

User Guide
HH1620
Wireless VoIP Gateway





Important Safety Information

WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS PRODUCT TO RAIN OR MOISTURE. THE UNIT MUST NOT BE EXPOSED TO DRIPPING OR SPLASHING. DO NOT PLACE OBJECTS FILLED WITH LIQUIDS, SUCH AS VASES, ON THE UNIT.

CAUTION: TO PREVENT ELECTRIC SHOCK, THIS EQUIPMENT MAY REQUIRE A GROUNDING CONDUCTOR IN THE LINE CORD. CONNECT THE UNIT TO A GROUNDING TYPE AC WALL OUTLET USING THE POWER CORD SUPPLIED WITH THE UNIT.

CAUTION: THIS PRODUCT WAS QUALIFIED UNDER TEST CONDITIONS THAT INCLUDED THE USE OF THE SUPPLIED CABLES BETWEEN SYSTEMS COMPONENTS. TO ENSURE REGULATORY AND SAFETY COMPLIANCE, USE ONLY THE PROVIDED POWER AND INTERFACE CABLES AND INSTALL THEM PROPERLY.

CAUTION: DIFFERENT TYPES OF CORD SETS MAY BE USED FOR CONNECTIONS TO THE MAIN SUPPLY CIRCUIT. USE ONLY A MAIN LINE CORD THAT COMPLIES WITH ALL APPLICABLE PRODUCT SAFETY REQUIREMENTS OF THE COUNTRY OF USE.

CAUTION: INSTALLATION OF THIS PRODUCT MUST BE IN ACCORDANCE WITH NATIONAL WIRING CODES AND CONFORM TO LOCAL REGULATIONS.

CAUTION: DO NOT OPEN THE UNIT. DO NOT PERFORM ANY SERVICING OTHER THAN THAT CONTAINED IN THE INSTALLATION AND TROUBLESHOOTING INSTRUCTIONS. REFER ALL SERVICING TO QUALIFIED SERVICE PERSONNEL.

CAUTION: CHANGES AND MODIFICATIONS NOT EXPRESSLY APPROVED BY MOTOROLA FOR COMPLIANCE COULD VOID USER'S AUTHORITY TO OPERATE THE EQUIPMENT.



IMPORTANT SAFETY INSTRUCTIONS — *When using your telephone equipment, basic safety precautions should always be followed to reduce the risk of fire, electric shock, and injury to persons, including the following:*

- Read all of the instructions listed here and/or in the user manual before you operate this equipment. Give particular attention to all safety precautions. Retain the instructions for future reference.
- This device must be installed and used in strict accordance with manufacturer's instructions as described in the user documentation that comes with the product.
- Comply with all warning and caution statements in the instructions. Observe all warning and caution symbols that are affixed to this equipment.
- Comply with all instructions that accompany this equipment.
- Do not overload outlets or extension cords, as this can result in a risk of fire or electric shock. Overloaded AC outlets, extension cords, frayed power cords, damaged or cracked wire insulation, and broken plugs are dangerous. They may result in a shock or fire hazard.
- Route power supply cords so that they are not likely to be walked on or pinched by items placed upon or against them. Pay particular attention to cords where they are attached to plugs and convenience receptacles, and examine the point where they exit from the product.
- Place this equipment in a location that is close enough to an electrical outlet to accommodate the length of the power cord.
- Place unit to allow for easy access when disconnecting the power cord of the device from the AC wall outlet.
- Do not connect the plug into an extension cord, receptacle, other outlet unless the plug can be fully inserted with no part of the blades exposed.
- Place this equipment on a stable surface.
- It is recommended that the customer install an AC surge protector in the AC outlet to which this device is connected. This is to avoid damaging the equipment by local lightning strikes and other electrical surges.
- Do not cover the device, or block the airflow to the device with any other objects. Keep the device away from excessive heat and humidity and keep the device free from vibration and dust.
- Wipe the unit with a clean, dry cloth. Never use cleaning fluid or similar chemicals. Do not spray cleaners directly on the unit or use forced air to remove dust.
- Operate this product only from the type of power source indicated on the product's marking label. If you are not sure of the type of power supplied to your home, consult your dealer or local power company.
- Do not use this product near water for example, near a bathtub, washbowl, kitchen sink or laundry tub, in a wet basement or near a swimming pool.
- Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning.
- Do not use the telephone to report a gas leak in the vicinity of the leak.
- Use only the power cord and batteries indicated in this manual. Do not dispose of batteries in a fire. They may explode. Check with local codes for possible special disposal instructions.
- CAUTION: To reduce the risk of fire, use only No. 26 AWG or larger (e.g., 24 AWG) UL Listed or CSA Certified Telecommunication Line Cord.
- Disconnect TNV circuit connector(s) before disconnecting power.
- Disconnect TNV circuit connector before removing cover.
- Upon completion of any service or repairs to this product, ask the service technician to perform safety checks to determine that the product is in safe operating condition.
- **SAVE THESE INSTRUCTIONS**



FCC Compliance Class B Digital Device

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential environment. This equipment generates, 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 of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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

Canadian Compliance

This Class B digital apparatus meets all requirements of the Canadian Interference Causing Equipment Regulations. Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Wireless LAN Information

The HH1620 Wireless VoIP products are wireless network products that use Direct Sequence Spread Spectrum (DSSS) radio technology. These products are designed to be inter-operable with any other wireless DSSS type product that complies with:

Wireless LAN and your Health

The HH1620, like other radio devices, emit radio frequency electromagnetic energy, but operate within the guidelines found in radio frequency safety standards and recommendations.

Restrictions on Use of Wireless Devices

In some situations or environments, the use of wireless devices may be restricted by the proprietor of the building or responsible representatives of the organization. For example, using wireless equipment in any environment where the risk of interference to other devices or services is perceived or identified as harmful.

If you are uncertain of the applicable policy for the use of wireless equipment in a specific organization or environment, you are encouraged to ask for authorization to use the device prior to turning on the equipment.

The manufacturer is not responsible for any radio or television interference caused by unauthorized modification of the devices included with this product, or the substitution or attachment of connecting cables and equipment other than specified by the manufacturer. Correction of interference caused by such unauthorized modification, substitution, or attachment is the responsibility of the user.

The manufacturer and its authorized resellers or distributors are not liable for any damage or violation of government regulations that may arise from failing to comply with these guidelines.

FCC Certification

The HH1620 contain a radio transmitter and accordingly have been certified as compliant with 47 CFR Part 15 of the FCC Rules for intentional radiators. Products that contain a radio transmitter are labeled with FCC ID and the FCC logo.

Caution: Exposure to Radio Frequency Radiation.

To comply with the FCC RF exposure compliance requirements, the separation distance between the antenna and any person's body (including hands, wrists, feet and ankles) must be at least 20 cm (8 inches).



Canada - Industry Canada (IC)

The wireless radio of this device complies with RSS 210 and RSS 102 of Industry Canada. This Class B digital device complies with Canadian ICES-003 (NMB-003).

Caring for the Environment by Recycling

When you see this symbol on a Motorola product, do not dispose of the product with residential or commercial waste.



Recycling your Motorola Equipment

Please do not dispose of this product with your residential or commercial waste. Some countries or regions, such as the European Union, have set up systems to collect and recycle electrical and electronic waste items. Contact your local authorities for information about practices established for your region. If collection systems are not available, call Motorola Customer Service for assistance.

Regulatory, Safety, Software License, and Warranty Information Card

This product is provided with a separate *Regulatory, Safety, Software License, and Warranty Information* card.

THIS PRODUCT IS IN COMPLIANCE WITH ONE OR MORE OF THE STANDARDS LISTED ON THE *REGULATORY, SAFETY, SOFTWARE LICENSE, AND WARRANTY INFORMATION CARD*. NOT ALL STANDARDS APPLY TO ALL MODELS.

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1. Overview

Congratulations on purchasing the Motorola® HH1620 Wireless VoIP Gateway.

The HH1620 includes both an 802.11b/g wireless access point and a 4-port Ethernet router. It also enables up to two standard analog telephones to use digital telephone services over a broadband Internet connection. The broadband connection can be any high-speed data service through either:

- A cable modem connected to coaxial cable from a cable television company
- A DSL (digital subscriber line) modem connected to telephone wiring from a telephone company

You can connect up to four computers or other Ethernet devices directly to the HH1620. By adding hubs or other routers, you can expand your network up to the recommended maximum of 16 connected devices.

The computers on the HH1620 network must:

- Have a 10Base-T or 10/100Base-T Ethernet adapter
- Be running Microsoft® Windows®, Macintosh® OS, Linux®, or UNIX®

So it is both wireless and wired, providing the foundation for a truly customized network full of options.

Using the HH1620, you can share files, pictures, peripherals, printers and more with everyone else on the network. By connecting a broadband modem (cable, DSL or other), you can also share a single high speed Internet connection.

The HH1620 offers both the popular 802.11b wireless standard as well as the nearly 5-times-faster 802.11g standard, providing you the ultimate in flexibility and speed. With Wi-Fi® Protected Access (WPA™) included, your wireless connections are robust and secure, giving you the security to communicate without fear that your signal might be compromised.

The HH1620 comes loaded with Performance Enhancement technology that accelerates your wireless network and your fun. This new technology boosts wireless performance among compatible Motorola devices up to 35% faster than over standard 802.11g networking.

Upgradeable firmware keeps the router's control software up-to-date. The HH1620 captures the latest technology in a package that stays current, protects your home network, and provides you easy home network management.

Features

The HH1620 Wireless VoIP Gateway provides:

- Up to two lines of robust, full-featured telephone and fax service
- Voice-over-data prioritization so you can speak on the phone while using the Internet with no reduction in voice quality
- Full network connectivity in a single unit, eliminating the cost and clutter of stand-alone routers and hubs
- VPN pass-through support for remote access to enterprise applications
- Portability to plug into any broadband connection (cable or DSL)
- Plug-and-play installation
- Compact, low-profile design
- Easy Web-based configuration
- Support for features such as caller ID, call waiting, three-way calling, and call forwarding
- Firewall to help protect your network against external attacks
- Connects the laptop wirelessly and allows you to roam unfettered
- Supports a multitude of devices that operate with both 802.11g and 802.11b wireless communication standards
- Protects your wireless communications using Wi-Fi Protected Access (WPA), Wi-Fi Protected Access version 2 (WPA2TM), 802.1X, and Wired Equivalent Privacy (WEP) security algorithms
- Supports peer-to-peer communication using built-in Wireless Distribution System (WDS) functionality

Box Contents

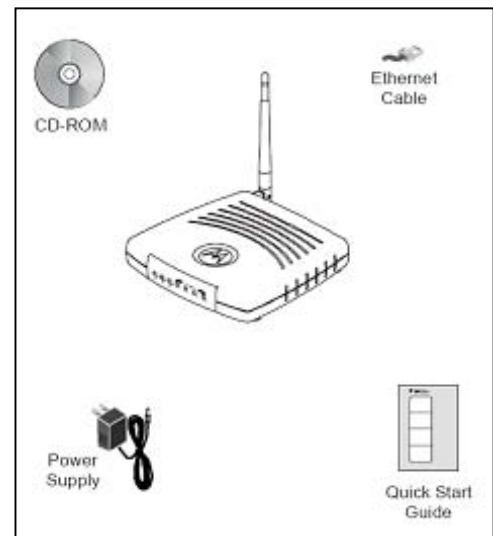
Your box contains the following:

AC Adapter: Connects the HH1620 to an AC electrical outlet (the plug shown is for the USA; yours may look different)

Ethernet Cables: Blue cable connects the **Internet** port on your HH1620 to your cable or DSL modem Yellow cable connects an **Ethernet** port on your HH1620 to a computer or other network device

Quick Start Guide: Provides instructions to quickly set up and configure your voice gateway

Telephone Cables: Connect the ADSL port on your HH1620 to the wall jack. And connect the TEL Port on your HH1620 to your telephone.



In addition to your HH1620, you also need:

- An established DSL or cable Internet connection
- One or two touch-tone telephones
- One or more computers with these minimum requirements:
 - Pentium-class processor or faster
 - 16 MB of memory
 - 10 MB of hard disk space available
 - Windows® 98, Windows 98 SE, Windows Me®, Windows NT®, Windows XP™
- A 10/100Base-T category 3 or better straight-through Ethernet cable with RJ-45 terminators for each computer to be wired to the network (the yellow cable provided with the voice gateway connects one computer)

If you purchased your HH1620 voice gateway from a retail location, you must first activate your XXXXX® Phone Service. You will need to provide the **WAN MAC ID** on the bottom of the HH1620.

Precautions

Postpone installation until there is no risk of thunderstorm or lightning activity in the area. To prevent overheating the HH1620, do not block the ventilation holes on the unit. Do not open the HH1620.



We recommend powering your HH1620 through a surge protector or universal power supply (UPS).

Caution!

Gather Information

You may need to obtain the following information about your high-speed Internet connection:

- For a DSL connection only, your user name and password
- For a cable modem connection using static IP addresses only, your IP address, subnet mask, default gateway, and DNS server IP address or addresses

If you already have a router, we recommend printing its configuration screens to use for reference during Basic Configuration.

Connect the HH1620

- If you already have a router, use instructions [A: Installation With an Existing Router](#).

Note: *If you have more than one computer connected to a single Internet connection, you have a router.*

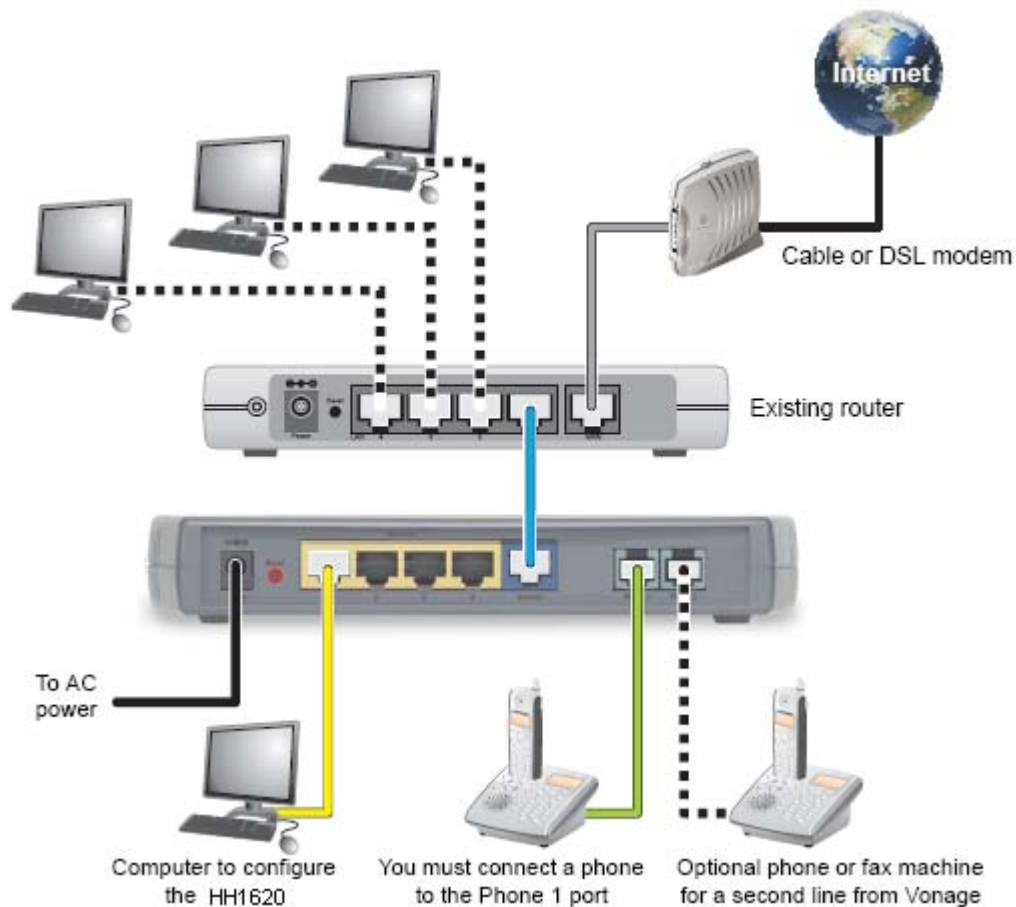
- If your cable or DSL modem has a built-in router with multiple computers connected, you should also use instructions A.

Note: *Some cable data and DSL providers supply modems containing a router. If your modem has multiple Ethernet ports, it probably contains a router. If you are not sure, call your cable or DSL provider and ask them whether your modem contains a router.*

- If you have a standard cable or DSL modem with just one computer connected, use instructions B: Installation With a Standard Modem.

You can place the HH1620 on a flat surface horizontally or vertically. For vertical installation, insert the voice gateway into the supplied base stand. The voice gateway slides snugly into a notch in the stand to keep it stable.

A Installation With an Existing Router



1. Unplug your cable or DSL modem power cord or adapter.
2. Unplug your router power cord or adapter. Please leave your modem and router connected to the cable or phone line that provides your Internet connection.
3. Disconnect one computer from your router.
4. Connect one end of the blue Ethernet cable to an Ethernet port on your router.
5. Connect the other end of the blue Ethernet cable to the blue Ethernet port labelled **Internet** on the rear panel of your voice gateway.
6. Connect one end of the yellow Ethernet cable to the **Ethernet 1** port on your voice gateway.
7. Connect the other end of the yellow Ethernet cable to the Ethernet port on the computer you disconnected in step 3.
8. Plug your cable or DSL modem power cord or adapter into an AC power outlet. Refer to the instructions provided with the modem.

IMPORTANT: Before you continue, be sure to allow enough time for your modem to complete its start-up process. Refer to the information provided by the modem manufacturer. For example, startup for a Motorola SURFboard cable modem is complete when its Power, Receive, Send, and Online lights are on and no longer flashing.

9. Plug your router power cord or adapter into an AC power outlet. Be sure to allow enough time for your router to complete its start-up process. Refer to the instructions provided with the router.
10. Connect the power adapter supplied with your voice gateway to the **Power** connector on its rear

panel.

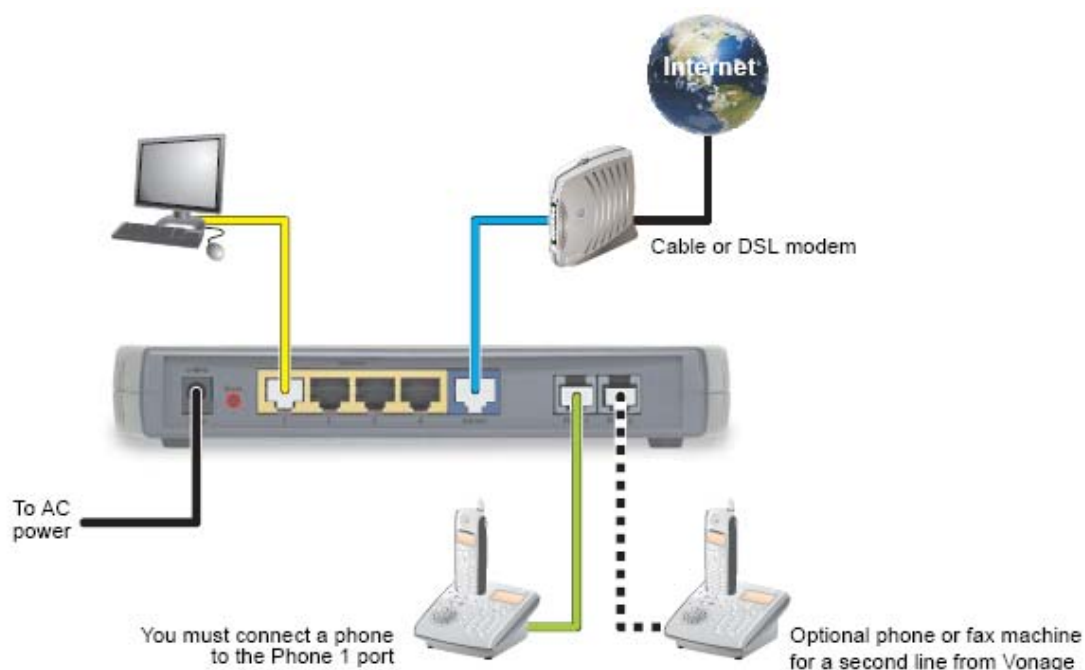
11. Plug the other end into an AC power outlet.
This turns on your voice gateway. The HH1620 does not have an On/Off power switch. The Power light on the front panel performs a series of blinks as described in “[Front Panel](#)” on page 3. *You should not unplug your voice gateway when it is not in use.*

IMPORTANT: Before you continue, be sure to allow enough time for your voice gateway to complete its start-up process. HH1620 startup is complete when the Power light on its front panel lights solid green. This usually takes a few minutes.

We recommend plugging the HH1620 power adapter into an electrical outlet that is grounded and equipped with a surge protector or [UPS](#).

12. Turn on your computer. The Ethernet 1 light on the HH1620 front panel should light.
IMPORTANT: Before you continue, be sure the HH1620 Power, Ethernet 1, and Internet lights are all on.
13. On your computer, open a Web browser such as Microsoft Internet Explorer, Netscape Navigator®, or Mozilla Firefox®.
14. Check your Internet connection by visiting any website.
 If your Internet connection does not work, see “[Troubleshooting](#)” on page 66.
 If your Internet connection works, go to [C “Connecting Your Telephone”](#) on page 12.

B Installation With a Standard Modem



1. Shut down your computer properly. Follow the instructions provided with the computer.
2. Unplug your cable or DSL modem power cord or adapter.
3. Disconnect any cables connecting your computer to the modem. Please leave your modem connected to the cable or phone line that provides your Internet connection.

Hint: Your modem should remain off for about 10 minutes to “clear its memory” so it can recognize the HH1620 when you turn it back on. You can continue with the installation during this time.

4. Connect one end of the blue Ethernet cable to the Ethernet port on your modem.
5. Connect the other end of the blue Ethernet cable to the blue Ethernet port labeled **Internet** on the rear panel of your voice gateway.
6. Connect one end of the yellow Ethernet cable to the **Ethernet 1** port on your voice gateway.
7. Connect the other end of the yellow Ethernet cable to the Ethernet port on your computer.

Hint: Your modem should remain off for about 10 minutes to “clear its memory” so it can recognize the HH1620 when you turn it back on. You can continue with the installation during this time.

Note: If your high-speed Internet connection was through [USB](#) and your computer does not have an Ethernet adapter, see “[Troubleshooting](#)” on page 66 for information.

Optionally, you can connect up to three more computers directly to the other HH1620 Ethernet ports (2, 3, or 4) using Ethernet cables. You can purchase additional Ethernet cables from any electronics or computer retailer.

8. Plug your cable or DSL modem power cord or adapter into an AC power outlet. Refer to the instructions provided with the modem.

IMPORTANT: Before you continue, be sure to allow enough time for your modem to complete its start-up process. Refer to the information provided by the modem manufacturer. For example, startup for a Motorola SURFboard cable modem is complete when its Power, Receive, Send, and Online lights are on and no longer flashing.

9. Connect the power adapter supplied with your voice gateway to the **Power** port on its rear panel.
10. Plug the other end into an AC power outlet.

This turns on your voice gateway. The HH1620 does not have an On/Off power switch. The Power light on the front panel performs a series of blinks as described in “[Front Panel](#)” on page 3. *You should not unplug your voice gateway when it is not in use.*

IMPORTANT: Before you continue, be sure to allow enough time for your voice gateway to complete its start-up process. HH1620 startup is complete when the Power light on its front panel lights solid green. This usually takes a few minutes.

We recommend plugging the HH1620 power adapter into an electrical outlet that is grounded and equipped with a surge protector or [UPS](#).

11. Turn on your computer. The Ethernet 1 light on the HH1620 front panel should light.

IMPORTANT: Before you continue, be sure the HH1620 Power, Ethernet 1, and Internet lights are all on.

12. On your computer, open a Web browser such as Microsoft Internet Explorer, Netscape Navigator®, or Mozilla Firefox®.

13. Check your Internet connection by visiting any website.
If your Internet connection does not work, continue with step 14.
If your Internet connection works, go to [C "Connecting Your Telephone"](#) on page 12.
14. Depending on whether your high-speed Internet service is cable or DSL, do *one* of the following:

Cable modem users:

First, as mentioned in step 3, be sure your cable modem remained off for at least 10 minutes before you turned it back on.

If leaving the cable modem unplugged for at least 10 minutes does not correct your problem, you may need to register your HH1620 with your cable provider. Please contact them to update your information. You need to provide them with the **WAN MAC ID** on the bottom of the HH1620.

When your Internet connection works, go to [C "Connecting Your Telephone"](#) on page 12.

DSL modem users:

You may need to configure [PPPoE](#) to work with your HH1620:

- On a computer connected to one of the HH1620 **Ethernet** ports, open a Web browser.
- In the **Address** field, type **http://192.168.15.1** and press **ENTER**.
- In the **Username** and **Password** fields, type **router** and click **Log In**. The HOME page is displayed.
- Click **SETUP** followed by **WAN Configuration**. From the **Type** drop-down list, choose **PPPoE**:
- Type the **Username** and **Password** you normally use to log in to your DSL service.
- In the **Keep Alive** field, type **0** to ensure that your DSL link is always active.
- Click **Connect** to start your Internet connection.
- Click **Save**. Go back to step 13 to test your Internet connection.
- For details and more screen shots, see "[Logging In to the HH1620](#)" on page 14 and "[WAN Setup for PPPoE \(DSL\)](#)" on page 18.

When your Internet connection works, go to [C "Connecting Your Telephone"](#) on page 12.

C Connecting Your Telephone

1. In the United Kingdom, connect your BT telephone cord to the Telephone Jack Adapter. Connect the adapter to the green **Phone 1** port on the HH1620.
In the United States, connect a telephone cord to the green **Phone 1** port on the HH1620.
If you only subscribed to one phone line from Xxxxx, you must connect your phone to the Phone 1 port.
2. If you subscribed to a second phone or fax line from Xxxxx, connect a telephone or fax machine to the **Phone 2** port.
3. Check for a dial tone. If you hear a recording instructing you to connect your phone to the **Phone 1** port, please do so. If you hear neither this message nor a dial tone, refer to "[Troubleshooting](#)" on page 66.
4. If you hear a dial tone, to complete your installation:
 - In the United Kindom, call **0207 993 8973**.
 - In the United States, call **1-800-342-1791**.

Basic Configuration

The HH1620 provides a graphical user interface (GUI) to configure Ethernet, router, [DHCP](#), and security settings.

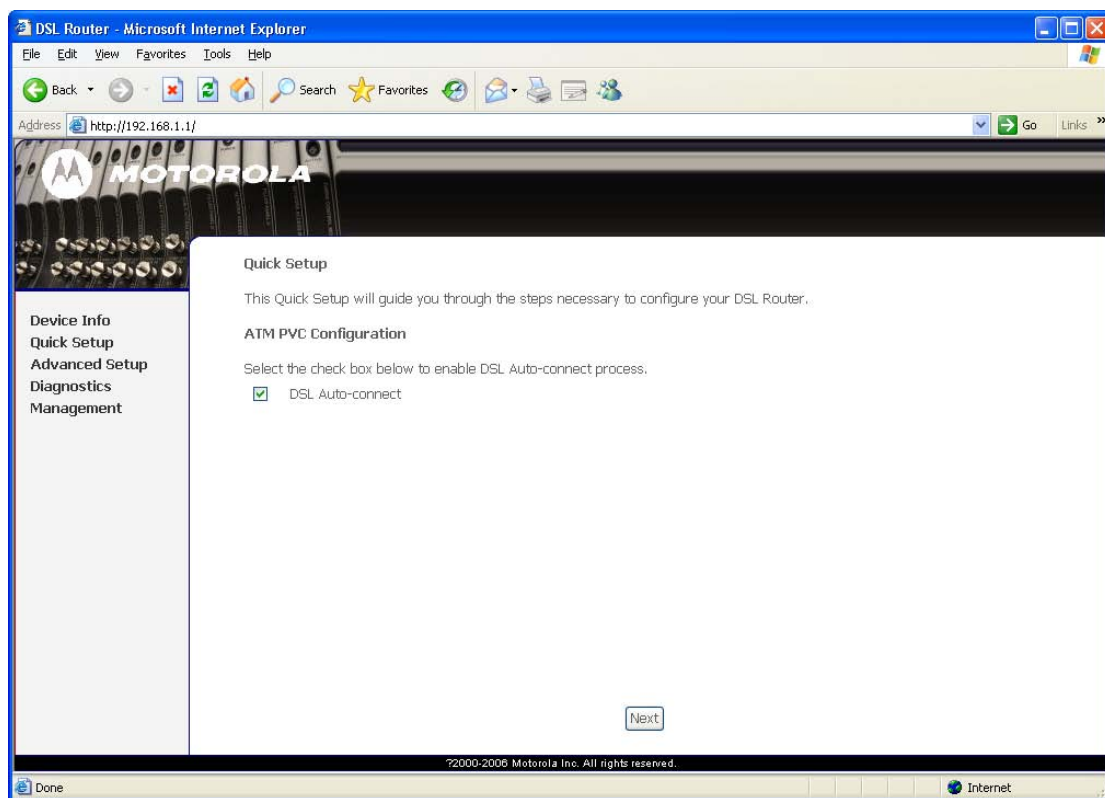
It is much easier to configure your local area network (LAN) using a HH1620 than with traditional networking equipment. *For basic operation, most default settings require no modification.*

If DHCP is enabled on all of the computers on your home network (LAN), you do not need to change any of the default LAN settings. Unless you have sufficient networking knowledge, we recommend not changing any LAN settings.

For information about advanced configuration, see [“Advanced Configuration”](#) on page 23.

Logging In to the HH1620

1. On a computer connected to the HH1620, open a Web browser.
2. In the **Address** or **Location** field, type **http://192.168.1.1** and press **ENTER** to display:
3. In the **Username** field, type **admin**.
4. In the **Password** field, type the **admin**.
5. Click **OK** to log in to the main page:



WAN Configuration

1. Log in to the HH1620 (see [“Logging In to the HH1620”](#) on page 14).
2. Click **Quick Setup**.
3. Click **WAN Configuration**.
4. From the **Type** drop-down list, choose *one* of:
 - PPPoE** PPPoE is used with all DSL modems See [“WAN Setup for PPPoE \(DSL\)”](#) on page 18

Static For some cable modems, the cable company assigns the cable modem a static (unchanging) IP address. You must provide the IP address, subnet mask, default gateway, and one to three domain name server (DNS) addresses.

See [“WAN Setup for a Static IP Address \(Cable Modem\)”](#) on page 19.

DHCP Most cable modems have a dynamic IP address assigned by the cable company DHCP server. Typically no additional configuration is needed for the HH1620. See [“WAN Setup for DHCP \(Cable Modem\)”](#) on page 20.

WAN Setup for PPPoE (DSL)

WAN Setup for a Static IP Address (Cable Modem)

WAN Setup for DHCP (Cable Modem)

LAN Configuration

If DHCP is enabled on all of the computers on your home network (LAN), you should not need to change any of the default LAN settings. For information about enabling DHCP, see [“Configuring TCP/IP”](#) on page 54.

Unless you have sufficient networking knowledge, we recommend not changing any LAN settings.

Figure

Field or Button Description

Subnet IP Address	Sets your LAN subnetwork IP address in dotted-decimal format . <i>We recommend not changing the default 192.168.1.1.</i>
Netmask	Sets the HH1620 subnet mask , in dotted-decimal format. The default is 255.255.255.0, which enables the HH1620 router to support up to 253 users connected through multiple hubs, switches, routers, or wireless access points.
Default Gateway	Sets the default gateway IP address for your network, in dotted-decimal format. It must be in the range for the subnet specified by Subnet IP Address and Netmask. <i>We recommend not changing the default 192.168.1.1.</i>
Host Name	Sets the voice gateway host name. It can contain any alphanumeric characters, except spaces.
Domain	Sets the domain name. It is used in conjunction with the host name to uniquely identify the voice gateway. To access the web pages of the voice gateway you can type 192.168.15.1 (the IP address) or mygateway1.rgw (hostname.domain).

Advanced Setup

This section describes the [Advanced Setup](#) menus.

The ADVANCED menu provides the following links:

Understanding Functions

Before installing your wireless router, please take a few minutes to review the wireless networking functions described in this section.

Router

Generally, routers connect two networks together. The HH1620 connects your home network with the Internet, which can be thought of as a very large network.

The router's firewall inspects each packet of data as it flows in from the Internet before delivering it to the appropriate PC. Network Address Translation (NAT) protects the privacy of the IP addresses of devices on your home network, by translating them into a single address when visible to the public Internet. This is how your network remains protected and private on the Internet.

LAN (Local Area Network)

A local area network provides a full-time, high-bandwidth connection over a limited area such as a home, building, or campus. Ethernet is the most widely used LAN standard.

TCP/IP

Transmission Control Protocol/Internet Protocol (TCP/IP) comprises the backbone of the Internet. IP moves packets of data between nodes while TCP verifies delivery from client to server. Every device you hook up to your wireless router identifies itself with an IP address.

You are able to assign devices on your network with either a static or dynamically assigned IP address.

Static IP Address

A static IP address is a fixed address that is assigned manually to a device on the network.

Static IP addresses must be unique and cannot be shared, therefore they are used in situations where the address should never change, like print servers or PC servers.

If you are using your wireless router to share an Internet connection, your Internet Service Provider (ISP) might have assigned you a static IP address, which you will use when configuring your router. See Section 3: Configuration.

Dynamic IP Address

A dynamic IP address is a temporary IP number, dynamically or randomly generated by a DHCP server. The address lasts only as long as the server allots, usually in the space of a day or two. When the IP address expires, the client is automatically reassigned a new IP address, ensuring smooth communication.

If you are using your wireless router to share an Internet connection, your ISP might have assigned you a dynamic IP address, which you use when configuring your router. See Section 3: Configuration.

DHCP Server

A Dynamic Host Configuration Protocol (DHCP) Server assigns IP addresses to clients connected to the router. A client is any device that can connect with your router. The client (PC, gaming device, etc.) is automatically assigned an IP address every time a device is added to your network, which frees you from manually assigning IP addresses.

Sample Home Network Diagram

Your wireless router serves as the centerpiece of your network, allowing you to share files, printers, and the Internet connection. A sample home network is shown below:



The Internet communicates with the modem, which in turn communicates with the router. The router acts as the gateway to your network; it sends devices information such as requests for Internet access, file sharing, or multiplayer games. The router controls the information for your network, intelligently routing the information to its required destination while at the same time protecting your network from the public domain.


Router Physical Description

The following sections describe the physical characteristics of your router. For instructions on installing your router, see Section 2: Installation.

Back of Router

The following illustration shows the HH1620 back panel:





Using a power supply with a different voltage rating than the one included with the HH1620 will cause damage and void the warranty for this product.

WARNING!

Feature	Description
Power	Connector for a 12 V adapter that you plug into an AC power outlet
Reset Button	<p>Resets your router or resets the router to the default login settings.</p> <p>If the router experiences trouble connecting to the Internet, briefly press and release the Reset button to reset the router. This retains the router's configuration information.</p> <p>To reset the router to the factory defaults, press and hold the Reset button for more than five seconds. This clears the HH1620's Username, Password, IP Address, Subnet Mask and Operation Mode.</p>
LAN 1,2,3	<p>These three ports connect the router to your LAN or home network using Ethernet cables. This enables communication among clients, such as PCs or print servers, on the network. The LAN ports support either 10-BASE-T or 100-BASE-T transmission speeds as well as straight-through and crossover Ethernet cables.</p> <p>Any of these three ports can also serve as an uplink port to other network devices, such as another router or switch, which allows you to extend your network.</p>
WAN	This port serves as an uplink port to other network devices, such as router or switch, which allows you to extend your network.
TEL1, 2	<p>Connect your HH1620 to the standard analog telephone(s) using this port with your supplied RJ-11 cables.</p> <p>This enables your HH1620 to make calls via the Internet.</p>
ADSL	<p>Connect your HH1620 to the ADSL wall outlet using this port with your supplied RJ-11 cable.</p> <p>This enables your HH1620 to access the Internet.</p>
USB	This port connects the router to your computer using USB cables.
Printer Port	This port connects the router to printer using a USB cable. This feature is used to share the printer on the network.
Antenna	The antenna is used for wireless connections. You are able to rotate the antenna to gain the best signal reception.

Top Case of HH1620

The following illustration shows the HH1620 front panel:



The LEDs of the router indicate its operational status.

LED Description

LED	Description
Power	Indicates the unit is powered on.
Status/Alarm	The Status LED will flash when performing a self-test/booting up or is registering with the service provider. The Status LED will flash green slowly when the system is connected with the service. The Alarm LED will light solid red if the self-test or boot up fails. The Alarm LED will flash red slowly when the system is ready but cannot receive an acknowledgement from the service.
Prov	This LED flashes when the device has established a connection and received authorization from your service provider.
WAN	When a connection is established the 10 or 100 LED will light up solid. The LED will blink to indicate activity. If the 10 or 100 LED does not light up when a cable is connected, verify the cable connection and make sure your device is powered on.
LAN1-3	When a connection is established the 10 or 100 LED will light up solid on the appropriate port. The LEDs will blink to indicate activity. If the 10 or 100 LED does not light up when a cable is connected, verify the cable connections and make sure your devices are powered on.
Phone1-2	This LED displays the VoIP status and Hook/Ringing activity on the phone port that is used to connect to your normal telephone(s)/fax machine and regular telephone line. If a phone connected to a phone port is off the hook or in use, this LED will light solid. When a phone is ringing, the indicator will blink.
ADSL	When a DSL connection is established, this LED will light up solid. The LED will blink to indicate activity. If it does not light up when a DSL cable (RJ-11 line) is connected, verify the cable connection and make sure your device is powered on.

2. Installation

This section will help you:

- physically install your HH1620, and
- establish a first connection between a PC and the HH1620.

Once this first connection is made, you can configure the HH1620 to support all of the other wired and/or wireless connections you need.

Physical Installation of the HH1620

Positioning Your HH1620 for Optimal Wireless Performance

The HH1620 uses a radio transmission technology defined by the Institute of Electrical and Electronics Engineers (IEEE) called 802.11 Wireless Fidelity (Wi-Fi). This standard is subdivided into distinct categories of speed and the frequency spectrum used, designated by the lower case letter after the standard.

For example, your router supports both the 'b' and 'g' specifications. The 802.11b specification transmits data rates up to 11 Mbps while the 802.11g specification transmits data rates up to 54 Mbps. These are theoretical standards so your performance may vary.

The radio waves radiate out in a donut-shaped pattern. The waves travel through walls and floors, but transmission power and distance are affected. The theoretical distance limit is 1,000 feet (305 meters), but actual throughput and distance varies.

Both standards operate in the 2.4 GHz range, meaning other electrical appliances also might interfere with the router – televisions, radios, microwave ovens, or 2.4 GHz cordless telephones. Therefore, positioning your router where it encounters the least interference helps maintain a better connection.

The following lists the expected wireless range of the router. This table is only a guide and coverage varies due to local conditions.

Data Rate	Open Area	Closed Area
54 Mbps	Up to 100 ft (30m)	Up to 60 ft (18m)
11 Mbps	Up to 900 feet (275 m)	Up to 160 feet (49 m)
5.5 Mbps	Up to 1300 feet (396 m)	Up to 200 feet (61 m)
2 or 1 Mbps	Up to 1500 feet (457 m)	Up to 300 feet (91 m)

To achieve the best wireless performance, review these guidelines before deciding where to place your router:

- Placing your base station in the physical center of your network is the best location because the antenna sends out the signal in all directions.
- Placing the router in a higher location, such as on top of a cabinet, helps disperse the signal cleanly, especially to receiving locations on upper stories.
- If possible, position your router so there is direct line of sight between the router and your other home network devices.
- Avoid placing the router next to large solid objects like computer cases, monitors, walls, fireplaces, etc. This helps the signal penetrate more cleanly.
- Other wireless devices like televisions, radios, microwaves, and 2.4 GHz cordless telephones can interfere with the signal. Keep these devices away from the router.
- Mirrors, especially silver-coated, can reduce transmission performance.

Hardware Setup

Hardware setup includes:

Antenna Installation: connecting the antenna to the router

Physical Placement: how and where you physically place your router

Electrical Connection: how to connect the power cord

Antenna Installation

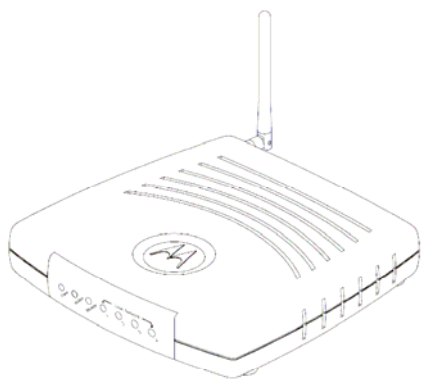
When shipped, the antenna for the HH1620 is not connected to the router. To attach the antenna to the router:

1. Locate the antenna port on the back of the router (the threaded knob).
2. Screw the antenna connector clockwise on to the threaded knob until firmly seated. Do not over-tighten.



Physical Placement

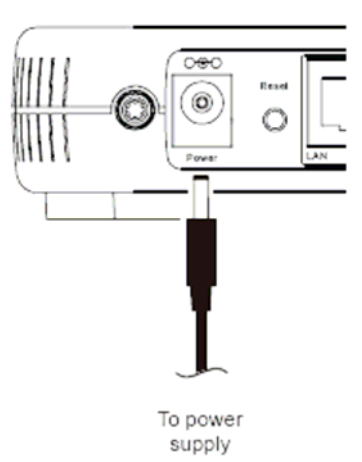
1. Place the router in the desired location and follow the procedures below for connecting and configuring the router.



2. Follow the installation procedures for connecting and configuring the router.

Electrical Connection

Your router does not have an On/Off power switch and therefore will only be powered on by plugging in the power adapter.



1. Connect the power adapter to the router's Power port, found on the back of the router.
2. Plug the power adapter into a grounded and surge-protected power outlet. The Power LED on the front panel lights green when connected properly.

Establishing Your First Connection to the HH1620

Once the HH1620 is placed, you can now establish your first PC connection to the HH1620. There are three ways to choose from to accomplish this:

- If your first connection will be a wired connection (i.e., an Ethernet cable will connect the PC and the HH1620), you can follow the step-by-step easy install process with the included HH1620 Installation Wizard CD-ROM. (recommended)
- If your first connection will be a wired connection, but you do not wish to use the HH1620 Installation Wizard CD-ROM, you can manually install this first wired connection.
- If your first connection will be a wireless connection, you can manually install this first wireless connection.

Easy Install Process

Run the Installation Wizard program from the supplied CD-ROM to quickly set up your network. Once your network is up and running, for advanced configuration, see Section 3: Configuration.

The Installation Wizard will automatically run once you place the CD-ROM in your PC's CD-ROM drive. It will confirm that the antenna and electrical connections have been made, and then lead you step-by-step through setting up your HH1620 in a typical configuration as a wired/wireless router.

Manual Install – Wired Connection

If you are manually connecting your PC with an Ethernet cable to the router, your PC must be installed first with an Ethernet adapter. You need two Ethernet cables for this procedure, one to connect the router to the modem and one to connect a PC to the router.

Figure

1. If you are currently running broadband to a single computer: Unplug the Ethernet cable that runs between your modem and PC from the back of your PC and plug it into the

port labeled WAN on the back of your router.

If you are not running broadband to a single computer: Connect an Ethernet cable to the WAN port on your router.

2. Connect the other end of the same cable to your cable or DSL modem. You have now connected the router to the modem. It will be necessary to restart your cable or DSL modem after making this connection.
3. To connect the PC to the router, use a second Ethernet cable and connect it to the Ethernet port on your PC.
4. Connect the other end of the same cable into one of the LAN ports on your router. You have now connected your PC to the router.
5. Your PC's Ethernet adapter may need to be configured to work with the HH1620. By default, the HH1620 has a LAN IP Address of 192.168.1.1, and dynamically assigns an IP Address to connected devices. The PC will not communicate properly with the HH1620 if the Ethernet adapter is not configured either:
 - (a) to accept a dynamic IP Address, or
 - (b) with a compatible static IP Address (i.e., 192.168.10.x, where x is a number between 2 and 254).

To make any necessary adjustments to your PC's Ethernet Adapter, you can follow the instructions in this section under Configuring Computers to Communicate with the HH1620.

NOTE: You can make wired connections between the HH1620 and other devices by repeating Steps 3, 4, and 5 with each of those devices.

6. Once the PC is communicating with the HH1620, you can proceed to Section 3: Configuration to access the built-in Web-based Configuration Utility and configure the HH1620:
 - For a typical HH1620 configuration as a wired/wireless router, review and adjust as necessary only those configuration options designated as "commonly used" or "recommended". These fields are labeled with white letters.
 - For advanced HH1620 configuration, review and adjust any and all configuration options as desired. Field codes requiring more advanced knowledge to configure are labeled with black letters.

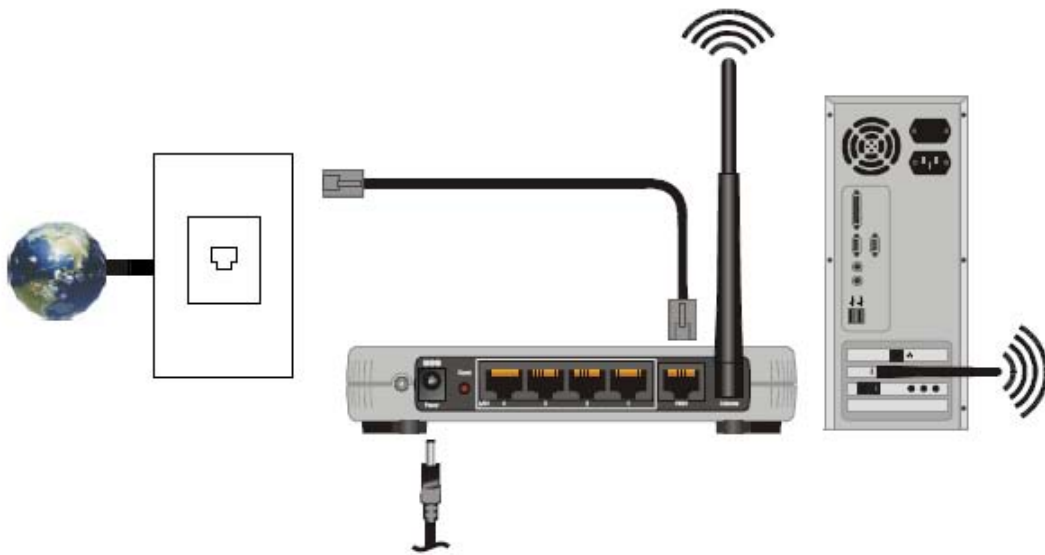
Manual Install – Wireless Connection



WARNING!

When first configuring your router, it is recommended that you have an Ethernet cable connected to the router. Performing the INITIAL configuration using a wireless connection is not secure and is not recommended. After you have finished the initial configuration of the router, your connection will be secure and you can safely use either a wired or wireless connection.

If you are connecting your client wirelessly to the router, you can use the Motorola WPCI810G or WPCI810GP, a wireless PCI adapter for your desktop PC. If you have a laptop, the Motorola WN825G or WN825GP wireless PC card adapter provides access. A Motorola WU830G wireless USB adapter can also provide access for desktops or laptops.



1. If you are currently running broadband to a single computer, unplug the Ethernet cable that runs between your modem and PC from the back of your PC and plug it into the port labeled WAN on the back of your router.
If you are not running broadband to a single computer, connect an Ethernet cable to the WAN port on your router.
2. Connect the other end of the same cable to your cable or DSL modem. You have now connected the router to the modem. It will be necessary to restart your cable or DSL modem after making this connection.
3. Your PC's wireless adapter may need to be configured to work with the HH1620. By default, the HH1620 has a LAN IP Address of 192.168.1.1, and dynamically assigns an IP Address to connected devices. The PC will not communicate properly with the HH1620 if the wireless adapter is not configured either:
 - (a) to accept a dynamic IP Address, or
 - (b) with a compatible static IP Address (i.e., 192.168.10.x, where x is a number between 2 and 254).
 To make any necessary adjustments to your PC's wireless adapter, you can follow the instructions in this section under Configuring Computers to Communicate with the HH1620.
4. To connect the PC to the HH1620 through a wireless connection, use your PC's wireless adapter utility to verify:
 - (a) the selection of the SSID (Service Set Identifier) of the HH1620, which by default is set to **motorolaABCDEF012345**, where the final 12 characters represent the HH1620's Wireless MAC address (see the image below to identify the HH1620's Wireless MAC address from the product label),

fig

- (b) that authentication is set to Open, since the HH1620 by default has no wireless authentication enabled, and
- (c) that no encryption is enabled, since the HH1620 by default has no wireless encryption enabled.

Refer to your wireless adapter's documentation for instructions on how to review and adjust these settings.

NOTE: You can make wireless connections between the HH1620 and other devices by repeating Steps 3 and 4 with each of those devices, but it is recommended to wait until after securing your wireless network to do so.

5. Once the PC is communicating with the HH1620, you can proceed to Section 3: Configuration to access the built-in Web-based Configuration Utility and configure the HH1620:
 - For a typical HH1620 configuration as a wired/wireless router, review and adjust as necessary only those configuration options designated as “commonly used” or “recommended”. These fields are labeled with white letters.
 - For advanced HH1620 configuration, review and adjust any and all configuration options as desired. Field codes requiring more advanced knowledge to configure are labeled with black letters.

In either case, it is recommended that you first use the Web-based Configuration Utility to establish security measures on your wireless network, and re-connect securely to the HH1620, prior to making any other changes to the HH1620.

Configuring Computers to Communicate with the HH1620

Each computer that will be part of your network needs to communicate with the router. To do this, you may need to configure each PC’s network settings to automatically obtain an IP address.

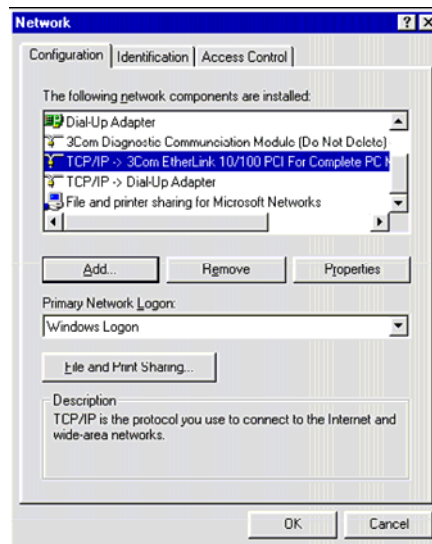
This section includes information on configuring computers with the following operating systems:

- Windows® 98SE
- Windows Me®
- Windows® 2000
- Windows XP™

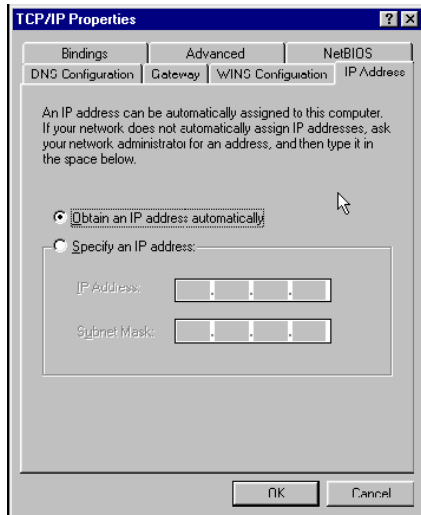
Determine the operating system for each computer you will include in your wireless network and follow the steps to configure the network settings for that PC.

Configuring Windows 98SE and ME

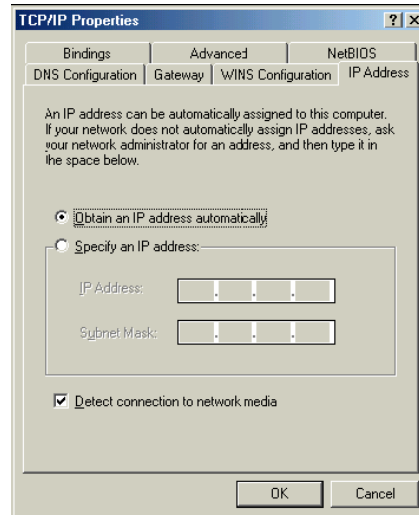
1. Select **Start > Settings > Control Panel**.
2. Double-click **Network**. The Network window is displayed.



3. On the **Configuration** tab, select the TCP/IP line the for the appropriate wired or wireless Ethernet adapter on your PC. There may be multiple adapters installed – choose only the one that is configured for your adapter. In the example above, a 3Com Ethernet adapter card is installed and is the appropriate choice.
4. Click **Properties**. The TCP/IP Properties window is displayed.



Windows 98SE

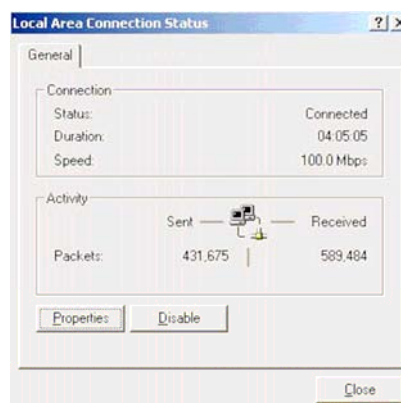


Windows ME

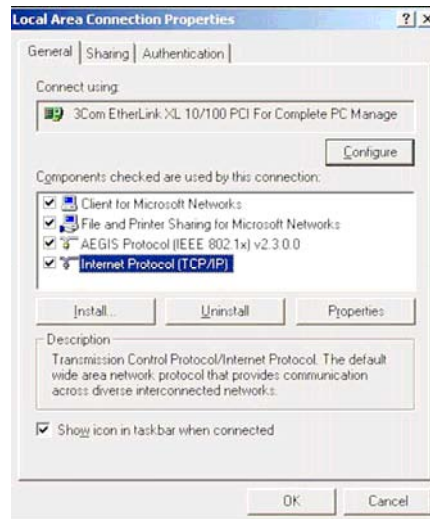
5. Click the **IP Address** tab.
6. Select **Obtain an IP address automatically**.
7. Click **OK**.
8. Click the **Gateway** tab and confirm that the Installed Gateway field is blank.
9. Click **OK** twice. Windows may ask for the Windows Installation disk. First check to see if the installation files are installed at c:\windows\options\cabs. Otherwise, load your Windows CD and follow the prompts.
10. Restart your computer to save your settings.

Configuring Windows 2000

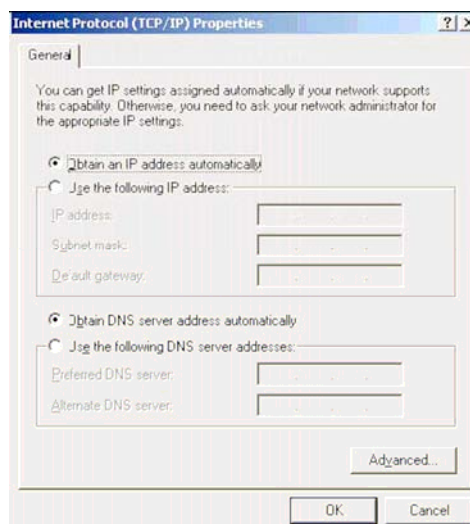
1. Select **Start > Settings > Control Panel**.
2. Double-click **Network and Dial-Up Connections**.
3. Double-click the **Local Area Connection** appropriate for your wired or wireless Ethernet adapter.



4. Click **Properties**.
The Local Area Properties window is displayed.



5. Ensure the box next to Internet Protocol (TCP/IP) is selected.
6. Click to highlight **Internet Protocol (TCP/IP)** and click **Properties**. The Internet Protocol (TCP/IP) Properties window is displayed.



7. Select **Obtain an IP address automatically**. Click **OK** twice to exit and save your settings.
8. Restart your computer to save your settings.

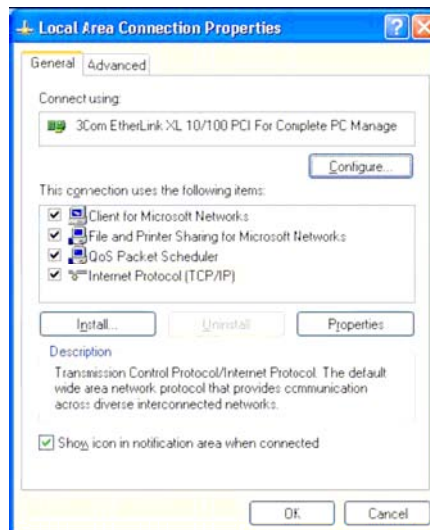
Configuring Windows XP

This configuration assumes you have retained the default interface for Windows XP. If you are running the 'Classic' interface, please follow the instructions for Windows 2000.

1. Select **Start > Settings > Control Panel**.
2. Double-click **Network and Dial-Up Connections**.
3. Double-click the **Local Area Connection** appropriate for your wired or wireless Ethernet adapter.

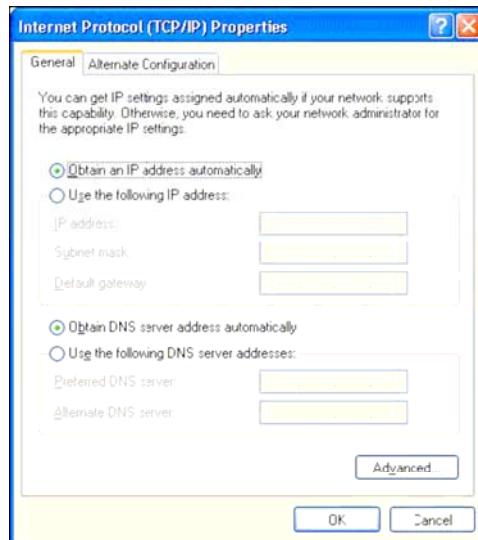


4. Click **Properties**.
The Local Area Properties window is displayed.



5. Ensure the box next to Internet Protocol (TCP/IP) is selected.

6. Click to highlight **Internet Protocol (TCP/IP)** and click **Properties**. The Internet Protocol (TCP/IP) Properties window is displayed.



7. Click **Obtain an IP address automatically**. Click **OK** twice to exit and save your settings.

3. Configuration

This section describes how to use the Web-based Configuration Utility built into your HH1620 Wireless Broadband Router. This utility allows you to customize the HH1620 to meet your specific needs.

The Web-based Configuration Utility provides several pages of configuration options.

These configuration options are factory set to default values, based on the typical use of the HH1620 as a wired/wireless router. When you login to the utility for the first time, you will find all options set to these factory defaults, unless you have already made changes by running the HH1620 Installation Wizard CD-ROM.

In fact, if you have already used the HH1620 Installation Wizard CD-ROM to initially set up your router, in many cases you will not need to adjust any other configuration options.

Where adjustments of configuration options are required, additional online help is provided through “rollover” descriptions. While using the Web-based Configuration Utility, as you roll your mouse cursor over the name of any configuration option, a brief description of that option will be displayed.



Note

The screenshots shown are intended for reference only; your version of firmware may differ slightly.

Accessing the Web-Based Configuration Utility

Logging In

1. Once the router is connected, open your web browser. In the URL field enter `http://192.168.1.1` (the router’s default IP address). Press the Enter key. The login window will appear (the HH1620 login window is shown in the example below):



2. Enter the User Name. The default factory setting is admin.
3. Enter the Password. The default factory setting is admin. Once you have logged in, for security reasons you should change the User ID and Password. See below.



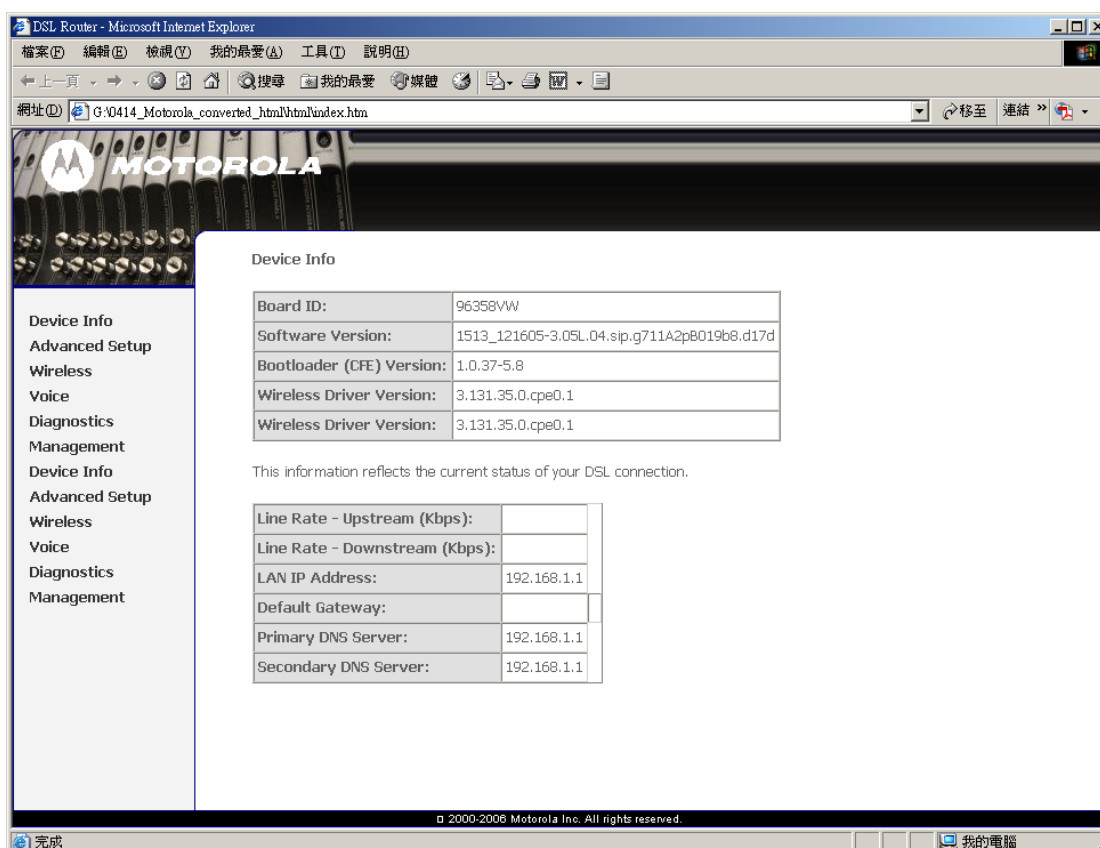
- Click **OK** to enter the Web-based Configuration Utility.
The Main page will appear when entering the Web-based Configuration Utility.

Overview of Configuration Pages

Navigation Between Pages

The Web-based Configuration Utility is made up of nine configuration pages, each with configuration options tied to different functions of the HH1620. A “selection bar,” listing all of these configuration pages, appears at the top of each configuration page.

Figure 3-2 Configuration Page Selection Bar



You can access any page by moving the cursor over a specific configuration page title in the selection bar, and clicking on the page title.

These configuration categories are as follows:

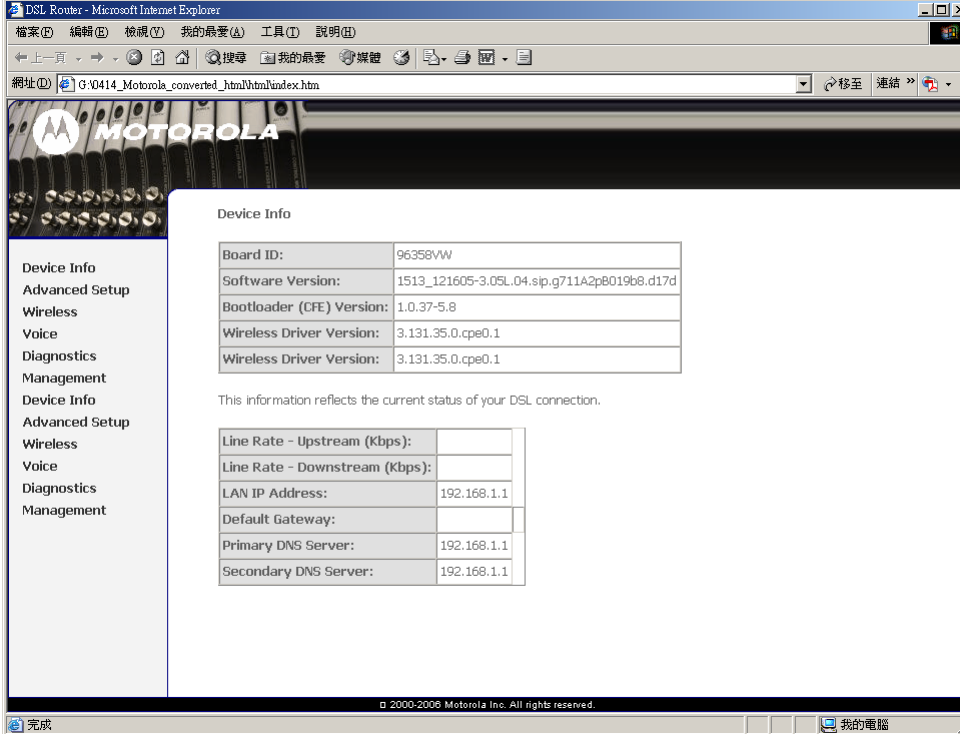
- Device Info:
- Advanced Setup:
- Wireless:
- Voice:
- Diagnostics:
- Management:

What follows are page-by-page descriptions of the configuration options available.

The Device Info Category

It is the first page you see when entering the Web-based Configuration Utility.

Summary



The screenshot shows a Microsoft Internet Explorer browser window displaying the DSL Router configuration utility. The address bar shows the URL: G:\0414_Motorola_converted_html\html\index.htm. The page features a Motorola logo and a navigation menu on the left with the following items: Device Info, Advanced Setup, Wireless, Voice, Diagnostics, Management, Device Info, Advanced Setup, Wireless, Voice, Diagnostics, Management. The main content area is titled "Device Info" and contains two tables.

Device Info

Board ID:	963S8VW
Software Version:	1513_121605-3.05L.04.sip.g711A2pB019b8.d17d
Bootloader (CFE) Version:	1.0.37-5.8
Wireless Driver Version:	3.131.35.0.cpe0.1
Wireless Driver Version:	3.131.35.0.cpe0.1

This information reflects the current status of your DSL connection.

Line Rate - Upstream (Kbps):	
Line Rate - Downstream (Kbps):	
LAN IP Address:	192.168.1.1
Default Gateway:	
Primary DNS Server:	192.168.1.1
Secondary DNS Server:	192.168.1.1

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WAN

This page shows the statistics of each PVC on your HH1620.

The DSL Status page displays current information on the DSL line performance. The page refreshes regularly to represent the latest status.

The screenshot shows the configuration page for the WAN interface. The browser window is titled "DSL Router - Microsoft Internet Explorer" and the address bar shows "http://192.168.1.1/". The page features the Broadcom logo and a navigation menu on the left. The main content area is titled "WAN Info" and contains a table with the following data:

VPI/VCI	Con. ID	Category	Service	Interface	Protocol	Igmp	QoS	State	Status	IP Address
0/35	1	UBR	pppoe_0_35_1	ppp_0_35_1	PPPoE	Disabled	Disabled	Enabled	ADSL Link Down	

At the bottom of the page, there is a copyright notice: "©2000-2005 Broadcom Corporation. All rights reserved."

Statistics – LAN

This page shows the statistics of each connection on your LAN.

The screenshot shows the configuration page for LAN statistics. The browser window is titled "DSL Router - Microsoft Internet Explorer" and the address bar shows "http://192.168.1.1/". The page features the Broadcom logo and a navigation menu on the left. The main content area is titled "Statistics -- LAN" and contains a table with the following data:

Interface	Received				Transmitted			
	Bytes	Pkts	Errs	Drops	Bytes	Pkts	Errs	Drops
Ethernet eth1	307241	2971	0	0	820139	1756	0	0
Ethernet eth0	0	0	0	0	448	7	0	0
USB	0	0	0	0	0	0	0	0
Wireless	0	0	0	0	0	0	0	0

Below the table, there is a "Reset Statistics" button. At the bottom of the page, there is a copyright notice: "©2000-2005 Broadcom Corporation. All rights reserved."

Statistics – WAN

Statistics -- WAN

Service	VPI/VCI	Protocol	Interface	Received				Transmitted			
				Bytes	Pkts	Errs	Drops	Bytes	Pkts	Errs	Drops
pppoe_0_33	0/33	PPPoE	ppp_0_33_1	4238	13	0	0	1406	13	0	0

Reset Statistics

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Statistics – ATM

ATM Interface Statistics

In Octets	Out Octets	In Errors	In Unknown	In Hec Errors	In Invalid Vpi Vci Errors	In Port Not Enable Errors	In PTI Errors	In Idle Cells	In Circuit Type Errors	In OAM RM CRC Errors	In GFC Errors
6768	2880	0	0	0	0	0	0	0	0	0	0

AAL5 Interface Statistics

In Octets	Out Octets	In Ucast Pkts	Out Ucast Pkts	In Errors	Out Errors	In Discards	Out Discards
6768	2880	31	20	0	0	0	0

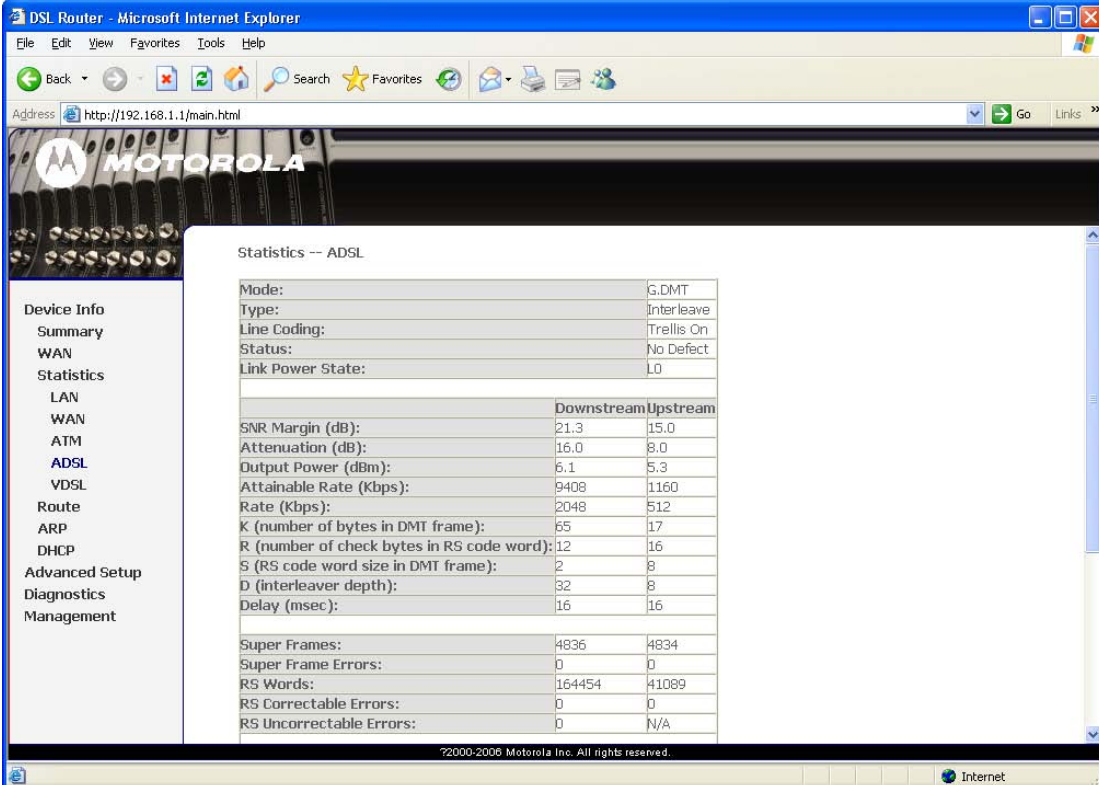
AAL5 VCC Statistics

VPI/VCI	CRC Errors	SAR Timeouts	Oversized SDUs	Short Packet Errors	Length Errors
0/33	0	0	0	0	0

Reset Close

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Statistics – ADSL



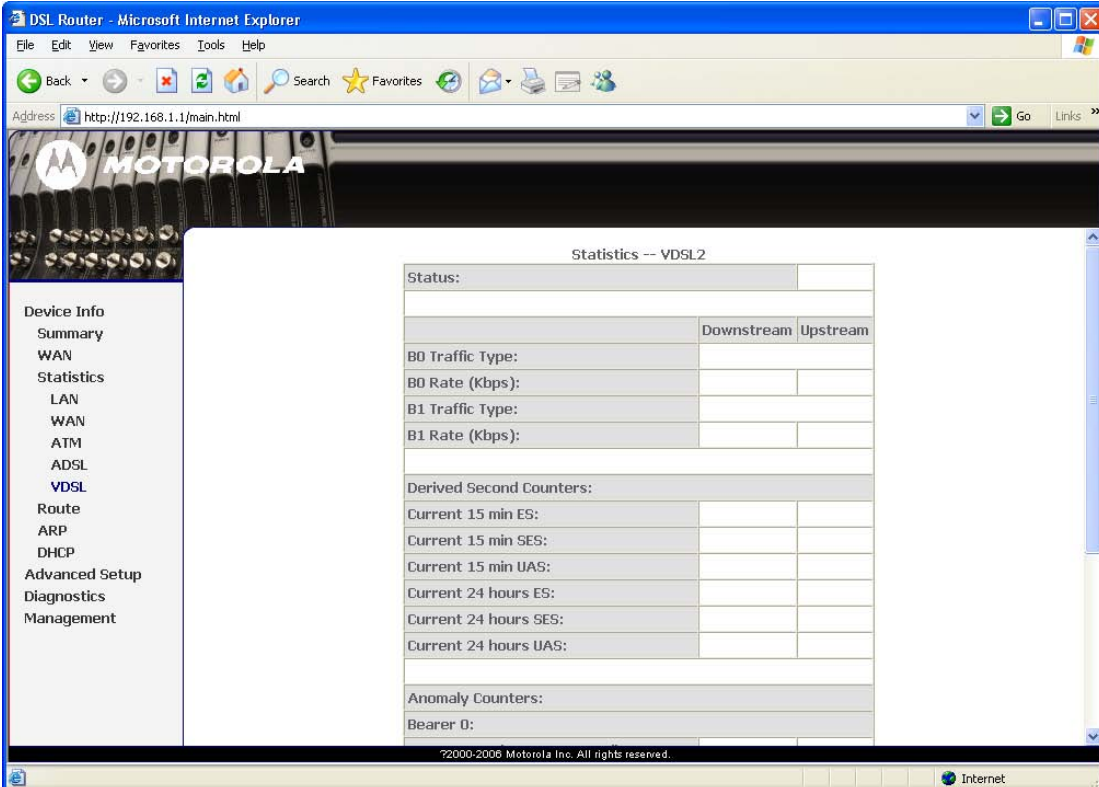
DSL Router - Microsoft Internet Explorer
Address: http://192.168.1.1/main.html

Statistics -- ADSL

Mode:	G.DMT	
Type:	Interleave	
Line Coding:	Trellis On	
Status:	No Defect	
Link Power State:	L0	
	Downstream	Upstream
SNR Margin (dB):	21.3	15.0
Attenuation (dB):	16.0	8.0
Output Power (dBm):	6.1	5.3
Attainable Rate (Kbps):	9408	1160
Rate (Kbps):	2048	512
K (number of bytes in DMT frame):	65	17
R (number of check bytes in RS code word):	12	16
S (RS code word size in DMT frame):	2	8
D (interleaver depth):	32	8
Delay (msec):	16	16
Super Frames:	4836	4834
Super Frame Errors:	0	0
RS Words:	164454	41089
RS Correctable Errors:	0	0
RS Uncorrectable Errors:	0	N/A

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Statistics – VDSL



DSL Router - Microsoft Internet Explorer
Address: http://192.168.1.1/main.html

Statistics -- VDSL2

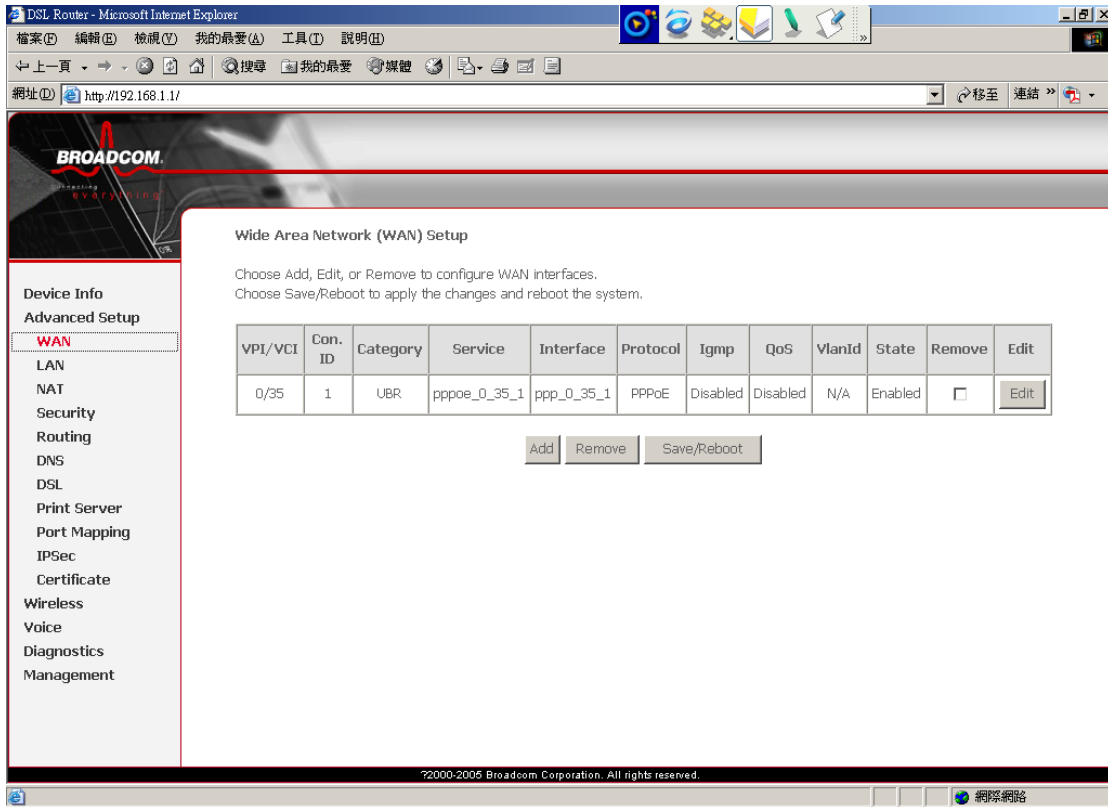
Status:		
	Downstream	Upstream
B0 Traffic Type:		
B0 Rate (Kbps):		
B1 Traffic Type:		
B1 Rate (Kbps):		
Derived Second Counters:		
Current 15 min ES:		
Current 15 min SES:		
Current 15 min UAS:		
Current 24 hours ES:		
Current 24 hours SES:		
Current 24 hours UAS:		
Anomaly Counters:		
Bearer 0:		

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The Advanced Setup Category

It is the

WAN Setup



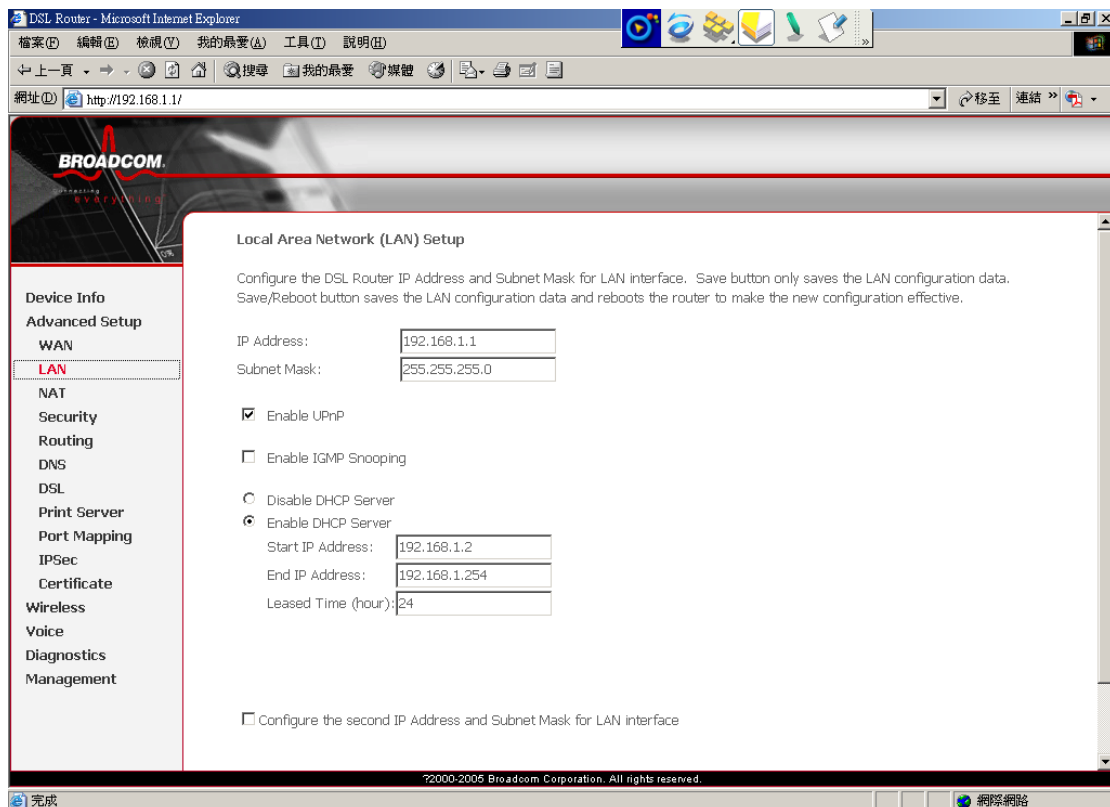
You can click edit to modify an existing WAN interface or tick Remove checkbox and click Remove button to delete a WAN interface.

Type	Details	ISP Data required
Dynamic IP Address	Your IP Address is allocated automatically, when you connect to you ISP.	<ul style="list-style-type: none"> ADSL parameters (VPI and VCI) may be required, if they cannot be detected automatically. Some ISP's may require you to use a particular Hostname or Domain name, or MAC (physical) address.
Static (Fixed) IP Address	Your ISP allocates a permanent IP Address to you. Usually, the connection is "Always on".	<ul style="list-style-type: none"> ADSL parameters (VPI and VCI) may be required, if they cannot be detected automatically. IP Address allocated to you, and related information, such as Network Mask, Gateway IP address, and DNS address.
PPPoE, PPPoA	You connect to the ISP only when required. The IP address is usually allocated automatically.	<ul style="list-style-type: none"> ADSL parameters (VPI and VCI) may be required, if they cannot be detected automatically. User name and password are always required.

		<ul style="list-style-type: none"> If using a Static (Fixed) IP address, you need the IP address and related information (Network Mask, Gateway IP address, and DNS address)
IPoA (IP over ATM)	Normally, the connection is "Always on".	<ul style="list-style-type: none"> ADSL parameters (VPI and VCI) may be required, if they cannot be detected automatically. IP Address allocated to you, and related information, such as Network Mask, Gateway IP address, and DNS address.

LAN Setup

Configure the DSL Router IP address and Subnet mask for LAN interface.



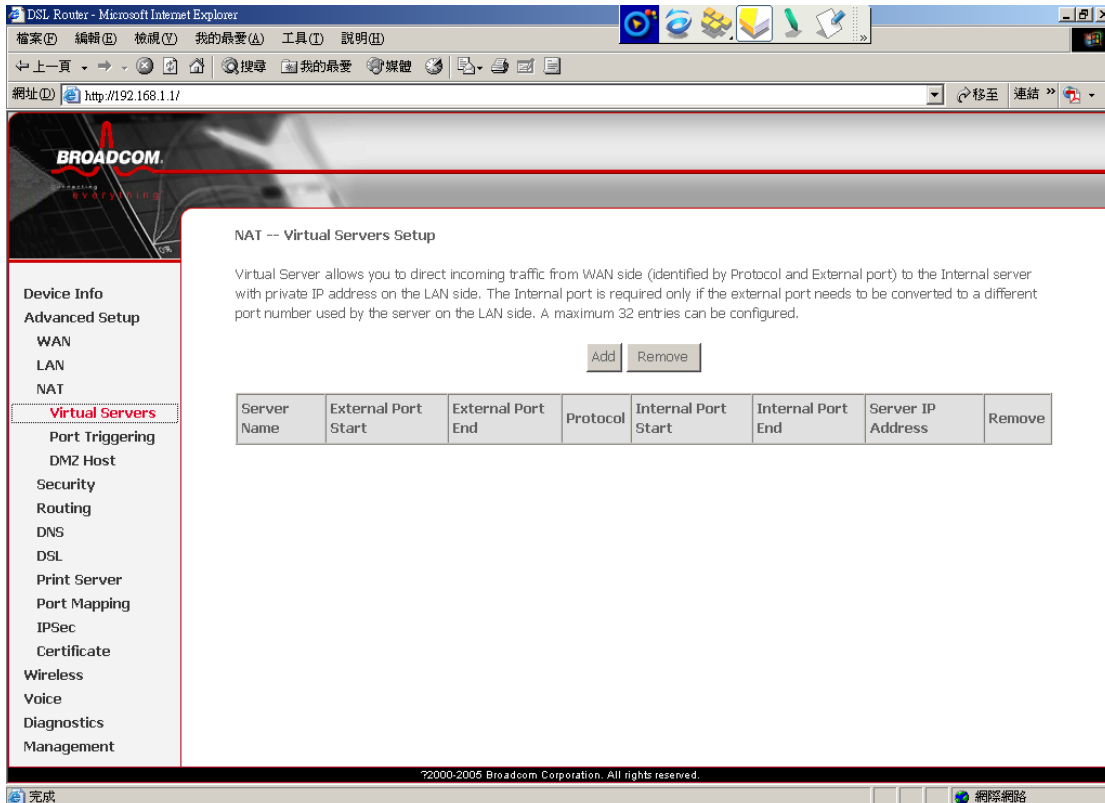
IP Address	IP address for the HH1620, as seen from the local LAN. Use the default value unless the address is already in use or your LAN is using a different IP address range. In the latter case, enter an unused IP Address from within the range used by your LAN.
Subnet Mask	The default value 255.255.255.0 is standard for small (class "C") networks. For other networks, use the Subnet Mask for the LAN segment to which the IAD-200 / IAD-200W is attached (the same value as the PCs on that LAN segment).
Enable UPnP	
Enable IGMP Snooping	IGMP Snooping provides a dynamic user registration mechanism to decide whether to multicast packets or not to the specific user in the specified group.
Enable/Disable DHCP Server	<ul style="list-style-type: none"> If Enabled, the HH1620 will allocate IP Addresses to PCs (DHCP clients) on your LAN when they start up. The default (and recommended) value is Enabled. If you are already using a DHCP Server, this setting must be Disabled,

	and the existing DHCP server must be re-configured to treat the HH1620 as the default Gateway. <ul style="list-style-type: none"> The Start IP Address and End IP Address fields set the values used by the DHCP server when allocating IP Addresses to DHCP clients. This range also determines the number of DHCP clients supported.
--	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Universal Plug and Play (UPnP) is a distributed, open networking standard that uses TCP/IP for simple peer-to-peer network connectivity between devices. An UPnP device can dynamically join a network, obtain an IP address, convey its capabilities and learn about other devices on the network. In turn, a device can leave a network smoothly and automatically when it is no longer in use. UPnP-enabled devices may communicate freely with each other without additional configuration. Disable UPnP if this is not your intention.

NAT – Virtual Servers

You can configure the HH1620 as a virtual server so that when the remote users accessing services such as the web or FTP at your local site via public IP addresses can be automatically redirected to local servers configured with private IP addresses. In other words, depending on the requested services, the HH1620 redirects the external service request to the appropriate server (located at another internal IP address).



NAT – Virtual Servers Setup

Virtual Server allows you to direct incoming traffic from WAN side (identified by Protocol and External port) to the Internal server with private IP address on the LAN side. The Internal port is required only if the external port needs to be converted to a different port number used by the server on the LAN side. A maximum 32 entries can be configured.

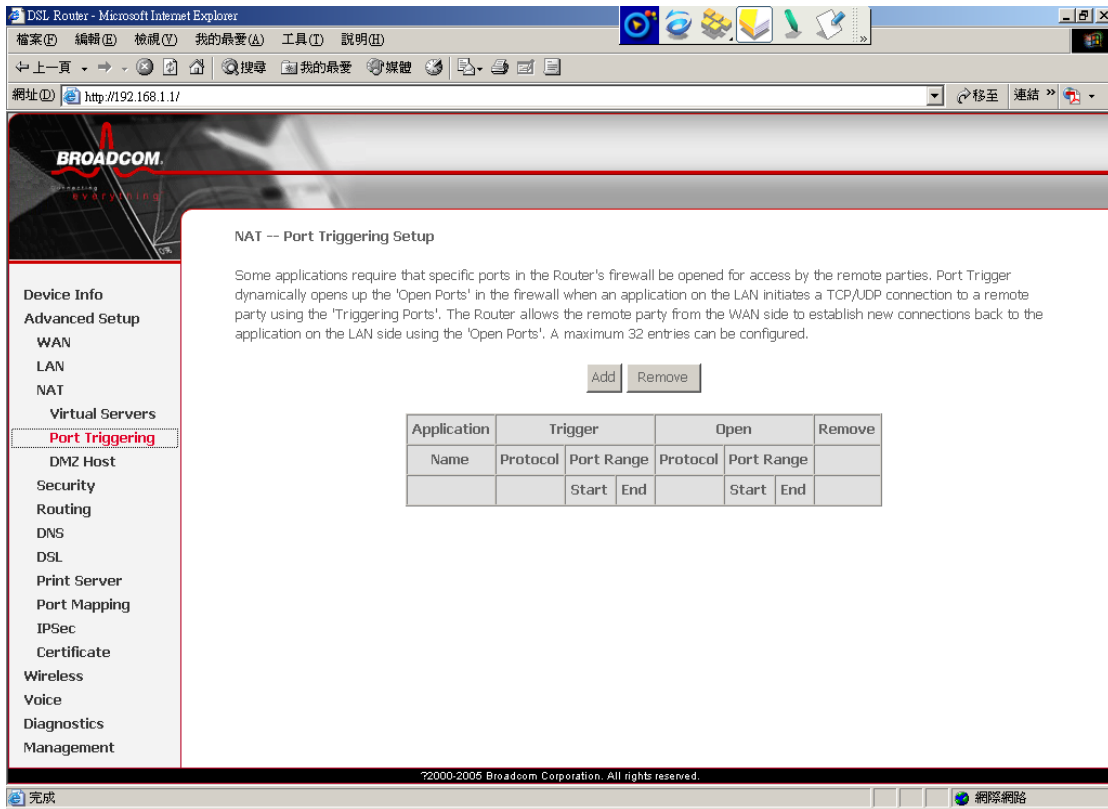
Server Name	External Port Start	External Port End	Protocol	Internal Port Start	Internal Port End	Server IP Address	Remove

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NAT – Port Triggering

Triggers are used to deal with application protocols that create separate sessions. Some applications, such as NetMeeting, open secondary connections during normal operations, for example, a connection to a server is established using one port, but data transfers are performed on a separate connection. A trigger tells the device to expect these secondary sessions and how to handle them.

Once you set a trigger, the embedded IP address of each incoming packet is replaced by the correct host address so that NAT can translate packets to the correct destination.

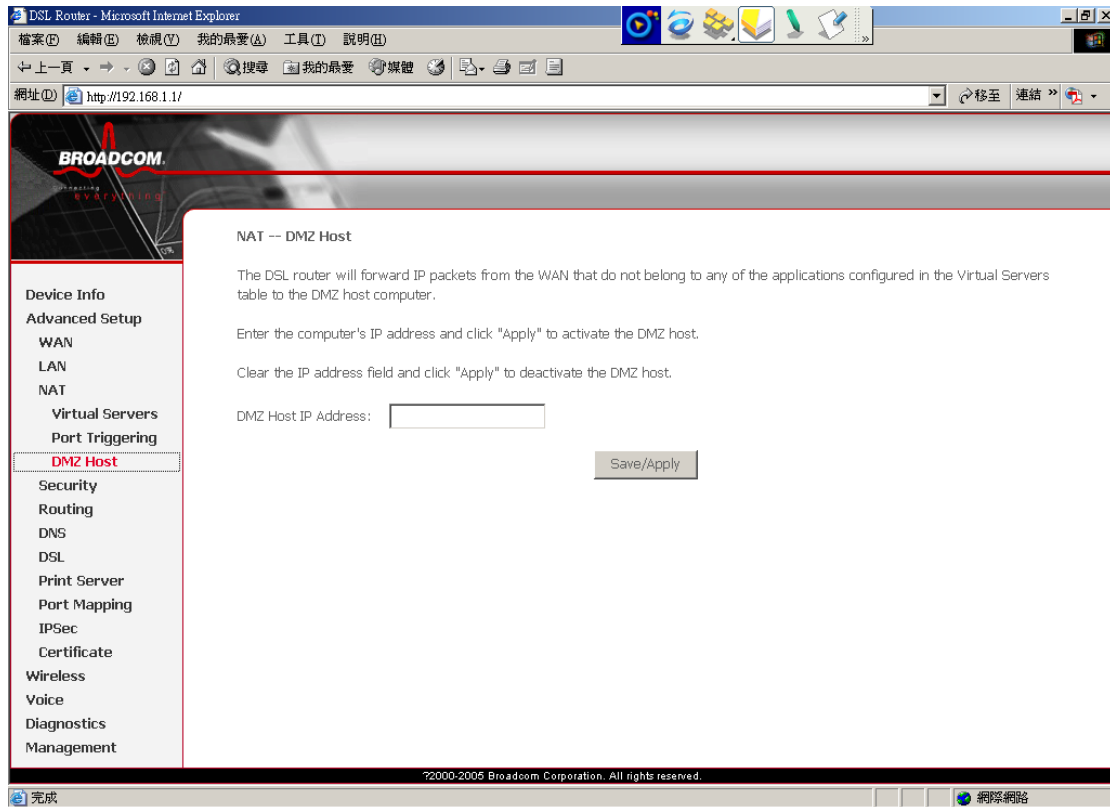


NAT – DMZ Host

A DMZ (De-Militarized Zone) is added between a protected network and an external network, in order to provide an additional layer of security. When there is a suspected packet coming from WAN, the system will forward this packet to the DMZ host.

You can assign the public IP address of your Internet Connection(s) to a specific device on your local network. You might want to do this if:

- You do not want to use the Network Address Translation engine of your HH1620.
- This device is running server applications such as web server and you want it to be accessible from the Internet.



This feature allows the DMZ computer on your LAN to be exposed to all users on the Internet. If you enable DMZ function, you must configure an IP address of the PC to be used as the “DMZ Host”.

DMZ Host IP Address: The IP address of the DMZ host viewable at the WAN (external) side.

Security – IP Filtering – Outgoing

When you define an outgoing IP filter rule, you instruct the HH1620 to examine the traffics it sends to determine whether it meets criteria set forth in the rule. If the traffics match the criteria established in the rule, the traffic will be blocked.

BROADCOM
Powering Every IP

Device Info
Advanced Setup
WAN
LAN
NAT
Security
IP Filtering
Outgoing
Incoming
Parental Control
Routing
DNS
DSL
Print Server
Port Mapping
IPSec
Certificate
Wireless
Voice
Diagnostics

Outgoing IP Filtering Setup

By default, all outgoing IP traffic from LAN is allowed, but some IP traffic can be **BLOCKED** by setting up filters.

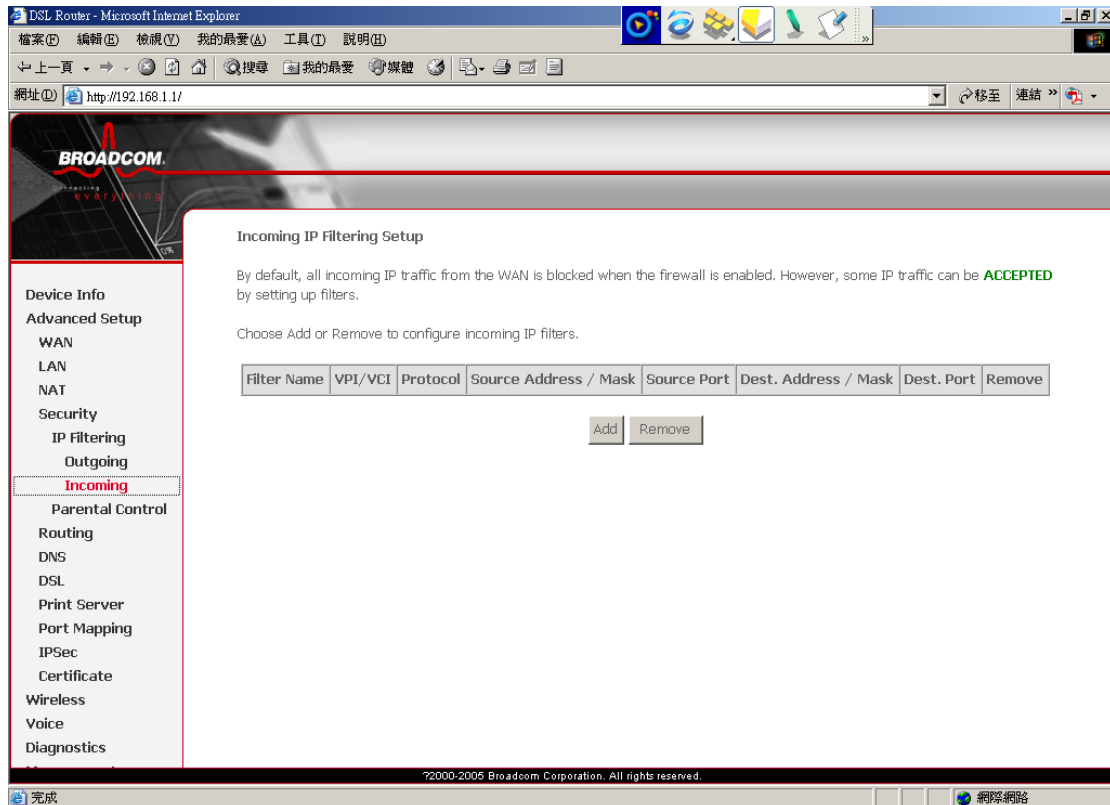
Choose Add or Remove to configure outgoing IP filters.

Filter Name	Protocol	Source Address / Mask	Source Port	Dest. Address / Mask	Dest. Port	Remove
<input type="button" value="Add"/> <input type="button" value="Remove"/>						

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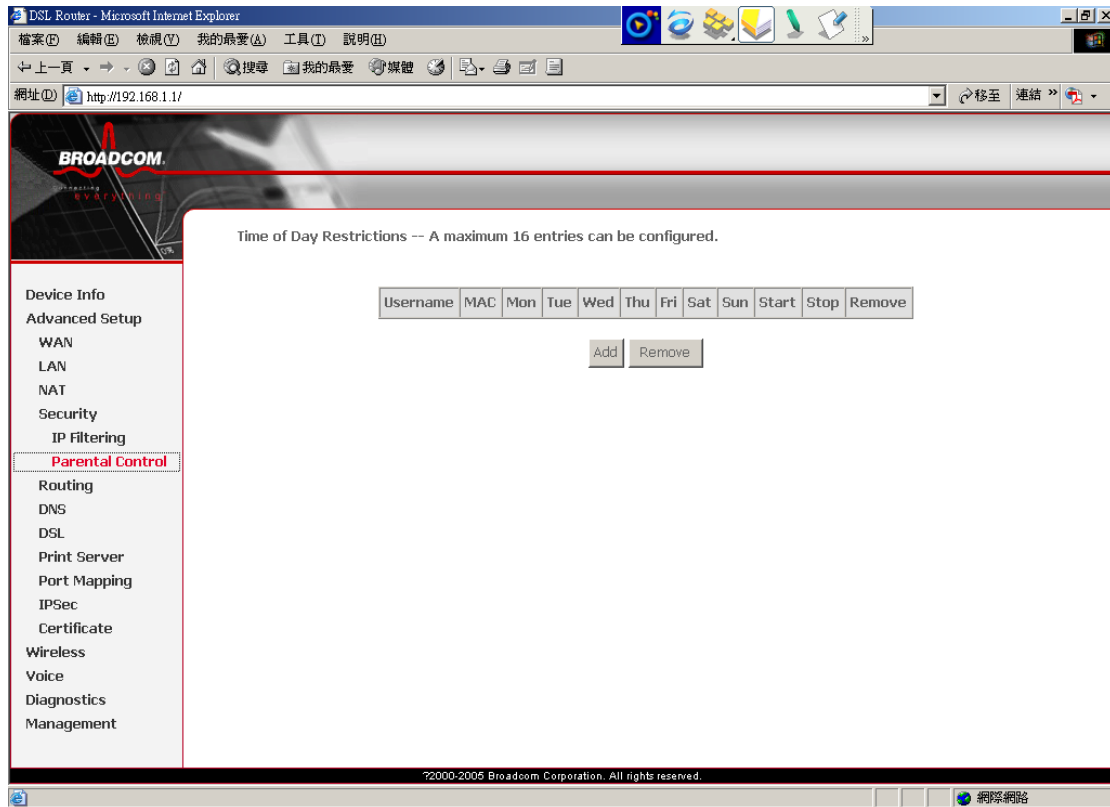
Security – IP Filtering –Incoming

When you define an incoming IP filter rule, you instruct the HH1620 to examine traffics it receives to determine whether it meets criteria set forth in the rule. If the traffics match the criteria established in the rule, the traffics can be accepted (forwarded towards its destination).



Security – Parental Control

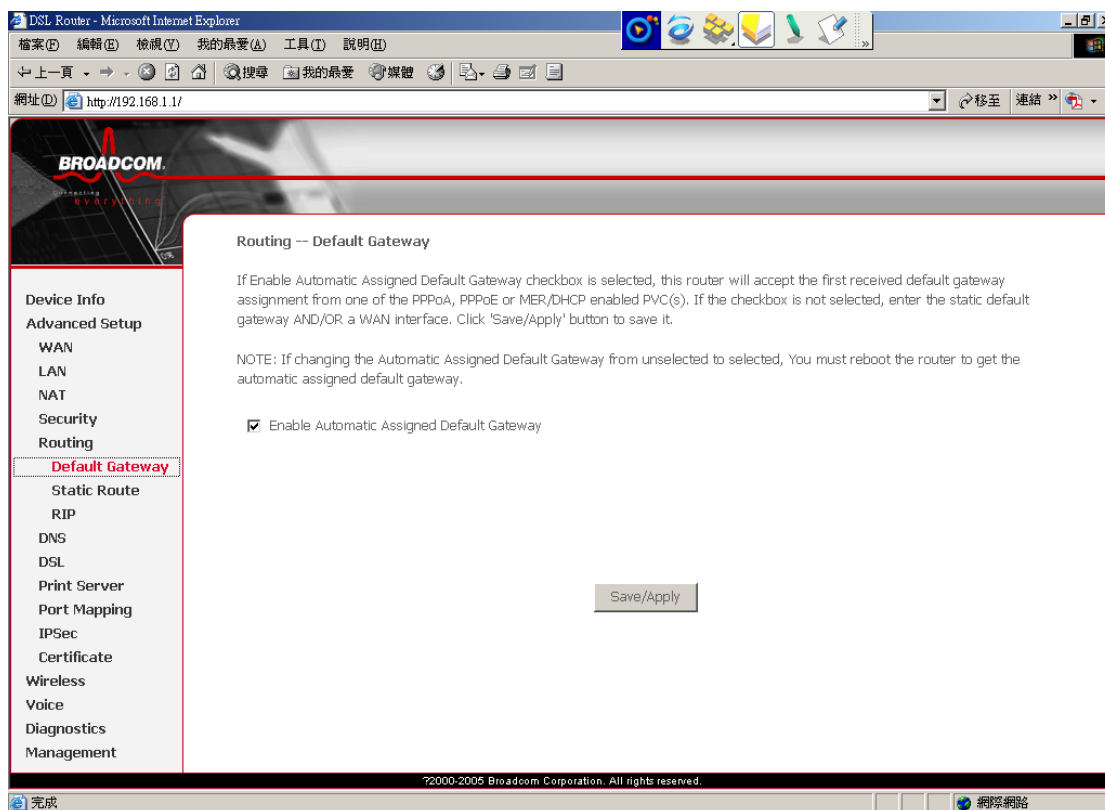
The Parental Control feature enables management users to block Internet access from specified LAN hosts for specified periods. Ensure that either the system time is specified directly or SNTP is enabled.



For example, if you want to restrict web access to Mon-Fri from 5pm to 11pm, you could create a schedule selecting Mon, Tue, Wed, Thu, and Fri and enter a Start Time of 5pm and Stop Time of 11pm.

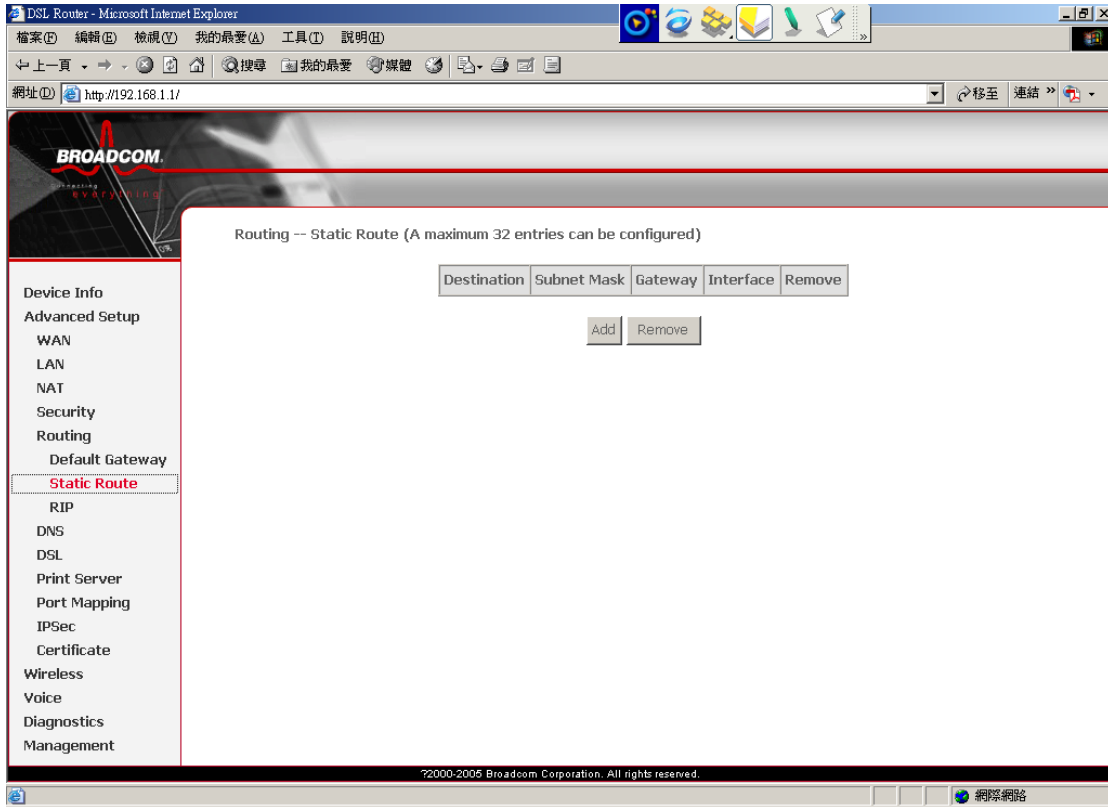
The parental control rule itself will remain on the system and will be in effect for same time period each subsequent day until you delete (remove) the rule.

Routing – Default Gateway



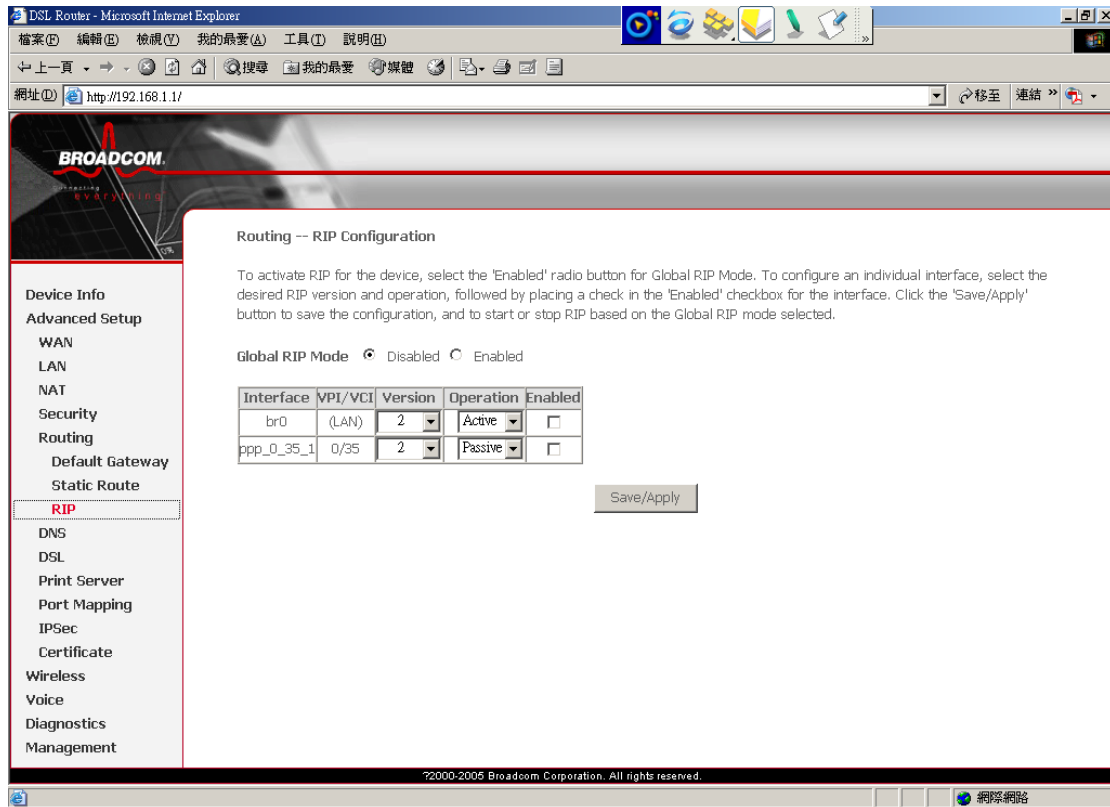
Routing – Static Route

Generally, you will use either Static Route or RIP (Routing Information Protocol) although they can be used simultaneously.



Routing – RIP

RIP is an Internet protocol you can set up to share routing table information with other routing devices on your LAN, at your ISP's location, or on remote networks connected via the ADSL line.



Routing -- RIP Configuration

To activate RIP for the device, select the 'Enabled' radio button for Global RIP Mode. To configure an individual interface, select the desired RIP version and operation, followed by placing a check in the 'Enabled' checkbox for the interface. Click the 'Save/Apply' button to save the configuration, and to start or stop RIP based on the Global RIP mode selected.

Global RIP Mode Disabled Enabled

Interface	VPI/VCI	Version	Operation	Enabled
br0	(LAN)	2	Active	<input type="checkbox"/>
ppp_0_35_1	0/35	2	Passive	<input type="checkbox"/>

Save/Apply

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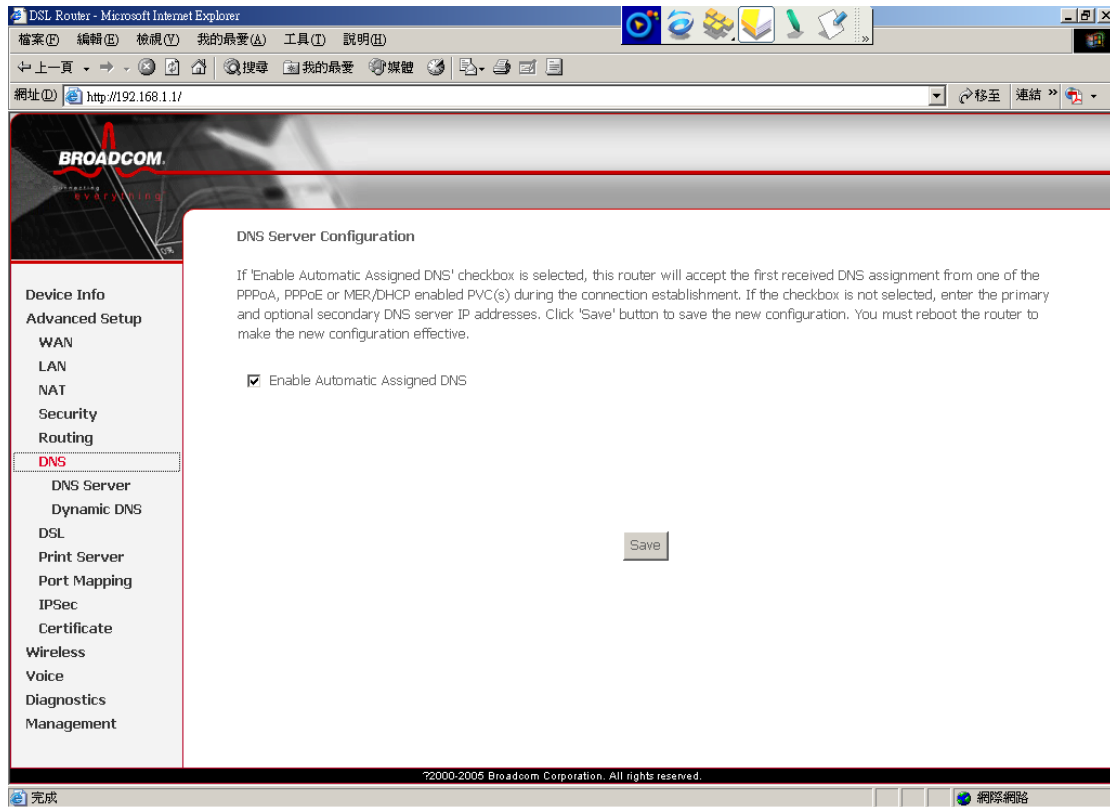


In order for the Router to communicate with other devices using RIP, you must also enable the other devices to use the protocol.

Note

DNS

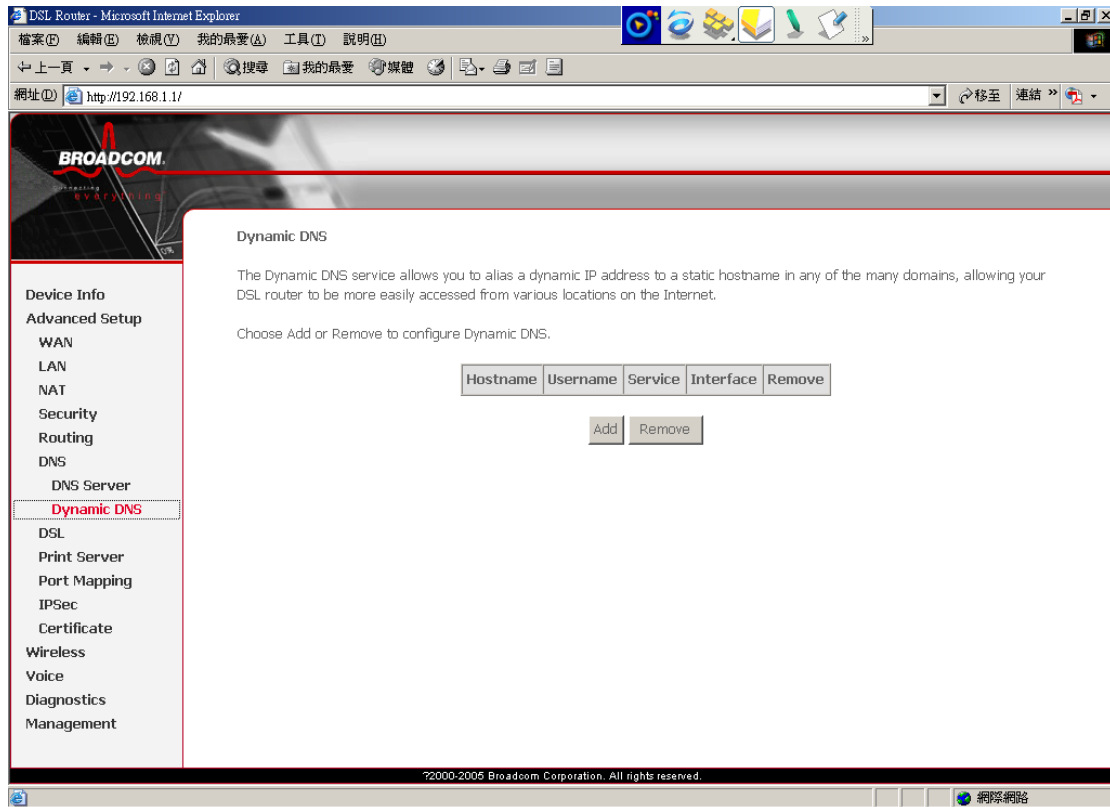
Domain Name System (DNS) servers map the user-friendly domain names that users type into their Web browsers (e.g., "www.motorola.com") to the equivalent numerical IP addresses that are used for Internet routing.



DDNS – Dynamic DNS

DDNS is useful when you have a host (running for example, a web server) that receives a dynamically assigned IP address from a DHCP server. A user on the Internet would typically access the host by entering its name in their web browser. A DNS server on the web would then resolve the name to its associated numeric IP address, as required for Internet protocol processing. However, when a host's IP address is dynamically assigned (for example, by a DHCP server), it may change frequently. In this scenario, a DNS server may have outdated data and may not be able to resolve a host name to the current IP address.

When a host is registered with a DDNS service provider, the provider is automatically notified by the host of any change in its IP address and the provider then propagates the change throughout the DNS server system.



Dynamic DNS (DDNS) is very useful when combined with the Virtual Server feature. It allows Internet users to connect to your Virtual Servers using a URL, rather than an IP Address. This also solves the problem of having a dynamic IP address. With a dynamic IP address, your IP address may change whenever you connect, which makes it difficult to connect to you.

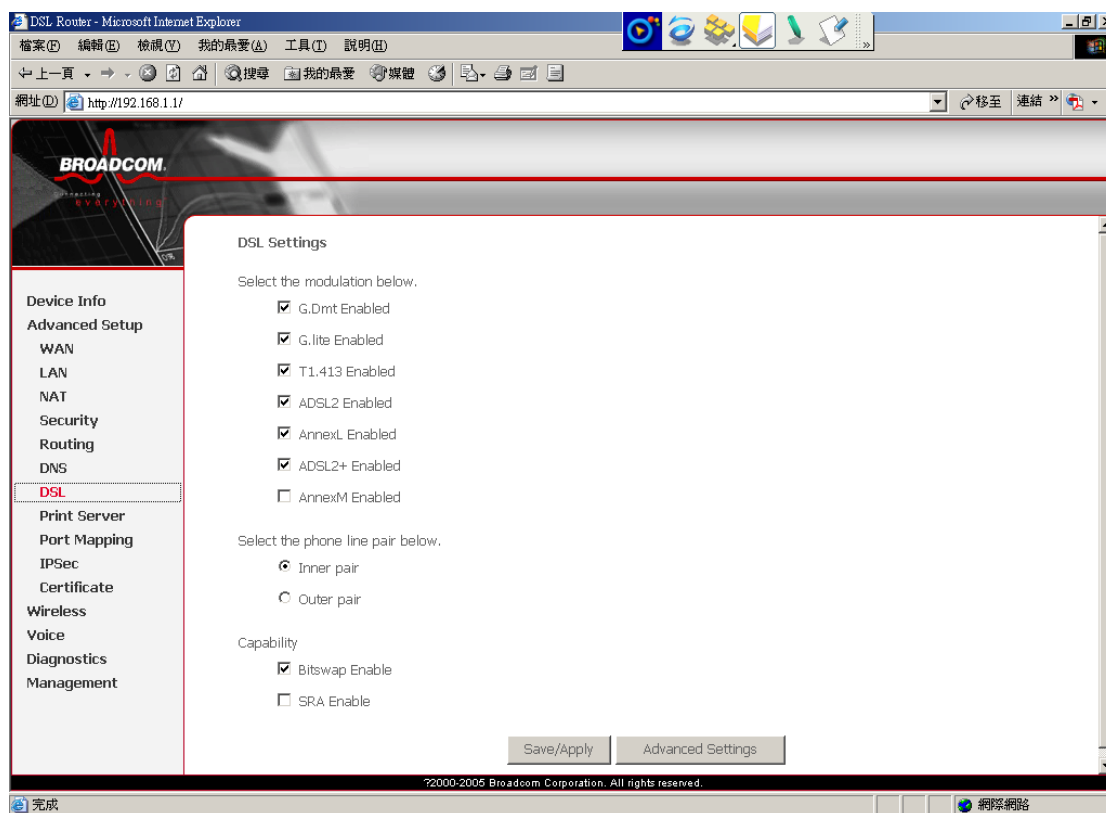
The Dynamic DNS service allows you to assign a dynamic DNS host name (for example john.dyndns.org) to a broadband connection even if it is using a dynamic IP address. As soon as the device gets a new IP address, the dynamic DNS server updates its entry to the new IP address.

On the Configure page, you can assign a Dynamic DNS host name to a broadband connection. Proceed as follows:

1. Click Add.
2. Create an account at the Dynamic DNS service of your choice, for example:
 - www.dyndns.org
 - www.no-ip.com
 - www.dtdns.com
3. Type the user name and password of your Dynamic DNS service account in the corresponding fields.
4. If necessary, click the broadband connection to which you want to assign the Dynamic DNS hostname in the Interface list.
5. In the Service list, click your Dynamic DNS service.
6. In the Host box, type the host name you want to assign to this interface (for example myspeedtouch.dyndns.org).

DSL

Select the modulation types, line pair and capability that you want the HH1620 to support.



Multi-Mode standard (ANSI T1.413, Issue 2; G.dmt (G.992.1); G.lite (G.992.2))

EOC specified in ITU-T G.992.1

ADSL2 G.dmt.bis (G.992.3)

ADSL2 G.lite.bis (G.992.4)

AnnexL: Annex L, also known as Reach Extended ADSL, extends DSL line reach, making it possible for Telcos to offer DSL service to subscribers who are more than 18,000 feet from the CO (central office).

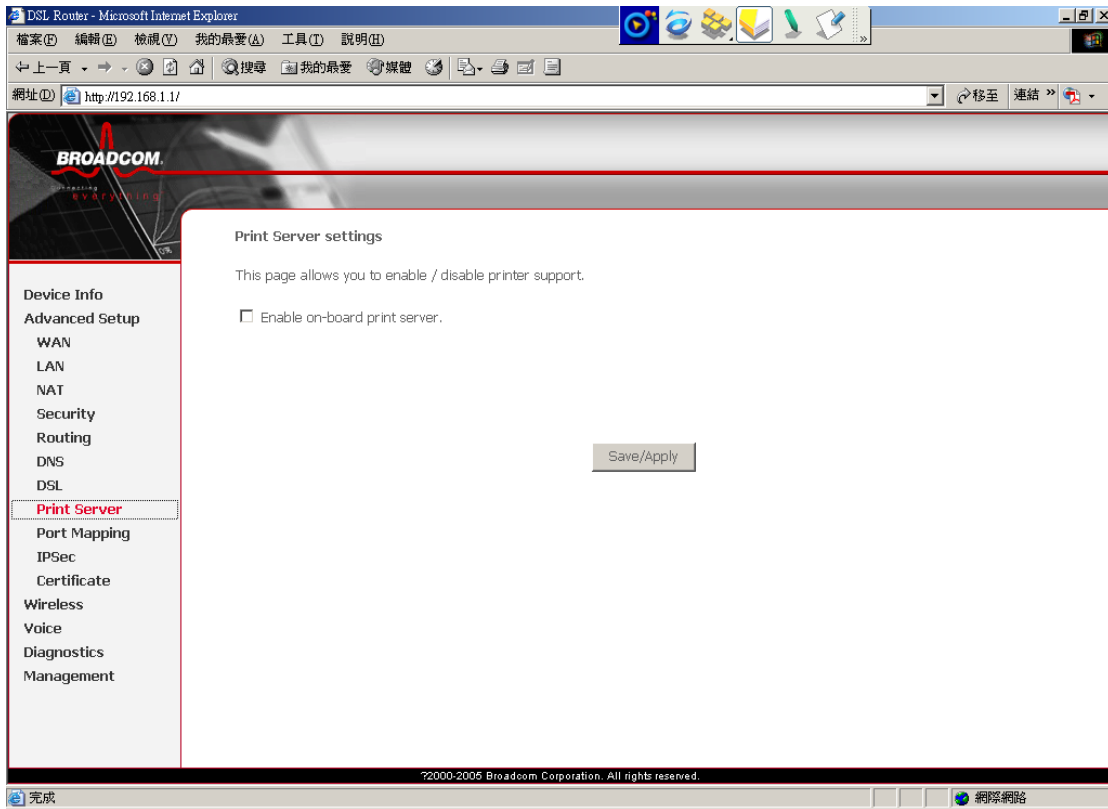
ADSL2+ (G.992.5)

SRA (Seamless Rate Adaptation): SRA makes dynamic data transfer rate changes to accommodate temporary noise conditions on the line thus preventing dropped connections.

AnnexM: Annex M doubles upstream data rates. With this new feature, Telcos can create and offer business subscribers an approximately 2.5 Mbps symmetrical data service providing with businesses a low-cost alternative to T1 or G.SHDSL data services.

Printer Server

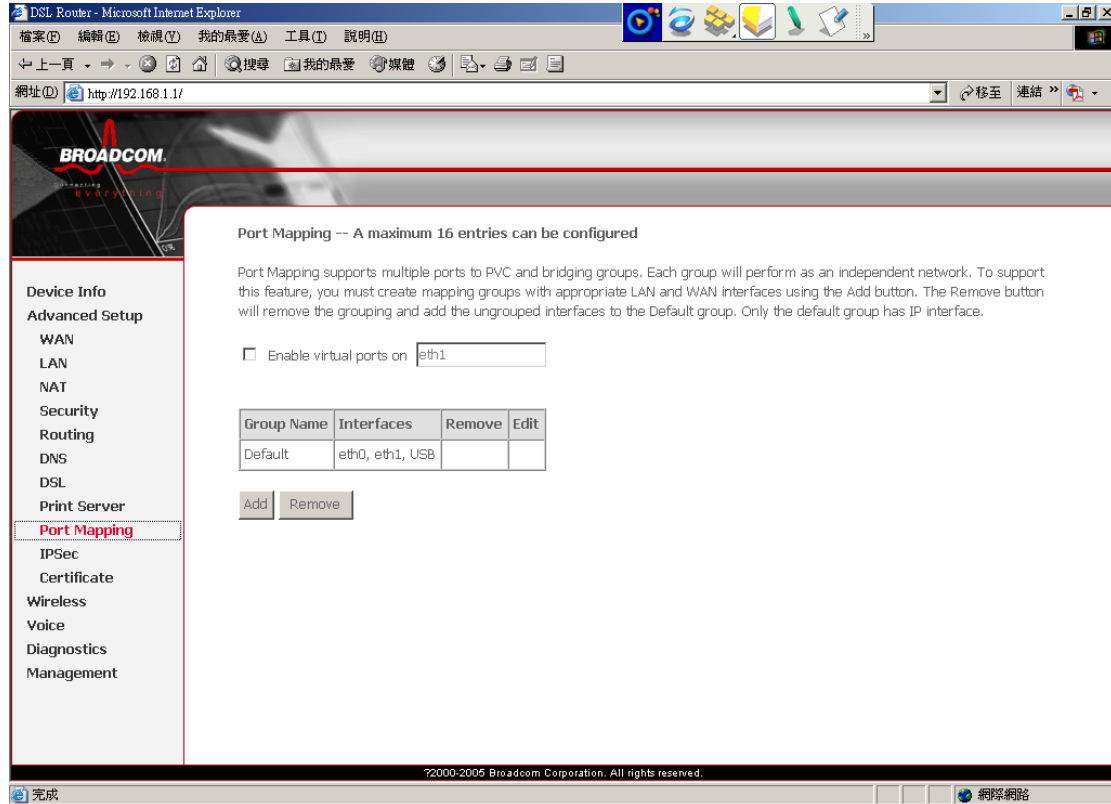
HH1620 includes an integrated printer server that allows a printer shared between multi computers on your LAN. USB port to connect to a USB printer and includes a Windows-based print server software application, so users on the network can share the printer. **The print server is also capable of TCP/IP printing.**



Printer Status	Shows the status of the printer attached to the router.
Raw TCP Port Printing	Shows the “IP Address” and “TCP Port” values that you need to enter when you configure your computer to use the printer in TCP Raw mode.
LPD/LPR Printing	Shows the “IP Address” and “Queue Name” values that you need to enter when you configure your computer to use the printer in LPR/LPD mode.

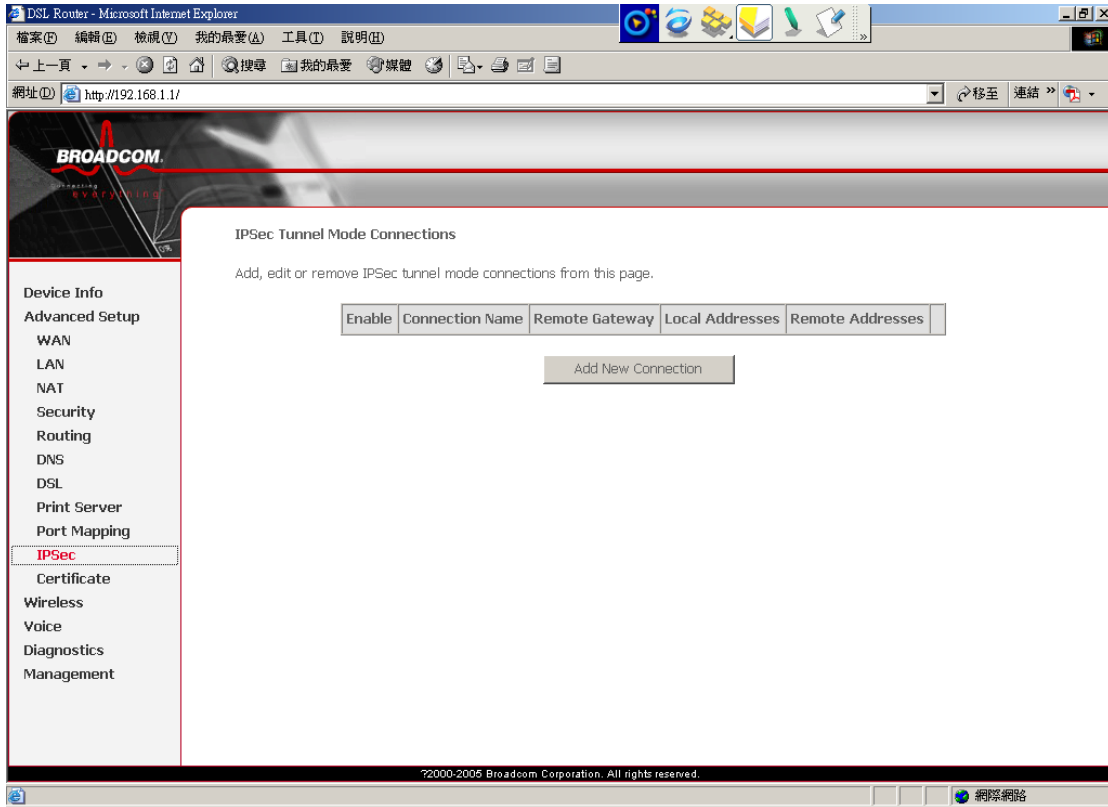
Port Mapping

Port Mapping supports multiple ports to PVC and bridging groups. Each group will perform as an independent network. You must create mapping groups with appropriate LAN and WAN interfaces before you can use this feature.

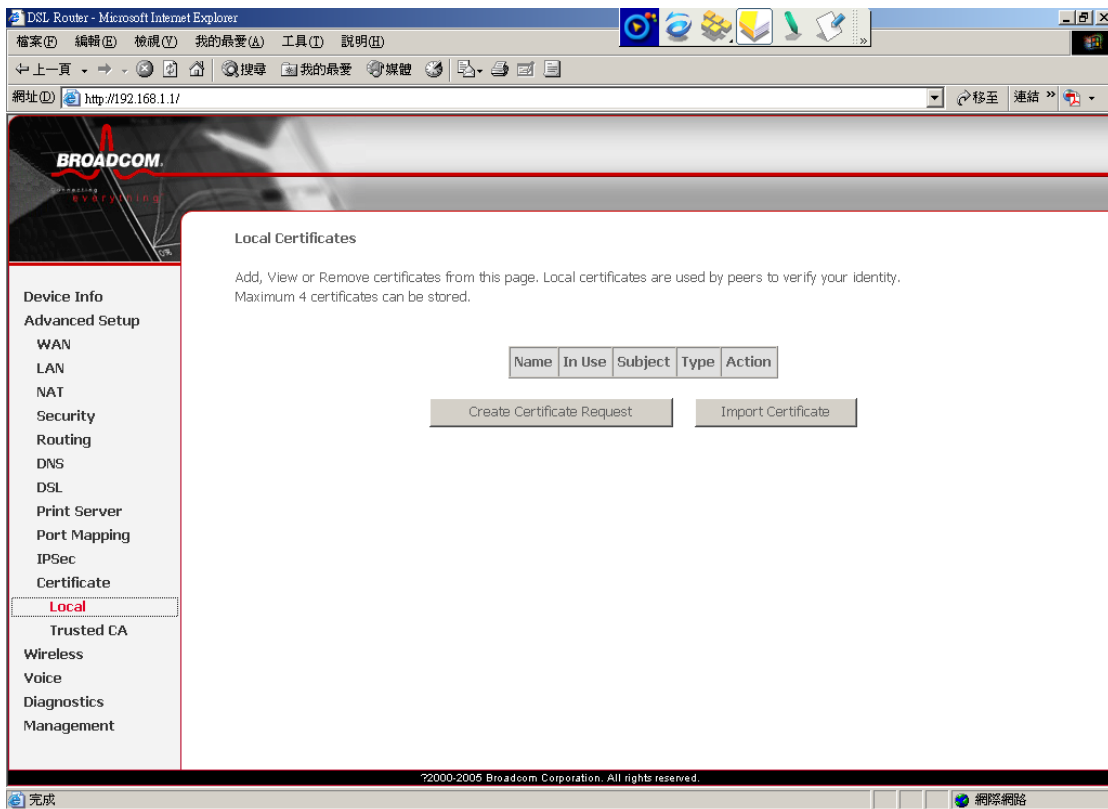


IPSec

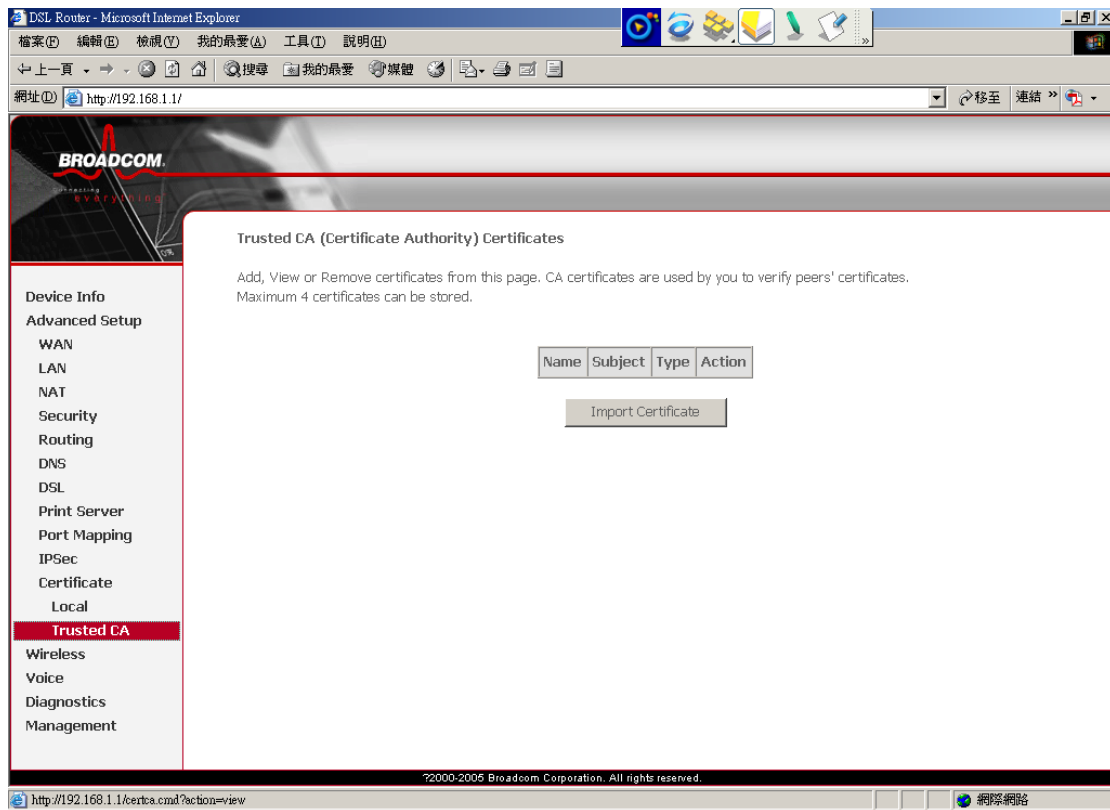
Internet Protocol Security (IPSec) is a standards-based VPN that offers flexible solutions for secure data communications across a public network like the Internet. IPSec is built around a number of standardized cryptographic techniques to provide confidentiality, data integrity and authentication at the IP layer.



Certificate – Local



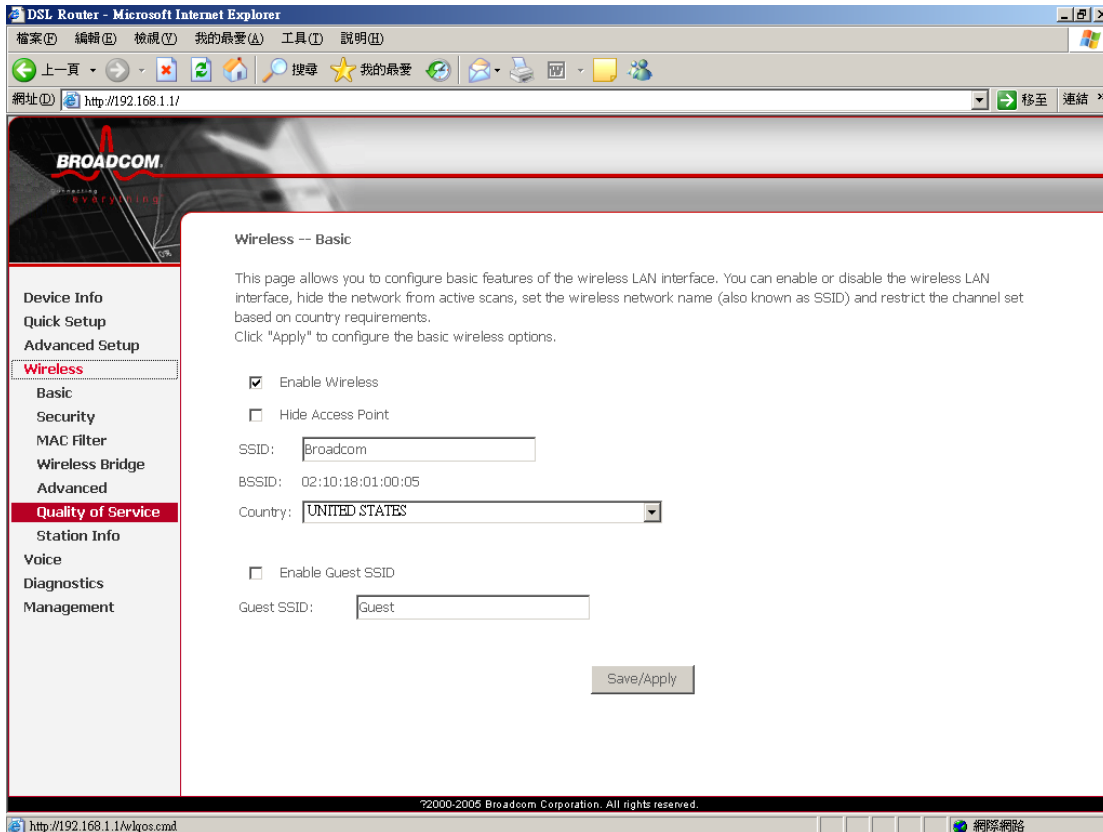
Certificate – Trust CA



The Wireless Category

Basic

This page allows you to configure features of the wireless LAN interface. You can enable/disable wireless LAN interface, hide the network from activate scans, set wireless network name and restrict the channel set based on country requirements.

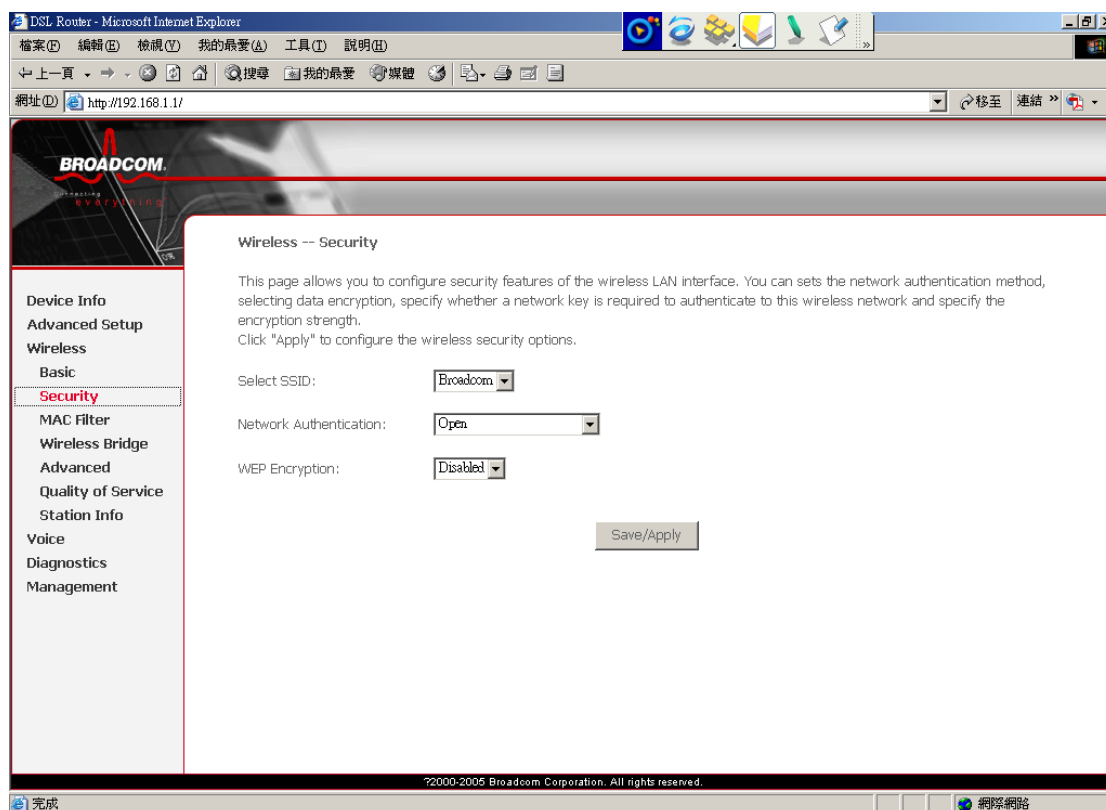


Enable	Enable this if your want to use Wireless Access Point function. If not tick, no wireless stations can use the wireless function, and all connections must be made via the wired LAN.
Hide Access Point	Select Hide to hide the SSID in so a station cannot obtain the SSID through scanning.
SSID	The SSID (Service Set Identification) is a unique name to identify the HH1620 in the wireless LAN. Wireless stations associating to the HH1620 must have the same SSID. Enter a descriptive name of up to 32 printable characters (including spaces, alphabetic characters are case-sensitive).
BSSID	The BSSID (Basic Service Set Identifier) is the MAC address of the wireless station in an Access Point (AP) in an infrastructure mode BSS.
Country	
Guest SSID	
Restrict	

Security

WEP encryption scrambles the data transmitted between the wireless stations and the access points to keep network communications private. It encrypts unicast and multicast communications in a network. Both the wireless stations and the access points must use the same WEP key.

The HH1620 allows you to configure up to four **64-bit, 128-bit or 256-bit** WEP keys but only one key can be enabled at any one time.



The SSID (Service Set IDentification) is a unique name to identify the HH1620 in the wireless LAN. Wireless stations associating to the HH1620 must have the same SSID. Enter a descriptive name of up to **32** characters (including spaces; alphabetic characters are case-sensitive).

WEP (Wired Equivalent Privacy) encrypts data frames before transmitting over the wireless network.

Select Disable to allow all wireless stations to communicate with the access points without any data encryption. Or, select 64-bit WEP, 128-bit WEP or 256-bit WEP to use data encryption.

64-bit WEP: Enter 5 characters or 10 hexadecimal digits (0-9 and A-F).

128-bit WEP: Enter 13 characters or 26 hexadecimal digits (0-9 and A-F).

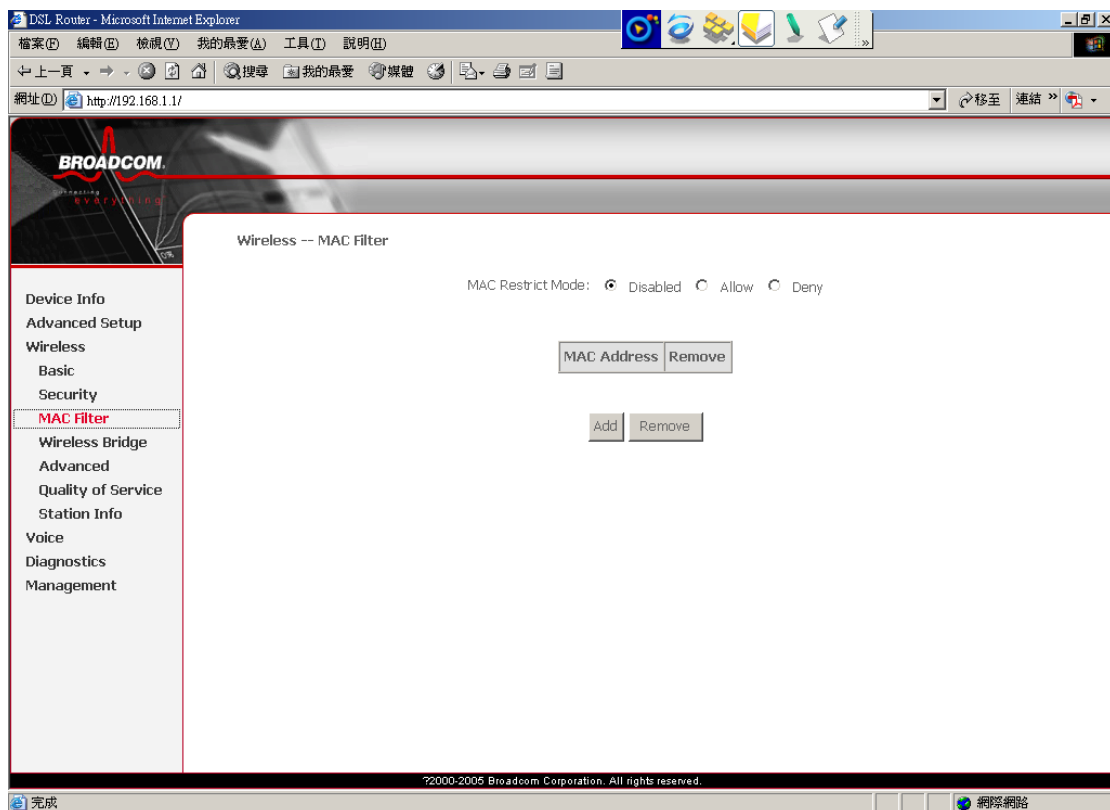
256-bit WEP: Enter 29 characters or 58 hexadecimal digits (0-9 and A-F).

MAC Filter

MAC address filtering means sifting traffic going through the HH1620 based on the source and/or destination MAC addresses.

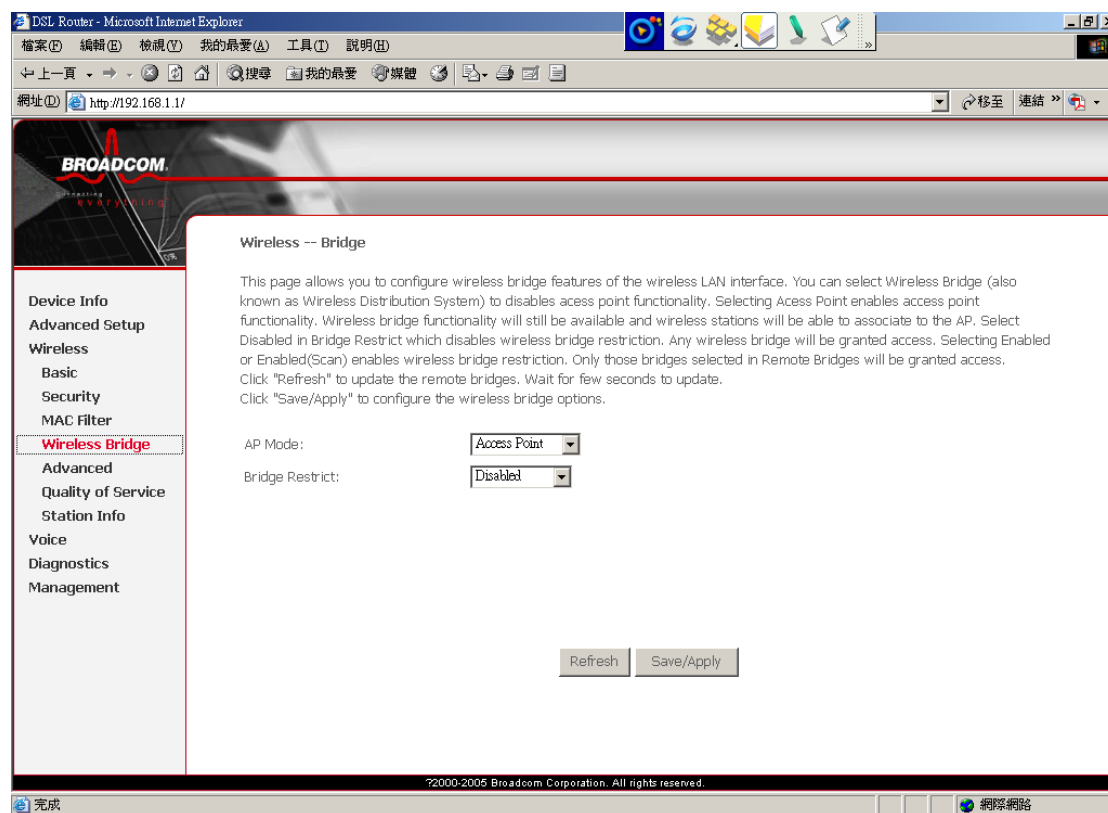
Every Ethernet device has a unique MAC (Media Access Control) address. The MAC address is assigned at the factory and consists of six pairs of hexadecimal characters, for example, 00:A0:C5:00:00:04. You need to know the MAC addresses of the devices to configure this page.

You can configure the HH1620 to give exclusive access to devices (**Allow Association**) or exclude them from accessing the HH1620 (**Deny Association**).



Wireless Bridge

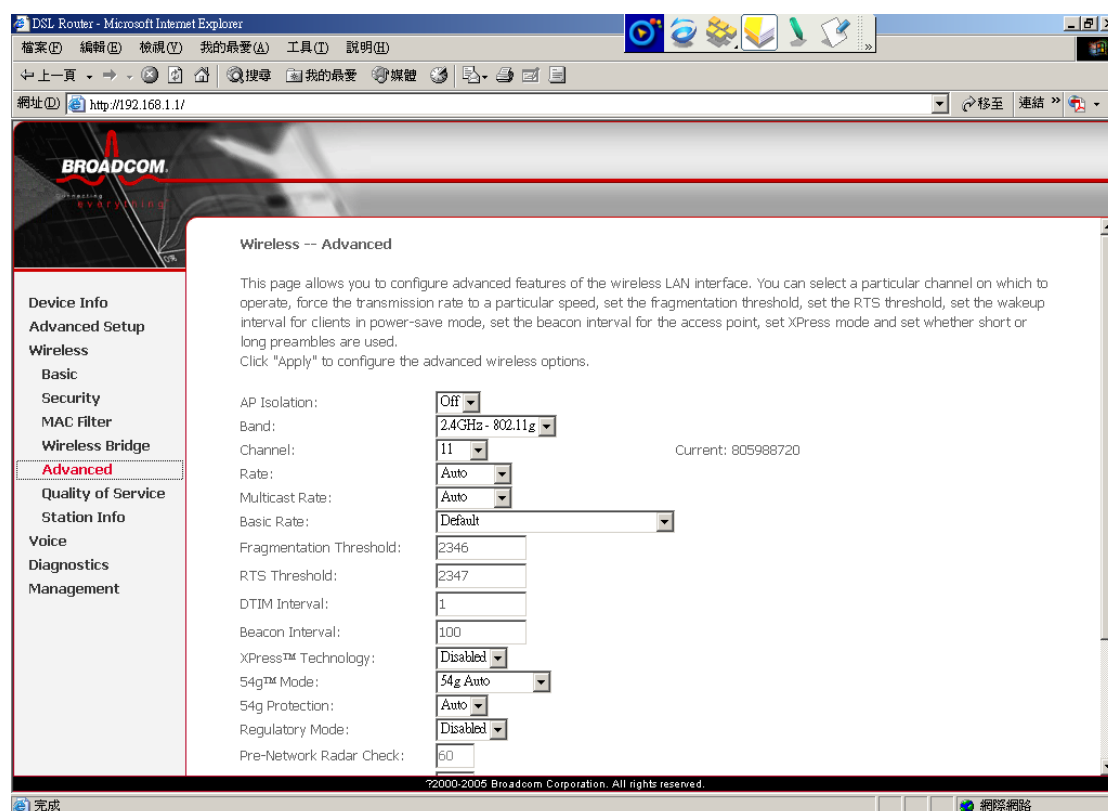
This page allows you to configure wireless bridge feature of the wireless LAN interface.



AP Mode	Wireless Bridge (Wireless Distribution System): This mode allows you to disable access point functionality. Access Point: This mode allows you to enable access point functionality, and wireless bridge functionality will still be available and wireless stations will be able to associate to the AP.
Bridge Restrict	This selection allows you to enable/disable the wireless bridge restriction. If disabled, any wireless bridge will be granted access. Only those bridges selected in Remote Bridges will be granted access.

Advanced

This page allows you to configure advanced features of the wireless LAN interface, including channel, transmission rate fragmentation threshold, beacon interval and so on.



The Xpress Technology is one of the popular performance-enhancing WiFi technologies, designed to improve wireless network efficiency and boost throughput. It is more efficient in mixed environments, and it can work with 802.11a/b/g networks.

When Xpress is turned on, aggregate throughput (the sum of the individual throughput speeds of each client on the network) can improve by up to 27% in 802.11g-only networks, and up to 75% in mixed networks comprised of 802.11g and 802.11b standard equipment.

The technology achieves higher throughput by re-packaging data, reducing the number of overhead control packets, so that more useful data can be sent during a given amount of time.

54g

54g® is Broadcom's Wi-Fi chipset designed for maximum performance IEEE 802.11g wireless networks. 54g® is found in leading brands of high-performance wireless products that deliver greater speed, improved reach, and the latest, toughest security that is configured with the push of a button.

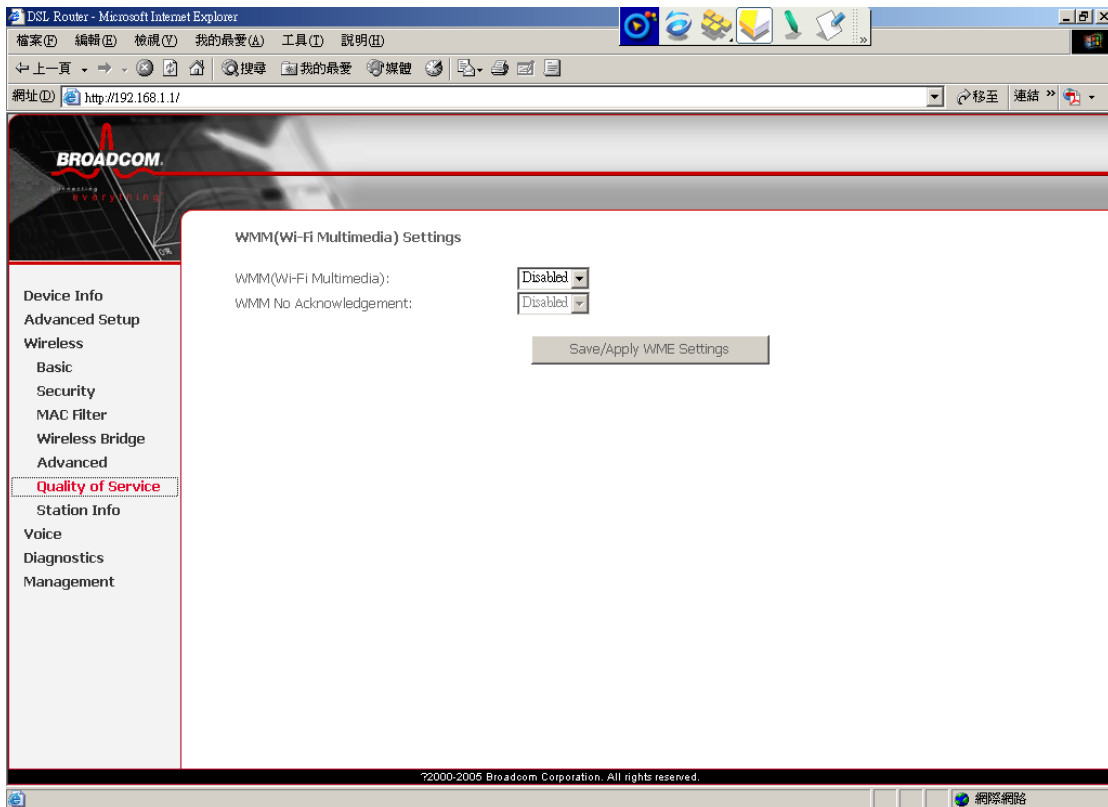
Quality of Service

Quality of Service (QoS) refers to both a network's ability to deliver data with minimum delay, and the networking methods used to provide bandwidth for real-time multimedia applications.

WMM is designed to support consumer and corporate applications and works with all three 802.11 wireless physical layer standards - 802.11a, 802.11b and 802.11g. The specification provides basic prioritization of data packets based on four categories - voice, video, best effort and background.

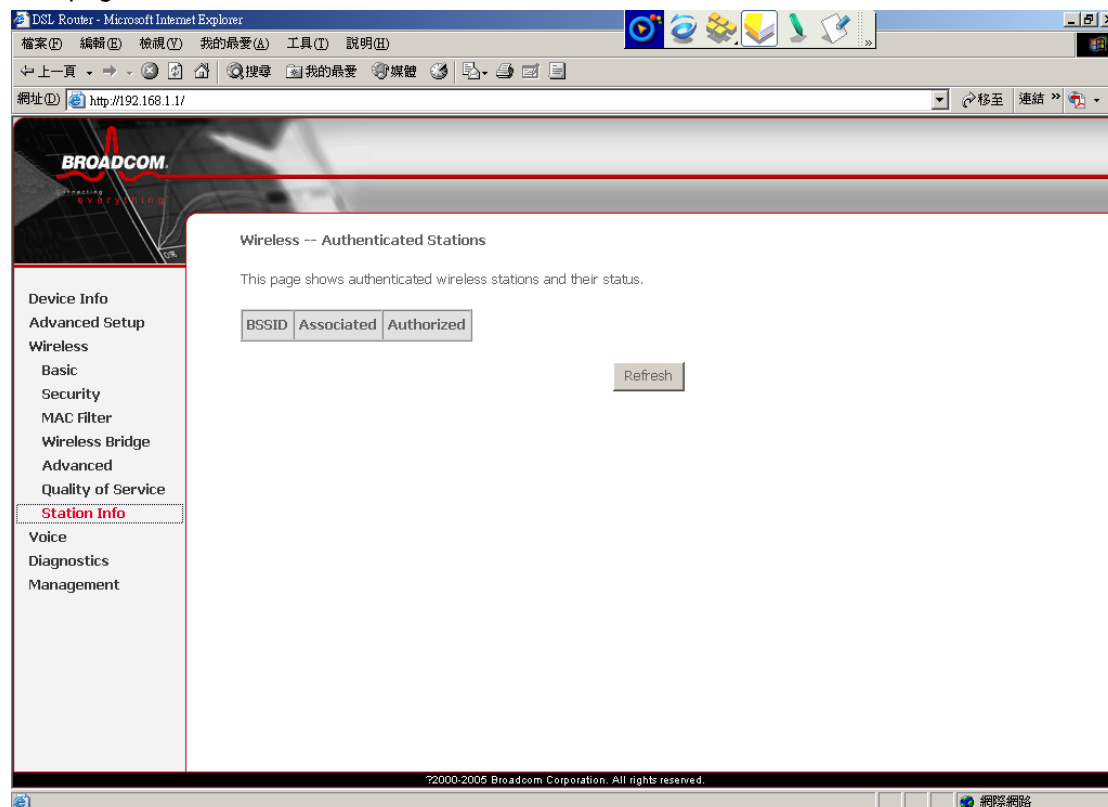
Select to enable or displays WMM. WMM (Wi-Fi MultiMedia) enhances QoS at wireless driver level. It provides a mechanism to prioritise wireless data traffic to and from the associated (WMM capable) stations.

If your enable WMM feature, you may need to decide whether to broadcast HH1620's network name or not. Broadcasting allows you to easily recognize your wireless network in the list of available networks. Once you have configured your wireless clients, it is recommended to disable this feature.



Station Info

This page shows authenticated wireless stations and their status.

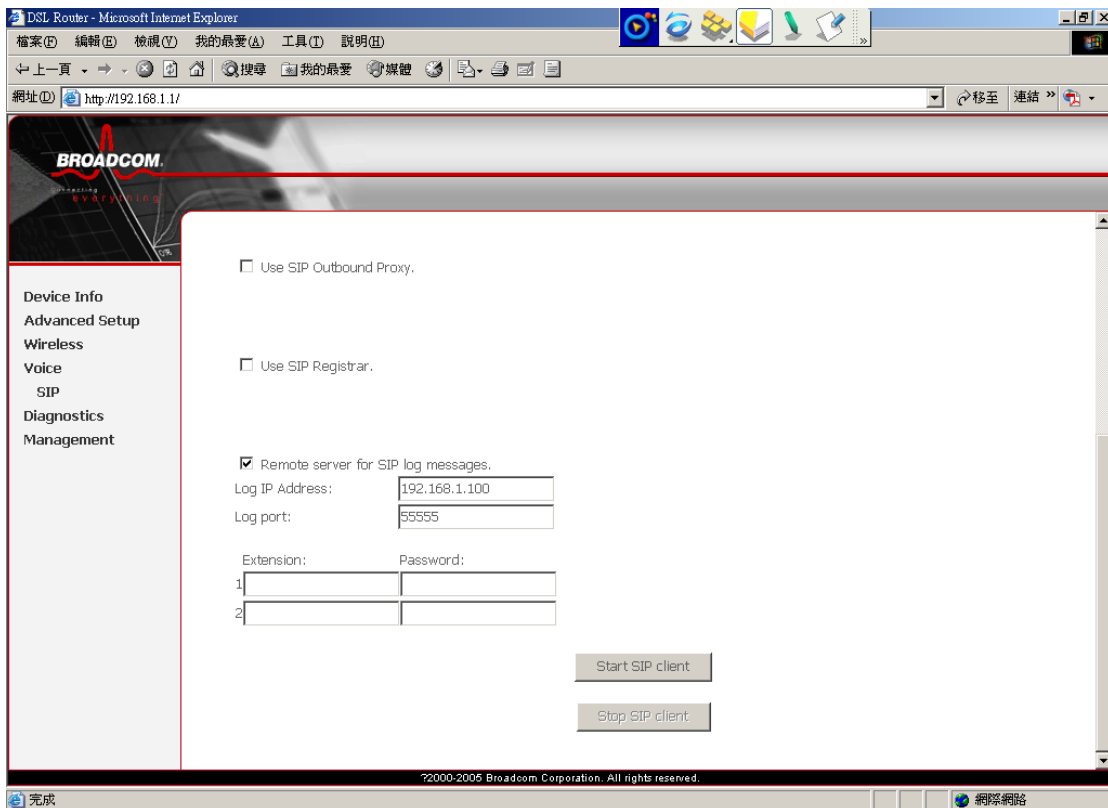
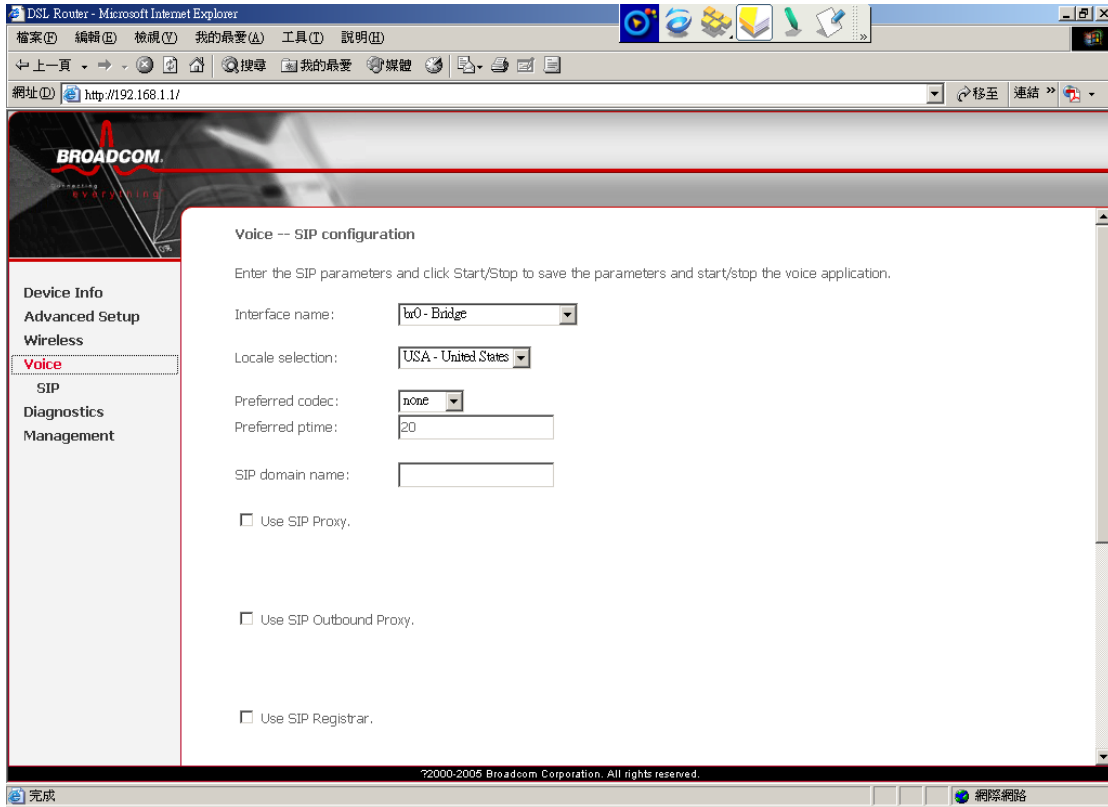


The Voice Category

voice sip 的 preferred ptime

Internet telephony or Voice over IP (VoIP) can be defined as the transfer of telephone calls over your Internet connection.

You can make Internet and PSTN telephone calls using tradition analogue phones connected to your HH1620. HH1620 provides additional lines without the need for additional copper pairs. It allows you to make and receive calls simultaneously.



Select the Codec that is more suitable than the other Codecs.

You can also connect a fax machine to your HH1620 to send and receive faxes over your Internet connection or the PSTN phone line.

Your ISP should provide you with the following SIP configuration parameters:

Uniform Resource Identifier (URI)

User name

Password

IP address and port number (usually 5060) of the provider's registrar

IP address and port number (usually 5060) of the provider's SIP proxy server

The SIP URI is a unique name used to identify and locate your telephone. The SIP URI can have a numerical format or the format user@host.

Example:

1234567

username@hostname.org

username@192.168.10.1

1234567@hostname.org

If your ISP gives you an URI in the format containing an '@', your ISP will tell you whether the '@' can be formed on your phone by dialing '1', '**' or '#'.

Connect TEL port(s) to your phone(s) or fax.

If you want to make phone calls using the regular telephone line. Connect PSTN port to the telephone output of your DSL splitter or the telephone wall outlet to allow regular phone calls with the same telephone set.

Configure Internet Telephony

Enable the telephony service

Assign phone numbers

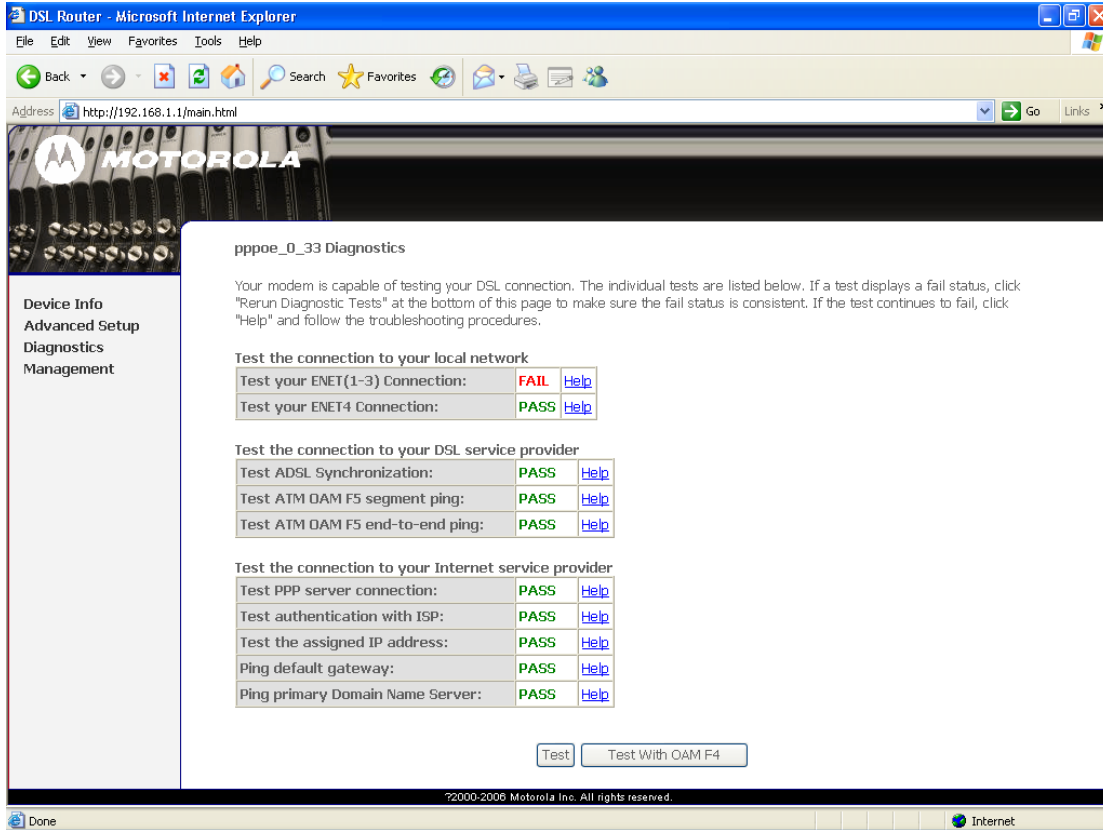
Configure the telephony service

Enter the Registrar Server address to register end point.

Enter the Registrar port number that is between 1024 and 32768. By default, it is 5060.

The Diagnostics Category

This feature allows you to perform a series of testing. This activity can be useful in solving network problems.



DSL Router - Microsoft Internet Explorer

Address: <http://192.168.1.1/main.html>

MOTOROLA

Device Info
Advanced Setup
Diagnostics
Management

pppoe_0_33 Diagnostics

Your modem is capable of testing your DSL connection. The individual tests are listed below. If a test displays a fail status, click "Rerun Diagnostic Tests" at the bottom of this page to make sure the fail status is consistent. If the test continues to fail, click "Help" and follow the troubleshooting procedures.

Test the connection to your local network

Test your ENET(1-3) Connection:	FAIL	Help
Test your ENET4 Connection:	PASS	Help

Test the connection to your DSL service provider

Test ADSL Synchronization:	PASS	Help
Test ATM OAM F5 segment ping:	PASS	Help
Test ATM OAM F5 end-to-end ping:	PASS	Help

Test the connection to your Internet service provider

Test PPP server connection:	PASS	Help
Test authentication with ISP:	PASS	Help
Test the assigned IP address:	PASS	Help
Ping default gateway:	PASS	Help
Ping primary Domain Name Server:	PASS	Help

Test Test With OAM F4

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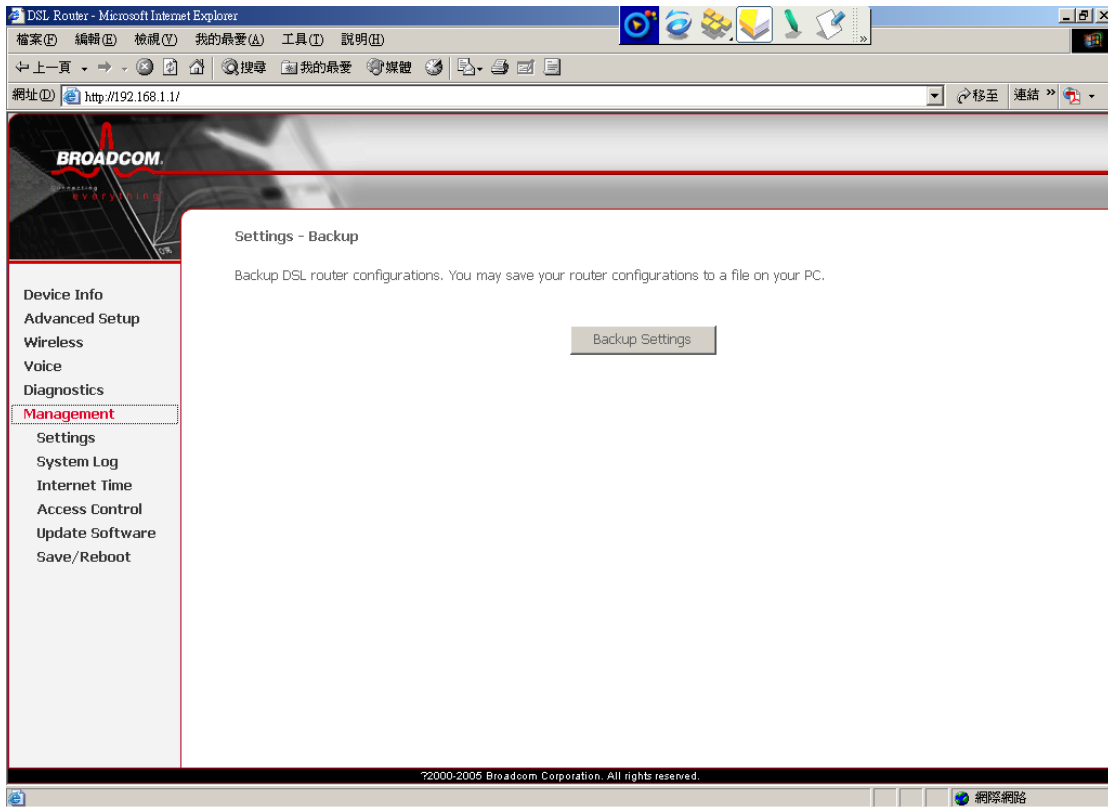
Done Internet

The Management Category

Settings – Backup

This page allows you to backup the HH1620's current settings.

Once you have the HH1620 working properly, you should backup the information to have it available if something goes wrong. When you backup the settings, they are saved as a file on your computer. You can restore the settings from this file.



To create a backup file of the current settings:

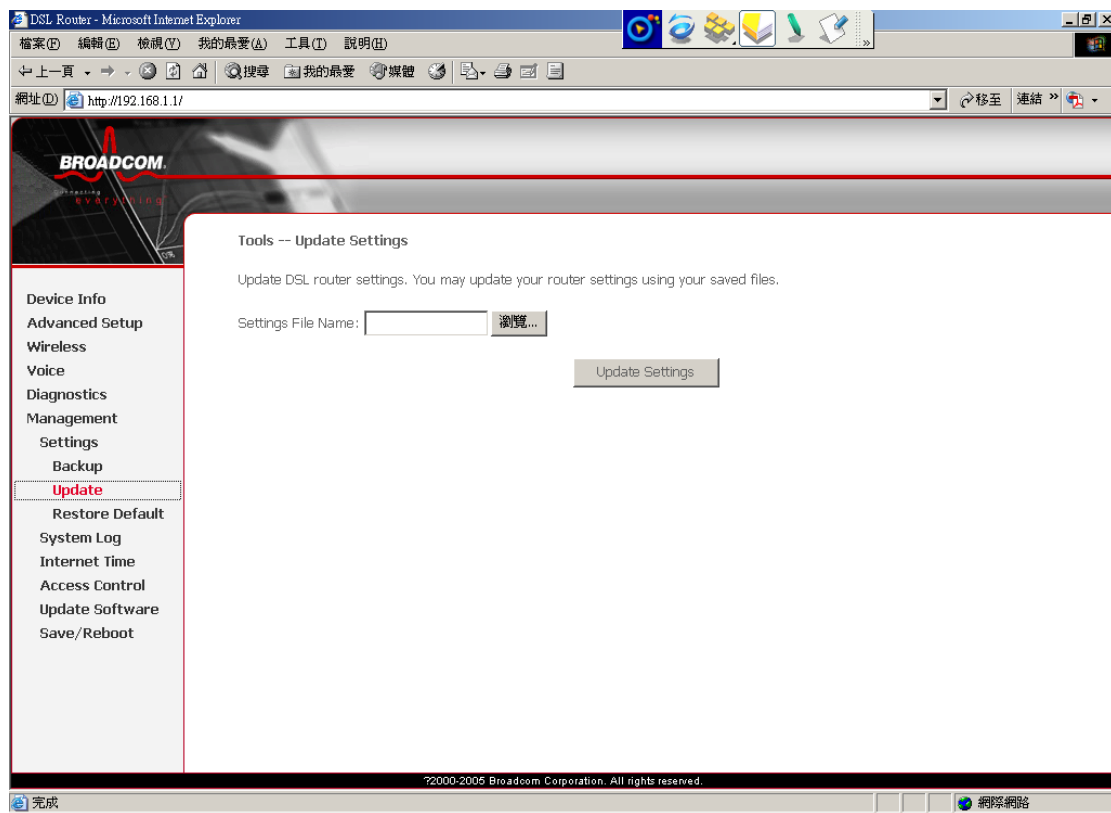
1. Click **Backup Settings** Button.
2. Locate where you want to save the file, rename it if you like, and click **OK**.

**Note**

DO NOT power off the HH1620 while processing. Restart the HH1620 after the upgrade is complete. Your previous configuration will be lost and you need to re-configure the settings.

Settings – Update

Use this to download a copy of the current configuration, and store the file on your PC.



To perform the Update process:

1. Click **Browse** button and indicate the location of the update DSL setting file.
2. Click Update Settings button to commence the setting update.
3. Wait about 2 minutes for the process to be completed and reboot the HH1620. **A window appears letting you know that the HH1620 has been successfully restored to previous settings.**



Note

DO NOT power off the HH1620 while processing. Restart the HH1620 after the upgrade is complete. Your previous configuration will be lost and you need to re-configure the settings.


Settings – Restore Default

You might consider a reset to factory defaults as described below.

You can choose between:

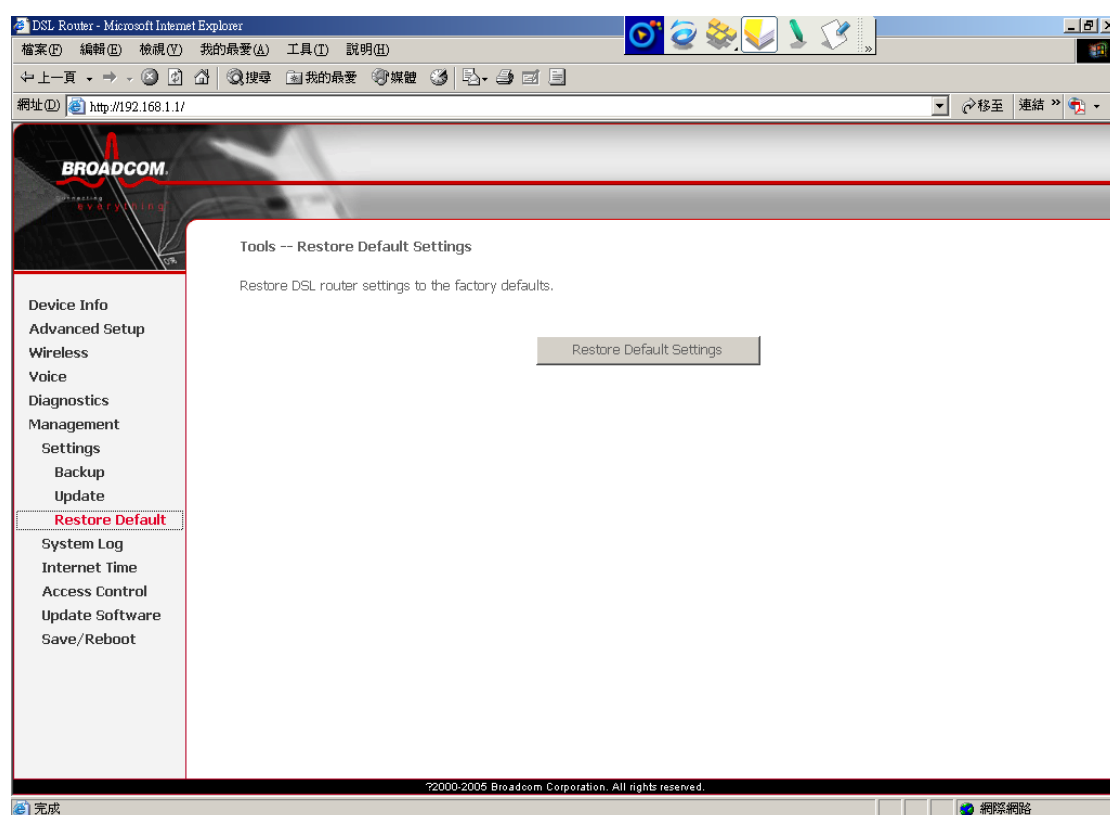
- Software reset
- Hardware reset

A reset to factory default settings deletes the configuration profile settings. Therefore, after the reset, a reconfiguration of your HH1620 will be needed.



Be aware that a reset to factory defaults will reset all configuration you made to the HH1620.

Note



Software Reset

1. Make sure that you need to reset all configurations to default and click Reset Default Settings button.
2. Wait for the HH1620 reset to default settings and return to its home page.
3. You need to re-configure your settings to reform the all the connections.

Hardware Reset

1. Make sure the HH1620 is turned on.
2. Use a pen or an unfolded paperclip to push the recessed reset button on the back panel. The reset button is marked with a red circle. Push it until the power LED lights red - this will take about 7 seconds.
3. Release the reset button.

4. The HH1620 restarts.
5. You need to re-configure your settings to reform the all the connections.

System Log

The System Logs page records various types of activity on the HH1620. This data is useful for troubleshooting, but enabling all logs will generate a large amount of data and adversely affect performance.

You can view data generated or acquired by routine system communication with other devices, such as the results of negotiations with the ISP's computers for DNS and gateway IP addresses.

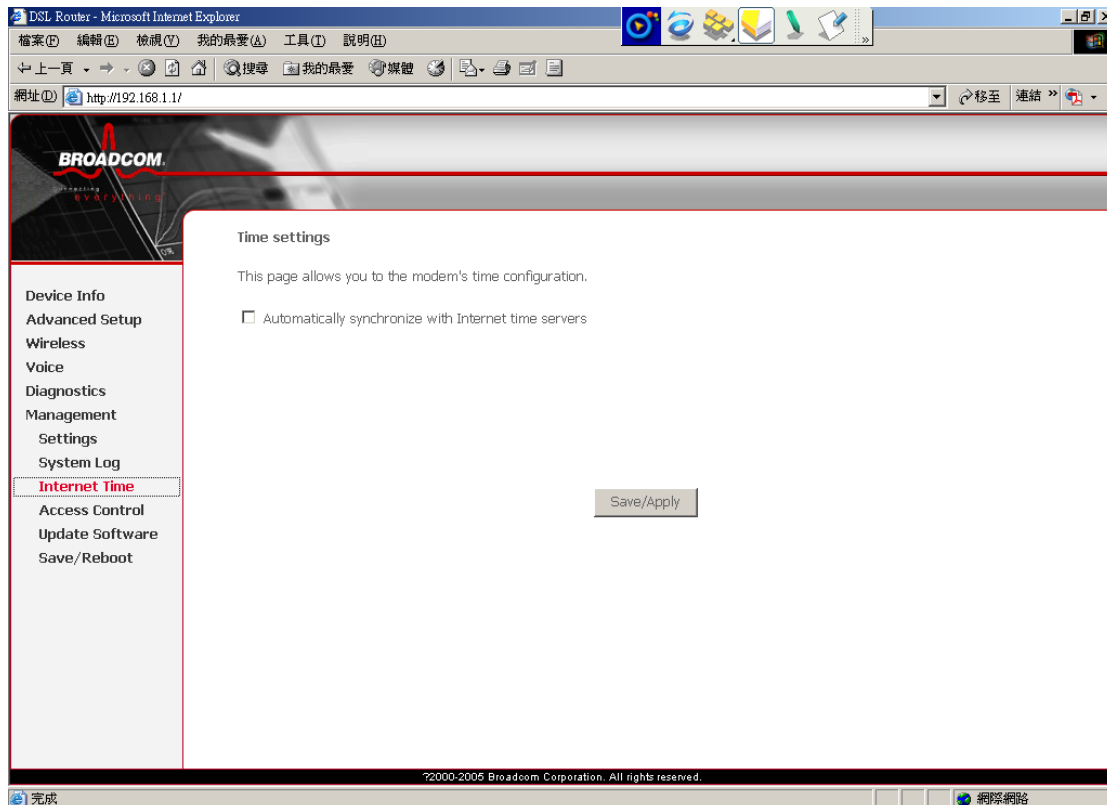
Since only a limited amount of log data can be stored in the HH1620, log data can also be E-mailed to you PC. Click Configure System Log button to configure this feature.

The System Log table gives you an overview of the last event logs that have been recorded since the HH1620 was turned on.

The Configure system log page allows you to configure the events shown in the System Log table.

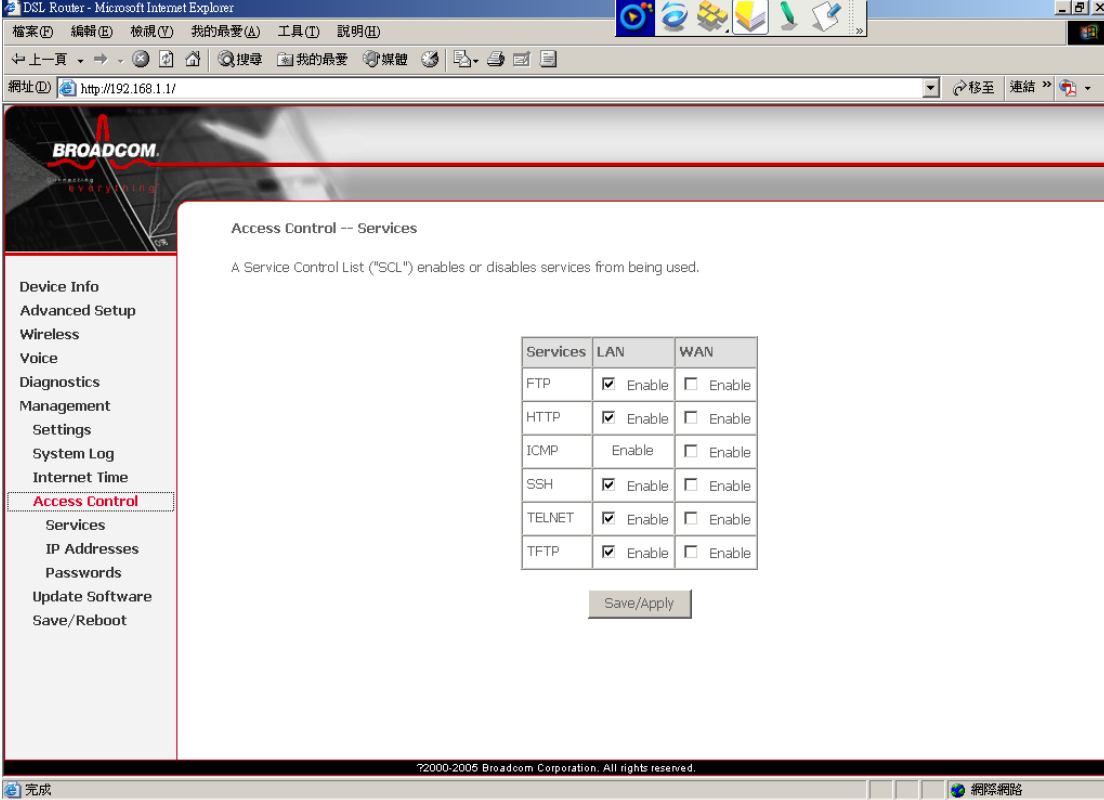
Current Time	The current time on the HH1620 is displayed.
Log Data	Current log data is displayed in this panel.

Internet Time



Tick the button to use the default Internet time server to get the time from Internet.

Access Control – Services



DSL Router - Microsoft Internet Explorer

網址: http://192.168.1.1/

BROADCOM

Access Control -- Services

A Service Control List ("SCL") enables or disables services from being used.

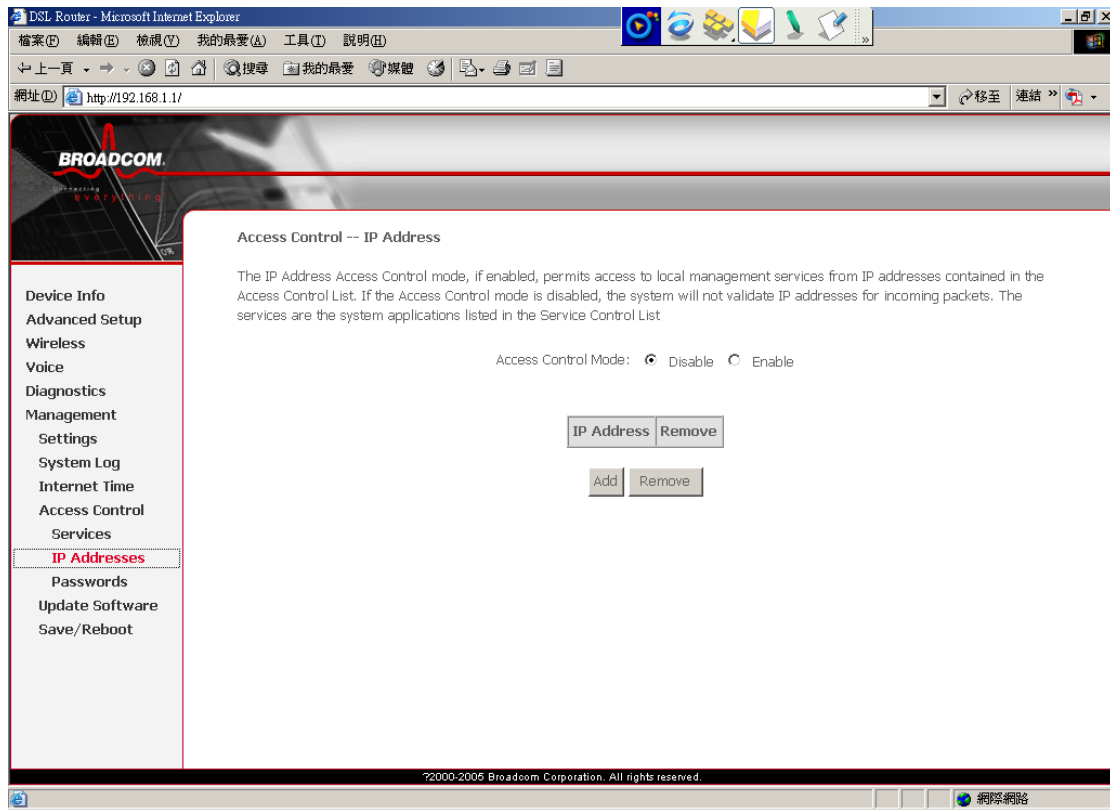
Services	LAN	WAN
FTP	<input checked="" type="checkbox"/> Enable	<input type="checkbox"/> Enable
HTTP	<input checked="" type="checkbox"/> Enable	<input type="checkbox"/> Enable
ICMP	<input type="checkbox"/> Enable	<input type="checkbox"/> Enable
SSH	<input checked="" type="checkbox"/> Enable	<input type="checkbox"/> Enable
TELNET	<input checked="" type="checkbox"/> Enable	<input type="checkbox"/> Enable
TFTP	<input checked="" type="checkbox"/> Enable	<input type="checkbox"/> Enable

Save/Apply

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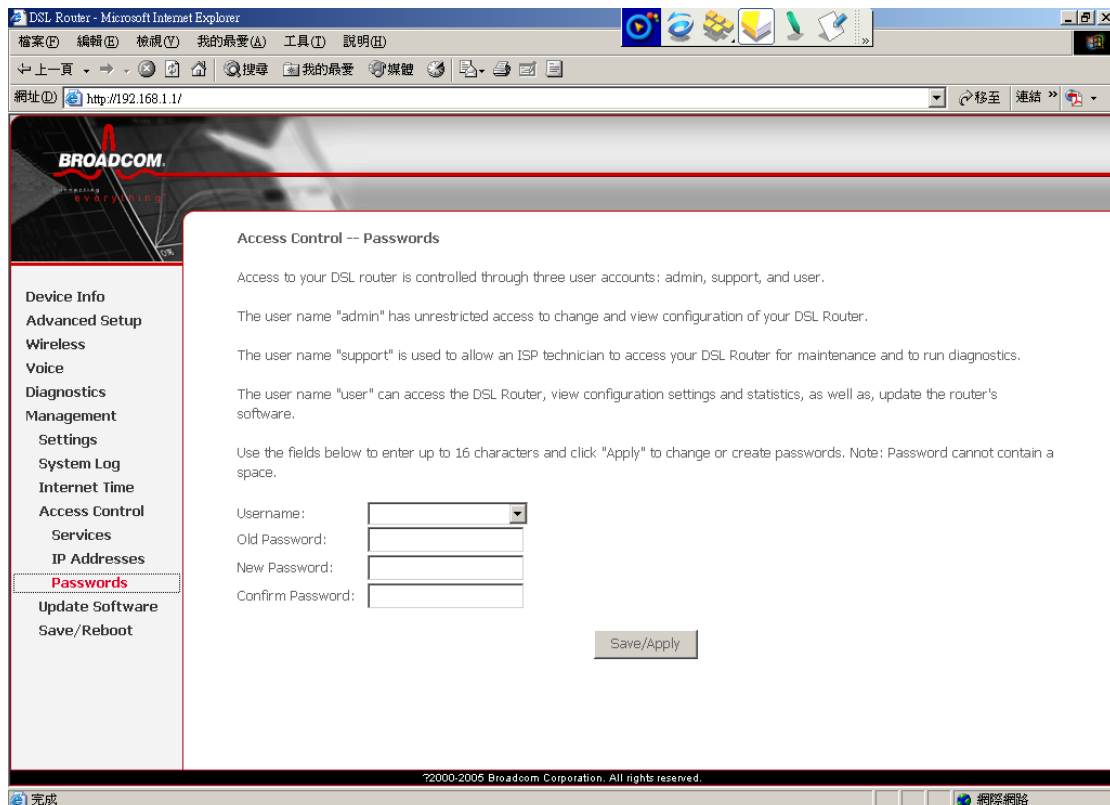
完成 國際網路

Access Control – IP Addresses



Access Control – Passwords

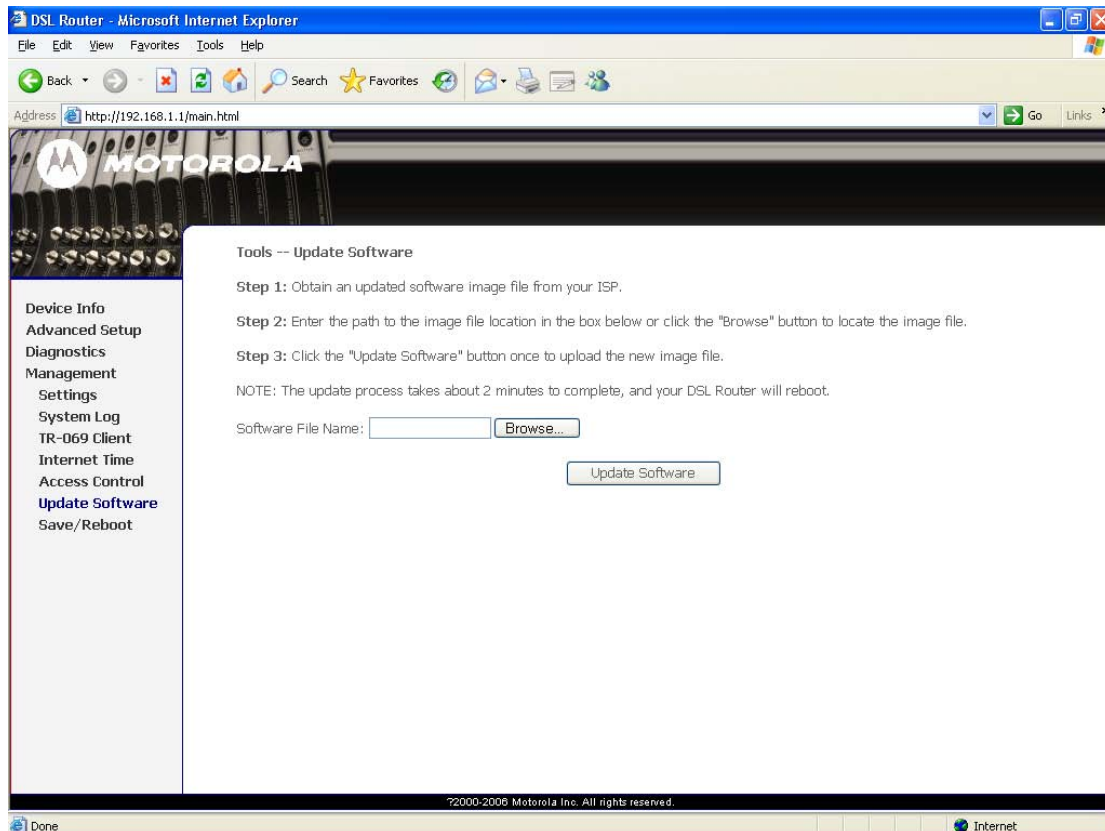
On this page you can change the default user.



1. Select the username from the drop-down list to change its password.
2. Type the old password, new password and confirm (re-type) password.
3. Click Save/Apply to confirm your choice.

Update Software

The firmware (software) in the HH1620 can be upgraded by using your web browser. You must first download the upgrade file to your local hard drive, then proceed with the update process.



To perform the Update process:

1. Click **Browse** button and indicate the location of the upgrade file.
2. Click **Update Software** button to commence the firmware upgrade.
3. Wait about 2 minutes for the process to be completed and reboot the HH1620.

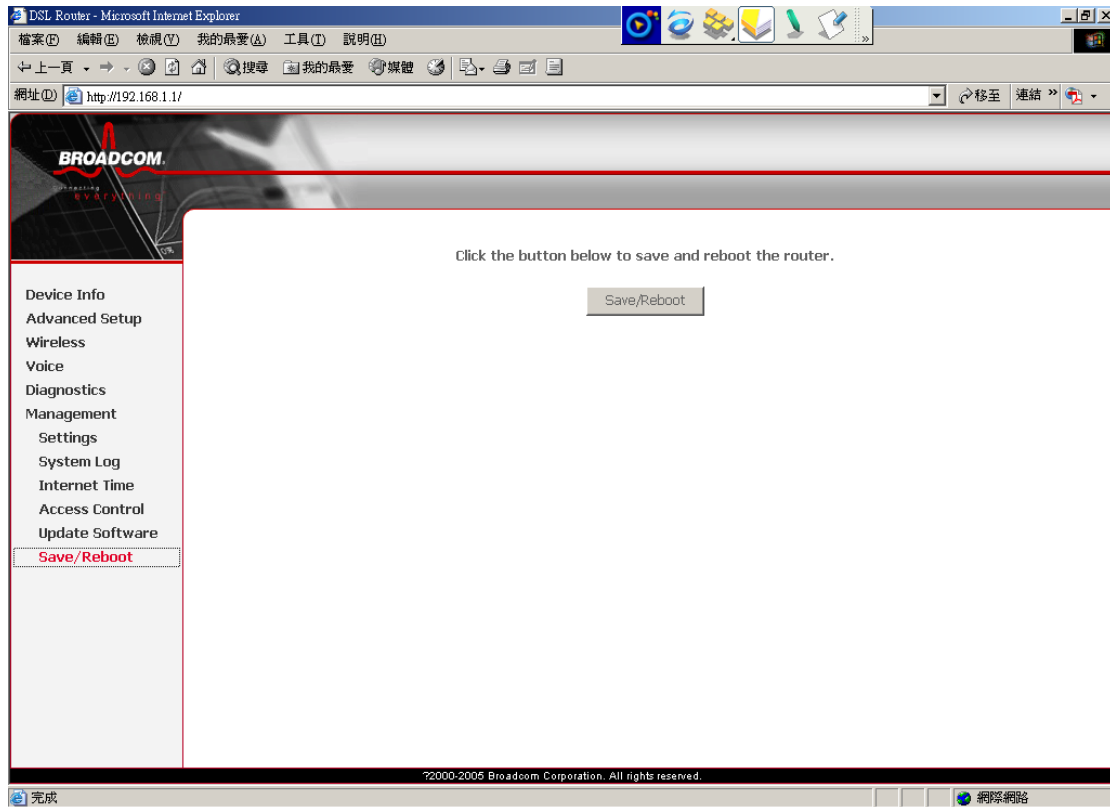


Note

DO NOT power off the HH1620 while processing. Improper operation could damage the Gateway. The HH1620 will restart automatically after the upgrade is complete. Your previous configuration will be lost and you need to re-configure the settings.

Save/Reboot

After changing the HH1620's configuration settings, you must save all of the configuration parameters to FLASH to avoid them being lost after turning off or resetting your HH1620. Click **Save/Reboot** to write your new configuration to FLASH.



4. Troubleshooting

This section details possible solutions to common problems that might occur in using the router.

Contact Us

If you are unable to locate a solution here, please access our website at <http://www.motorola.com/homenetworking> for the latest information. You can also reach us 7 days a week, 24 hours a day at 1-877-466-8646.

My HH1620 does not work.

If none of the LEDs light up, make sure that:

- The HH1620 is plugged into a power socket outlet.
- You are using the correct power supply for your HH1620 device.
- The HH1620 is turned on via the push button at the back panel.

Note: *The power requirements for your HH1620 are clearly indicated on the identification label on the bottom of the HH1620.*

If the LAN LED does not light up, make sure that:

- The LAN cable is securely connected to the 10/100Base-T port.
- You are using the correct cable type for your Ethernet equipment, that is UTP CAT5 with RJ-45 connectors.

My computer is experiencing difficulty connecting to the wireless network.

- Ensure that your router is powered on and that the Wireless LED is on.
- Ensure that your wireless adapter (PCI card, Notebook or Ethernet adapter) is installed correctly and is active.
- Ensure that your wireless adapter's radio signal is enabled. Review your adapter's documentation for further instructions.
- Ensure that your wireless adapter for your PC and the wireless router have the same security settings that will allow your computer to access the wireless network. Also, verify that the list of Restricted Wireless MAC Addresses (on the WIRELESS Page of the Web-based Configuration Utility is not configured to block your PC.
- Ensure that your wireless adapter is within range of your router or is not behind an obstruction. For example, metal structures will interfere with the signal, as will 2.4 GHz cordless phones, and microwaves.
- Ensure that your router's antenna is connected and that your PC's wireless adapter antenna is also connected.

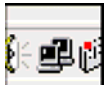
My computer is experiencing difficulty in connecting to the router.

- Ensure that all of your cabling connections are firmly connected. This includes the cables from the wall to your modem, between the router and modem, and, if available, from the router to your PC.
- Ensure that your LEDs are not lit Red or not at all. For further information about LED descriptions, see Section 1: Overview.
- Ensure that you are using Ethernet cables and not telephone cables between the router and modem or router and PC. See the illustration below. Ethernet cables use a wider RJ-45 style plug using 8 wires where telephone style plugs use the smaller RJ-11 style plug using 4 to 6 wires.



The plug on the left is RJ-45; the plug on the right is RJ-11 – use only RJ-45.

- Ensure that your Ethernet adapter is enabled. To check the status of your adapter, click the monitor icon in the System Tray at the bottom right of your screen.



You can also check the status of the Ethernet adapter by selecting **Control Panel > Network and Dial-Up Connections**.

My broadband modem already uses a built-in router.

Because the two routers will cancel each other out, turn off the NAT function in the modem to enable access for your router. Refer to your modem's documentation for further instructions.

I can login to HH1620.

If your HH1620 cannot be reached due to misconfiguration, you might consider a hardware reset to factory defaults as described in section [1.2.3](#).



Note

However, note that resetting the HH1620 to its factory settings will revoke all the changes you made to the configuration.

The performance of HH1620 is poor.

Make sure that the HH1620 is installed and configured as instructed in the Installation and Setup Guide or as instructed by the Service Provider.

The wireless performance of HH1620 is poor.

Choose automatic channel selection or carefully select a radio channel that does not interfere with other radio channels.

Make sure both the WLAN client adapter and the HH1620 are allowed to connect through wireless channels as defined for local regulatory domain.

Check the location of the HH1620 in the building.

Check the signal strength, indicated by the wireless client manager. If the signal is low, try to place the HH1620 or to direct the HH1620's antenna for optimal performance.

I would like to test to see if my Internet connection is live.

Use the ping command to test the connection. Before attempting, ensure that Obtain an IP address automatically has been selected in the computer's settings and that you have an IP address assigned. Refer to Configure Your Computers in Section 2: Installation, for further details.

1. Open a command prompt by clicking Start and Run.
2. For Windows 98 and ME, in the Open field, type command and press Enter or OK. For Windows 2000 and XP, type cmd. Or, navigate using your Start button to Programs>Accessories>Command Prompt.
3. In the Command window, type ipconfig.
 - You should see an IP address for your network adapter:

```
Ethernet Adapter Local Area Connection:
Connection-specific DNS Suffix: Example.example.example.com.
IP Address. . . . . : 192.168.110
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 192.168.11
```

4. In the Command window, type ping followed by the Router's IP address and press Enter.
 - If you receive a reply (the first word will be Reply...), then your computer is connected to the router. Proceed to Step 4.
 - If you do NOT receive a reply, repeat steps 1 – 4 on a different computer to verify that the first computer is not the cause of the problem. Your computer's Default Gateway's IP address may also be your router's IP address. Verify the router's IP address by logging on to the router's Web-based Configuration Utility and reviewing the IP Address field on the LAN Page.
5. In the Command window, type ping followed by your ISP's default gateway and press Enter.
 - If you receive a reply (For example: Reply from 216.109.125.72...), then your connection to the Internet is live.
 - To verify the ISP default gateway's IP address, log on to the router's Web-based Configuration Utility and verify the Default Gateway field on the WAN Page.
 - If you do NOT receive a reply, repeat steps 1 - 5 on a different computer to verify that the first computer is not the cause of the problem.

I cannot access the Web-based Configuration Utility for the router.

Verify your Ethernet connection to the router.

- Verify that the IP address of the PC being used to configure the router is on the same network as the router's configuration IP address.
- The IP address of your network adapter must be on the same network and not a duplicate of any others on the network (for example: 192.168.10.10 and using a subnet mask of 255.255.255.0 can be used to login to the router's default IP address of 192.168.10.1). To adjust the IP address for your PC, refer to Configure Your Computers in Section 2: Installation.
- Verify that you can ping the router on this IP address.
- In the Command window, type ping and your router's default IP address and press Enter.
- If you have changed the factory configured default IP address of the router, you will need to set your network adapter accordingly.
- Verify you are entering the correct URL in the browser. The default is http://192.168.10.1. If you think you have changed the IP address used to configure the router and cannot remember it, you must reset the unit back to factory defaults. To do this, press and hold the reset button for more the 5 seconds. This clears the router's user settings, including Username, Password, IP Address, and Subnet mask.

- Once the router is reset to factory default, re-verify the Ethernet connectivity and IP address issues.

How do I extend my wireless network to cover more area?

You need more than one access point with WDS (Wireless Distribution System) enabled to expand your wireless network. For example, if you are running HH1620, you will need another wireless Access Point (AP), most likely a WA840G or WA840GP (but you can use another HH1620; just ensure that you do not run two DHCP servers at the same time).

Set up both the HH1620 and the WA840 with the same wireless SSID, the same channel number, and the same WPA Pass Phrase or WEP keys. It is suggested that you also enable the Wireless Bridge Restriction Mode to limit the exposure of your wireless network to outside users. The wireless MAC address of the other AP needs to be added to each AP's list of Recognized Bridges, that is, the WA840's wireless MAC address needs to be in the HH1620's list of Recognized Bridges, and vice versa.

Once enabled, your laptop can now roam between the two APs, thereby extending your wireless network.

I cannot browse past the first screen of the Web-based Configuration Utility.

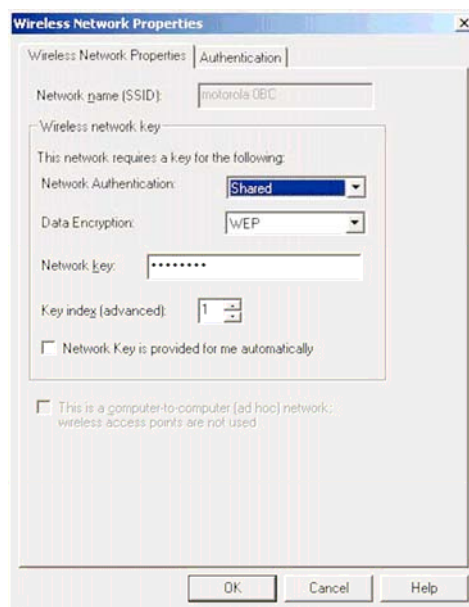
Sometimes, especially when upgrading, some leftover files may be in your Internet Cache. Flush your cache and restart your unit to fix. From Internet Explorer's menu, select Tools > Options and click Delete Files to clear your cache.

How do I match WEP keys between the router and my wireless clients?

Some wireless cards do not support WPA, and in turn cannot accept a WPA Pass Phrase.

For compatibility with these clients, WEP Encryption must be enabled on the SECURITY Page of the Web-based Configuration Utility, with at least one WEP Network Key entered.

Using the utility provided with your wireless client, you must enter the same key that is entered in the HH1620. If more than one WEP Network Key is entered in the HH1620, refer to the Current WEP Network Key Index to determine which key to enter in your client device, and then enter the Current WEP Network Key Index as the client's Key Index.



I cannot make a call via VoIP.

- Your telephone is correctly connected to the HH1620.
- Your telephone is working on the PSTN network:
 - Connect your phone directly to PSTN.
 - Try to make a phone call.
- Your phone number, user name, and password is configured correctly.
- The registrar's and proxy server's IP address and port number are configured correctly.
- The PWR, PPP and VoIP Ready LEDs are on.



As soon as the VoIP Ready LED turns on, you will hear a click, indicating the switch from PSTN to VoIP.

Note

I cannot make a call via PSTN (the regular phone line).

- Your telephone is correctly connected to the HH1620.
Note: *If the HH1620 is turned off, phone calls are always routed over PSTN.*
- Your telephone is working on the PSTN network:
 - Connect your phone directly to PSTN.
 - Try to make a phone call.
- The Forced FXO service is activated, or whether your service provider requested you to dial an extra prefix for making calls via PSTN.



If VoIP is enabled (VoIP Ready LED is on), and when making a forced FXO call, you will hear a click, indicating the switch from VoIP to PSTN.

Note

How to reset my HH1620?

You might consider a reset to factory defaults as described below.

You can choose between:

- Software reset
- Hardware reset

A reset to factory default settings deletes the configuration profile settings.

Therefore, after the reset, a reconfiguration of your HH1620 will be needed.

Software reset Proceed as follows:

1. Go to the HH1620 Web pages.
2. In the menu, select Management > Restore Default.
3. Click Restore Default Settings. The HH1620 restarts.
4. The HH1620 returns to the HH1620 home page (unless the IP address of your computer is not in the same subnet as the default IP address of the HH1620, being 192.168.1.1).

Hardware reset Proceed as follows:

1. Make sure the HH1620 is turned on.
2. Use a pen or an unfolded paperclip to push the recessed reset button on the back panel. The reset button is marked with a red circle. Push it until the power LED lights red - this will take about 7 seconds.

3. Release the reset button.
4. The HH1620 restarts.

Appendix. Device Specifications

Default IP Address	192.168.1.1
Default Subnet Mask	255.255.255.0 (24 bits)
DHCP Pool	192.168.1.32 to 192.168.1.64
Default Password	admin
Built-in Switch	Three auto-negotiating, auto MDI/MDI-X 10/100 Mbps RJ-45 Ethernet ports
USB ports	
PHONE Ports	2 RJ-11 FXS POTS ports.
RESET Button	Restores factory defaults
Antenna	One non-detachable external dipole antenna, 2dBi
Dimensions	248 W x 168 D x 37 H mm
Weight	350g
Power Specification	12VDC 1A
Operation Temperature	0° C ~ 40° C
Storage Temperature	-20° ~ 60° C
Operation Humidity	20% ~ 95% RH
Storage Humidity	20% ~ 95% RH

Glossary

This glossary defines terms and abbreviations used in this manual.

10/100Base-T	See Ethernet.
Adapter	A device or card that connects a computer, printer, or other peripheral device to the network or to some other device. An Ethernet adapter connects a computer to the LAN.
Ad-Hoc Network	A temporary local area network connecting AP clients together, usually just for the duration of the communication session. The clients communicate directly to each other and not through an established, such as through a router. Also known as IBSS (Independent Basic Service Set).
Broadband	High-speed telecommunication over a wide range of frequencies, typically 256 Kbps or faster. Broadband enables more information to be transmitted in less time. The most common broadband service types available to homes and small-offices are cable modem and DSL. Both cable modem and DSL are much faster than a traditional dial-up Internet connection.
Broadband Provider	If you have a cable modem, the cable company from which you subscribe to high-speed data service. If you have a DSL modem, the telephone company from which you subscribe to DSL service.
BSS	Basic Service Set. A configuration of Access Points that communicate with each other without resorting any infrastructure. Also known as Ad-Hoc networks. Also see ESS.
Cable Modem	A device enabling a broadband connection to the Internet over cable television lines. It requires a subscription for high-speed data service from your local cable provider.
Coaxial Cable (Coax)	A type of wire consisting of a center wire surrounded by insulation and a grounded shield of braided wire traditionally used mainly to carry cable television signals. The shield minimizes electrical and radio frequency interference.
DDNS	Dynamic Domain Name System enables you to assign a fixed host and domain name to a dynamic Internet IP address. It is used when you are hosting your own web server, FTP server, or another server behind the router.
Default Gateway	A designated router that forwards all traffic not addressed to a host on the local subnet.
DHCP	A Dynamic Host Configuration Protocol server dynamically assigns IP addresses to client hosts on an IP network. DHCP eliminates the need to manually assign static IP addresses by “leasing” an IP address and subnet mask to each client. It enables the automatic reuse of unused IP addresses. The HH1620 can simultaneously be a DHCP client and a DHCP server: <ul style="list-style-type: none">• A DHCP server at xxxx headend assigns a WAN IP address to your HH1620.• The HH1620 contains a built-in DHCP server that assigns private IP addresses to each computer on its LAN.
DMZ	A “de-militarized zone” is one or more hosts logically located between a private LAN and the Internet. A DMZ prevents direct access by outside users to private data. (The term comes from the geographic buffers located between some conflicting countries such as North and South Korea.) In a typical small DMZ configuration, the DMZ host receives requests from private LAN users to access external web sites and initiates sessions for these requests. The DMZ host cannot initiate a session back to the private LAN. Internet users outside the private LAN can access only the DMZ host. You can use a DMZ to set up a web server or for gaming without exposing confidential data.
DOCSIS	The Data-Over-Cable Service Interface Specification define a standard

interface for cable modems to deliver data between a cable network and computer systems. Euro-DOCSIS is DOCSIS adapted for use in Europe.

DNS	The Domain Name System is the Internet system for converting domain names to IP addresses. ADNS server contains a table matching domain names such as Internetname.com to IP addresses such as 192.169.9.1. When you access the Web, a DNS server translates the URL displayed on the browser to the destination website IP address. The DNS lookup table is a distributed Internet database; no one DNS server lists all domain-to-IP address matches.
Domain name	A unique name, such as motorola.com, that maps to an IP address. Domain names are typically much easier to remember than IP addresses.
Dotted-decimal Format	Method of representing an IP address or subnet mask using four decimal numbers called octets. Each octet represents eight bits. In a class C IP address, the octets are "network.network.network.host." The first three octets together represent the network address and the final octet is the host address. In the HH1620 LAN default configuration, 192.168.15 represents the network address. In the final octet, the host address can be from 2 to 254.
Download	To copy a file from one computer or other network device to another. You can use the Internet to download files from a server to your home computer. Your voice gateway downloads its configuration file and firmware from XXXX .
Downstream	In a cable data or DSL network, the direction of data received by your computer from the Internet.
Driver	Software that enables a computer to interact with a network or other device. For example, there are drivers for printers, monitors, graphics adapters, modems, Ethernet, USB, and many others.
DSL	A digital subscriber line enables a broadband connection to the Internet over traditional telephone lines that support DSL. You need a subscription for DSL service from your local telephone company.
DSSS	Direct-Sequence Spread Spectrum. DSSS is a transmission technology used in WLAN transmissions where a data signal at the sending station is combined with a higher data rate bit sequence, or chipping code, that divides the user data according to a spreading ratio. The chipping code is a redundant bit pattern for each bit that is transmitted, which increases the signal's resistance to interference. If one or more bits in the pattern are damaged during transmission, the original data can be recovered due to the redundancy of the transmission.
Dynamic IP Address	An IP address that is temporarily leased to a host by a DHCP server. The opposite of static IP address.
ESS	An Extended Service Set (ESS) is a set of two or more BSSs that form a single subnetwork. See also BSS.
Ethernet	The most widely used type of local area network (LAN). The most commonly installed Ethernet networks are called 10Base-T. 10Base-T provides transmission speeds up to 10 megabits per second (Mbps), usually over twisted-pair wire. Fast Ethernet (100Base-T) provides transmission speeds up to 100 Mbps.
Event	A message generated by a device to inform an operator or the network management system that something has occurred.
F-type Connector	A type of connector used to connect coaxial cable to equipment such as the HH1620.
Firewall	A security software system on the HH1620 that enforces an access control policy between the Internet and the HH1620 LAN.
Firmware	Code written onto read-only memory (ROM) or programmable read-only memory (PROM). Once firmware has been written onto the ROM or PROM, it is retained even when the device is turned off. Firmware is

	upgradeable.
Flow	A data path moving in one direction.
GUI	graphical user interface
Hexadecimal	A base-sixteen numbering system that uses sixteen sequential numbers (0 to 9 and the letters A to F) as base units before adding a new position. On computers, hexadecimal is a convenient way to express binary numbers.
HFC	A hybrid fiber/coaxial cable network uses fiber-optic cable as the trunk and coaxial cable to the subscriber premises.
Host	Any computer or similar device supporting end-user applications or services with full two-way network access. Each host has a unique host number that combined with the network number forms its IP address.
Hub	On a LAN, a device that connects multiple hosts to the LAN. A hub performs no data filtering. See also router.
ICMP	Internet Control Message Protocol is a protocol used for error, problem, and informational messages sent between IP hosts and gateways. ICMP messages are processed by the IP software and are not usually apparent to the end-user.
IGMP	Internet Group Management Protocol
Internet	A worldwide collection of interconnected networks, all using TCP/IP.
IP	Internet Protocol is a set of standards that enable different types of computers to communicate with one another and exchange data through the Internet. IP provides the appearance of a single, seamless communication system and makes the Internet a virtual network.
IP address	An Internet Protocol address identifies a computer or other device on a TCP/IP network. Networks using the TCP/IP protocol route messages based on the destination IP address.
IPSec	The Internet Protocol Security protocols are authentication and encryption standards for secure data exchange over the Internet.
ISP	Internet service provider
LAN	A local area network provides a full-time, high-bandwidth connection over a limited area, such as a building, campus, office, or home. The computers and other devices you connect to your voice gateway, except for the telephones, form a LAN. Ethernet is the most widely used LAN standard.
MAC	address The Media Access Control address uniquely identifies each device that can be connected to an Ethernet network. It is permanently written to read-only memory (ROM) at the factory and printed on your HH1620.
MHz	Mega hertz. A measure of frequency; one MHz means one million cycles per second.
Multicast	A data transmission sent from one sender to multiple receivers. See also broadcast and unicast.
NAT	Network Address Translation is a standard for a LAN to use one set of IP addresses for internal traffic and a second set of IP addresses for external traffic.
NAPT	Network Address Port Translation is the most common form of translation between public and private IP addresses.
Network	Two or more computers connected to communicate with each other. Networks have traditionally been connected using some kind of wiring.
NIC	Network interface card is another name for network adapter. A NIC is installed in an expansion slot or can be built-in. Every Ethernet NIC has a MAC address permanently saved in its ROM.
OOB DTMF	Out-of-Band Dual-Tone Multi-Frequency protocol for voice traffic.
PING	A network utility that tests host reachability by sending a small packet to the host and waiting for a reply. If you PING a computer IP address and receive a reply, you know the computer is reachable over the network. It

also stands for “Packet InterNet Groper.”

Port	On a computer or other electronic device, a port is a socket or plug used to physically connect it to the network or to other devices. In TCP/IP, a port is a number from 0 to 65536 used logically by a client program to specify a server program. Ports 0 to 1024 are reserved.
Port Triggering	A mechanism that enables incoming communication with specified applications. Primarily used for gaming applications.
POTS	“Plain old telephone service;” basic analog telephone service. POTS uses the lowest 4 kHz of bandwidth on twisted pair wiring.
PPP	Point-to-Point Protocol is a method to establish a network connection or session between hosts.
PPPoE	Point-to-Point Protocol over Ethernet is a specification for connecting to the Internet used with DSL modems.
PPTP	Point-to-Point Tunneling Protocol encapsulates other protocols to create VPNs. It is developed jointly by several vendors.
Private IP Address	An IP address assigned to a computer on the HH1620 LAN by the DHCP server on the HH1620 for a specified lease time. Private IP addresses are used by the HH1620 LAN only; they are invisible to devices on the Internet. See also public IP address.
PSTN	The public switched telephone network is the traditional circuit-switched, voice-oriented telephone network. See also POTS.
Public IP Address	A public IP address is visible to devices on the Internet. See also private IP address.
QoS	quality of service
RIP	Routing Information Protocol enables routers to exchange routing information with other network routers. Any RIP-enabled router: <ul style="list-style-type: none">• Sends automatic update packets containing its routing table periodically (every 30 seconds)• Accepts periodic updates from other routers and adds, deletes, or modifies routes in its routing table accordingly• Responds to requests for its routing table
RTP	Real Time Protocol for voice traffic.
RJ-11	The most common type of connector for household or office phones.
RJ-45	The most common type of port for Ethernet networks.
Roaming	The ability to transfer your wireless session from one AP to another AP seamlessly.
Router	On IP networks, a device connecting at least two networks, which may or may not be similar. A router filters data based on the IP address, examining the source and destination IP addresses to determine the best route on which to forward it.
Routing Table	A table listing available routes that is used by a router to determine the best route for a packet.
Server	A dedicated computer that supplies files, data, or services to other “client” computers or devices.
SIP	Session Initiation Protocol for voice traffic.
S-MTA	A standalone media terminal adapter converts analog voice signals to and from a standard telephone to digital data that can be transmitted through a broadband connection over the Internet.
SSH	secure shell
Stateful Inspection	A type of firewall that tracks each connection traversing all firewall interfaces to ensure validity. In addition to examining the source and destination in the packet header based on static rules, a stateful inspection firewall:

- Examines packet headers on context established by previous packets that traversed the firewall
- Monitors the connection state and saves it in a table
- Closes ports until a connection to a specific port is requested
- May examine the packet contents up through the application layer to determine more than just the source and destination

A stateful-inspection firewall is more advanced than a static filter firewall.

Static Filter	A type of firewall that examines the source and destination in the packet header based on administrator-defined rules only.
Static	IP address An IP address that is permanently assigned to a host. Normally, a static IP address must be assigned manually. The opposite of dynamic IP address.
Subnet Mask	A bit mask that is logically ANDed with the destination IP address of a packet to determine the network address. A router routes packets using the network address.
Subnetwork	A part of a network; commonly abbreviated “subnet.” When subnetting is used, the host portion of the IP address is divided into a subnet and host number. Hosts and routers use the subnet mask to identify the bits used for the network and subnet number.
TCP	Transmission Control Protocol provides reliable transport over the network for data transmitted using IP. It defines rules and procedures for data exchange.
TCP/IP	The Transmission Control Protocol/Internet Protocol is a set of protocols that provides rules for communication between networks. It is the worldwide internetworking standard and the basic communications protocol of the Internet.
TFTP	Trivial File Transfer Protocol is a very simple protocol used to transfer files.
Unicast	A point-to-point data transmission sent from one sender to one receiver. This is the normal way you access websites. See also multicast.
UPnP	Universal Plug and Play protocol.
UPS	A universal power supply provides battery back-up for a specified time during a power outage.
Upstream	In a cable data or DSL network, the direction of data sent from your computer to the Internet.
USB	Universal Serial Bus
Wireless Access Point (WAP)	A device that provides network connectivity to one or more client computers using radio signals over a wireless connection. One example you could use with your voice gateway is the Motorola Wireless Access Point WA840G .
VoIP	Voice over Internet Protocol is a method to exchange voice, fax, and other information over the Internet. Voice and fax have traditionally been carried over telephone lines using a dedicated circuit for each line. VoIP enables calls to travel as discrete data on shared lines.
VoIP provider	The company from which you purchase VoIP telephone service.
VPN	A virtual private network is a private network that uses “virtual” connections (tunnels) routed over a public network (usually the Internet) to provide a secure and fast connection, usually to users working remotely at home or in small branch offices. A VPN connection provides security and performance similar to a dedicated link (for example, a leased line), but at much lower cost.
WAN	A wide-area network provides a connection over a large geographic area, such as a country or the whole world. The bandwidth depends on need and cost, but is usually much lower than for a LAN. For the voice gateway, “WAN” refers to the VoIP and broadband provider networks.

WAP	Wireless Access Point or Wireless Access Protocol. See also <i>Access Point</i> .
WEP	Wired Equivalent Privacy encryption protects the privacy of data transmitted over a wireless LAN. WEP uses keys to encrypt and decrypt transmitted data. The access point must authenticate a client before it can transfer data to another client. WEP is part of IEEE 802.11b.
Wi-Fi	Wireless fidelity (pronounced why'-fy) brand name applied to products supporting IEEE 802.11b/g.
WLAN	Wireless LAN.
WME	Wireless Media Extensions (WME) is another acronym commonly used for WMM features.
WMM	Wi-Fi Multimedia, which optimizes the multimedia (e.g., voice, video) sharing over the network.
WPA	Wi-Fi Protected Access. A security regimen developed by IEEE for protection of data on a WLAN.
World Wide Web	An interface to the Internet that you use to navigate and hyperlink to information.



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