air with at least the following specifications:
  - 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 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 cotton swap or connector plate may be removed to clean the internal fiber patch cords.

#### **CAUTION:** Be cautions when handling fibers.

Do not exceed fiber manufacturers 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 section A of 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 two fiber patch cords, one from the output of the transmitter to the EDFA, the other from the output of the EDFA to an optical power meter.
4. First turn the transmitter laser key switch to the ON position, then turn on the EDFA.
5. Using the optical power meter verify the transmitter optical power is within specification. Turn the transmitter laser key switch to the OFF position.
6. Shut off the laser of transmitter.

## 6.0 EDFA CONTROLS, INDICATORS, ALARMS

This section will outline the menu of the EDFA. For a description of all instructions, please refer to the panel shown below. The user can scroll through all the menus of the amp by using the buttons on the right side of the LCD screen.

### 6.1 The operation of the panel

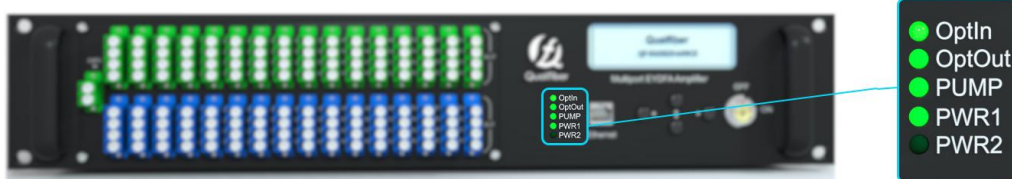
#### 6.1.1 Open menu

A、 Connect the fiber cable to optical connector and insert the power supply module (There are 2 power supply module for your option).

B、 Turn on power switch in the back panel

Front panel display "KEY OFF"

LED Indicators



- OptIN Input optical power indicator, when the input optical power is within the normal range, it is green
- OptOut Output optical power indicator, when the input optical power is within the normal range, it is green
- PUMP Pump working status indicator, green when pump is on
- PWR1 Status lamp Green (It will be Green when power is ON, and no lights when power OFF)
- PWR2 Status lamp Green (It will be Green when power is ON, and no lights when power OFF)



C、 Turn on the key



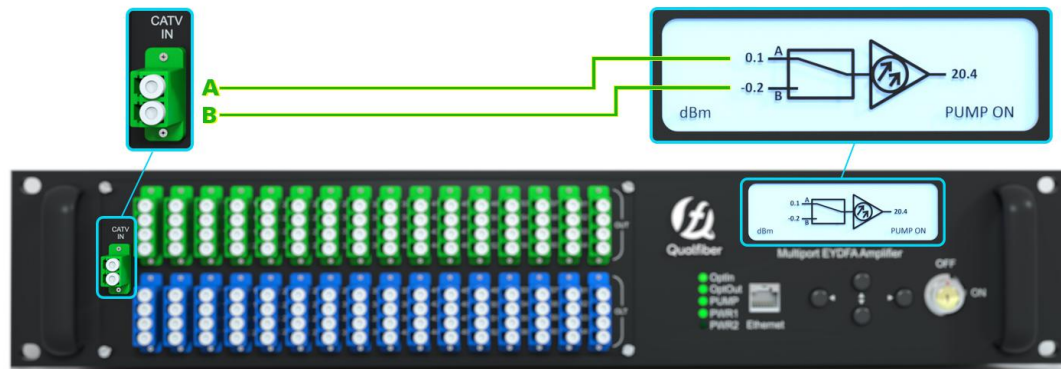
The front panel displays PUMP ON and counts down for 5 seconds.  
The PUMP status light changes from red to green.

### 6.1.2 Start-up main menu



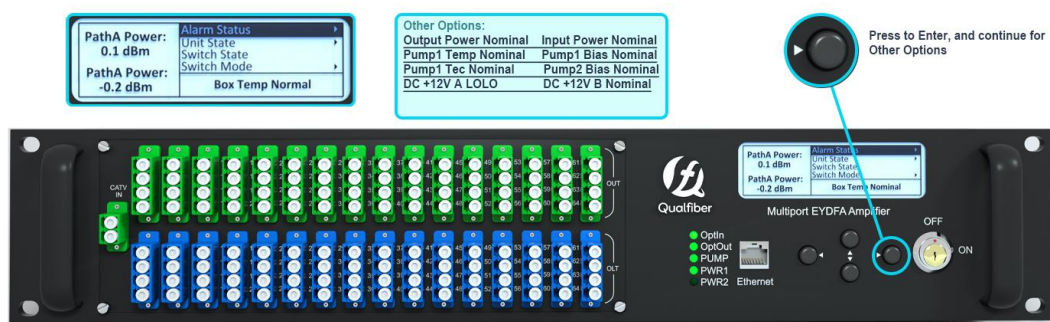
Press ► button will display below menu in sequence.

### Working Overview



The 2 input Qualfiber EDFA series, Can work in 2 independent input fiber channel A and B. The overview shows each channel's connection and it's optic power

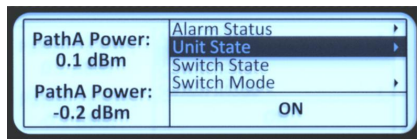
### Alarm Status



Alarm status of the device. Press ► to check whether each parameter is normal or in alarm state.

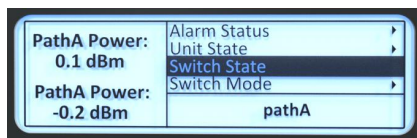
The device is on or off. Press ► can be set up and down again, equivalent to turning the key.

### Unit State



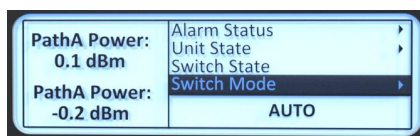
The Unit State Options ON/OFF.

### Switch State



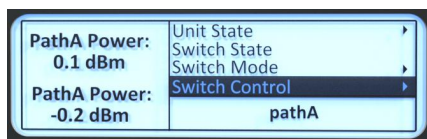
The channel where the optical switch is currently working. This menu is available if the device has an input light switch assembly.

### Switch Mode



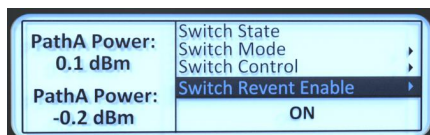
Switch mode, press ► can be set. If the above Switch Mode is set to "**AUTO**", which is recommended; if the Switch Mode is set to "**MANUAL**", this value means to force a manual switch to the corresponding channel. This menu is available if the device has an input light switch assembly.

### Switch Control



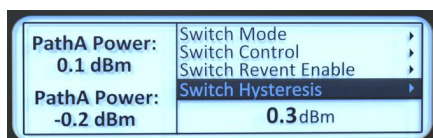
Set the channel path A or B manually, press ► to changing it.

### Switch Revert Enable



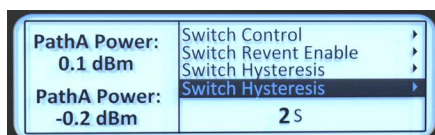
Switch revert enable set, press ► can be set. If Switch Mode is "OFF" mode, when the priority channel loses the signal, the optical switch will switch to the standby channel. If the priority channel signal returns to normal and the value is "ON", the optical switch will switch back to the priority channel, otherwise it stays on the standby channel. This menu is available if the device has an input light switch assembly.

### Switch Hysteresis



Hysteresis of optical switch switching back to priority channel, press ► can be set. This menu is available if the device has an input light switch assembly.

### Switch Restore Time



Optical switch recovery delay time setting, press ► can be set. This menu is available if the device has an input light switch.

### Input Optical Level A

PathA Power:	Switch Revent Enable	▶
0.1 dBm	Switch Hysteresis	▶
PathA Power:	Switch Hysteresis	▶
-0.2 dBm	Input Optical Level A	▶
	0.1 dBm	

Input optical power of channel A. This menu is available if the device has an input light switch assembly.

### Input Power Threshold A

PathA Power:	Switch Hysteresis	▶
0.1 dBm	Switch Hysteresis	▶
PathA Power:	Input Optical Level A	▶
-0.2 dBm	Input Power Threshold A	▶
	-5.0 dBm	

Optical switching threshold of A channel, press ▶ can be set. This menu is available if the device has an input light switch assembly.

### Input Optical Level B

PathA Power:	Switch Hysteresis	▶
0.1 dBm	Input Optical Level A	▶
PathA Power:	Input Power Threshold A	▶
-0.2 dBm	Input Optical Level B	▶
	-0.2 dBm	

Input optical power of channel B. This menu is available if the device has an input light switch assembly.

### Input Power Threshold B

PathA Power:	Input Optical Level A	▶
0.1 dBm	Input Power Threshold A	▶
PathA Power:	Input Optical Level B	▶
-0.2 dBm	Input Power Threshold B	▶
	-5.0 dBm	

Optical switching threshold for B channel , press ▶ can be set. This menu is available if the device has an input light switch assembly.

### Rated Total Output Power

PathA Power:	Input Power Threshold A	▶
0.1 dBm	Input Optical Level B	▶
PathA Power:	Input Power Threshold B	▶
-0.2 dBm	Rated Total Output Power	▶
	41.0 dBm	

The rated maximum output power of the device. This value is the total power.

### Set Total Output Power

PathA Power:	Input Optical Level B	▶
0.1 dBm	Input Power Threshold B	▶
PathA Power:	Rated Total Output Power	▶
-0.2 dBm	Set Total Output Power	▶
	41.0 dBm	

Adjust the total output power of the device, press ▶ can be set. This value is valid when Control Mode is "constPower".

### Total Output Power

PathA Power:	Input Power Threshold B	▶
0.1 dBm	Rated Total Output Power	▶
PathA Power:	Set Total Output Power	▶
-0.2 dBm	Total Output Power	▶
	41.0 dBm	

The total power value currently output by the device.

### Single Output Power

PathA Power:	Rated Total Output Power	▶
0.1 dBm	Set Total Output Power	▶
PathA Power:	Total Output Power	▶
-0.2 dBm	Single Output Power	▶
	20.4 dBm	

The single power value currently output by the device.

## Set Gain

PathA Power: 0.1 dBm	Set Total Output Power Total Output Power Single Output Power Set Gain
PathA Power: -0.2 dBm	20.0 dB

Gain value of the device, press ► can be set. This value is valid when Control Mode is "constGain". The total output power at this time will change with the input power.

## Control Mode

PathA Power: 0.1 dBm	Total Output Power Single Output Power Set Gain Control Mode
PathA Power: -0.2 dBm	ConstPower

Equipment power control mode, press ► can be set to **constPower** or **constGain**.

## Pump1 TEMP

PathA Power: 0.1 dBm	Single Output Power Set Gain Control Mode Pump1 TEMP
PathA Power: -0.2 dBm	25.0℃

The temperature of the foreline DFB pump.

## Pump1 BIAS

PathA Power: 0.1 dBm	Set Gain Control Mode Pump1 TEMP Pump1 BIAS
PathA Power: -0.2 dBm	380 mA

The working current of the previous stage DFB pump.

## Pump1 TEC

PathA Power: 0.1 dBm	Control Mode Pump1 TEMP Pump1 BIAS Pump1 TEC
PathA Power: -0.2 dBm	0.02 A

Refrigerator current of the foreline DFB pump.

## Pump2 BIAS

PathA Power: 0.1 dBm	Pump1 TEMP Pump1 BIAS Pump1 TEC Pump2 BIAS
PathA Power: -0.2 dBm	5098 mA

Working current of the after-stage pump.

## Device TEMP

PathA Power: 0.1 dBm	Pump1 BIAS Pump1 TEC Pump2 BIAS Device TEMP
PathA Power: -0.2 dBm	29.3℃

The temperature inside the device.

## Fan State and Control

PathA Power: 0.1 dBm	Pump1 TEC Pump2 BIAS Device TEMP Fan State and Control
PathA Power: -0.2 dBm	OFF

Working status of the cooling fan in the device, press ► can be set. It can be set to "OFF", "ON", and "AUTO" as required. Generally, it is recommended to set to "AUTO". The device will automatically control



## Fan Control Temp

PathA Power: 0.1 dBm	Pump2 BIAS Device TEMP Fan State and Control ▶
PathA Power: -0.2 dBm	Fan Control Temp ▶ 30 °C

Turn on the temperature of the fan. Press ▶ can be set. When Fan Control is set to "AUTO" and the controller inside the device detects that the internal temperature is higher than this value, it will turn on the fan. When the temperature falls below 3 degrees below this value, the fan will turn off.

## +12V Supply A

PathA Power: 0.1 dBm	Device TEMP Fan State and Control ▶
PathA Power: -0.2 dBm	Fan Control Temp ▶ +12V Supply A ▶ 2.8 v

Output voltage of the A-channel power supply.

## +12V Supply B

PathA Power: 0.1 dBm	Fan State and Control ▶ Fan Control Temp ▶
PathA Power: -0.2 dBm	+12V Supply A ▶ +12V Supply B ▶ 12.2 v

Output voltage of the A-channel power supply.

## IP Address

PathA Power: 0.1 dBm	Fan Control Temp ▶ +12V Supply A ▶
PathA Power: -0.2 dBm	+12V Supply B ▶ IP Address ▶ 192.168.1.122

The network IP address of the device, press ▶ can be set to different IP.

## Netmask

PathA Power: 0.1 dBm	+12V Supply A ▶ +12V Supply B ▶
PathA Power: -0.2 dBm	IP Address ▶ Netmask ▶ 255.255.0.0

Device's network subnet mask, press ▶ can be set.

## Gateway

PathA Power: 0.1 dBm	+12V Supply B ▶ IP Address ▶
PathA Power: -0.2 dBm	Netmask ▶ Gateway ▶ 192.168.1.1

Gateway address of the device, press ▶ can be set.

## MAC

PathA Power: 0.1 dBm	IP Address ▶ Netmask ▶
PathA Power: -0.2 dBm	Gateway ▶ Mac ▶ XX-XX-XX-XX-XX-XX

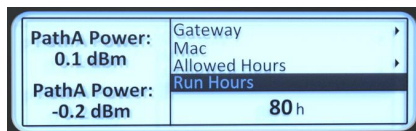
The network MAC address of the device.

## Allowed Hours

PathA Power: 0.1 dBm	Netmask ▶ Gateway ▶
PathA Power: -0.2 dBm	Mac ▶ Allowed Hours ▶ forever

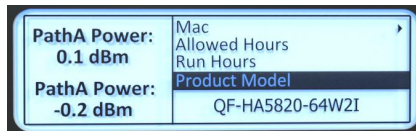
Permitted number of working hours for the device, press ▶ can check the 10-digit ID code of the device. When displayed as "forever", it means a permanent license

## Run Hours



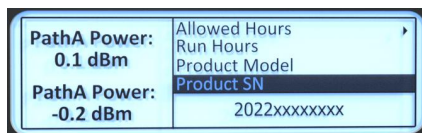
The time the device has been running, unit: hours.

## Product Model



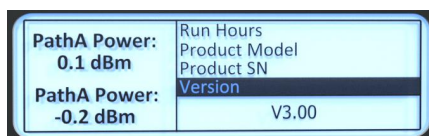
The model of device.

## Product SN



Serial number of the device.

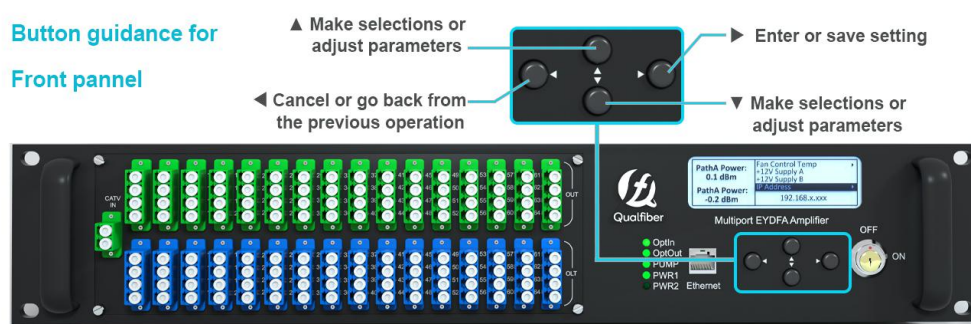
## Version



The version number of the control software in the device.

### 6.1.3 Menu operation

Button guidance for  
Front pannel



Select the menu mode you want to modify and press enter ► settings, press ▼ and ▲ make selections or adjust parameters, press ◀ cancel or back from the previous operation. After modifying the parameters, press ► to enter or save setting.

## 7.0 PORT AND CABLE ASSIGNMENTS

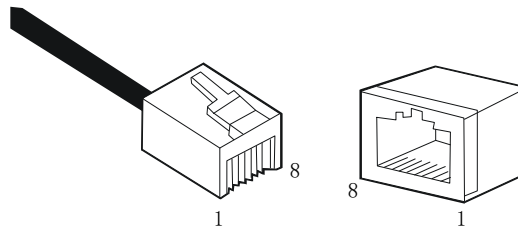
Front panel provide the following manage port

Before connection, please read the following instructions and port connectivity requirements.

## 7.1 LAN Port (RJ-45)

### 7.1.1 port description

EDFA can be managed by Ethernet via UTP cable, which with RJ-45 Connectors.



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 be connected with similar network equipment (such as other HA5800B 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 5 cable for 100 Mbps connections. Beside, please ensure that the cable length does not exceed 100 meters.

### 7.1.2 Port connection

The EDFA series can automatically detect the type of Ethernet cable (straight-through or crossover), so you can choose one of them. Connect an Ethernet twisted pair between the RJ-45 (MDI-X) port of the EDFA series and any device with a standard network interface (such as a workstation or server) or a network interconnect device (such as a bridge or router).

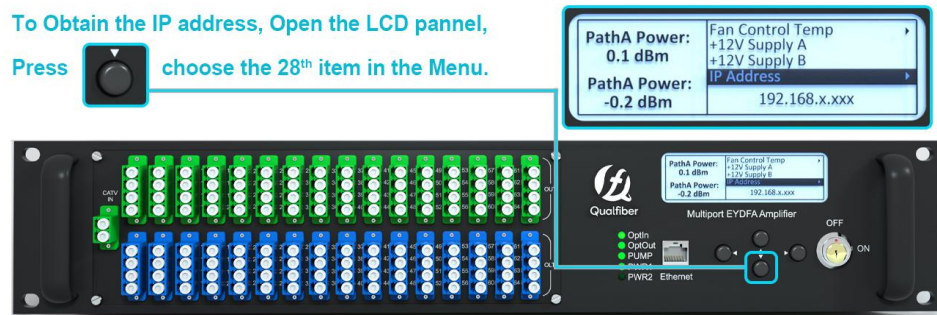
- 1) Prepare the network devices to be connected and make sure that they are equipped with a 10BASE-T or 100BASE-TX network interface board (NIC). These NICs will connect to the RJ-45 (MDI-X) ports of the Qualfiber EDFA.
- 2) Prepare a straight-through shielded or unshielded twisted-pair cable with RJ-45 plugs at both ends. Use Category 3, 4 or 5 cables for standard 10Mbps Ethernet connections, or Category 5 cables for 100Mbps Fast Ethernet connections.
- 3) One end of the cable is connected to the RJ-45 port of the network interface device, and the other end is connected to any of the RJ-45 ports of the EDFA series. All EDFA series RJ-45 ports support 10Mbps and 100Mbps Ethernet access. When inserting the RJ-45 plug, make

sure that the sheet on the plug snaps into place to ensure good contact.

**Warning: Do not plug the telephone socket connector into any RJ-45 port, otherwise the device itself may be damaged. Use only twisted-pair wires with RJ-45 connectors that comply with FCC standards.**

Precautions:

- 1) When connecting other compatible EDFA series or network hubs, use straight or crossover cables to connect MDI ports on other devices.
- 2) Make sure that the twisted-pair cable does not exceed 100 meters.
- 3) Category 5 cables are recommended for all network connections to avoid future confusion or inconvenience when upgrading to Fast Ethernet devices.
- 4) Cascade length regulations: The IEEE 802.3 standard specifies a maximum of four cascaded hubs (such as repeaters) through twisted pairs, while the IEEE 802.3u standard has stricter regulations on fast Ethernet. Therefore, when cascading devices other than this EDFA series, please follow the above cascading regulations. However, please note that because the EDFA series decomposes the paths of the connected devices into independent conflict domains, please do not count this EDFA series or connected cables into the cascade length related to other devices.
- 5) Find the IP address.



### 7.1.3 Port management

Remote management can be performed through a dedicated LAN port (10 / 100BASE-TX port) on the front panel .

Before accessing the management module through the LAN port, configure its IP address and subnet mask through the menu or tool software according to the network configuration requirements.

### 7.1.4 Web management





The device has a built-in Web page management. You can view and set parameters remotely through a web browser. The default login user name is "admin" and the password is "123456".

## 7.2 POWER SUPPLY PORTS

### 7.2.1 Port description

The power module provides stable working power for the system. The input voltage is 220VAC. Output voltage is + 12VDC to meet power requirements of all components in the system.

## 8.0 FAULT REPAIR

EDFA series FTTP EDFA software monitors system operation, provides short notes on warnings, and corrects most equipment state deviations, such as: system parameter drift, equipment errors, laser aging, RF level changes, temperature changes. The PUMP laser will continue to work when the warning is issued; the warning can be eliminated by continuous self-test of the equipment or the related system parameters return to the normal range. Some serious alarms can be eliminated by turning the equipment off and on again. If the relevant parameters return to the normal range, the alarm will disappear automatically.

When the error correction capability approaches or exceeds the range allowed by the error correction capability, most of the warnings are triggered. In most cases, these states cannot be corrected by the user. Condition corrections require specialized equipment and available facilities. These corrections can only be made in the factory.

## **8.1 Warning status**

When the PUMP laser is in the alarm state, the status LED will turn red, and a brief description of the state will appear on the display. Warning generally does not stop the equipment, but only indicates that the relevant parameters are slightly out of range. If the warning status stops, it means that the relevant parameters return to the allowed range, and the display and LED will return to their normal status without user intervention. It should be emphasized that the problems indicated by the warning should not be ignored, and there may be latent system failures.

## **8.2 Alarm status**

PUMP lasers generally stop working when alarmed. The alarm may be because a related parameter is outside its safe working range, or a situation has caused the laser to be damaged. Some alarms can usually be eliminated by turning off or on the power switch or key switch several times. For alarms that cannot be eliminated by the user, please contact the company immediately.

## **8.3 Fault prevention**

User can notice below information to prevent some potential problems:

1. Please place the pump laser under environment temperature  $-5^{\circ}\text{C} \sim 65^{\circ}\text{C}$ ,  $0^{\circ}\text{C} \sim 50^{\circ}\text{C}$  will be better for the long term using, other conditions accords with requested running range. We suggest placing the EDFA in low dust environment.
2. Ensure the rear panel fan & front panel sockets in ventilation; let the rear panel fans running.
3. Check the power supply to see whether it works in stipulated standard scope. And check all the joints are correct.
4. Check the changing of RF gain, and control it in the permitted range.
5. Keep the optic fiber connector clean & joint properly. Prevent output optic power decreasing result from optic leakage.