7 Configuration

7.1 Configure via Telnet

- The given example uses Microsoft Windows XP. For other OS, please assess accordingly.
- STEP 1: Click **Start** → **Run**.

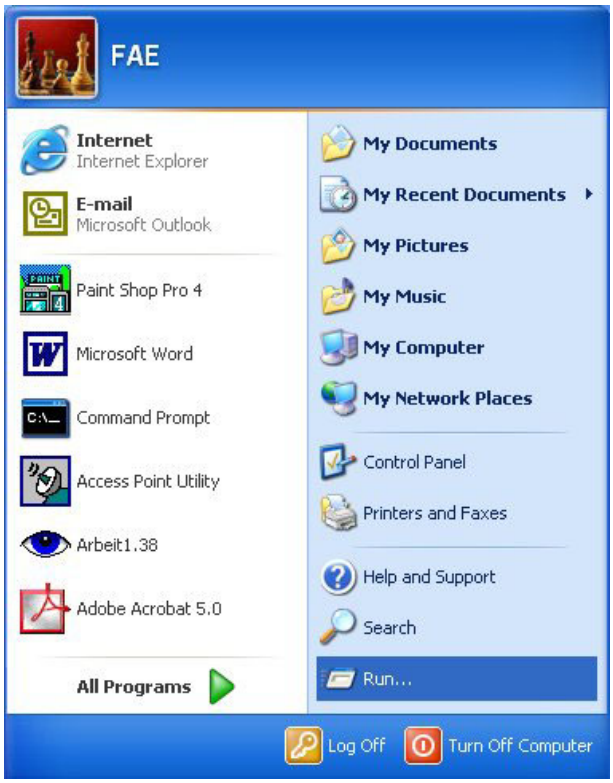

Figure 7-1 Configuration Process of telnet (1)

- STEP2: In the **Run** window enter command: telnet xxx.xxx.xxx.xxx.

  ✓ Default IP is 192.168.168.101.

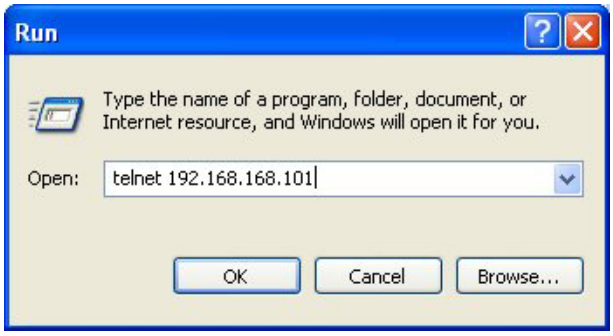

Figure 7-2 Configuration Process of telnet (2)

- STEP3: Click **OK** to continue.

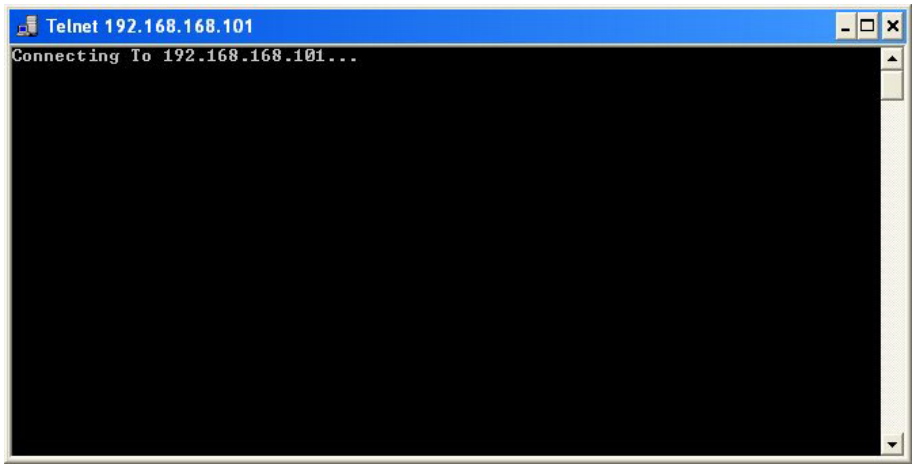

Figure 7-3 Configuration Process of telnet (3)

- STEP4: Enter username

✓ Default username: root.

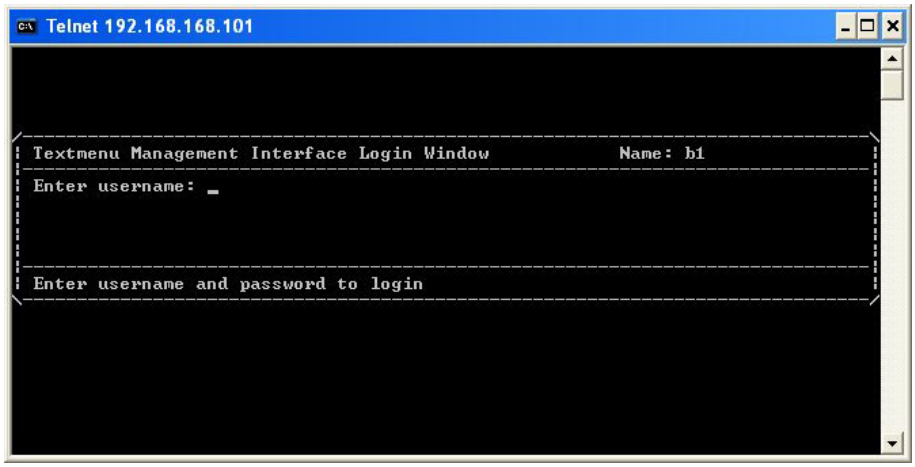

Figure 7-4 Enter Username

- STEP5: Enter password

✓ Default password: root.

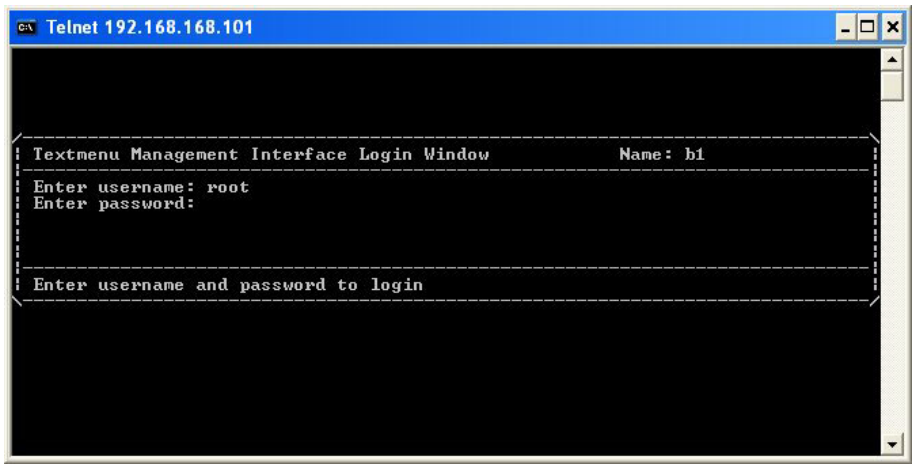

Figure 7-5 Enter Password

Then you could access textmenu to configure or setup detail parameters.

✓ We strongly recommend that after you setup all the parameters, you should change your password for security reason.

7.2 Configure via HyperTerminal

- The given example uses Microsoft Windows XP. For other OS, please assess accordingly.
- STEP 1: Click **Start** → **Accessories** → **Communications** → **HyperTerminal**.

Figure 7-6 Configuration Process of HyperTerminal (1)

- STEP2: Fill in the connection name in the column. Then press “OK” to continue.

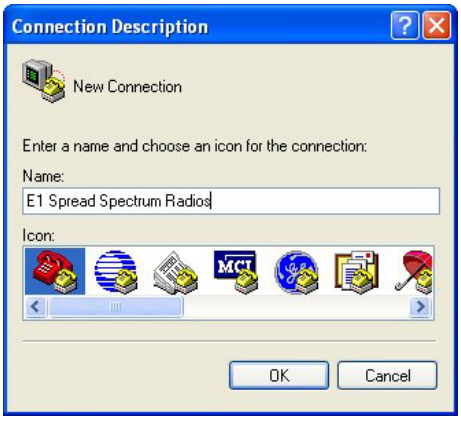

Figure 7-7 Configuration Process of HyperTerminal (2)

- STEP3: Choose the item of “connect using” to be TCP/IP(Winsock)”.

Figure 7-8 Configuration Process of HyperTerminal (3)

- STEP4: Fill in the IP address of the ETH port. The port number left to be default value of 23. Then press “OK”.

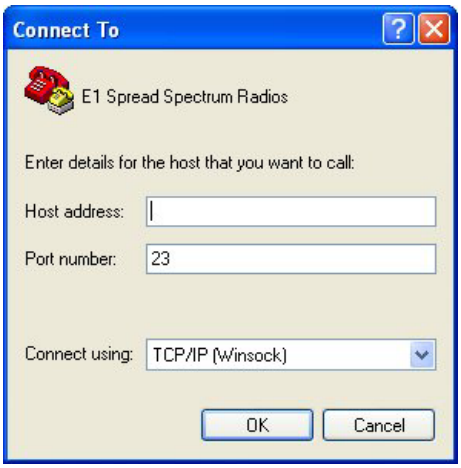

Figure 7-9 Configuration Process of HyperTerminal (4)

- STEP5: You will enter the login windows of HyperTerminal.

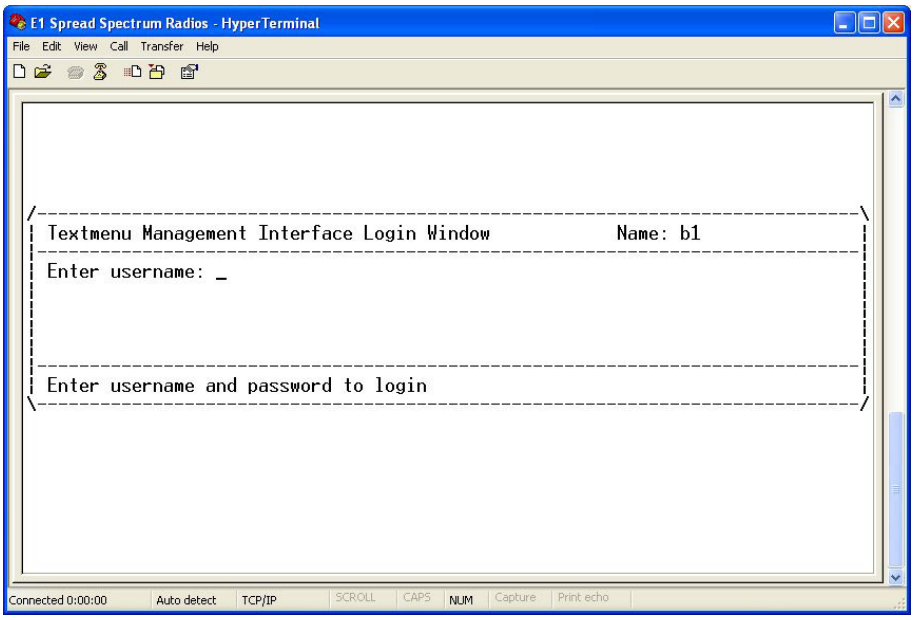

Figure 7-10 Configuration Process of HyperTerminal (5)

- STEP6: Then enter username and password. You will enter the textmenu configuration.

  ✓ We suggest you use the telnet to enter the textmenu. Because telnet could be operated in various operation systems.

8 Textmenu Details

After you login successfully, you will access the following windows of textmenu.

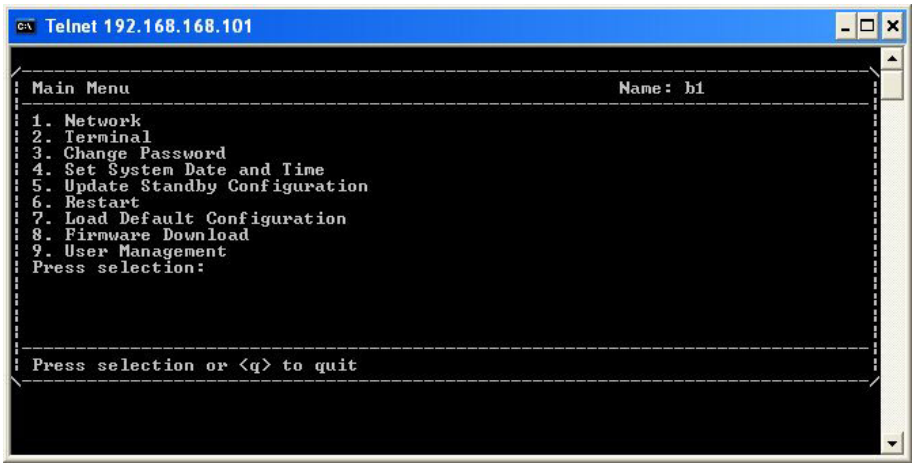

Figure 8-1 Main Menu of Textmenu

■ ***Note:*** Problems that might have occurred in using textmenu:

1. You might be incapable of deleting the words or selection you entered by backspace key. You could delete the words or selection by delete key or login via other telnet tools to implement your operation.
2. When you get event record, if you have no action for a long while, the information would be printed gradually in the windows instead of output to be a file. You should operate this command in the short period of time to avoid this situation.
3. If you login in the older version operation system such as Windows 95,98, the page would not display correctly. This is because that telnet tools version of operation system are older to automatically adjust screen manifest. We recommend using other telnet tools other than one in the operation system.

8.1 Network

In this page, you could setup all the network parameters such as IP address, Peer IP address, IP routing, SNMP setting etc.

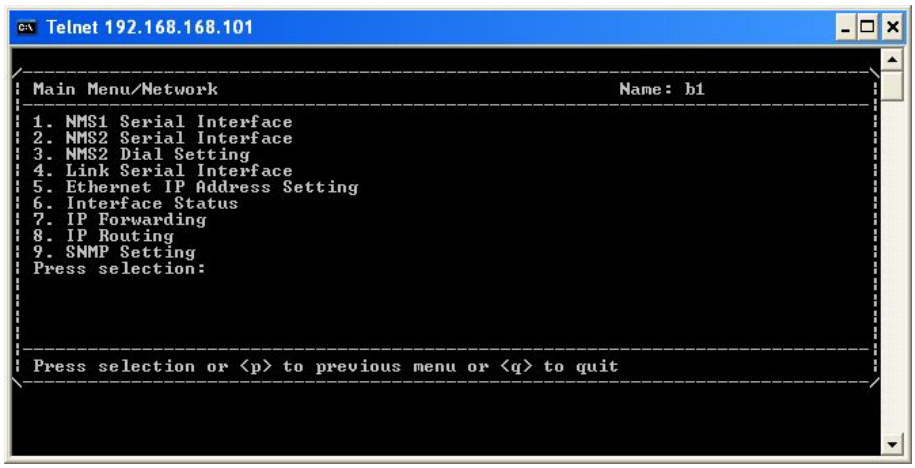

Figure 8-2 Network

✓ After you made any configuration of change in the item, you should restart to make the setting or change into effective.

8.1.1 NMS1 Serial Interface

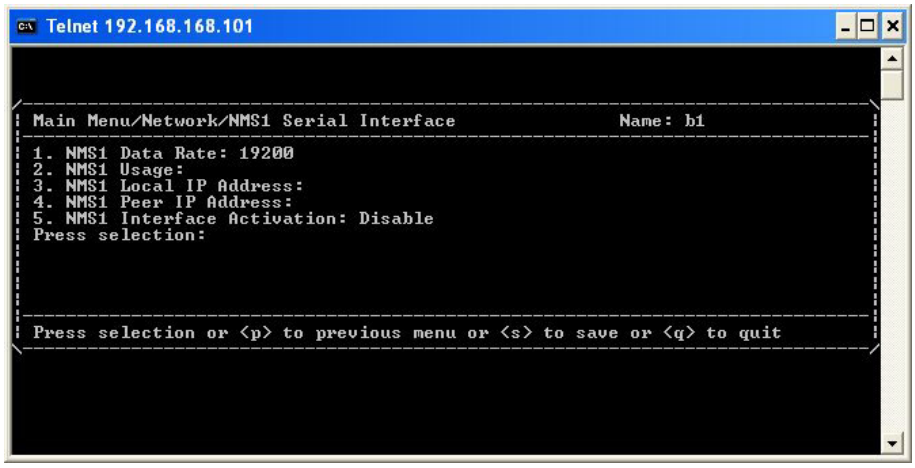

Figure 8-3 NMS1 Serial Interface

In this subpage, you could configure information of NMS1 interface.

NMS1 Data Rate: Data rate of NMS1 setting. There are 5 optional speeds: 9600, 19200, 38400, 57600, 115200. Default value is 19200.

✓ We recommend that you should set the value to 115200.

NMS1 Usage: There are 3 optional usages: Master Null Modem, Slave Null Modem, Connect with Computer. When NMS1 port establishes PPP connection with other equipments, you should choose value “Master Null Modem” in one end of the connection and “Slave Null Modem” in the other end. The NMS1 IP of equipment

which chooses to be “Slave Null Modem” is assigned by the Master equipment. Therefore, you don’t have to setup NMS1 IP of slave modem. When NMS1 port is to connect with computer, please choose “Connect with Computer”.

NMS1 Local IP Address: IP address of NMS1 port in local equipment.

NMS1 Peer IP Address: IP address of NMS1 port in remote equipment when PPP connection is established.

NMS1 Interface Activation: Enable or disable of NMS1 port. When you have to establish PPP connection via NMS1 port, you should set the value to “Enable”.

8.1.2 NMS2 Serial Interface

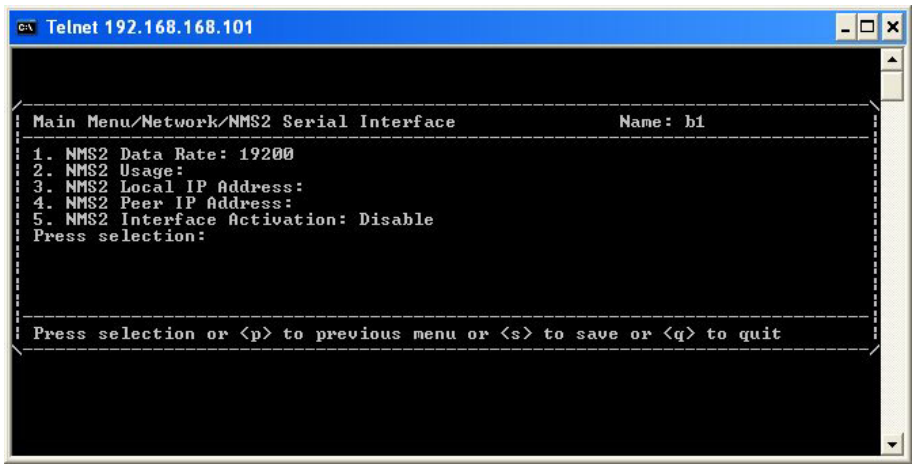

Figure 8-4 NMS2 Serial Interface

In this subpage, you could configure information of NMS2 interface.

NMS2 Data Rate: Data rate of NMS2 setting. There are 5 optional speeds: 9600, 19200, 38400, 57600, 115200. Default value is 19200.

✓ We recommend that you should set the value to 115200.

NMS2 Usage: There are 4 optional usages: Master Null Modem, Slave Null Modem, Connect with Computer, and External Modem.

When NMS1 port establishes PPP connection with other equipments, you should choose value “Master Null Modem” in one end of the connection and “Slave Null Modem” in the other end. The NMS2 IP of equipment which chooses to be “Slave Null Modem” is assigned by the Master equipment. Therefore, you don’t have to setup NMS2 IP of slave modem. When NMS2 port is to connect with computer, please choose “Connect with Computer”. When you have to connect modem to external modem such as dial-up modem, please choose “External Modem”.

NMS2 Local IP Address: IP address of NMS2 port in local equipment.

NMS2 Peer IP Address: IP address of NMS2 port in remote equipment when PPP connection is established.

NMS2 Interface Activation: Enable or disable of NMS2 port. When you have to establish PPP connection via NMS2 port, you should set the value to “Enable”.

8.1.3 NMS2 Dial Setting

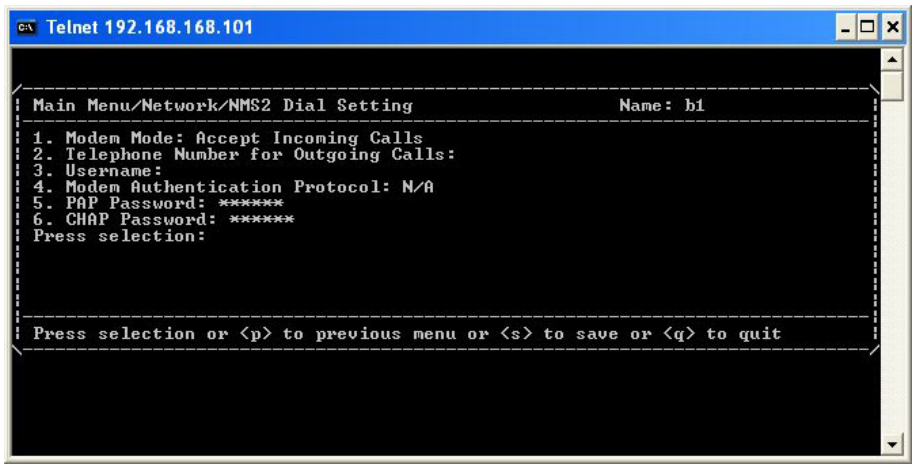

Figure 8-5 NMS2 Dial Setting

In this subpage, you could configure dialing information of NMS2 interface.

Modem Mode: There are two options: “Accept Incoming Call” or “Dial Out at Once”. “Accept Incoming Call” could connect with computer or other equipment via PPP. If you want to make connection, PPP parameters should be setup. “Dial Out at Once” could make you make outgoing calls. If it loses connection, it will redial.

Telephone Number of Outgoing Calls: Set the outgoing telephone number. It should be used in modem mode(item 2) of “Dial Out at Once”.

Username: Username for dial out service.

Modem Authentication Protocol: Authentication protocol setting of the modem. There are three options: “PAP”, “CHAP”, “N/A”. The default value is “N/A”.

PAP Password: When PAP is chose for dial out service, this password is activated.

- ✓ PAP: Password Authentication Protocol

CHAP Password: When CHAP is chose for dial out service, this password is activated.

- ✓ CHAP(Challenge-Handshake Authentication Protocol):PPP server protocol for establishing connection. The protocol applies for three-parties handshake and is more secure than PAP.

8.1.4 Link Serial Interface

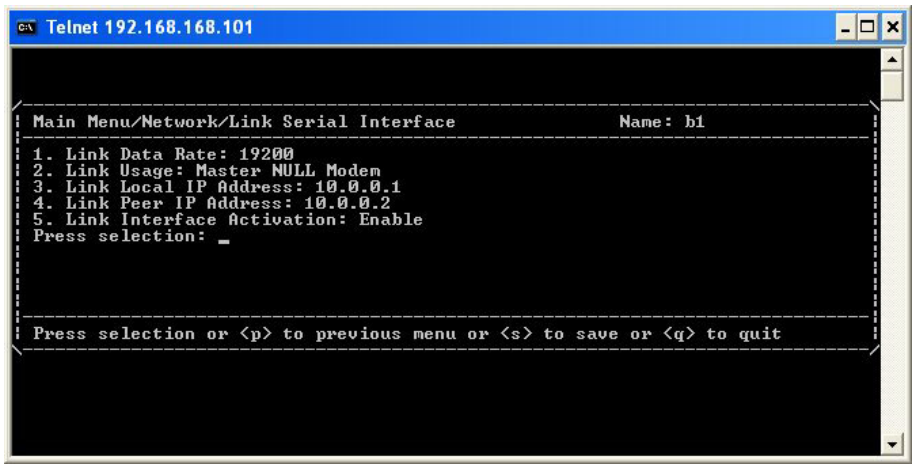

Figure 8-6 Link Serial Interface

In this subpage, you could configure information of Link interface.

Link Data Rate: Data rate of Link setting. There are 2 optional speeds: 9600, 19200. Default value is 19200.

✓ We recommend that you should set the value to 19200.

Link Usage: There are 2 optional usages: Master Null Modem, Slave Null Modem.

When Link port establishes RF connection with other equipments, you should choose value “Master Null Modem” in one end of the connection and “Slave Null Modem” in the other end. The Link IP of equipment which chooses to be “Slave Null Modem” is assigned by the Master equipment. Therefore, you don’t have to setup Link IP of slave modem.

Link Local IP Address: IP address of Link port in local equipment.

Link Peer IP Address: IP address of Link port in remote equipment when RF connection is established.

Link Interface Activation: Enable or disable of Link port. When you have to establish RF connection via Link port, you should set the value to “Enable”.

8.1.5 Ethernet IP Address Setting

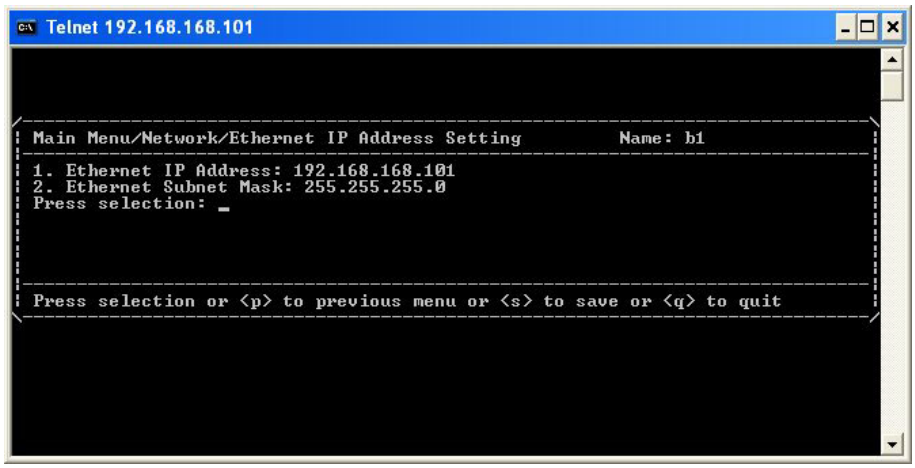

Figure 8-7 Ethernet IP Address Setting

In this subpage, you could configure IP address and subnet mask of ETH port.

Ethernet IP Address: IP address of ETH LAN(please refer to section 4.1.1) port.

Ethernet Subnet Mask: Subnet mask of ETH LAN port.

✓ This item allows you to access and manage the system via Ethernet after correctly setting.

8.1.6 Interface Status

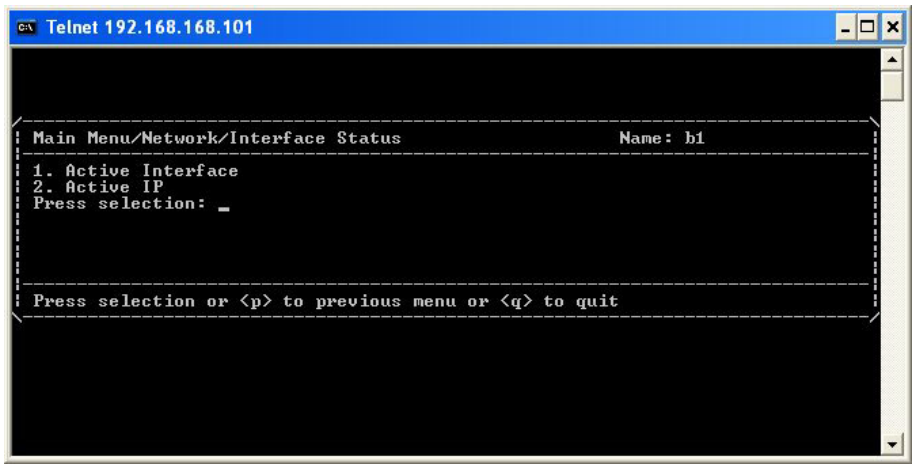

Figure 8-8 Interface Status

This subpage will display the current interfaces condition.

Active Interface: This item shows interface status. You could immediately “Down” the PPP connection already in place, including the “Up” and PPP link which has been “Down”. You could select one interface and activate or deactivate the interface by choosing “Up” or “Down”.

Active IP: This item displays the current IP address and subnet mask. After PPP is connected, the corresponding IP addresses will be shown in this window.

8.1.7 IP Forwarding

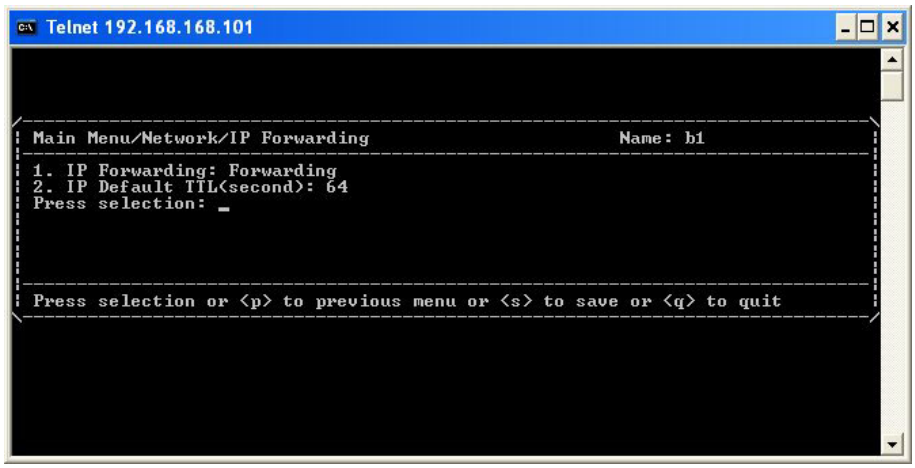

Figure 8-9 IP Forwarding

In this subpage, you could setup IP forwarding configurations.

IP Forwarding: Whether IP packet is forwarding. When selected “Forwarding” and connection is established with other equipments, the IP packet would forward to other equipments. all the IP packet will be forwarding. Default setting will be “Forwarding”.

IP Default TTL: Meaning how many times of “Forwarding” did an IP packet experience before loss. Default value is 64.

8.1.8 IP Routing

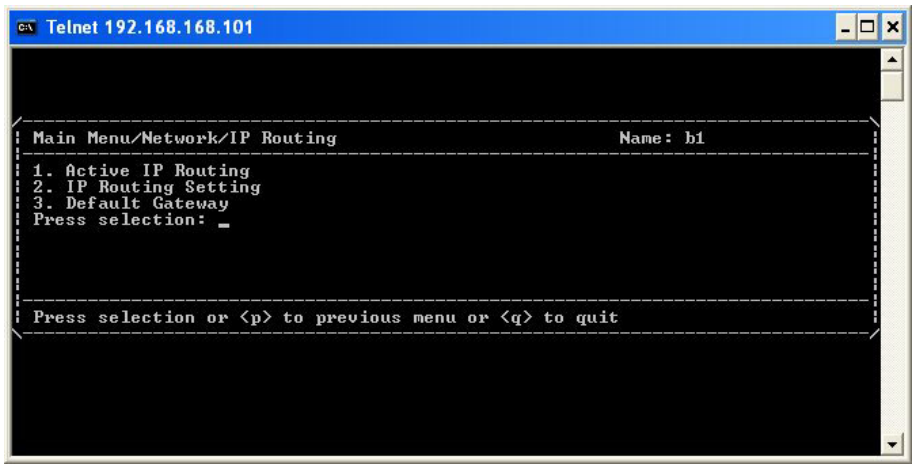

Figure 8-10 IP Routing

The subpage shows the IP Routing status in active, the default route will be in the form of Ethernet, when the

interface formed PPP connection, a point-to-point PPP route will be formed automatically, and other routes will be formed after settings. Textmenu supports up to 15 static routing setting rules.

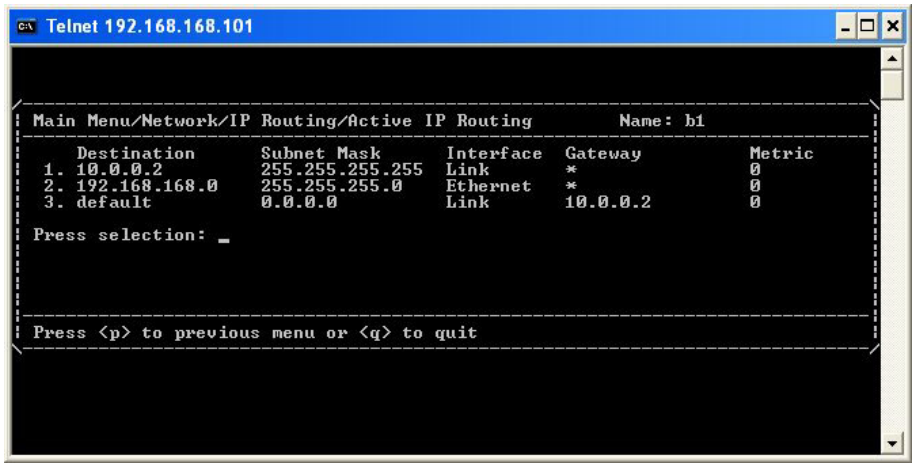

Figure 8-11 Active IP Routing

Active IP Routing: This item shows the current active IP routing status.

✓ Destination will be the routes' targeted address, subnet mask will be the subnet mask of targeted address, interface will be the path of which routing takes, Gateway will be routing's next hop address, and metric will be the statistics of routing in order for it to reach the destined address.

IP Routing Setting: This item allows you to add, delete, and save the IP Routing configurations.

Default Gateway: This item allows you to set the values of default gateway interface and address.

8.1.9 SNMP Setting

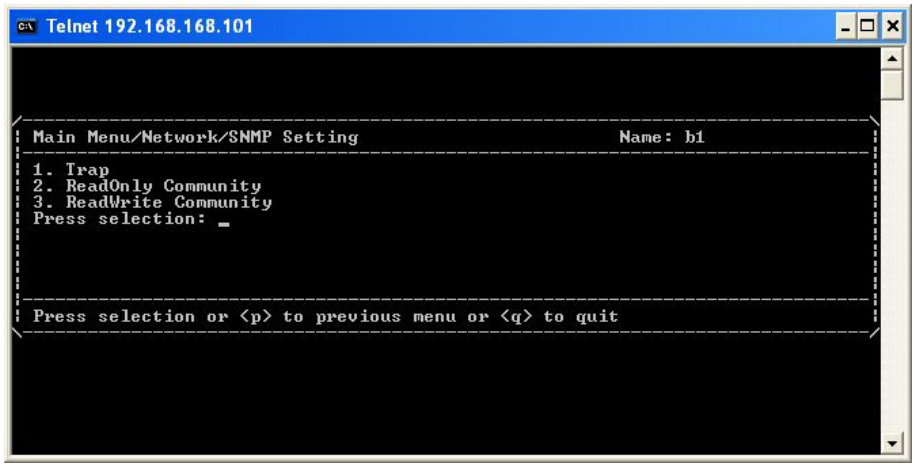

Figure 8-12 SNMP Setting

This subpage allows you to set the SNMP related configurations. There are three items.

Trap: This item allow you to set the Trap function of SNMP.

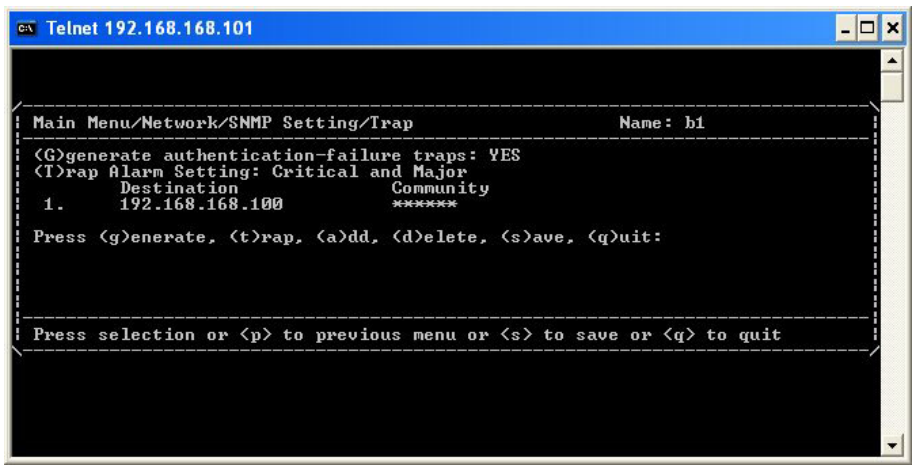

Figure 8-13 Trap

Trap/Generate authentication-failure traps: This item can be set as “YES” or “NO”. When set as “YES”, if there’s an intrusion by unauthorized user, an illegal “Trap” will occur. The default setting is “YES”.

Trap/Trap Alarm Setting: This item can select “Critical”, “All”, or “None”. After selection, when an alarm is issued under the denoted setting, a trap will be cast upon the destination address. The default setting is “All”.

Trap/Destination: As the Trap destination address. The system could support up to 10 trap destinations.

Trap/Community: As the Trap community string setting.

SNMP ReadOnly Community: This item allows you to change community of “GET” command.

✓ The default value is “Public”.

SNMP ReadWrite Community: This item allows you to change community of “SET” command.

✓ The default value is “Private”.

8.2 Terminal

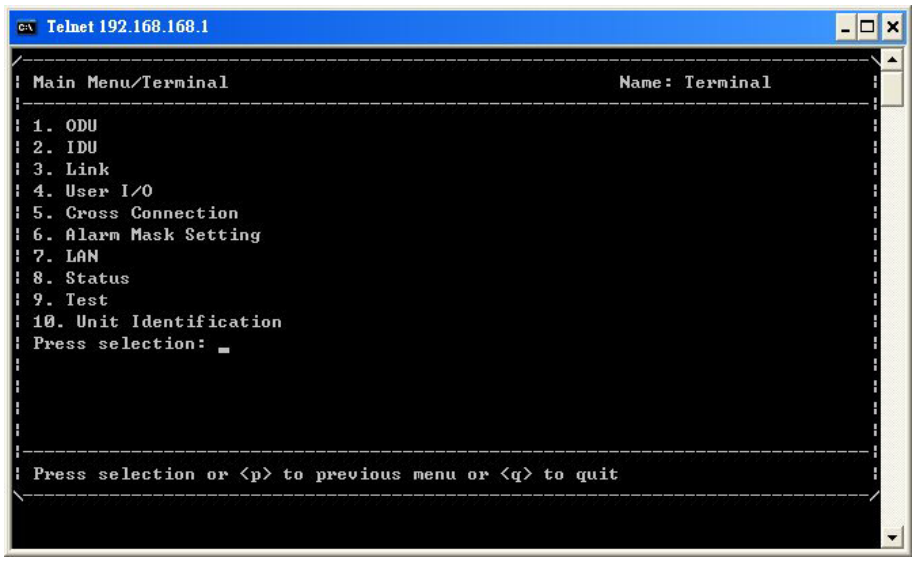

Figure 8-14 Terminal

This page shows terminal statistics and settings display window.

8.2.1 ODU

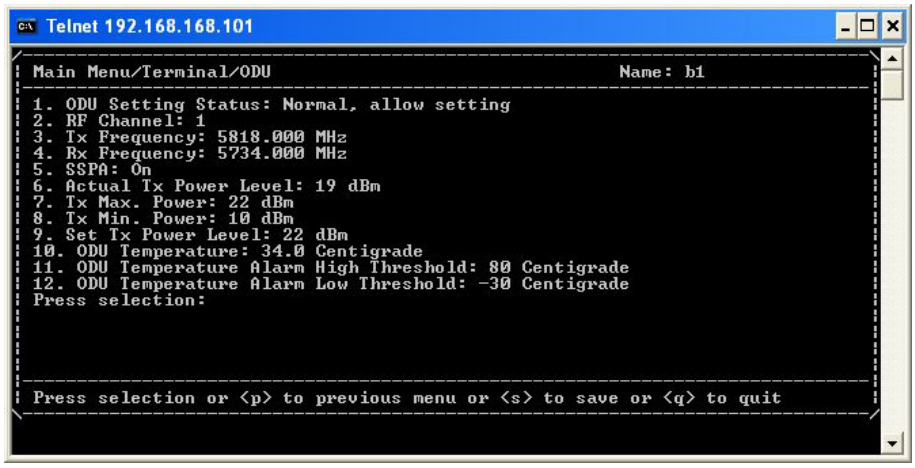

Figure 8-15 ODU

In this subpage, you could set the configuration or check the status of ODU.

ODU Setting Status: This item displays the current ODU setting status.

✓ When not connecting to ODU, each ODU's status is "Unknown". At this moment any setting amendment is not allowed, only after connecting with ODU, the above statistics could then be amended.

RF Channel: This item allows you to set RF channel settings.

Tx Frequency: The display of transmitting frequency.

Rx Frequency: The display of receiving frequency.

SSPA: This item allows you to set the Solid State Power Amplifier.

Actual Tx Power Level: This item shows the actual Tx power level.

Tx Max Level: This item shows maximum Tx power level.

Tx Min Level: This item shows minimum Tx power level.

Set Tx Power Level: This item allows you to set Tx output power level.

ODU Temperature: This item shows ODU's actual temperature condition.

ODU Temperature Alarm High Threshold: This item shows ODU's upper temperature limit setting.

ODU Temperature Alarm Low Threshold: This item shows ODU's lower temperature limit setting.

✓ The temperature threshold of ODU fixes to -30~80℃.

8.2.2 IDU

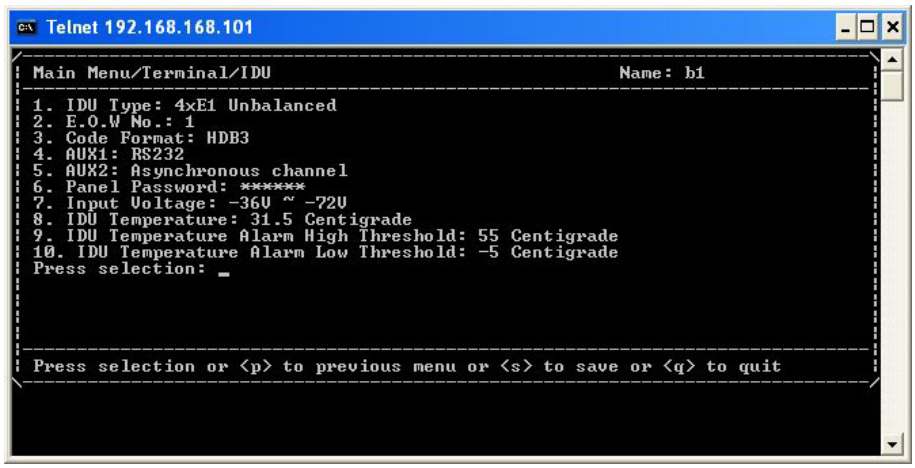

Figure 8-16 IDU

In this subpage, you could set the configuration or check the status of IDU.

IDU Type: This item displays the system capacity and interface type.

EOW No: This item shows Engineering OrderWire number. The range is between 1~255.

Code Format: This items show the setting of code format in E1 interface. There are two optionals:HDB3, and AMI. The default value is "HDB3".

AUX1: This item shows the protocol of AUX1. It has selections of "RS232" and "RS422". The default value is "RS232".

AUX2: This item shows the connection type of AUX2. It has selections of "Asynchronous channel" and "Synchronous channel". The default value is "Asynchronous channel".

Panel Password: The password setting of LCD panel. The default value is "000000".

Input Voltage: This item shows the input power voltage.

IDU Temperature: This item shows IDU's actual temperature condition.

IDU Temperature Alarm High Threshold: This item shows IDU's upper temperature limit setting.

IDU Temperature Alarm Low Threshold: This item shows IDU's lower temperature limit setting.

✓ The temperature threshold of IDU fixes to -5~55℃。

After you make any configuration, you should select <s> to save into memory. If the configuration failed, the error will display on window. The status of window will not fresh immediately. You should quit and reenter the windows for fresh information.

8.2.3 Link

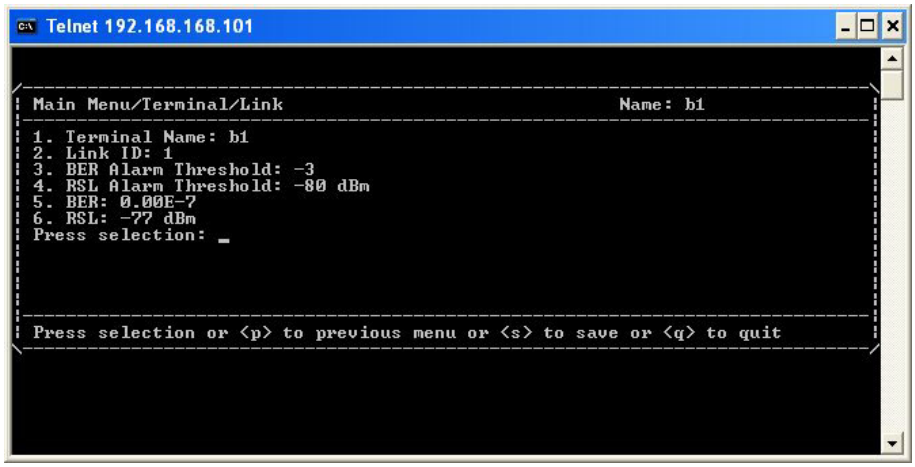

Figure 8-17 Link

In this subpage, you could set the configuration or check the status of Link.

Terminal Name: This item allows you to set the name of terminal. It will be shown in the upper right side of textmenu. The length is up to 15 characters which allow only letters, digits, space, line, underline, spot and the first character should be letter.

Link ID: This item allows you to set the number of Link ID.

BER Alarm Threshold: This item allows you to set the threshold of BER(Bit Error Rate) alarm. There are four options: "-3", "-4", "-5", and "-6" which mean 10^{-3}, 10^{-4}, 10^{-5}, and 10^{-6}.

RSL Alarm Threshold: This item allows you to set the threshold of RSL(Receive Signal Level) alarm. The optional range is from "-50" dBm to "-80" dBm.

BER: This item shows current BER.

RSL: This item shows current RSL.

8.2.4 User I/O

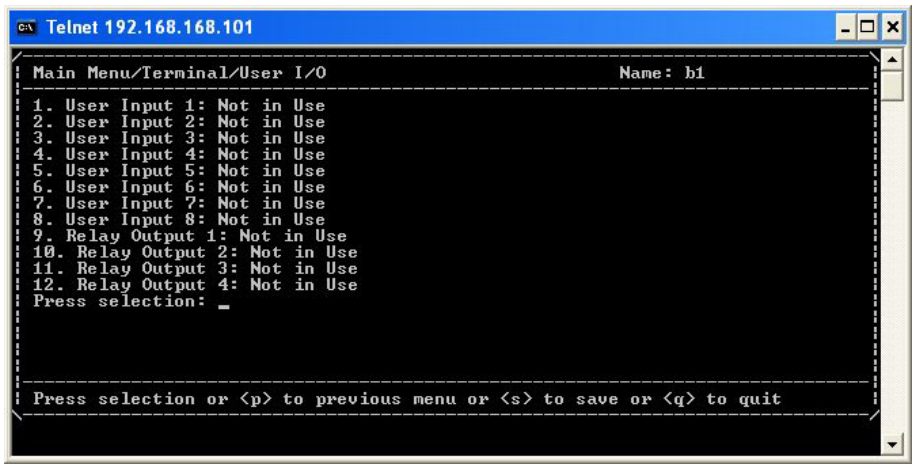

Figure 8-18 User I/O

This subpage allows you to set the configurations of User I/O interfaces.

✓ Besides the standard E1 interface, there are the User I/O ports. This allows the users to fully control the controlling room from the local end. For example: If there is no manual control over the remote end, it is possible to have all the date of temperature, alarm, power supply etc. from the central controlling computer. The central controlling computer controls most of the functions which makes intelligent management possible. This device has 8 ports for input and 4 relay output ports.

8 input ports: Setting can be **Not in Use** status or **Alarm on Low** status.

4 relay output ports: Setting can be **Not in Use** status, or **Always Open** status, or **Always Closed** status, or **Closed on Input Alarm** status, or **Closed on Alarm** status. For either of these, you may select either of Rx or Tx.

8.2.5 Cross Connect

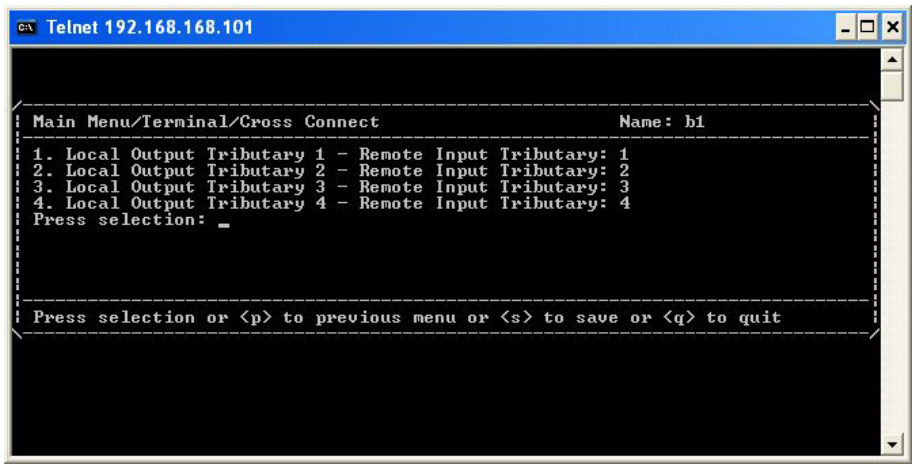

Figure 8-19 Cross Connect

This subpage allows you to set E1 cross-over connection settings.

✓ With the need of adjusting the controlling room channel, the local and remote end E1 Interface have certain asymmetric variation. The system administrator need not have to manually switch the lines. The following diagram shows the 4E1 equipment cross connection between local end, IDU A, and remote end, IDU B.

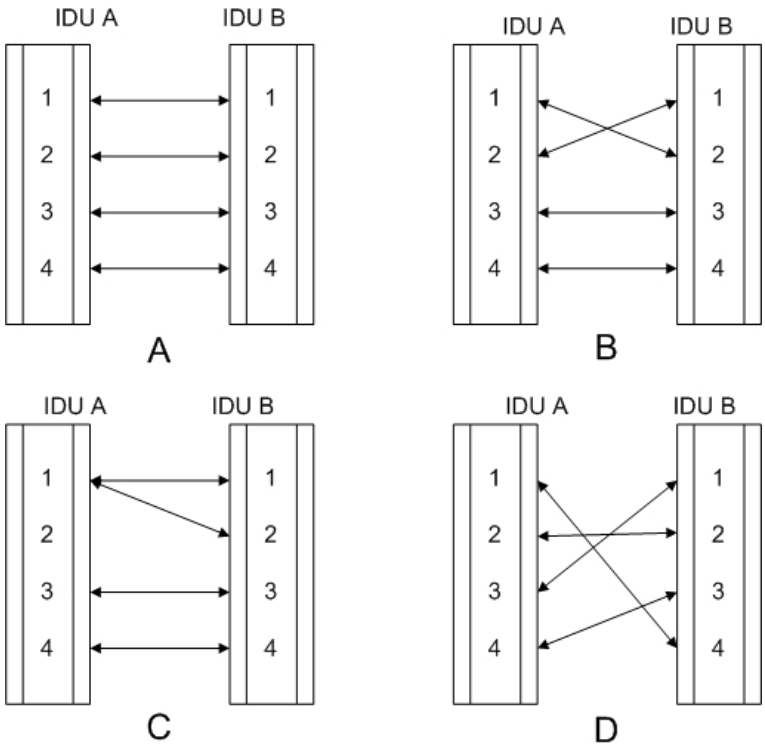

Figure 8-20 Cross Connection Diagram

Figure A: Normal connection mode.

Figure B: Local and remote port1 & port2 in cross connection mode and port3 & port4 in normal connection mode.

Figure C: Local port1 connected to remote port1 & port2. Local and remote port3 & port4 are in normal connection mode.

Figure D: Local and remote port in cross connection mode between ports 1&4, 2&2, 3&1 and 4&3.

8.2.6 Alarm Mask Setting

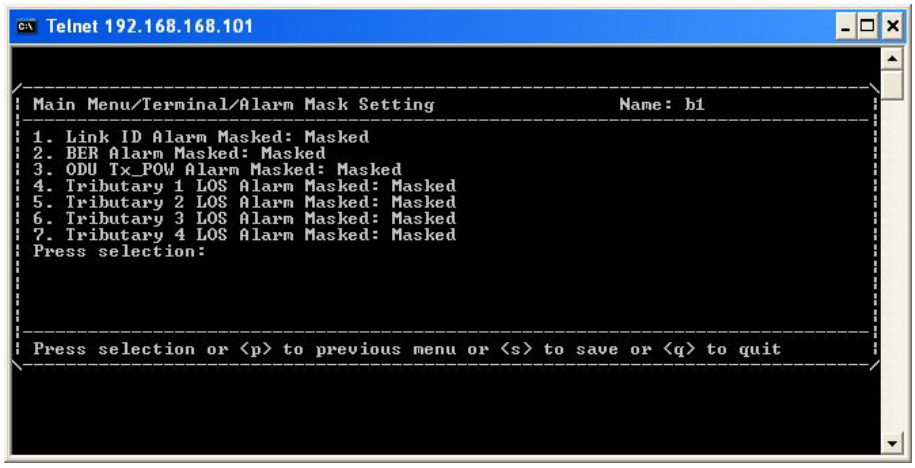

Figure 8-21 Alarm Mask Setting

This subpage allows you to set the configurations to whether or not mask some of the alarms.

✓ When the IDU goes into a critical state, the alarm will start beeping. However, in some cases like if the administrator considers the **Link ID** unimportant, s/he may tick **masked** and turns off all the alarm functions.

Link ID Alarm Masked: The alarm that local and peer remote equipments don't have the same **Link ID**.

BER Alarm Masked: The alarm that BER has been over the threshold.

ODU Tx_POW Alarm Masked: The alarm that ODU output power has been over the threshold.

Tributary n LOS Alarm Masked: The alarm that IDU cannot find the tributary signal.

8.2.7 LAN

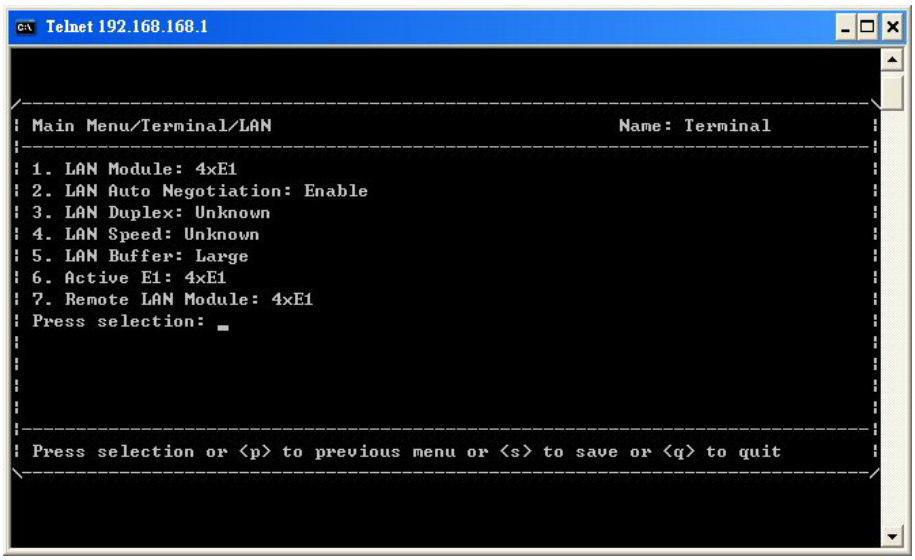

Figure 8-22 LAN

This subpage allows you to set the configurations of LAN. (This subpage displays with only E1+LAN product)

LAN Module: Activate E1 interface number which should be used for Ethernet transmission. Following items is for option:Disable/1E1/2E1/3E1/4E1. When it is disabled, LAN function is closed and link LED light is off. If it set to be 1E1/2E1/3E1/4E1, system will transfer E1 to Ethernet transmission.

✓ If you choose 1E1, system would transfer last E1 to Ethernet transmission. If 2E1, system would transfer last two E1 to Ethernet transmission and so on.

LAN Auto Negotiation: Activate/close Ethernet auto-negotiation function.

LAN Duplex: The configuration of Ethernet interface duplex.

LAN Speed: The configuration of Ethernet interface speed.

LAN Buffer: The configuration of Ethernet interface buffer.

Active E1: Display actual E1 interface number which has been transferred to Ethernet transmission.

✓ If the configured interface number is different, the smaller number would be set to transmit.

Remote LAN Module: Display remote LAN interface status.

8.2.8 Status

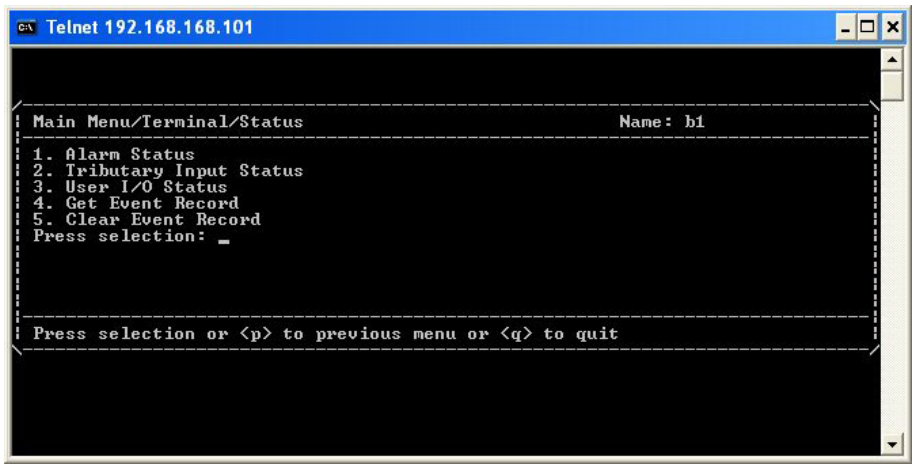

Figure 8-23 Status

This page shows current status of alarm record, tributary, user I/O and retrieves event record. There are 5 subpages below:

8.2.9 Alarm Status

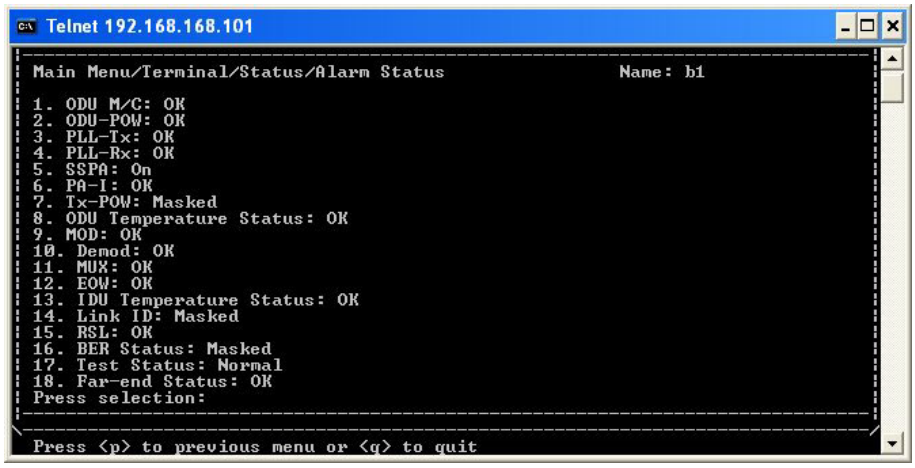

Figure 8-24 Alarm Status

This subpage shows the status of all the alarm items.

8.2.10 Tributary Input Status

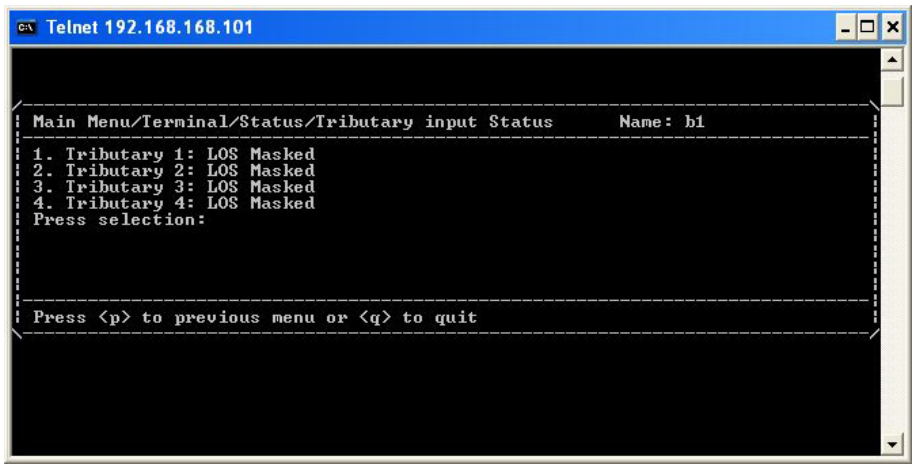

Figure 8-25 Tributary Input Status

This subpage shows the tributary input signal status.

8.2.11 User I/O Status

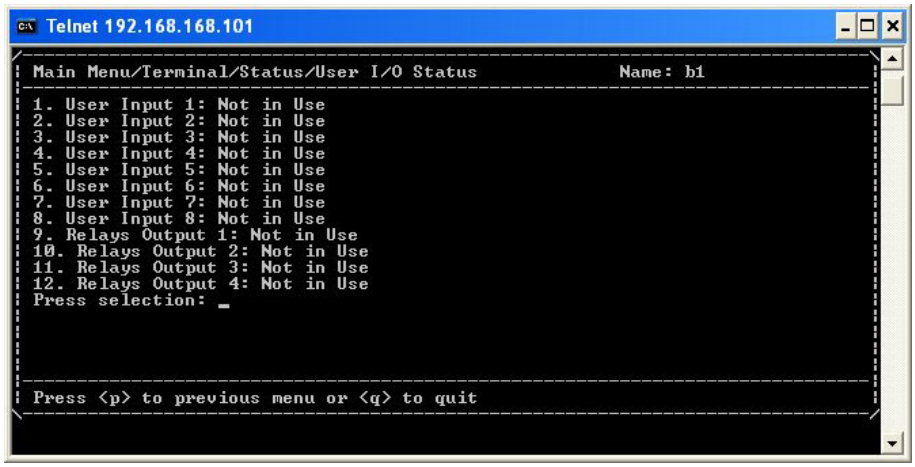

Figure 8-26 User I/O Status

This subpage shows the User I/O interfaces status.

8.2.12 Get Event Record

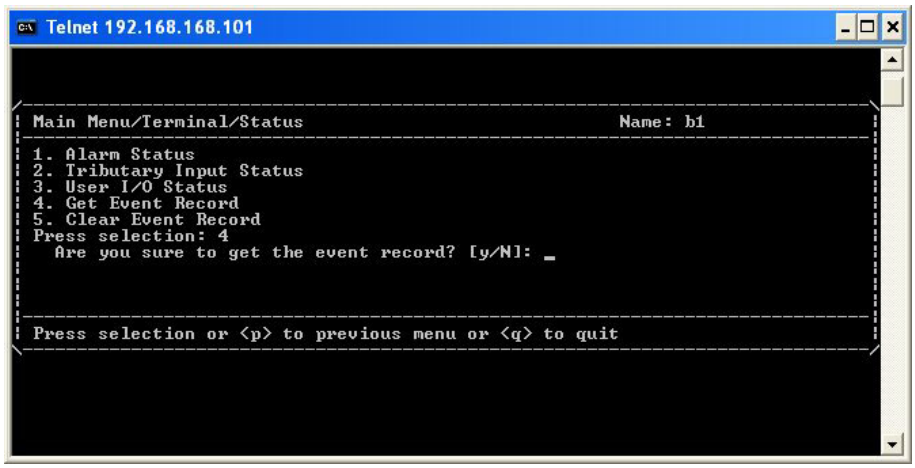

Figure 8-27 Get Event Record

Alarm record could record up to 1000 items which save in IDU memory. It is compatible with G.826 protocol and record for functionality of system.

The major parameter of error lists below:

(1)Error Second(ES):The second with one or more errors.

(2)Severe Error Second(SES): The second which error occupied more than 30% of the second.

(3)Background Block Error(BBE):The second which deducts total seconds from error of SES.

(4)Unavailable Second(UAS): Continuous 10 SES is the start of UAS which 10 SES have been defined to be part ot UAS.

The method is as follows:

- STEP1: Proceed to HyperTerminal under windows, and from HyperTerminal can further reach login windows. Then login by the account you wish.

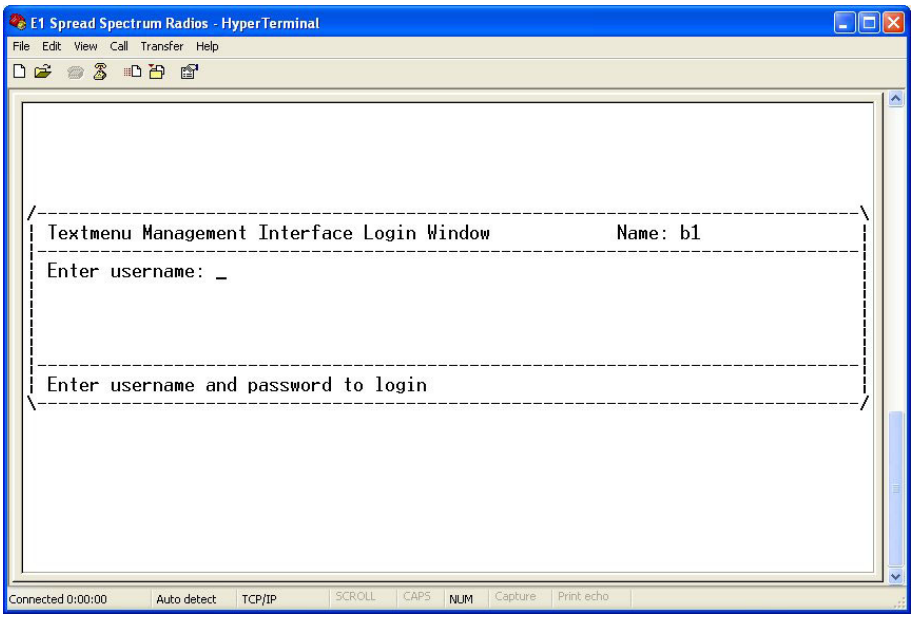

Figure 8-28 Get Event Record(1)

- STEP2: Proceed with the login windows as above, then activate Get Event Record item.

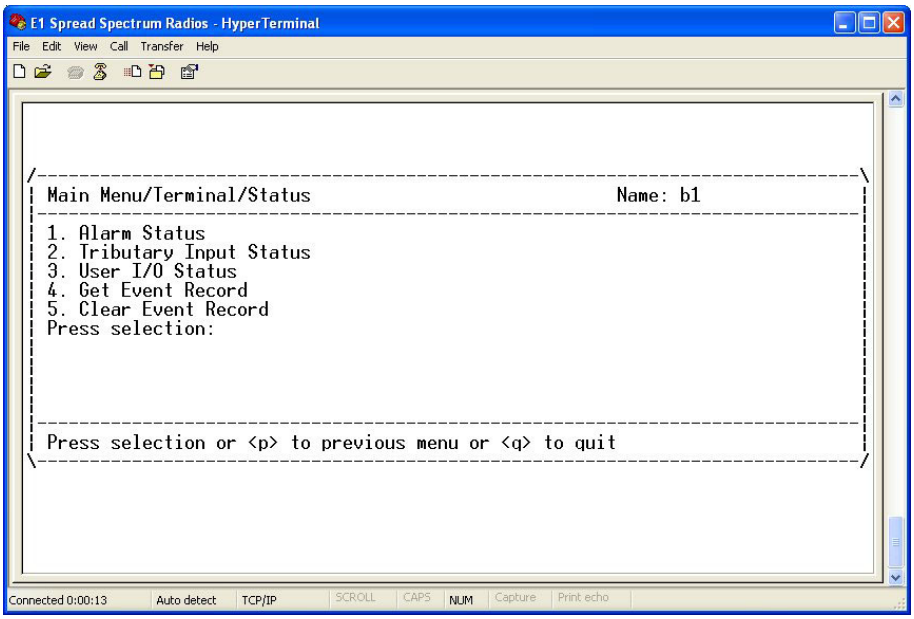

Figure 8-29 Get Event Record(2)

- STEP3: Right click the mouse and it will show the menu. Choose the “Receive File…”.

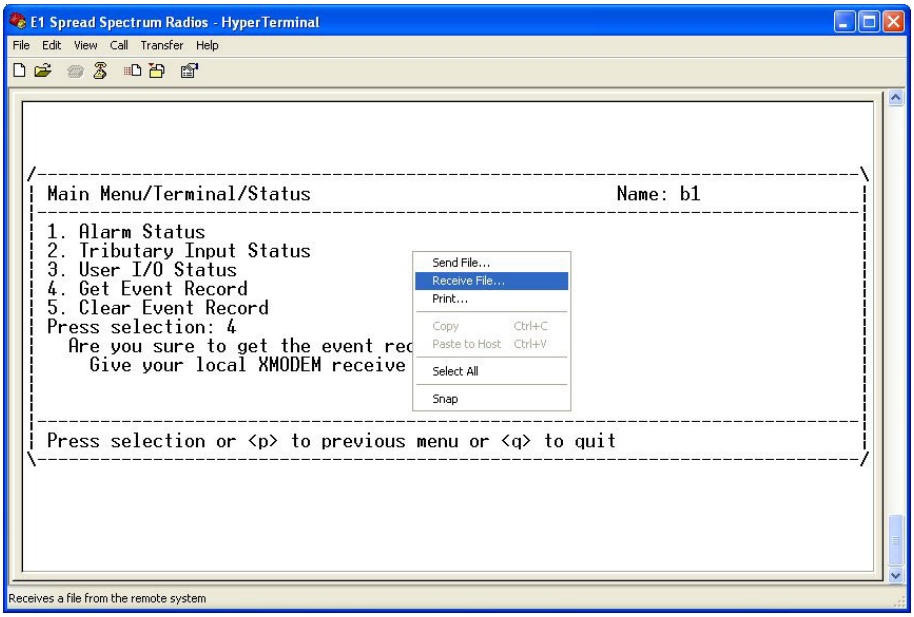

Figure 8-30 Get Event Record(3)

- STEP4: Fill in the received file path and choose the receiving protocol to be “Xmodem”.

Figure 8-31 Get Event Record(4)

■ STEP5: Fill in the receive filename and press “OK”. The procedure will be finished.

Figure 8-32 Get Event Record(5)

✓ The received file would be in the format of txt file.

8.2.13 Test

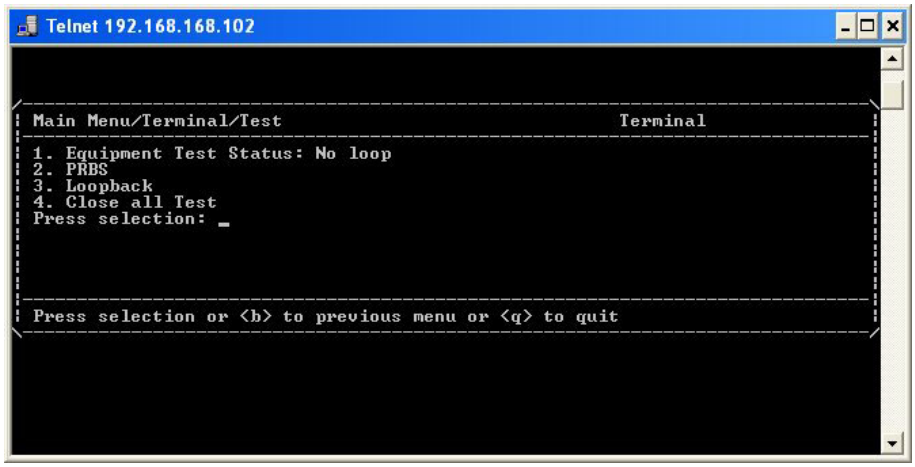

Figure 8-33 Test

This subpage displays all the loopback test items.

Equipment Test Status: This item shows current equipment status. If the status is “Test”, you could disable all

test operations via implementing item “Close All Test”.

8.2.14 PRBS

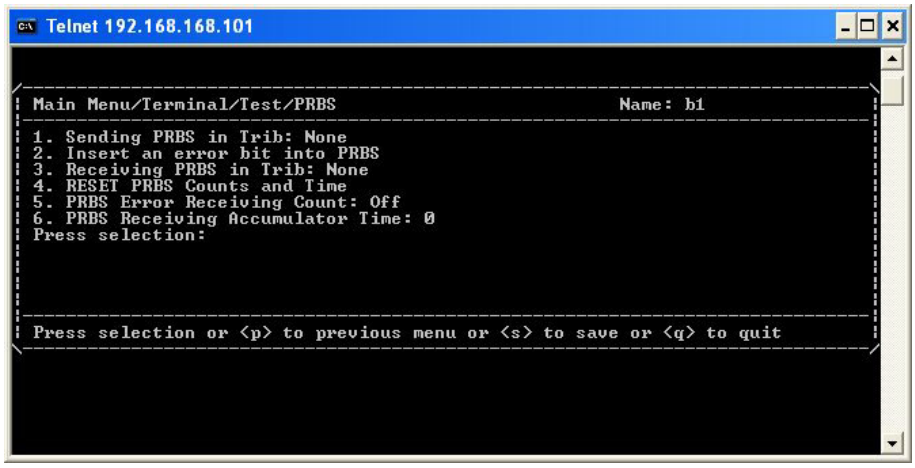

Figure 8-34 PRBS

PRBS: This item enables you to configure PRBS test operations.

✓ Under normal working condition, other than the normal BER test, the PRBS function can be used as well to test the individual link accumulated BER and stability of the system. While detecting, it is required to start the PRBS function. This function setting is done through the textmenu or the LCD display button.

PRBS/Sending PRBS in Trib: This item allows you to set the tributary that you wish to send PRBS.
PRBS/Insert an error bit into PRBS: Once you have set the tributary of PRBS, you could select this item to insert an error.
PRBS/Receiving PRBS in Trib: This item allows you to set the tributary that you wish to receive PRBS.
PRBS/RESET PRBS Counts and Time: This item allows you to reset the time and counts that receive PRBS.
PRBS/PRBS Error Receiving Count: This item shows the count number of receiving PRBS errors.
PRBS/PRBS Receiving Accumulator Time: This item shows the time of PRBS Receiving Accumulator.

■ ***Note:*** PRBS test explanation: Please refer to C.3 of chapter 5.

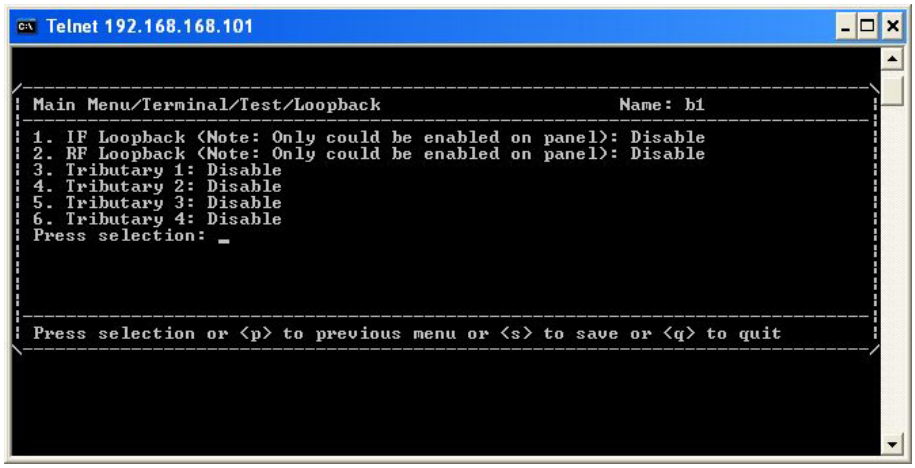

Figure 8-35 Loopback

Loopback: This item enables you to configure loopback tests such as RF, IF, Local, Remote loopback tests.

✓ IF and RF loopback only could be activated on panel and here shows the status of these two loopback tests.

Close All Test: Disable all the running tests.

8.2.15 Unit Identification

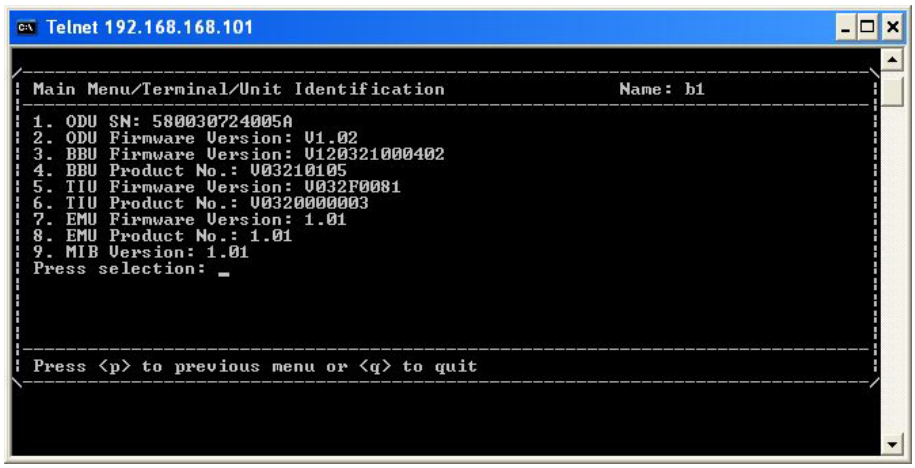

Figure 8-36 Unit Identification

This subpage will display hardware and software version or serial number of system components.

8.3 Change Password

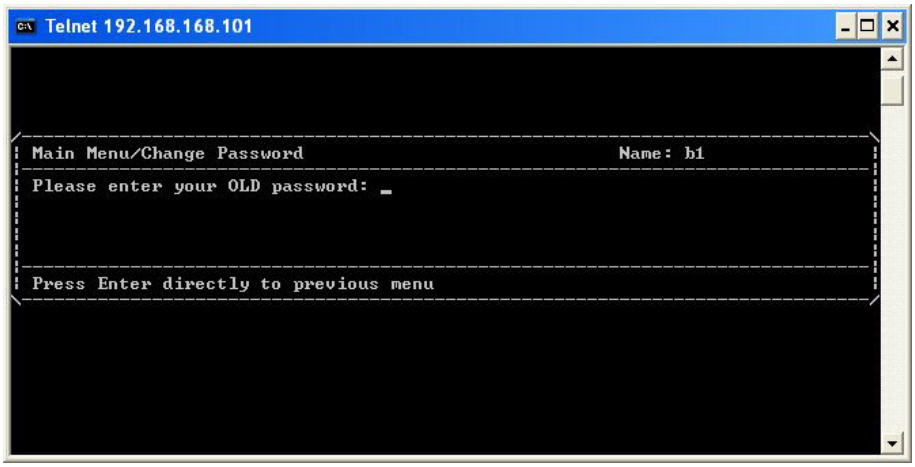

Figure 8-37 Change Password

In this page, you could modify password of account which you have login.

8.4 Set System Date and Time

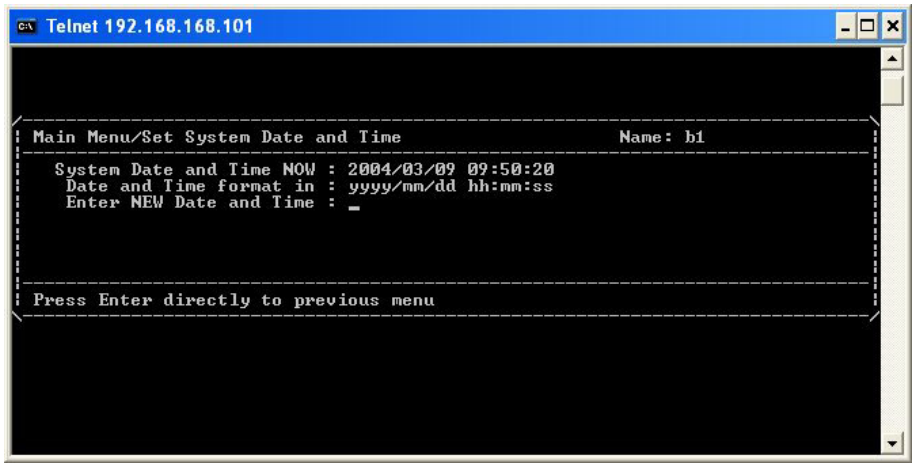

Figure 8-38 Set System Date and time

Configure the system date and time.

8.5 Update Standby Configuration

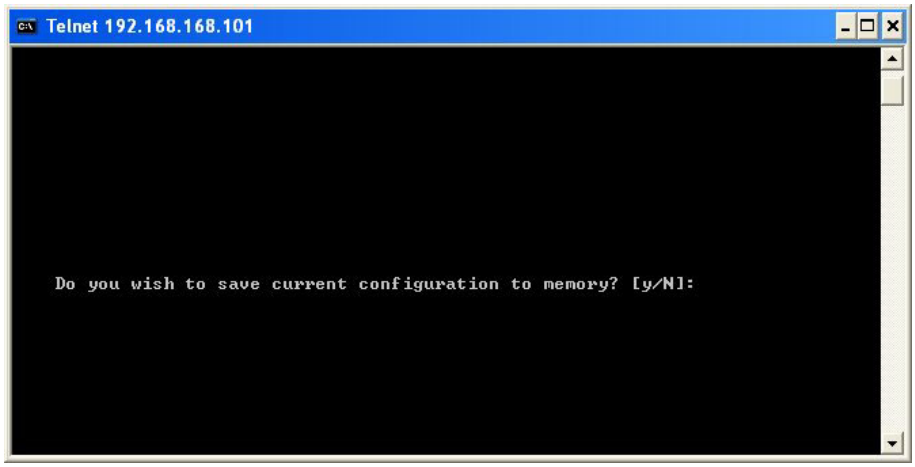

Figure 8-39 Update Standby Configuration

This item is to write configuration into system flash. If this action is not implemented, you will lose you configuration after you restart system. This item is only for network setting.

8.6 Restart

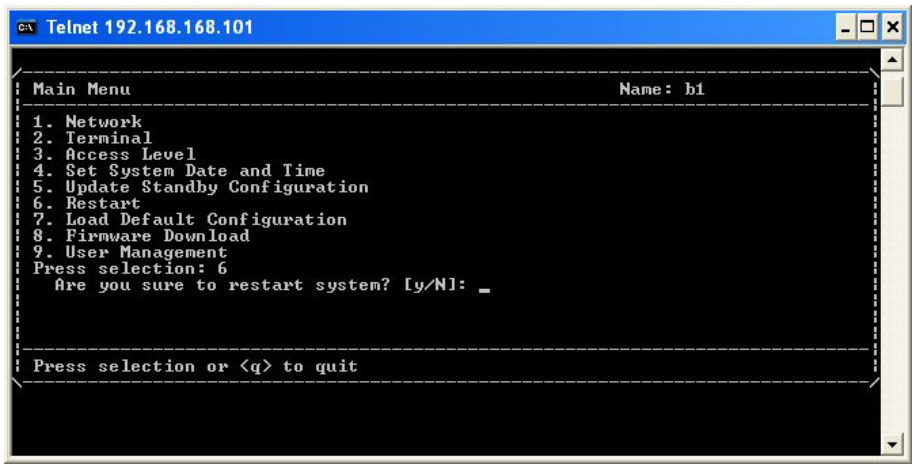

Figure 8-40 Restart

In this page, you could restart the system. During restart process, E1 and data communication operation will not be influenced. Any change or setup of items in the network pages should be restart to take configuration into effect.

✓ In the process of restarting, E1 and data transmission would not be affected.

8.7 Load Default Configuration

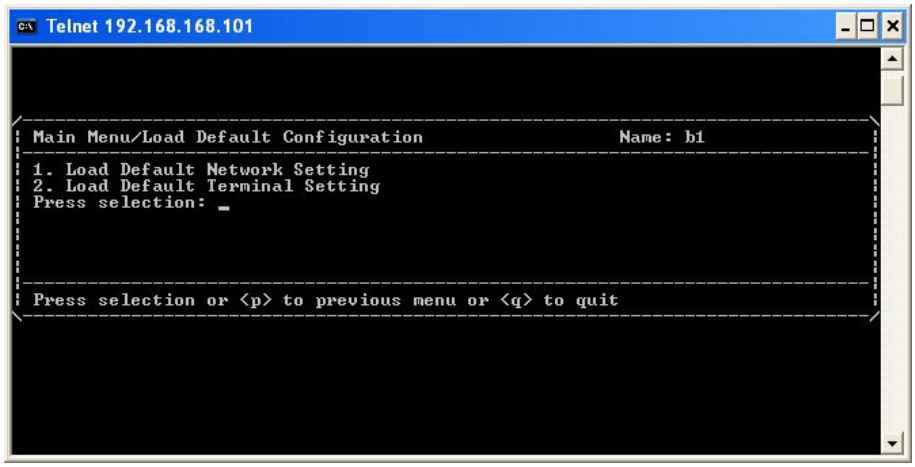

Figure 8-41 Load Default Configuration

This page allows only superuser to access. In this page, there are two options:

Load Default Network Setting: This item would load network portion of default setting. When new firmware first executes, you need to implement this item.

✓ All the configurations including IP addresses and IP routes will disappear except that ETH IP address will return to default value of 192.168.168.1.

Load Default Terminal Setting: This item would load terminal portion of default setting.

8.8 Firmware Download

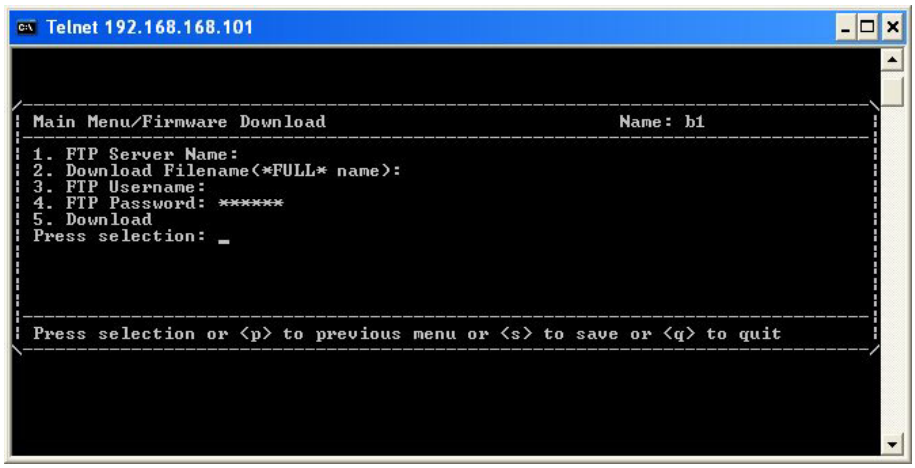

Figure 8-42 Firmware Download

This page allows only superuser to access.In this page, you could implement download of firmware.

FTP Server Name: The IP of FTP server.

Download Filename(*FULL* Name): The name which has to be downloaded.

FTP Username: Set the name of FTP server account.

FTP Password: Set the password of FTP server account.

Download: After you setup all necessary items above, select this item to download.

✓ When you in the process of download, please **DO NOT** close the windows of download page and turn off or restart the modem. These actions would result in crash of system. If system crashes, please contact with us.

If finishing download, you need to restart the system to take new software into effective. After you restart, you have to implement "Load Default Configuration/Load Default Network Setting" to load the new software downloaded. Or software will not work properly.

8.9 User Management

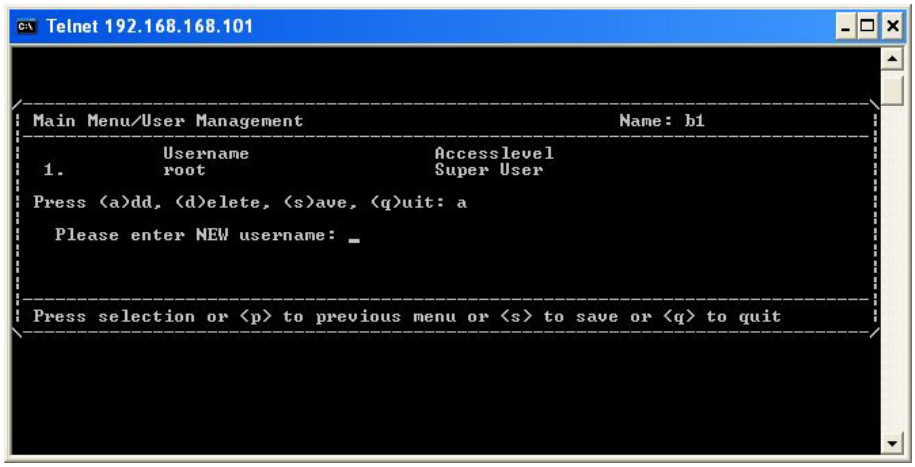

Figure 8-43 User Management

This page allows only superuser to access.In this page, you could manage login account. Login account level has been classified into "Super User", "User", and "Operator". The accounts which have been classified into "Super User" have the highest priority and could implement all operations in the textmenu. If customer wants to change its account name, be sure to add a new super user account and then delete old account. The accounts which have been classified into "User" have permission to query. The accounts which have been classified into "Operator" have permission to setup or change items except for pages of "User Management", "Load Default

Configuration", and "Software Download".

✓ If there is no super user account exists, you would incapable of accessing the textmenu.

9 Management Application Structure

IDU is an embedded system with routing function. It provides various managerial interfaces and abundant method for management which is convenient for remote access. This chapter introduces how to deploy network topology.

9.1 Managment via Local Equipment(Normal)

The following diagram is most popular in topology. The rest of the diagrams skip ODU and take IDU as the whole system.

✓ You should connect computer and ETH interface via cross-over cable.

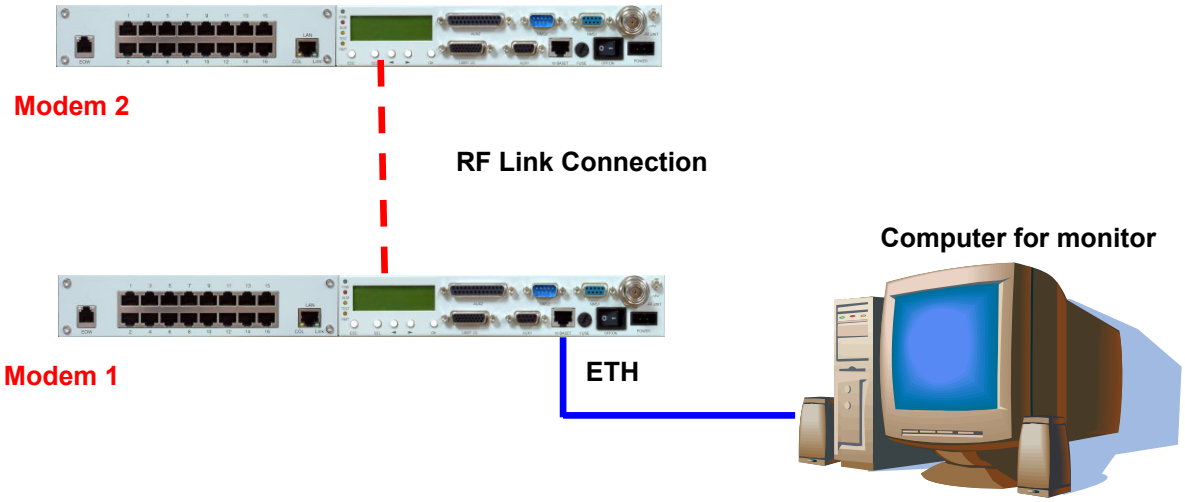

Figure 9-1 Managment via Local Equipment(Normal)

Relative configuration parameters list below:

Table 9-1 Example for managerial application(1)

Item	Modem 1	Modem 2	Note
ETH(10BaseT) IP	192.168.168.1	192.168.100.1	Refer to section 8.1.5
ETH(10BaseT) Mask	255.255.255.0	255.255.255.0	Refer to section 8.1.5
Link Data Rate	19200	19200	Refer to section 8.1.4
Link Usage	Master Modem	Slave Modem	Refer to section 8.1.4
Link Local IP	10.0.0.1	10.0.0.2	Refer to section 8.1.4
Link Peer IP	10.0.0.2	10.0.0.1	Refer to section 8.1.4
Link Interface Activation	Enable	Enable	Refer to section 8.1.4

IP Forwarding	Forwarding	Forwarding	Refer to section 8.1.7
IP Route Destination	192.168.100.0		Refer to section 8.1.8
IP Route Subnet Mask	255.255.255.0		Refer to section 8.1.8
IP Route Interface	Link		Refer to section 8.1.8
IP Route Gateway	10.0.0.2		Refer to section 8.1.8
Default Gateway Interface	Ethernet	Link	Refer to section 8.1.8
Default Gateway	192.168.168.100	10.0.0.1	Refer to section 8.1.8
Trap/Trap Alarm Setting	All	All	Refer to section 8.1.9
Trap/Destination	192.168.168.100	192.168.168.100	Refer to section 8.1.9
Trap/Community	Private	private	Refer to section 8.1.9
Item	**Computer**		**Note**
IP	192.168.168.100		The same subnet with modem 1
Subnet Mask	255.255.255.0		
Default Gateway	192.168.168.1		
Route add 192.168.100.0 mask 255.255.255.0 192.168.168.1			

9.2 Managment via Local Equipment(Cascading)

The following diagram is cascading mode. Multiple systems should interconnect NMS2-NMS1 with RS-232 cable to communicate all the monitor signals.

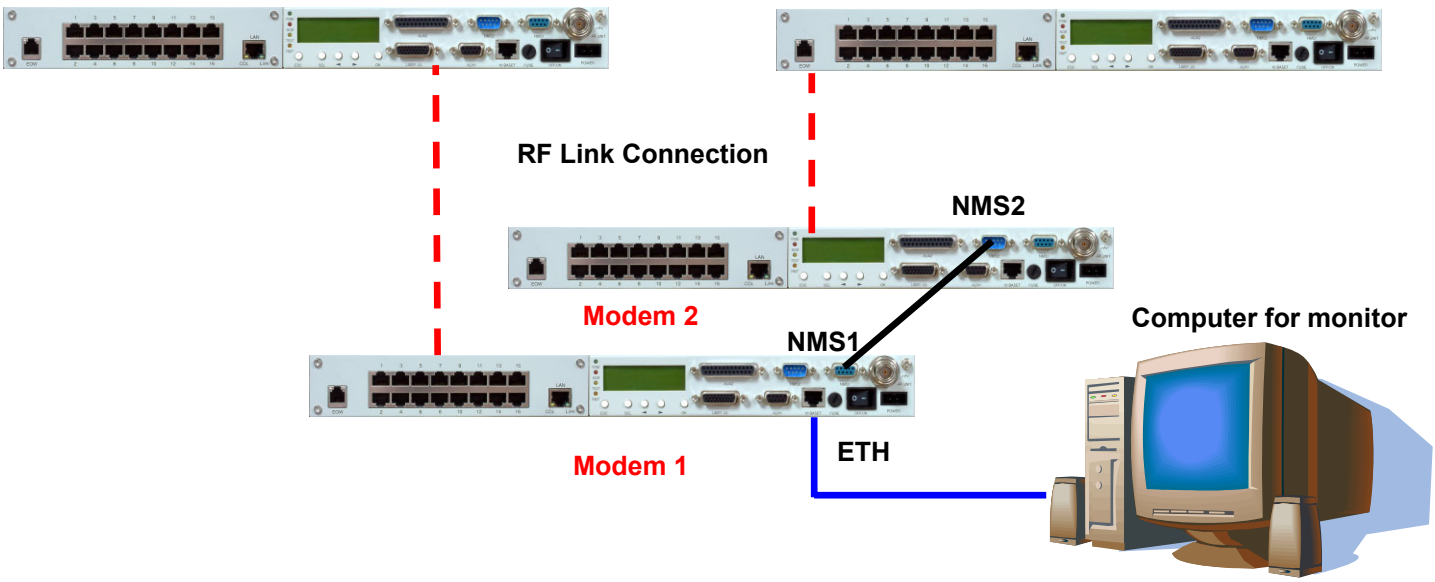

Figure 9-2 Managment via Local Equipment(Cascading)

Please refer to example 1 for configuration of Point-to-Point. This example focuses on configuration of cascading.

Table 9-2 Example for managerial application(2)

Item	Modem 1	Modem 2	Note
ETH(10BaseT) IP	192.168.168.1	192.168.100.1	Refer to section 8.1.5
ETH(10BaseT) Mask	255.255.255.0	255.255.255.0	Refer to section 8.1.5
NMS2 Data Rate	115200	N/A	Refer to section 8.1.2
NMS2 Usage	Master Modem	N/A	Refer to section 8.1.2
NMS2 Local IP	10.0.0.1	N/A	Refer to section 8.1.2
NMS2 Peer IP	10.0.0.2	N/A	Refer to section 8.1.2
NMS2 Interface Activation	Enable	N/A	Refer to section 8.1.2
NMS1 Data Rate	N/A	19200	Refer to section 8.1.1
NMS1 Usage	N/A	Slave Modem	Refer to section 8.1.1
NMS1 Local IP	N/A	10.0.0.2	Refer to section 8.1.1
NMS1 Peer IP	N/A	10.0.0.1	Refer to section 8.1.1
NMS1 Interface Activation	N/A	Enable	Refer to section 8.1.1

9.3 Remote Management via External Modem

The following shows how to remote manage via external modem.

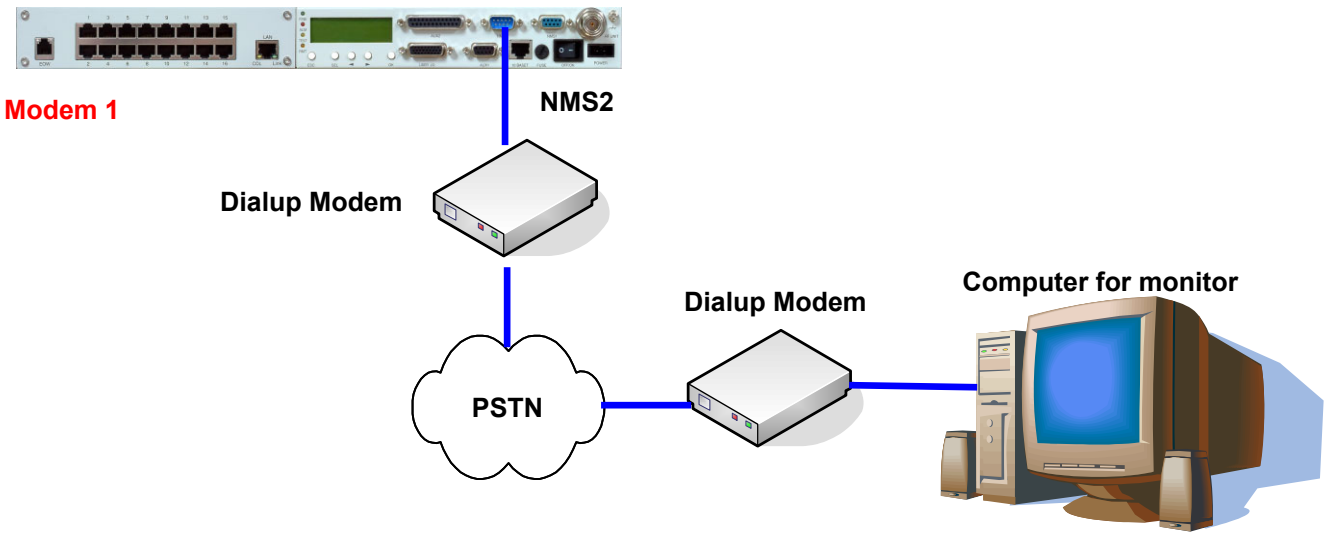

Figure 9-3 Remote Management via External Modem

Please refer to example 1 for configuration of Point-to-Point. This example focuses on configuration of external modem.

Table 9-3 Example for managerial application(3)

Item	Modem 1	Note
ETH(10BaseT) IP	192.168.168.1	Refer to section 8.1.5
ETH(10BaseT) Mask	255.255.255.0	Refer to section 8.1.5
NMS2 Data Rate	115200	Refer to section 8.1.2
NMS2 Usage	External Wired Modem	Refer to section 8.1.2
NMS2 Local IP	N/A	Refer to section 8.1.2
NMS2 Peer IP	N/A	Refer to section 8.1.2
NMS2 Interface Activation	Enable	Refer to section 8.1.2
Model Mode	Dial Out at Once	Refer to section 8.1.3
Telephone Number for Outgoing Call	PSTN Telephone Number	Refer to section 8.1.3
Username	N/A	Refer to section 8.1.3
Modem Authentication Protocol	N/A	Refer to section 8.1.3
PAP Password	N/A	Refer to section 8.1.3
CHAP Password	N/A	Refer to section 8.1.3

10Appendices

10.1 Specifications

Table 10-1 Transmitter& Receiver

Operation Frequency		5725~5850MHz
Communication Mode		Frequency Division Duplex, FDD
Modulation		QPSK
TX Output Power		≤ 22dBm
RX Dynamic Range		-84dBm ~ -15dBm
		5.8GHz
Sensitivity (10^{-3} BER)	2E1	≤ -89dBm
	4E1	≤ -86dBm
	8E1	≤ -83dBm
	16E1	≤ -80dBm
Sensitivity (10^{-6} BER)	2E1	≤ -87dBm
	4E1	≤ -84dBm
	8E1	≤ -81dBm
	16E1	≤ -77.5dBm
Frequency Selection	2E1	8 Channel
	4E1	4 Channel
	8E1	2 Channel
	16E1	1 Channel
BER During Normal Propagation		≤ 10^{-10}
Receiver Max Input		≤ -10dBm
Receiver Max Input with no BER		≤ -15dBm
Frequency Stability		±10ppm
Gain Flatness (anywhere)		RX: ± 1 dB TX: ± 1dB
TX & RX Isolation		60dB
TVS		> 40 kilovolts
RSSI (BNC)		for Antenna Alignment

Table 10-2 Digital Line Interface

Data Rate	2,048 Mbps
E1 Connector (ITU-T G.703)	BNC Unbalanced, 75 ohm

	or RJ-48, 120 ohm
Signal BER	LCD Display on IDU

Table 10-3 IDU Structure

IDU LCD		Display of IDU, ODU, Remote, Alarm, Test Item Information
Alarm		Buzzer, LED Indication, LCD Display
LED Indication	FINE	IDU Status
	ALM	Alarm Condition
	TEST	Test Condition
	RMT	Remote Status

Table 10-4 Temperature and Environment

Operating Temperature Range	IDU:-5 to 55 ℃ ODU:-30 to 60 ℃
Humidity	IDU:10%~95% Non-condensing ODU:0%~100%
Altitude	5,000 meters (maximum)

Table 10-5 Network Management System

Operating Method	HyperTerminal/Telnet
Interface	10/100BaseT
Protocol	Telnet, SNMPv1,SNMPv2,MIB

Table 10-6 IF Cable

Link Cable		≤ 100M RG-6 ≤ 200M RG-8
IDU INPUT	Frequency	70MHz
	Stability	±50ppm
	Power	-35dBm~-5dBm
	Return Loss	VSWR≦ 1.3
IDU OUTPUT	Frequency	310MHz

	Stability	±50ppm
	Power	-4dBm±2dBm
	Return Loss	VSWR≦1.3
Monitoring Signal	Frequency	11.0592MHz
	Stability	±50ppm
	Power	150~180mVpp
	Return Loss	VSWR ≦ 1.3

Table 10-7 Power

DC Input	-48VDC (-36~ -72V)
Power Consumption	< 45 watts
AC Input (optional)	100-240VAC 50-60Hz
Connector	Barrier strip, plug-in type

Table 10-8 Service Channel

Telephone	Frequency	300-3400Hz
	Impedance	600 ohm balance
	Interface	RJ-11
Monitoring Data (NMS1)	Bit Rate	≦9600 baud
	Protocol	RS-232
	Interface	DB-9(Female)
Monitoring Data (NMS2)	Bit Rate	≦9600 baud
	Protocol	RS-232
	Interface	DB-9(Male)
Computer Data (AUX1)	Bit Rate	≦9600 baud
	Protocol	RS-232
	Interface	DB-9(Female)
Computer Data (AUX2)	Bit Rate	≦9600 baud
	Protocol	RS-232
	Interface	DB-25(Female)
User Input	Type	Photo-coupled (TTL)
	Interface	DB-26(Female)
	Number	8
	Isolation	3000 VAC(rms)
	LED Power Dissipation	90 mW

User Output	Type	Relay output
	Interface	DB-26(Female)
	Number	4
	Max. switching voltage	125VAC / 60VDC
	Max. switching current	1A

10.2 LCD Alarm Items

Table 10-9 LCD Alarm Items

Alarm	Grade	Status	Explanation
MOD	Critical	Modulation alarm	Modulation malfunctions
DEMOD	Critical	Demodulation lock failure	Demodulation signal loss
EOW	Major	No service between equipments	Incorrect connection data
ODU-POW	Critical	The -48V power supply of IDU malfunctions	The cable between IDU & ODU is short
Link ID	Major	LINK ID at the remote end is different from the user's setting	
MUX	Critical	Receiving lock failure	Even bridging cannot lock the timing
I n-LOS	Warning	IDU cannot detect the input tributary signal	No Traffic input parameters
I n- AIS	Warning	Tributary signal input are all 1's	Traffic input parameters are all 1's
ODU- M/C	Major	IDU cannot monitor ODU	M&C channel between IDU and ODU is down
RSL	Major	Receive signal level alarm	Rx connection is not on the best situation
BER	Major	Bit error rate alarm	Connection is not on the best situation
-5V	Critical	ODU -5V power alarm	
SSPA	Major	Solid state power amplifier is off	
TX-POW	Major	Tx is out of range	Transmitter is abnormal
PLL-TX	Critical	Tx of ODU phase lock LO lose lock	
PLL-RX	Critical	Rx of ODU phase lock LO lose lock	
PA-I	Critical	The current is out of range	SSPA is abnormal

10.3 LCD Function

Table 10-10 LCD Function

Status	LCD Display		Function	Description
IDU Info	1	EOW No.: n	Display the service number	Display the local equipment's service phone number
	2	IDU Type: nXE1	Display the activity measure	Display the number of E1 equipments
	3	Code: AMI/HDB3	Display or set the model number	Display or set the E1 equipments model number
	4	AUX1: RS-232/RS-422	Display or set the protocol	Display the selected protocol
	5	AUX2: ASY-CH/SYN-CH	Display or set the transmission methodology	Display the transmission method
	6	I-Temp: n℃	IDU working temperature	IDU working temperature
	7	Buzzer: On/Off	Buzzer switch	Buzzer switch
	8	Restart EMU:Y/N	Restart E1 radios system	Set the configuration via LCD and textmenu
	9	Power: -36~-72V	Display input power	Display input power
ODU Info	1	RF-CH	Display RF channel	Display the present ODU RF channel
	2	TxL-SET: n dBm	Display the transmit power	Display the transmit power, n = 10~22dBm
	3	SSPA: On/Off	Set the PA to ON/OFF	Set the PA to ON/OFF
	4	O-Temp: n℃	ODU working temperature	ODU working temperature
Test Item	1	Tri-Loc-Loop Tn-L-Lp: En/Dis	Set Local Loopback	Perform loopback test in the local end for the convenience of testing the local end equipment's stability
	2	Tri-Rem-Loop Tn-R-Lp: En/Dis	Set Remote Loopback	Perform loopback test in the remote end for the convenience of testing the link system stability
	3	Tri-TX-PRBS Tn-PRBS: En/Dis	BER test	Use Pseudo Random Code to test the E1 signal transmission
	4	Ber-Clear:	Clear all accumulated Ber	Clear all accumulated Ber on starting the Ber test
	5	Count-Add:	Display all accumulated BER	Display all currently accumulated BER on starting the Ber test
	6	P-Acc-T:nS	Display all accumulated BER time	Display all currently accumulated BER when start loopback test

	7	IF-Loop: En/Dis	Set IF Loopback	Perform loopback test from IF interface for the convenience of testing the IDU's stability
	8	RF-Loop: En/Dis	Set RF Loopback	Perform loopback test from RF interface for the convenience of testing the IDU's stability
	9	Close-Test: Y/N	Close all test	Y: close N: cancel
Remote Info	1	Link ID: n	Display the remote link ID	Display the link ID of the remote equipment; n=1~255
	2	Far-end OK/Loss	Display the connection status of remote end	OK: in connection Loss: remote monitor function lost
	3	R-AUX1: RS-232/RS-422	Display remote AUX1 status	Display remote AUX1 status
	4	R-AUX2: ASY-CH/SYN-CH	Display remote AUX2 status	Display remote AUX2 status
IP Info	1	ETH IP:	Display ETH port IP address	Set the configuration via textmenu
	2	ETH Mask:	Display ETH port subnet mask	Set the configuration via textmenu
	3	NMS1 IP:	Display NMS1 port IP address	Set the configuration via textmenu, and manifest when PPP connection are established
	4	NMS1 Peer IP:	Display peer NMS1 port IP address when more than two equipments are connected in the local station	Set the configuration via textmenu, and manifest when PPP connection are established
	5	NMS2 IP:	Display NMS2 IP address	Set the configuration via textmenu, and manifest when PPP connection are established
	6	NMS2 Peer IP:	Display peer NMS2 port IP address when more than two equipments are connected in the local station	Set the configuration via textmenu, and manifest when PPP connection are established
	7	Link IP:	Display Link port IP address. Link means RF connection between two stations	Set the configuration via textmenu, and manifest when PPP connection are established

	8	Link Peer IP:	Display peer Link port IP address	Set the configuration via textmenu, and manifest when PPP connection are established
LAN Info	1	LAN-Port: Dis/1E1/2E1/3E1/4E1	Activate E1 interface number which should be used for Ethernet transmission.	Set the configuration via LCD, textmenu, and SNMP software
	2	Actual: None/n E1	Display actual E1 interface number which has been transferred to Ethernet transmission.	Set the configuration via LCD, textmenu, and SNMP software
	3	Auto-Nego: None/Dis/En	Activate/close Ethernet auto-negotiation function.	Set the configuration via LCD, textmenu, and SNMP software
	4	Duplex: None/Full/Half	The configuration of Ethernet interface duplex.	Set the configuration via LCD, textmenu, and SNMP software
	5	Speed: None/10M/100M	The configuration of Ethernet interface speed.	Set the configuration via LCD, textmenu, and SNMP software
	6	Buffer: None/Small/Large	The configuration of Ethernet interface buffer.	Set the configuration via LCD, textmenu, and SNMP software
Self Test Info	1	S-Test: Start/Testing	Activate Self Test function/Self Test status display	
	2	S-Test Result	Self Test result displays	
	3	Close-Test	Close Self Test function	
Link Info	1	Link ID:n	Display and set the link ID	Set the configuration via LCD, textmenu, and SNMP software
	2	MODEM: On/Off	Display remote dialup modem status	Display if any remote dialup modem is connected or not

10.4 Spread Spectrum Plan

Table 10-11 5.8GHz Spread Spectrum List (16E1, Side A)

Channel	16E1					
	TX			RX		
	Left	Middle	Right	Left	Middle	Right
1	5816	5830	5844	5732	5746	5760

(Frequency Unit: MHz / QPSK)

Table 10-12 5.8GHz Spread Spectrum List (16E1, Side B)

Channel	16E1					
	TX			RX		
	Left	Middle	Right	Left	Middle	Right
1	5732	5746	5760	5816	5830	5844

(Frequency Unit: MHz / QPSK)

10.5 ODU IF & RF Status

10.5.1 5.8GHz Status

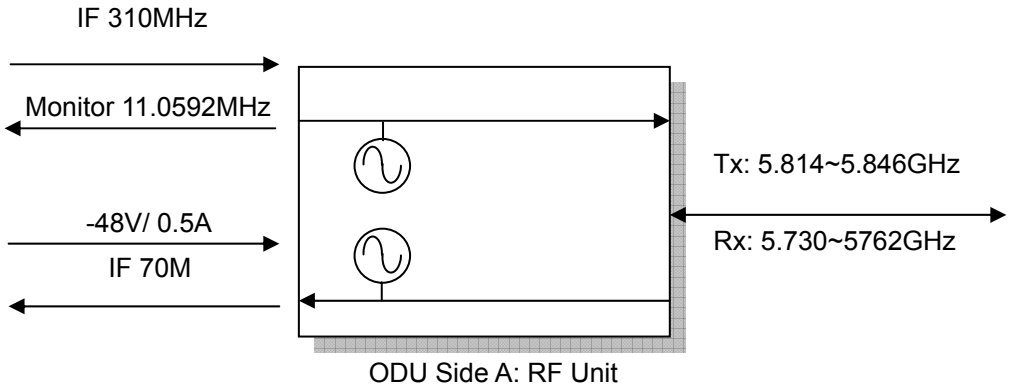

Figure 10-1 Side A IF & RF Status

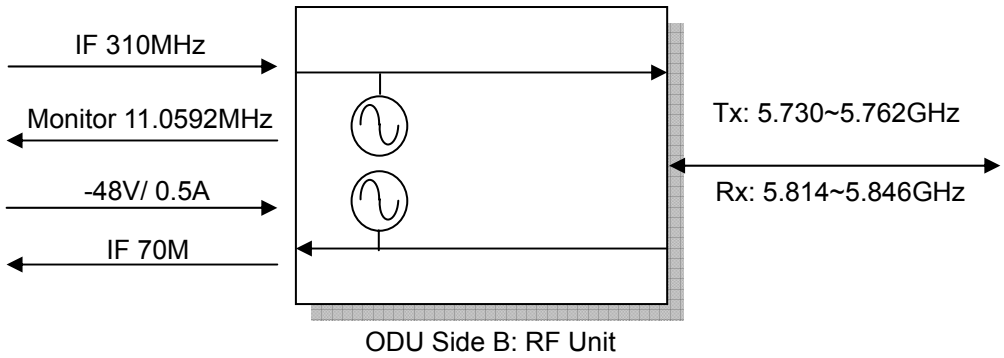

Figure 10-2 Side B IF & RF Status

10.6 The Definition of Pins

Table 10-13 DB9 female pins of NMS1

DB-9	Description
1	
2	Transmitted data （OUTPUT）
3	Received data (INPUT)
4	
5	GND
6	
7	Request to send (INPUT)
8	
9	NC

Table 10-14 DB9 male pins of NMS2

DB-9	Description
1	Received Line Signal Detector (INPUT)
2	Receive data (INPUT)
3	Transmit data (OUTPUT)
4	
5	GND
6	DCE Ready (INPUT)
7	
8	
9	NC

Table 10-15 DB9 female pins of AUX1 (V.28)

DB-9	Description
1	NC
2	TXD (OUTPUT)
3	RXD （INPUT）
4	
5	GND
6	
7	
8	
9	

Table 10-16 DB9 female pins of AUX1 (V.11)

DB-9	Description
1	NC
2	TXD- (OUTPUT)
3	RXD+ (INPUT)
4	
5	GND
6	
7	TXD+ (OUTPUT)
8	RXD- (INPUT)
9	

Table 10-17 DB26 pins of USER I/O

DB-26	Description
1	Input 3
2	GND
3	Input 4
4	Output 1C
5	Output 1NC
6	Output 1NO
7	Output 3C
8	Output 3NC
9	Output 3NO
10	Input 2
11	Input 5K
12	Input 5A
13	Input 6K
14	Input 6A
15	Input 7K
16	Input 7A
17	Input 8K
18	Input 8A
19	GND
20	Input 1
21	Output 4NO
22	Output 4NC
23	Output 4C
24	Output 2NO
25	Output 2NC
26	Output 2C

Table 10-18 DB25 pins of AUX2

DB-25	Description
1	GND

2	TX+ （OUTPUT）transmit data+
3	RX+ (INPUT) receive data+
4	
5	
6	
7	GND
8	
9	RC- (OUTPUT) receive clock-
10	
11	
12	TC- (OUTPUT) transmit clock-
13	
14	TX- (OUTPUT) transmit data-
15	TC+ (OUTPUT) transmit clock
16	RX- (INPUT) receive data-
17	RC+ (OUTPUT) receive clock+
18	
19	
20	
21	
22	
23	
24	
25	

Table 10-19 Balanced E1 Interface(RJ-48)

RJ-48	Description	Direction
1	RX TIP	Input
2	RX Ring	Input
3	RX Shield	
4	TX TIP	Output
5	TX Ring	Output
6	TX Shield	
7		
8		

10.7 Installation Guide

10.7.1 Parts of ODU assembly

Nut[1]

Split Washer[2]

Flat Washer[3]

Hex Screw[4]

ODU Fastening Assembly

Part	Q'TY
Nut[1]	4
Split Washer[2]	8
Flat Washer[3]	8
Hex Screw[4]	4
Mounting Bracket[5]	2
U-Bracket[6]	2

Mounting Bracket [5]

U-Bracket[6]

Figure 10-3 Part accessories

10.7.2 ODU Installation Diagram

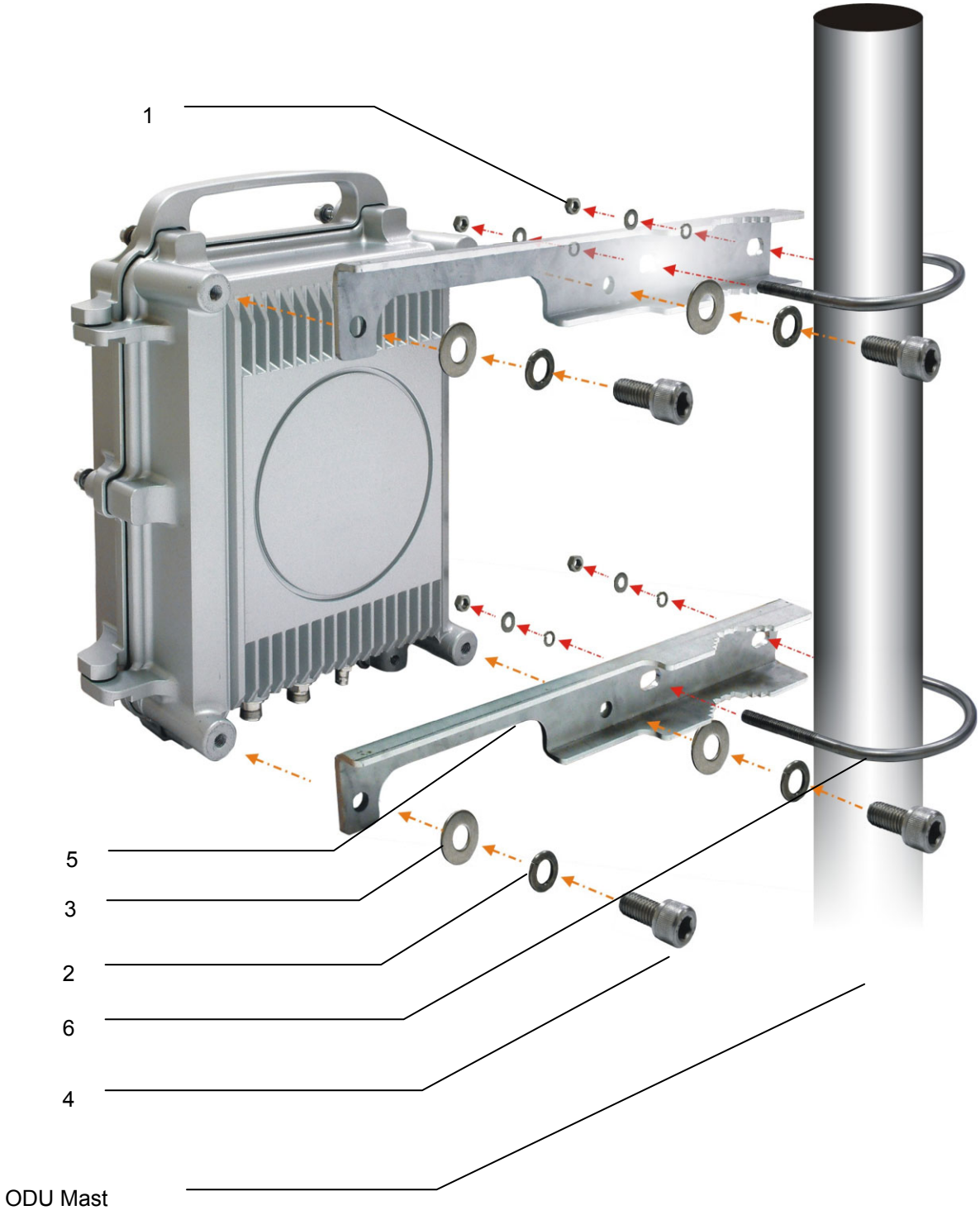

Figure 10-4 ODU Installation Diagram

10.7.3 IDU+ODU Quick Installation

For RJ-48/BNC Type

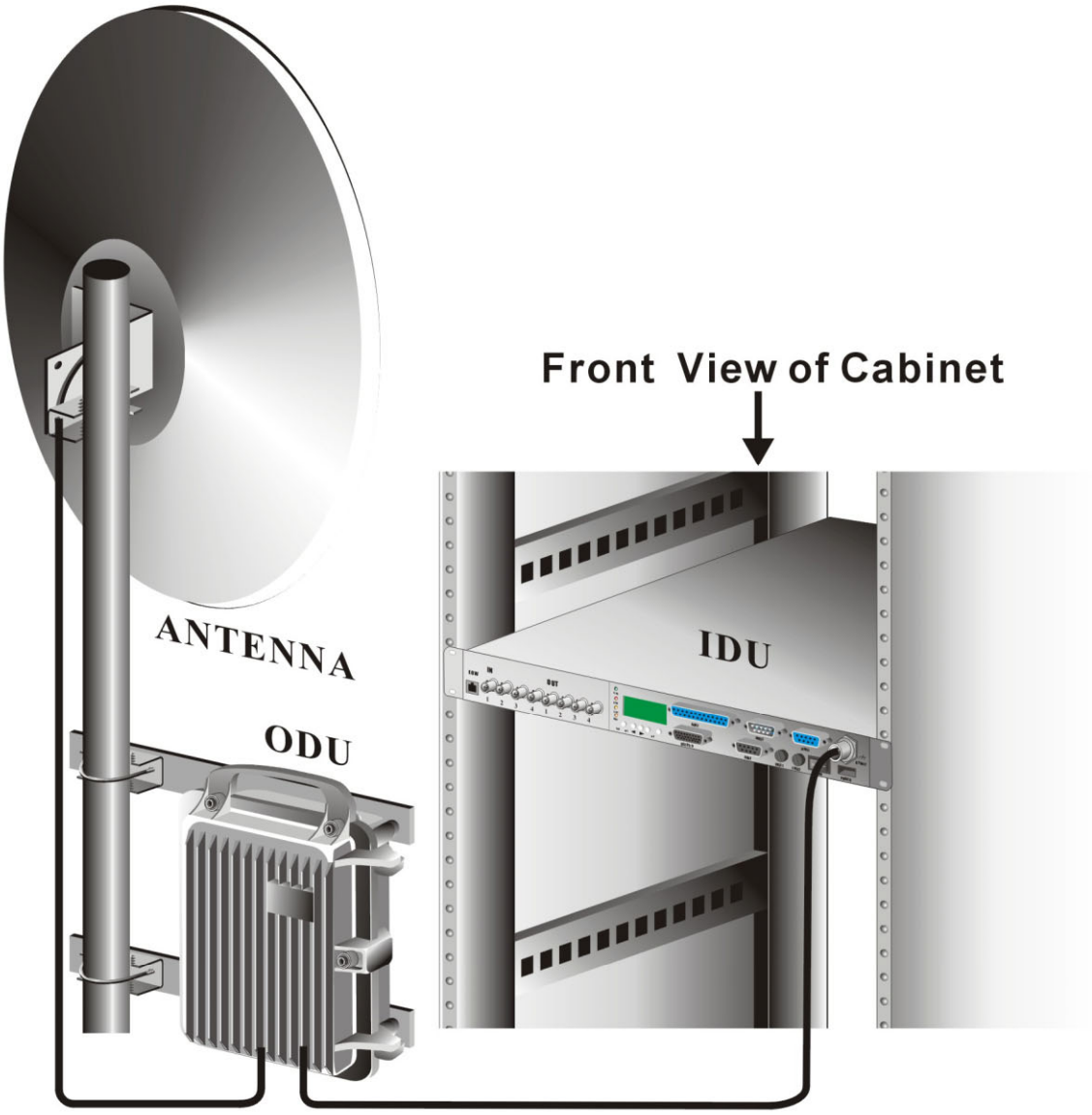

Figure 10-5 IDU & ODU Connection Diagram

10.8 RSL and Link Budget

The received signal level (RSL) can be estimated using the following formula:

RSL (dBm) = $P_{out} – FL_1 + G_1 + G_2 – FL_2 – L_P$

Link budget or SOM (dBm) = RSL – Sensitivity of system

where: P_{out} is the transmitter output power (in dBm)

FL_1 is the feeder loss of the transmit side (in dBm)

G_1 is the gain of the transmit antenna (in dB)

G_2 is the gain of the receive antenna (in dB)

FL_2 is the feeder loss of the receive side (in dB)

L_P is the Path loss, defined by:

L_P (dB) = $96.6 + 20 \log_{10}F + 20 \log_{10}D$

where: F = Frequency in GHz (1.5, 2.4 or 5.8)

D = Distance of path in km

This link budget is very important for determining any potential problems during installation. We suggest that link budget should be more than 20dB and then the link status would be stable and transmission would be perfect. If you have calculated the expected RSL, you can see if it has been achieved during installation, and troubleshoot if necessary.

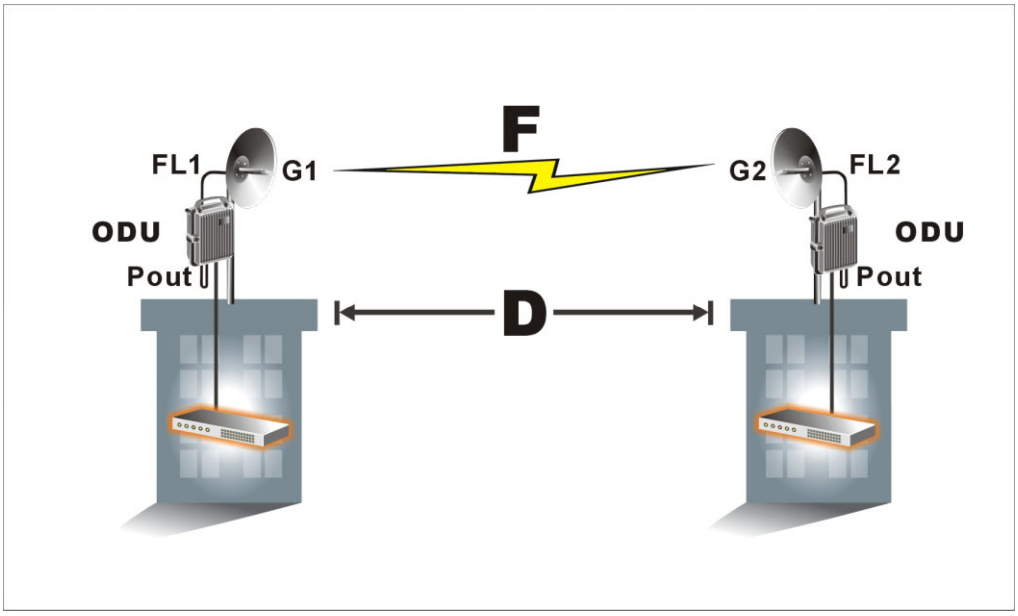

Figure 10-6 RSL and Link Budget

10.9 Troubleshooting

10.9.1 Can Not Establish a Link

If your E1 radios can't link each other perfectly and display no green light on IDU, please find the following steps for troubleshooting.

Step1: Check the physical connection from IDU to antenna of both sides if any connector is loosened or improper connected. Please refer to section 10.7 for further information.

- ✓ We suggest that the cable between IDU and ODU should be the one we attached in our package.
- ✓ As for the signals come from the ODU are high frequency ones, we suggest customers use low-loss high-frequency cable such as LMR-900 to maximize the distance between two sides.

Step2: Check the Rx LED on the ODU or Rx/Tx reading on the IDU. We suggest that if the Rx reading is lower than -60dB, then it has great possibility that you encounter RF problem. You could take following measures in order to verify the situation.

Step2.1: There is possibility of wrong antenna angle toward each other. Please adjust your antennas to the correct angle.

Step2.2: There is possibility of air interference. Please switch your RF channel to another available one of both sites.

Step3: Check the configuration. Please find the following configurations are correct or not by using whether LCD panel or telnet utility.

Item	Location of LCD	Location of Textmenu	Configurations
RF Channel	ODU Info/RF-CH(Section 5.2.2)	Terminal/ODU(Section 8.2.1)	This setting should be the same as remote site.
Power of Tx	ODU Info/TxL-SET(Section 5.2.2)	Terminal/ODU(Section 8.2.1)	This setting should be set to be maximum value such as 22.
SSPA	ODU Info/SSPA(Section 5.2.2)	Terminal/ODU(Section 8.2.1)	This setting should be set to be ON.
Link ID	Link Info/Link ID(Section 5.2.8)	Terminal/Link(Section 8.2.3)	This setting should be the same as remote site.

Step4: Please conduct loopback tests to verify if the system is broken or not by following order. Please refer to section 5.2.3 and section 8.2.13 for detail operation. If any of the following items fails, then contact us to start RMA procedure.

Step4.1: Perform IF loopback to check if IDU works well or not. If IF loopback is error-free, then IDU must be ok.

Step4.2: Perform RF loopback to check if ODU works well or not. IF RF loopback is error-free, then ODU must be ok.

Step4.3: Perform the same loopback on the other sites to check if the status of the other site.

Step5: If you have spare parts for system or antennas, try to replace equipment one by one to verify the problem. If any of the equipments fails, then contact us to start RMA procedure.

Step6: Shorten the distance between two sites to about 500 meters or connect antenna port to each other with physical cable and about 50 attenuation loss. This is to verify the system status in short distance. If the system fails with this topology, then the antenna or RF cable must be defective.

Step7: Recalculate link budget by the method of section 10.8. If the link budget is lower than standard, then please reduce the system loss or increase the gain of antenna.

10.9.2 Establish a Link but Poor Performance

If E1 radios display green light on the IDU but with lots of error occurred, please find the following steps for troubleshooting.

Step1: Check the Rx LED on the ODU or Rx/Tx reading on the IDU. We suggest that if the Rx reading is lower than -60dB, then it has great possibility that you encounter RF problem. You could take following measures in order to verify the situation.

Step1.1: There is possibility of wrong antenna angel toward each other. Please adjust your antennas to the correct angle.

Step1.2: There is possibility of air interference. Please switch your RF channel to another available one of both sites.

Step1.3: There is possibility of poor link budget. Please reduce the system loss or increase the gain of antenna.

Step2: Check if some loopback tests have been performed then.

Step3: Please conduct loopback tests to verify if the system is broken or not by following order. Please refer to section 5.2.3 and section 8.2.13 for detail operation. If any of the following items fails, then contact us to start RMA procedure.

Step3.1: Perform IF loopback to check if IDU works well or not. If IF loopback is error-free, then IDU must be ok.

Step3.2: Perform RF loopback to check if ODU works well or not. IF RF loopback is error-free, then ODU must be ok.

Step3.3: Perform the same loopback on the other sites to check if the status of the other site.

10.9.3 Pre-RMA and RMA Procedure Notification

Please see the following steps for pre-RMA and RMA procedure.

Step1: Contact with your sales person and ask for help by email or telephone.

✓ Our technical support personnel will try our best to help you with the problems.

Step2: If the problem can't solve by email or telephone, then inform your sales person with following information. Then sales person would give you a return RMA number and address.

(1) The model number of the products.

(2) The S/N of the system such as IDU, ODU or any other equipment procured from us.

(3) The name of contact sales.

(4) The procured date.

(5) The detail problem you have encountered and what measures you have took to solve the situation.

Step3: Pack the product and the accessories properly and attached manifest RMA outside the carton. Then send the package back to the return address.

Step4: Our sales person would update latest RMA schedule to you.