High-power1550nm Fiber Amplifier Manual



2013.6 (Version 1)

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Foreword

This manual applies to fiber amplifier. It mainly describes the performance characteristics, technical parameters, installation and debugging, common troubleshooting, and other related content of the product. In order to ensure that the equipment can be successfully installed and safely operated, please read this manual carefully before installing and debugging the equipment. And the installation and debugging should be strictly according to the specified steps on the manual to avoid unnecessary damage to equipment or accident harm to the operator. Any questions, please contact with us in time.

Special Tips:

- Er Yb Codoped Fiber Amplifier is high end professional equipment, and its installation and debugging must be operated by special technician. Read this manual carefully before operating to avoid damage to equipment caused by fault operation or accident harm to the operator.
- While the fiber amplifier is working, there is an invisible laser beam from the optical output adapter on the front panel. Avoiding permanent harm to the body and eye, the optical output should not aim at the human body and human should not look directly at the optical output with the naked eye!
- Please make sure that the ground terminal of the case and power outlet has been reliably grounding before turning on the power (Grounding resistance should be $<4\Omega$) to prevent the static damage the pump laser device and harm to human because of case charged.
- To ensure the equipment can work stable over a long time, in voltage unsteady or poor voltage wave region, it's recommend to the customer that he equips special AC regulated power supply, or even AC uninterrupted power supply (UPS) system for conditional users. In the region with large temperature variation environment (The equipment's ideal work environment temperature is 25°C) or bad room environment, it's recommend to the customer that he equips special air-condition system to improve the work environment.

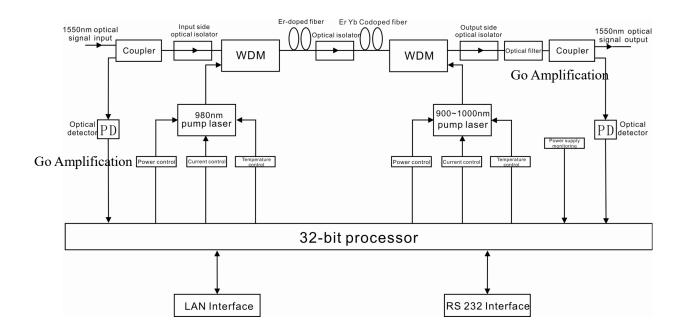
1. Application

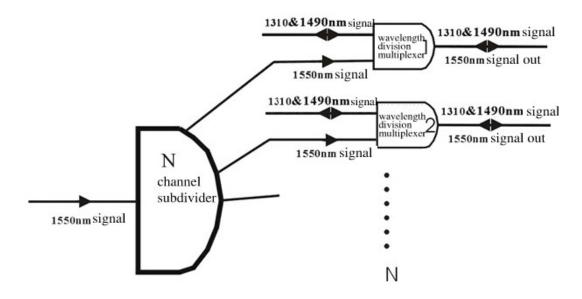
- Single-mode fiber 1550 amplification network
- FTTH network
- CATV network
- Long distance trunk network.FTTx PON, max working wavelength: 1529.16~1563.86nm.
- All kinds of SDH/PDH transmission system.

2. Performance Characteristics

- Built-in optical fwdm,it can transmit broadband network and CATV together.
- Adopts Er Yb Codoped double-clad fiber technology;
- Catv input ports: 1 optional
- Olt input ports: 4-32 optional
- Com Output ports: 4-32 optional;
- Optical output power: total output up to 15W (41dBm);
- Low noise figure: <6dB when input is 0dBm;
- Perfect network management interface, in line with standard SNMP network management;
- Intelligent temperature control system make the power consumption lower;

3. Block diagram





Internal integrated Fwdm structure

4 Technique Parameter

4.1 Technique Parameter

7.1 10011110	Damada			
Item			Technique parameters	Remark
	Operating bandwidth		1545 - 1565	
Optical inpurange	1	dBm	-3 - +10	Max rang:-10-+10
Optical Switch	ning time	ms	≤ 5	
Maximum output po	-	dBm	41	
Output power	stability	dBm	±0.5	
Noise fig	gure	dB	≤ 6.0	Optical input power 0dBm, λ=1550nm
D - 6 1	Input	dB	≥ 45	
Return loss	Output	dB	≥ 45	
0 1 10			CATV IN:SC/APC,	
Optical Con			PON:SC/PC OR LC/PC	
Туре			COM:SC/APC OR LC/APC	
PON to CO	-		≤ 1.0	dBm
insertion	loss	_	-	
C/N		dB	≥ 50	Test condition
C/CTB		dB	≥ 63	according to
C/CSO		dB	≥ 63	GT/T 184-2002.
			A: AC100V - 260V	
Doverna symmly	, x, a1ta a a	V	(50 Hz~60Hz)	
rower suppry	Power supply voltage		B: DC48V(50 Hz~60Hz)	
			C:DC12V(50 Hz~60Hz)	
Operating temperature range		°C	-10 - +42	
Maximum operating relative humidity		%	Max 95% no condensation	
Maximum storage relative humidity		%	Max 95% no condensation	
Dimens	ion	mm	$483(L) \times 440(W) \times 88(H)$	

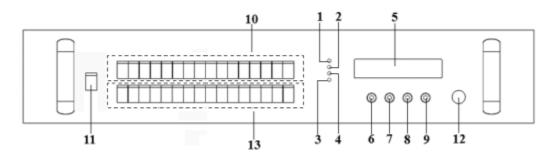
4.2 Model and Power Comparison Table

Model	Total output power dBm	Output ports number	Output power per port dBm	ADD WDM
EYA-4 -18	25	4	18	17
EYA-4 -19	26	4	19	18
EYA-4 -20	27	4	20	19
EYA-4 -21	28	4	21	20
EYA-4 -22	29	4	22	21
EYA-4 -23	30	4	23	22
EYA-4 -24	31	4	24	23
EYA-8 -15	25	8	15	14
EYA-8 -16	26	8	16	15
EYA-8 -17	27	8	17	16
EYA-8 -18	28	8	18	17
EYA-8 -19	29	8	19	18
EYA-8 -20	30	8	20	19
EYA-8 -21	31	8	21	20
EYA-8 -22	32	8	22	21
EYA-8 -23	34	8	23	22
EYA-16 -15	29	16	15	14
EYA-16 -16	30	16	16	15
EYA-16 -17	31	16	17	16
EYA-16 -18	32	16	18	17
EYA-16 -19	33	16	19	18
EYA-16 -20	34	16	20	19
EYA-16 -21	35	16	21	20
EYA-16 -22	36	16	22	21
EYA-32 -15	32	32	15	14
EYA-32 -16	33	32	16	15
EYA-32 -17	34	32	17	16
EYA-32 -18	35	32	18	17
EYA-32 -19	36	32	19	18
EYA-32 -20	37	32	20	19
EYA-32 -21	38	32	21	20
EYA-32 -22	39	32	22	21
EYA-32 -23	40	32	23	22
EYA-32 -24	41	32	24	23

From PON Port to COM Port have 1dBm insert loss& 1310nm and 1490nm.

5. External Function Description

5.1 Front Panel Description



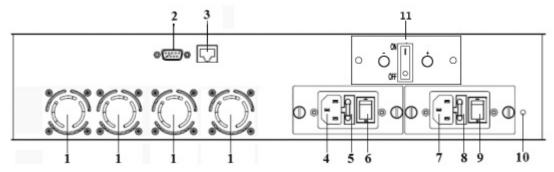
Schematic diagram of the front panel

- 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, but the machine parameters are normal; flashing red light means the machine has broken down, related fault reason see the alarm menu of the display menu; green light means the pump is working normal.
- 4) Optical output power indicator: This light turns on when the optical output power is > +10 dBm.
- 5) 160×32 dot-matrix LCD screen: used to display all the parameters of the machine.
- 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)** Optical signal output: This interface is the optical signal output port of the device. The default connector type is SC/APC; the port number is 4-32 optional. Other specification requirements are specified by the customer.

Warning: There is an invisible laser beam from this port while working normal. So the port should not be aligned to the human body or the naked eye to avoid accidental injury.

- 11) Optical signal input: The default connector type is SC/APC. Other specification requirements are specified by the customer.
- 12) Pump laser switching key: used to control the working status of pump laser. "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.

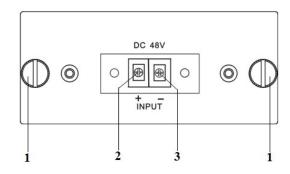
5.2 Rear Panel Description



Schematic diagram of the rear panel

- 1) Fan outlet.
- 2) RS232 interface: Used for configuring the network management parameters.
- 3) LAN interface: correspond to IEEE802.3 10Base-T, used for network management.
- 4) The AC 220V input port of power supply 1.
- 5) The fuse of power supply 1.
- 6) The switch of power supply 1.
- 7) The AC 220V input port of power supply 2.
- **8)** The fuse of power supply 2.
- **9)** The switch of power supply 2.
- 10) Ground stud of the chassis: used for the connection of device and ground wire.
- 11) 12VDC Battery interface: When the machine is in normal operation, there is 12VDC voltage to the 12VDC battery. When the machine room is powered off, the battery will output 12VDC to EDFA for power supply. The power supply time depends on the storage capacity of the battery, with an average of 50W / h. If 500W battery is used, EDFA can work for 10 hours

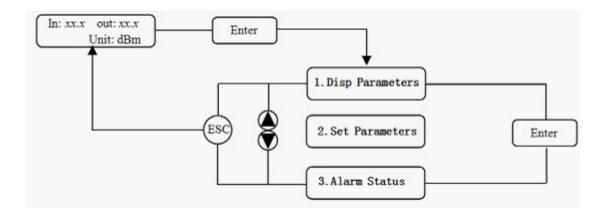
5.2.1 DC Power Module Introduction



		1	Mounting screws	2	+ Positive terminal block	3	- Negative terminal block
--	--	---	-----------------	---	---------------------------	---	---------------------------

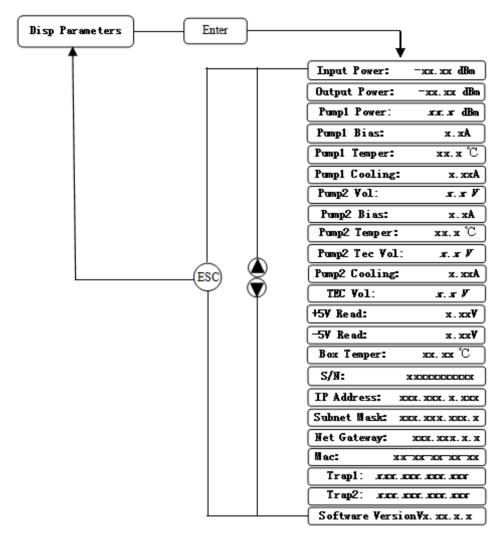
6. Menu System

6.1 Main Menu



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

6.2 Display Menu

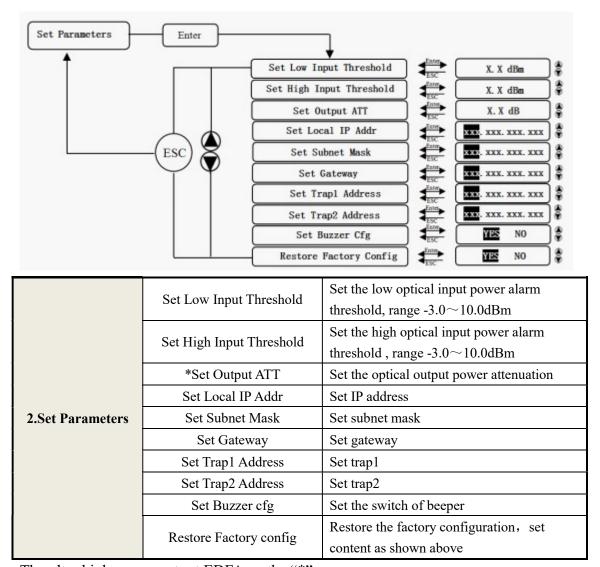


	Input Power: xx.x dBm	Input power, accurate to 0.1 dBm	
	Output Power: xx.x dBm	Output power, accurate to 0.1 dBm	
	Pump1 Power: xx.x dBm	Power of pump1, accurate to 0.1 dBm	
	Pump1 Bias: x.x A	Bias current of pump1, accurate to 0.1 A	
	Pump1 Temper: xx.x°C	Temperature of pump1, accurate to $0.1^{\circ}C$	
	Pump1 Cooling: x.xx A	Cooling current of pump1, accurate to 0.01 A	
	Pump2 Vol: x.x V	Drive voltage of pump2, accurate to 0.1 V	
Pump2 Bias: x.x A		Bias current of pump2, accurate to 0.1 A	
1.Disp Parameters	* Pump2 Temper: $xx.x$ \mathcal{C}	Temperature of pump2, accurate to $0.1 ^{\circ}C$	
	* Pump2 Tec Vol: x.x V	Cooling voltage of pump2, accurate to 0.1 V	
	* Pump2 Cooling: x.xx A	Cooling current of pump2, accurate to $0.01 A$	
	* TEC Vol: x.x V	The first stage voltage of pump2 cooler, $0.1 V$	
	+5V Read: <i>x.x V</i>	+5V power supply voltage, accurate to $0.1 V$	
-5V Read: - <i>x.x V</i>		-5V power supply voltage, accurate to 0.1 V	
	Box Temper: $xx.x {}^{\circ}C$	Box temperature, accurate to $0.1 ^{\circ}C$	
	S/N: xxxxxxxx	Device serial number	
	IP Address: xxx.xxx.xxx	IP address	

	Subnet Mask:xxx.xxx.xxx	Subnet mask	
	Net Gateway:xxx.xxx.xxx.xxx	Gateway	
	Mac: xxxxxxxxxxxxx	Physical address	
Trap1: xxx.xxx.xxx		trap1 address	
Trap2: xxx.xxx.xxx Software Version: Vx.xx.xx		trap2 address	
		Firmware version number	

The ultra high power output EDFA no the "*" menu.

6.3 Setup Menu



The ultra high power output EDFA no the "*" menu.

6.4 Warning menu

			1
	Input Status: xxx	xxx = LOLOW:	Very low optical input power alarm
		xxx = LOW:	Low optical input power alarm
	1	xxx = HIGH:	High optical input power alarm
		xxx = HIHIGH:	Very high optical input power alarm
		xxx = LOLOW:	Very low optical output power alarm
	Output Status: xxx	xxx = LOW:	Low optical output power alarm
	Output Status. 1111	xxx = HIGH:	High optical output power alarm
		xxx = HIHIGH:	Very high optical output power alarm
		xxx = LOLOW:	Very low power of pump x alarm
	Pumpx Power: xxx	xxx = LOW:	Low power of pump x alarm
	Tumpx Tower. xxx	xxx = HIGH:	High power of pump x alarm
		xxx = HIHIGH:	Very high power of pump x alarm
		xxx = LOLOW:	Very low bias current of pump x alarm
	Drawer Diego	xxx = LOW:	Low bias current of pump x alarm
	Pumpx Bias: xxx	xxx = HIGH:	High bias current of pump x alarm
		xxx = HIHIGH:	Very high bias current of pump x alarm
	Pumpx Temper: xxx	xxx = LOLOW:	Very low temperature of pump x alarm
2 41 64-4		xxx = LOW:	Low temperature of pump x alarm
3.Alarm Status		xxx = HIGH:	High temperature of pump x alarm
		xxx = HIHIGH:	Very high temperature of pump x alarm
	Pumpx Tec: xxx	xxx = LOLOW:	Very low cooling current of pump x alarm
		xxx = LOW:	Low cooling current of pump x alarm
		xxx = HIGH:	High cooling current of pump x alarm
		xxx = HIHIGH:	Very high cooling current of pump x
		xxx-IIIIIOII.	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
		xxx = LOLOW:	Very low -5V DC power supply alarm
	-5V Status: xxx	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
		xxx = LOLOW:	Very low chassis temperature alarm
	Device Temper: xxx	xxx = LOW:	Low chassis temperature alarm
		xxx = HIGH:	High chassis temperature alarm
		xxx = HIHIGH:	Very high chassis temperature alarm

6.4 Warning menu

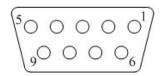
	1		
	A Input Optical: xxx	xxx = LOW:	Optical switch Low input power alarm
	71 input Optical. xxx	xxx = HIGH:	Optical switch High input power alarm
	B Input Optical: xxx	xxx = LOW:	Optical switch Low input power alarm
	B input Optical. xxx	xxx = HIGH:	Optical switch High input power alarm
	A Input RF: xxx	xxx = LOW:	Optical switch Low input RF alarm
	A input Kr. xxx	xxx = HIGH:	Optical switch High input RF alarm
	D Issuert DEs succe	xxx = LOW:	Optical switch Low input power alarm
	B Input RF: xxx	xxx = HIGH:	Optical switch High input power alarm
	Innut Status, and	xxx = LOW:	Edfa Low optical input power alarm
	Input Status: xxx	xxx = HIGH:	Edfa High optical input power alarm
Output Status: xxx	xxx = LOW:	Low optical output power alarm	
	Output Status: xxx	xxx = HIGH:	High optical output power alarm
Pumpx Bias: xxx		xxx = LOW:	Low bias current of pump x alarm
		xxx = HIGH:	High bias current of pump x alarm
	Pumpx Temper: xxx	xxx = LOW:	Low temperature of pump x alarm
	Fumpx Temper: xxx	xxx = HIGH:	High temperature of pump x alarm
	Drymany To as anno	xxx = LOW:	Low cooling current of pump x alarm
	Pumpx Tec: xxx	xxx = HIGH:	High cooling current of pump x alarm
	LENI CLA	xxx = LOW:	Low +5V DC power supply alarm
	+5V Status: xxx	xxx = HIGH:	High +5V DC power supply alarm
	-5V Status: xxx	xxx = LOW:	Low -5V DC power supply alarm
		xxx = HIGH:	High -5V DC power supply alarm
		•	•

7. Communication Setup Descriptions

7.1 Communication Interface Description

1) RS232 communication interface

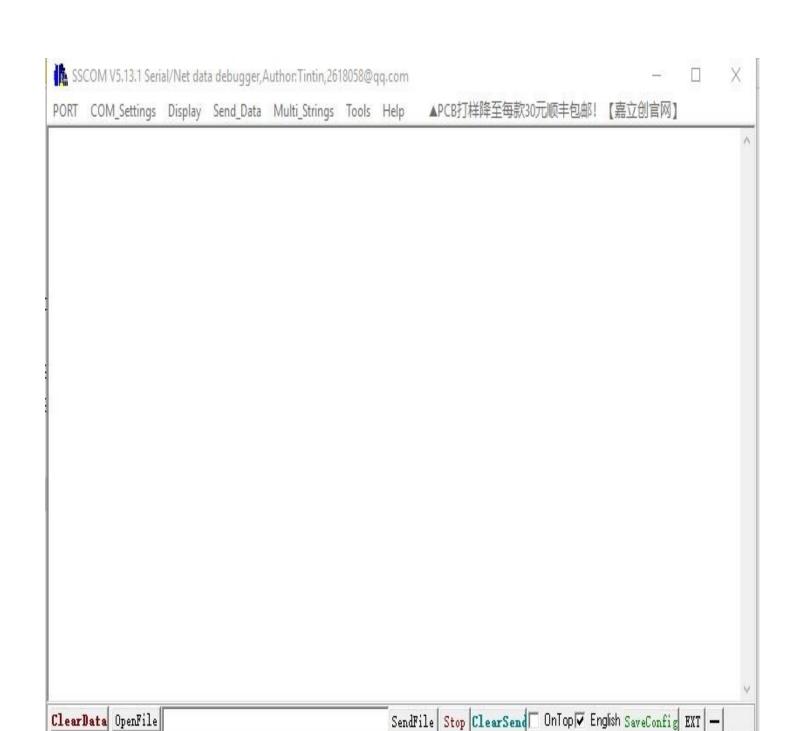
Adopt DB9 standard connector, the pin definitions as follow:



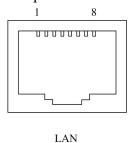
2: TX 1: No Connect 3: RX

4: No Connect 5: GND 6: No Connect

7: No Connect 8: No Connect 9: No Connect The serial communication uses the sscom App, bit and the baud rate is 19200.



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



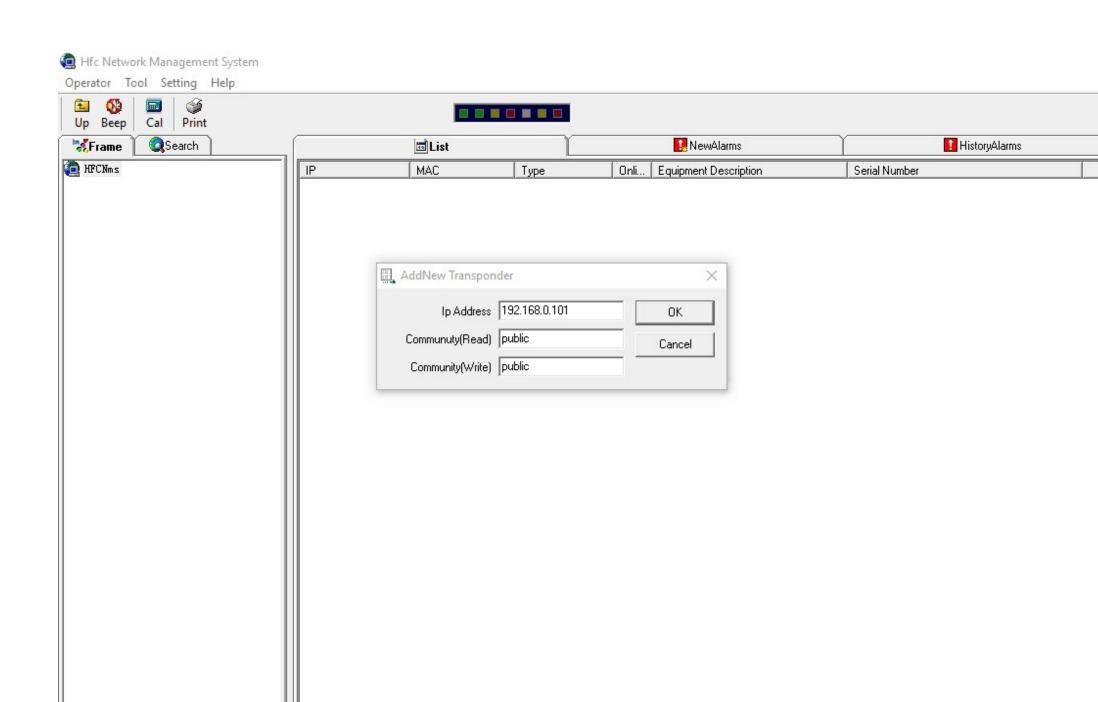
1: TX+ 2: TX- 3: RX+ 4: No Connect 5: No Connect 6: RX-

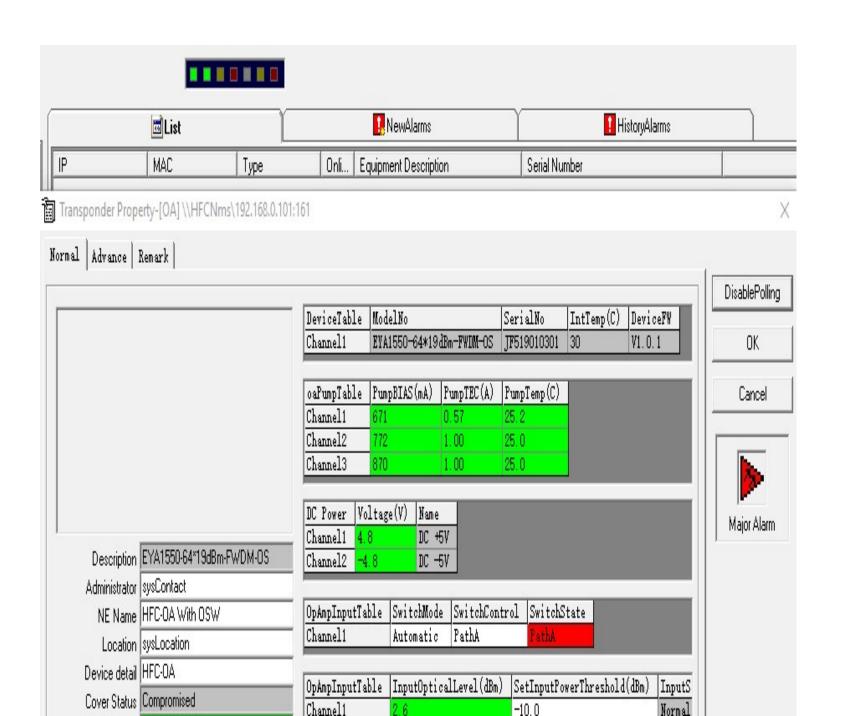
7: No Connect 8: No Connect

7.2 The management and application of network interface

7.2.1 Support large network management platform for monitoring

Set up PC IP same with transponder telemetry. The IP for transponder telemetry is 192.168.0.101, the PC can be set 192.168.0.2





7.2.2 Support web browsing SNMP function

Ues name:Admin Pass word:123456





- X

Search...

Device Status:



Device Status

Device Settings

Alarm Status

Alarm Properties

Network Settings

Change Password

Reset Settings

Serial Number	JF519010301	
Internal Temprature	28.8	°C
Input Power	1.5	dBm
Output Power	19.4	dBm
DC Power +5V	4.8	V
DC Power -5V	-4.8	V
Switch Source	Optical signal	
Switch Mode	Automatic	
Switch Position	Path A	

Index	Optical Input Power	Optical Threshold	Description
1	1.6 dBm	-10.0 dBm	Path A
2	2.1 dBm	-10.0 dBm	Path B

Index	RF Level	RF Threshold	Description





Device Status

Device Settings

Alarm Status

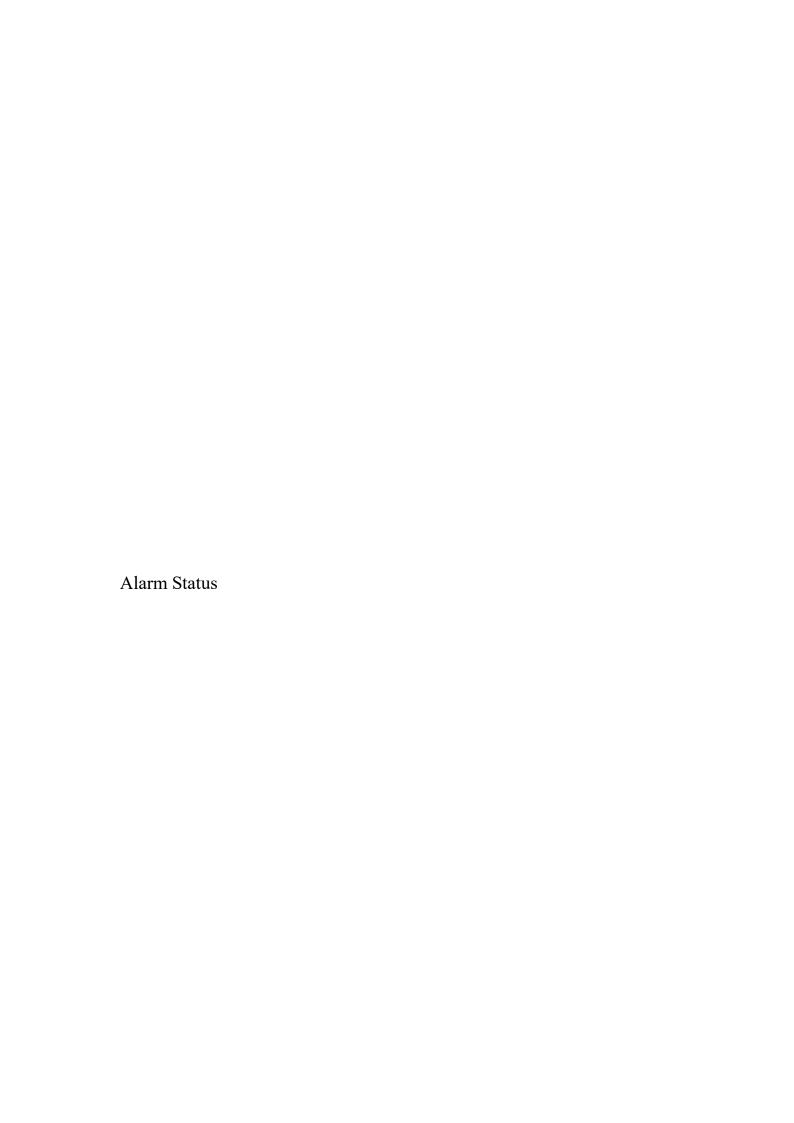
Alarm Properties

Network Settings

Change Password

Reset Settings

- Device Settings		
PUMP Status:	PUMP ON V]
Set Output:	19.5	dB
Switch Source:	Optical signal V]
Switch Mode:	Automatic ~]
Switch To:	Path A ∨]
Optical Threshold:	-10.0	dBm
RF Threshold:	0	dBuV
	Submit	





Device Status

Device Settings

Alarm Status

Alarm Properties

Network Settings

Change Password

Reset Settings

- Alarm Status -

Index	Parameter Name	Alarm Status
1	Output optical power	Nominal
2	Input optical power	Nominal
3	Box Temp	Nominal
4	Pump1 BIAS	Nominal
5	Pump2 BIAS	Nominal
6	Pump1 TEC	Nominal
7	Pump2 TEC	Nominal
8	Pump1 Temp	Nominal
9	Pump2 Temp	Nominal
10	DC +5V	Nominal
11	DC -5V	Nominal





Device Status

Device Settings

Alarm Status

Alarm Properties

Network Settings

Change Password

Reset Settings

-Alarm Properties

Index

Index	Parameter Name	HIHI	н	LO	LOLO	Deadband	Action
1	Output optical power (dBm)	₹ 27.0	2 6.0	11.0	☑ 10.0	1.0	Set
2	Input optical power (dBm)	☑ 10.0	≥ 8.0	-5.0	-10.0	1.0	Set
3	Box Temp (`C)	☑ 85	₹ 70	v 0	☑ -5	2	Set
4	Pump1 BIAS (mA)	☑ 1200	2 1000	☑ 100	≥ 80	10	Set
5	Pump2 BIAS (mA)	☑ 1200	2 1000	2 100	∡ 80	10	Set
6	Pump1 TEC (A)	2.00	1.50	-1.50	-2.00	0.10	Set
7	Pump2 TEC (A)	☑ 2.00	☑ 1.50	-1.50	-2.00	0.10	Set
8	Pump1 Temp ('C)	☑ 35.0	☑ 30.0	20.0	15.0	1.0	Set
9	Pump2 Temp ('C)	☑ 35.0	∡ 30.0	20.0	1 5.0	1.0	Set
10	DC +5V (V)	☑ 6.5	₹ 6.0	₹ 4.0	☑ 3.5	0.2	Set
11	DC -5V (V)	✓ -3.5	√ -4.0	√ -6.0	√ -6.5	0.2	Set

Control

Action

Parameter Name

Network Settings



Device Status

Device Settings

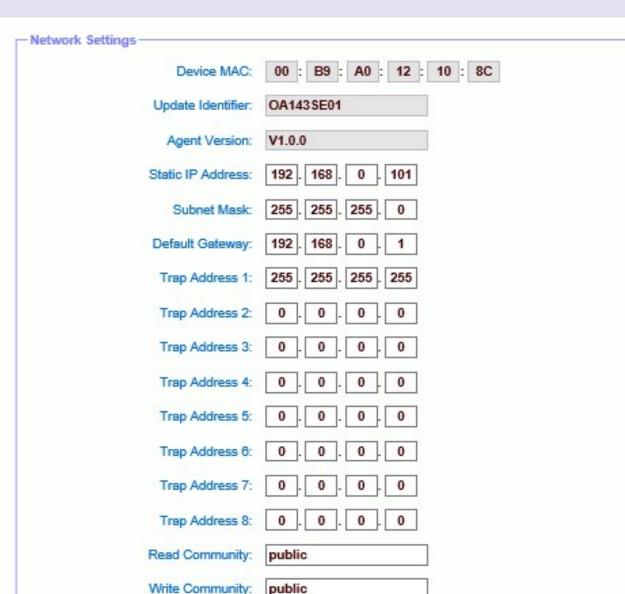
Alarm Status

Alarm Properties

Network Settings

Change Password

Reset Settings



Change Password



Device Status

Device Settings

Alarm Status

Alarm Properties

Network Settings

Change Password

Reset Settings

— Chango Daceword	
Change Password	
Username	e:
Passwor	d:
New Usernam	e:
New Passwor	d:
Confirm Password	d:
	Submit Reset





Device Status

Device Settings

Alarm Status

Alarm Properties

Network Settings

Change Password

Reset Settings

- Restore settings and Reboot device-

· Reboot device

· Restore factory settings

Warning!!

Click the restore button, all parameters will be restored to factory default.

Restore Factory

Reboot device

· Restore Net parameters:

IP Address: 192.168.1.8

Subnet Mask: 255.255.255.0

Gateway Address: 192.168.1.1

TRAP Address 1: 192.168.1.200

TRAP Address 2: 255.255.255.255

· User parameters:

· User name: admin

Password: 123456

Restore net

8. Installation debugging

8.1 Unpack and Check

- 1. Insure the package is not defaced. If it has any damage or water mark, please contact local agency or carrier.
- **2.** After unpacking, check equipments and accessories according to package list. Any question, please contact local agency or our company.
- **3.** If you think the equipment has been damaged, please don't electrify to avoid worse damage. Please contact local agency or our company in time.

8.2 Instruments and tools

- 1. An optical power meter;
- 2. A digital multimeter;
- 3. A standard optical fiber test jumper (SC/APC);
- 4. Some absolute alcohol and medical cotton wool;

8.3 Installation steps

- 1. Before installing the equipment, please read the <User's manual> carefully and install the equipment according to the <User's manual>. **Note:** For the man-made damage and other all consequence caused by error installation that not according to the <User's manual>, we will not be responsible and will not supply free warranty.
- 2. Take out the device from the box; fix it to the rack and reliably grounding. (The grounding resistance must be $< 4\Omega$).

- 3. Use the digital multimeter to check the supply voltage, make sure the supply voltage comply with the requirements and the switch key is on the "OFF" position. Then connect the power supply.
- **4.** Input the optical signal according to the display message. Turn the switch key to the "ON" position and observe the front panel LED status. After the pump working status indicator turn into green, the device is working normal. Then press the menu button on the front panel to check the working parameters.
- 5. Connect the optical power meter to the optical signal output end by the standard optical fiber test jumper, then measure the optical output power. Affirm the measured optical output power and the displayed power are the same and have reached the nominal value. (Affirm the optical power meter is on 1550nm wavelength test position; the optical fiber test jumper is the matched one and on the connector surface has no pollution.) Remove the standard optical fiber test jumper and optical power meter; connect the device to the network. So far, the device has been completely installed and debugged.

9. Clean and maintenance method of the optical fiber active connector

In many times, we consider the decline of the optical power as the equipment faults, but actually it may be caused by that the optical fiber connector was polluted by dust or dirt. Inspect the fiber connector, component, or bulkhead with a fiberscope. If the connector is dirty, clean it with a cleaning technique following these steps:

- 1. Turn off the device power supply and carefully pull off the optical fiber connector from the adapter.
- 2. Wash carefully with good quality lens wiping paper and medical absorbent alcohol cotton. If use the medical absorbent alcohol cotton, still need to wait 1~2 minutes after wash, let the connector surface dry in the air.
- **3.** Cleaned optical connector should be connected to optical power meter to measure optical output power to affirm whether it has been cleaned up.
- **4.** When connect the cleaned optical connector back to adapter, should notice to make force appropriate to avoid china tube in the adapter crack.
- 5. If the optical output power is not normal after cleaning, should pull off the adapter and clean the other connector. If the optical power still low after cleaning, the adapter may be polluted, clean it. (Note: Be carefully when pull off the adapter to avoid hurting inside fiber.)
- **6.** Use compressed air or degrease alcohol cotton to wash the adapter carefully. When use compressed air, the muzzle aims at china tube of the adapter, clean the china tube with compressed air. When use degrease alcohol cotton, insert directions need be consistent, otherwise can't reach a good clean effect.

Special notice:

a. In the process of clean the active optical fiber connector, you should avoid

- direct shining at eye, which will cause permanence burn!!!!
- b. Use proper energy to install the active optical connector, or the ceramic tape in the adaptor will lead to break. Once the ceramic tape is broken, the optical output power will decrease rapidly. And turn the active optical fiber connector slightly, the optical output power changes obviously.
- c. Please operate the optical fiber under the condition of shut off the pump laser. Or the high output power will lead to burn the joint of the optical output fiber, which will cause the output power decrease.

10. After-sales Service Description

- 1. If the equipment fault is resulted from the users' improperly operation or unavoidable environment reasons, we will responsible maintenance but ask suitable material cost.
- 2. When the equipment breaks down, immediately contact local distributor.
- **3.** The site maintenance of the fault equipment must be operated by professional technicians to avoid worse damage.

Special notice: If the equipment has been maintained by users, we will not responsible free maintenance. We will ask suitable maintenance cost and material cost.

11. Disclaimer

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