B-OptiX

Optical Amplifier Product User’s Manual

BO-EDFA-DB Series

STATEMENT

Please read the manual first before using the equipment for the safety of the equipment and operator. The manufactory does NOT take on any responsibility for any equipment damage, personal hurt and property loss for improper operation.

All the parameters, operations, states and descriptions on the manual have been tested and verified seriously and strictly，and believed to be accurate, but the accuracy cannot be guaranteed. The manufactory reserves the right to make any changes without notice. Please contact the manufactory for more information.

CONTENTS

Safety

The following safety precautions must be observed during all stages of operation, service, and repair of this instrument. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument. Manufactory has no liability to customer's loss for disobey the following item.

Laser and EDFA output is the high-power invisible laser radiation, complies with CLASS 1M of IEC Standards. The laser radiation can seriously damage your eyes or skin when in any case looking into the interface of the output port or optical fiber as it is on. Do NOT enable the laser when there is no fiber attached to the optical output connector.

Please avoid vibration and collision violently for that there are precise optics devices in the equipment. Please operate carefully for the fiber tail easy to be snapped off.

Please handle carefully, ensure ground well. And power cable in normal state for that there are static sensitive devices in the equipment.

Please contact us or our distributor if any problem or question existed. The equipment may be permanently damaged when dismantling module without written permission.

If a problem occurs, please contact us with product serial number, and describe the nature of the problem.
Please **DO NOT** open module without authorization.

1 Description

The product is a high output power C-Band Er-doped optical fiber amplifier. The key components are high reliable PUMP laser and the optical fiber. The particular ATC (Automatic Temperature Control) and APC (Automatic Gain Control) circuit ensure the output power high stability and reliability; the unique optical design ensures the excellent optical indicators. The high stability and high precision MPU system make the control, adjustment and display intelligent and user-friendly.

Adopt the original intellectualized temperature control system:

(1)Adopt special temperature control chip, radiation and power consumption can be reduced 30%, compared to common products;

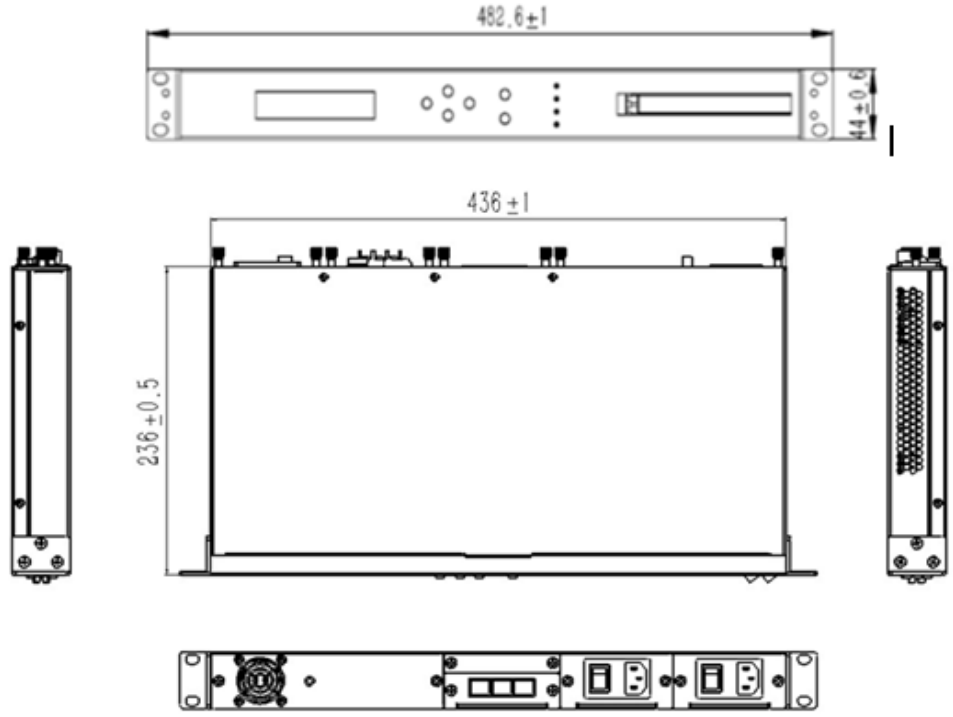
(2)The professional heat transfer wind channel technique can also ensure the best temperature stability, at the same time powerful fan will operate to make sure good thermal stability of the system and long life of the fan.

The intellectualized supervisory and management system contains unique network interfaces: Ethernet、RS-485 and RS-232，and the network management interfaces ensure the compatibility with other network management systems.

2 Mechanical Structure and Interfaces

2.1 **Product Diagram**

Figure 2-1Four Views of the Equipment in 19-Inch Dimension



2.2 **Front Panel of the Equipment**

Please find hereafter the demonstration and explanation of equipment front panel:

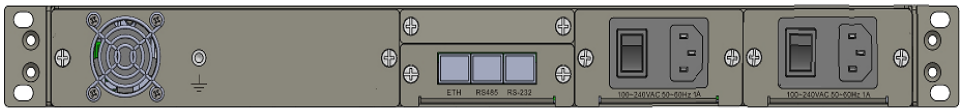
Figure 2-2Front Panel Demonstration

No.	Function	Specification	Remark
1	Output port	SC/APC	
3	Input port	SC/APC	
4	Indicators		
5	Press key		
6	OLED display		

2.3 **Rear Panel of the Equipment**

Please find hereafter the demonstration and explanation of equipment rear panel:

Figure 2-3Rear Panel Demonstration



No.	Function	Specification	Remark
1	Power1	100~240VAC	
2	Power2	100~240VAC	
3	NUM	RS232,RS485,ETH	
4	FAN		

3 Interface Definition

3.1 **RS232 Interface (DB-9 Male Connector)**

Pin	Description	Pin	Description
1	NA	6	NA
2	RS232 TXD	7	NA
3	RS232 RXD	8	NA
4	NA	9	NA
5	GND	--	--

3.2 **RS485 interface (RJ11 Connector)**

Pin	Description	Pin	Description
1	A: In-phase receptor input	3	B: Reverse phase input
2	Z: Reverse phase output	4	Y: In-phase output

3.3 **Definitions of Power Unit**

There are two power units designed for power redundancy in equipment (Power Unit 1 and Power Unit 2). These power units can be plugged when the power supply is off. There are two power supply type, -48VDC Power Supply and 100~240V AC Power Supply. The equipment power supply types refer to chapter 3.3 optical and electrical specifications.

Figure 3-4 -48VDC Power Supply PIN Definition

The definition is as following:

Left pin: -48V; Right pin: -48VRTN; Middle pin: GND

Figure 3-1100~240V AC Power Supply

The definition is as following:

Upper pin: N; under pin: L; Middle pin: GND

3.4 **LED Indicators Definition**

There are 4 LED indicators in the front panel for equipment. The definition of these indicators is as following:

Table 3-3 LED Indicators Definition

NO.	Functional Description
Power	When Power is working, LED shows green; When Power is in alarm, LED shows red; When Power is switched OFF or no supply, LED is red.
Pump	When the Pump is normal, LED shows green; When the Pump is abnormal, LED shows red;
Alarm	When the module is normal, LED shows green; When the module is abnormal, LED shows red;
Optical	When IN or OUT is normal, LED shows green; When IN or OUT is out of threshold range or disconnected, LED shows red;

3.5 **Fan Performance**

The FAN unit supports hot-plugging feature, and it works even if the temperature of pump module is higher than specific threshold. The FAN is related to the module

temperature as followed:

1. When pump module temperature is lower than 35℃,FAN speed is 0;
2. When pump module temperature is higher than 35℃,The Fan start working;

Actually, the FAN module is consisted of redundant FAN component which can improve the reliability of FAN module.

4 Specification and Performance

4.1 Environmental Parameters

Table 3-1 Absolute Maximum Ratings

Parameters	Specification	Units	Note
Operation Temperature	-5~+65	°C	
Operation Humidity	5~95	%	
Storage Temperature	-20~+80	°C	
Storage Humidity	5~95	%	

4.2 Mechanical Size and Power Dissipation

Table 3-2 Mechanical Size and Power Dissipation

Parameters	Specification	Units
Size	482.6X238X44	mm
Power Loss	30	W

4.3 Optical and Electrical Specification

Please find hereafter the optical and electrical specifications of equipment:

Table 4-3Technical Parameters of the Equipment

Item	Min.	Typ.	Max.	Unit
Wavelength	1529		1561	nm

Input Power	-3	0	+3	dBm
Output Power			20	dBm
Gain		20		dB
Flatness			1.5	dB
NF (In=0dBm)			5.5	dB
Pump Leakage @ Input/output port			-40	dBm
Isolation @ Input/output port	30			dB
RL(Optical Return Loss)			-45	dB
Woke Mode	AGC			
Power Supply	Double 100~240VAC			

4.4 **Optical Port Connector**

Please find hereafter all the connector type of all the optical interfaces in equipment:

Table 4-4Optical Port Connector

NO	Parameter	Specifications	Note
3.1	Input Connector	SC/APC	
3.2	Output Connectors	SC/APC	

5 Installation

5.1 **Unpacking**

Upon receiving the equipment, visual inspection is necessary to ensure that there is no damage occurs during shipment.

The equipment shipped together with following packing list content:

Table 5-1Packing List Content

No.	Device Name	Model Specifications	QTY
1	B-OPTIX	BO-EDFA-DB	1
2	User's Manual	/	1
3	Test Report	/	1
4	Certification	/	1
5	Warranty Card	/	1
6	Power Cable	100~240VAC	2
7	Fuse	3.15A	2

8	Hanger	/	2
9	Hanger Screw	M4*8	8
10	Screw Nut	M6*20	6
11	Grounding Line	1.5M	1

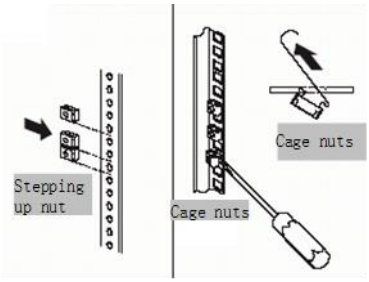
We recommend you to save all the shipping cartons and packaging material which are designed to protect the equipment during shipment. Also, these packing materials could be used for equipment transportation and storage.

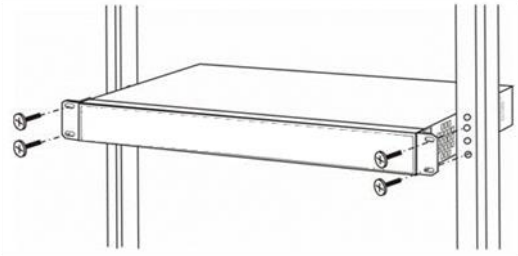
5.2 **Installation**

To install the equipment amplifier, please follow steps below:

1. Fix the equipment to the rack/cabinet using four screws:

Stick protective film technology in the equipment appearance, please thrown it off, or it will affect the cooling of equipment.





2. Connect the cable to the front and rear panel.

(1) Fix the ground cable to the grounding stud of the chassis

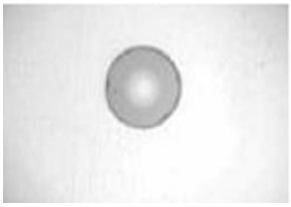
(2) Connect the power cable

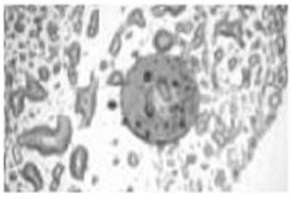
(3) Connect the network cable

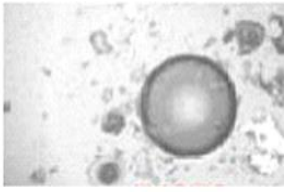
3. Carefully clean the ends of the optical fiber jumpers.

(1)Inspect with instrument

The Optical Microscope is widely used in fiber pigtail face-end inspection area. The following graphs indicate the different fiber pigtail face-end:







Clean Fingerprint Dust

(2) Cleaning is necessary to ensure the communication quality. Cleaning through professional tools could achieve better effect.

Two cleaning ways show as follow:

①Clean without professional tools

Material: Pure alcohol, cotton ball, dust-free cloth

Cleaning procedure:

Drop a little pure alcohol in cotton ball.

1) Wipe with the cotton ball in the same direction, the number of the cleaning is up to the situation of dirt.

2) Wipe the face-end through lens paper with 3 layers in the same direction till it is dry and it has very bright reflection.

3) Inspect the face-end carefully to avoid residual fiber. Repeat steps 1 to 3 till it clean.

② Clean with professional tools

The user can use the professional tools to clean the fiber pigtail face-end to ensure it is clean.

Attention:

Make sure no light in the fiber while inspecting the face-end.

Use the protective sleeve to cover the interface when the fiber pigtail is on.

After using the pure alcohol to clean, make sure to wipe the face-end clean to avoid dirt caused by the liquid volatilizing.

1) Connect fiber jumper to the amplifier; and check the loss of EDFA is lower than 1.5dB before power on.
2) Power on and check whether the output power display is 1.5dB lower than input power(by the power meter)
3) If the power is normal, turn on the PUMP. If the power is abnormal, check the fiber end face again or call support.

In normal case, all LED indicators in the front panel should be green in several

seconds after the power is turned on. If any alarm indicator is activated, please refer to the Maintenance and Troubleshooting instructions.

6 Operation

Once all the connections have been implemented to the amplifier (see Installation), the equipment can be operated following the instructions below:

1. Confirm that all fiber connections are correct;
2. Verify that the power cable is properly connected to the amplifier;
3. Turn on the power switch of the equipment amplifier on the behind panel.

At the time of turning on the power switch of the equipment, and after few seconds of self-testing, the equipment OLED display should indicate product information of the equipment. And all the LED indictors should be green in several seconds.

6.1 **Parameters on OLED Display**

The OLED display in the front panel of equipment could be used to display the information and situation of equipment, also guide the operation and configuration of equipment. All the parameters on OLED display are as followings:

1. Main Interface of the Equipment(by Page-Down button):

NO.	Interface name
1	Module TEMP
2	IN Power
3	OUT Power
4	EDFA Gain
5	Pump Statue
6	Working Mode
7	Power1
8	Power2
9	Alarm Switch
10	Alarm State
11	Basic State
12	Pump Information
13	Reset Select

2. Basic State contains the following interface:

NO.	Interface name
1	Serial NO
2	Firmware
3	Company Logo
4	Model Type
5	MAC Address
6	IP Address
7	Subnet Mask
8	Gateway

3. Alarm State contains the following interface:

NO.	Interface name
1	Power 1
2	Power 2
3	IN Power
4	OUT Power
5	P1 current
6	P1 power
7	P1 TEC
8	P1 temp
9	Module Temp

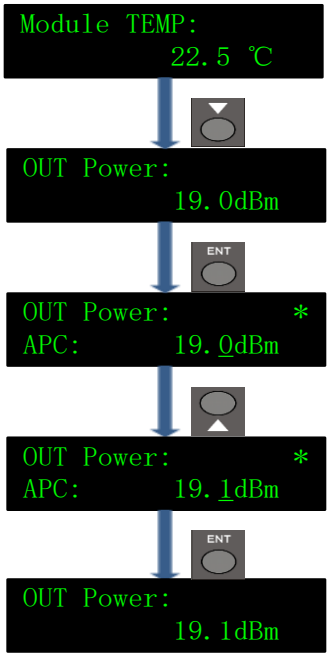
4. Pump Information contains the following interface:

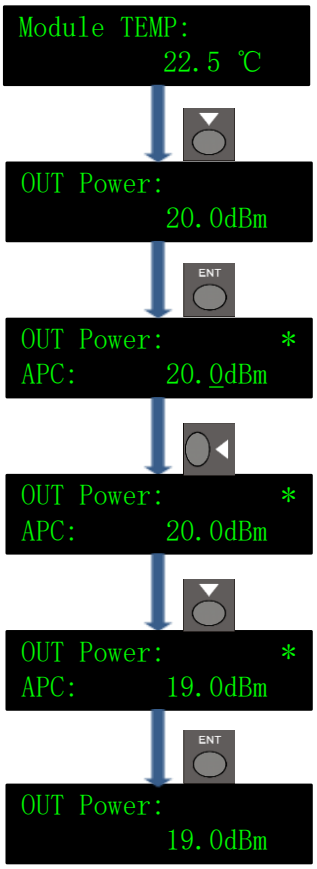
NO.	Interface name
1	Pump1 Current
2	Pump1 Power
3	Pump1 TEC
4	Pump1 Temp

6.2 **Configuration of Output Power**

As shown in figure, the output power configuration buttons:

1. Change the level of the output power2. Move the position of each digit:

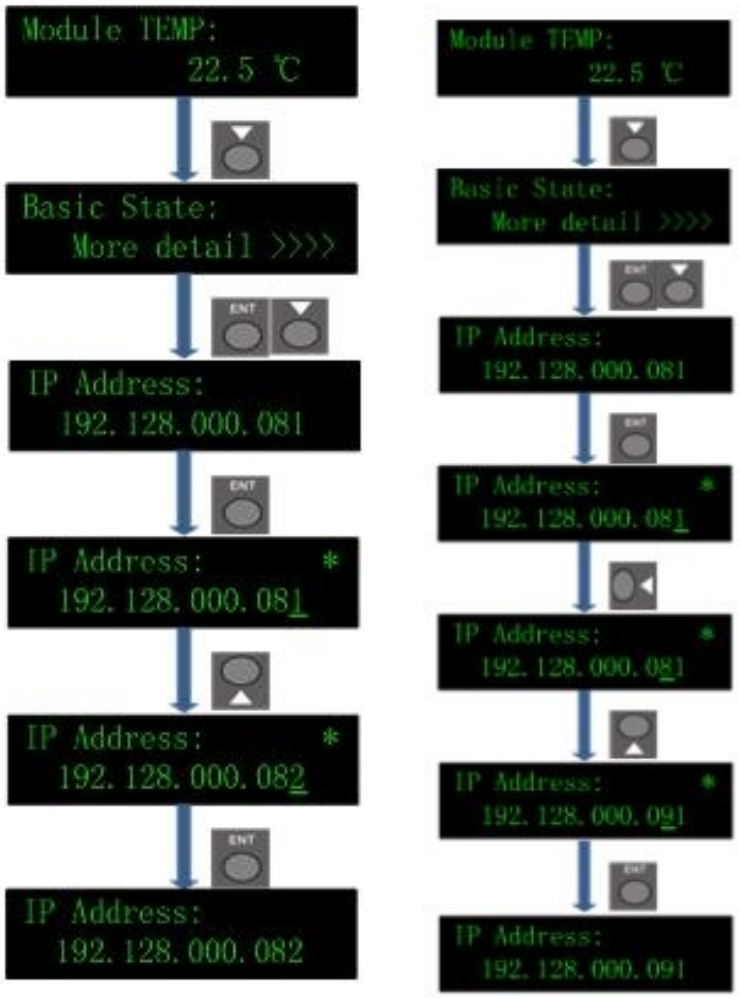

Module TEMP:
22.5 ℃
OUT Power:
19.0dBm
ENT
OUT Power: *
APC: 19.0dBm
OUT Power: *
APC: 19.1dBm
ENT
OUT Power:
19.1dBm


Module TEMP:
22.5 ℃
OUT Power:
20.0dBm
ENT
OUT Power: *
APC: 20.0dBm
OUT Power: *
APC: 20.0dBm
OUT Power: *
APC: 19.0dBm
ENT
OUT Power:
19.0dBm

6.3 Configuration of Network Management IP

As shown in below figure, configuration of network management IP address is implemented by following buttons:

1. Change Network IP Address: 2. Move the Position of Each Digit:



6.4 **Pump Switch ON/OFF**

As shown in figure, switching pump state by the following buttons:

1. Turn OFF Operation: 2. Turn ON Operation:

7 Maintenance

7.1 **Fiber Optic Maintenance**

Any time when the fiber connections to the equipment are cut off, there is potential risk of contamination to the ends of fiber connectors. Dirt or other contaminants on these components will reduce the amplifier's performance or result in damage to the system. Highly recommend that keep fiber connectors clean each time is always prior to reconnection to the system.

7.2 Troubleshooting

Please find hereafter routine troubleshooting instruction according to equipment deployment experience:

Table 7-1Routine Troubleshooting Suggestion

Problem	Probable Case	Solution
No power indicator on	The connection of power cable is incorrect	Make sure that the power cable is connected correctly(see installation and operation)
Signal indicator is red	Signal power too low	LED will be red when the Input power is less than receiving threshold, please adjust the input power above the receiving threshold
	Fiber cord is not connected correctly to optical input connector	Check connection of fiber cord to optical input connector
	Fiber cord end face or optical input connector is dirty	Clean the end face of the fiber cord and connector
ALM indicator is red	The internal module is working abnormally	Turn off equipment and call technical service
PUMP indicator is red	The PUMP fails.	Turn off equipment and call technical service