Networking your world

Managed 2 Gbps G.hn MDU Master & Slave

NHG-420M & NHG-200S USER'S MENUAL

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Foreword

Attention:

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

Netsys' NHG-420M and NHG-200S are the latest technological innovation of G.hn wave 2 Ethernet over coaxial managed Master and Slave (client) respectively. The NHG-420M Giga Ethernet over Coax Master connects with the NHG-200S MDU Slave, supporting both 10/100/1000Mbps Ethernet and coaxial cable connections for MDU and MTU applications.

MDU and MTU typically have wired networks for small file transfers and shared applications. However, there is a growing need for high-speed applications like remote lecturing, telemedicine, IPTV, and fast internet access to support triple play services.

NHG-420M and NHG-200S are cost-effective solutions for MDU and MTU needs. With plug & play, this simply eliminates the pain in modification and high infrastructure cost. With data transmission up to 1.7Gbps and link establishment under -76db attenuation, it caters to the rising need for high-speed multimedia services. MDU and MTU applications enable high-bandwidth networking for buildings, apartments, hotels, resorts, sports centers, and similar locations.

Caution:

The NHG-420M is for indoor applications only. This product does not support waterproof protection, please do not install.
on outdoor environment.

Safety Warnings

For user 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 may expose users to high voltage points or other risks. Only qualified service personnel can service the device. Contact the vendor for more details.
- **Use ONLY** the dedicated power supply for user device. Connect the power to the right supply voltage (110V AC used for North America and 230V AC used for Europe, NHG-420M/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 user device during a thunderstorm. There may be a remote risk of electric shock from lightning.
- **DO NOT** exposing the user's 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** block the device ventilation slots to avoid overheating.
- **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** unplugging the power to avoid sparks.
- **Keep** the device and all its parts and accessories out of the reach of children.
- **Clean** the device using a soft, dry cloth rather than with liquids or atomizers.
- This product is **recyclable**. Dispose of it properly.

Table of Contents

Chapter 1. Unpacking Information

1.1 Check List

Thank user for choosing NHG-420M/S. Before installing the EOC product, please verify the contents inside the package.

Package Contents:

- NHG-420M Device
- 4 x rubber foot (NHG-420M pre-installed on the bottom
- 12V DC / 1A power adapter (AC100-240V)
- UTP Ethernet Cable

Notes:

1. Please inform user dealer at once for any missing or damaged parts. If possible, keep 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 user 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 NHG-420M/S require 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. NHG-420M Hardware Description

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

2.1 Front Panel

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

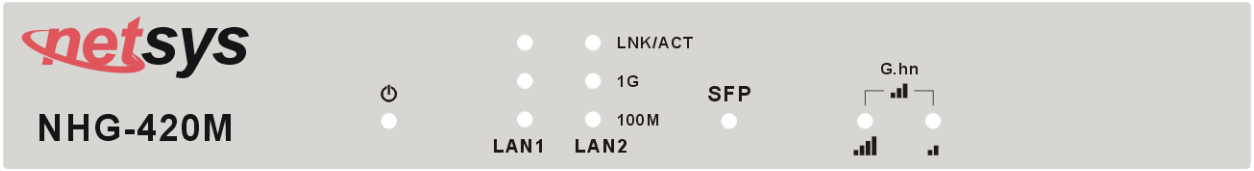


Figure 2.1 NHG-420M Front Panel

2.2 Front Indicators

The NHG-420M has Nine LED indicators. The following Table shows the description. (Table 2-1)

Table 2-1 LED Indicators Description and Operation

LEDs	Color	Status	Descriptions
	Green	On	G.hn system power good and also functioning properly.
		Off	G.hn is not ready or has malfunctioned.
EthA & EthB (LNK/ ACT LED)	Green	On	The Ethernet link is up.
		Blinking	Transmit or receive activity.
		Off	The Ethernet link is down.
1G LED	Green	On	Ethernet Link on 1Gbps speed
100M LED	Green	On	Ethernet Link on 100Mbps speed
SFP LED	Green	On	The SFP module Link is up
	Green	On	G.hn data rate **> 1000Mbps** by upstream plus downstream bandwidth.
	Green Yellow	On	G.hn data rate between **600Mbps** and 10**00Mbp**s by upstream plus downstream bandwidth.
	Yellow	On	G.hn data rate **< 600Mbps** by upstream plus downstream bandwidth.

Table 2-1

2.3 Rear Panel

The rear panel has connectors for the power adapter and network devices. (Figure 2.2)

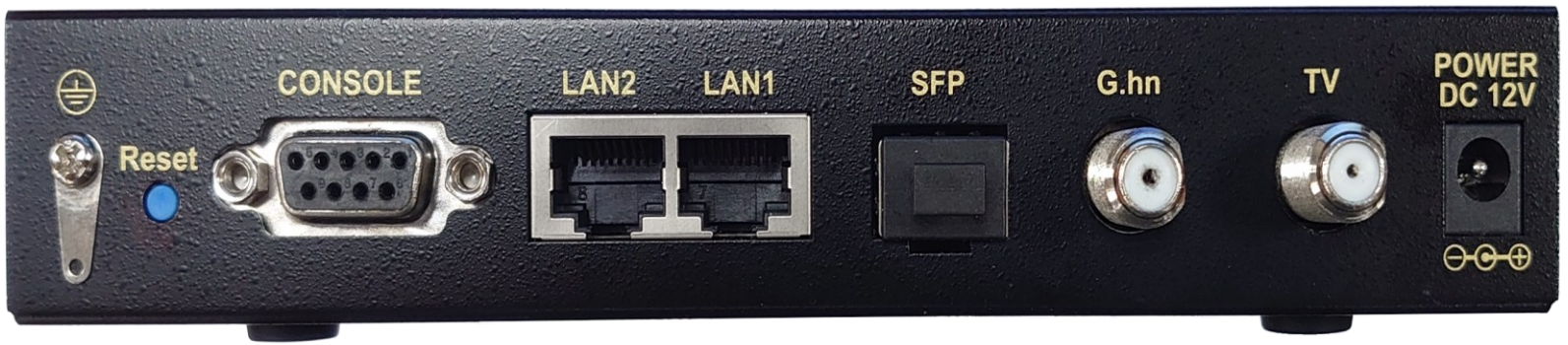


Figure 2.2 Rear panel of the NHG-420M

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

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

Connectors	Type	Description
G.hn Port	F-type female coaxial cable	Connect the NHG-420M G.hn port to the NHG-200S G.hn port using an RG59U/RG6 75Ω coaxial cable.
TV Port	F-type female coaxial cable	Connect to cable TV or set-top box.
LAN1&LAN2 Port	RJ-45	Connect to a network device.
Power	DC Jack	Connect to **12V/1A DC** power adapter

Chapter 3. NGH-200S Hardware Description

3.1 Front Panel

The front panel displays interface symbols for the NHG-200S LED indicators, as shown in Figure 3.1

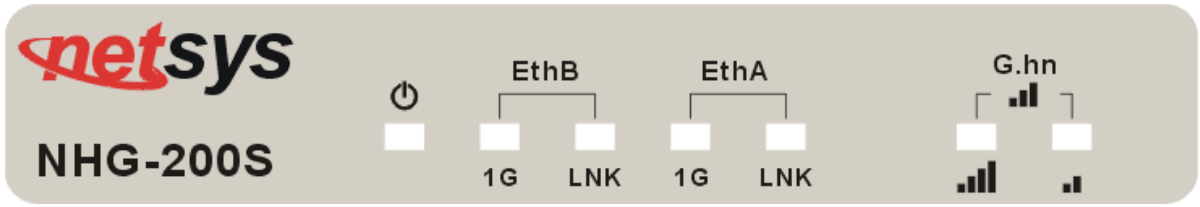


Figure 3.1: NHG-200S Front Panel

3.2 LED indicators

At a quick glance of the front panel, it will be easy to indicate that the NHG-200S has good power, and 2 Ethernet RJ-45 port of link / 1G indicate Link and speed status, and G.hn port of link quality LED indicates high / middle / low speed.

Front Indicators

The NHG-200S supports **7** LEDs indicator. The following Table shows as the description. (Table 3-1)

Table 3-1: LED Indicators Description and Operation

LEDs	Color	Status	Descriptions
⏻	Green	On	G.hn system power good and functioning well.
		Off	G.hn is not ready or has malfunctioned.
EthA & EthB (Link LED)	Green	On	The Ethernet link is up.
		Blinking	Transmit or receive activity.
		Off	The Ethernet link is down.
	Green	On	G.hn data rate **> 1000Mbps** by upstream plus downstream bandwidth.
	Green Yellow	On	G.hn data rate between **600Mbps** and 10**00Mbp**s by upstream plus downstream bandwidth.
	Yellow	On	G.hn data rate **< 600Mbps** by upstream plus downstream bandwidth.

3.3 Rear Panel

- The rear panel has connectors for the power adapter and network devices. The following of the rear side outward of the NHG-200C shown as Figure 3.2

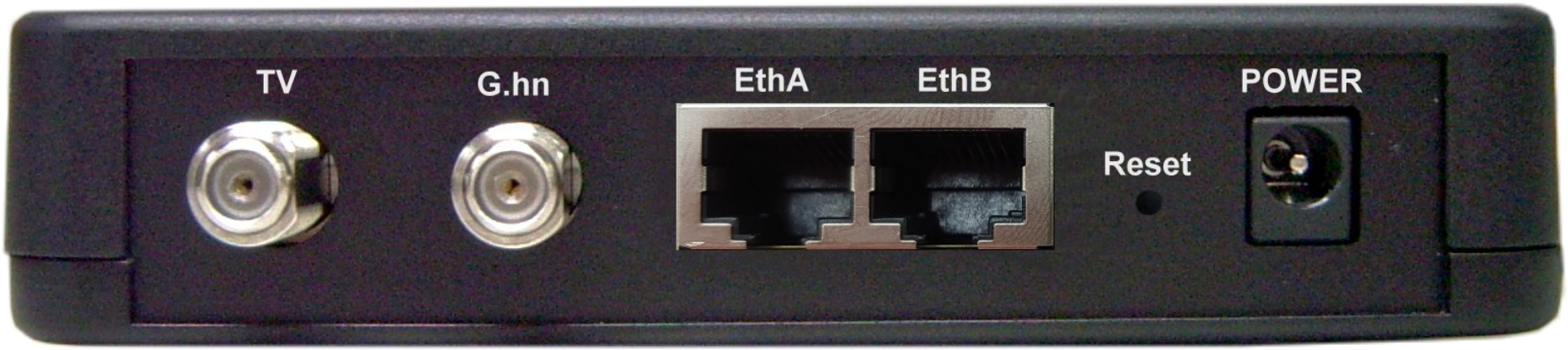


Figure 3.2

- Connecting interface description shown as Table 3-3

Connectors	Type	Description
G.hn Port	F-type female coaxial cable	Connect the NHG-200S G.hn port to the NHG-420M G.hn port using an RG59U/RG6 75Ω coaxial cable.
TV Port	F-type female coaxial cable	Connect to a cable TV or a set-top box.
LAN1 &LAN2 Port	RJ-45	Connect to a network device or computer.
Power	DC Power Jack	Connect to a **12VDC / 1A** power adapter.

Table 3-3

Chapter 4. Installation

4.1 Hardware Installation

This chapter provides detailed instructions on how to install the device and set up network connections. The NHG-420M install on any level surface (e.g., a table or shelf). However, please take note of the following smallest site requirements before the user begins. The NHG-420M comes with four rubber feet pre-installed.

4.2 Pre-installation Requirements

Before starting the hardware installation, ensure the environment meets power requirements, has enough space, and is close to other network devices. Check the installation requirements:

- DC Power: 12VDC (1A or higher)
- Keep the device in a cool, dry place with at least 10cm/4in of clearance for ventilation.
- Place the device away from **direct sunlight**, **heat sources**, or areas with a high amount of electromagnetic interference.
- Connect NHG-420M and NHG-200S with RG59u or RG6 75Ω coaxial cable. Make sure total attenuation is below -76dB.
- Ensure network cables and connectors are available for installation.
- Do not install this device near radio amplifying stations or transformer stations.

4.3 General Rules

Before connecting to the device, consider these rules:

- **Ethernet Port (RJ-45)**
  Use Category 5e UTP or higher for all Master Ethernet port connections to support 1000 Mbps.
  No more than 100 meters of cabling may be used between the Ethernet device and an end node.
- **G.hn Port (Coaxial)**
  G.hn port connection recommend through RG59u / RG6 75ohm coaxial cable and link set up under -76dBm/Hz attenuation.
- **Diplexer / multi-Splitter**
  MDU/MTU network connections can use either a diplexer, a multi-splitter, or a combination of connecting a slave device.
  Please choose according to different environments to different specifications of the Diplexer or Multi-Splitter.
- **Max. nodes connection**
  The NHG-420M does not connect over 15 NHG-200S, the total attenuation must be under -76dB.

		
Diplexer	Multi-Splitter	Attenuator

4.4 G.hn Connections

The device functions with the coaxial cable commonly available in households globally. They used standard TV cables and connectors.

The 2 x F-connectors link a TV or coaxial wall socket to devices like PCs, notebooks, or set-top boxes via RJ-45 to LAN card or coaxial connectors.

The device's coaxial connector transmit data up to 1700 Mbps over existing cables and links below **-76db attenuation**. Ensure that the connector is correctly inserted and securely locked.

Ethernet cable used must conform to CAT 5e or above standard to ensure data integrity and it should not exceed **100meters**(328feet).

The NHG-420M Giga Ethernet over Coax managed MDU Master can support up to 15(maximum) NHG-200S Slave (Clients).

Notes:

1. Please refer to Appendix E: installation guide. There is an introduction how to install a G.hn device.
2. The NHG-420M is max. connected to 15 NHG-200S (Mac Address).

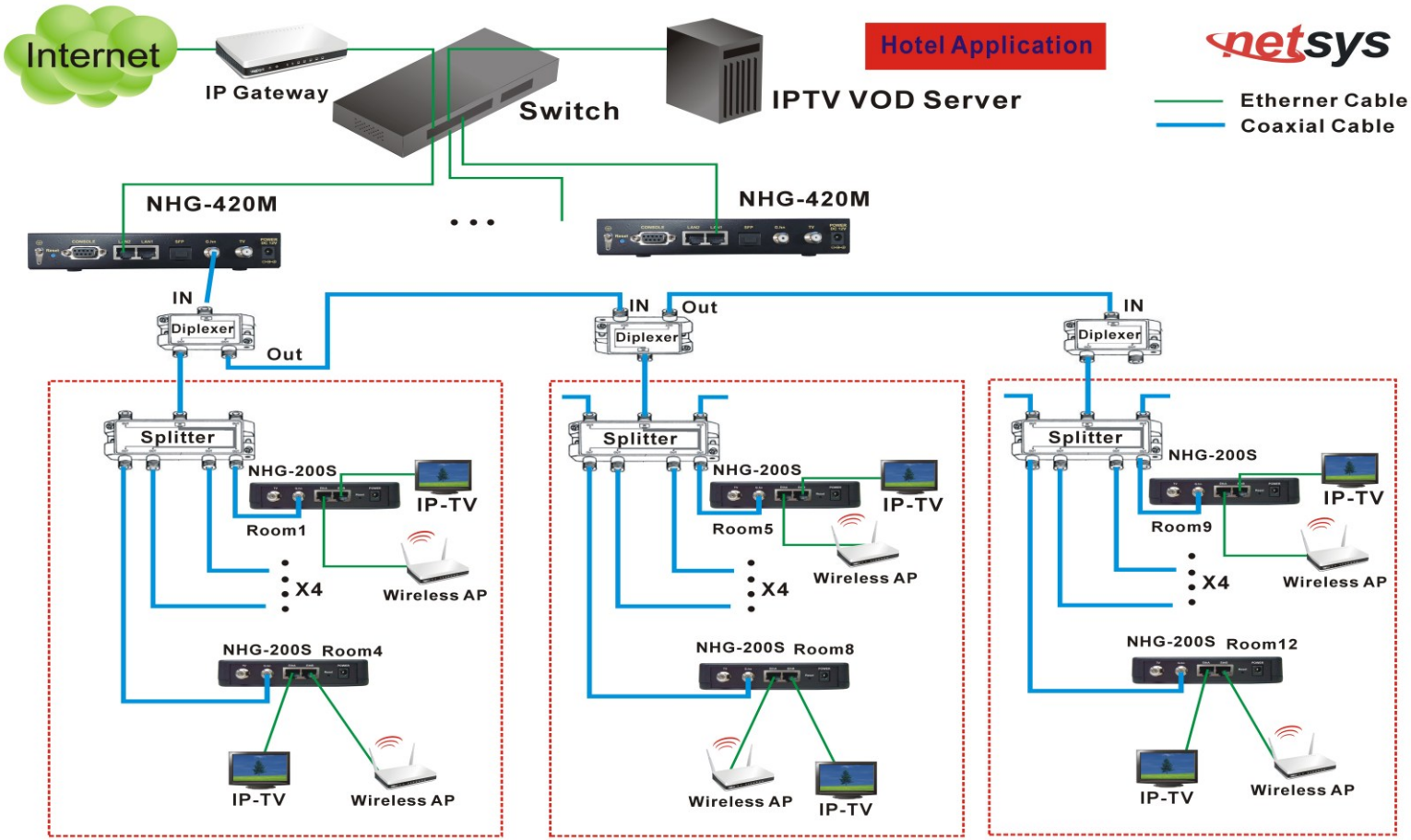


Figure 4.2 NHG-420M & NHG-200S connection diagram-1

Chapter 5. Configure the NHG-420M via Web management.

The NHG-420M provides a built-in HTML based management GUI that allows configuration of the NHG-420M via Internet Browser, such as Google Chrome or Microsoft Edge browsers.

To config argument by web management, users may need to allow:

- Web browsers display pop-up windows from user devices. Web pop-up blocking is enabled by default in Windows / Linux /MAC OS.
- Java Scripts. (Enabled by default)
- Java permissions. (Enabled by default)

Launch user web browser and input the default IP address "192.168.16.249" in the Web page.

Following section users can find default password.

5.1 Login

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

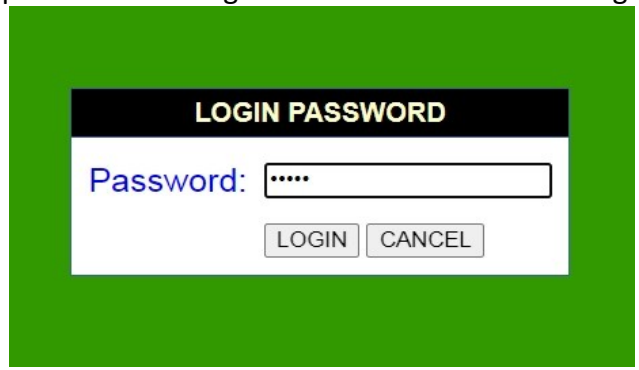


Figure 5.1 Login Password

5.2 Select the Menu Level

There is an easy Setup for end users at the setup of NHG-420M with **SYSTEM**, **LAN**, **G.hn** for more detail configurations.

Figure 5.2 Select the Menu Level

5.3 Select "SYSTEM"

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

The menu screen as shown in Figure 5.3

Figure 5.3 Select" SYSTEM" in the Entry Screen

5.3.1 Administrator Setting

To add a user or change user's password, click on the "Administrator Settings" link in the left navigation bar. The menu screen as shown in Figure 5.3.1.

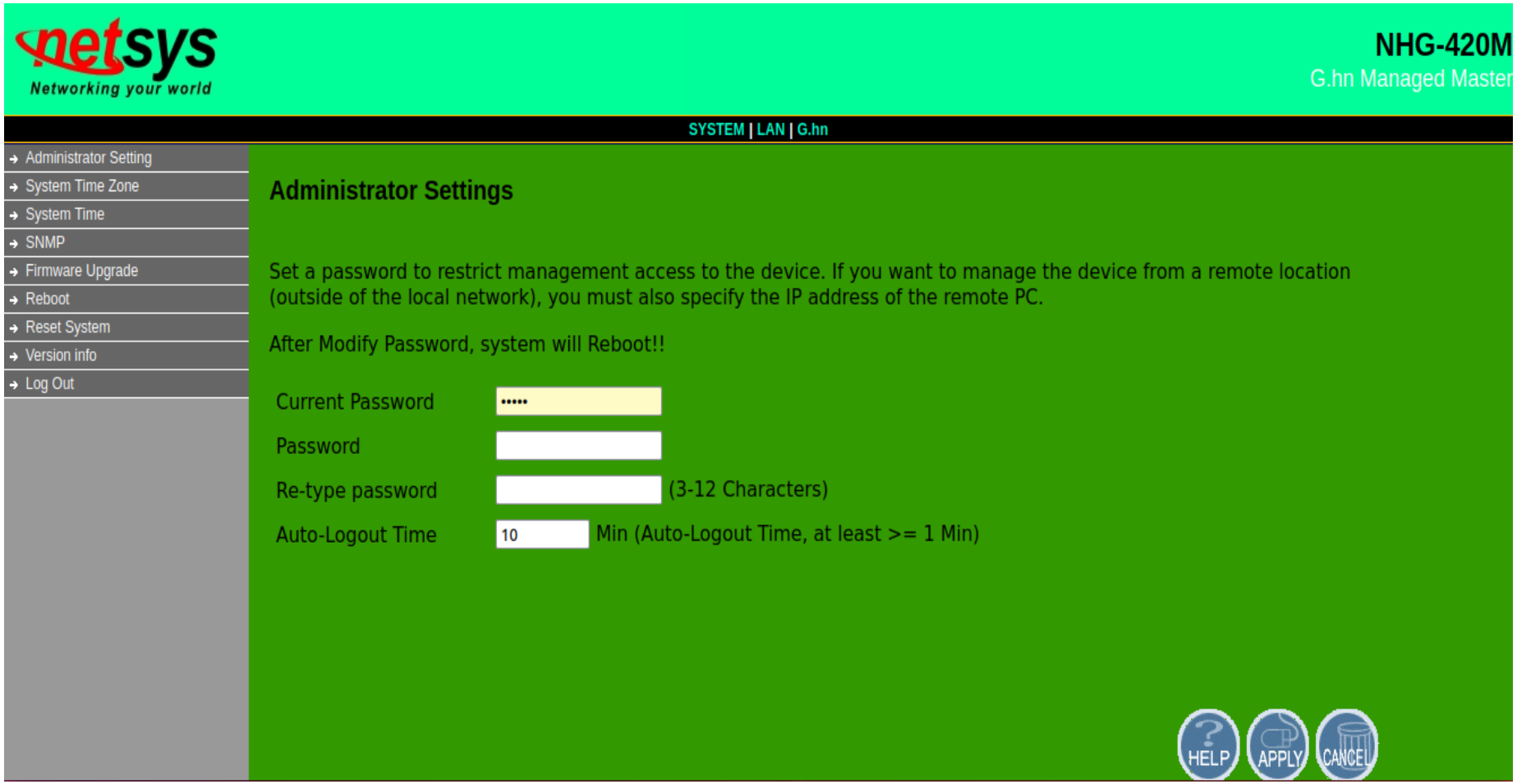


Figure 5.3.1 Administrator Settings Configuration

5.3.2 System Time Zone

Users 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 to record the security log and control client filtering. The menu screen as shown in Figure 5.3.2.

Figure 5.3.2 System Time Configuration

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

5.3.3 System Time setting menu.

If user can't connect to a SNTP server to allow the Device to synchronize the system clock to the global Internet. User can setup "System Time". The menu screen as shown in Figure 5.3.3

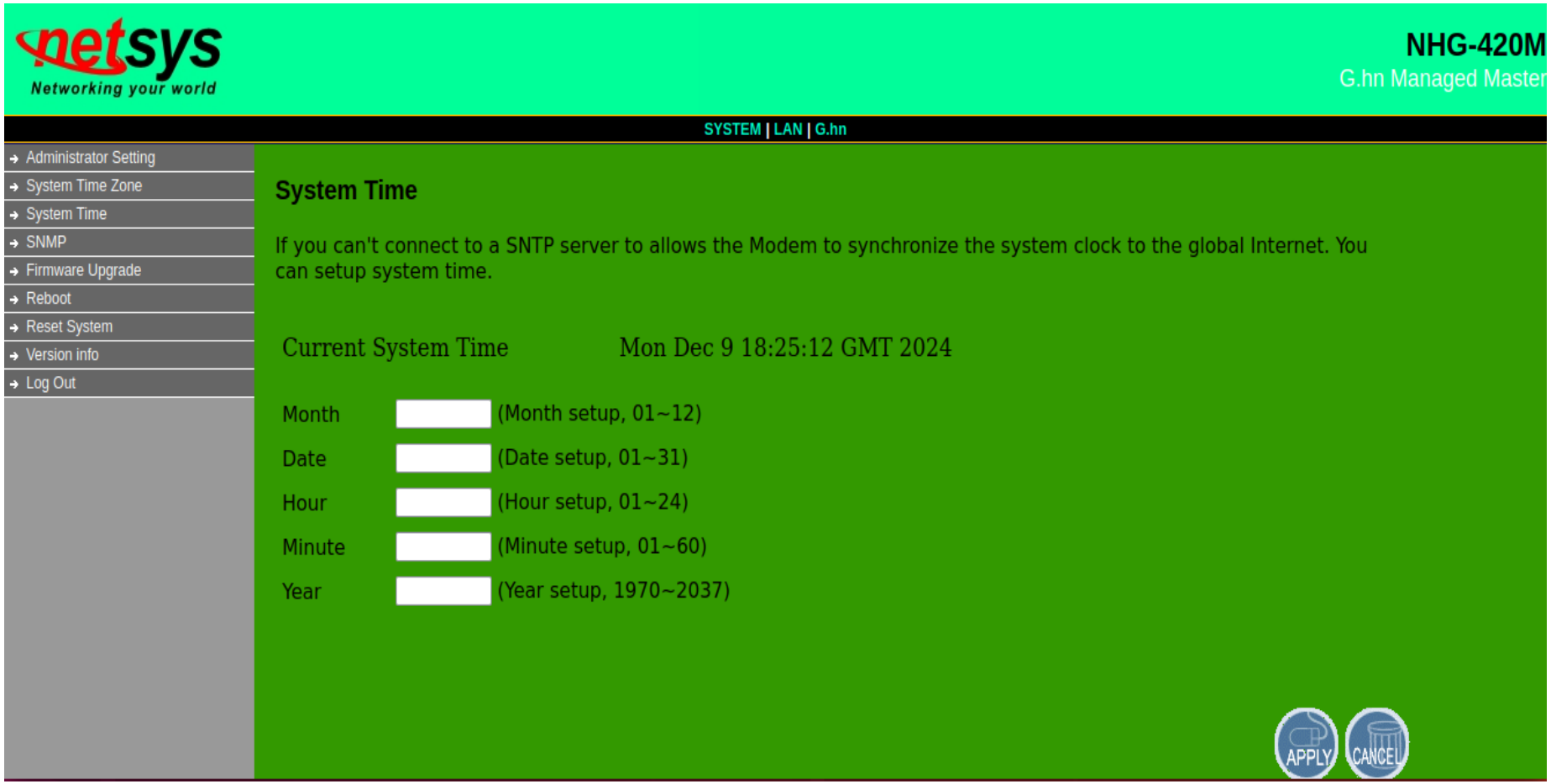


Figure 5.3.3 System Time Configuration

5.3.4 SNMP setting menu.

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. The menu screen as shown in Figure 5.3.4.

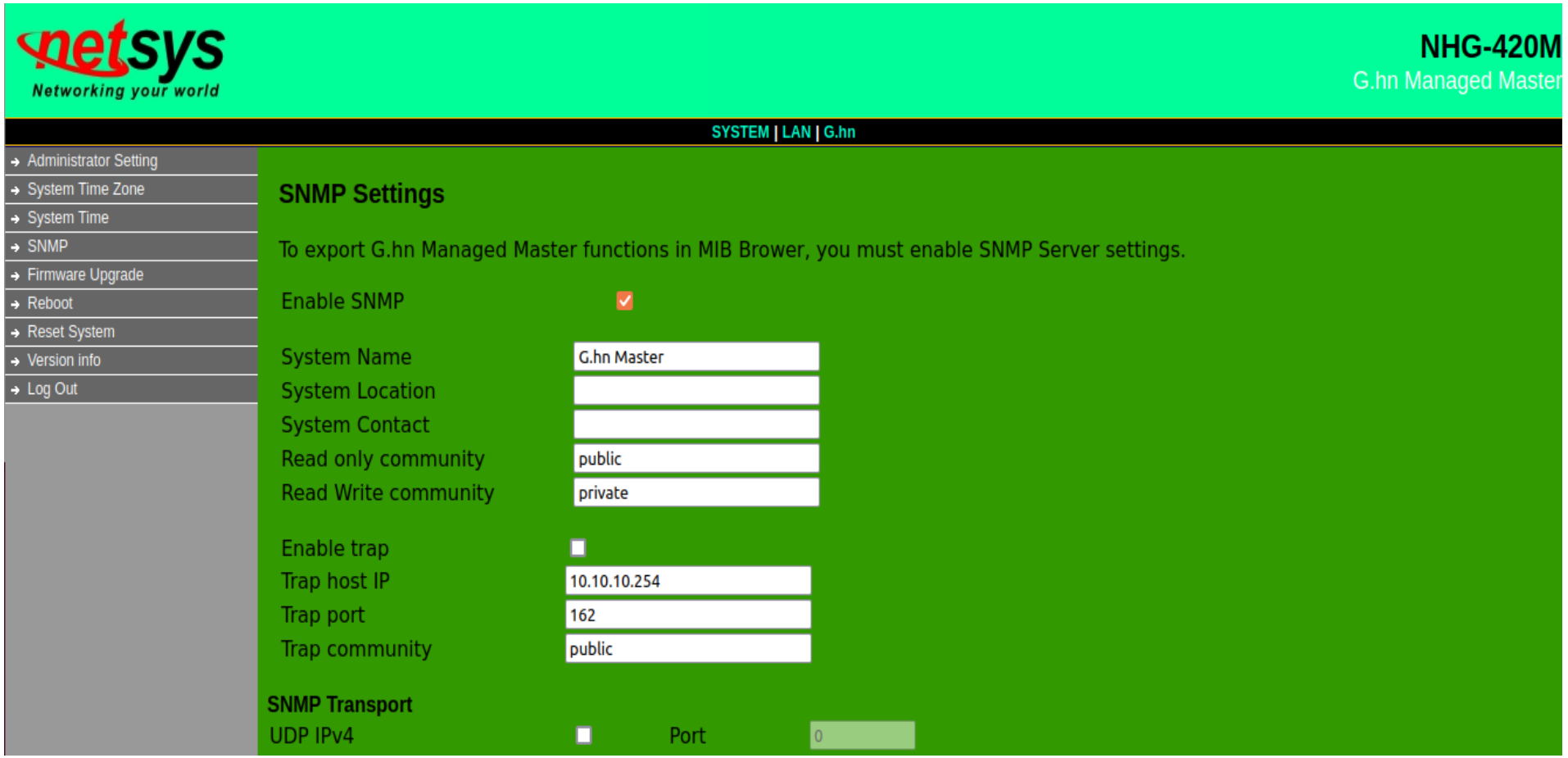


Figure 5.3.4 SNMP Settings

1. Use this page to define management stations as trap managers and to enter SNMP community strings. Users 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 NHG-420M.
Location: Enter the location of the NHG-420M.
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.

5.3.5 Firmware Upgrade

To update the system firmware, click on the "Firmware Upgrade" link in the left navigation bar. The menu screen as shown in Figure 5.3.5

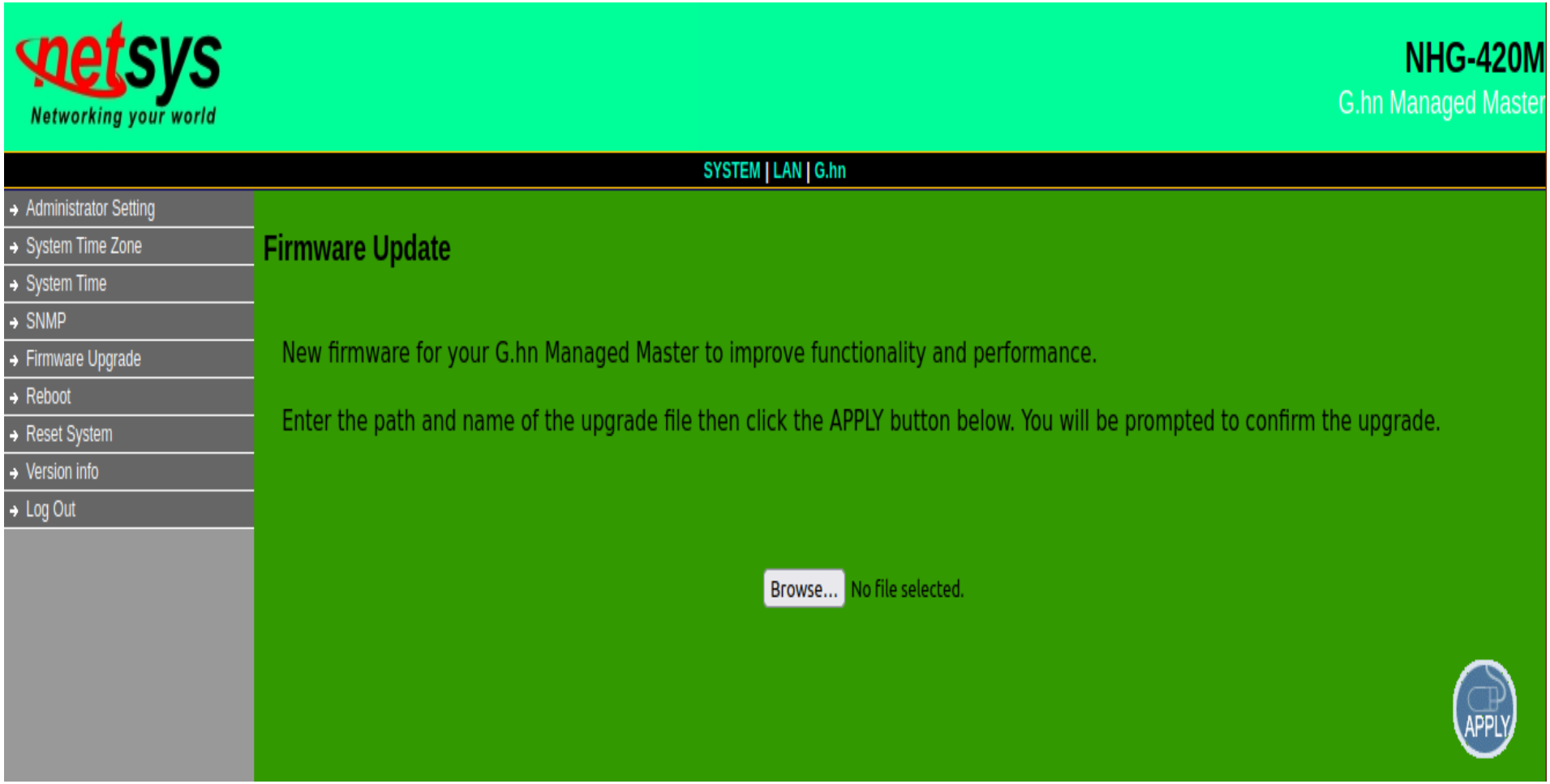


Figure 5.3.5 Firmware Upgrade

The screen contains the following details:

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

Notes:

1. If the device firmware version is too old, after the firmware upgrade, user must reset system to default that to avoid the new features cannot use or system error occurred.
2. Regarding firmware version, please refer to section 5.3.7.

5.3.6 Reboot

To reboot the device, click on the "Reboot" link in the left navigation bar. The menu screen as shown in Figure 5.3.6.

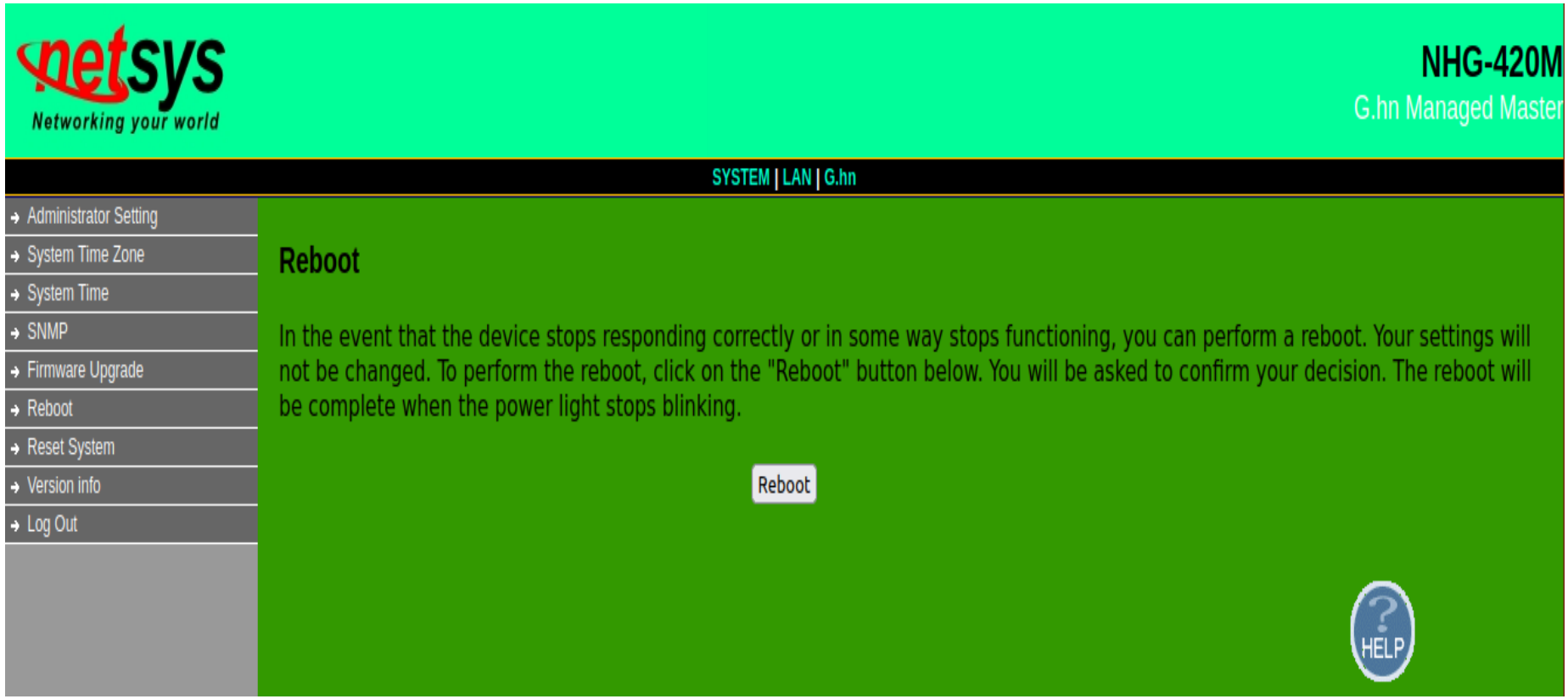


Figure 5.3.6 Reboot NHG-420M

- Click "Reboot" to restart the device.
- To reload the web browser after 30 seconds later.

5.3.7 Reset System

To reset the system, click on the Reset link in the left navigation bar. The menu screen as shown in Figure 5.3.7.

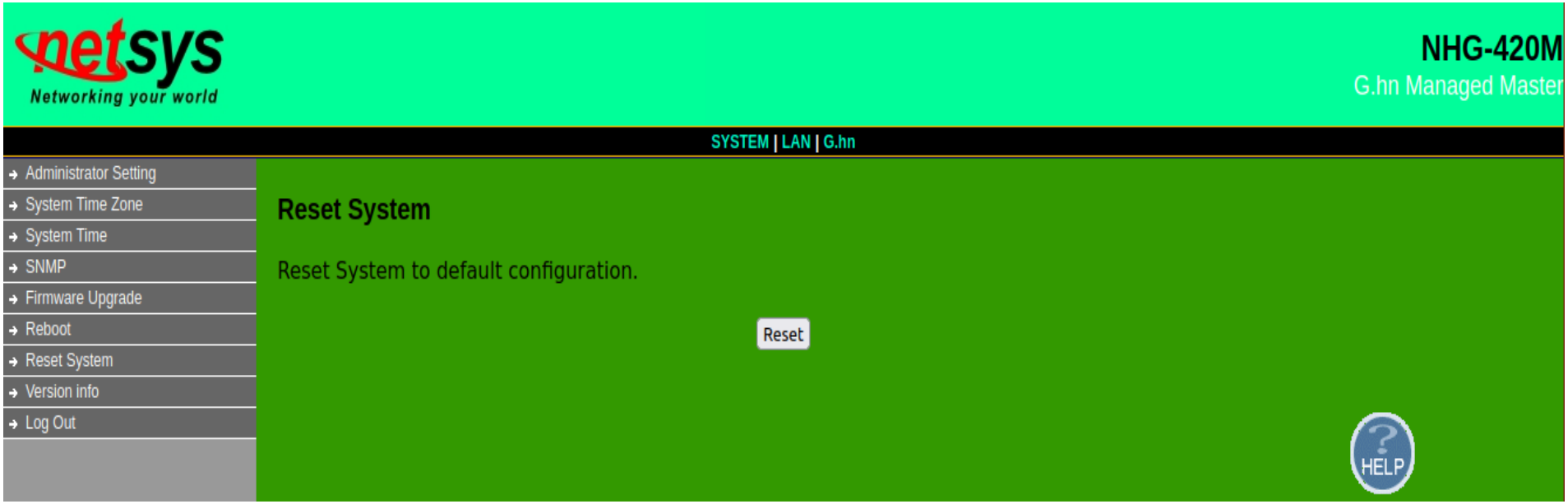


Figure 5.3.7 Reset NHG-420M.

- Click Reset to restart the system to default configuration.
- Automatically reboot the device after upgrading the firmware.
- All settings will be restored to the default value(default IP: 192.168.16.249).

5.3.8 Version Info

This function shows the version of Web Interface firmware and G.hn Driver. The menu screen as shown in Figure 5.3.8.

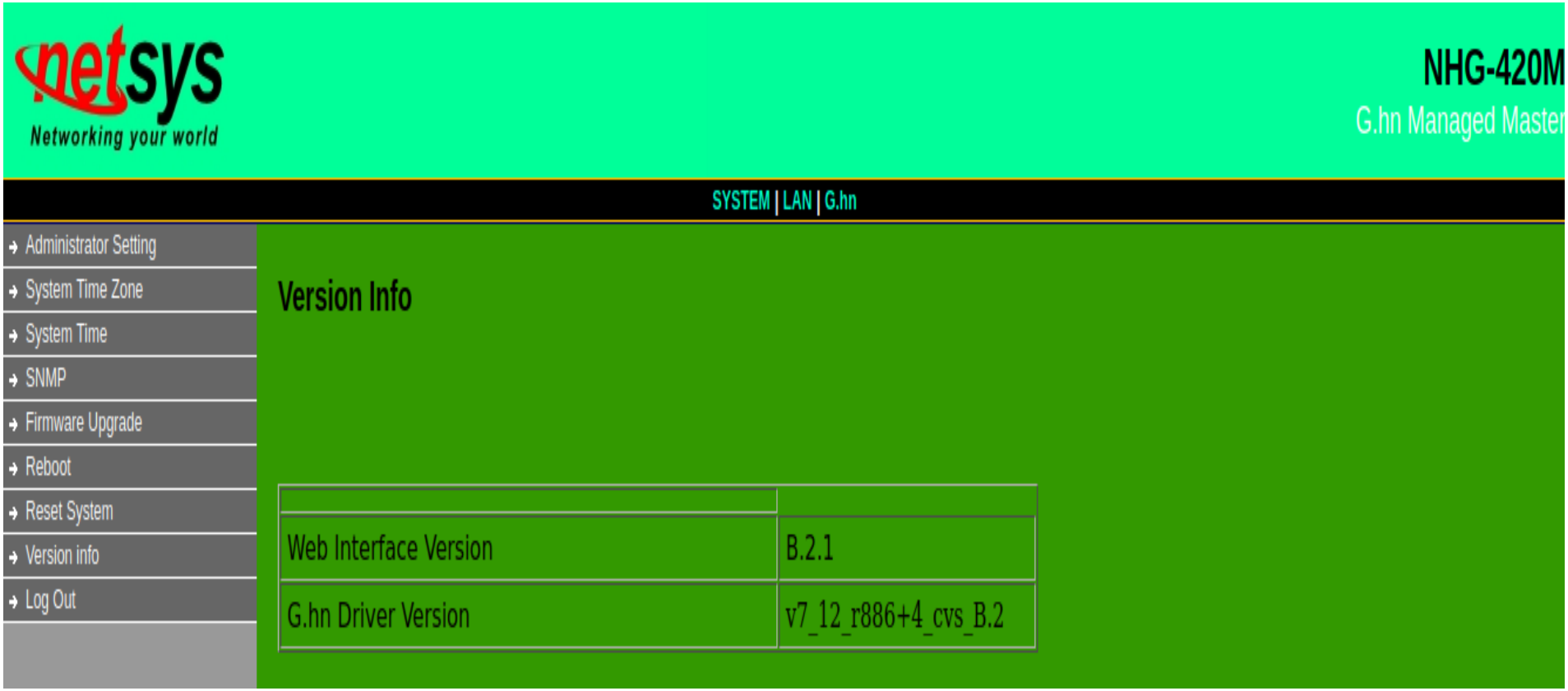


Figure 5.3.8 Version Info

Note:

1. Web interface version is also called firmware version, the NHG-420M firmware extension file format is "dat".

5.4 Select" LAN" menu.

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

A screen as shown in Figure 5.4.

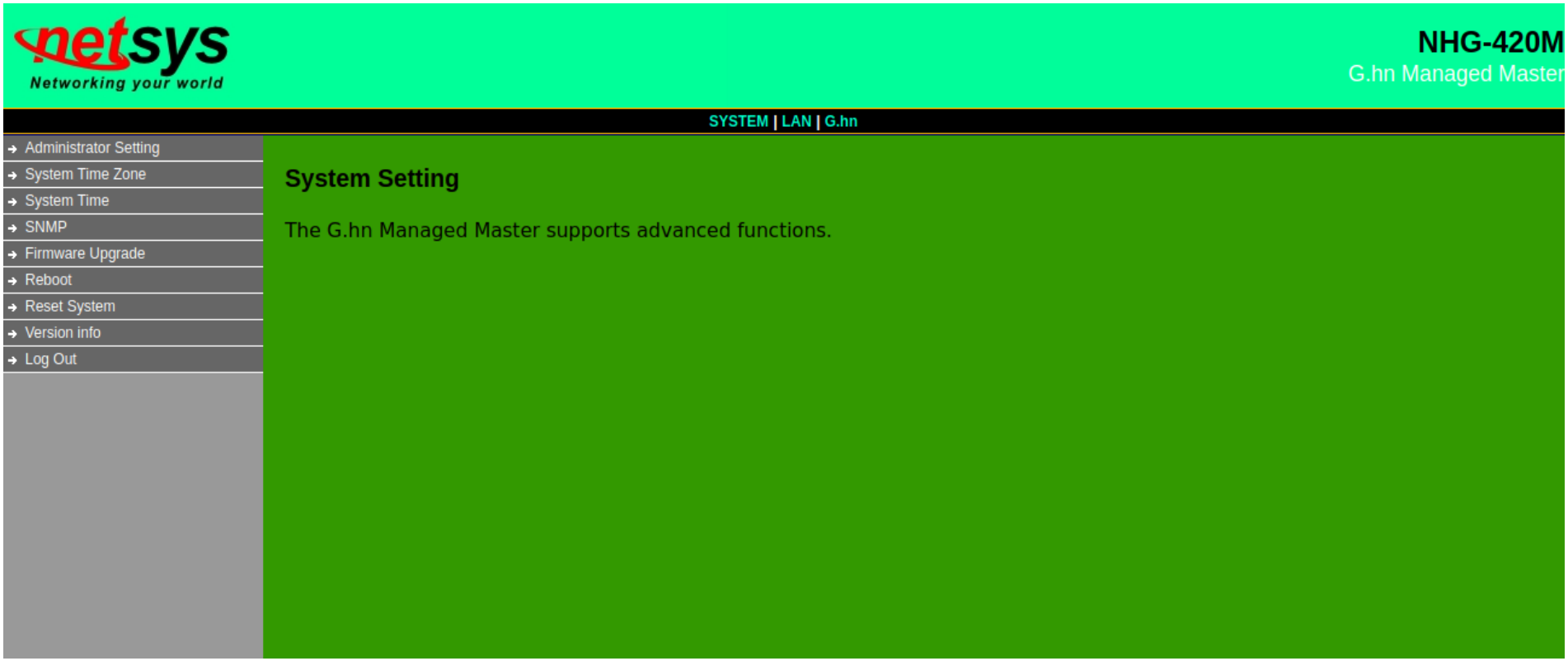
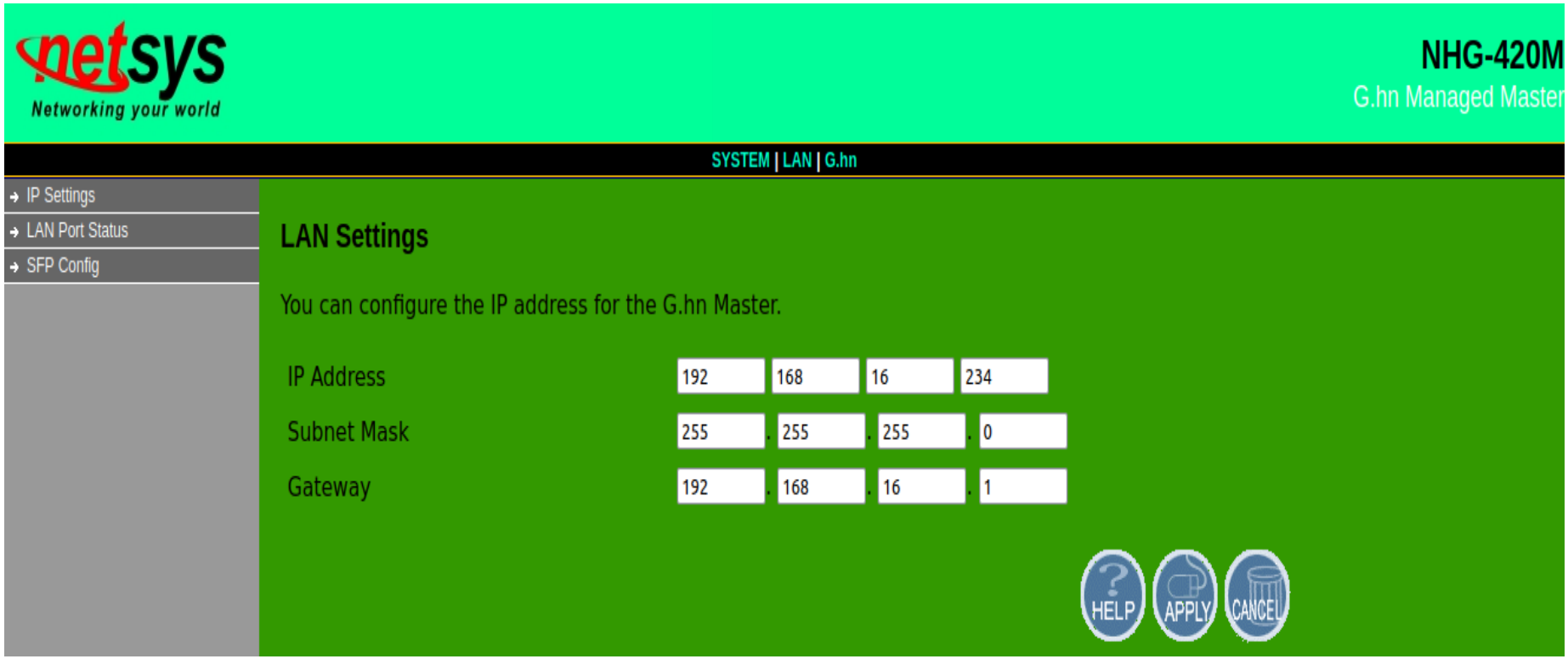


Figure 5.4 Select" LAN" in the Entry Screen

5.4.1 LAN Setting menu

The form below is used to change the IP address of the LAN (Local Area Network) port "adm0" in the NHG-420M and the "adm0" IP address is the CPU IP address of NHG-420M for PC to remote control the NHG-420M with network management.



The IP address is either the default address of adm0 (i.e. 192.168.16.249) or changing a new IP address by ifconfig command via the shell running in the terminal. The Default value of Subnet Mask display is 255.255.255.0. A screen as shown in Figure 5.4.1.

Figure 5.4.1 LAN Setting

5.4.2 LAN Port Status

The following information provides a view of the current Ethernet ports status of the device as below:

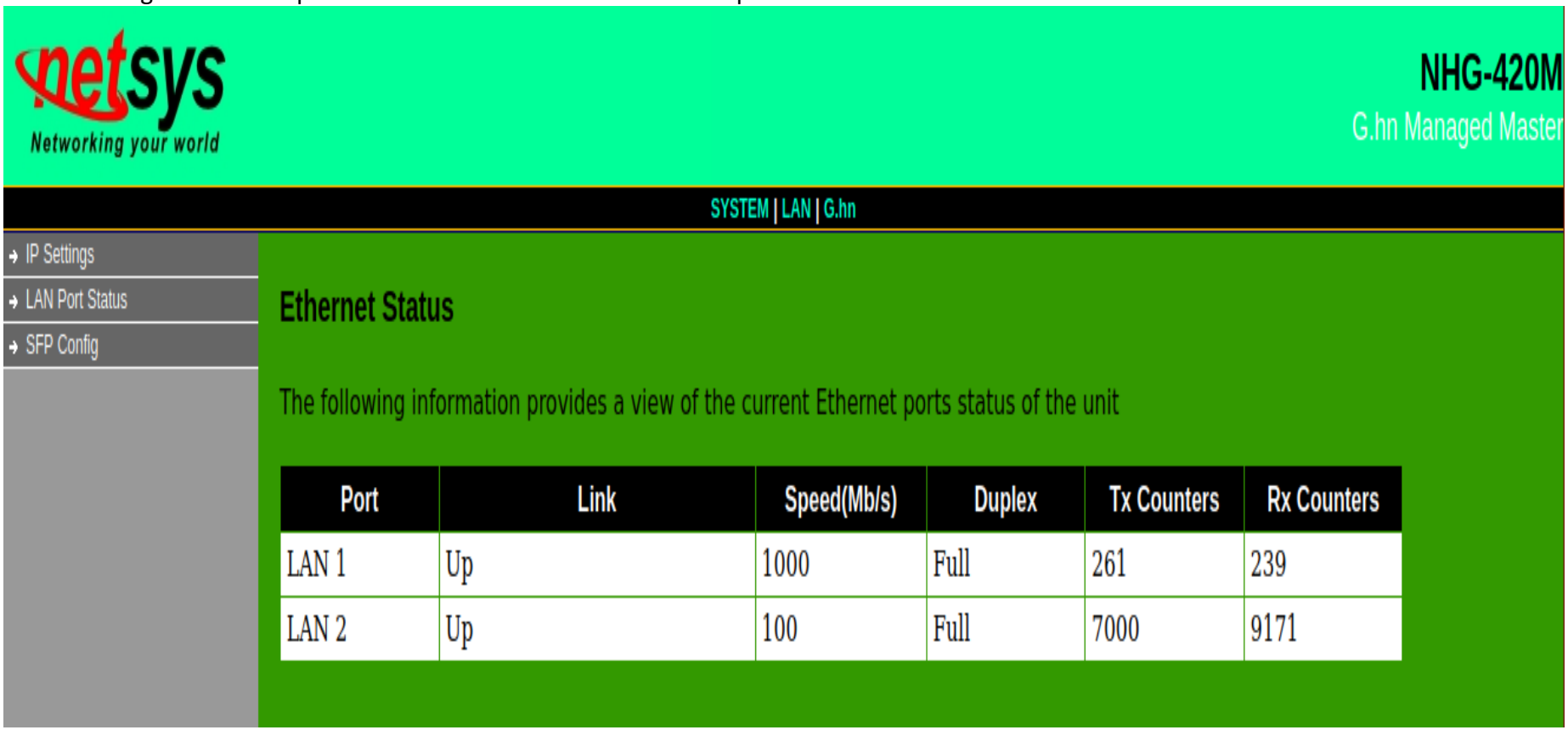


Figure 5.4.2 LAN Port Status

For example, the NHG-420M Giga Ethernet is connected to two networking devices. It appears LAN1 Link Status Link up, 1000Mb/s, Full duplex; LAN2 Link Status Link Up, 100Mb/s, Full duplex. The menu screen shown in Figure 5.4.2.

5.4.3 SFP config menu

The SFP config menu is for selecting 1.25G/2.5G speed mode. It is upon whether the installation is a 1.25G/2.5G single-mode or multi-mode fiber optic module.

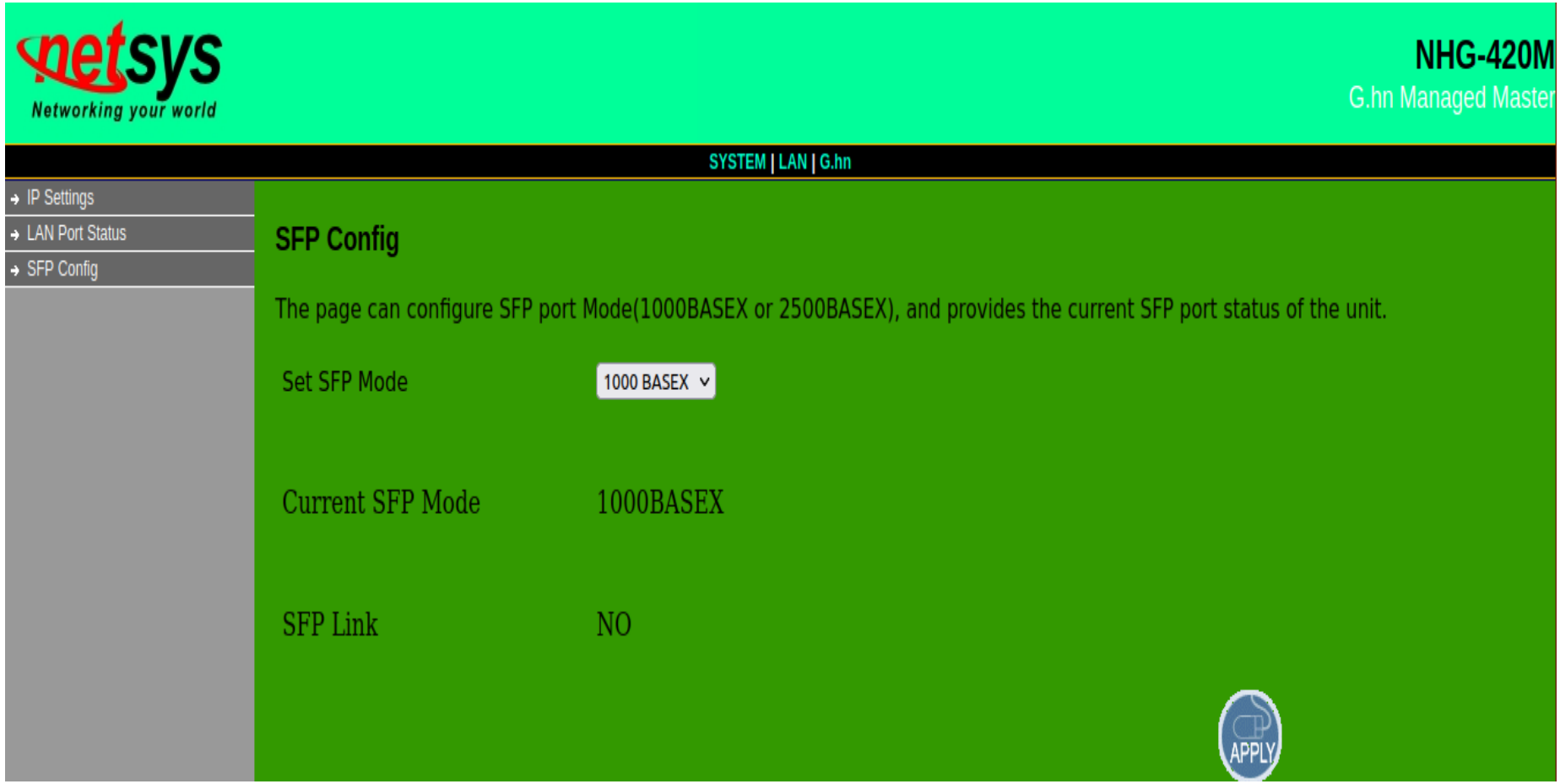


Figure 5.4.3 SFP Setting

5.5 Select" G.hn" Menu.

Select the "G.hn". The menu below includes the sub-menus of **Device**、**User Add**、**User List**、**Notches**、**Master Firmware**, and **Slave Firmware**. The menu screen as shown in Figure 5.5.

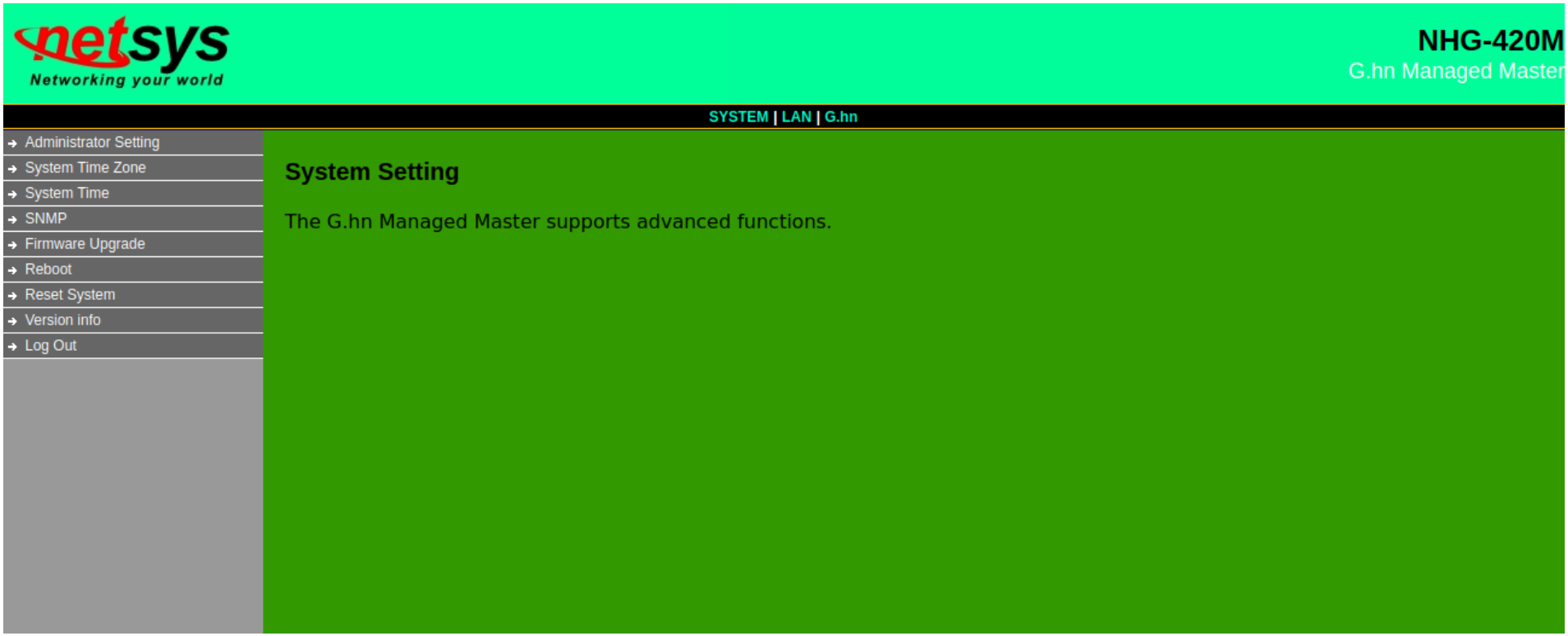


Figure 5.5" G.hn" main menu config in the Entry Screen

Note:

The "G.hn" config menu is for configuring and managing NHG-420M (Master) and NHG-200S (Slave) G.hn functions, please refer to the function introduction as provided below.

5.5.1 Device Info.

This is the sub-menu for Device Info. appears the G.hn Device Information of the Numbers 、Mode (Master/Slave) 、 MAC Address、Driver Version、Software Version、 Spectrum 、G.hn Profile、User List、G.hn Status、Ethernet Status、Reboot、Factory Default、Firmware update. The menu screen as shown in Figure 5.5.1.

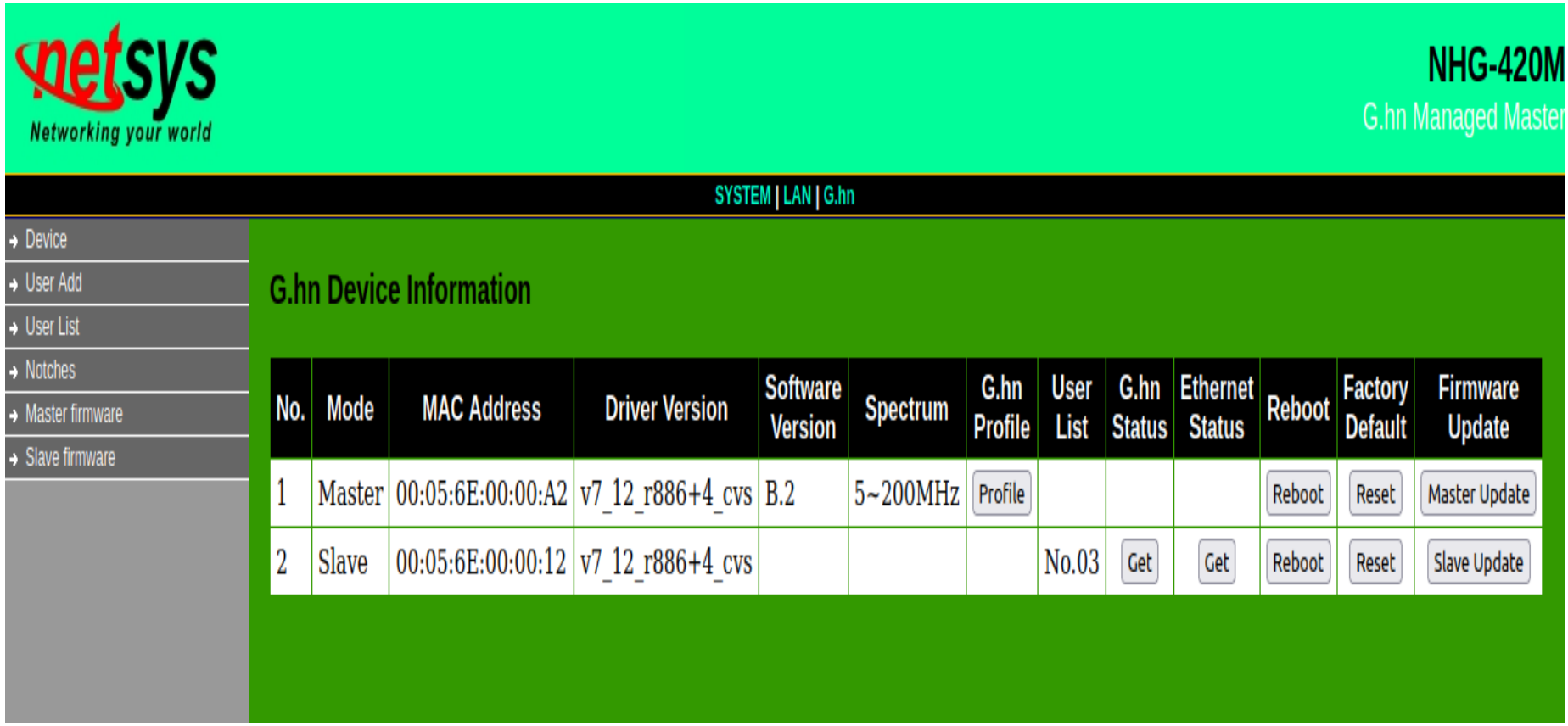


Figure 5.5.1 Device Infomation

5.5.1.1 G.hn Config

Click on G.hn "Profile" button in the menu of G.hn device information, then it appears the window which shows the MAC Address of the Master. There are support 100MHz / 200MHz profile selectable. The menu screen as shown in Figure 5.5.1.1

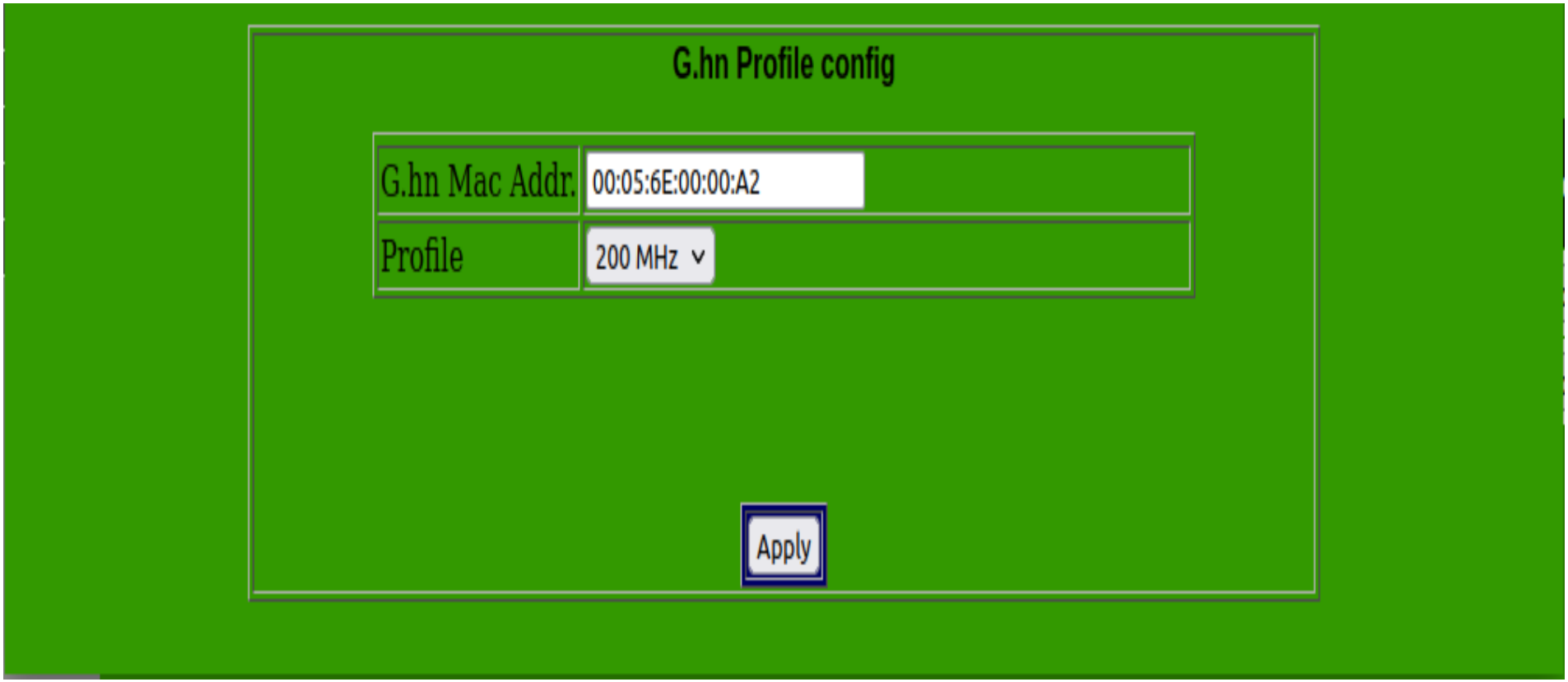


Figure 5.5.1.1 G.hn Profile Config

5.5.1.2 G.hn Status

Click on G.hn "Get" button in the menu of "G.hn device information", then it appears the window which shows the G.hn Network Status of the Master. The menu screen as shown in Figure 5.5.1.2

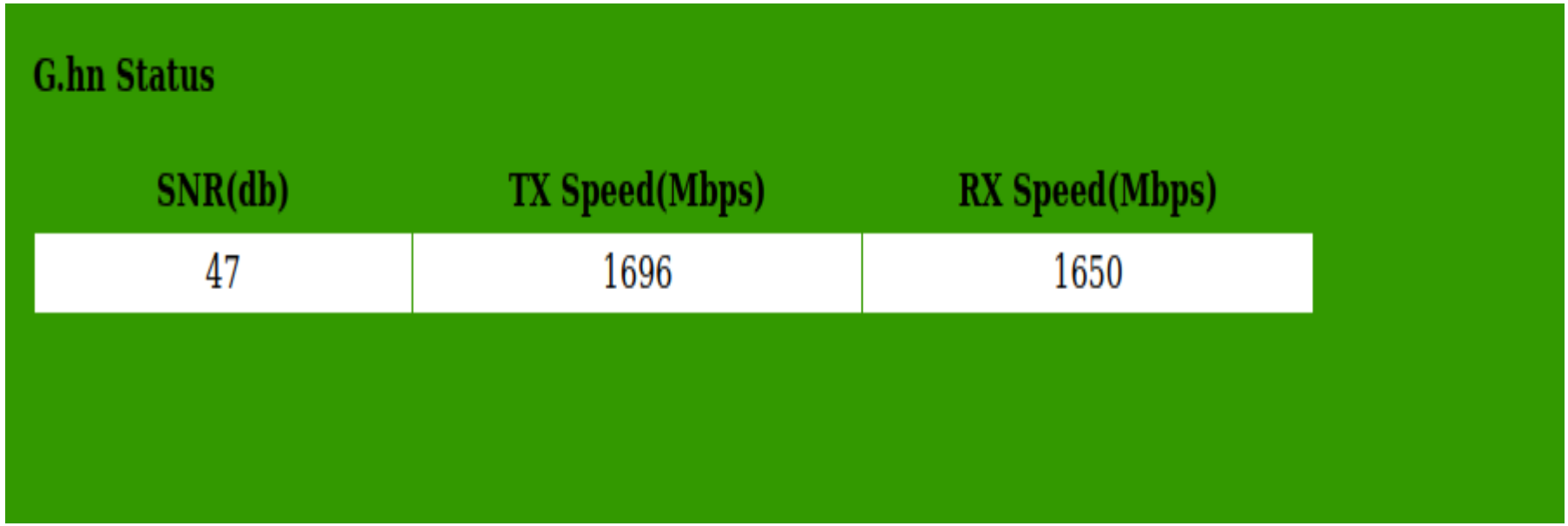


Figure 5.5.1.2 G.hn Status

5.5.1.3 Slave Ethernet Status

Click on Ethernet status "Get "button in the menu of "G.hn device information" for getting each linking Slave ethernet status and it appears the window which shows the MAC Address of the Slave. The menu screen as shown in Figure 5.5.1.3.1.

Slave Ethernet Status

Mac Addr.: 00:05:6E:00:00:12

Port	Link	Tx Packets	Rx Packets
ETH A	Link Up	389	1284
ETH B	Link Up	1371	441

Figure 5.5.1.3 Slave Read Packet Counter

5.5.1.4 G.hn Master / Slave Reboot

Click on "Reboot "button in the menu of "G.hn device information" for rebooting G.hn Master / Slave and it appears the window which shows the MAC Address of the Master / Slave. The menu screen as shown in Figure 5.5.1.4.1 and Figure 5.5.1.4.2

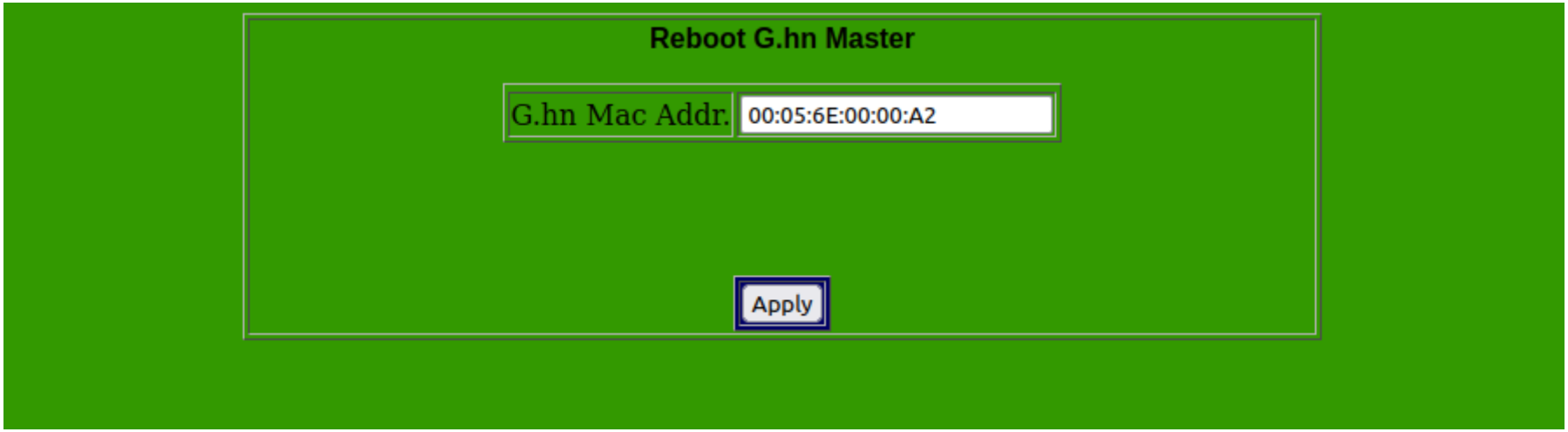


Figure 5.5.1.4.1 Reboot NHG-420M

Figure 5.5.1.4.2 Reboot NHG-200S

5.5.1.5 G.hn Master / Slave Factory Default setting

Click on "Factory Default" in the menu of "G.hn device information" for rebooting G.hn Master / Slave and it appears the window which shows the MAC Address of the Master / Slave. The menu screen as shown in Figure 5.5.1.5.1 and Figure 5.5.1.5.2

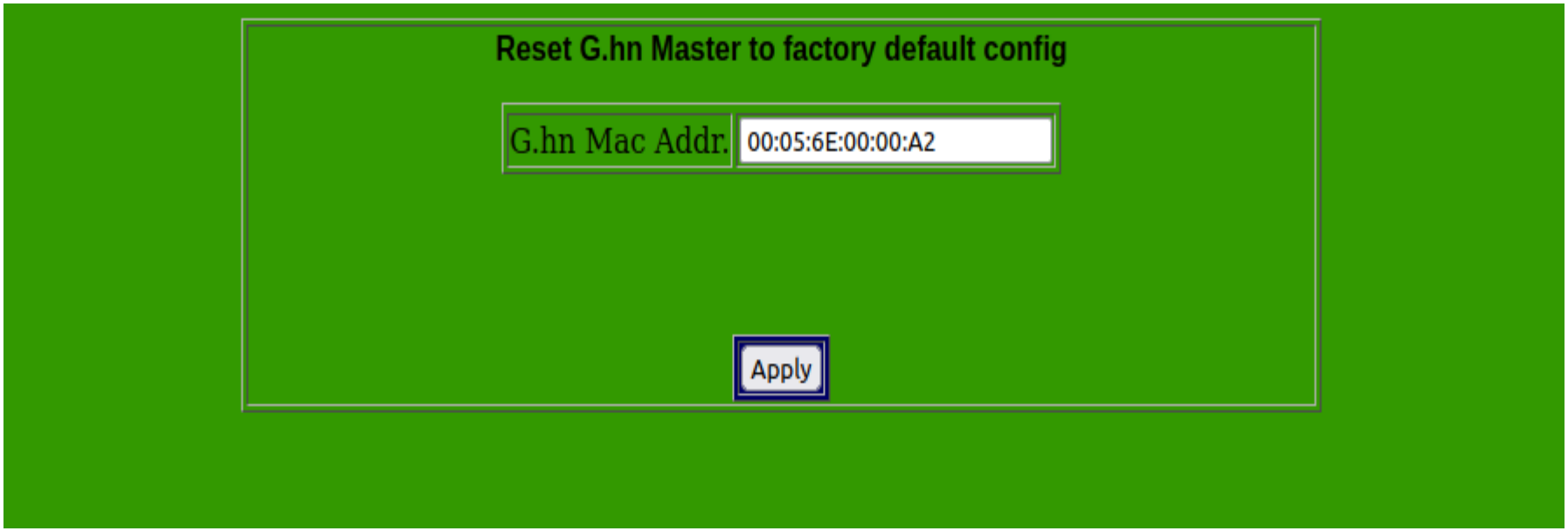


Figure 5.5.1.5.1 NHG-420M Factory default setting

Figure 5.5.1.5.2 NHG-200S Factory default setting

5.5.1.6 G.hn Master / Slave firmware update

Click on "Firmware Update" in the menu of "G.hn device information" for rebooting G.hn Master / Slave and it appears the window which shows the MAC Address of the Master / Slave. The menu screen as shown in Figure 5.5.1.6.1 and Figure 5.5.1.6.2

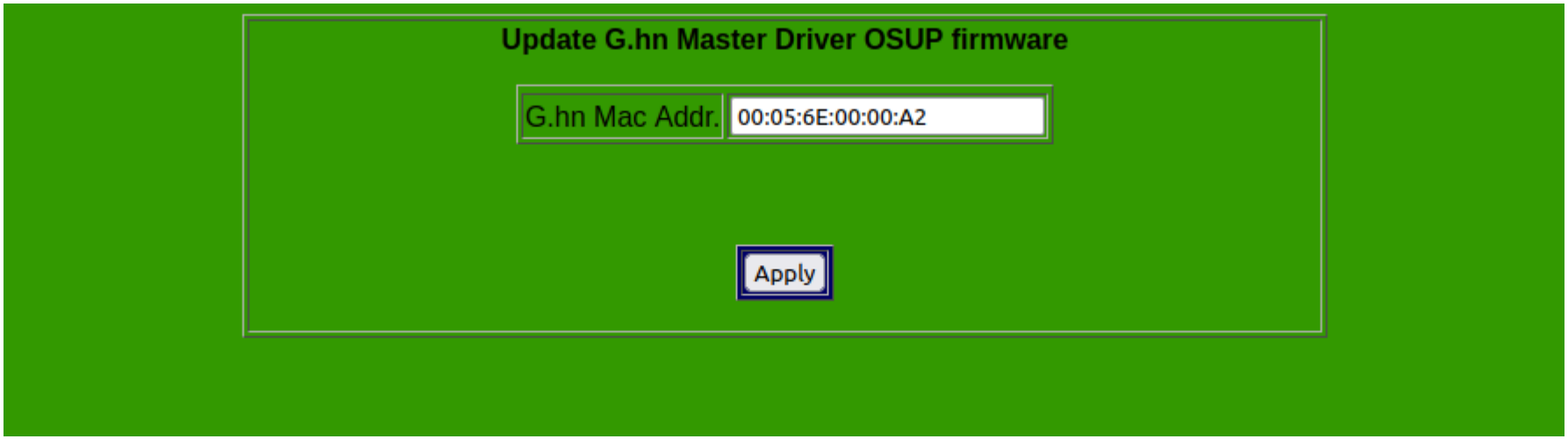


Figure 5.5.1.6.1 NHG-420M firmware update

Figure 5.5.1.6.2 NHG-200S firmware update

5.5.2 User Add

Select "User Add". The menu below includes the sub-menus of **Numbers**、**MAC Address**、**Location**、**Enable / Disable**、**IGMP and MLD ON/OFF** for the Slave. The menu screen as shown in Figure 5.5.2.

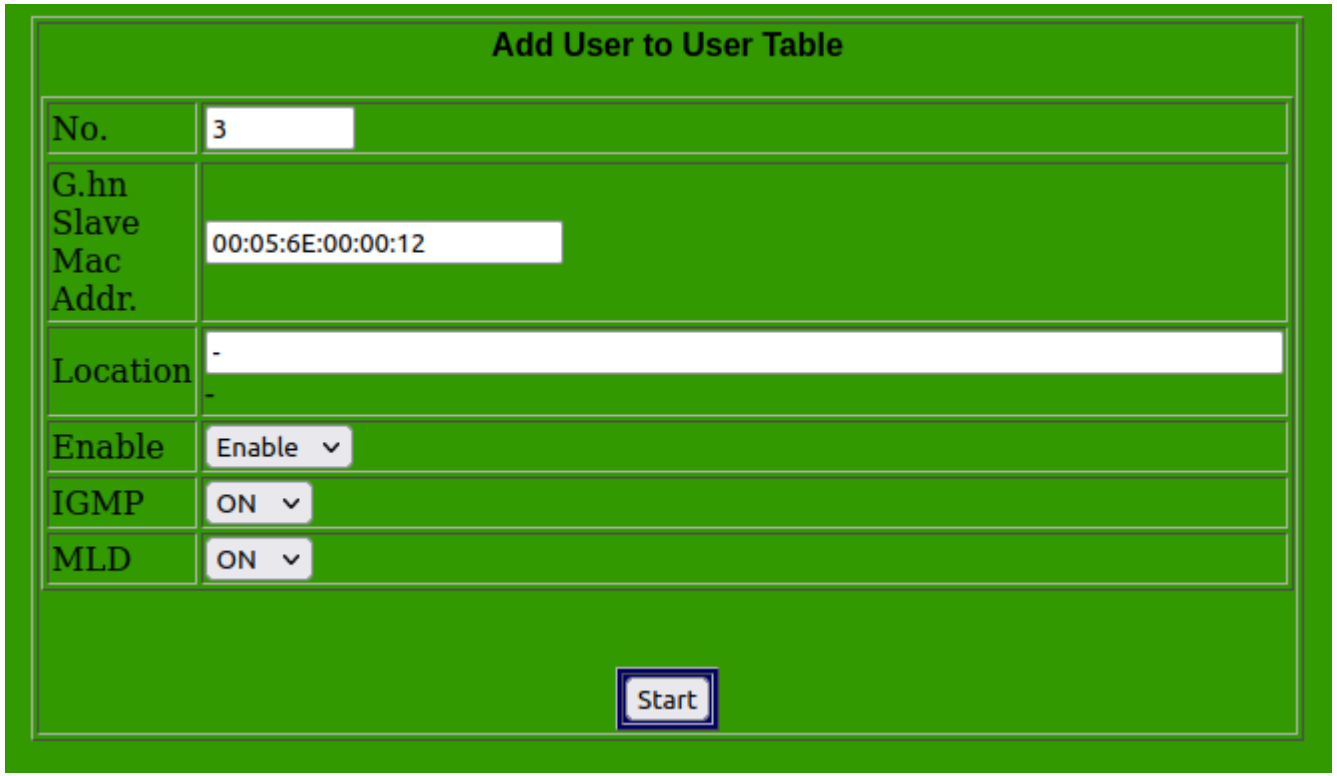


Figure 5.5.2 user add.

Appendix A: Cable Requirements

A.1 Ethernet Cable

A CAT 5~7 UTP (unshielded twisted pair) cable is typically used to connect the Ethernet device to the Modem. A: 10/100TX cable often consists of four pairs of wires, two of which are used for transmission. The connector at the end of the 10/100TX cable is referred to as a 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 10/100TX)

B: 1000TX cable often consists of four pairs of wires, all of which are used for transmission. The connector at the end of the 1000TX cable is referred to as a RJ-45 connector and it consists of eight pins. The Ethernet standard uses pins 1, 2, 3, 4, 5 and 6 for data transmission purposes. (Table A-1 1000TX)

Table A-1 RJ-45 Ethernet Connector Pin Assignments

PIN #	10/100TX		1000TX	
	Signal	Media Dependant Interface-cross	**Signal**	Media Dependant interface
1	TX+	Transmit Data+	BI_DA+	Bi-directional pair A+
2	TX-	Transmit Data-	BI_DA-	Bi-directional pair A-
3	RX+	Receive Data+	BI_DB+	Bi-directional pair B+
4	NC	Unused	BI_DC+	Bi-directional pair C+
5	NC	Unused-	BI_DC-	Bi-directional pair C-
6	RX-	Receive Data-	BI_DB-	Bi-directional pair B-
7	NC	Unused	BI_DD+	Bi-directional pair D+
8	NC	Unused	BI_DD-	Bi-directional pair D-

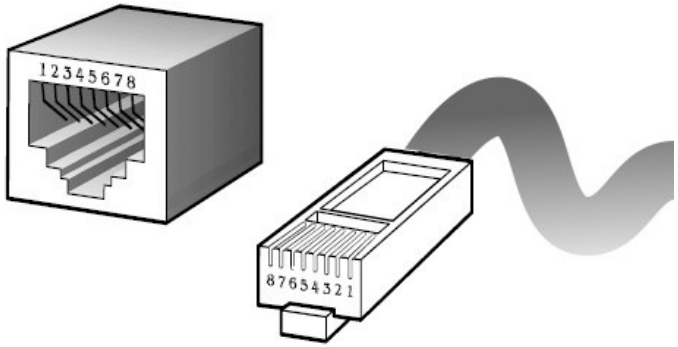


Figure A-1 Standard RJ-45 receptacle /connector

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 connection to 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 has 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.

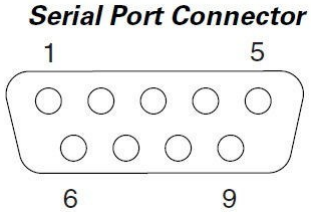


Figure A-3

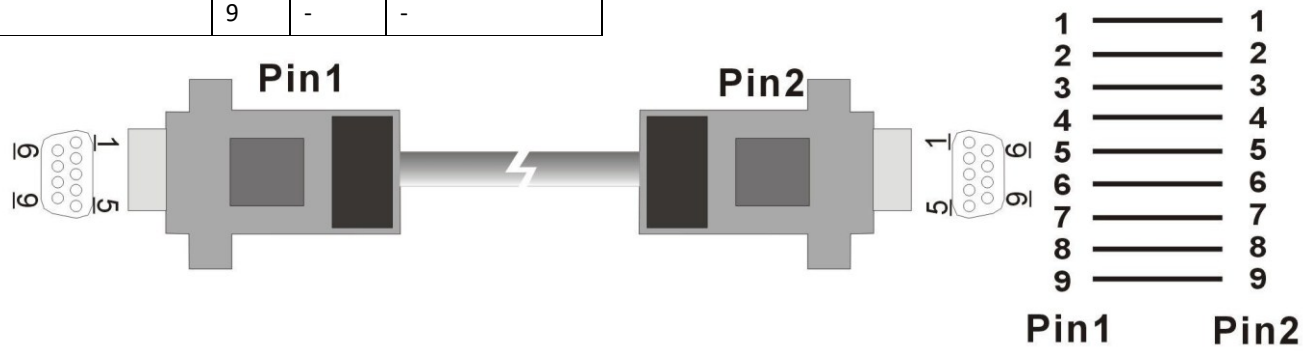


Figure A-4 Pin Assignments and Wiring for an RS-232 Cable

Appendix B: Product Specification

Key Features & Benefits

- Compliant with G.hn ITU-T G.9960/9961/9962/9964 standard
- Compliant with IEEE802.3 10Base-T & IEEE802.3u 100Base-TX & IEEE802.3ab 1000Base-T standard
- Compliant with IEEE802.3x flow control standard
- Support 2 x 10/100M/1000M auto-negotiation RJ-45 Ethernet ports with auto-MDI/MDIX
- Supports 1 x 1.25G/2.5G SFP slot.
- Support 2 x F-type female coaxial connectors for G.hn and TV ports
- Supports transmission speed up to 1700Mbps over RG-59u / RG-6 coaxial cable.
- Supports client side enable / disable.
- Supports user information for address and room number list.
- Supports SNTP time server.
- Supports SNMP V1/V2
- Supports attenuation up to -76db for G.hn port.
- Supports MDU/MTU application.
- Supports IEEE802.1p priority mapping.
- Supports IEEE802.1p/TOS priority queue.
- Supports IEEE802.1Q Tag VLAN pass through.
- Supports auto-speed & link quality indication.
- Supports up to 16 nodes connection.
- Built in surge protector for G.hn port.
- EMI / EMS certificate by FCC & CE

- Support auto logout, user list and each Slave side isolation.
- Guaranteed QoS based on G.hn 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
NHG-420M Interfaces:	2 x RJ-45 10/100/1000Mbps Ethernet port 1 x F-type female coax connector for G.hn port 1 x F-type female coax connector for STB/TV 1 x 12 VDC/1A power jack 1 x DB9 Console port 1 x SFP Slot
NHG-420M LED Indicators:	1 x Power LED 2 x G.hn Link quality LED 1 x Ethernet Link/Activity LED 1 x 100M speed LED 1 x 1G speed LED
Items	**Descriptions**
G.hn port Max Bandwidth	Up to 1.7Gbps

Networking Microprocessor:	32-bit MIPS 4KC CPU
Memory Size:	64M bytes
Max Power Attenuation:	-76dBm
G.hn port Spectrum	5Hz ~ 200MHz
TV port Spectrum	250Mhz ~ 1.2Ghz
Items	**Descriptions**
Dimension:	173 x 142 x 30mm (6.81" x 5.59" x 1.18")
Weight	608g
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 checked through its comprehensive panel indicators. These indicators assist the network manager in identifying problems the hub may encounter. This section describes common problems users may encounter and possible solutions.

1. 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 NHG-420M/NHG-200S that is functioning properly. If these measures fail to resolve the problem, please replace a power adaptor via a qualified vendor. The power source supports DC 12V/1A power adaptor.
2. Symptom:	**The link quality LED can't light on when NHG-420M and NHG-200S both coaxial cables are connection.** The NHG-420M and NHG-200S both connections cannot be established.
Cause	1.Check both connection that power attenuation over -76db by RG59u / RG6 coaxial cable if G.hn port Link lost.
Solution	2.Check LAN port link LED if EthA and EthB link lost

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 G.hn coaxial cable or Ethernet port is defective.

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

5. Question:	The user connected the G.hn port of the NHG-420M with the G.hn port of the NHG-200S via a splitter, but the connection still can't be established or not stable. But when it connects to the TV port of NHG-420M with the G.hn port of NHG-200S via a splitter then the connection's ok.
Answer	The TV port of Master connect to G.hn port of Slave is not correct, It why can link establish the reason using a short cable, causing G.hn signal of NHG-200S too strong and pass to G.hn port of NHG-420M through TV port (250MHZ high pass filter build in) of NHG-200S, so user can create a weak connection, but as long as extend coaxial over 350m length or plug a -20db attenuator, this link will be loss.

7. Question:	NHG-420M signal source? To CATV signal source only or to common distribution of Antenna signal also.
Answer	The user can use the CATV signal and can also use the antenna signal as long as it does not to conflict with the G.hn signals, due to G.hn working frequency being between 5Mhz and 200Mhz, CATV spectrum is between 250Mhz and 1.2Ghz.

8. Symptom:	The TV signal does not display when connected to NHG-420M/S.
Cause:	TV signal is too weak or other factors.
Solution:	**Verify these items to help clarify the problem:** 1. Verify coaxial cable use RG59u / RG6 75 Ω impedance. 2. Verify the TV signal source and TV if available. 3. Check if the TV signal needs between 250 MHz and 1.2 GHZ so that the signal will be passed. 4. Add a TV signal repeater before the NHG-420M if the TV signal source is too weak.
Notes:	1. The output television signal is due to environmental factors. NHG-420M/NHG-200S support TV signal pass-through but cannot guarantee being able to maintain an appropriate TV signal output to TV. If the connection distance is too long, it can lead to the output of a TV signal with no signal or attenuation. 2. NHG-420M/NHG-200S TV signal input power is unrestricted, so users are not required to add an attenuator before NHG-420M/S to reduce the strength of the TV signal source. 3. If the TV signal is too strong, causing television ripple, add an attenuator before the TV. 4. G.hn port must be installed on 75 Ω coaxial cable. If a 50 Ω impedance is used, the performance will drop by 50%.

9. Question:	How much node (Mac Address) can be connected to behind of the NHG-420M.
Answer:	Each of the NHG-420M can only be connected to 16 nodes (Mac Address).

10.Question:	I forgot NHG-420M password, what can I do?
Answer:	If the user forgot the NHG-420M password, only use the console command line to reset system to default value. Please refer to the following steps for user's reference: 1. Please connect the NHG-420M console port to PC or laptop PC series port. 2. Launch "Hyper Terminal" into the terminal window on the user 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 NHG-420M 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, the user may have a problem with the power outlet, power cord, or internal power supply as explained in the earlier 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 the user still cannot isolate the problem, then the internal power supply may be defective. In this case, please contact the user localdealer.

Installation

Verify that all system components have been properly installed. If one or more components are malfunctioning (e.g. the power cord or network cabling), test them in an alternate environment where users 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 10/100/1000 Mbps Ethernet, for coaxial connectors are 1.7Gbps G.hn. wave-2 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 power fluctuation. The best way to resolve this problem is to upgrade these devices to a version that supports Ethernet and 1.7Gbps G.hn wave-2.

Physical Configuration

If problems occur after altering the network configuration, restore the original connections, and try to track the problem down by implementing the latest changes, one step at a time. Ensure that cable distances and other physical aspects of the installation 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 the user has completed all the preceding diagnoses, then contact the user dealer.

Appendix D: Compliance and Safety Information

FCC Radio Frequency Interference Statement

This equipment has been evaluated and found to follow the limits for a computing device, pursuant to Part 15 subpart B of FCC class A rules. These limits protect against harmful interference in commercial settings. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used following 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 interferes with the radio or TV reception, as found by turning it off and on, try these steps:

1. Reorient or move the receiving antenna.
2. Increase the separation between the equipment and receiver.
3. The equipment and the receiver must be connected to outlets on different 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 prevent the user's authority to operate the equipment.

If this telephone equipment causes harm to the telephone network, the telephone company will notify users in advance that temporary discontinuance of service may be needed. But if advance notice is not practical, the telephone company will notify the customer as soon as possible. Also, the user will be advised of the user's right to file a complaint with the FCC if the user believes it is necessary.

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

This equipment may not be used on the 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 should be installed on 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 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 a user experiences trouble with this unit, please contact customer service of user dealer immediately.
- **DO NOT DISASSEMBLE THIS EQUIPMENT**. It does not have 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 used 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.
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 have 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 have 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 cross-out wheeled bin symbol. Do not dispose of WEEE as unsorted municipal waste and have to collect such WEEE separately.

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。						

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Appendix E: Home Networking access Installation guide

Caution:

Please note this install guide only for construction device to install the G.hn EOC, 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 users have everything user 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) ◆ NHG-420M ◆ NHG-200S ◆ G. fast modem	◆ Notebook PC (with Win/Linux/ MAC OS) ◆ One 1-to-2 coax splitters with two short. ◆ Coaxial cables (3-feet) ◆ One short CAT-5e Ethernet cable ◆ IPerf test software	◆ 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-59u 75ohm) ◆ AC power strips ◆ Coax connector installation tool. ◆ Wire cutter ◆ 90-degree angle connectors

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 aTV.

- Try to find a location for the RG where the user can connect it back to the coax network. (Note: Certain RGs may need a grounded power outlet.)
- Turn on all TVs with existing TV service (if applicable) and check for image quality. If you notice issues, check if the TV is faulty and inform the homeowner or resident.
- Check for devices such as 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 anychanges.

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
  - On 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.

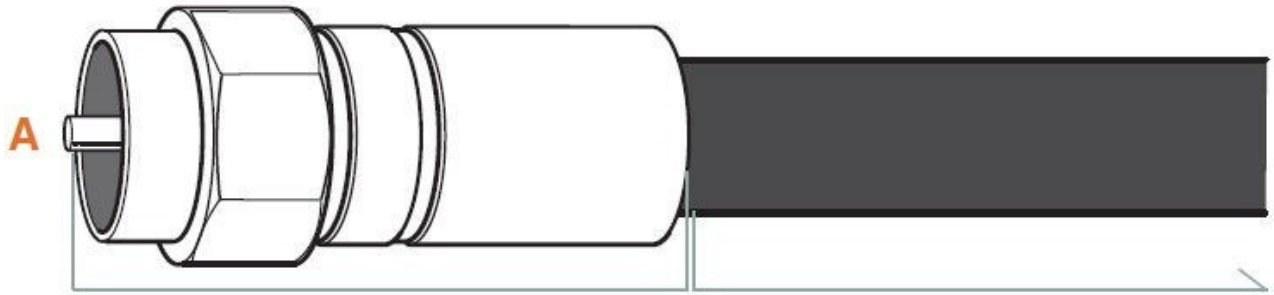
Check Environment and Wiring Integrity

Disconnect any devices connected directly to the coax network, excluding STBs. 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.

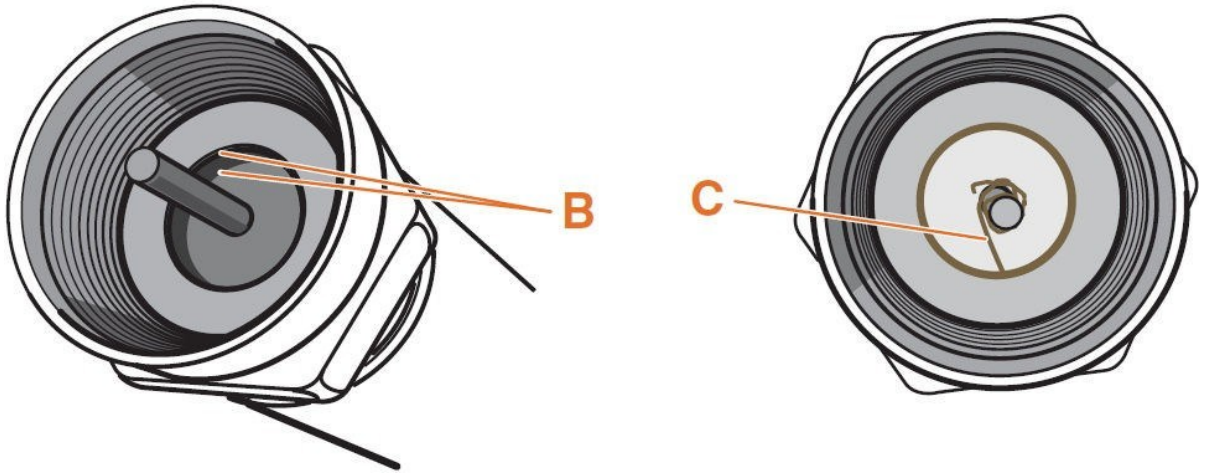
Coax Line:

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:

Coaxial cable requests RG59 / RG6 75ohm impedance to set up G.hn port connection.

Install Hardware

Now users are ready to install the Customer Premises Equipment.

Disconnect the Existing Service

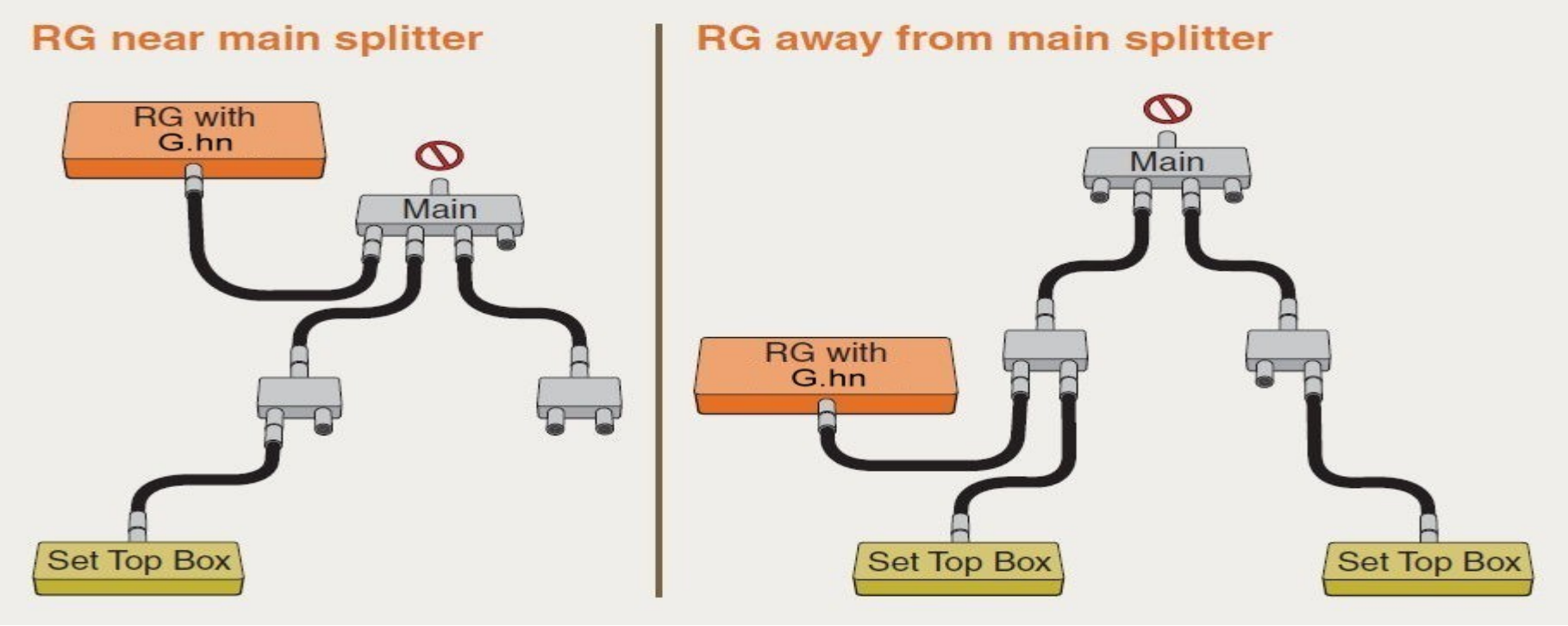
- Find the main splitter (where the service enters the house). If the RG is far away from the main splitter, create a splitter tree (see diagram on right).
- Remove the cable service provider's connection to the INPUT on the main splitter. Please ensure that no G.hn device connect to the INPUT on this splitter.
- Do not put a resistive end cap on the input. If a user wants to cap the input, use only a plastic cap.
  Ensure all splitter connections are secure and high-quality.

Tip:

Make sure nothing is connect to the **INPUT** on the splitter — including the G.hn device.

Install the Residential Gateway and STBs (Set Top Box)

- Test the RJ-11 jack to ensure a good GPON signal (using a GPON tester).
- Plug the RG into the power outlet. Power up the RG, and let it synchronize with the GPON service. Verify the GPON 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 **G.hn test**. ***See shaded box in step 5 for instructions.***
- Repeat the **G.hn 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 troubleshoot5.



Complete Installation

Verify that the entire home network is functioning correctly.

Test and Verify the Home Network

- Run IPerf test software with all devices connected. **See shaded box on right for instructions.* As the test runs...

Clean Up Userr Work Area

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

Explaining New Services to the Consumer

- Follow the service provider's protocol.
- A physical data rate => 1.7G bps (Reference Only)

Tip:

1. **Be sure to test and verify the home network; user 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 user **G.hn test** passed but user TV service does not work properly. Check the user DSL service or replace the RG and/or STB equipment.
- If user G.hn test failed, follow these steps to pinpoint and fix the problem(s). After each step, re-run the G.hn 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 find 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:

- 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-G.hn devices from coaxes in the home (those devices might add to the noise).

Step F:

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

Appendix F: MDU /MTU Installation Guide

Caution:

Please note this install guide only for construction unit to install the NHG-420M / NHG-200S, general of home users do not need read this.

installation guide. And please note we do not provide the tools mentioned in this guide.

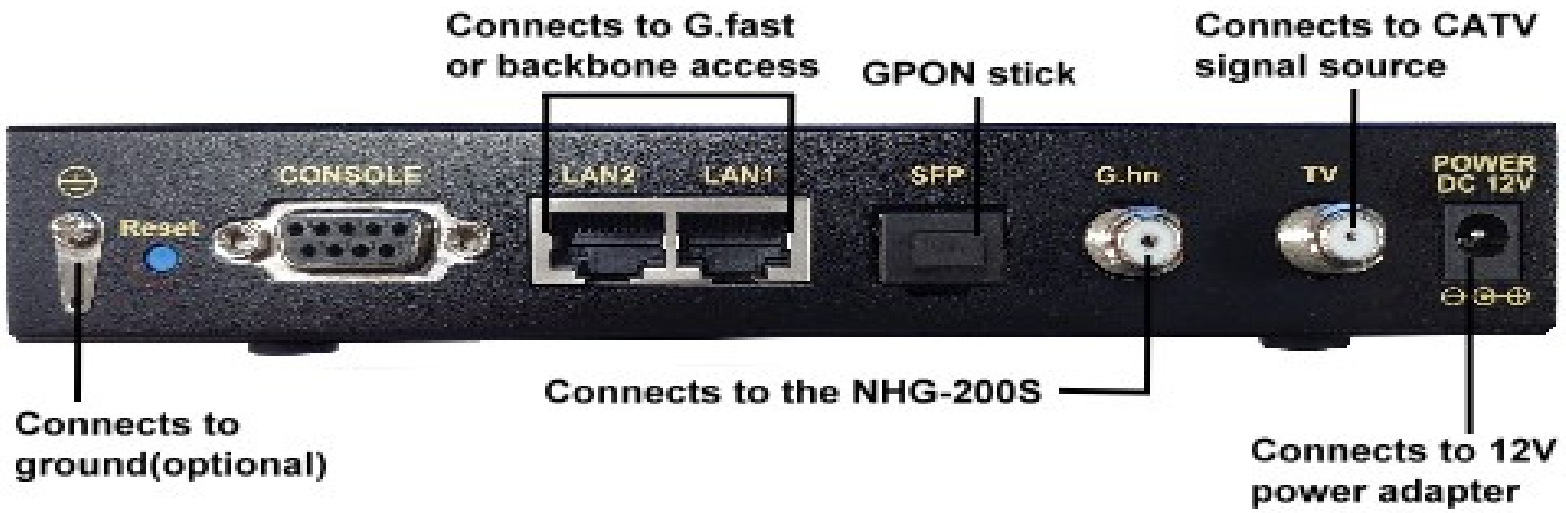
F-1 Before Leaving the Office

Make sure that the user has everything the user needs to install and test the MDU/MTU network.

Equipment to Install	Equipment for Testing	Supplies and Tools
◆ Residential Gateway (RG) ◆ Set-top boxes (STB) ◆ NHG-420M ◆ NHG-200S ◆ G. fast (NV-450S) / GPON	◆ Notebook PC (with Win / Linux/ MAC OS) ◆ One 1-to-2 coax splitters with two short. ◆ Coaxial cables (3 feet) ◆ One short CAT-5e Ethernet cable ◆ IPerf test software	◆ 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-59u 75ohm) ◆ AC power strips ◆ Coaxial connector installation tool. ◆ Wire cutter ◆ 90-degree angle connectors

NHG-420M(Master) Installation:

Before beginning the installation, survey the installation site.



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 they 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 an active Internet service to the building.

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

Pre-Installation Inspection

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

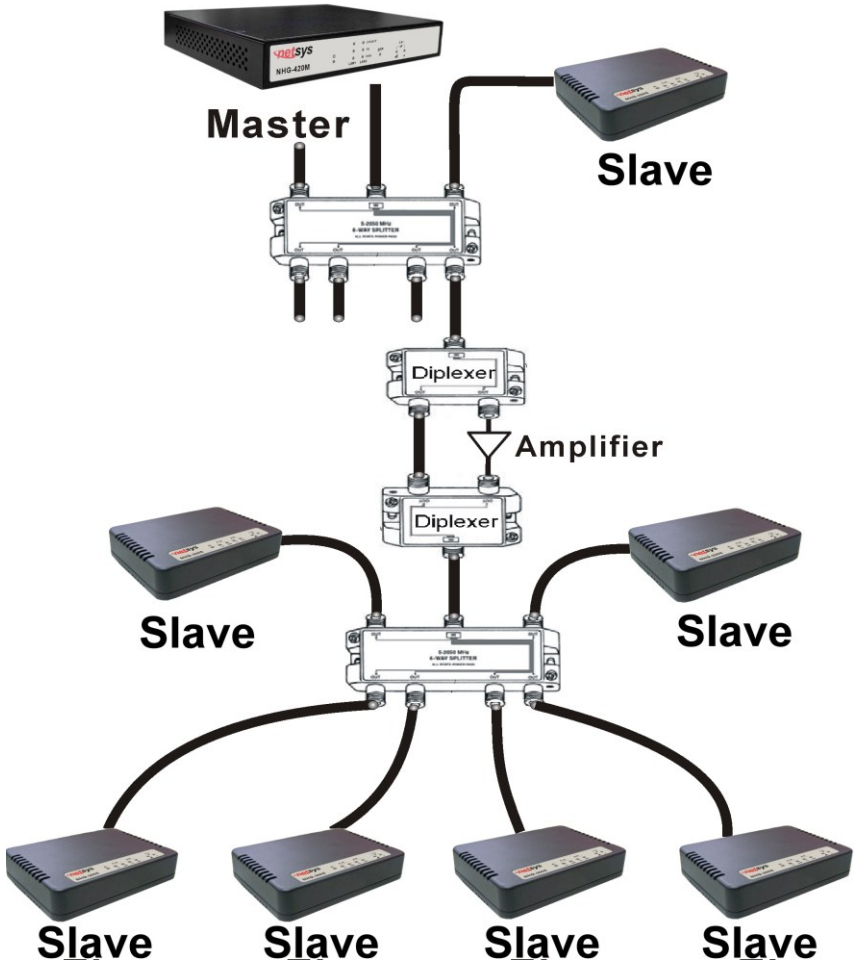
- Inspect and replace damaged splitter and F-connectors.
- Check every coax connector, splitter, tap and amplifier (if exists). Look for missing components, damaged connectors, corrosion and/or other problems.
- Replace any damaged splitters/taps.
- Replace damaged and low-quality coax fittings (crimp, 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.

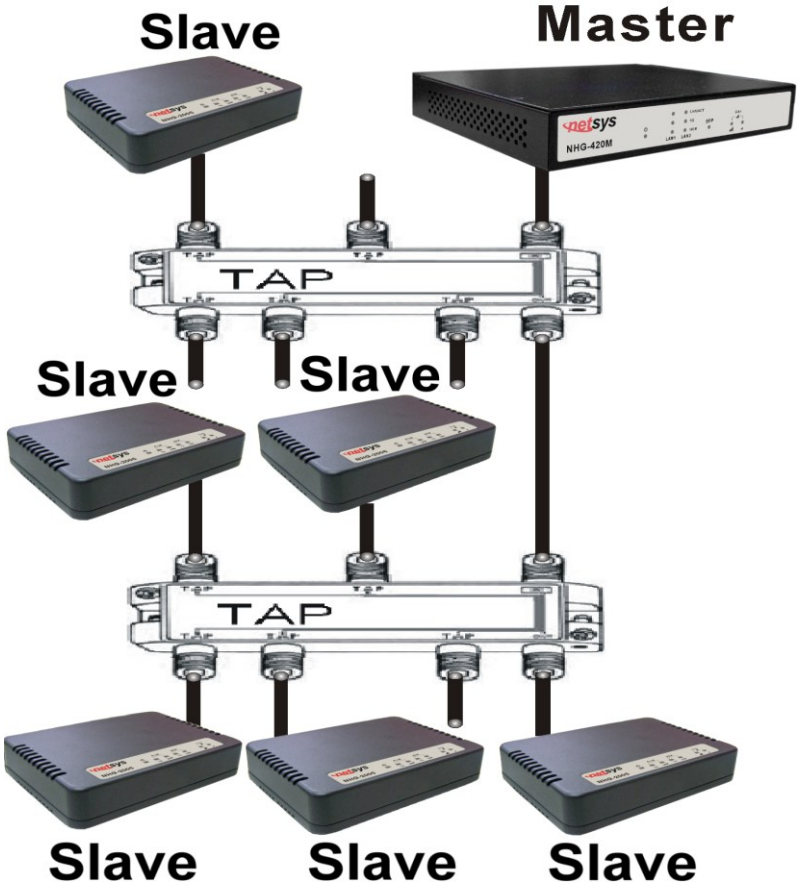
Installation of the Master

- 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 5~200Mhz band. If not, a bypass network must be installed using 2 diplexers (see diagram).
- If an apartment lacks an MDU unit and the attenuation between the Master and the non-G.hn apartment TV is under 15dB, install an attenuator/HPF at the entrance. (Without this, there will be problems with the TV reception).

Network with Diplexer



Network with TAP



Verification of Master Installation

- Connect user PC to the Master using Ethernet cable, run section 4.6.1 Device Info. and check that the details of the Master are listed.
- Still using the PC, open user Internet browser and check if user 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 the user 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

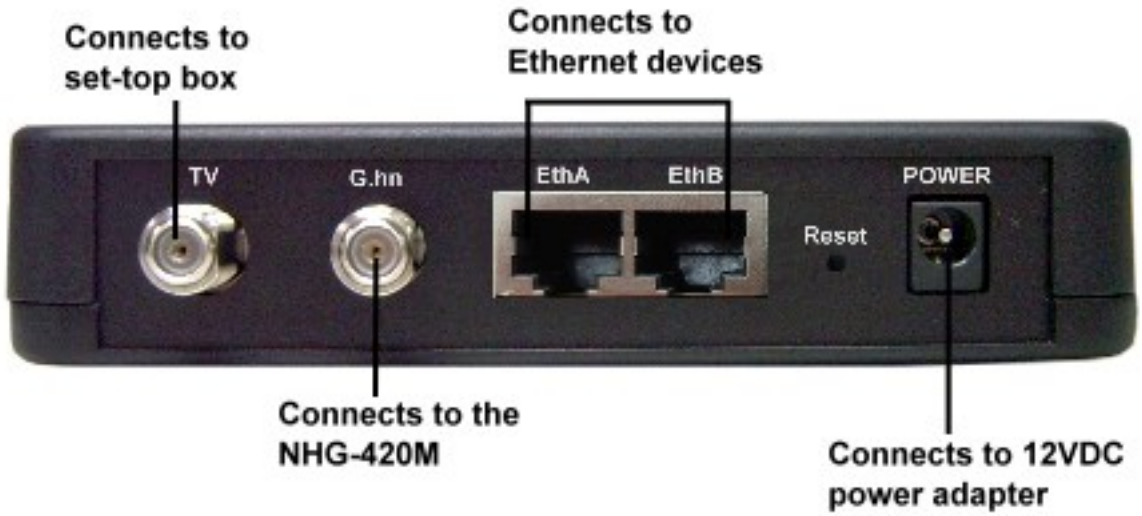
- If the problem occurred when the Master was connected but without power (electricity), the problem is with the service provider.
- If the problem happens only when the Master is powered on, then an HPF/Attenuator/splitter must be installed between the wall outlet and the TV. Repeat the test to make sure that the TV picture is now clear.

Problem 4: Can G.HN EoC Master and Slave amplify the signal?

- Please note that the EOC Master and Slave signal cannot pass any amplifier, when user use the amplifier, please bypass G.hn signal.

NHG-200S(Slave) Installation:

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



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 an 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 coaxial cables and wall plates.
- Check every visible coaxial 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 LED should be lighted up.
- Connect the TV to the Slave TV connection.
- Connect the PC/STB to the Slave via the LAN (Ethernet) connection.
- Make sure that all coaxial connections are tight and of high 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 DC power source is good.
- Check if the Master link LED is ON.
- Check to see that all devices appear and have the same firmware version.

On the Slave side

- Check if 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 there is no link, then there is a problem with the coax connection between the Master and the floor and the user 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, users 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)

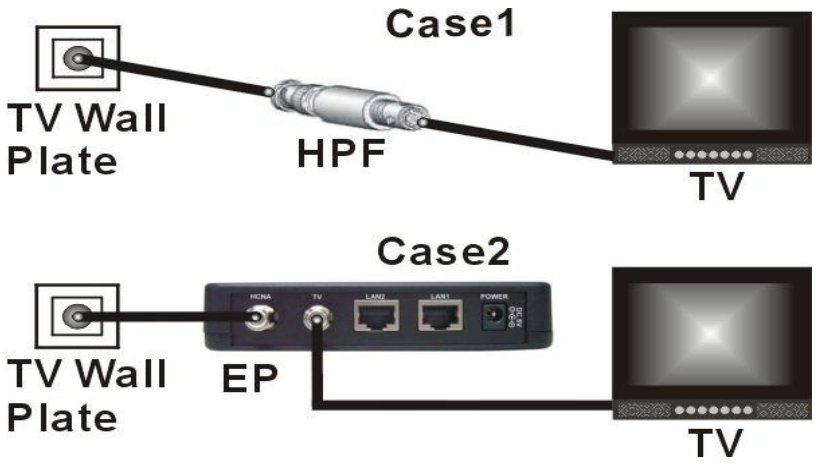
- Wait for 30 seconds. If the quality LED has not changed, check the device if connected properly.
- Tighten all screws and check connectors/jacks/coax cables; replace if necessary. Test the Master and Slave units back-to-back with 8dB attenuation. The quality LED should be Green.
- Check the Slave over the coax network until the user finds the problematic area and fixes it. If not change the malfunctioning device.

Problem 4: No internet access/IPTV service

- If Device Info. and Net Interface Test functions 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 side unit only) Rerun Device Info. These tests ensure the performance of the full MDU network.
- When running Device Info. make sure users can see all devices.
- When running the IPerf Test, make sure the data rates are equal to or higher than 1000Mbps.

Warranty

The original owner that the product delivered in this package will be free from defects in material and workmanship for one year 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:

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.