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OTEA-CO-B Series EDFA

Single Stage EDFA

Operation Manual

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SAFETY PRECAUTIONS



The OTEA-CO-B EDFA emits invisible radiation that can cause permanent eye damage. ***AVOID DIRECT EXPOSURE TO BEAM.*** Operate the transmitter only with the proper optical fiber installed in the transmitter optical connector. Power to the OTEA-CO-B EDFA should be turned off or preferably, disconnected whenever the optical connector cover is opened and there is no installed fiber (as when the fiber connector is being installed or removed from the optical connector).



When the amplifier is working in normal state, the output power of light with wavelengths in the invisible range (infrared light) may exceed +26dBm (400 mW). Therefore, to avoid damaging your eyes, do not look into the output port of the EDFA directly.

NEVER look at the end of the fiber to see if light is coming out. **NEVER!** Most fiber optic laser wavelengths (1310nm and 1550nm) are totally invisible to the unaided eye and will cause permanent damage. Always use instruments, such as an optical power meter, to verify light output. “Optical instrument” includes magnifying glasses, microscopes, etc.

NEVER look into the output of the EDFA or a fiber connected to an EDFA.

NEVER look into or use any optical instrument to view the distant end of a fiber that may be connected directly or via an optical splitter, to a transmitter or EDFA that may be operating. This specifically applies to fibers that are to be connected to receivers (such as the OTPN-1000) or other devices at any distance from the laser transmitter or EDFA.

ALWAYS read the product data sheet and the laser safety label before powering the product. Note the operation wavelength, optical output power and safety classifications.

If safety goggles or other eye protection are used, be certain that the protection is effective at the wavelength emitted by the device under test **BEFORE** applying power.

ALWAYS connect a fiber to the output of the device **BEFORE** power is applied. Power should never be applied without an attached fiber. If the device has a connector output, a connector should be attached that is connected to a fiber. This will ensure that all light is confined within the fiber waveguide, virtually eliminating all potential hazard.

NEVER look at the end of the fiber to see if light is coming out. **NEVER!** Most fiber optic laser wavelengths (1310nm and 1550nm) are totally invisible to the unaided eye and will cause permanent damage. Always use instruments, such as an optical power meter, to verify light output.

HIGH VOLTAGE

The inside of the OTEA-CO-B EDFA contains no user serviceable parts. There is exposed high voltage inside this unit. Only authorized factory service technicians should open the unit with power applied.

SHOCK HAZARD

The OTEA-CO-B EDFA is designed for indoor use only. Direct exposure to moisture must be avoided.

If you have questions about laser safety procedures, please call Olson Technology before powering your product.

The fiber amplifier is sensitive equipment. Therefore, please do not open the case of the amplifier to avoid damaging the internal component devices. Opening the case of the amplifier without the written permission of Olson Technology, Inc., will void the warranty.

INTRODUCTION

Olson Technology, Inc., a major manufacturer in fiber optic components, provides a wide range of Erbium Doped Fiber Amplifiers (EDFA's), for 1550nm HFC networks. They features low noise figure, stable output power and excellent environmental stability. It is the ideal optical amplifier for the HFC networks.

The EDFA is made up of two main parts:

EDFA Gain Module: This is the core of the EDFA which amplifies the optical signal in 1550 nm wavelength band (1540-1560nm typically). It is made of high quality optical components, and carefully designed to maximize overall performance. Low power EDFA's may only have a single pump, while high power units can have up to three pumps.

The Block Diagram of OTEA-CO-B Series EDFA is shown below:

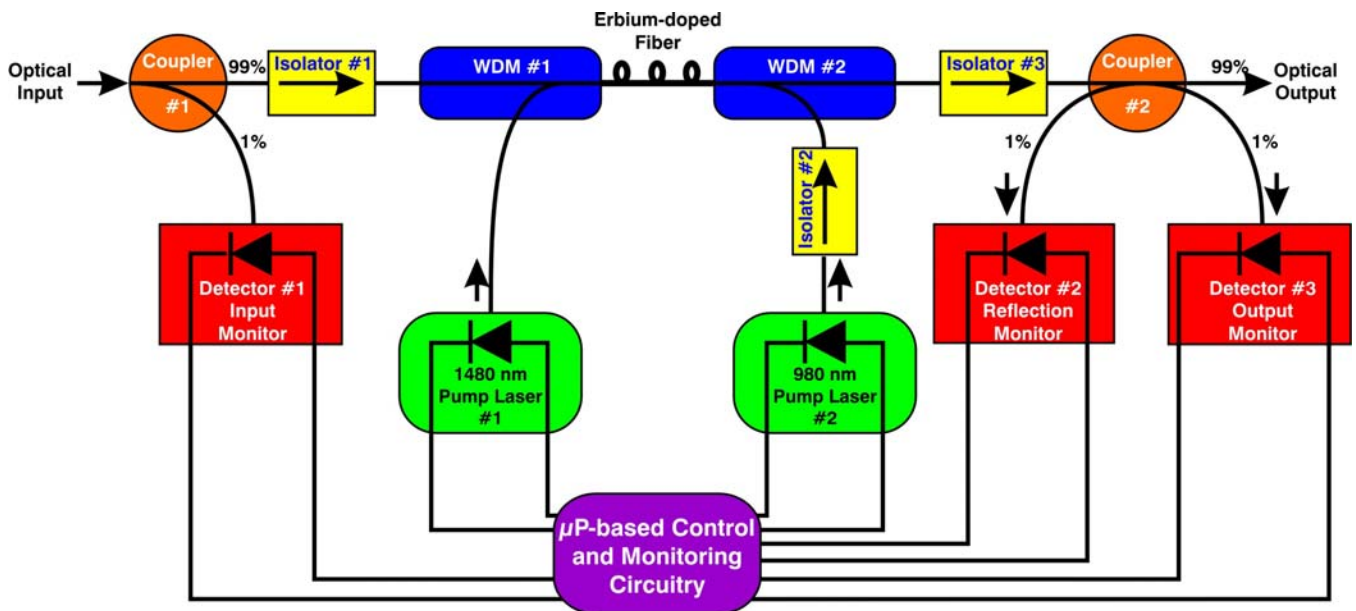


Figure 1 - EDFA Gain Module

External Control System: This is the necessary part of the EDFA to ensure that the gain module is working optimally. Controlled by microprocessor, it monitors the states of the gain module, such as pump power, pump temperature, pump current, input and output power, and adjusts all the parameters to ensure a stabilized output power of the gain module. Moreover, this system provides warning functions, which can give warning signal through the LED's on the front panel of EDFA when the working state of the amplifier is abnormal. The detailed working parameters of the EDFA are shown by the LCD on the front panel. This information can also be accessed via RS-232 interface by an external computer.

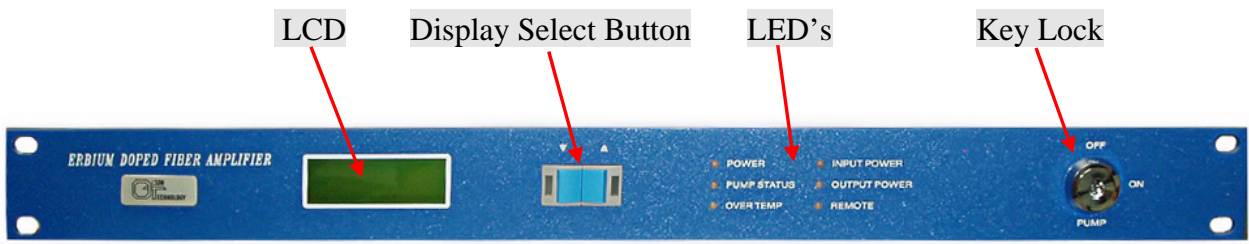


Figure 2 - Front Panel of OTEA-CO-B EDFA

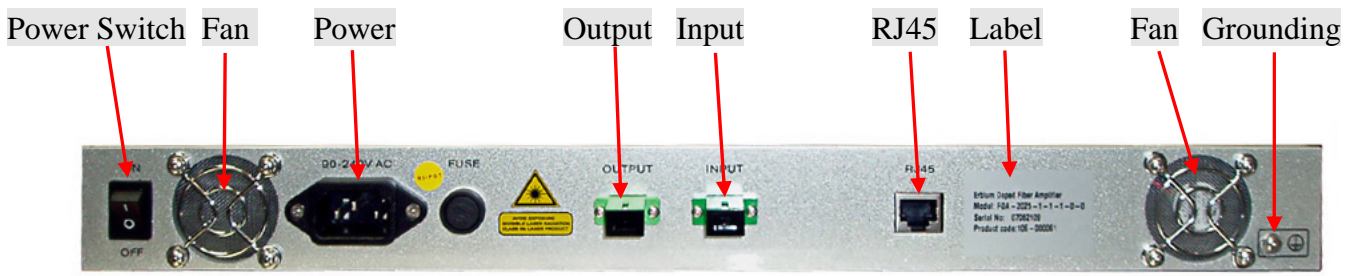


Figure 3 - Rear Panel of OTEA-CO-B EDFA:

SPECIFICATIONS

1. Optical Performance

Input power:	-5dBm to +10dBm
Output power:	+13dBm to +26dBm
Wavelength range:	1540nm to 1560nm
Typical noise figure:	≤5dB (with 0dBm input power at 1550nm)
Optical interface:	SC/APC Standard, FC/APC optional

2. Operating Conditions

Operating temperature:	0°C to +50°C
Storage temperature:	-25°C to +65°C
Relative humidity:	95% (Noncondensing)

3. Power Supply

Voltage:	90~240V _{AC} , 50 Hz, or -48V _{DC}
Power consumption:	<50W

4. Mechanical Specifications

Dimension:	17.0" (W) x 10.2" (D) x 1.71" (H) 434mm (W) ×260mm (D) ×43.5mm (H)
Weight:	5 kg
Installation:	Standard 19" 1RU rack

OPERATION INSTRUCTIONS

1. Connection

- * Connect the EDFA to the power supply when EDFA's power switch and key lock are both off
- * Be sure that the input optical power is in the right range, and the optical interfaces of the patch cords used are in accordance with those of the EDFA.
- * Connect the patch cords to the input and output interfaces

2. Turn EDFA On and Off

- * First turn on the power switch (in the back panel), the LCD will display and LED will light. Then open the key switch, and EDFA will be in the normal working state
- * To turn off the EDFA, first close the key lock, then turn off power switch after a moment

3. LED Indications

The six LED's indicate as follows:

- * POWER - Power indicator - Shows green when the power is on
- * PUMP STATUS - Pump states indicator. It shows green when the pump works in normal states, and shows red when the pump is not working. The pump will be shut down in these cases: input power is less than -5dBm, pump temperature is higher than 35°C, pump current value exceeds its limit value
- * INPUT POWER - Input power indicator - It shows green when the input power is in its right range, and will shows red when the input power is less than -5dBm
- * OUTPUT POWER - Output power indicator - Shows red when the output power is 3dB less than the rated output power, otherwise shows green
- * OVER TEMP - Over temperature indicator - Shows green when pump temperature is below 35°C, otherwise shows red. Moreover, it will flash green when the fan is broken out and flash red when pump TEC current is higher than 3A
- * REMOTE - Remote connection (optional) - Remote control Shows green when the amplifier is connected with external computer through RS-232 interface or RJ-45.

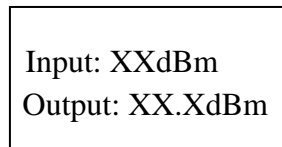
4. LCD Display

The LCD screen in the front panel is to show the detail information of EDFA. Press the blue key to show these parameters circularly.

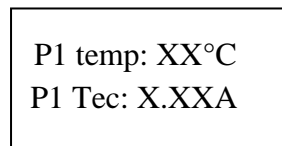
Content display:
It displays the model of EDFA



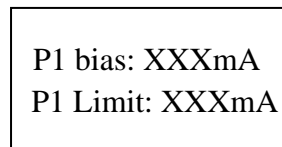
Input Power
Output Power



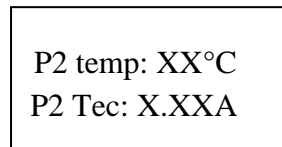
Pump1 Temperature
Pump1 Tec



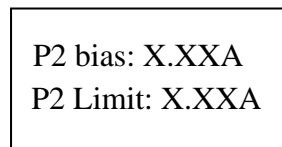
Pump1 Bias Current
Pump1 Limit Current



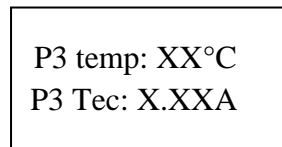
Pump2 Temperature
Pump2 Tec



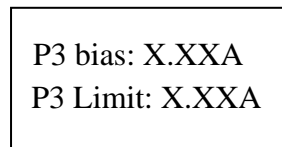
Pump2 Bias Current
Pump2 Limit Current



Pump3 Temperature
Pump3 Tec



Pump3 Bias Current
Pump3 Limit Current



ERRORS AND MAINTENANCE

When EDFA is at its normal working state, the first five LED's on the front panel will all show green, and the last two are not lit. If any of the LED's shows red, it indicates an abnormal state. In this case, please make sure that:

1. The key lock is On

2. The input power is in correct range

If the value of input power is less than -5dBm, the *INPUT POWER* LED will show red. In this case the pump will turn off, and the EDFA will stop working.

3. Environmental temperature is suitable for EDFA working in its normal state

The working temperature for EDFA is from 0°C to 50°C. Too high environment temperature will cause the TEC current exceed its limit, thus *OVERTEMP* LED will show red to give a warning. When the pump temperature exceed 35°C, EDFA will shut off the pump automatically, and the *PUMP STATUS* LED will also show red. The EDFA may not work in very cold environments as well.

Please contact us if the problem cannot be solved after trying the above steps. Do not attempt any repair.

VI SNMP NETWORK MANAGEMENT USER GUIDE

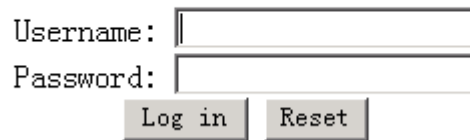
Accessing server management

1. Start the web browser and type the URL: <http://xxx.xxx.xxx.xxx>.

Note: xxx.xxx.xxx.xxx is the default IP address.

2. The login screen of EDFA Network Management System is shown below:

Log in to EDFA Network Management System



Username:

Password:

Figure 6-1

3. The default Server Management user name is “admin”, and it is necessary to log in with this name for full access to the server.
4. Use the default password “snmpedfa” to log in.

Management Interface Summary

When the network manager of EDFA logs in, the web browser displays the following main interface:

MAIN INTERFACE

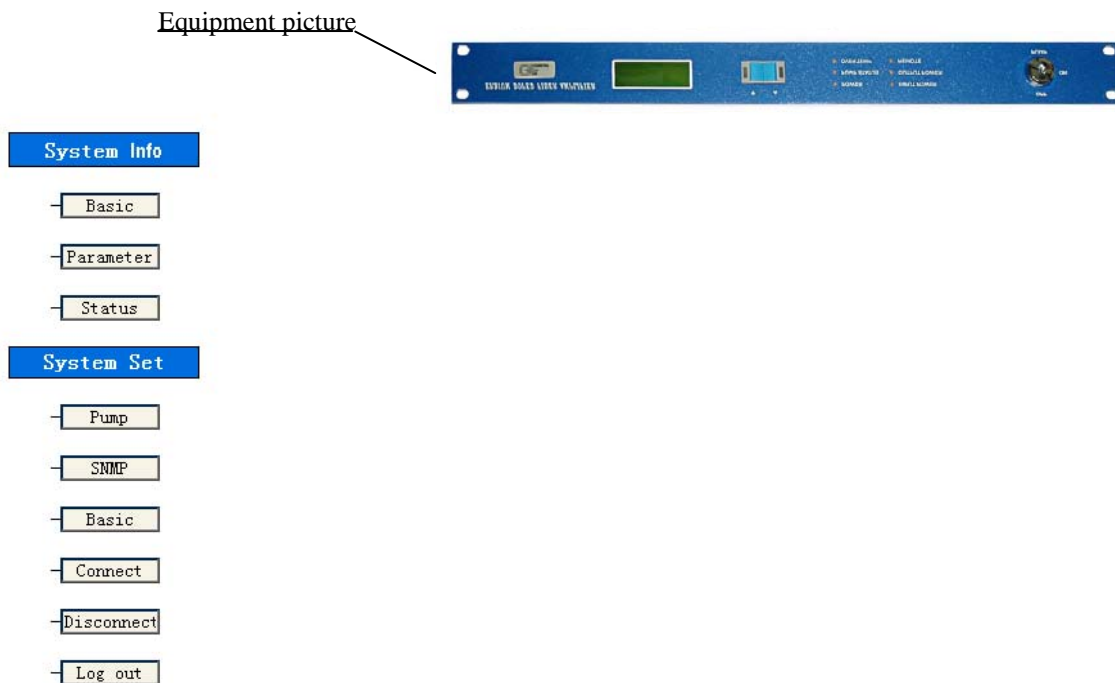


Figure 6-2

System Menu

Clicking on the different system menu will change the displaying area screen.

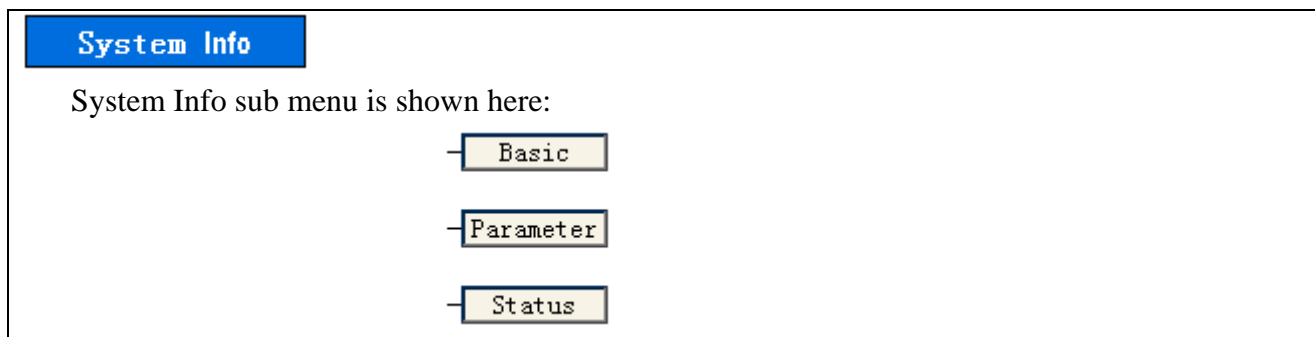


Figure 6-3

System Info sub menu explanation:

Basic: Click [**Basic**] to view the network basic information, the SNMP information and the user setting information for EDFA networking management system.

Basic Info

IP Address	192.168.1.239
Gateway	--- not set ---
Netmask	255.255.255.000
Trap IP Address1	192.168.001.117
Trap IP Address2	192.168.001.106
Trap IP Address3	192.168.001.113
Community Name(read)	public
Community Name(write)	private
Stat	Com Normal
Location	aaaaaaaaaaaaaaaa
Administrator	bbbbbbbbbbbbbbbb
Telephone	1111111111111111

Figure 6-4

Basic Terms:

IP Address: Unique IP address designated to this system.

Gateway: The IP address of the default gateway (router).

Netmask: The subnet mask of the IP address specified above.

Trap IP Address: IP address of the trap host to which a trap is issued.

Community Name (read): The read community to which the system belongs.

Community Name (write): The write community to which the system belongs.

Stat: Scan data elements status. Com Abnormal expresses unreliable or useless data status.

Com Normal expresses reliable or useful data status.

Location: Location where the system is installed (user setting).

Administrator: Administrator for the system (user setting).

Telephone: Contact telephone regarding the system (user setting).

Parameter: Click [**Parameter**] to view EDFA working parameters in a table.

Parameter Info

Input Power	3dBm
Output Power	19.3dBm
Pump1 Current	218mA
Pump1 TEC Current	348mA
Pump1 Bias Limit	350mA
Pump1 Temperature	25°C
Pump2 Current	368mA
Pump2 TEC Current	315mA
Pump2 Bias Limit	700mA
Pump2 Temperature	26°C
Pump3 Current	0mA
Pump3 TEC Current	0mA
Pump3 Bias Limit	0mA
Pump3 Temperature	0°C

Figure 6-5

Note: The EDFA management system can monitor up to three pumps, it can automatically identifies the number of pumps, if the parameters of a pump are all zero, then the pump is not present in the equipment.

Status: Click [**Status**] to view EDFA status.

EDFA Status Info

- Power Normal
- Pump status Normal
- Input power Normal
- Output power Normal
- Over temp Normal
- Remote Connected

Figure 6-6

Status items are explained as follows:

Power Normal: Power supply of EDFA is normal.

Pump status Normal: Pump works in normal states.

Pump Status Abnormal: The pump is not working. The pump will be shut down in these cases: input power is less than -5dBm, pump temperature is higher than +35°C, pump current value exceeds its limit value.

Input power Normal: Input power is in its right range.

Input power Abnormal: Input power is less than -5dBm.

Output power Normal: Output power is not 3dB less than the rated output power.

Output Power Abnormal: Output power is 3dB less than the rated output power.

Over temp Normal: Pump temperature is below +35°C.

Over temp Abnormal: Pump TEC current is higher than limit or pump temperature is above +35°C.

Remote Connected: The amplifier is connected with network management system.

Remote Disconnected: The amplifier is not connected with network management system.

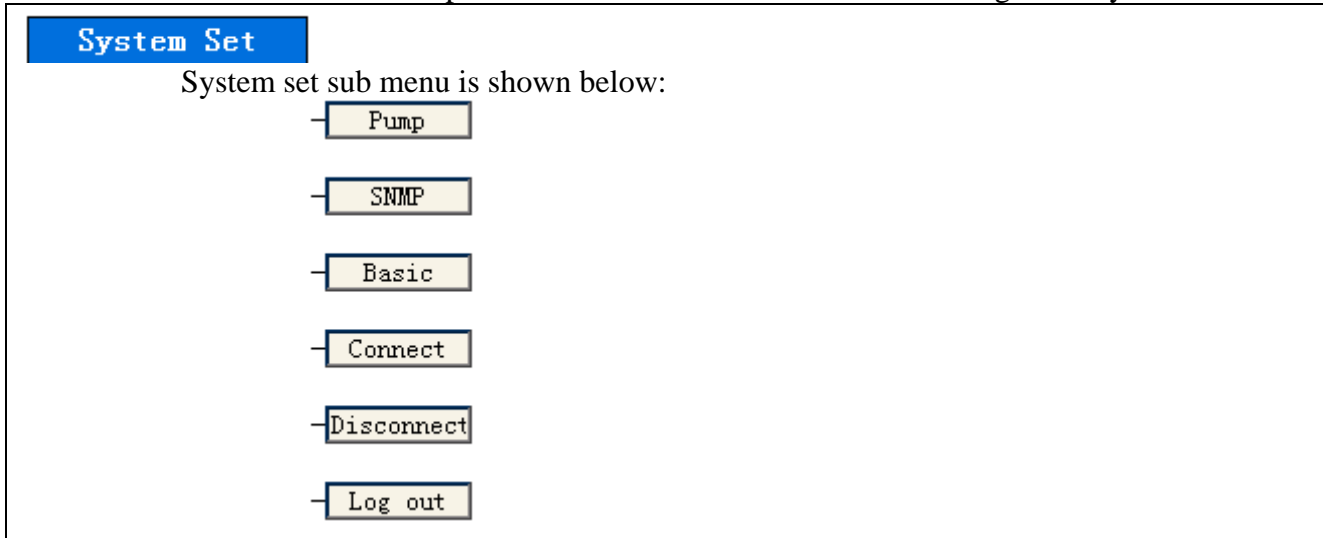


Figure 6-7

System Set Sub Menu Explanation:

Pump: Click [**Pump**] to view the pump setting.

Pump Current Adjust

In Figure 6-8, the boxes in the first line are for increasing current. The boxes in the second line are for decreasing current. Pump option is for selecting pump number. Level option is for adjusting step of pump current. Press down list boxes to choose the pump number, then appears Figure 6-9. Press down list boxes to choose the up/down level, then appears Figure 6-10. Click the UP button to increase the pump bias current, and click the DOWN button to reduce the pump bias current.



Note: Increasing or reducing the pump current may decrease of some EDFA parameters (like NF).

Pump Current Adjusting

pump	1	level	1	UP
pump	1	level	1	DOWN

Pump Switch

ON
OFF

Figure 6-8

pump	1
pump	1
	2
	3

Figure 6-9

level	1
level	1
	2
	3
	4
	5

Figure 6-10

Turn On/Off the Pump

In figure 6-8, click the button to enable the pump, click the button to disable the pump.

SNMP: Click [SNMP] to view the SNMP setting.

SNMP trap Address Setting: IP address of the trap host to which a trap is issued (three trap hosts are supported). The system enter into force upon setting.

SNMP Community Name: SNMP read/write communities to which the system belongs. The default name is CON. When the setting has been successfully completed, reset your system.

Note: If the SNMP trap address setting and SNMP community name options are successfully set up , 'setting success' will appear.

SNMP Trap Address Setting

Trap1 Address	192	168	1	113
Trap2 Address	192	168	1	117
Trap3 Address	0	0	0	0

Apply

SNMP Community Name

Community Name for Read	public
Community Name for Write	private

Apply

Figure 6-11

Basic: Network setup and user related settings.

Network Setting: Click [Apply] button to set IP address, netmask, gateway.

Other Setting: Click [Apply] button to set location, administrator, telephone.

Note: *The maximum length of the characters is 16 ,and the characters can ONLY be numbers(0-9),upper and lower case letters(a-z), and special characters such as “- , * , @ , _ , .”.*

Network Setting

IP Address	192	168	1	239
Netmask	255	255	255	0
Gateway	0	0	0	0

Apply

Other Setting

Location	aaaaaaaaaaaaaaaa
Administrator	bbbbbbbbbbbbbbbb
Telephone	1111111111111111

Apply

Figure 6-12

Connect: establish data collection and trap function.

Disconnect: close data collection and trap function.

Note: *The default setting is disconnect.*

Log out: Operator exit system and return to log in window.

VII. FAQ

Q: Why has communication failed between the management server and SNMP agent?

A: Please try the following steps.

- 1) Make sure Physical link is connected.
- 2) Test the connection to the administrative station through ping orders.
- 3) Check your IP setting (IP address, sub netmask and broadcasting address) make sure it is correct. If SNMP administrative station is in different networks, make sure to establish a suitable gateway IP address.
- 4) If SNMP can't communicate to management server and SNMP agent, please check SNMP parameter.
- 5) Check read community and write community.
- 6) If traps are not received, check whether the address of the administrative station is trap address, and whether IP address and community are correct.

IF the problem can not be solved through above steps, please contact the factory.