netsys

Networking your world

**Giga Ethernet over Coax Master
and MDU/MTU Slave**

NH-310HG/S USER'S MANUAL

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Maximum signal rate derived from 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. Netsys does not warrant that the hardware will work properly in all environments and applications, and makes no warranty and representation, either implied or expressed, with respect to the quality, performance, merchantability, or fitness for a particular purpose. Make sure you follow in line with the environmental conditions to use this product.

Foreword

Attention:

> **Be sure to read this manual carefully before using this product. Especially Legal Disclaimer, Statement of Conditions and Safety Warnings.**

Netsys' NH-310HG and NH-310S are the latest technological innovation of HomePNA3.1 Ethernet over coaxial managed Master and Slave (client) respectively. NH-310HG Giga Ethernet over Coax Master is designed to connect with NH-310S MDU Slave for MDU and MTU applications that leverage the two most popular network connections for home use: 10/100/1000Mbps Ethernet connection and coaxial cable connection.

It is a norm that MDU and MTU are equipped with wired network that simply transfer small files and shared applications, but the need for triple play services like transferring large multimedia files such as music, video, photo and deliver high speed VOIP data are ever increasing.

This is why NH-310HG/S is designed to be a cost effective MDU and MTU solution. With plug & play, this simply eliminates the pain in modification and high infrastructure cost. With the data transmission up to 320Mbps and link establish under -145dBm/Hz noise floor, it meets the growing demand for high speed multimedia services. Most importantly, with MDU and MTU applications, it allows networking for any locations such as buildings, apartments, hotels, resorts, sports center and other places that need a high bandwidth network.

Caution:

> **The NH-310HG and NH-310S are for indoor** applications only. This product does not have waterproof protection, please do not use in outdoor applications.

Safety Warnings

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

- ◆ **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 to the right supply voltage (110V AC used for North America and 230V AC used for Europe, NH-310HG/S supports 12 VDC power input).
- ◆ **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 air flow may harm your device.
- ◆ **DO NOT** place items on the device.
- ◆ **DO NOT** use the device for outdoor applications directly, and make sure all the connections are indoors or have waterproof protection place.
- ◆ **Be careful** when unplugging the power, because it may produce sparks.
- ◆ **Keep** the device and all its parts and accessories out of the reach of children.
- ◆ **Clean** the device using a soft and dry cloth rather than liquid or atomizers. Power off the equipment before cleaning it.
- ◆ This product is **recyclable**. Dispose of it properly.

Table of Contents

Chapter 1. Unpacking Information

1.1 Check List

Thank you for choosing Netsys NH-310HG/S. Before installing the EOC product, please verify the contents inside the package.

Package Contents:

- NH-310HG or NH-310S Device
- 4 x rubber foot (NH-310HG pre-installed on the bottom, and you can find the rubber foot inside the inner box right side of the NH-310S)
- 1 x AC to DC **12V** Power Adapter
- 1 x RJ-45 Cable

Notes:

1. 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.

2. If the product has any issue, please contact your local vendor.

3. Do not use sub-standard power supply. Before connecting the power supply to the device, be sure to check compliance with the specifications. The NH-310HG/S supports 12 VDC power input.

4. The power supply included in the package is commercial-grade. Do not use in industrial-grade applications.

5. Please look for the QR code on the bottom of the product, the user can launch the QR code scanning program to scan and download the user's manual electronic format file.

Chapter 2. Hardware Description

This chapter describes the important parts of the device. It features the front indicators and rear connectors.

| **NH-310HG Outward** | **NH-310S Outward** |

2.1 Front Panel

The front panel provides a simple interface monitoring of the Master/Slave. (Figure 2.1)

Figure 2.1 NH-310HG and NH-310S Front Panel

2.2 Front Indicators

The NH-310HG has **Eight** LED indicators. The following Table shows the description. (Table 2-1)

Table 2-1 LED Indicators Description and Operation

LEDs	Status	Descriptions
Power	ON	Indicates the power good and also functioning properly
	OFF	Indicates the power is not ready or has malfunctioned
LAN1 LINK/ACT 1000M 100M	Steady	LINK/ACT LED steady indicates Ethernet Giga port on Link status Blinking to show data on traffic status. 1000M LED ON Indicates Ethernet Giga port speed on 1000Mbps. 100M LED ON indicates Ethernet Giga port speed on 100Mbps. 100M & 1000M LED both OFF indicates Ethernet Giga port speed on 10Mbps
	Blinking	
	ON	
LAN2 LINK/ACT 1000M 100M	Steady	LINK/ACT LED steady indicates Ethernet Giga port on Link status Blinking to show data on traffic status. 1000M LED ON Indicates Ethernet Giga port speed on 1000Mbps. 100M LED ON indicates Ethernet Giga port speed on 100Mbps. 100M & 1000M LED both OFF indicates Ethernet Giga port speed on 10Mbps
	Blinking	
	ON	
HCNA LINK / ACT	Steady	LED steady Indicates Coax port on Link status
	Blinking	LED Blinking Indicates Coax port active and transferring data

The NH-310S has **Six** LED indicators. The following Table shows the description. (Table 2-2)

Table 2-2 LED Indicators Description and Operation

LEDs	Color		Status	Descriptions
Power	Green		On	The HCNA is receiving the power and also functioning properly
			Off	The HCNA is not ready or has malfunctioned
LAN1 (Ethernet LED)	Green		On	The LAN port is connected to Ethernet devices
			Blinking	The HCNA is transferring data
			Off	The LAN port is not connected to any Ethernet devices
LAN2 (Ethernet LED)	Green		On	The LAN port is connected to Ethernet devices
			Blinking	The HCNA is transferring data
			Off	The LAN port is not connected to any Ethernet devices
HCNA (HCNA LED)	Green		On	The HCNA is link to another HCNA device
			Blinking	The HCNA is active and it is transferring data
			Off	The HCNA is not connected
Link Quality (HCNA LED)	Green		On	Actual HCNA link speed is ≧ **128MB**
	Green	Yellow	On	Actual HCNA link speed is ≧ **64MB and < 128MB**
	Yellow		On	Actual HCNA link speed is **< 64MB**

2.3 Rear Panel

The rear panel provides the physical connectors connected to the power adapter and any other network device. (Figure 2.2)
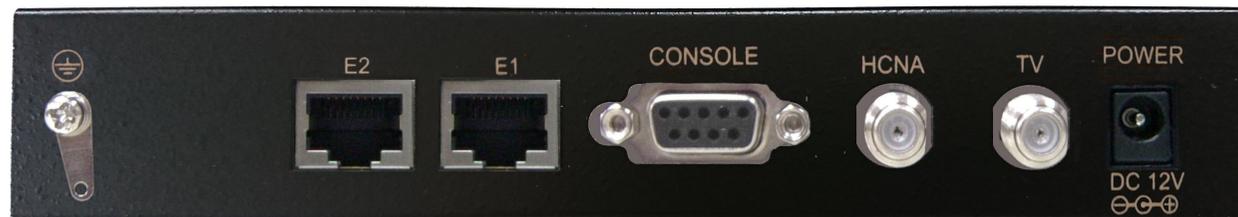
Figure 2.2 Rear panel of the NH-310HG

And the table shows the description. (Table 2-3)

Table 2-3 Connectors shown on the rear side of the device

Connectors	Type	Description
HCNA	F-type female coaxial cable	For connecting HCNA port to another HCNA port with RG59 75ohm coaxial cable.(HCNA port spectrum **12M - 44MHz**)
TV	F-type female coaxial cable	For connecting to TV or STB.(TV port spectrum **47M - 1GHz**)
LAN1/LAN2/	RJ-45	For connecting to an Ethernet equipped device
Power	DC Power Jack	For connecting to **12V/1A DC** power adapter

The following figure shows the rear side of the NH-310S. (Figure 2.3)

And the table shows the description. (Table 2-4)

Figure 2.3 Rear panel of the NH-310S

Table 2-4 Connectors shown on the rear side of the device

Connectors	Type	Description
HCNA	F-type female coaxial cable	For connecting HCNA port to another HCNA port with RG59 75ohm cable. (HCNA port spectrum **12M - 44MHz**)
TV	F-type female coaxial cable	For connecting to TV or STB. (TV port spectrum **47M - 1GHz**)
LAN1/LAN2	RJ-45	For connecting to an Ethernet equipped device
Power	DC Power Jack	For connecting to **12V/1A DC** power adapter, regarding the NH-310S power specification you can refer to serial sticker of the

Chapter 3. Installation

3.1 Hardware Installation

This chapter describes how to install the device and establish the network connections. The NH-310HG/S may be installed on any level surface (e.g. a table or shelf). However, please take note of the following minimum site requirements before you begin. **NH-310S must be stick the 4 rubber feet at the bottom and the NH-310HG pre-installed 4 rubber feet.**

3.2 Pre-installation Requirements

Before you start the actual hardware installation, make sure you can 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: **12VDC (1A or above)**
- The device should be located in a **cool dry place**, with at least **10cm/4in** of space at the front and back for ventilation.
- Place the device away from **direct sunlight**, **heat sources**, or areas with a high amount of electromagnetic interference.
- If you trying to setup basic connection between NH-310HG and NH-310S, you need to add at least **-10dB attenuator (5M-850MHz).**
- Check if the network cables and connectors needed for installation are available.
- Avoid installing this device with radio amplifying stations nearby or transformer stations nearby.

3.3 General Rules

Before making any connections to the device, take note the following rules:

- **Ethernet Port (RJ-45)**
  All network connections to the Master Ethernet ports must be made using Category 5 UTP or above for 100 Mbps, Category 3, 4 UTP for 10Mbps.
  No more than 100 meters of cabling maybe use between the MUX or HUB and an end node.
- **HCNA Port (Coaxial)**
  All Home network connections we recommend use RG59 75ohm coaxial cable and link establish under -145dBm/Hz noise floor.
- **Diplexer / Multi-Splitter**
  All Home network connections could be use Diplexer or Multi-Splitter or use mix of them as you would like to connect an Slave device. Please choose according to different environments to different specifications of the Diplexer (5M-45MHz, 47M-1GHz) or Multi-Splitter (5M-1Ghz).
- **Attenuator**
  Establish the basic link for NH-310HG and NH-310S, please add a attenuator (at least -10 dB 5M-850MHz).

Diplexer	Multi-Splitter	Attenuator

3.4 HCNA Connections

The device has been designed to operate on the coaxial cable installed in homes throughout the world. They utilized the same cable and connectors commonly used for television.

The 2x Coaxial connector are used to connect to TV or coaxial wall socket to another device that connect its RJ-45 to the LAN card of another set of PC, notebook, or other internet access device or coaxial connector to TV or set top box.

The device's coaxial connector must support the transmission of data up to 320Mbps across the existing coaxial cable and link establish under **-145dBm/Hz** noise floor. But make sure that the connector is inserted properly and lock.

Ethernet cable used must conform to FCC standard to ensure data integrity and it should not exceed **100meters** (328feet).

The NH-310HG Giga Ethernet over Coax managed MDU Master can support up to 60(maximum) NH-310S Slave (Clients).

Notes:

1. Please refer to Appendix E: installation guide. There is introduced how to install HPNA3.1 device.
2. Each of the NH-310S can only be connected to 16 nodes (Mac Address).
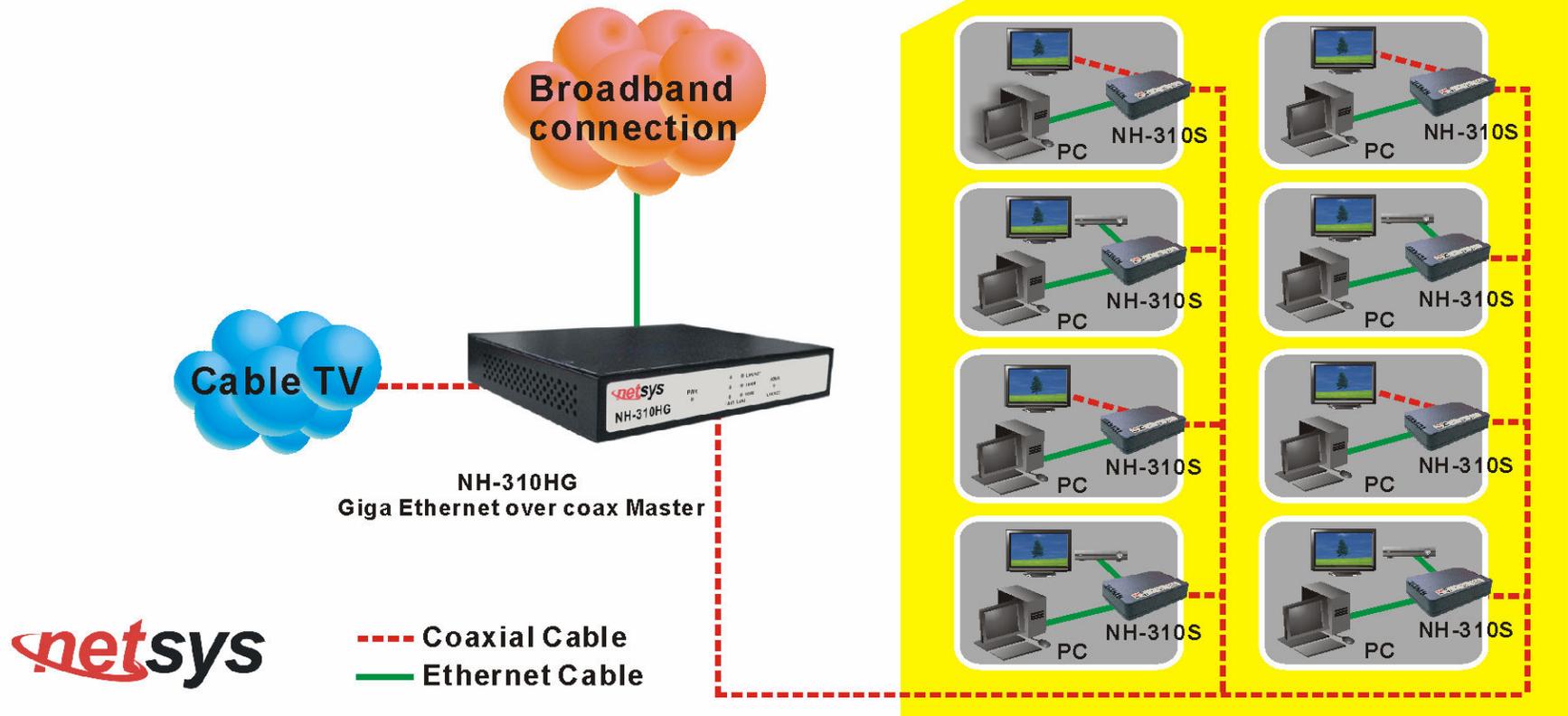
**Figure 3.1 NH-310HG/S connection diagram**
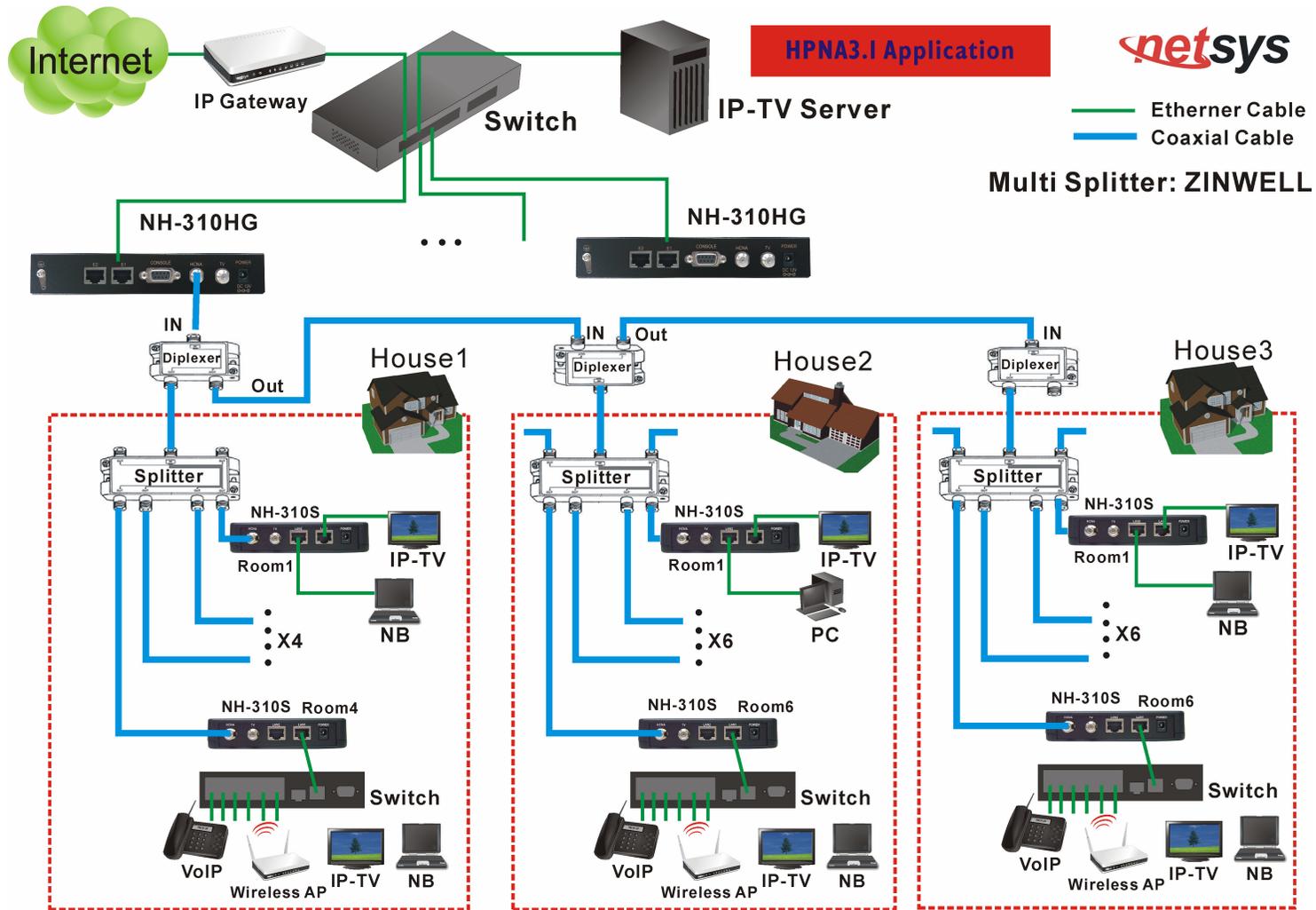
Figure 3.2 NH-310HG/S connection diagram-2

Chapter 4. Configure the NH-310HG via Web Browser

The NH-310HG provides a built-in HTML based management interface that allows configuration of the NH-310HG via Internet Browser. Best viewed using Chrome or Firefox browsers.

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 or above.
- Java Scripts. (Enabled by default)
- Java permissions. (Enabled by default)

Launch your web browser and input the default IP address "192.168.16.249" in the Web page. Following section user can find default password.

4.1 Login

The default login 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 for end users at the setup of NH-310HG with `SYSTEM`, `LAN`, ,`HCNA` for more detail configurations.
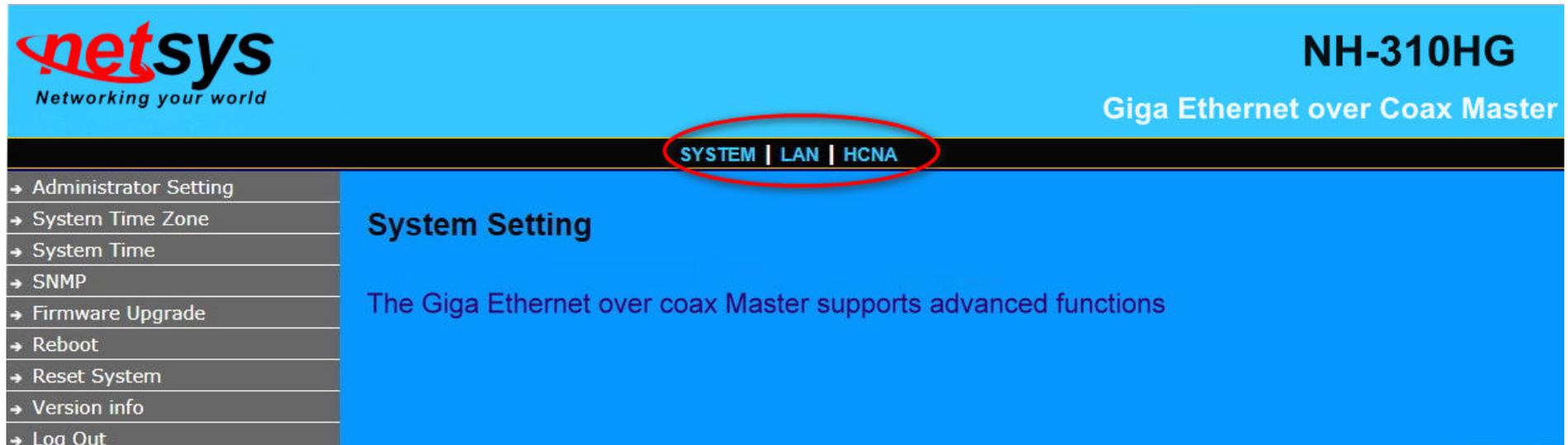
Figure 4.2 Select the Menu Level

4.3 Select "SYSTEM"

Select the "SYSTEM". The menu below will be used frequently. It includes the sub-menus of Administrator Setting 、 System Time Zone 、 System Time 、 SNMP 、 Firmware Upgrade 、 Reboot 、 Reset System 、 Version Info and Log Out.

A screen is displayed as shown in Figure 4.3
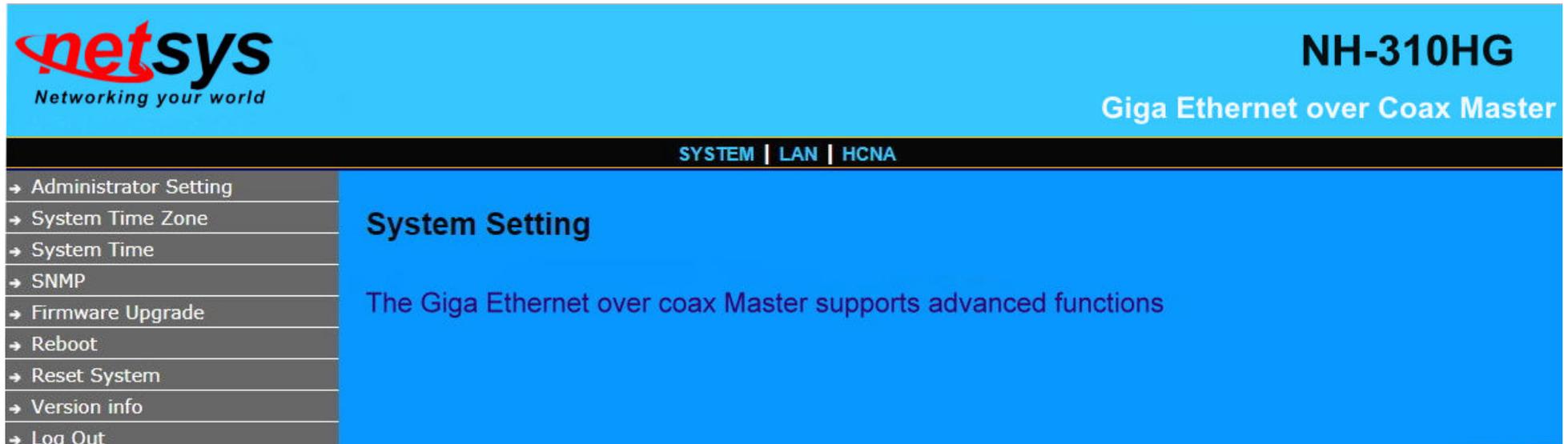
Figure 4.3 Select "SYSTEM" in the Entry Screen

4.3.1 Administrator Setting

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 4.3.1.
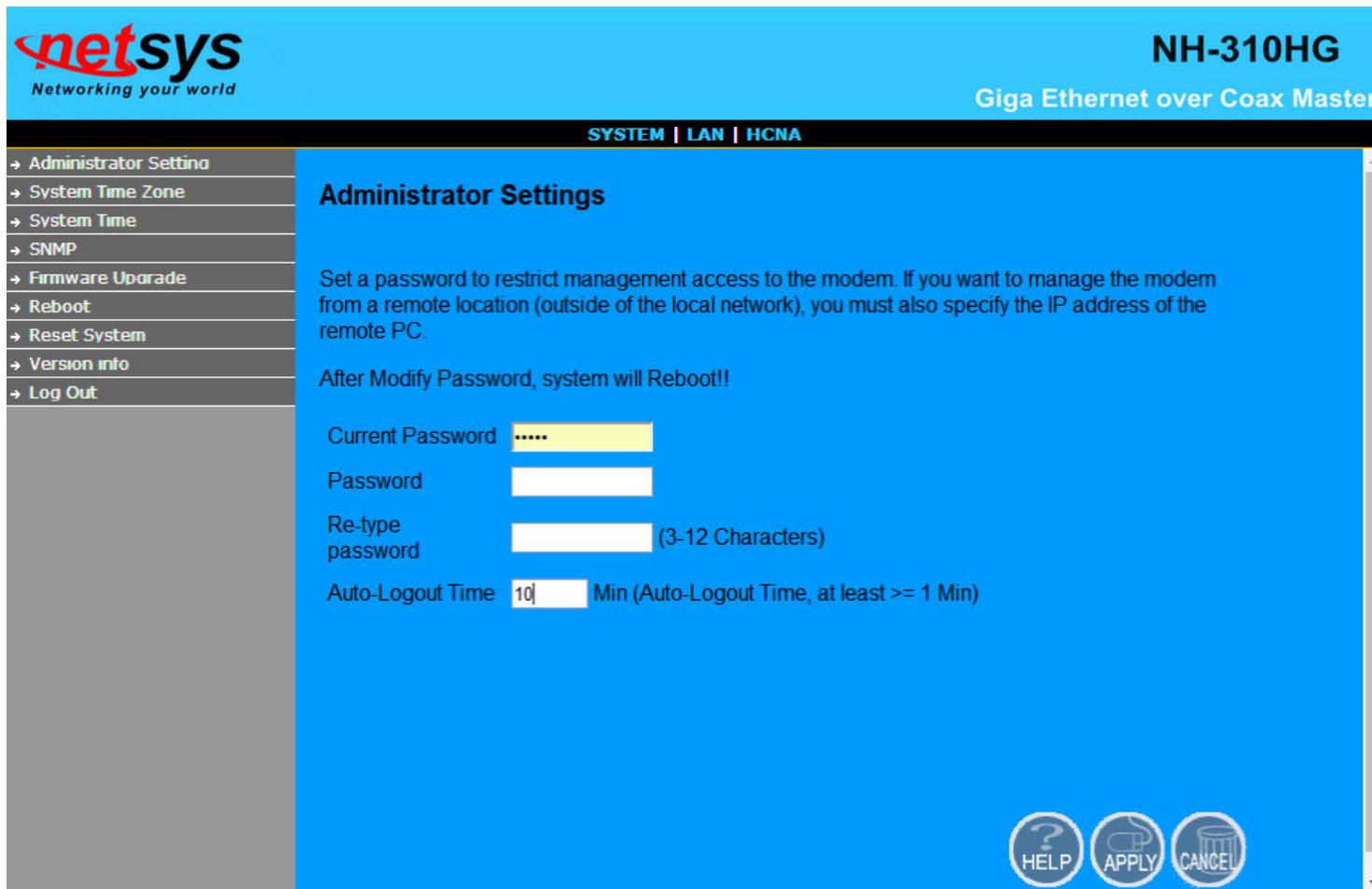
Figure 4.3.1 Administrator Settings Configuration

4.3.2 System Time Zone

User can set Time Zone by connecting to a **Simple Network Time Protocol** (SNTP) server allows the Device to synchronize the system clock to the global Internet. The synchronized clock in the Device is used to record the security log and control client filtering. A screen is displayed as shown in Figure 4.3.2.
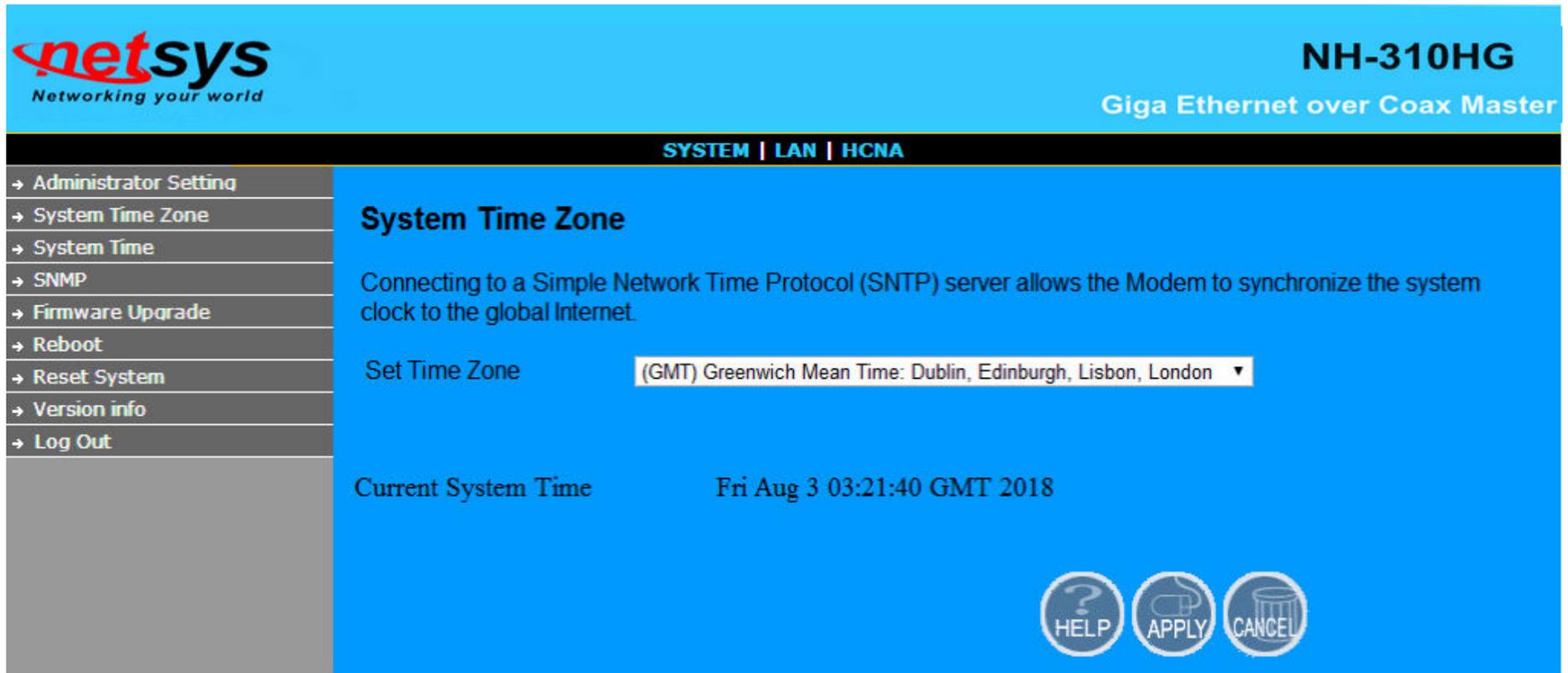
Figure 4.3.2 System Time Configuration

- Choose "Set Time Zone" and Click "Apply" to enable the SNTP function.

4.3.3 System Time

If user can't connect to a SNTP server to allows the Device to synchronize the system clock to the global Internet. User can setup "System Time". A screen is displayed as shown in .
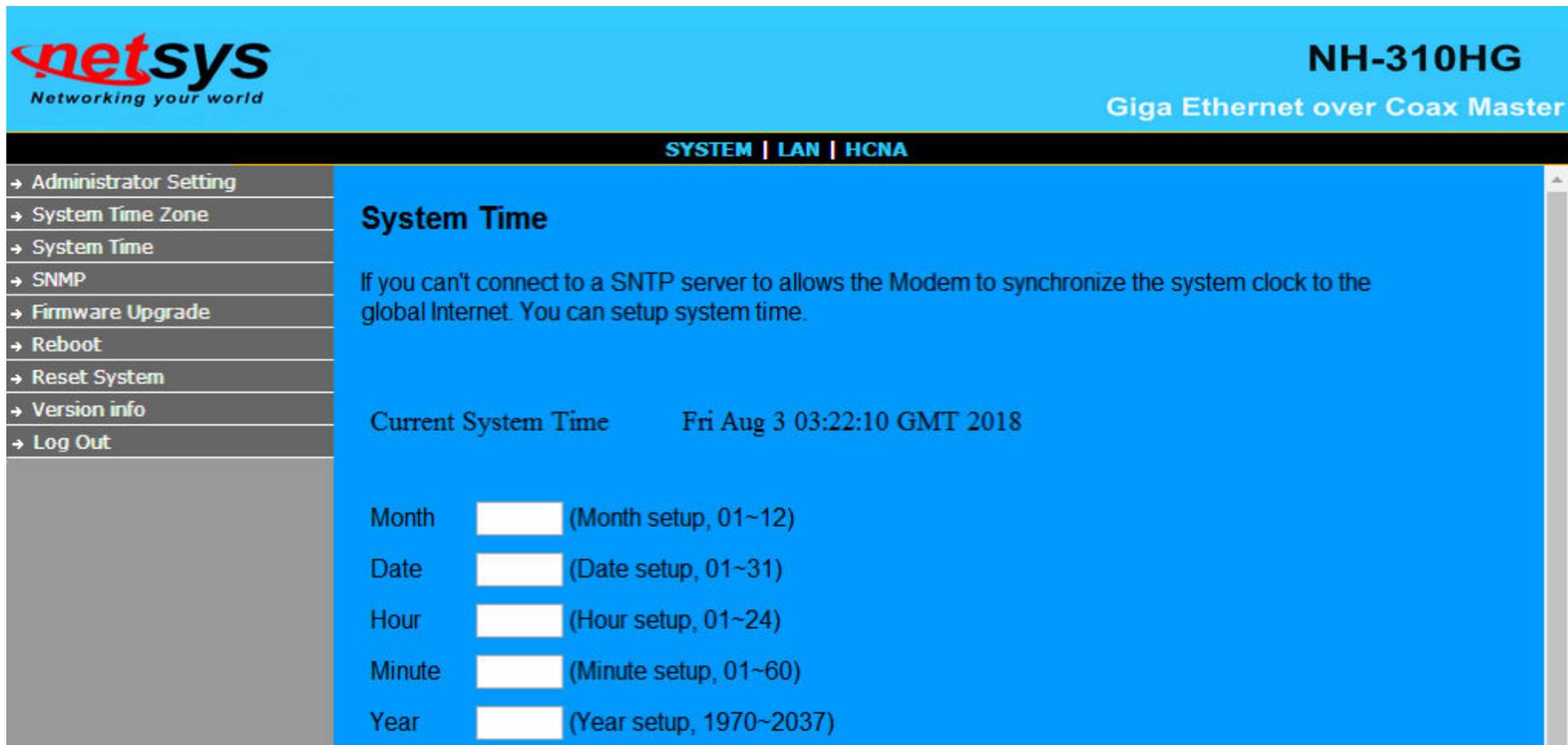
Figure 4.3.3 System Time Configuration

4.3.4 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 4.3.4
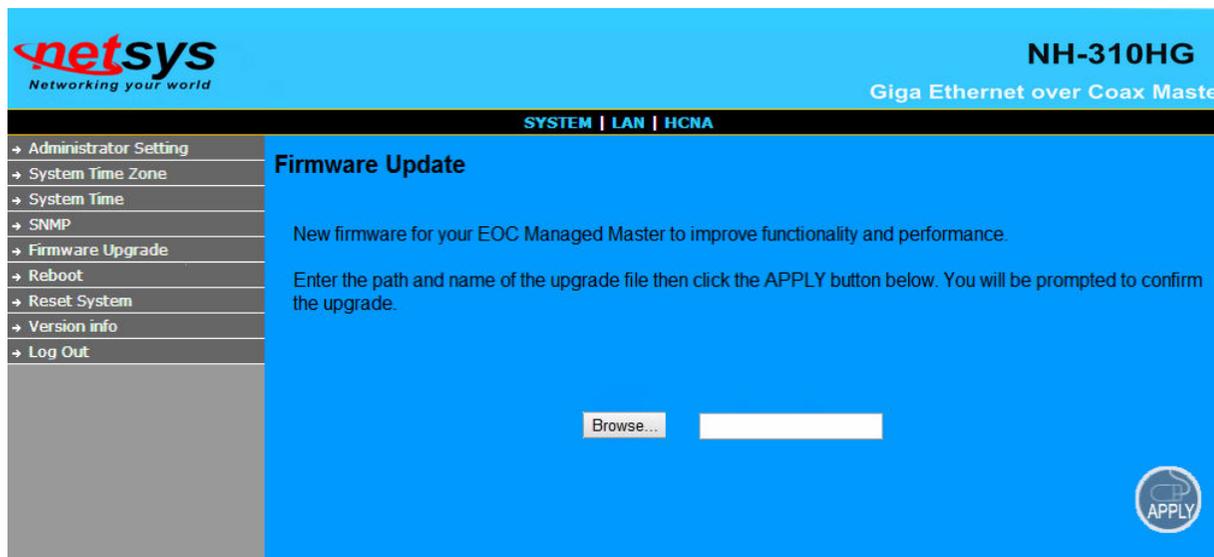
Figure 4.3.4 Firmware Upgrade

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.

Notes:

1. If the machine firmware version is too old, after the firmware upgrade, user must reset system to default that to avoid the new features can not use or system error occurred.

2. Regarding firmware version, please refer to section 4.3.7.

4.3.5 Reboot

To reboot the unit, click on the "Reboot" link in the left navigation bar. A screen is displayed as shown in Figure 4.3.5.
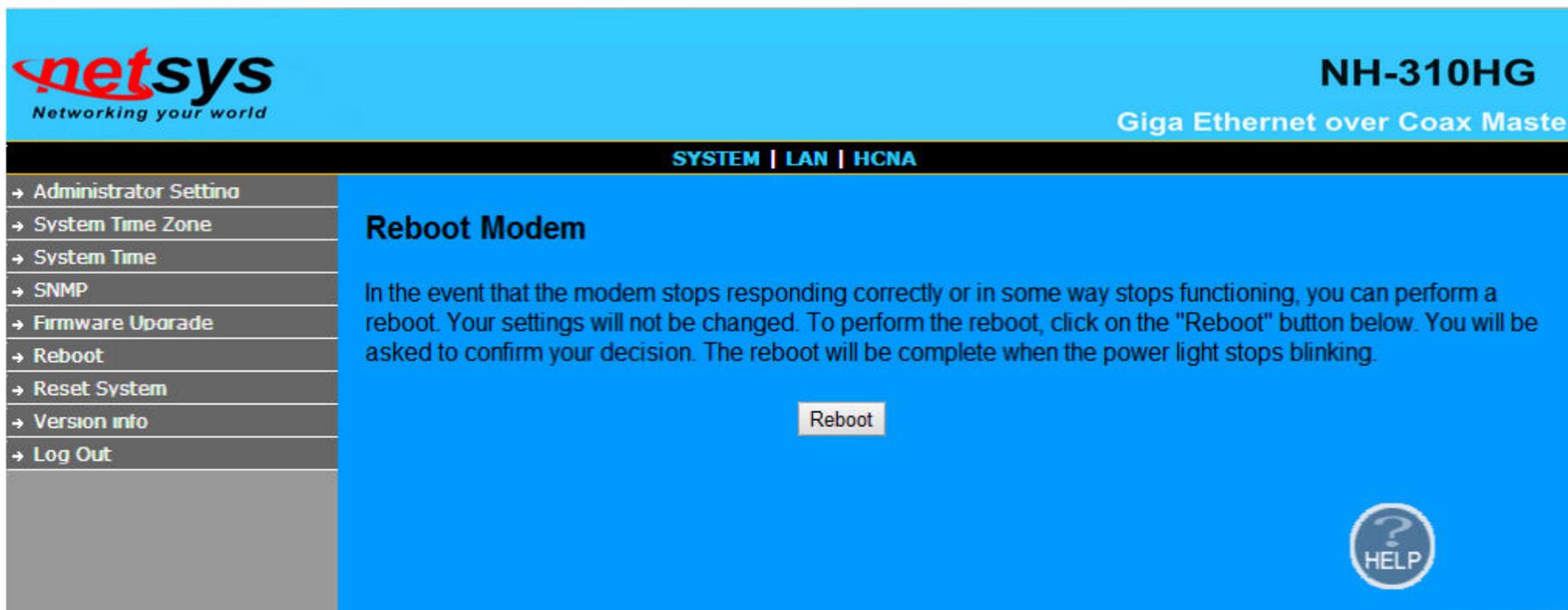
Figure 4.3.5 Reboot NH-310HG

- Click "Reboot" to restart the unit.
- Wait at least 20 sec and refresh the web browser.

4.3.6 Reset System

To reset the system, click on the Reset link in the left navigation bar. A screen is displayed as shown in Figure 4.3.6.
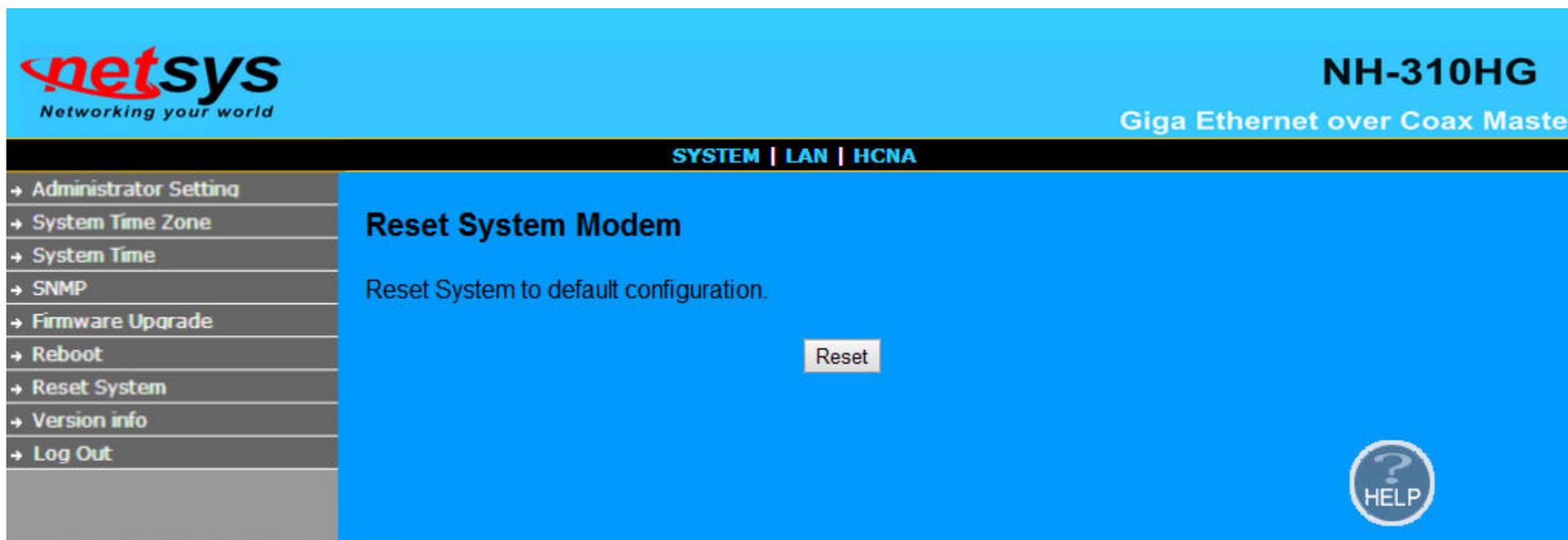
Figure 4.3.6 Reset NH-310HG

- Click Reset to restart the system to default configuration.
- After upgrade the firmware, and then automatically reboot.
- All settings will be cleard, and return to the default IP(192.168.16.249).

Note:
1. Please note that if user reset system to default, this process will change all your settings back to the factory default.

4.3.7 Version Info

This function shows the version of Web Interface firmware and EOC Driver. A screen is displayed as shown in Figure 4.3.7.
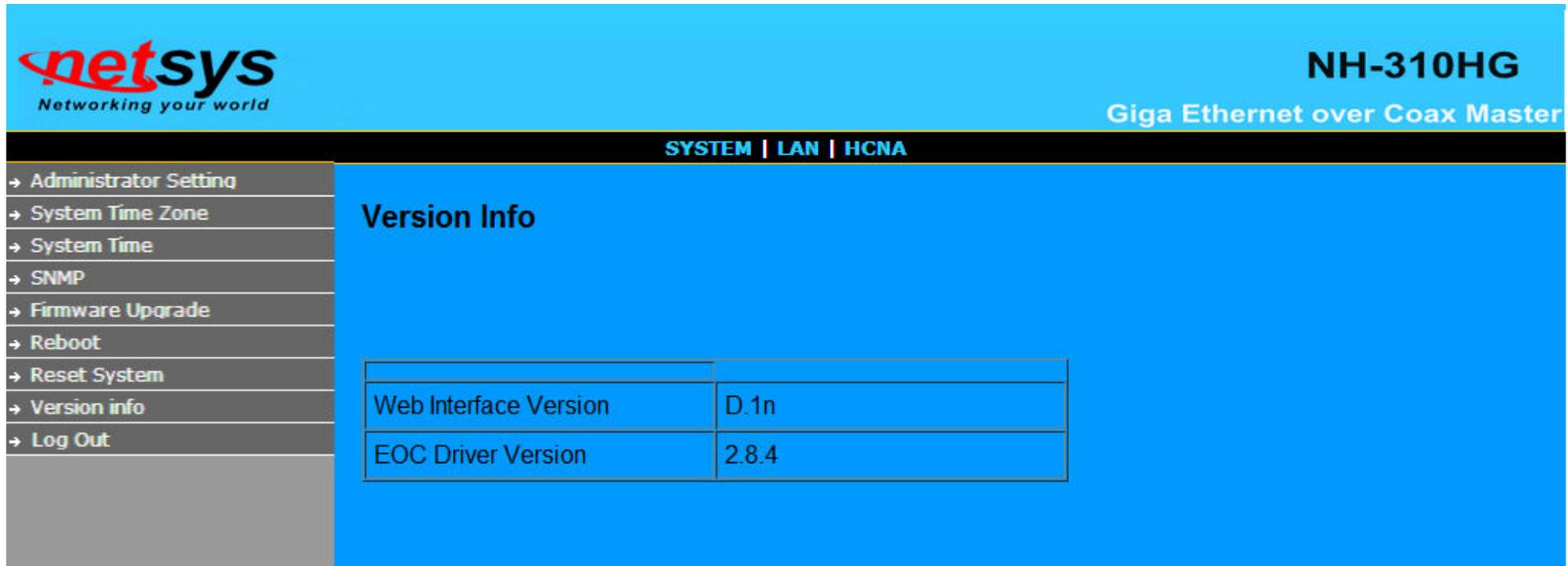
Figure 4.3.7 Version Info

Note:

1. Web interface version is also called firmware version, the NH-310HG firmware extension file format is "dat".

4.3.8 SNMP

Any Network Management running the simple Network Management Protocol (SNMP) can manage the switch, provided the Management Information Base (**MIB**) is installed correctly on the management station. The SNMP is a Protocol that governs the transfer of information between management and agent. A screen is displayed as shown in Figure 4.3.8.
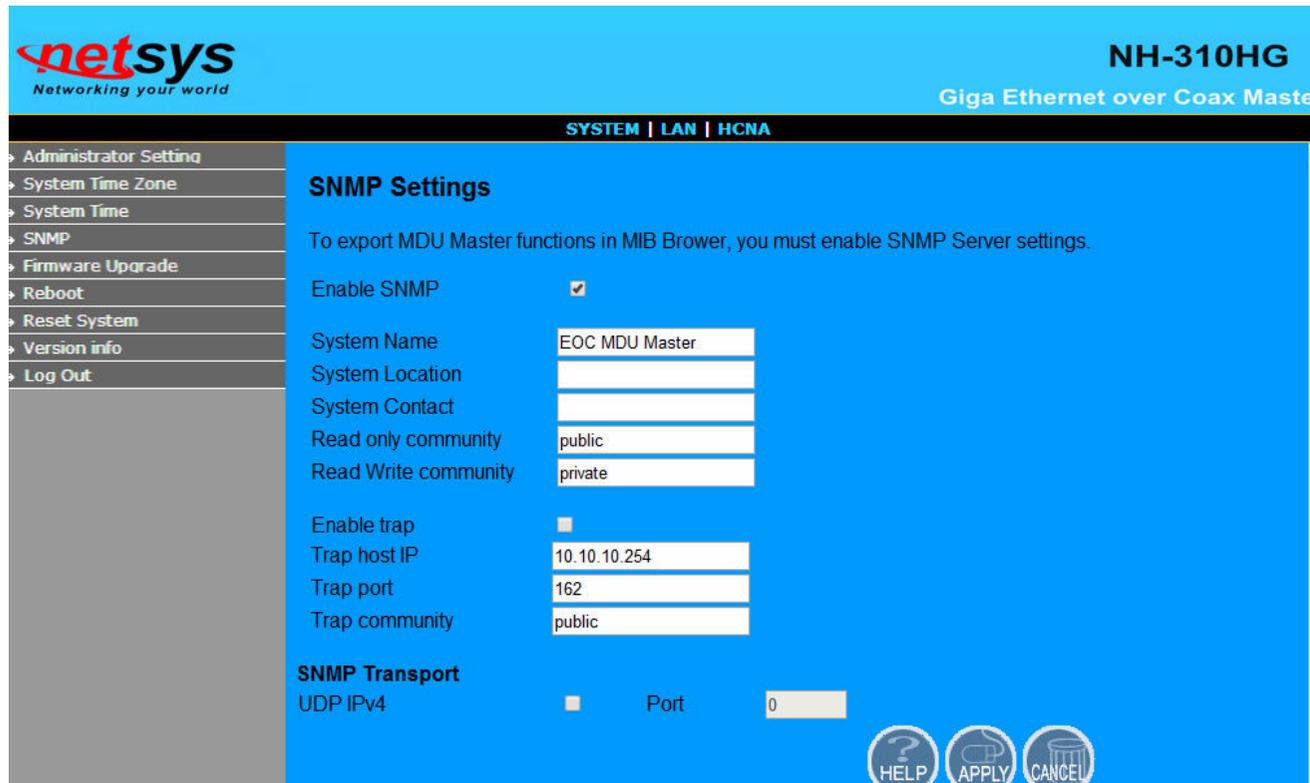
Figure 4.3.8 SNMP Settings

1. Use this page to define management stations as trap managers and to enter SNMP community strings. User can also define a name, location, and contact person for the switch. Fill in the system options data, and then click Apply to update the changes on this page.

Name: Enter a name to be used for the switch.
Location: Enter the location of the switch.
Contact: Enter the name of a person or organization.

2. Community strings serve as passwords and can be entered as one of the following:

RO: Read only. Enables requests accompanied by this string to display MIB-object information.
RW: Read write. Enables requests accompanied by this string to display MIB-object information and to set MIB objects.

3. Trap Manager
   A trap manager is a management station that receives traps, the system alerts generated by the switch. If no trap manager is defined, no traps are issued. Create a trap manager by entering the IP address of the station and a community string.

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. i.e. public.

Note:
1. NH-310HG supports SNMP V1/V2.

4.4 Select "LAN"

Select "LAN". The menu below includes the sub-menus of IP Settings, LAN Switch Port Setting , and LAN Port Status.

A screen is displayed as shown in Figure 4.4.
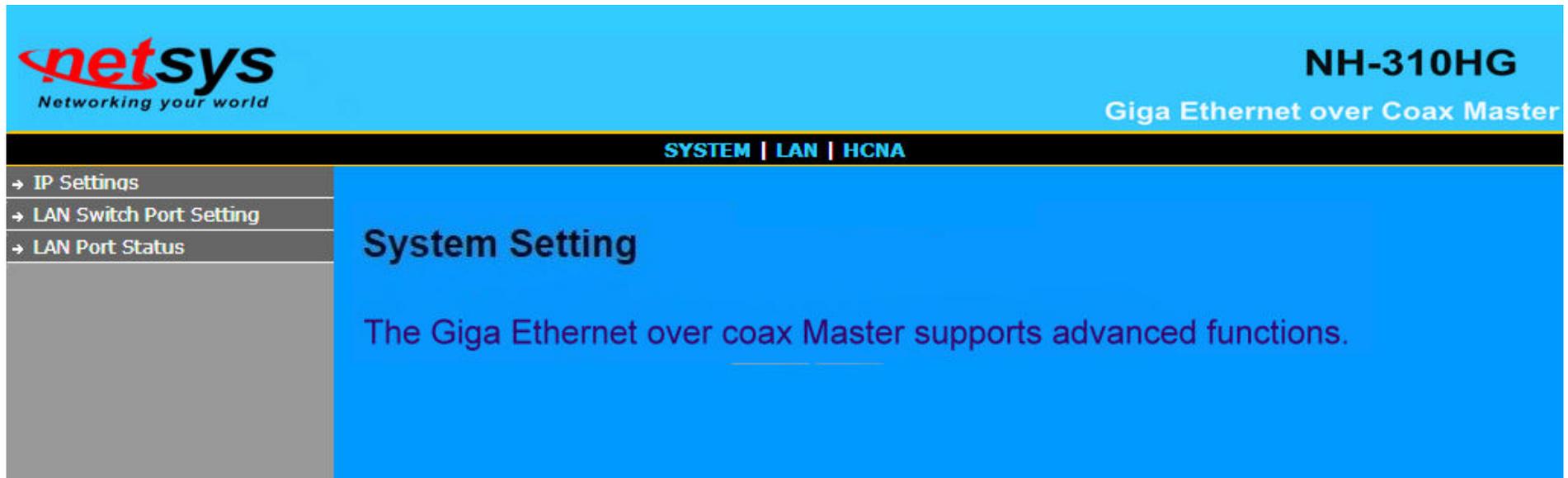
Figure 4.4 Select "LAN" in the Entry Screen

4.4.1 LAN Settings

The form below is used to change the IP address of the LAN (Local Area Network) port "adm0" in the NH-310HG and the "adm0" IP address is the CPU IP address of NH-310HG for PC to remote control the NH-310HG with network management.
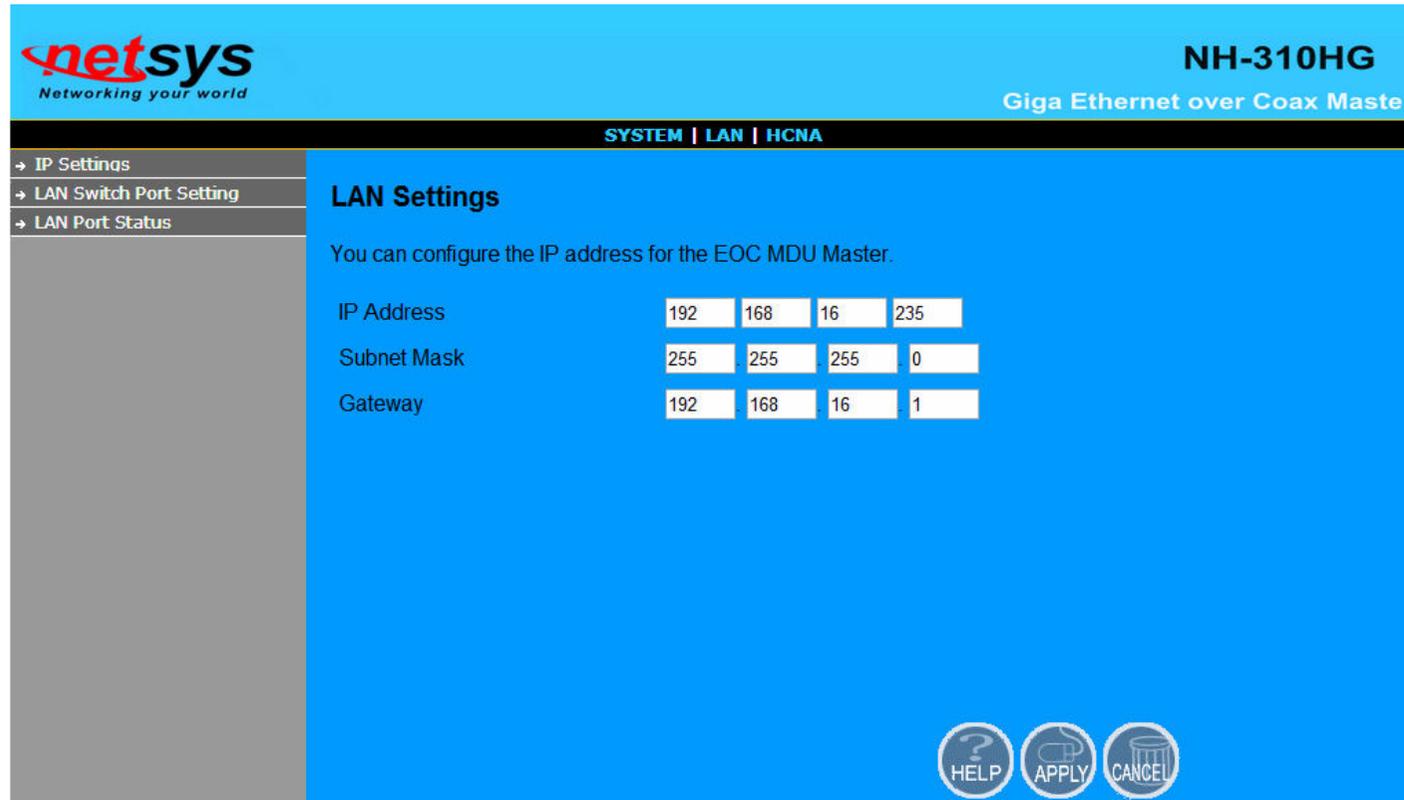
The proposed IP address is either the default address of adm0 (i.e. 192.168.16.249) or it is the address changed by an ifconfig command via the shell running in the terminal. The Default value of Subnet Mask display is 255.255.255.0. A screen is displayed as shown in Figure 4.4.1.

Figure 4.4.1 LAN Setting

4.4.2 LAN Switch Port Setting

The LAN Port Setting mode allows the user to specify the mode setting for the NH-310HG. Users can choose 10Mb or 100 Mb modes for cases as "Force 10Mb Full", "Auto 10/100 Full/Half", "Force 10Mb Half", "Force 100Mb Half", and "Force 100Mb Full". The default value is "**Auto 10/100 Full/Half**". A screen is displayed as shown in Figure 4.4.2.
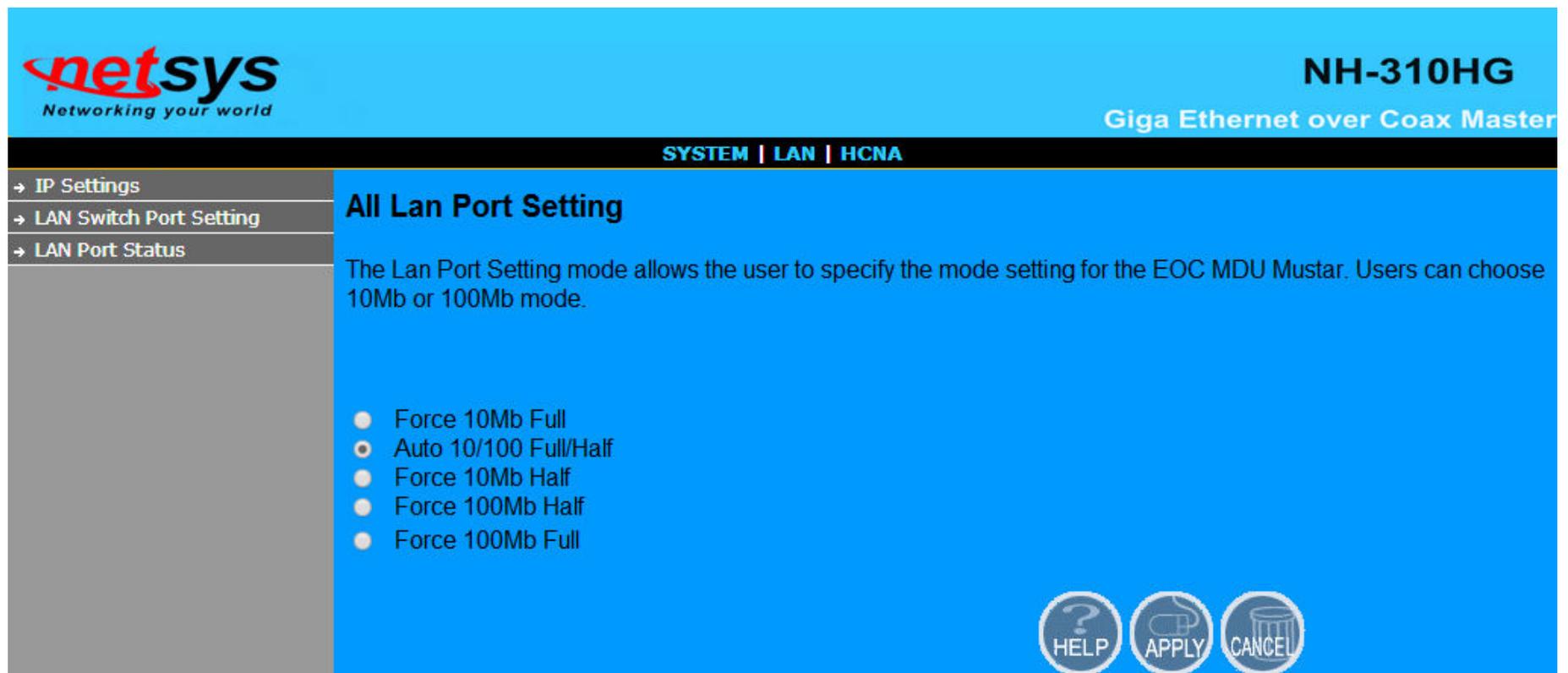
Figure 4.4.2 LAN Switch Port Setting

4.4.3 LAN Port Status

The following information provides a view of the current Ethernet ports status of the unit as below:
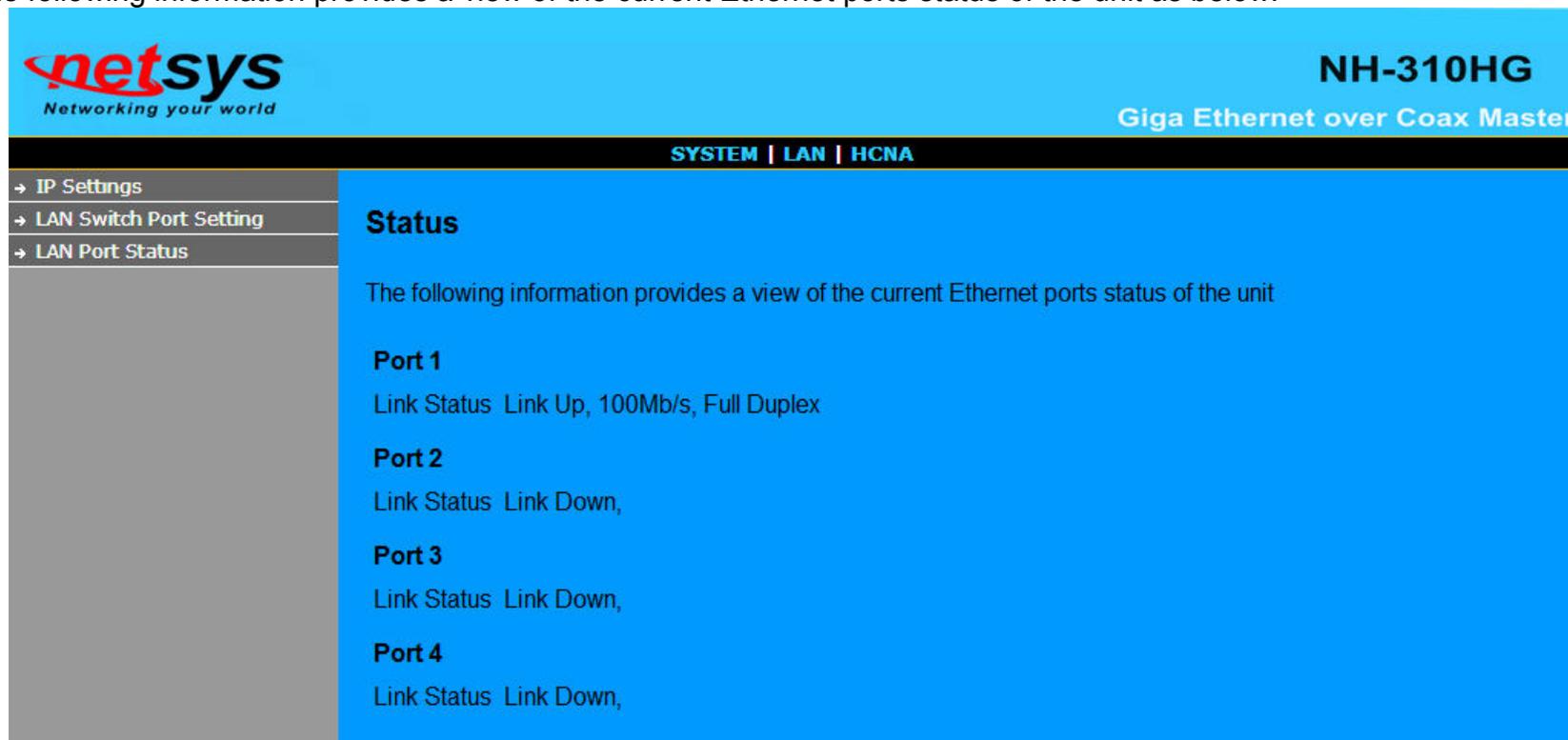
Figure 4.4.3 LAN Port Status

For this example, the NH-310HG Giga Ethernet over Coax Master is connected to two NH-310S Slave with
Port 1. It appears Port1 Link Status Link Up, 100Mb/s, Port2 Link Status Link Down, Port3 and Port4 Link Status Link Down.
A screen is displayed as shown in Figure 4.4.3.

4.5 Select "HPNA"

Select the "HPNA". The menu below includes the sub-menus of Device Info./Test 、Device Control, and User List.

A screen is displayed as shown in Figure 4.5.
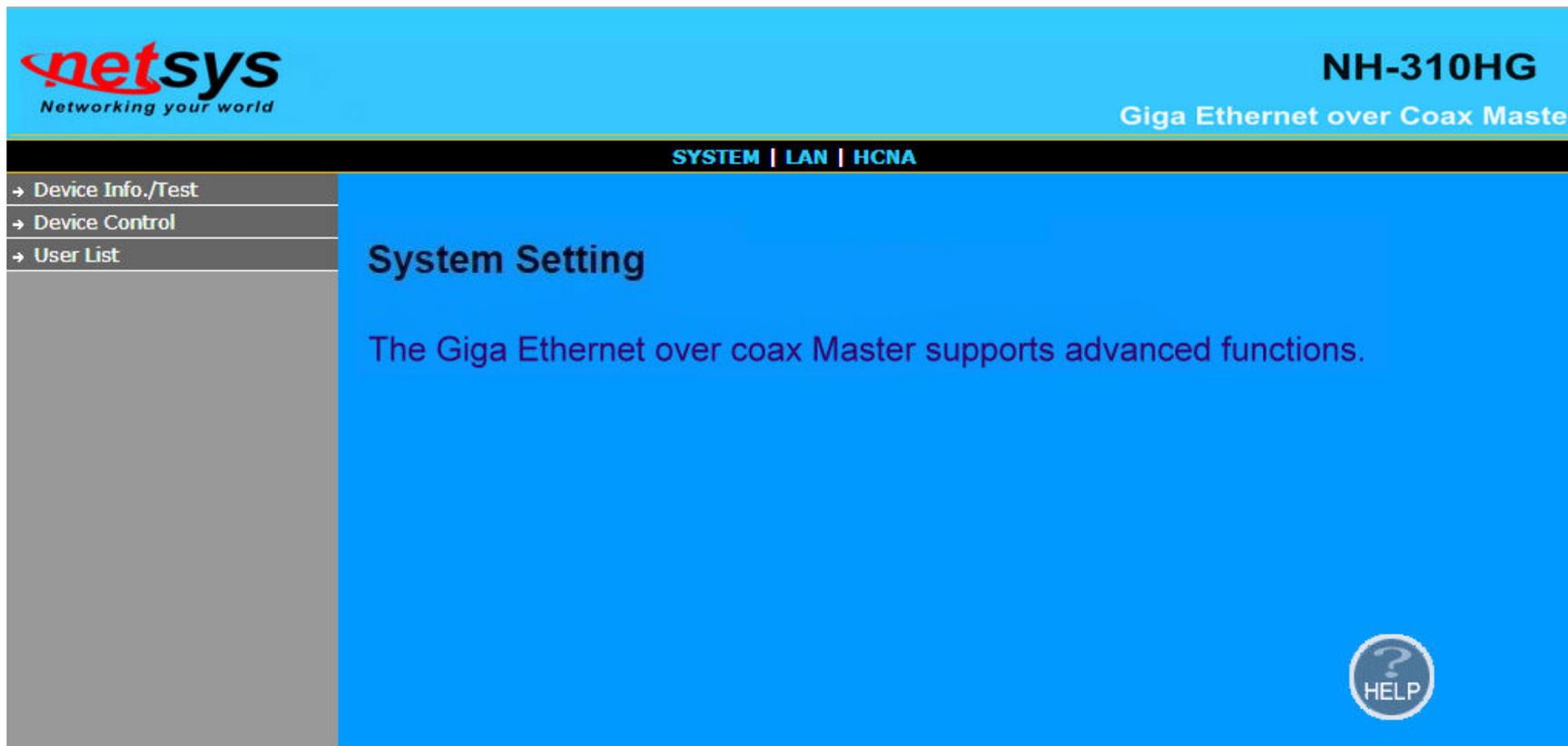
Figure 4.5 Select "HPNA" in the Entry Screen

Note:

The "HPNA" can configure and manage NH-310H (Master) and NH-310S (Slave) HPNA functions, please refer to the Function Introduction as below.

4.5.1 Device Info./Test

This sub-menu for Device Info./Test appears the HPNA Device Information of the Numbers、Mode(Master/Slave), MAC Address, Firmware Version , Spectrum for the Master/Slave. It also includes **Counter test for Master** and **Net_Test**, and **Counter test for Slave**. A screen is displayed as shown in Figure 4.5.1.

Figure 4.5.1 Device Info./Test

The screen contains the following details:

Mode	Test	Descriptions
Master	Count	Master Read Packet Counter.
Slave	User List	Slave User List Table No. **Refer to section 4.5.1.1**
	Net_Test	Slave Net Interface Test. **Refer to section 4.5.1.2**
	Count	Slave Read Packet Counter. **Refer to section 4.5.1.3**

Note:

1. Version 2.8.4: EoC driver version, please refer to section 4.5.2(Device Control).
2. Spectrum: HPNA band mode, there are three modes, namely, Full Band(12-44MHz), High Band(28-44Mhz), Low Band(12-28MHz). Please refer to section 4.5.2.1(EOC driver Upgrade for Master).

4.5.1.1 Master Read Packet Counter

Click on "Count" button in the end of line for Master and it appears the window which shows the MAC Address of the Master. A screen is displayed as shown in Figure 4.5.1.1 and Figure 4.5.1.2.
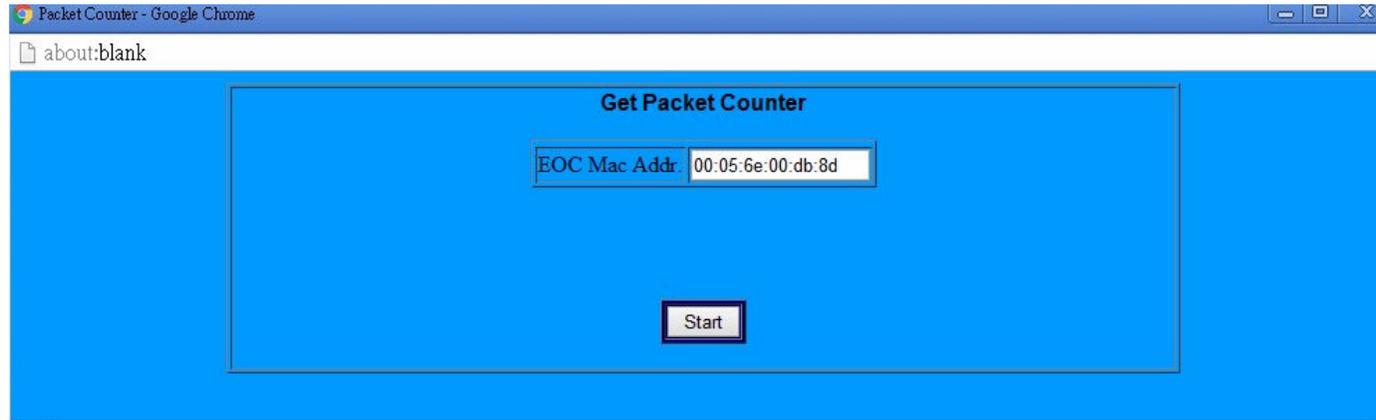
Figure 4.5.1.1.1 Master Read Packet Counter

Click on the "Start" button, and the example for test result of Master Read Packet Counter will be as below:

Tx	Rx	TX Byte	Rx Byte	Tx bcast	Rx bcast	Tx mcast	Rx mcast	Rx crc	Rx short	Tx dropped	Rx dropped	ctl loc_req	ctl loc_rep	ctl rem_req	ctl rem_rep	avg period	cyc period
51608	6186	4127253	452938	42152	0		0	0	0	0	0	0	6128	6128	0	0	0
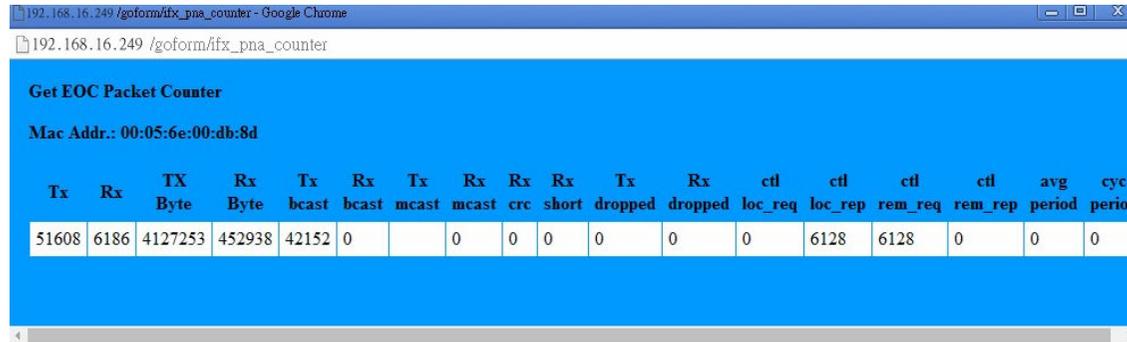
Figure 4.5.1.1.2 Output of Master Read Packet Counter

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4.5.1.2 Slave Net Interface Test

Click on "Net_Test " button in the line for each Slave and it appears the window which shows the MAC Address of the Slave. A screen is displayed as shown in Figure 4.5.1.2.1. In the pop-up window shows "WARNING!! All data transmission in the network will pause during the test".

Figure 4.5.1.2.1 Slave Net Interface Test

Click on the "**START**" button, wait for some time you will see the Master Read Packet Counter test results such as the example of Figure 4.5.1.2.2 below:

EOC Network Test
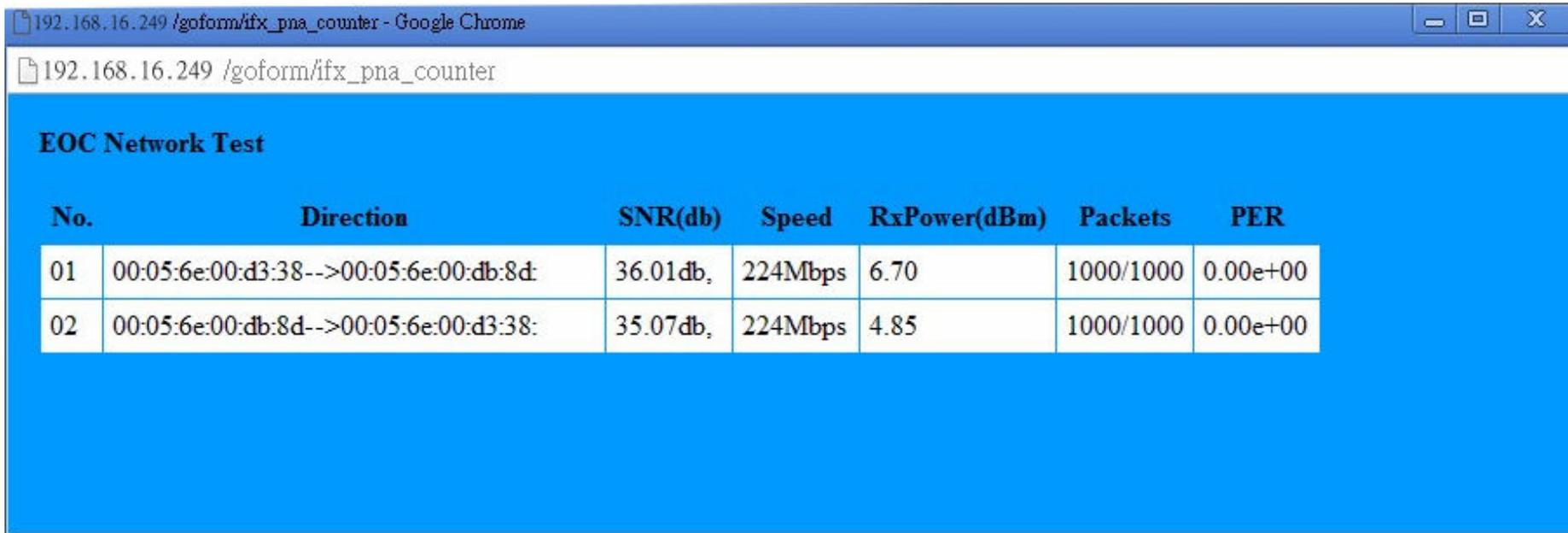
No.	Direction	SNR(db)	Speed	RxPower(dBm)	Packets	PER
01	00:05:6e:00:d3:38-->00:05:6e:00:db:8d:	36.01db,	224Mbps	6.70	1000/1000	0.00e+00
02	00:05:6e:00:db:8d-->00:05:6e:00:d3:38:	35.07db,	224Mbps	4.85	1000/1000	0.00e+00

Figure 4.5.1.2.2 Output of Slave Net Interface Test

It shows the network information regarding the network test results for the SNR, the speed(rate), the receive power, transmitted packets, and the PER.

4.5.1.3 Slave Read Packet Counter

Click on "Count " button in the line for each Slave and it appears the window which shows the MAC Address of the Slave.

A screen is displayed as shown in Figure 4.5.1.3.1.
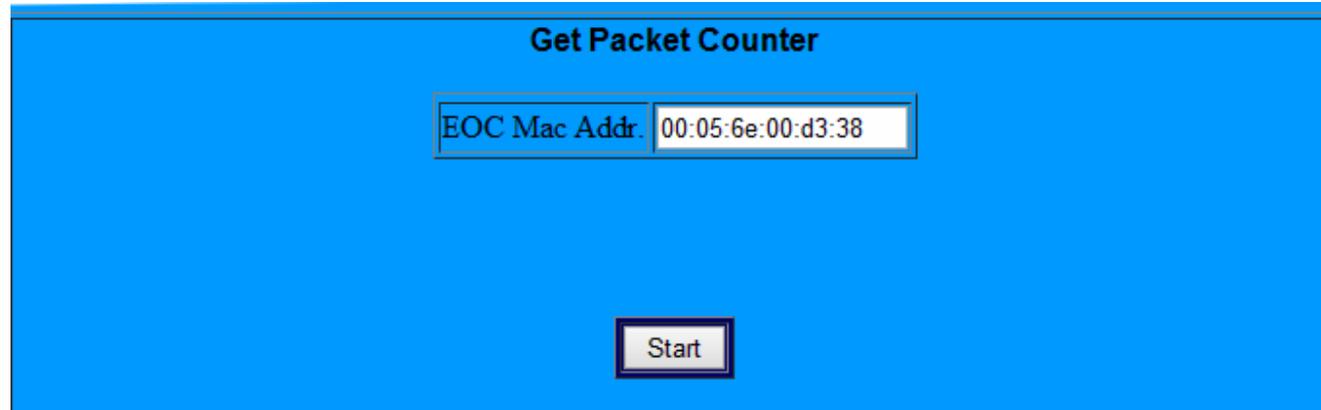
Figure 4.5.1.3.1 Slave Read Packet Counter

Click on the "Start" button, and the example for test result of Slave Read Packet Counter will be as below:
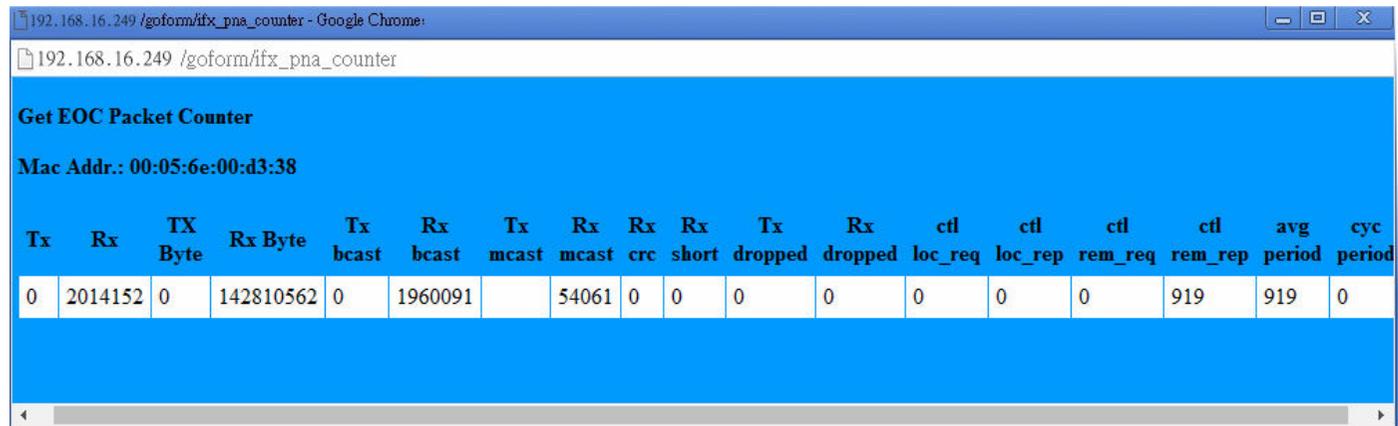
Get EOC Packet Counter

Mac Addr.: 00:05:6e:00:d3:38

Tx	Rx	TX Byte	Rx Byte	Tx bcast	Rx bcast	Tx mcast	Rx mcast	Rx crc	Rx short	Tx dropped	Rx dropped	ctl loc_req	ctl loc_rep	ctl rem_req	ctl rem_rep	avg period	cyc period
0	2014152	0	142810562	0	1960091		54061	0	0	0	0	0	0	0	919	919	0

Figure 4.5.1.3.2 Output of Slave Read Packet Counter

4.5.2 Device Control

Select "Device Control". The menu below includes the sub-menus of **Numbers**, **Mode**, **MAC Address**, and **Spectrum** for the Master/Slave. The table also includes **User List, Firmware driver Upgrade**, **Reboot** and **User Add** for Slaves. A screen is displayed as shown in Figure 4.5.2.

Figure 4.5.2 Device Control

The screen contains the following details:

Mode	Function	Descriptions
Master	Upgrade	EOC driver Upgrade for Master
Slave	User List	Slave User List Table No
	Speed	EOC driver Upgrade for Slaves
	Reboot	Reboot for Slaves
	Add	Add User for Slaves

Notes:

1. EoC driver and web firmware is different, due to the Web firmware is control web UI management, the EoC driver is control NH-310HG and NH-310S HPNA function. Please see the current driver version is "2.8.4", such as the Figure 4.5.2.
2. EoC driver contains the web firmware. If user would like to upgrade latest EoC driver, please refer to point 3 and section 4.5.2.2)
3. The first, user need to upgrade latest web firmware, and user need to access Device Control menu, and then click the "Upgrade" from the Firmware table to upgrade EoC driver. A screen is displayed as shown in Figure 4.5.2.

4.5.2.1 EOC driver Upgrade for Master

Click on "Upgrade" button in the line for Master and it appears the window which shows the MAC Address, the New Version and Band Mode of the firmware which contains the EOC Master driver for upgrading.

To Band Mode, it supports Full Band (12-44MHz), High Band (28-44MHz), Low Band (12-28MHz). User can selected band mode to configure HPNA operating band frequency. The pop window also shows the Firmware New Version (i.e. 2.8.4).

Note:

1. If user changed Band Mode, Master and Slave will auto change the same operating band frequency.
2. The band mode will used in the different environments and different applications. For example, if your equipment noise signal (i.e. 20MHz) conflict to the EOC working frequency, you have to change EOC band from full band to High Band for preventing the EOC signal overlap the video noise.
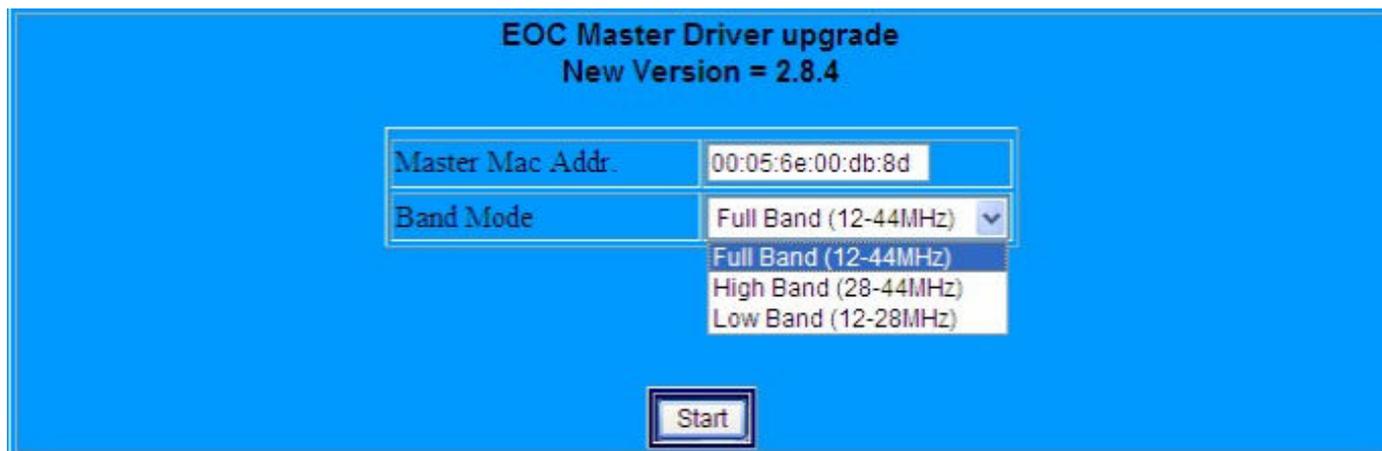
Figure 4.5.2.1.1 EOC driver Upgrade for Master

Click on the "Start" button, and it only takes short time to upgrade the driver.

A screen is displayed as shown in Figure 4.5.2.1.2.
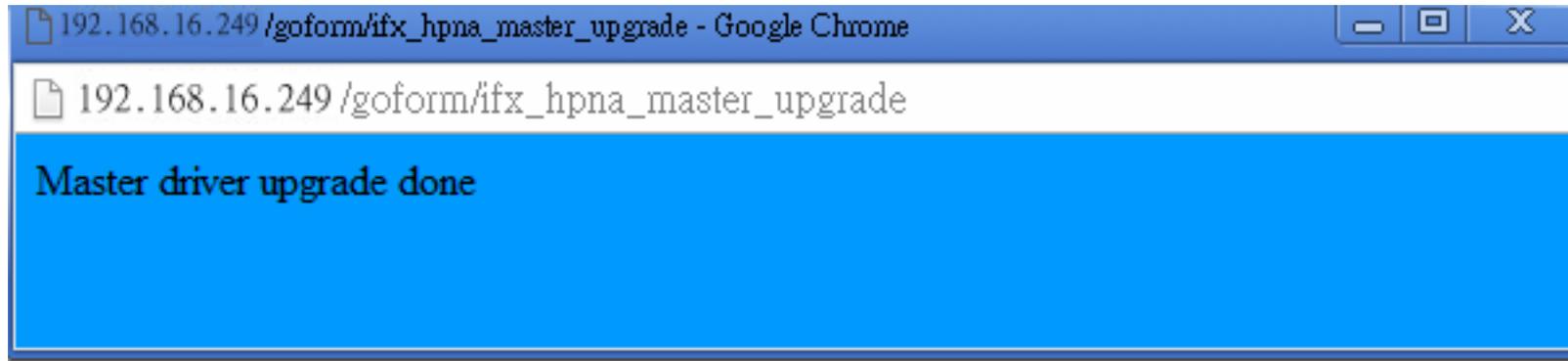
Figure 4.5.2.1.2 Complete the EOC driver Upgrade for Master

4.5.2.2 HPNA driver Upgrade and user speed control for Slaves

Click on "Upgrade" button in the line for each Slave and it appears the window which shows the MAC Address and Enable/Disable Mode of the Slave. It supports **Enable** or **Disable** for EOC Slave and also include driver upgrade. The window also shows the Firmware New Version(i.e. 2.8.4). A screen is displayed as shown in Figure 4.5.2.1.1.

Figure 4.5.2.2.1 HPNA driver Upgrade and user speed control for Slaves

Click on the "Start" button with the default Enable Mode and it only takes short time to upgrade the driver.
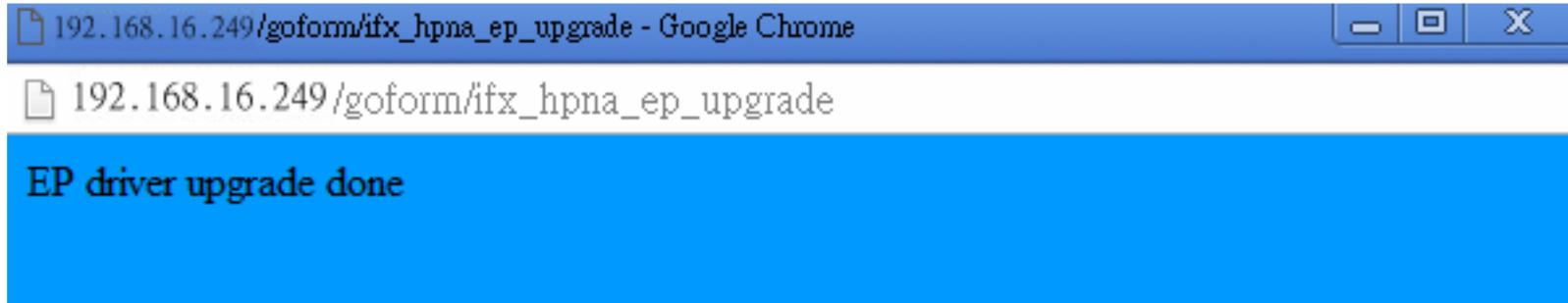
Figure 4.5.2.2.2 Complete the HPNA driver Upgrade for Slaves

4.5.2.3 Reboot for Slaves

Click on the "Reboot" button in the line for each one Slave and it appears the window which shows the MAC Address.

A screen is displayed as shown in Figure 4.5.2.3.1.
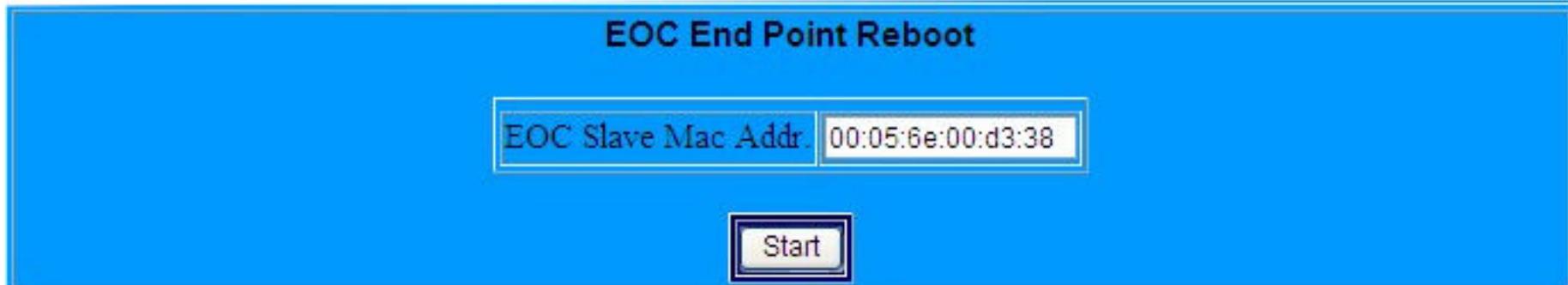
Figure 4.5.2.3.1 Reboot for Slave

Click on the "Start" button, and it only takes short time to reboot for each one Slave.
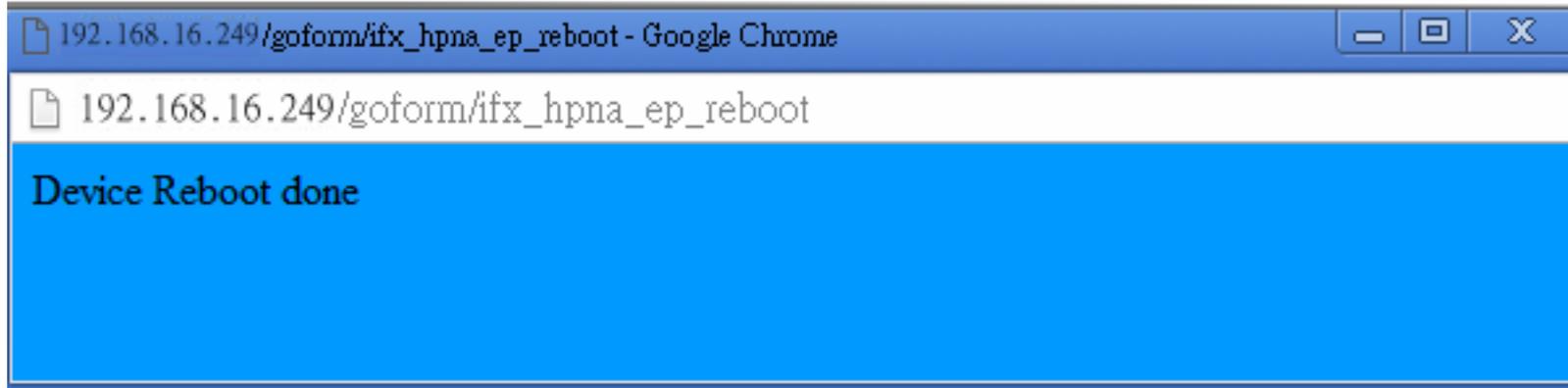
Figure 4.5.2.3.2 Reboot for Slaves is done

4.5.2.4 Add User for Slaves

Click the "Add" button in the line for each Slave and it appears the window which shows the MAC Address and Number/Remark fields. The Remark field is convenient to apply for the User List information such as address and hotel room number…etc. The Maximum numbers of characters is sixty. A screen is displayed as shown in Figure 4.5.2.4.1.

Note:

To the Number field, if you would like to modify the new number of the Slave has been configured, it will replace the older information.

Figure 4.5.2.4.1 Add User for Slaves

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For example, A screen is displayed as shown in Figure 4.6.2.4.2 :

(1) Fill No. as 1 (**NO.1~ NO.60**).

(2) Remark: 9F, NO.208, TATUNG RD, SEC3,HSI CHIH, TAIPEI. (**Max characters:60**)

(3) E1 Vlan ID:0 (**0:No VLAN, 2-4095: Tag VLAN**)

(4) E2 Vlan ID:0 (**0:No VLAN, 2-4095: Tag VLAN**)

(5) IGMP: OFF (**OFF/ON**)

(6) Rate Control UP:1M (**12 Speed Modes**)

(7) Rate Control Down:10M (**12 Speed Modes**)

(8) QoS: OFF (**OFF/ON**)

(9) Click on "Start".

Note:

1. The No. is **1~ 60**.

2. Remark can type 60 characters.

3. The VLAN ID is **0 or 2-4095**. In HPNA MDU structure, all of the Slaves will be isolated. Therefore, if you don't need use 802.1Q Tag VLAN, set VLAN ID=0. When you need IEEE 802.1Q VLAN Tagging application, configure VLAN Id during 2~4095.

4. The Upstream Rate Control have 12 Speed Modes as Full Speed/ 512k/ 1M/ 2M/ 3M/ 4M/ 6M/ 8M/ 10M/ 16M/ 20M/ 30M for EOC Slave.

5. The Downstream Rate Control have 12 Speed Modes as Full Speed/ 512k/ 1M/ 2M/ 3M/ 4M/ 6M/ 8M/ 10M/ 16M/ 20M/ 30M for EOC Slave.

6. The QoS priority packet ratio is 8 : 4 : 2 : 1(Highest : High : Low : Lowest).

7. The above configuration settings take effect immediately after.

8. In order to comply with the MDU / MTU application, NH-310HG/S is characterized by a Slaved and can pass through any packets. In addition to, the security considerations, each of the NH-310S is independent.

9. Regarding rate control function, which must rely on flow control to limit bandwidth. If client side device doesn't support flow control, the upstream bandwidth control will invalid, so for this case, client side device must support flow control function.

Add User to User Table

No.	1
EOC Slave Mac Addr.	00:05:6e:00:d3:38
Remark	9F,No.208.TATUNG RD. SEC3, HSI, CHIH, TAIPEI
E1 Vlan ID	0
E2 Vlan ID	0
IGMP	OFF
Rate Control Up	1M
Rate Control Down	10M
QOS	OFF

Start

Figure 4.5.2.4.2 Example for adding new user for one Slave

The User Add is done.
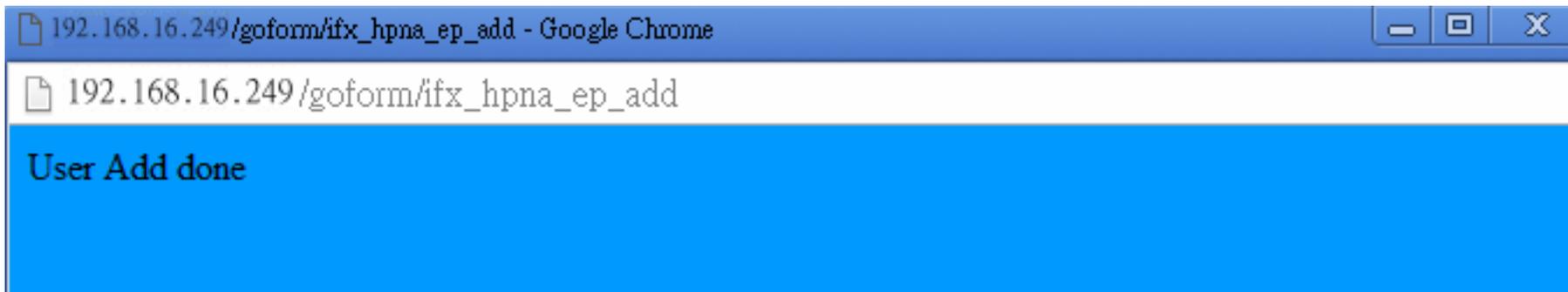
Figure 4.5.2.4.3 Example for adding new user for one Slave

NH-310S tag vlan(web ui) examples:

1. ISP ethernet switch VLAN ID 3→NH-310HG→ NH-310S VLAN ID 3→ Access

2. ISP ethernet switch VLAN ID 3→NH-310HG→ NH-310S VLAN ID 4→ Reject access

3. 1 x NH-310S VLAN ID 3→NH-310HG→ another NH-310S VLAN ID 3→ Reject access

4. A NH-310S VLAN ID 3 of Ethernet port 1 → NH-310S VLAN ID 4 of Ethernet port 2 → Both reject access

5. A NH-310S VLAN ID 3 of Ethernet port 1 → NH-310S VLAN ID 3 of Ethernet port 2 → Access

4.5.3 User List

Follow the example in 4.6.2.4 add a Slave, there are several information appears in User Information window. User can click the "Edit" button to modify each Slave or click the "Erase" button to delete each the Slave information. A screen is displayed as shown in Figure 4.5.3.1.

Figure 4.5.3 User List

Figure 4.5.3.1 Erase the No. and click "Start"
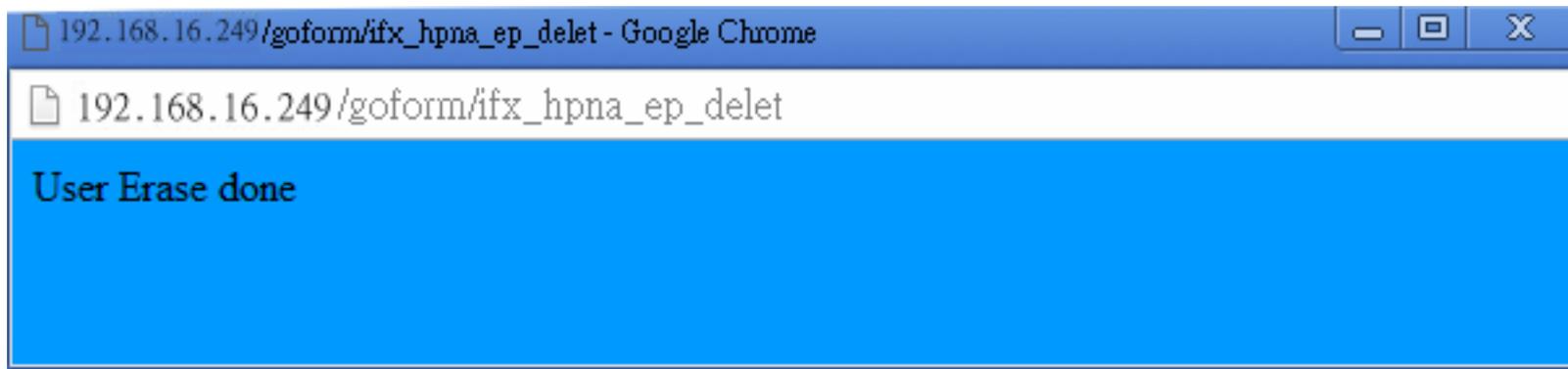
Figure 4.5.3.2 User Erase done

Edit User Config.	
No.	1
EOC Slave Mac Addr.	00:05:6e:00:d3:38
Remark	-
E1 Vlan ID	0
E2 Vlan ID	0
IGMP	ON
Rate Control Up	Full Speed
Rate Control Down	Full Speed
QOS	OFF

Start

Figure 4.5.3.3 Edit User Config of Slave

Notes:

1. If user needs to change the settings in the User Information, please click on the "Edit" to change the configuration.
2. **Change the settings, user need click on the "User list" button to refresh the User Information. Please refer to Figure 4.5.1.**
3. If need, user can disable or enable IGMP and QoS function.
4. IGMP support v1/v2.

Chapter 5. Configure the NH-310HG via Console

5.1 Setup on HyperTerminal

Open the HyperTerminal and set the baud rate to **115200, 8N1N** to properly set the HyperTerminal.

A screen is displayed as shown in Figure 5.1.
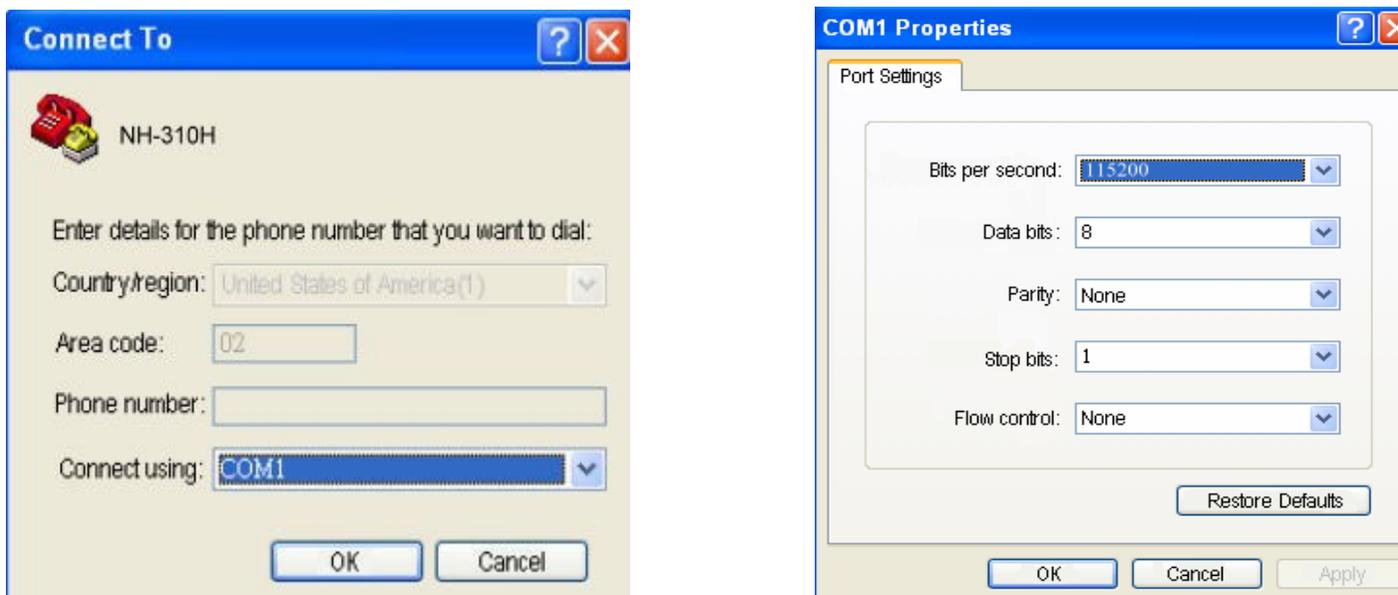
Figure 5.1 HyperTerminal Configuration

5.2 Reset the system to default configuration

At the CLI command, type the command "**rawaccess –e**" to reset the system to default configuration. After the commencement of the previous command, then type "**reboot**" command to restart the system.

5.3 TFTP Protocol for firmware upgrade

(1) Powered on and execute HyperTerminal, within three seconds press the **<space>** to enter Loader menu. You will see the boot Loader menu with the items of function selection. A screen is displayed as shown in Figure 5.3.1.


```
CPU: ADM5120-175MHz
SDRAM: 32MB
Flash: NOR-4MB
Boot System: Linux-2.4.18-5120
Loader Version: 1.02.00 (PNA)
Creation Date: 2005.08.03

Press <space> key tree times to enter boot menu..
2


Loader Menu
====================================
  [1] Xmodem Download
  [2] TFTP Client Download
  [3] Print Boot Params
  [4] Set Boot Params
  [5] Update bootloader
  [6] Exit

Please enter your number:_
```
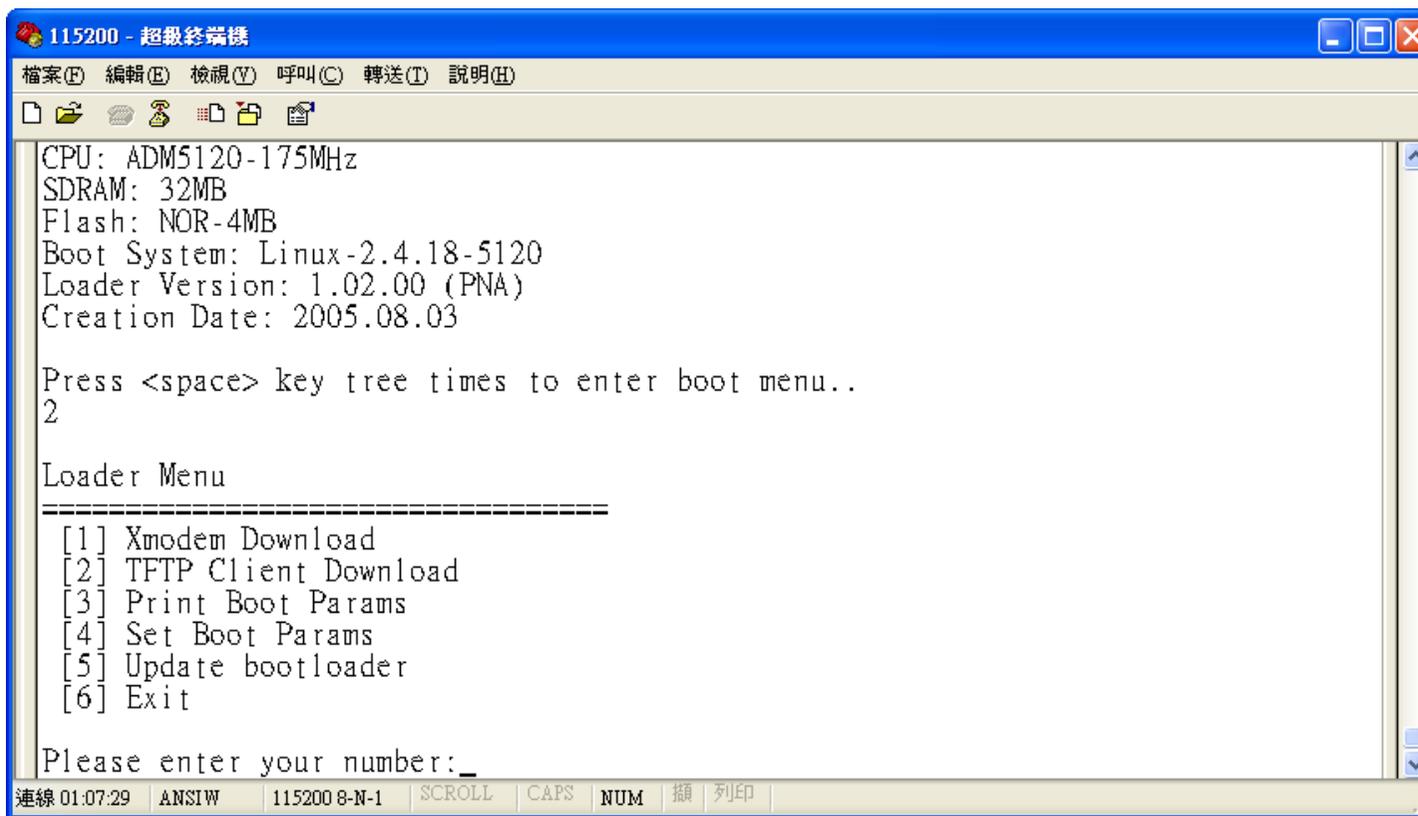
Figure 5.3.1 boot Loader Menu entry

(2) Execute the TFTP tool and specify current directory which is stored the NH-310HG firmware. Enter the IP address of the TFTP server interface field.Now the TFTP server is ready for firmware upgrading. A screen is displayed as shown in Figure 5.3.2.

Note:

We must remind you must set TFTP tool, do not miss this step!
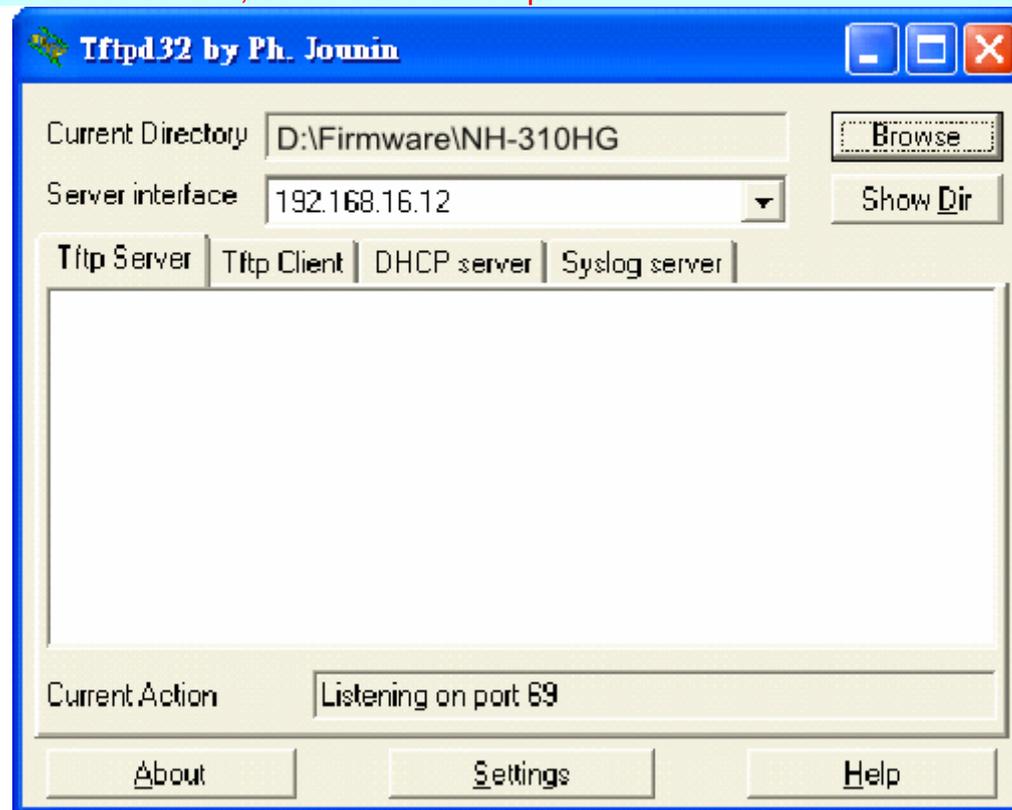
Figure 5.3.2 TFTP tool for f/w upgrading

(3) Please enter the number: "2" as set TFTP Client Download. A screen is displayed as shown in Figure 5.3.3.
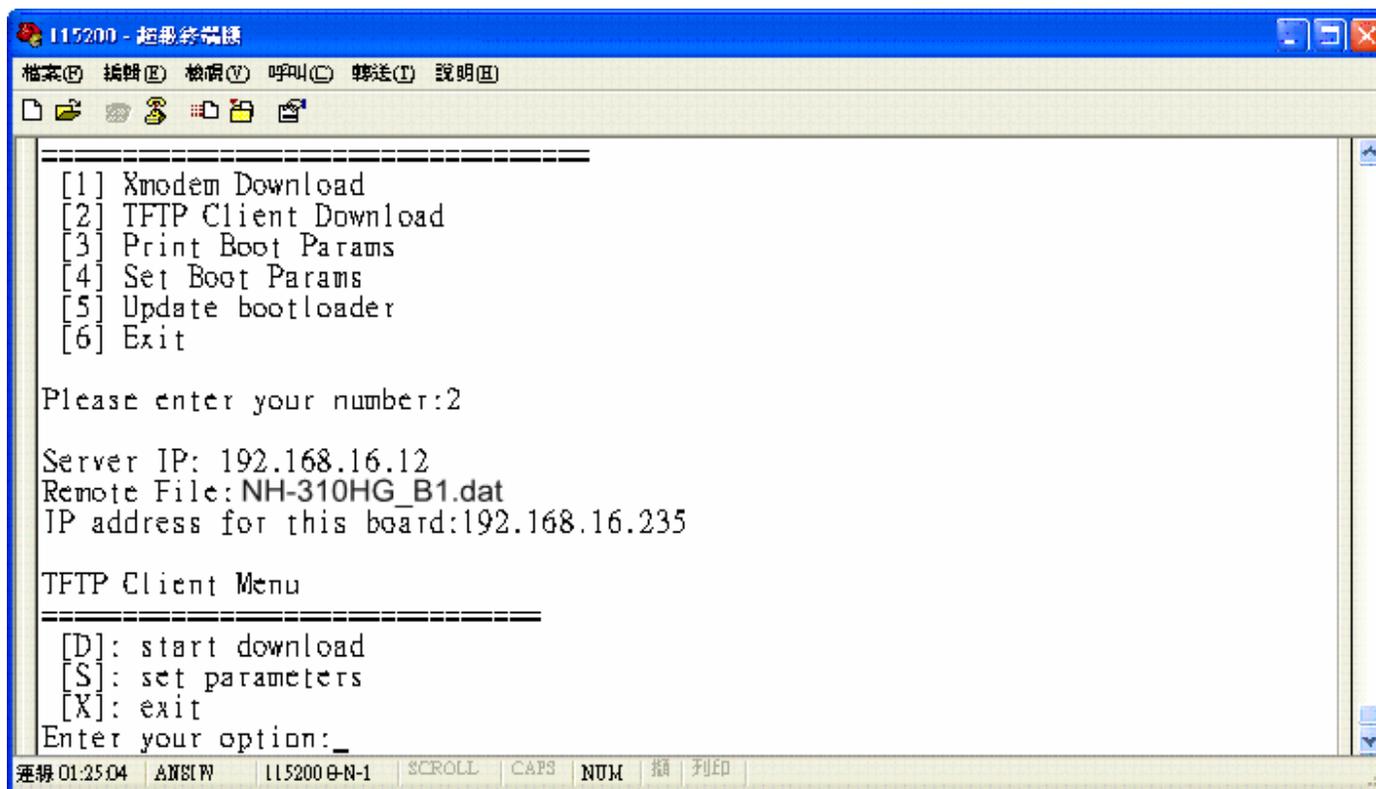
Figure 5.3.3 TFTP Client Download

(4)Please enter your option: "**s**" as set parameters, then enter TFTP Server IP and Remote File Name as the NH-310HG firmware for upgrading. A screen is displayed as shown in Figure 5.3.4.
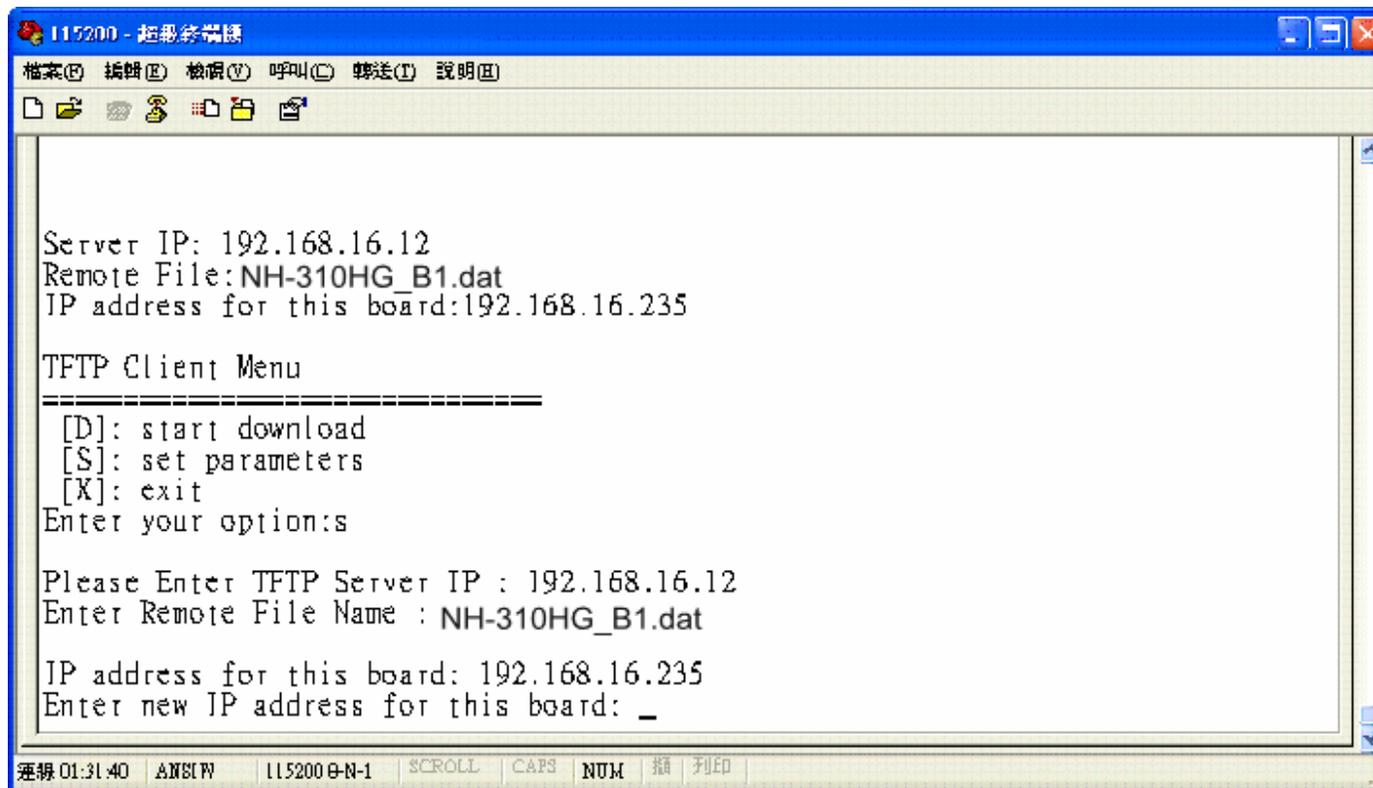
Figure 5.3.4 Set parameters

(5) Enter your option: "**D**" and it will be beginning the TFTP download. After Erasing and Programming flash process, and NH-310HG new firmware upgrade is completed. A screen is displayed as shown in Figure 5.3.5.
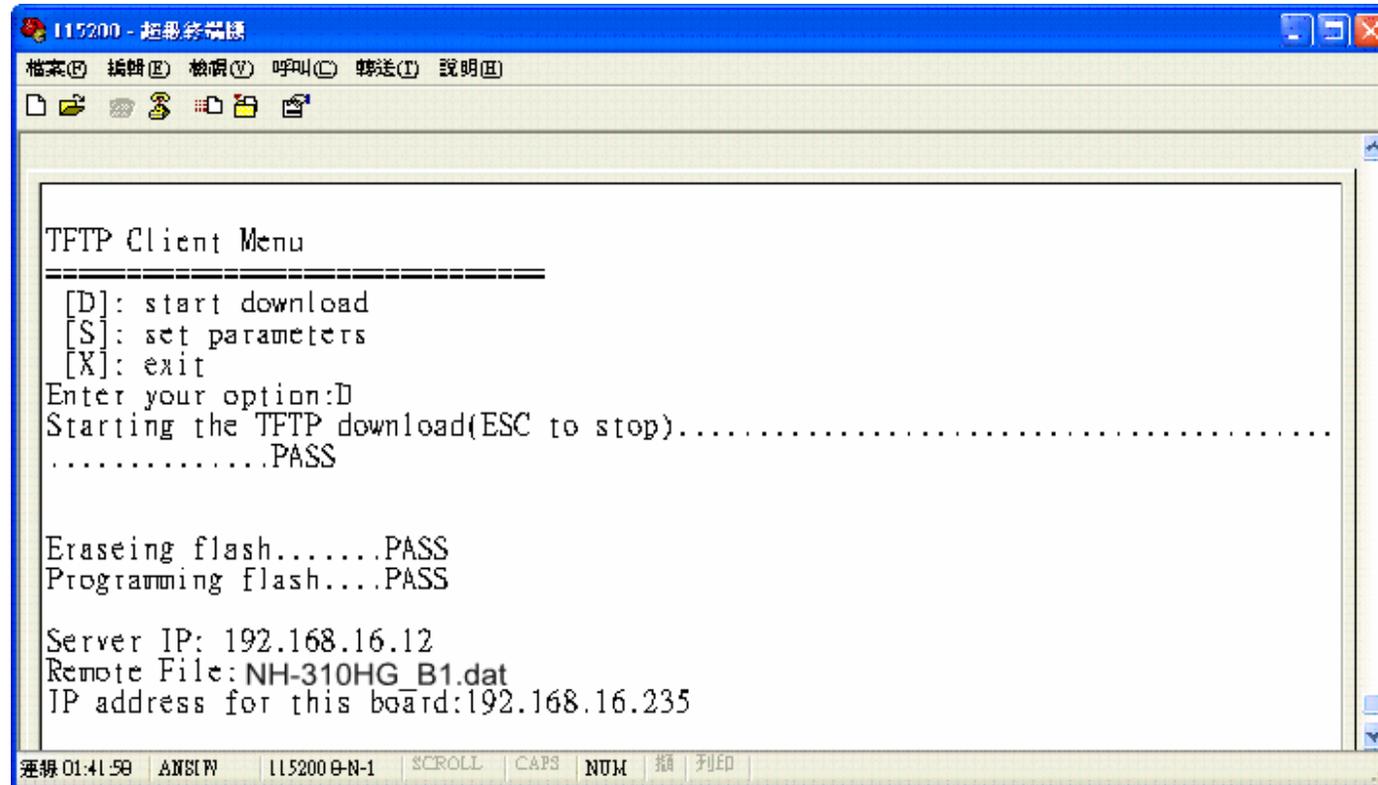
Figure 5.3.5 Firmware upgrade completed

Appendix A: Cable Requirements

A CAT 3, 4 or 5 UTP (unshielded twisted pair) cable is typically used to connect the Ethernet device to the device. 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 A-1)

Table A-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
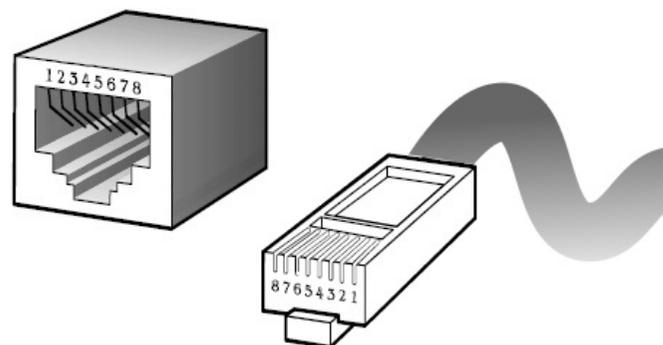
Figure A-1 Standard RJ-45 repectacle/connector

Note:

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

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

Figure A-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 device cable is required to connect a workstation running the Linux or Windows operating system. Table A-2 lists the pin assignments for the serial console interface connector.

Table A-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 device have one standard serial port connector located on the back of the device. Figure A-3 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.
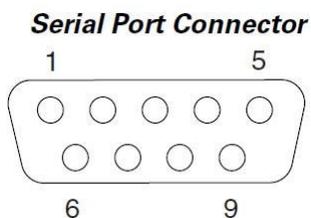
Figure A-3
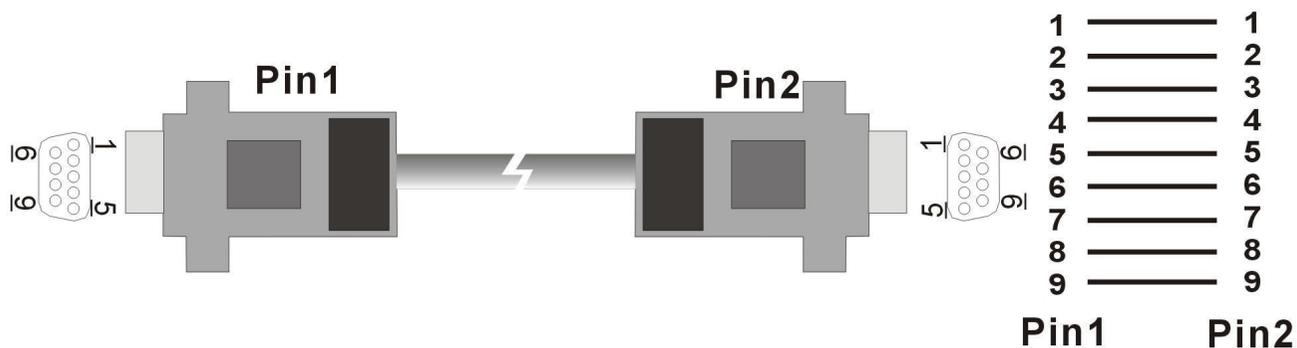
Figure A-4 Pin Assignments and Wiring for an RS-232 Cable

Appendix B: Product Specification

Key Features & Benefits

- Compliant with HomePNA3.1/ HomePNA3.0 over Coaxial cable(HCNA) specifications (ITU-TG.9954)
- Compliant with IEEE802.3 10Base-T and IEEE802.3u 100TX and IEEE802.3ab 1000TX Ethernet standards
- Compliant with IEEE802.3x Flow Control standard
- Provides 2 x 10/100/1000M auto-negotiation RJ-45 Ethernet ports with auto-MDI/MDIX(NH-310HG only)
- Provides 2 x 10/100M auto-negotiation RJ-45 Ethernet ports with auto-MDI/MDIX(NH-310S only)
- Provides 2 x F-type female coax connectors for HCNA(12M-44MHz) and TV(47M-1GHz)
- Supports transmission speed up to320Mbps(throughput) over coaxial cable and link establish under -145dBm/Hz noise Floor
- Supports point to multipoint application
- Supports HPNA Master/Slave driver upgrade
- Supports IEEE802.1p Priority Mapping and IEEE802.1p/TOS Priority Queue
- Support IEEE802.1Q Tag VLAN Pass Through
- Support Web Management(HTTP),Telnet for Remote Management (NH-310HG only)
- Support HTTP and TFTP protocol for firmware upgrade(NH-310HG only)
- Support monitor all Slave(NH-310S) of version, SNR, Rate, RX power, and packet counter (NH-310HG only)
- Support max. connecting up to 60 Slave (client)
- Support auto-speed from 32Mbps up to 320Mbps (throughput)
- Support Slave(Clients) Rate control 512k/1M/2M/3M/4M/6M/8M/10M/16M/20M/30M
- Support VLAN function for each Slave(Client) isolation and IEEE802.1Q Tag VLAN
- Support rate control of Full Speed (auto), Fix Speed setting

- Support auto logout , user list and each Slave isolation
- Guaranteed QoS based on HomePNA3.1 Parameterized QoS
- Supports SNMP v1/v2
- EMI certified by CE and FCC

Product Specification

Items	Descriptions
Standard:	IEEE802.3 / IEEE802.3u / IEEE802.3ab / ITU-T G.9954 standard
NH-310HG Interfaces:	2 x RJ-45 10/100/1000Mbps Ethernet port 1 x F-type female coax connector for HCNA 1 x F-type female coax connector for STB/TV 1 x 12 VDC/1A power jack 1 x DB9 Console port
NH-310S Interfaces:	2 x RJ-45 10/100Mbps Ethernet port 1 x F-type female coax connector for HCNA 1 x F-type female coax connector for STB/TV 1 x 12Vdc/1A power jack
NH-310HG LED Indicators:	1 x Power LED 1 x HCNA Link/Activity LED 2 x Ethernet Link/Activity LED 2 x Speed100/1000M for Gigabit ports

Items	Descriptions
NH-310S LED Indicators:	1 x Power LED 1 x HCNA Link/Activity LED 2 x Ethernet Link/Activity LED 2 x Link Quality LED 2 x Link Quality LED
Max Bandwidth:	Up to 320Mbps (throughput)
NH-310HG Networking Microprocessor:	32 bit MIPS 4KC CPU
NH-310HG Memory Size:	32M bytes
Max Noise Floor:	-145dBm/Hz
Max Power Attenuation:	-60dBm
SAT HCNA Transmission Spectrum:	12MHz ~ 44MHz and coexist at 47MHz

Items	Descriptions
Dimension:	NH-310HG: 173mm x 142mm x 30mm(Metal Case) (6.81" x 5.59" x 1.18") (L x W x H) NH-310S: 130mm x 94.5mm x 27mm (5.12" x 3.72" x 1.06") (L x W x H)
Temperature:	Operating: 0ºC ~ 50ºC (32ºF ~ 122ºF) Storage: -20ºC ~ 70ºC (-4ºF ~ 158ºF)
Humidity:	10% ~ 90% (non-condensing)
External Power Adapter:	Input Voltage: 12VDC / 1A (Commercial-grade Power Adapter)

Appendix C: Troubleshooting

Diagnosing the Device's Indicators

The Device can be easily monitored through its comprehensive panel indicators. These indicators assist the network manager in identifying problems the hub may encounter. This section describes common problems you may encounter and possible solutions.

1. Symptom:	The link is failed between NH-310HG and NH-310S. The functionality of NH-310S is abnormal.
Cause:	The output level of voltage is too high for short connection.
Solution:	It must use the attenuator to be connected with MDU Master NH-310HG and Slave NH-310S to attenuate the transmission power level to **-10dBm(5M-850MHz)** at least.

2. Symptom:	POWER indicator does not light up (green) after power on.
Cause:	Defective External power supply
Solution:	Check the power adapter plugging to another device or check another power adaptor plugging NH-310HG/S that is functioning properly. If these measures fail to resolve the problem, please replace a power adaptor via a qualified vendor. NH-310HG/S supports DC 12V/1A power adaptor.

3. Symptom:	Link indicator does not light up (green) after making a connection.
Cause:	Network interface (ex. a network adapter card on the attached device), network cable, or HCNA coaxial cable or Ethernet port is defective.

4. Question:	Why the long HomePNA test passed but TV service does not work properly?
Answer:	The problem is not with the HomePNA network. Check your DSL service or replace the RG and/or STB equipment.

5. Question:	We connected HCNA port of Master with HCNA port of Slave via a splitter but the connection still can't be established or not stable. But when we connect TV port of Master with HCNA port of Slave via splitter then the connection's ok.
Answer:	The TV port of Master connect to HCNA port of Slave is not correct, It why can link establish the reason using a short cable, causing HPNA signal of NH-310S too strong and pass to HPNA port of NH-310HG through TV port (50MHZ high pass filter build in) of NH-310HG, so you can create a weak connection, but as long as extend coaxial over 350m length or plug a -20db attenuator, this link will be loss. We recommend add a -10dB attenuator (5M-850MHz) to establish a basic connection.

6. Question:	About rate control of Slave, can we create a new one or modify them?
Answer:	Only select the rate of 12 speed modes as Full Speed/ 512k/ 1M/ 2M/ 3M/ 4M/ 6M/ 8M/ 10M/ 16M/ 20M/ 30M for EOC Slave. Therefore you can not create a new kind of rate.

7. Question:	NH-310HG signal source ? To CATV signal source only or to common distribution of Antenna signal also.
Answer:	You can use the CATV signal, you can also use the Antenna signal as long as not to conflict with the HPNA signals, due to HPNA working frequency is between 12Mhz~44Mhz, CATV and Antenna is over 50Mhz.

8. Symptom:	I connect TV signal to NH-310HG/S, why TV signal can't show on TV.
Cause:	TV signal is too weak or other factors.
Solution:	Please verify that the following items to help you clarify the problem: 1. Verify coaxial cable use RG59 75 ohm cable. 2. Verify TV signal source and TV if available. 3. Check TV signal need to over 50MHz that will be passed. 4. Add TV signal repeater before NH-310HG if TV signal source is too weak. 5. Add attenuator before TV if TV signal is too strong.
Notes:	1. Weakened by the output television signal is due to environmental factors. NH-310HG/S support TV signal pass through, but can not guarantee to be able to maintain an appropriate TV signal output to TV, If the connection distance is too long lead to output of TV signal no signal or attenuation. 2. Please note NH-310HG/S TV signal input power is unlimited, user does not need add the attenuator before NH-310HG/S to weaken the TV signal source. 3. If TV signal is too strong, leading to the advent of television ripple, please add an attenuator before TV. 4. HPNA3.1 must use 75 ohm coaxial cable. If use 50 ohm impendence, the performance will be less than half.

9. Question:	How much node(Mac Address) can be connected to behind of the NH-310S.
Answer:	Each of the NH-310S can only be connected to 16 nodes (Mac Address).

10.Question:	I forgot NH-310HG password, what can I do ?
Answer:	If you forgot the NH-310HG password, only use the console command line to reset system to default value. Please refer to the following steps for your reference: 1. Please connects NH-310HG's console port to PC or laptop PC series port. 2. Launch "Hyper Terminal" into terminal window on your PC. 3. Set "Bits per second" at " 115200 " on the content window. 4. Set "Data bits" at " 8 " on the content window. 5. Set "Parity" at " none " on the content window. 6. Set "Stop bits" at " 1 " on the content window. 7. Set "Flow control" at " none " on the content window. 8. Power on NH-310HG and wait some time until the login menu appears. 9. At the CLI command, type the command " rawaccess -e " to reset system to default. 10. At the CLI command, type the command " reboot " to reboot the NH310HG. Note: Default IP is 192.168.16.249. Default password is "admin"

System Diagnostics

Power and Cooling Problems

If the POWER indicator does not turn on when the power cord is plugged in, you may have a problem with the power outlet, power cord, or internal power supply as explained in the previous section. However, if the unit power is off after running for a while, check for loose power connections, power losses or surges at the power outlet, and verify that the fan on back of the unit is unobstructed and running prior to shutdown. If you still cannot isolate the problem, then the internal power supply may be defective. In this case, please contact your local dealer.

Installation

Verify that all system components have been properly installed. If one or more components appear to be malfunctioning (e.g. the power cord or network cabling), test them in an alternate environment where you are sure that all the other components are functioning properly.

Transmission Mode

The default method of selecting the transmission mode for RJ-45 ports is 10/100 Mbps Ethernet, for coaxial connectors are 320Mbps HCNA. It supports auto-negotiation and is half-duplex. Therefore, if the link signal is disrupted (e.g. by unplugging the network cable and plugging it back in again, or by resetting the power), the port will try to reestablish communications with the attached device via auto-negotiation. If the device does not support auto-negotiation, communications can be easily lost (i.e., reset to the wrong mode) whenever the attached device is reset or experiences a power fluctuation. The best way to resolve this problem is to upgrade these devices to a version that support Ethernet and 320Mbps HCNA.

Physical Configuration

    If problems occur after altering the network configuration, restore the original connections, and try to track the problem down by implementing the new changes, one step at a time. Ensure that cable distances and other physical aspects of the installation that do not exceed recommendations.

System Integrity

    As a last resort verify the switch integrity with a power-on reset. Turn the power to the switch off and then on several times. If the problem still persists and you have completed all the preceding diagnoses, then contact your dealer.

Appendix D: Compliance and Safety Information

FCC Radio Frequency Interference Statement

This equipment has been tested and found to comply with the limits for a computing device, pursuant to Part 15 subpart B of FCC class A rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generate, uses and can 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 one or more of the following measures:

1. Reorient or relocate the receiving antenna.
2. Increase the separation 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 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.

RoHS Mark Warning

RoHS stands for Restriction of Hazardous Substances, and impacts the entire electronics industry and many electrical products as well. The original RoHS, also known as Directive 2002/95/EC, originated in the European Union in 2002 and restricts the use of six hazardous materials found in electrical and electronic products. All applicable products in the EU market since July 1, 2006 must pass RoHS compliance. Directive 2011/65/EU was published in 2011 by the EU, which is known as RoHS-Recast or RoHS 2. RoHS 2 includes a CE-marking directive, with RoHS compliance now being required for CE marking of products. RoHS 2 also added Categories 8 and 9, and has additional compliance recordkeeping requirements. Directive 2015/863 was published in 2015 by the EU, which is known as RoHS 3. RoHS 3 adds four additional restricted substances (phthalates) to the list of six.

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.

Appendix E: Home Networking Installation Guide

Caution:

Please note this install guide only for construction unit to install the HPNA, general of home users do not need read this **installation guide. And please note we do not provide the tools mentioned in this guide.**

E-1 Before Leaving Office

Make sure you have everything you need to install and test the home network.

Please bring extra equipment in case a part or component is faulty.

Equipment to Install	Equipment for Testing	Supplies and Tools
◆ Residential Gateway (RG) ◆ Set-top boxes (STB) ◆ HomePNA adapters	◆ Notebook PC (with Windows) ◆ One 1-to-2 coax splitters with two short coax cables (approximately 3-feet) ◆ One short CAT-5 Ethernet cable ◆ DSL tester	◆ Compression-type male/female coax connectors ◆ Barrel coax connectors (joiners) ◆ Coax wall outlets ◆ Coax wall plates ◆ Coax splitters (1:2, 1:4, etc.) ◆ Series resistors ◆ High pass filters ◆ Coax cable (RG-6 type or RG-59 75 ohm) ◆ AC power strips ◆ Coax connector installation tool ◆ Wire cutter ◆ 90-degree angle connectors ◆ Other basic tools, as needed

E-2 Homeowner Site Survey

Before beginning the installation, it is important to survey the installation site and plan the job.

Meet With the Homeowner and Survey the Home

Note the location of the main splitter and any secondary splitters. The main splitter usually connects to an outside coax cable.
Locate a coax connection (if one exists) near every place where the customer wants a TV.

Try to find a location for the RG where you can connect it back to the coax network. (Note: Some RGs may require a grounded power outlet.)
Turn on all TVs with existing TV service (if applicable) and check for image quality. If you observe problems, determine if the TV is faulty; if so, inform the homeowner/resident.
Check for devices (TVs, etc.) connected directly to coax outlets. Disconnect them. Such devices can add noise to the coax network.

Tip:

Always check the quality and type of existing service before making any changes.

Pre-Install Inspection

For the fastest and smoothest installation, address any wiring or connector problems before starting the installation.

Inspect and Fix Wiring

Inside and outside the house or residence, check every visible coax or telephone wire for cracks, nicks, splices, and/or other types of coating or shielding damage.

Inspect and Replace Damaged Connectors

Inside and outside the residence, check every coax connector and splitter. Look for missing components, damaged connectors, corrosion, and/or other problems.

Replace any damaged splitters.

Replace damaged and low-quality coax fittings (crimp, screw-in, and others) with compression-type fittings.

Check these locations:

- At the splitter
- At the wall plate
- On external cables running from the wall to equipment

Tip:

Be sure to change defective connectors; this will save time in the long run.

Check Environment and Wiring Integrity

Remember to disconnect any devices that are directly connected to the coax network (not connected through an STB).

Remove all unused coax cables and devices attached to coax wall outlets.

Examples of a Compression F-Connector

CORRECT CONNECTOR CONDITION:

A. Stinger is right length – it protrudes a bit beyond the rim.
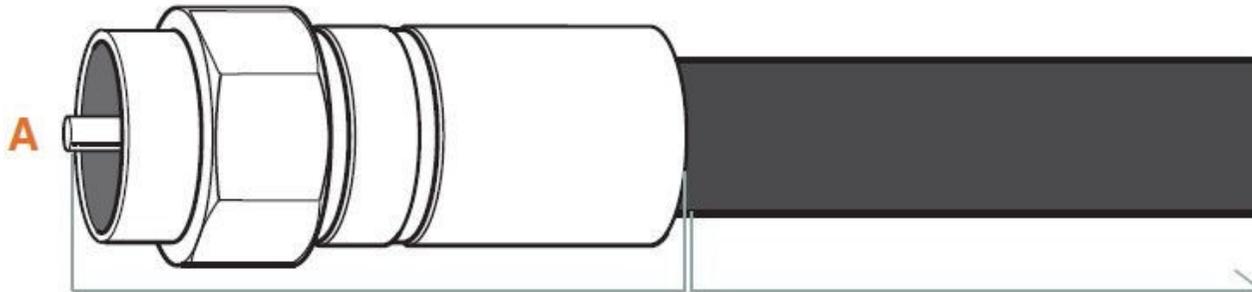
Metal Fittings:
Check for signs of rust or corrosion; replace if necessary

Coax Line:
Visually check visible coax for nicks, splits, and tangling

AVOID THESE BAD CONDITIONS:

B. Low dielectric – a gap between the dielectric and ridge will cause packet loss; dielectric should be flush with the ridge.

C. Debris inside connector – for example, loose shielding strands wrapped around the stinger will cause 30dB attenuation.
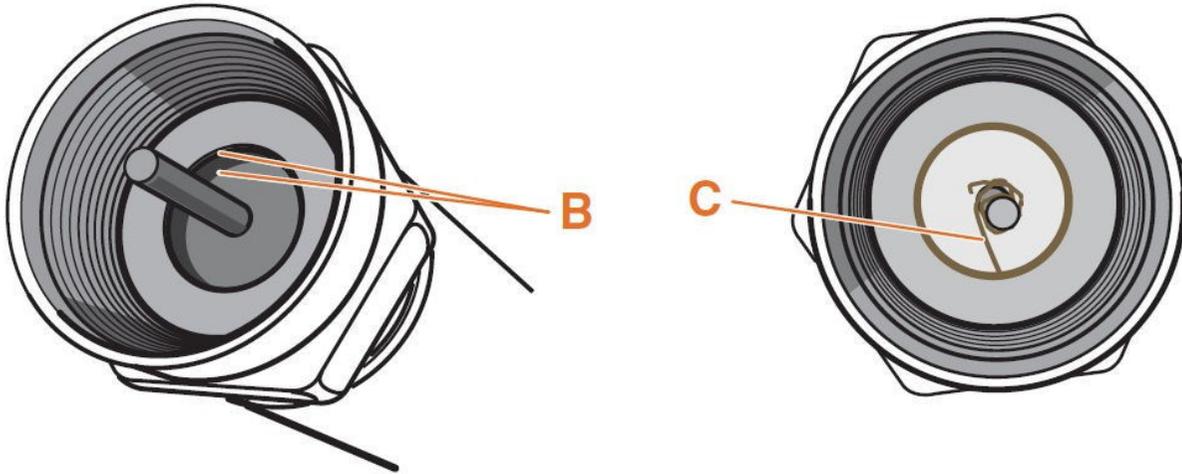
Note:

We recommend use RG59 75ohm coaxial cable to establish HomePNA network.

Install Hardware

Now you are ready to install the Customer Premises Equipment.

Disconnect the Existing Service

◆ Find the main splitter (where the service enters the house). If the RG is far away from the main splitter, create a splitter tree (see diagram on right).

◆ Remove the cable service provider's connection to the INPUT on the main splitter. **It is critical that no HomePNA device is connected to the INPUT on this splitter!**

◆ Do not put a resistive end cap on the input. If you want to cap the input, use only a plastic cap.

◆ Make sure all other connections to splitters are tight and of good quality.
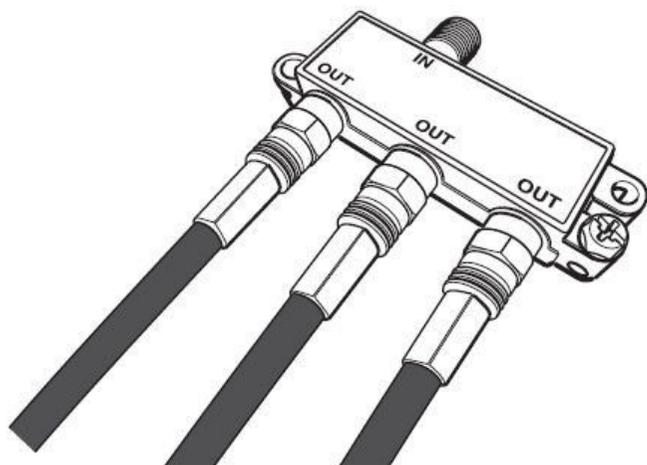
Tip:

Make sure nothing is connected to the **INPUT** on the splitter — including the HomePNA device.

Install the Residential Gateway and STBs (Set Top Box)

Test the RJ-11 jack to ensure a good DSL signal (using a DSL tester).

Plug the RG into the power outlet. Power up the RG, and let it synchronize with the DSL service. Verify the DSL rate on the RG.

Plug the RG into the coax outlet.

Go to the coax outlet where the first STB will be installed.

Plug the handheld tester (or a Slave with the laptop running the diagnostic tools) into the coax outlet and run the **HomePNA test**. *See shaded box in step 5 for instructions.*

Repeat the **HomePNA test** for each coax outlet, one at a time, before attaching any STBs. If all lines test fine, then connect the STBs and power them up. If the lines do not test well, go to Appendix C troubleshoot 5.
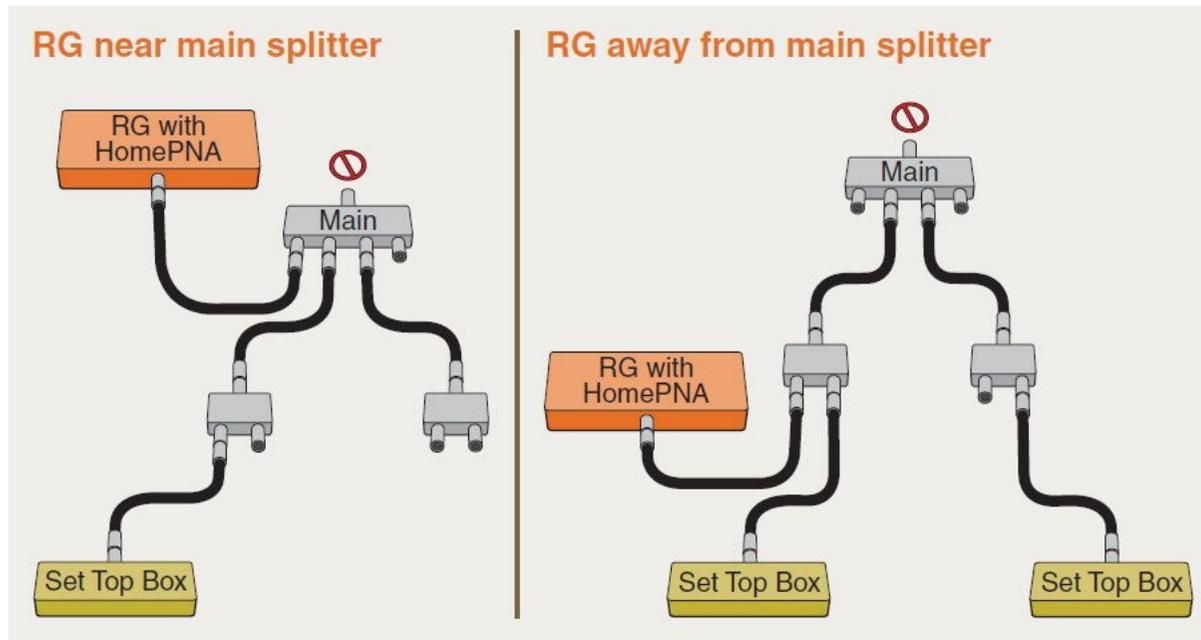
Complete Installation

Verify that the entire home network is functioning correctly.

Test and Verify the Home Network

Run a **long HomePNA test** (20,000+ packets or more) with all devices connected. *See shaded box on right for instructions.* As the test runs...

Clean Up Your Work Area

Sweep up and dispose of cut wires, packaging materials, spare parts, broken parts, tools, etc.

Explain New Services to the Consumer

◆   Follow the service provider's protocol.

How to Perform a HomePNA Network Test

The test can be performed from either:

a HomePNA handheld tester, or

a PC pre-loaded with test tool software and connected to the Ethernet

port of a Slave or other device on the coax network.

The **HomePNA test** consists of:

◆   netinf – short HomePNA test (1000 packets) , (Refer to 4.6.1.2 Slave Net Interface Test)

To pass, we recommend the **HomePNA test** need to achieve:

ZERO packet error rate for all test lines (PER) (Reference Only)

A physical data rate => 96 Mb/sec (Reference Only)

Tip:

1. **Be sure to test and verify the home network; you will save future truck** rolls.
2. Please note that the EOC actual data rate will vary on the coaxial cable attenuation and environmental factors.

Troubleshoot & Repair

If your **HomePNA test** passed but your TV service does not work properly. Check your DSL service or replace the RG and/or STB equipment.

If your HomePNA test failed, follow these steps to pinpoint and fix the problem(s). After each step, re-run the HomePNA test; if the test still fails, continue to the next step.

Step A:

◆ Verify that INPUT on the main splitter is disconnected. All connections to coax wall jacks must come from splitter outputs. Remove the cable service provider's connection to INPUT on the main splitter.

Use the test results to identify which network segment is failing. If test results are unclear, disconnect the splitter outputs and test each segment separately (or two segments through the splitter) to determine which segment is faulty. Inspect and replace any poor quality or damaged coax connectors.

Tighten each coax connector along that segment. Use a wrench on the splitter connections.

Step B:

Check for any damaged coax cables. Be sure to untangle any cables that have been forced behind wall plates. Also check for damaged or loose barrel connectors.

Step C:

1 Replace the splitter(s).

Locate any secondary splitters. Look inside wall junction boxes and behind coax jacks.

Step D:

Detach the input to any secondary splitters. Install a 56-Ohm or 65-Ohm resistor on the input of any secondary splitter(s) and re-attach the input to the resistor.

Step E:

Disconnect all non-HomePNA devices from coax in the home (those devices might add to the noise).

Step F:

Replace the RG and STBs one-by-one to determine which is causing the problem.

Appendix F: MDU Installation Guide

Caution:

> **Please note this install guide only for construction unit to install the HPNA, general of home users do not need read this installation guide. And please note we do not provide the tools mentioned in this guide.**

F-1 Before Leaving the Office
Make sure that you have everything you need to install and test the MDU network.

Equipment to Install	Equipment for Testing	Supplies and Tools
The product package includes a Master and/or Slave device along with the following (per device): ◆ Power supply ◆ Ethernet cable ◆ Coax cable	◆ Notebook PC (with Windows) ◆ One Ethernet cable	◆ High Pass filters ◆ Diplexer pairs for amplifier bypass ◆ Other basic tools, for a coax installation, and replacement parts (TAPs, Splitters, etc…)

NH-310HG(Master) Installation:

Before beginning the installation, survey the installation site.

Connects to ONU
or backbone access

Connects to CATV
signal source

E2 E1 CONSOLE HCNA TV POWER

DC 12V

Connects to
ground(optional)

Connects to the
root of coax infrastructure

Connects to 12V
Power adapter
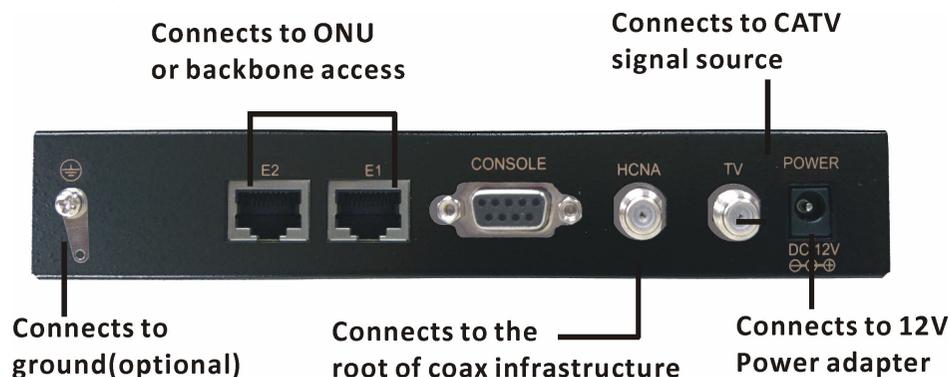
Site Survey

◆ Determine the Master's location.

Draw the connection tree (coax network map of the site).

Attenuation (map) (depends on the number of splitters/taps and length of the coax cable).

Locate amplifiers (if exist in the network) and show them in the connection tree.

Find the location of the main splitter.

Are there other services connected to the coax cable (TV, SAT, Docsis, Moca)?

Check that the TV reception is clear (no interference).

Know the room and outside temperature during summer and winter.

If possible, check that there is active Internet service to the building.

Tip: Drawing a map of the coax network tree can help you avoid connection issues.

Pre-Installation Inspection

For the fastest and smoothest installation, address any wiring or connector problems if seen, before starting the installation.

Inspect and replace damaged splitter and F-connectors.

Check every coax connector, splitter, tap and amplifier (if exists). Look for missing components, damaged connectors, corrosion and/or other problems.

Replace any damaged splitters/taps.

Replace damaged and low-quality coax fittings (crimp, screw-in, others).

Tip: Inspect and replace damaged coax cables. Check every visible coax cable for cracks, nicks, splices and/or other types of coating or shielding damage.

Installation of the Master

Connect the Master to the power outlet.

Connect the Master (coax line) to the main splitter of the building.

Connect the TV service to the Master TV connection.

Connect the Broadband or IPTV service to the Master via the LAN (Ethernet) connection.

If there are any amplifiers in the coax network, check that they are bi-directional and pass the 12-44MHz band. If not, a bypass network must be installed using 2 diplexers (see diagram).

If there is an apartment which does not have an MDU unit installed and the attenuation between the Master and the (non-HPNA) apartment TV is less than 15dB, an attenuator/ HPF should be installed at the entrance to that apartment/home. (Without this, there will be problems with the TV reception).

Network with Diplexer
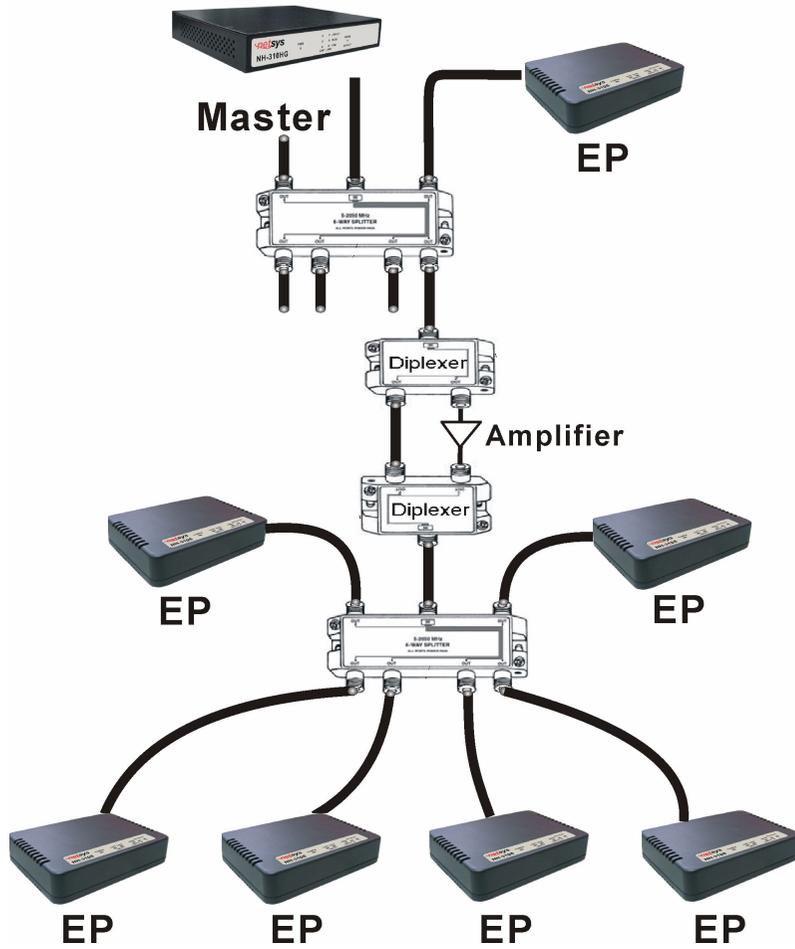
Network with TAP
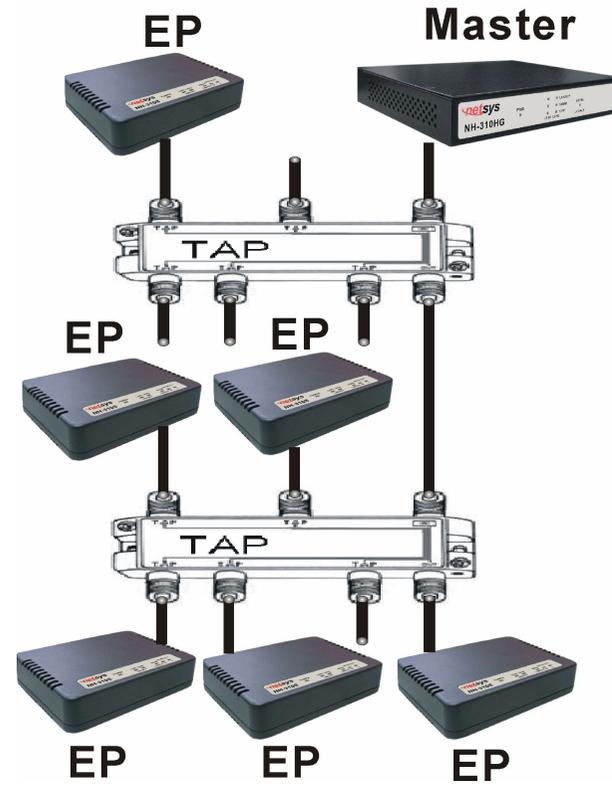
Verification of Masterr Installation

Connect your PC to the Master using Ethernet cable, run section 4.6.1 Device Info./Test and check that the details of the Master are listed.

◆ Still using the PC, open your Internet browser and check if you have Internet access (optional – might require password). Check that the TV reception is still clear (no interference).

Master Troubleshooting

Problem 1: Device Info. / Test fails

Check to make sure that your PC has a static IP address.

Check that the power LED and the Ethernet LED are operating. If not, replace the Master.

Problem 2: Internet access not available

If no Internet access is available, please check with the service provider.

Problem 3: TV in the apartment has a poor picture

If the problem occurred when the Master was connected but without power (electricity), the problem is with the service provider.

If the problem happens only when the Master is powered on, then a HPF/Attenuator/splitter must be installed between the wall outlet and the TV. Repeat the test to make sure that the TV picture is now clear.

Problem 4: Can HPNA EoC Master and Slave amplify the signal?

Please note that the EOC Master and Slave signal can not pass any amplifier, when you use the amplifier, please bypass HCNA signal.

netsys

NH-310S(Slave) Installation:

Before beginning the installation, it is important to survey the installation site.

Connects to head of coax infrastructure

Connect to Ethernet devices

HPNA   TV   LAN 2   LAN 1   POWER   DC 12V

Connects to TV input

Connects to 12V power adapter
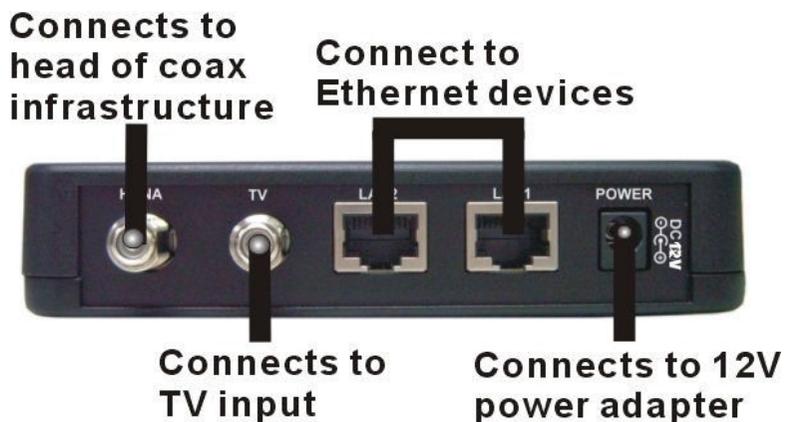
Apartment site survey

If there was a prior MDU installation in the building, check to make sure that there is no HPF connected to the splitter of the specific apartment. If there is a HPF, it should be disconnected before installing the Slave.

Note the location of the main splitter and any secondary splitters. The main splitter usually connects to an outside coax cable.

Locate the coax connection near where the customer wants the TV (for IPTV applications) and/or where the customer places their computer (for broadband access).

Check for devices (TVs, etc.) connected directly to coax outlets.

Pre-Install Inspection

For the fastest and smoothest installation, address any wiring or connector problems before starting the installation.

Inspect and replace damaged splitters and F-connectors.

Check every coax connector and splitter. Look for missing components, damaged connectors, corrosion, and/or other problems.

Replace any damaged splitters.

Replace damaged and low-quality coax fittings (crimp, screw-in, others).

Inspect and replace damaged coax cables and wall plates.

Check every visible coax cable for cracks, nicks, splices, and/or other types of coating or shielding damage.

Check inside the wall plates for corrosion or poor connections or disconnections.

Verify that the TV service is clear prior to installing the Slave.

Installation of Slave

Connect the Slave to the power outlet. The power LED should be turned ON.

Connect the Slave (coax line) to the wall plate (coax network). The link LED should be turned ON.

Connect the TV to the Slave TV connection.

Connect the PC/STB to the Slave via the LAN (Ethernet) connection.

Make sure that all coax connections are tight and of good quality and that the coax network in the apartment is in good condition.

Verification of Slave installation

See the section on troubleshooting, if any problems are found.

On Master side

Check if the Master link LED is ON.

Run the following tests using the PC:

Device Info./Test(Refer to 4.6.1 Device Info./Test)

Check to see that all devices appear and have the same firmware version.

Net Interface Test(Refer to 4.6.1.2 Slave Net Interface Test)

Verify PER<=1x10e-5 (IPTV) or <=1x10-2 (Broadband Access).

On Slave side

Check if your Slave link LED is ON.

Connect to the internet and surf the web. Perform a visual check of each TV to verify good video quality.

Slave Troubleshooting

Problem1: Device Info. / Test / Link LED failure

Connect the Slave directly to the Master with 8dB attenuation and check for a link. If yes, move the Slave to the main splitter of the apartment floor and check for a link. If no link, then there is a problem with the coax connection between the Master and the floor and you should continue to debug this by moving closer to the Master with each test.

If there is a link, then the problem is between the main splitter of the floor and the wall plate in the apartment. Again, you should debug by moving closer to the wall plate with each consecutive test.

◆ If these tests don't solve the problem, replace the Slave and retest.

Problem 2: Net Interface Test failure

Tighten all screws and check connectors/jacks/coax cable; replace if necessary.

Test the Master and Slave units back to back with 8dB attenuation. Rx power should receive at least +8dBm.

If neither of these actions solves the problem, replace the Slave and retest.

Problem 3: quality LED is yellow (bad connection)

Wait for 30 seconds. If the quality LED has not changed, check the device if connected properly.

Tighten all screws and check connectors/jacks/coax cables; replace if necessary. Test the Master and Slave units back to back with 8dB attenuation. The quality LED should be Green.

Check the Slave over the coax network until you find the problematic area and fix it. If not change the malfunctioning device.

Problem 4: No internet access/IPTV service

If Device Info./Test and Net Interface Test function properly, then the problem is with the service provider. Please check with them to verify that the service is operational.

Problem 5: Quality of TV Picture is Poor

◆ (Case 1): In case that TV is not connected directly to the Slave, add a HPF or connect the TV directly to the Slave's TV connector.

(Case 2): In case the TV connects directly to the Slave and the TV picture is still poor, replace the Slave.

If there are still problems with the TV picture after replacing the Slave, then check the connection with the service provider.
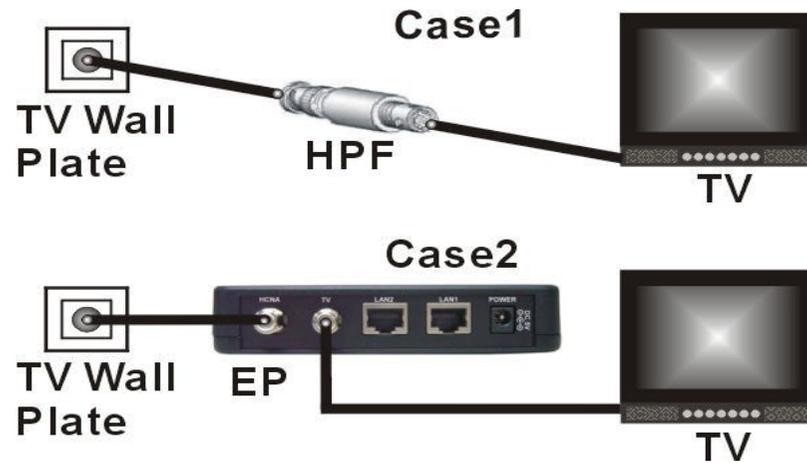
Before leaving

(Master unit only) Rerun Device Info./Test and Net Interface Test and service tests (TV reception). These tests ensure the performance of the full MDU network.

When running Device Info. / Test , make sure you see all units.

When running Net Interface Test, make sure the PER is less than 10e-5 and that the rates are equal to or higher than 128Mbps.

Warranty

The original owner that the product delivered in this package will be free from defects in material and workmanship for one year parts after 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 any other liability.

WARNING
Warranty Void
If Removed

WARNING:
DO NOT TEAR OFF OR REMOVE THE WARRANTY STICKER AS SHOWN, OR THE WARRANTY IS VOID.
1. WARRANTY VOID IF USE COMMERCIAL-GRADE POWER SUPPLY IS USED AT HARSH ENVIRONMENTS.

Chinese SJ/T 11364-2014

部件名称	有 毒 有 害 物 质 或 元 素					
	铅(Pb)	汞(Hg)	镉(Cd)	六价铬[Cr(VI)]	多溴联苯(PBB)	多溴二苯醚(PBDE)
结构壳体	○	○	○	○	○	○
电路组	○	○	○	○	○	○
电源供应器	○	○	○	○	○	○
线材	○	○	○	○	○	○
包装及配件	○	○	○	○	○	○
○：表示该有毒物质在该部件所有均质材料中的含量均在 GB/T 26572 标准规定的限量要求以下。						
╳：表示该有毒物质至少在该部件的某依均质材料中的含量超出 GB/T 26572 标准规定的限量要求。						

上述規範僅適用於中國法律