Random noise was first regarded as an element that damages the quality and quantity of communicative signals in communication technology. The random noise in signal channels often distorts the simulated signal produced or bit error to appear upon the demodulation of digital signals. At the same time, it is also one of the elements that limit the channel capacity. Consequently, human's early attempt was to remove or lessen all the pseudo noise in the communication system. Nonetheless, some of them decided to obtain all these pseudo noise. For example, communicative equipments or systems testing in laboratory require an addition of certain noise. So it is necessary to produce/obtain noise here. In the late 1940s, along with the communications, must adopt signals containing the statistical property of white noise. Besides, in order to achieve communications of high reliability and privacy, we must use random noise. However, the biggest difficulty faced in using random noise is that it is not easy to repeatedly produced and processed. Until the 60's, the pseudo random noise came about and solve all these problems.

Pseudo random noise poses statistical property similar to random noise. At the same time, it can be repeatedly produced and processed easily. It has increasingly been extensively use practically because it poses the advantages of random noise and none of its disadvantages. In today's world, it has been extensively used in digital circuit produced periodic series (after filtering). In the future, this shall be called the periodic series or the random series.

Pseudo random sequences are generated using a binary shift register with taps that are modulo-2 added together and fed back to the register's input. The name commonly used for this simple circuit is linear feedback shift register, or LFSR. Another type is known as the Non-Linear Feedback Shift Registers. Only certain combinations of feedback taps will result in maximal-length sequences, called m-sequences. These are the longest sequences possible given a specific shift register size, and they have many desirable properties. If the register size is m stages, the length of the m-sequence will be 2m-1. Nowadays, the equipments used are mostly PRBS of m-sequence: x15 + x + 1, 100003.

C4. Ber-Clear

Clear all accumulated bit error on starting the BER transmission test. Press the OK button.



Figure 5-37 Ber-Clear

C5. Count-Add:

Display all the current accumulated bit error on starting the BER transmission test.



Figure 5-38 Count-Add:n

C6. P-Acc-T: nS

Display all accumulated BER time.



Figure 5-39 P-Acc-T:nS

C7. IF-Loop: En/Dis

Perform IF Loopback at the IF interface for the convenience of testing the IDU's stability. Press OK. Use the Right/Left button for selecting either En/Dis (En: Enable/Dis: Disable). Press OK button again to execute the function. This can be used along with E1 transmission tester.



Figure 5-40 IF-Loop:En/Dis (1)

In **IF Loopback**, **()** appears at the right bottom of the LCD. TEST led gives an orange glow.



Figure 5-41 IF-Loop:En/Dis (2)

C8. RF-Loop: En/Dis

In RF Loopback, Hy appears at the right bottom of the LCD. The local's and remote's TEST led gives an orange glows.

When the local end is executing RF Loopback, the remote end's connection will be broken. ALM led gives a red warning alarm.



Figure 5-42 RF-Loop:En/Dis

C9. Close-Test

Press "OK" to close all tests.



Figure 5-43 Close-Test

5.2.4 Remote Info



Figure 5-44 Remote Info

D1. Remote ID: n

Display the address of remote equipment; n=1~255. It is possible to check the remote end's current ID address.



Figure 5-45 Remote ID:n

D2. Far-End: OK/Alarm/Loss/Test

Display the link status of the remote end equipments. It is used as a function of signal monitor for the determination of its source.

OK: active connection

Alarm: remote system alarm occurs

Loss: remote monitor loss

Test: remote system test activated



Figure 5-46 Far-End:OK/Alarm/Loss/Test

D3. R-Status: Test/Normal

Display the system current working status. It is possible to check the base station at the remote end as well as the status of any online test.

Test: remote end in test mode.

Normal: normal working condition.



Figure 5-47 R-Status:Test/Normal

D4. R-AUX2: ASY-CH/SYN-CH

Display remote AUX2 working status.



Figure 5-48 R-AUX2:ASY-CH/SYN-CH

5.2.5 Config Info



Figure 5-49 Config Info

E1. MODEM: ON/OFF

Display the status of external modem at the local end. "ON" implies external modem is connected. "OFF" implies external modem is not connected.



Figure 5-50 MODEM:ON/OFF

E2. SYS-Conf : 1+1/1+0

Display the IDU system redundant status. 1+1 implies system with redundant. 1+0 implies system without redundant.



Figure 5-51 SYS-Conf:1+1/1+0

E3. TX : Active/Standby

Display the transmitter Tx status. Under 1+0 condition, Tx is Active. Under 1+1 condition, Tx is either Active or Standby.



Figure 5-52 Tx:Active/Standby

E4. RX : Active/Standby

Display the transmitter Rx status. Under 1+0 condition, Tx is Active. Under 1+1 condition, Tx is either Active or Standby.



Figure 5-53 Rx:Active/Standby

E5. Power: -36 ~ -72V

Display the power supply.



Figure 5-54 Power:-36 ~ -72V

E6. Date: Year/Month/Day

Display system current date.



Figure 5-55 Date:Year/Month/Day

E7. Time: Hour/Min/Sec

Display system current time.



Figure 5-56 Time: Hour/Min/Sec

6 Environmental Condition

6.1 Cable

IF Cable: RG-6 \leq 100m; RG-8 \leq 200m RF Cable: Insertion Loss \leq 1dB

6.2 Operating Temperature Range

IDU: -5℃ ~ +55℃ ODU: -30℃ ~ +60℃

6.3 DC Input Voltage

DC Input Voltage: -36 ~ -72VDC

6.4 Power Consumption

Power Consumption: <45W

6.5 Humidity

Relative humidity as follows: IDU: $10\% \sim 95\%$, non-condensed. ODU: $0\% \sim 100\%$ ODU equipment is water-resistant.

7 Software Installation

		nop				
Back 🔹 🚫 🕤 🏂	, s	earch 🜔 Folders 🛄	. 1			
ress 🛅 J:\Product Disk\E1 S	5pread S	pectrum Radios			~	Þ
	0	Name 🔺	Size	Туре	Date Modified	
File and Folder Tasks	۲	🛅 Arbeit 1.38		File Folder	8/11/2003 4:31 PM	
		🛅 Quick Installation Guide		File Folder	6/6/2003 11:05 AM	
Other Places	۲	🚞 User Manual		File Folder	6/6/2003 11:05 AM	
Dataile	8					

a) Open the CD-ROM folder containing the monitor software. The following window appears:

Figure 7-1 Software Installation (1)

b) Open the Arbeit v1.xx. Click twice to execute the setup.exe file.

e Edit view Favorites	TOOIS	нер			
🕽 Back 🔹 🕥 🕤 🏂	<u>_</u>	Search 🔀 Folders	•		
dress 🛅 J:\Product Disk\E1	Spread S	5pectrum Radios\Arbe	it1.38		✓ ⇒
	-	Name 🔺	Size	Туре	Date Modified
File and Folder Tasks	۲	INST32I	294 KB	EX_File	11/19/1997 4:05 PM
		ISDEL	8 KB	Application	11/19/1997 4:05 PM
Other Places	*	🔊 _setup.dll	11 KB	Application Extension	11/19/1997 4:08 PM
	~	🧔_sys1	182 KB	WinZip File	8/6/2003 10:59 PM
P 1 1		🧔 user 1	44 KB	WinZip File	8/6/2003 10:59 PM
Details	۷	🗇 data 1	11,696 KB	WinZip File	8/6/2003 10:59 PM
		DATA.TAG	1 KB	TAG File	8/6/2003 10:59 PM
		🛅 lang	5 KB	DAT File	5/30/1997 11:31 AM
		🖬 layout	1 KB	BIN File	8/6/2003 10:59 PM
		🔟 os	1 KB	DAT File	5/6/1997 2:15 PM
		🔊 setup	81 KB	Bitmap Image	4/16/1997 1:46 AM
		🗑 setup	56 KB	Internet Communic	8/6/2003 10:59 PM
		SETUP	59 KB	Application	11/19/1997 4:09 PM
		SETUP	1 KB	Configuration Settings	8/6/2003 10:59 PM
		🔟 setup.lid	1 KB	LID File	8/6/2003 10:59 PM
					3038

Figure 7-2 Software Installation (2)

c) Click Next to start installation.



Figure 7-3 Software Installation (3)

d) Install the software to any desired folder by clicking on **Browse**. Click **Next** to continue.



Figure 7-4 Software Installation (4)

f) Enter the name of the Program Folders. Click Next to continue.



Figure 7-5 Software Installation (5)

g) Click Next to begin copying files.

Start Copying Files	
	Setup has enough information to start copying the program files. If you want to review or change any settings, click Back. If you are satisfied with the settings, click Next to begin copying files. Current Settings: Source Directory: J:\Product Disk\E1 Spread Spectrum Radios\Arbeit1 Destination Directory: G:\Program Files\Arbeit1.38 Displayed folder: Arbeit1.38
	< Back Next > Cancel

Figure 7-6 Software Installation (6)

8 Arbeit NMS Software

8.1 Open Arbeit NMS

There are two ways to open the program Arbeit:

1. Click on Start → Program → Arbeit

2. Open File Manager → Program Files → Arbeit → Arbeit.exe



Figure 8-1 Open Arbeit

8.2 Login

After executing the program Arbeit, click the menu bar **Monitor** \rightarrow select **Login**.



Figure 8-2 Login Arbeit

In the Login window, please enter User name and Password.

ogin	
User name:	
ov l	Cancel

Figure 8-3: Arbeit's User name and Password

The system already has some preset user name and password, which are given below:

#	# User name Password		Function		
Configuration	initialize	initialize	Initial setting for single machine		
User	r user user		General and station maintenance user		
Administrator	system	system	Administrator; can add new users		
System Test	loopback	loopback	System test		
Superuser	superuser	superuser	Superuser; can use all the functions		

Table 8-1: System Preset Password

※ *Note*: Remember to Logout after execution or change of user name.

8.3 Initialize

Login the local equipment's initialization mode as User Name: initialize; In the Main Window, select Superuser → Equipment Setting. Another initialization window will appear with five different working mode: IDU Setting 、 ODU Setting 、 Alarm Setting 、 Cross Connecting 、 User I/O Setting. We shall explain the different mode in the coming section.



Figure 8-4: Initialize

8.3.1 IDU Setting

While setting the below functions, first modify the parameters in the setting window, then press **Send Setting** to save it in the **Status**. It is also saved in the IDU. The setting will now be shown on the window **Status**. Press **Check** to check any settings made. It will read all the data from the IDU. Exit the window if there are no error settings.

Initialization					
Station No.:	1 Equipment: 1	Model: 1+	H0 4xE1		
IDU Setting	Link Setting ODU Setting	Alarm Setting	Cross Connecti	ng User I/O	Setting
	Status	Send Setting	Setting		
Address:	1	1	1 2	55	
E.O.W. No.:	001	1	1 2	:55	
Panel PWD:	000000	o	000000 9	99999	
Bit Format:	HDB3		HDB3 💌		
AUX 1:	RS232		RS232 💌		
AUX 2:	Asynchro Channel		Asynchro Ch	annel 💽	-
Location:	ertr				
Time:	12:31:34	<<	12:34:33	System Tim	e
Date:	2003-Jul-26		2003 ÷ Ju	1 🕶 26 -	-
	-			System Date	·]
	Check				
			I	Exit	
The rea	al setting of ODU 240030612	001A is shown in s	tatus.	2003/7/26	6:06 PM

Figure 8-5: IDU Setting

Address: Each and every E1 modem in the network has its own unique **IDU** Address for differentiating and easy setting. While setting up the station, all initialization must be done here first. If initialization is not set accordingly, it will not work properly.

E.O.W No: Enter any number between 0~255 for service number setting. <u>* Note</u> that the EOW number should be different from the Link ID. On the right side of the IDU panel, there is a RJ-11 connector that is meant for analog telephone. It is used for all phone connection in the link with the base station.

Panel PWD: If necessary, enter the IDU password, which must only be 0~9 digits, ranging from 0~9999999.

Bit Format: IDU transmission encoding format AMI or HDB3.

AUX1: Asynchronous data transmission protocol setting for either RS232 or RS422.

AUX2: Asynchronous or Synchronous channel setting.

Location: Equipment's location detail setting.

Time: Set system time. Press System Time for original system time.

Date: Set system date. Press System Date for original system date.

Check: Check all the IDU setting data.

Exit: Exit the initialization mode.

nitialization Station No.: 1 Equipm	ent: 1	Model: 1+	0 4xE1	
IDU Setting Link Setting 0	DU Setting	Alarm Setting	Cross Connec	cting User I/O Setting
	Status	Send Setting	Setting	
Link ID:	1	1	1	255
BER alarm threshold:	-3	-6	-3	-3
RSL alarm threshold:	-80	-80	-80	-50
				Exit
T1. T 1. 1. 1. 1.	CIDIT :	hanna in shahar		2003/2/26 6.06

8.3.2 Link Setting

Figure 8-6 Link Setting

Link ID: In order to prevent wrong connection if similar equipment is kept close by in the same environment, it is strongly advised to enter a differentiating Link ID.



Figure 8-7 Link

A.T.P.C: Automatic transmitting power control, retain.

Expected RSL: Automatic transmitting power control parameters, retain.

BER Alarm Threshold: BER alarm setting: E-5 × E-4 × E-3 etc. **RSL Alarm Threshold:** Receiving power alarm setting.

8.3.3 ODU Setting

Station No.: 1	Equipme	nt: 1	Model: 1	+0 4xE1	
DU Setting Lini	k Setting OD	U Setting	Alarm Setting	Cross Connecting User I/O Se	ttir
	Status	ន	end Setting	Setting	
Channel No.	Channel 1	Tx. 2468MI Rx. 2405MI		Channel 1 Tx. 2468MHz Rx. 2405MHz	
Tx. Level	20	dBm		16 dBm Range: 10dBm ~ 22dBm	
SSPA	ON			ON 💌	
1	Check				

Figure 8-8: ODU Setting

Channel No: Set the ODU's frequency range. 4E1 has four frequency channels to use. Please refer to Appendix 4 for further details.

Tx. Level: IDU transmitting power setting (preset = 22dBm).

SSPA: Switch ON/OFF the ODU power amplifier (PA On/Off).

8.3.4 Alarm Setting

Station No.: 1 Equipment: 1	Model:	1+0 4xE1		
IDU Setting Link Setting ODU Setting Link ID fault alarm BER alarm ODU Tx POW alarm Tributary2 alarm Tributary3 alarm Tributary3 alarm Tributary5 alarm Tributary5 alarm Tributary6 alarm Tributary8 alarm	Alarm Setting Status unmasked masked masked masked masked masked	Cross Connecting Setting □ - masked ▼ - masked □ - mas	User I/O	Setting
		Ex	it	

Figure 8-9: Alarm Setting

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 fault alarm: Local equipment receives the wrong Link ID.

BER alarm: BER alarm.

ODU Tx_POW alarm: ODU output power alarm.

Tributary n alarm (n=1~4): IDU cannot find the tributary signal.

Send Setting: Modified data are written into the IDU.

8.3.5 Cross Connecting

OU Setting Link Setting OI	DU Set	ting Alar	m Se	tting Cross Cor	nnec	ung	User	I/O Set	tu
		Stat	us	Se	ttin	g			
Out Connector	1	Tributary	1	Tributary	1	•			
Out Connector	2	Tributary	2	Tributary	2	•			
Out Connector	3	Tributary	3	Tributary	3	•			
Out Connector	4	Tributary	4	Tributary	4	•			
Out Connector	5	Tributary		Tributary	-	+			
Out Connector	6	Tributary		Tributary	-	Ŧ			
Out Connector	7	Tributary		Tributary	-	×.			
Out Connector	8	Tributary		Tributary	-	7			
Cł	neck	Ľ		Send Setting	L				
		1							

Figure 8-10: Cross Connecting (1)

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.

Send Setting: Modified data are written into the IDU.





Figure 8-11: Cross Connecting (2)

- Fig. A Normal connection mode
- Fig. B Local and remote port1 & port2 in cross connection mode and port3 & port4 in normal connection mode
- Fig. C Local port1 connected to remote port1 & port2. Local and remote port3 & port4 in normal connection mode
- Fig. D Local and remote port in cross connection mode between ports 1&4, 2&2, 3&1 and 4&3

8.3.6 User I/O Setting

DU Setting Link S	Setting ODU Setting Alar	m Setting Cross Cor	nnecting	User I/O	Setting
	Status	Setting			
User Input #1	Not in use	Not in use	•		
User Input #2	Not in use	Not in use	-		
User Input #3	Not in use	Not in use	•		
User Input #4	Not in use	Not in use	•		
User Input # 5	Not in use	Not in use	-		
User Input #6	Not in use	Not in use	-		
User Input #7	Not in use	Not in use	•		
User Input #8	Not in use	Not in use	•		
Relays Output #1	Not in use	Not in use	-		*
Relays Output #2	Not in use	Not in use	-		-
Relays Output #3	Not in use	Not in use	•		*
Relays Output #4	Not in use	Not in use	-		+
	Check	Send	Setting	1	

Figure 8-12: User I/O Setting

Besides the standard E1 interface, there are the environment detection and control port. 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 temperature, alarm, power supply etc. data from the central controlling computer. The central controlling computer controls most of the functions which makes intelligent management possible. This device has <u>8</u> input and <u>4</u> relay output ports. 4 relay outputs represent Critical Grade Alarm, Major Grade Alarm, Minor Grade Alarm, and over 1 condition of above-mentioned happened respectively.(See P.64)

Send Setting: Modified data are written into the IDU.

8.4 Superuser

Login the link route setting mode as User Name: superuser; Password: superuser. In the Main Window, select Superuser \rightarrow Network Setting. Another initialization window will appear with <u>five</u> different working mode: Change \sim Delete \sim Add. \sim Close \sim OK. We shall explain the different mode in the coming section.

🁁 Main	Window					
Monitor	System Record	System Management	Superuser	Help		
			Network	Setting		
			Equipm	ent Setting		

Figure 8-13: Superuser

Add. First select Add. to add new station.

	Station Setup		
	1 station was set in system.		
	No. Station Name Stat:	ion Type Equip. Nu Equip. Addres	
Enter Station Name			Enter Station Type
	Information of Station 1		L
	Name:	Туре:	
	Temperature Alarm Threshold: (in centizrade)	Equipped with equipments	- Enter Equipment's
	UDU 📕 👷 📕 ODU 🗍	Equipment List Address	
		Equipment 1 Initialize	Address
	upper 55 upper	Equipment 2 Initialize	
	Guaranteed	Equipment 3 Initialize	
	lower temperature lower	Equipment 4 Initialize	
		Equipment 5 Initialize	
	-30 -	ApplyCancel	
		Change Delete Add. Close	

Figure 8-14: Station Setup (1)

Press Apply after entering all the data in the red circled blanks.

110.	Station Nam	e St	ation Type	Equip. Nu	Equip. Addres
1 2	aa bb	Te: Te:	rminal Stat rminal Stat	1	1 2
tation I	nformation				
Nam	ie:			Туре:	
Temp (in cen IDU	erature Alarm T tigrade) 80 -	'hreshold: ODU	Equipped Equipment Equipment	with equ List Address	uipments Initialize
uppe	er – 55	upper	Equipment	.2	Initialize
 uppe	er – 55 Guaranteed	upper	Equipment Equipment	.2	Initialize Initialize
uppe lowe	er – 55 Guaranteed working r temperature	upper lower	Equipment Equipment Equipment	2 3 4	Initialize Initialize Initialize

Figure 8-15: Station Setup (2)

Station Setup Example:

- 1. Enter "aa" in Name and "1" in Address. Select Terminal Station to complete the newly added station's data.
- ※ Note: Station Name must not exceed 30 characters or numbers.
- 2. Press Add. to enter the second data. Enter "bb" in Name and "2" in Address.

Select **Terminal Station** again. Every station has its own address after **Initialize** setting. First, select **Add.**, and then choose the corresponding **Address**. In the **Station Name**, enter a different name. It will be displayed on the Monitor and on the IDU-LCD.

Arbeit Menu, after adding two stations:



Figure 8-16: Station Setup (3)

The stations position in the above diagram is a random result. Point the mouse on the station, right click and move it without releasing by placing it to any desired position.

Under normal connection, the station icon will display its working status.

Green glow = normal connection; Red glow = connection, with alarm

Orange glow = test mode; Grey glow = no connection



Figure 8-17: Station Setup (4)

Now let us introduce some other functions in the Station Setup window:

Temperature Alarm Threshold:

Station S	letup				
2 stations	were set in sys	stem.			
No.	Station Nam	e S	tation Type	Equip. Nu	Equip. Addres
1	aa	T	erminal Stat	1	1
2	66	T	erminal Stat	1	2
-Information Name Temper (in centi IDU 55 upper lower -5	on of Station 1 - : : : : : : : : : : : : :	aa "hreshold: ODU 80 upper lower -30	Equipped Equipment Equipment Equipment Equipment Equipment	Type: with 1 ec List Address 1 1 2 3 4 5	Terminal Station quipments Initialize Initialize Initialize Initialize Initialize
	-30 -				Appry Cancer
			Change	Delete	Add. Close

Figure 8-18: Temperature Alarm Threshold

Set the IDU & ODU alarm temperature range. Enter the desired parameters in the **upper** and **lower** IDU & ODU temperature alarm threshold blanks. When the temperature is higher than or lower than this threshold, the system alarm will start beeping. The system has its own **Operating Temperature** threshold as well. As shown in the **Station Setup** window, the IDU upper and lower Temperature threshold is $+50^{\circ}$ C and -5° C respectively and the ODU are $+60^{\circ}$ C and -30° C respectively. The threshold can be set between these two upper and lower thresholds. The upper threshold must not be too low and the lower threshold must not be too high, if it is NOT so, the alarm will go off every now and then even if all the other settings are correct.

No.

Number of Equipment already set up.

Change

For modifying any stations data, select that particular station and press **Change** to modify its content. Press **Apply** after completing.

Add.

To add new stations.

Delete

To delete unwanted stations.

Terminal Station/Center Station

Base station acts as **Terminal Station**. The stations are in a PTP, point-to-point connection. Base station acts as **Center Station**. When there are more than two equipments in the base station, please select this type of mode. Then only we can use the IDU Net port function. Using Arbeit, it is possible to see all the equipment's link in the station by concatenating all the monitoring information of the station. Each base station can have NOT more than <u>ten</u> **Center Station**. Extended link can have a maximum of 255. This mode is also called the star topology, as illustrated in the following figure:



Figure 8-19: Terminal/Center Station

Initialize

This function can randomly change the link of the stations, only provided it is in connection mode. Please refer to the previous chapter on how to initialize.

8.5 System Setting

In the **Main Window**, select **System Management** \rightarrow **System Setting**. Another initialization window will appear with <u>three</u> different working mode: **Background Setting** \sim **COM Port Setting** \sim **Record Saving Time**. We shall explain the different mode in the coming section.

₽ Mair	n Window				
Ionitor	System Record	System Management	Superuser	Help	
		System Setting			
		User Setting			
		System Test			
	044				

Figure 8-20: System Setting

8.5.1 Background Setting



Figure 8-21: Background Setting (1)

In **System Setting**, we use the **Background Setting** tab to edit the router map. For example: street, building, station setting etc. Save the file in *JPEG format after editing. In Arbeit folder, we can open the picture file again for

Open						? 🔀
Look in:	C Arbeit		~	ODE	•	
My Recent Documents	 ■ 01 ■ 02 ■ 03 					
My Documents						
My Computer						
My Network	File name: Files of type:	JPEG (*JPG,*JPEG,*	JPE: "JFIF)	~		Open Cancel

easy modification. In the following diagram, for example, we open the 03.jpg file, it will show the following:

Figure 8-22: Background Setting (2)

After opening the 03.jpg file, we can see a preview of the picture file in the browse section. Press **Accept** to use the picture file as the background setting. Press **Clear** button to remove the background setting.

System Setting	
Background Setting COM port Setting Red	ord Saving Time
ground of the main window. G:\Program Files\Arbeit1.38\03.JPG	Browse.
	Clear
	Exit

Figure 8-23: Background Setting (3)

Example: Selected background setting



Figure 8-24: Background Setting Complete

8.5.2 COM port Setting

👁 System Setting	3	
Background Setting	COM port Setting	Record Saving Time
You can select a NMS.	COM port as the co	ommunication port of
	0M 1	Accept
		Exit

Figure 8-25: COM port Setting

In **COM port Setting** tab, you can select a COM port as the communication port of NMS. Press **Accept** after selection.

8.5.3 Record Saving Time



Figure 8-26: Record Saving Time

Select the saving time of all the records: one, two, five or forever years. Press Accept after selection.

8.6 User Setting

In the Main Window, select System Management \rightarrow User Setup.

Monitor	System Record	System Management	Superuser	Help		
		System Setting				
		User Setting				
		System Test				
	111	2			CXX .	
		1				

Figure 8-27: User Setting

<u>Note</u>: The higher the grade (with different login account), the more the function is allowed. Superuser is the highest grade. The following table shows the different functions allowed for each grade:

Grade Login	User	Administrator	System Test	Configuration	Superuser
Superuser	V		$\mathbf{\nabla}$		$\mathbf{\nabla}$
Administrator	A	\square			
System Test			M		
Configuration				V	
User	V				

Table 8-2: Function Limits

User user Administrator system system Char System Test loopback loopback	le	User name	Password	New User.
Administrator system system System Test loopback loopback		user	user	
DialUp dialup dialup Dele Superuser *******	iinistrator em Test figuration Up ruser	system loopback initialize dialup ********	system loopback initialize dialup ******	Change Delete

Figure 8-28: User List

Edit User Name or Password: Click on User Name "user". Press Change.

The following dialog box appears.

You may now change the old user name to a new one. Press Accept.

If you need to change password, press Next to continue.

Login Setting		
	User name can be up to 20 characters long.	
Old user name:	user	
New user name:		
		Accept

Figure 8-29: Change Superuser Login Setting (1)

A new dialog box appears to confirm the new password. Press **Accept** to write the data.

Login Setting		
	Password can be up to 20 characters long.	
Old password:	user	
New password:		Accept
Confirm new passwo	rd:	

Figure 8-30: Change Superuser Login Setting (2)

8.7 System Test

% *Note*: Check all online status while performing any of the loopback functions. Be careful to check if there is any broken link.



Figure 8-31: System Test (1)

Station:		aa	Equipn	nent: 1	Local I	Loopback
Model: Status: Remote:	1+0 4xE1 Normal Station bb	Equipment l				Clear All Test
∓ a a # <mark>1</mark> bb		Tributary 1 Tributary N Tributary 1 Tributary N			D RF	R + Tributary E + Tributary M Tributary O T + Tributary F + Tributary
		Customer traffi output without connection of will be helpful	fic is looped-ba t any handling 'traffic from ti when the cust	ack from the trib within IDU, this he customer outp omer equipment	utary input function equit to custon need to be	t to the tributary equal the direct omer input, and it checked out

Figure 8-32: System Test (2)

8.7.1 Local Loopback

Under **Local Loopback**, it is easier to detect any malfunction at the E1 interface. E1 testing equipment is required while detecting because on the execution of this function the testing signal cannot enter MOD, so it is not possible to use PRBS to detect. This function setting is also done through the NMS or the LCD display button.



Figure 8-33: Local Loopback

In the **System Test** window, tick the **Setting** column for Tributary 1. Press **Accept Setting**. The IDU's first E1 interface is now performing the **Local Loopback** test. There can be multiple selections for the test. Press **Clear All Test** to stop all tests.

Station:		aa	Equipn	nent: 🗌	1	Local L	oopback.	
Model: Status: Remote:	1+0 4xE1 Normal Station bb	Equipment l				Local L IF Loop RF Loo Remote	oopback bback p-back Loopbac	k
B 📕 bb		Tributary 1 Tributary N Tributary 1				RF T	R + T $E + T$ $M + T$ $O + T$	ributary : ributary ributary
		Tributary N Customer traff output withour connection of will be helpful	fic is looped-ba t any handling traffic from the	ack from the within IDI he custome omer equip	he tribut. J, this for er output ment ne	ary input inction e to custo ed to be	E Tri to the trit qual the dir mer input, checked or	ributary outary rect and it

Figure 8-34: Local Loopback Setting

8.7.2 IF Loopback

Under **IF Loopback**, a self-detection test on any IDU components malfunction is carried out. This function setting is done through the LCD display button.



Figure 8-35: IF Loopback

This function is performed only through the IDU's LCD panel.



Figure 8-36: IF Loopback Setting

8.7.3 RF Loopback

Under **RF Loopback**, a self-detection test on the working conditions of both the IDU and ODU is carried out. This function setting is done through the LCD display button.



Figure 8-37: RF Loopback

This function is performed only through the IDU's LCD panel.

		aa	Equipment:	1 RF L	oop-back 🔽
Model: Status: Remote:	1+0 4xE1 Normal Station bb	Equipment l			Clear All Test
# ■ aa # ■ bb		Tributary I Tributary N Tributary N Tributary N Radio signal is can check out not. Note: Because one type of lo loop-back stat type of loop-b	IDU W W W W W W W W W W W W W	P C C C C C C C C C C C C C C C C C C C	Tributary Tributary Tributary Tributary Tributary Tributary Tributary Tributary th this function, user re working correctly o affic, it can only take an equipment is in ipment can't take any

Figure 8-38: RF Loopback Setting

8.7.4 Remote Loopback

Under **Remote Loopback**, a self-detection test on the complete loopback from local to remote is carried out. This function setting is done through the NMS or the LCD display button.



Figure 8-39: Remote Loopback

In the **System Test** window, tick the **Setting** column for Tributary 1. Press **Accept Setting**. The IDU's first E1 interface is now performing the **Remote Loopback** test. There can be multiple selections for the test. Press **Clear All Test** to stop all tests.

Station:		аа	Equipr	nent: 1	Rem	ote Loopba	ck 👱
Model: Status: Remote:	1+0 4xEl Normal Station bb	Equipment l			Loca IF Lo RF L Rem	l Loopback Jopback Jop-back Ste Loopba	ck
#- bb		Tributary 1 Tributary N					'rib utary rib utary
		Tributary N Traffic is loop demultiplexed connection for traffic is loope	ed-back from within the ren om remote ID ed-back from o	tributary output note IDU. This : U's tributary out one end of a hop	to tribut function put to its to the o	ary input afte is equal the tributary inp ther. It will t	ributary er being out, be very

Figure 8-40: Remote Loopback Setting

8.7.5 PRBS Test

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 NMS or the LCD display button.



Figure 8-41: PRBS Test

In the **System Test** window, enter "1" for PRBS Generator. Press **Enable**. The IDU's first E1 interface is now performing the PRBS test. Press **Clear All Test** to stop all tests or press **Disable** to stop this test.

Insert an error: Once the PRBS generator is enabled, it will insert PRBS into the selected tributary in order to test the quality of signal.

Station:	aa	Equipment: 1	PRBS Test
Model: 1+0 Status: Ser Remote: Sta) 4xEl <mark>ading PRBS</mark> ation bb Equipmer	u 1	Clear All Test
e de bb	Trib uta Trib uta Trib uta PRES test analyzer w and PRES PRES into	I to check out transmission que vhich comprises two compnents analyzer. Once the PRES gener o the selected tributary before mo	Remote Trib utary I Trib uta
	PRBS G is inse PRBS A has	enerator enting PRBS into tributary nalyzer analyzed PRBS from tributar has recorded 0 ei	1 Disable Insert an error y for 0000h.00m.00s <u>Rese</u> rror.

Figure 8-42: PRBS Test Setting

8.8 System Record

In the **Main Window**, select **System Record**. Another initialization window will appear with <u>two</u> different working mode: **Alarm Record** • **Login Record** and **Report Export**. We shall explain the different mode in the coming section.

8.8.1 Alarm Record

In the Main Window, select System Record \rightarrow Alarm Record.

Ionitor	System Record	System Management	Superuser	Heln		
	Alarm Recon	1				
	Event Record	1				
	Login Record	đ				
	Report Expor	rt				
	X	3			8	

Figure 8-43: Alarm Record (1)

The following window appears: All the alarm record in the network will be recorded here. The levels of alarm are classified into 3 levels: Critical Grade, Major Grade, and Minor Grade. The following states the detail items in every level:

Critical Grade: ODU M/C, Cable, Mod, Demod, Link ID, Mux, PLL-Tx, PLL-Rx and SSPA.

Major Grade:T# LOS 及 T# AIS.

Minor Grade: DSC, Far end, PA-I, -5V and Tx-POW.



Figure 8-44: Alarm Record (2)