

The User Manual

TRANSMISOR

1550nm External Modulation Optical Transmitter



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1 The product overview

1.1 The product overview

External modulation laser transmitter product is a new type of high-performance 1550nm external modulation optical transmitter. Transmitter is the 1U height, and can be easily installed in 19" rack. Laser transmitter is the 1550 dual-wavelength 7dBm optical output, the output signal spectral lines is narrow, more advantages in the long-distance transmission. The main devices adopt DFB low-noise, narrow line width, continuous-wave lasers with thermoelectric cooling device made in JDSU, Fujitsu, MITSUBISHI and AVANEX CATV high linearity external modulator. Because of the international brand adoption of key components and our company system optimization control technology, SMNP network control technology, the machine's technical performance indicators fully measure up the standard of similar imported equipment, It can provide high-quality images, digital or compressed digital signal long-distance transmission for cable television and telephone communications.

1.2 The features

1.2.1) High quality: original system optimization control technology and RF pre-distortion technology ensure that the system can acquire the maximum CTB, CSO, and SBS targets in the case of excellent performance CNR. 1.2.2) Flexibility: In ensuring the high performance system CSO, the phase modulation technology of external modulator maximize the optical power into the fiber in order to obtain long-distance transmission, and the field adjustable SBS threshold, 13,16,18, may apply a different network transmission.

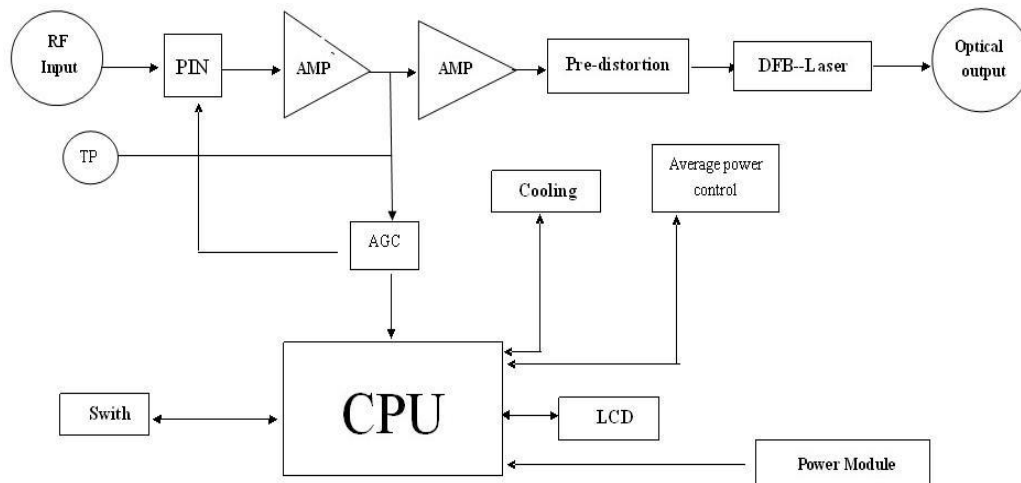
1.2.3) Reliability: The 19" 1U standard rack, built-in high-performance dual switching power supply, it can work in the backup at 85 ~ 265Vac City Network Voltage, MS-level automatic switching; chassis cooling automatic temperature control.

1.2.4) Intuitive: The laser is the most expensive machine components, machine equipped with microprocessor monitors the working state of the laser, the panel LCD window displays the operating parameters.

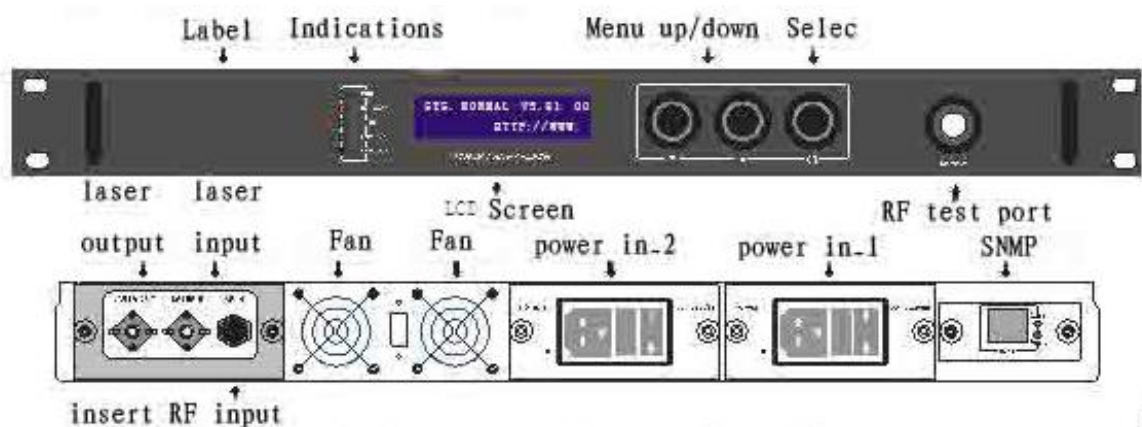
1.2.5) Network type: Select All-piece status monitoring transponder guarantee to meet the national standard and be compatible with the SCTE HMS standard, it enable network management monitoring capabilities.

2 The product structure diagram

2.1 The Electrical block diagram



2.2 The transmitter's front panel, back panel diagram



3 The main technical indicators

No.	Item	Units	Parameter	Note
1	Laser type		FWT-1550ES-2X6	
2	Wavelength	nm	1550±10	Specified before ordering
3	Optical Modulation		External modulation	
4	Optical output power	dBm	2x7	See specifications
5	SBS threshold	dBm	16	13, 16, 18 adjustable
6	Optical Connector		Optional FC/APC, SC/APC	Specified before ordering
7	Frequency range	MHz	47~750 (862)	
8	CNR	dB	≥52.0	GY/T143-2000 6.2.3.5
9	Flatness	dB	±0.75	GY/T143-2000 6.2.4
10	RF input level	dBuV	78~88	AGC automatic control
11	C/CTB	dB	≥65.0	GY/T143-2000 6.2.5
12	C/CSO	dB	≥65.0	GY/T143-2000 6.2.6
13	RF input impedance	Ω	75	
14	RF Input Return Loss	dB	> 16(47~550)MHz > 14[55~750(862)MHz	GB/T11381.1 4.2.2.2.5
15	VCC	V	90~265Vac	Optional -48VDC
16	Power	W	≤50	Single-supply operation
17	Working Temperature	℃	0~50	Automatic temperature control
18	Storage temperature	℃	-20~85	
19	Working relative humidity	%	20%~85%	
20	Size	"	19"×11"×1.75"	(W) x (D) x (H)
21	Network management interface		RJ45	supporting The browser and SNMP

Note:

- 1) 1) In the condition of stipulated link-loss, configurate 59 PAL-D analog television channel signals within 550MHz frequency, in the range of 550MHz ~ 750 (862) MHz frequency transmit digital modulation signals, digital modulation signal level (in 8MHz bandwidth) is 10dB lower than the analog signal carrier level,when the optical input power is 0dBm, you can measure the carrier combination triple beat ratio (C / CTB), carrier combination of second-order beat ratio (C / CSO) and the carrier to noise ratio
- 2) Fiber:50KM+EDFA。

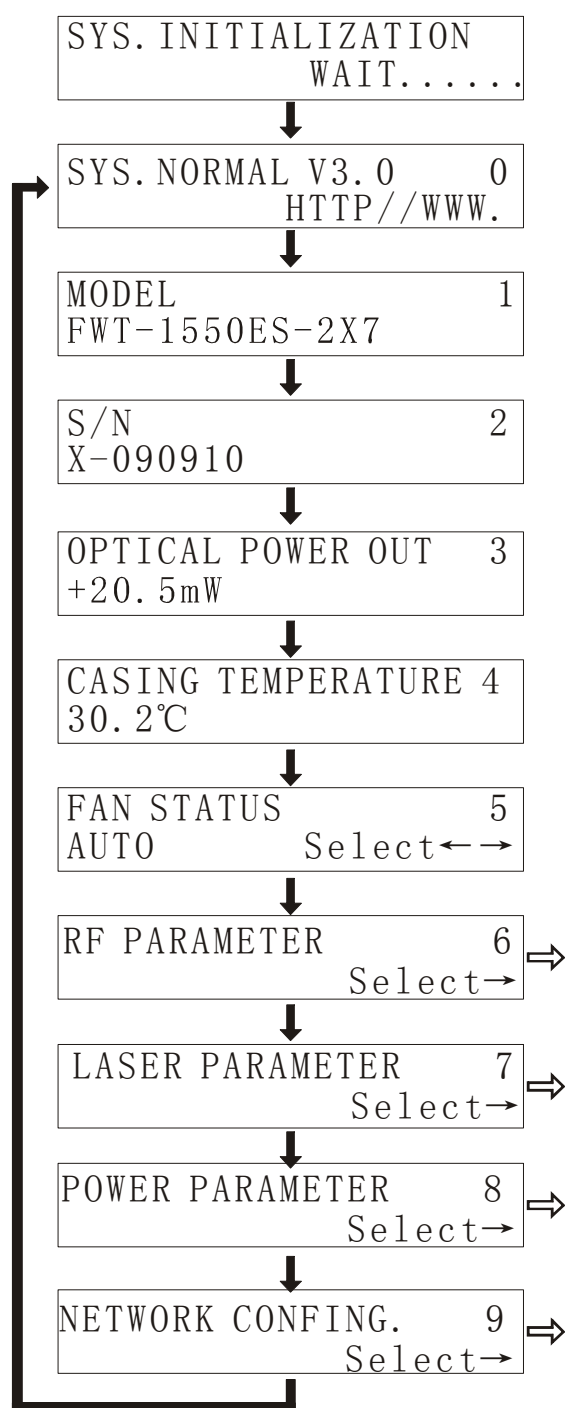


图 (1)

4 Operation instruction

4.0) Boot Show: plugging the power connected to AC220V power supply, panel LCD displays "SYS_INITIALIZATTING Wait", after the System Initialization , the LCD panel displays in Figure (1) as shown in page "0". If the LCD displays the initial screen is always a standstill and only "... .." In the blink, "TEMP indicator light is red", there are problems in the initial process of the equipment. The general problem is that the temperature offsets the rating too much. (Note: If your monitor is VFD, the VFD brightness declines to a minimum in standby mode, this is done to protect the VFD life, simply click the button "▲、▼" to wake up, LCD is not set this feature).

4.1) Product Type: Figure (1) page "1"

4.2) Product serial number: Figure (1) page "2"

4.3) the device's output of real-time optical power: Figure (1) page "3".

4.4) Chassis temperature: Figure (1) page "4".

4.5) fan status: Figure (1) page "5". The fan, a total of three kinds of working state can be adopted .In the current page, click the "↻" key to change the working state, while in the "AUTO" state, when the device internal temperature is higher than 35 °C, the SCM will automatically open the chassis fan to cool, and it will not close until the temperature dropped to 30 °C.

4.6) RF parameters: Figure (1)page "6". In the current page, click the button "↻" to query or set RF parameter.

4.6.1) RF-level instruction: the RF input level of rear panel is proposed greater than 80dBμ. Figure (2) as shown.

4.6.2) AGC / MGC status: in the current page, click the button "↻" to change the working state. Figure (2) as shown.

Whether the current state is AGC or MGC, adjusting the "OMI" fine-tuning

knob in the front panel will affect the RF level which Loaded into the laser, that is changing the RF modulation. However, there are essential differences between the two, in the AGC state, although adjusting the "OMI" fine-tuning knob in the front panel can change the RF modulation, at this time once the "OMI" will not be regulated, to change the input lever of RF of the rear panel (in the AGC control range) ,the RF Modulation will not change. But for the MGC state, this adjustment is only for the use of RF attenuation.

Excessive RF modulation causes the CSO / CTB of system severe degradation, while the low modulation causes the CNR of system serious degradation, the contradictions between the two mutually restrict the dynamic range of modulation, so need discretionary grasp.

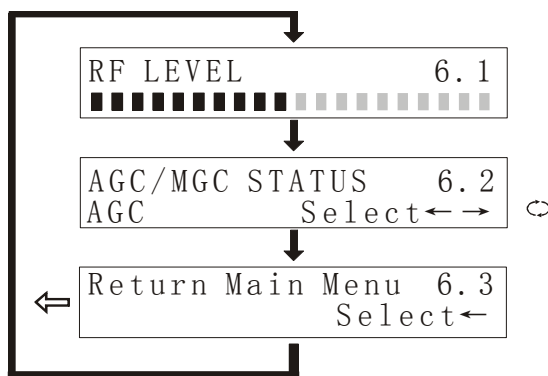


图 (2)

4.7) External modulator operating parameters: Figure (1) page "7". In the current page , click the button "↻" to query or set the laser parameters.

4.7.1). External modulator operating point: controlling the external modulator operating point is the core technology of 1550nm external modulator optical transmitters. Whether the operating point tracks automatically the optimum value of CSO is an important basis for ensuring the CSO indicators of the

system As shown in Figure (3).

4.7.2) SBS status: on the current page may be through the key "↻" to change the working state. For the actual network, set the SBS suppression value to achieve the optimal network performance. According to the following steps, can determine the appropriate SBS suppression values for the actual optical link.

4.7.2.1) First of all, see the actual design of the network to determine the maximum optical power that the fiber optic transmission link enter. Note that this power value is not EDFA output values. Nor is the input values between the optical devices and optical fiber passive components, the best is measuring the actual optical power in the transmission fiber.

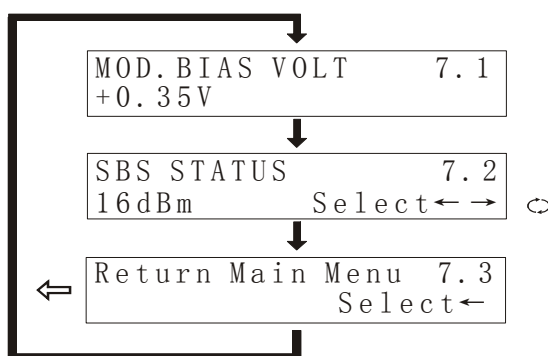


图 (3)

4.7.2.2) After determining the chain's largest optical power into the fiber, record this value.

4.7.2.3) Now use the SBS of the front panel to adjust the menu, set the SBS suppression threshold (that is, in step 4.7.2.2 recorded value). In this way, the transmitter will automatically carry out an index optimization, respectively, to meet the optimization requirements of the CNR (low-frequency) and CSO

(high-frequency) .

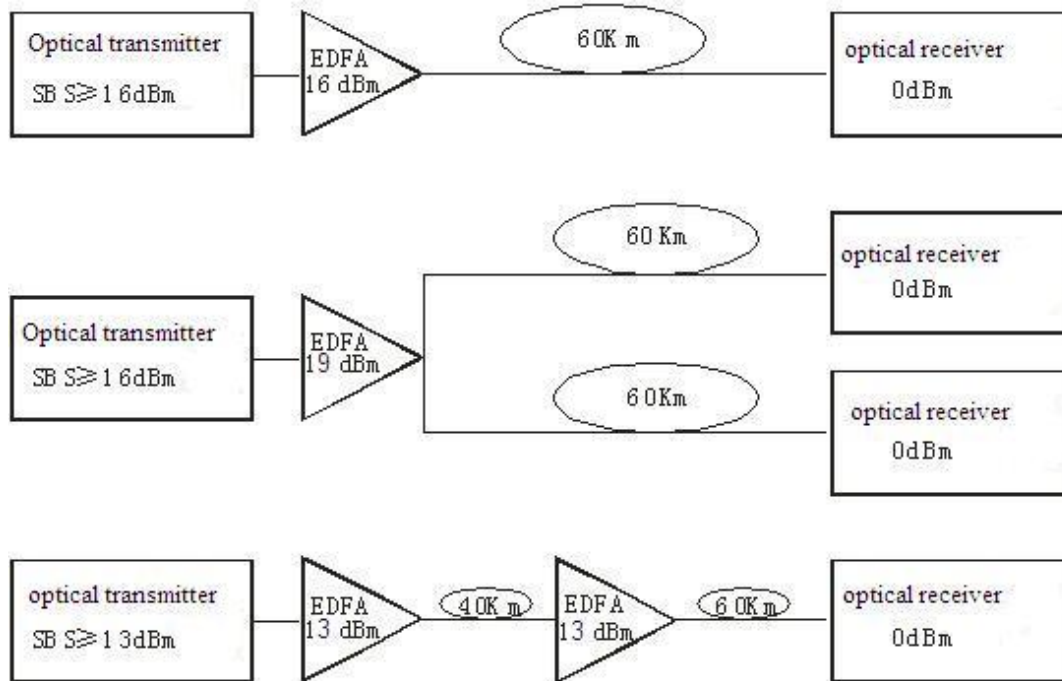
4.7.2.4) recommending that the SBS suppression value is no more than +18 dBm, the current transmitter does not support that the value of SBS suppression is higher than 18dBm,

4.7.2.5) If the actual optical power is below +13 dBm, transfer the SBS suppression of the transmitter to minimum (that is, +13 dBm), so it can ensure that the optical link operate in the best condition.

4.7.2.6) Make sure the transmitter SBS setup is correct, the use of SBS does not exceed this value; the most low-end channel CNR (Carrier to Noise ratio) can be measured with the instrument. If the CNR value is within the specified scope, you no longer have to adjust the SBS setup of the transmitter

4.7.2.7) SBS is a kind of physical phenomena occurred in the input light power exceeds a certain threshold -, that is, in the fiber the input light is converted into a backward scattering Stokes (Stokes) light, so that the forward signal light is non-linear attenuation, and then the backward may return to the transmitter that cause fluctuations of the input optical power ,and the formation of noise, it is a role process of light waves and acoustic parameters, SBS is accumulated in 1550nm fiber optic long-distance transmission. Small-power into the fiber is the most preferred program. Thus, selection or use of optical amplifiers, we should note that the relationship between the saturation output power of optical amplifier with SBS indicators and the transmission distance.

4.7.2.8) When the configuration system, we need to understand the SBS suppression value of the transmitter as well as the fiber maximum transmission distance. If the optical transmitter specification marked: "the SBS value is 16dBm" or "covering 60 km fiber link", then the EDFA 's (optical amplifier) optical power that directly into the fiber can not exceed 16dBm; total distance of optical fiber link do not exceed 60 kilometers best. As shown below, these types of configuration, entry-fiber optical power is less than the nominal value of SBS.



When the nominal SBS suppression of the transmitter is greater than 16dBm, the design can be changed correspondingly , consult the Equipment supply-side the specific situation.

4.8) laser parameter query: Figure (1) "8" page. Under the current page through the "" button to carry out Laser parameter query, shown in Figure (4) as follows:

4.8) laser parameter query: Figure (1) page "8". In the current page , click the button "◁" to query Laser parameters, Figure (4) as shown.

4.8.1) laser Bias current: laser diode has nominal operating current, when the operating current is greater than 130% of rated current, the working life of laser are affected, even damage the lasers. Therefore, when the detected laser operating current is greater than 130% of rated current. The internal hardware circuit of equipment has limited its scope.

4.8.2). Laser Temperature: lasers work properly at 15 °C ~ 35 °C temperature range. LCD displays the actual temperature of laser, such as "25.5 °C",

4.8.3) laser cooling current: In order to ensure the internal temperature of laser range from 20 °C ~ 30 °C, we should provide Thermoelectric cooling device a certain amount of operating current.

4.9) Power parameter query: Figure (1) page"9".In the current page click the button " ◁ " to query the power parameters, as

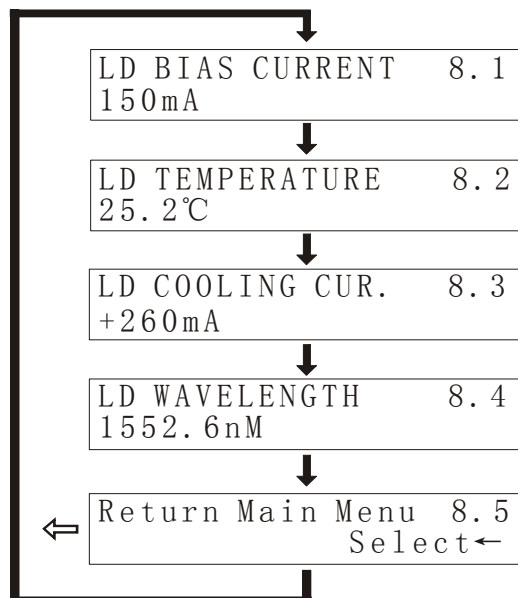
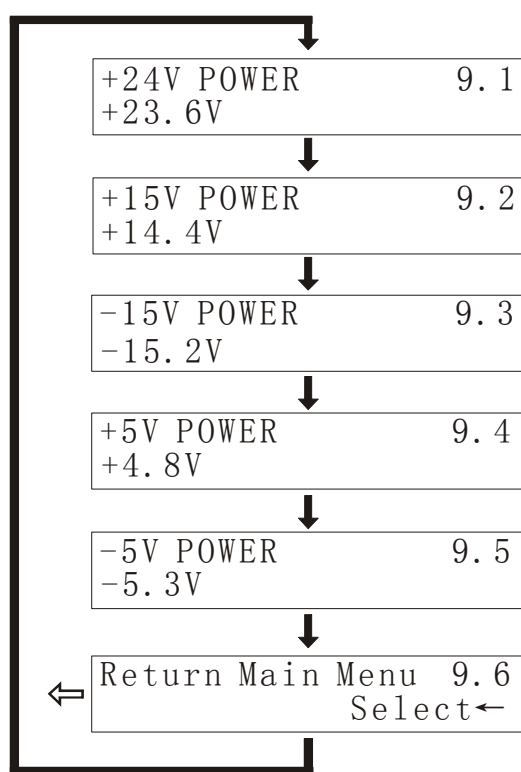


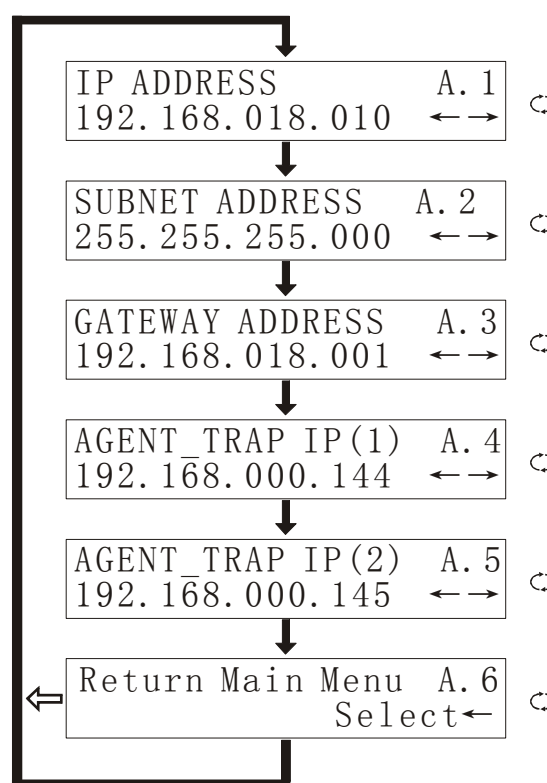
图 (4)

shown in Figure (5).

Power supply voltage detection circuit (+5 V,-5V, +12 V,-12V, +24 V):the laser is a more expensive devices, in order to ensure the safe and reliable work, if the power supply circuit is normal ,it is a precondition. So this machine attaches a microprocessor to monitor the circuit in real time, when it detects the power is within the normal range, LCD displays the conventional values of the Separate ways power supply.



图(5)



图(6)

4.A) setting IP address: Figure (1) page "A". In the current page click the button "↻" to search and configuration net (if you didn't purchase the network transponders, you can skip this step)

In the LAN, this machine should be assigned an IP address and related information. Click "▼" to enter "NETWORK CONFING. A" and click "↻" to enter in Figure (4) The Flowchart shown in pages A.1.

4.A1) setting IP address: Press key "↻" to enter the first one of paragraph 1 of IP address, click "▲" the number increases, click "▼" number decreases, after the number is selected well ,press "↻" key to enter the second setting, and so on. If there is only one paragraph, the front figures are 0.

4.A.2) mask: Click "▼" to enter the following sequence flow chart on page A.2, general equipment has been set "255.255.255.000" in the factory, so adjustment is unnecessary.

4.A3) Default Gateway: Setting method ibid.

4.A.4) the preferred DNS settings: Setting method ibid.

4.A.5) alternate DNS settings: Setting method ibid.

5 Network management applications

HFC network management system, has always been a difficulty that concerned by users and manufacturers. Imported equipment is generally claimed with a network management system which is based on industry standard RS232 or RJ45 interface. In order to achieve the network management, the users need to purchase high-cost private network management software. And each manufacturer's software is not compatible with each other. To achieve network management is very difficult. at present ,there are no news report about available network management in Domestic system. If adopt the SNMP, the users also need to purchase specialized network management software and there are incompatible issues between manufacturers. Many domestic manufacturers also claim that their equipments have a network management system or are compatible with the AM company's network management system. but the device's RJ45 or RS232 interface is basically vacant and can not achieve the network management functions.

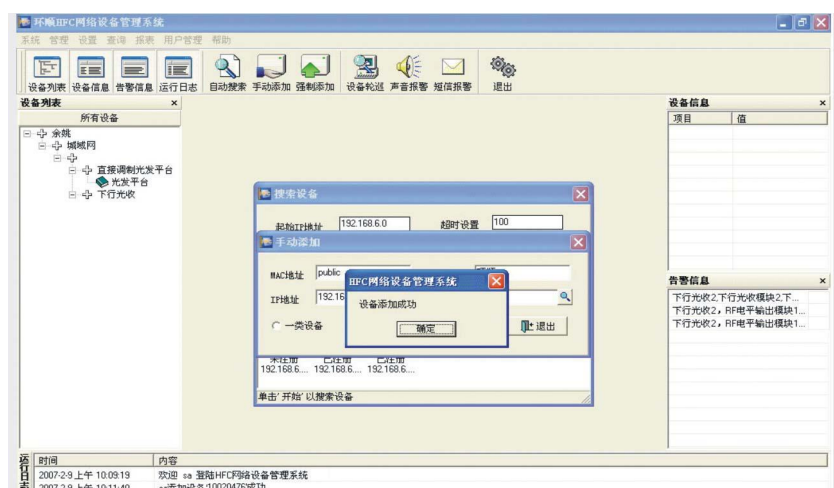
Our company is the well-known manufacturers in the cable broadband optical transmission system. we have been concerned about how to use the most economical and most convenient way to achieve the network management in the cable broadband networks. Now the ESV6.0 network management system launched by our company is a new network management concepts based on the SNMP / TCP / IP protocol .

5.1 The interface of integrated work of the monitor server

After plugging the optional transponder ,the machine has the function of network management, just need to connect the RJ45 interface signals to the LAN, and connect to the main server from any of the LAN Ethernet port.,then set up IP addresses, according to the method in 4.A etc. so we can monitor the machine's running conditions real time when the network management system is running



5.2 The search interface of the equipment



6 The notes about optical connection

6. .1) before you connect them, carefully clean all the fiber optic connectors and connectors

Cleaning Guide:

6.1.1) Fiber Optic jumper

Removal the dust cap of fiber optic connector, pay attention to confirm the optical connector is a APC surface;

The tips of cleaning fiber optic connector is to use a dedicated and dry cloth without velveteen (the company 5Kimwipes ®'s fine cloth); In addition, preferably adopt special microscope (at 100 times, 200 times) to check the cleanliness of fiber

optic connector surface or blemish.

pay attention to maintaining the fiber optic connectors is clean;

fiber optic connectors (flange) is clean

you can use a dedicated compressed gas to clean the surface of fiber optic connector;

you can remove the dust which is less than 0.2 microns, better without residue;

hold the tank of compressed air from the connector about 6 inches, alignment flange, and press the nozzle switch shortly times,so you can clean the connector completely;

if there is no dedicated compressed air, the 2.5 mm cotton swab for cleaning can also be used to clean the optical transmitter connectors, or remove the flange and clean the optical fiber jumper connector of the other side directly ;

Note: When handling fiber optic connectors must be very careful to avoid damage.

6.1.2) using the optical fiber jumper to connect the output of optical transmitter to the optical power meter;

6.1.3) rotating the key switch on the front panel of laser transmitter to the "ON" (open) position;

6.1.4) Using the optical power meter to check the output of the transmitter optical power is within normal limits;

7 Other notes

7.1) The machine should have a good grounding, grounding resistance should be smaller than 4Ω . According to international standards, 220Vac line adopt three-wire system, the midline is grounding wire.

7.2) The machine should be set up in anti-hot, anti-cold, anti-wet environment, so as to avoid excessive temperature and humidity affect the use life of machine.

7.3) The machine adopts high-performance, highly reliable switching power supply with constant voltage and over-current protection. In the internal of switching power supply ,there is 2A fuse of import that can be work at 85Vac \sim 265Vac electrical line. The machine using a dual power supply, which can be used for a cold, hot backup, it is recommended to use hot backup.

8 The scope of the product warranty

The company's quality assurance system, includes equipment testing and inspection of operational procedures, thus ensure the reliability of product quality. Prior to the product exporting from the Company, we adopt all possible measures to make the electrical, optical, mechanical and other indicators of products have reached the standards promulgated. The Company requires the user to monitor on-site inspection and assembly; the testing personnel should be carry out related operations

In strict accordance with the preventive measures formulated when they operate and test optical static sensitive devices.

8.1) Warranty Rules

For users' first-hand products, the company repair them in the area of materials and manufacturing processes free of charge one year since users pick up them.

Using this product, please follow the requirements on the instructions strictly, do not arbitrarily change. In the warranty period, the user can not break the seal, the internal circuitry can not be changed. If the product does not meet quality requirements or experience problems to be solved, please return the products to the company, the company will handle according to the warranty provisions.

In the warranty period, users have the right to repair or replace the defective product confirmed by the company. However, the above provision is considered invalid to change ownership, or the irregularities caused by use, storage, transport, assembly or accidents.

8.2) assurance for specific product and guide to repair

All products are produced according to high-quality standards to ensure that avoid the failures in technology, materials and external framework, etc. If requests maintenance or return faulty equipment, the user should raise the equipment within 30 days after receipt goods or warranty period, please follow the following principles:

8.2.1) you shall return them after you receipt the Recycling Single issued by the company's sales department. When you apply return, please attach the device model, serial number and return reasons, and requested prepay return shipping. If you do not pay the freight in advance or no recycling single, the Company will not receive.

8.2.2) before the repair, the Company will inform the user about the equipment test results and maintenance costs (generally about the failure caused by the users or issues which do not meet the warranty conditions). If the returned facilities fully meet the quality requirements and don't need to repair, or the user does not require repairs outside of warranty service, users have to pay the basic fee. Only when the user acknowledge all the costs of maintenance, the company carry out repairs. Similarly, only with the user's consent, the company will be able to replace equipment parts (such as connectors), which is very necessary to the company's testing and repair.

8.2.3) the products repaired enjoy the same shelf life, and enjoy warranty treatment within 90 days after pick up the goods.