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Networking your world

# NV-600LS/RS VDSL2 CO/CPE Modem

# USER'S MANUAL

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Maximum signal rate derived form IEEE Standard specifications. Actual data throughput will vary. Network conditions and environmental factors, including volume of network traffic, building materials and construction, and network overhead lower actual data throughput rate.

# VDSL2 Point to Point Solution

**VDSL2** (Very-High-Bit-Rate Digital Subscriber Line 2, ITU-T G.993.2 Standard) is an access technology that exploits the existing infrastructure of copper wires that were originally deployed for POTS services. It can be deployed from central offices, from fibre-fed cabinets located near the customer premises, or within buildings.

ITU-T G.993.2 VDSL2 is the newest and most advanced standard of DSL broadband wireline communications. Designed to support the wide deployment of Triple Play services such as voice, video, data, high definition television (HDTV) and interactive gaming, VDSL2 enables operators and carriers to gradually, flexibly, and cost efficiently upgrade existing xDSL-infrastructure.

ITU-T G.993.2 (VDSL2) is an enhancement to G.993.1 VDSL that permits the transmission of asymmetric and symmetric(Full-Duplex) aggregate data rates up to 200 Mbit/s on twisted pairs using a bandwidth up to 30 MHz.

VDSL2 deteriorates quickly from a theoretical maximum of 200 Mbit/s (Full-Duplex) at "source" to 100 Mbit/s at 0.3 km (symmetric) and 50 Mbps at 1 km, but degrades at a much slower rate from there and still outperforms VDSL. Starting from 1.6 km its performance is equal to ADSL2+.

## Safety Warnings

For your safety, be sure to read and follow all warning notices and instructions before device use.

- DO NOT open the device or unit. Opening or removing covers can expose you to dangerous high voltage points or other risks. ONLY qualified service personnel can service the device. Please contact your vendor for further information.
- Use ONLY the dedicated power supply for your device. Connect the power cord or power adaptor to the right supply voltage (110V AC in North America or 230V AC in Europe).
- DO NOT use the device if the power supply is damaged as it might cause electrocution.
- If the power supply is damaged, remove it from the power outlet.
- DO NOT attempt to repair the power supply. Contact your local vendor to order a new power supply.
- Place connecting cables carefully so that no one will step on them or stumble over them. DO NOT allow anything to rest on the power cord and do NOT locate the product where anyone can work on the power cord.
- DO NOT install nor use your device during a thunderstorm. There may be a remote risk of electric shock from lightning.
- DO NOT expose your device to dampness, dust or corrosive liquids.
- DO NOT use this product near water, for example, in a wet basement or near a swimming pool.
- Connect ONLY suitable accessories to the device.
- Make sure to connect the cables to the correct ports.
- DO NOT obstruct the device ventilation slots, as insufficient airflow may harm your device.
- DO NOT store things on the device.
- DO NOT use the device outside, and make sure all the connections are indoors. There may be a remote risk of electric shock from lightning.
- Be careful when unplugging the power, because the transformer may be very hot.
- Keep the device and all its parts and accessories out of children's reach.
- Clean the device using a soft and dry cloth rather than liquid or atomizers. Power off the equipment before cleansing it.
- This product is recyclable. Dispose of it properly.

# Table of Contents

# Chpater 1. Unpacking Information

## 1.1 Check List

Carefully unpack the package and check its contents against the checklist.

Package Contents

- VDSL2 Modem (NV-600LS for CO side or NV-600RS for CPE side)
- 2 x rubber feet (Pre-installed on the bottom)
- 1 x CD User's Manual
- 1 x AC to DC 12V Power Adapter
- 1 x RJ-45 cable
- 1 x RJ-11 cable

**Note:**

Please inform your dealer immediately for any missing or damaged parts.

If possible, retain the carton including the original packing materials.

Use them to repack the unit in case there is a need to return for repair.

**Note2:**

Do not use sub-standard power supply, connect the power supply in device before be sure to check compliance with specifications. The NV-600LS/RS of the power supply at least use DC12V/1A.

# Chpater 2. Complete Installation

## 2.1 Hardware Installation

This chapter describes how to install the NV-600LS/RS and establishes network connections. This may install the NV-600LS/RS on any level surface (e.g., a table or shelf). However, please take note of the following minimum site requirements before you begin.

## 2.2 Pre-installation Requirements

Before the start actual hardware installation, make sure to provide the right operating environment, including power requirements, sufficient physical space and proximity to other network devices that are to be connected. Verify the following installation requirement:

- Power requirements: DC12V/1A or above.
- The NV-600LS/RS should be located in a cool dry place, with at least 10cm(4in) of space at the front and back for well ventilation.
- Place the NV-600LS/RS away from direct sunlight, heat sources, or areas with a high amount of electromagnetic interference.
- Check if network cables and connectors needed for installation are available
- Do Not install phone lines strapped together with AC power lines, or telephone office line with voice signal.
- Avoid installing this device radio amplifying station nearby or transformer station nearby.

## 2.3 General Rules

Before making any connections to the NV-600LS/RS, note the following rules:

- **Ethernet Port (RJ-45)**
  All network connections to the Modem Ethernet port must be made using Category 5 UTP for 100Mbps; Category 3, 4 UTP for 10Mbps
  No more than 100 meters of cabling may be use between the MUX or HUB and an end node.
- **Phone Port (RJ-11)**
  All Phone set connections to the RJ-11 Port must use **24~26** Gauge phone wiring.
- We **do not recommend using 28 gauge** or above phone line.

## 2.4 NV-600LS/RS Connections

The NV-600LS/RS can be controlled by a PC. For this purpose, a PC is needed with an Ethernet network interface and a RS-232(D-SUB 9Pin) serial interface. Two programs are required: A Web browser is mandatory and a terminal program should be available optionally.

The board has several connectors.

- 4 x Ethernet RJ-45 jack; the Auto MDIX feature of the port switches automatically between MDI and MDI-X (MDI – X = Media Dependant Interface - Crossover). Therefore straight Ethernet cables can be used.
- 2 x RJ-11 jack (Line port is for VDSL client side connection to Line interface, Phone port is for connection to phone set or FAX machine).
- 1 x Console port (access monitoring to operating system for firmware downloads, starting drivers and etc.)
- 1 x Power Supply (as described above)

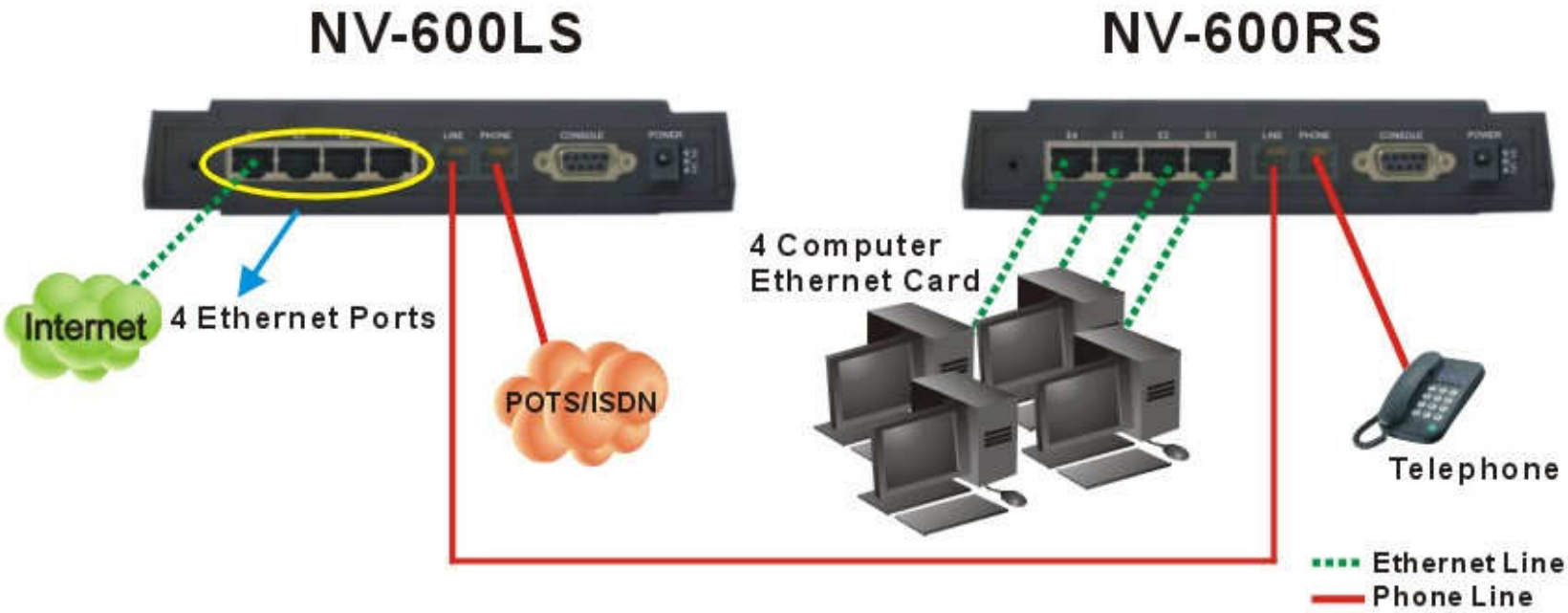



**Figure 2.4 VDSL2 Basic Setup**

# Chpater 3. Hardware Description

This section describes the important parts of the NV-600LS/RS. It features the front indicators and rear connectors.

## 3.1 Front Panel

The following figure shows the front panel.

Figure 3.1.1 NV-600LS

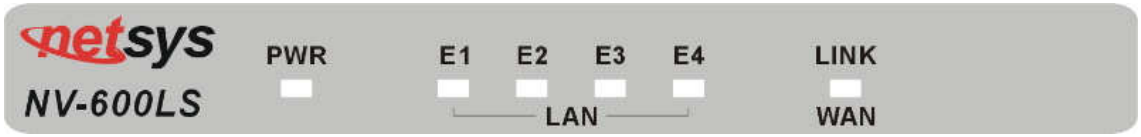
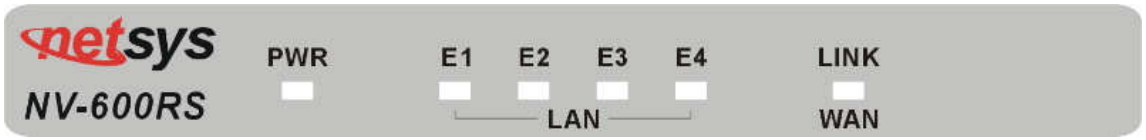



Figure 3.1.2 NV-600RS



## 3.2 Six LED indicators

At a quick glance of the front panel, it will be easy to tell if the modem has power signal from its Ethernet RJ-45 port or there is phone line signal RJ-11port

## 3.3 Front Indicators

The following table describes the LEDs.

| LEDs | Color | Status | Descriptions |
|---|---|---|---|
| PWR(Power) | Green | On(Steady) | The device is receiving the power and functioning properly. |
| | | Off | The device is not ready or has malfunctioned. |
| E1~E4 (LAN) | Green | On(Steady) | The device has a good Ethernet connection. |
| | | Blinking | The device is sending or receiving data or has malfunctioned. |
| | | Off | The LAN is not connected or has malfunctioned. |
| LINK / WAN (VDSL2 LINK) | Green | On(Steady) | The Internet or network connection is up. |
| | | Blinking | The device is sending or receiving data. |
| | | Off | The Internet or network connection is down or has malfunctioned. |

## 3.4 Rear Panel

The following figure shows the rear connectors

**Figure 3.4 Rear Connectors**


NV-600LS/RS Rear Connectors

| Connectors | Type | Description |
|---|---|---|
| Line | RJ-11 | For connecting to the VDSL2 Modem Using a RJ-11 cable |
| Phone | RJ-11 | For connecting to the POTS equipment or ISDN |
| E1~E4 | RJ-45 | For connecting to a Ethernet equipped device |
| Console | RS-232 | For connecting to PC with RS-232 serial port over a D-SUB Cable |

## 3.5 Power On

1. Check the adapter is properly connected.
2. Verify the power LED is steadily on.

# Chpater 4. Configure the NV-600LS/RS Via Web Browser

The NV-600LS/RS provides a built-in HTML based management interface that allow user configure the NV-600LS/RS via Internet Browser. Best viewed at using the Firefox and set screen resolution at 1024 x 768.

In order to use the web browser configure the device, you may need to allow:

- Web browser pop-up windows from your device. Web pop-up blocking is enabled by default in windows XP SP2.
- JavaScripts. (Enabled by default)
- Java permissions. (Enabled by default)

Launch your web browser and input the IP address 192.168.16.249 (NV-600LS) or 192.168.16.250 (NV-600RS) in the Web page.

## 4.1 Login

The default password is "admin". The password is changeable in Administrator Settings.

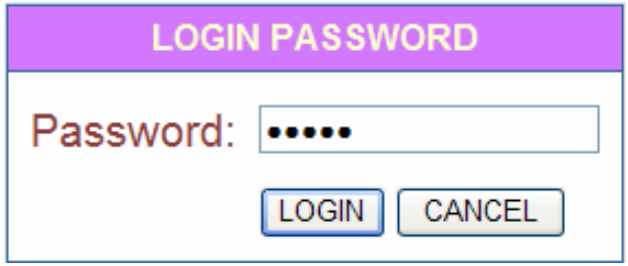



**Figure 4.1 Login Password**

## 4.2 Select the Menu Level

There is an easy Setup Wizard for end users at the NV-600LS/RS and an Advanced Setup for more detail configurations. This manual attaches importance to the Advanced Setup.

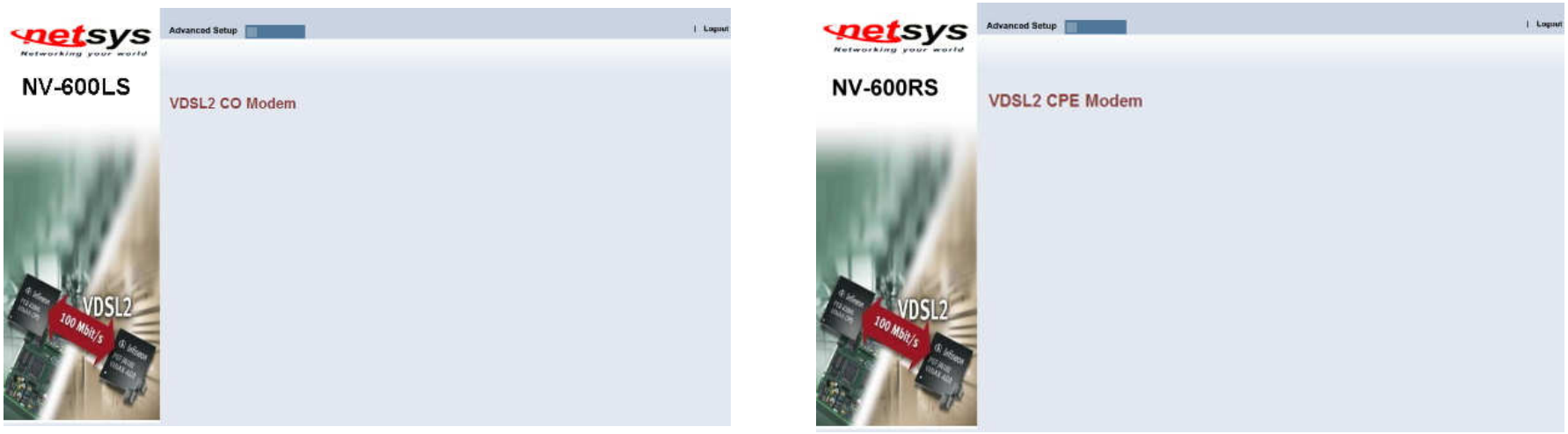
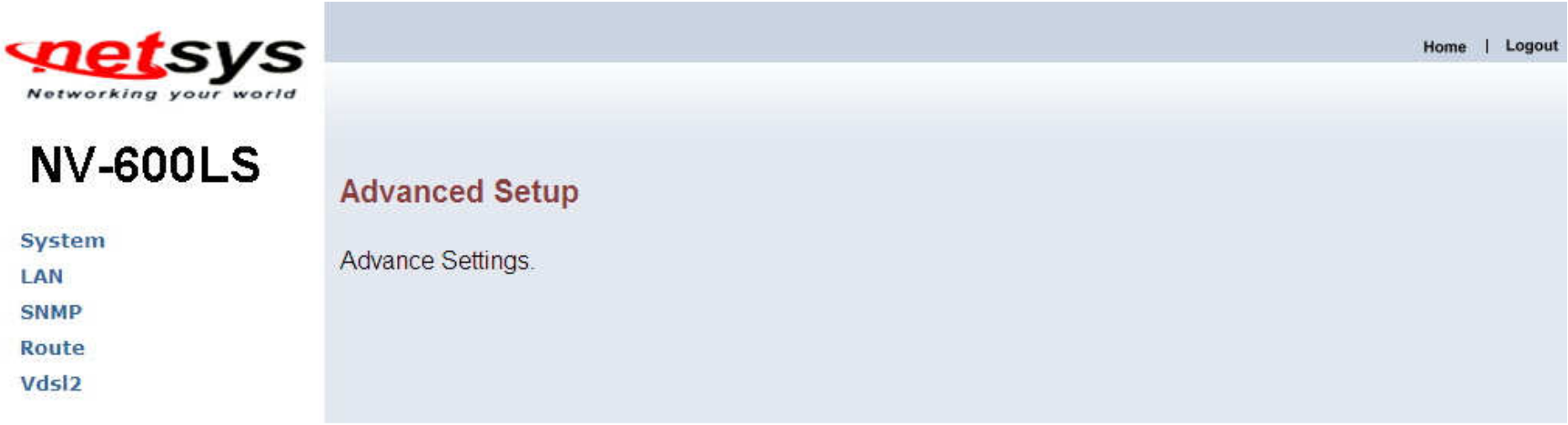



**Figure 4.2 Select the Advanced Setup in the Entry Screen**

## 4.3 Select Advanced Setup

Select the Advanced Setup. The menu below will be used frequently. As an exercise and an example now the IP address will be set.



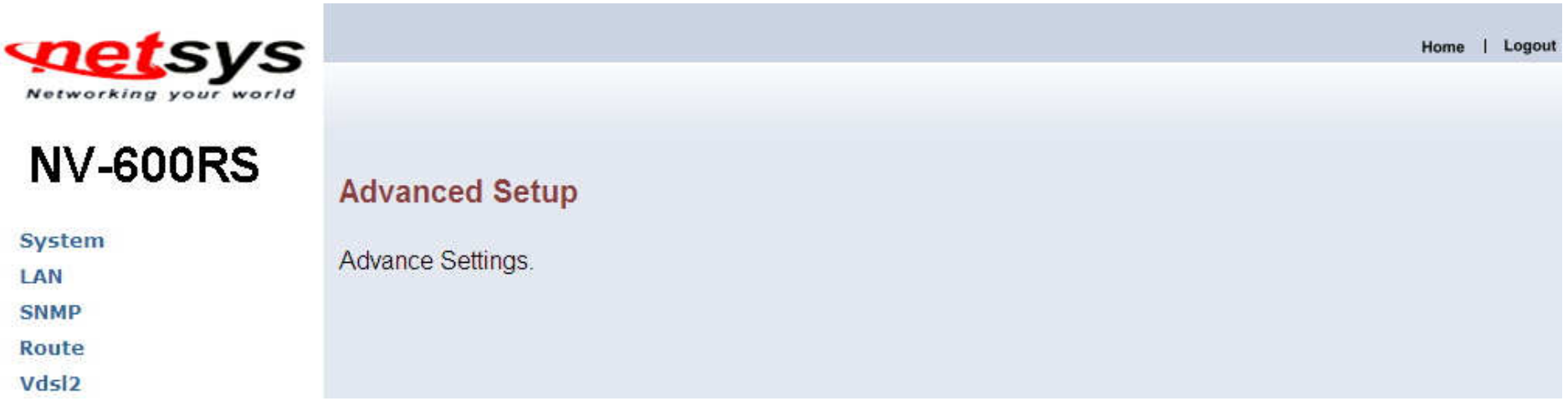



**Figure 4.3 Advanced Setup**

**Note:**

The settings in the following Chapter 4.4 only need to be performed in order to change LAN settings. Such a change may be necessary when connecting the NV-600LS/RS to a new control PC and/or in order to turn the IP address changed via a shell command into a default address for the next restart of the board.

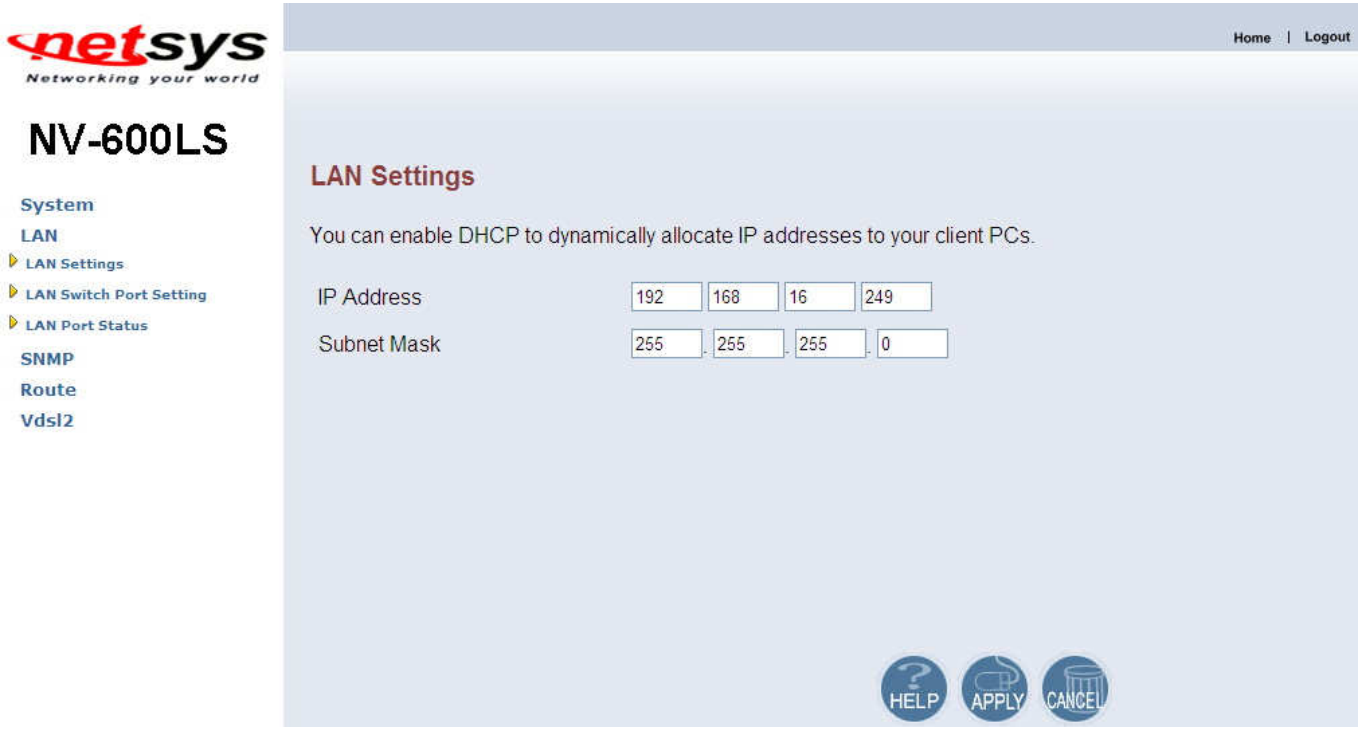
## 4.4 Select LAN

The menu below will not be used very often, but when connecting the NV-600LS/RS to a new control PC, one may want to go through the following steps in order to make the IP address previously set by ifconfig in the console or on some later occasion one may want to change it again without using the console then the menu below will be helpful. In order to set the IP address, click on "LAN Settings".


**Figure 4.4 LAN menu**

## 4.4.1 Select LAN Settings and set the IP Address

The form below is used to change the IP address of the LAN port "adm0" in the NV-600LS/RS.
The proposed IP address is either the default address of adm0 or it is the address changed by an ifconfig command via the shell running in the terminal. The Subnet Mask display can be ignored.



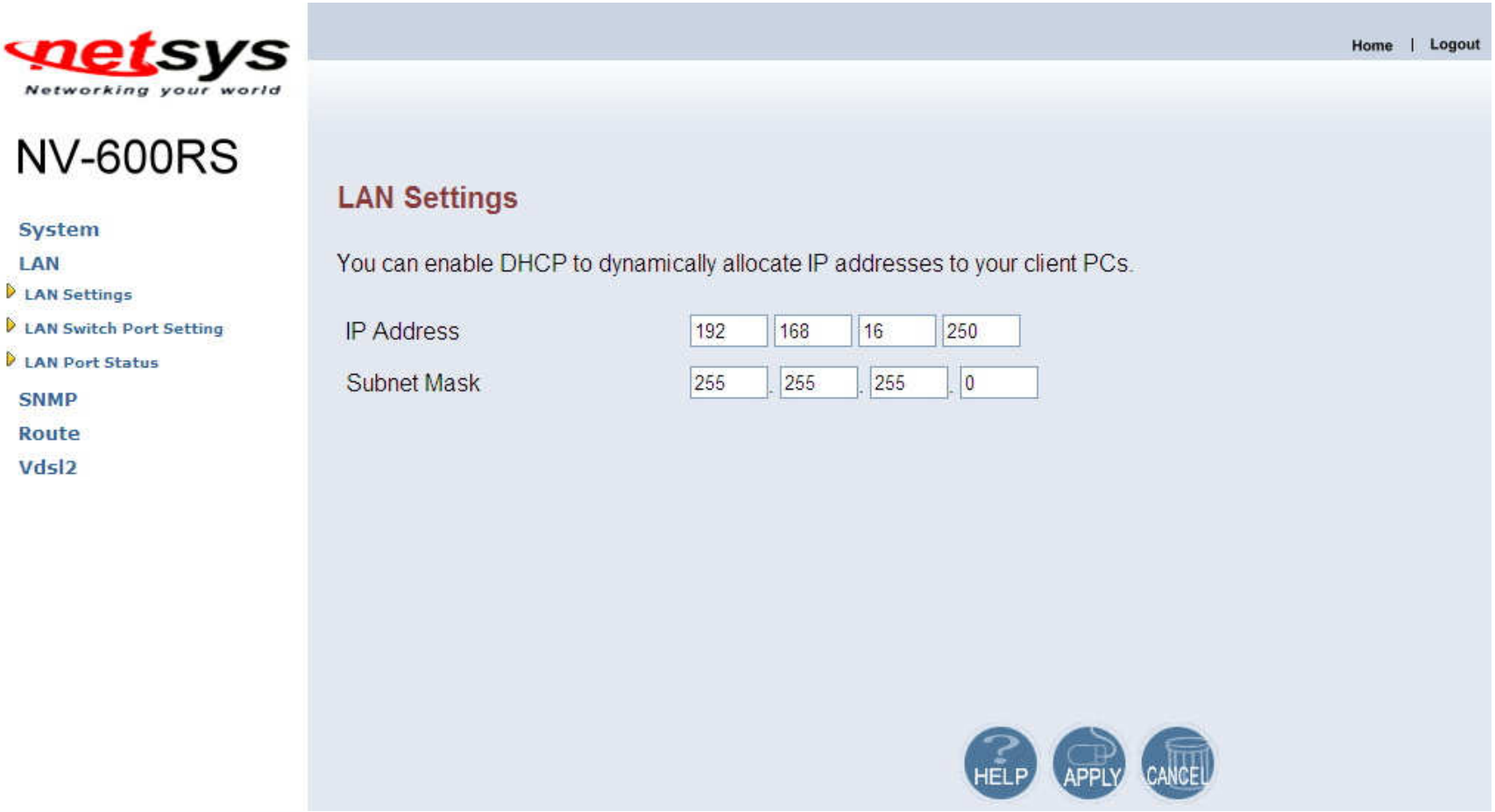



**Figure 4.4.1 LAN Settings**

Now the IP address either may be changed or left as it is. If it has been changed in the form or after it has been changed through console ifconfig command, it needs to be "APPLY" in order to make the displayed IP address new default address.

### 4.4.2 Restart the Settings Dialog

After the "APPLY" button has been hit, the displayed IP address "adm0" port will be stored in a non volatile memory on the NV-600LS/RS. Also, the Ethernet link between the control PC and the NV-600LS/RS will be re-initialized – even if the IP address has not been changed. Refresh the display of the HTTP browser running on the control PC and login again.

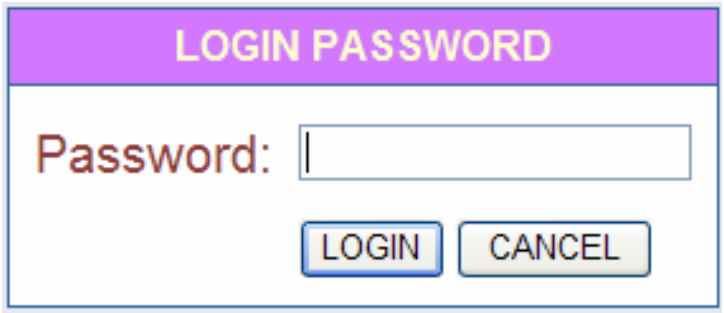



**Figure 4.4.2 Login Password**

The NV-600LS/RS is ready to be controlled by the control PC now.

# Chpater 5. Configure the NV-600LS/RS via Console

## 5.1 Setup on Hyperterminal

Open the Hyperterminal and set the baud rate to 115200, 8N1N to properly set the hyperterminal.

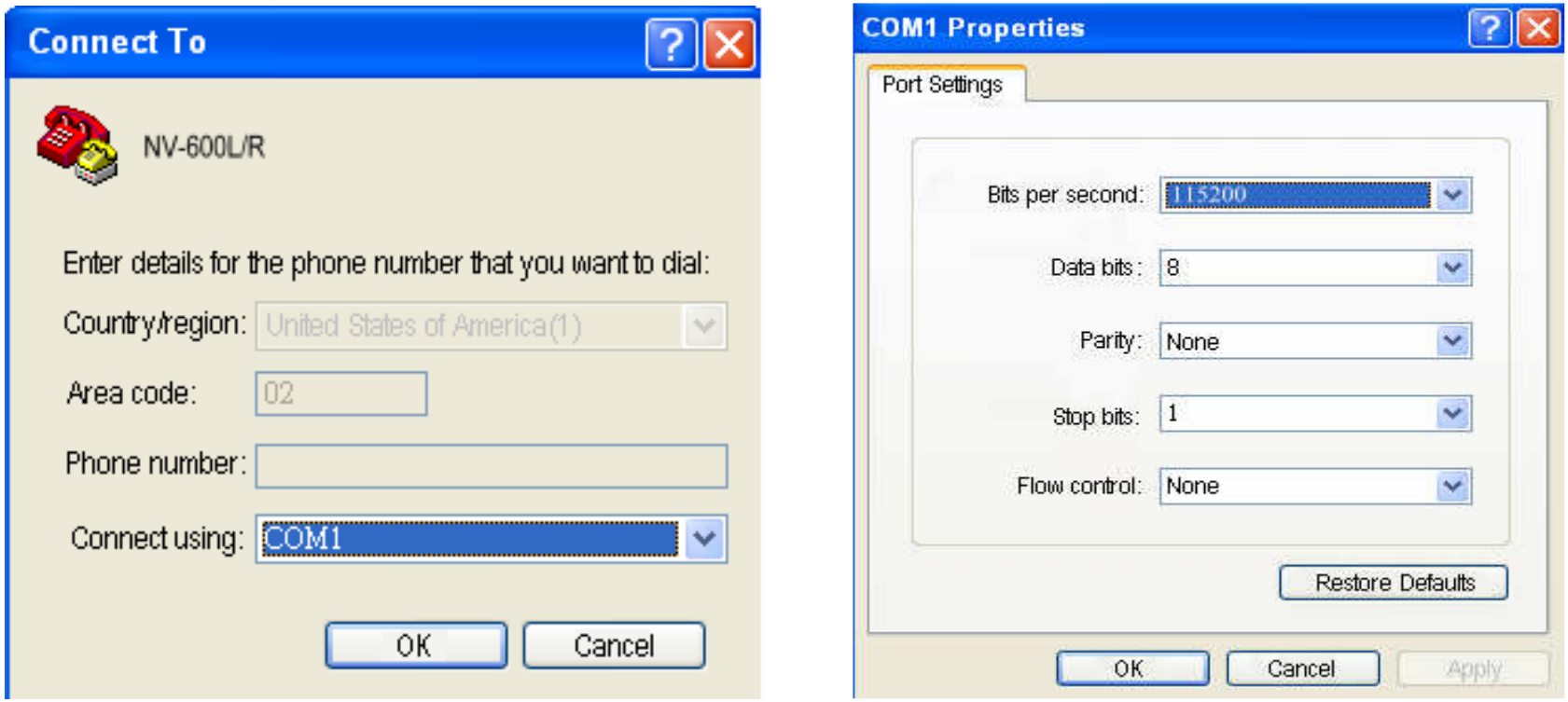



**Figure 5 Hyperterminal Configuration**

## 5.2 Reset the system to default configuration.

At the CLI command, write the command "**rawaccess –e**" to reset the system to default configuration. For it to take effect write the command "**reboot**" to restart the system.

# Chpater 6. Building a VDSL2 System

First a quick overview on a complete setup of NV-600LS/RS:

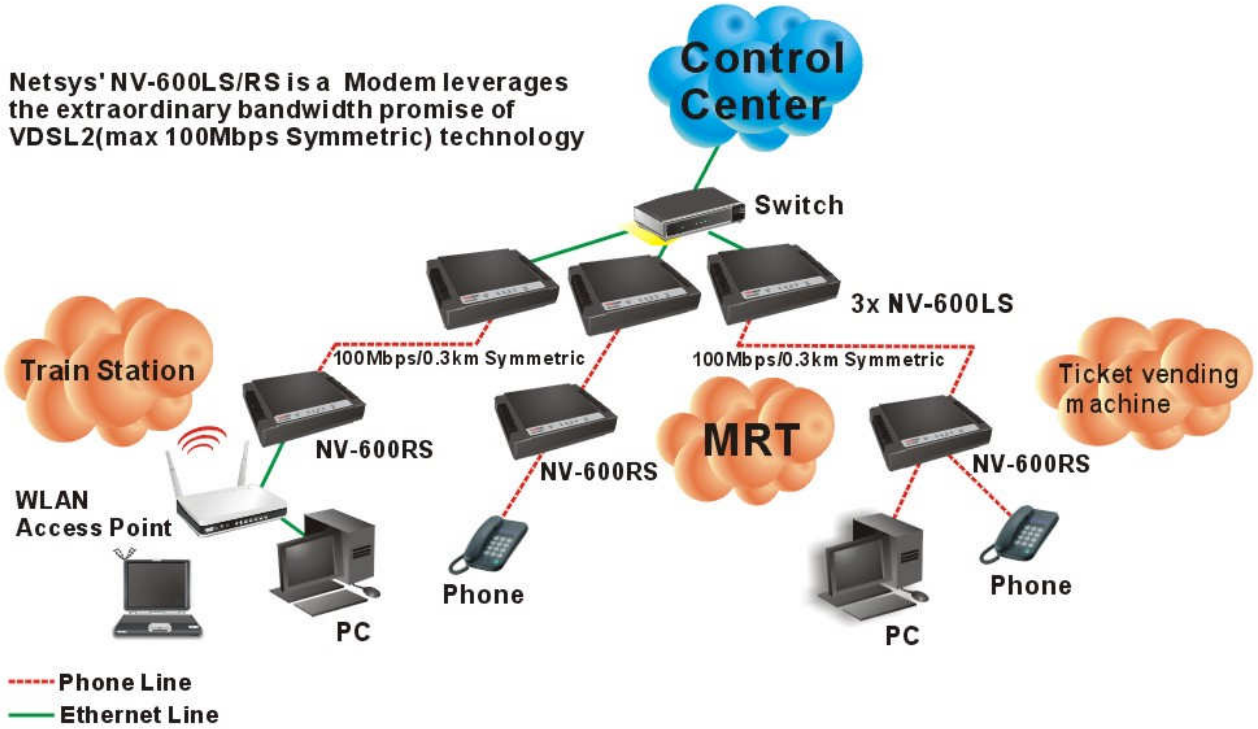



Figure 6 VDSL2 Application

## 6.1 Connect the NV-600LS and the NV-600RS to the Line

The objective for VDSL2 is to pass high speed data over a twisted pair cable. In the setup, connects NV-600LS to NV-600RS through phone wire or line simulator or any other hardware representation of a cable network, with or without noise injection and crosstalk simulations.

## 6.2 Connect the NV-600LS and the NV-600RS to LAN Devices

In the setup, usually an Ethernet tester serves as representation of the LAN side as well as representation of the WAN side.

## 6.3 Run Demos and Tests

The Ethernet tester may send data downstream as well as upstream. It also receives the data in order to check the integrity of the data transmission. Different data rates can be tested under different line conditions.

# Chpater 7. Operating the VDSL2 System

After the VDSL2 system has been set up, one may want to configure the settings that are related to VDSL2. Configuration of operation modes, test modes (loop back) and the display of status information are supported by GUI (Graphical User Interface).

## 7.1 Configuration Settings

Configure and start the NV-600LS (CO) and the NV-600RS (CPE).

- Configuration: As a minimum configuration, usually selecting the bandplan is required.
  See Chapter 7.1.3, Profile Configuration.
- Next, both sides should be activated from the web interface.
  See Chapter 7.1.5, Line Activation
- The connection status of the link can be monitored.
  See Chapter 7.2.1, Line Status

## 7.1.1 Channel Configuration

This function is for setting VDSL2 channel.

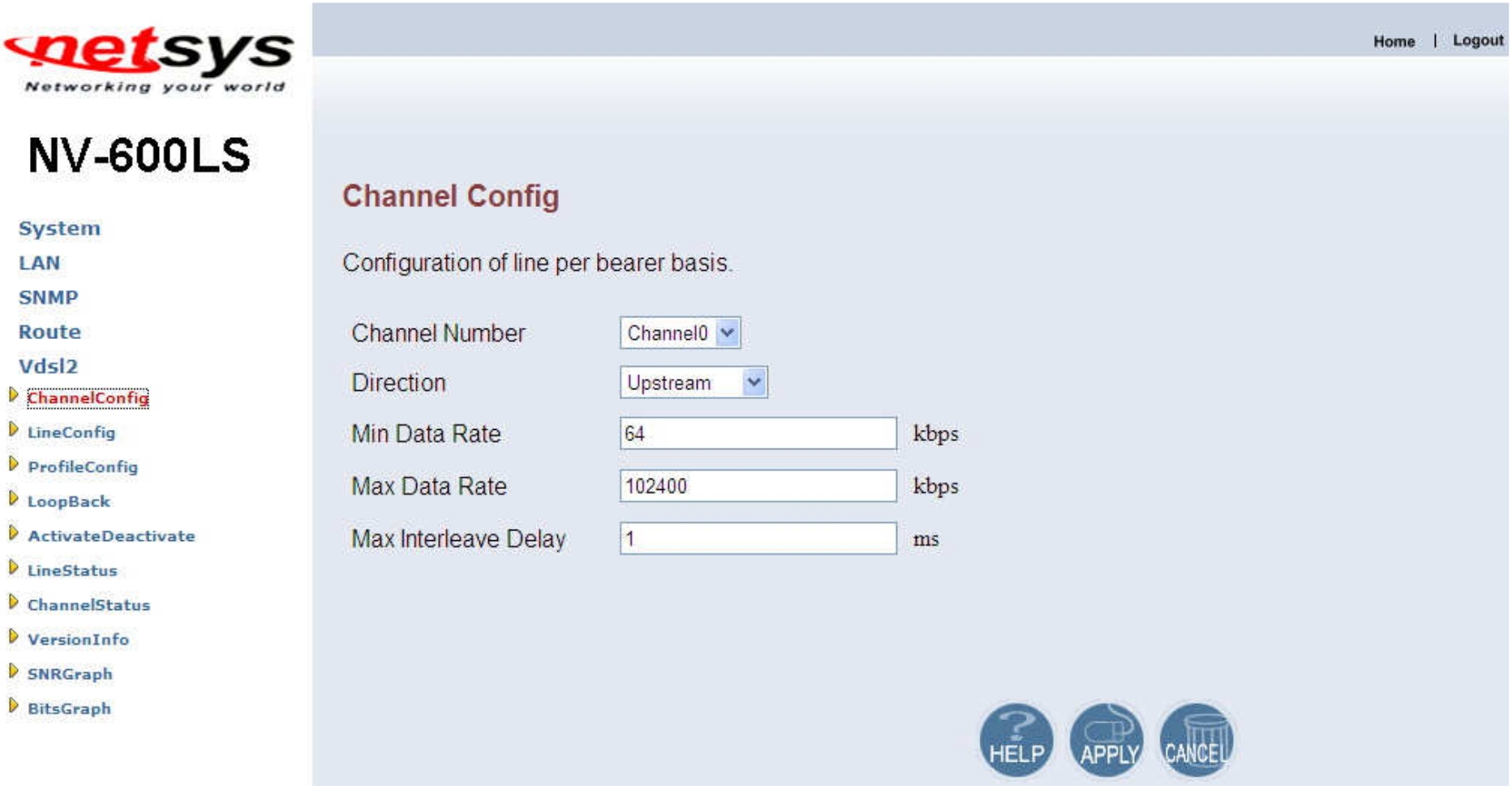


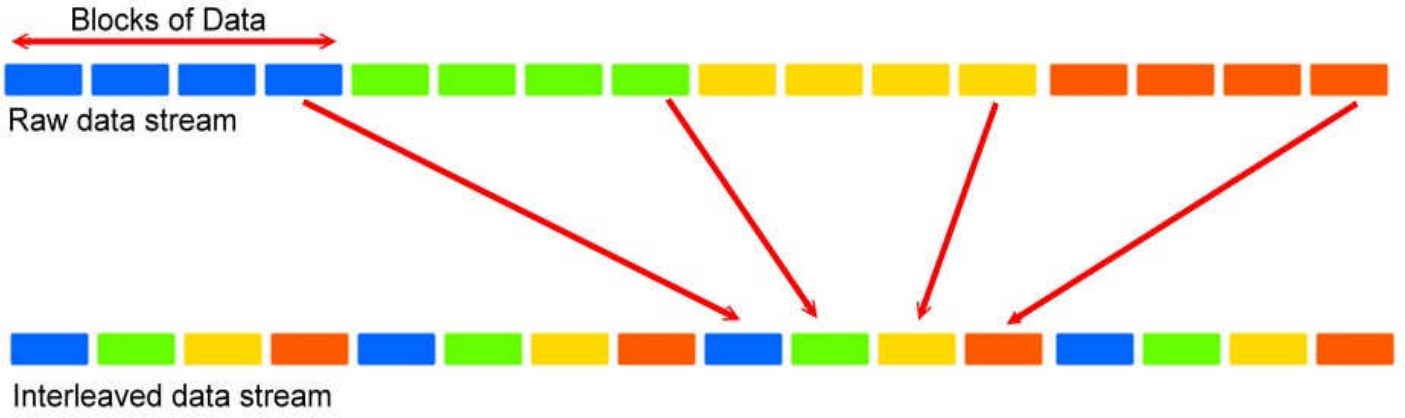

**Figure 7.1.1 Channel Configuration Menu**

Interleave delay function is used in digital data transmission technology to protect the transmission against noise issue and data error.

If during transit more than a certain amount of data has been lost then the data cannot be correctly decoded. Short bursts of noise on the line can cause these data packets to become corrupt and the modem has to re-request data which in turn can slow down the overall rate at which data is transmitted.

Interleaving is a method of taking data packets, chopping them up into smaller bits and then rearranging them so that once contiguous data is now spaced further apart into a non continuous stream. Data packets are re-assembled by your modem.

The diagram below is an example of how interleaved traffic is transmitted.




If your line is particularly susceptible to bursts of noise then interleaving should improve your VDSL2 experience simply because if you lose a whole batch of data then this could cause your modem to loose sync with the exchange.

Using Interleaving, the modem is able to re-assemble the data or if necessary just re-request the part of the data that it is unable to recover. By increasing the interleave depth of each ports that are susceptible to noise, this will improve error performance and stability of marginal lines.

**Channel Configuration Settings**

| Setting | Description |
|---|---|
| Channel Number | To which bearer channel number shall the settings apply?<br>• Channel 0 |
| Direction | To which direction shall the settings apply?<br>• Upstream<br>• Downstream |
| Min Data Rate | Minimum Payload Data Rate |
| Max Data Rate | Maximum Payload Data Rate |
| Max Interleave Delay | Maximum Interleave Delay (set from 0 to 255ms) |

**Note:**
The Reboot is needed for saving the new settings.

## 7.1.2 Line Configuration

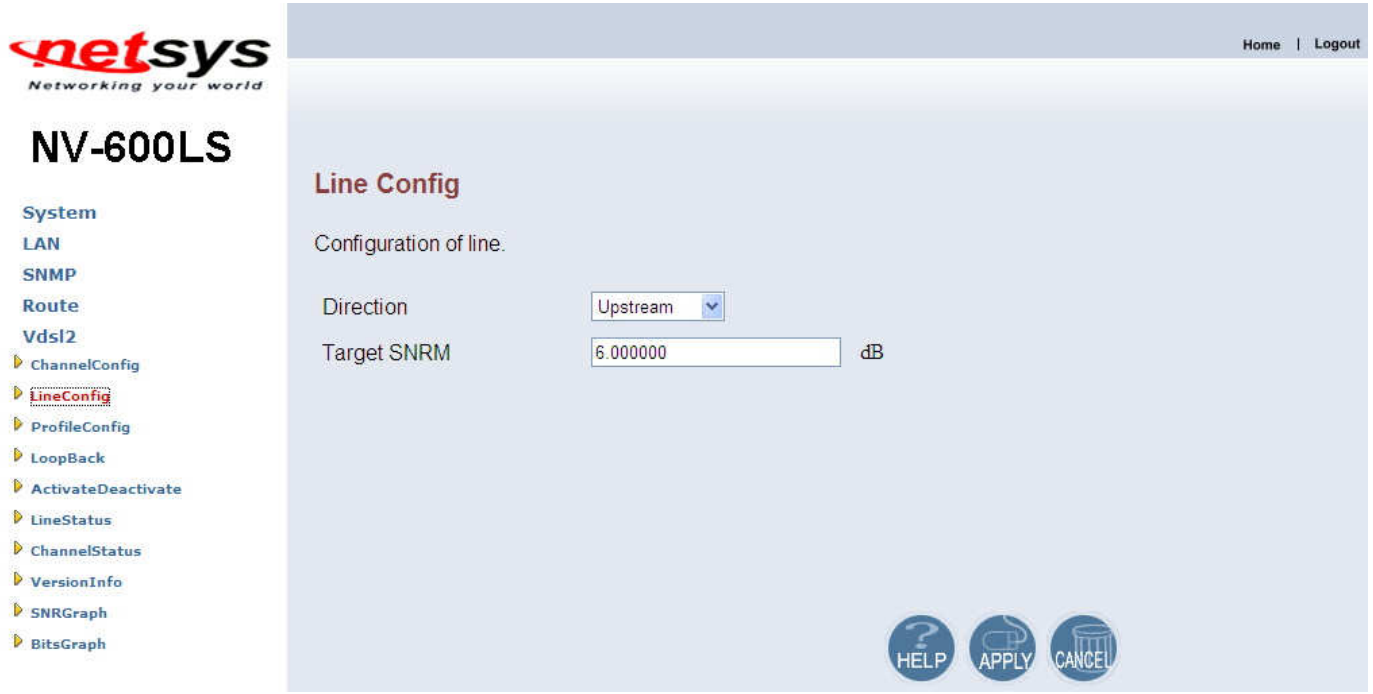



**Figure 7.1.2 Line Configuration Menu for SNR Margin Selection**

Line Configuration

| Setting | Description |
|---|---|
| Direction | Select the target direction. |
| Target SNRM | Set the required SNR Margin *10 (**60=6dB**) |

### 7.1.3 Profile Configuration

For this function, NV-600LS/RS provides world wide telecom standard band plan, such as meet European telecom standard band plan **998(17a)**, USA telecom standard band plan **997(8a, 8b)** and APAC Telecom standard band plan **(30a)** etc.

Annex A specifies bandplans for the North American region and enables NV-600LS/RS to be deployed with traditional POTS telephony or in an all-digital mode. Annex B specifies bandplans for Europe and enables NV-600 LS/RS deployment with underlying POTS and ISDN services. Annex C allows NV-600LS/RS to coexist with TCM-ISDN services, found primarily in APAC.

NV-600LS/RS has numerous configuration profiles and bandplans to meet regional service provider requirements. The frequency bandwidth has increased to 30 MHz, with configuration options at 8.5 MHz, 12 MHz, 17.7 MHz and 30 MHz.

Band profile and band plan can only be configured at NV-600LS as NV-600RS will auto-follow up on the settings of NV-600LS. The only thing that NV-600RS must be configured so that the modems will link is the tone mode. However, the default tone mode for NV-600LS/RS is V43, so at default there's no need to change the tone mode unless it is required by the telecom companies to use different tone mode. Another important thing is that band profile and band plan setting must be compatible to each other if not access error will show when applied. Please deactivate and activate once the setting has been changed.

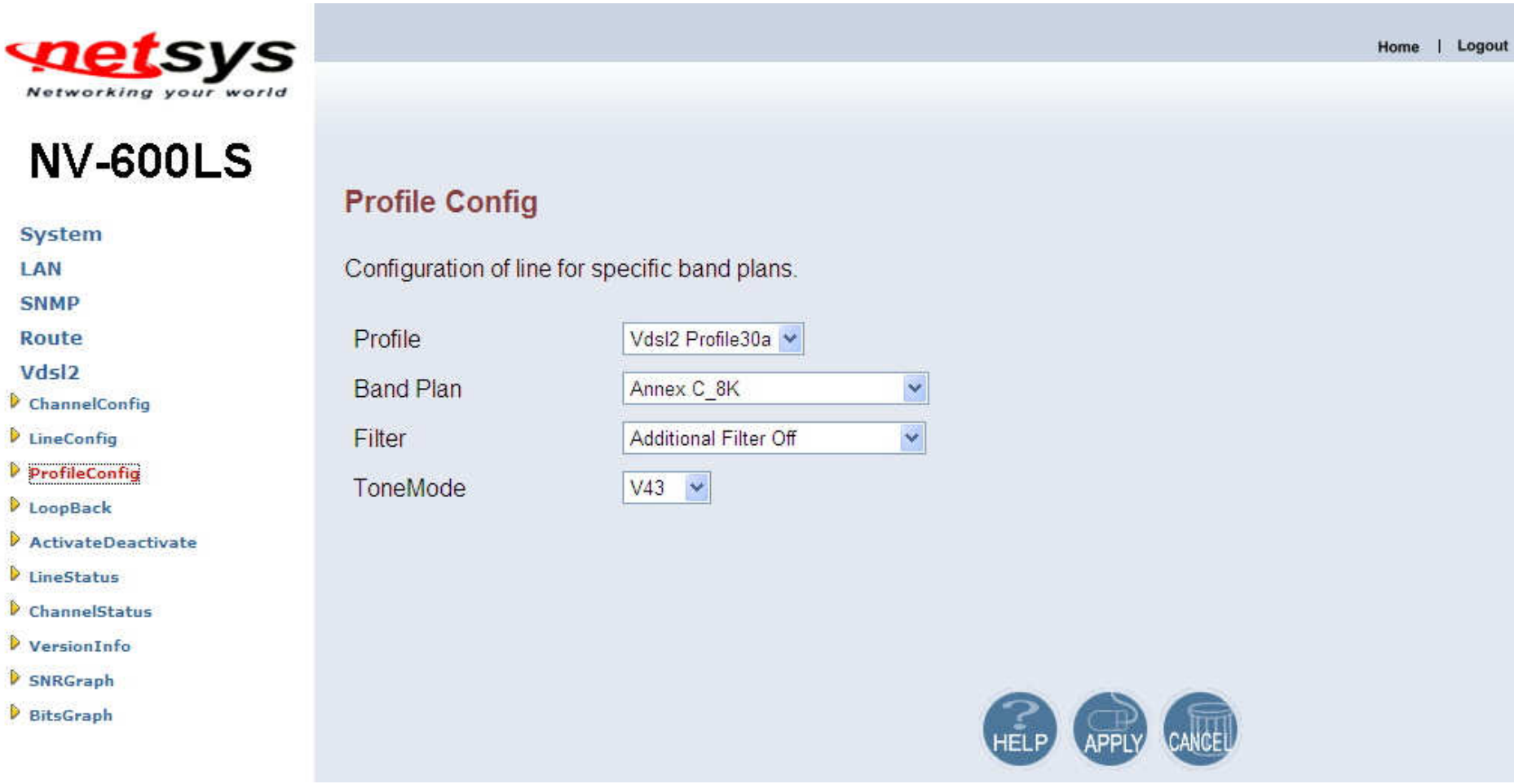



**Figure 7.1.3.1 NV-600LS Profile Configuration**


Figure 7.1.3.2 NV-600RS Profile Configuration


Figure 7.1.3.3 Band Profile and Plan Setup Error

| Profile<br>Region | 8a<br>US | 8b<br>EU | 8c<br>US | 8d<br>all | 12a<br>all | 12b<br>all | 17a<br>EU/US | 30a<br>APAC |
|---|---|---|---|---|---|---|---|---|
| Bandwidth (MHz) | 8.832 | 8.832 | 8.500 | 8.832 | 12.000 | 12.000 | 17.664 | 30.000 |
| Tones | 2047 | 2047 | 1971 | 2047 | 2782 | 2782 | 4095 | 3478 |
| Tone Spacing (kHz) | 4.3125 | 4.3125 | 4.3125 | 4.3125 | 4.3125 | 4.3125 | 4.3125 | 8.625 |
| Line Power (dBm) | +17.5 | +20.5 | +11.5 | +14.5 | +14.5 | +14.5 | +14.5 | +14.5 |
| Netsys(Infineon) | Yes | **Yes** | Yes | Yes | **Yes** | Yes | **Yes** | **Yes** |
| Competitor A | No | **No** | Yes | Yes | **?** | Yes | **No** | **No** |
| Competitor B | Yes | **No** | Yes | Yes | **Yes** | Yes | **CO only** | **No** |

**Figure 7.1.3.4 Band Profile Region**

The following shows the band profile and band plan compatibility:

| | Band Profile List | | Band Plan List |
|---|---|---|---|
| 0 | VDSL2 Profile8a | 0 | Annex A M1_EU32 |
| 1 | VDSL2 Profile8b | 1 | Annex A M9_EU64 |
| 2 | VDSL2 Profile8c | 8 | Annex B 997-M2x-A (B05) |
| 3 | VDSL2 Profile8d | 9 | Annex B 997-M2x-M (B06) |
| 4 | VDSL2 Profile12a | 10 | Annex B 997-M1c-A-7 (B07) |
| 5 | VDSL2 Profile12b | 11 | Annex B 998-M1x-B (B08) |
| 6 | VDSL2 Profile17a | 13 | Annex B 998-M2x-A (B10) |
| 7 | VDSL2 Profile30a | 14 | Annex B 998-M2x-M (B11) |
| 8 | VDSL2 Profile17b | 16 | Annex B 998-M2x-B (B12) |
| | | 18 | Annex B 998-M2x-NUS0 (B13) |
| | | 20 | Annex C |
| | | 21 | Annex C_8K |
| | | 22 | Annex B 997-M2x-NUS0 |
| | | 23 | Annex C 1M1 |
| | | 24 | Annex C_8K 1M1 |
| | | 25 | Annex B 998E17-M2x-A |
| | | 26 | Annex B 998E17-M2x-NUS0 |

| Band Profile \ Band Plan | 0 | 1 | 8 | 9 | 10 | 11 | 13 | 14 | 16 | 18 | 20 | 21 | 22 | 23 | 24 | 25 | 26 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | O | O | O | O | O | O | O | O | O | X | X | X | X | X | X | X | X |
| 1 | O | O | O | O | O | O | O | O | O | X | X | X | X | X | X | X | X |
| 2 | X | X | O | X | O | X | X | O | X | X | X | X | X | X | X | X | X |
| 3 | O | O | O | X | O | O | O | O | O | X | X | X | X | X | X | X | X |
| 4 | O | O | O | O | O | O | O | O | O | X | X | X | X | X | X | X | X |
| 5 | O | O | X | X | O | O | O | O | O | O | X | X | X | X | X | X | X |
| 6 | O | X | X | X | O | O | O | O | O | X | O | X | X | O | X | X | O |
| 7 | O | X | X | X | X | X | X | X | X | X | X | O | O | X | O | X | X |
| 8 | X | X | X | X | X | X | X | O | O | X | X | X | X | X | X | O | X |

**Note: O = Compatible; X = Not Compatible**

The following phone wire distance and data rates are possible according to the band profile and band plan setup:

***Comment:***

**Downstream:** Traffic from Transmitter to Receiver
**Upstream:** Traffic from Receiver to Transmitter

**Default plan profile and band plan = 30a and C8K**

| Distance | 0-350m | 350-450m | 450-600m | 600-900m | Beyond 900m |
|---|---|---|---|---|---|
| Downstream | 100Mbps | 70-85Mbps | 40-60Mbps | 20-40Mbps | X |
| Upstream | 100Mbps | 40Mbps | 10Mbps | 1-5Mbps | X |

**Note:**

Using Band profile 30a and band plan C8K for distances beyond 900m is not recommended.

**Alternative band profile and band plan = 8d and M1_EU32**

| Distance | 0-800m | 800-1200m | 1200-1500m | Beyond 1500m |
|---|---|---|---|---|
| Downstream | 60-80Mbps | 30-50Mbps | 30Mbps | X |
| Upstream | 15Mbps | 5-10Mbps | 2-5Mbps | X |

**Note:**

Using Band profile 8d and band plan M1_EU32 for distances beyond 1500m is not recommended.

**Note:**

The performance data above is for reference only, the actual data rate will vary on the quality of the copper wire and environment factors.

## 7.1.4 Loop Back

The loop back testing function for checking phone wire link problem: 1. System Loop.  2. Line Side Loop

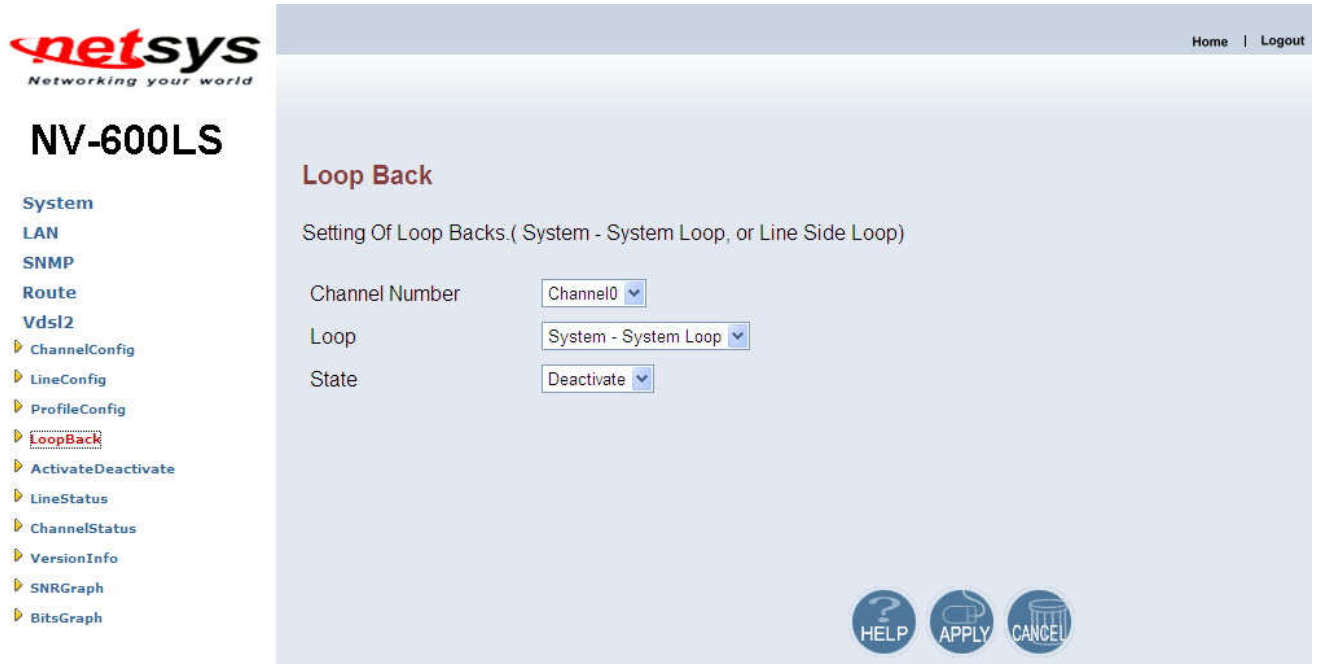



**Figure 7.1.4 Loop Back Activation/Deactivation Menu**

**Loop Back**

| Setting | Description |
|---|---|
| Channel No. | To which bearer channel number shall the settings apply?  **Channel 0** |
| Loop | System loop or line side loop |
| State | Activate or deactivate loop back within the transmission convergence layer |

## 7.1.5 Line Activation

This function is for enable/disable VDSL2 port.


**Figure 7.1.5 Activation and Deactivation of the Line**

**Line Activation/Deactivation:**

| Setting | Description |
|---|---|
| Line | Activate or deactivate the line. (Select the activity and the press the APPLY button.) |

## 7.2 Status Displays

### 7.2.1 Line Status

This function provides SNR value for checking phone wiring quality.

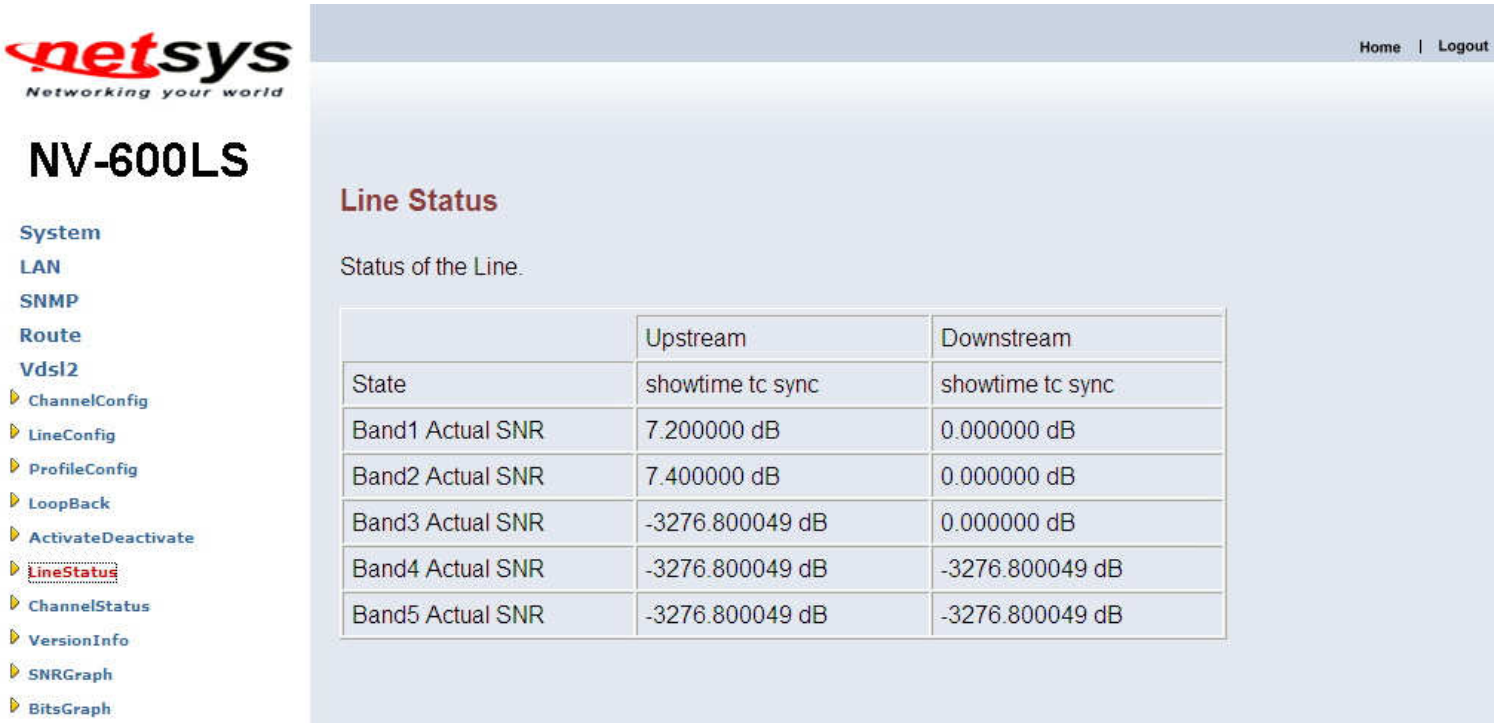



**Figure 7.2.1 Line Status Display: Actual SNR**

**The following status messages may occur:** not_initialized, exception, idle request, idle, silent request, silent, handshake, full init, discovery, training, analysis, exchange, showtime no sync, showtime tc sync, fast retrain, lowpower l2, loopdiagnostic, loopdiagnostic complete, resync, test, lowpower l3, unknown.

## 7.2.2 Channel Status

This function shows VDSL2 port status.

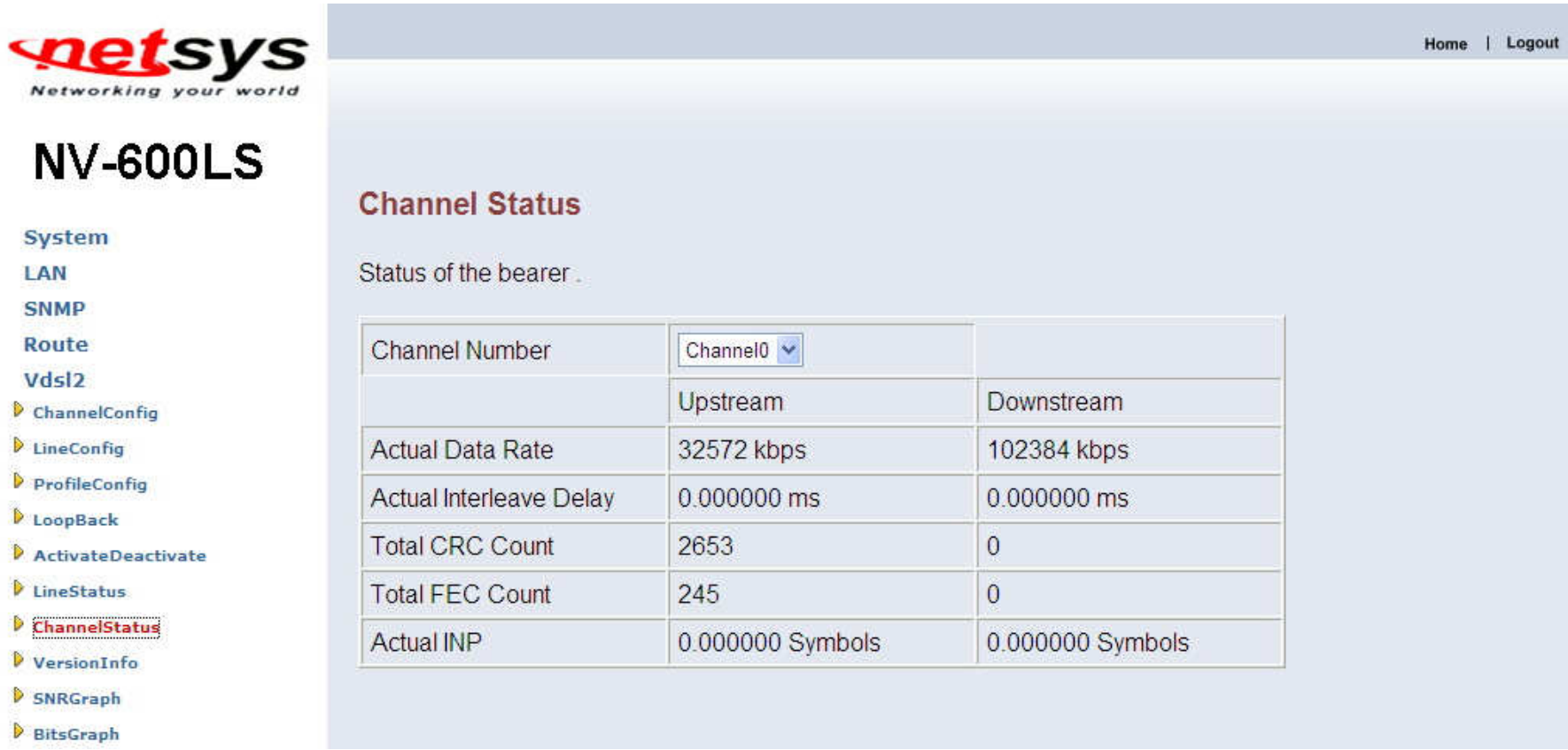



**Figure 7.2.2 Channel Status Display: Data Rate, Delay, Error Counters and Impulse Noise Protection**

## 7.2.3 Version Info

This function shows hardware and firmware version.

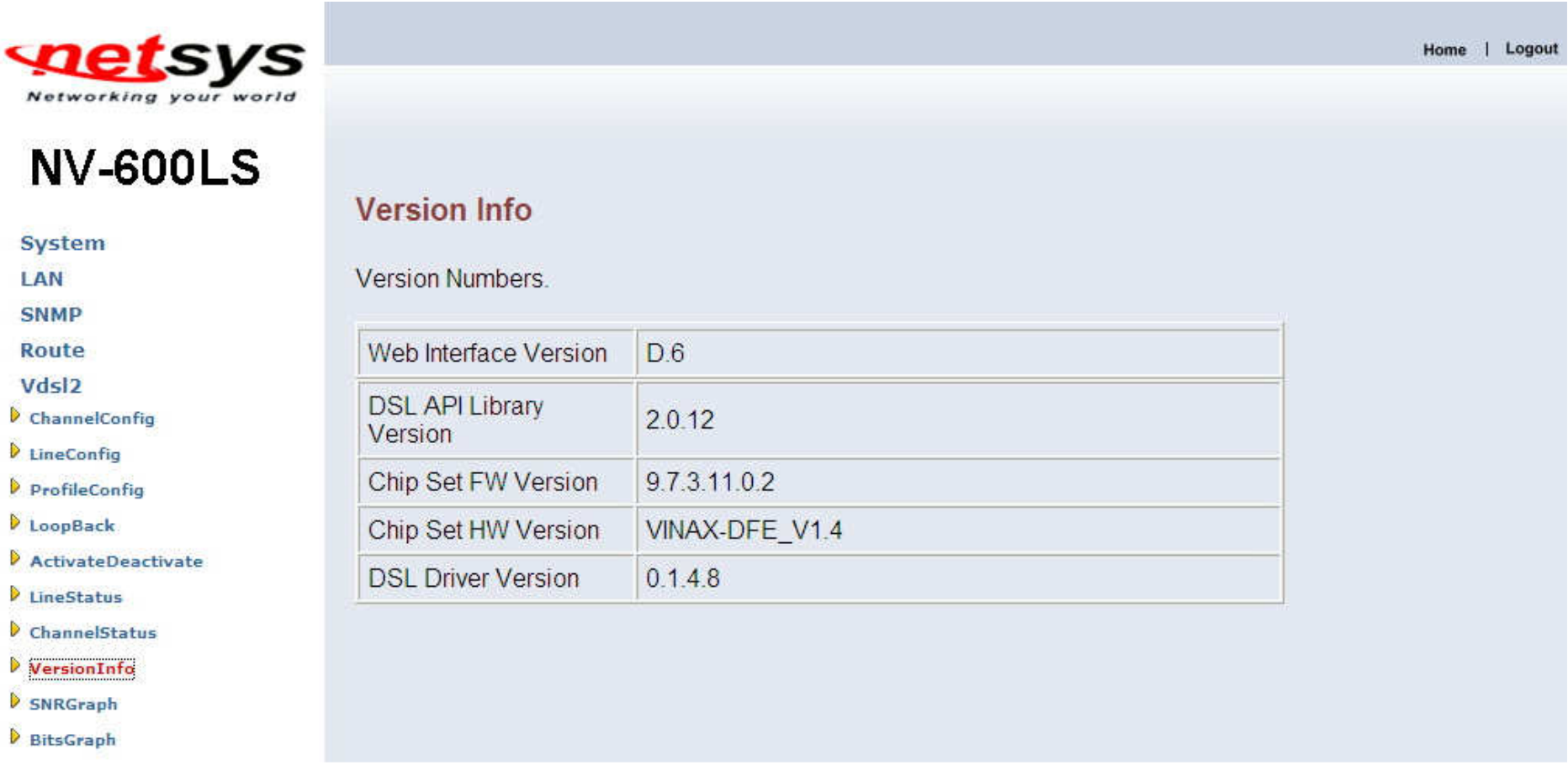
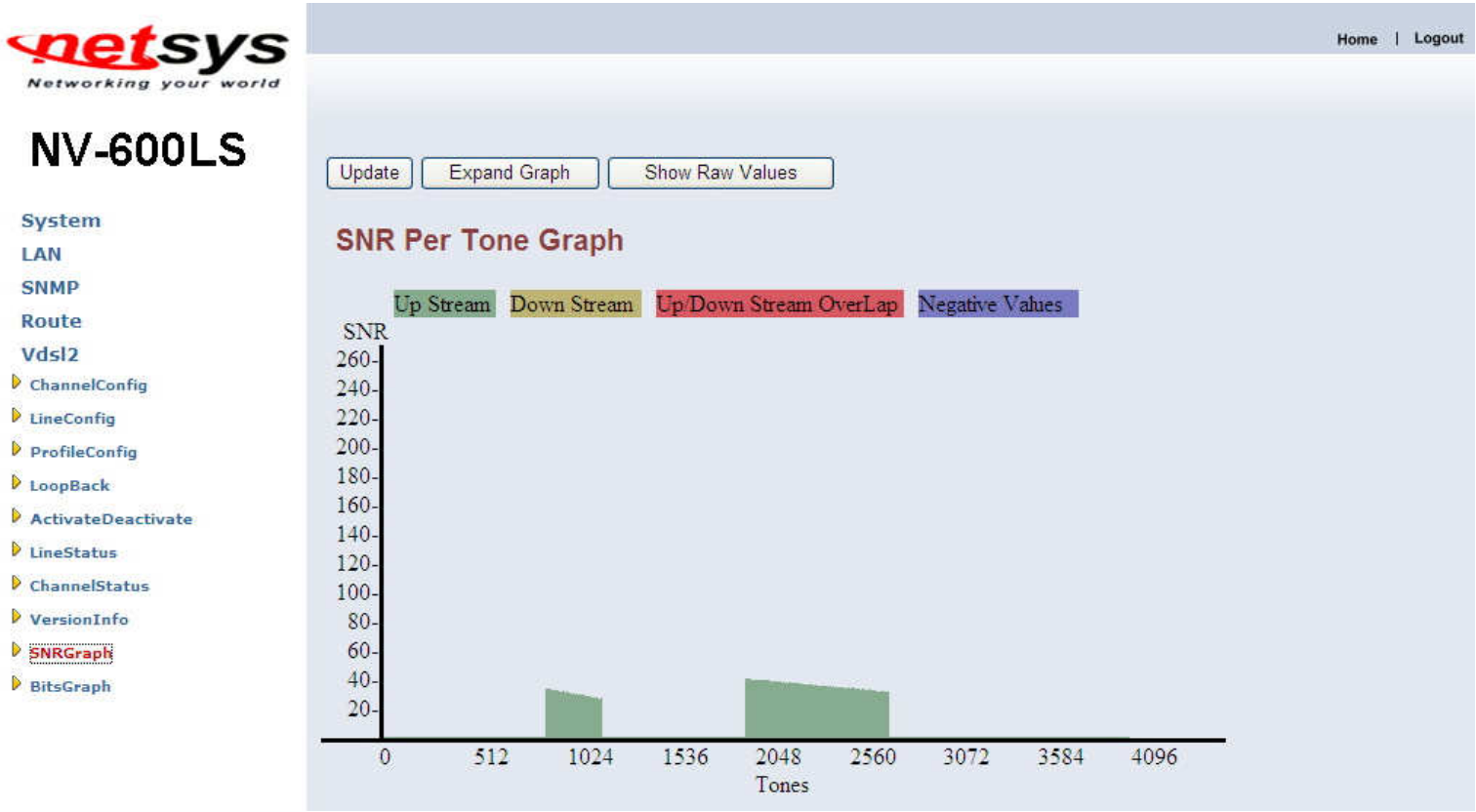



**Figure 7.2.3 Display of Version Data**

## 7.2.4 SNR Graphs

When NV-600LS link with NV-600RS, this graph will show the SNR value for each band.



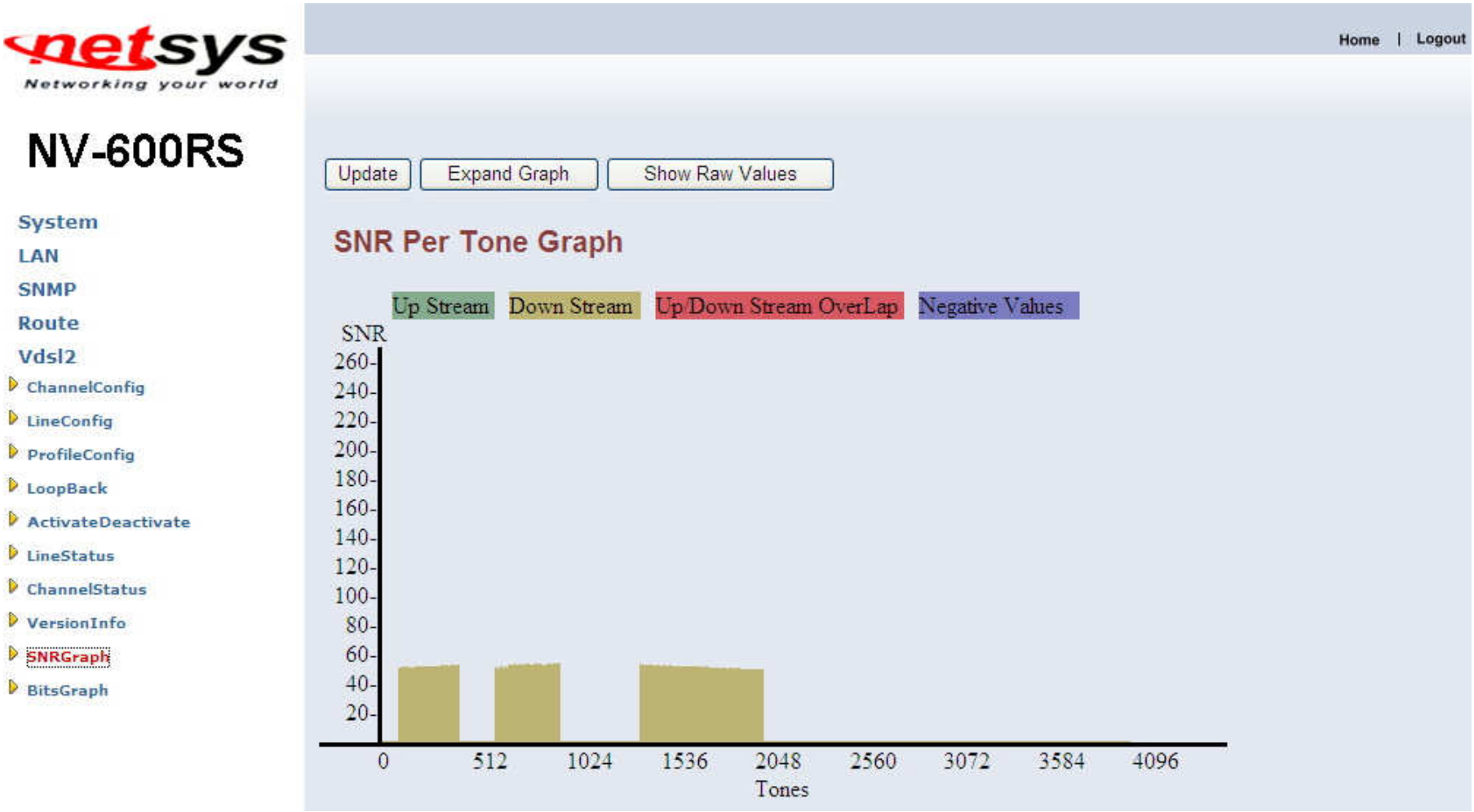



**Figure 7.2.4 Display of SNR per Carrier**

## 7.2.5 Bits Graphs

When NV-600LS link with NV-600RS, this graph will show the bits value for each tone.

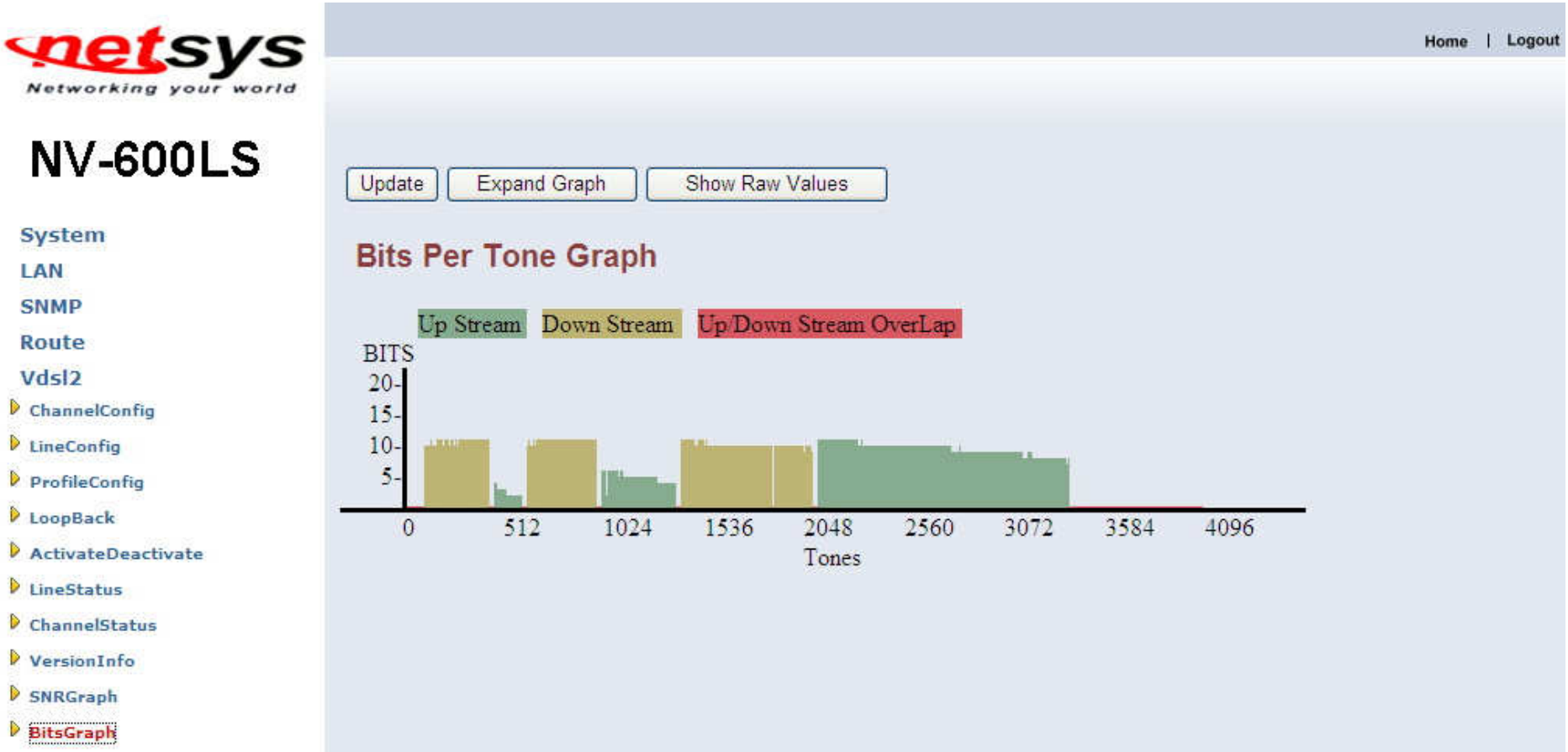



**Figure 7.2.5 Display Bits Per Tone Graph**

# Chpater 8. Configuration Interface of the Modem

This section explains how to configure the modem section of the NV-600LS/RS using its web-based configuration.

The part of the circuitry as well as the modem configuration menu has been ported from that of the reference kit to the NV-600LS/RS reference board. As for the menu, there are only a few differences:

- The "adm1" port now is the port to the VDSL2 side. The port on the LAN is "**adm0**". It supports four Ethernet connections.
- The IP addresses are used in this chapter are different from the examples in the previous chapters.
- The password used in this chapter is different from the examples in the previous chapters.

## 8.1 Logging in to the NV-600LS/RS

To log on to the NV-600LS/RS Web Application, you must have a valid password. The Administrator creates the log on user with its password. When one log on to the NV-600LS/RS Web Application, the LOGIN PASSWORD window is displayed as shown in Figure 8.1.

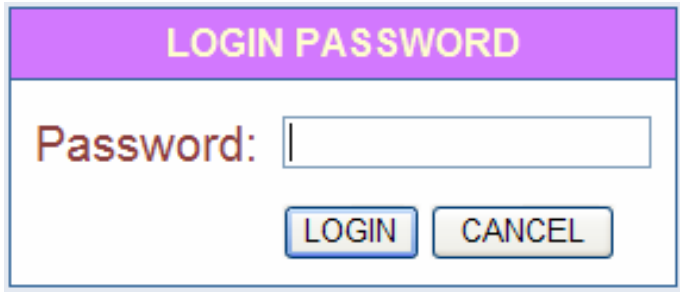



**Figure 8.1 NV-600LS/RS Web Application**

**In the LOGIN PASSWORD window:**

1. Enter the password in the Password text box. For an Admin user, the default password is "**admin**".
2. Click LOGIN to begin the configuration or click CANCEL in the LOGIN PASSWORD window to cancel this log on operation.

## 8.2 Advanced Setup

There is an Advanced Setup for more detail configurations for both NV-600LS/RS. This manual gives importance to the Advanced Setup.


**Figure 8.2 Select the Advanced Setup in the Entry Screen**

## 8.2.1 Advanced Setup

Click on the Advanced Setup link in the homepage in case you want to configure a wider range of settings. The following configuration options are displayed in the left navigation bar, as shown in Figure 8.2.1.

- System
- LAN
- SNMP
- Route
- VDSL2


Figure 8.2.1 Advanced Setup

## 8.2.2 System

The System link can be viewed in the left navigation bar. The following are the options available under System, as shown in Figure 8.2.2.

- Administrator Settings
- Firmware Upgrade
- Reboot
- Reset System

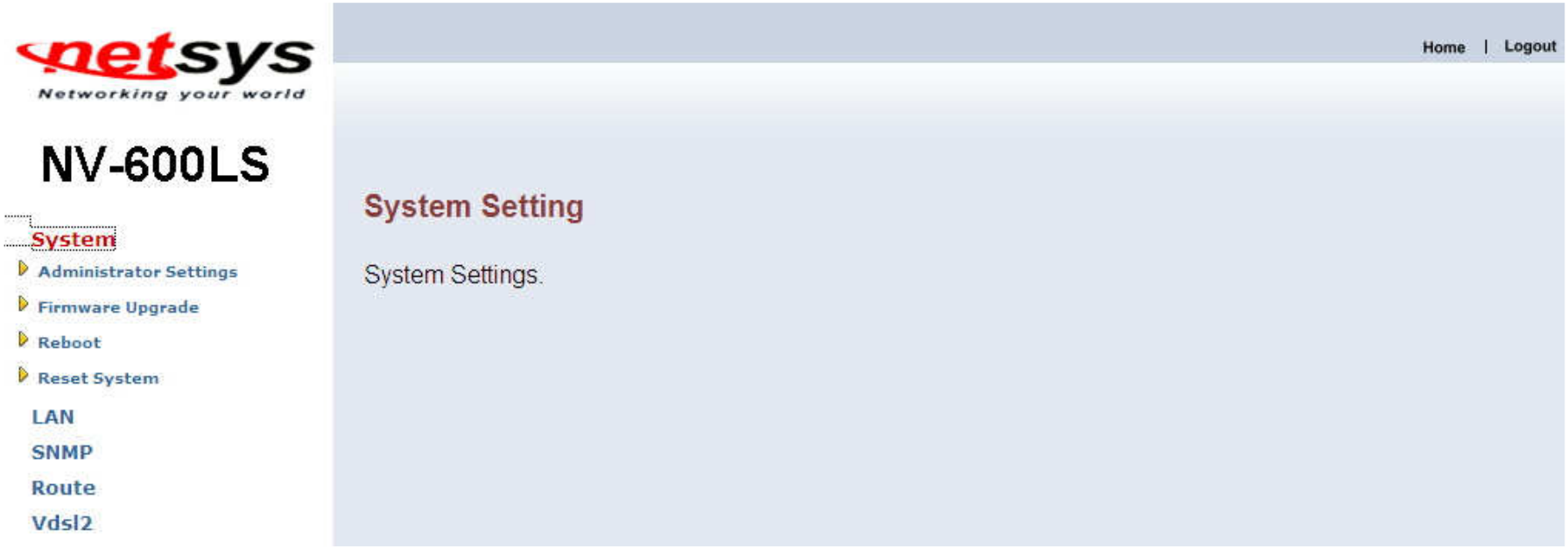



**Figure 8.2.2 System in the Left Navigator Bar**

### 8.2.2.1 Administrator Settings

To add a user or change user's password, click on the "Administrator Settings" link in the left navigation bar. A screen is displayed as shown in Figure 8.2.2.1.

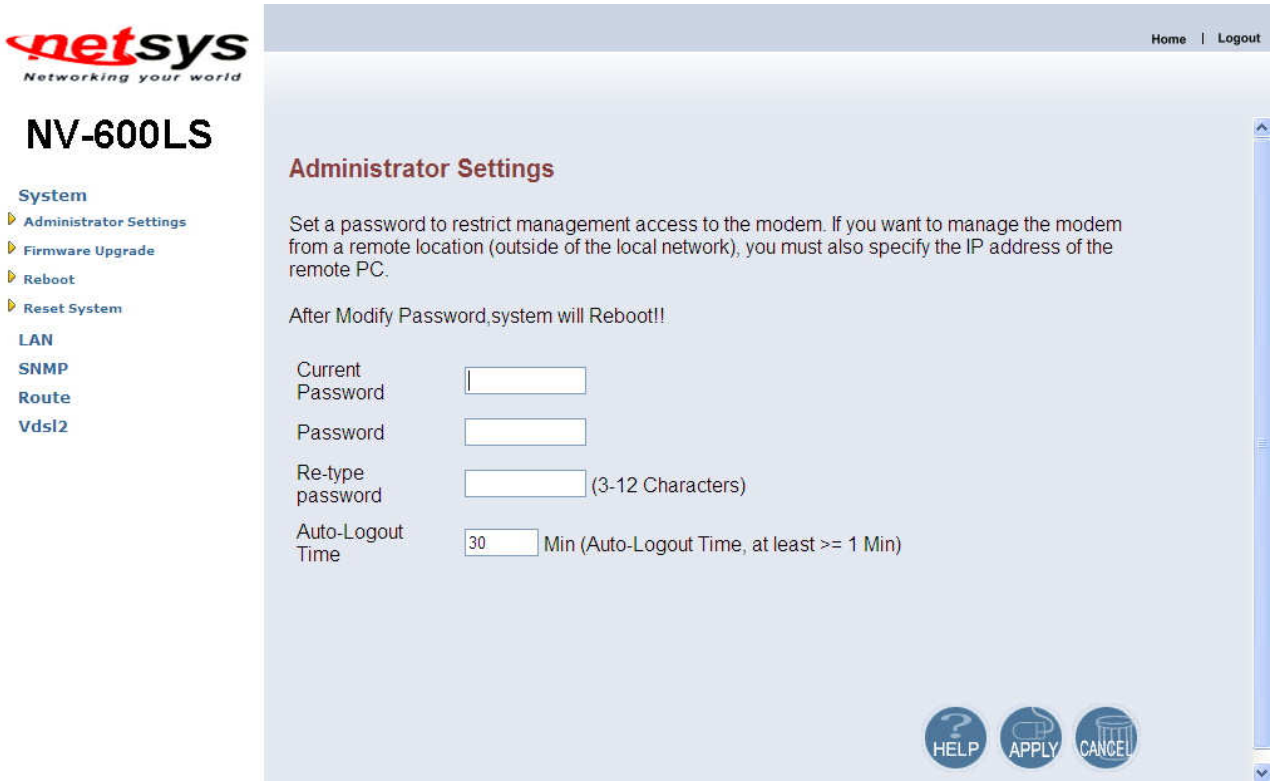



**Figure 8.2.2.1 Administrator Settings Configuration**

While adding a user, each user must assign a separate port. Hence the number of users that can be added to the system depends on the number of ports available on the NV-600LS/RS.

The screen contains the following details:

**Fields in User Setting:**

| Field | Description |
|---|---|
| Current Password | This is the password associated with the administrator. This is enabled only for the user Administrator login. |
| Password | This is the password of the login administrator. (3-12 characters) |
| Re-type Password | This is the password verification. (3-12 characters) |
| Auto-Logout Time | The auto-logout time, at least one minute. |

- Click APPLY to save the information that has been entered.
- Click CANCEL to exit from this page without saving the changes.

## 8.2.2.2 Firmware Upgrade

To update the system firmware, click on the "Firmware Upgrade" link in the left navigation bar. A screen is displayed as shown in Figure 8.2.2.2.

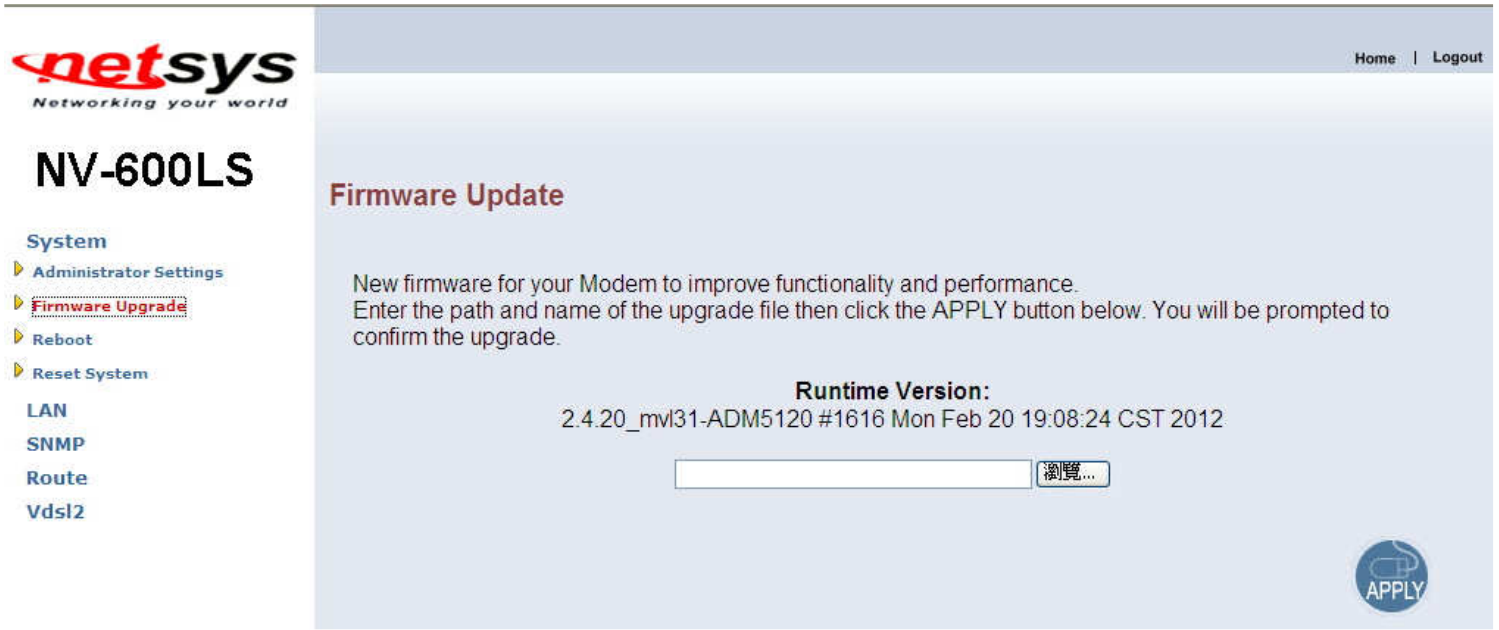



**Figure 8.2.2.2 Firmware Update**

The screen contains the following detail:

- Click "Browse" to select a specific file name in preparation upgrade the firmware.
- Click APPLY to start the firmware update.

## 8.2.2.3 Reboot

To reboot the unit, click on the "Reboot" link in the left navigation bar. A screen is displayed as shown in Figure 8.2.2.3.

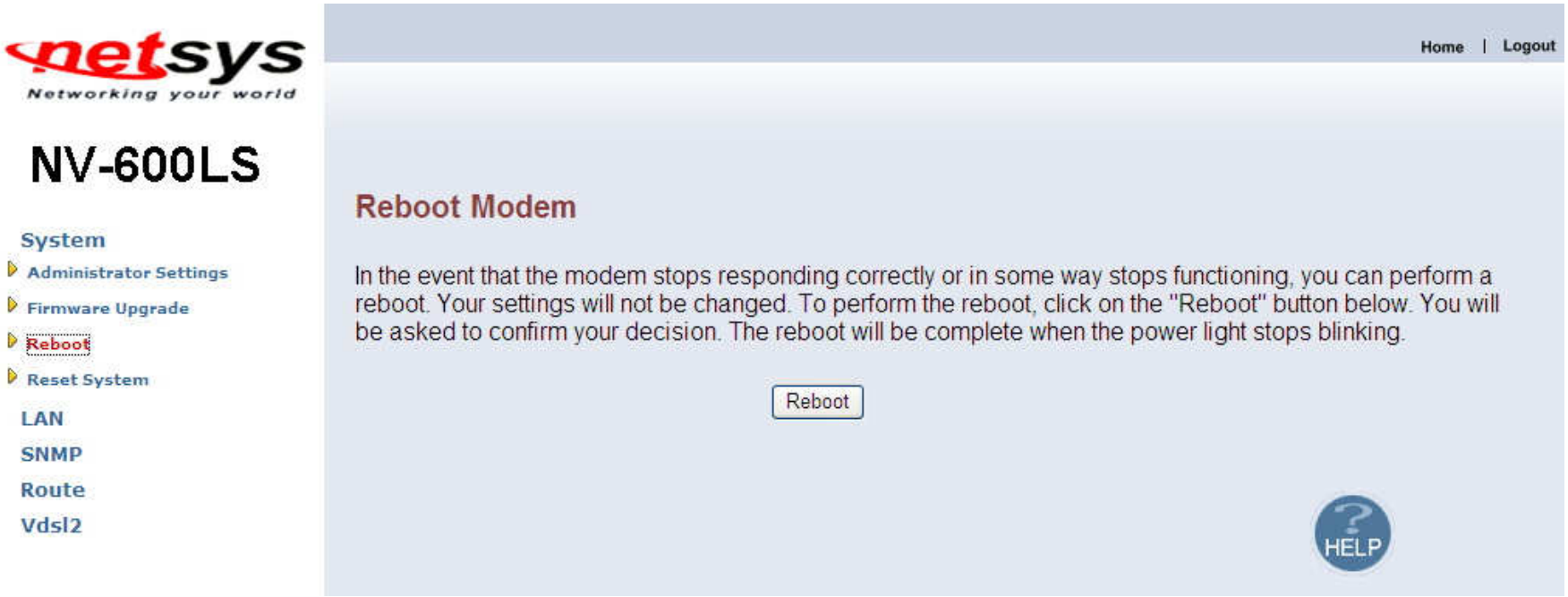



**Figure 8.2.2.3 Reboot NV-600LS/RS Modem**

- Click Reboot to restart the unit.

## 8.2.2.4 Reset system

To reset the system, click on the "Reset" link in the left navigation bar. A screen is displayed as shown in Figure 8.2.2.4.

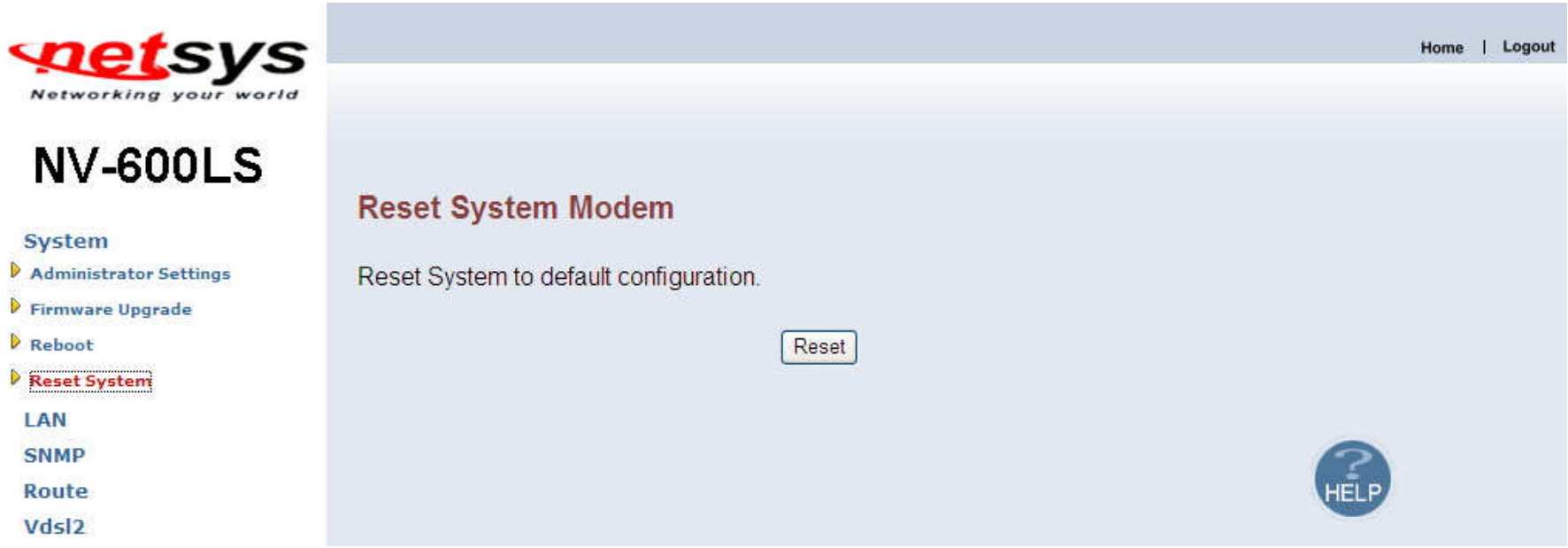



**Figure 8.2.2.4 Reset NV-600LS/RS Modem**

- Click Reset to restart the system to default configuration.

## 8.2.3 LAN

The LAN Setting can be viewed in the left navigation bar. The following are the options available under LAN, as shown in Figure 8.2.3:

- LAN Settings
- LAN Switch Port Setting
- LAN Port Status


**Figure 8.2.3 LAN in Left Navigator Bar**

## 8.2.3.1 LAN Settings

**Note:**

For the NV-600LS/RS it is recommended to select a simple IP setting suitable to controlled lab environments. Please set a static IP address.

To configure the LAN interface, click on the "LAN Settings" link in the left navigation bar. A screen is displayed as shown in Figure 8.2.3.1 in case of the NV-600LS/RS.

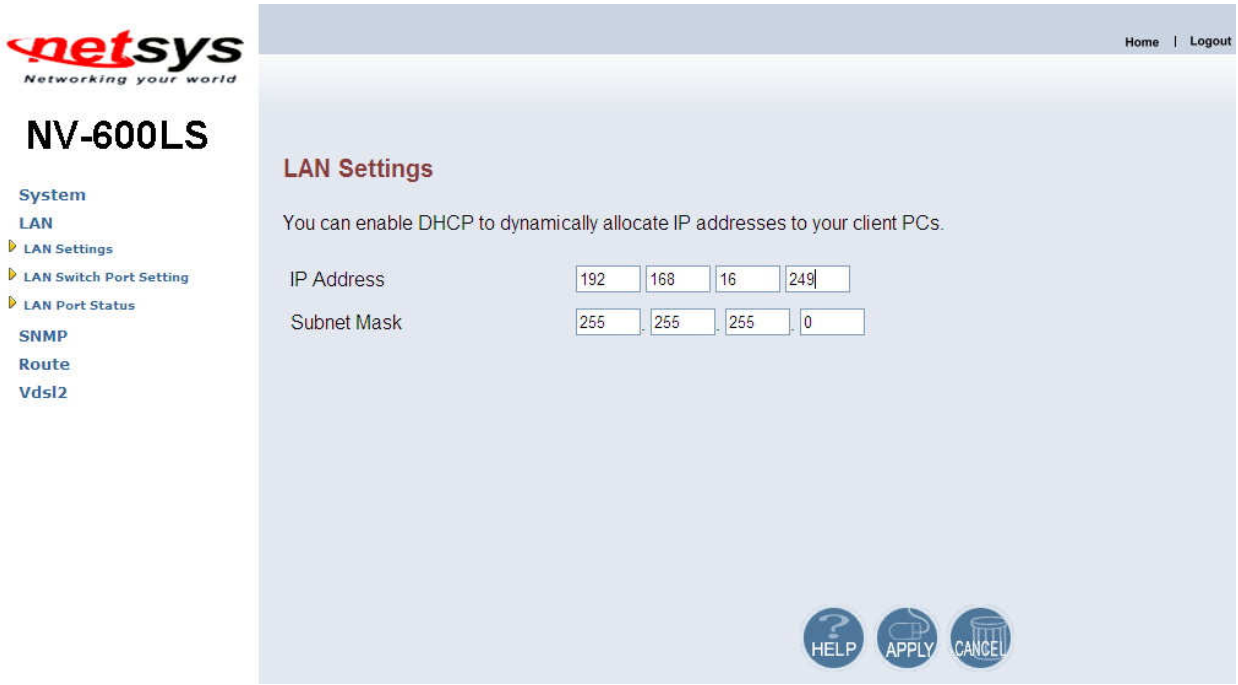



**Figure 8.2.3.1 LAN Settings**

The screen contains the following details:

**Fields in LAN Settings:**

| Field | Description |
|---|---|
| IP Address | Enter the LAN interface IP Address of NV-600LS/RS. |
| Subnet Mask | Enter the LAN Subnet Mask of NV-600LS/RS. |

- Click APPLY to save the information that has been entered.
- Click CANCEL to exit from this page without saving the changes.

## 8.2.3.2 LAN Switch Port Setting

To view the All LAN Port Setting, click on the "All Lan Port Setting" link in the left navigation bar. A screen is displayed to all LAN Port Setting as shown in Figure 8.2.3.2.

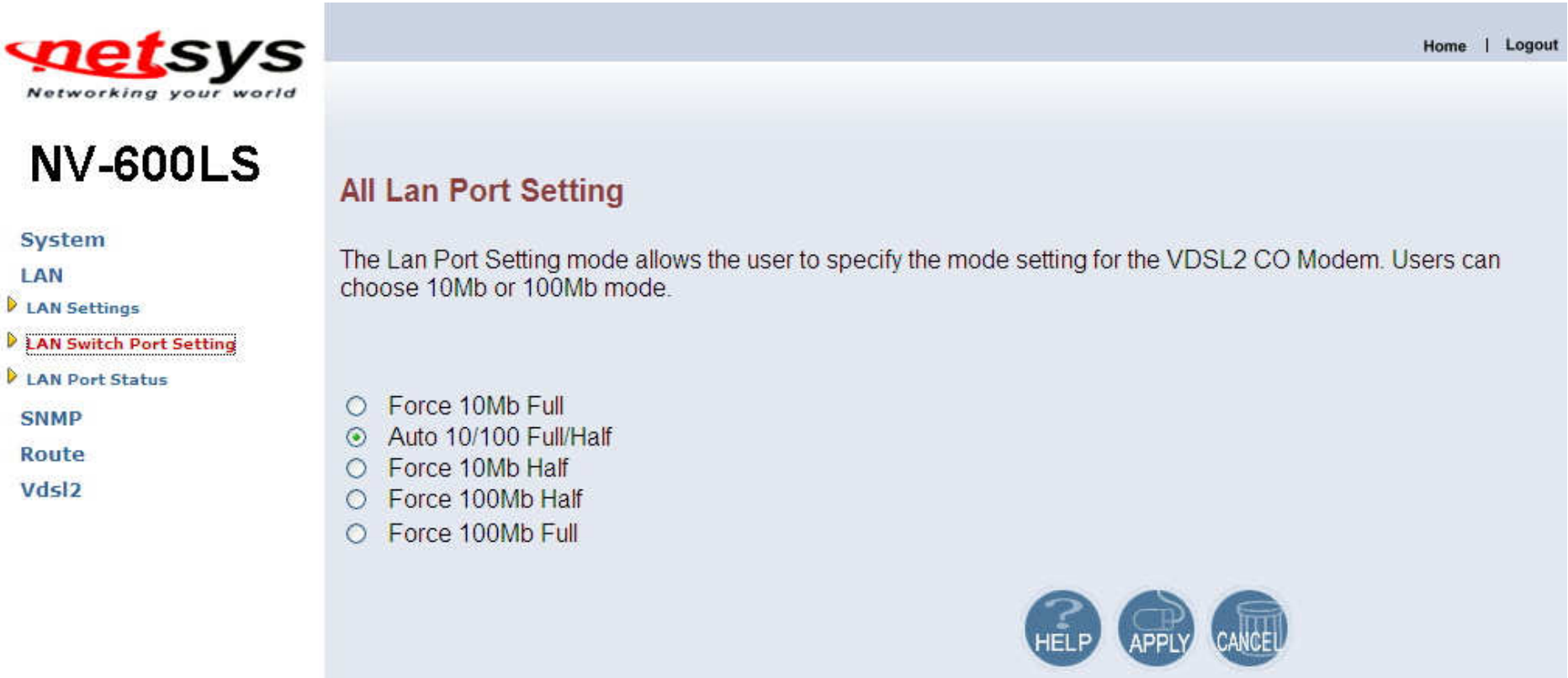



**Figure 8.2.3.2 DHCP Client List**

## 8.2.3.3 LAN Port Status

To view the LAN Port Status, click on the "LAN Port Status" link in the left navigation bar. The following information provides a view of the current Ethernet ports status of the unit


**Figure 8.2.3.3 LAN Port Status**

## 8.2.4 SNMP

The SNMP Settings can be viewed in the left navigation bar. The following are the options available under SNMP, as shown in Figure 8.2.4.

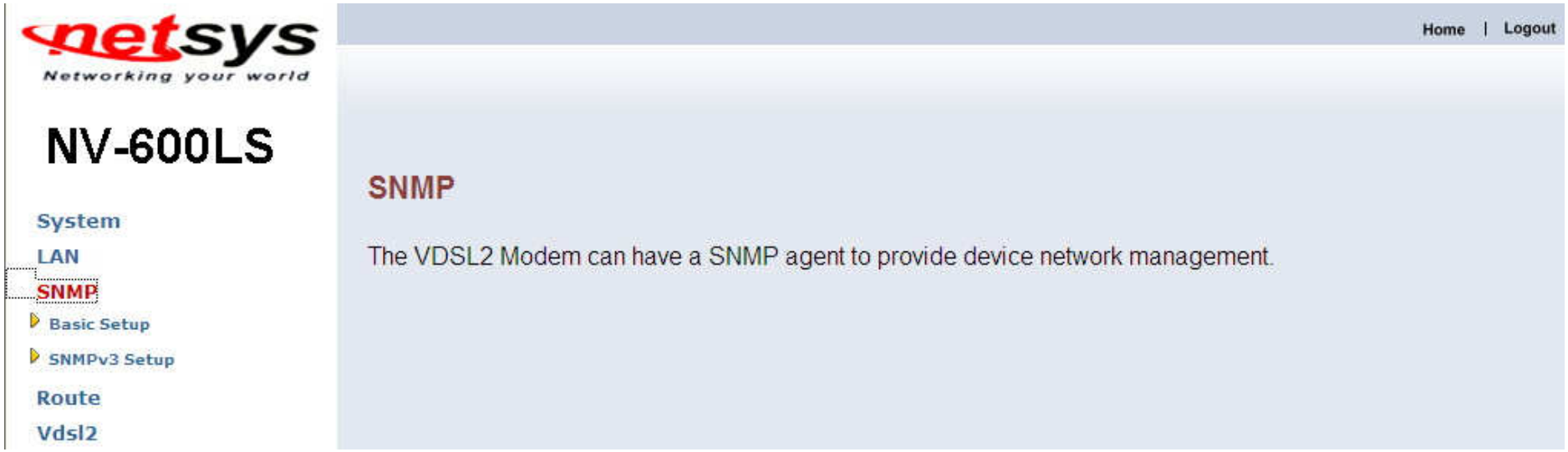



**Figure 8.2.4 SNMP in Left Navigator Bar**

### 8.2.4.1 Basic Setup

To enable or disable the SNMP Settings, click on the "Basic Setup" link in the left navigation bar. A screen is displayed as shown in Figure 8.2.4.1.

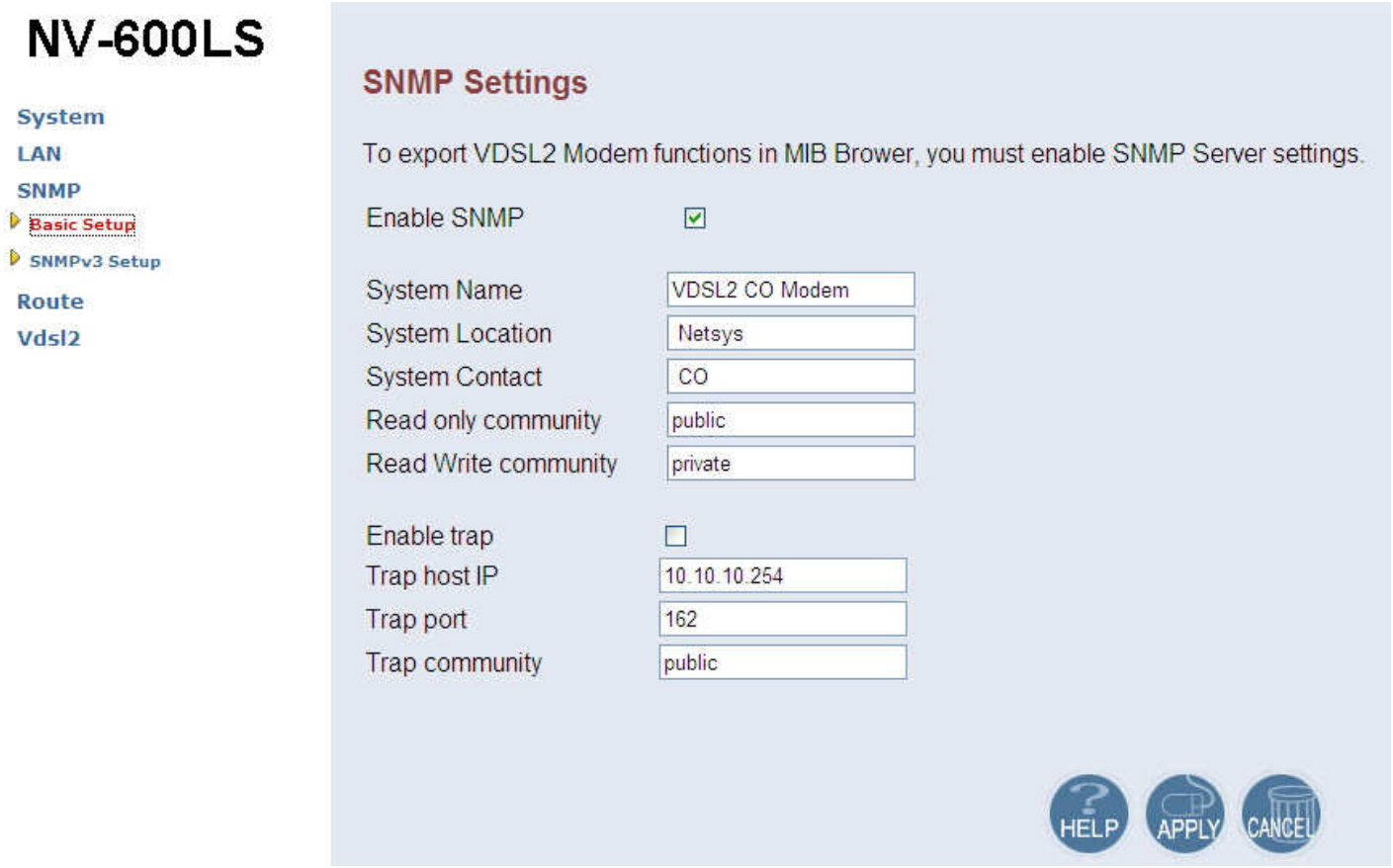



**Figure 8.2.4.1 SNMP Configuration**

The screen contains the following details:

**Fields in SNMP Settings:**

| Field | Description |
|---|---|
| Enable SNMP | To enable or disable SNMP Setting. Select the check box to Enable or Disable the SNMP function of NV-600LS/NV-600RS. |
| System Name | Enter a system name to be used for the VDSL2 Modem |
| System Loaction | Enter the system location of the VDSL2 Modem |
| System Contact | Enter the name of a person or organization |
| Read only community | Enables requests accompanied by this string to display MIB-object information. Deafult word is "public". |
| Read Write community | Enables requests accompanied by this string to display MIB-object information and to set MIB objects. Deafult word is "private". |
| Enable Trap | To enable or disable Trap Setting. Select the check box to Enable or Disable the Trap function of NV-600LS/NV-600RS. |
| Trap Host IP | Create a trap manager by entering the IP address. |
| Trap port | Specifies the trap port. Default trap port is "162". |
| Trap community | Create a trap manager by entering a community string. |

- Click APPLY at any time during configuration to save the information that you have entered.
- Click CANCEL to exit from this page without saving the changes.

## 8.2.4.2 SNMPv3 Setup

To enable or disable the SNMPv3 Settings, click on the "SNMPv3 Setup" link in the left navigation bar. A screen is displayed as shown in Figure 8.2.4.2.

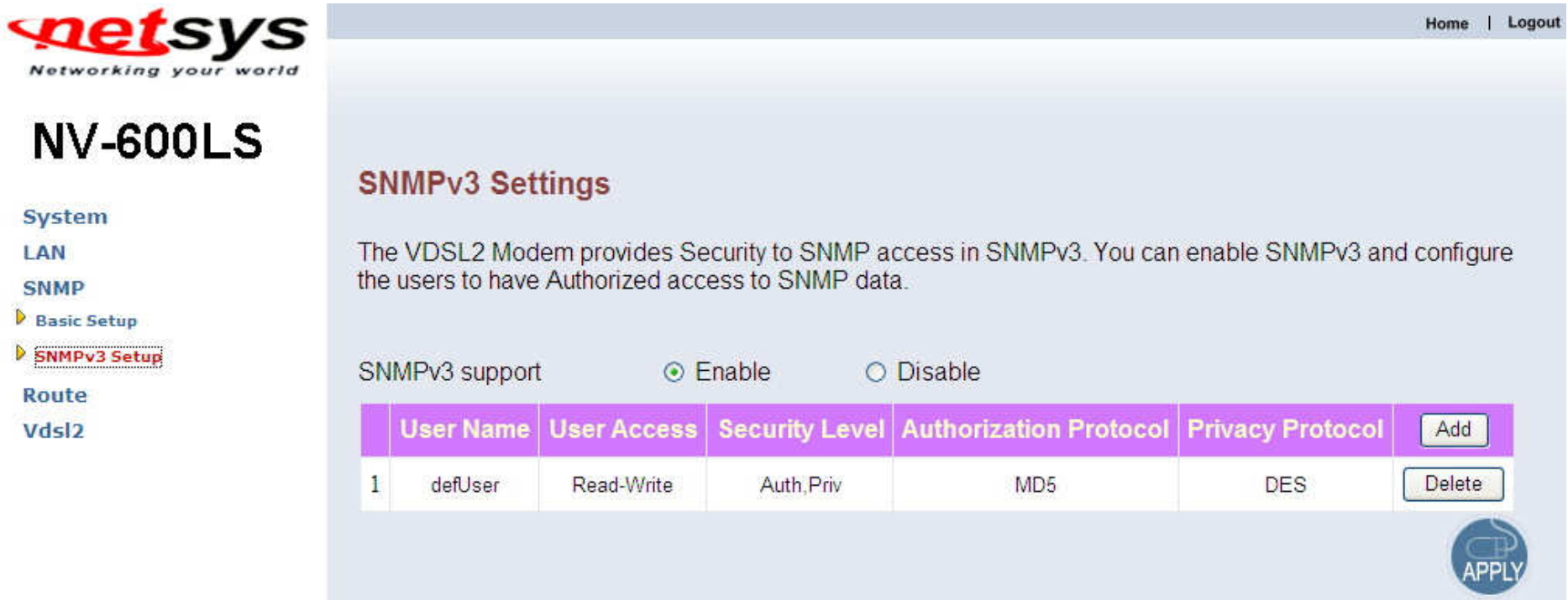



**Figure 8.2.4.2 SNMPv3 Configuration**

The screen contains the following details:

**Fields in SNMPv3 Settings:** A screen is displayed as shown in Figure 8.2.4.2.

| Field | Description |
|---|---|
| Enable SNMPv3 | To enable or disable SNMP Setting. Select the check box to Enable or Disable the SNMP function of NV-600LS/NV-600RS. |
| Add | Add a SNMPv3 user |
| Delete | Delete a SNMPv3 user |

**Fields in SNMPv3 Add Settings:** A screen is displayed as shown in Figure 8.2.4.2-1.

| Field | Description |
|---|---|
| User Access | Select the check box to Read-Only or Read-Write.<br>Read-Only: Enables requests accompanied by this string to display MIB-object information.<br>Read-Write: Enables requests accompanied by this string to display MIB-object information and to set MIB objects. |
| User name | Specifies the user name. (1~15 chars) |
| Security Level | Specifies security level of your need:<br>1. No Authorization, No Privacy 2. Authorization, No Privacy 3. Authorization, Privacy |
| Authorization Protocol | Specifies the authorization type. (MD5 / SHA) |
| Auth Password | Specifies the authorization password. (8~15 chars) |
| Privacy Protocol | Specifies the privacy type. (DES / AES) |
| Privacy Password | Specifies the privacy password. (8~15 chars) |

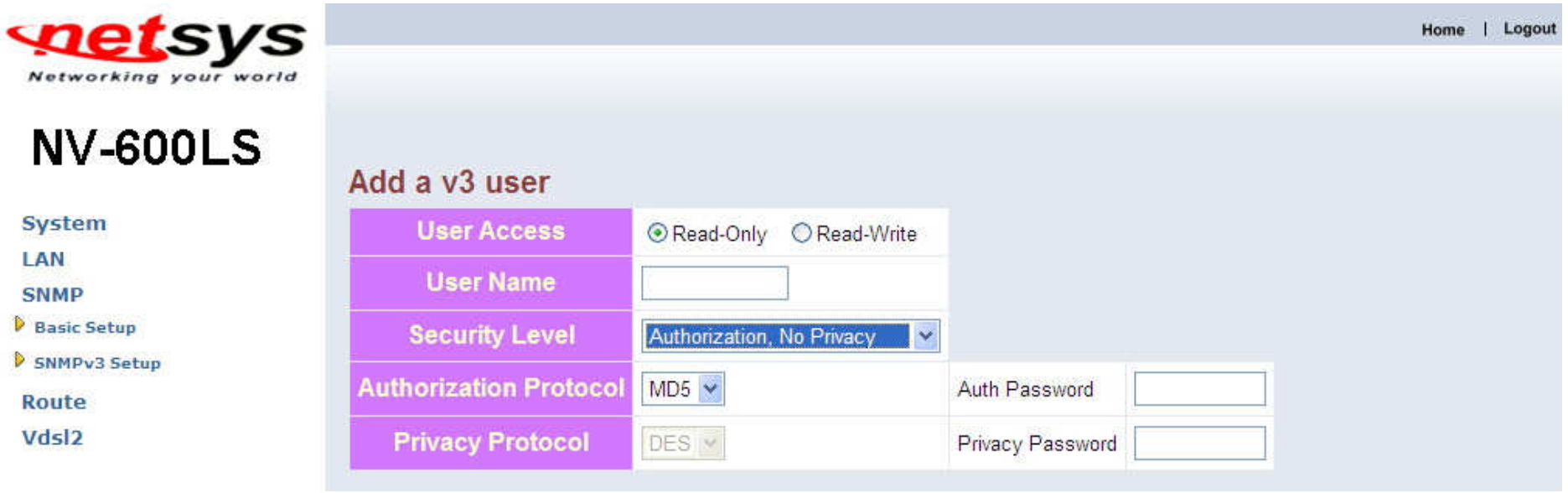



**Figure 8.2.4.2-1 Add a v3 user**

## 8.2.5 Route Settings

The Route Settings can be viewed in the left navigation bar. The following are the options available under Route, as shown in Figure 8.2.5:

- Static Routing
- Routing Table List

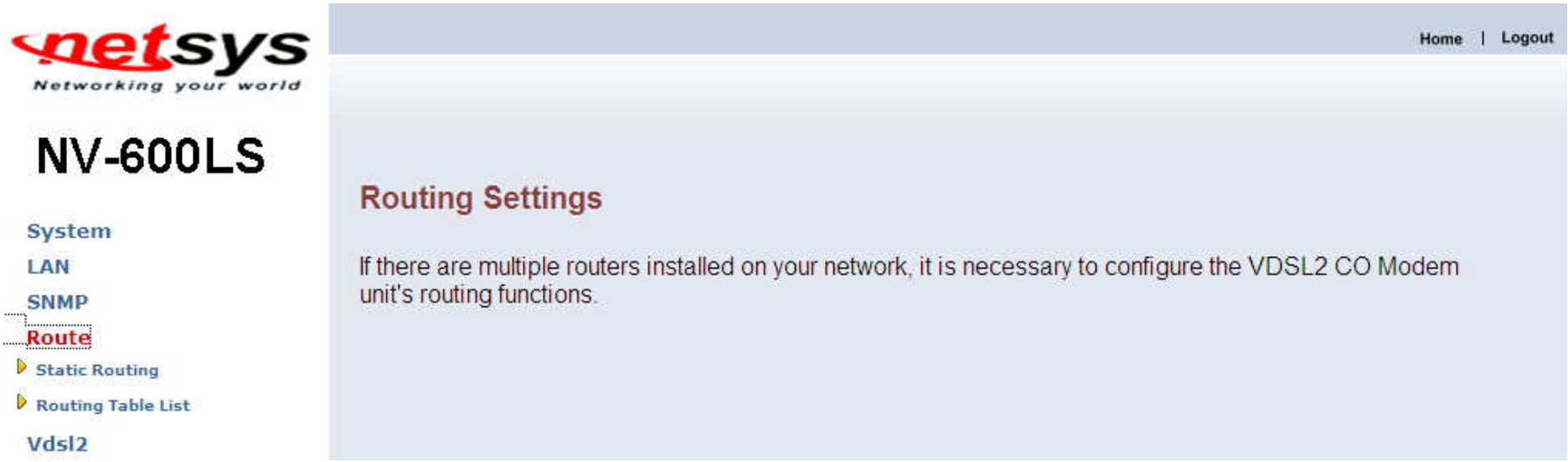



**Figure 8.2.5 Route in Left Navigator Bar**

## 8.2.5.1 Static Routing

To setup Static Routing, click on the "Static Routing" link in the left navigation bar. A screen is displayed as shown in Figure 8.2.5.1.

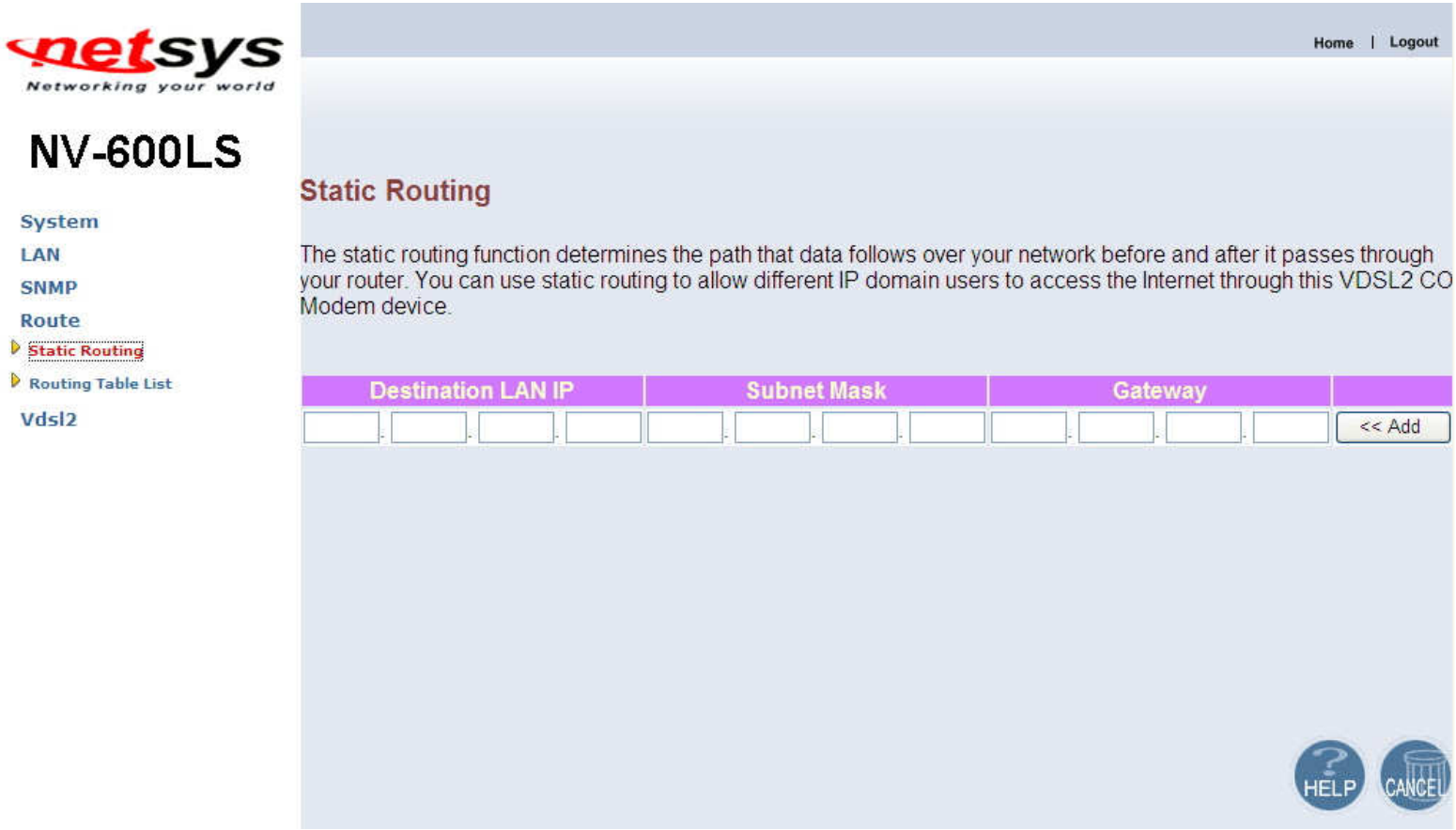



**Figure 8.2.5.1 Static Routing Configuration**

The screen contains the following details:

**Fields in Static Routing:**

| Field | Description |
|---|---|
| Destination LAN IP | Enter the IP Address **0-0-0-0** of routing entry. |
| Subnet Mask | Enter the Subnet Mask **0-0-0-0** of routing entry. |
| Gateway | Enter the Gateway address of routing entry. |

- Click Add to add the information that has been entered.

**Note:**

**Static Routing functionality is used to define the connected Gateway between the LAN and WAN.** For example, if we want to activate the Network Time Protocol (NTP) service, and we have to define the Gateway connected to NTP server in the WAN.

## 8.2.5.2 Routing Table List

To view the Routing entry table list of NV-600LS/RS, click on the "Routing Table" link in the left navigation bar.
A screen is displayed as shown in Figure 8.2.5.2.


**Figure 8.2.5.2 Routing Table List**

The screen contains the following details:

- Click Refresh to update currently routing list of the NV-600LS/RS.

# Appendix A: Product Features & Specification

## Features:

- Compliant with IEEE 802.3 & 802.3u Ethernet Standards
- Compliant with G993.2 VDSL2 standards
- Provides 4 x 10/100M auto-sensing RJ-45 Ethernet ports
- Supports Bandwidth up to 100Mbps over RJ-11 ports
- POTS / ISDN Splitter port RJ-11 x 1 (Splitter on board)
- Support Downstream Power Back-Off(DPBO)
- Supports auto speed for VDSL2 port
- Supports Web management (HTTP)
- Supports TFTP
- Supports Console (RS-232C)
- Supports Switch (Bridge) mode
- Supports UPnP
- Supports Loop back
- Supports SNR indicator for checking phone wiring quality
- Supports Interleave Delay to prevent against noise and data errors
- Support 8a, 8b, 8c, 8d, 12a, 12b, 17a, 17b, and 30a band profile
- Support 997, 998 band plan
- Provides surge protection for VDSL2 port
- Supports SNMP v1/v2

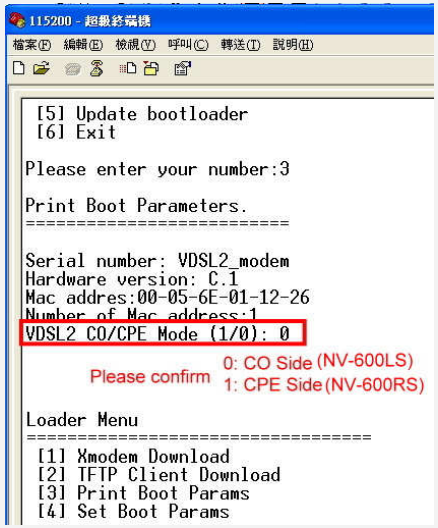
## Specifications:

| | |
|---|---|
| **Standard:** | IEEE802.3 standard<br>IEEE802.3u standard<br>Compliant G993.2 VDSL2 standard |
| **Interface:** | 4 * RJ-45 10/100Mbps Ethernet port<br>1 * RJ-11 connector for VDSL2<br>1 * RJ-11 connector for POTS/ISDN device |
| **Band Profile:** | 8a, 8b, 8c, 8d, 12a, 12b, 17a, 17b, 30a |
| **Band Plan:** | 997, 998 |
| **Max. Bandwidth:** | Symmetric 100 Mbps / 0.3 km |
| **LED indication:** | Power LED<br>Link/Active Status for Ethernet port * 4<br>Link LED for VDSL2 port |
| **Switch method:** | Store and forward |
| **Console port:** | RS-232C/115200bps |
| **Flow control:** | Full duplex: IEEE 802.3x<br>Half duplex: Back pressure |
| **Power Consumption:** | NV-600LS (LT): 5.52W<br>NV-600RS (NT): 6.12W |
| **Operating Temperature:** | 0℃ ~ 50℃ (32℉ ~ 122℉) |

| | |
|---|---|
| **Storage Temperature:** | -20℃ ~ 65℃ (-4℉ ~ 149℉) |
| **Humidity:** | 10 to 90% (non-condensing) |
| **Weight:** | About 0.96kg |
| **Dimensions:** | 184 x 146 x 40 mm (7.2" x 5.74" x 1.57") |
| **AC to DC adapter:** | Input range: 85VAC~240VAC/50~60Hz<br>Output: 12V DC/1A |
| **EMI Compliant:** | CE, FCC, VCCI |
| **Chipset:** | Lantiq MIPS ADM5120P, VINAX |

# Appendix B: Troubleshooting

| | |
|---|---|
| **1. Symptom:** | Connected the CO Modem with CPE Modem within 300 meters RJ-11 phone cable got only less than 10 Mbit/s. |
| **Cause:** | Some testing program which is base on TCP/IP protocol such as FTP, Iperf, NetIQ, the bandwidth of testing outcome will be limited by TCP window size. |
| **Solution:** | We recommend to test VDSL2 bandwidth best by Smartbit equipment, if you don't have Smartbit, we recommend test that by IPERF program, and TCP window size must be settled max. 64k, the parameter as iperf –c server IP address –i 1 –t 50 –w 65535 for client side. |
| **2. Symptom:** | VDSL2 CO modem cannot link with CPE modem. |
| **Cause:** | 1. The VDSL2 CO/CPE mode settings of VDSL2 modem become unknown.<br>2. VDSL2 CO and CPE modem tone mode is different due to mixed use of new and old hardware VDSL2 modems. |
| **Solution:** | 1. Using the console, reboot the system and go to loader menu. Select set boot parameters and choose the VDSL2 CO/CPE mode correctly. Choose "1" if it is CO modem and "0" if it is CPE modem. Do not just press enter to skip the setting as it will not retain even if the setting is correct, then it will become unknown causing the VDSL2 modem not to link. 0: NV-600LS. 1: NV-600RS. |




2. Update the old hardware to D series firmware so that you can set the same tone mode for both CO and CPE modem.

**3. Symptom:** VDSL2 web management that uses public IP address cannot be accessed.

**Cause:** It can be affected by some incoming traffic perhaps web crawlers, worms or other automated activity.

**Solution:** Open a command prompt and log in to telnet by writing "telnet xxx.xxx.xxx.xxx", xxx is the IP address of your modem, then write "cd /etc/rc.d/init.d" to go to this folder, then write "./httpd start" to open the web management, so that it can be accessed again.

# Appendix C: Cable Requirements

A CAT 3, 4 or 5 UTP (unshielded twisted pair) cable is typically used to connect the Ethernet device to the modem. A 10Base-T cable often consists of four pairs of wires, two of which are used for transmission. The connector at the end of the 10Base-T cable is referred to as an RJ-45 connector and it consists of eight pins. The Ethernet standard uses pins 1, 2, 3 and 6 for data transmission purposes. (Table C-1)

**Table C-1** RJ-45 Ethernet Connector Pin Assignments

| PIN # | MDI | | MDI-X | |
|---|---|---|---|---|
| | **Signal** | Media Dependant interface | **Signal** | Media Dependant interface-cross |
| 1 | TX+ | Transmit Data + | RX+ | Receive Data + |
| 2 | TX- | Transmit Data - | RX- | Receive Data - |
| 3 | RX+ | Receive Data + | TX+ | Transmit Data + |
| 4 | -- | Unused | -- | Unused |
| 5 | -- | Unused | -- | Unused |
| 6 | RX- | Receive Data - | TX- | Transmit Data - |
| 7 | -- | Unused | -- | Unused |
| 8 | -- | Unused | -- | Unused |

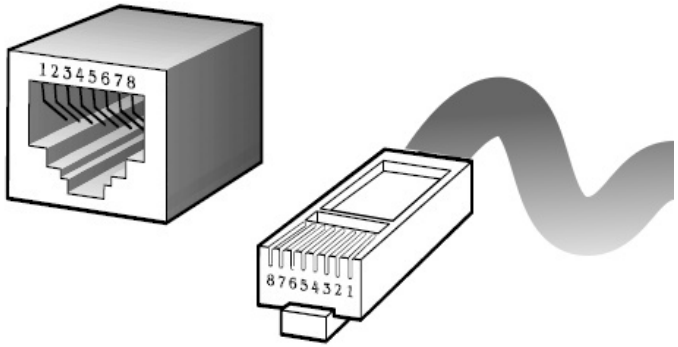



**Figure C-1 Standard RJ-45 repectacle/connector**

**Note:**

Please make sure your connected cables are with same pin assignment as above table before deploying the cables into your network.

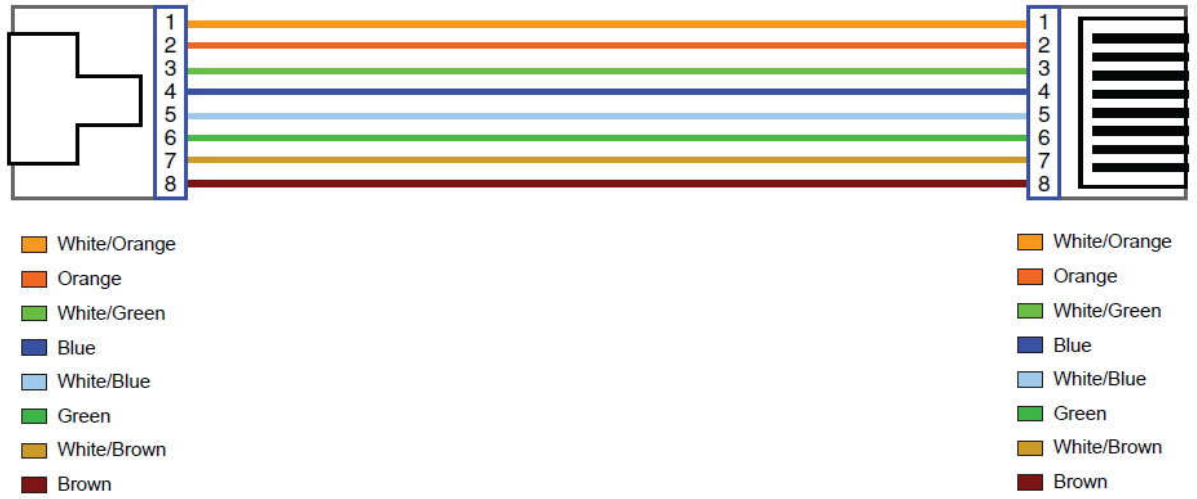



**Figure C-2 Pin Assignments and Wiring for an RJ-45 Straight-Through Cable**


**Figure C-3 Pin Assignments and Wiring for an RJ-45 Crossover Cable**

## Serial Console Interface Connector Pin Assignments

The serial console interface connector is a 9-pin, RS-232 D-type, DTE connector. A null modem cable is required to connect a workstation running the Linux or Windows operating system. Table C-2 lists the pin assignments for the serial console interface connector.

**Table C-2** RS-232 Connector Pin Assignments

| Description | Pin | I/O | Signal Name |
|---|---|---|---|
| Not used | 1 | - | - |
| Receive data; input | 2 | In | RXD |
| Transmit data; output | 3 | Out | TXD |
| Data terminal ready; output | 4 | Out | DTR |
| Interface signal ground | 5 | - | GND |
| Data set ready; input | 6 | In | DSR |
| Not used | 7 | - | - |
| Not used | 8 | - | - |
| Not used | 9 | - | - |

The CDEs have one standard serial port connector located on the back of the device. Figure C-4 shows the pin number assignments for the 9-pin, male D-shell serial port connector on the back of the device. These pin number assignments conform to the industry standard for RS-232 communications.

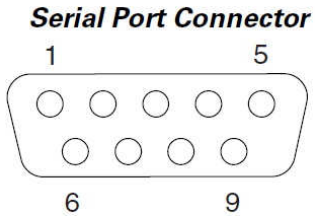



**Figure C-4**

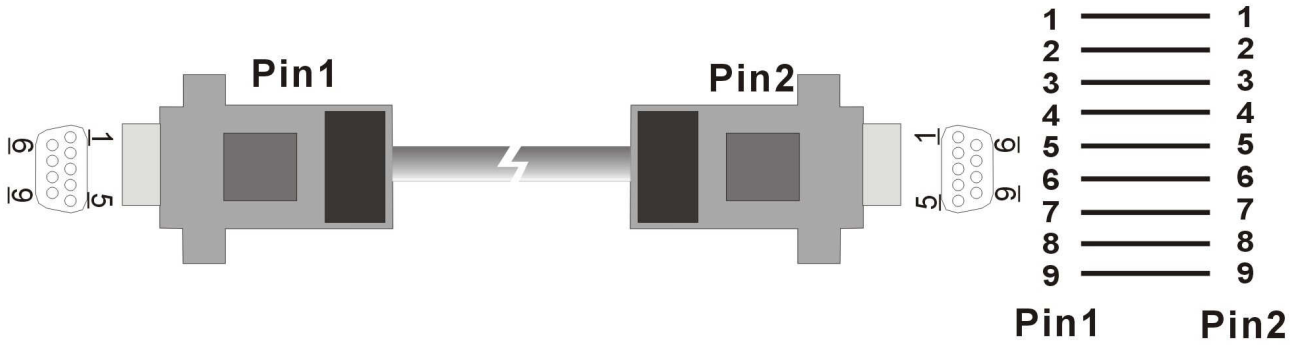



**Figure C-5 Pin Assignments and Wiring for an RS-232 Cable**

# Appendix D : Compliance and Safety Information

## FCC Radio Frequency Interference Statement

This equipment has been tested to comply with the limits for a computing device, pursuant to Part 15 of FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment can generate, use and radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by taking one or more of the following measures:

1. Reorient or relocate the receiving antenna.
2. Increase the distance between the equipment and receiver.
3. The equipment and the receiver should be connected to outlets on separate circuits.
4. Consult the dealer or an experienced radio/television technician for help.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

If this telephone equipment causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice isn't practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the proper functioning of your equipment. If they do, you will be notified in advance in order for you to make necessary modifications to maintain uninterrupted service.

This equipment may not be used on coin service provided by the telephone company. Connection to party lines is subject to state tariffs.

## Important Safety Instructions

- **Caution:** The direct plug-in wall transformer serves as the main product for disconnecting. The socket outlet shall be installed near the product and be readily accessible.
- **Caution:** Use only the power supply included with this product. In the event the power supply is lost or damaged:In the United States, use only with CSA certified or UL listed Class 2 power supply, rated **12Vdc 1A** or above.
  IN Europe, use only with CE certified power supply, rated **12Vdc 1A** or above.
- **Do not** use this equipment near water, for example in a wet basement.
- **Avoid** using a telephone during an electrical storm. There may be a remote risk of electrical shock from lightning.
- **Do not** use the telephone to report a gas leak in the vicinity of the leaking area.
- If you experience trouble with this unit, please contact customer service of your dealer immediately.
- **DO NOT DISASSEMBLE THIS EQUIPMENT**. It does not contain any user serviceable components.

## FCC Warning

This equipment has been tested to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment can generate, use, and radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at owner's expense.

## CE Mark Warning

This is a CE class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

## WEEE Warning

To avoid the potential effects on the environment and human health as a result of the presence of hazardous substances in electrical and electronic equipment, end users of electrical and electronic equipment should understand the meaning of the crossed-out wheeled bin symbol. Do not dispose of **WEEE as unsorted municipal waste and have to collect such WEEE separately.**

# Warranty

The original owner of this package will be free from defects in material and workmanship for one year parts after purchase. For the warranty to apply, you must register your purchase by returning the registration card indicating the date of purchase.

There will be a minimal charge to replace consumable components, such as fuses, power transformers, and mechanical cooling devices. The warranty will not apply to any products which have been subjected to any misuse, neglect or accidental damage, or which contain defects which are in any way attributable to improper installation or to alteration or repairs made or performed by any person not under control of the original owner.

The above warranty is in lieu of any other warranty, whether express, implied, or statutory, including but not limited to any warranty of merchantability, fitness for a particular purpose, or any warranty arising out of any proposal, specification, or sample. We shall not be liable for incidental or consequential damages. We neither assume nor authorize any person to assume for it any other liability.


**WARNING:**
**DO NOT TEAR OFF OR REMOVE THE WARRANTY STICKER AS SHOWN, OR THE WARRANTY IS VOID.**