The User Guide

domusntw

DN-EDFA-WDM-16X22

X-PON & CATV and SAT-TV WDM EDFA

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※※※※PROMPT※※※※

Application caution of equipment:

1, Installation and debugging of the EDFA should be done only by qualified or experienced technician;

2, Do not turn on the device before it connects to the system, or without rubber cover, in case of the connectors being burnt out;

3, Do not look directly into optical output port with naked eyes while the EDFA is operating;

4, EDFA with output power ≥21dBm per port is made with factory setting “safe pluggable mode" status "ON" with default output power 19dBm in order to protect the connectors from burning out by maloperation. Please turn off this function after the optical output

connection is completed, the power will return to the output specification or set.

1. Production Description

1.1 Introduction

DN-EDFA-WDM-16X22 EYDFA optical amplifier combiner is the latest equipment of optical transmitting system for X-PON & CATV and SAT-TV FTTH/FTTP. It realizes the combination function of X-PON and 1550nm after optical signal is amplified. In detail, there is one way CATV and SAT-TV input plus 16 routes X-PON signal in and the 16 routes which have 1310/1490nm +1550nm combined output 1550nm with 27 to 45dBm total power. This equipment is well compatible to the OLT of HUAWEI, ZTE, FiberHome etc, and no data lost which owns high cost performance. The EDFA can be placed in a telecom style cabinet, namely fit into a 24mm tray. With the power supply socket, optical fiber ports and web management interface placed in the front panel, it facilitates wiring operations.

Ordinary erbium doped fiber amplifier (EDFA) has advantages of low noise, high gain, wider bandwidth, high efficient pumping and stable operating, which is widely used in CATV and SAT-TV system. However, along with the implement of fiber to the house (FTTH), system C/N will be worse significantly when EDFA uses as cascade amplification. Therefore, EDFA is required to produce high saturation output power and low distortion as shown as 13dBm to 23dBm (approximate. 27dBm limited) for EDFA saturated output power. Moreover, the gain fiber of EDFA is single mode and single packed fiber. Optic of pump is directly coupling into fiber but the diameter of fiber is very small therefore it requires single mode of pump optic. Semiconductor of single mode only supports hundreds milliwatt of output power and it is limited by the area of pump which makes high power pump optic cannot be coupling. It consequently causes serious output power of optical laser. In case, it develops double-cladding fiber internationally and solve the problem of listed weakness of single packed fiber which improves 1 to 2 level for output power. It then drives the development of high power optical amplifier. After several years' research, our company overcome multiple technical difficulties, high power ytterbium-erbium co-doped double-cladding fiber amplifier was developed for CATV and SAT-TV system to fit the requirement of FTTH and FTTB after conquer many technical difficulties.

This series product adopts LUMENTUM,IPG, II VI etc. multimode high power pump laser as pump source and American OFS closed beam splitter as double-cladding synthesizer. Built-in stable optical power circuit and laser thermoelectricity freezer guarantees best performance and long life cycle operating. Microprocessor software monitors operating status of laser which shows on LCD. Once operating parameter of laser deviate from the range of set value, microprocessor will cut power supply of laser automatically and red light turn will turn on with alarm (prompting fault cause on LCD). Please refer to the following "Operation Instruction" for detailed report of equipment parameters.

1.2 Features

1.2.1 High Quality: Adoption of multimode high power pump laser and power is optimized by software which maximizes lower NF of EDFA rival to normal EDFA. It makes system get superior

CNR through power optimize balancing technique.

1.2.2 Reliability: adoption of 19″2U standard case, built-in high performance external modular switching power supply, operating under AC90 to 250V, optional DC48V power supply (pre-order) hot-plugging supported, automatic temperature control case heat dissipation with dual power cold&hot backup.

1.2.3 Intuitive: Microprocessor monitors operating status of pump laser which is the most valuable part of the equipment, operating parameters show on LCD display.

1.2.4 Network Management: Optional type status monitoring transponder certainly satisfy national, SCTE, HMS, WEB standard, it realizes network management monitoring function.

1.2.5 Patented Product: 19"2U Rack only 260mm chassis depth, fits for small cabinet.

1.2.6 Plug-in EDFA module: the pluggable module integrates the laser controlling circuit, the optical path for amplification, and the X-PON WDM wavelength division multiplexer, which is easy for maintenance, network upgrading and troubleshooting.

1.2.7 High Power Output: Combined output power has maximum to 27~45dBm and multiple output configuration is available for user's requirement.

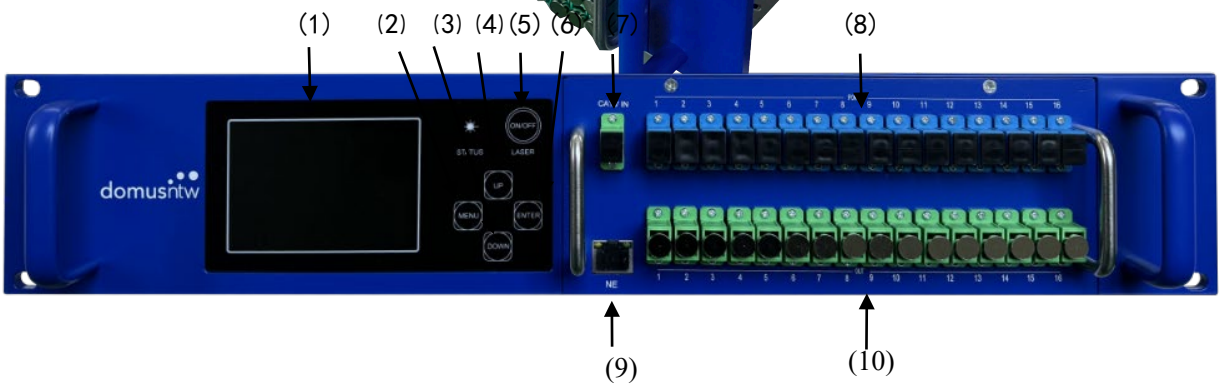
1.2.8 WDM Insertion: Achieving GPON, GEPON, Ethernet PtP & Wavelength multiplexing of RF video (CATV) in FTTH xPON

1.2.9 Connecting al patch cord end face from being burnt when the opt he output power direct to 19dBm durin ver.

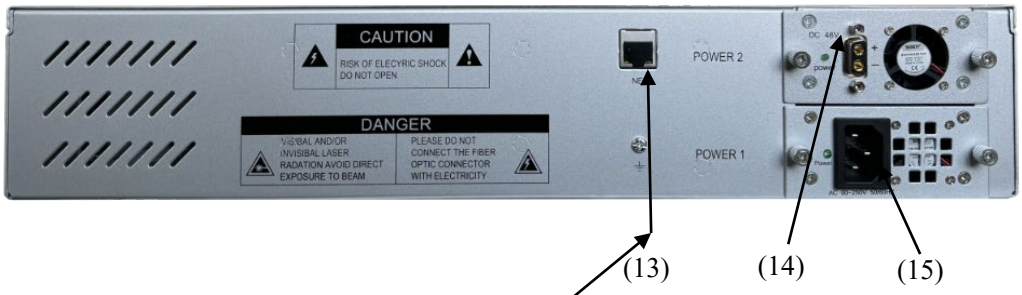
1.2.10 cal signal has two way as **A** and l（force） mode，auto mode uses pa n priority.

2. Equipment Struct

2.1 DN-EDFA-WDM-16X22 Front

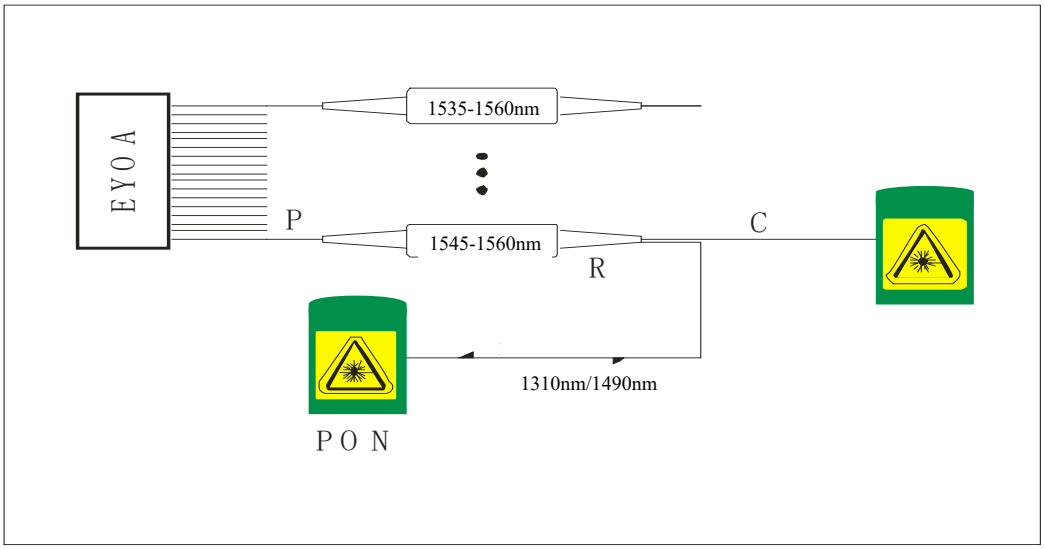


(16)



(1)LCD Display,(2)MENU Main Menu Button, (3)DOWN Button,(4)UP Button,(5)Laser Lock Switch,(6)ENTER Confirm Button,(7)CATV and SAT-TV input ,(8) X-PON signal input,(9)NE Web Management Transponder1,(10)CATV and SAT-TV (1550nm) & X-PON (1490/1310nm) signal output port,(11)FAN Group1,(12)FAN Group2,(13)NE Web Management Transponder2(14)Module Power Supply2(DC48V),(15)Module Power Supply1(AC90～250V), （16）Plug-in X-PON & WDM EDFA Module.

2.2 Integrated X-PON & CATV + SAT-TV　WDM EDFA Block Diagram



3.Main Technical Index

Items		Unit	Performance Index
Optical Operating Wavelength		nm	1545～1560
Input Optical Power Range		dBm	-10～+10
Nominal Input Optical Power		dBm	+3
Maximum Alarm Value		dBm	≥+10 front panel display alarm, buzzer ring
Minimum Alarm Value		dBm	＜-10 front panel display and power off
Noise Ratio		dB	≤5.0 (0dBm,@1550nM)
Gain Flatness		dB	＜±0.3
Optical Power Output Stability		dB	＜±0.5
Polarization Sensitivity		dB	＜0.2
Polarization Mode Dispersion		Ps	＜0.5
Input End Pump Leakage Power		dB	≤-30
Output End Pump Leakage Power		dB	≤-30
Optical Input, Output Return Loss		dB	＞45 （APC Stepped Face）
Pump Operating Number		No.	1～3
Rated Output Power		dBm	27～45
Linker(IN)		-	SC/APC
Linker(OUT)		-	SC/APC
C/N		dB	≥48(comment 1)
C/CTB		dB	≥63(comment 1)
C/CSO		dB	≥63(comment 1)
Power Supply/Consumption		V/W	AC90～250 or DC48 /55(hot-plugging single power)
Operating/Storage Temperature		℃	-20～50/-30～70
Operating/Storage Humidity		%	5～90
Case Size		mm	446×260×86
Network Management Connector		/	RJ45(following national network management standard, supports WEB)
X-PON Optical Path with WDM	PON Wavelength	mm	1310/1490
	PON Linker	/	SC/UPC
	PON Insertion Loss	dB	＜1.2
	1550 Port Insertion Loss	dB	＜0.7

Comment:

1.Optical Link Test provides link index by measuring optical transmitter and WDM optical receiver.

2.The main performance index above accords with GY/T 184-2002 CATV and SAT-TV analog

optical amplifier technical requirement and measuring method.

4.Operation Instruction

The microprocessor software of this machine has many functions, such as laser working state monitoring, digital panel display, fault alarm, network management and so on. When querying or setting, press panel MENU key first, then press ENTER to confirm, press UP or DOAN to query or set different parameters and set items.

4.1 The security connection mode setting interface (Figure 1) on (Figure 2). The ON is turned on, the output power is adjusted to about 19 dBm, and the OFF is turned off, that is, the specification power output. Safe connection mode setting step: in "ON" press Enter confirm to" ON", press UP or select "press Enter confirm, then press Main to exit. IP Address (IP address，Figure 3), OPT POWER(output optical power，Figure 4), FAN Control (fan set Set, Figure 5), select item content by UP or Down, press Enter to confirm, and then press Main to exit previous menu. IP settings are : IP address, subnet mask, gateway, alarm server 1 and 2; output power settings are: output power 1(1-32 channels); fan settings are : open (long-term open), automatic (chassis temperature <35℃ off ,≥35℃ open). The third item under the main menu is system information. The information is as follows (Figure 6): Product name, product model specifications, laser 1(1-16 channels) nominal output power, product serial number, control software version number and software version compilation date.

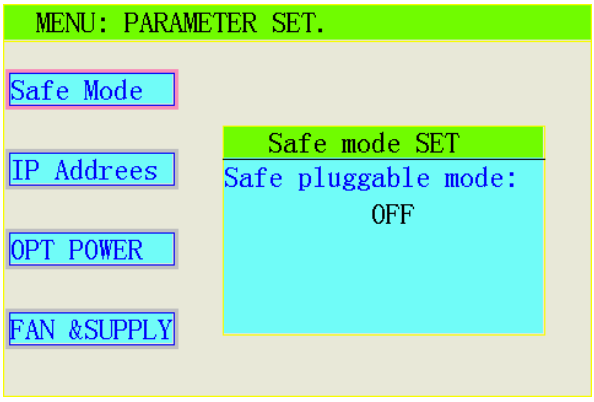


Figure 1

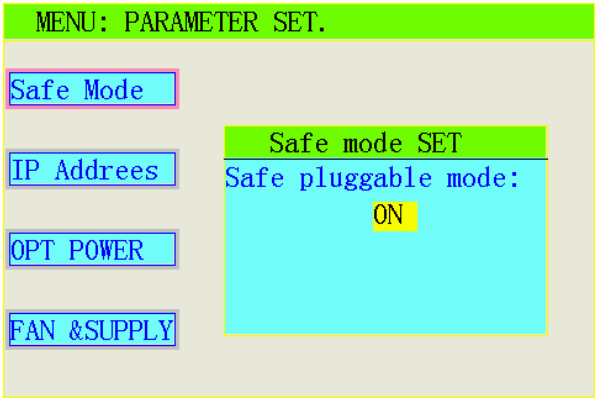


Figure 2

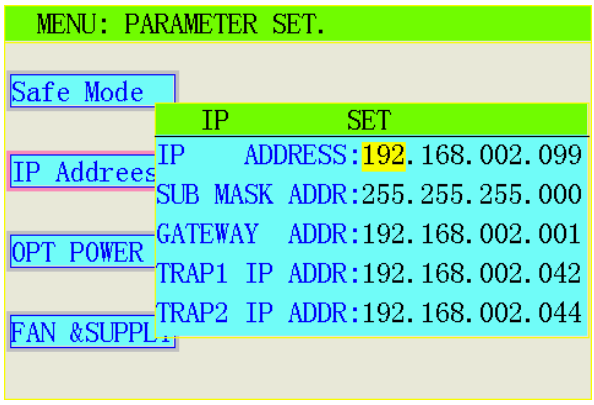


Figure 3

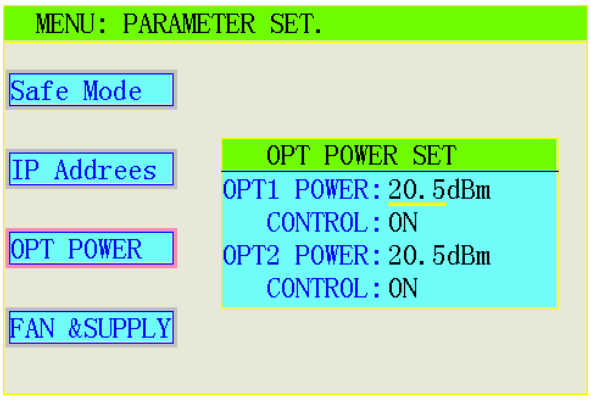


Figure 4

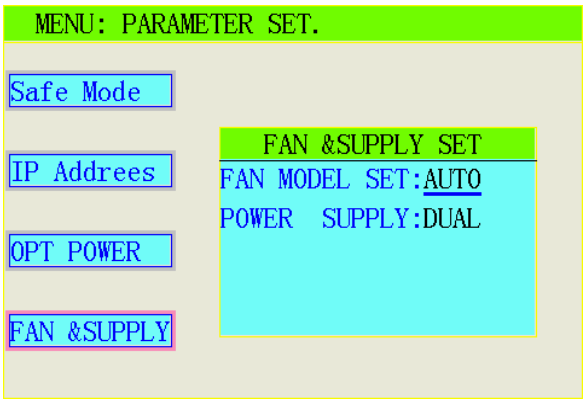


Figure 5

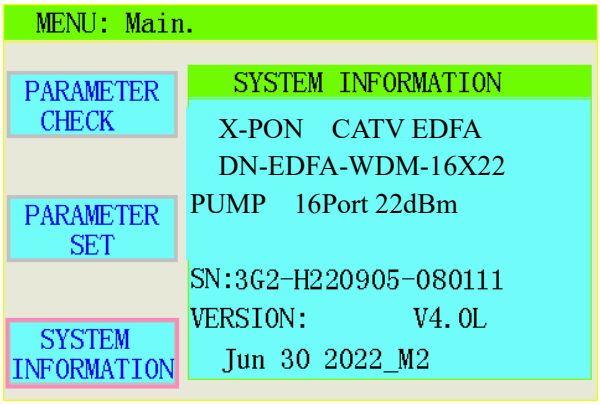


Figure 6

4.2 Query function

Press MENU key to enter the parameter query, and LCD displays the main MENU query. See Figure 7 for details: the real-time power value of optical input power, 1-32 optical amplification output power, and the working status of laser switch, fan, and power module 1 and 2; Press ENTER to ENTER the sub-menu query, as shown in Figure 8: Press UP or DOWN to ENTER the power module parameter query: power module 1 and 2 +12V and -5V real-time voltage values; Prepump parameter query: input optical power, operating current of the prepump laser, temperature, refrigeration or heating, and real-time parameters of output power of the prepump; FIG. 9: Back-pump parameter query: back-pump lasers 1 and 2 's working current, temperature and output optical power in real time; Figure 10: Case temperature, fan switching state and system working hours and pumping laser working hours query.

The above parameter queries are all online detection values. If a certain content exceeds the limit setting value, its display parameters will turn red, indicating that there is an error in this content. Meanwhile, the STATUS working on the panel is flashing a positive/abnormal red light.

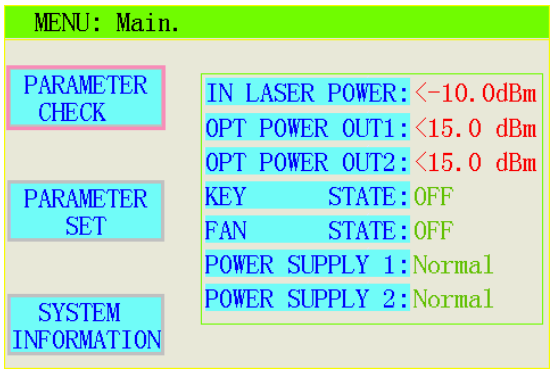


Figure 7

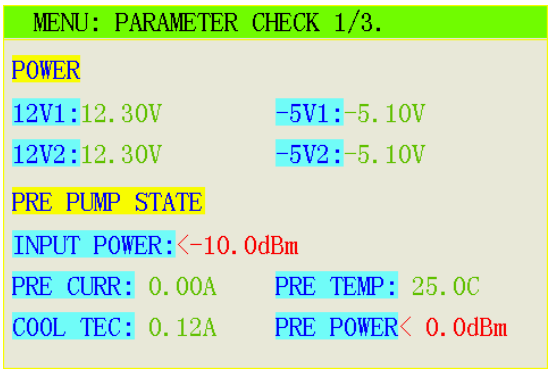


Figure 8

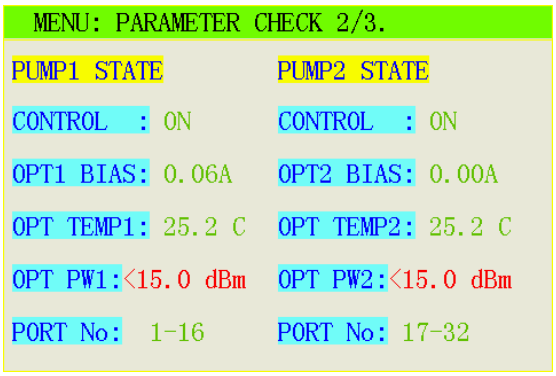


Figure 9

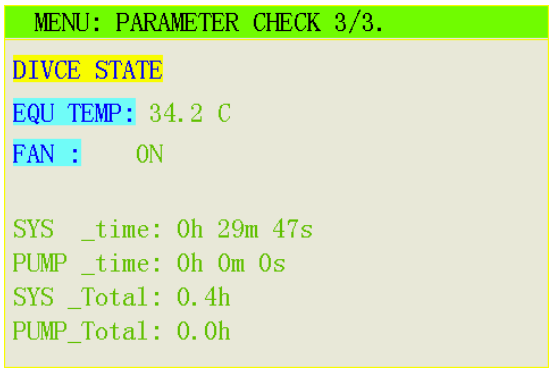


Figure 10

4.3 Laser switch, whether in any state to turn on or off the laser, press LASER ON/OFF,LCD to display the laser switch interface (Figure 11/12), then press ENTER to select and confirm.

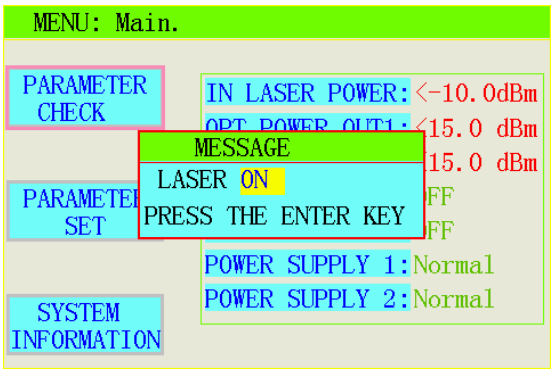


Figure 11

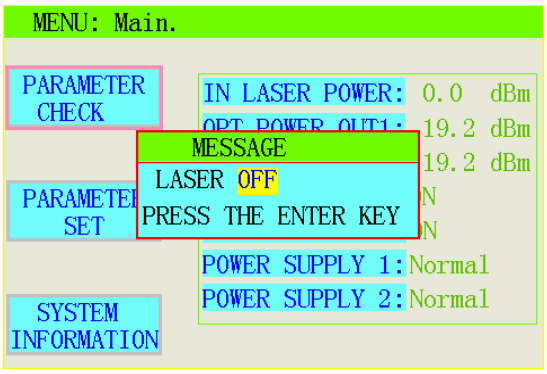


Figure 12

5. Status Alarm Description

5.1 The machine is in the upper right position of the front panel with STATUS working status indication (LED). The green light indicates that the operation is normal, the red light indicates that the laser is not in operation, the red light flashes to indicate the alarm (there are related parameters that do not conform to the set value), and is accompanied by a "beep" sound, which is automatically turned off after one minute to reduce the noise of the machine room.

5.2 The local status display, any item abnormal, will prompt alarm, STATUS light red light flashing, LCD display content is red text.

5.3 In order to protect the safe operation of the laser, the laser power supply of this machine has a delay function. When the laser is turned on, it takes 10 seconds to delay the laser to enter the operation.

6. Application of Network

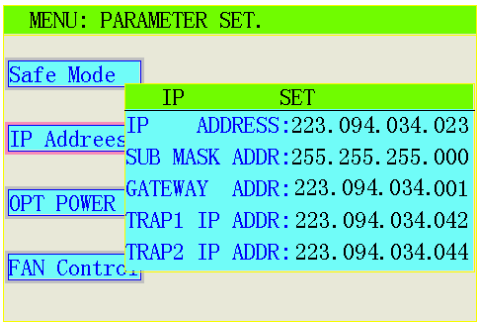
This machine has network management function, set up IP、 gateway, subnet mask, server address according to the above operation steps, just connect the RJ45 interface signal to the local area network (Ethernet), then connect with the main server from any network port in the local area network, install the standard HFC network equipment management system application software

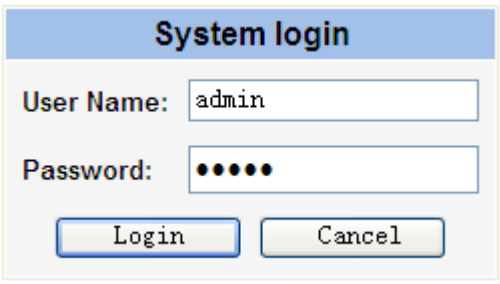
on the main network management server (PC), when running the network management system can monitor the running status of the local machine in real time.

6.1 Introduction to network remote Access

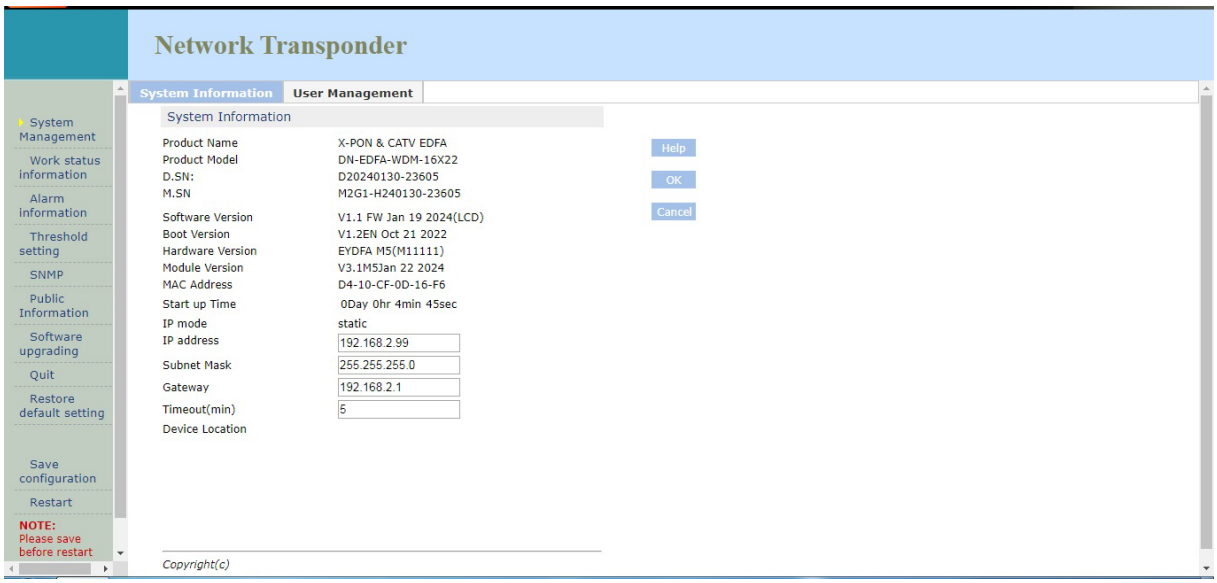
6.1.1 Direct access method

Network remote direct access according to the following steps to set up the device IP(public network), gateway, subnet mask, server address. In equipment operation interface, by pressing the "MENU" button to switch to the MENU item "PARAMETER SET", press "ENTER" button to ENTER submenu, press the "UP" or "DOWN" key to switch to the MENU item "IP Address" press "ENTER" button to ENTER, the cursor in the line, when flashing state press "UP" or "DOWN" button to choose parameters need to be modified, in a state of full words flashing cursor when press "UP" or "DOWN" key can modify the parameters of the current position, Press "ENTER" to switch the cursor state from underscore to full-word, or from full-word to underscore. Press MENU to exit the modified state and save the modified parameter to enable the new parameter. An example of a device IP(public network) is shown below.



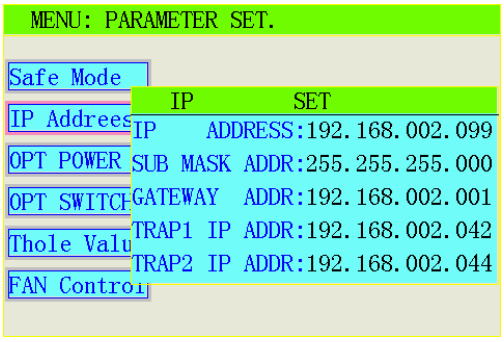


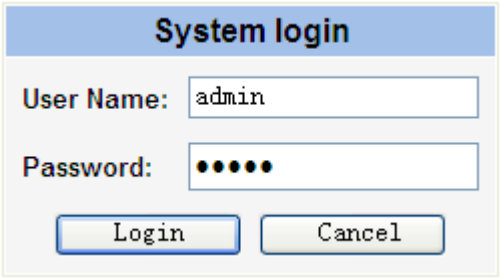
After the completion of the need to responder network management interface using direct cable connected to the Ethernet device, and then from the PC to open the browser can access Ethernet, IP address bar input equipment, open the Login page (see on the right side of the figure), User Name and Password by default are "admin", point "Login" button to enter net home page (see below); Click the relevant button in the left navigation bar to query various functional parameters.



6.1.2 Indirect access method

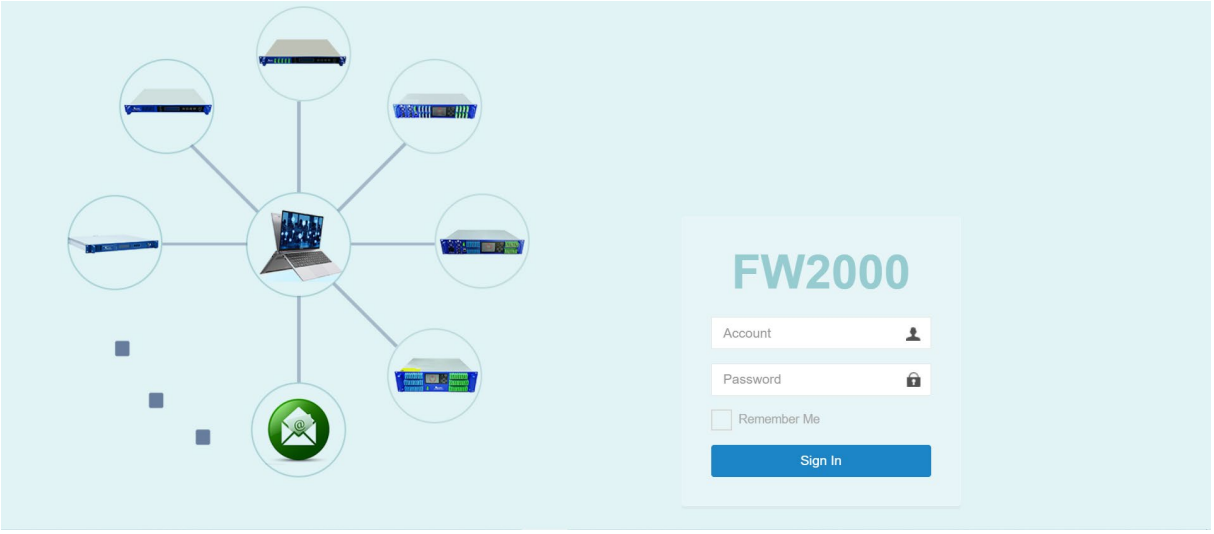
Set up the internal server forwarding function on the gateway device requires professional operation. The web information of the local device (IP: 192.168.2.99) is transferred to the public network (IP: 223.94.34.23:17380). After completion, you need to connect the "NE network management responder interface" of the machine to the Internet port of the gateway device with a network cable, and then open the browser from a PC that can access Ethernet (note that it should not be in the same local area network), and enter (http: //223.94.34.23:17380), open the login page (see the login diagram on the right for details),User Name and Password by default are "admin", point "Login" button to enter net home page (see below). Click the relevant button in the left navigation bar to query various functional parameters.





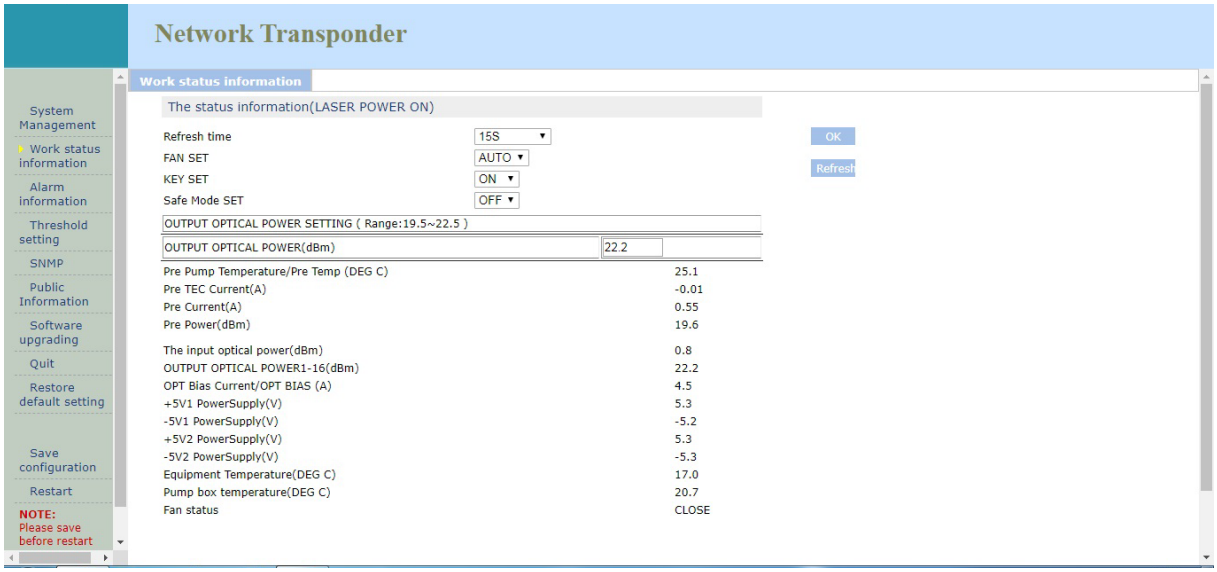
6.2 FW2000 Device Network Management System

Network management system solutions FW2000, a Java programming-based network management system, can realize SNMP management and WEB network management at the same time. The scope of managing equipment now includes 1550 external modulation transmitter, direct modulation optical transmitter, X-PON & CATV WDM EDFA, CATV EDFA and Building Optical receiver, etc. The system can perform equipment's configuration management, performance management, and alarm management, which achieve real-time parameter collecting, alarm web interface reminder, and alarm email reminder.



6.3 Parameter or threshold setting: To set relevant parameters, power supply, fan, output power, etc., click Work Status Information, enter the setting page (see the figure below), and select or set

relevant functions and parameters according to requirements



7.Optical Connection Attention

Before connection, clean all optical connectors carefully and read cleaning guide:

7.1 Optical Fiber Patch Cord

7.1.1 Taking off dust cap of fiber connector and making sure optical connector is APC interface;

7.1.2 Using a specified dry wiping cloth without wool(5Kimwipes®); better to use specified microscope (100 and 200 times) to check the clean level of optical connector or imperfection statue;

7.1.3 Attention to keep connector clear and clean of flange plate, specified compressed gas to clean the face of optical connector;

7.1.4 It is better to clean dust smaller than 0.2 micron;

7.1.5 Taking compressed gas pot away 6 inch to connector, aim at flange plate, pressing muzzle transiently several times;

7.1.6 If you do not have specified compressed gas, 2.5 milometer swab is the substitution to clean connector or clean the other side of fiber jumper getting rid of installing flange plate;

Caution: taking really carefully to deal with connector because it is easy to be broken.

7.2 Using jumper to connect to EDFA output to optical power meter.

7.3 Using optical power meter to check output power whether remains in normal range.

8. Caution

8.1 The machine should have a good grounding, grounding resistance should be <4Ω. According to international standards, 220V use three-wire system into the line, middle line is the grounding wire.

8.2 This machine uses imported high-performance, highly reliable switching power supply with

constant voltage over-current protection, which already have imported fuse can be 165V ~ 260V voltage range of the city within the network work properly. The machine's microprocessor output DC voltage of the monitors, if the fuse blew, indicating failures have occurred inside the machine. Therefore, the back panel of this machine has no 220V fuse. (The same as the imported equipment).

8.3 In order to ensure the optical return loss ≥ 45dB, this machine optical connectors uses SC/APC & SC/UPC(X-PON). Connecting joints should be maintained clean. Plug should be used after repeated ethanol and cotton wool to wipe the optical connector.

8.4 The input optical power of optical amplifier affects the system's CNR, in practice, should be based on indicators system, reference to " CNR degradation of the table " design the input optical power of amplifier.

8.5 Optical fiber amplifiers work in the 1550nm wavelength, the max output optical power ≤ 500mW. Access system in the machine, or optical output port unprotected pre-sets should not open so as to avoid burns due to the optical connector, but also should prevent the laser direct the human body, especially the eyes, causing harm to the people.

9. Guarantee and Maintenance Matters

9.1 Each optical transmitter has the company serial number (bar code). To the date of sale can provide one-year.

9.2 The machine's microprocessor software with the laser working condition monitoring, digital panel displays, fault alarm, network management functions. Non-human factors that can not be damaged laser. If the machine flashes a red light appears (hint alarms), should be sent to the company warranty. Users shall not open the lid for maintenance, otherwise the warranty period, repairs and materials should be charged.

9.3 The warranty expires, providing life-long maintenance and equipment upgrades.

9.4 Due to power supply and man-made failures, resulting in damage to the device, are required to collect materials costs.