

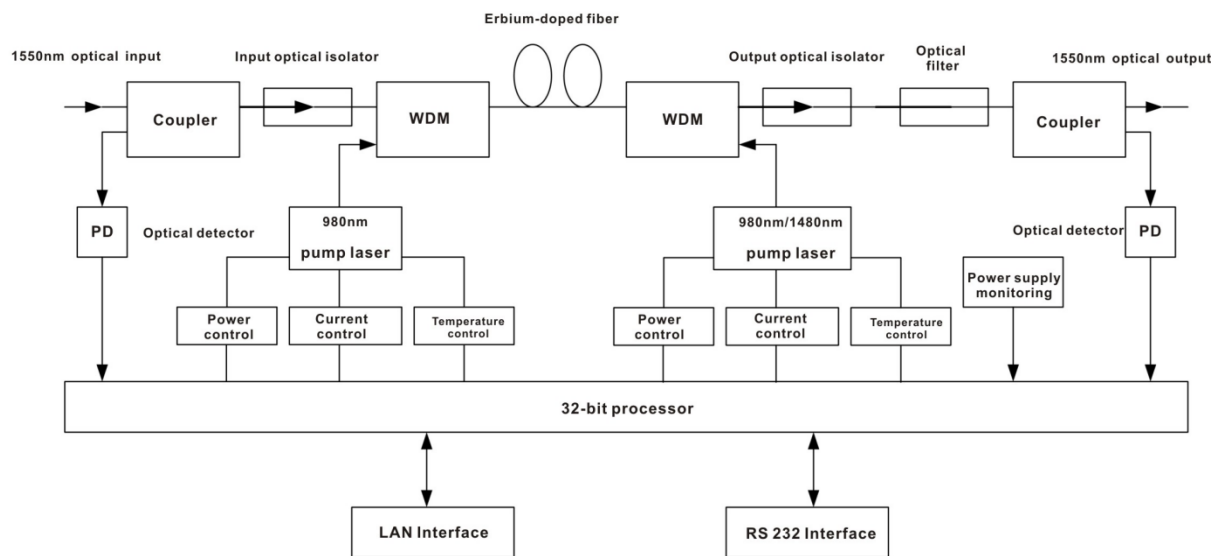
OP-EDFA-04/15-WDM Erbium Doped Fiber Amplifier (EDFA) + CWDM



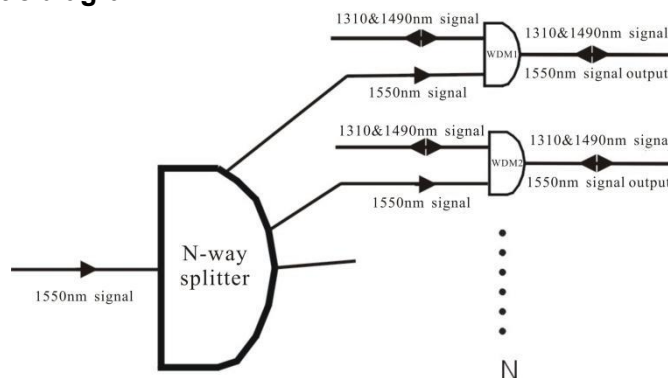
1 Product Overview

1550nm 4 output optical fiber amplifier with CWDM is the important optical relay transmission equipment in 1550nm optical fiber communication system. It mainly used for the long-distance optical fiber transmission of TV image signal, digital television signal, telephone voice signal and data (or compressed data) signal. This product uses the high-performance erbium doped fiber and low noise pump laser with dual power supply and built-in embedded automatic monitoring system to ensure the excellent performance indicators.

2 Block Diagram



Built-in WDM schematic diagram

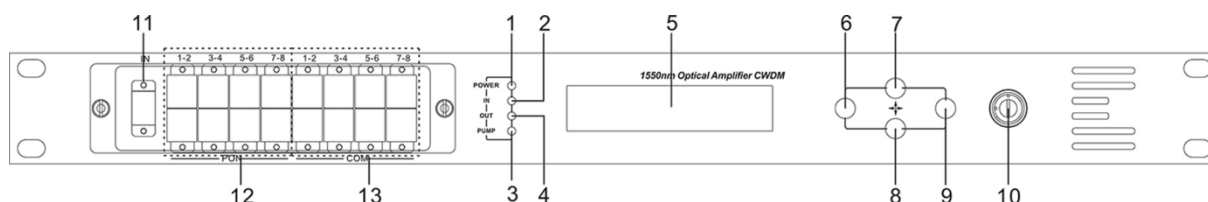


3 Technique Parameter


Item	Unit	Technique parameter	Remark
CATV pass through wavelength	nm	1545 - 1565	
PON pass through wavelength	nm	1260 – 1360 & 1480 - 1500	
PON insertion loss	dB	<0.8	
Isolation	dB	>30	
Input optical power range	dBm	-5 - +10	
Port number & each output power		4*15	Per OUT Port
Total output optical power	dBm	22.5	Total Power
Output power stability	dBm	±0.5	
Noise figure	dB	≤ 5.0	Input optical power 0dBm
Return loss	Input	dB	≥ 45
	Output	dB	≥ 45
Pump leakage power	Input	dBm	≤ -30
	Output	dBm	≤ -30
Optical connector type		INPUT Port: SC/APC, PON Port: SC/UPC COM Port: SC/APC	
Power supply voltage	V	AC100 - 250V (50-60 Hz) DC48V	DUAL PSU
Consumption	W	< 30	
Operating Temperature Range	°C	-5 - +55	
Maximum operating relative humidity	%	Max 95% No Condensation	
Storage Temperature Range	°C	-30 - +70	
Maximum storage relative humidity	%	Max 95% No Condensation	
Dimension	mm	483(W)×340(D)× 44(H)	

4 External Function Description

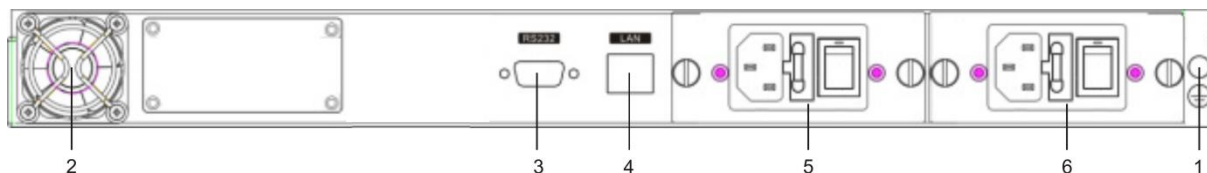
4.1 Front Panel Description



- | |
|--|
| 1. Power indicator: One switching power supply is working – yellow; two switching power supplies are working – green. |
| 2. Optical input power indicator: This light turns on when the optical input power is > -10dBm. |
| 3. Pump working status indicator: Red light means the pump is not working; Flashing red light means the machine has broken down; Green light means the pump is working normal. |
| 4. Optical output power indicator: This light turns on when the optical output power is > +10dBm. |
| 5. 160×32 dot-matrix LCD screen |

6. Display the exit or cancel key of the setup menu.
7. Display the up or increase key of the setup menu.
8. Display the down or decrease key of the setup menu.
9. Display the enter key of the setup menu.
10. Pump laser switching key: "ON" means the pump laser is open and "OFF" means the pump laser is closed. Ensure the key is on "OFF" position before power on. After passing self-test, rotate the key to "ON" position according to the displayed message.
11. Optical signal input.
12. PON ports
13. COM ports: The default connector type is SC/APC.  There is invisible laser beam from this port after normal operating. So, the port should not be aligned to the human body or the naked eyes to avoid accidental injury.

4.2 Rear Panel Description



1. Ground stud of the chassis	2. Fan outlet	3. RS232 interface
4. RJ45 interface	5. Power supply 1	6. Power supply 2

5 Menu System

5.1 Main Menu

Name	Display	Description
System Starting	xxxxxxx	Display vendor logo.
	xxxxxxx	Display model number.
	xxxxxxx	Start countdown / lock status.
Suspend Page	In: xx.x out: xx.x Unit: dBm	Display the input / output optical power
Main Page	1.Disp Parameters	Entry of parameter display menu
	2.Set Parameters	Entry of parameter setting menu
	3.Alarm Status	Entry of alarm information menu

5.2 Display Menu

Input Power: xx.x dBm	Input power, accurate to 0.1 dBm
Output Power: xx.x dBm	Output power, accurate to 0.1 dBm
Output ATT: x.x dBm	Output power ATT, accurate to 0.1 dBm
Pump1 Bias: x mA	Bias current of pump1, accurate to 1mA
Pump1 Temper: xx.x °C	Temperature of pump1, accurate to 0.1°C
Pump1 Tec: x.xx A	Cooling current of pump1, accurate to 0.01 A

Pump2 Bias: x mA	Bias current of pump2, accurate to 1m A
Pump2 Temper: xx.x °C	Temperature of pump2, accurate to 0.1°C
Pump2 Tec: x.xx A	Cooling current of pump2, accurate to 0.01 A
+5V Read: x.x V	+5V power supply voltage, accurate to 0.1 V
-5V Read: -x.x V	-5V power supply voltage, accurate to 0.1 V
System Temper: xx.x °C	Chassis temperature, accurate to 0.1°C
Serial NO.: xxxxxxxx	Device serial number
IP Addr: xxx.xxx.xxx.xxx	IP address
Mask: xxx.xxx.xxx.xxx	Subnet mask
Gateway: xxx.xxx.xxx.xxx	Gateway
Mac: xxxxxxxxxxxx	Physical address
Trap Addr1: xxx.xxx.xxx.xxx	trap1 address
Trap Addr2: xxx.xxx.xxx.xxx	trap2 address
Firmware Ver: Vx.xx	Firmware Version number

5.3 Setup Menu

Set Low Input Threshold	Set the input optical power low alarm threshold, range -10.0~9.9dBm
Set High Input Threshold	Set the input optical power high alarm threshold , range -10.0~10.0dBm
Set APC MODE	Set the constant optical power output function, on or off
Set Output ATT	Set the output optical power attenuation,range -4.0~0.5dBm
IP Addr	Set IP address
Mask	Set subnet mask
Gateway	Set gateway
Trap Addr1	Set trap1
Trap Addr2	Set trap2
Buzzer Switch	Set the switch of beeper
Restore Factory config	Restore the factory configuration, set content as shown above

5.4 Warning Menu

Input Status: xxx	xxx= LOLOW: Very low input optical power alarm
	xxx= LOW: Low input optical power alarm
	xxx= HIGH: High input optical power alarm
	Xxx= HIHIGH: Very high input optical power alarm
Output Status: xxx	xxx= LOLOW: Very low output optical power alarm
	xxx= LOW: Low output optical power alarm
	xxx= HIGH: High output optical power alarm

	Xxx= HIHIGH: Very High output optical power alarm
Pump1 Bias: xxx	xxx= LOLOW: Very low bias current of pump1 alarm
	xxx= LOW: Low bias current of pump1 alarm
	xxx= HIGH: High bias current of pump1 alarm
	Xxx= HIHIGH: Very high bias current of pump1 alarm
Pump1 Temper: xxx	xxx= LOLOW: Very low temperature of pump1 alarm
	xxx= LOW: Low temperature of pump1 alarm
	xxx= HIGH: High temperature of pump1 alarm
	Xxx= HIHIGH: Very high temperature of pump1 alarm
Pump1 Tec: xxx	xxx= LOLOW: Very low cooling current of pump1 alarm
	xxx= LOW: Low cooling current of pump1 alarm
	xxx= HIGH: High cooling current of pump1 alarm
	Xxx= HIHIGH: Very high cooling current of pump1 alarm
Pump2 Bias: xxx	xxx= LOLOW: Very low bias current of pump2 alarm
	xxx= LOW: Low bias current of pump2 alarm
	xxx= HIGH: High bias current of pump2 alarm
	Xxx= HIHIGH: Very high bias current of pump2 alarm
Pump2 Temper: xxx	xxx= LOLOW: Very low temperature of pump2 alarm
	xxx= LOW: Low temperature of pump2 alarm
	xxx= HIGH: High temperature of pump2 alarm
	Xxx= HIHIGH: Very high temperature of pump2 alarm

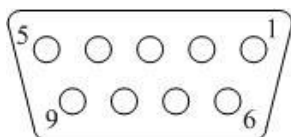
Pump2 Tec: xxx	xxx= LOLOW: Very low cooling current of pump2 alarm
	xxx= LOW: Low cooling current of pump2 alarm
	xxx= HIGH: High cooling current of pump2 alarm
	Xxx= HIHIGH: Very high cooling current of pump2 alarm
+5V Status: xxx	xxx= LOLOW: Very low +5V DC power supply alarm
	xxx= LOW: Low +5V DC power supply alarm
	xxx= HIGH: High +5V DC power supply alarm
	Xxx= HIHIGH: Very high +5V DC power supply alarm
-5V Status: xxx	xxx= LOLOW: Very low -5V DC power supply alarm
	xxx= LOW: Low -5V DC power supply alarm
	xxx= HIGH: High -5V DC power supply alarm
	Xxx= HIHIGH: Very high -5V DC power supply alarm
Device Temper: xxx	xxx= LOLOW: Very low chassis temperature alarm
	xxx= LOW: Low chassis temperature alarm
	xxx= HIGH: High chassis temperature alarm
	xxx= HIHIGH: Very high chassis temperature alarm

6.Communication Setup Descriptions

6.1 Communication Interface Description

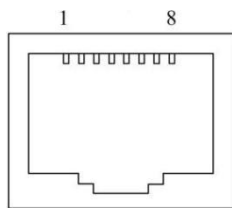
- 1) RS232 communication interface adopts DB9 standard connector, the pin definitions as follow:

The serial communication uses the standard NRZ form, 1 starts bit, 8 data bits, 1 stop bit and the baud rate is 38400.



1: No Connect	2: TX	3: RX
4: No Connect	5: GND	6: No Connect
7: No Connect	8: No Connect	9: No Connect

2) LAN communication interface adopts RJ45 standard connector, the pin definitions as follow:



LAN

1: TX+	2: TX-	3: RX+
4: No Connect	5: No Connect	6: RX-
7: No Connect	8: No Connect	

6.2 Set Up the Super Terminal

If you have not setup the Hyper Terminal in your Windows system, follow these steps:

Click “start menu →program→ accessory→communication→ Hyper Terminal”:

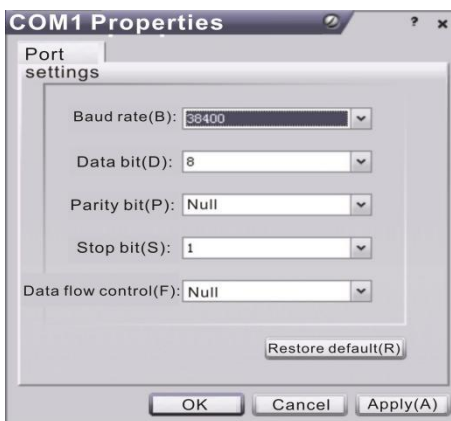
This results in the following screen:



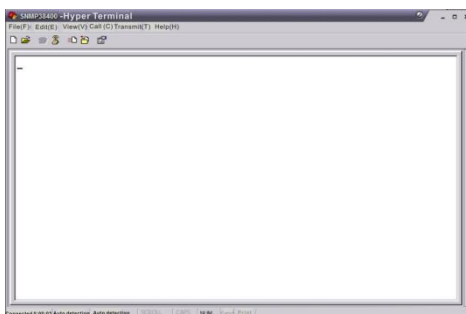
Then input your connection name, such as “SNMP38400”, and choose the serial port to connect with your equipment. As follows:



Press the “OK” button shows the configuration page of serial port. As follows:



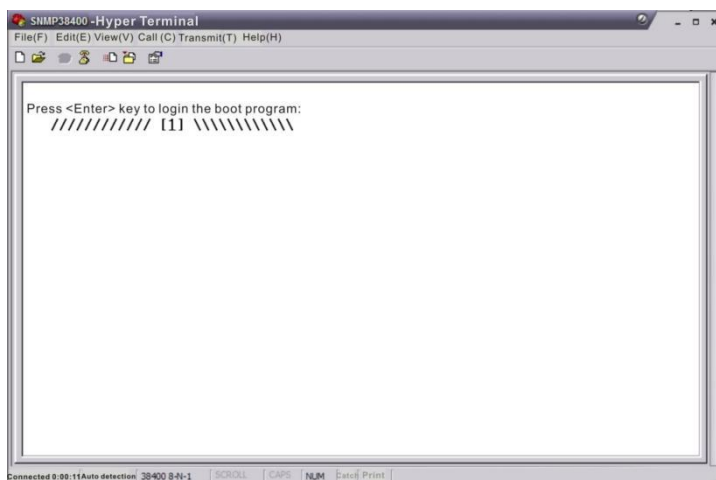
Change the serial port configuration to 38400-baud rate, 8 data bits, no parity bit, 1 stop bit, no data flow control, press the “OK” button, you have set up the Windows serial port Hyper Terminal.



You can click “file→save” menu to save this configuration of Hyper Terminal for later using.

6.3 Operating Parameters Configuration

Under the condition of EDFA power off, please use the Serial Port Lines to connect the RS232 port of EDFA with the computer port. Open the Windows Hyper Terminal which you have set up. Then turn on the EDFA's power, you will see the page as follows, at this time, you can press the “OK” button into the boot program and do some advanced configuration. Boot program is like the BIOS setting program of PC. Generally speaking, users do not have to enter the boot program to configure the parameter, so we set the password to avoid damaging the properly configuration.



Skip the boot program and the application program begins as follows:


```

SNMP38400 -Hyper Terminal
File(F) Edit(E) View(V) Call (C) Transmit(T) Help(H)
init treenode pool.
init varbind pool.
init trap module.
register mib tree.
snmp init ok.
eth drv init
eth drv ok.
if init
if init ok.
lwIP thread prio = 12 created.
lwIP thread prio = 13 created.
ethernet initialize finished.
start gui initialize...
gui initialize finished.

-----
Application For EDFA SNMP Agent
-----

Version: 2.00
Build time: Nov 04 2006 09:35:01

EDFA:\>
    
```

You can input your command in this page, and then configure the operating parameter of the application program.

System supports the following commands:

help	List internal commands of the system;
ethcfg	Configure the Ethernet operating parameters;
community	Configure the SNMP group name;

Specific using as follows:

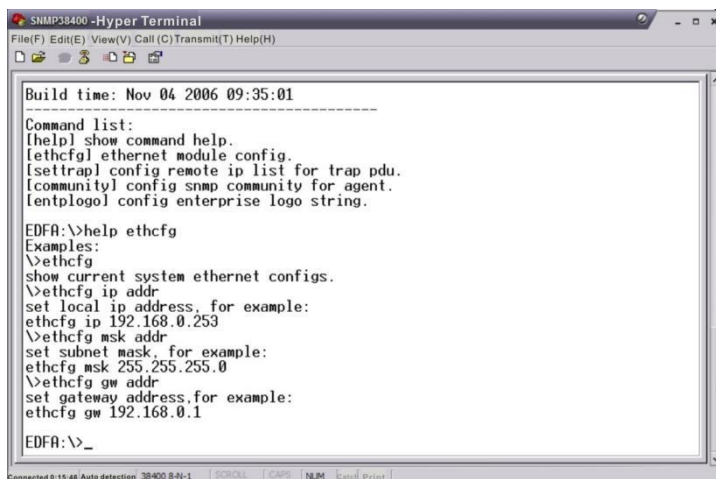
help

This command shows current application program version, program name and the internal commands list of the system as follows:

```

SNMP38400 -Hyper Terminal
File(F) Edit(E) View(V) Call (C) Transmit(T) Help(H)
-----
Application For EDFA SNMP Agent
-----
Version: 2.00
Build time: Nov 04 2006 09:35:01
-----
EDFA:\>help
-----
Application For EDFA SNMP Agent
-----
Version: 2.00
Build time: Nov 04 2006 09:35:01
-----
Command list:
[help] show command help.
[ethcfg] ethernet module config.
[community] config snmp community for agent.
[entplog] config enterprise logo string.
EDFA:\>_
    
```

You can also use the “help” command to show help information of other commands, such as “help ethcfg”, ethcfg’s help information appears as follows:



ethcfg

This command configures the Ethernet parameters, including IP address, subnet mask and gateway. You can refer to the help information for its usings.

community

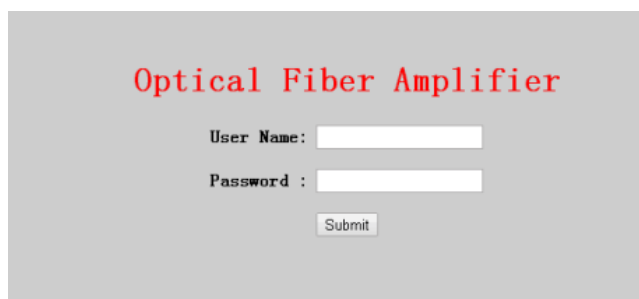
This command configures the read-only group name and read-write group name. "Group name" is the concept of SNMP agreement like the password. Use the command "community ro" to configure the read-only, and "community rw" for the read-write. For example, input "community rw public", "public" is the read-write group name. The group name for read-only and read-write are both "public" as the equipment default setting from factory.

The commands of EDFA are shown as follows:

Command	Descriptions	Default
ethcfg ip xx.xx.xx.xx	Set ip address	
ethcfg msk xx.xx.xx.xx	Set submask	
ethcfg gwt xx.xx.xx.xx	Set gateway	
community ro xxxxx	Set read-only group name	public
community rw xxxxx	Set read-write group name	public
setpswd xxxxxxxx	Set login password	123456

6.4 WEB Network Management

1. Opening the IE browser and entering the equipment IP address leads to the following interface:



2. Enter the user name **admin** and password **123456** (factory default), to show the following interface:

Optical Fiber Amplifier

Display Parameter

- *Display Parameter*
- *Set Parameter*
- *Modify Password*

Item	Value
Device Model:	WE-HD-XX
Serial Number:	20111028
Pump Number:	2
Input Power:	-99.9 dBm
Output Power:	16.8 dBm
Output ATT:	0.0 dB
Pump1 Bias:	239 mA
Pump1 Temperature:	24.8 °C
Pump1 TEC:	-260 mA
Pump2 Bias:	664 mA
Pump2 Temperature:	24.8 °C
Pump2 TEC:	-280 mA
+5V:	4.9 V
-5V:	-5.1 V
Device Temperature:	31 °C
MAC Address:	00.ac.b1.cd.ef.0e
Software Version:	5.9.15

There are 3 sub-interfaces:

- 1). **Display Parameter** interface: Describes the equipment display menu.
- 2). **Set Parameter** interface: Change the equipment parameters in this interface.
- 3). **Modify password** interface: Change the login password in this interface.

3. Click **Set Parameter** to open the following interface:

Optical Fiber Amplifier

Set Parameter

- *Display Parameter*
- *Set Parameter*
- *Modify Password*

Module Parameter

Item	Current	New	Update
Output ATT	0.0dB	4.0 • dB	<input type="button" value="Update"/>

Set IP Parameter

Item	Current	New	Update
Static IP Address	192.168.1.173	<input type="text"/>	<input type="button" value="Update"/>
Subnet Mask	255.255.255.0	<input type="text"/>	<input type="button" value="Update"/>
Default Gateway	192.168.14.1	<input type="text"/>	<input type="button" value="Update"/>
Trap Address1	192.168.14.2	<input type="text"/>	<input type="button" value="Update"/>
Trap Address2	192.168.14.3	<input type="text"/>	<input type="button" value="Update"/>

The **Item** shows the changeable parameters, **Current**—the current parameters; **New**—select or enter the new parameters; **Update**—update the parameters.

The update steps: Find the item which needs to be changed, select a new value, and click the **Update** button.

4. Click **Modify Password** to open the following interface:

Optical Fiber Amplifier

Modify Login Password

- *Disp Parameter*
- *Set Parameter*
- *Modify Password*

Current User Name	<input type="text"/>
Current Password	<input type="password"/>
New User Name	<input type="text"/>
New Password	<input type="password"/>
Confirm Password	<input type="password"/>
<input type="button" value="Modify"/>	

7 SNMP MIB

NSCRTV standard and relevant MIBs

Description	Specifications	Conditions / Comments
NSCRTV hfcemsCommonMIB	support	
NSCRTV hfcemsPROPERTYMIB	support	
NSCRTV hfcemsOPTICAAMPLIFIERMIB	support	
NSCRTV hfcemsALARMSMIB	support	

r-read-only; w-write; a-alarm

Description	Comments	MIB Variable	Alarm Severity	Alarm Description
Model number	r	entPhysicalModelName		
Serial number	r	entPhysicalSerialNum		
Firmware version	r	entPhysicalFirmwareRev		
Input power	r, a	heOpAmpInputPower	Major	Input Power Alarm
Input power alarm threshold	r, s (-10 to +10dBm)	analogAlarmLO. heOpAmpInputPower		
Output power	r, a	heOpAmpOutputPower	Major	Output Power Alarm
System temperature	r, a	heCommonTemperature	Major	System Temperature Alarm
Pump laser current	r, a	heOpAmpLaserBiasCurrent	Major	Pump Laser Current Alarm
Pump laser power	r, a	heOpAmpLaserOutputPower	Major	Pump Laser Output Alarm
Pump laser temperature	r, a	heOpAmpLaserTemp	Major	Pump Laser Temperature Alarm

Description	Comments	MIB Variable	Alarm Severity	Alarm Description
Power supply voltage	r, a	hePsOutputVoltage	Major	Power Supply Alarm
System Name	r, w	sysName		
System Location	r, w	sysLocation		
System Contact	r, w	sysContact		
Pump laser switch off	r, a	hlEdfaExtPUnitLaserSwitch	Major	Pump Laser Switch Off Alarm

8 Attention

- Ensure the package is not defaced. If the equipment is damaged due to transportation or other reasons, please don't electrify to avoid worse damage.
- Before powering on, make sure that the grounding terminals of the chassis and power socket are reliably grounded, and the grounding resistance should be $<4\Omega$, which can effectively protect against surges and static electricity.
- Optical amplifier is a highly technical professional equipment, its installation and debugging must be operated by professional technicians. Read this manual carefully before operating to avoid damage to equipment caused by fault operation or accident harm to the operator.
- When installing and debugging optical equipment, invisible laser beams may be emitted inside the fiber connector. Avoiding permanent harm to the body and eye, the fiber connector should not aim at the human body and human should not look directly at the fiber connector with the naked eye!
- There must be no shielding outside the ventilation holes of the device. Poor ventilation will cause the index to decrease, and in serious cases will cause damage to the device.
- When cleaning the fiber end face, you must confirm that the optical source is turned off.
- When the fiber connector is not in use, put a dust cover to avoid dust pollution and keep the end surface of the optical fiber clean.
- When installing the fiber connector, apply appropriate force to avoid damage to the adapter. Otherwise, the output optical power may decrease.