Dynamix UM-SN Ver.2 User Manual

Version 1.03

Tables of Contents

1 Introduction

1.1 Models

The UM-SN VER.2 NTU offers three different interfaces (E1, Serial and Ethernet) connected customers to high-speed TDM services .This series have four models on the following:-

1.1.1 E1 interface model

It offers two different ways have connected customers to high-speed TDM services with two G.703 E1 interfaces (Balance 120Ω RJ45 jack and Unbalance 75Ω dual BNCs). The G.703 interface can carry 64kbps to 2.048Mbps.

1.1.2 Serial (V.35) interface model

It offers customers premises has high-speed TDM services with a DB25 interface. The industry standard DB25 interface can be configured as a V.35/RS530 or V.36/X.21 connection. The DB25 connection can transfers data up to 2.304Mbps.

1.1.3 Ethernet interface model

It offers customers premises has high-speed TDM services with a LAN interface. The industry standard LAN interface can detect a 10Mbps or 100Mbps connection automatically.

1.1.4 Multi-interfaces model

It offers customers premises have three types interface: E1 interface (balanced 120Ω RJ48C jack and unbalanced 75Ω dual BNCs), V.35 interface (DB25 female connector) and Ethernet interface (RJ-45 connector). You can select five type interfaces according to your application: (a) E1 interface only, (b) Series interface only, (c) Ethernet interface only , (d) E1 and Serial interface come together and (e) E1 and Ethernet interface come together.

They can be configured and managed via EOC, or menu-driven VT100 compatible Asynchronous Terminal Interface, either locally or remotely.
The UM-SN VER.2 NTU is equipped with an auto rate capability that identifies the maximum line rate supported by the copper loop. This powerful automatic configuration capability makes installation and service provisioning simple and painless. Further flexibility is provided in the ability to manually set the maximum NTU speed at different levels for different customer-tailored service offerings.

1.2 Features

- ✓ Standard UM-SN VER.2 (ITU G.991.2) supports improved reach/speed and greater interoperability
- ✓ Fast and cost-effective provisioning of traditional frame relay (FR or T-HDLC) or TDM leased line services
- ✓ User existing copper loop infrastructures
- ✓ Can operate back to back connection
- ✓ Efficient single wire pair usage
- ✓ Up to 2.312Mbps symmetric service bit rate
- ✓ Auto rate installation maximizes data rate based on loop conditions
- ✓ Auto configuration wetting current to protect SHDSL line
- ✓ Local management interface with LCD display
- ✓ Remote line loopback
- ✓ SHDSL Line performance monitoring (Data Rate and SNR)
- ✓ Raw and per time interval statistics
- ✓ Bandwidth guaranteed transmission equipment
- ✓ Remote firmware upgrade

1.3 Specification

WAN Interface

- Line Rate: SHDSL per G.991.2
- Coding: trellis coded pulse amplitude modulation (TCPAM-16)
- Support: Annex A(ANSI) and Annex B(ETSI)
- Payload rates: 64kbps to 2.304Mbps (N x 64kbps N=1 to 36) for Serial and Ethernet interface
  64kbps to 2.048Mbps (N x 64kbps N=1 to 32) for E1 interface
- Connection: RJ-45 jack (2-wire or 4-wire)
- Impedance: 135 ohms

G.703 Interface (as E1)

- Connection: RJ-45 for balanced 120Ω E1 cable
- Connection: BNC for unbalanced 75Ω E1 cable
- Line Rate: 2048KHz +/- 50ppm
- Framing: PCM30/30C/31/31C and Unframed
- Data Rate: 64Kbps to 2.048Mbps (Nx64Kbps , N=1 to 32)
- Operation: Full E1 and Fractional E1

SERIAL Interface (as V.35)

- Connection:DB-25(F)
- Payload rates: Up to 2.304Mbps (N=1 to 36)
- Support RS-530, V.35 or V.36/X.21

LAN Interface (as Ethernet)

- Single Ethernet Interface
- 10/100Mpbs Half/Full Duplex, Auto-sensing, Auto-Crossover
- Up to 2048 MAC address learning

DSL Timing

- Internal
- From E1 Recovery (as E1)
- From DTE (as V.35 and Ethernet)

Performance Monitoring

- ES, SES, UAS, LOSW, Alarms, Errors

Loopback Tests (for E1 and V.35 interface only)

- Digital Local Loopback
- Digital Loopback
- Remote Line Loopback
- Remote Payload Loopback
- Far-end Line Loopback
- Far-end Payload Loopback
- V.54(For V.35 interface only)
- Build-in 2047 bit (2^{11}-1) BER tester

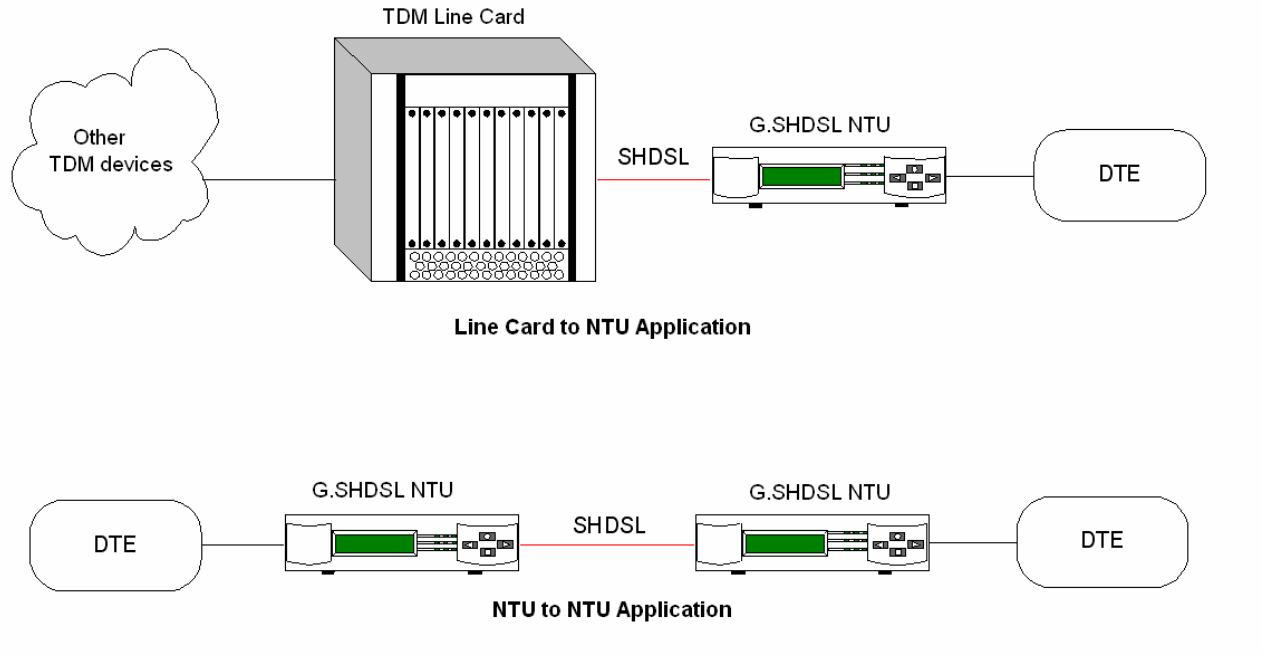
Management

- Configuration with keypads and LCD display
- Console port (RJ45)
- Support firmware upgradeable

Physical/Electrical

- Dimensions: 19.8 x 4.6 x 16.8 cm
- Input: For AC power input version 90~240VAC with 50~60Hz
  For DC Power input version -48VDC
- Power Consumption: 10W Max
- Operation temperature: 0 to 50°C
- Humidity: Up to 95% (non-condensing)
- External screw for frame grounding

1.4 Applications

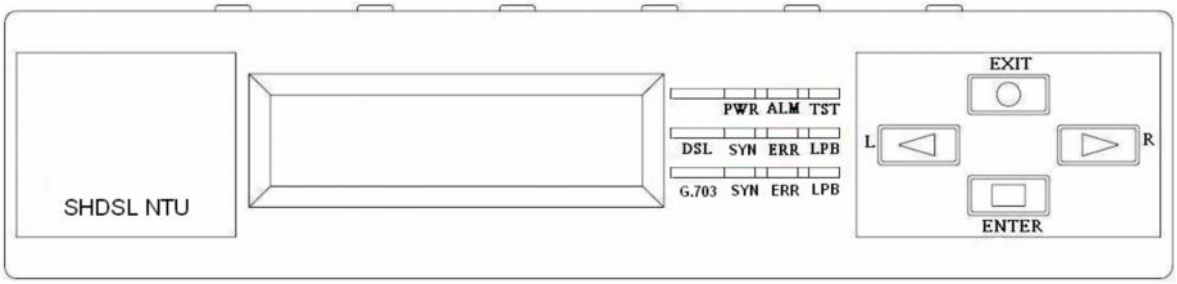


2 Getting to know about the UM-SN Ver.2 NTU

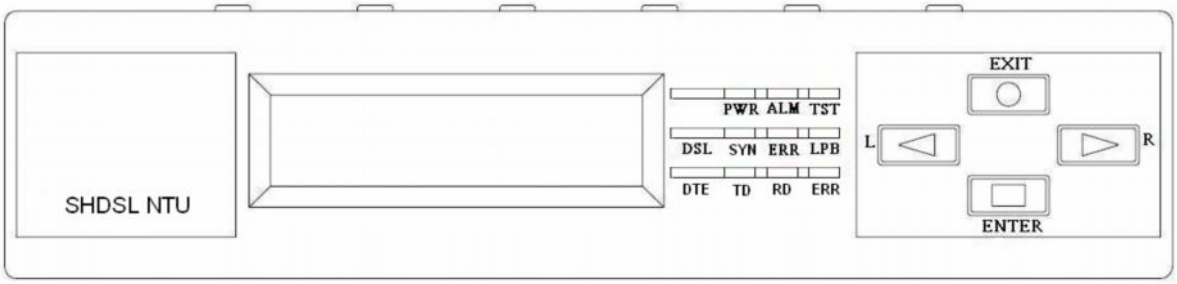
This chapter shows the front and rear panel and how to install the hardware.

2.1 Front Panel

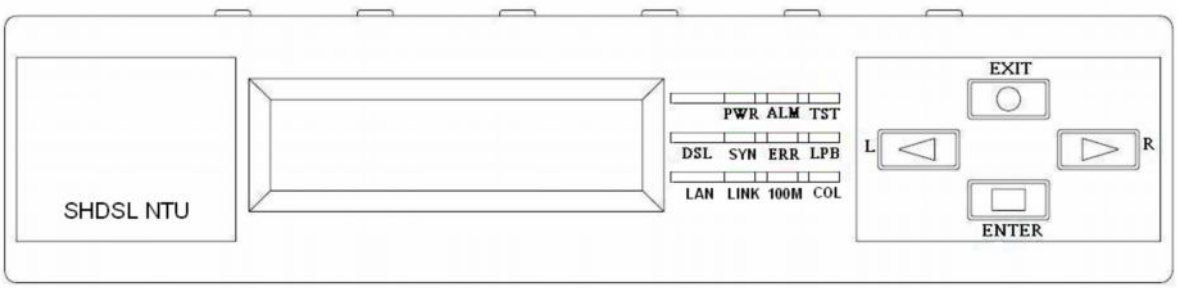
2.1.1 E1 interface model



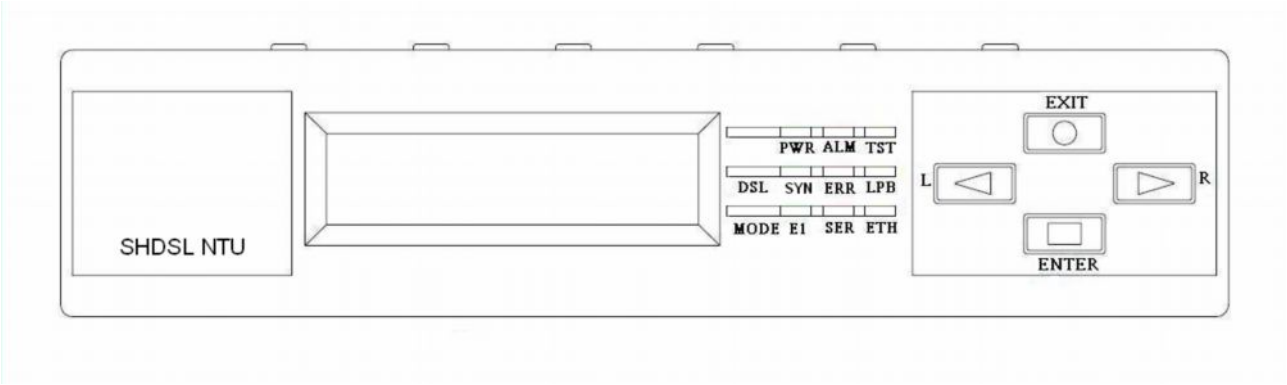
2.1.2 Serial interface model



2.1.3 Ethernet interface model



2.1.4 Multi-interfaces model



Front panel can be separated into three parts: LCD display, LED indicator and Keypads.
The LCD display can show the status and configuration of device. The local management interface will be done by keypads with this LCD display.
The purpose of key pads is to configure the setting or selecting of function on this SHDSL NTU.

The following table describes the LEDs' function of device.

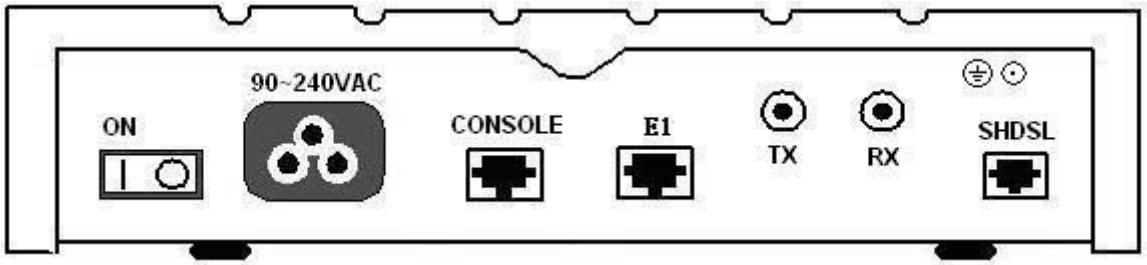
LED		Color	Action	Description
PWR		Green	On	Power is on.
			Off	Power is off.
ALM		Red	On	System loss.
			Off	System is working nomarally.
TST		Yellow	On	System is testing for connection.
			Off	System is working nomarlly.
DSL	**SYN**	Green	On	SHDSL line is connected.
			Blink	Data transmit in SHDSL line.
			Off	SHDSL line is dropped.
	ERR	Red	Blink	Error second occurs.
			Off	No error second.
	LPB	Yellow	On	Loopback is on.
			Off	Loopback is off.
E1	**SYN**	Green	On	E1 line is connected.
			Off	E1 line is dropped.
	ERR	Red	Blink	There are error seconds.
			Off	There is not any error second.
	LPB	Yellow	On	Loopback is on.
			Off	Loopback is off.

Serial	**TD**	Green	On	Data transmit in V.35.
			Off	No data transmit in V.35.
	RD	Green	On	Data receive in V.35.
			Off	No data reveive in V.35.
	ERR	Red	Blink	Error second occurs.
			Off	No error second.
ETH	**LINK**	Green	On	Data transmit in Ethernet.
			Off	No data transmit in Ethernet.
	100M	Green	On	Data receive in 100M.
			Off	No data receive in 100M.
	COL	Red	Blink	Error collision occurs.
			Off	No error collision.
	E1	Green	Blink	E1 Data tramsmit and receive
			On	E1 cable cable connected
		Red	On	No E1 cable connected
Mode	**SER**	Green	Blink	Serial Data tramsmit and receive
			On	DTE Connected
		Red	On	DTE Disconnect
	ETH	Green	Blink	Ethernet Data tramsmit and receive
			On	Ethernet cable connected
		Red	On	No Ethernet cable connected

2.2 Rear Panel

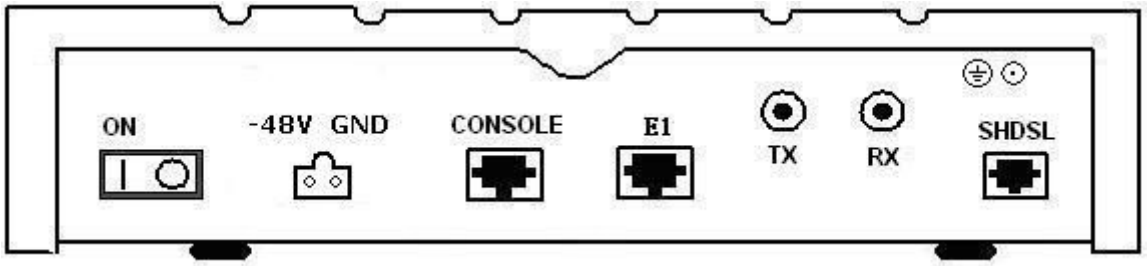
2.2.1 E1 Interface Model

AC power input version



The rear panel of this model is including power switch, AC power socket, RJ-45 console, G.703 RJ-48C jack or BNC jack for transmitting and receiving and RJ-45 for SHDSL from left to right.

DC power input version

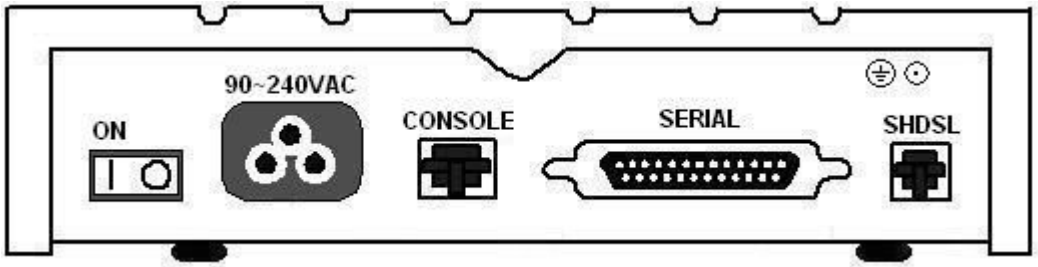


The rear panel of this model is including power switch, DC power socket, RJ-45 console, G.703 RJ-48C jack or BNC jack for transmitting and receiving and RJ-45 for SHDSL from left to right.

Connector	Description
ON	Power switch. Press 1 for turn on and press 0 for off
90~240V AC	IEC-320 C6 AC input connector. It has power adapting function from 90V to 240V
-48V GND	DC power input connector (-48V)
CONSOLE	RJ-45 for system configuration and maintenance
G.703	RJ-48C for 120Ω E1 connection with PABX (Private Automatic Branch Exchange) or E1 Router
TX	BNC for 75Ω E1 transmitting
RX	BNC for 75Ω E1 receiving
SHDSL	RJ-45 for DSL connection

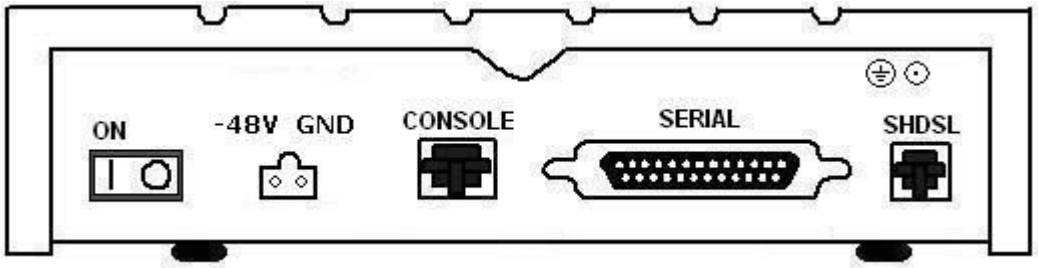
2.2.2 Serial (V.35) Interface Model

AC power input version



The rear panel of this model is including power switch, AC power socket, RJ-45 for console cable, DB-25(Female) for serial and RJ-45 for SHDSL from left to right.

DC power input version

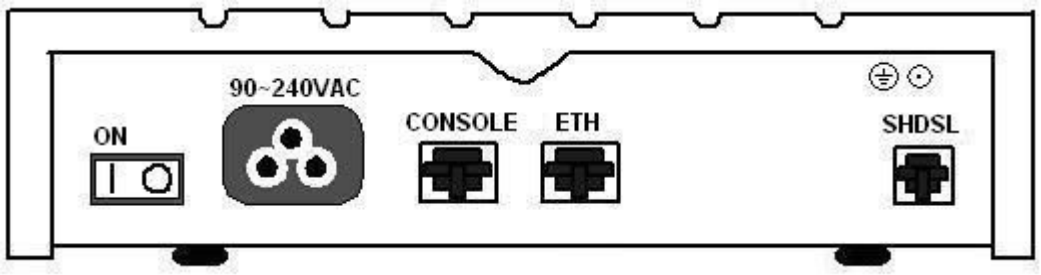


The rear panel of this model is including power switch, DC power socket, RJ-45 for console cable, DB-25(Female) for serial and RJ-45 for SHDSL from left to right.

Connector Description	
ON	Power switch. Press 1 for turn on and press 0 for off.
90~240V AC	IEC-320 C6 AC input connector. It has power adapting function from 90V to 240V
-48V GND	DC power input connector (-48V)
CONSOLE	RJ-45 for system configuration and maintenance
SERIAL	DB-25(F) for RS-530 and V.35 or X.21(with adaptor cable)
SHDSL	RJ-45 for DSL Connection

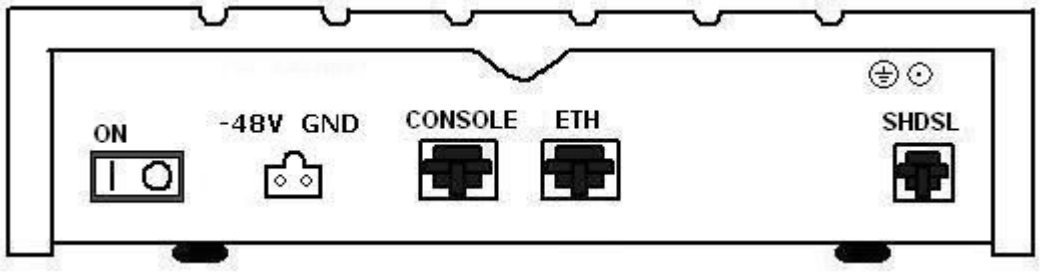
2.2.3 Ethernet Interface Model

AC power input version



The rear panel of this model is including power switch, AC power socket, RJ-45 for console cable, LAN for Ethernet cable and RJ-45 for SHDSL from left to right.

DC power input version

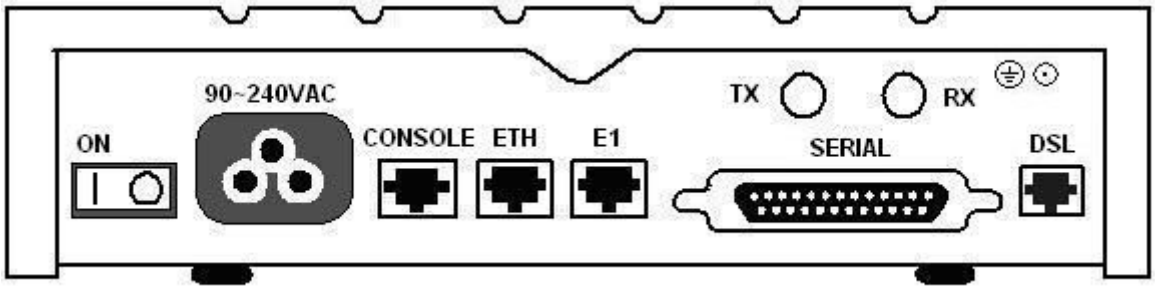


The rear panel of this model is including power switch, DC power socket, RJ-45 for console cable, LAN for Ethernet cable and RJ-45 for SHDSL from left to right.

Connector	Description
ON	Power switch. Press 1 for turn on and press 0 for turn off.
90~240V AC	IEC-320 C6 AC input connector. It has power adapting function from 90V to 240V.
-48V GND	DC power input connector (-48V)
CONSOLE	RJ-45 for system configuration and maintenance.
ETH	RJ-45 LAN port for Ethernet cable
SHDSL	RJ-45 for DSL Connection

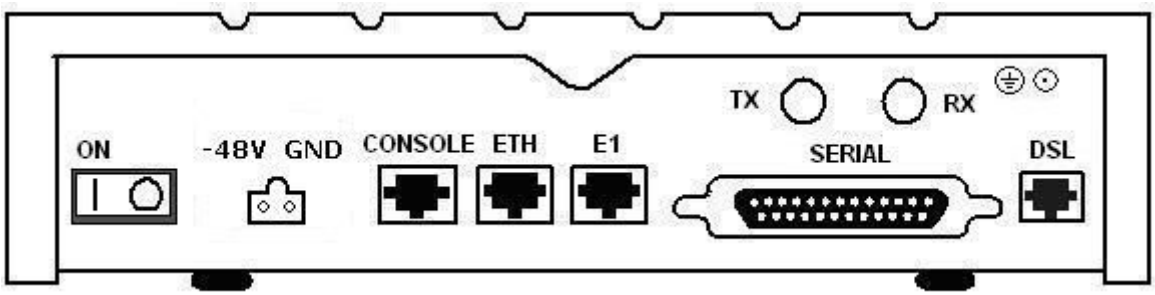
2.2.4 Multi-interfaces Model

DC power input version



The rear panel of this model is including power switch, AC power socket, RJ-45 for console cable, LAN for Ethernet cable, G.703 RJ-48C or BNC jacks for transmitting and receiving, DB-25(Female) for serial and RJ-45 for SHDSL from left to right.

DC power input version



The rear panel of this model is including power switch, DC power socket, RJ-45 for console cable, LAN for Ethernet cable, G.703 RJ-48C or BNC jacks for transmitting and receiving, DB-25(Female) for serial and RJ-45 for SHDSL from left to right.

Connector	Description
ON	Power switch. Press 1 for turn on and press 0 for off
90~240V AC	IEC-320 C6 AC input connector. It has power adapting function from 90V to 240V
-48V GND	DC power input connector (-48V)
CONSOLE	RJ-45 for system configuration and maintenance
ETH	RJ-45 LAN port for Ethernet cable
E1	RJ-48C for 120Ω E1 connection with PABX (Private Automatic Branch Exchange) or E1 Router
SERIAL	DB-25(F) for RS-530 and V.35 or X.21(with adaptor cable)
TX	BNC for 75Ω E1 transmitting
RX	BNC for 75Ω E1 receiving
DSL	RJ-45 for DSL connection

2.3 Installation

Note: To avoid possible damage to this router, do not turn on the product before hardware installation.

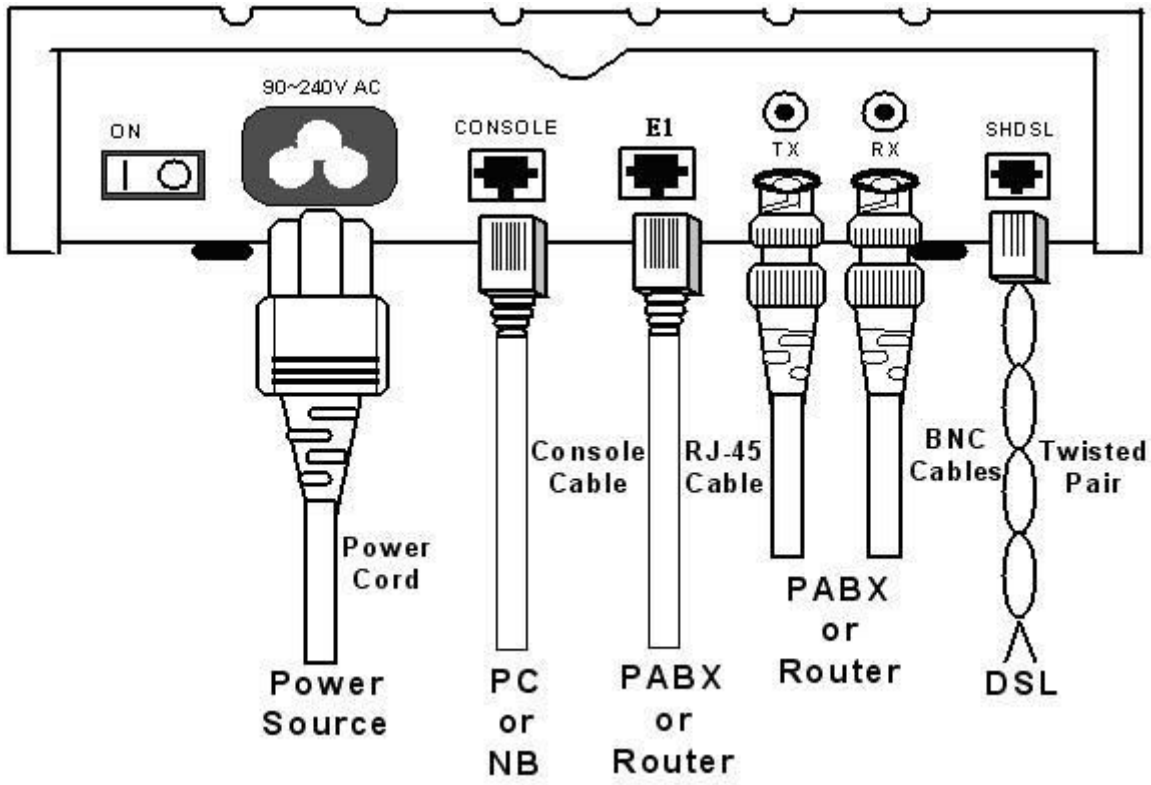
- ✓ Plug the power cord in the power socket.
- ✓ Plug the console port in console if you want to configure the NTU with VT100 program of NB or PC.
- ✓ Plug the E1 cable (Either 75Ω BNC cables or 120Ω cable) / SERIAL cable / Ethernet cable
- ✓ Plug SHDSL cable
- ✓ Power on

Model	Interface modes support
E1 interface model	E1 interface
V.35 interface model	V.35 interface
Ethernet interface model	Ethernet interface
Multi-interfaces model	E1 interface
	V.35 interface
	Ethernet interface
	E1+V.35 interface
	E1+Ethernet interface

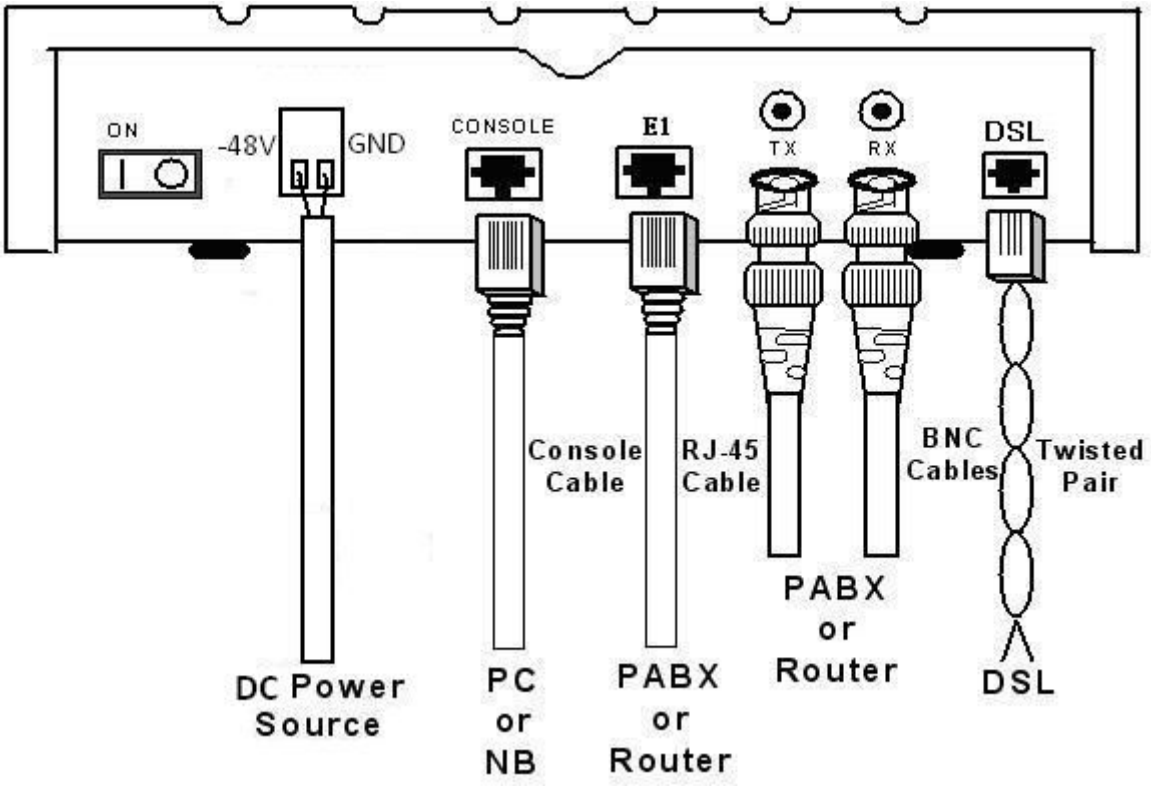
Only the Multi-interfaces model can support all five type interfaces.

2.3.1 For E1 Interface

AC power input version

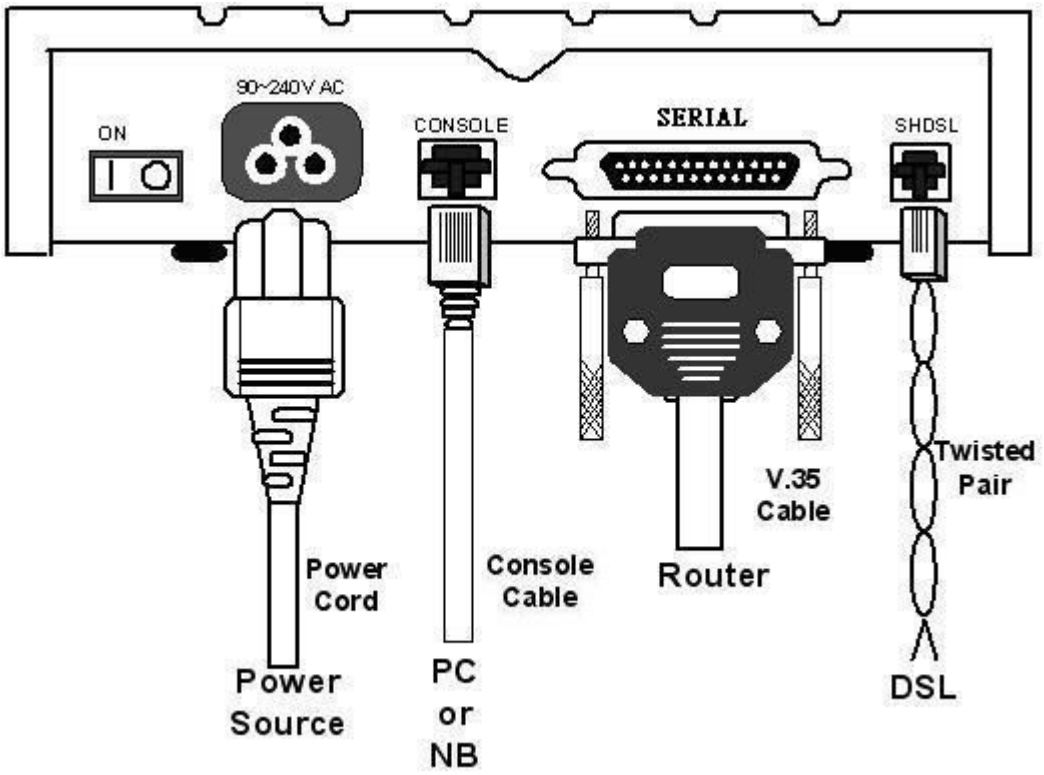


DC power input version

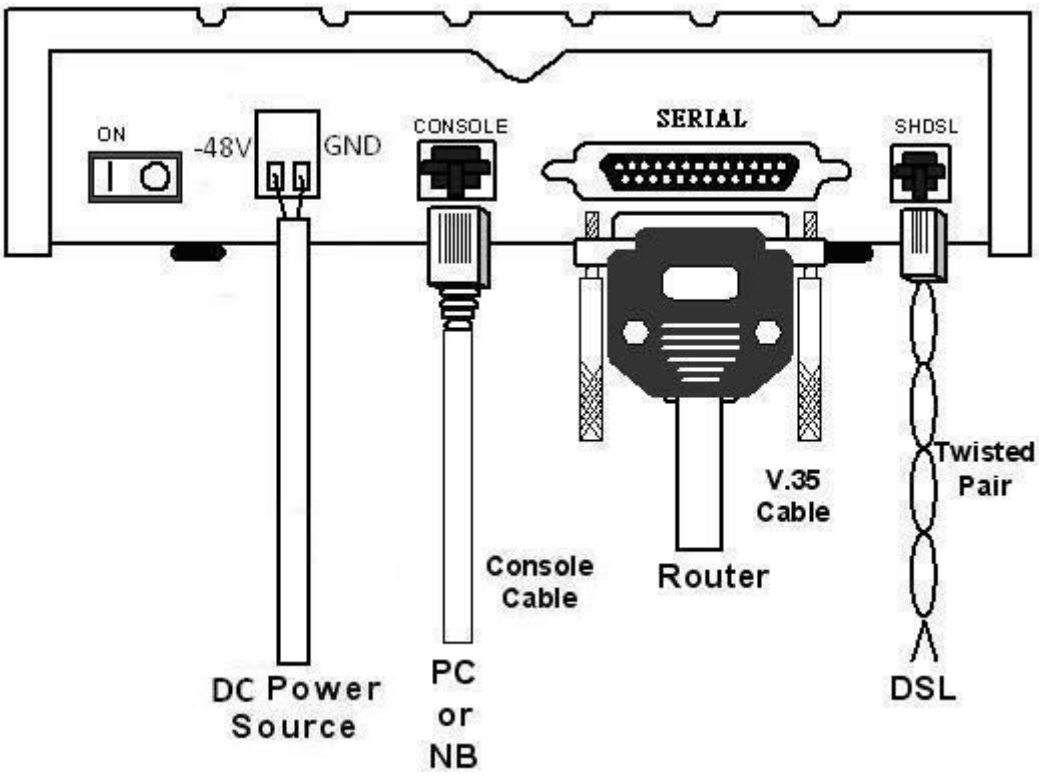


2.3.2 For Serial Interface

AC power input version

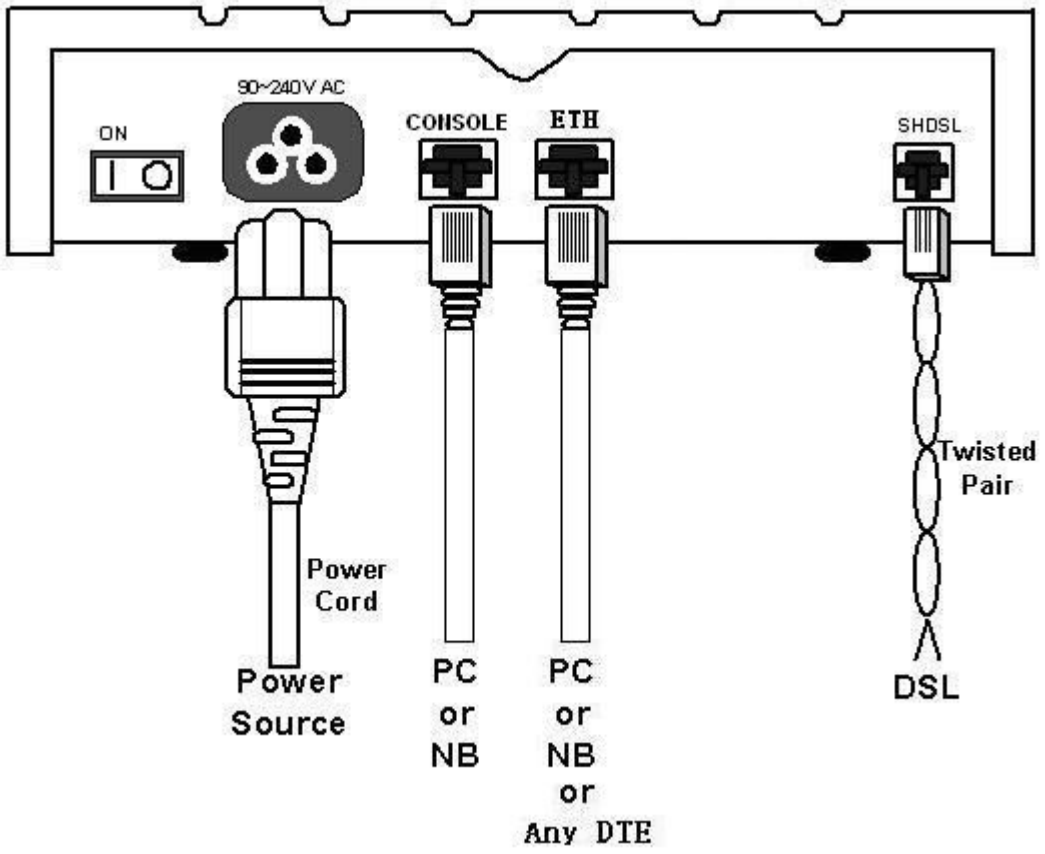


DC power input version

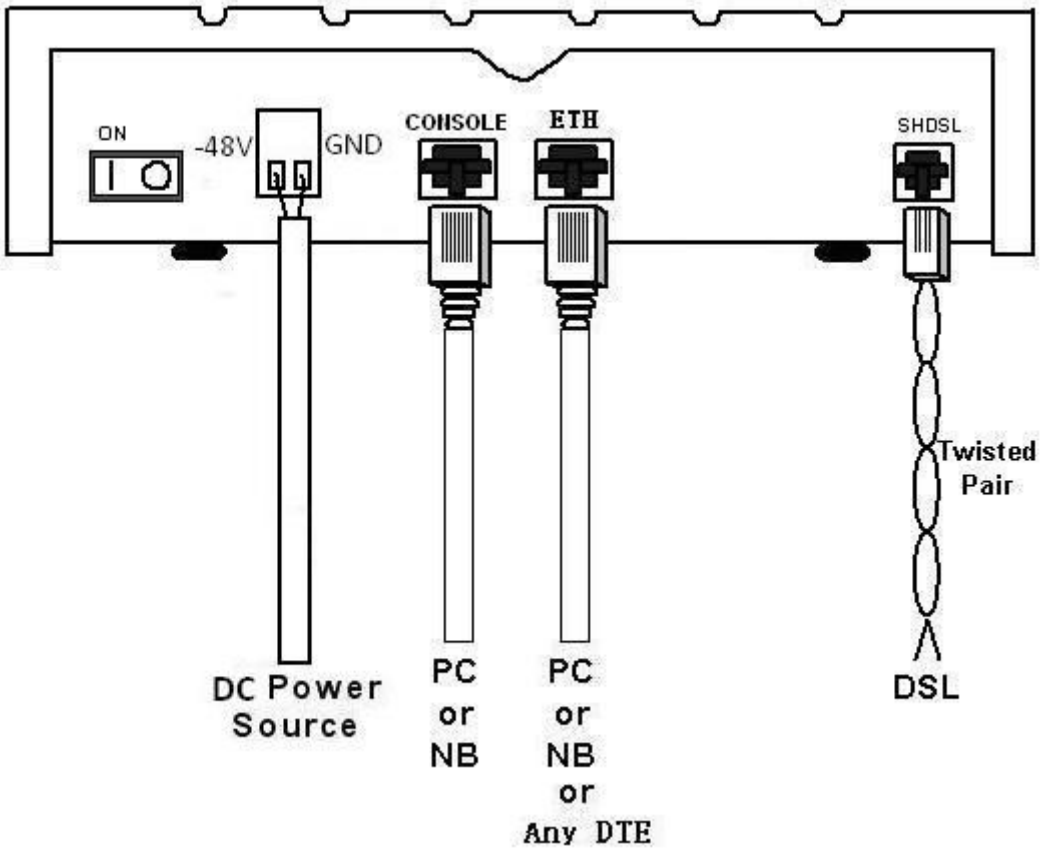


2.3.3 For Ethernet Interface

AC power input version



DC power input version



Protective earth:

The marked lug or terminal should be connected to the building protective earth bus.
The function of protective earth does not serve the purpose of providing protection against electrical shock, but instead enhances surge suppression on the DSL lines for installations where suitable bonding facilities exist.
The connector type is M3 machine screw.

Wetting Current:

Wetting current, also known as loop sealing current, is a low-level DC current applied to a loop for the specific purpose of maintaining cable splice integrity by preventing the build-up of oxidation. There has the ability to sink the source wetting current.

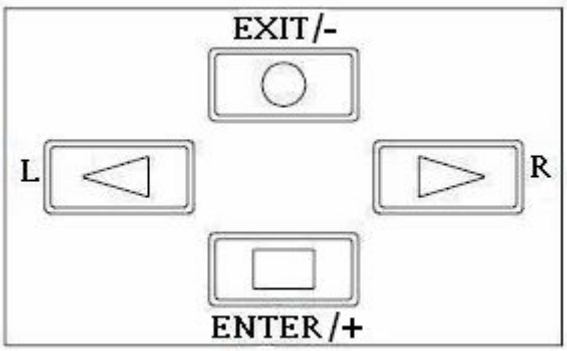
 Warning! High Voltage. Do not open the housing.

3 Configuration with Keypad and LCD

This chapter provides information about configuration on your UM-SN VER.2 NTU via front panel LCD display and keypads.

3.1 Key Pads

The UM-SN VER.2 NTU is designed by user-friendly configuration and management can using keypads and LCD display on front panel only without computer with VT100 terminal software.



Key Pad	Description
Exit/- ●	Return to previous configuration menu.
Enter/+ ■	Skip to next configuration menu or configure this item.
L ◄	Select other parameter in the same level menu.
R ►	Select other parameter in the same level menu.

3.2 Main menu Tree

After turning on UM-SN VER.2 NTU, the LCD display will prompt "SHDSL NTU" and their interface mode. Press ***Enter*** key to enter. There will display some sub-menu of the following.

E1 interface mode:

SHDSL NTU ======E1======

SHOW STATUS
SHOW STATISTICS
SYSTEM SETUP
REBOOT SYSTEM
SYSTEM DIAGNOSTIC

Serial interface mode:

SHDSL NTU ====SERIAL====

SHOW STATUS
SHOW STATISTICS
SYSTEM SETUP
REBOOT SYSTEM
SYSTEM DIAGNOSTIC

Ethernet interface mode:

SHDSL NTU ===ETHERNET===

SHOW STATUS
SHOW STATISTICS
SYSTEM SETUP
REBOOT SYSTEM

E1 and Serial interface mode:

SHDSL NTU == E1 + SERIAL ==

SHOW STATUS
SHOW STATISTICS
SYSTEM SETUP
REBOOT SYSTEM
SYSTEM DIAGNOSTIC

E1 and Ethernet interface mode:

SHDSL NTU == E1 ETHERNET ==

SHOW STATUS
SHOW STATISTICS

SYSTEM SETUP
REBOOT SYSTEM
SYSTEM DIAGNOSTIC

For more detail on those sub-menus, please refer to each chapter.

3.3 Menu tree for [SHOW STATUS]

You can check five kinds mode of status via LCD display.

SHOW STATUS

E1 interface mode:

STATUS INTERFACE ,
STATUS SHDSL
STATUS E1
STATUS Code Version

.

V.35 interface mode:

STATUS INTERFACE ,
STATUS SHDSL
STATUS SERIAL
STATUS Code Version.

Ethernet interface mode:

STATUS INTERFACE ,
STATUS SHDSL
STATUS ETHERNET
STATUS Code Version.

E1 and Serial interface mode:

STATUS INTERFACE ,
STATUS SHDSL
STATUS E1
STATUS SERIAL
STATUS Code Version

E1 and Ethernet interface mode:

STATUS INTERFACE ,
STATUS SHDSL
STATUS E1
STATUS ETHERNET
STATUS Code Version

The next levels of their menus tree are as following:

SHOW STATUS > STATUS INTERFACE

STATUS INTERFACE

* INTERFACE*

SHOW STATUS > STATUS SHDSL

STATUS SHDSL

* MODE *
* ANNEX *
* LINE RATE *
* ATTENUATION *
* SNR MARGIN *
* TX POWER *

SHOW STATUS > STATUS E1

STATUS E1

* SIGNAL FRAME *
* LINE CODE *
* CHANNEL *
* SLOT NUMBER *
* FIRST SLOT *
* AIS ALARM *
* BUILD OUTS *

SHOW STATUS > STATUS SERIAL

STATUS
SERIAL

* INTERFACE *
* DATA RATE *
* CLOCK *
* SERIAL RTS *
* SERIAL CTS *
* SERIAL DTR *
* SERIAL DSR *
* SERIAL DCD *
* RTS/CTS DELAY *

SHOW STATUS > STATUS ETHERNET

STATUS
ETHERNET

LINK SPEED
OPERATION
RATE

SHOW STATUS > STATUS CODE VERSION

STATUS
CODE VERSION

KERNEL FPGA

3.4 Menu tree for [SHOW STATISTICS]

The product can display two kinds of statistics data:

SHDSL statistics data [ES, SES, UAS and LOWS]

Show the current 15 minutes period and 96 previous 15-minutes period of SHDSL performance.

Show the current 24 hours period and 7 previous 24-hours periods of SHDSL performance.

SHDSL
ES
SES
UAS
LOSW

E1 statistics data [ES, SES and UAS]

Show the current 15 minutes period and 96 previous 15-minutes period of E1 performance.

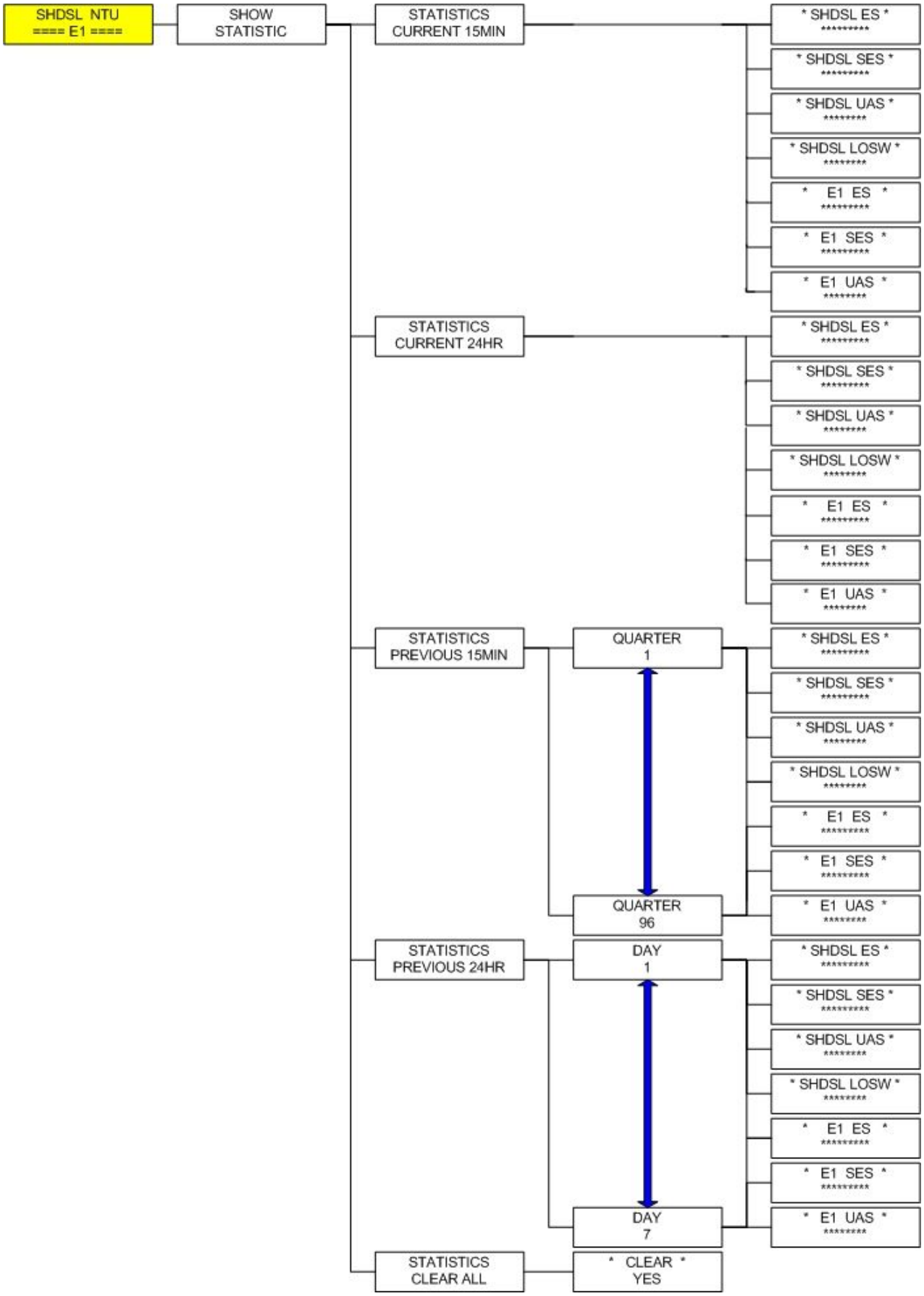
Show the current 24 hours period and 7 previous 24-hours periods of E1 performance.

E1
ES
SES
UAS

Abbreviation:

ES	Error Second
SES	Severely Error Second
UAS	Unavailable Second
LOWS	Loss of Synchronization word

E1 Interface

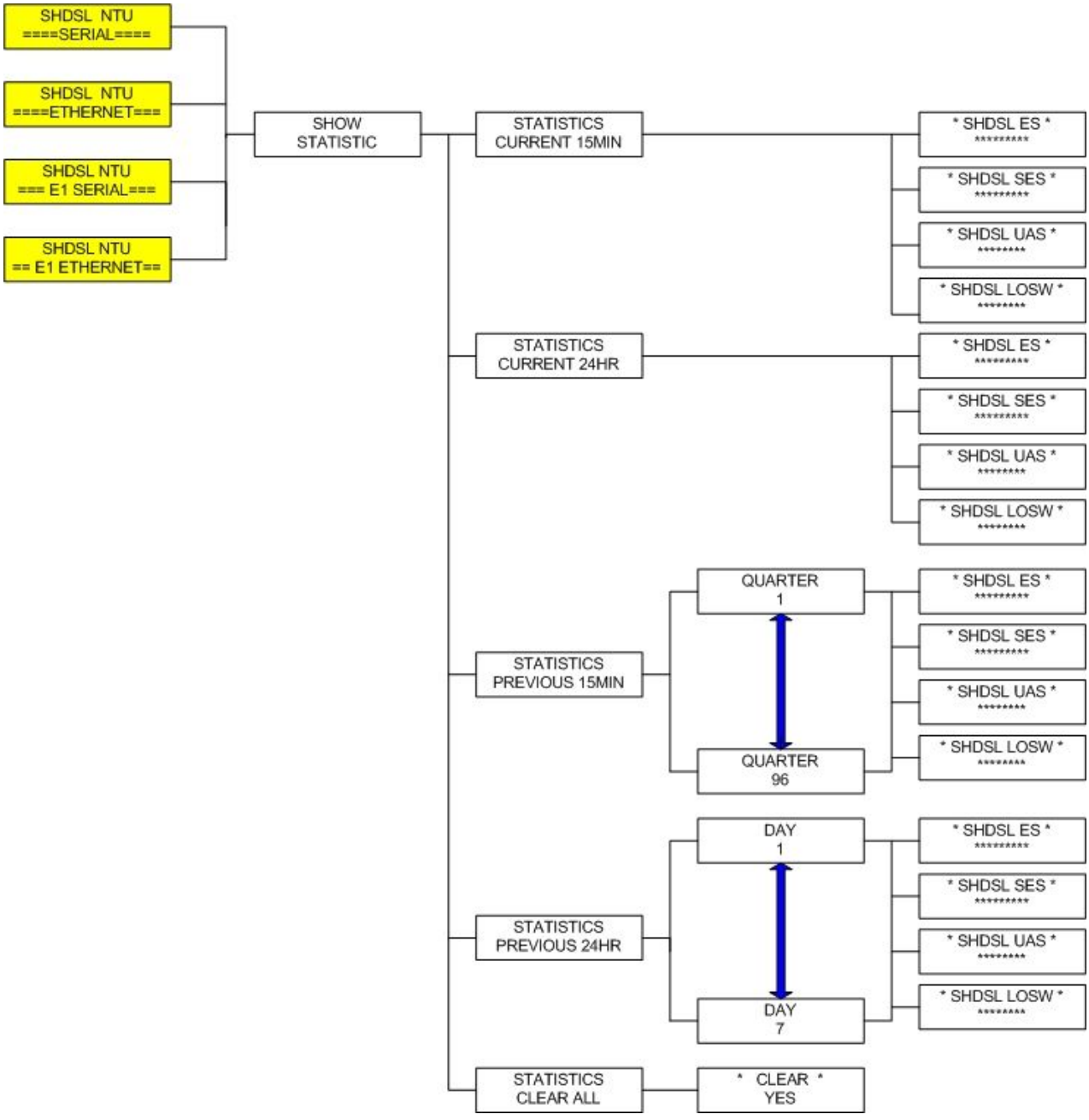


Serial Interface

Ethernet Interface

E1 and SERIAL Interface

E1 and Ethernet Interface



3.5 Menu tree for [SYSTEM SETUP]

You can check five kinds mode of setup type via LCD display.

SYSTEM SETUP

E1 interface mode:

SETUP INTERFACE ,
SETUP SHDSL
SETUP E1
SETUP ALLOW RMT CONFIG
SETUP DEFAULT
SETUP REMOTE CONFIG

V.35 interface mode:

SETUP INTERFACE ,
SETUP SHDSL
SETUP SERIAL
SETUP ALLOW RMT CONFIG
SETUP DEFAULT
SETUP REMOTE CONFIG

Ethernet interface mode:

SETUP INTERFACE ,
SETUP SHDSL
SETUP ETHERNET
SETUP ALLOW RMT CONFIG
SETUP DEFAULT
SETUP REMOTE CONFIG

E1 and Serial interface mode:

SETUP INTERFACE ,
SETUP SHDSL
SETUP E1
SETUP SERIAL
SETUP ALLOW RMT CONFIG
SETUP DEFAULT
SETUP REMOTE CONFIG

E1 and Ethernet interface mode:

SETUP INTERFACE ,
SETUP SHDSL
SETUP E1
SETUP ETHERNET

SETUP ALLOW RMT CONFIG
SETUP DEFAULT
SETUP REMOTE CONFIG

SYSTEM SETUP > SETUP INTERFACE

SETUP INTERFACE

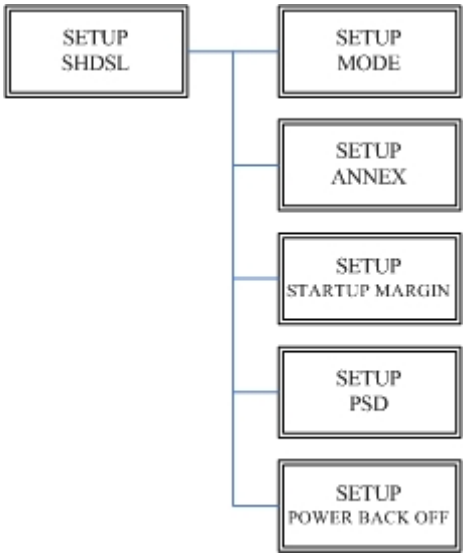
	Selection items
SETUP INTERFACE	E1, SERIAL, ETHERNET, E1+SERIAL, E1+ETHERNET

Model	Interface modes support
E1 interface model	E1
Serial interface model	Serial
Ethernet interface model	Ethernet
Multi-interfaces model	E1
	Serial
	Ethernet
	E1+Serial
	E1+Ethernet

For Multi-interfaces model, there have five types for your selection: **E1**, **Serial**, **Ethernet**, **E1+ Serial** and
E1+ Ethernet.

SYSTEM SETUP > SETUP SHDSL

SETUP
SHDSL



SETUP SHDSL	Selection items
SETUP MODE	STU-R, STU-C-INTCLK, STU-C-EXTCLK
SETUP ANNEX	A, B
SETUP STARTUP MARGIN	DISABLE , 0 to 10
SETUP PSD	R1_ASTM, R2_ASYM, SYM_ENABLE, ASYM_DISBALE
SETUP POWER BACK OFF	Disable, Enable

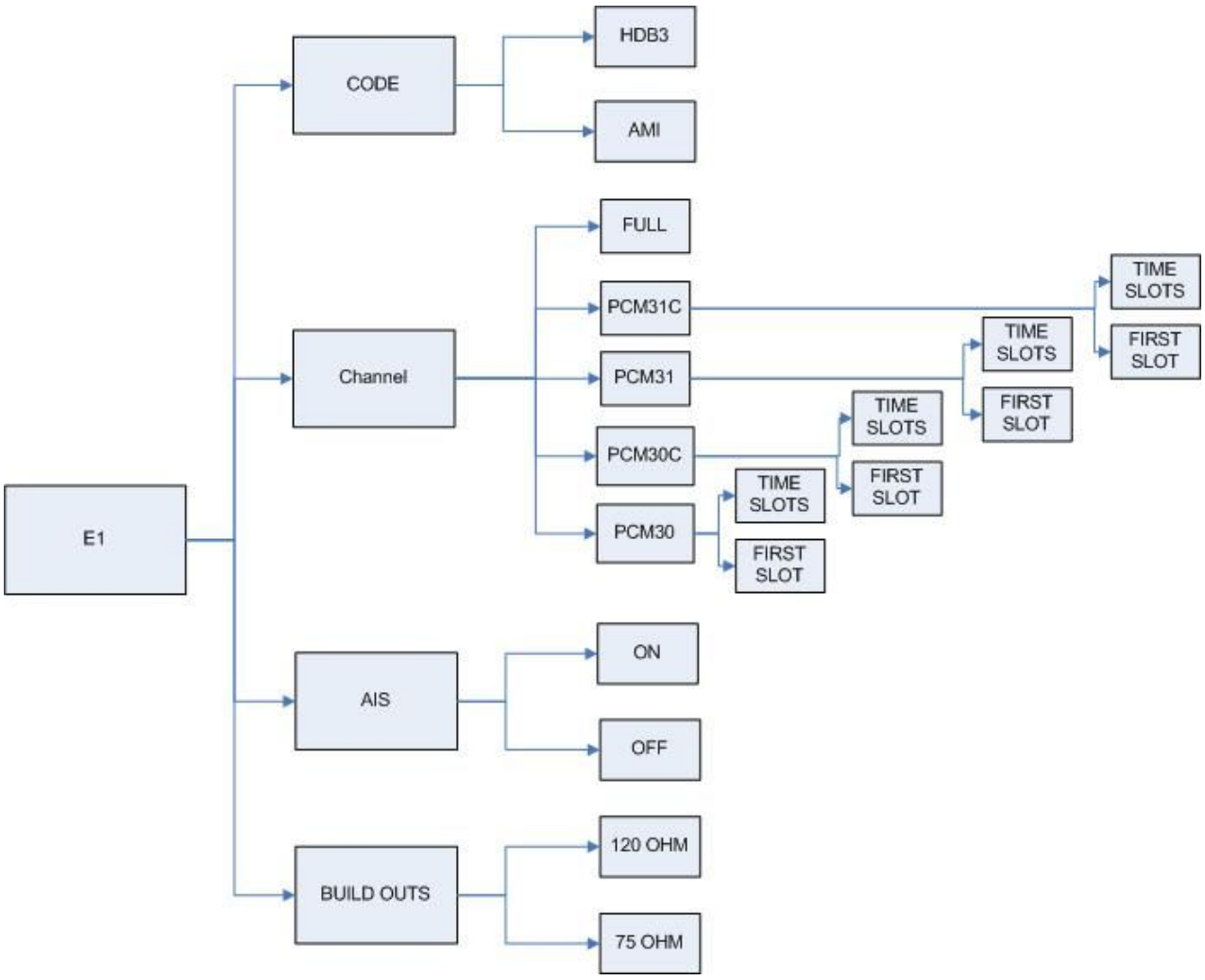
The following are commonly used acronyms for **SETUP MODE**:

STU-R	RT side, where the clock source is set to external
STU-C-INTCLK	CO side, where the clock source is set to internal
STU-C-EXTCLK	CO side, where the clock source is set to external

3.5.1 Sub-Menu tree for SETUP E1 Interface

SYSTEM SETUP ➔ SETUP E1

SETUP
E1



E1 parameter setting:

E1 Items	Setting
Channel	FULL PCM31 PCM31C PCM30 PCM30C
Code	HDB3 AMI
AIS	On Off
Build Outs	120 ohms 75 ohms

E1 Framer Setting:

Framer		Slot Number	First Slot
PCM31	FAS	1 to 31	1 to 31
PCM31C	FAS+CRC4	1 to 31	1 to 31
PCM30	FAS+CAS	1 to 30	1 to 31 (can't use 16)
PCM30C	FAS+CAS+CRC4	1 to 30	1 to 31 (can't use 16)
FULL	UNFRAMED		

Table of number of slots and their first time slot:

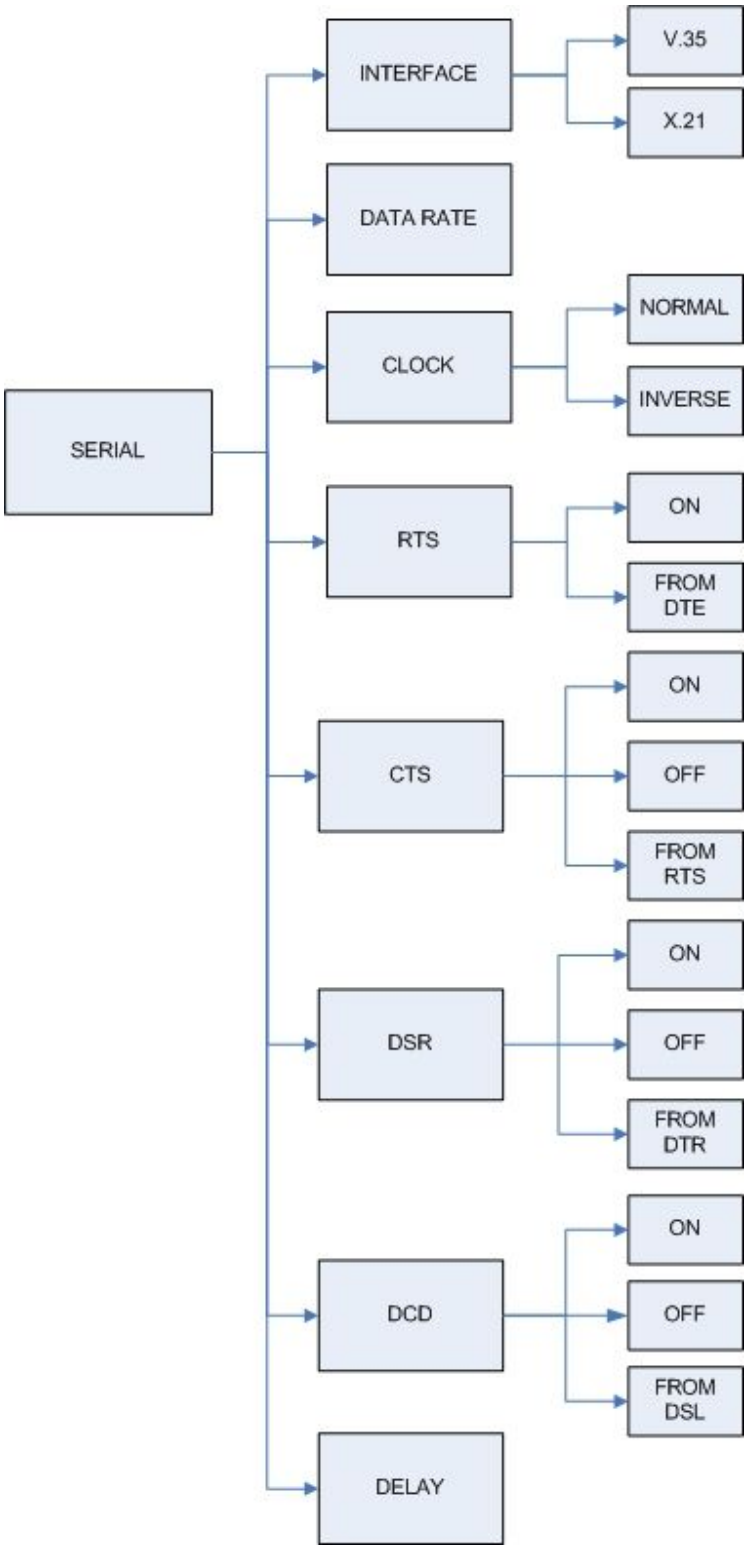
Channel	Number of slots	1st slot
FULL (UNFRAMED)	-----	-----
PCM31 PCM31C	31	1
	30	1~2
	29	1~3
	28	1~4
	27	1~5
	26	1~6
	25	1~7
	24	1~8
	23	1~9
	22	1~10
	21	1~11
	20	1~12
	19	1~13
	18	1~14
	17	1~15
	16	1~16
	15	1~17
	14	1~18
	13	1~19
	12	1~20
	11	1~21
	10	1~22
	9	1~23
	8	1~24
	7	1~25
	6	1~26
	5	1~27
	4	1~28
	3	1~29
	2	1~30
	1	1~31
PCM30 PCM30C	30	1
	29	1~2
	28	1~3
	27	1~4
	26	1~5

	25	1~6
	24	1~7
	23	1~8
	22	1~9
	21	1~10
	20	1~11
	19	1~12
	18	1~13
	17	1~14
	16	1~15
	15	1~15,17
	14	1~15,17~18
	13	1~15,17~19
	12	1~15,17~20
	11	1~15,17~21
	10	1~15,17~22
	9	1~15,17~23
	8	1~15,17~24
	7	1~15,17~25
	6	1~15,17~26
	5	1~15,17~27
	4	1~15,17~28
	3	1~15,17~29
	2	1~15,17~30
	1	1~15,17~31

3.5.2 Sub-Menu tree for SETUP SERIES Interface

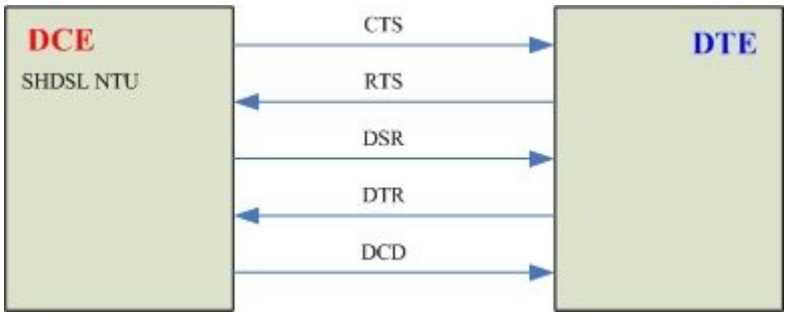
SYSTEM SETUP ➔ SETUP SERIES

SETUP
SERIAL
7

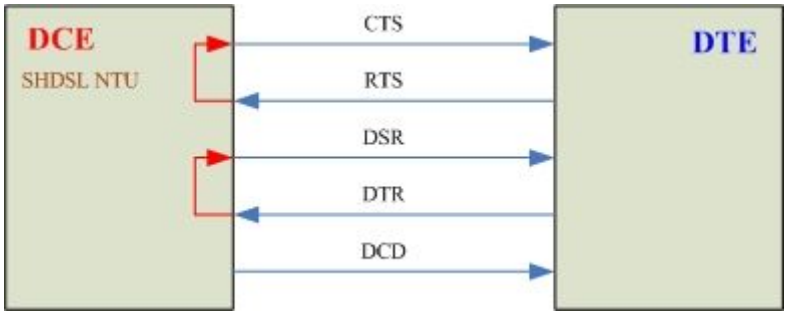


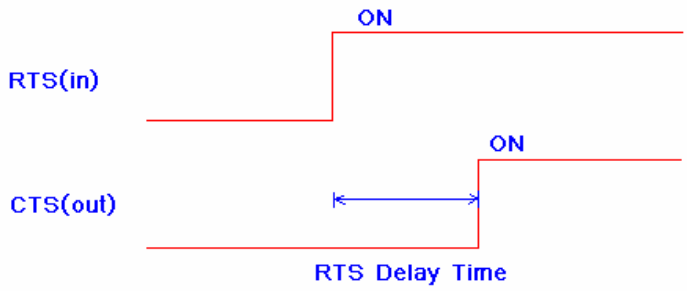
Serial Items	Setting
INTERFACE	V.35 X.21(RS-530)
Nx64K (Rate)	1 ~ 36
CLOCK	Normal Inverse
RTS	On From DTE
CTS	On Off From RTS
DSR	On Off From DTR
DCD	On Off From DSL
DELAY	0mS 1mS 2mS 3mS

The handshake signal direction between DCE and DTE



The below diagram shows CTS follow RTS, DSR follow DTR



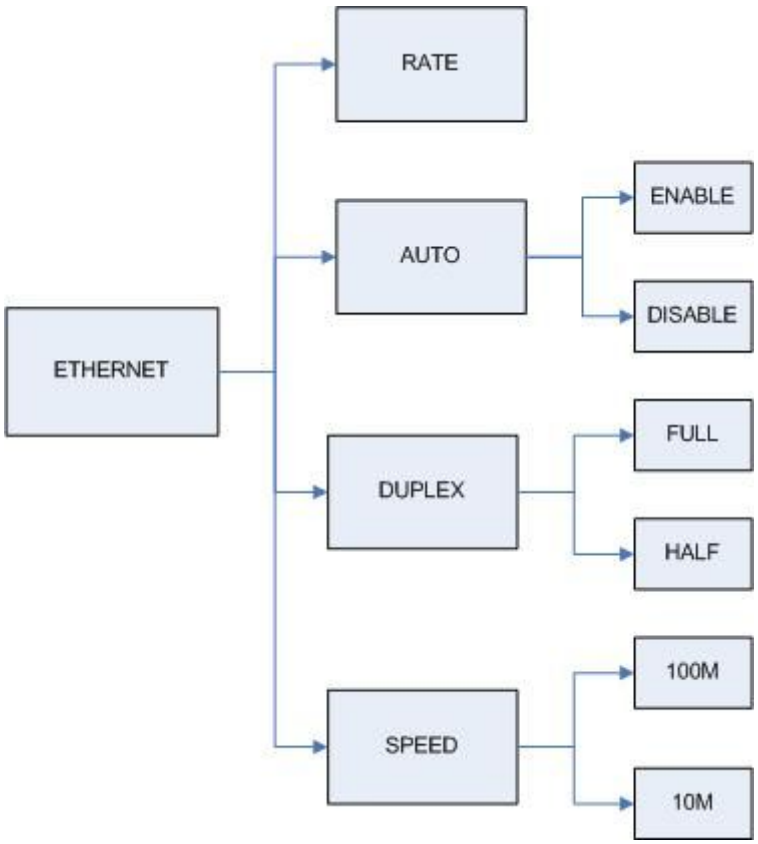


The RTS delay time is use to control CTS on delay to RTS signal, It is work only for the setting: *CTS follow RTS* and *RTS follow from DTE*

3.5.3 Sub-Menu tree for SETUP Ethernet Interface

SYSTEM SETUP ➔ SET UP ETHERNET

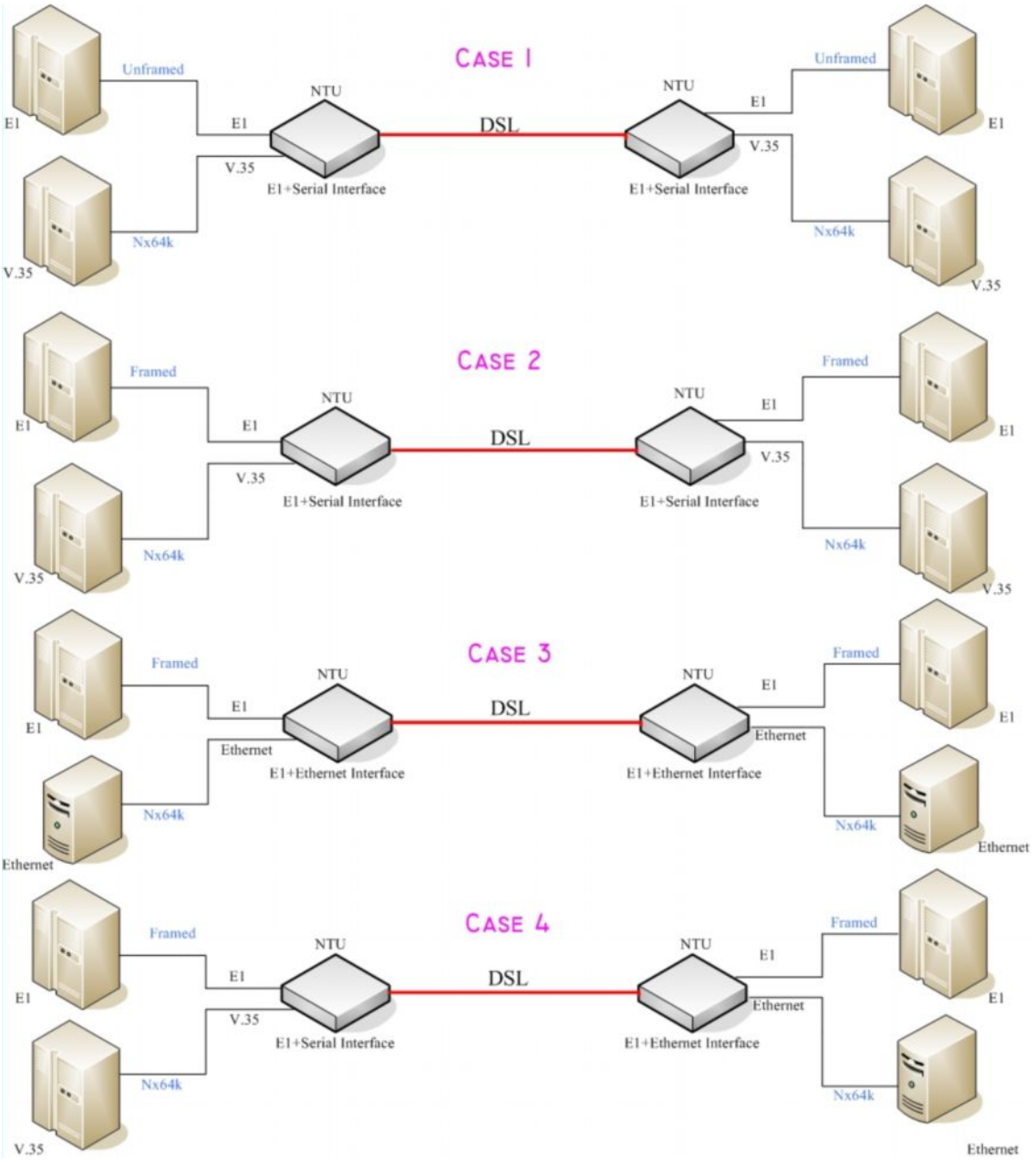
SETUP ETHERNET



If you set Ethernet **Auto** Negotiation is as Enable, the **Duplex** and **Speed** can't be set up and using auto configuration.

Ethernet Items	Setting	
Rate	1 ~ 36	
Auto	Disable	Enable
Duplex	Full-Duplex Half-Duplex	Auto Configuration
Speed	100M 10M	Auto Configuration

3.5.4 Application of Multi-interfaces



Case 1 E1(Unframed)+ Serial interface ←---------→ E1(Unframed)+ Serial interface

Case 2 E1(Frame)+ Serial interface ←---------→ E1(Frame)+ Serial interface

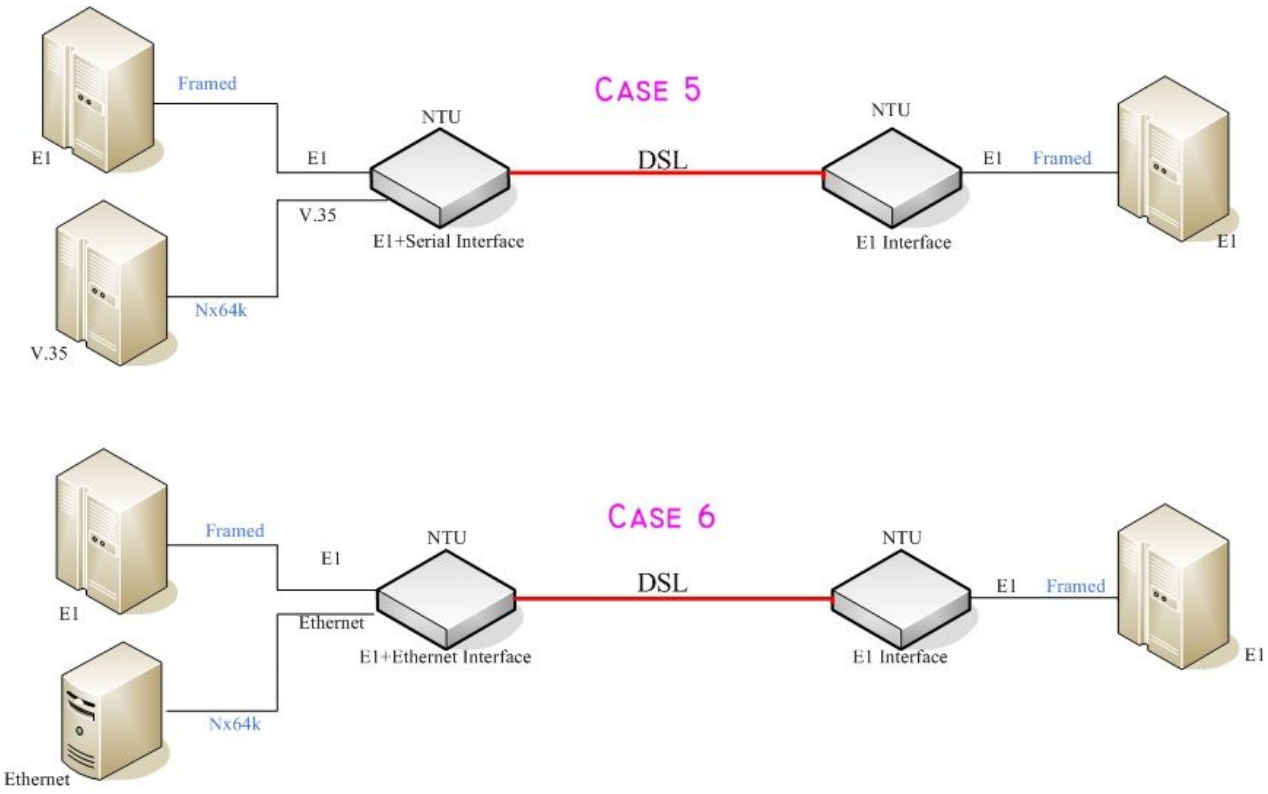
Case 3 E1(Frame)+ Ethernet interface ←---------→ E1(Frame)+ Ethernet interface

Case 4 E1(Frame)+ Serial interface ←---------→ E1(Frame)+ Ethernet interface

Table of E1+ Serial interface and E1+Ethernet interface mode on both sides

E1 interface			Serial interface Ethernet interface
Channel	Number of slot	1st slot	Nx64K (Rate)
FULL (UNFRAMED)	-----	-----	1~4
PCM31 PCM31C	31	1	1~5
	30	1~2	1~6
	29	1~3	1~7
	28	1~4	1~8
	27	1~5	1~9
	26	1~6	1~10
	25	1~7	1~11
	24	1~8	1~12
	23	1~9	1~13
	22	1~10	1~14
	21	1~11	1~15
	20	1~12	1~16
	19	1~13	1~17
	18	1~14	1~18
	17	1~15	1~19
	16	1~16	1~20
	15	1~17	1~21
	14	1~18	1~22
	13	1~19	1~23
	12	1~20	1~24
	11	1~21	1~25
	10	1~22	1~26
	9	1~23	1~27
	8	1~24	1~28
	7	1~25	1~29
	6	1~26	1~30
	5	1~27	1~31
	4	1~28	1~32
	3	1~29	1~33
	2	1~30	1~34
	1	1~31	1~35
PCM30 PCM30C	30	1	1~6
	29	1~2	1~7
	28	1~3	1~8

	27	1~4	1~9
	26	1~5	1~10
	25	1~6	1~11
	24	1~7	1~12
	23	1~8	1~13
	22	1~9	1~14
	21	1~10	1~15
	20	1~11	1~16
	19	1~12	1~17
	18	1~13	1~18
	17	1~14	1~19
	16	1~15	1~20
	15	1~15,17	1~21
	14	1~15,17~18	1~22
	13	1~15,17~19	1~23
	12	1~15,17~20	1~24
	11	1~15,17~21	1~25
	10	1~15,17~22	1~26
	9	1~15,17~23	1~27
	8	1~15,17~24	1~28
	7	1~15,17~25	1~29
	6	1~15,17~26	1~30
	5	1~15,17~27	1~31
	4	1~15,17~28	1~32
	3	1~15,17~29	1~33
	2	1~15,17~30	1~34
	1	1~15,17~31	1~35



Case 5 E1(frame)+ Serial interface ←---------→ E1(frame)

Case 6 E1(frame)+Ethernet interface ←---------→E1(frame)

Table of E1+ Serial interface and E1+Ethernet interface mode on local side and E1 interface on remote side

E1 interface			Serial interface Ethernet interface
Channel	Number of slot	1st slot location	Nx64K (Rate) range
PCM31 PCM31C	31	1	1
	30	1~2	1~2
	29	1~3	1~3
	28	1~4	1~4
	27	1~5	1~5
	26	1~6	1~6
	25	1~7	1~7
	24	1~8	1~8
	23	1~9	1~9
	22	1~10	1~10
	21	1~11	1~11
	20	1~12	1~12
	19	1~13	1~13

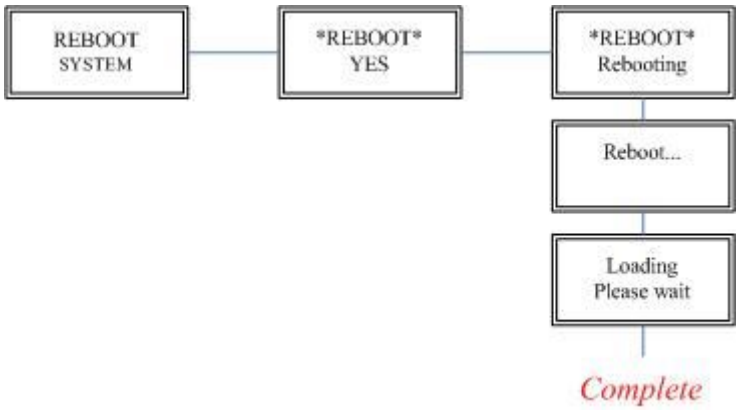
	18	1~14	1~14
	17	1~15	1~15
	16	1~16	1~16
	15	1~17	1~17
	14	1~18	1~18
	13	1~19	1~19
	12	1~20	1~20
	11	1~21	1~21
	10	1~22	1~22
	9	1~23	1~23
	8	1~24	1~24
	7	1~25	1~25
	6	1~26	1~26
	5	1~27	1~27
	4	1~28	1~28
	3	1~29	1~29
	2	1~30	1~30
	1	1~31	1~31
PCM30 PCM30C	30	1	1~2
	29	1~2	1~3
	28	1~3	1~4
	27	1~4	1~5
	26	1~5	1~6
	25	1~6	1~7
	24	1~7	1~8
	23	1~8	1~9
	22	1~9	1~10
	21	1~10	1~11
	20	1~11	1~12
	19	1~12	1~13
	18	1~13	1~14
	17	1~14	1~15
	16	1~15	1~16
	15	1~15,17	1~17
	14	1~15,17~18	1~18
	13	1~15,17~19	1~19
	12	1~15,17~20	1~20
	11	1~15,17~21	1~21
	10	1~15,17~22	1~22
	9	1~15,17~23	1~23

	8	1~15,17~24	1~24
	7	1~15, 17~25	1~25
	6	1~15, 17~26	1~26
	5	1~15, 17~27	1~27
	4	1~15, 17~28	1~28
	3	1~15, 17~29	1~29
	2	1~15, 17~30	1~30
	1	1~15, 17~31	1~31

3.6 Menu tree for [REBOOT SYSTEM]

REBOOT SYSTEM

While use the REBOOT SYSTEM command, press "ENTER" Key; select "YES" and press "ENTER" Key. You can see the "Reboot…" display. It will return to main menu after the reboot operation is finish.



3.7 Menu tree for [SYSTEM DISGNOSTIC]

SYSTEM
DIAGNOSTIC

System Diagnostic has two functions: Loopback test and BER test.

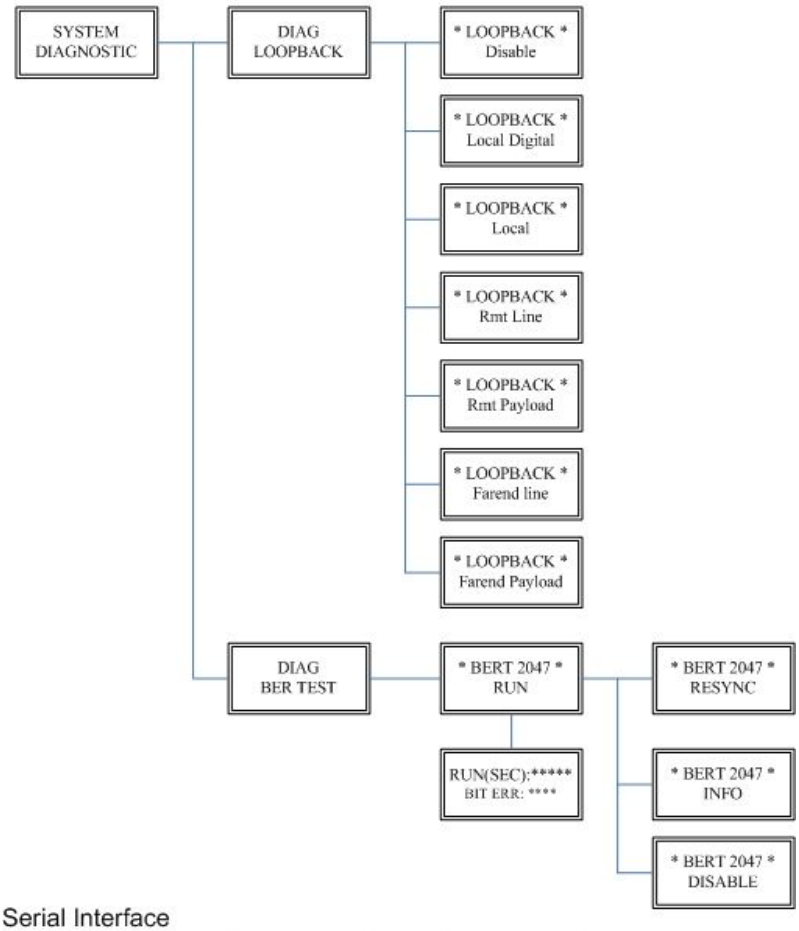
SYSTEM DIAGNOSTIC ➔ DIAG LOOPBACK

DIAG
LOOPBACK

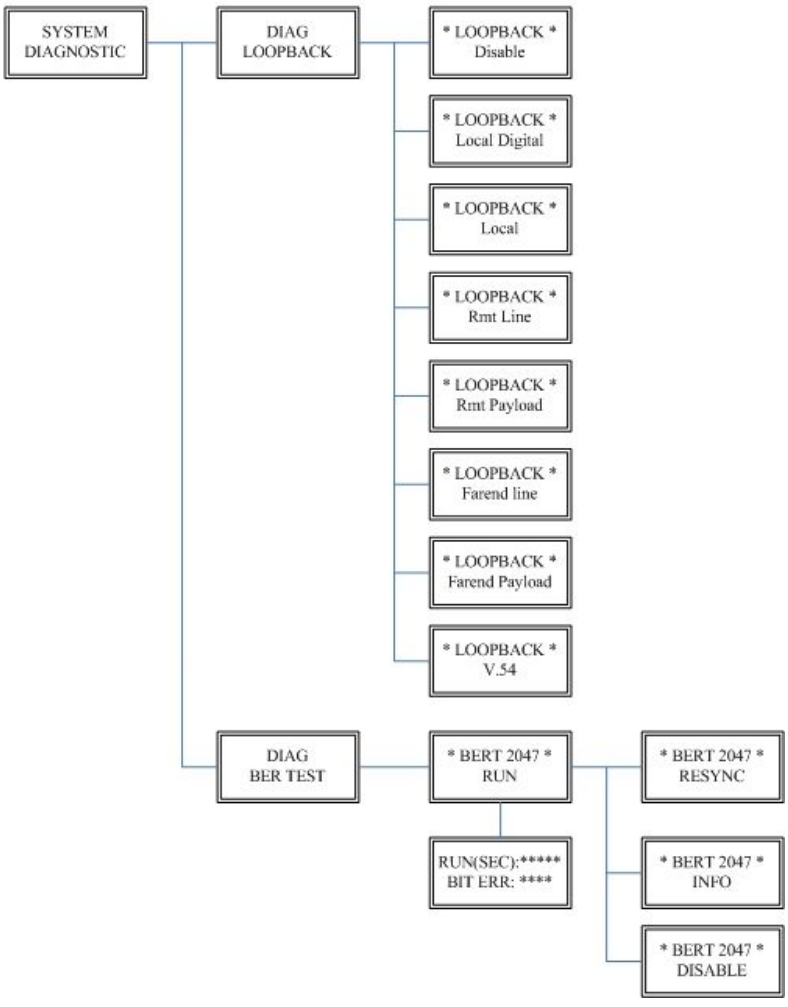
SYSTEM DIAGNOSTIC ➔ DIAG BER TEST

DIAG
BER TEST

E1 Interface



Serial Interface



3.7.1 Loopback Test

Note : No SYSTEM DIAGNOSTIC menu on Ethernet Interface Model

For E1 Interface model as CO side, there have: local digital, local, remote line, remote payload, farend line and farend payload.
For Serial Interface model as CO side, there have: Local digital, local, remote line, remote payload, farend line, farend payload and V.54.
For E1 Interface model as CPE side, there have: local digital, remote line, remote payload, farend line and farend payload.
For Serial Interface model as CPE side, there have: Local digital, remote line, remote payload, farend line, farend payload and V.54.

If the device haven't connect or under handshake, there will not have farend line, farend payload and V.54.

Definition of ***V.54***
An ITU standard (1976) for various loopback tests that can be incorporated into modems for testing the telephone circuit and isolating transmission problems.
Operating modes include local and remote digital loopback and local and remote analog loopback.

Stand alone NTU, no connection with other NTU:

E1 interface CO side
Local digital
Local
Remote line
Remote payload

Serial interface CO side
Local digital
Local
Remote line
Remote payload

E1 interface CPE side
Local digital
Remote line
Remote payload

Serial interface CPE side
Local digital
Remote line
Remote payload

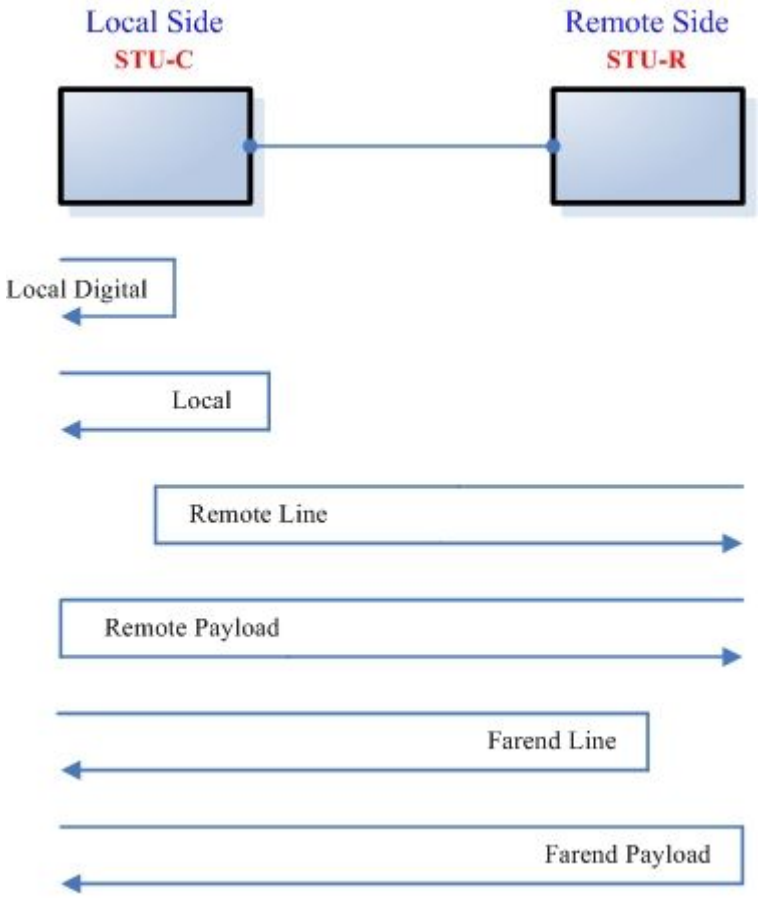
After connection both CO side and CPE side:

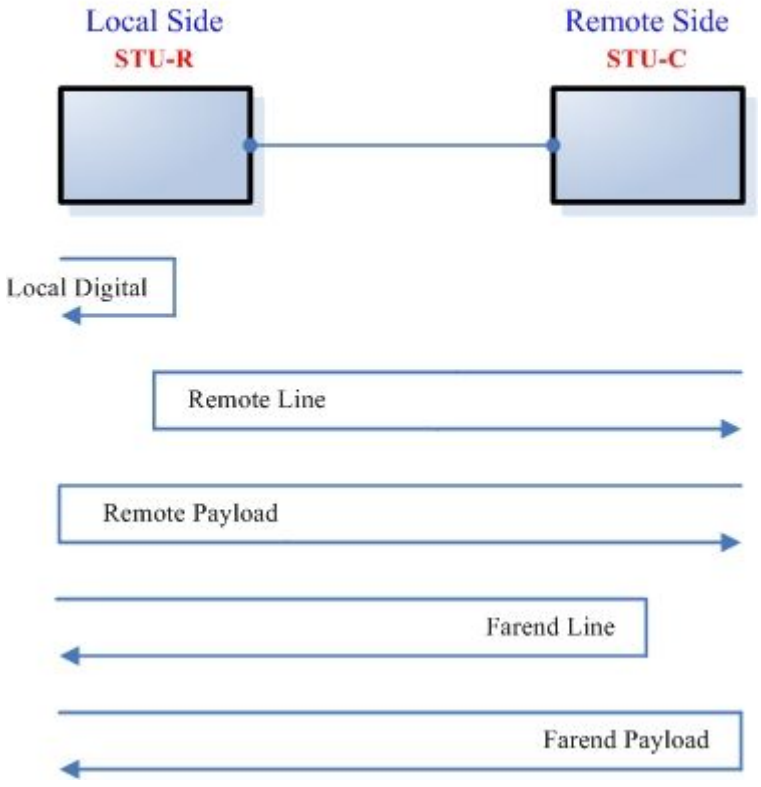
E1 interface CO side
Local digital
Local
Remote line
Remote payload
Farend line
Farend payload

Serial interface CO side
Local digital
Local
Remote line
Remote payload
Farend line
Farend payload
V.54

E1 interface CPE side
Local digital
Remote line
Remote payload
Farend line
Farend payload

Serial interface CPE side
Local digital
Remote line
Remote payload
Farend line
Farend payload
V.54


Local Side
STU-C
Remote Side
STU-R
Local Digital
Local
Remote Line
Remote Payload
Farend Line
Farend Payload


Local Side
STU-R
Remote Side
STU-C
Local Digital
Remote Line
Remote Payload
Farend Line
Farend Payload

3.7.2 BER Test

This is the internal Bit Error Rate Tester (BERT) for complete testing of local and remote modem and the link quality without any external test equipment.
This built-in Bit Error Rate Test generator can generates a standard 2047 (2^{11}-1) test pattern.

DIAG
BER TEST

BERT 2047
RUN

When the BERT haven't any Bit Error, it show zero. Otherwise, it will show some number counter.
RUN(SEC) item is show the time elapsed second count

RUN(SEC): 00001
BIT ERR: 00000

If there have NO SYNC on bit error message, it shows the testing paths haven't connected.

RUN(SEC): 00001
BIT ERR: NO SYNC

Press ENTER key on this display message, it will re-sync again.

BERT 2047
RESYNC

Press ENTER key on this display message, it will show the test real time.

BERT 2047
INFO

If you want to exit the BERT, you can press ENTER key from this display message.

BERT 2047
DISABLE

3.8 Parameters Table

3.8.1 E1 Interface Model

NTU	Type	□STU-R □STU-C-INTCLK □STU-C-EXTCLK
SHDSL	Annex	□A □B
	PSD	□R1_ASTM □R2_ASYM □SYM_ENABLE □ASYM_DISABLE
	SNR Margin	□DISABLE □0 □1 □2 □3 □4 □5 □6 □7 □8 □9 □10
	Power Back Off	□Disable □Enable
E1	Channel	□PCM31 □PCM31C □PCM30 □PCM30C □Unframed
	Slot Number	
	First Slot	
	Code	□HDB3 □AMI
	AIS	□Off □On
	Build Outs	□75 Ohm □120 Ohm

3.8.2 Serial Interface Model

NTU	Type	□STU-R □STU-C-INTCLK □STU-C-EXTCLK
SHDSL	Annex	□A □B
	PSD	□R1_ASTM □R2_ASYM □SYM_ENABLE □ASYM_DISABLE
	SNR Margin	□DISABLE □0 □1 □2 □3 □4 □5 □6 □7 □8 □9 □10
	Power Back Off	□Disable □Enable
Serial	Interface	□V.35 □X.21
	Data Rate	
	Clock	□Normal □Inverse
	RTS	□On □From DTE
	CTS	□On □Off □From RTS
	DSR	□On □Off □From DTR
	DCD	□On □Off □From DSL
	Delay	□0mS □1mS □2mS □3mS

3.8.3 Ethernet Interface model

NTU	Type	□STU-R □STU-C-INTCLK □STU-C-EXTCLK
SHDSL	Annex	□A □B
	PSD	□R1_ASTM □R2_ASYM □SYM_ENABLE □ASYM_DISABLE
	SNR Margin	□DISABLE □0 □1 □2 □3 □4 □5 □6 □7 □8 □9 □10
	Power Back Off	□Disable □Enable
Ethernet	Date Rate	
	Auto Config	□Disable □Enable
	Speed	□Full □Half
	Duplex	□100M □10M

3.8.4 Multi-interface model--E1 Interface

NTU	Interface	☒E1 □Serial □Ethernet □E1+Serial □E1+Ethernet
	Type	□STU-R □STU-C-INTCLK □STU-C-EXTCLK
SHDSL	Annex	□A □B
	PSD	□R1_ASTM □R2_ASYM □SYM_ENABLE □ASYM_DISABLE
	SNR Margin	□DISABLE □0 □1 □2 □3 □4 □5 □6 □7 □8 □9 □10
	Power Back Off	□Disable □Enable
E1	Channel	□PCM31 □PCM31C □PCM30 □PCM30C □Unframed
	Slot Number	
	First Slot	
	Code	□HDB3 □AMI
	AIS	□Off □On
	Build Outs	□75 Ohm □120 Ohm

3.8.5 Multi-interface model--Serial Interface

NTU	Interface	□E1 ☒Serial □Ethernet □E1+Serial □E1+Ethernet
	Type	□STU-R □STU-C-INTCLK □STU-C-EXTCLK
SHDSL	Annex	□A □B
	PSD	□R1_ASTM □R2_ASYM □SYM_ENABLE □ASYM_DISABLE
	SNR Margin	□DISABLE □0 □1 □2 □3 □4 □5 □6 □7 □8 □9 □10
	Power Back Off	□Disable □Enable
Serial	Interface	□V.35 □X.21
	Data Rate	
	Clock	□Normal □Inverse
	RTS	□On □From DTE
	CTS	□On □Off □From RTS
	DSR	□On □Off □From DTR
	DCD	□On □Off □From DSL
	Delay	□0mS □1mS □2mS □3mS

3.8.6 Multi-interface model--Ethernet Interface

NTU	Interface	□E1 □Serial ☒Ethernet □E1+Serial □E1+Ethernet
	Type	□STU-R □STU-C-INTCLK □STU-C-EXTCLK
SHDSL	Annex	□A □B
	PSD	□R1_ASTM □R2_ASYM □SYM_ENABLE □ASYM_DISABLE
	SNR Margin	□DISABLE □0 □1 □2 □3 □4 □5 □6 □7 □8 □9 □10
	Power Back Off	□Disable □Enable
Ethernet	Date Rate	
	Auto Config	□Disable □Enable
	Speed	□Full □Half
	Duplex	□100M □10M

3.8.7 Multi-interface model--E1+Serial Interface

NTU	Interface	□E1 □Serial □Ethernet ☒E1+Serial □E1+Ethernet
	Type	□STU-R □STU-C-INTCLK □STU-C-EXTCLK
SHDSL	Annex	□A □B
	PSD	□R1_ASTM □R2_ASYM □SYM_ENABLE □ASYM_DISABLE
	SNR Margin	□DISABLE □0 □1 □2 □3 □4 □5 □6 □7 □8 □9 □10
	Power Back Off	□Disable □Enable
E1	Channel	□PCM31 □PCM31C □PCM30 □PCM30C □Unframed
	Slot Number	
	First Slot	
	Code	□HDB3 □AMI
	AIS	□Off □On
	Build Outs	□75 Ohm □120 Ohm
Serial	Interface	□V.35 □X.21
	Data Rate	
	Clock	□Normal □Inverse
	RTS	□On □From DTE
	CTS	□On □Off □From RTS
	DSR	□On □Off □From DTR
	DCD	□On □Off □From DSL
	Delay	□0mS □1mS □2mS □3mS

3.8.8 Multi-interface model--E1+Ethernet Interface

NTU	Interface	□E1 □Serial □Ethernet □E1+Serial ☒E1+Ethernet
	Type	□STU-R □STU-C-INTCLK □STU-C-EXTCLK
SHDSL	Annex	□A □B
	PSD	□R1_ASTM □R2_ASYM □SYM_ENABLE □ASYM_DISABLE
	SNR Margin	□DISABLE □0 □1 □2 □3 □4 □5 □6 □7 □8 □9 □10
	Power Back Off	□Disable □Enable
E1	Channel	□PCM31 □PCM31C □PCM30 □PCM30C □Unframed
	Slot Number	
	First Slot	
	Code	□HDB3 □AMI
	AIS	□Off □On
	Build Outs	□75 Ohm □120 Ohm
Ethernet	Date Rate	
	Auto Config	□Disable □Enable
	Speed	□Full □Half
	Duplex	□100M □10M

4 Configuration with Console Port

This chapter will deal with the specifics of configuration and operation of this product via console port with terminal emulation program. The configuration UM-SN VER.2 NTU is performed via a menu-driven embedded software, using a standard ASCII terminal or a PC running a terminal emulation application connected to the rear panel CONSOLE port.

Windows includes a terminal emulation program called HyperTerminal. Connect the appropriate communication port from the PC to this device. After the physical connection is made, you are ready to configure this product. Make sure you have connected the supplied RS-232C serial cable (DB9F to RJ-45 Plug) to the console port on the rear panel on this product.

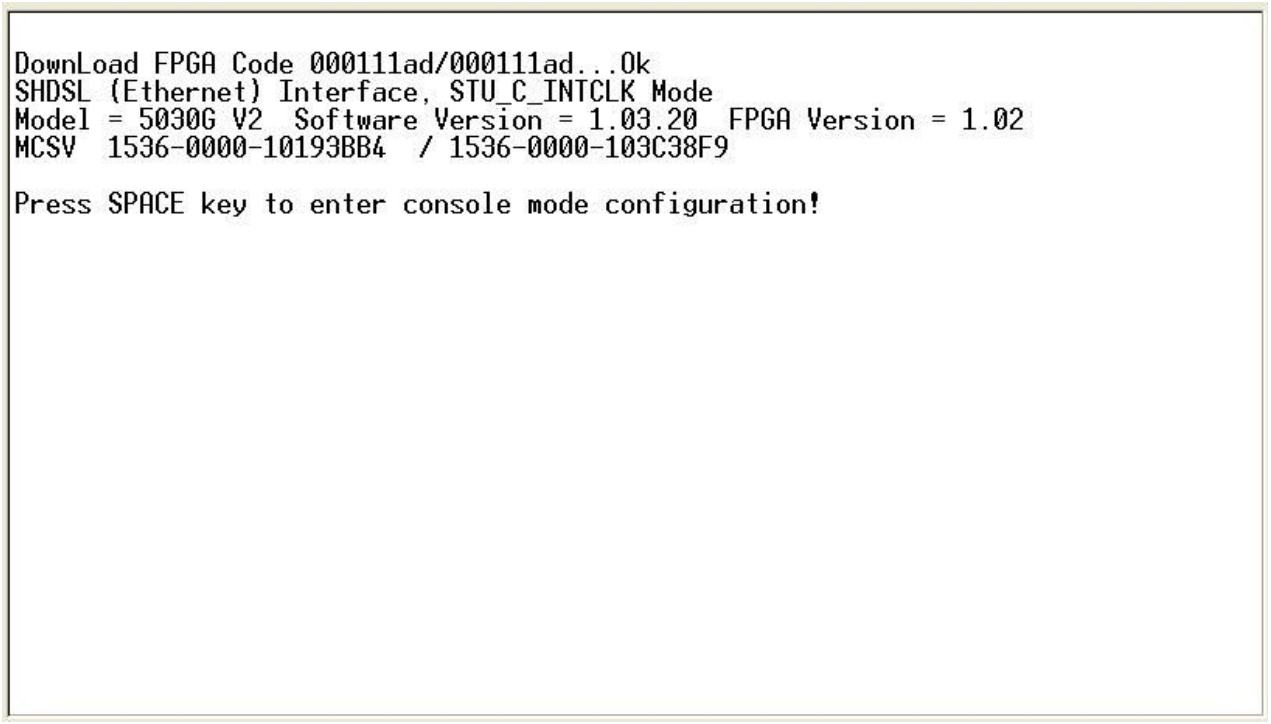
Run the terminal emulation program such as Hyper Terminal with the following setting:

Emulation: VT-100 compatible

Band rate: 115200, Data bits: 8, Parity: None, Stop Bits:1 , Flow Control: None

4.1 Login Procedure

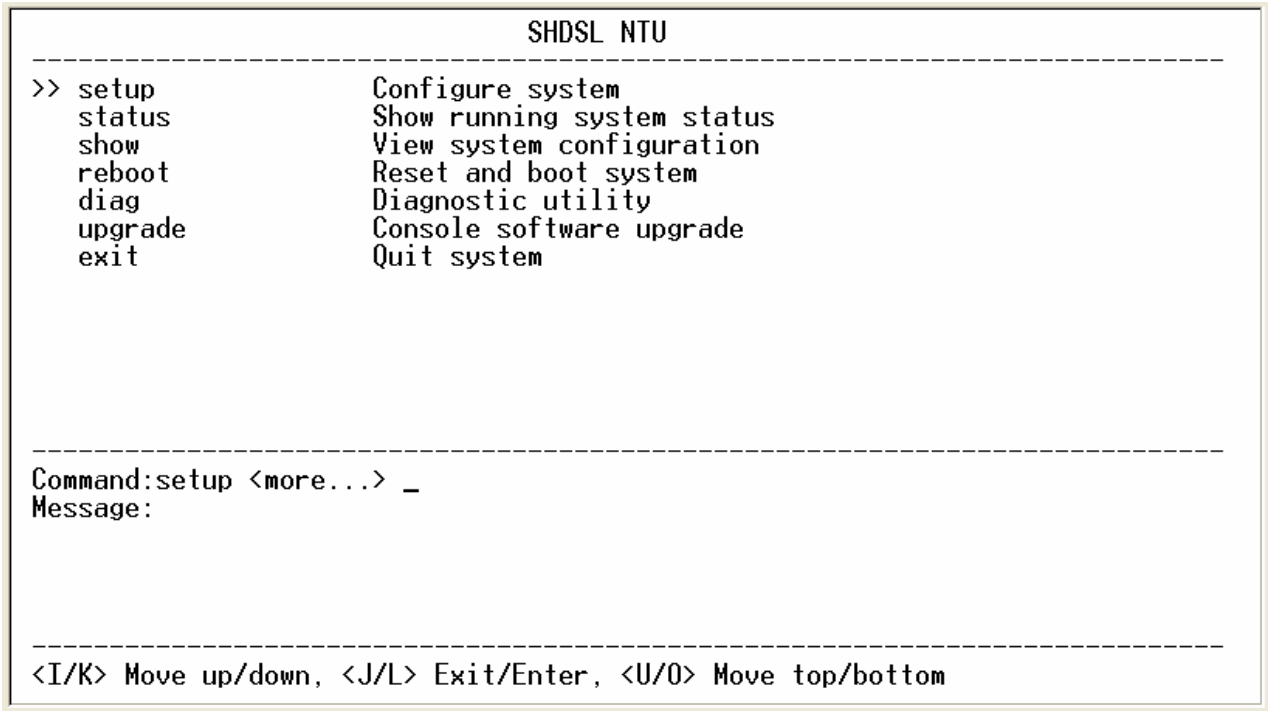
At the start up screen, you will see:



Press the SPACE key until the login screen appears. When you see the login screen, you can logon to device. Username use "**admin**". When the system prompts you for a password, type "**admin**" to enter is O.K.

4.2 Window structure

After you type the password, it will display the main menu.



Above screen capture shows the common structure for all windows used throughout the configuration console terminal.

From top to bottom, the window is divided into four major sections.

The very top line displays the product name.

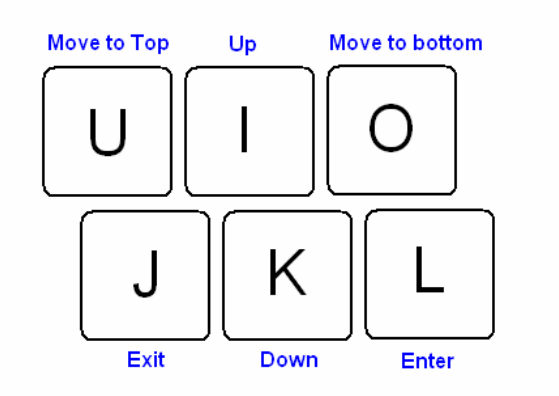
Next a block of commands is listed where the ">>" symbol indicates the current cursor placeholder.

The next block down is the "command" section. The command that is selected and ready for execution is displayed after the "Command:" prompt. The "<more…> designation indicates that there are other sub menus to this command. The "Message:" field is used to display any special system messages or warnings.

Finally, at the very bottom of the screen is a help command line and reminder of the currently available command keys. In most cases, the keyboards four cursor keys can be used to navigate all the menu system. If for some reason your keyboard's cursor keys are not supported in the terminal emulation software, you may uses the keys listed on the help command line.

4.3 Menu Commands

Before changing the configuration, familiarize yourself with the operations list in the following table. The operation list will be shown on the window.



Keypads	Description
[UP] or **I**	Move to above field in the same level menu
[DOWN] or **K**	Move to below field in the same lever menu
U	Move to top field in the same level menu
O	Move to bottom field in the same level menu
[LEFT] or **J**	Move back to previous menu (Exit)
[RIGHT] , **L** or [ENTER]	Move forward to submenu(Enter)
[TAB]	To choose another parameters
Ctrl + C	To quit the show data display screen

4.4 Main Menu Summary

The main menu is prompt as follow.

Menu Title	Function
Setup	To setup SHDSL type, SHDSL parameters and E1/Serial/Ethernet parameters or restore factory default setting.
Status	To show SHDSL status, E1 /V.35/Ethernet status and statistics or clear the statistics on both local and remote side.
Show	To show general information, all configurations and all configurations in command script format.
Reboot	To reboot the system
Diag	To setup diagnostic utility
Upgrade	To upgrade firmware (kernel and FPGA code)
Exit	To exit this system

4.5 [Setup] Configuration

This section provides information about configuration the UM-SN VER.2 NTU. Follow the procedures:

In main menu, select **setup** and press [ENTER] or [RIGHT]

```
                                SHDSL NTU
--------------------------------------------------------------------------------
>> setup                Configure system
   status               Show running system status
   show                 View system configuration
   reboot               Reset and boot system
   diag                 Diagnostic utility
   upgrade              Console software upgrade
   exit                 Quit system




--------------------------------------------------------------------------------
Command:setup <more...> _
Message:



--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

Press [ENTER] or [L] key to select which channel (Local side or Remote side).

```
                                SHDSL NTU
--------------------------------------------------------------------------------
>> LocCh                Setup Local  Channel
   RmtCh                Setup Remote Channel









--------------------------------------------------------------------------------
Command:LocCh <CR>
Message:



--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

The screen will prompt as following:

E1 interface model

```
                                    SHDSL NTU
--------------------------------------------------------------------------------
>> Interface            Configure NTU Interface
   Shdsl                Configure SHSDL Parameters
   E1                   Configure E1 Parameters
   Rmtcfg               Enable/Disable Remote Config
   Default              Restore NTU's Default Setting









--------------------------------------------------------------------------------
Command:Interface <CR>
Message:



--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

You can see E1 parameter can been setting.

Serial interface model

```
                                    SHDSL NTU
--------------------------------------------------------------------------------
>> Interface            Configure NTU Interface
   Shdsl                Configure SHSDL Parameters
   Serial               Configure Serial Parameters
   Rmtcfg               Enable/Disable Remote Config
   Default              Restore NTU's Default Setting









--------------------------------------------------------------------------------
Command:Interface <CR> _
Message:



--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

You can see Serial parameter can been setting.

Ethernet interface model

```
                                SHDSL NTU
--------------------------------------------------------------------------------
>> Interface          Configure NTU Interface
   Shdsl              Configure SHSDL Parameters
   Ethernet           Configure Ethernet Parameters
   Rmtcfg             Enable/Disable Remote Config
   Default            Restore NTU's Default Setting









--------------------------------------------------------------------------------
Command:Interface <CR> _
Message:



--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

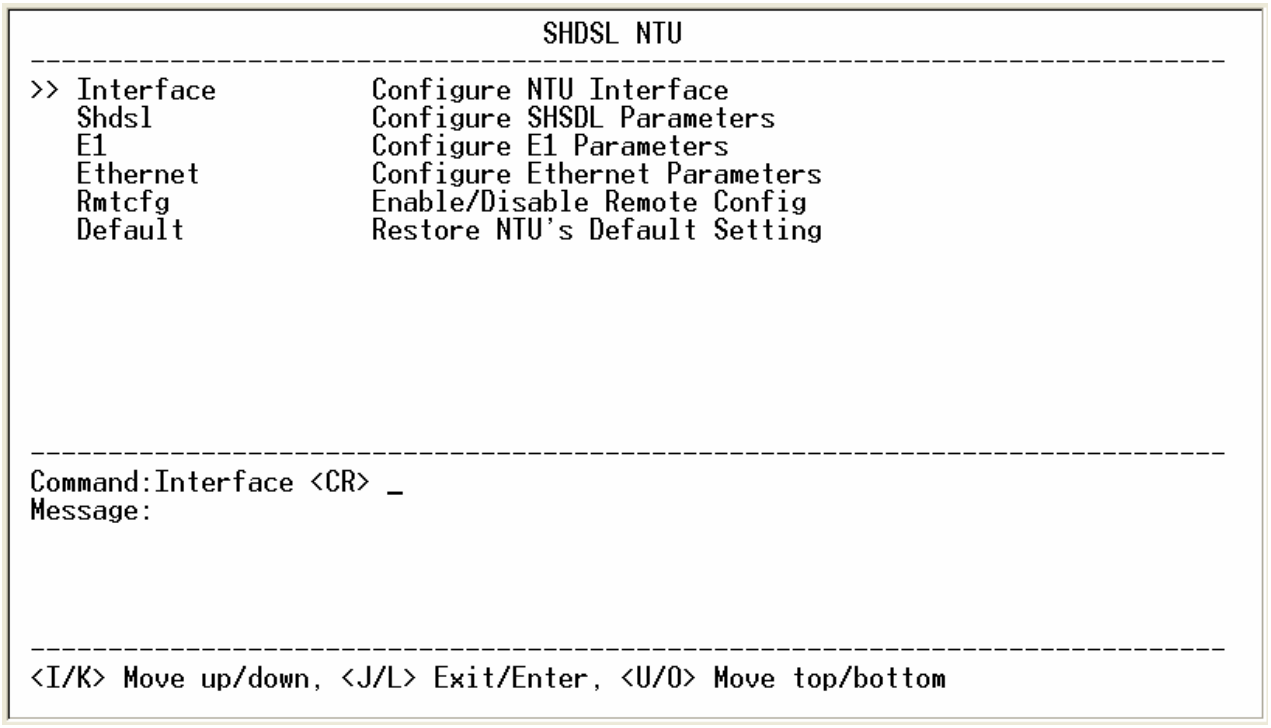
You can see Ethernet parameter can been setting.

E1 and Serial interface model

```
                                SHDSL NTU
--------------------------------------------------------------------------------
>> Interface          Configure NTU Interface
   Shdsl              Configure SHSDL Parameters
   E1                 Configure E1 Parameters
   Serial             Configure Serial Parameters
   Rmtcfg             Enable/Disable Remote Config
   Default            Restore NTU's Default Setting









--------------------------------------------------------------------------------
Command:Interface <CR>
Message:



--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

You can see the E1 and Serial parameters can been setting.

E1 and Ethernet interface model



You can see the E1 and Ethernet parameters can been setting.

4.5.1 Configure Interface

Select **Interface** item, and press [ENTER] or [RIGHT] to setup NTU Interface.

```
                                SHDSL NTU
--------------------------------------------------------------------------------
>> Interface          Configure NTU Interface
   Shdsl              Configure SHSDL Parameters
   E1                 Configure E1 Parameters
   Ethernet           Configure Ethernet Parameters
   Rmtcfg             Enable/Disable Remote Config
   Default            Restore NTU's Default Setting









--------------------------------------------------------------------------------
Command:Interface <CR>
Message:




--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

```
                                SHDSL NTU
--------------------------------------------------------------------------------
>> Interface          Configure NTU Interface
   Shdsl              Configure SHSDL Parameters
   E1                 Configure E1 Parameters
   Ethernet           Configure Ethernet Parameters
   Rmtcfg             Enable/Disable Remote Config
   Default            Restore NTU's Default Setting









--------------------------------------------------------------------------------
Command:Interface <CR>
Message: Please input the following information.

SHDSL Interface (TAB Select) <E1+Ethernet>: E1+Ethernet


--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

Press [TAB] to select the operating type and press enter to finish setting.

Model	Interface modes support
E1 interface model	E1
Serial interface model	Serial
Ethernet interface model	Ethernet
Multi-interfaces model	E1
	Serial
	Ethernet
	E1+Serial
	E1+Ethernet

For Multi-interfaces model, there have five types for your selection: **E1**, **Serial**, **Ethernet**, **E1+ Serial** and
E1+ Ethernet.

4.5.2 Configure SHDSL parameters

This section will introduce the configuring of SHDSL parameters.

Select **Shdsl** , and press [ENTER] or [RIGHT].

```
                                SHDSL NTU
--------------------------------------------------------------------------------
   Interface          Configure NTU Interface
>> Shdsl              Configure SHSDL Parameters
   E1                 Configure E1 Parameters
   Ethernet           Configure Ethernet Parameters
   Rmtcfg             Enable/Disable Remote Config
   Default            Restore NTU's Default Setting









--------------------------------------------------------------------------------
Command:Shdsl <more...> _
Message:



--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

The SHDSL parameters items have **SHDSL Mode**, **Annex type**, **PSD**, **SNR margin and Power backoff**.

```
                                SHDSL NTU
--------------------------------------------------------------------------------
>> Mode               Configure SHDSL Mode
   Annex              Configure SHDSL Annex
   Psd                Configure SHDSL PSD Mask
   Margin             Configure SHDSL SNR Margin
   Pwr Backoff        Configure SHDSL Power backoff









--------------------------------------------------------------------------------
Command:Mode <CR>
Message:



--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

For configuring SHDSL mode, move the cursor to **Mode** and press [ENTER] or [L]. Select the SHDSL mode by using [TAB] key.

Setup SHDSL parameter, Mode

```
                                SHDSL NTU
--------------------------------------------------------------------------------
>> Mode                 Configure SHDSL Mode
   Annex                Configure SHDSL Annex
   Psd                  Configure SHDSL PSD Mask
   Margin               Configure SHDSL SNR Margin
   Pwr Backoff          Configure SHDSL Power backoff









--------------------------------------------------------------------------------
Command:Mode <CR>
Message: Please input the following information.

SHDSL Mode (TAB Select) <STU-R>: STU-R


--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

There are three SHDSL modes can be used: **STU-R**, **STU-C-INTCLK** and **STU-C-EXTCLK**.

INTCLK: The device will generate the appropriate clock speed defined by the speed setting of the interface.

EXTCLK: The device will accept the clock from the interface and will use that clock to receive and transmit data across the interface.

Most applications use Internal Clock. If the DTE provides a clock with TX data, the clock can set to be External Clock.

For configuring SHDSL Annex type, move the cursor to **Annex** and press [ENTER or [L]]. Select the Annex type by using [TAB] key.

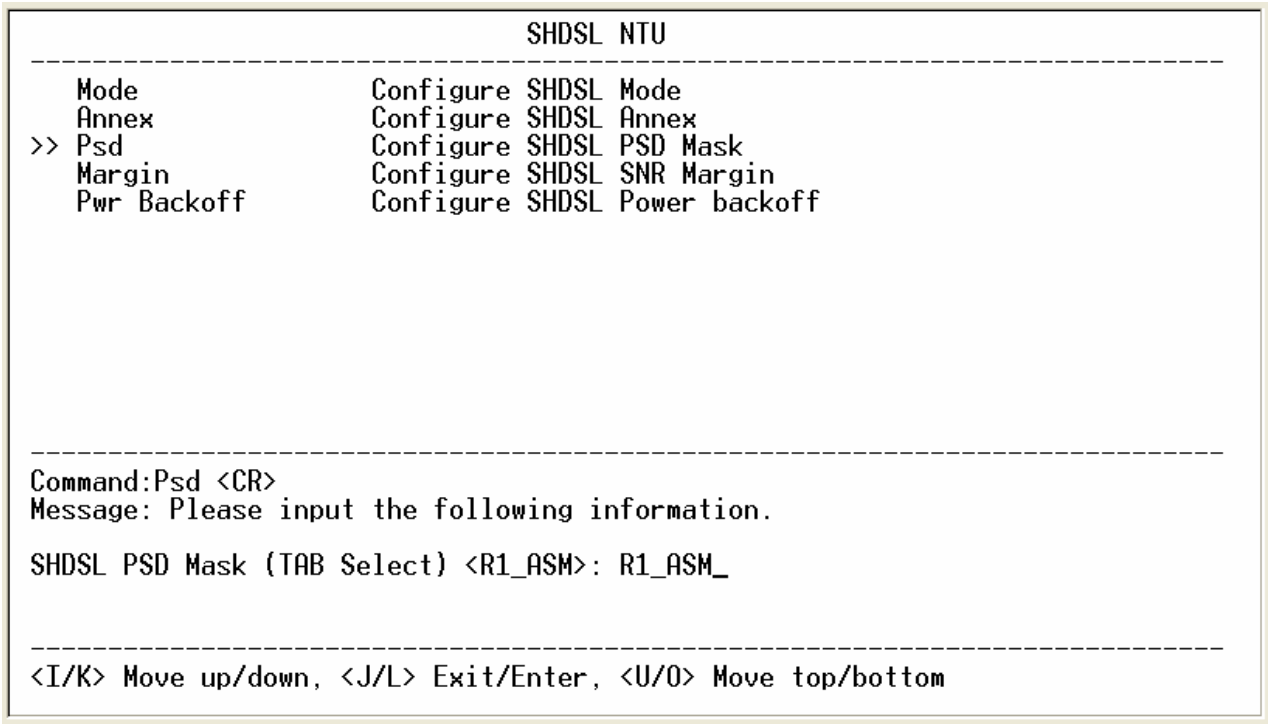
Setup SHDSL parameter, Annex

```
                                SHDSL NTU
------------------------------------------------------------------------------
   Mode                 Configure SHDSL Mode
>> Annex                Configure SHDSL Annex
   Psd                  Configure SHDSL PSD Mask
   Margin               Configure SHDSL SNR Margin
   Pwr Backoff          Configure SHDSL Power backoff









------------------------------------------------------------------------------
Command:Annex <CR>
Message: Please input the following information.

SHDSL Annex (TAB Select) <Annex-B>: Annex-B


------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

There are two annex type can be used: **Annex-A** and **Annex-B**

For configuring SHDSL PSD, move the cursor to **psd** and press [ENTER] or [L]. Select the parameter by using [TAB] key.

Setup SHDSL parameter, PSD



There are four PSD type can be used: **R1_ASM**, **R2_ASM**, **SYM_ENABLE** and **ASYM_DISABLE**.

For setting SHDSL Margin, move the cursor to **margin** and press [ENTER] or [L]. You can key the SHDSL margin setting value.

Setup SHDSL parameter, SNR Margin

```
                                SHDSL NTU
------------------------------------------------------------------------------
   Mode                 Configure SHDSL Mode
   Annex                Configure SHDSL Annex
   Psd                  Configure SHDSL PSD Mask
>> Margin               Configure SHDSL SNR Margin
   Pwr Backoff          Configure SHDSL Power backoff









------------------------------------------------------------------------------
Command:Margin <CR>
Message: Please input the following information.

SHDSL Startup Margin (TAB Select) <0~10> (0) : 0~10
SHDSL Current Margin <0> (0~10): _

------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

SNR margin is an index of line connection. You can see the actual SNR margin from 0 to 10 in STATUS SHDSL. The larger SNR margin has the better line connection. For example, if you set SNR margin in the field as 3, the SHDSL connection will drop down and reconnect when the SNR margin is lower than 3.

For configuring SHDSL Power Back off function, move the cursor to **Pwr Backoff** and press [ENTER] or [L]. Select the parameter by using [TAB] key.

Setup SHDSL parameter, Power Backoff

```
                                SHDSL NTU
--------------------------------------------------------------------------------
   Mode                 Configure SHDSL Mode
   Annex                Configure SHDSL Annex
   Psd                  Configure SHDSL PSD Mask
   Margin               Configure SHDSL SNR Margin
>> Pwr Backoff         Configure SHDSL Power backoff









--------------------------------------------------------------------------------
Command:Pwr Backoff <CR>
Message: Please input the following information.

SHDSL Power BackOff (TAB Select) <Disable>: Disable_


--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

There are two power back-off type can be used: **Disable** and **Enable**.

4.5.3 Configure E1 parameters

When using on E1 interface, select the E1 item and press [ENTER] or [RIGHT].

```
                                SHDSL NTU
------------------------------------------------------------------------------
   Interface          Configure NTU Interface
   Shdsl              Configure SHSDL Parameters
>> E1                 Configure E1 Parameters
   Rmtcfg             Enable/Disable Remote Config
   Default            Restore NTU's Default Setting









------------------------------------------------------------------------------
Command:E1 <more...> _
Message:



------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

The E1 settings include Channel, line code, AIS and build out settings.

Setup E1 Parameter, Channel

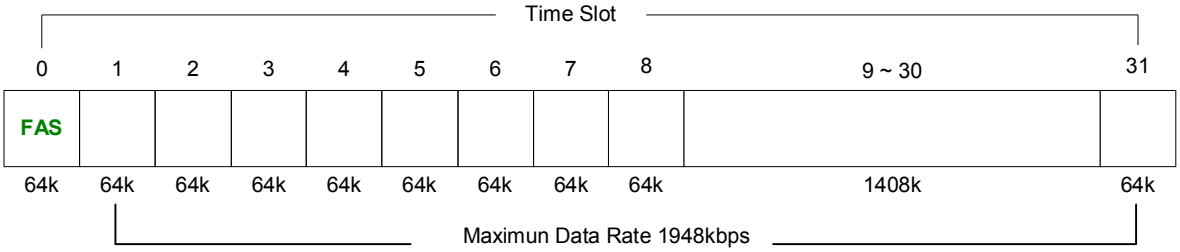
```
                                SHDSL NTU
------------------------------------------------------------------------------
>> Channel            Configure E1 Channel
   Code               Configure E1 code
   Ais                Configure E1 AIS
   Build_outs         Configure E1 build outs









------------------------------------------------------------------------------
Command:Channel <CR>
Message:



------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

Framing is required to recover the channelized E1. In transparent operation, the framing is configured as Unframed. In this case the UM-SN VER.2 framer must be set to Nx64 with N=32. For any framing such as FAS or CAS, the UM-SN VER.2 framer must be set to E1, then the E1 framing here may be set accordingly. The default setting is PCM31C.

Channel	Framing
PCM31	FAS
PCM31C	FAS+CRC4
PCM30	FAS+CAS
PCM30C	FAS+CAS+CRC4
FULL	Unframed E1 (transparent)

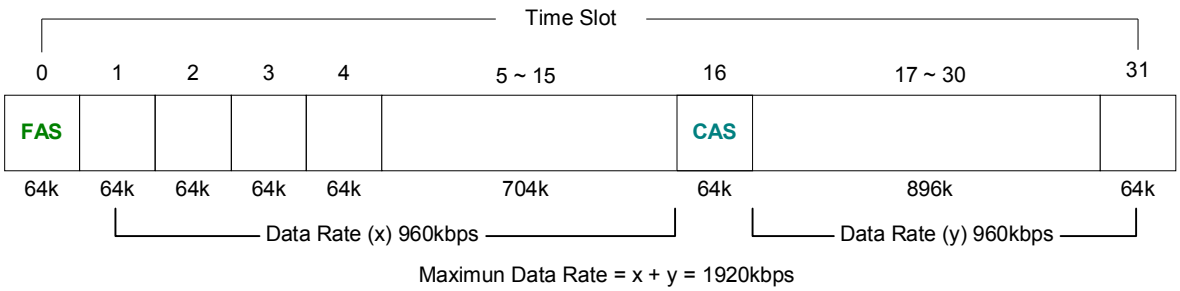
FAS	Frame Alignment Signal use 7-bit pattern to establish and maintain frame synchronization. The FAS word is located in timeslot 0 of frame. In FAS mode there have 1~31 timeslot available for use data.

PCM31 and PCM31C / FAS and FAS+CRC4



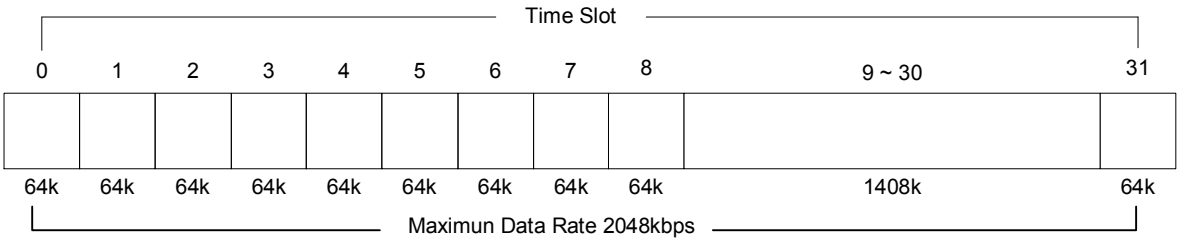
CAS	Also known as time slot 16 multiframing. It requires a multiframe alignment signal to be present for frame sync. The Multiframe Alignment Signal (MFAS) is inserted into the 16th timeslot of frame 0 of the 16-frame multiframe. In CAS mode, there have 30 channels available for user data. If timeslot 16 is included in the unit's mapping, it will be disregarded.

PCM30 and PCM30C / FAS+CAS and FAS+CAS+CRC4

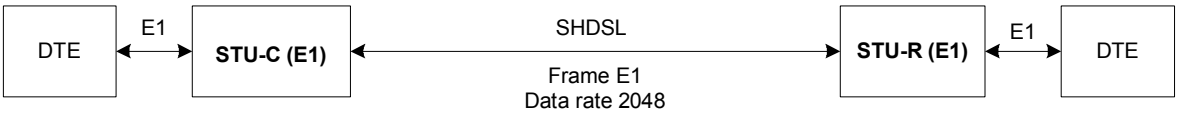


CRC4	The CRC-4 checksum bits are transmitted in the outgoing E1 data stream. Also the received signal is checked for errors. CRC-4 checksum cannot be sent in unframed mode.
Unframed	In this mode, user data is inserted into all 32 channels (64k x 32 = 2048k) of the E1 stream. The object of running without framing is to utilize the full bandwidth of the E1 line.

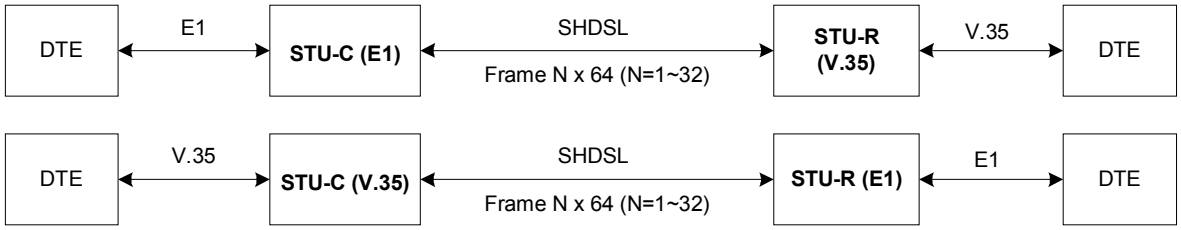
UNFRAMED



G.703 (E1) can supports data rate of 2048kbps, so the maximum data rate of SHDSL line, connected with E1 DCEs, depends on data rate of E1, 2048kbps.



If the connection is E1 vs V.35 or V.35 vs E1, the frame has to be used N x 64k. In this case, the data rate depends on value of N. Same as above case, SHDSL and V35 can support 2304kbps data rate (36 x 64k) but E1 supports maximum data rate of 2048kbps (32 x 64k).

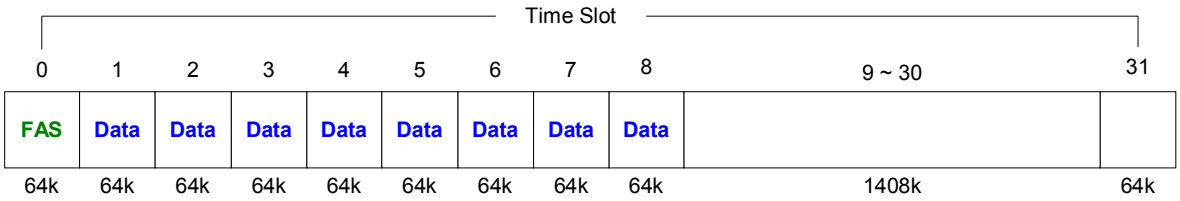


Time slot, N value, is place of data in the frame. Time Slot Number 1~31 (N=1~31) is Fractional E1 and Time Slot Number 32 (N=32) is unframed.

Fractional E1

For fractional E1(FE1), the data rate is from 64k, N=1, to 1984k, N=31, according to the E1 frame. If the E1 frame is PCM31(FAS) or PCM31C(FAS+CRC4), there have 1~31 available time slot for used data.

For example, if the data rate of SHDSL line set to be 512k, the time slot number is 8 and first time slot number is 1. The frame is shown as below.

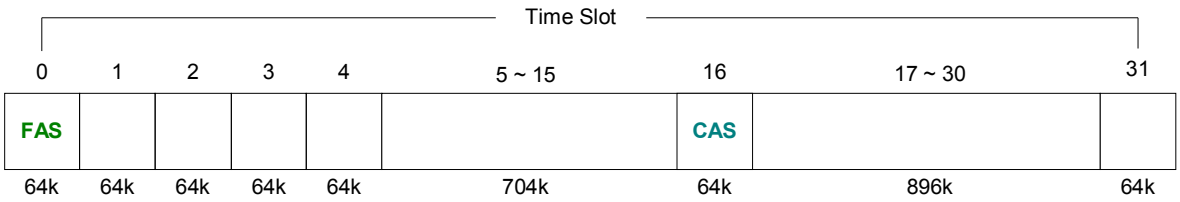


The First Time Slot setting of FAS and FAS+ CRC4 (PCM31 and PCM31C)have to follow the rule:

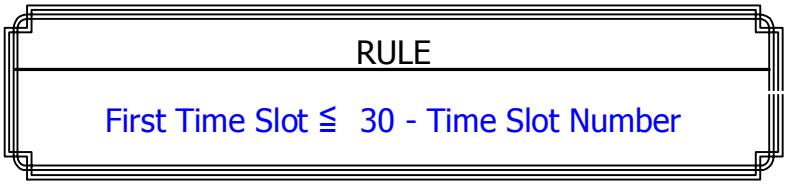
RULE

First Time Slot ≦ 31- Time Slot Number

Using E1 frame of FAS+CAS or FAS+CAS+CRC4(PCM30 or PCM30C), the [FAS] will occupy Time Slot 0 and [CAS] will occupy Time Slot 16. There have only 30 Time Slot left for data. On the other hand, the data rate is 1920kbps (30x64Kbps).

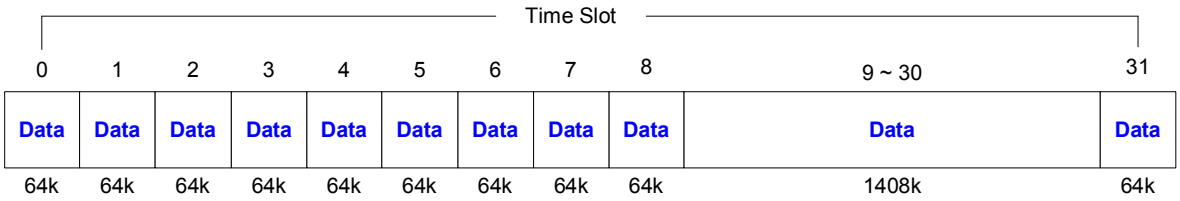


The First Time Slot setting of FAS+CAS and FAS+CAS+CRC4 (PCM30 and PCM30C) have to follow the rule:

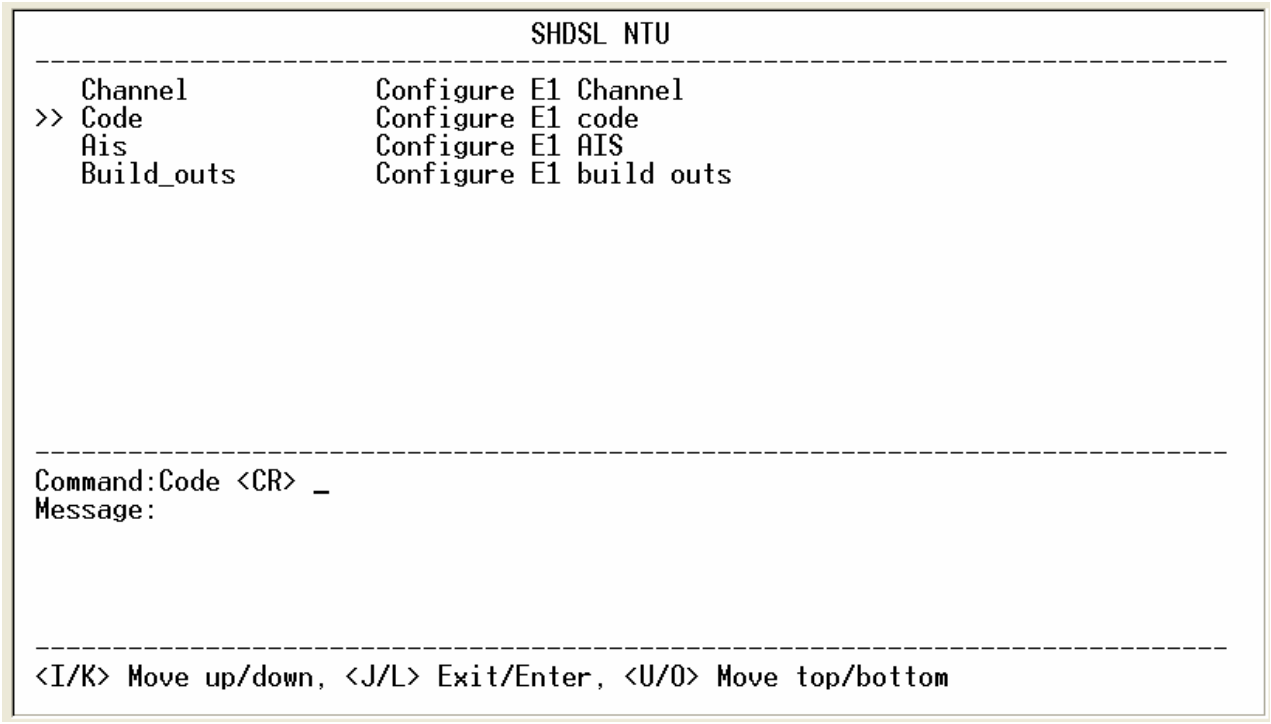


Unframed E1

Used data is inserted into all 32 channels (64Kbps x 32 = 2048Kpbs) of the E1 stream



Setup E1 Parameter, Line Code



The UM-SN VER.2 NTU supports two different line codes: HDB3 and AMI.
HDB3 is the most popular and preferred line coding and is also the default setting.
AMI line coding is also selectable.

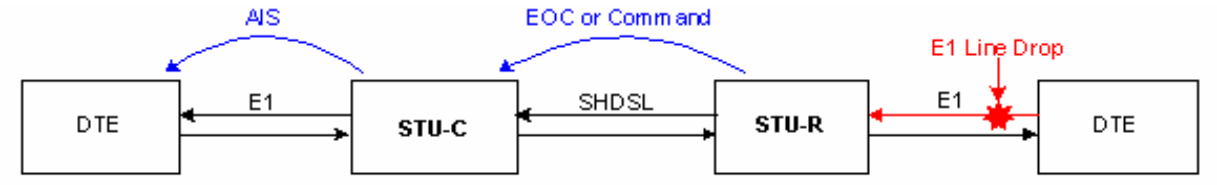
HDB3	In this line coding, the transmitter substitutes a deliberate bipolar violation when excessive zeros in the data stream are detected. The receiver recognizes these special violations and decodes them as zeros. This method enables the network to minimum pulse density requirements. Unless AMI is required for your application, HDB3 should be used whenever possible.
AMI	Alternate Mark Inversion defines a pulses as a "mark," a binary one as, as opposed to a zero. In an E1 network connection, signals are transmitted as a sequence of one and zero. One is sent as pulse, and zero is sent as spaces, i.e. no pulse. Every other pulse is inverted from the previous pulse in polarity, so that the signal can be effectively transmitted. This means, however, that a long sequence of zero in data stream will cause problems, since the NTU receiving the signal relies on the signal to recover the 2048kbps clock.

Setup E1 Parameter, AIS

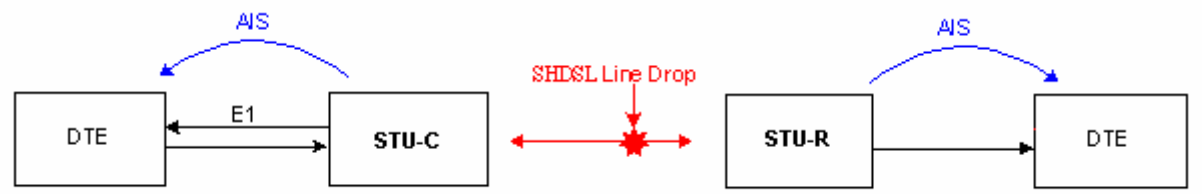
```
                                SHDSL NTU
------------------------------------------------------------------------------
   Channel              Configure E1 Channel
   Code                 Configure E1 code
>> Ais                  Configure E1 AIS
   Build_outs           Configure E1 build outs









------------------------------------------------------------------------------
Command:Ais <CR>
Message:



------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

AIS (Alarm Indication Signal) is a method to inform the remote connection that there is a signal or sync problem with the E1. AIS is only valid in framed mode E1, not in Unframed E1. The setting here of AIS enabled (on) or not (off) and is for testing with AIS. When enabled, the E1 will transmit the AIS and it should be confirmed at the remote device (AIS indication lit). After testing, please turn AIS back off.

For example 1: When STU-R E1 RX line is drop, STU-R sends the status to STU-C via EOC or command, and then STU-C will send AIS (Alarm Indication Signal) to DTE while AIS function is enabled.



For example 2: When SHDSL connection drops, STU-R and STU-C both send AIS (Alarm Indication Signal) to DTE in the same time while AIS function is enabled.



Setup E1 Parameter, Build Out

```
                                SHDSL NTU
--------------------------------------------------------------------------------
   Channel              Configure E1 Channel
   Code                 Configure E1 code
   Ais                  Configure E1 AIS
>> Build_outs          Configure E1 build outs









--------------------------------------------------------------------------------
Command:Build_outs <CR>
Message:



--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

The UM-SN VER.2 NTU can support both unbalanced E1 at 75 ohms and balanced E1 at 120 ohms. The settings for impedance are made here under the build out menu setting.

4.5.4 Configure Serial parameters

When using on Serial interface, select the Serial item and press [ENTER] or [RIGHT].

```
                                SHDSL NTU
------------------------------------------------------------------------------
   Interface          Configure NTU Interface
   Shdsl              Configure SHSDL Parameters
>> Serial             Configure Serial Parameters
   Rmtcfg             Enable/Disable Remote Config
   Default            Restore NTU's Default Setting









------------------------------------------------------------------------------
Command:Serial <more...> _
Message:



------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

The serial settings include the Interface, data rate, clocking and handshaking lines (RTS, CTS, DSR and DCD) setup etc.

```
                                SHDSL NTU
------------------------------------------------------------------------------
>> Interface          Configure Serial Interface
   Data rate          Configure Serial Data Rate (N*64)
   Clock              Configure Serial clock
   Rts                Configure Serial rts
   Cts                Configure Serial cts
   Dsr                Configure Serial dsr
   Dcd                Configure Serial dcd
   Delay              Configure Serial delay









------------------------------------------------------------------------------
Command:Interface <CR> _
Message:



------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

Setup Serial Parameter, Interface

```
                                SHDSL NTU
--------------------------------------------------------------------------------
>> Interface          Configure Serial Interface
   Data rate          Configure Serial Data Rate (N*64)
   Clock              Configure Serial clock
   Rts                Configure Serial rts
   Cts                Configure Serial cts
   Dsr                Configure Serial dsr
   Dcd                Configure Serial dcd
   Delay              Configure Serial delay




--------------------------------------------------------------------------------
Command:Interface <CR>
Message: Please input the following information.

Change V.35 Interface (TAB Select) <V35>: V35


--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

You can set serial interface as V.35 or RS-530(X.21) hardware standard.

Setup Serial Parameter, Data Rate

```
                                SHDSL NTU
--------------------------------------------------------------------------------
   Interface          Configure Serial Interface
>> Data rate          Configure Serial Data Rate (N*64)
   Clock              Configure Serial clock
   Rts                Configure Serial rts
   Cts                Configure Serial cts
   Dsr                Configure Serial dsr
   Dcd                Configure Serial dcd
   Delay              Configure Serial delay




--------------------------------------------------------------------------------
Command:Data rate <CR>
Message: Please input the following information.

Change Serial Nx64 (TAB Select) <32>: 32_


--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

For serial data rate, the default setting is N=32. The date rate can be adjusted in increments of 64kbps from 64kbps to 2304kbps (N=1~36).

Setup Serial Parameter, Clock Polarity

```
                                SHDSL NTU
------------------------------------------------------------------------------
   Interface          Configure Serial Interface
   Data rate          Configure Serial Data Rate (N*64)
>> Clock              Configure Serial clock
   Rts                Configure Serial rts
   Cts                Configure Serial cts
   Dsr                Configure Serial dsr
   Dcd                Configure Serial dcd
   Delay              Configure Serial delay




------------------------------------------------------------------------------
Command:Clock <CR>
Message: Please input the following information.

Change Serial Clock (TAB Select) <normal>: normal_


------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

The data port clock polarity may be adjusted to solve some rare clocking issues. The default setting is 'Normal' clock polarity, where data is sent on the positive transition of the clock, while the option exists to set inverse clock polarity where data is sent on the negative clock transition.

Setup Serial Parameter, RTS

```
                                SHDSL NTU
------------------------------------------------------------------------------
   Interface          Configure Serial Interface
   Data rate          Configure Serial Data Rate (N*64)
   Clock              Configure Serial clock
>> Rts                Configure Serial rts
   Cts                Configure Serial cts
   Dsr                Configure Serial dsr
   Dcd                Configure Serial dcd
   Delay              Configure Serial delay




------------------------------------------------------------------------------
Command:Rts <CR>
Message: Please input the following information.

Change Serial RTS (TAB Select) <on>: on_


------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

The behavior of the RTS (Request To Send) signal may be set in one of two ways. When set 'on', the RTS signal is always forced high (on, positive voltage or SPACE), when set 'from DTE' the RTS signal will follow the DTE's condition. The default setting for RTS is ON.

Setup Serial Parameter, CTS

```
                                SHDSL NTU
--------------------------------------------------------------------------------
   Interface          Configure Serial Interface
   Data rate          Configure Serial Data Rate (N*64)
   Clock              Configure Serial clock
   Rts                Configure Serial rts
>> Cts                Configure Serial cts
   Dsr                Configure Serial dsr
   Dcd                Configure Serial dcd
   Delay              Configure Serial delay




--------------------------------------------------------------------------------
Command:Cts <CR>
Message: Please input the following information.

Change Serial CTS (TAB Select) <from_rts>: from_rts_


--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

The behavior of the CTS (Clear To Send) signal may be set in one of three ways. When set 'on', the CTS signal is always forced high (on, positive voltage or SPACE), when set 'off' the signal is always forced low (off, negative voltage or MARK), or CTS will follow RTS (Request To Send) condition of 'on' for RTS on 'off' for RTS off. The default setting for CTS is to follow RTS.

Setup Serial Parameter, DSR

```
                                SHDSL NTU
------------------------------------------------------------------------------
   Interface          Configure Serial Interface
   Data rate          Configure Serial Data Rate (N*64)
   Clock              Configure Serial clock
   Rts                Configure Serial rts
   Cts                Configure Serial cts
>> Dsr                Configure Serial dsr
   Dcd                Configure Serial dcd
   Delay              Configure Serial delay




------------------------------------------------------------------------------
Command:Dsr <CR>
Message: Please input the following information.

Change Serial DSR (TAB Select) <on>: on


------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

The behavior of the DSR (Data Set Ready) signal may be set in one of three ways. When set 'on', the DSR signal is always forced high (on, positive voltage or SPACE), when set 'off' the signal is always forced low (off, negative voltage or MARK), or DSR will follow DTR (Data Terminal Ready) condition of 'on' for DTR on or 'off' for DTR off. The default setting for DSR is ON.

Setup Serial Parameter, DCD

```
                                SHDSL NTU
------------------------------------------------------------------------------
   Interface          Configure Serial Interface
   Data rate          Configure Serial Data Rate (N*64)
   Clock              Configure Serial clock
   Rts                Configure Serial rts
   Cts                Configure Serial cts
   Dsr                Configure Serial dsr
>> Dcd                Configure Serial dcd
   Delay              Configure Serial delay




------------------------------------------------------------------------------
Command:Dcd <CR>
Message: Please input the following information.

Change Serial DCD (TAB Select) <from_dsl>: from_dsl


------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

The behavior of the DCD (Data Carrier Detect) signal may be set in one of three ways. When set 'on', the DCD signal is always forced high (on, positive voltage or SPACE), when set 'off' the signal is always forced low (off, negative voltage or MARK), or DCD will follow the DSL condition of 'on' for DSL link or 'off' for DSL no link. The default setting for DCD is to follow the DSL link status.

Setup Serial Parameter, Delay

```
                                SHDSL NTU
------------------------------------------------------------------------------
   Interface          Configure Serial Interface
   Data rate          Configure Serial Data Rate (N*64)
   Clock              Configure Serial clock
   Rts                Configure Serial rts
   Cts                Configure Serial cts
   Dsr                Configure Serial dsr
   Dcd                Configure Serial dcd
>> Delay              Configure Serial delay




------------------------------------------------------------------------------
Command:Delay <CR>
Message: Please input the following information.

Change Serial Delay <3> (0~3): 3


------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

The delay setting is used to cause a delay for CTS to follow RTS. The delay setting may be set from 0 to 3 milliseconds. The default setting is 3 milliseconds.

4.5.5 Configure Ethernet parameters

When using on Ethernet interface mode, select the Ethernet item and press [ENTER] or [RIGHT].

```
                                SHDSL NTU
------------------------------------------------------------------------------
   Interface          Configure NTU Interface
   Shdsl              Configure SHSDL Parameters
>> Ethernet           Configure Ethernet Parameters
   Rmtcfg             Enable/Disable Remote Config
   Default            Restore NTU's Default Setting









------------------------------------------------------------------------------
Command:Ethernet <more...> _
Message:



------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

The Ethernet settings include the data rate, auto config, duplex and speed.

```
                                SHDSL NTU
------------------------------------------------------------------------------
>> Rate               Configure Ethernet Data Rate(N*64K)
   Auto               Configure Ethernet Auto Config
   Duplex             Configure Ethernet Duplex
   Speed              Configure Ethernet Speed









------------------------------------------------------------------------------
Command:Rate <CR> _
Message:



------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

Setup Interface Parameter, Data Rate

```
                                SHDSL NTU
--------------------------------------------------------------------------------
>> Rate                 Configure Ethernet Data Rate(N*64K)
   Auto                 Configure Ethernet Auto Config
   Duplex               Configure Ethernet Duplex
   Speed                Configure Ethernet Speed









--------------------------------------------------------------------------------
Command:Rate <CR>
Message: Please input the following information.

Change Ethernet Rate <36> (3~36): _


--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

For date rate, the default setting is 36, or full rate. The date rate can be adjusted in increments of 64kbps from 64kbps to 2304kbps (N=1~36).

Setup Ethernet Parameter, Auto Configuration

```
                                SHDSL NTU
--------------------------------------------------------------------------------
   Rate                 Configure Ethernet Data Rate(N*64K)
>> Auto                 Configure Ethernet Auto Config
   Duplex               Configure Ethernet Duplex
   Speed                Configure Ethernet Speed









--------------------------------------------------------------------------------
Command:Auto <CR>
Message: Please input the following information.

Change Ethernet Auto Config  (TAB Select) <Enable>: Enable_


--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

You can select Enable and Disable on auto configuration.

When auto configuration set enable, the other parameter Duplex and Speed can't need to setup.

On this case, the message will show as "Ethernet is in auto negotiate"

```
                                SHDSL NTU
--------------------------------------------------------------------------------
   Rate                 Configure Ethernet Data Rate(N*64K)
   Auto                 Configure Ethernet Auto Config
>> Duplex               Configure Ethernet Duplex
   Speed                Configure Ethernet Speed









--------------------------------------------------------------------------------
Command:Duplex <CR>  Ethernet is in auto negotiate
Message:



--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

```
                                SHDSL NTU
--------------------------------------------------------------------------------
   Rate                 Configure Ethernet Data Rate(N*64K)
   Auto                 Configure Ethernet Auto Config
   Duplex               Configure Ethernet Duplex
>> Speed                Configure Ethernet Speed









--------------------------------------------------------------------------------
Command:Speed <CR>  Ethernet is in auto negotiate
Message:



--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

If auto configuration set disable, the other parameter Duplex and Speed can setup.

Setup Ethernet Parameter, Duplex

```
                                SHDSL NTU
--------------------------------------------------------------------------------
   Rate                 Configure Ethernet Data Rate(N*64K)
   Auto                 Configure Ethernet Auto Config
>> Duplex               Configure Ethernet Duplex
   Speed                Configure Ethernet Speed









--------------------------------------------------------------------------------
Command:Duplex <CR>
Message: Please input the following information.

Change Ethernet Duplex  (TAB Select) <Full-Duplex>: Full-Duplex_


--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

You can set up the duplex mode is Full-Duplex and Half-Duplex.

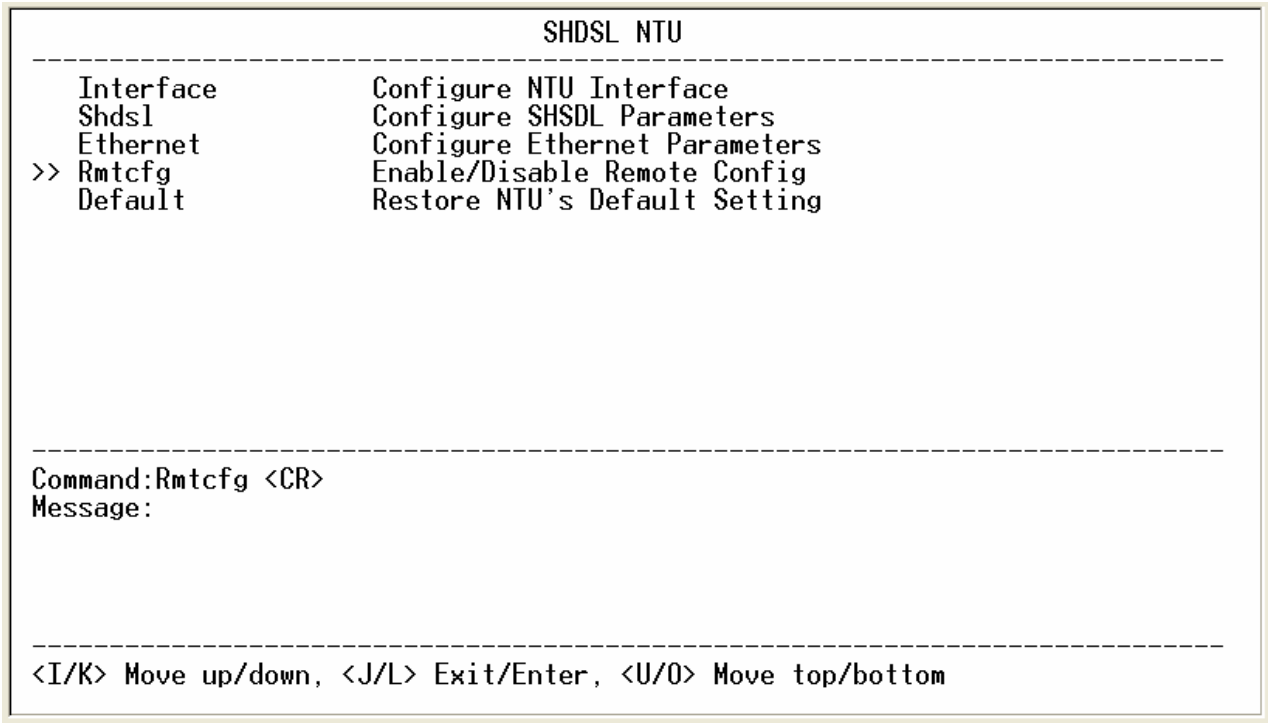
Setup Ethernet Parameter, Speed

```
                                SHDSL NTU
--------------------------------------------------------------------------------
   Rate                 Configure Ethernet Data Rate(N*64K)
   Auto                 Configure Ethernet Auto Config
   Duplex               Configure Ethernet Duplex
>> Speed                Configure Ethernet Speed









--------------------------------------------------------------------------------
Command:Speed <CR>
Message: Please input the following information.

Change Ethernet Speed (TAB Select) <100M>: 100M


--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

You can set up the Ethernet speed is 10Mbps or 100Mbps.

4.5.6 Enable and Disable Remote configuration

You can set the "Enable/Disable Remote Config Capability" to let the remote side can configure parameters to this device remotely.



4.5.7 Restore factory default setting

The UM-SN VER.2 NTU can have all settings restored to their original factory settings simply by going to the setting menu, selecting the Default item, and then press ENTER. The system will ask for a y(es) or n(o) confirmation followed by an ENTER.

```
                                SHDSL NTU
--------------------------------------------------------------------------------
   Interface           Configure NTU Interface
   Shdsl               Configure SHSDL Parameters
   Ethernet            Configure Ethernet Parameters
   Rmtcfg              Enable/Disable Remote Config
>> Default             Restore NTU's Default Setting









--------------------------------------------------------------------------------
Command:Default <CR>
Message: Please input the following information.

Are you sure? (y/n):


--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

When display DONE, it means that is restore suceesfully.

```
                                SHDSL NTU
--------------------------------------------------------------------------------
   Interface           Configure NTU Interface
   Shdsl               Configure SHSDL Parameters
   Ethernet            Configure Ethernet Parameters
   Rmtcfg              Enable/Disable Remote Config
>> Default             Restore NTU's Default Setting









--------------------------------------------------------------------------------
Command:Default <CR>
Message: Done_

Are you sure? (y/n): y


--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

The default vaules are as the following:

SHDSL	setup NTU Interface	E1
	setup NTU Type	STU-R
	setup Shdsl Annex	Annex-B
	setup Shdsl Psd	ASYM_DISABLE
	setup Shdsl Margin	0
	setup Shdsl Power BackOff	Disable
E1	setup E1 Channel	PCM31C
	setup E1 Slot Number	31
	setup E1 First Slot	1
	setup E1 code	HDB3
	setup E1 AIS	Off
	setup E1 Build Outs	120 Ohm
Serial	setup Serial Interface	V35
	setup Serial Data Rate	32
	setup Serial Clock	normal
	setup Serial Rts	on
	setup Serial Cts	from_rts
	setup Serial Dsr	on
	setup Serial Dcd	from_dsl
	setup Serial Delay	3
Ethernet	Setup Ethernet Rate	36
	setup Ethernet Auto Config	Enable Auto negotiate
	setup Ethernet Speed	Auto negotiate
	setup Ethernet Duplex	

4.6 [Status] View the system status

You can use the status command to view the status of SHDSL, E1, Serial and Interface as well as statistic and clear the statistic log. Select **status** and press [ENTER].

If the two sets of SHDSL NTU connection is ready, you can also view the remote side's statistic data.

```
                                SHDSL NTU
--------------------------------------------------------------------------------
   setup                Configure system
>> status               Show running system status
   show                 View system configuration
   reboot               Reset and boot system
   diag                 Diagnostic utility
   upgrade              Console software upgrade
   exit                 Quit system




--------------------------------------------------------------------------------
Command:status <more...> _
Message:



--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

4.6.1 Show SHDSL Status

Select **SHDSL** command to show the status of SHDSL.

```
                                SHDSL NTU
--------------------------------------------------------------------------------
>> Shdsl                Show SHDSL Status
   Interface            Show Interface Status
   Current Perf         Show Current Performamce
   Loc_statistics       Show Local Statistics
   Rmt_statistics       Show Remote Statistics
   clear                Clear Channel Statistics









--------------------------------------------------------------------------------
Command:Shdsl <CR> _
Message:




--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

You can see the following screen:

```
                                SHDSL  NTU
 -------------------------------------------------------------------------------
<Shdsl Status>
Channel                :          LocA                        RmtA
STU  Type              :  STU-C-INTCLK
DSL  Type              :         SHDSL
Line Rate(Kbps)        :             0
SNR Margin (dB)        :           0.0
Attenuation(dB)        :           0.0
Receiver Gain(dB)      :           0.0
Transmit Power(dBm)    :           0.0



Loopback State         :       Disable
Bert Test State        :       Disable
Bert Sync              :      Not Sync
Bert Error Count       :             0
Refresh counter:10, Press 'Ctrl+C' to quit...


 -------------------------------------------------------------------------------
 <I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

The SHDSL status will display a real-time status of the SHDSL on local side and remote side if the two NTUs have connected. The screen is refreshed about every 1.5 seconds. The monitoring window displays the SHDSL line parameters, such as Line Rate, SNR margin, attenuation and Receiver Gain, Transmit Power, Loopback and BERT status etc. The below side of window displays the loopback and BER test status.

Table of SHDSL Line rate vs. Data rate:

SHDSL Line rate	Data Rate (kbps)	
	Number of time slot for E1	Nx64K for Serial and Ethernet
2304(n=36)	Can't use	36
2240(n=35)	Can't use	35
2176(n=34)	Can't use	34
2112(n=33)	Can't use	33
2048(n=32)	32(unframed)	32
1984(n=31)	31	31
1920(n=30)	30	30
1856(n=29)	29	29
1792(n=28)	28	28
……..	……..	…
……..	……..	…
……..	……..	…
……..	……..	…
384(n=6)	6	6
320(n=5)	5	5
256(n=4)	4	4
192(n=3)	3	3
192(n=3)*	2	2
192(n=3)*	1	1

Note (*) : Due to SHDSL working line rate is start up from 192kbps(n=3) , all setting on all interface with apply 64kbps(n=1) and 128kbps(n=2) are actually using on 192kbps DSL line rate.

4.6.2 Show Interface Status

Select the Interface command to show the Interface status:

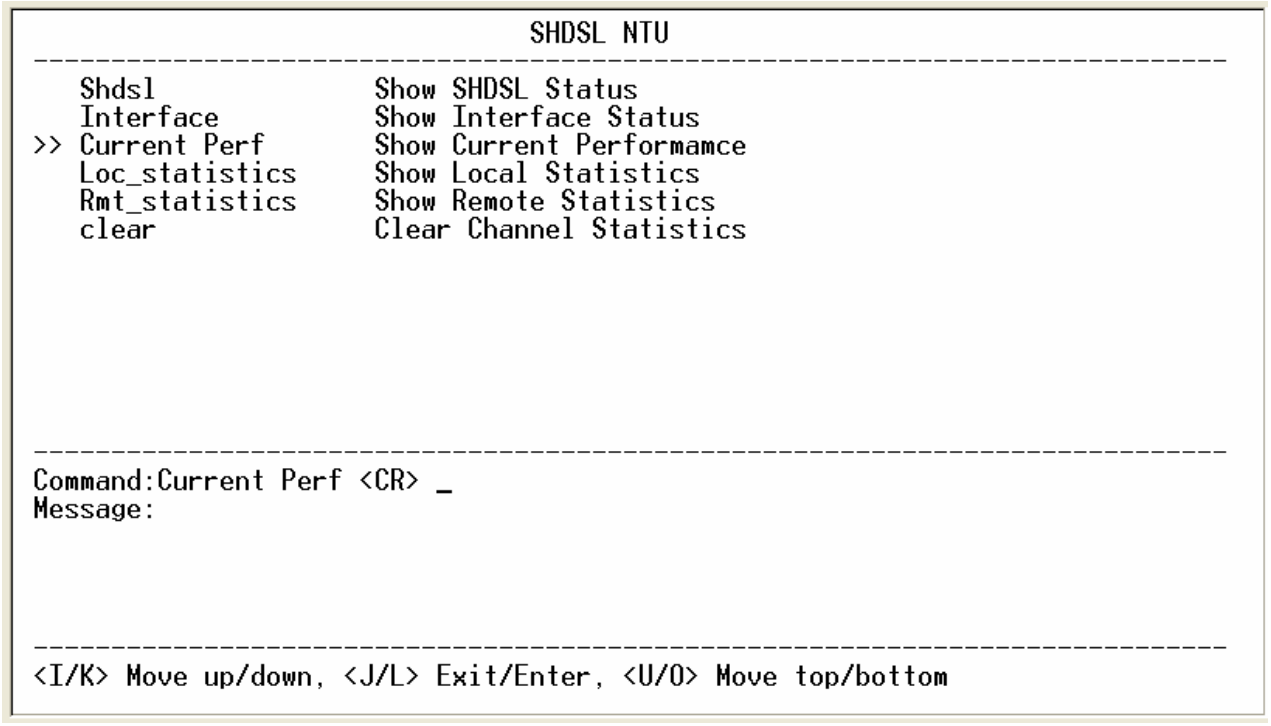
```
                                 SHDSL NTU
 ----------------------------------------------------------------------------
    Shdsl                 Show SHDSL Status
 >> Interface             Show Interface Status
    Current Perf          Show Current Performamce
    Loc_statistics        Show Local Statistics
    Rmt_statistics        Show Remote Statistics
    clear                 Clear Channel Statistics









 ----------------------------------------------------------------------------
 Command:Interface <CR> _
 Message:




 ----------------------------------------------------------------------------
 <I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

You can see all the interface status of E1, V.35 and Ethernet according which interface are you used. While in this display mode the terminal window will not timeout. To exit the window, press CTRL-C.

```
                                 SHDSL NTU
 ----------------------------------------------------------------------------
Channel                :          LocA                     RmtA
STU  Type              :         STU-R             STU-C-INTCLK
Interface              :            E1                       E1
E1 DataRate(Kpbs)      :          1984                     1984
E1 Sync                :          Down                     Down
E1 AIS Alarm           :            On                      Off

V35 DataRate(Kpbs)     :
V35 DCD                :
V35 DSR                :
V35 CTS                :
V35 RTS                :
V35 DRT                :

Eth DataRate(Kpbs)     :
Eth Link               :
Eth Speed              :
Eth Duplex             :

Refresh counter:10, Press 'Ctrl+C' to quit...
 ----------------------------------------------------------------------------
 <I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

4.6.3 Show Current Performance

Select Current Perf command to show the Current Performance.

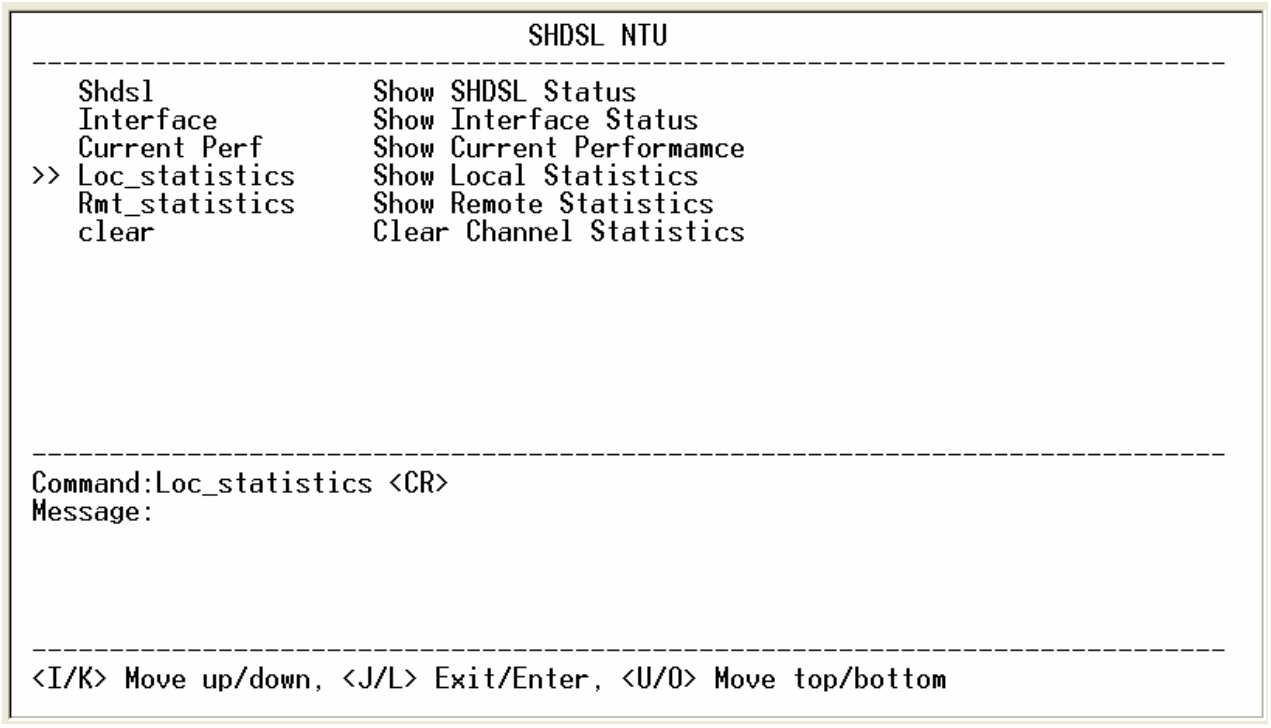


This window displays the accumulated performance data for the current 15 minute interval and for the current 24 hour interval. While in this display mode the terminal window will not timeout. To exit the window, press CTRL-C.

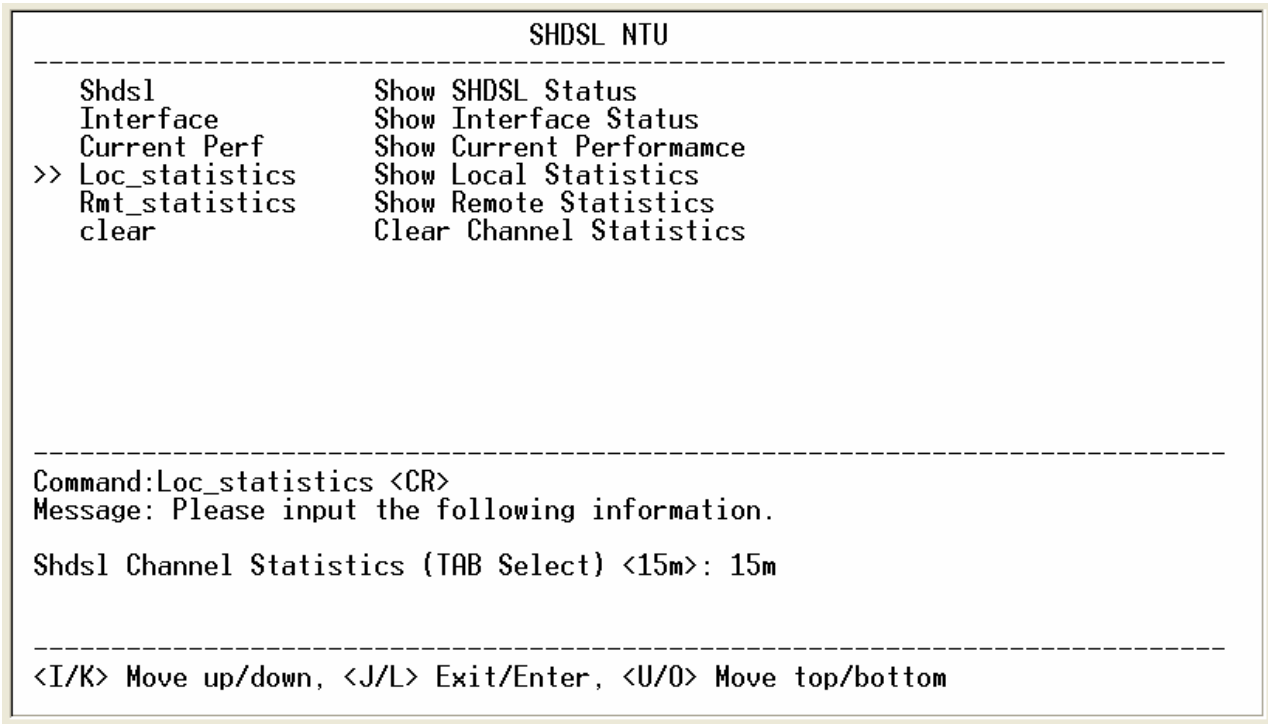
```
                                SHDSL NTU
 ------------------------------------------------------------------------------
Shdsl Performance
Channel                :          LocA                    RmtA
Interface              :            E1                E1 Serial
Current 15Min  ES      :             0                       0
               SES     :             0                       0
               UAS     :             0                       0
               LOSWS   :             0                       0
Current 24Hour ES      :             0                       0
               SES     :             0                       0
               UAS     :           114                    6041
               LOSWS   :             0                       0

E1 Performance
Current 15Min  ES      :             0                       0
               SES     :             0                       0
               UAS     :           647                     650
Current 24Hour ES      :             0                       0
               SES     :             0                       0
               UAS     :          1493                   14808
Refresh counter:1, Press 'Ctrl+C' to quit...
 ------------------------------------------------------------------------------
 <I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

4.6.4 View the Local and remote Statistics

Select **Loc_statistic** command to show the local side statistic information.



It also have 15 minutes or 24 hour via [TAB] to choose



The statistics display window will display performance monitor data for the selected interval (15 minutes or 24 hours).
The display will show the recorded results for ES (error seconds), SES(severely errored seconds), UAS (unavailable seconds), and LOSW (loss of sync word). While in this display mode the terminal window will not timeout. The 15 minute display window will display all the performance information for each 15 minute interval in the current 24 hour period. There are a total of 96 intervals.
Press the ENTER key to display the next page of intervals. To exit the window, press CTRL-C and then ENTER.

The performance monitor is capable of storing and retrieving performance information for each 24 hour interval, up to 7 days.

For **E1 Interface mode** , there have SHDSL and E1 item.

View the performance monitor data for the selected interval 15 minutes:

```
                                SHDSL NTU
 ------------------------------------------------------------------------------
Local                       SHDSL                        E1
                ------------------------         -----------------
15 Minute         ES     SES     UAS    LOSW        ES     SES    UAS
Current            0       0       8       0         0       0    358
Quarter   1        0       0       0       0         0       0      0
Quarter   2        0       0       0       0         0       0      0
Quarter   3        0       0       0       0         0       0      0
Quarter   4        0       0       0       0         0       0      0
Quarter   5        0       0       0       0         0       0      0
Quarter   6        0       0       0       0         0       0      0
Quarter   7        0       0       0       0         0       0      0
Quarter   8        0       0       0       0         0       0      0
Quarter   9        0       0       0       0         0       0      0
Quarter  10        0       0       0       0         0       0      0
Quarter  11        0       0       0       0         0       0      0
Quarter  12        0       0       0       0         0       0      0
Quarter  13        0       0       0       0         0       0      0
Quarter  14        0       0       0       0         0       0      0
More .... <CR>

 ------------------------------------------------------------------------------
 <I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

View the performance monitor data for the selected interval 1 day:

```
                                SHDSL NTU
 ------------------------------------------------------------------------------
Local                       SHDSL                        E1
                ------------------------         -----------------
24 Hour           ES     SES     UAS    LOSW        ES     SES    UAS
Current            0       0      34       0         0       0    659
Day   1            0       0       0       0         0       0      0
Day   2            0       0       0       0         0       0      0
Day   3            0       0       0       0         0       0      0
Day   4            0       0       0       0         0       0      0
Day   5            0       0       0       0         0       0      0
Day   6            0       0       0       0         0       0      0
Day   7            0       0       0       0         0       0      0

Press any key to Return Menu Window..._
 ------------------------------------------------------------------------------
 <I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

For **Serial and Ethernet Interface model**, there have only SHDSL item.

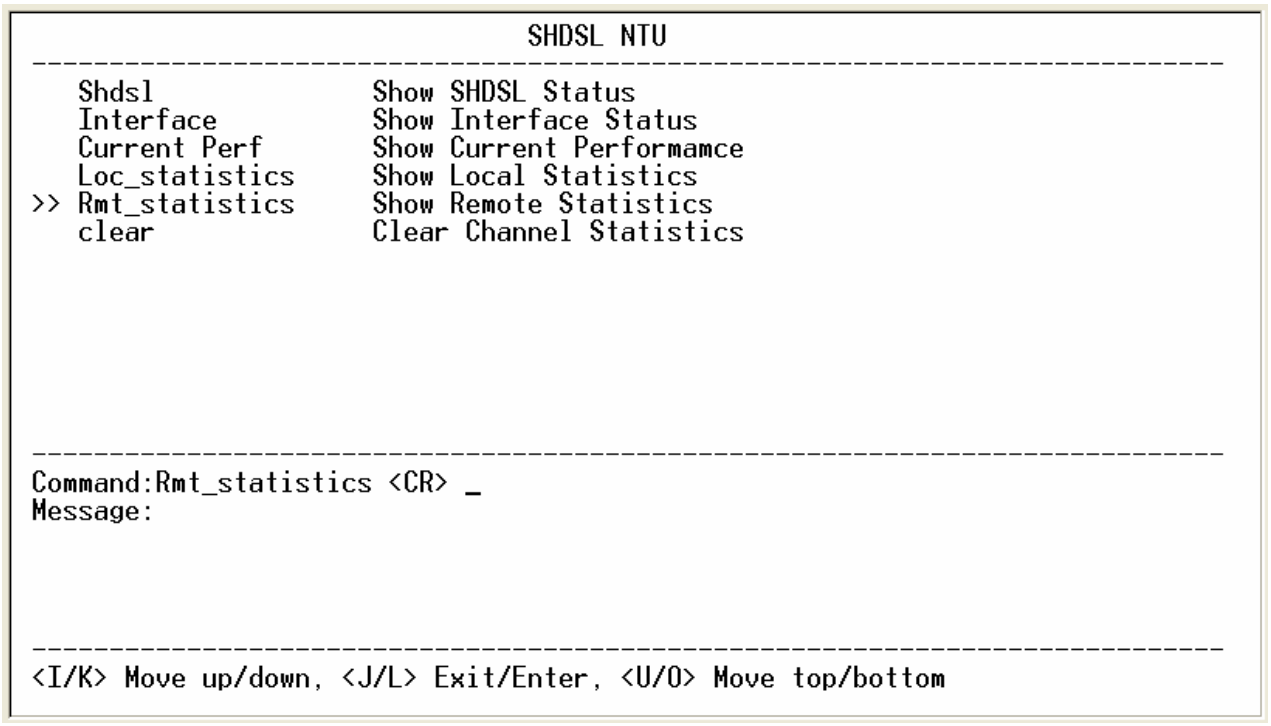
View the performance monitor data for the selected interval 15 minutes:

```
                                SHDSL NTU
 ----------------------------------------------------------------------------
Local                      SHDSL
               -------------------------
15 Minute        ES     SES     UAS    LOSW
Current          0       0      37      0
Quarter  1       0       0       0      0
Quarter  2       0       0       0      0
Quarter  3       0       0       0      0
Quarter  4       0       0       0      0
Quarter  5       0       0       0      0
Quarter  6       0       0       0      0
Quarter  7       0       0       0      0
Quarter  8       0       0       0      0
Quarter  9       0       0       0      0
Quarter 10       0       0       0      0
Quarter 11       0       0       0      0
Quarter 12       0       0       0      0
Quarter 13       0       0       0      0
Quarter 14       0       0       0      0
More .... <CR>
_
 ----------------------------------------------------------------------------
 <I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

View the performance monitor data for the selected interval 1 day:

```
                                SHDSL NTU
 ----------------------------------------------------------------------------
Local                      SHDSL
               -------------------------
24 Hour          ES     SES     UAS    LOSW
Current          0       0      80      0
Day  1           0       0       0      0
Day  2           0       0       0      0
Day  3           0       0       0      0
Day  4           0       0       0      0
Day  5           0       0       0      0
Day  6           0       0       0      0
Day  7           0       0       0      0






Press any key to Return Menu Window...
 ----------------------------------------------------------------------------
 <I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

If you want to show the remote side's statistics, please use the Rmt-statistics function as the following.



The following are commonly used acronyms:

ES	Number of error seconds in which one or more CRC (Cyclic Redundancy Check) error events occurred during the current interval. This value is updated every time.
UAS	Number of unavailable seconds in which a failed signal occurred during the current interval. This value is updated every time.
SES	Number of severely errored seconds in which 832 or more CRC error events occurred during the current interval. This value is updated every time.
LOSW	Number of seconds with loss of sync word during the current interval. This value is updated every time.

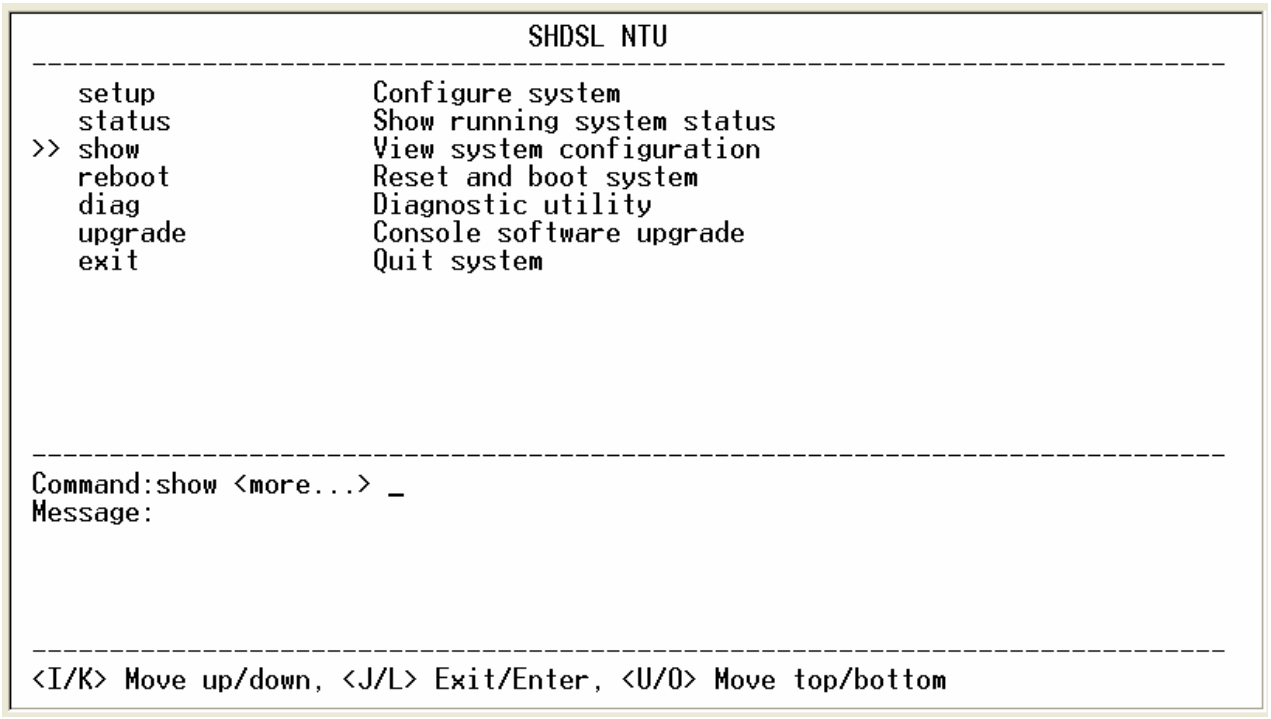
4.6.5 Clear Channel Statistics

If you want clear the statistics log data, please select clear command and choose **Local**, **Remote** or **Both side** to clear.

```
                                SHDSL NTU
------------------------------------------------------------------------------
   Shdsl               Show SHDSL Status
   Interface           Show Interface Status
   Current Perf        Show Current Performamce
   Loc_statistics      Show Local Statistics
   Rmt_statistics      Show Remote Statistics
>> clear               Clear Channel Statistics









------------------------------------------------------------------------------
Command:clear <CR>
Message: Please input the following information.

Input the channel to clear (TAB Select) <Local>: Local_


------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

4.7 [Show] View System Configuration

By using show command, you can view the system configuring. Select **show** and press [ENTER] or [RIGHT].



4.7.1 Show general Interface

To show system information, please select **system** and press [ENTER] or [RIGHT]. The screen will prompt the system information.

```
                              SHDSL NTU
--------------------------------------------------------------------------
>> System              Show General Information
   Config              Show Configuration
   Script              Show Configuration in Command Script









--------------------------------------------------------------------------
Command:System <CR> _
Message:




--------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

The cursor is already on the **System** command, so press ENTER and the following screen will display the general system information.

```
                              SHDSL NTU
--------------------------------------------------------------------------
<System Info Window>
                     Local Side                    Remote Side
                ===================           ======================
 Model          :            5030G V2                        5030G V2
 Sw Version     :                0.33                            0.33
 FPGA Version   :                0.10                            0.10
 CPU            :      Winbond W90N740                 Winbond W90N740
 RAM            :                 8MB                             8MB
 FLASH          :                 2MB                             2MB
 Dsp Version    :              R3.1.1                          R3.1.1
 SerialNo       :         BKLM1234ABCD                    BKLM1234ABCD
 System MCSV    :   1537-0000-10011244              1537-0000-10011244
 Kernel MCSV    :   1537-0012-03313AE1              1537-0012-03413AE3
 FPGA   MCSV    :   1388-0012-01013ADE              1388-0012-01013ADE
 System Live Time  : 0 Day/ 0Hour/ 48Min /44 Secs






--------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

Most of the information on this screen is either self explanatory or it is simply irrelevant for the end user. However, two items, the Kernel (SW Version) and FPGA (Field Programmable Gate Array) version will give the software and hardware versions respectively of NTU. These are important to know in case new firmware becomes available in the future to add extra functions of to fix unknown bugs from the original manufactured equipment.

4.7.2 Show configuration in listing format

To show the system configuration, please select **Config** and press [ENTER] or [RIGHT]. The screen will prompt the all configuration data.

For E1 interface model:

```
                                SHDSL NTU
 ------------------------------------------------------------------------------
Showing System Configuration...
setup NTU  Interface       :            E1
setup NTU  Type            :         STU-R
setup Shdsl Annex          :       Annex-B
setup Shdsl Psd            :           SYM
setup Shdsl Margin         :            21
setup Shdsl Power BackOff  :       Disable
setup E1 Channel           :          FULL
setup E1 Slot Number       :            32
setup E1 First Slot        :             1
setup E1 Code              :          HDB3
setup E1 AIS               :           Off
setup E1 Build Outs        :       120 Ohm
Press any key to Return Menu Window...
```

For Serial interface model:

```
                                SHDSL NTU
 ------------------------------------------------------------------------------
Showing System Configuration...
setup NTU  Interface       :        Serial
setup NTU  Type            :         STU-R
setup Shdsl Annex          :       Annex-B
setup Shdsl Psd            :           SYM
setup Shdsl Margin         :            21
setup Shdsl Power BackOff  :       Disable
setup Serial Interface     :           V35
setup Serial Data Rate     :            32
setup Serial Clock         :        normal
setup Serial Rts           :            on
setup Serial Cts           :      from_rts
setup Serial Dsr           :            on
setup Serial Dcd           :      from_dsl
setup Serial Delay         :             3
Press any key to Return Menu Window..._
```

For Ethernet interface model:

```
                                SHDSL NTU
 ------------------------------------------------------------------------------
Showing System Configuration...
setup NTU  Interface        :      Ethernet
setup NTU  Type             :         STU-R
setup Shdsl Annex           :       Annex-B
setup Shdsl Psd             :           SYM
setup Shdsl Margin          :            21
setup Shdsl Power BackOff   :       Disable
setup Ethernet Auto Config  :        Enable
setup Ethernet Speed        :          100M
setup Ethernet Duplex       :   Full-Duplex
setup Ethernet Rate         :            36
Press any key to Return Menu Window..._
```

For E1 and Serial interface model:

```
                                SHDSL NTU
 ------------------------------------------------------------------------------
Showing System Configuration...
setup NTU  Interface        :     E1 Serial
setup NTU  Type             :         STU-R
setup Shdsl Annex           :       Annex-B
setup Shdsl Psd             :           SYM
setup Shdsl Margin          :            21
setup Shdsl Power BackOff   :       Disable
setup E1 Channel            :         PCM31
setup E1 Slot Number        :            24
setup E1 First Slot         :             1
setup E1 Code               :          HDB3
setup E1 AIS                :           Off
setup E1 Build Outs         :       120 Ohm
setup Serial Interface      :           V35
setup Serial Data Rate      :            32
setup Serial Clock          :        normal
setup Serial Rts            :            on
setup Serial Cts            :      from_rts
setup Serial Dsr            :            on
setup Serial Dcd            :      from_dsl
setup Serial Delay          :             3
Press any key to Return Menu Window..._
```

For E1 and Ethernet interface model:

```
                                SHDSL NTU
 ------------------------------------------------------------------------------
Showing System Configuration...
setup NTU  Interface        :   E1 Ethernet
setup NTU  Type             :         STU-R
setup Shdsl Annex           :       Annex-B
setup Shdsl Psd             :           SYM
setup Shdsl Margin          :            21
setup Shdsl Power BackOff   :       Disable
setup E1 Channel            :         PCM31
setup E1 Slot Number        :            24
setup E1 First Slot         :             1
setup E1 Code               :          HDB3
setup E1 AIS                :           Off
setup E1 Build Outs         :       120 Ohm
setup Ethernet Auto Config  :        Enable
setup Ethernet Speed        :          100M
setup Ethernet Duplex       :   Full-Duplex
setup Ethernet Rate         :            36
Press any key to Return Menu Window..._
```

4.7.3 Show configuration in command script

To show the system script file, please select **Script** and press [ENTER] or [RIGHT]. The screen will prompt the configuration in script type.

```
                                SHDSL NTU
 ------------------------------------------------------------------------------
    System              Show General Information
    Config              Show Configuration
 >> Script              Show Configuration in Command Script









 ------------------------------------------------------------------------------
 Command:Script <CR>
 Message:



 ------------------------------------------------------------------------------
 <I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

For E1 interface model:

```
                                SHDSL NTU
 ------------------------------------------------------------------------------
<Script Window>

setup mode STU-R
setup Shdsl Interface E1
setup Shdsl Annex Annex-B
setup Shdsl Psd SYM
setup Shdsl Margin 3
setup Shdsl Pwr Backoff Disable
setup E1 Channel FULL
setup E1 code HDB3
setup E1 ais Off
setup E1 build_outs 120 Ohm
Press any key to Return Menu Window..._
```

For Serial interface model:

```
                                SHDSL NTU
 ------------------------------------------------------------------------------
<Script Window>

setup mode STU-R
setup Shdsl Interface Serial
setup Shdsl Annex Annex-B
setup Shdsl Psd SYM
setup Shdsl Margin 3
setup Shdsl Pwr Backoff Disable
setup Serial Interface V35
setup Serial Data Rate 32
setup Serial Clock normal
setup Serial Rts on
setup Serial Cts from_rts
setup Serial Dsr on
setup Serial Dcd from_dsl
setup Serial Delay 3
Press any key to Return Menu Window..._
```

For Ethernet interface model:

```
                                SHDSL NTU
 ------------------------------------------------------------------------------
<Script Window>

setup mode STU-R
setup Shdsl Interface Ethernet
setup Shdsl Annex Annex-B
setup Shdsl Psd SYM
setup Shdsl Margin 3
setup Shdsl Pwr Backoff Disable
setup Ethernet Rate 36
setup Ethernet Auto Enable
setup Ethernet Duplex Full-Duplex
setup Ethernet Speed 100M
Press any key to Return Menu Window...
```

For E1 and Serial interface model:

```
                                    SHDSL NTU
 ------------------------------------------------------------------------------
<Script Window>

setup mode STU-R
setup Shdsl Interface E1 Serial
setup Shdsl Annex Annex-B
setup Shdsl Psd SYM
setup Shdsl Margin 3
setup Shdsl Pwr Backoff Disable
setup E1 Channel PCM31 24  1
setup E1 code HDB3
setup E1 ais Off
setup E1 build_outs 120 Ohm
setup Serial Interface V35
setup Serial Data Rate 32
setup Serial Clock normal
setup Serial Rts on
setup Serial Cts from_rts
setup Serial Dsr on
setup Serial Dcd from_dsl
setup Serial Delay 3
Press any key to Return Menu Window..._
```

For E1 and Ethernet interface model:

```
                                    SHDSL NTU
 ------------------------------------------------------------------------------
<Script Window>

setup mode STU-R
setup Shdsl Interface E1 Ethernet
setup Shdsl Annex Annex-B
setup Shdsl Psd SYM
setup Shdsl Margin 3
setup Shdsl Pwr Backoff Disable
setup E1 Channel PCM31 24  1
setup E1 code HDB3
setup E1 ais Off
setup E1 build_outs 120 Ohm
setup Ethernet Rate 36
setup Ethernet Auto Enable
setup Ethernet Duplex Full-Duplex
setup Ethernet Speed 100M
Press any key to Return Menu Window..._
```

4.8 [Reboot] Reboot the system

In main menu, move the cursor to **reboot** and press [ENTER]. The device will reboot after confirming.

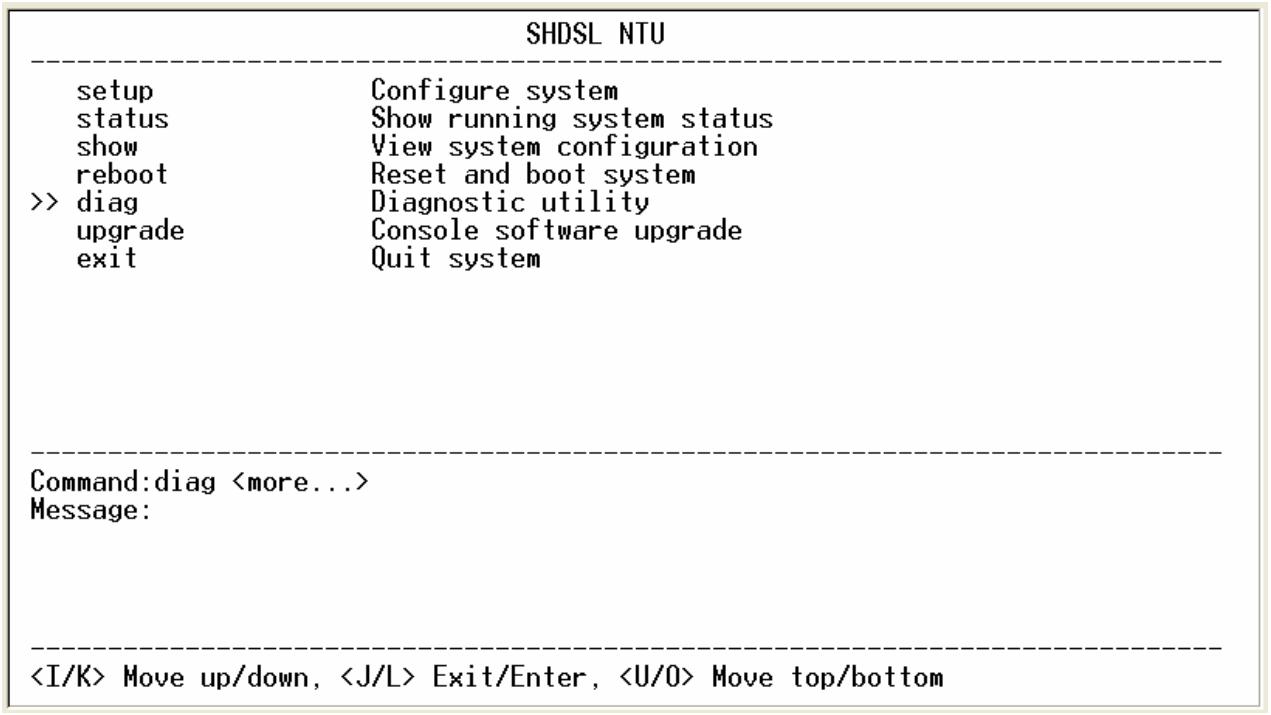
```
                                SHDSL NTU
--------------------------------------------------------------------------------
   setup                Configure system
   status               Show running system status
   show                 View system configuration
>> reboot               Reset and boot system
   diag                 Diagnostic utility
   upgrade              Console software upgrade
   exit                 Quit system




--------------------------------------------------------------------------------
Command:reboot <CR>
Message: Please input the following information.

Do you want to reboot? (y/n): y_


--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

After the reboot operation have finished, RAM test are starting again.

```
                                SHDSL NTU
--------------------------------------------------------------------------------
   setup                Configure system
   status               Show running system status
   show                 View system configuration
>> reboot               Reset and boot system
   diag                 Diagnostic utility
   upgrade              Console software upgrade
   exit                 Quit system




--------------------------------------------------------------------------------
Command:reboot <CR>
Message: Please input the following information.

 Do you want to reboot? (y/n): y
00800000 Ram Ok

--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

4.9 [Diag] Diagnostic – Loopback and BER Test

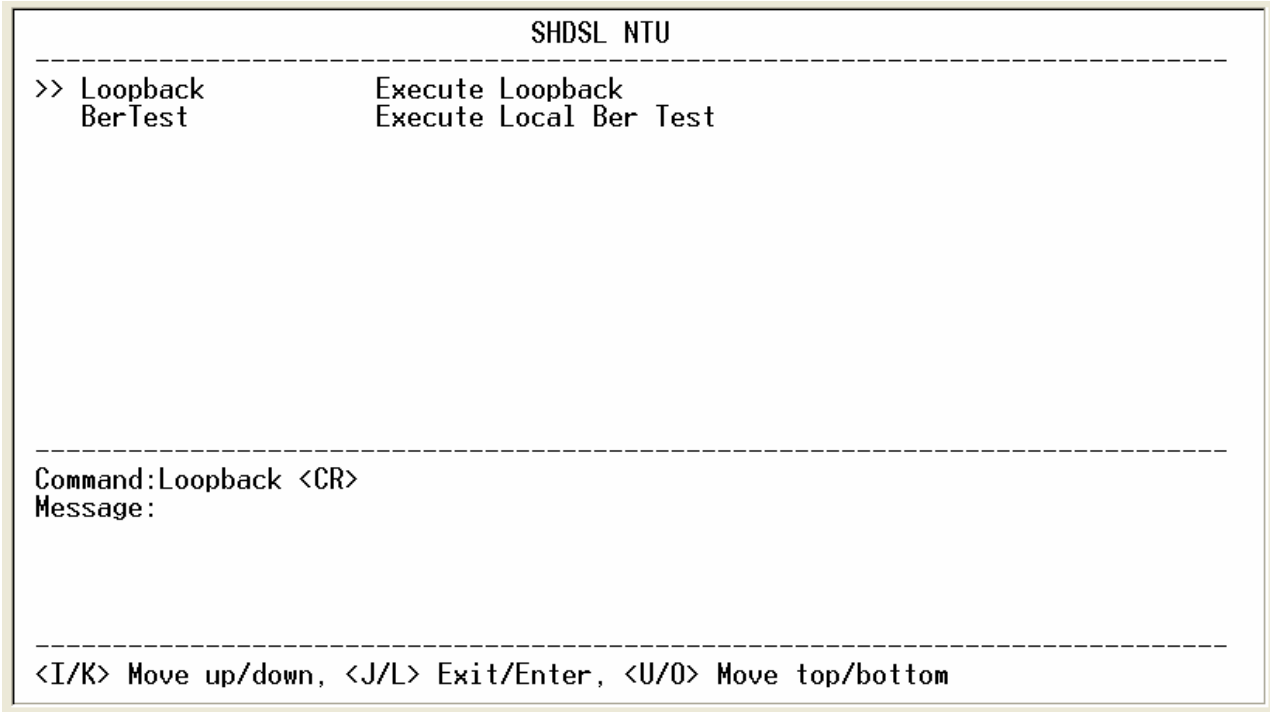
The diagnostic facility allows you to test the different aspects of your UM-SN VER.2 NTU to determine if it is working properly. Select **diag** and press [ENTER] .



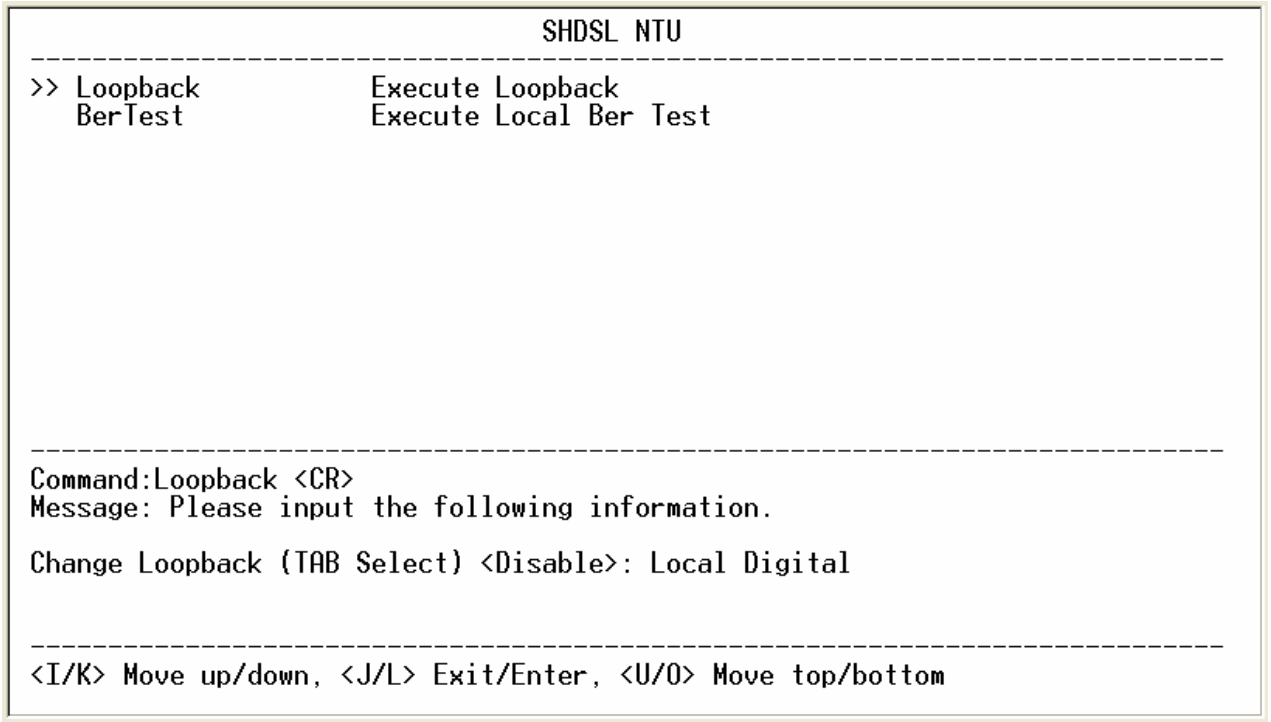
4.9.1 Loopback test

Loopback can test whether the NTU is properly worked with the connection device.

Press [ENTER] or [RIGNT] to setup the loopback.



The loopback screen is as following:



For more information about those loopback functions, please refer the Keypads and LCD setting chapter.

4.9.2 BER Test

The product supports Bit Error Rate Testing (BERT). To configure the BERT, move the cursor to BerTest and press [ENTER] or [RIGHT].

```
                                SHDSL NTU
--------------------------------------------------------------------------------
   Loopback             Execute Loopback
>> BerTest             Execute Local Ber Test









--------------------------------------------------------------------------------
Command:BerTest <CR> _
Message:



--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

The BER Test screen is as following:

```
                                SHDSL NTU
--------------------------------------------------------------------------------
Monitoring Window...BER Test

Test Pattern            :          2047
Time Elapsed            :           101
Pattern Sync            :          Sync
Bit Error Count         :           275









Refresh counter:51, Press 'Ctrl+C' to quit..._
--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

The UM-SN VER.2 NTU includes an internal Bit Error Rate Tester (BERT) for complete testing of local and remote modem and the link quality without any need for external test equipment. This built-in Bit Error Rate Test generator can generates a standard 2047 (2^{11}-1) test pattern (Pseudorandom test pattern, 2047 bits in length).

Test Pattern 2047	Use the standard 2047 (2^{11}-1) test
Time Elapsed	pattern
Pattern Framing	Show the time elapsed count
Bit Error Count	Show the linking is **sync** or **no sync**
Refresh counter	Show the bit error counter
	Page refresh counter

You can press CTRL-C to quit this page anytime.

4.10 [Upgrade] firmware upgrade

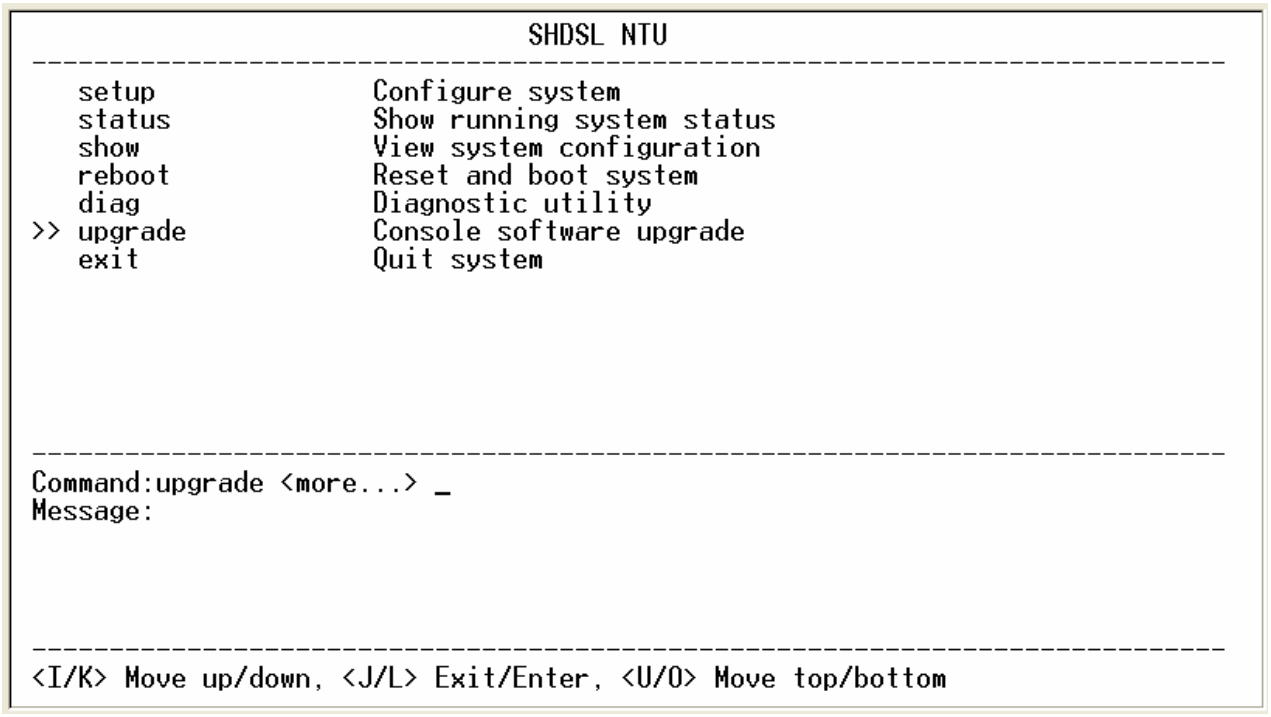
This section will introduce how to upgrade the kernel and FPGA code of UM-SN VER.2 NTU. Select **upgrade** in main menu and press [ENTER] or [RIGHT].

Please notice that when you use Remote Upgrade feature. It means you can use those feature to update firmware to remote side. It will describe below.

During on upgrade and re-flash, the normal transmissions will be halted, so the upgrade should be done when the system is taken offline or done during a time of extremely low impact to the customer's line.

The upgrade process uses the Xmodem protocol via the rear panel's serial console port.

Following show the upgrade feature:



Before upgrading the SHDSL NTU, make sure you have the Kernel code and FPGA code files in your computer.

When you upgrade the kernel code, select the **Kernel** item and press [ENTER] or [RIGHT].

```
                                SHDSL NTU
--------------------------------------------------------------------------------
>> Kernel              Upgrade main software
   Fpga                Upgrade FPGA code
   Rmt Kernel          Upgrade the remote's main software
   Rmt FPGA            Upgrade the remote's FPGA code









--------------------------------------------------------------------------------
Command:Kernel <CR>
Message:



--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

Click Send file in terminal access program, hyper terminal, to send the file. Make sure the sending protocol is **Xmodem**. Select the source file in window and press OK.

When it was upgrading, you can see as following:

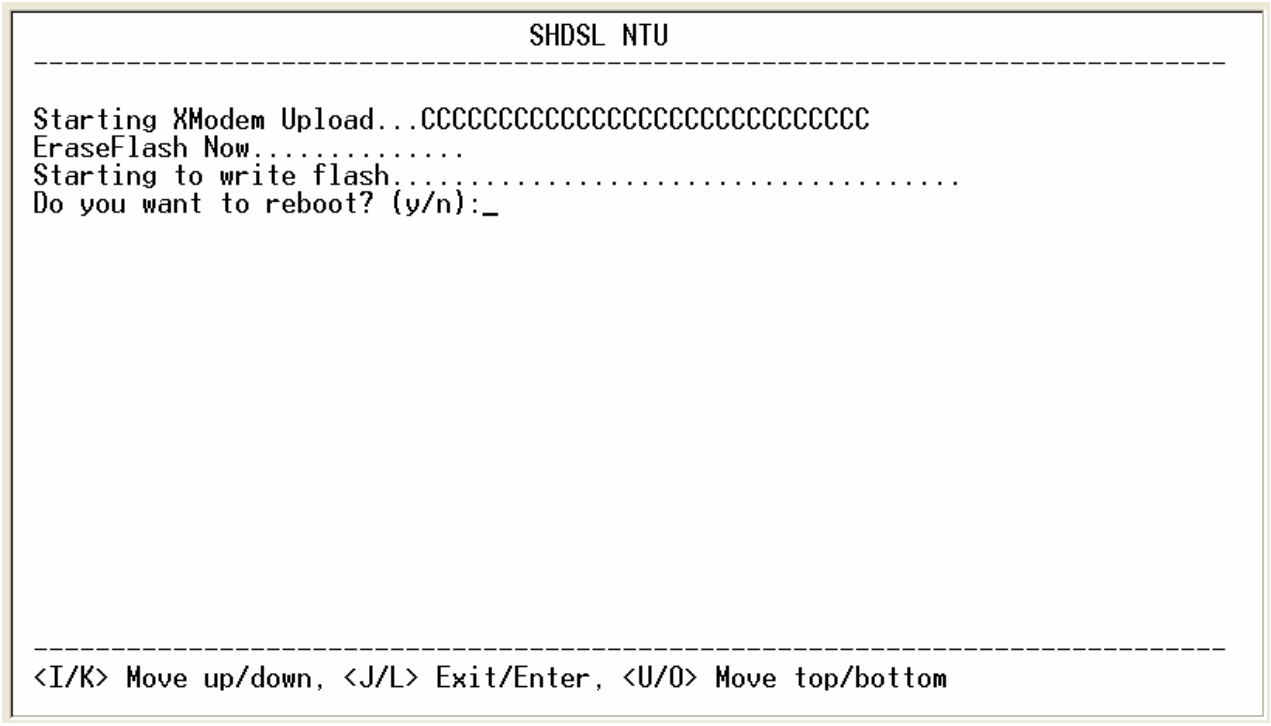
```
                                SHDSL NTU
--------------------------------------------------------------------------------

Starting XModem Upload...CCCCCCC









--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

If you want to upgrade the FPGA code, select **FPGA** item and press [ENTER] or [RIGHT].

```
                                SHDSL NTU
--------------------------------------------------------------------------------
   Kernel              Upgrade main software
>> Fpga                Upgrade FPGA code
   Rmt Kernel          Upgrade the remote's main software
   Rmt FPGA            Upgrade the remote's FPGA code









--------------------------------------------------------------------------------
Command:Fpga <CR>
Message:



--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

When it was upgrading, you can also see as following:

```
                                SHDSL NTU
--------------------------------------------------------------------------------

Starting XModem Upload...CCCCCCC









--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```



Once the upgrade is complete, there required to male the final confirmation to erase and re-write the flash with new code. After the upgrade produces is finish, you can reboot the system starting to use the new firmware version.

If the local side and remote side have connected, you can use the remote side firmware upgrade function.

Below showed is the remote upgrade feature:

Remote upgrade - Kernel

```
                                SHDSL NTU
--------------------------------------------------------------------------------
   Kernel               Upgrade main software
   Fpga                 Upgrade FPGA code
>> Rmt Kernel          Upgrade the remote's main software
   Rmt FPGA             Upgrade the remote's FPGA code









--------------------------------------------------------------------------------
Command:Rmt Kernel <CR> _
Message:



--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

Remote upgrade - FPGA

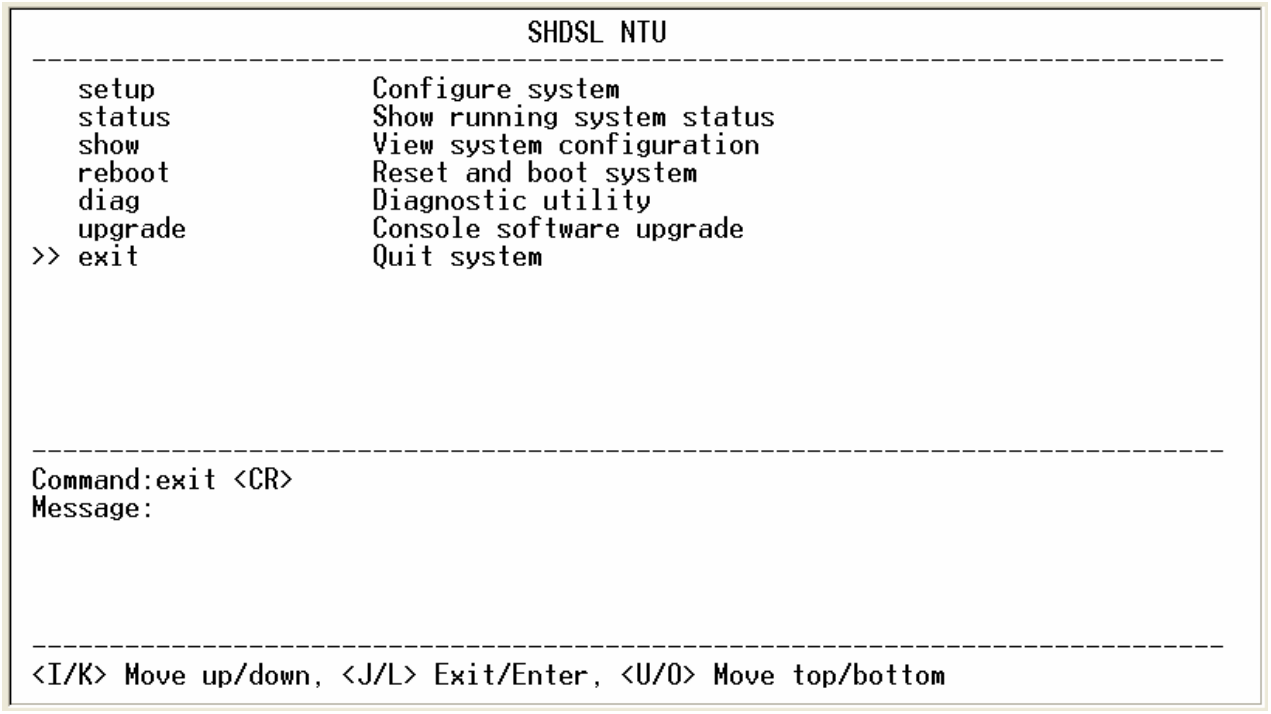
```
                                SHDSL NTU
--------------------------------------------------------------------------------
   Kernel               Upgrade main software
   Fpga                 Upgrade FPGA code
   Rmt Kernel           Upgrade the remote's main software
>> Rmt FPGA            Upgrade the remote's FPGA code









--------------------------------------------------------------------------------
Command:Rmt FPGA <CR> _
Message:



--------------------------------------------------------------------------------
<I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

Before upgrading the NTU, you must have the Kernel code file and FPGA code file in your computer.

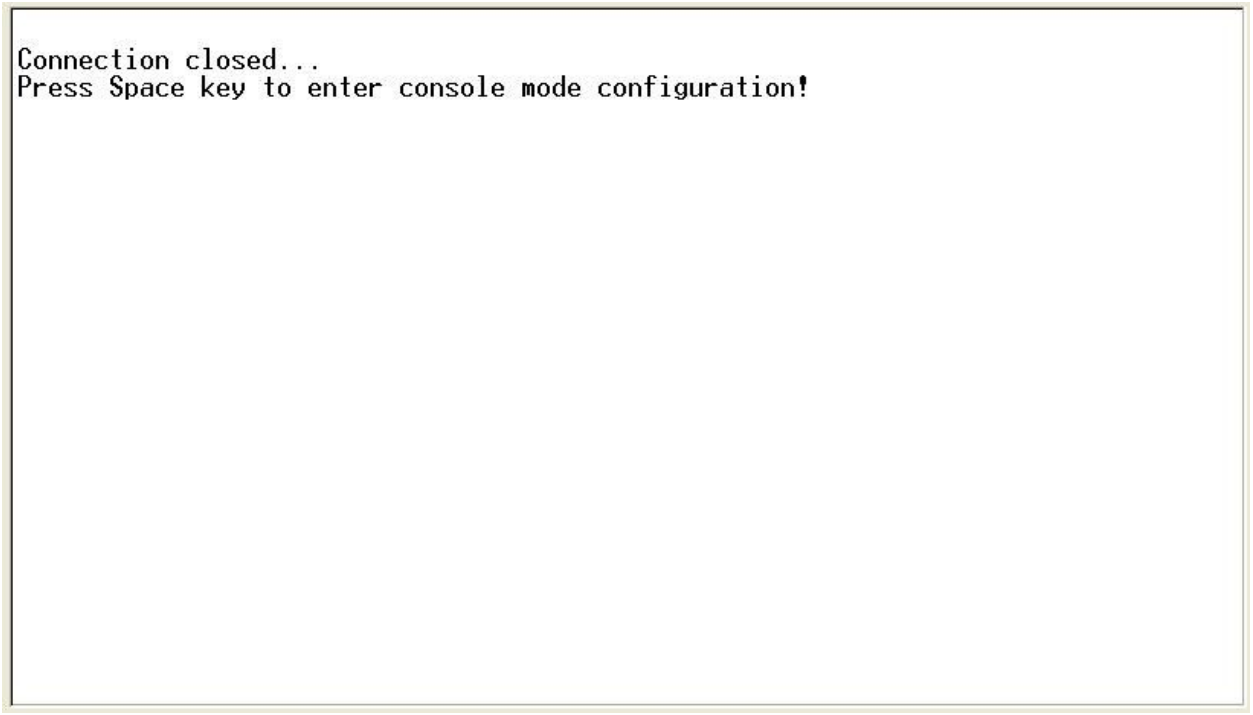
WARNING!!: Do not allow any interruption of power during the erase and re-write operation or the Flash will be left in an unknown state and the device will no longer be able to function. The device must then be returned to the factory for repair.

4.11 [Exit] Exit the system

For exiting the system, you can use **exit** command to exit. Select **exit** in main menu and press [ENTER] or [RIGHT]. Answer y(es) to confirm.



After press [ENTER], they will be disconnected.



When it have disconnected, we can see the close screen. You can press Space key to restart the display.

The new login screen will show again, you can type username and password again to re-enter this system.

5 Appendix

5.1 Abbreviation

AIS	Alarm Indication Signal
AMI	Alternate mark inversion
ASYM	Asymmetric
ATM	Asynchronous Transfer Mode
B8ZS	Bipolar with 8 zero substitution
BER	Bit error rate
BERT	Bit Error Rate Tester
BNC	Bayonet Nut Coupling Bayonet Neill-Concelman Barrel Nut Connector Bayonet Nipple Connector Bayonet Navy Connector Baby N Connector
bps	Bits per second
CAS	Channel Associated Signaling
CEPT	European Conference of Postal and Telecommunications Administrations.
CERR	CRC Errors
CO	Central Office
CPE	Customer Premises Equipment
CPU	Central processing unit
CRC	Cyclic redundancy check
CRC4	Cyclic redundancy check 4 bit
CRS	Carrier Sense
CSU	Channel service unit
CTS	Clear to send
DCD	Data carrier detect
DCE	Data communication equipment
DSL	Digital subscriber loop
DSR	Data set ready

DSLAM	DSL Access Multiplexer
DTE	Data terminal equipment
DTR	Data terminal ready
E BIT GEN	Remote End Block Error Bit generation
EOC	Embedded operations channel
ES	Number of Error second (Errors/Second)
ESF	Extended super frame
ETSI	European Telecommunications Standardization Institute
FAS	Frame alignment signal
FCS	Frame Check Sequence
HDB3	High-Density Bipolar of order 3
HDLC	High-Level Data Link Control
HEC	Header error check
I/F	Interface
ITU	International Telecommunication Union
ITU-T	ITU-Telecommunication Standardization Sector
LBO	Line Build Out
LIU	Line Interface Unit
LOC	Loss of Connection
LOF	Loss of frame
LOS	Loss of signal
LOSW	Loss of synchronization word
LTU	Line Termination Unit
MAS	Multi-frame Alignment Sequence (CAS Format)
MFAS	Multi-frame Alignment Sequence (CRC4 Format)
MHz	Megahertz
NI	Network Interface
NRZ	Non-Return to Zero
NTU	Network Termination Unit
PABX	Private Automatic Branch Exchange
PAM	Pulse Amplitude Modulation
PLL	Phase-locked loop
POTS	Plain Old Telephone Service
PRBS	Pseudo-Random Bit Sequence
PSD	Power spectral density
QRSS	Quasi-Random Signal Source
RAI	Remote alarm indication
RESYNC	Resynchronization

RJ-45	Registered Jack-45
RTS	Request to send
RX	Receiver
SES	Number of Severely error seconds (more than 832 CRC errors / second. Approximately equivalent to a bit error rate of 1 x 10^{-3}
SDLC	Synchronous data Link Control
SF	Super Frame
SHDSL	Symmetric High-Bitrate Digital Subscriber Loop
SLC	Subscriber Loop Carrier
SMF	Sub-Multi frame
SNA	System Network Architecture
SNR MARGIN	Signal to noise ration margin
STU	SHDSL Terminal Unit
STU-C	SHDSL Terminal Unit - Central office side
STU-R	SHDSL Terminal Unit - Remote side
STU-C-INTCLK	STU-C internal clock
STU-R-EXTCLK	STU-R external clock
SYM	Symmetric
SYNC	Synchronization
TC-PAM	Trellis Coded Pulse Amplitude Modulation
TDM	Time Division Multiplexing
TPS-TC	Transmission Protocol Specific TC layer
TX	Transmitter
Tx Power	Transmission power
UAS	Unavailable second
UI	User interface
WAN	Wide Area Network
xDSL	"Any" DSL , (ADSL , HDSL ,SHDSL or VDSL etc)

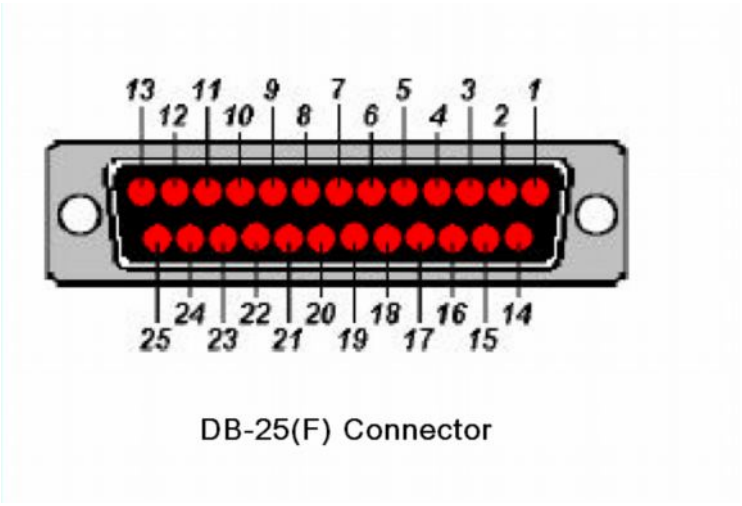
5.2 Serial Interface Pin Assignments

The table below displays Serial Interface Pin Assignments for the DCE Mode

.

Function	Abbrev.	Direction	RS-530 DB-25(F)	V.35 M.34(F)	X.21 DB-15(F)
Frame Ground	FG	N/A	1	A	1
Transmit Data	TD	Input	2	P	2
Receive Data	RD	Output	3	R	4
Request to Send	RTS	Input	4	C	3
Clear to Send	CTS	Output	5	D	
Data Set Ready	DSR	Output	6	E	
Signal Ground	SG	N/A	7	B	8
Data Carrier Detect	DCD	Output	8	F	5
Secondary Receiver Clock	(S)RC	Output	9	X	13
Secondary Data Carrier Detect	(S)DCD	Output	10		12
Secondary External Transmitter Clock	(S)ETC	Input	11	W	7
Secondary Transmitter Clock	(S)TC	Output	12	AA	
Secondary Clear to Send	(S)CTS	Output	13		
Secondary Transmit Data	(S)TD	Input	14	S	9
Transmitter Clock	TC	Output	15	Y	
Secondary Receive Data	(S)RD	Output	16	T	11
Receiver Clock	RC	Output	17	V	6
Local Loopback			18		
Secondary Request to Send	(S)RTS	Input	19		10
Data Terminal Ready	DTR	Input	20	H	
Remote Loopback			21		
Secondary Data Set Ready	(S)DSR	Output	22		
Secondary Data Terminal Ready	(S)DTR	Input	23		
External Transmitter Clock	ETC	Input	24	U	14
Test Indicator			25		

The front view of DB-25(F) Serial interface connector on rear panel:



DB-25(F) Connector

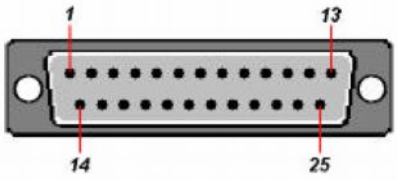
5.3 V.35 DB25(M) to M.34(F) adaptor Cable

If the DTE (Data Terminal Equipment) connector is using 34-pin Winchester type, we must use the cable adaptor from DB-25 to Winchester (M.34).

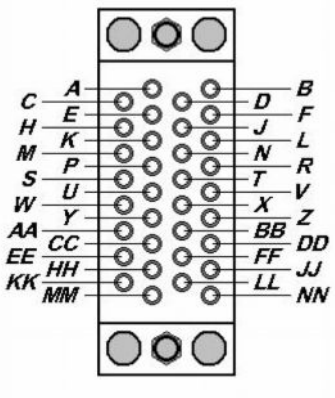
The pin out of cable on DB-25(male) Connector to M.34(female) Connector

DB-25 Pin	Signal	M.34 Pin	Description
2	TD	P	Transmit Data
14	TD	S	Transmit Data
3	RD	R	Receive Data
16	RD	T	Receive Data
4	RTS	C	Ready To Send
5	CTS	D	Clear To Send
6	DSR	E	Data Set Ready
20	DTR	H	Data Terminal Ready
24	XTC	U	DTE Transmit Clock
11	XTC	W	DTE Transmit Clock
15	TC	Y	Transmit Clock
12	TC	AA	Transmit Clock
17	RC	V	Receive Clock
9	RC	X	Receive Clock
1	FGND	A	Protective Ground
7	GND	B	Signal Ground
8	DCD	F	Data Carrier Detect

The front view of DB-25(M) connector and V.35(F) connector on this cable:



DB-25(M) connector



M.34(F) connector

V.35 interface (34-pin Winchester type) contains the following signals:

Pin	Signal	Abbr.	DTE	DCE
A	Chassis Ground	FGND	---	---
B	Signal Ground	GND	---	---
C	Request To Send	RTS	Out	In
D	Clear To Send	CTS	In	Out
E	Data Set Ready	DSR	In	Out
F	Data Carrier Detect	DCD	In	Out
H	Data Terminal Ready	DTR	Out	In
J	Unassigned			
K	Unassigned			
L	Unassigned			
M	Unassigned			
N	Unassigned			
P	Send Data A	SD(A)	Out	In
R	Receive Data A	RD(A)	In	Out
S	Send Data B	SD(B)	Out	In
T	Receive Data B	RD(B)	In	Out
U	Terminal Timing A	SCTE(A)	Out	In
V	Receive Timing A	SCR(A)	In	Out
W	Terminal Timing B	SCTE(B)	Out	In
X	Receive Timing B	SCR(B)	In	Out
Y	Send Timing A	SCT(A)	In	Out
Z	Unassigned			
AA	Send Timing B	SCT(B)	In	Out
BB	Unassigned			
CC	Unassigned			
DD	Unassigned			
EE	Unassigned			
FF	Unassigned			
HH	Unassigned			
JJ	Unassigned			
KK	Unassigned			
LL	Unassigned			
MM	Unassigned			
NN	Unassigned			

V.35 is a partially balanced, partially single-ended interface specification. The data leads and clock leads are balanced, the handshake leads are single-ended.
TD, RD, TC, RC and XTC are differential signals conforming to RS-422/V.11. Remaining signals are conformed to RS-232.

5.4 X.21 DB25(M) to DB15(F) adaptor Cable

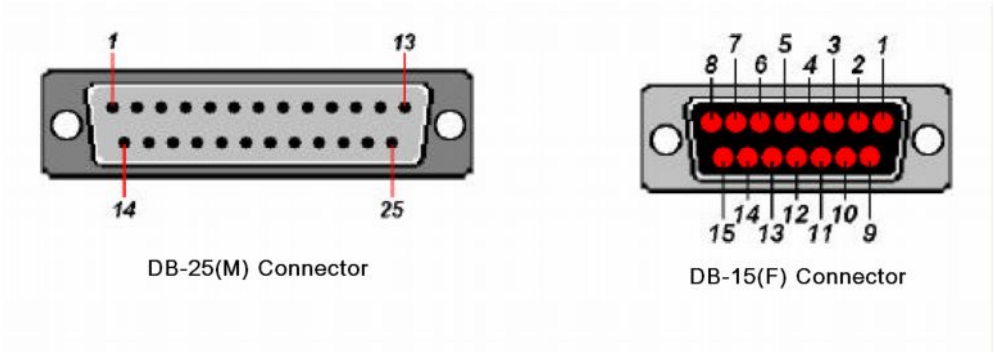
For X.21 application, we must use the DB-25 to DB-15 adaptor cable for connects to a X.21 DTE DB-15 male cable.

The pin out of cable on DB-25(male) Connector to DB-15(Female) (X.21) Connector

DB-25 Pin	Signal	DB-15 (X.21) Pin	Description
1	FGND	1	Protective Ground
7	GND	8	Signal Ground
2	T	2	Transmit Data
14	T	9	Transmit Data
3	R	4	Receive Data
16	R	11	Receive Data
4	C	3	Request To Send
19	C	10	Request To Send
8	I	5	Data Carrier Detect
10	I	12	Data Carrier Detect
17	S	6	Receive Clock
9	S	13	Receive Clock

All signals are balanced. Meaning there is always a pair (+/-) for each signal, like used in RS422. The X.21 signals are the same as RS422, so please refer to RS422 for the exact details.

The front view of DB-25(M) connector and DB-15(F) connector on this cable:



The pin out of DB-15 connector on X.25 adaptor cable:

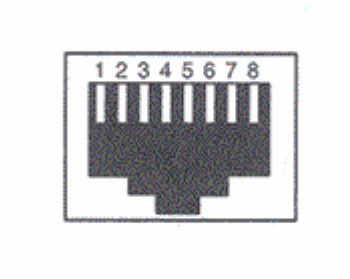
Pin	Signal	Abbr.	DTE	DCE
1	Shield			
2	Transmit (A)	TA	Out	In
3	Control (A)	CA	Out	In
4	Receive (A)	RA	In	Out
5	Indication (A)	IA	In	Out
6	Signal Timing (A)	SA	In	Out
7	Unassigned			
8	Ground			
9	Transmit (B)	TB	Out	In
10	Control (B)	CB	Out	In
11	Receive (B)	RB	In	Out
12	Indication (B)	IB	In	Out
13	Signal Timing (B)	SB	In	Out
14	Unassigned			
15	Unassigned			

Functional Description:

The Signal Element Timing (clock) **(S)** is provided by the DCE. This means that the NTU is output the correct clocking and that X.21 is a synchronous interface. Hardware handshaking is done by the Control **(C)** and Indication **(I)** lines. The Control is used by the DTE and the Indication is the DCE one.

5.5 Console Cable

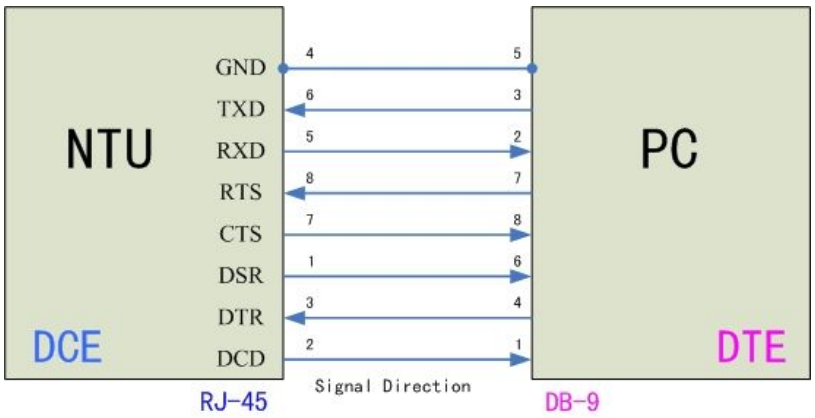
The front view of RJ-45 console cable socket on rear panel:



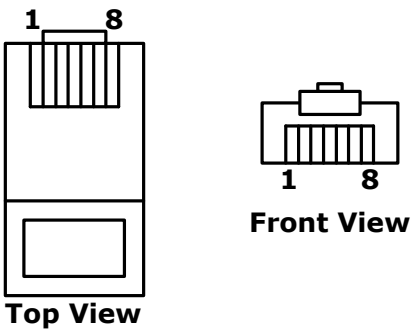
The wire connection of console cable DB-9(Female) to RJ-45:

DB9 (Female)		RJ-45	
1	DCD	1	DSR
2	RXD	2	DCD
3	TXD	3	DTR
4	DTR	4	GND
5	GND	5	RXD
6	DSR	6	TXD
7	RTS	7	CTS
8	CTS	8	RTS
9	NC		

The signal direction of console cable:

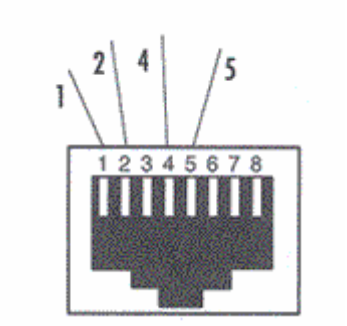


The pin assignment of RJ-45 modular jack on the console cable:

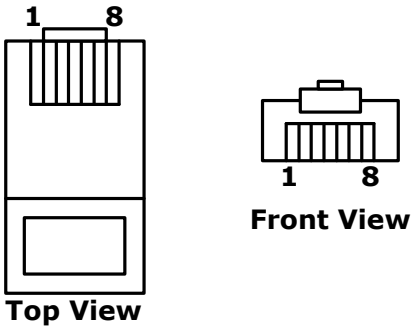
Pin Number	Abbrev.	Description	Figure
1	DSR	DCE ready	
2	DCD	Received Line Signal Detector	
3	DTR	DTE ready	
4	GND	Signal Ground	
5	RXD	Received Data	
6	TXD	Transmitted Data	
7	CTS	Clear to Send	
8	RTS	Request to Send	

5.6 E1 Balance Cable

The front view of RJ-48C E1 balance cable socket on rear panel:



The pin out of RJ-48C plug on the G.703 120Ω E1 balance cable:

Pin Number	Description	Figure
1	E1 interface receive pair-ring	
2	E1 interface receive pair-tip	
3	No connection	
4	E1 interface transmit pair-ring	
5	E1 interface transmit pair-tip	
6	No connection	
7	No connection	
8	No connection	

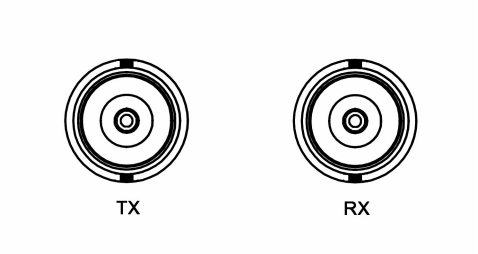
The pin out of cable on DB-15(female) Connector to RJ-48C Connector:

DB15(Female) Pin Number	RJ-48C Pin number	Description
11	4	Transmit Ring
5	3	Rx Shield
9	1	Receive Ring
6	6	TX Shield
3	5	Transmit Tip
1	2	Receive Tip

5.7 E1 Unbalance Cable

Connections to the E1 BNC ports are make using a 75-ohm coaxial cable with a bayonet-style twist-lock BNC connector.
We do not provide the cable. It is widely available from other sources.

The front view of BNC sockets on rear panel:



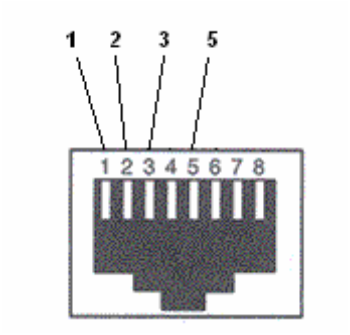
The internal wiring between BNC sockets and RJ-48C:

Signal Name	BNC Connecters	RJ-48C Connector
Transmit Tip	Center pin of Tx Connector	5
Transmit Ring	Shield of Tx Connector	4
Receive Tip	Center pin of Rx Connector	2
Receive Ring	Shield of Rx Connector	1

5.8 Ethernet Cable

The Ethernet cables should be 4 pair unscreened cable (UTP) or screened (STP) of type CAT5 (or higher). Both crossed and normal wiring styles are supported by the auto-crossover feature of the NTU.
We do not provide the cable. It is widely available from other sources.

The front view of RJ-45 Ethernet cable socket on rear panel:

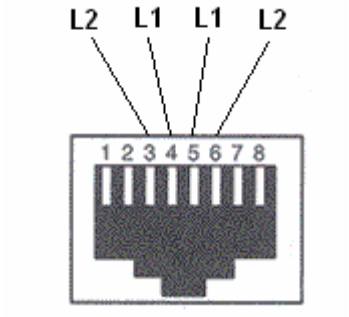


The pin out of RJ-45 Ethernet Connector:

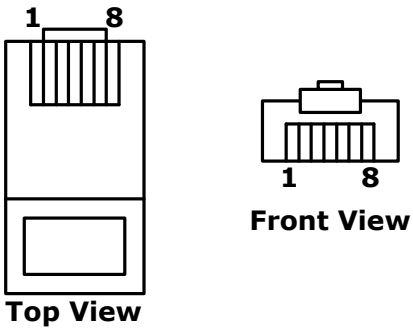
Pin number	Signal Name
1	Transmit Data +
2	Transmit Data -
3	Receive Date +
4	Not used
5	Not used
6	Receive Date -
7	Not used
8	Not used

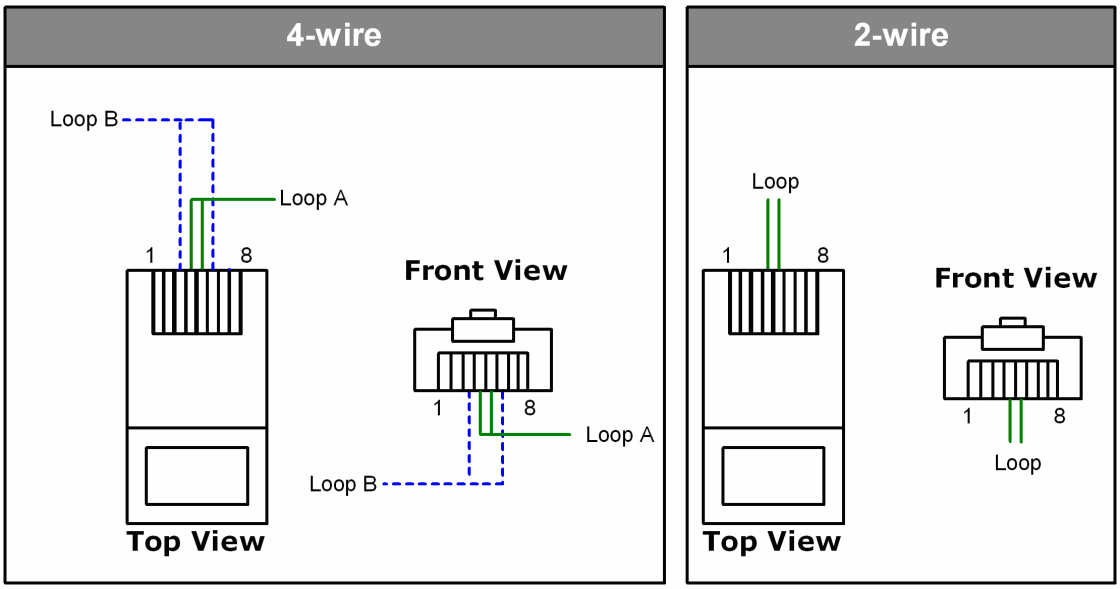
5.9 DSL Cable

The front view of DSL cable socket on rear panel:



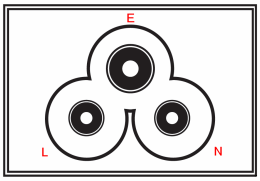
The pin out of RJ-45 modular jack on DSL cable:

Pin Number	Description	Figure
1	No connection	
2	No connection	
3	LOOP 2 Input/Output	
4	LOOP 1 Input/Output	
5	LOOP 1 Input/Output	
6	LOOP 2 Input/Output	
7	No connection	
8	No connection	



5.10 Power Cord

The front view of IEC-320 C6 type AC Inlet on rear panel:



The pin out of AC Inlet connector:

Pin number	Description
E	Earth conductor
L	Live, hot or active
N	conductor
	Neutral or identified
	conductor

The socket of the power cord is using IEC-320 C5 type. This 3-connector colloquially called "Mickey Mouse" or "Clover Leaf".

The front view of C5 line socket of the power cord:

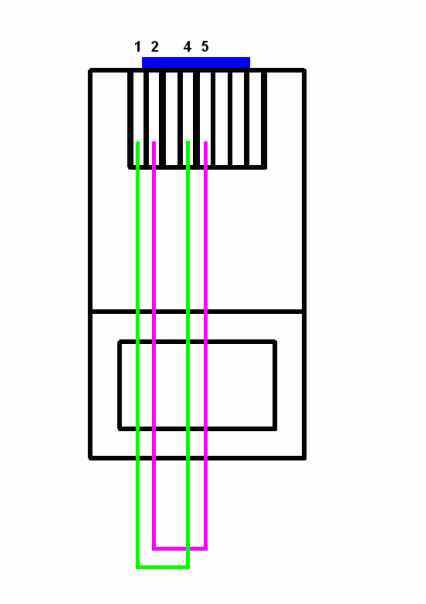
5.11 Illustration of Loopback connection device (E1)

RJ-48C Pin number	Description
4	Transmit Ring
3	Rx Shield
1	Receive Ring
6	TX Shield
5	Transmit Tip
2	Receive Tip

Make the short circuit/wiring with a RJ-45 module jack of the following:

PIN1←----→PIN4
PIN2 ←----→PIN5

The top view of RJ-45 module jack on short circuit/wiring:



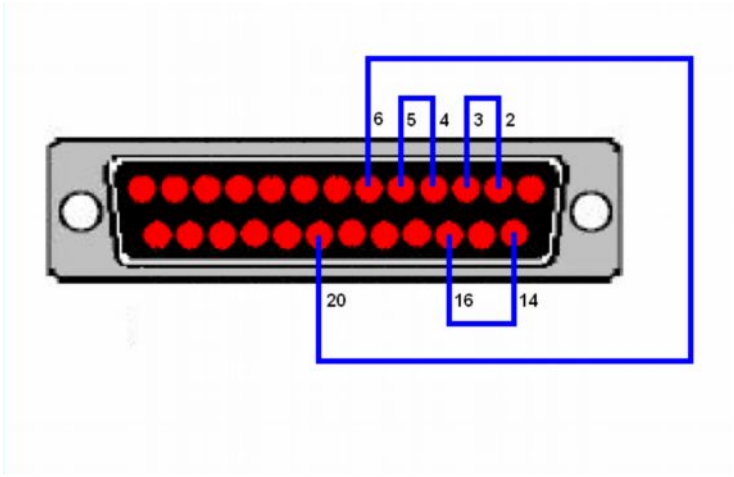
5.12 Illustration of Loopback connection device (Serial)

DB-25(M) Pin number	Signal	Description
2	TD(A)	Transmit Data
14	TD(B)	Transmit Data
3	RD(A)	Receive Data
16	RD(B)	Receive Data
4	RTS	Ready To Send
5	CTS	Clear To Send
6	DSR	Data Set Ready
20	DTR	Data Terminal Ready
24	XTC	DTE Transmit Clock
11	XTC	DTE Transmit Clock
15	TC(A)	Transmit Clock
12	TC(B)	Transmit Clock
17	RC(A)	Receive Clock
9	RC(B)	Receive Clock
1	FGND	Protective Ground
7	GND	Signal Ground
8	DCD	Data Carrier Detect

Make the short circuit/wiring with a DB-25(male) connector of the following:

PIN2 ←----→PIN3
PIN14←---→PIN16
PIN4 ←----→PIN5
PIN6 ←---→PIN20

The back side view of DB-15(male) connector on short circuit/wiring:


6
5
4
3
2
20
16
14