Ver. 2.1en

1550nm CATV Erbium Doped Fiber Amplifier • HA5800B Series

USER MANUAL

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1.0 PRODUCT SUMMARIZE

HA5800B (2RU) series is a low noise, high performance, FTTP high power, multi-ports optical amplifier with gain spectrum band within 1540~1563nm. Each output port for optical amplifier has built-in well-performed CWDM. Every external up-link optical port of optical amplifier can connect with OLT PON port very conveniently. Each 1550nm (CATV)'s output optical port multiplex 1310/1490n's data stream, in order to reduce the quantity of the component and improve the index and reliability of the system.

HA5800B optical amplifier can be compatible with any FTTx PON Technology. It offers a flexible and low-cost solution for three-network integration and Fiber to the Home.

HA5800B has extremely low noise figure, the entire unit adopts twin-stage amplification, and the pre-amplifier adopts low noise EDFA, output cascade adopts high power EYDFA. When input optical power Pin=0dBm, the noise figure of unit is: Typ ≤4.5dB, Max ≤5.5dB Unlike other kind of product which need high optical power input to maintain lower noise figure.

HA5800B optical amplifier adopts the world's top class pump laser and active optical fiber. Perfect APC, ACC and ATC control, excellent design in the ventilation and heat-dissipation ensure the long life and high reliable work of pump laser. RS232 and RJ45 offer serial commutation and SNMP network management port.

HA5800B LCD at the front panel offers the work index of all equipment and warning alarms. The laser will switch off automatically if optical power is missing, which offers security protection for the laser. All the optical port of optical amplifier can be installed in the front panel or back panel.

HA5800B optional two-way optical input (built-in 2x1 optical switch), can be used for self-healing ring network or redundant backup network.

HA5800B with carrier-class reliability and network security management, high quality, high reliability and excellent cost performance and is ideal for system integrators and system operator.

HA5800B optical amplifier: 19” 2RU chassis, total output power up to 41dBm (13000mW), use LC/APC, offers 64 optical outputs at most, 64pcs uplink optical ports.

2.0 INSTALLATION

2.1 Unpacking

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.

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.

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. 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	110VAC, 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.

2.3 Optic connection

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

Cleaning Guidelines:

Fiber Patch cord connectors

- 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 HA5800B, the other from the output of the HA5800B to an optical power meter.

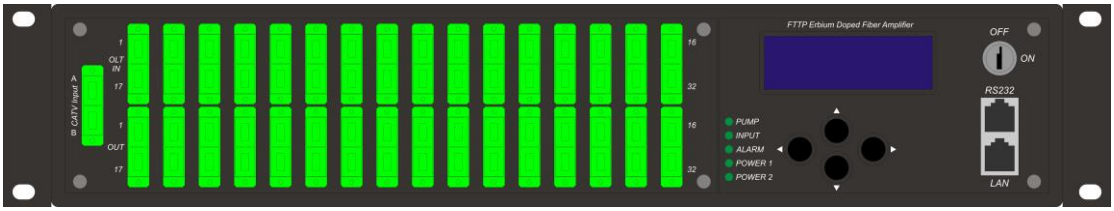
4. First turn the transmitter laser key switch to the ON position, then turn on the HA5800B.

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.

3.0 EDFA CONTROLS, INDICATORS, AND ALARMS

This section of the manual will give an overview of the available menus in the HA5800B series EDFA and their descriptions. All instructions in Section 3.0 refer to the representation of the front panel shown in the diagram below. The user scrolls through the menus by pushing the bottoms found on the front panel of the EDFA, just in the down of the LCD screen.



3.1 The operation of the panel

3.1.1 Open menu

A. Plug in power supply

B. Turn on power switch in the back panel

Front panel display "KEY OFF"

C. Open the key switch

Front panel display "KEY ON"

The status lamps in front panel:

PUMP	Status lamp	Red
INPUT	Status lamp	Red
Alarm	Status lamp	Red
POWER1	Status lamp	Green (It will be Green when power is ON, and no lights when power OFF)
POWER2	Status lamp	Green (It will be Green when power is ON, and no lights when power OFF)

Press any button enters into main menu.

3.1.2 Start-up main menu

Press ▼button will display below menu in sequence.

Menu #1 - Model
Read-only menu, tells the equipment model

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

Menu #3 - InputA
Read-only menu, tells the input optical power A of optical switch

Menu #4 - InputB
Read-only menu, tells the input optical power B of optical switch

Menu #5 - Input
Read-only menu, tells the input optical power of EDFA

Menu #6 - OP Switch Mode
Adjustable list, displays the switch mode of optical switch

Menu #7 - OP Route Status
Read-only menu, tells the status of route

Menu #8 - OP Switch Point
Adjustable list, displays the switch point of optical switch

Menu #9 - Set Output

Adjustable list, displays the output power setting.

Menu #10 - Total Output
Read-only menu, tells the total output optical power of EDFA

Menu #11 - Each Output
Read-only menu, tells the each output optical power of EDFA

Menu #12 - PA Current
Read-only menu, tells the PA current of EDFA

Menu #13 - PA Temp
Read-only menu, tells the PA temperature of EDFA

Menu #14 - BA Current
Read-only menu, tells the multimode amplify current of EDFA

Menu #15 - Unit Temp
Read-only menu, tells the unit temperature

Menu #16 - IP
Adjustable list, displays the IP address setting menu

Menu #17 - SUB

Adjustable list, displays the subnet setting menu

Menu #18 - GW

Adjustable list, displays the gateway address setting menu

Menu #19 - TR1

Adjustable list, displays the trap address setting menu 1

Menu #20 - TR2

Adjustable list, displays the trap address setting menu 2

Menu #21 - LCD Contrast Level

Adjustable list, display the LCD contrast level adjustment

3.1.3 Assistant manual

1. Switch Mode (Set the mode of optical switch)

   Choose the menu which need to modify, press▶button into modify status, press ▲/▼button to choose the working mode of optical switch. At last press▶button to save, and press◀button can back to main menu to cancel the operation.

2.Switch Point (Set the switch point of optical switch)

   Choose the menu which need to modify, press▶button into modify status, press▲/▼button to increase or decrease the value. At last press▶button to save, and press◀button can back to main menu to cancel the operation.

3.Set Output (Set the output optical power)

Choose the menu which need to modify, press▶button into modify status, press▲/▼button to increase or decrease the value. At last press▶button to save, and press◀button can back to main menu to cancel the operation.

4.IP address setting

   Choose the menu which need to modify, press▶button into modify status, press ▲ / ▼ button to increase the value and press ◀\▶button to shift the value. At last press▶button to save, and press◀button can back to main menu to cancel the operation and save.

5.LCD Contrast Level (Set the LCD contrast level)

   Select the menu that need modification, press ▶button enter into sub menu, then press ▶button enter into menu modify status, press▲/▼button to set LCD contrast level, press ▶button to save, and press◀button back to main menu.

4.0 PORT AND CABLE ASSIGNMENTS

HA5800B series provide the following manage port:

RS232 port: be suitable for examining HA5800B parameters and some system configuration by PC machine RS232 port.

SNMP: Simple network management protocol

Before connection HA5800B series of the port, please read the following instructions and port connectivity requirements.

4.1 LAN Port (RJ-45)

4.1.1 Port Description

The HA5800B series management port connector type is RJ-45.

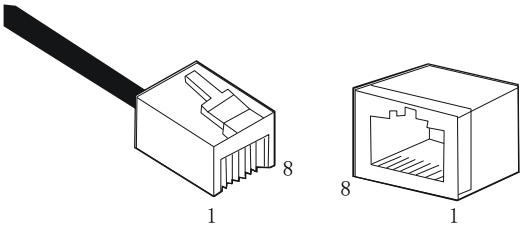


Figure 4.1.1 RJ–45 Connector Plug and Socket

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 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.

4.1.2 Pin assignment

When network management reticle (RJ-45 connector in each side) connects NMS PC and HA5800B series directly, it should use straight reticle. See Figure 4.1.2.

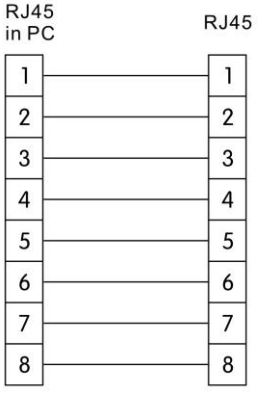


Figure 4.1.2 RJ-45 connector straight through connecting

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		
(HA5800B)	(Adapter)		(HA5800B)	(HUB/ HA5800B)	
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

HA5800B series can auto detects 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 HA5800B 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 5 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 HA5800B series. All the HA5800B 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 conform to FCC standards.

Note:

1) Connect other compatible HA5800B 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 HA5800B series, please following the above connection regulation. But please pay attention because HA5800B series divide the connected path into unattached port, don't reckon in the HA5800B series or connected cable related device in cascade length.

4.1.4 Connection Management (Out-Band)

Remote management can be performed through the dedicated LAN port (10/100BASE-TX port) on the front of the HA5800B or any 10/100BASE port of HA5800B.

Before the Management port be 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)

4.2.1 Port Description

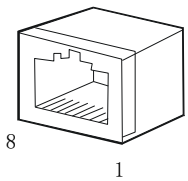


Figure 4-2.1 DB9 interface

DB9 interface is a standard connectors used in RS232 in series communication connects. OLT adopt 9 pin standard connector which is the same as the connector of PC Com interface.

4.2.2 Pin assignment

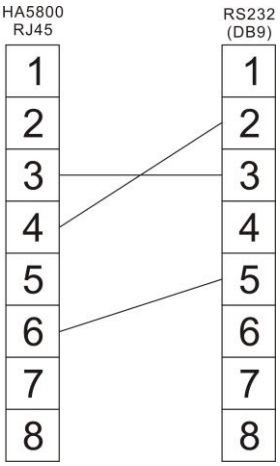


Figure 4-2.2 DB9/RS232 pin assignment

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

Table 4-3 Pin information

4.2.3 Port connection

HA5800B series is equipped with a cable to connect HA5800B series serial port. This cable has a DB9 connector in HA5800B series and PC side. Consult figure 4.2.1.

According to the following steps to connect cables:

1) Through RS232 (DB9) cable, connect a super terminal program PC to RS232 port in HA5800B series back panel. For example, connect one COM port in PC (com 1~4) and one RS232 port of HA5800B series.

2) Setup terminal analogue type VT100, distribute a COM (com 1~4) to connect with HA5800B series RS232, then setup communication mode as follows:

1. Data bit: 8
2. Stop bit: 1
3. Parity check: No
4. Baud: 9600 bps (applies to initial configuration)
5. Flow control: No

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 DISPOSAL

HA5800B series FTTP EDFA can monitor system operation and offer brief note of warning, and can correct the majority status deflection of the equipment, such as: system parameter floating, equipment tolerance, laser aging, RF level changing, and temperature changing. The PUMP laser will go on working when alarming. The alarm will disappear through the facility is self-detected continually or relative system parameter recovers into normal range. Some serious warning can be eliminated by restart the power supply of the equipment. The warning will disappear automatically if some relative parameters recover to normal range.

The majority 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 only could 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 stop the EDFA running, 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 it is possible there are 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 input 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 is stopped working generally. The alarm is because of some relative parameter exceeding its safety working scope or some situation causes damage to the laser. Some alarm could be eliminated by restart the power supply or reset the key switch. For user couldn't eliminate some alarm, please contact our company immediately.

5.3 Fault prevention

User can notice below information to prevent some potential problems.

1. Please place the pump laser under environment temperature 0°C ~50°C, 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.

6.0 GUARANTEE AND REPAIR ITEMS

1. Each unit is packaged with <Products Qualification>, with the series number, one-year's guarantee can be provided.
2. Micro-processor software, with the function of monitoring laser status, digital display, trouble alarm, network management etc. pump laser will not be damaged only by man-induced factor. In case of Red lamp sparking (Alarm). Please return for repairing. User should not open the top cover for repair, otherwise, even within guarantee period, maintain and material fee will be charged.
3. Lifelong maintain and upgrade is provided even guarantee period is expired.
4. If component is damaged by man-induced factor, material fee will be charged.