Proscend

NTU-5066GM

Series

User Manual

Version 0.02

Tables of Contents

1 Introduction

1.1 Models

The G.SHDSL NTU 5066GM series offers four different interface models: E1 interface, Serial interface, Ethernet interface and Co-direction interface. They can connect customers to high-speed TDM services .This series have eight models on the following:-

1.1.1 E1 interface model

Products Number: 5066GM-DA/2W/E1

5066GM-DA/2W/E1/LCD

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 interface model

Products Number: 5066GM-DA/2W/SER

5066GM-DA/2W/SER/LCD

It offers customers premises has high-speed and low-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

Products Number: 5066GM-DA/2W/ETH

5066GM-DA/2W/ETH/LCD

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

1.1.4 Co-directional interface model

Products Number: 5066GM-DA/2W/COD

5066GM-DA/2W/COD/LCD

It offers customers premise has low-speed TDM services with balance 120Ω RJ-45 interface. The industry standard Co-directional interface can transfer 64Kbps.

They can be configured and managed via EOC, or menu-driven VT100 compatible Asynchronous Terminal Interface, either locally or remotely. Also, they can be configured and manage by management port with SNMP.

The G.SHDSL NTU 5066GM series 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 G.SHDSL (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
- ✓ Wetting current sink to protect SHDSL line
- ✓ Remote line loopback
- ✓ SHDSL Line performance monitoring (Data Rate and SNR)
- ✓ Raw and per time interval statistics
- ✓ Bandwidth guaranteed transmission equipment
- ✓ SNMP management port with SNMP version 1 and 2C
- ✓ Remote firmware upgrade
- ✓ Can use AC or DC power input

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

  64kbps (N x 64kbps N=1) for Co-direction interface

- Connection: RJ-45 jack
- Impedance: 135 ohms

E1 Interface

- Connection: RJ-45 for balanced 120Ω E1 cable
- Connection: BNC for unbalanced 75Ω E1 cable
- Line Rate: 2048KHz +/- 50ppm
- Framing: PCM30 / PCM30C / PCM31 / PCM31C 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)
- Connection: M.34
- 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
- Connection: RJ-45 for Ethernet cable

Co-directional Interface

- Interface Rate：Co directional G.703 interface 64kbps +-50PPM
- Interface coding：ITU-T G.703
- Impedance：120Ω (balance)
- Interface character：match G.703
- Connection: RJ-45 for balanced 120Ω cable
- Payload rates: 64Kbps

DSL Timing

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

Performance Monitoring

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

Loopback Tests

- 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 model only)
- Build-in 511 bit (2^9-1) BER tester

Management

- Console port (RJ45)
- Management Port (RJ-45)
- Support firmware upgradeable

Physical/Electrical

- Dimensions: 216mm x 154mm x 42mm
- Input: For AC power input version 100 to240Vac with 50 to 60Hz
  For DC Power input version -36 to72Vdc
- Power Consumption: 12W Max
- Operation temperature: 0 to 40°C
- Humidity: Up to 95% (non-condensing)
- External screw for frame grounding

Order information:

	Without LCD display	With LCD display
E1 Interface Type A: 2 x BNC and 1 x RJ-45 Type B: 1 x RJ-45	**5066GM-DA/2W/E1**	**5066GM-DA/2W/E1/LCD**
Serial Interface Type A: 1 x DB-25 Type B: 1 x M.34	**5066GM-DA/2W/SER**	**5066GM-DA/2W/SER/LCD**
Ethernet Interface 4 x RJ-45	**5066GM-DA/2W/ETH**	**5066GM-DA/2W/ETH/LCD**
Co-Directional Interface 1 x RJ-45	**5066GM-DA/2W/COD**	**5066GM-DA/2W/COD/LCD**

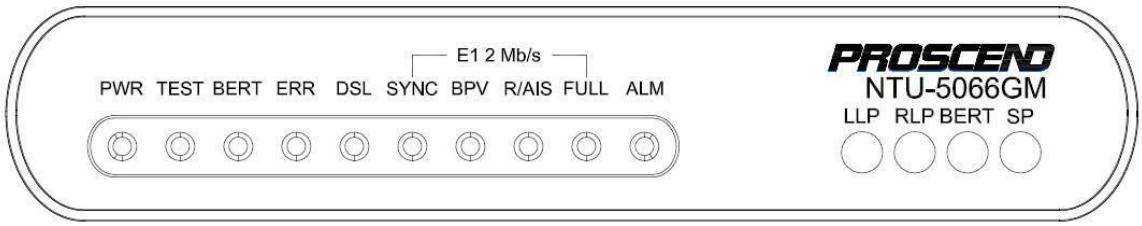
2 Getting to know about the SHDSL NTU

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

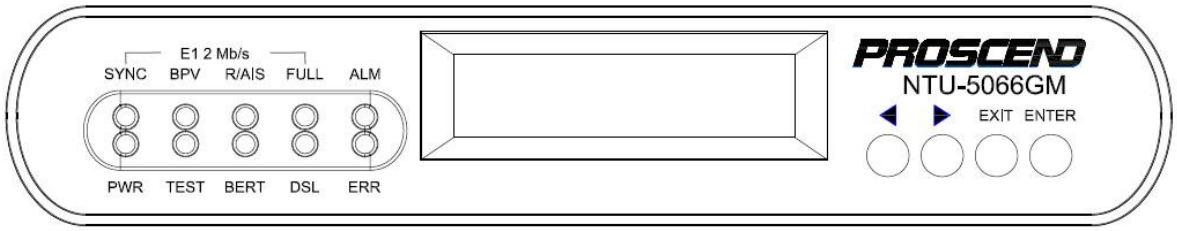
2.1 Front Panel

2.1.1 E1 interface model

5066GM-DA/2W/E1

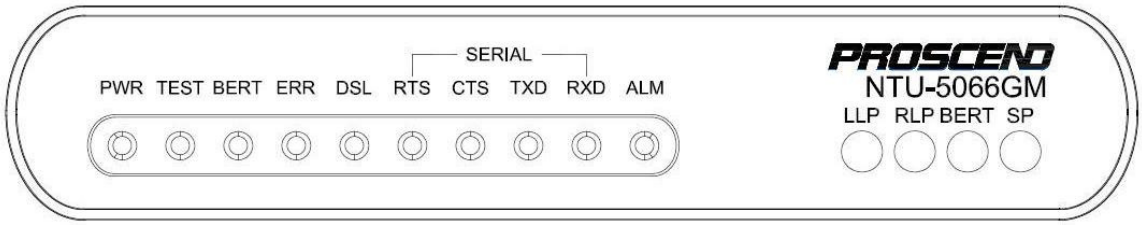


5066GM-DA/2W/E1/LCD

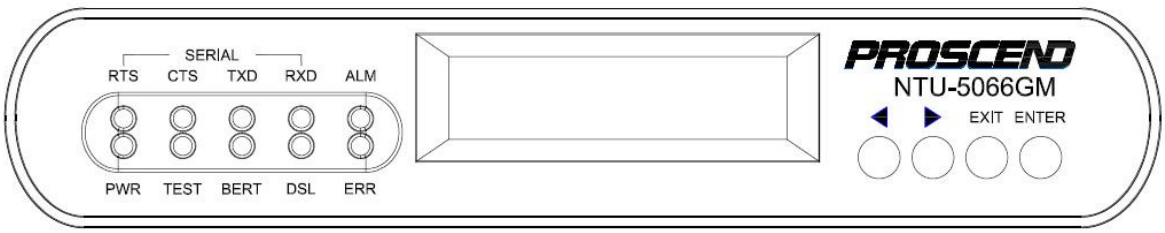


2.1.2 Serial interface model

5066GM-DA/2W/SER

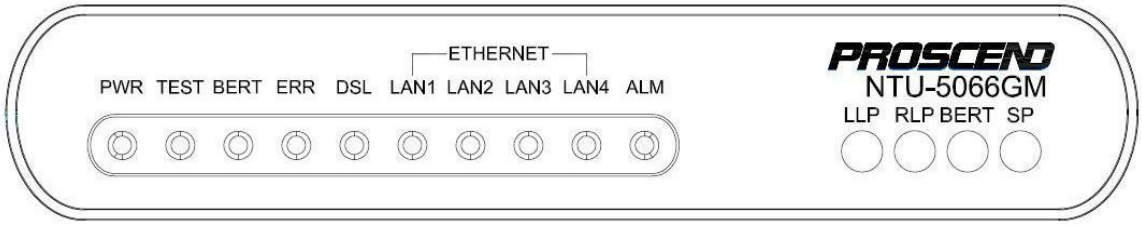


5066GM-DA/2W/SER/LCD

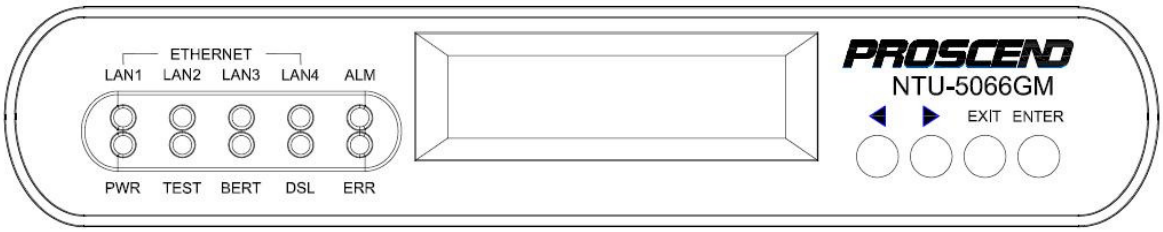


2.1.3 Ethernet interface model

5066GM-DA/2W/ETH

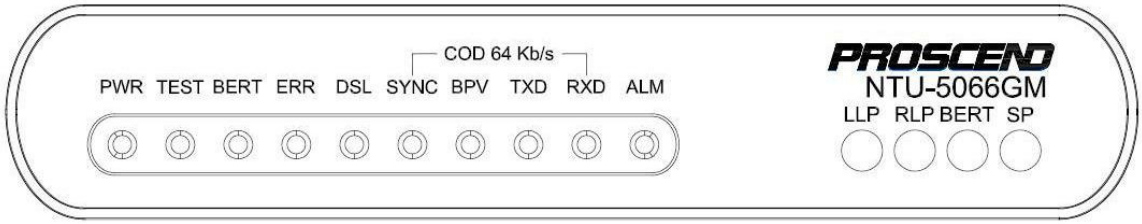


5066GM-DA/2W/ETH/LCD

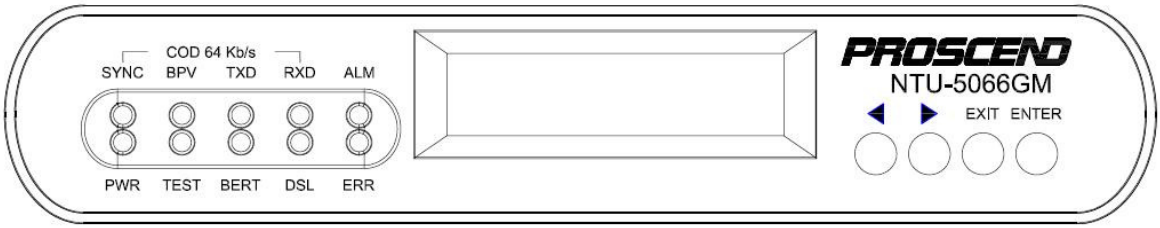


2.1.4 Co-directional interface model

5066GM-DA/2W/COD



5066GM-DA/2W/COD/LCD



The following table describes the function of push button switch:

5066GM-DA/2W/E1

5066GM-DA/2W/SER

5066GM-DA/2W/ETH

5066GM-DA/2W/COD

LLP	Local Loopback
RLP	Remote payload Loopback
BERT	BER Test
SP	Set date rate

5066GM-DA/2W/E1/LCD

5066GM-DA/2W/SER/LCD

5066GM-DA/2W/ETH/LCD

5066GM-DA/2W/COD/LCD

◀	Left
▶	Right
EXIT	Exit
ENTER	Enter

The following table describes the function of LED indicators:

Usage	LED	Color	Action	Description
Common use	PWR	Green	On	Power is on.`
			Off	Power is off.
	TEST	Yellow	On	Loopback test is on
			Off	Loopback test is off
	BERT	Green	On	BER test is on
			Off	BER Test is off
	DSL	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.
E1	SYNC	Green	On	E1 line is connected.
			Off	E1 line is dropped.
	BPV	Green	On	Bipolar Violation error
			Off	No Bipolar Violation error
	R/AIS	Green	On	Alarm Indication Signal is on
			Off	Alarm Indication Signal is off
	FULL	Green	On	Unframed mode
			Off	Framed mode
	ALM	Red	On	SHDSL or E1 link is connect
			Off	SHDSL or E1 link is dropped
Serial	RTS	Green	On	RTS is on
			Off	RTS is off
	CTS	Green	On	CTS is on
			Off	CTS is off
	TXD	Green	On	Data transmit in V.35.
			Off	No data transmit in V.35.
	RXD	Green	On	Data receive in V.35.
			Off	No data reveive in V.35.
	ALM	Red	On	SHDSL link is connect
			Off	SHDSL link is dropped

Ethernet	LAN1 LAN2 LAN3 LAN4	Green	On	Ethernet line is connected.
			Blink	Data transmit in Ethernet line.
			Off	Ethernet line is dropped.
	ALM	Red	On	SHDSL link is connect
			Off	SHDSL link is dropped
Co-directional	SYNC	Green	On	Co-directional line is connected.
			Off	Co-directional line is dropped.
	BPV	Green	On	Bipolar Violation error
			Off	No Bipolar Violation error
	TXD	Green	On	Data transmit in Co-directional
			Off	No data transmit in Co-directional
	RXD	Green	On	Data receive in Co-directional
			Off	No data reveive in Co-directional
	ALM	Red	On	SHDSL link or Co-directional link is connect
			Off	SHDSL link or Co-directional link is dropped

2.2 Data rate display by LEDs

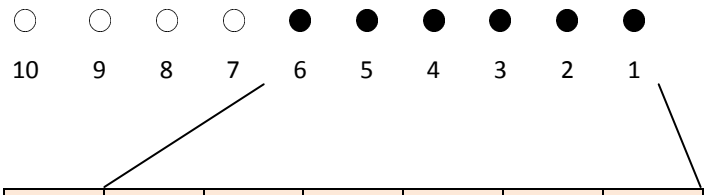
This function will using on without LCD display models:

5099GM-DA/2W/E1

5099GM-DA/2W/SER

5099GM-DA/2W/ETH

5099GM-DA/2W/COD



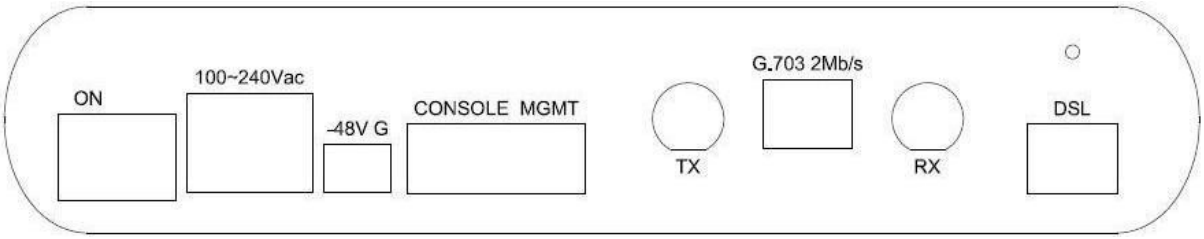
Rate	LED-6	LED-5	LED-4	LED-3	LED-2	LED-1
N	2^5	2^4	2^3	2^2	2^1	2^0
36	ON	OFF	OFF	ON	OFF	OFF
35	ON	OFF	OFF	OFF	ON	ON
34	ON	OFF	OFF	OFF	ON	OFF
33	ON	OFF	OFF	OFF	OFF	ON
32	ON	OFF	OFF	OFF	OFF	OFF
31	OFF	ON	ON	ON	ON	ON
30	OFF	ON	ON	ON	ON	OFF
.	.	.	.	.	.	.
.	.	.	.	.	.	.
6	OFF	OFF	OFF	ON	ON	OFF
5	OFF	OFF	OFF	ON	OFF	ON
4	OFF	OFF	OFF	ON	OFF	OFF
3	OFF	OFF	OFF	OFF	ON	ON
2	OFF	OFF	OFF	OFF	ON	OFF
1	OFF	OFF	OFF	OFF	OFF	ON

2.3 Rear Panel

2.3.1 E1 Interface Model

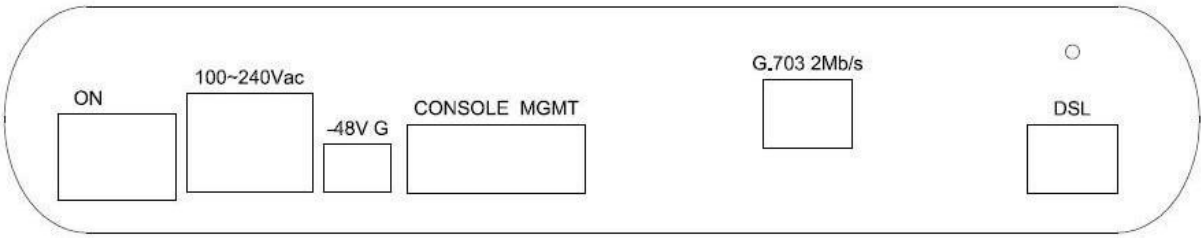
5066GM-DA/2W/E1 (with BNC and RJ-48C)

5066GM-DA/2W/E1/LCD (with BNC and RJ-48C)



5066GM-DA/2W/E1 (with RJ-48C)

5066GM-DA/2W/E1/LCD (with RJ-48C)



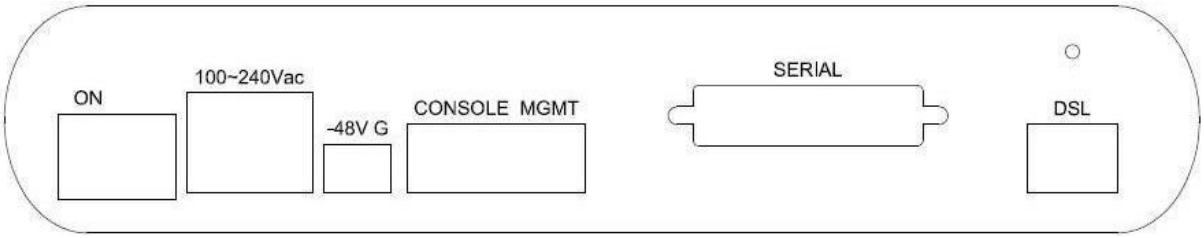
The rear panel of this model is including DC power socket, power switch, AC power socket, RJ-45 console, RJ-45 management port, G.703 RJ-45 jack or BNC jack for transmitting and receiving and RJ-45 for DSL from left to right.

Connector Description	
ON	Power switch. Press 1 for turn on and press 0 for off
100~240V AC	IEC-320 C6 AC input connector. It has power adapting function from 100V to 240V
-48V G	DC power input connector (-48V)
CONSOLE	RJ-45 for system configuration and maintenance
MGMT	RJ-45 for SNMP Management
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
DSL	RJ-45 for DSL connection

2.3.2 Serial Interface Model

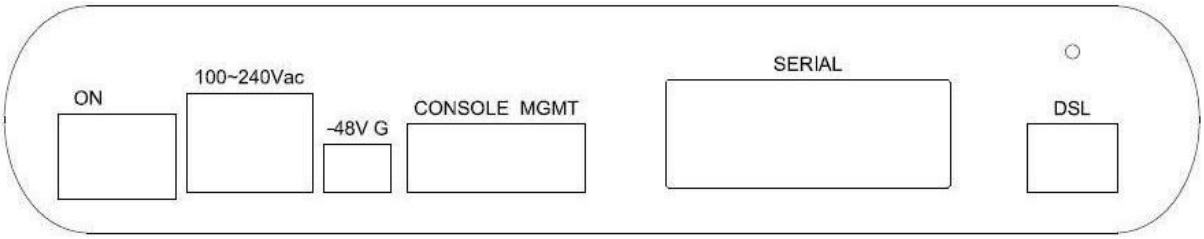
5066GM-DA/2W/SER (with DB-25 connecter)

5066GM-DA/2W/SER/LCD (with DB-25 connecter)



5066GM-DA/2W/SER (with M.34 connecter)

5066GM-DA/2W/SER/LCD (with M.34 connecter)



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

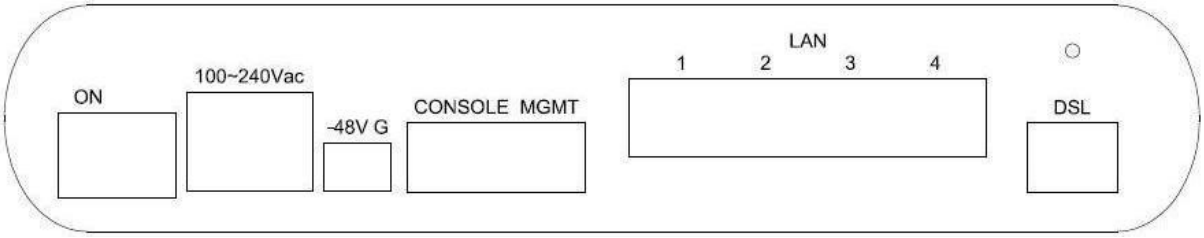
Connector Description

ON	Power switch. Press 1 for turn on and press 0 for off
100~240V AC	IEC-320 C6 AC input connector. It has power adapting function from 100V to 240V
-48V G	DC power input connector (-48V)
CONSOLE	RJ-45 for system configuration and maintenance
MGMT	RJ-45 for SNMP Management
SERIAL	DB-25(F) for RS-530 and V.35 or X.21(with adaptor cable) M.34(F) for V.35
DSL	RJ-45 for DSL connection

2.3.3 Ethernet Interface Model

5066GM-DA/2W/ETH

5066GM-DA/2W/ETH/LCD



The rear panel of this model is including DC power socket, power switch, AC power socket, RJ-45 console, RJ-45 management/LAN port and RJ-45 for DSL from left to right.

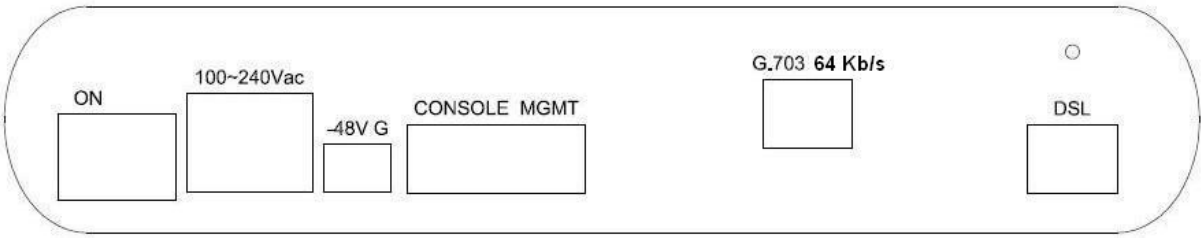
Connector Description

ON	Power switch. Press 1 for turn on and press 0 for off
100~240V AC	IEC-320 C6 AC input connector. It has power adapting function from 100V to 240V
-48V G	DC power input connector (-48V)
CONSOLE	RJ-45 for system configuration and maintenance
MGMT	RJ-45 for SNMP Management
LAN	RJ-45 for LAN(1,2,3 and 4)
DSL	RJ-45 for DSL connection

2.3.4 Co-directional Interface Model

5066GM-DA/2W/COD

5066GM-DA/2W/COD/LCD



The rear panel of this model is including DC power socket, power switch, AC power socket, RJ-45 console, RJ-45 management port, G.703 RJ-45 jack for Co-Directional and RJ-45 for DSL from left to right.

Connector Description	
ON	Power switch. Press 1 for turn on and press 0 for off
100~240V AC	IEC-320 C6 AC input connector. It has power adapting function from 100V to 240V
-48V GND	DC power input connector (-48V)
CONSOLE	RJ-45 for system configuration and maintenance
MGMT	RJ-45 for SNMP Management
COD	RJ-45 for Co-Directional interface
DSL	RJ-45 for DSL connection

2.4 Installation

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

- ✓ Plug the AC or DC power cord in the power socket.
- ✓ Plug the console cable 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)
  Co-directional cable (120Ω cable)
  SERIAL cable (V.35 cable)
  Ethernet cable
- ✓ Plug DSL cable
- ✓ Power on

Protective earth:

The screw terminal above of DSL interface 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.

2.5 CAUTION

CAUTION for accessibility

Be sure that the power outlet you plug the power card into is easily accessible and located as close as to the equipment operator as possible. When you need to disconnect power to the equipment, be sure to unplug the power card from the electrical outlet.

Warnings

- Do not use this product near water.
- Do not place this product on an unstable cart, stand or table. If the product falls, it could be seriously damaged.
- Slots and openings are provided for ventilation to ensure reliable operation of the product and to protect it from overheating. These openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, soft, rug or other similar surface. This product should never be placed near or over a radiator or heat register, or in a built-in installation unless proper ventilation is provided.
- Never push objects of any kind into this product through cabinet slots as they may touch dangerous voltage points or short-out parts that could result in a fire or electric shock. Never spill liquid of any kind onto or into the product.

Using electrical power

- This product should be operated from the type of power indicated on the marking label. If you are not sure of the type of power available, consult your dealer or local power company.
- Do not allow anything to rest on the power card. Do not locate this product where people will walk on the cord.
- If an extension cord is used with this product, make sure that the total ampere rating of the equipment plugged into the extension cord does not exceed the extension card ampere rating. Also, make sure that the total rating of all products plugged into the wall outlet does not exceed the fuse rating.
- Do not overload a power outlet, strip or receptacle by plugging in too many devices. The overall system load must not exceed 80% of the branch circuit rating. If power strips are used, the load should not exceed 80% of the power strip's input rating.
- The product's power supply is equipped with a three-wire grounding plug. The plug only fits in a grounded power outlet. Make sure the power outlet is properly grounded before inserting the power supply plug. Do not insert the plug into a non-grounded power outlet. Contact your electrician for details.

Warning! The grounding pin is a safety feature. Using a power outlet that is not properly grounded may result in electric shock and/or injury.

Note: The grounding pin also provides good protection from unexpected noise produced by other nearby electrical devices that may interfere with the performance of this product.

Product servicing

Do not attempt to service this product yourself, as opening or removing covers may expose you to dangerous voltage points or other risks, Refer all servicing to qualified service personnel.

- Unplug this product from the wall outlet and refer servicing to qualified service personnel when:
- The power card or plug is damaged, cut or frayed
- Liquid was spilled into the product
- The product was exposed to rain or water
- The product has been dropped or the case has been damaged
- The product exhibits a distinct change in performance, indicating a need for service
- The product does not operate normally after following the operating instructions

Note: Adjust only those controls that are covered by the operating instructions, since improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the product to normal condition.

Disposal instructions

Do not throw this electronic device into the trash when discarding.

To minimize pollution and ensure utmost protection of the global environment, please recycle.

3 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 G.SHDSL 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

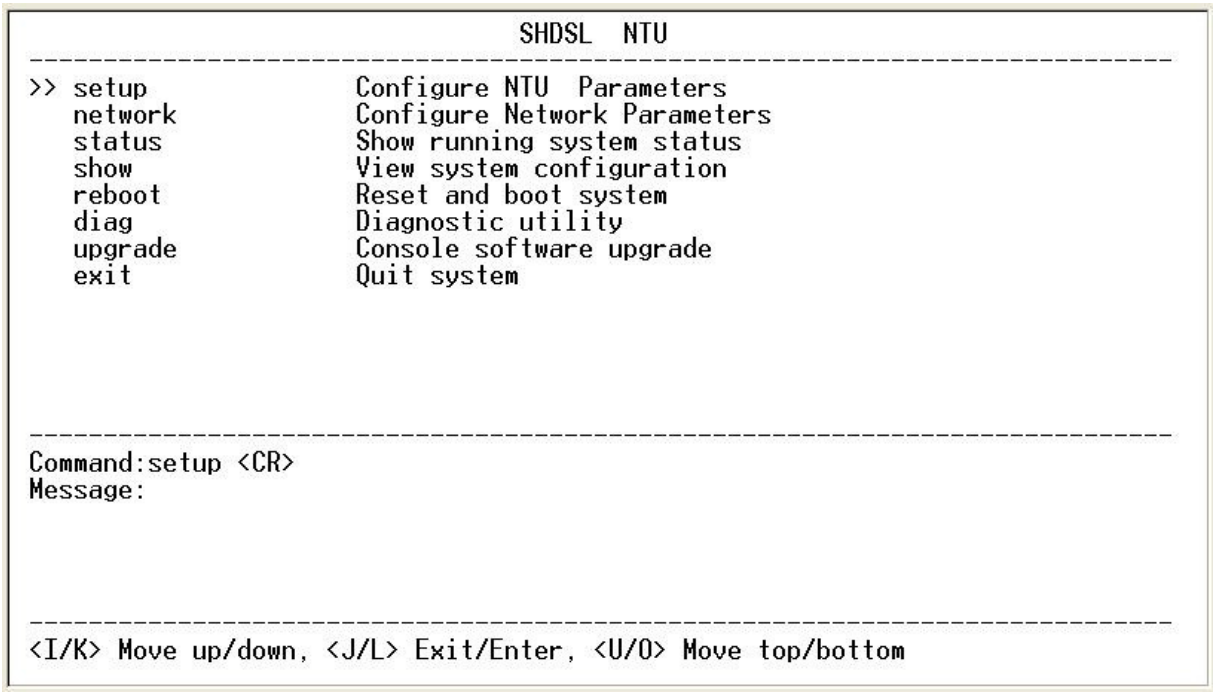
Band rate: 115200, Data bits: 8, Parity: None, Stop Bits: 1 , Flow Control: None

3.1 Login Procedure

At the start up screen, the login screen appears and you can login to this device. When the system prompts you for a user and password, type "**admin**" both to enter is O.K.

3.2 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 "**SHDSL NTU**".

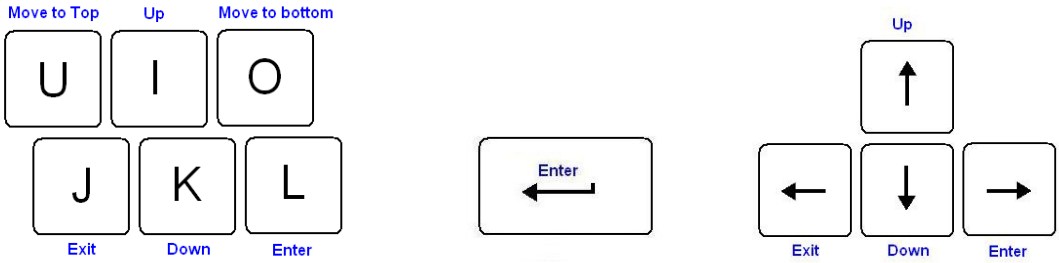
Next a block of commands is listed where the ">>" symbol indicates the current cursor placeholder.

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.

3.3 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

3.4 Main Menu Summary

The main menu is prompt as follow.

Menu Title	Function
Setup	To setup SHDSL type, SHDSL parameters and E1/Serial/Ethernet/Co-directional parameters or restore factory default setting.
Network	To setup hostname, IP, net mask, gateway and SNMP.
Status	To show SHDSL status, E1 /V.35/Ethernet/Co-directional 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

3.5 [Setup] Configuration

This section provides information about configuration the G.SHDSL NTU. Follow the procedures:

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

```
                                SHDSL  NTU
--------------------------------------------------------------------------------
>> setup                Configure NTU  Parameters
   network              Configure Network Parameters
   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 <CR>
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:

For E1 interface model **5066GM-DA/2W/E1**

5066GM-DA/2W/E1/LCD

```
   CH A                          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
   DIP SW             Configure if DIP SW is enabled









--------------------------------------------------------------------------------
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.

For Serial interface model **5066GM-DA/2W/SER**

5066GM-DA/2W/SER/LCD

```
                              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.

For Ethernet interface model **5066GM-DA/2W/ETH**

5066GM-DA/2W/ETH/LCD

```
                                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
   DIP SW             Configure if DIP SW is enabled









--------------------------------------------------------------------------------
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.

For Co-directional interface model **5066GM-DA/2W/COD**

5066GM-DA/2W/COD/LCD

```
   CH A                         SHDSL  NTU
--------------------------------------------------------------------------------
>> Interface          Configure NTU Interface
   Shdsl              Configure SHSDL Parameters
   Co-Directional     Configure Co-Directional Parameters
   Rmtcfg             Enable/Disable Remote Config
   Default            Restore NTU's Default Setting
   DIP SW             Configure if DIP SW is enabled









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




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

You can see Co-directional parameter can been setting.

3.5.1 Configure Interface

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

```
                                SHDSL  NTU
--------------------------------------------------------------------------------
>> Interface          Configure NTU Interface
   Shdsl              Configure SHSDL Parameters
   Co-Directional     Configure Co-Directional 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
```

The interface item display is according to what is the model, you can't change this configuration items.

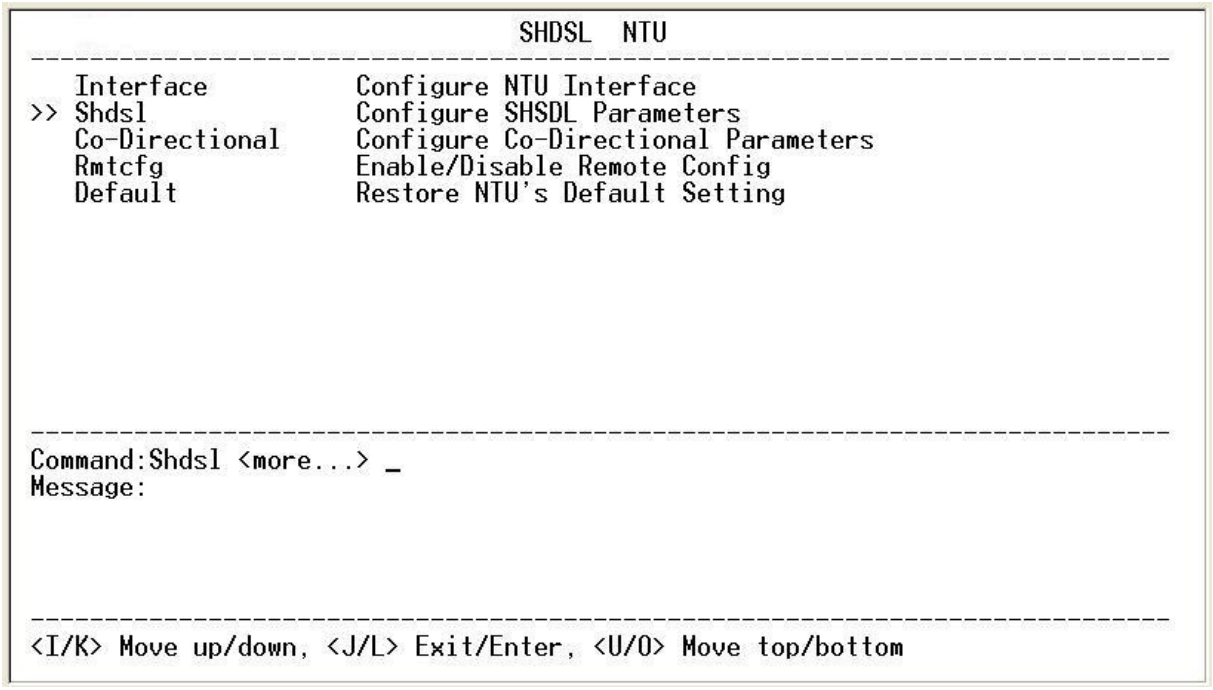
For example, if the model is 5099GM-DA/2W/E1 , then the SHDSL interface is E1. This item can't change.

```
                                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: Please input the following information.

SHDSL Interface (TAB Select) <E1>: E1_


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

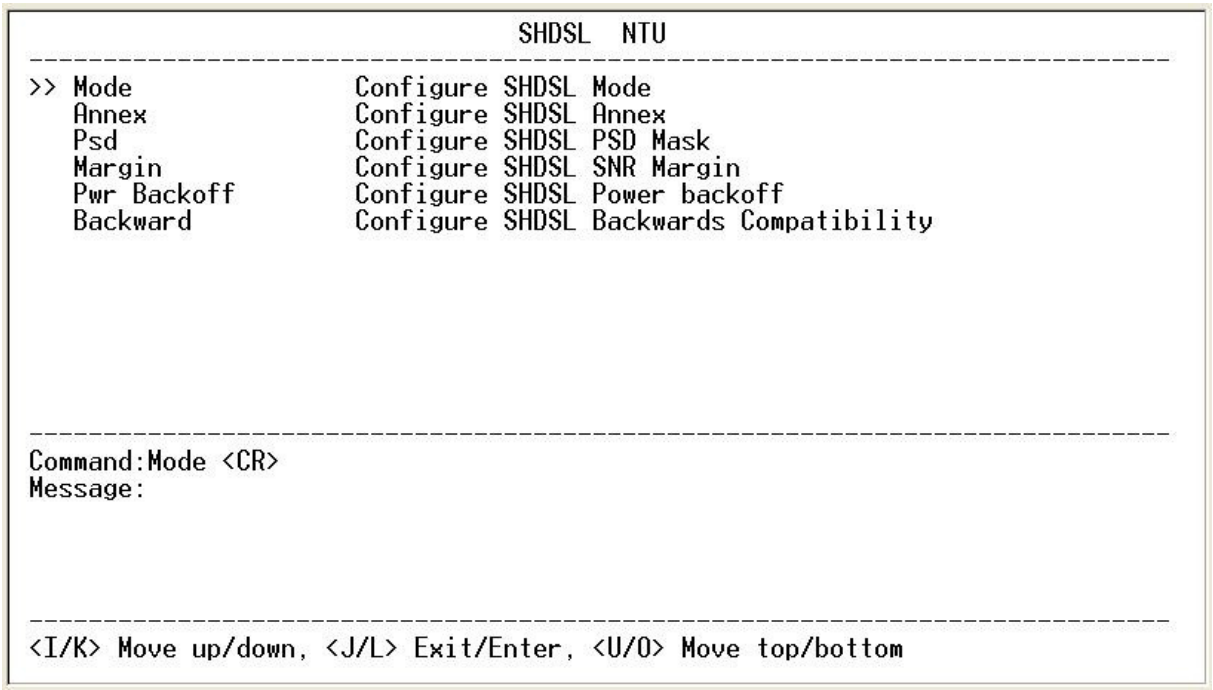
3.5.2 Configure SHDSL parameters

This section will introduce the configuring of SHDSL parameters.

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

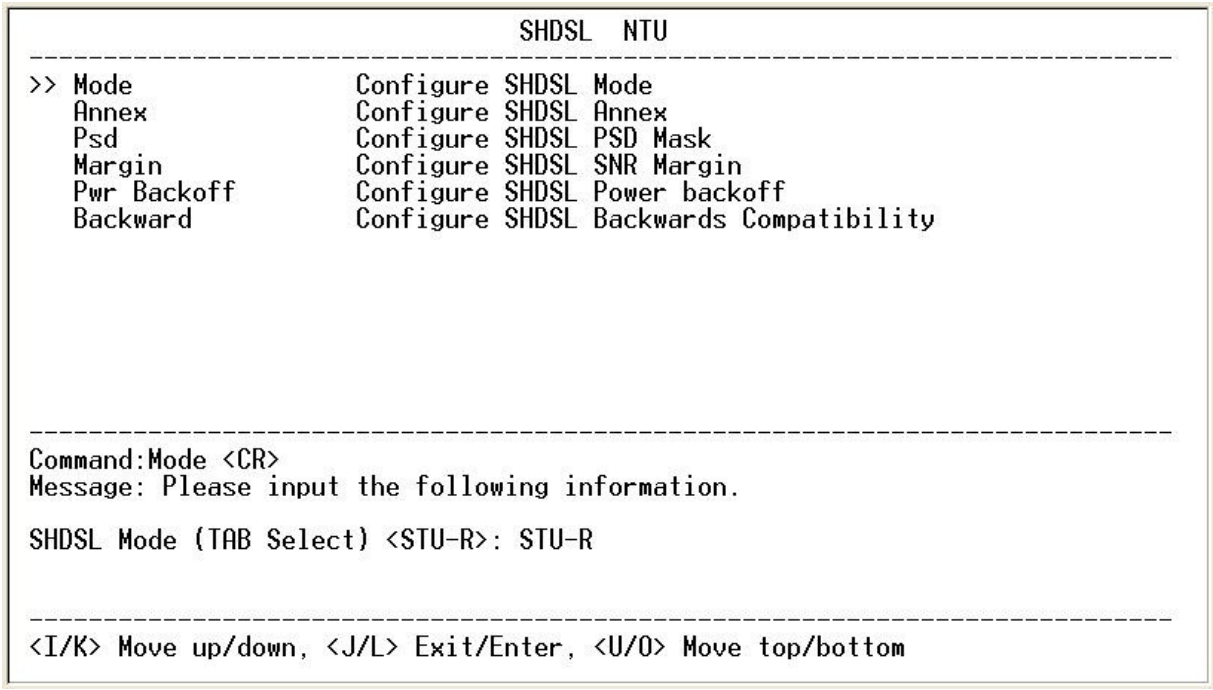


The SHDSL parameters items have **SHDSL Mode**, **Annex type**, **PSD**, **SNR margin, Power Backoff and Backward**.



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



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.

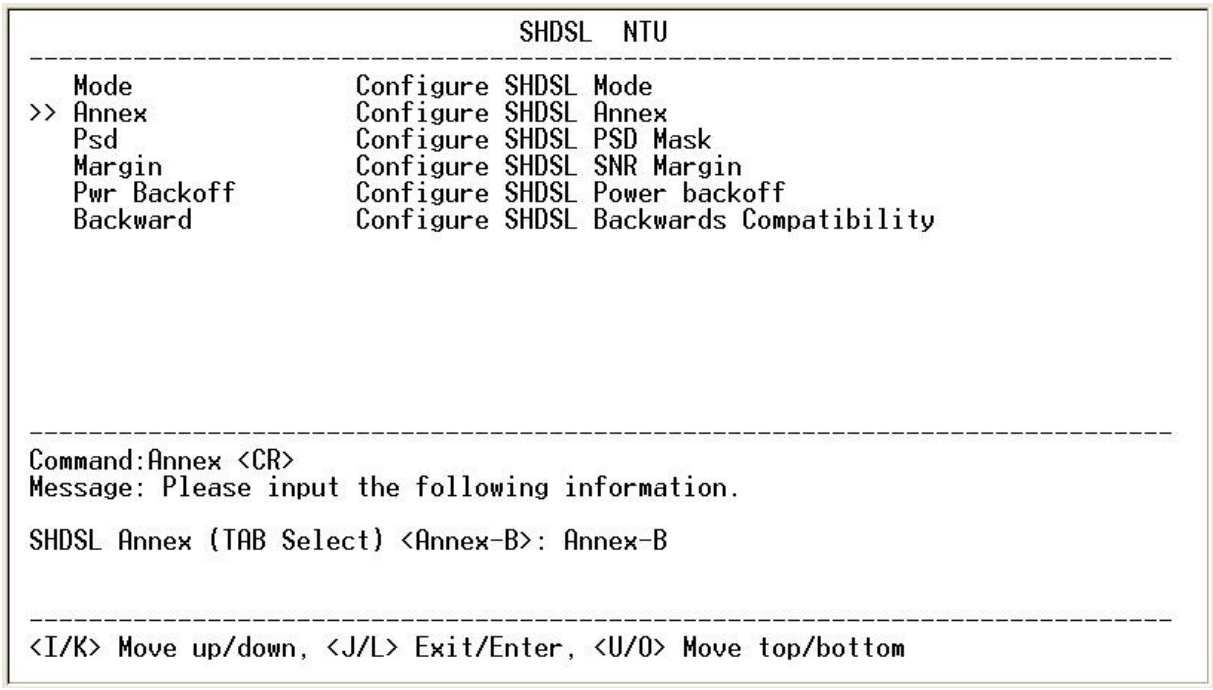
Most applications use Internal Clock. If the DTE provides a clock with TX data, the clock can set to be External Clock.

The following are commonly used acronyms for SHDSL 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

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



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

```
                                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
   Backward             Configure SHDSL Backwards Compatibility









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

SHDSL PSD Mask (TAB Select) <ASYM_DISABLE>: ASYM_DISABLE


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

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.

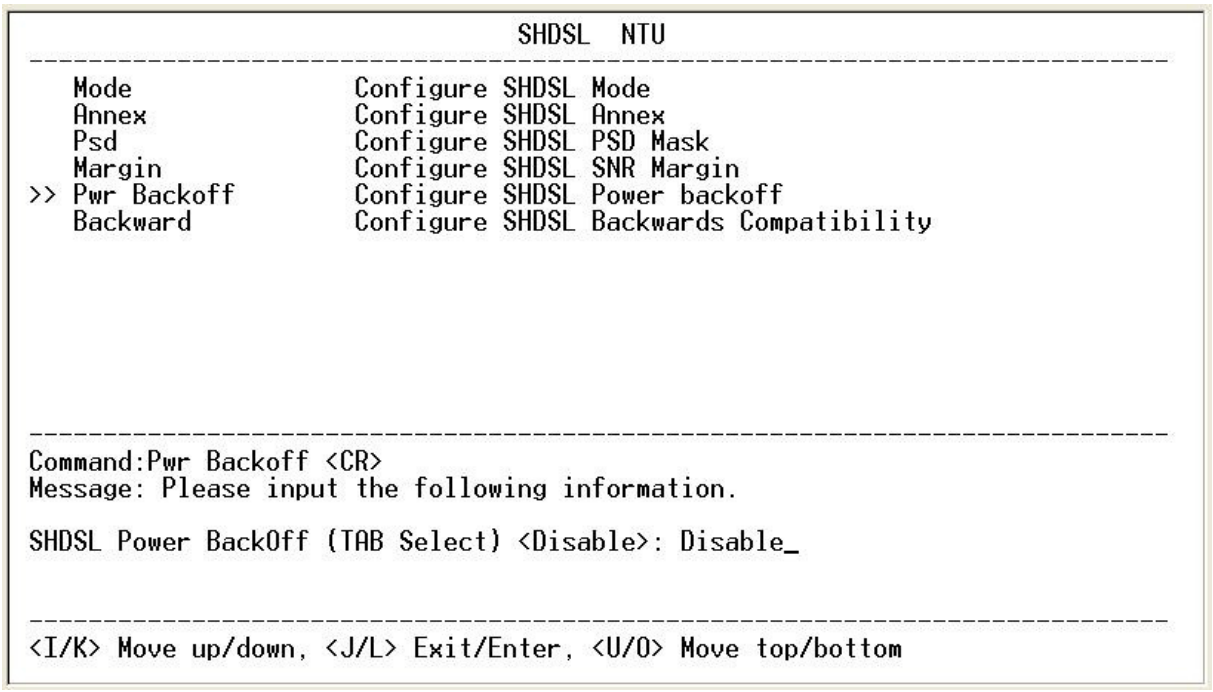
Setup SHDSL parameter, SNR Margin

```
                                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
   Backward             Configure SHDSL Backwards Compatibility









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

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

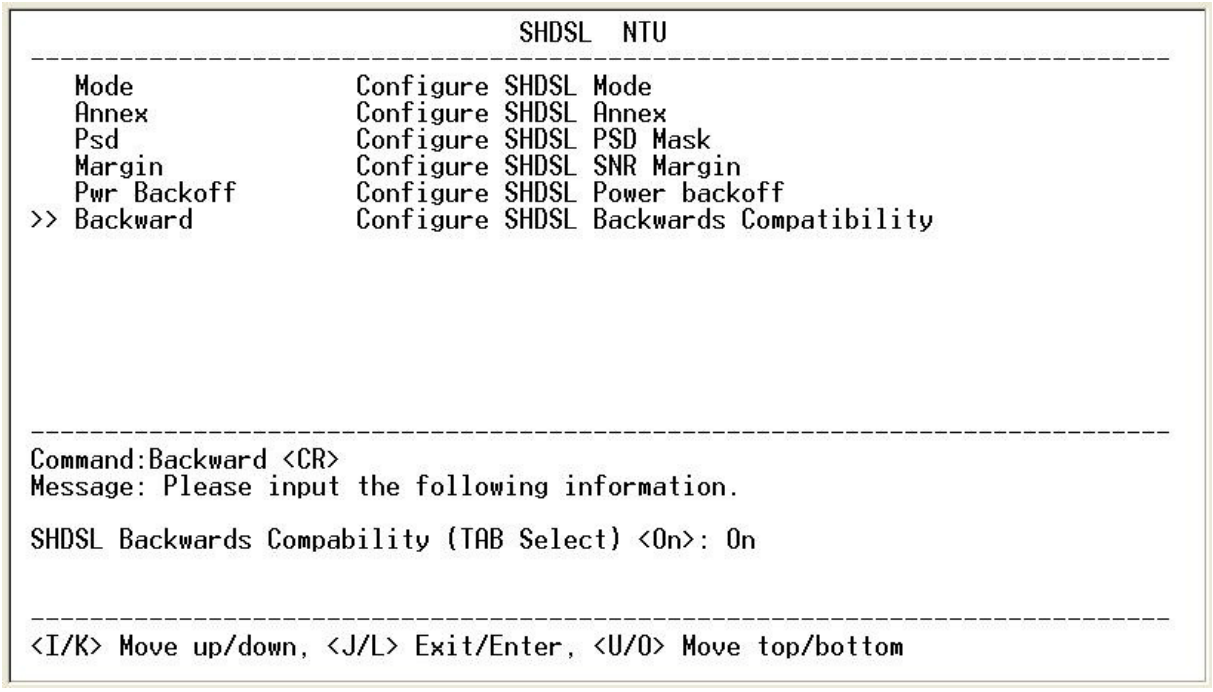
For configuring SHDSL Power Back off function, move the cursor to **Pwr Backoff** and press [ENTER] or [L]. Select the parameter by using [TAB] key.

Setup SHDSL parameter, Power Backoff



There are two power back-off type can be used: **Disable** and **Enable**. When DSL line is used with short distance, user may set Enable, it can use lower transmit power to get better signal to noise ratio.

Setup SHDSL parameter, Backward



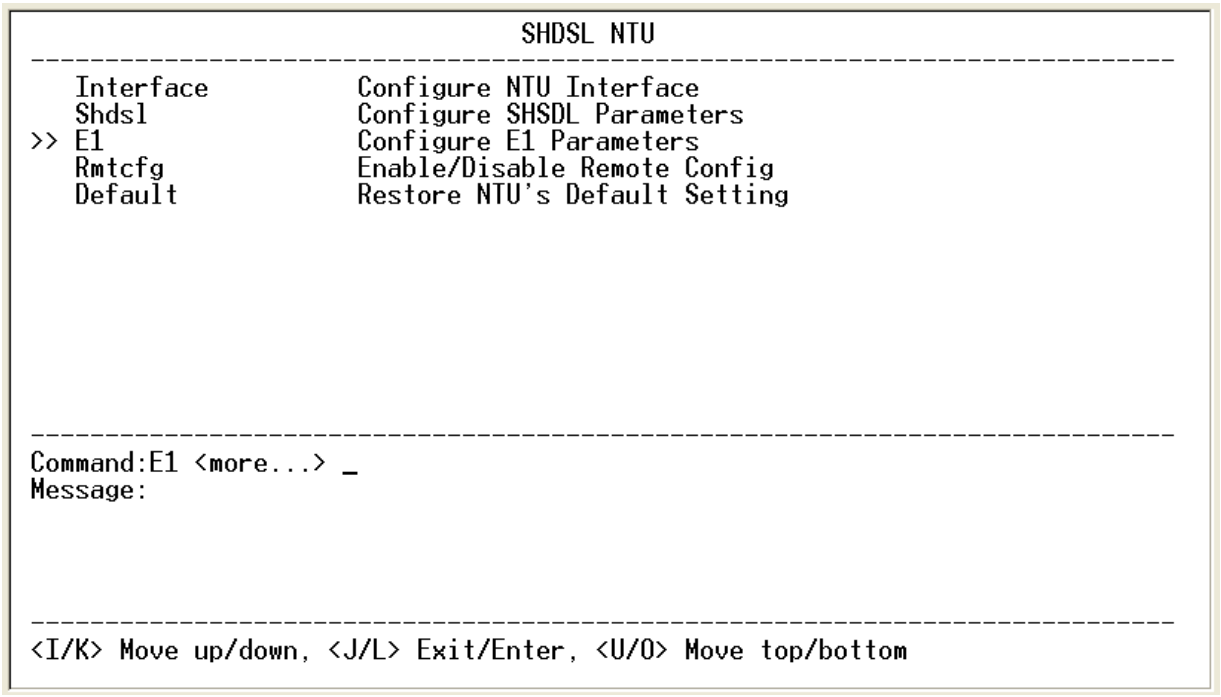
When this NTU connect to other NTU with old models, it may have some compatibility problem. You can set the item to ON for get better compatibility.

Setting Table on SHDSL parameter:

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

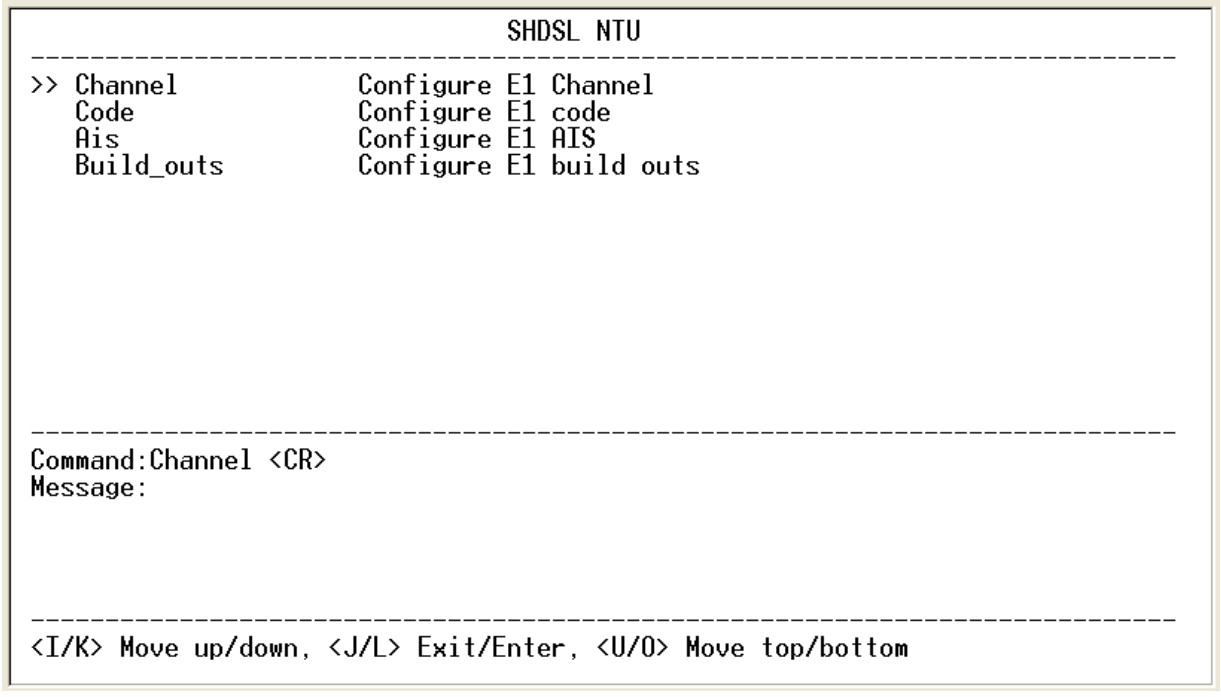
3.5.3 Configure E1 parameters

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



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

Setup E1 Parameter, Channel



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

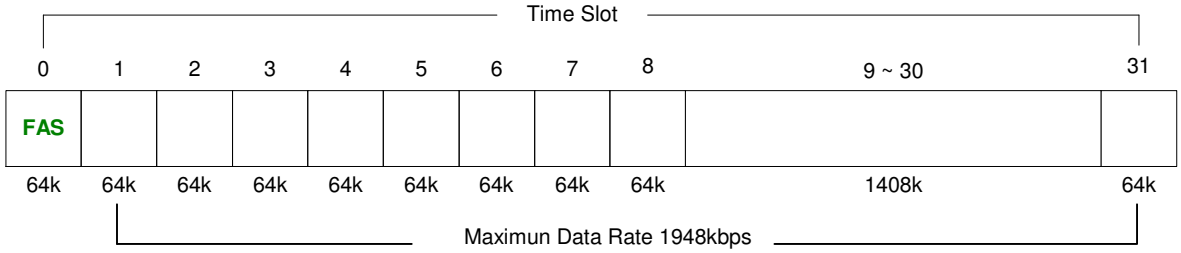
E1 Framer Setting:

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		

Information of FAS:

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.

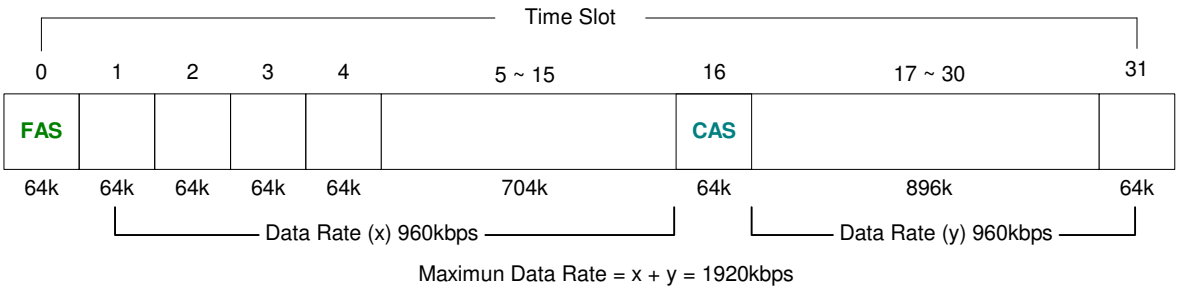
PCM31 and PCM31C (FAS and FAS+CRC4)



Information of CAS:

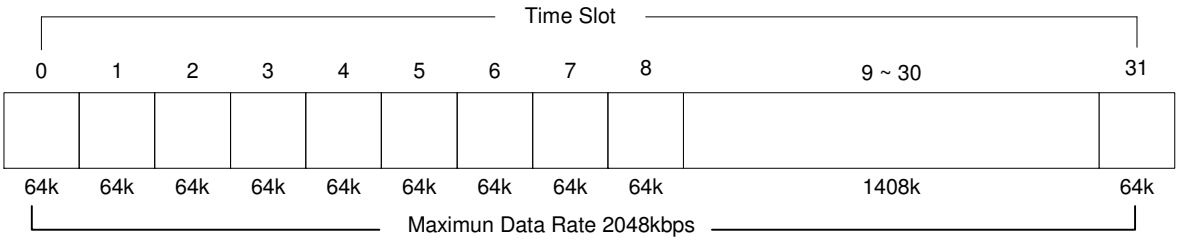
CAS	Also known as time slot 16 multiframing. It requires a multiframe alignment signal to be present for frame sync. The Multiframe Alignment Signal (MFAS) is inserted into the 16th timeslot of frame 0 of the 16-frame multiframe. In CAS mode, there have 30 channels available for user data. If timeslot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

PCM30 and PCM30C (FAS+CAS and FAS+CAS+CRC4)

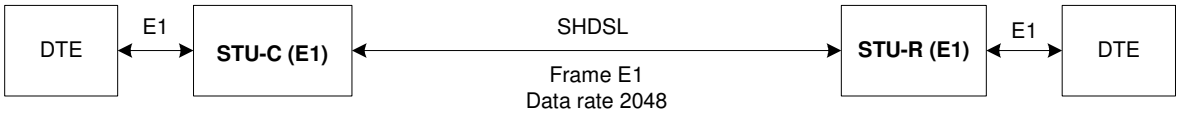


CRC4	The CRC-4 checksum bits are transmitted in the outgoing E1 data stream. Also the received signal is checked for errors. CRC-4 checksum cannot be sent in unframed mode.
Unframed	In this mode, user data is inserted into all 32 channels (64k x 32 = 2048k) of the E1 stream. The object of running without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

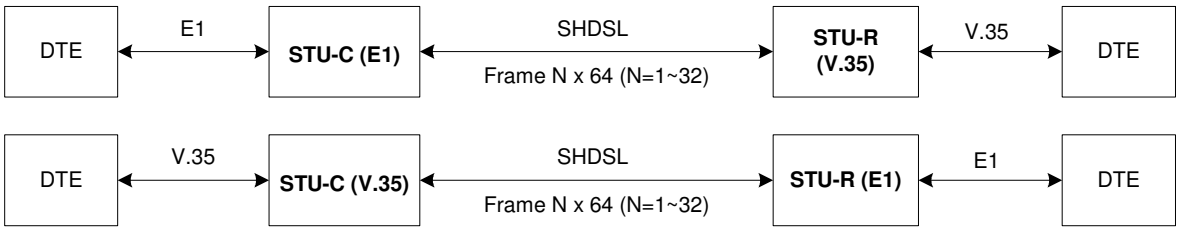
UNFRAMED



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).

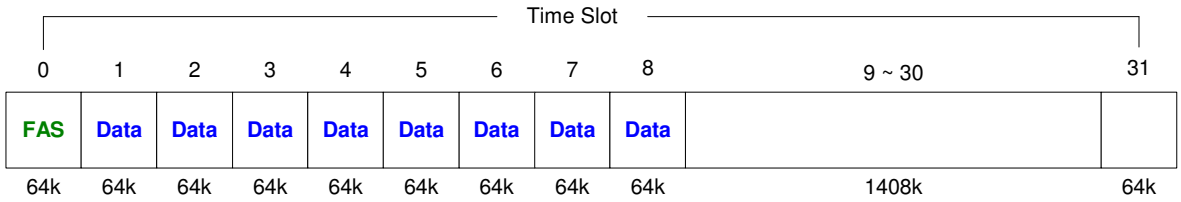


Time slot, N value, is place of data in the frame. Time Slot Number 1~31 (N=1~31) is Fractional E1 and Time Slot Number 32 (N=32) is unframed.

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.

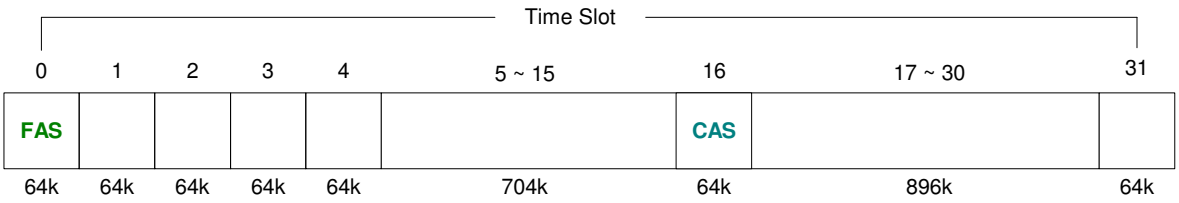
For example, if the data rate of SHDSL line set to be 512k, the time slot number is 8 and first time slot number is 1. The frame is shown as below.



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

First Time Slot ≦ 30 - Time Slot Number

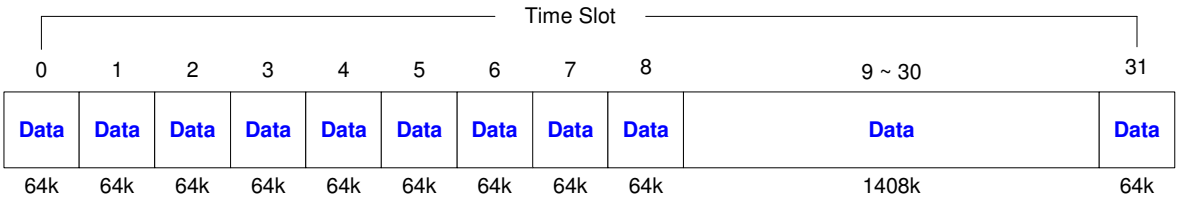
Table of number of slots and their first time slot:

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

Unframed E1

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



Setup E1 Parameter, Line Code

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









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



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

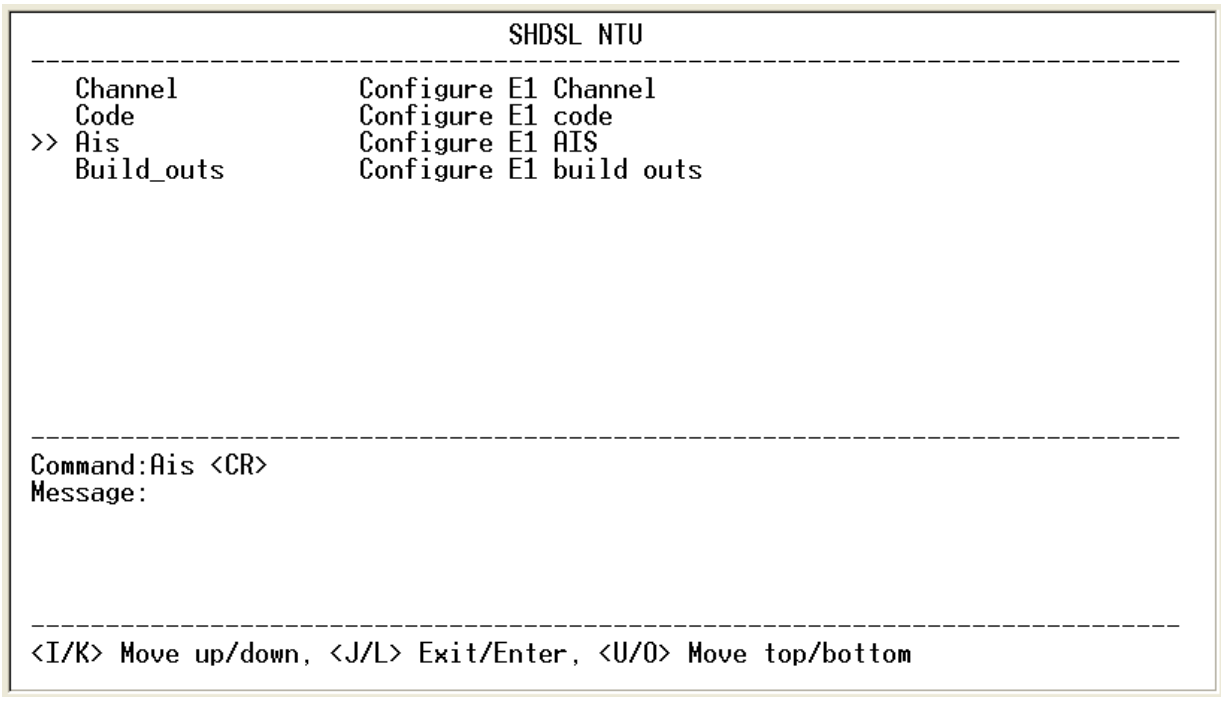
The G.SHDSL NTU supports two different line codes: HDB3 and AMI.

HDB3 is the most popular and preferred line coding and is also the default setting. AMI line coding is also selectable.

More information on HDB3 and AMI:

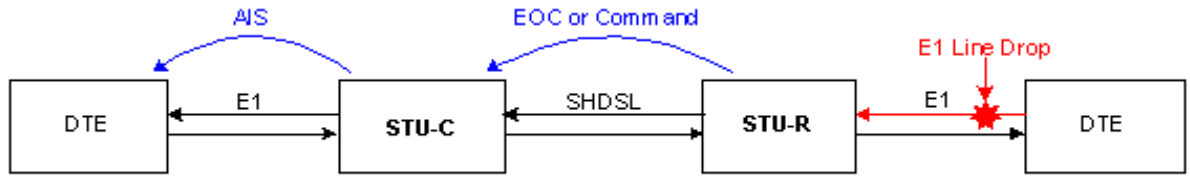
HDB3	In this line coding, the transmitter substitutes a deliberate bipolar violation when excessive zeros in the data stream are detected. The receiver recognizes these special violations and decodes them as zeros. This method enables the network to minimum pulse density requirements. Unless AMI is required for your application, HDB3 should be used whenever possible.
AMI	Alternate Mark Inversion defines the 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

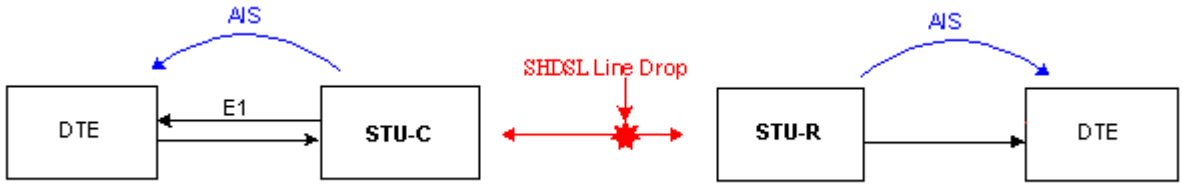


AIS (Alarm Indication Signal) is a method to inform the remote connection that there is a signal or sync problem with the E1. AIS is only valid in framed mode E1, not in Unframed E1. The setting here of AIS enabled (on) or not (off) and is for testing with AIS. When enabled, the E1 will transmit the 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 G.SHDSL 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.

Setting Table on E1 parameter :

E1 Items	Setting	Slot Number	First Slot
Channel	FULL	--	--
	PCM31	1 to 31	1 to 31
	PCM31C	1 to 31	1 to 31
	PCM30	1 to 30	1 to 31 (can't use 16)
	PCM30C	1 to 30	1 to 31 (can't use 16)
Code	HDB3		
	AMI		
AIS	On		
	Off		
Build Outs	120 ohms		
	75 ohms		

3.5.4 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 configure page is as following:

```
                                SHDSL  NTU
--------------------------------------------------------------------------------
>> Interface          Configure Serial Interface
   Data rate          Configure Serial Data Rate (N*64)
   Clock              Configure Serial clock
   Data               Configure Serial data
   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
```

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

Setup Serial Parameter, Interface

```
                                SHDSL  NTU
------------------------------------------------------------------------------
>> Interface          Configure Serial Interface
   Data rate          Configure Serial Data Rate (N*64)
   Clock              Configure Serial clock
   Data               Configure Serial data
   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 Serial 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
   Data               Configure Serial data
   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.

Rate Type (TAB Select) <N64>: N64_


------------------------------------------------------------------------------
<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
   Data               Configure Serial data
   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, Data Polarity

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




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

Change Serial Data (TAB Select) <normal>: normal


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

The data polarity may be adjusted to solve some data transfer problem. The default setting is 'Normal' polarity.

Setup Serial Parameter, RTS

```
                                SHDSL  NTU
--------------------------------------------------------------------------------
   Interface          Configure Serial Interface
   Data rate          Configure Serial Data Rate (N*64)
   Clock              Configure Serial clock
   Data               Configure Serial data
>> 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
   Data               Configure Serial data
   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
   Data               Configure Serial data
   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
   Data               Configure Serial data
   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
```

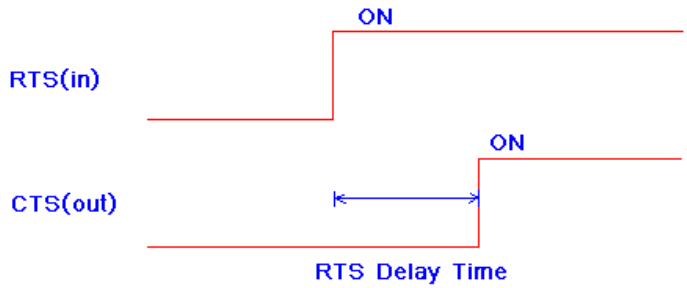
The behavior of the DCD (Data Carrier Detect) signal may be set in one of three ways. When set 'on', the DCD signal is always forced high (on, positive voltage or SPACE), when set 'off' the signal is always forced low (off,

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
   Data               Configure Serial data
   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):


------------------------------------------------------------------------------
<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.



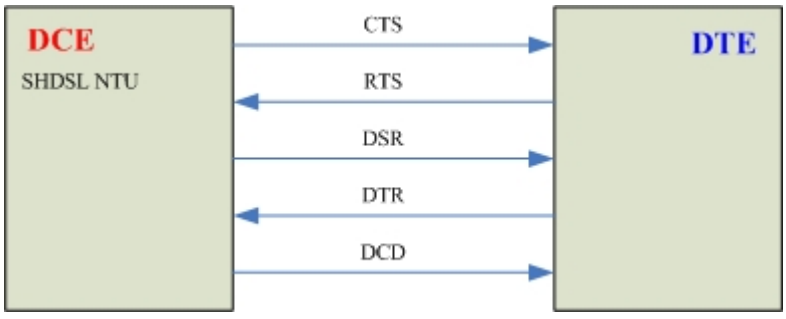
The RTS delay time is use to control CTS on delay to RTS signal.

It is work only for the setting: CTS follow RTS and RTS follow from DTE

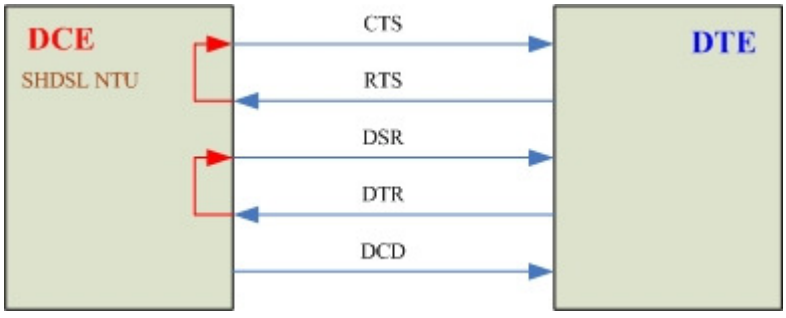
Setting Table of Serial parameter:

Serial Items	Setting
INTERFACE	V.35 X.21(RS-530)
Nx64K (Rate)	1 ~ 36
CLOCK	Normal Inverse
DATA	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

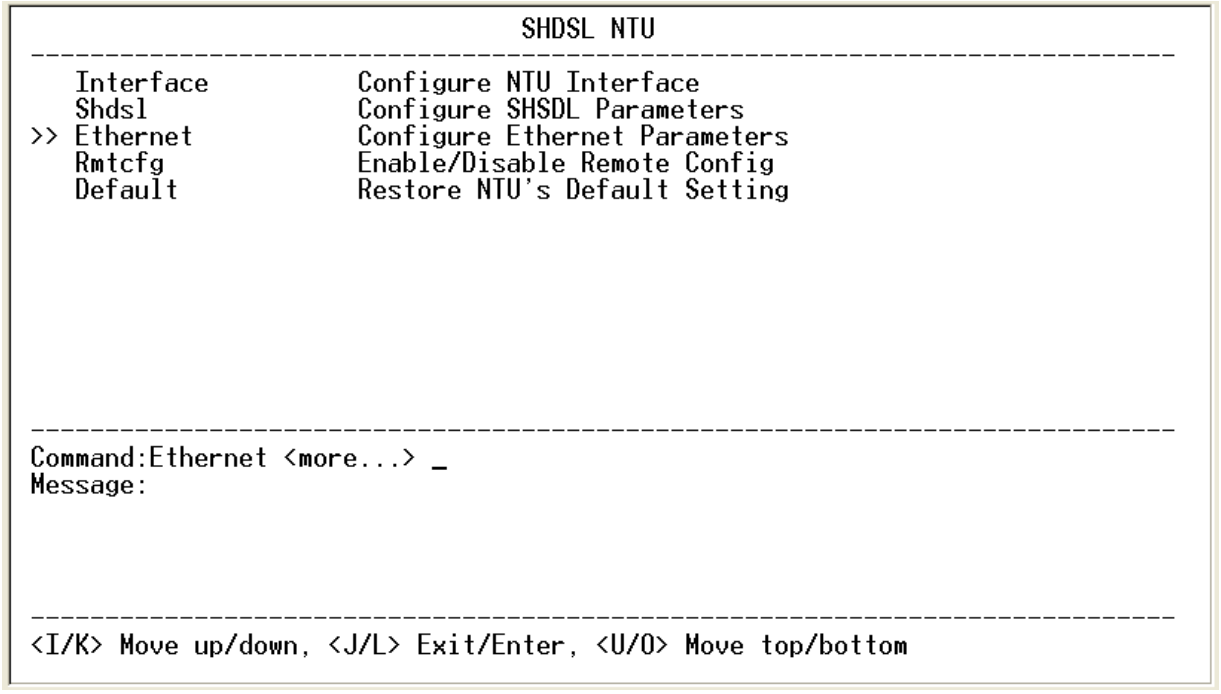


The below diagram shows CTS follow RTS, DSR follow DTR

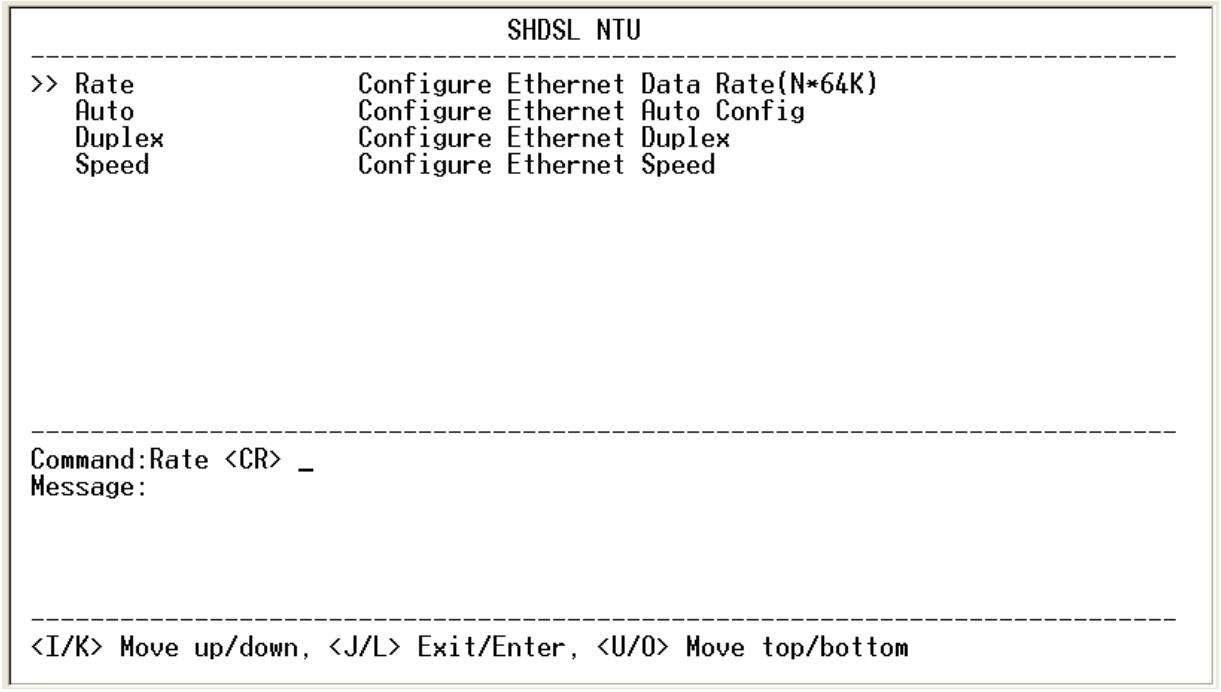


3.5.5 Configure Ethernet parameters

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



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



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**.

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

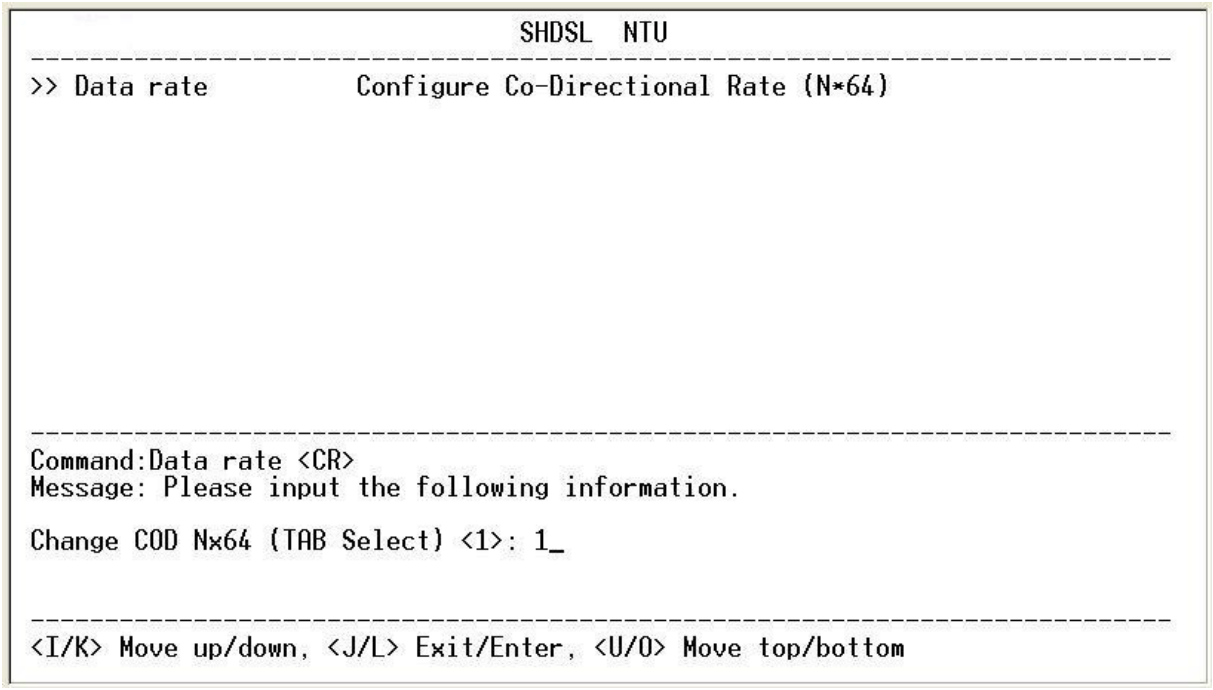
Setting Table on Ethernet parameter:

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

3.5.6 Configure Co-directional parameters

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

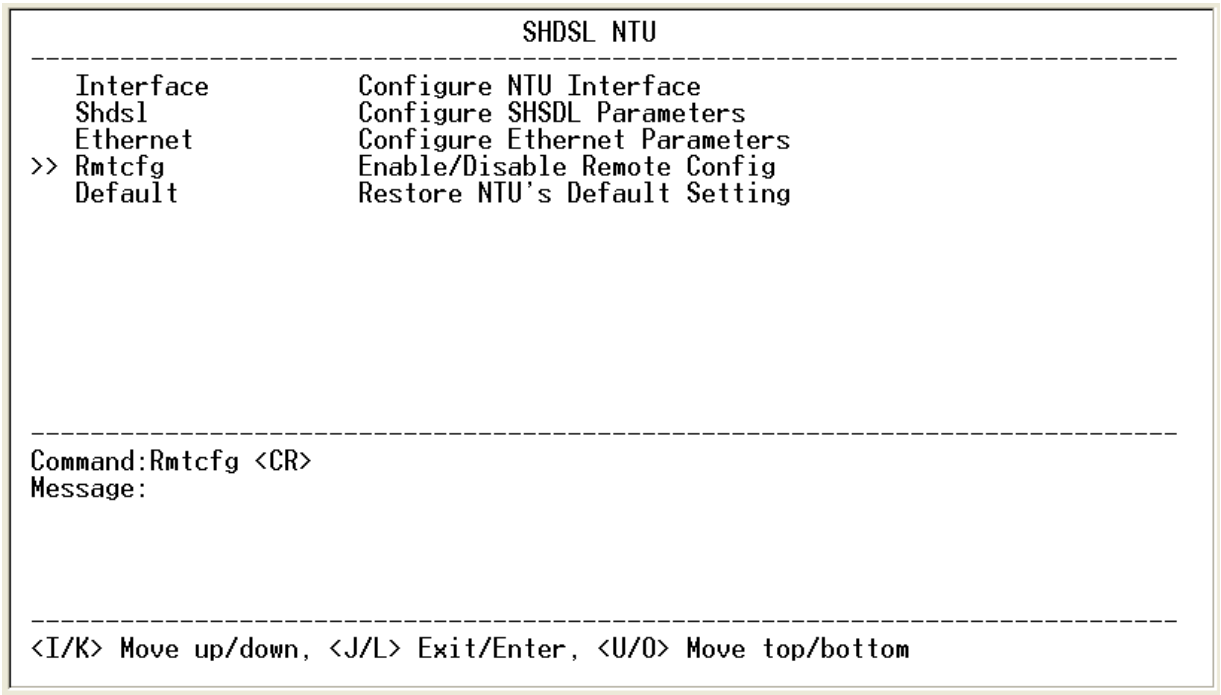
```
   CH A                              SHDSL  NTU
--------------------------------------------------------------------------------
>> Interface           Configure NTU Interface
   Shdsl               Configure SHSDL Parameters
   Co-Directional      Configure Co-Directional Parameters
   Rmtcfg              Enable/Disable Remote Config
   Default             Restore NTU's Default Setting
   DIP SW              Configure if DIP SW is enabled









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



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



Only display the data rate of Co-directional interface. It is N=1, such that the date rate is 64Kbps. User can't change this parameter.

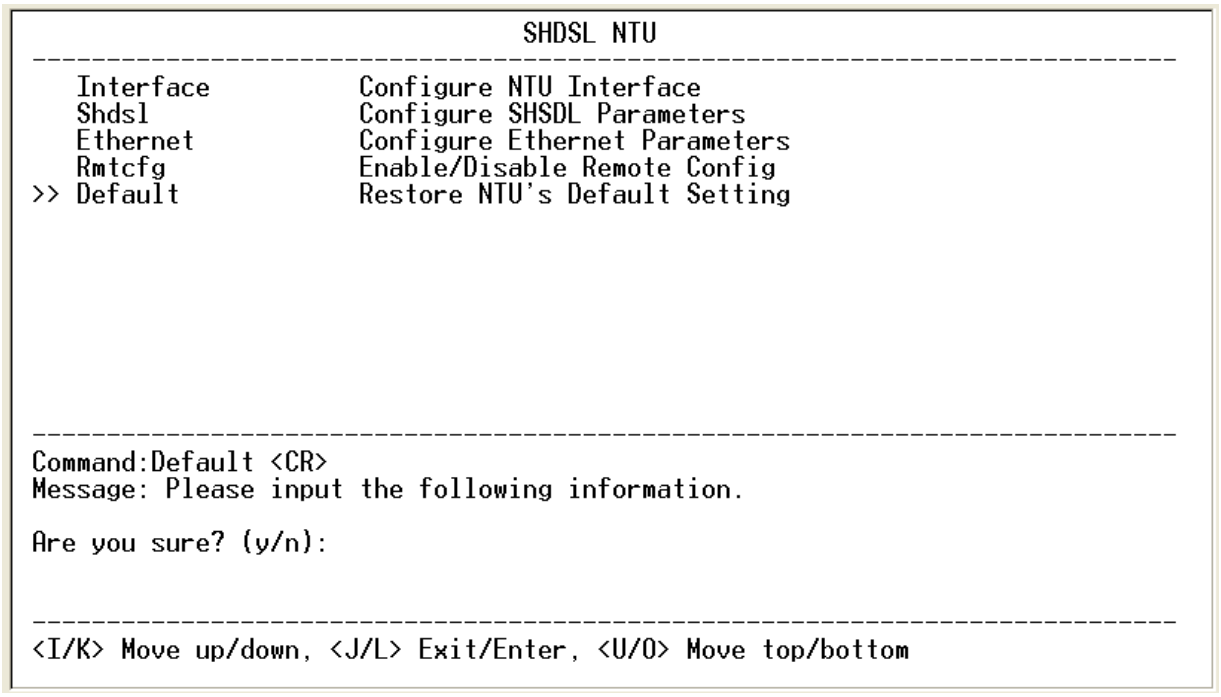
3.5.7 Enable and Disable Remote configuration

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

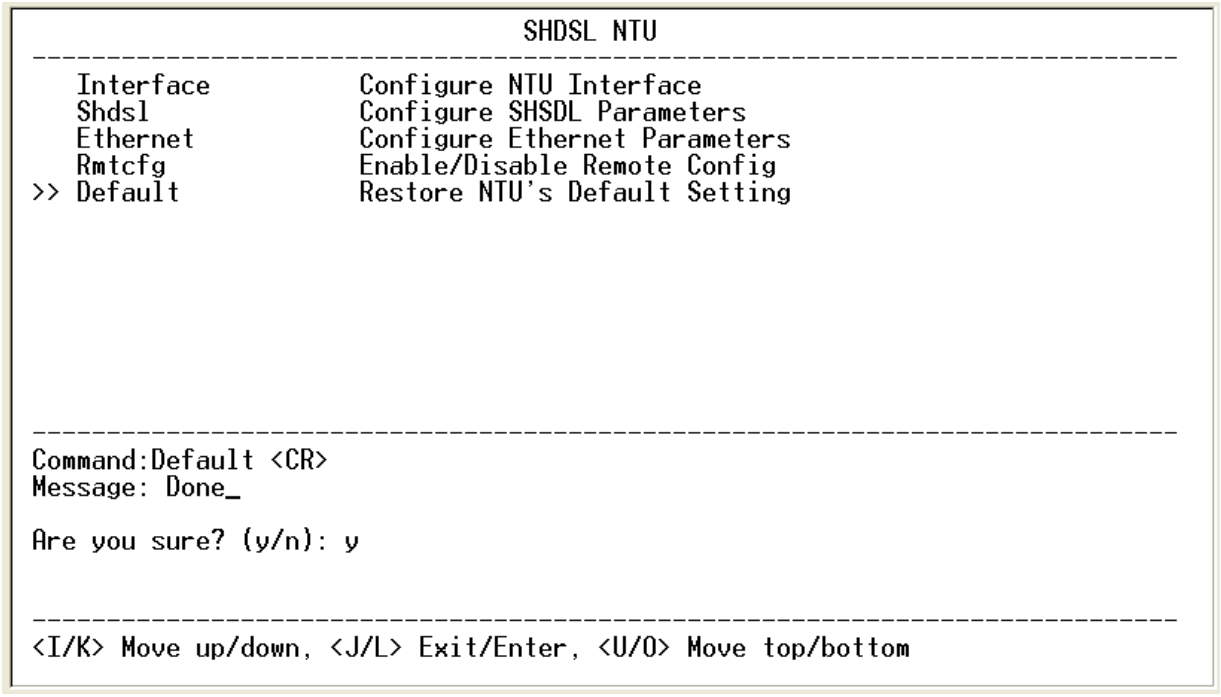


3.5.8 Restore factory default setting

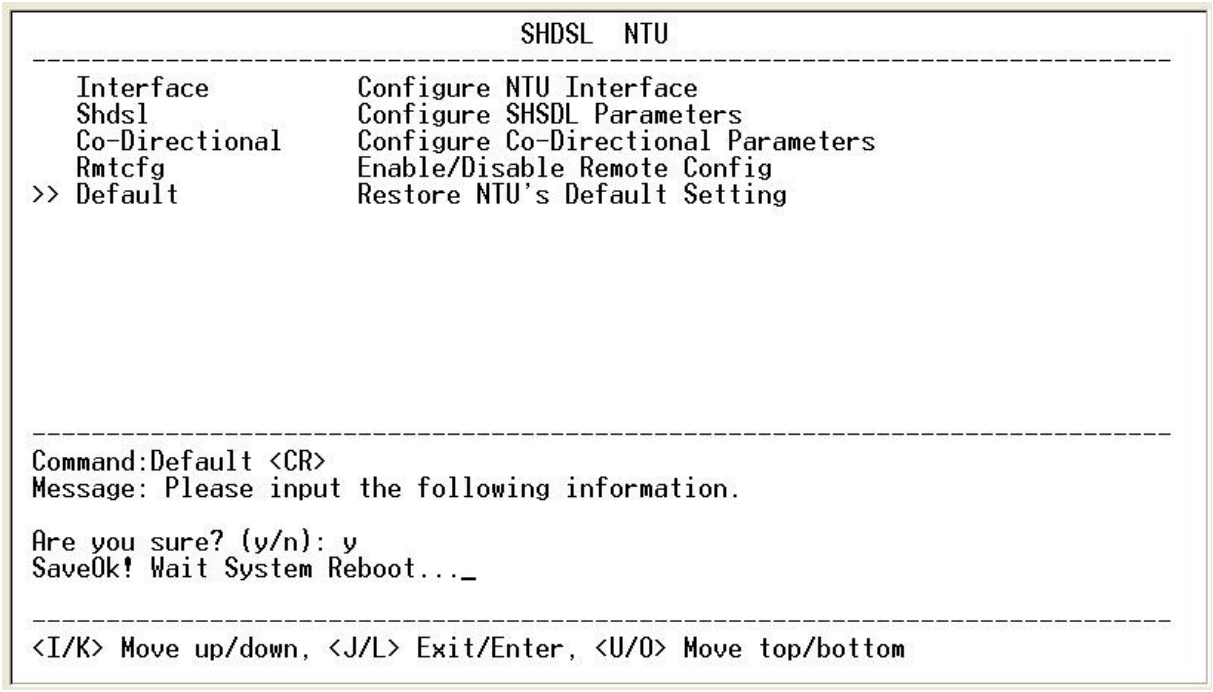
The G.SHDSL NTU can have all settings restored to their original factory settings simply by going to the setting menu, selecting the Default item, and then press ENTER. The system will ask for a y(es) or n(o) confirmation followed by an ENTER.



When display DONE, it means that is restore suceesfully.



Type “y” to comfirm to do this default operation.



If the setting of default vaule is finish, the device wil run system reboot operation automatic. Please waiting a moment, you can view the login screen again.

3.5.9 DIP Switch function

This function will using on without LCD display models:

5099GM-DA/2W/E1

5099GM-DA/2W/SER

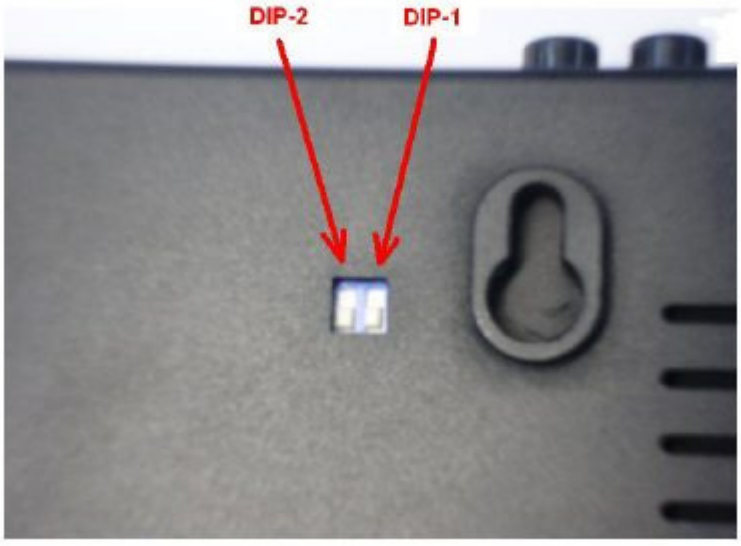
5099GM-DA/2W/ETH

5099GM-DA/2W/COD

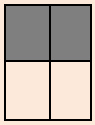
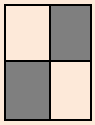
```
   CH A                              SHDSL  NTU
--------------------------------------------------------------------------------
   Interface           Configure NTU Interface
   Shdsl               Configure SHSDL Parameters
   Co-Directional      Configure Co-Directional Parameters
   Rmtcfg              Enable/Disable Remote Config
   Default             Restore NTU's Default Setting
>> DIP SW              Configure if DIP SW is enabled









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

Change Dip SW Configuration (TAB Select) <On>: On


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

If set DIP SW enable, it means the SHDSL mode setting by DIP switch, not by console.-

There have DIP Switch on the bottom side of housing of the following:



	DIP-2	DIP-1
OFF	INTCLK	STU-C
ON	EXTCLK	STU-R

STU-R	STU-C-INTCLK	STU-C-EXTCLK
		

When DIP SW set enable, the SHDSL Mode setting on console can't be used. It will show "The item can only be set using DIP SW"

```
   CH A                              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
   Backward             Configure SHDSL Backwards Compatibility









--------------------------------------------------------------------------------
Command:Mode <CR>
Message:  This item can only be set using DIP SW



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

3.6 [Network] Setup the network parameter

This section provides information about network configure of the G.SHDSL NTU. Follow the procedures:

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

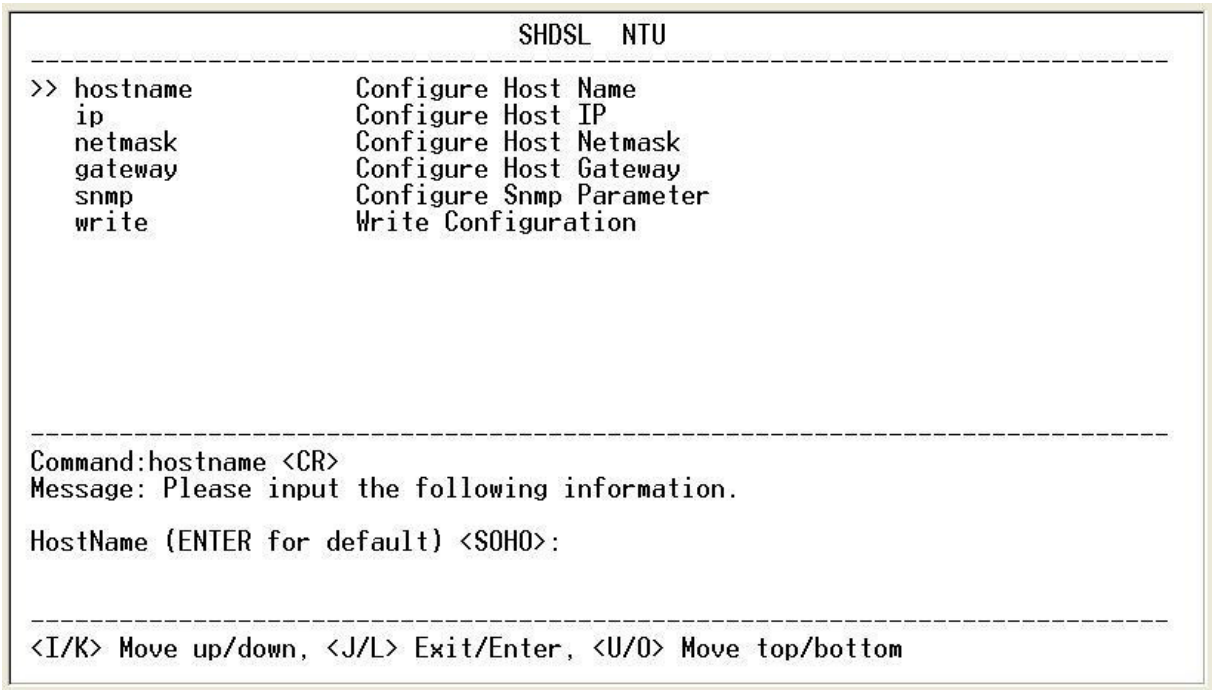
```
                                SHDSL  NTU
--------------------------------------------------------------------------------
   setup                Configure NTU  Parameters
>> network              Configure Network Parameters
   status               Show running system status
   show           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




--------------------------------------------------------------------------------
Command:network <more...>
Message:



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

The screen will prompt as following:

```
                                SHDSL  NTU
--------------------------------------------------------------------------------
>> hostname             Configure Host Name
   ip                   Configure Host IP
   netmask              Configure Host Netmask
   gateway              Configure Host Gateway
   snmp                 Configure Snmp Parameter
   write                Write Configuration







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



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

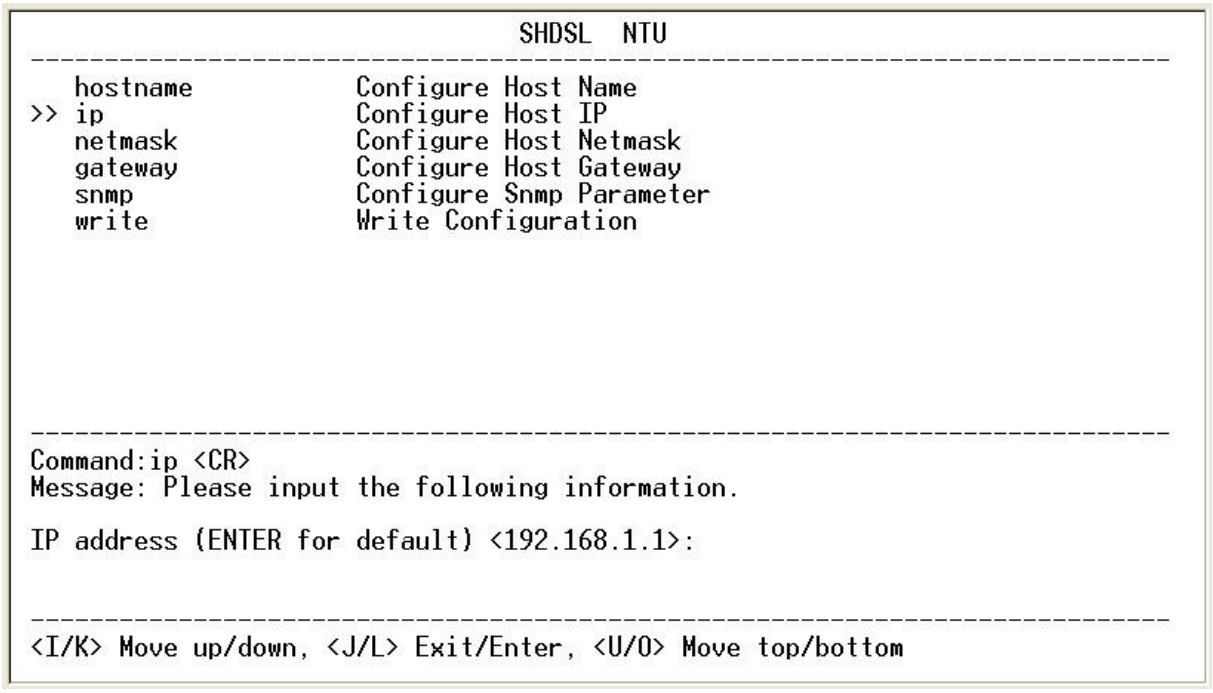
The network setup include the hostname, IP, net mask, gateway and SNMP.

Setup Network Parameter, hostname



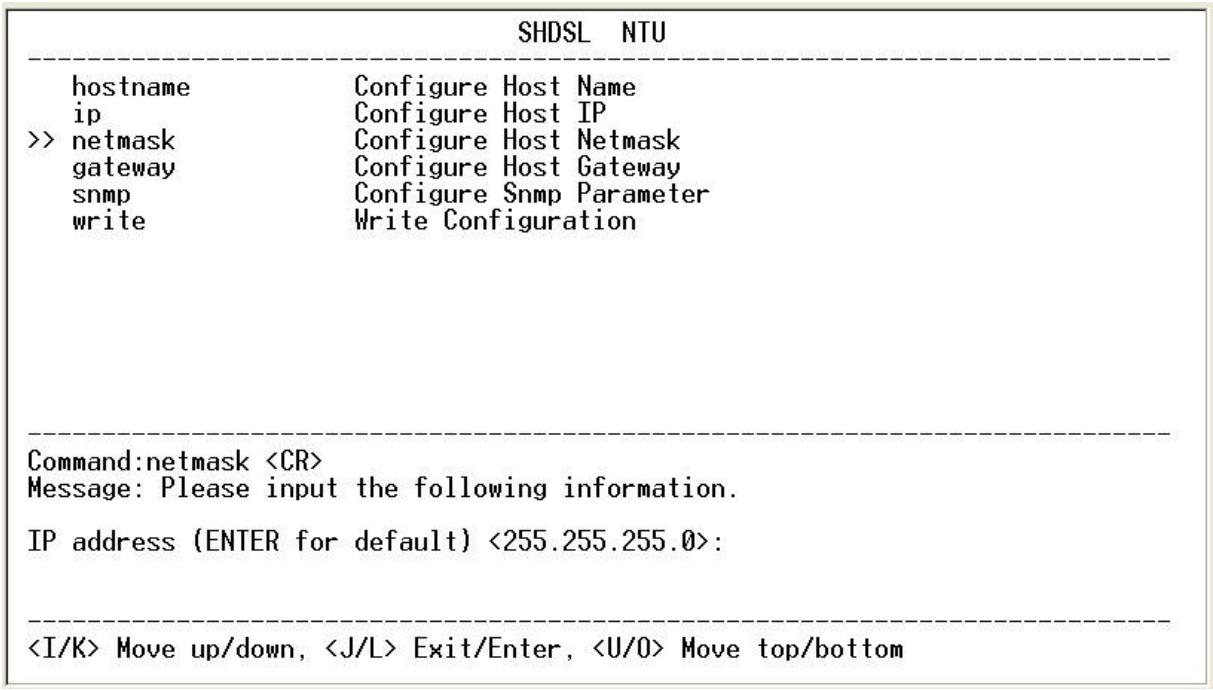
A Host Name is the unique name by which a network-attached. The hostname is used to identify a particular host in various forms of electronic communication. The default name is “SOHO”.

Setup Network parameter, IP



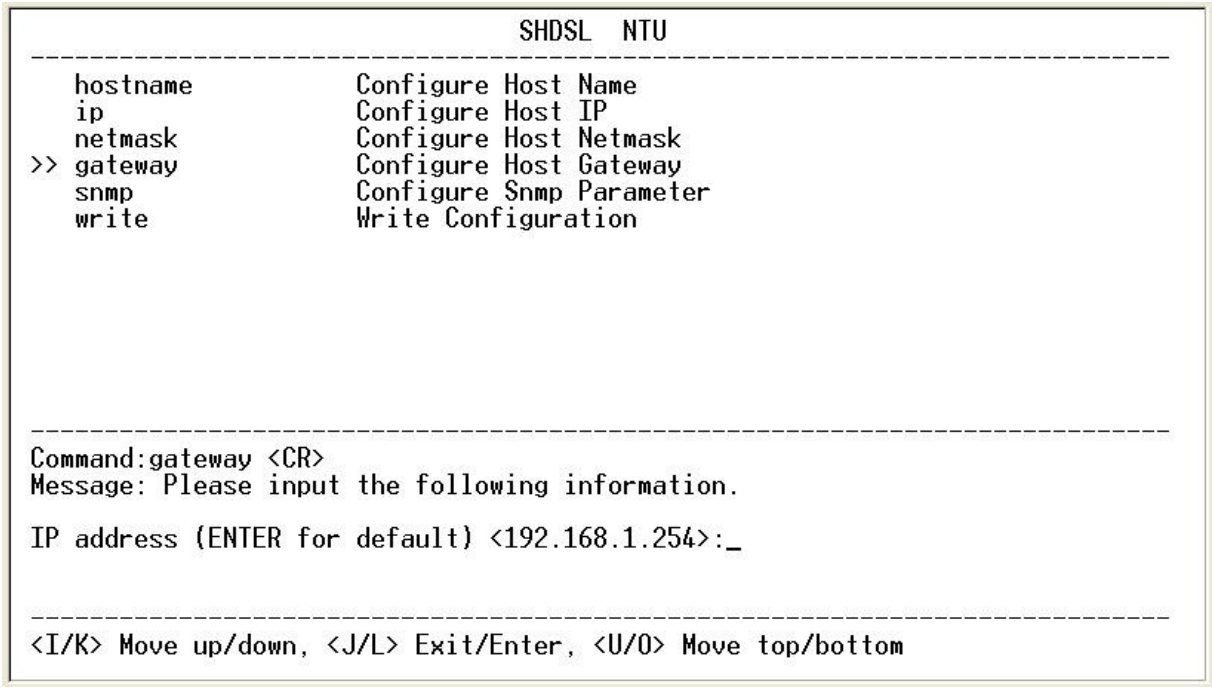
You can set host IP address on here.

Setup Network parameter, Net Mask



You can set Net Mask on here.

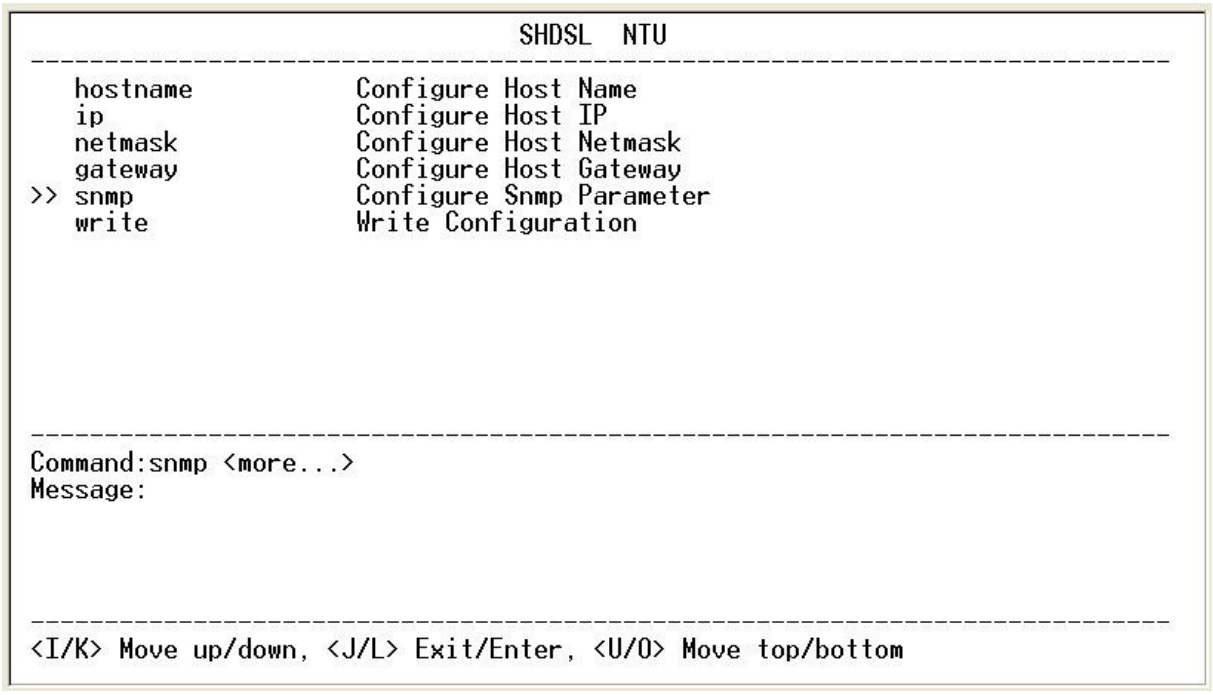
Setup Network parameter, Gateway



You can set gateway on here.

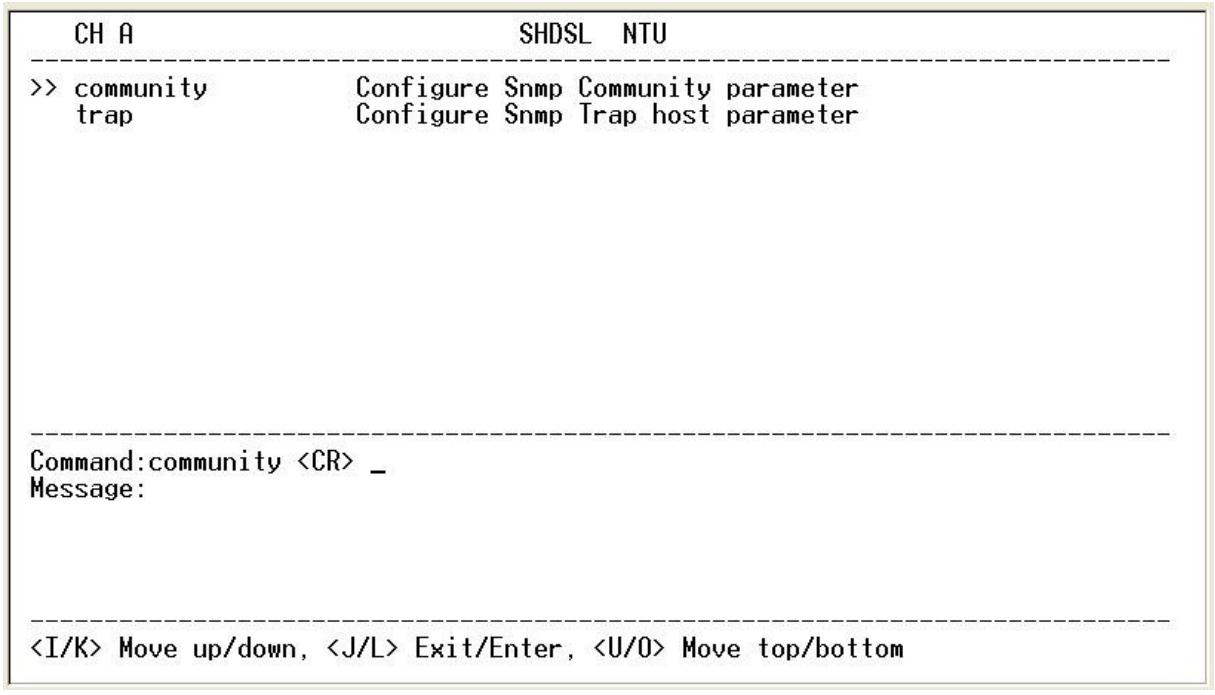
Simple Network Management Protocol (SNMP) provides for the exchange of messages between a network management client and a network management agent for remote management of network nodes. These messages contain requests to get and set variables that exist in network nodes in order to obtain statistics, set configuration parameters, and monitor network events.

Setup Network parameter, SNMP

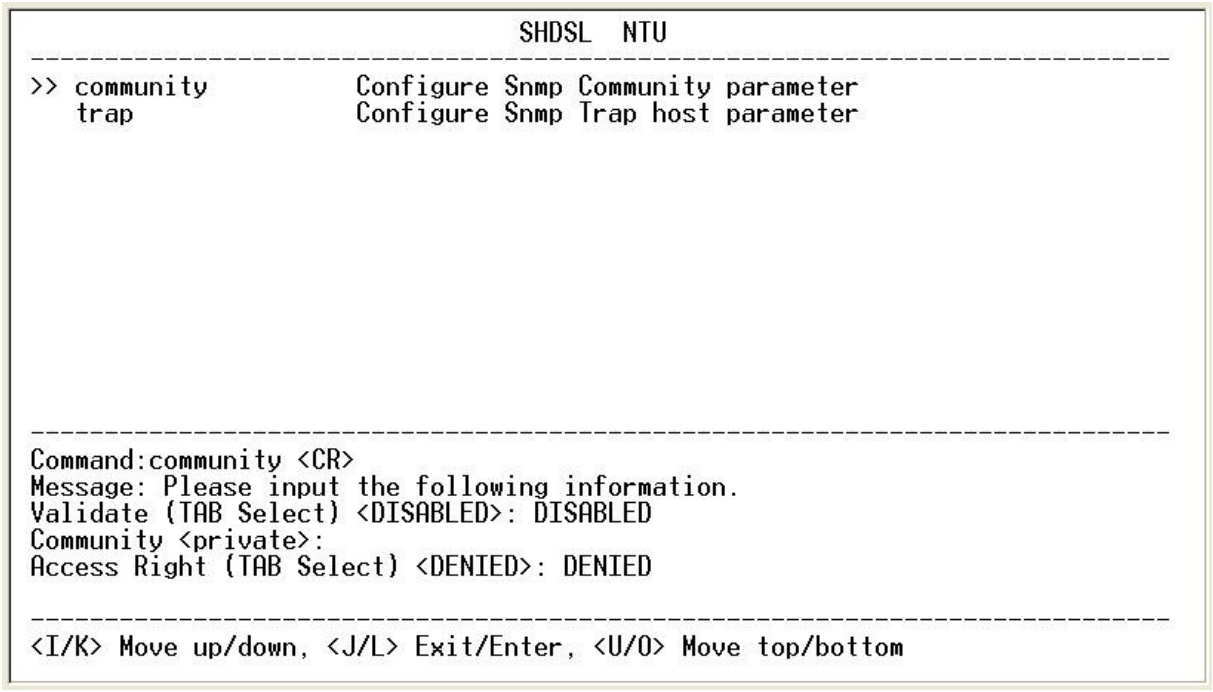


There are two configure items: community and trap

Setup Network parameter, SNMP, Community



There are three items setting on community:



Validate: It can turn on(**Enable**) or turn off(**Disable**) of SNMP function

Community: It serves as password for access right.

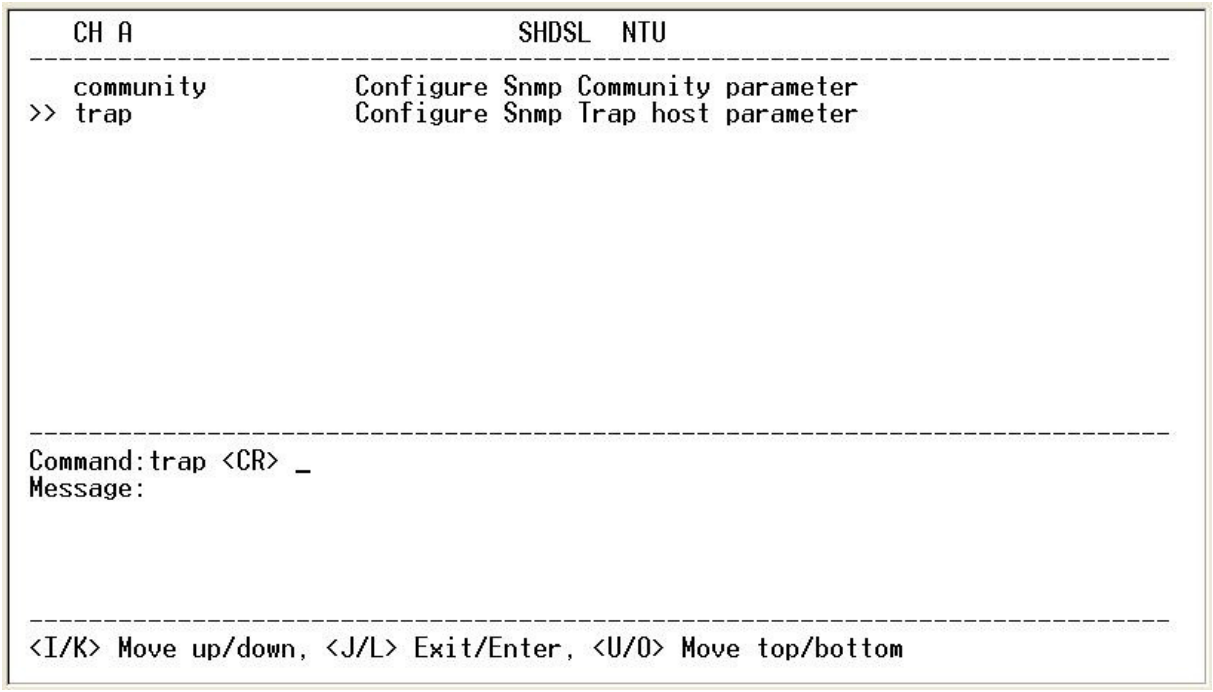
Access Right:

Deny for deny all access

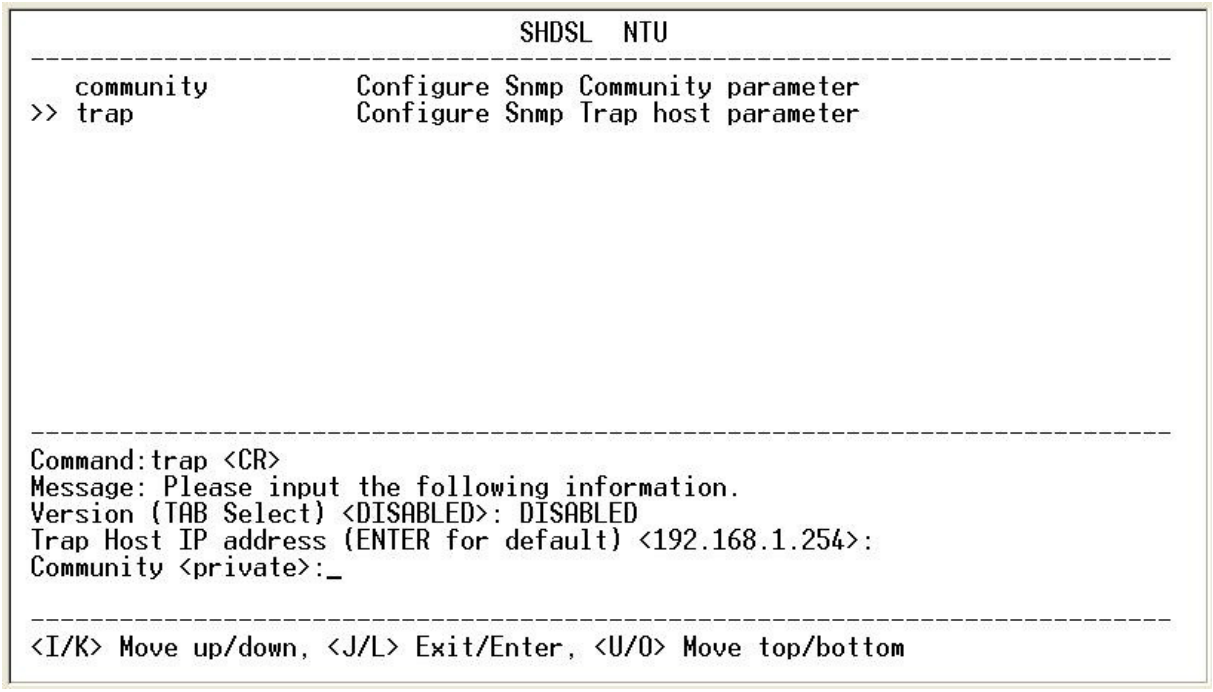
Read_only for access read only

Read_Write for access read and write.

Setup Network parameter, SNMP, trap



There are three items setting on trap:



Trap host Version:

Disable : disable the function of trap host

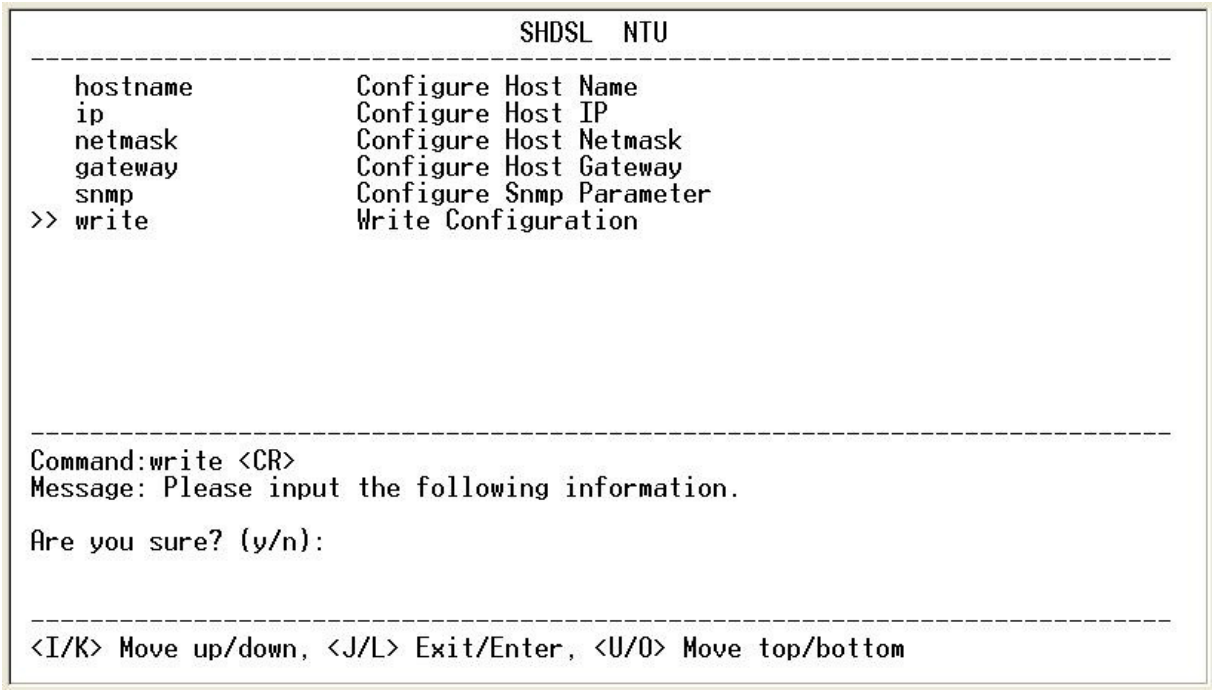
V 1 : Trap host Version 1

V2C : Trap host Version 2C

Trap host IP address: type the trap host IP address

Community: type the community password

Setup Network parameter, write



When finish on setting the network parameter, user must use write command. It can make those parameter can take effect.

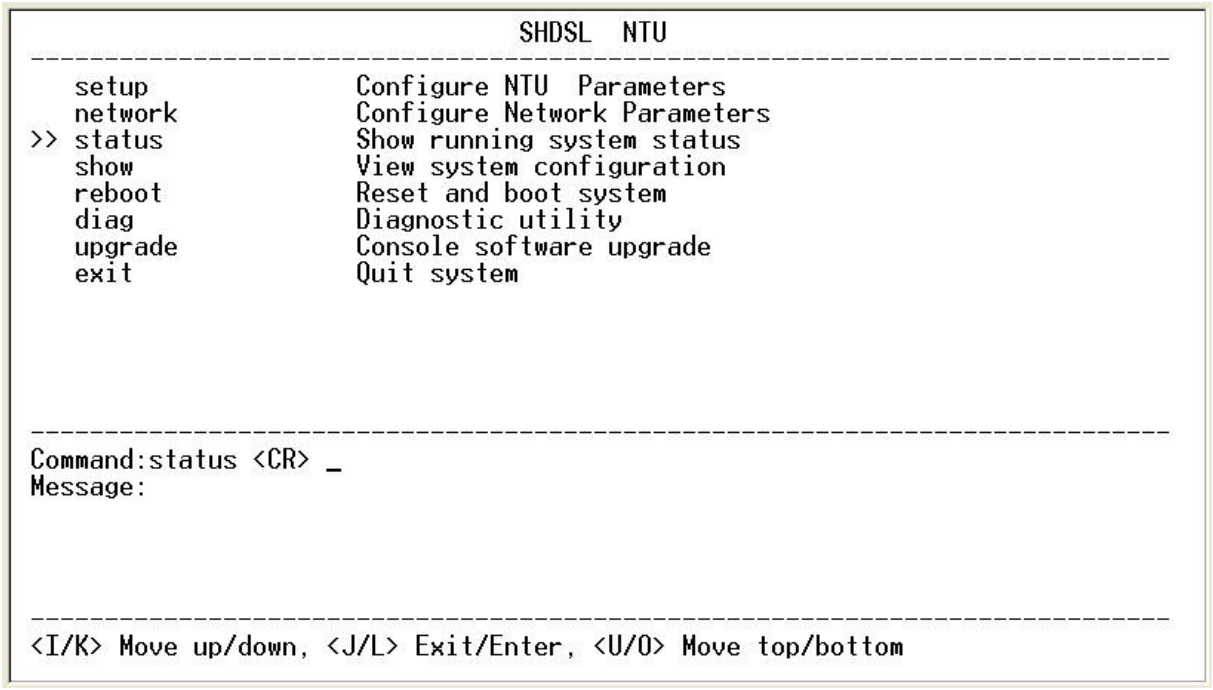
Setting table on Network parameter:

Host name			
IP Address			
Net mask			
Gateway			
SNMP	Community	Function	Diabale / Enable
		Community	
		Access Right	Denied / Read only / Read write
	Trap	Function	Diabale / V1 / V2C
		Host IP address	
		Community	

3.7 [Status] View the system status

You can use the status command to view the status of SHDSL, E1, Serial, Interface and Co-directional 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.



3.7.1 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.

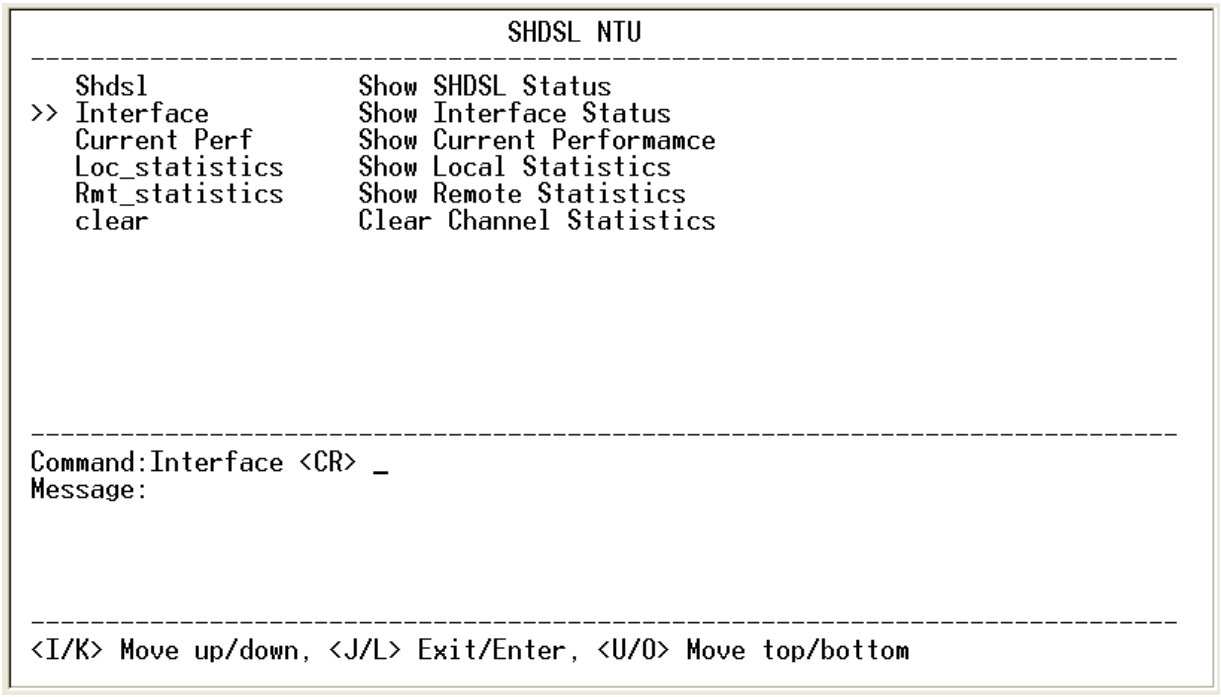
Table of SHDSL Line rate vs. Data rate:

SHDSL Line rate	Data Rate (kbps)		
	Number of time slot for E1	Nx64K for Serial and Ethernet	Co-directional
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	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.

3.7.2 Show Interface Status

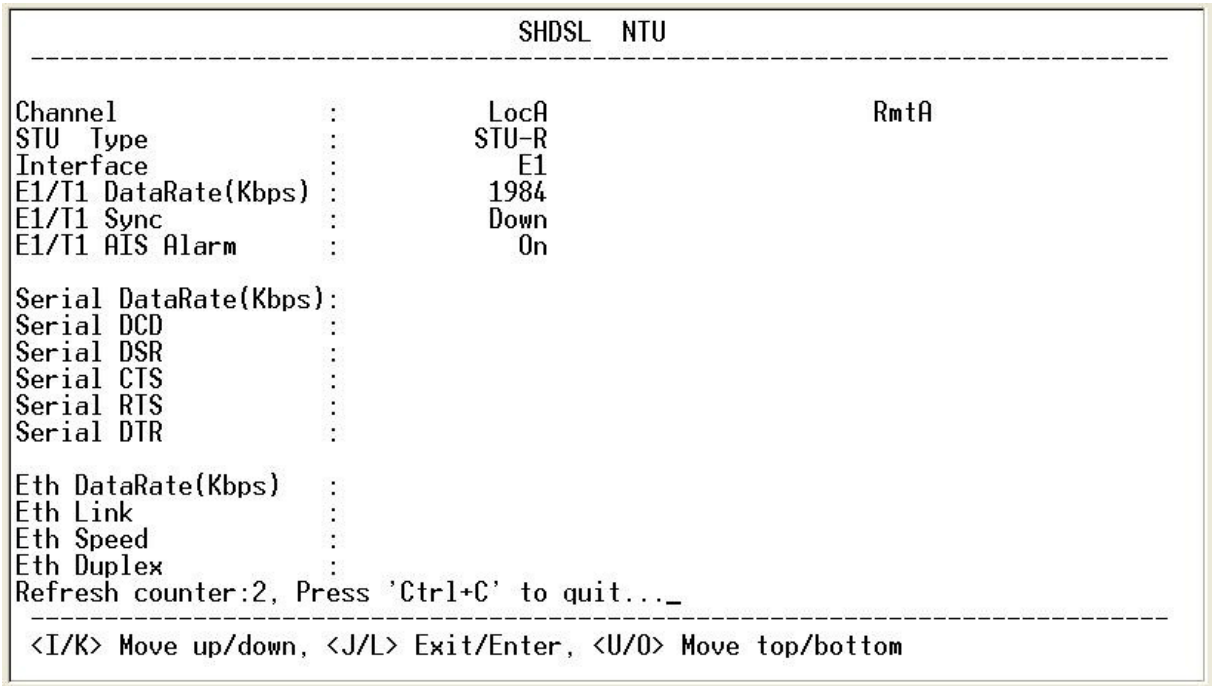
Select the Interface command to show the Interface status:



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

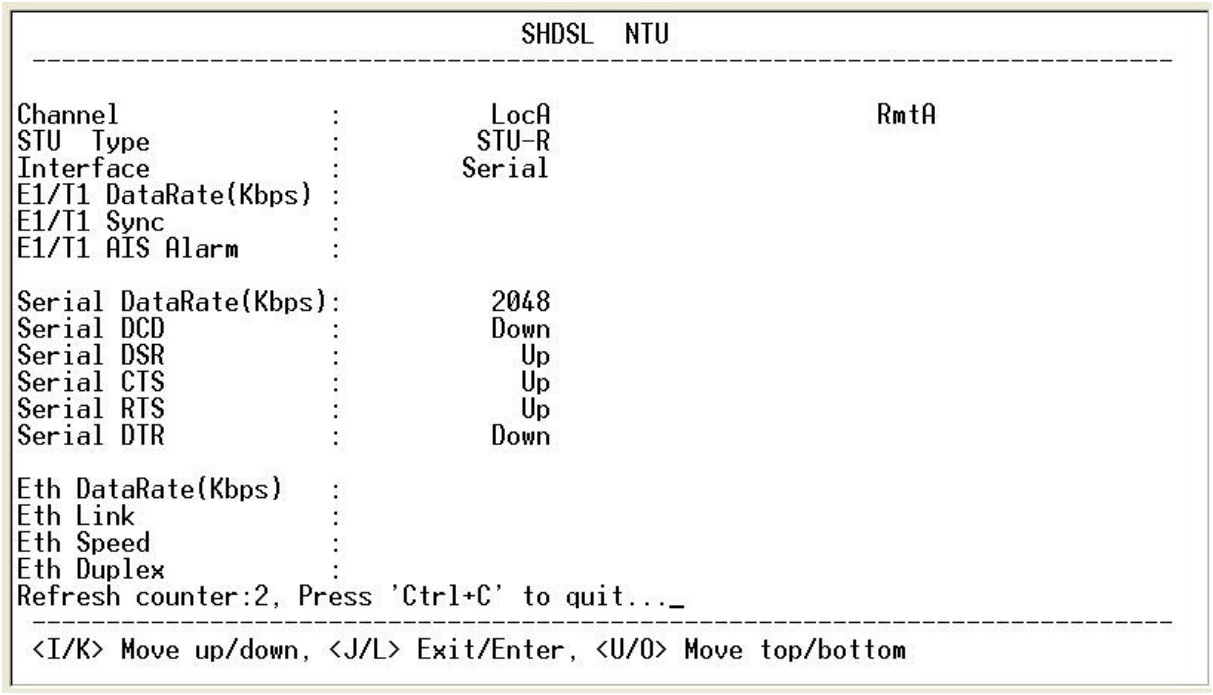
For E1 interface **5066GM-DA/2W/E1**

5066GM-DA/2W/E1/LCD



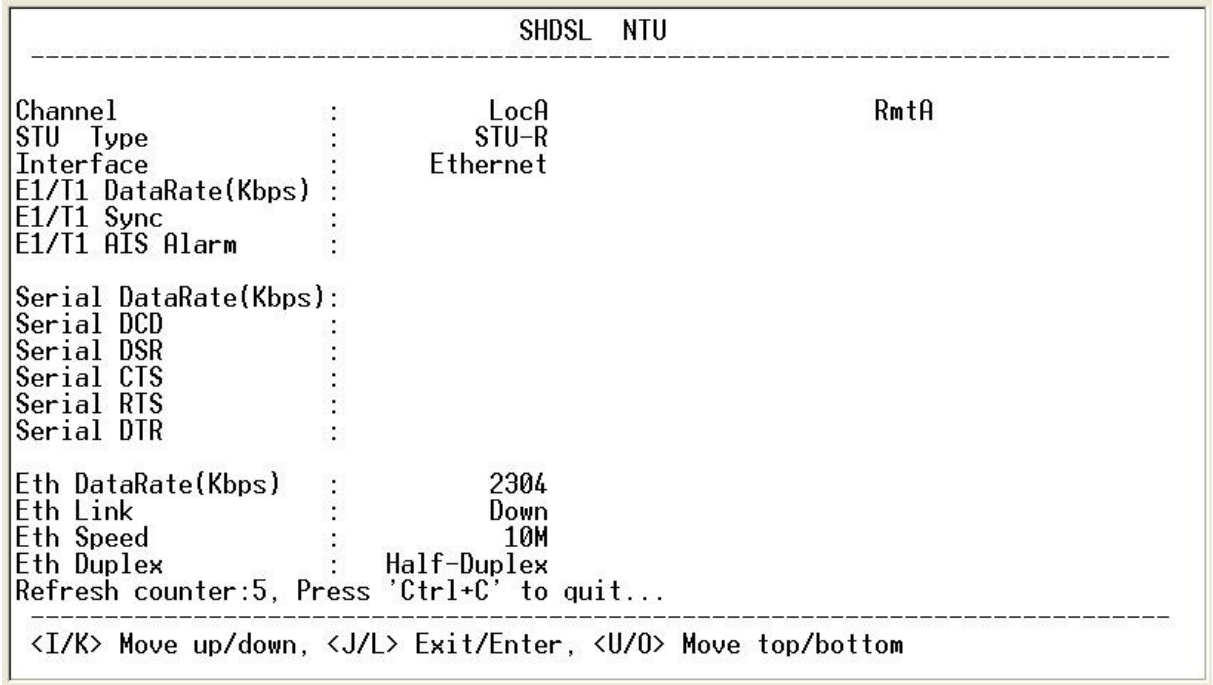
For Serial interface **5066GM-DA/2W/SER**

5066GM-DA/2W/SER/LCD



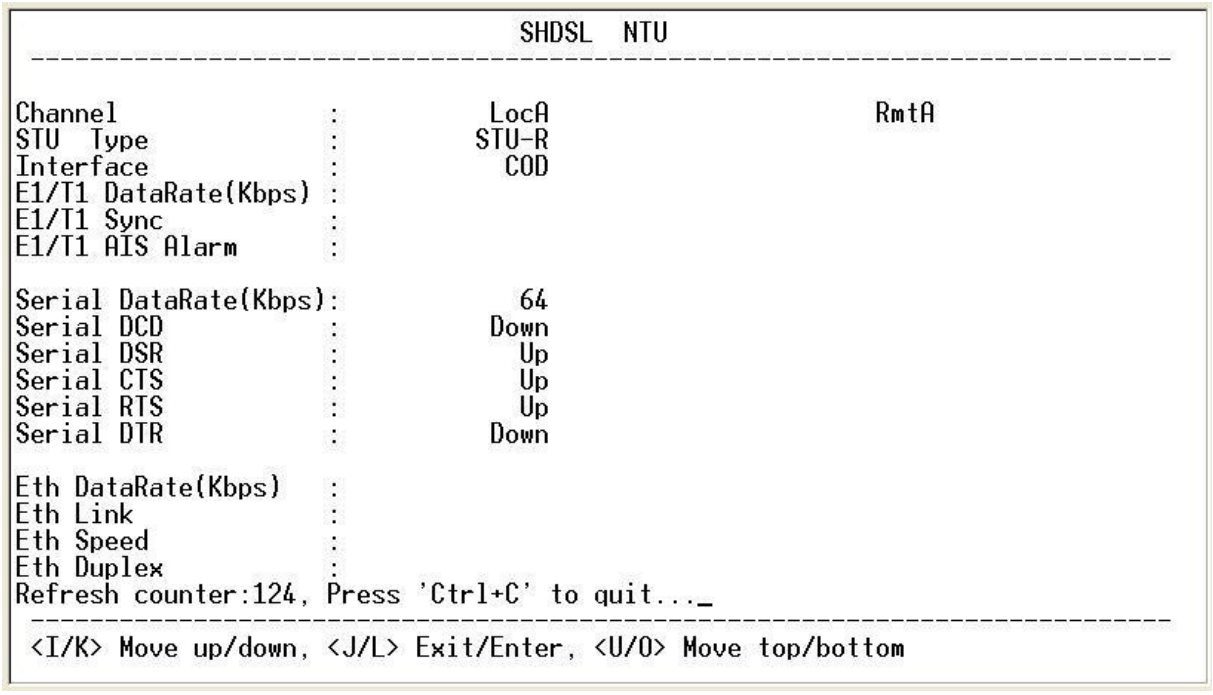
For Ethernet interface **5066GM-DA/2W/ETH**

5066GM-DA/2W/ETH/LCD



For Co-directional interface **5066GM-DA/2W/COD**

5066GM-DA/2W/COD/LCD



3.7.3 Show Current Performance

Select Current Perf command to show the Current Performance.

```
                                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:Current Perf <CR> _
Message:



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

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              :      Ethernet
Current 15Min  ES      :             0
               SES     :             0
               UAS     :           432
               LOSWS   :             0
Current 24Hour ES      :             0
               SES     :             0
               UAS     :          6732
               LOSWS   :             0

E1/T1 Performance
Current 15Min  ES      :             0
               SES     :             0
               UAS     :             0
Current 24Hour ES      :             0
               SES     :             0
               UAS     :             0
Refresh counter:128, Press 'Ctrl+C' to quit...
 ------------------------------------------------------------------------------
 <I/K> Move up/down, <J/L> Exit/Enter, <U/O> Move top/bottom
```

When the device connect to remote side, is also can view their accumulated performance data.

It can view the accumulated performance data of the following:

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

3.7.4 View the Local and remote Statistics

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

```
                                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:Loc_statistics <CR>
Message:



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

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

```
                                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:Loc_statistics <CR>
Message: Please input the following information.

Shdsl Channel Statistics (TAB Select) <15m>: 15m


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

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.

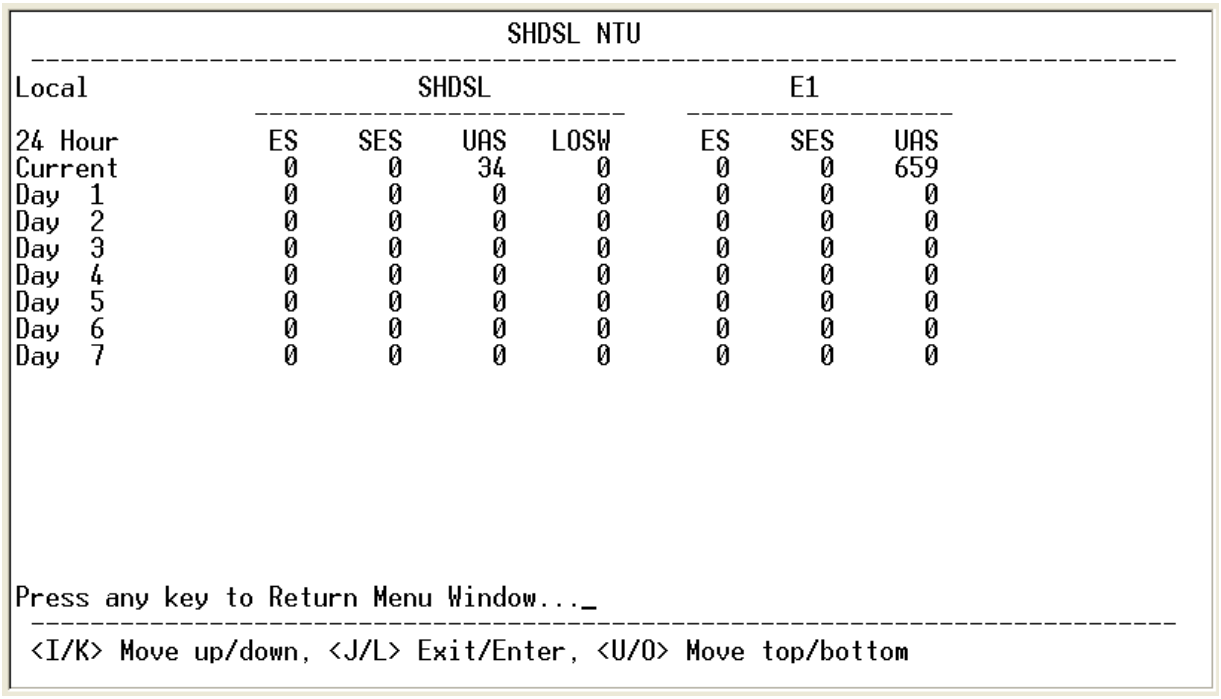
The performance monitor is capable of storing and retrieving performance information for each 24 hour interval, up to 7 days.

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

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

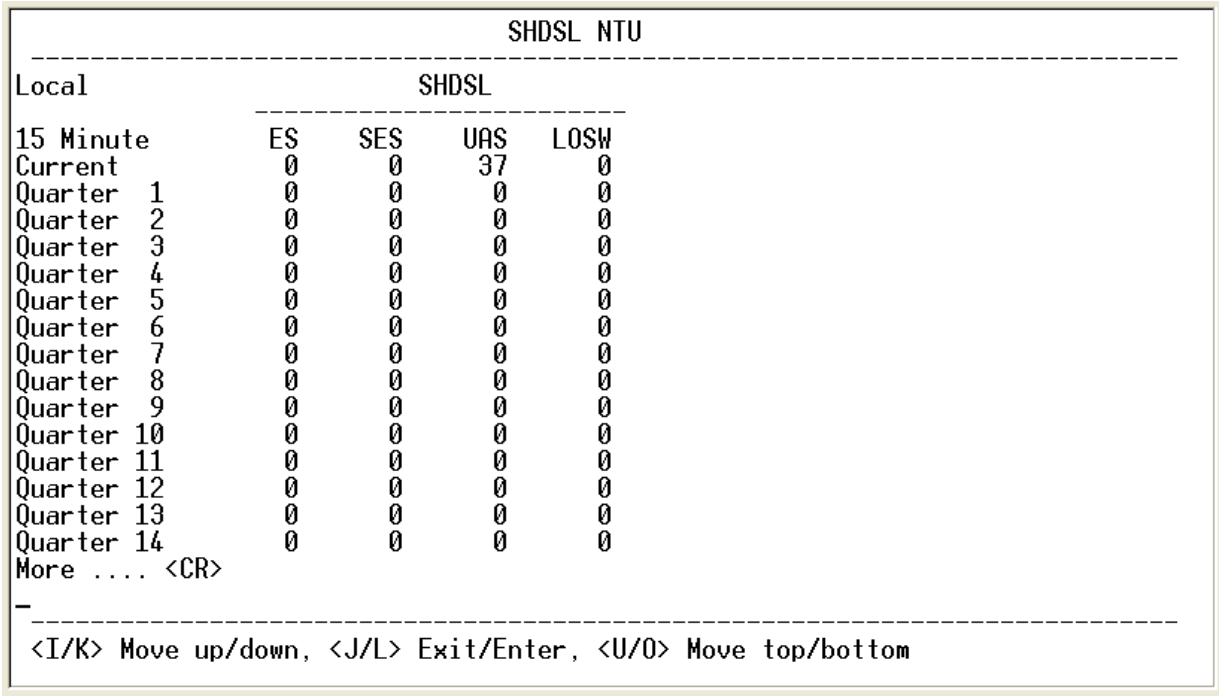
```
                                 SHDSL NTU
 -----------------------------------------------------------------------------
Local                       SHDSL                       E1
                 -------------------------      ------------------
15 Minute         ES     SES     UAS    LOSW      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:



For **Serial, Ethernet Interface and Co-directional models**, there have only SHDSL item.

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



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.

```
                              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:Rmt_statistics <CR> _
 Message:

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

Abbreviation table:

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

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.

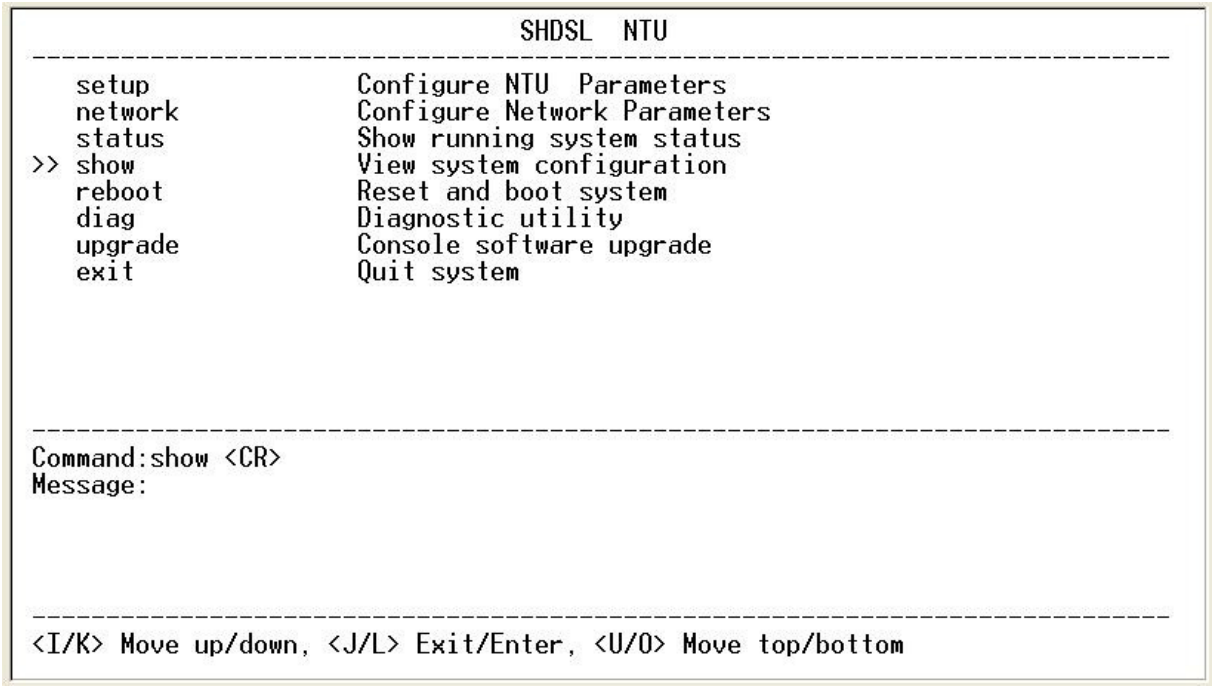
3.7.5 Clear Channel Statistics

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
```

3.8 [Show] View System Configuration

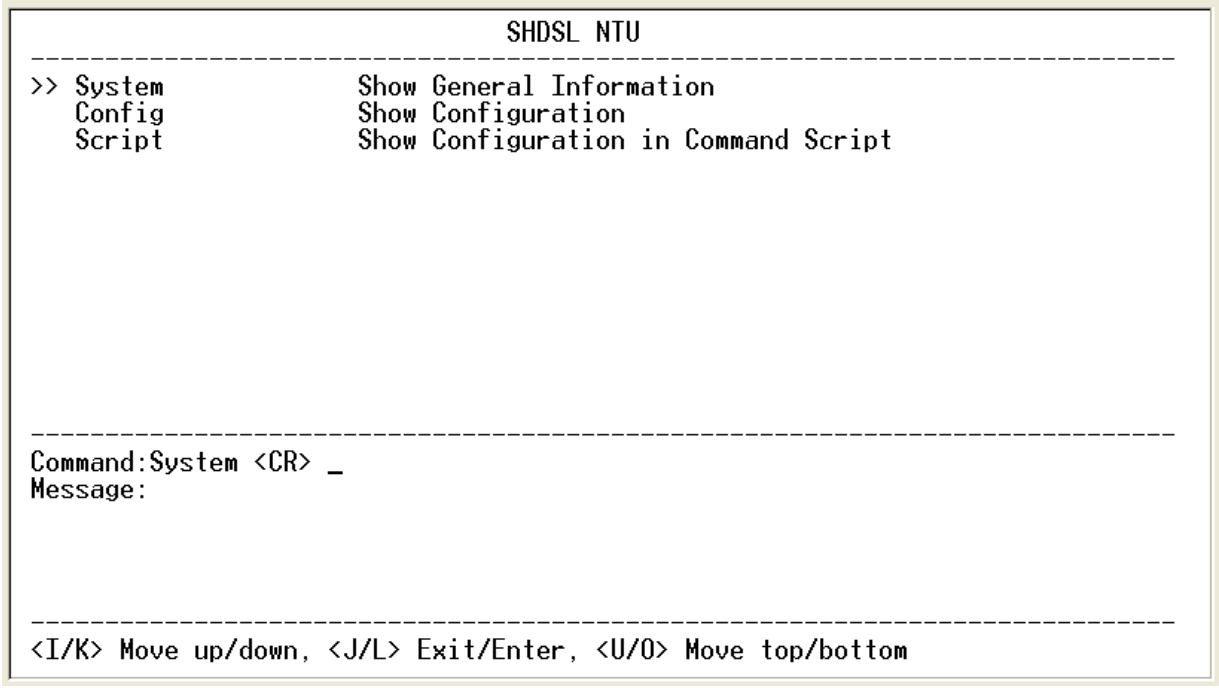
By using show command, you can view the system configuring. Select **show** and press [ENTER] or [RIGHT].



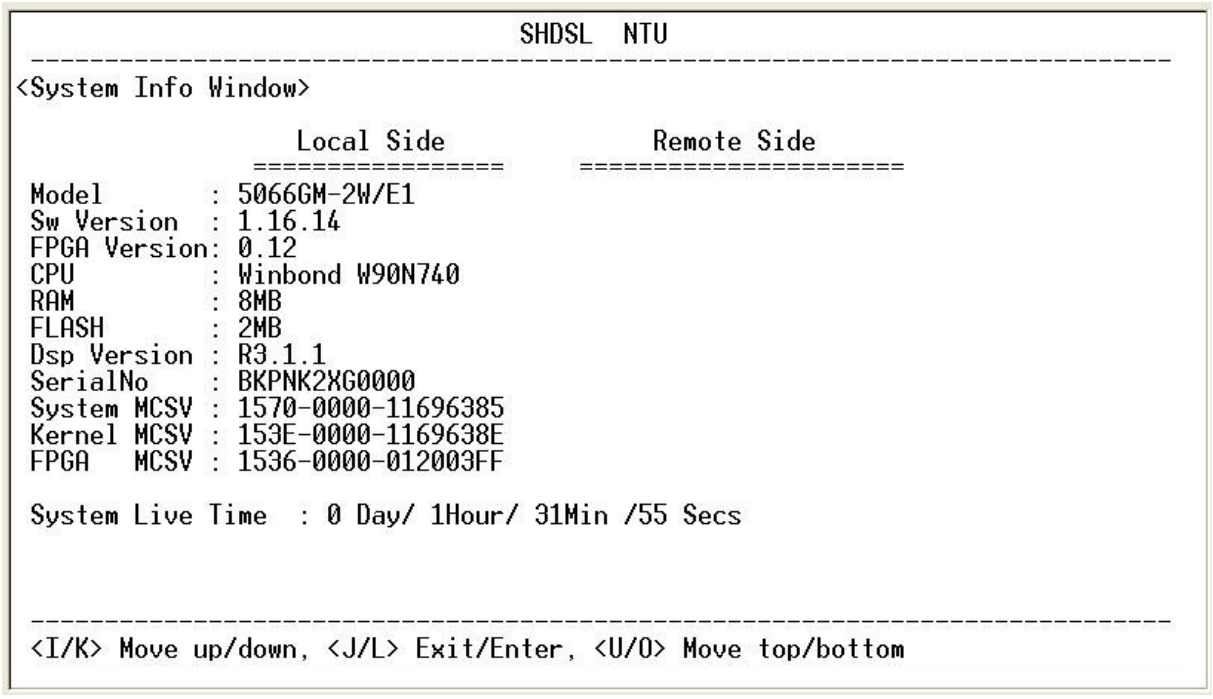
There have three types of screen can view: system information, configuration listing and configuration with script format.

3.8.1 Show General Interface

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



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



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.

If the device can connect to remote side, you can also view the remote side's information.

3.8.2 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 models 5066GM-DA/2W/E1
5066GM-DA/2W/E1/LCD

```
                                SHDSL  NTU
 ------------------------------------------------------------------------------
Showing System Configuration...

setup Interface             :            E1
setup Type                  :         STU-R
setup Shdsl Annex           :       Annex-B
setup Shdsl Psd             :  ASYM_DISABLE
setup Shdsl Margin          :             0
setup Shdsl Power BackOff   :       Disable
setup Shdsl Backward        :           Off
setup E1 Channel            :        PCM31C
setup E1 Pass Through       :           Off
setup E1 Slot Number        :            31
setup E1 First Slot         :             1
setup E1 Code               :          HDB3
setup E1 AIS                :            On
setup E1 Build Outs         :       120 Ohm

Press any key to Return Menu Window..._
```

For Serial interface models 5066GM-DA/2W/SER
5066GM-DA/2W/SER/LCD

```
                                SHDSL  NTU
 ------------------------------------------------------------------------------
Showing System Configuration...

setup Interface             :        Serial
setup Type                  :         STU-R
setup Shdsl Annex           :       Annex-B
setup Shdsl Psd             :  ASYM_DISABLE
setup Shdsl Margin          :             0
setup Shdsl Power BackOff   :       Disable
setup Shdsl Backward        :           Off
setup Serial Interface      :           V35
setup Serial Data Rate      :             1
setup Serial Clock          :        normal
setup Serial Data           :        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 models 5066GM-DA/2W/ETH
5066GM-DA/2W/ETH/LCD

```
                                SHDSL  NTU
 ------------------------------------------------------------------------------
Showing System Configuration...

setup Interface             :      Ethernet
setup Type                  :         STU-R
setup Shdsl Annex           :       Annex-B
setup Shdsl Psd             :  ASYM_DISABLE
setup Shdsl Margin          :             0
setup Shdsl Power BackOff   :       Disable
setup Shdsl Backward        :           Off
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 Co-directional interface models 5066GM-DA/2W/COD
5066GM-DA/2W/COD/LCD

```
                                SHDSL  NTU
 ------------------------------------------------------------------------------
Showing System Configuration...

setup Interface             :          COD
setup Type                  :         STU-R
setup Shdsl Annex           :       Annex-B
setup Shdsl Psd             :  ASYM_DISABLE
setup Shdsl Margin          :             0
setup Shdsl Power BackOff   :       Disable
setup Shdsl Backward        :            On
setup Serial Data Rate      :             1

Press any key to Return Menu Window...
```

3.8.3 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 models 5066GM-DA/2W/E1
5066GM-DA/2W/E1/LCD

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

setup mode STU-R
setup Shdsl Interface E1
setup Shdsl Annex Annex-B
setup Shdsl Psd ASYM_DISABLE
setup Shdsl Margin 0
setup Shdsl Pwr Backoff Disable
setup Shdsl Backward Off
setup E1 Channel PCM31C Off  31
setup E1 code HDB3
setup E1 ais On
setup E1 build_outs 120 Ohm

Press any key to Return Menu Window..._
```

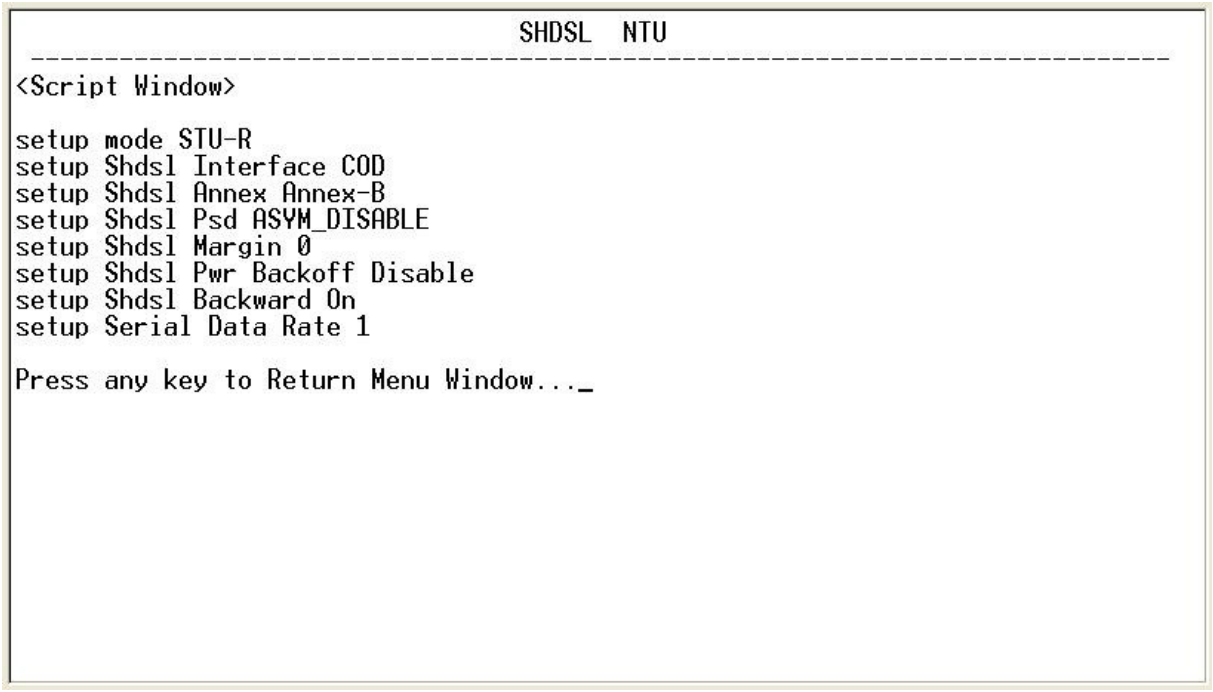
For Serial interface models 5066GM-DA/2W/SER
5066GM-DA/2W/SER/LCD

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

setup mode STU-R
setup Shdsl Interface Serial
setup Shdsl Annex Annex-B
setup Shdsl Psd ASYM_DISABLE
setup Shdsl Margin 0
setup Shdsl Pwr Backoff Disable
setup Shdsl Backward Off
setup Serial Interface V35
setup Serial Data Rate 1
setup Serial Clock normal
setup Serial Data  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 5066GM-DA/2W/ETH
5066GM-DA/2W/ETH/LCD

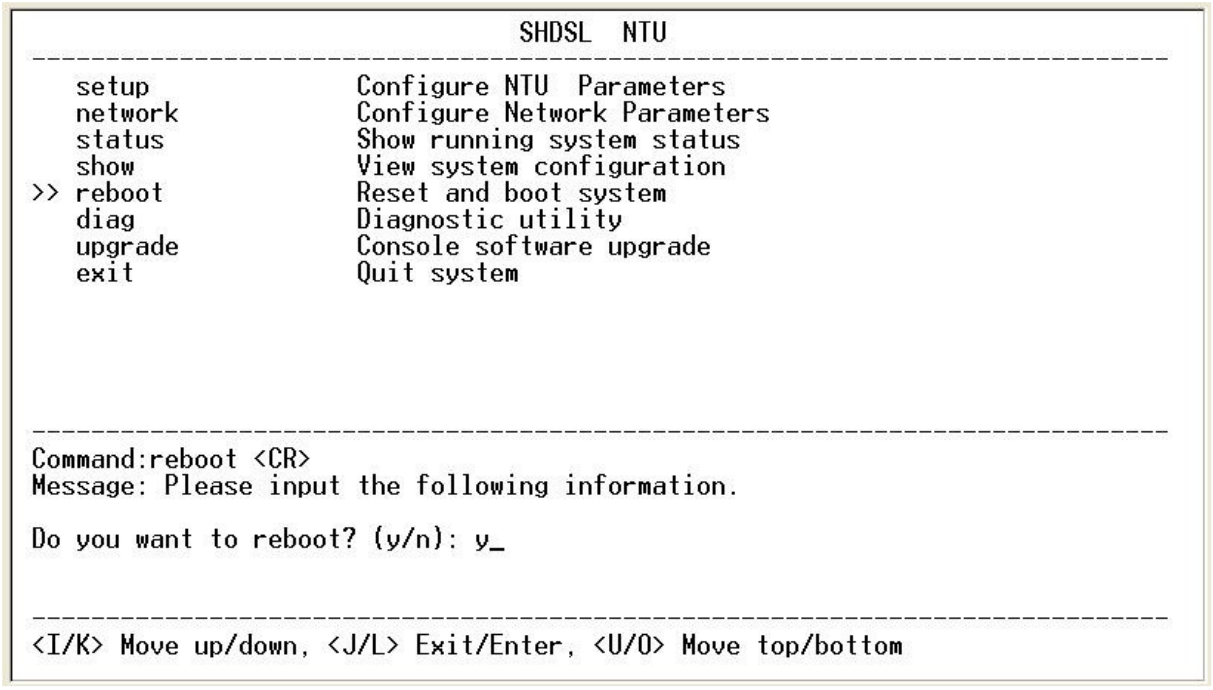
```
                                SHDSL  NTU
 ------------------------------------------------------------------------------
<Script Window>

setup mode STU-R
setup Shdsl Interface Ethernet
setup Shdsl Annex Annex-B
setup Shdsl Psd ASYM_DISABLE
setup Shdsl Margin 0
setup Shdsl Pwr Backoff Disable
setup Shdsl Backward Off
setup Ethernet Auto Enable
setup Ethernet Duplex Full-Duplex
setup Ethernet Speed 100M

Press any key to Return Menu Window...
```

For Co-directional interface models 5066GM-DA/2W/COD
5066GM-DA/2W/COD/LCD



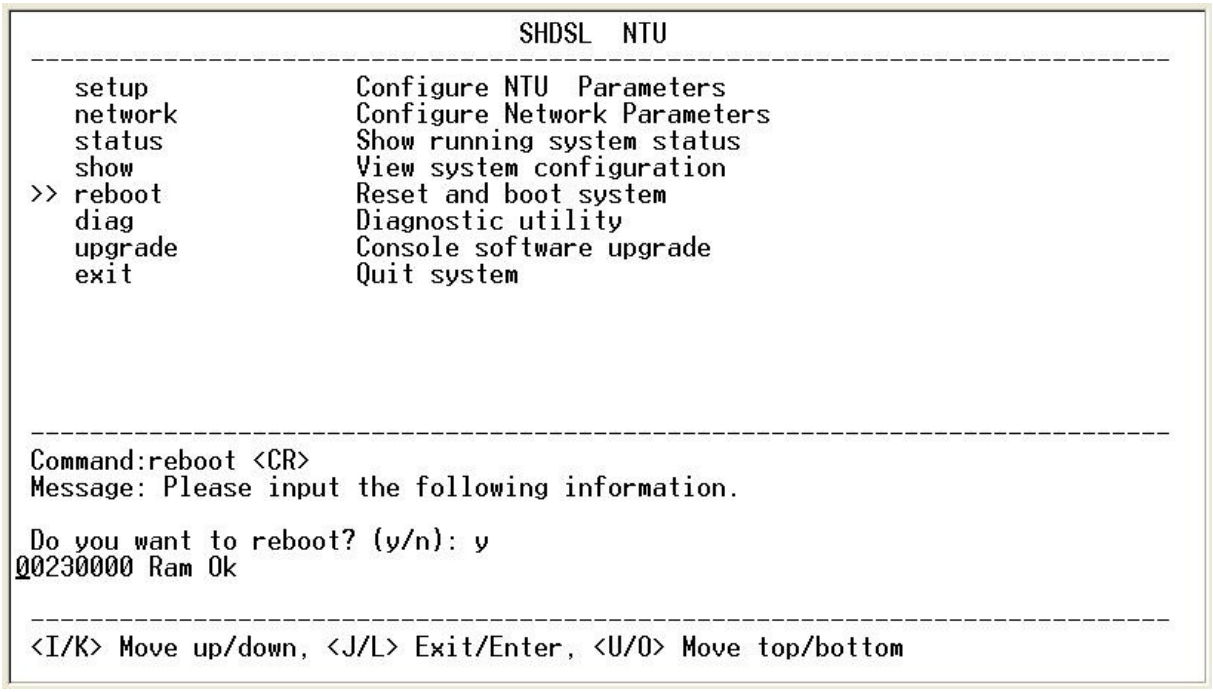
3.9 [Reboot] Reboot the system

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



User can type “y” to confirm the reboot operation.

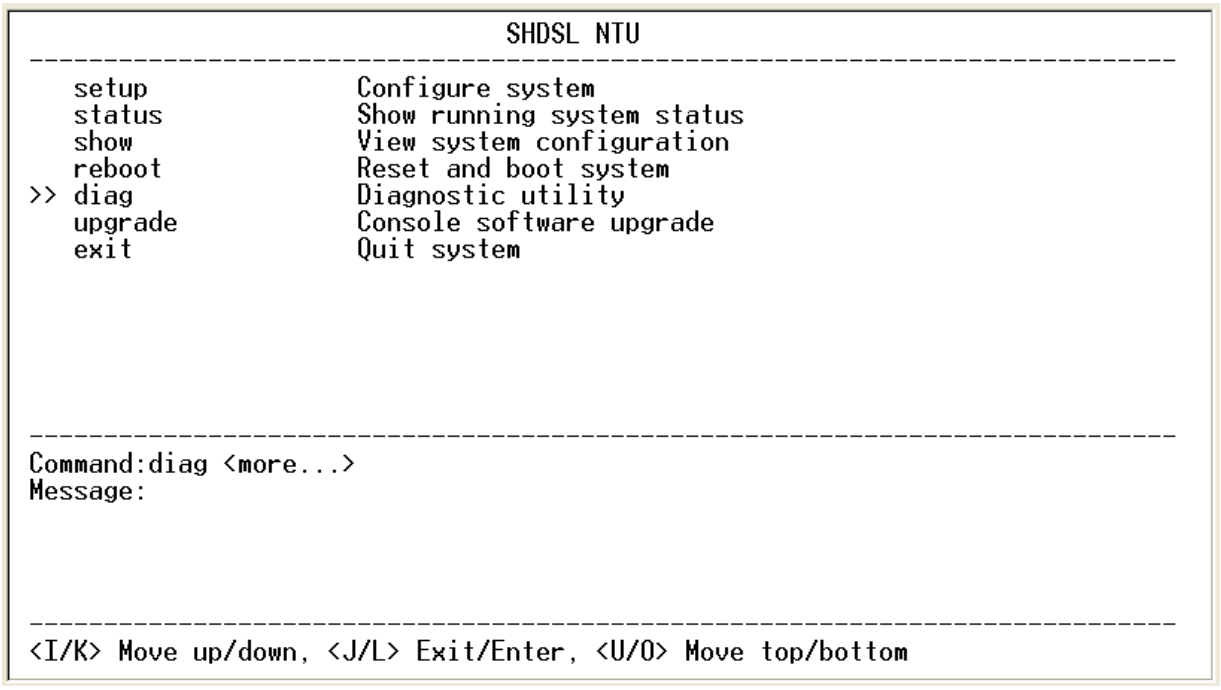
After the reboot operation have finished, RAM test are starting again.



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

3.10 [Diag] Diagnostic – Loopback and BER Test

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



3.10.1 Loopback test

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

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

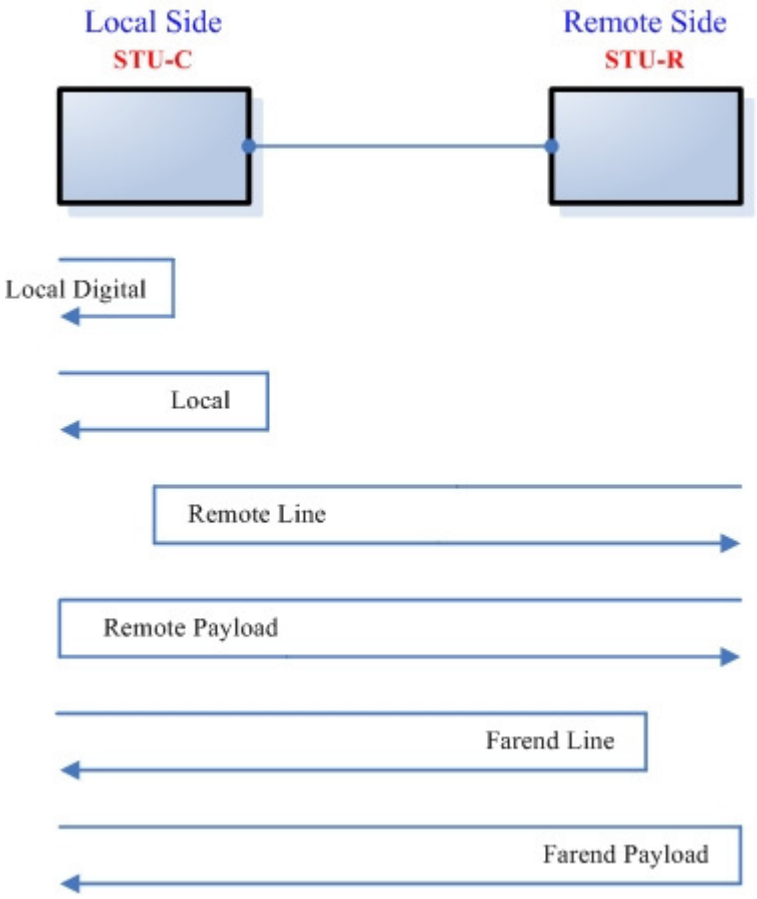
```
                                SHDSL NTU
--------------------------------------------------------------------------------
>> Loopback            Execute Loopback
   BerTest              Execute Local Ber Test









--------------------------------------------------------------------------------
Command:Loopback <CR>
Message:



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

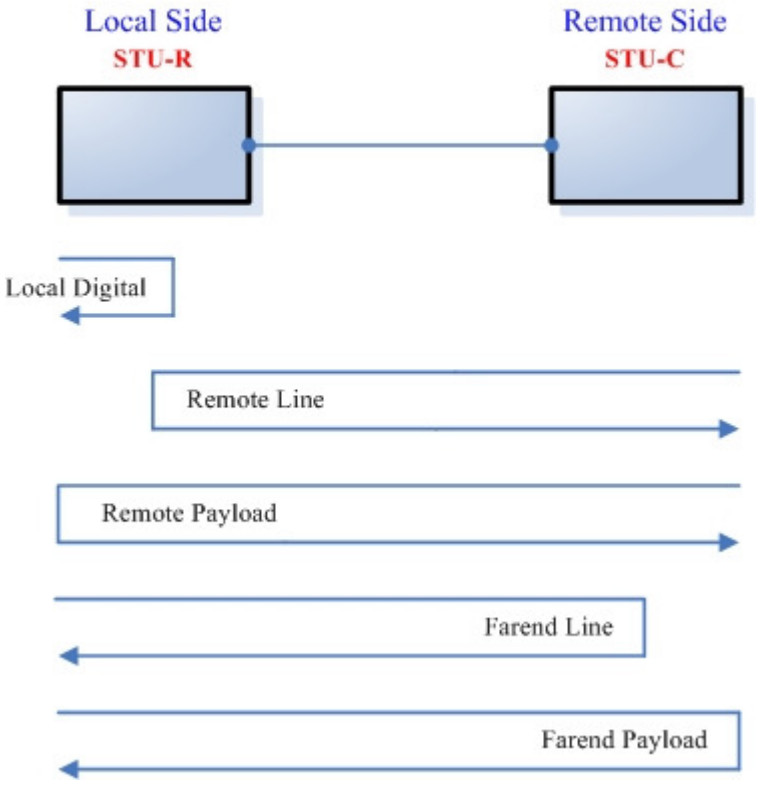
The loopback screen is as following:

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









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

Change Loopback (TAB Select) <Disable>: Local Digital


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

There are six types of loopback:

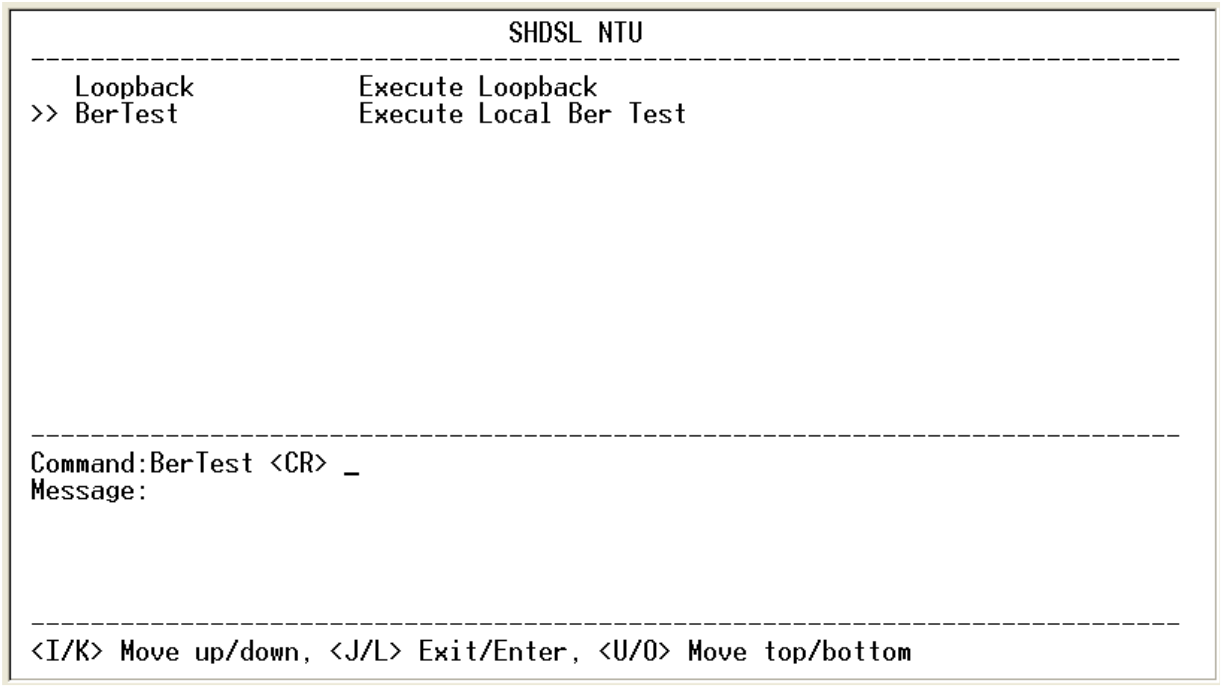
- **Local digital loopback**
- **Local loopback**
- **Remote Line**
- **Remote Payload**
- **Farend Line**
- **Farend Payload**


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

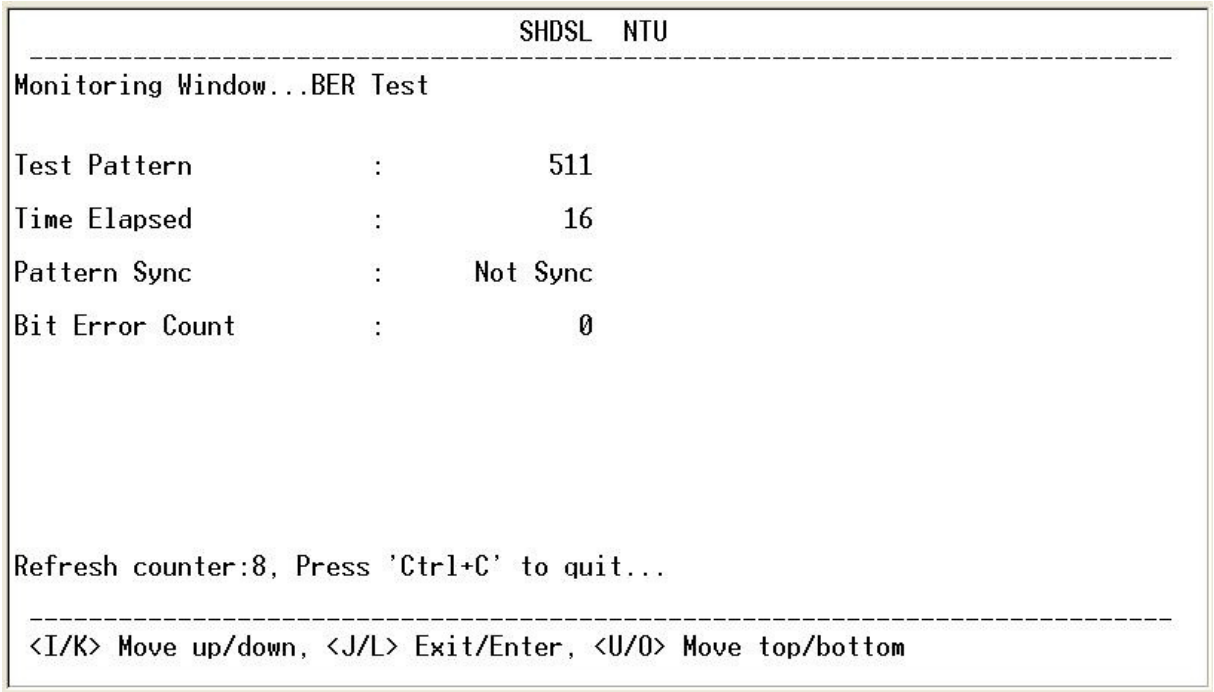

Local Side
STU-R
Remote Side
STU-C
Local Digital
Remote Line
Remote Payload
Farend Line
Farend Payload

3.10.2 BER Test

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



The BER Test screen is as following:



The G.SHDSL 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 511 (2^9-1)test pattern (Pseudorandom test pattern, 511 bits in length).

Test Pattern 511	Use the standard 511 (2^9-1) test pattern
Time Elapsed	Show the time elapsed count
Pattern Framing	Show the linking is **sync** or **no sync**
Bit Error Count	Show the bit error counter
Refresh counter	Page refresh counter

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

3.10.3 Loopback setup and BER test by push button switch

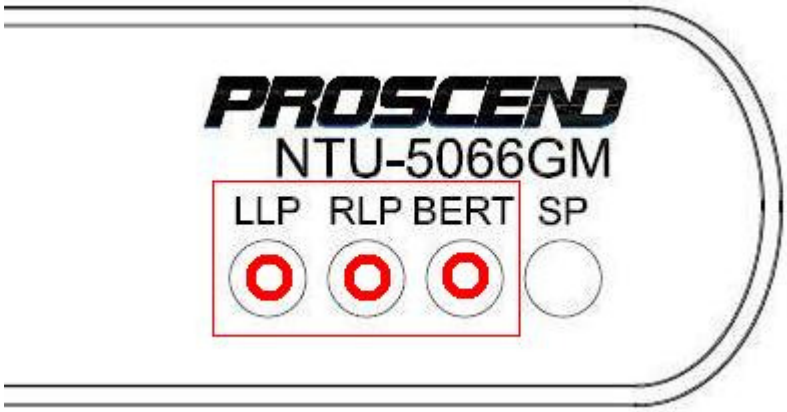
The following models can use the push button switch for loopback setup and BER test.

5066GM-DA/2W/E1

5066GM-DA/2W/SER

5066GM-DA/2W/ETH

5066GM-DA/2W/COD



LLP	Set Local Loopback
RLP	Set Remote payload Loopback
BERT	Set BER Test

Press the first time is enable, press the second time is disable.

3.11 [Upgrade] firmware upgrade

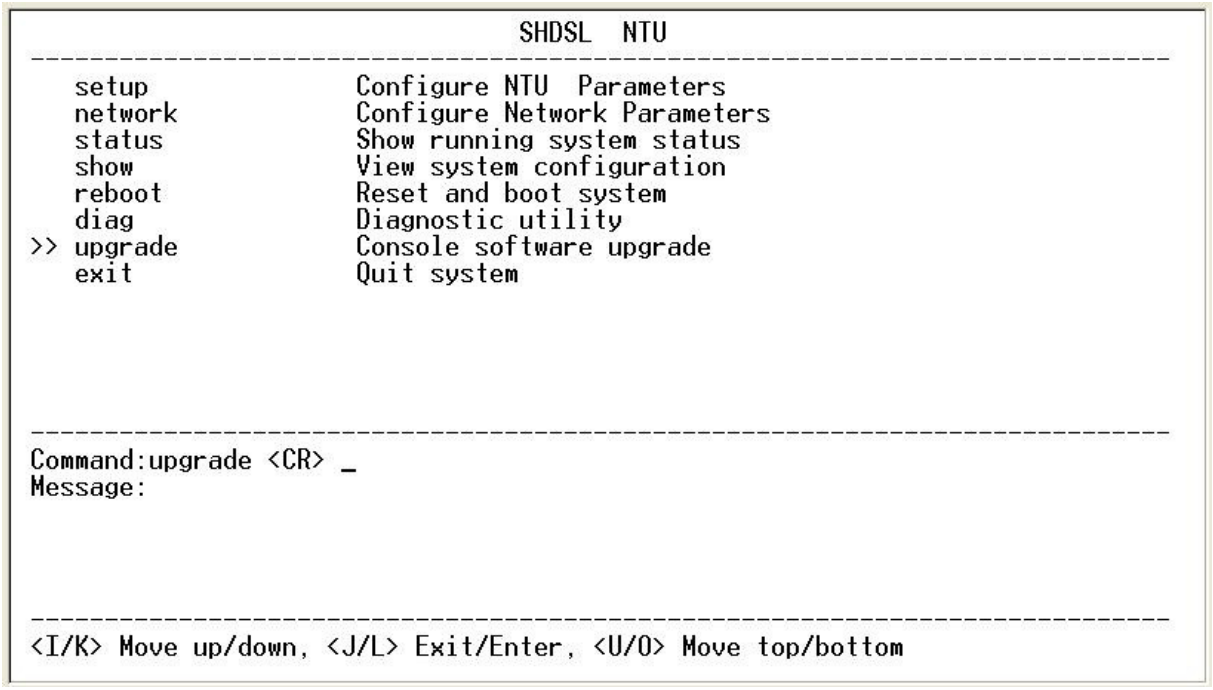
This section will introduce how to upgrade the kernel and FPGA code of G.SHDSL NTU. Select **upgrade** in main menu and press [ENTER] or [RIGHT].

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.

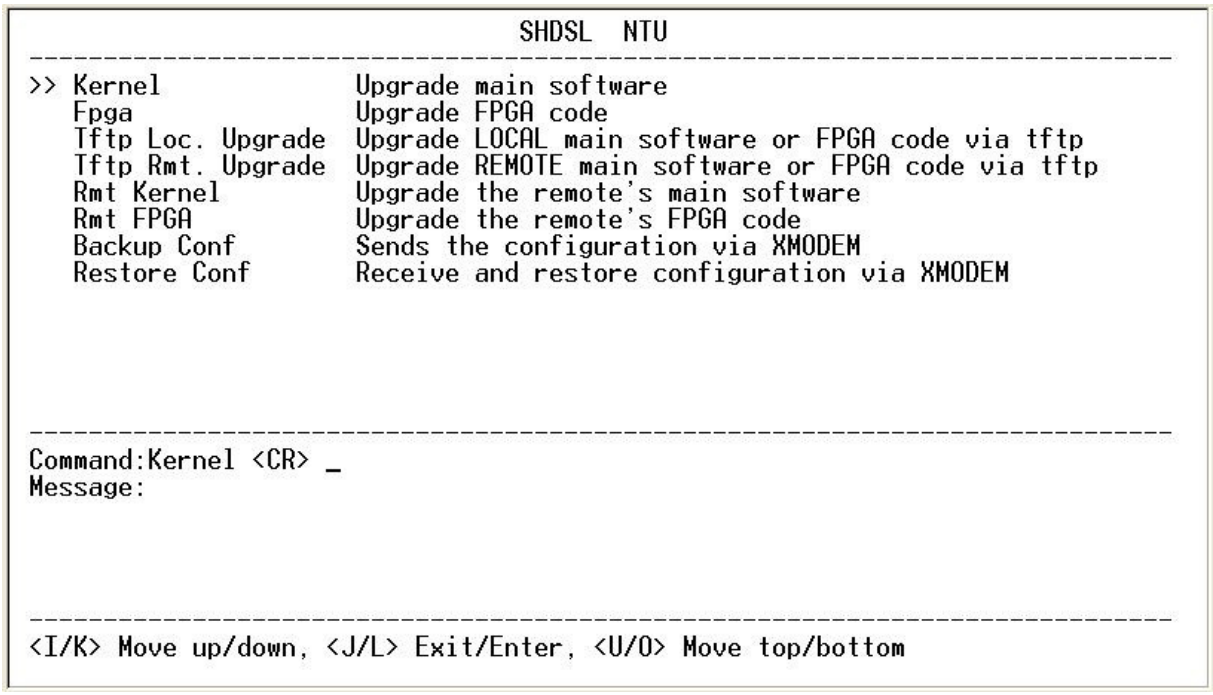
During on upgrade and re-flash, the normal transmissions will be halted, so the upgrade should be done when the system is taken offline or done during a time of extremely low impact to the customer's line.

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

Following show the upgrade feature:



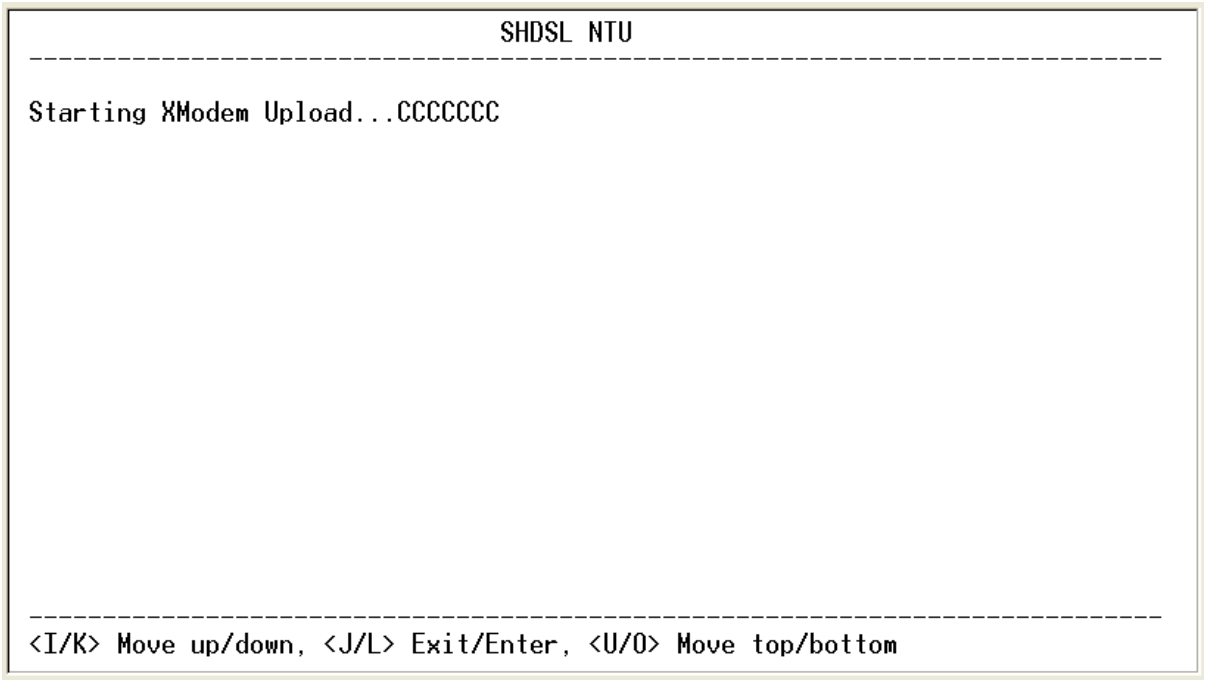
Before upgrading the SHDSL NTU, make sure you have the Kernel code and FPGA code files in your computer.



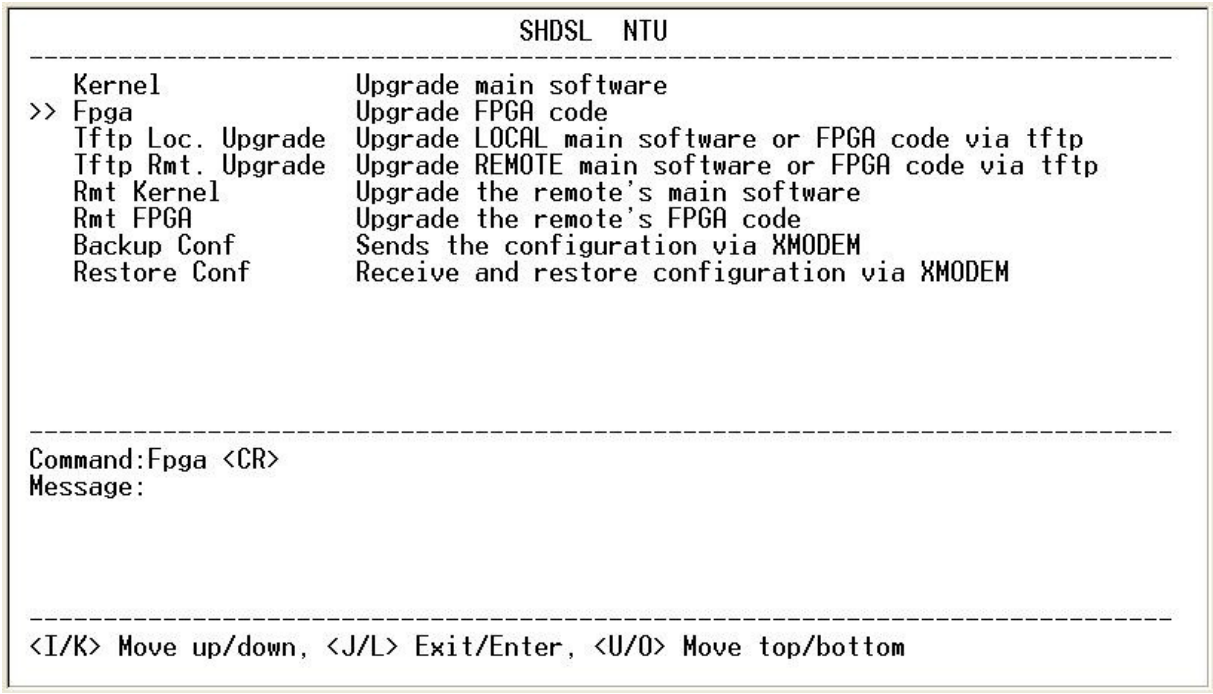
When you upgrade the kernel code, select the **Kernel** item and press [ENTER] or [RIGHT].

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.

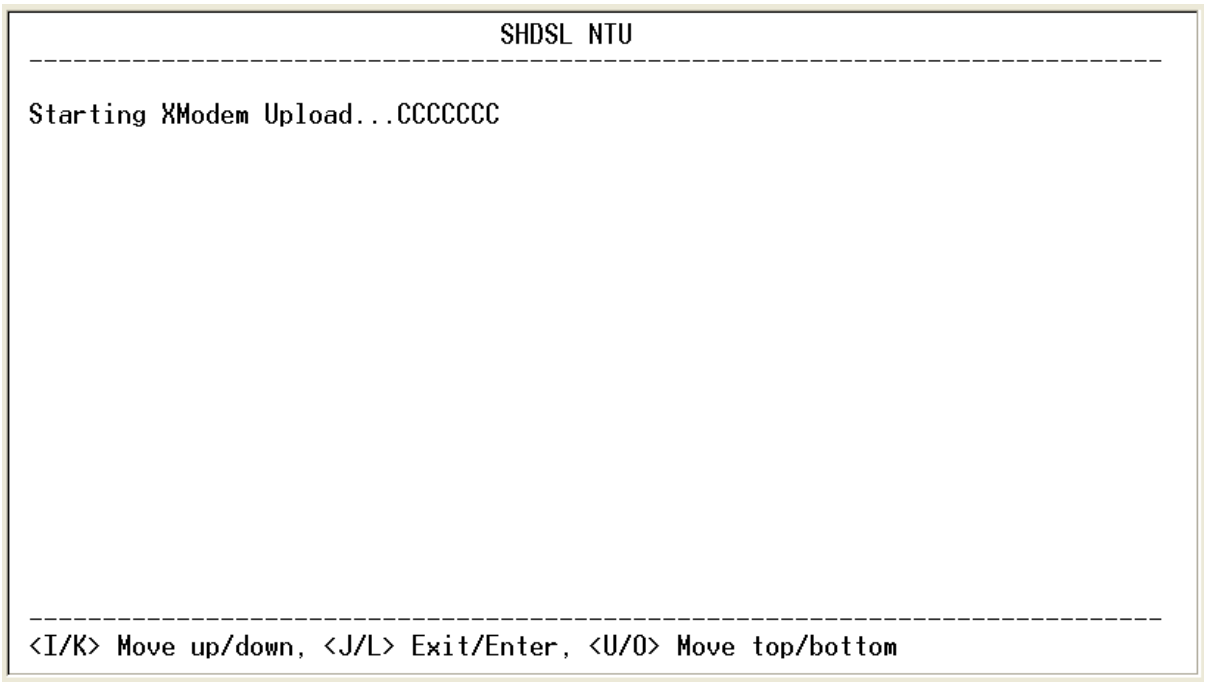
When it was upgrading, you can see as following:

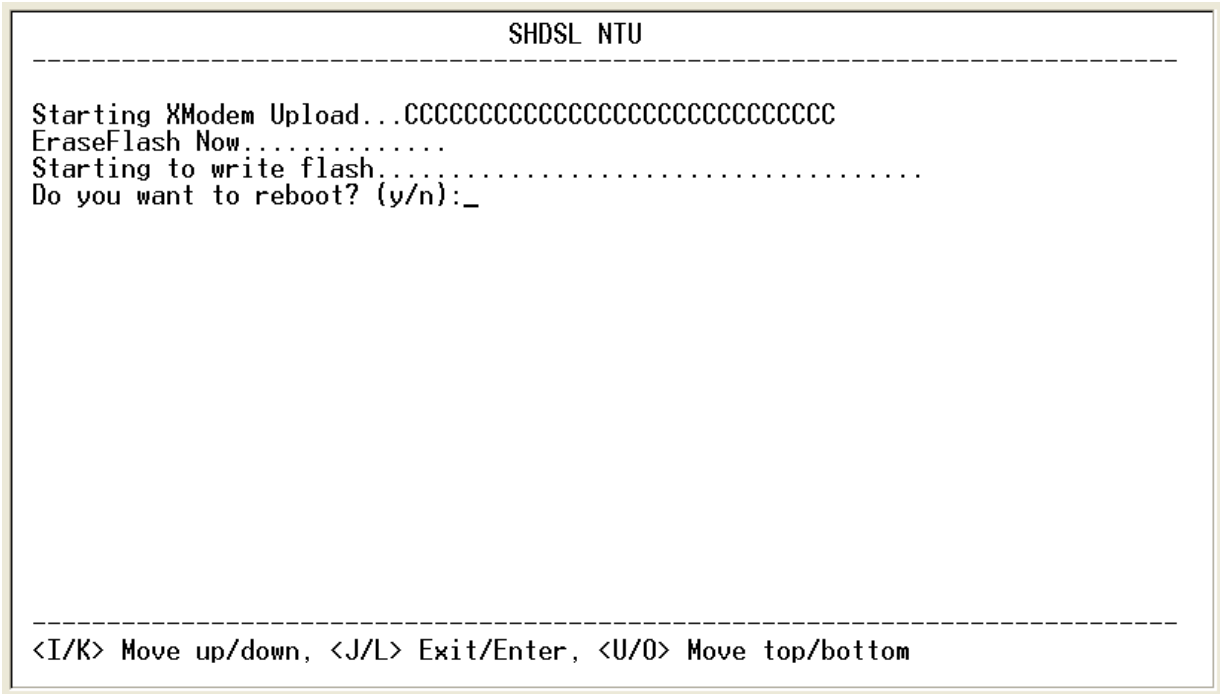


If you want to upgrade the FPGA code, select **FPGA** item and press [ENTER] or [RIGHT].



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





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
   Tftp Loc. Upgrade    Upgrade LOCAL main software or FPGA code via tftp
   Tftp Rmt. Upgrade    Upgrade REMOTE main software or FPGA code via tftp
>> Rmt Kernel           Upgrade the remote's main software
   Rmt FPGA             Upgrade the remote's FPGA code
   Backup Conf          Sends the configuration via XMODEM
   Restore Conf         Receive and restore configuration via XMODEM




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




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

Remote upgrade - FPGA

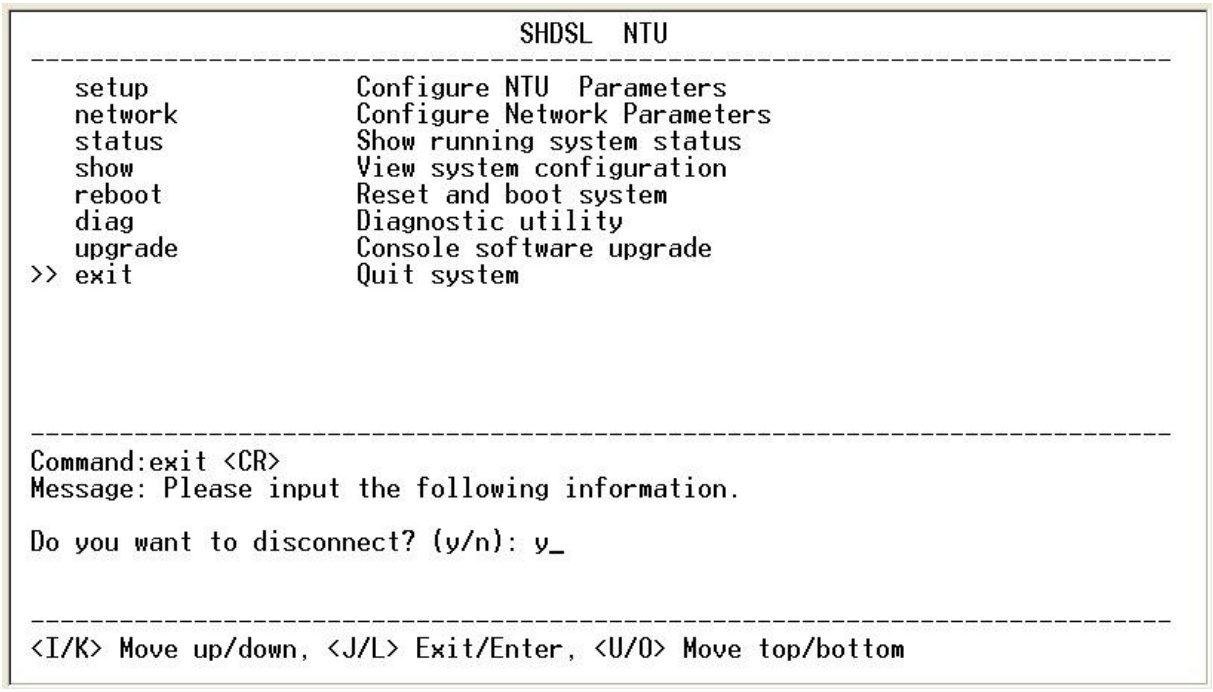
```
                                SHDSL  NTU
--------------------------------------------------------------------------------
   Kernel               Upgrade main software
   Fpga                 Upgrade FPGA code
   Tftp Loc. Upgrade    Upgrade LOCAL main software or FPGA code via tftp
   Tftp Rmt. Upgrade    Upgrade REMOTE main software or FPGA code via tftp
   Rmt Kernel           Upgrade the remote's main software
>> Rmt FPGA             Upgrade the remote's FPGA code
   Backup Conf          Sends the configuration via XMODEM
   Restore Conf         Receive and restore configuration via XMODEM




--------------------------------------------------------------------------------
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.

3.12 [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.



User can type “y” to confirm to exit , the device will be disconnected. And it will show the logon screen again.

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

4 Appendix

4.1 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
BPV	Bipolar Violation
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)

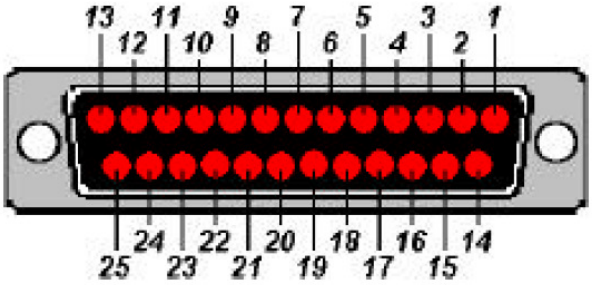
4.2 Serial Interface Pin Assignments

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

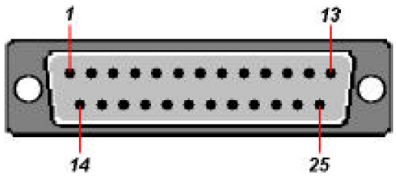
4.3 V.35 DB25(M) to M.34(F) adaptor Cable

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).

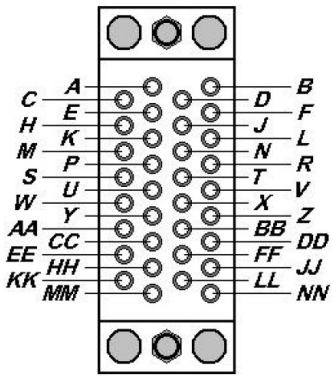
The pin out of cable on DB-25(male) Connector to M.34(female) Connector

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.

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

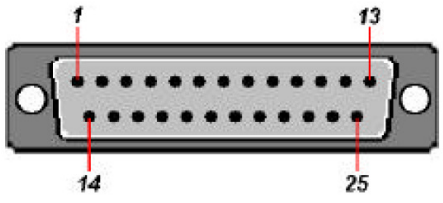
For X.21 application, we must use the DB-25 to DB-15 adaptor cable for connects to a X.21 DTE DB-15 male cable.

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

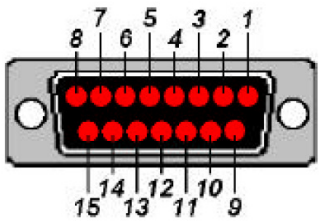
DB-25 Pin	Signal	DB-15 (X.21) Pin	Description
1	FGND	1	Protective Ground
7	GND	8	Signal Ground
2	T	2	Transmit Data
14	T	9	Transmit Data
3	R	4	Receive Data
16	R	11	Receive Data
4	C	3	Request To Send
19	C	10	Request To Send
8	I	5	Data Carrier Detect
10	I	12	Data Carrier Detect
17	S	6	Receive Clock
9	S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



DB-25(M) Connector



DB-15(F) Connector

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

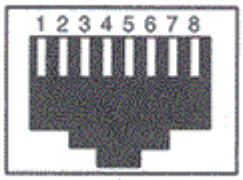
Pin	Signal	Abbr.	DTE	DCE
1	Shield			
2	Transmit (A)	TA	Out	In
3	Control (A)	CA	Out	In
4	Receive (A)	RA	In	Out
5	Indication (A)	IA	In	Out
6	Signal Timing (A)	SA	In	Out
7	Unassigned			
8	Ground			
9	Transmit (B)	TB	Out	In
10	Control (B)	CB	Out	In
11	Receive (B)	RB	In	Out
12	Indication (B)	IB	In	Out
13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

4.5 Console Cable

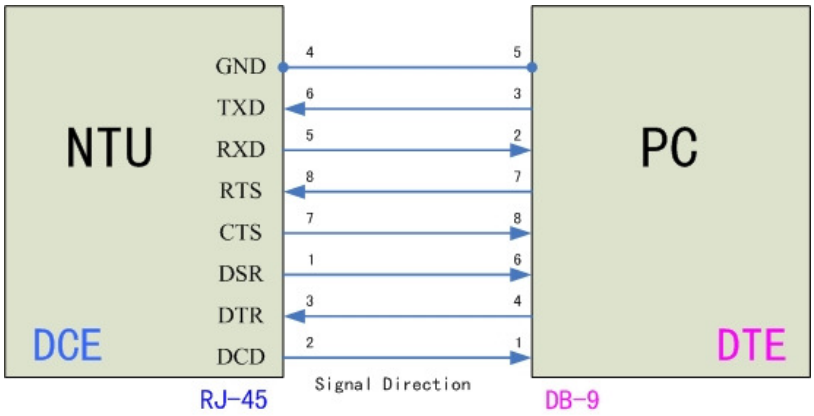
The front view of RJ-45 console cable socket on rear panel:



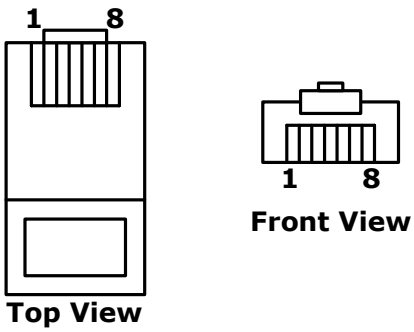
The wire connection of console cable DB-9(Female) to RJ-45:

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:

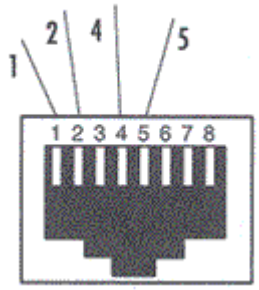


The pin assignment of RJ-45 modular jack on the console cable:

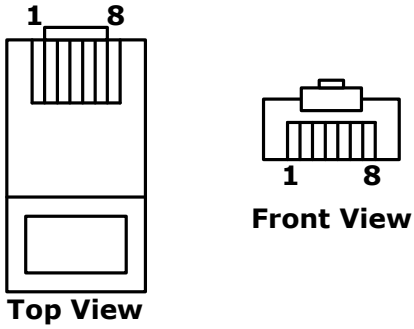
Pin Number	Abbrev.	Description	Figure
1	DSR	DCE ready	
2	DCD	Received Line Signal Detector	
3	DTR	DTE ready	
4	GND	Signal Ground	
5	RXD	Received Data	
6	TXD	Transmitted Data	
7	CTS	Clear to Send	
8	RTS	Request to Send	

4.6 E1 Balance Cable

The front view of RJ-45 E1 balance cable socket on rear panel:



The pin out of RJ-45 plug on the G.703 120Ω E1 balance cable:

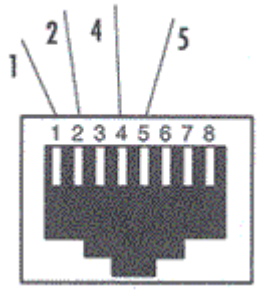
Pin Number	Description	Figure
1	E1 interface receive pair-ring	
2	E1 interface receive pair-tip	
3	No connection	
4	E1 interface transmit pair-ring	
5	E1 interface transmit pair-tip	
6	No connection	
7	No connection	
8	No connection	

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

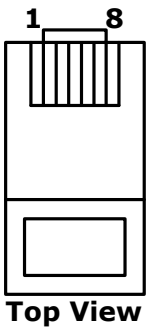
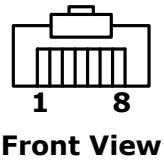
DB15(Female) Pin Number	RJ-48C Pin number	Description
11	4	Transmit Ring
5	3	Rx Shield
9	1	Receive Ring
6	6	TX Shield
3	5	Transmit Tip
1	2	Receive Tip

4.7 Co-directional Balance Cable

The front view of RJ-45 Co-directional balance cable socket on rear panel:



The pin out of RJ-45 plug on the G.703 120Ω Co-directional balance cable:

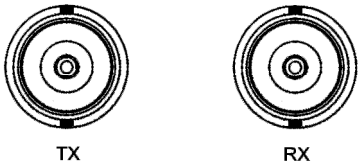
Pin Number	Description	Figure
1	Line Receive Positive	 
2	Line Receive Negative	
3	No connection	
4	Line Transmit Negative	
5	Line Transmit Positive	
6	No connection	
7	No connection	
8	No connection	

4.8 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:



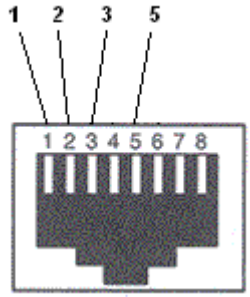
The internal wiring between BNC sockets and RJ-48C:

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

4.9 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:

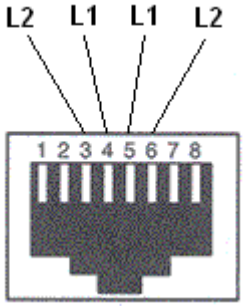


The pin out of RJ-45 Ethernet Connector:

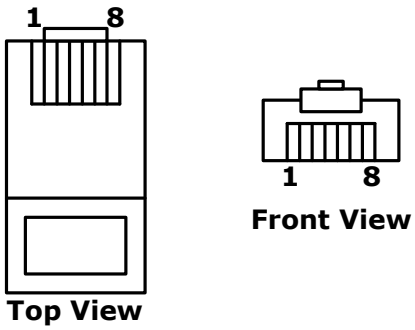
Pin number	Signal Name
1	Transmit Data +
2	Transmit Data -
3	Receive Date +
4	Not used
5	Not used
6	Receive Date -
7	Not used
8	Not used

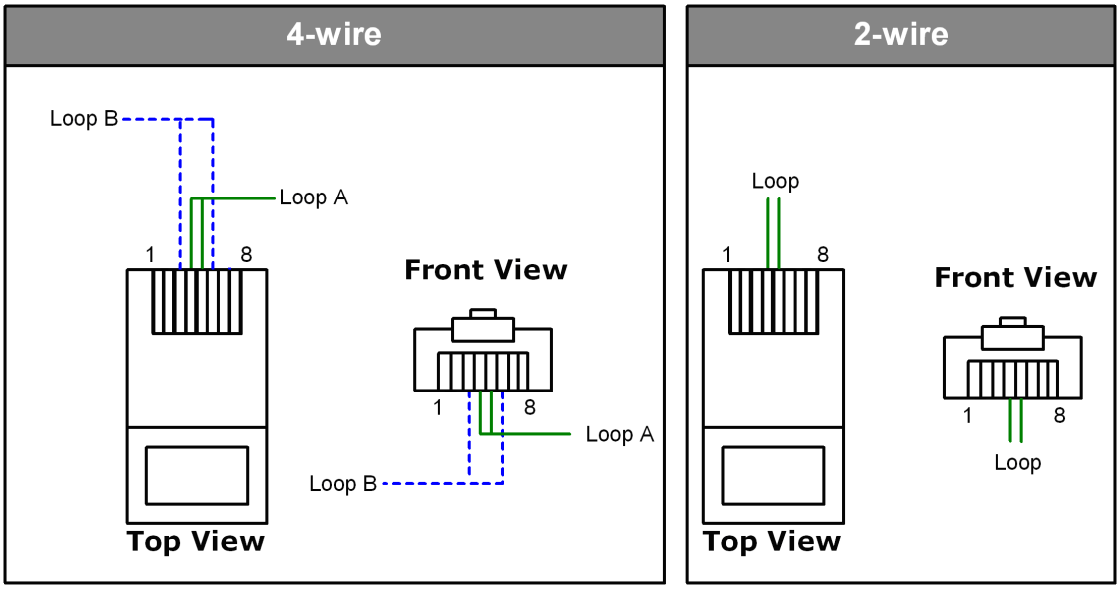
4.10 DSL Cable

The front view of DSL cable socket on rear panel:



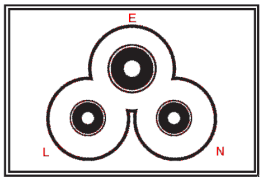
The pin out of RJ-45 modular jack on DSL cable:

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	



4.11 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 conductor
N	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:

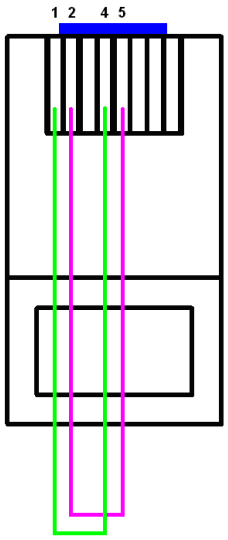
4.12 Illustration of Loopback connection device (E1)

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:



4.13 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: