Wireless Media Router

WL-350

Full Manual

Introduction

The WL-350 is a draft 802.11n compliant device that delivers up to 6x faster speeds than 802.11g while staying backward compatible with 802.11g and 802.11b devices.

It is not only a Wireless Access Point, which lets you connect to the network without wires. There's also a built-in 4-port full-duplex 10/100/1000 Gigabit Switch to connect your wired-Ethernet devices together. The Router function ties it all together and lets your whole network share a high-speed cable or DSL Internet connection.

The Access Point built into the Router uses advanced MIMO (Multi-Input, Multi-Output) technology to transmit multiple steams of data in a single wireless channel. The robust signal travels farther, maintaining wireless connections up to 3 times farther than standard 802.11g, eliminating dead spots and extending network range.

To protect the data and privacy, the Router can encode all wireless transmissions with 64/128-bit encryption. It can serve as your network's DHCP Server, has a powerful SPI firewall to protect your PCs against intruders and most known Internet attacks, and supports VPN pass-through. The router also provides easy configuration with the web browser-based configuration utility.

The incredible speed and the fully automatic QoS function of the 802.11n (draft2.0) Gigabit Router is ideal for media-centric applications like streaming video, gaming, and VoIP telephony. It is designed to run multiple media-intense data streams through the network at the same time, with no degradation in performance.

Features & Benefits

Features	Benefits
High Speed Data Rate Up to 300Mbps	**Capable of handling heavy data payloads such as MPEG video streaming**
Concurrent Dualband (2.4GHz and 5GHz)	**Connect your client devices via the 2.4GHz band, while streaming media on the clean 5GHz band.**
IEEE 802.11n draft Compliant and backward compatible with 802.11b/g	**Fully interoperable with IEEE 802.11b/g/n devices**
Four built-in 10/100/1000Mbps Gigabit Switch Ports (Auto-Crossover)	**Scalability, able to extend your network**
Supports DNS/ DDNS	**Lets users assign a fixed host and domain name to a dynamic Internet IP address.**
Supports NAT (Network Address Translation)/NAPT	**Shares single Internet account and provides a type of firewall by hiding internal IP addresses for keeping hacker out**
Hide SSID	**Avoids unallowable users sharing bandwidth, increases efficiency of the network**
Firewall supports Virtual Server Mapping, DMZ, IP Filter, ICMP Blocking, SPI	**Avoids the attacks of Hackers or Viruses from Internet**
Support 802.1x authenticator, 802.11i (WPA/WPA2, AES), VPN pass-thru mechanisms	**Provide mutual authentication (Client and dynamic encryption keys to enhance security**
WDS (Wireless Distribution System)	**Make wireless AP and Bridge mode simultaneously as a wireless repeater**
Universal Plug and Play (UPnP™)	**Works with most Internet gaming and instant messaging applications for automatic Internet access**
Filter Scheduling	**The filter can be scheduled by days, hours or minutes for easy management**
Real time alert	**The detection of a list for Hacker log-in information**
Web configuration	**Helps administrators to remotely configure or manage the Router via Telnet/Web-browser**

Package Contents

Open the package carefully, and make sure that none of the items listed below are missing. Do not discard the packing materials; in case of return, the device must be shipped in its original package.

- One WL-350 Wireless Media Router
- One 12V/1.25A Power Adapter
- UTP Cable
- One CD-ROM with User's Manual
- One Quick Installation Guide
- Warranty Card

Safety Guidelines

In order to reduce the risk of fire, electric shock and injury, please adhere to the following safety guidelines.

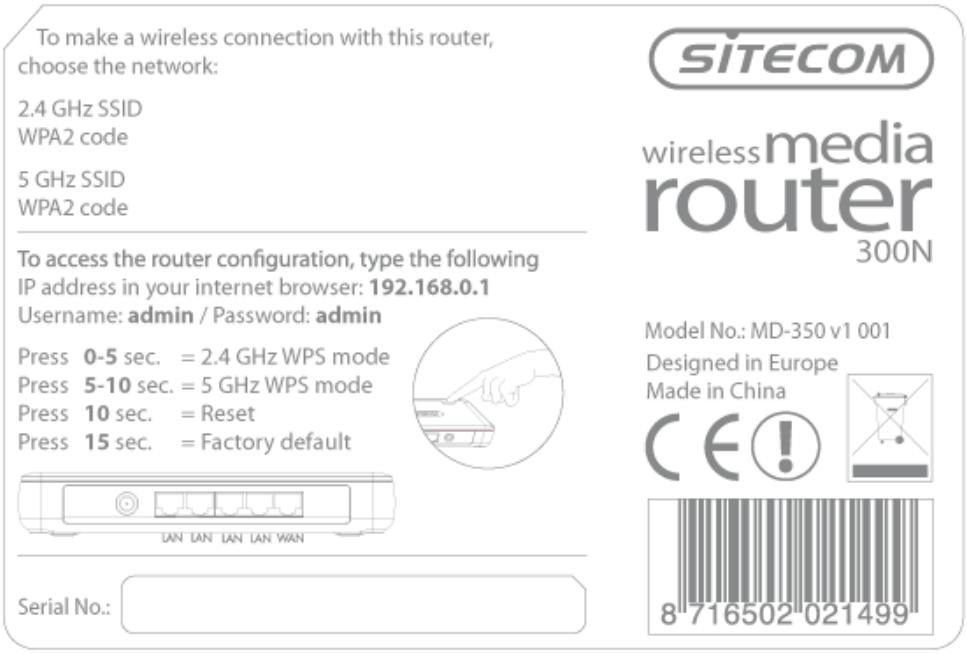
- Carefully follow the instructions in this manual; also follow all instruction labels on the device.
- Except for the power adapter supplied, the device should not be connected to any other adapters.
- Do not spill liquid of any kind on the device.
- Do not place the device on an unstable stand or table. The device may drop and become damaged.
- Do not expose the device to direct sunlight.
- Do not place any hot devices close to this device, as they may degrade or cause damage to the device.
- Do not place any heavy objects on top of the device.
- Do not use liquid cleaners or aerosol cleaners. Use a soft dry cloth for cleaning.

Product Layout

Item	Label	Description
1	LAN Ports (yellow)	Use an Ethernet cable to connect each port to a computer on your Local Area Network (LAN).
2	WAN Port (blue)	Use an Ethernet cable to connect this port to your WAN router/modem.
3	DC Connector	Use the power cable and connect the adapter to the power socket on the wall, and the DC inlet into the DC connector.
4	USB port	The USB port can be used to connect a USB memory stick or hard disk.
5	WPS (*on the top of the router*)	WPS (Wireless Push Button) is used for Wi-Fi Protected Setup. By pressing this button, the security settings of the device will automatically synchronize with other wireless devices on your network that support Wi-Fi Protected Setup.

Back label

The backlabel describes the IP address, login details, SSID, security code and WPS button functionality.



Button	Description
WPS BUTTON	Press 0-5 seconds for 2.4 GHz WPS mode Press 5-10 seconds for 5 GHz WPS mode Press 10 seconds to reset the router Press 15 Seconds to reset the router to factory defaults.

LED Definition

From left to right.

Port	Description
Power (Blue)	Shows the device is turned on.
USB (Blue)	Shows an USB device is connected.
WiFi 2.4 GHz (Blue)	Shows WiFi activity on the 2.4 GHz band.
WiFi 2.4 GHz (Blue)	Shows WiFi activity on the 2.4 GHz band.
WAN (Blue)	Shows the cable is connected.
LAN (Blue)	Shows the cable is connected.
LAN (Blue)	Shows the cable is connected.
LAN (Blue)	Shows the cable is connected.
LAN (Blue)	Shows the cable is connected.
WPS (Blue)	Shows WPS activity after pushing WPS button. Flashing = In progress Solid = success

System Requirements

The following are the minimum system requirements in order configure the device:

- PC/Notebook
- Operating System – Microsoft Windows XP/2000/Vista/Seven
- 1 Free Ethernet port
- Wi-Fi card/USB dongle (802.11 b/g/n) – optional
- External xDSL (ADSL) or Cable modem with an Ethernet port (RJ-45)
- PC with a web-browser (Internet Explorer, Safari, Firefox, Opera)
- Ethernet compatible CAT5 cables

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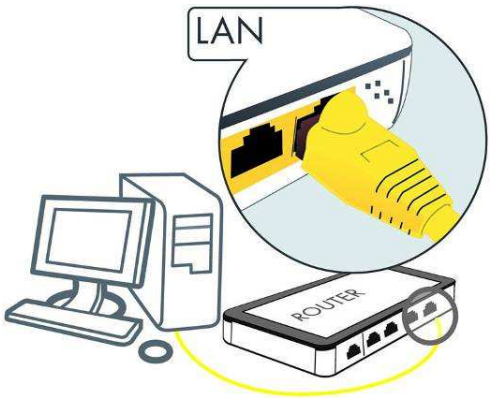
1 Understanding the Hardware

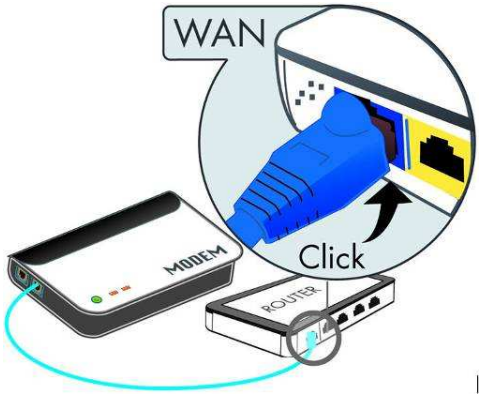
Hardware Installation

You can place the WL-350 on a desk or other flat surface, or you can mount it on a wall. For optimal performance, place your Wireless Broadband Router in the center of your office (or your home) in a location that is away from any potential source of interference, such as a metal wall or microwave oven. This location must be close to a power connection and your ADSL/Cable modem.

Plug one end of the Ethernet cable into the LAN port of the device and another end into your PC/Notebook.



Plug one end of another Ethernet cable to the WAN port of the device and the other end into you cable/DSL modem (Internet).

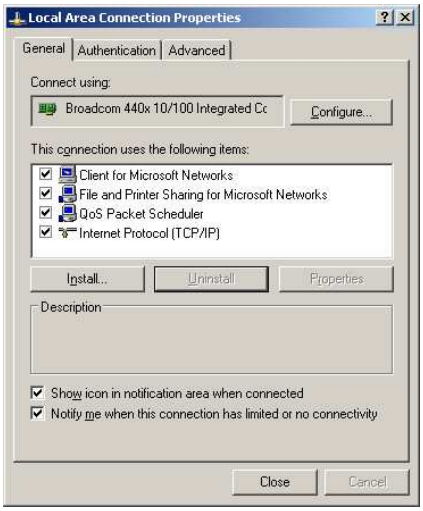


Insert the DC-outlet of the power adapter into the port labeled "DC-IN" and the other end into a power socket on the wall.

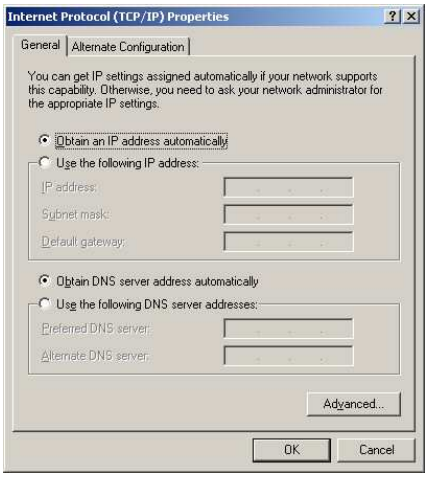
IP Address Configuration

This device can be configured as a Bridge/Router or Access Point. The default IP address of the device is 192.168.0.1. In order to log into this device, you must first configure the TCP/IP settings of your PC/Notebook.

1. In the control panel, double click Network Connections and then double click on the connection of your Network Interface Card (NIC). You will then see the following screen.



2. Select **Internet Protocol (TCP/IP)** and then click on the Properties button. This will allow you to configure the TCP/IP settings of your PC/Notebook.



Select both [**Obtain an IP address automatically**] and [**Obtain DNS server address automatically**].

3. Click on the OK button to close this window, and once again to close LAN properties window.

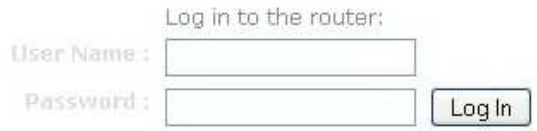
2 Internet Connection Wizard

This device offers a quick and simple configuration through the use of a wizard. This chapter describes how to use the wizard to configure the internet settings. Please refer to Chapter 6 in order to configure the more advanced features of the device.

Logging In

To configure the device, open a web browser.

Type http://192.168.0.1 in the address bar and press [Enter].
After connecting to the IP address, the web-browser will display the login page.

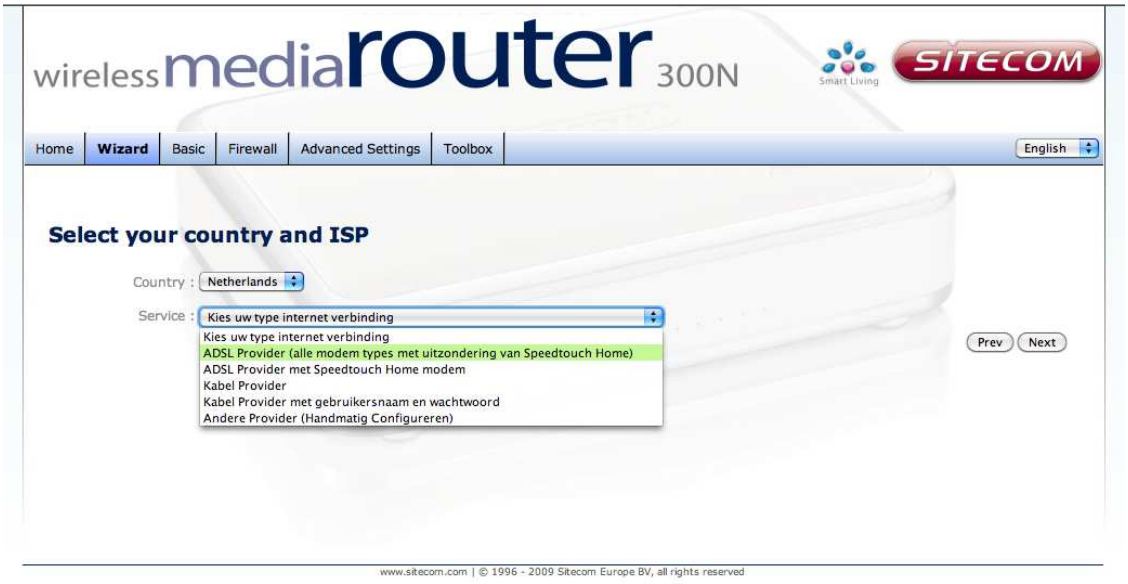


Fill in the username and password. The default credentials are shown below:

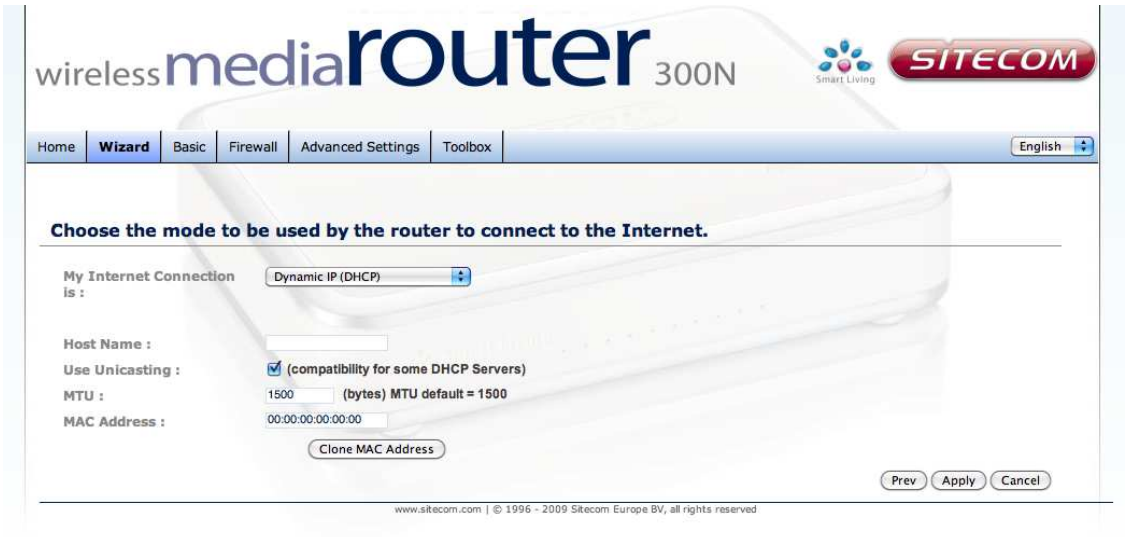
Username:	**admin**
Password:	**admin**

Click on the **Wizard** button to begin the process.

Select your country from the Country list. Select your internet provider. Click **Next.**



Depending on the chosen provider, you may need to enter your user name and password, MAC address or hostname in the following window. After you have entered the correct information, click **Next**.



Click **APPLY** to complete the configuration.

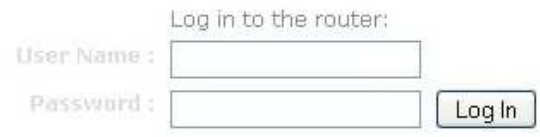
3 Wi-Fi Protected Setup Wizard

Wi-Fi Protected Setup is a feature that locks the wireless security settings and prevents the settings from being changed by any new external registrar using its PIN. Devices can still be added to the wireless network using Wi-Fi Protected Setup.

Please refer to Chapter 5 in order to configure the more advanced features of the device

Logging In

Open a web browser and type in the IP address (default: **http://192.168.0.1**), the web-browser will display the login page.

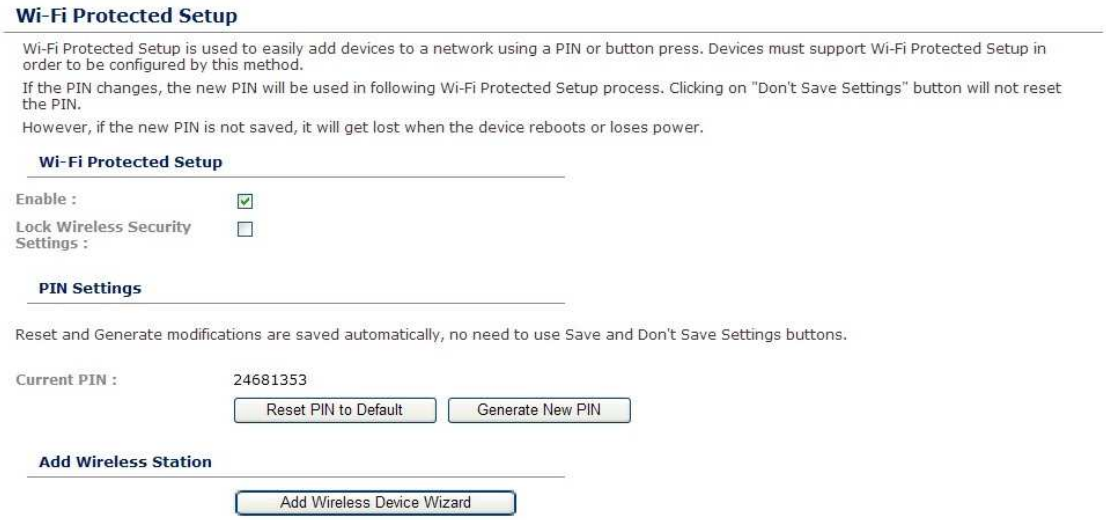


Fill in the username and password. The default credentials are shown below:

Username:	**admin**
Password:	**admin**

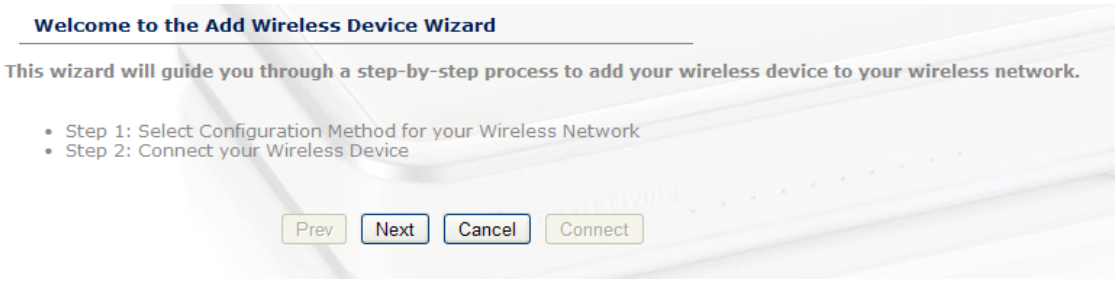
Add a Wireless Device

Click on **Basic -> Wireless** and click on the **Add Wireless Device Wizard** button.



The wireless wizard will inform you that there are two major steps in the process.

- Select the configuration method for your wireless network
- Connect your wireless device



Click on the **Next** button to continue.

You may select from three available options:

- **PIN**: Select this radio button if your wireless device supports PIN
- **Push Button**: Select this radio button if your wireless device supports push button.
- **Manual**: Select the radio button if you would like to setup your wireless device manually. Refer to chapter 5 in order to manually configure the device.

The wizard will either display the wireless network settings to guide you through manual configuration, prompt you to enter the PIN for the device, or ask you to press the configuration button on the device. If the device supports Wi-Fi Protected Setup and has a configuration button, you can add it to the network by pressing the configuration button on the device and then the on the router within

60 seconds. The status LED on the router will flash three times if the device has been successfully added to the network.

There are several ways to add a wireless device to your network. Access to the wireless network is controlled by a registrar. A registrar only allows devices onto the wireless network if you have entered the PIN, or pressed a special Wi-Fi Protected Setup button on the device. The router acts as a registrar for the network, although other devices may act as a registrar as well.

Using the PIN

A PIN is a unique number that can be used to add the router to an existing network or to create a new network. The default PIN may be printed on the bottom of the router. For extra security, a new PIN can be generated. You can restore the default PIN at any time. Only the Administrator ("admin" account) can change or reset the PIN.

Select the **PIN** radio button and then click on the **Next** button.

Specify the PIN and then click on the **Connect** button.

The wireless device configuration is now complete.

Using the Push Button

WPS is used for Wi-Fi Protected Setup. By pressing the WPS button on the top panel of the device, the security settings of the device will automatically synchronize with other wireless devices on your network that support Wi-Fi Protected Setup

If the device supports Wi-Fi Protected Setup and has a configuration button, you can add it to the network by pressing the configuration button on the device and then the one the router within 60 seconds. The status LED on the router will flash three times if the device has been successfully added to the network.

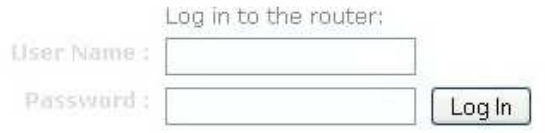
Select the **Push Button** radio button and then click on the **Next** button.

Press the **WPS** button on the device (which is located on the left side of the front panel) and then click on the **Next** button.

4 Advanced Web Configuration

Logging In

Open a web browser and type in the IP address (default: **http://192.168.0.1**), the web-browser will display the login page.



Fill in the username and password. The default credentials are shown below:

Username:	**admin**
Password:	**admin**

After logging in you will see the graphical user interface (GUI) of the device. The navigation menu on the top is divided into six main sections:

1. **Home**: This shows the basic status of the router.
2. **Wizard**: The setup wizard which will guide you through the initial setup.
3. **Basic**: This menu includes the network settings, wireless settings and WAN settings.
4. **Firewall**: This menu includes virtual server, special applications, port forwarding, access control, etc.
5. **Advanced Settings**: This menu includes DDNS, the Stream engine, MAC address filter, web filter etc.
6. **Toolbox**: This menu displays the Time zone, Firmware update, Password settings etc.

4.1 Home

Device

All of your Internet and network connection details are displayed on this page. The firmware version is also displayed here.

Wireless

Click on the **Wireless** link in the navigation menu. The wireless section allows you to view the wireless clients that are connected to the device.

- **MAC Address**: The Ethernet ID (MAC address) of the wireless client.
- **IP Address**: The LAN-side IP address of the client.

- **Mode**: The transmission standard being used by the client. Values are 11a, 11b, 11g, or 11n for 802.11a, 802.11b, 802.11g, or 802.11n respectively.
- **Rate**: The actual transmission rate of the client in megabits per second.
- **Signal**: This is a relative measure of signal quality. The value is expressed as a percentage of theoretical best quality. Signal quality can be reduced by distance, by interference from other radio-frequency sources (such as cordless telephones or neighboring wireless networks), and by obstacles between the router and the wireless device.

WISH

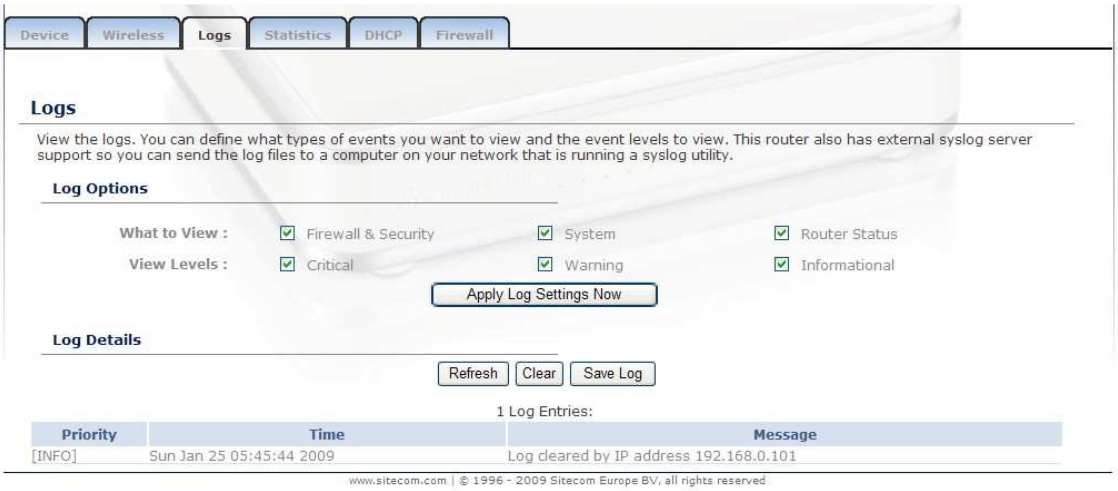
The WISH Sessions page displays full details of active local wireless sessions through your router when WISH has been enabled. A WISH session is a conversation between a program or application on a wirelessly connected LAN-side computer and another computer, however connected.

- **Originator**: The IP address and, where appropriate, port number of the computer that originated a network connection.
- **Target**: The IP address and, where appropriate, port number of the computer to which a network connection has been made.
- **Protocol**: The communications protocol used for the conversation.
- **State**: State for sessions that use the TCP protocol.
  - **NO**: None -- This entry is used as a placeholder for a future connection that may occur.
  - **SS**: SYN Sent -- One of the systems is attempting to start a connection.
  - EST: Established -- the connection is passing data.
  - **FW**: FIN Wait -- The client system has requested that the connection be stopped.
  - **CW**: Close Wait -- the server system has requested that the connection be stopped.
  - **TW**: Time Wait -- Waiting for a short time while a connection that was in FIN Wait is fully closed.
  - **LA**: Last ACK -- Waiting for a short time while a connection that was in Close Wait is fully closed.
  - **CL**: Closed -- The connection is no longer active but the session is being tracked in case there are any retransmitted packets still pending.
- **Priority**: The priority given to packets sent wirelessly over this conversation by the WISH logic. The priorities are:
  - **BK**: Background (least urgent).
  - **BE**: Best Effort.
  - **VI**: Video.
  - **VO**: Voice (most urgent).

- **Time Out**: The number of seconds of idle time until the router considers the session terminated. The initial value of Time Out depends on the type and state of the connection.
  - **300 seconds** - UDP connections.
  - **240 seconds** - Reset or closed TCP connections. The connection does not close instantly so that lingering packets can pass or the connection can be re-established.
  - **7800 seconds** - Established or closing TCP connections.

Logs

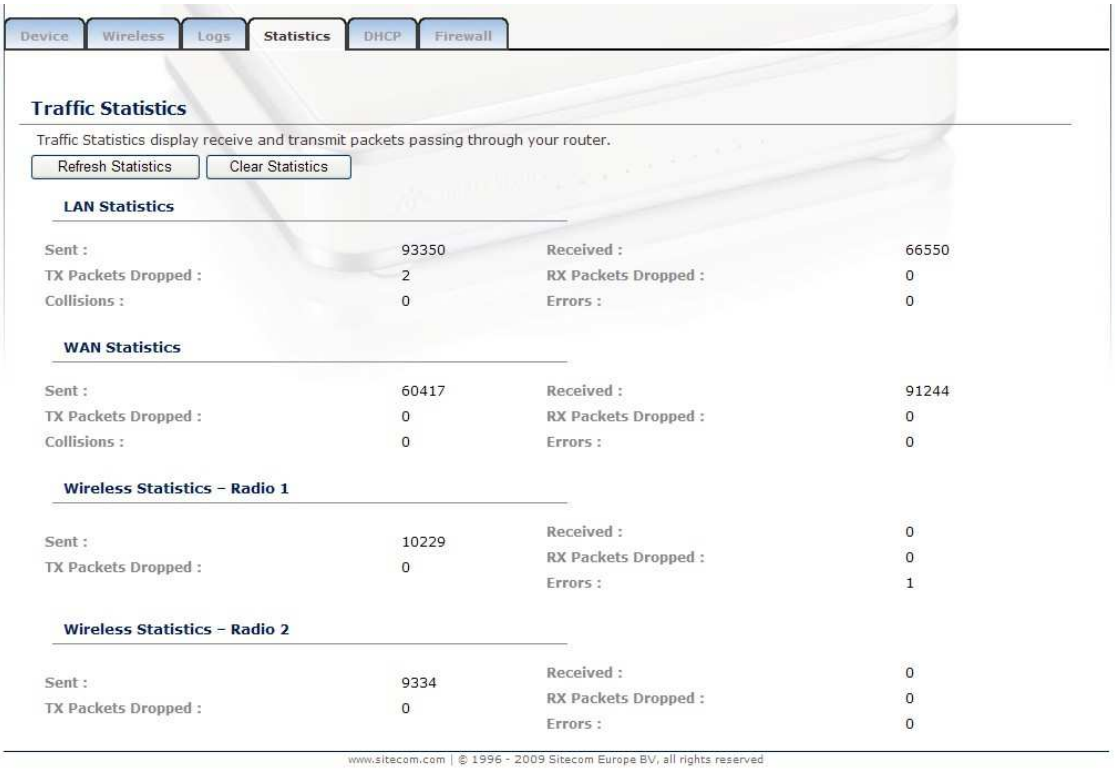
Click on the **Logs** link in the navigation menu. The router automatically logs (records) events of possible interest in its internal memory. If there is not enough internal memory for all events, logs of older events are deleted, but logs of the latest events are retained. The Logs option allows you to view the router logs. You can define what types of events you want to view and the level of events to view. This router also has external Syslog Server support so you can send the log files to a computer on your network that is running a Syslog utility.



- **What to View**: Select the features of which you would like to view the logs: Firewall & Security, System, or Router Status.
- **View Levels**: Select the warning levels for the logs: Critical, Warning, or Informational.
- Click on the **Apply Log Settings Now** to make the new log effective.

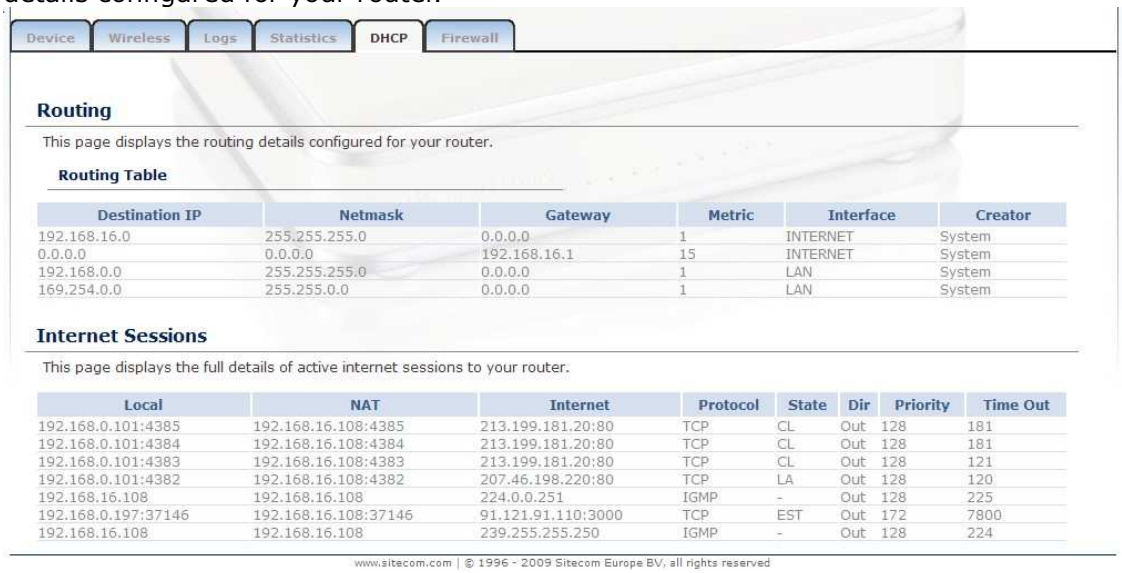
Stats

Click on the **Statistics** link in the navigation menu. This page displays the transmitted and received packet statistics of the wired (LAN & WAN) and wireless interface. Click on the Refresh button to refresh the statistics.



DHCP

Click on the **DHCP** link in the navigation menu. This page displays the routing details configured for your router.



- **Local**: The IP address and, where appropriate, port number of the local application.
- **NAT**: The port number of the LAN-side application as viewed by the WAN-side application.
- **Internet**: The IP address and, where appropriate, port number of the application on the Internet.
- **Protocol**: The communications protocol used for the conversation.
- **State**: State for sessions that use the TCP protocol.
    - **NO**: None -- This entry is used as a placeholder for a future connection that may occur.
    - **SS**: SYN Sent -- One of the systems is attempting to start a connection.
    - EST: Established -- the connection is passing data.
    - **FW**: FIN Wait -- The client system has requested that the connection be stopped.
    - **CW**: Close Wait -- the server system has requested that the connection be stopped.
    - **TW**: Time Wait -- Waiting for a short time while a connection that was in FIN Wait is fully closed.
    - **LA**: Last ACK -- Waiting for a short time while a connection that was in Close Wait is fully closed.
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    - **VI**: Video.
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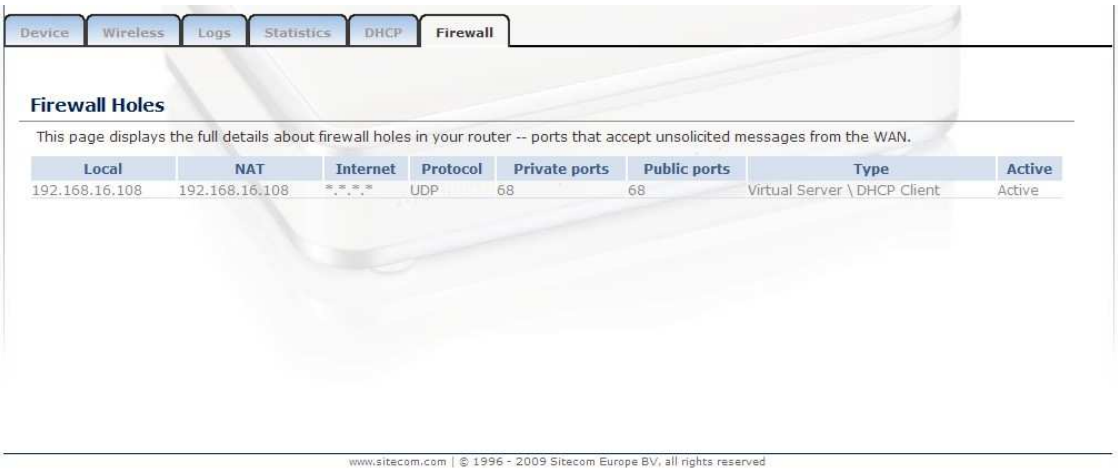
    - **300 seconds** - UDP connections.
    - **240 seconds** - Reset or closed TCP connections. The connection does not close instantly so that lingering packets can pass or the connection can be re-established.
    - **7800 seconds** - Established or closing TCP connections.

Firewall

Click on the **Firewall** link in the navigation menu. This page displays the details about firewall holes in your router.



4.2 BASIC

Network

This device can be configured as a **Router** or a **Bridge**. Select Router mode if the WAN port is connected to the Internet. Select Bridge if the device is connected to a local network downstream from another router.

Bridge Mode

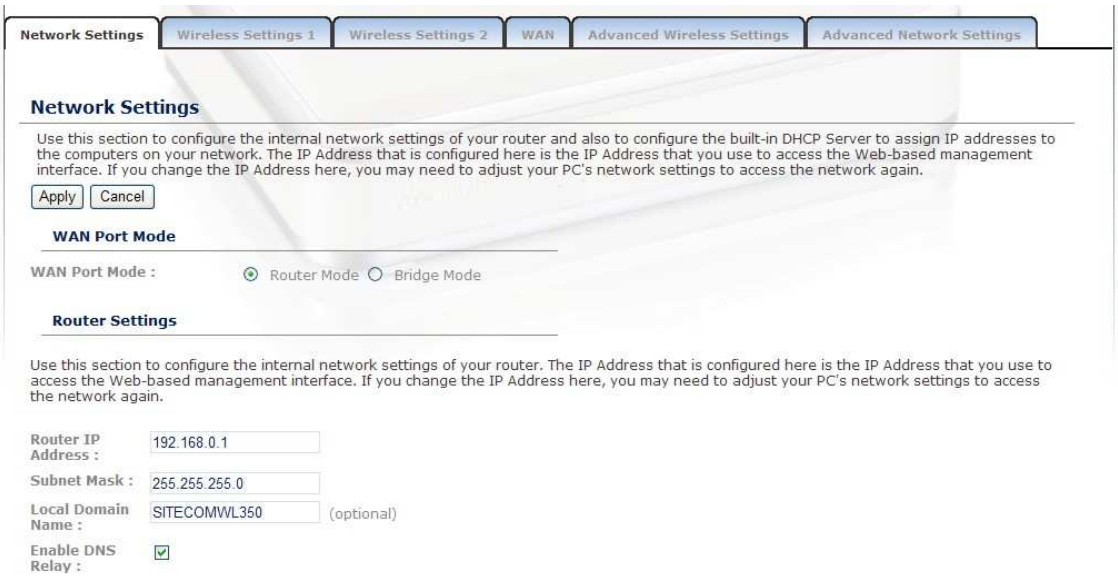
In this mode, the device functions as a bridge between the network on its WAN port and the devices on its LAN port and those connected to it wirelessly. Select the **Bridge Mode** radio button.

- **WAN Port Mode**: Select the **Bridge Mode** radio button.
- **Router IP Address**: Specify the IP address of this device.
- **Subnet Mask**: Specify the subnet mask for the IP address.
- **Default Gateway**: Specify the IP address of the upstream router.
- **Primary/Secondary DNS**: Specify the IP address of the DNS server.

Click on the **Apply** button to store these settings.

Router Mode

In this mode, the device functions as a NAT router and is connected to the Internet. Select the **Router Mode** radio button.



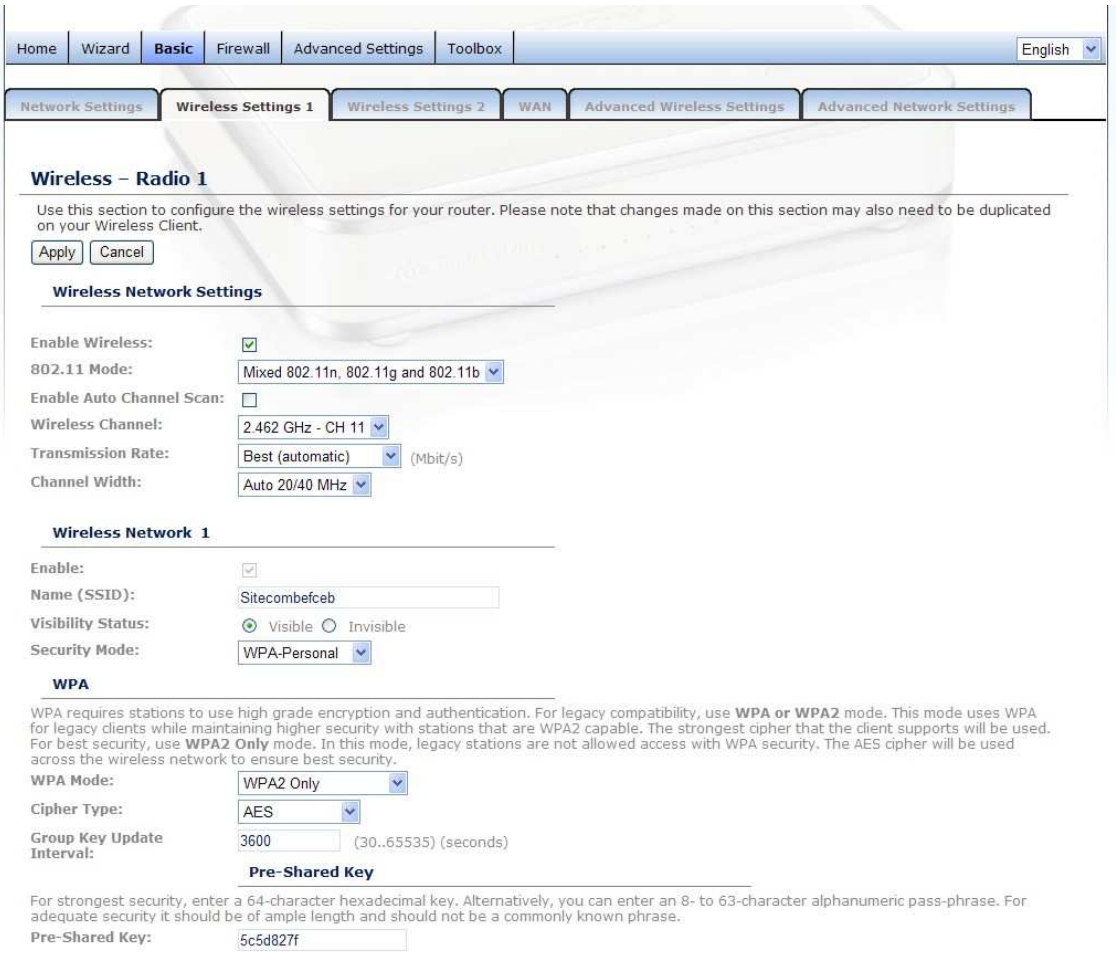
- **WAN Port Mode**: Select the **Router Mode** radio button.
- **Router IP Address**: Specify the IP address of this device.
- **Subnet Mask**: Specify the subnet mask for the IP address.
- **Local Domain Name**: This entry is optional. Enter a domain name for the local network. LAN computers will assume this domain name when they get an address from the router's built in DHCP server. So, for example, if you enter mynetwork.net here, and you have a LAN side laptop with a name of mark, that laptop will be known as mark.mynetwork.net. Note, however, the entered domain name can be overridden by the one obtained from the router's upstream DHCP server.
- **Enable DNS Relay**: Place a check in this box to enable the DNS relay feature. When DNS Relay is enabled, the router plays the role of a DNS server. DNS requests sent to the router are forwarded to the ISP's DNS server. This provides a constant DNS address that LAN computers can use, even when the router obtains a different DNS server address from the ISP upon re-establishing the WAN connection. You should disable DNS relay if you implement a LAN-side DNS server as a virtual server.

Click on the **Apply** button to store these settings.

Wireless

These options allow you to enable/disable the wireless interface, switch between the 11n, 11b/g and 11b radio band and channel frequency.

The "Wireless Settings 1" tab contains the settings for the 2.4GHz interface, and the "Wireless Settings 2" tab contains the settings for the 5GHz interface.



- **Enable Wireless:** Place a check in this box to enable the wireless interface. It is enabled by default.
- **Wireless Network Name (SSID)**: The SSID is a unique named shared amongst all the points of the wireless network. The SSID must be identical on all points of the wireless network and cannot exceed 32 characters.
- **802.11 Mode**: Select the IEEE 802.11 mode from the drop-down list. For example, if you are sure that the wireless network will be using only IEEE 802.11g clients, then it is recommended to select **802.11g** only instead of **2.4 GHz B+G**, which will reduce the performance of the wireless network. You may also select **Mixed 802.11n, 802.11g and 802.11b**. If all of the wireless devices you want to connect with this router can connect in the same transmission mode, you can improve performance slightly by choosing the

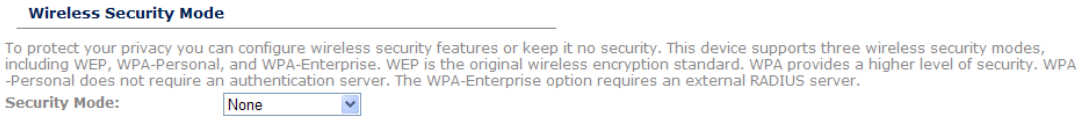
appropriate "Only" mode. If you have some devices that use a different transmission mode, choose the appropriate "Mixed" mode.

- **Wireless Channel**: Select a channel from the drop-down list. The channels available are based on the country's regulation. A wireless network uses specific channels in the wireless spectrum to handle communication between clients. Some channels in your area may have interference from other electronic devices. Choose the clearest channel to help optimize the performance and coverage of your wireless network.
- **Transmission Rate**: Select a transmission rate from the drop-down list. It is recommended to use the **Best (automatic)** option.
- **Channel Width**: Select a channel width from the drop-down list.
- **Visibility Status**: Select **Visible** or **Invisible**. This is the SSID broadcast feature. When this option is set to Visible, your wireless network name is broadcast to anyone within the range of your signal. If you're not using encryption then they could connect to your network. When Invisible mode is enabled, you must enter the Wireless Network Name (SSID) on the client manually to connect to the network.

Click on the **Apply** button to store these settings.

Wireless Security Mode

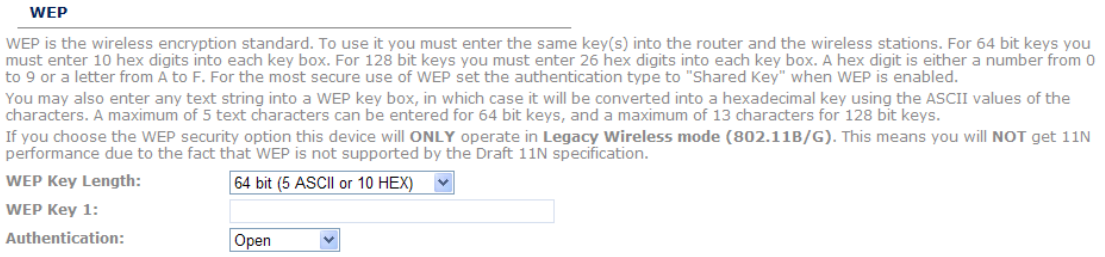
To protect your privacy this router supports several types of wireless security: WEP WPA, WPA2, and WPA-Mixed. WEP is the original wireless encryption standard. WPA provides a higher level of security. The following section describes the security configuration in detail.



WEP (Wired Equivalent Privacy)

Select the **WEP** radio button if your wireless network uses WEP encryption. WEP is an acronym for Wired Equivalent Privacy, and is a security protocol that provides the same level of security for wireless networks as for a wired network.

WEP is not as secure as WPA encryption. To gain access to a WEP network, you must know the key. The key is a string of characters that you create. When using WEP, you must determine the level of encryption. The type of encryption determines the key length. 128-bit encryption requires a longer key than 64-bit encryption. Keys are defined by entering in a string in HEX (hexadecimal - using characters 0-9, A-F) or ASCII (American Standard Code for Information Interchange - alphanumeric characters) format. ASCII format is provided so you can enter a string that is easier to remember. The ASCII string is converted to HEX for use over the network. Four keys can be defined so that you can change keys easily. A default key is selected for use on the network.

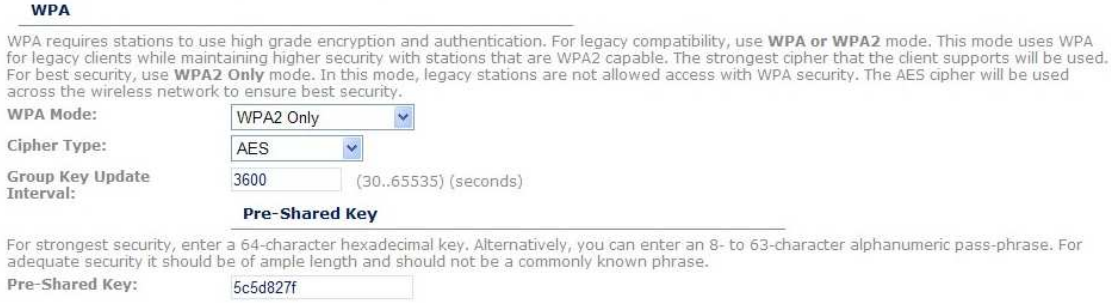


- **WEP Key Length**: Select a **64-bit** or **128-bit** WEP key length from the drop-down list.
- **WEP Key 1-4:** You may enter four different WEP keys.
- **Default WEP Key:** You may use up to four different keys for four different networks. Select the current key that will be used.
- **Authentication:** Select **Open**, or **Shared Key**. Authentication method from the drop-down list. An open system allows any client to authenticate as long as it conforms to any MAC address filter policies that may have been set. All authentication packets are transmitted without encryption. Shared Key sends an unencrypted challenge text string to any device attempting to communicate with the AP. The device requesting authentication encrypts the challenge text and sends it back to the access point. If the challenge text is encrypted correctly, the access point allows the requesting device to authenticate. It is recommended to select Auto if you are not sure which authentication type is used.

Click on the **Apply** button to store these settings.

WPA Personal (Wi-Fi Protected Access)

Select the **WPA-Personal** radio button if your wireless network uses WPA encryption. WPA (Wi-Fi Protected Access) was designed to improve upon the security features of WEP (Wired Equivalent Privacy). The technology is designed to work with existing Wi-Fi products that have been enabled with WEP. WPA provides improved data encryption through the Temporal Integrity Protocol (TKIP), which scrambles the keys using a hashing algorithm and by adding an integrity checking feature which makes sure that keys haven't been tampered with.



- **WPA Mode**: Select the **Auto WPA / WPA2** from the drop-down list.
- **Cipher Type**: Select **TKIP and AES** as the cipher suite. The encryption algorithm used to secure the data communication.

    - TKIP. Use TKIP only. TKIP (Temporal Key Integrity Protocol) provides per-packet key generation and is based on WEP.
    - AES. Use AES only. AES (Advanced Encryption Standard) is a very secure block based encryption. Note that, if the bridge uses the AES option, the bridge can associate with the access point only if the access point is also set to use only AES.
    - TKIP and AES. The bridge negotiates the cipher type with the access point, and uses AES when available.

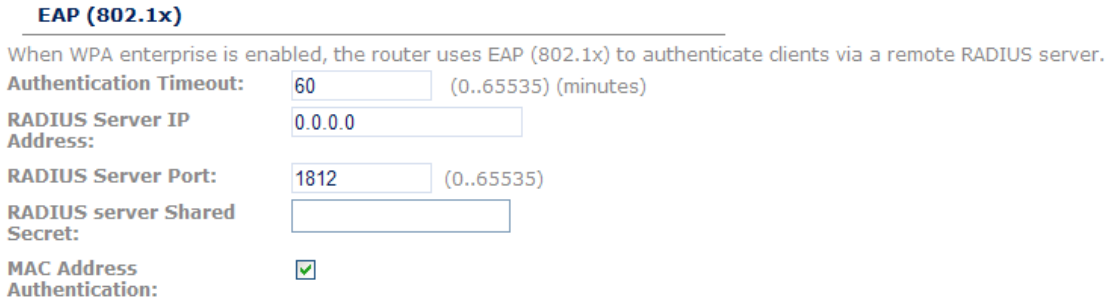
- **Group Key Update Interval**: Specify the number of seconds before the group key used for broadcast and multicast data is changed.
- **Pre-Shared Key**: The key is entered as a pass-phrase of up to 63 alphanumeric characters in ASCII (American Standard Code for Information Interchange) format at both ends of the wireless connection. It cannot be shorter than eight characters, although for proper security it needs to be of ample length and should not be a commonly known phrase. This phrase is used to generate session keys that are unique for each wireless client.

Click on the **Apply** button to store these settings.

WPA Enterprise (Wi-Fi Protected Access & 802.1x)

Select the WPA-Enterprise radio button if your wireless network uses WPA encryption. WPA (Wi-Fi Protected Access) was designed to improve upon the security features of WEP (Wired Equivalent Privacy). The technology is designed to work with existing Wi-Fi products that have been enabled with WEP. WPA provides improved data encryption through the Temporal Integrity Protocol (TKIP), which scrambles the keys using a hashing algorithm and by adding an integrity checking feature which makes sure that keys haven't been tampered with.

This option works with a RADIUS Server to authenticate wireless clients. Wireless clients should have established the necessary credentials before attempting to authenticate to the Server through this Gateway. Furthermore, it may be necessary to configure the RADIUS Server to allow this Gateway to authenticate users.



- **WPA Mode**: Select the WPA / WPA2 from the drop-down list.

- **Cipher Type**: Select TKIP or AES as the cipher suite. The encryption algorithm used to secure the data communication.

    - TKIP. Use TKIP only. TKIP (Temporal Key Integrity Protocol) provides per-packet key generation and is based on WEP.
    - AES. Use AES only. AES (Advanced Encryption Standard) is a very secure block based encryption. Note that, if the bridge uses the AES option, the bridge can associate with the access point only if the access point is also set to use only AES.
    - TKIP and AES. The bridge negotiates the cipher type with the access point, and uses AES when available.

- **Group Key Update Interval**: Specify the number of seconds before the group key used for broadcast and multicast data is changed.
- **Authentication Timeout**: Specify the number of minutes after which the client will be required to re-authenticate.
- **RADIUS Server IP Address**: Specify the IP address of the RADIUS server.
- **RADIUS Server Port**: Specify the port number of the RADIUS server, the default port is 1812.
- **RADIUS Server Shared Secret**: Specify the pass-phrase that is matched on the RADIUS Server.
- **MAC Address Authentication:** Place a check in this box if you would like the user to always authenticate using the same computer.
- **Optional Backup RADIUS server**: This option enables configuration of an optional second RADIUS server. A second RADIUS server can be used as backup for the primary RADIUS server. The second RADIUS server is consulted only when the primary server is not available or not responding.

Click on the **Apply** button to store these settings.

WAN

The device offers several types of WAN connections in order to connect to the Internet.

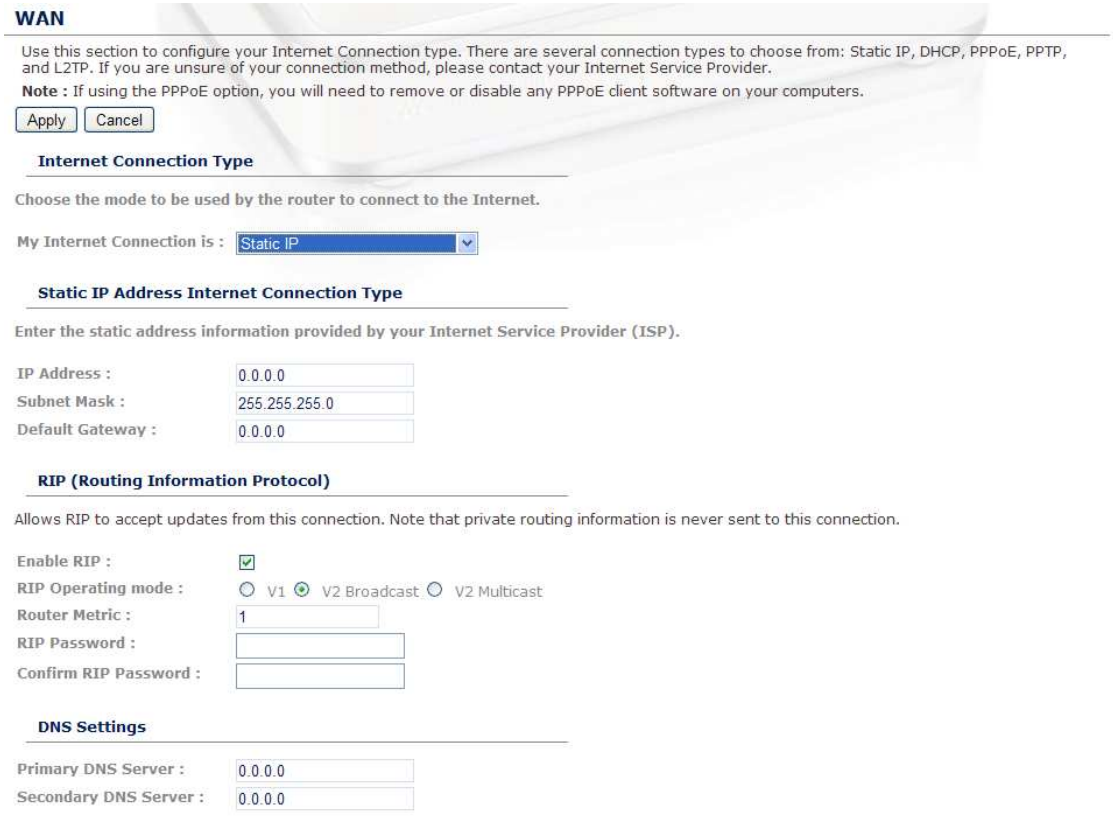
- Static IP Address
- Dynamic IP Address
- PPPoE
- PPTP

Select the type of Internet Connection from the drop-down list.

Static IP Address Configuration

The WAN interface can be configured as Static IP address. In this type of connection, your ISP provides you with a dedicated IP address (which does not change as DHCP).

Select **Static IP** from the **My Internet Connection** drop-down list.



- **IP Address:** Specify the IP address for this device, which is assigned by your ISP.

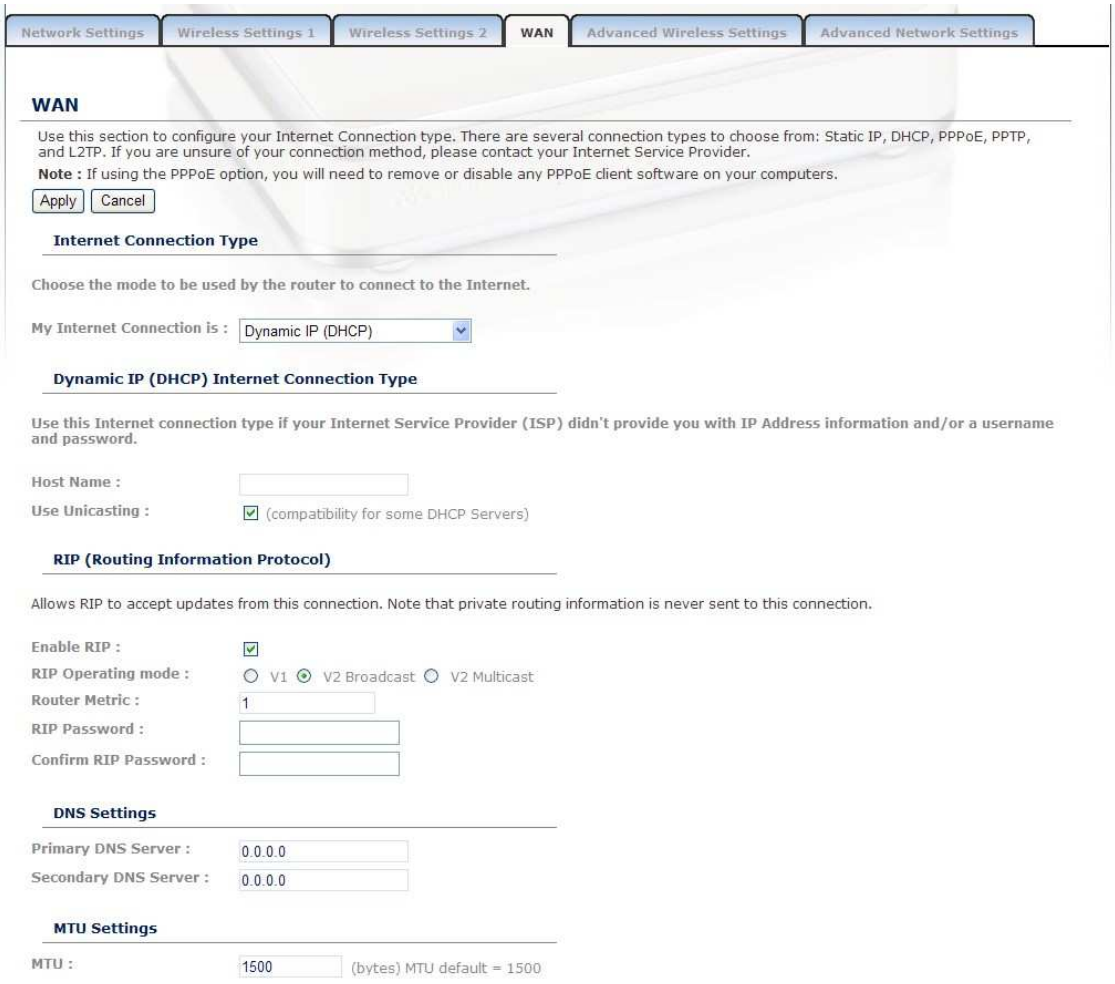
- **Subnet Mask:** Specify the subnet mask for this IP address, which is assigned by your ISP.
- **Default Gateway:** Specify the IP address of the default gateway, which is assigned by your ISP.
- **Primary / Secondary DNS Address:** Specify the primary and secondary IP address, which is assigned by your ISP.
- **MTU**: The Maximum Transmission Unit (MTU) is a parameter that determines the largest packet size (in bytes) that the router will send to the WAN. If LAN devices send larger packets, the router will break them into smaller packets. Ideally, you should set this to match the MTU of the connection to your ISP. Typical values are 1500 bytes for an Ethernet connection and 1492 bytes for a PPPoE connection. If the router's MTU is set too high, packets will be fragmented downstream. If the router's MTU is set too low, the router will fragment packets unnecessarily and in extreme cases may be unable to establish some connections. In either case, network performance can suffer.
- **MAC Address**: If you need to change the MAC address of the router's WAN-side Ethernet interface, either type in an alternate MAC address (for example, the MAC address of the router initially connected to the ISP) or click on **Clone Your PCs MAC Address**.

Click on the **Apply** button to store these settings. DHCP Connection (Dynamic IP Address)

Dynamic IP Address (DHCP) Configuration

The WAN interface can be configured as a DHCP Client in which the ISP provides the IP address to the device. This is also known as Dynamic IP.

Select the **Dynamic IP (DHCP)** from the **My Internet Connection** drop-down list.



- **Host Name**: Specify a host name to define your system or connection.
- **Use Unicasting**: This option is normally turned off, and should remain off as long as the WAN-side DHCP server correctly provides an IP address to the router. However, if the router cannot obtain an IP address from the DHCP server, the DHCP server may be one that works better with unicast responses. In this case, turn the Unicasting option on, and observe whether the router can obtain an IP address. In this mode, the router accepts unicast responses from the DHCP server instead of broadcast responses.
- **Primary / Secondary DNS Address:** Specify the primary and secondary IP address, which are assigned by your ISP.
- **MTU**: The Maximum Transmission Unit (MTU) is a parameter that determines the largest packet size (in bytes) that the router will send to the WAN. If LAN

devices send larger packets, the router will break them into smaller packets. Ideally, you should set this to match the MTU of the connection to your ISP. Typical values are 1500 bytes for an Ethernet connection and 1492 bytes for a PPPoE connection. If the router's MTU is set too high, packets will be fragmented downstream. If the router's MTU is set too low, the router will fragment packets unnecessarily and in extreme cases may be unable to establish some connections. In either case, network performance can suffer.

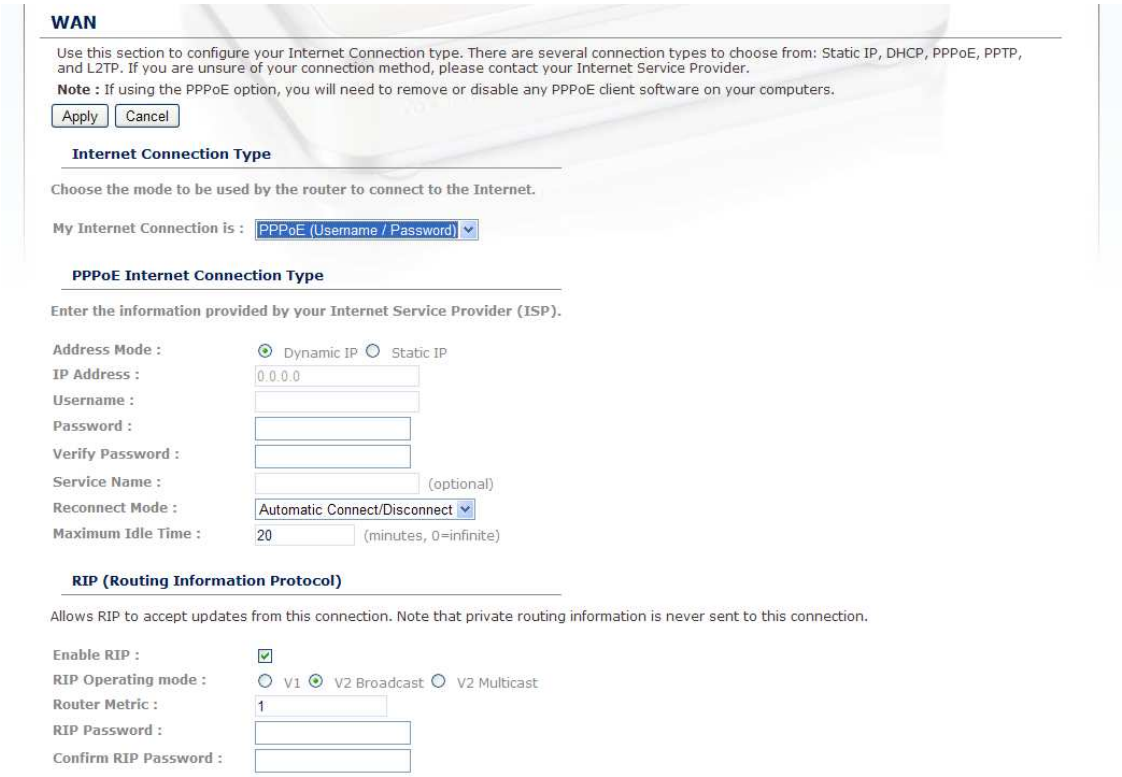
- **MAC Address**: If you need to change the MAC address of the router's WAN-side Ethernet interface, either type in an alternate MAC address (for example, the MAC address of the router initially connected to the ISP) or click on **Clone Your PCs MAC Address**.

Click on the **Apply** button to store these settings.

PPPoE (Point-to-Point Protocol over Ethernet)

The WAN interface can be configured as PPPoE. This type of connection is usually used for a DSL service and requires a username and password to connect.

Select the **PPPoE** from the **My Internet Connection** drop-down list.



- **Address Mode**: PPPoE can be used with a dynamic or static IP address. If you select the **Dynamic IP** radio button, then the IP address in the next field is not required. However, if you select the **Static IP** radio button, then the IP address in the next field is required.
- **User Name**: Specify the user name which is provided by your ISP.
- **Password:** Specify the password which is provided by your ISP, and then verify it once again in the next field.
- **Service Name**: Specify the name of the ISP.
- **Reconnect Mode**: Select a reconnection time: **Always on** (A connection to the Internet is always maintained), **On demand** (A connection to the Internet is made as needed), **Manual**: You have to open up the Web-based management interface and click the Connect button manually any time that you wish to connect to the Internet.
- **Maximum Idle Time**: Specify the time after which the router will automatically disconnect the current session when no data-traffic has been detected for the set period of time.
- **Primary / Secondary DNS Address:** Specify the primary and secondary IP address, which is assigned by your ISP.

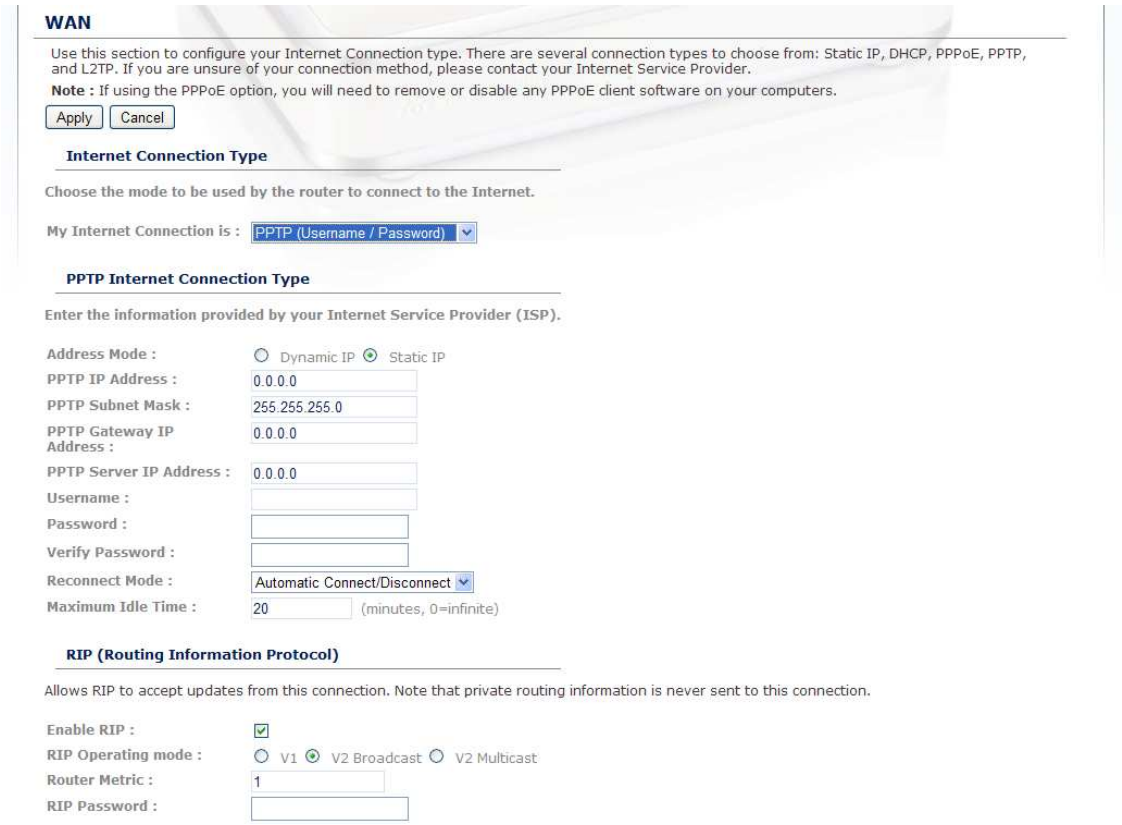
- **MTU**: The Maximum Transmission Unit (MTU) is a parameter that determines the largest packet size (in bytes) that the router will send to the WAN. If LAN devices send larger packets, the router will break them into smaller packets. Ideally, you should set this to match the MTU of the connection to your ISP. Typical values are 1500 bytes for an Ethernet connection and 1492 bytes for a PPPoE connection. If the router's MTU is set too high, packets will be fragmented downstream. If the router's MTU is set too low, the router will fragment packets unnecessarily and in extreme cases may be unable to establish some connections. In either case, network performance can suffer.
- **MAC Address**: If you need to change the MAC address of the router's WAN-side Ethernet interface, either type in an alternate MAC address (for example, the MAC address of the router initially connected to the ISP) or click on **Clone Your PCs MAC Address**.

Click on the **Apply** button to store these settings.

PPTP (Point-to-Point Tunneling Protocol)

The WAN interface can be configured as PPTP. PPTP (Point to Point Tunneling Protocol) uses a virtual private network to connect to your ISP. This method of connection is primarily used in Europe. This method of connection requires you to enter a username and password (provided by your ISP) to gain access to the Internet. The supported authentication protocols are PAP and CHAP.

Select the **PPTP** from the **My Internet Connection** drop-down list.



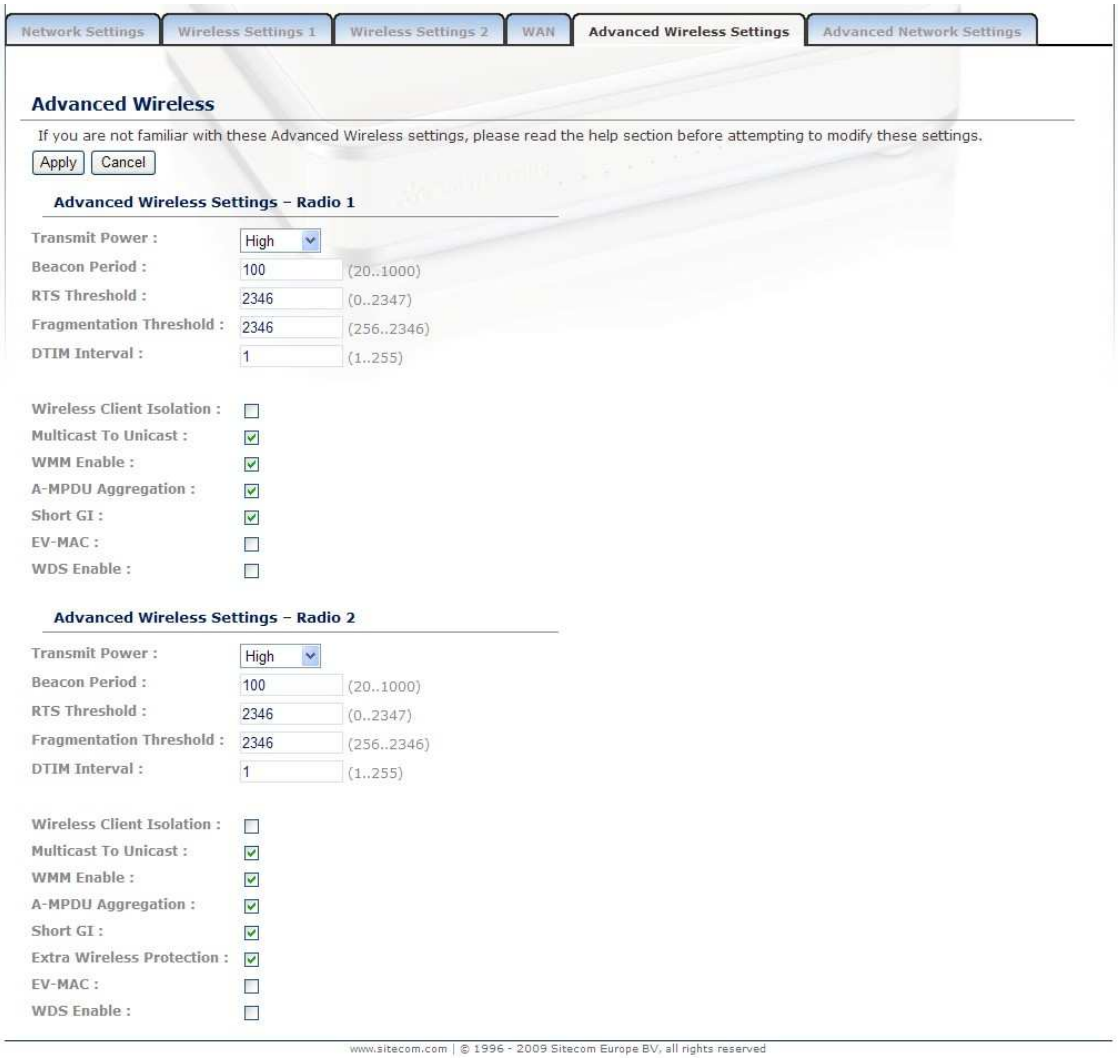
- **Address Mode**: PPTP can be used with a dynamic or static IP address. If you select the **Dynamic IP** radio button, then the IIP address in the next field is not required. However, if you select the **Static IP** radio button, then the IP address in the next field is required.
- **PPTP Address**: Specify the IP address
- **PPTP Subnet Mask**: Specify the subnet mask for the IP address.
- **PPTP Gateway IP Address**: Specify the IP address of the PPTP gateway.
- **PPTP Server IP Address**: If the PPTP Server's IP address is different from the default gateway, then you may specify it here.
- **User Name**: Specify the user name which is provided by your ISP.
- **Password:** Specify the password which is provided by your ISP, and then verify it once again in the next field.
- **Reconnect Mode**: Select a reconnection time:
    - **Always on**: A connection to the Internet is always maintained.
    - **On demand**: A connection to the Internet is made as needed.

    - **Manual**: You have to open up the Web-based management interface and click the Connect button manually any time that you wish to connect to the Internet.
- **Maximum Idle Time**: Specify the time after which the router will automatically disconnect the current session when no data-traffic has been detected for the set period of time.
- **Primary / Secondary DNS Address:** Specify the primary and secondary IP address, which is assigned by your ISP.
- **MTU**: The Maximum Transmission Unit (MTU) is a parameter that determines the largest packet size (in bytes) that the router will send to the WAN. If LAN devices send larger packets, the router will break them into smaller packets. Ideally, you should set this to match the MTU of the connection to your ISP. Typical values are 1500 bytes for an Ethernet connection and 1492 bytes for a PPPoE connection. If the router's MTU is set too high, packets will be fragmented downstream. If the router's MTU is set too low, the router will fragment packets unnecessarily and in extreme cases may be unable to establish some connections. In either case, network performance can suffer.
- **MAC Address**: If you need to change the MAC address of the router's WAN-side Ethernet interface, either type in an alternate MAC address (for example, the MAC address of the router initially connected to the ISP) or click on **Clone Your PCs MAC Address**.

Click on the **Apply** button to store these settings.

Advanced Wireless

This page allows you to configure the fragmentation threshold, RTS threshold, beacon period, transmit power, DTIM interval, wireless isolation, WMM and WDS (wireless distribution system).



- **Transmit Power**: You may control the output power of the device by selecting a value from the drop-down list. This feature can be helpful in restricting the coverage area of the wireless network.
- **Beacon Period**: Beacons are packets sent by a wireless Access Point to synchronize wireless devices. Specify a Beacon Period value between 20 and 1000. The default value is set to 100 milliseconds.
- **RTS Threshold**: Packets over the specified size will use the RTS/CTS mechanism to maintain performance in noisy networks and preventing hidden nodes from degrading the performance. Specify a value between 1 and 65535. The default value is 2346.

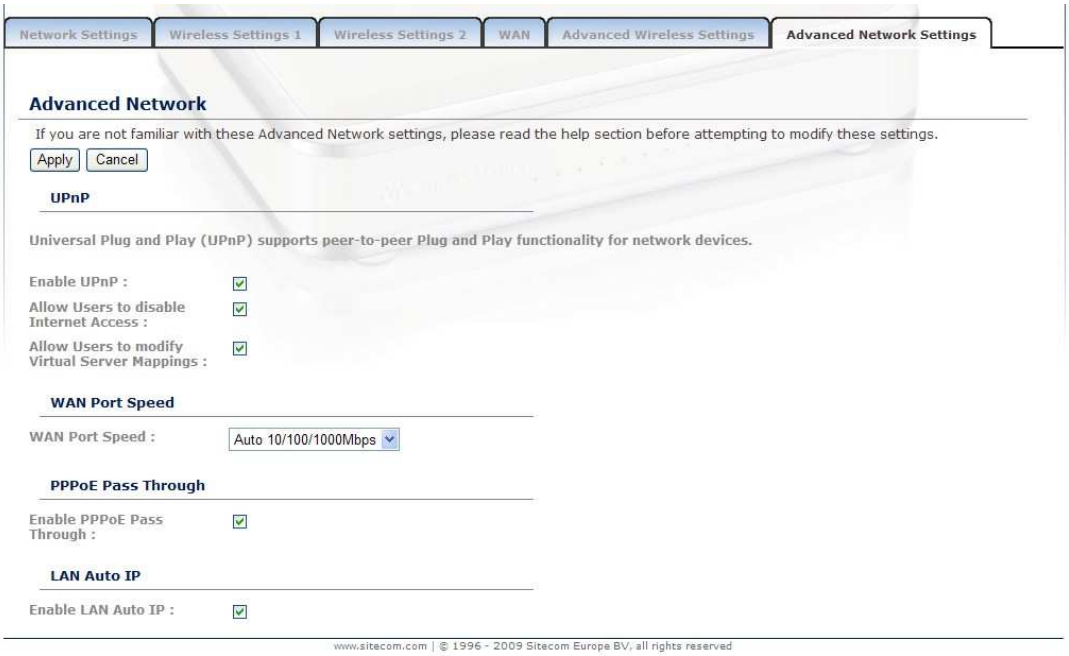
- **Fragment Threshold**: Packets over the specified size will be fragmented in order to improve performance on noisy networks. Specify a value between 256 and 65535. The default value is 2346.
- **DTIM Interval**: A DTIM is a countdown informing clients of the next window for listening to broadcast and multicast messages. When the wireless Access Point has buffered broadcast or multicast messages for associated clients, it sends the next DTIM with a DTIM Interval value. Wireless clients detect the beacons and awaken to receive the broadcast and multicast messages. The default value is 1. Valid settings are between 1 and 255.
- **Wireless Isolation**: Place a check in this box in order to prevent associated wireless clients from communicating with each other.
- **WMM Enable**: Enable WMM in order to help control latency and jitter when transmitting multimedia content over a wireless connection.
- **WDS**: Place a check in this box to enable WDS (Wireless Distribution System). When WDS is enabled, this access point functions as a wireless repeater and is able to wirelessly communicate with other APs via WDS links. **Note** that WDS is incompatible with WPA -- both features cannot be used at the same time. A WDS link is bidirectional; so this AP must know the MAC Address (creates the WDS link) of the other AP, and the other AP must have a WDS link back to this AP. Make sure the APs are configured with same channel number.
- **WDS AP MAC Address**: Specify one-half of the WDS link. The other AP must also have the MAC address of this AP to create the WDS link back to this AP.

Click on the **Apply** button to store these changes.

Advanced Network

In this section you can configure the UPnP, WAN Ping, WAN port speed, multicast streams, and PPPoE pass-through settings.

- **Enable UPnP**: Place a check in this box to enable UPnP. UPnP is short for Universal Plug and Play, which is a networking architecture that provides compatibility among networking equipment, software, and peripherals. This router has optional UPnP capability, and can work with other UPnP devices and software.
- **Allow Users to disable Internet Access**: Place a check in this box if you would like to allow to user to terminate the WAN session.
- **Allow Users to modify Virtual Server Mappings**: Place a check in this box if you would like the users to add, modify, or delete server mapping entries.



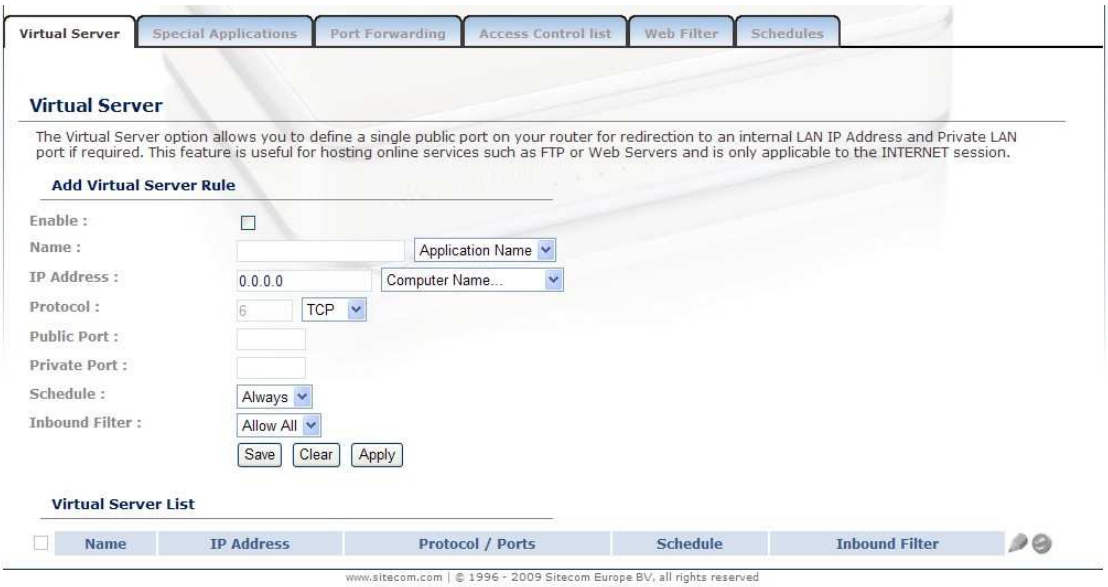
- **WAN Port Speed**: You may select a WAN port speed from the drop-down list. It is recommended that you select **Auto**.
- **Enable Multicast Streams**: Place a check in this box to enable multicast streams. The router uses the IGMP protocol to support efficient multicasting -- transmission of identical content, such as multimedia, from a source to a number of recipients. This option must be enabled if any applications on the LAN participate in a multicast group. If you have a multimedia LAN application that is not receiving content as expected, try enabling this option.
- **Enable PPPoE Pass Through**: Place a check in this box to enable PPPoE pass-through. This option controls whether LAN computers can act as PPPoE clients and negotiate the PPP sessions through the router over the WAN ethernet link. Enabling this option allows LAN computers to act as PPPoE clients. Disabling this option prevents LAN computers from establishing PPPoE pass-through connections.

Click on the **Apply** button to store these settings.

4.3 Firewall

Virtual Server

The Virtual Server option gives Internet users access to services on your LAN. This feature is useful for hosting online services such as FTP, Web, or game servers. For each Virtual Server, you define a public port on your router for redirection to an internal LAN IP Address and LAN port.

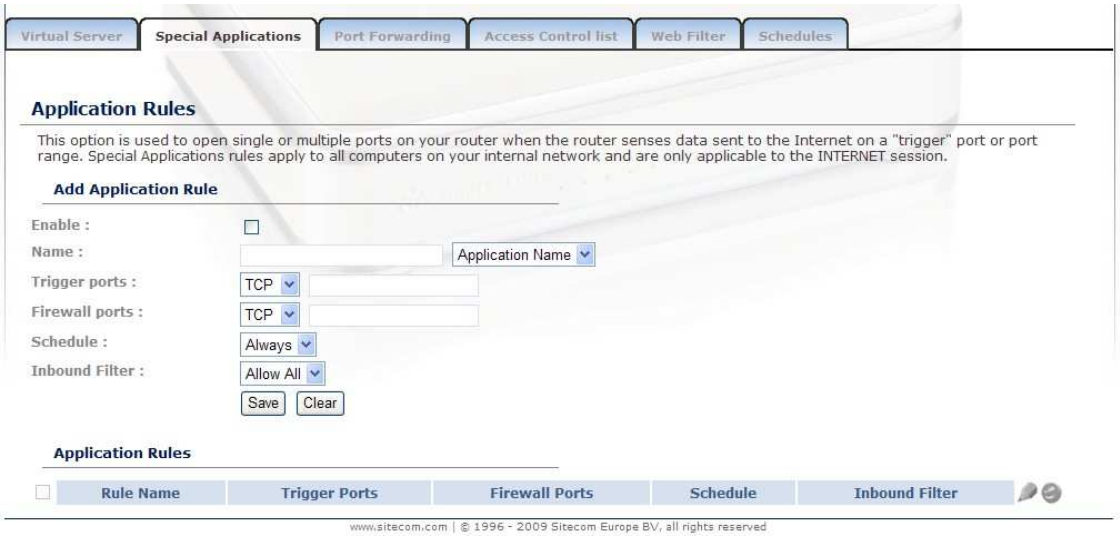


- **Enable**: Place a check in this box to enable the virtual server rule.
- **Name**: Assign a meaningful name to the virtual server, for example Web Server. Several well-known types of virtual server are available from the **Application Name** drop-down list. Selecting one of these entries fills some of the remaining parameters with standard values for that type of server.
- **IP Address**: Specify the IP address for the virtual server entry.
- **Protocol**: Specify a protocol or select one from the drop-down list.
- **Public Port**: Specify the public port number.
- **Private Port**: Specify the private port number.
- **Schedule**: Select a **schedule**, **Always,** or **Never** from the drop-down list. If a schedule does not exist, you may create it in the Tools > Schedule section.
- **Inbound Filter**: Select an inbound filter from the drop-down list. If an inbound filter does not exist, you may create it from Advanced > Inbound Filter section.

Click on the **Save** button to insert the entry into the Virtual Server list.

Special Application

An application rule is used to open single or multiple ports on your router when the router senses data sent to the Internet on a trigger port or port range. An application rule applies to all computers on your internal network.

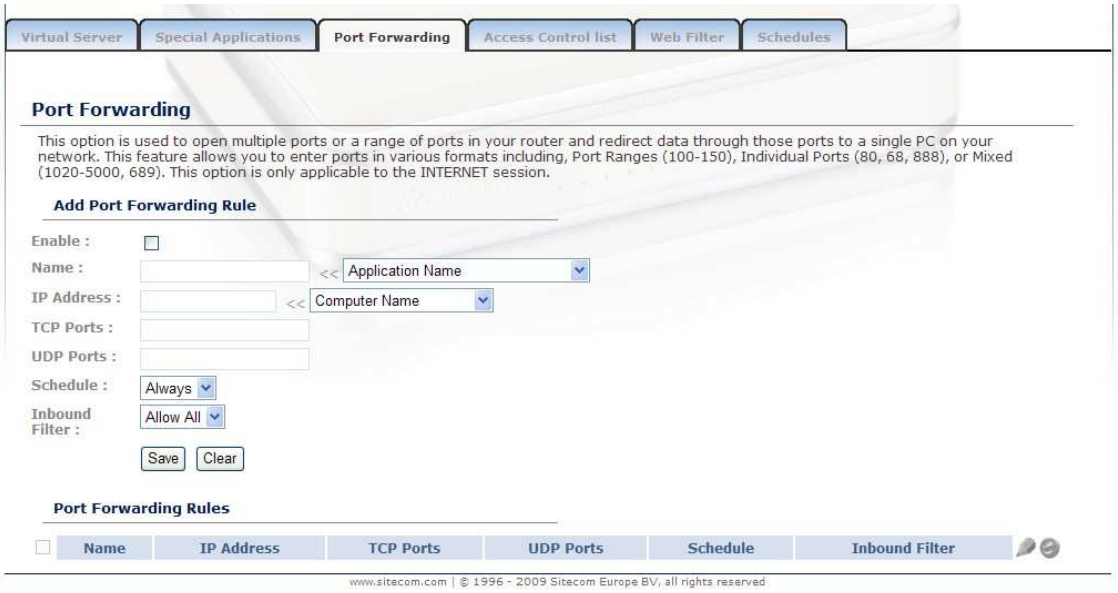


- **Enable**: Place a check in this box to enable the special application rule.
- **Name**: Assign a meaningful name to the virtual server, for example Web Server. Several well-known types of virtual server are available from the **Application Name** drop-down list. Selecting one of these entries fills some of the remaining parameters with standard values for that type of server.
- **Triggering Ports**: Specify the outgoing port range that is used by the application.
- **Firewall Ports**: Specify the port range that you would like to open for Internet traffic.
- **Schedule**: Select a **schedule**, **Always,** or **Never** from the drop-down list. If a schedule does not exist, you may create it in the Tools > Schedule section.

Click on the **Save** button to insert the entry into the Special Applications list.

Port Forwarding

Multiple connections are required by some applications, such as internet games, video conferencing, Internet telephony, and others. These applications have difficulties working through NAT (Network Address Translation). This section is used to open multiple ports or a range of ports in your router and redirect data through those ports to a single PC on your network.

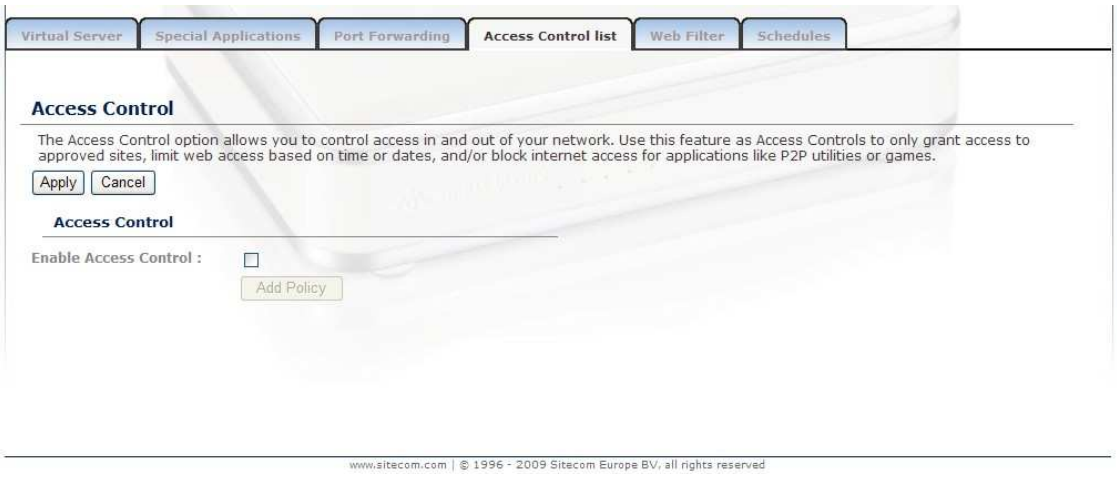


- **Enable**: Place a check in this box to enable the port forwarding rule.
- **Name**: Assign a meaningful name to the virtual server, for example Web Server. Several well-known types of virtual server are available from the Application Name drop-down list. Selecting one of these entries fills some of the remaining parameters with standard values for that type of server.
- **IP Address**: Specify the IP address for the virtual server entry.
- **TCP/UDP Ports**: Specify the TCP or UDP port numbers.
- **Schedule**: Select a **schedule**, **Always,** or **Never** from the drop-down list. If a schedule does not exist, you may create it in the Tools > Schedule section.
- **Inbound Filter**: Select an inbound filter from the drop-down list. If an inbound filter does not exist, you may create it from Advanced > Inbound Filter section.

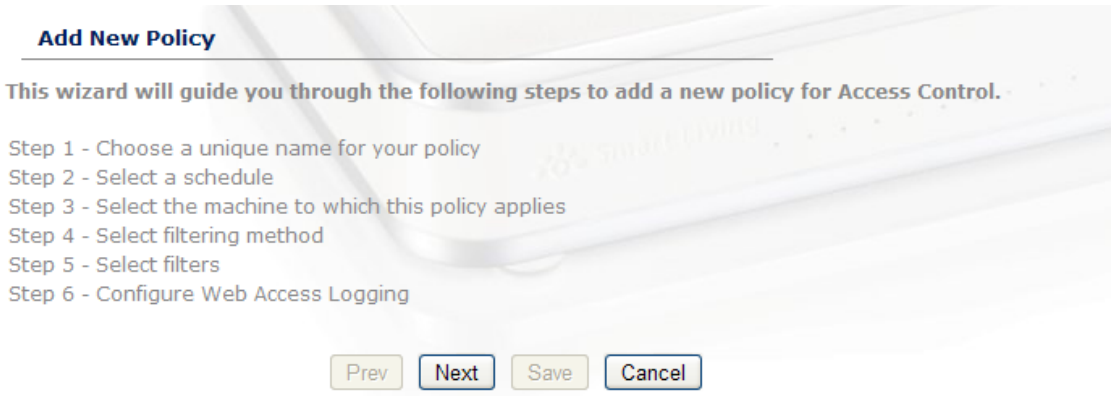
Click on the **Save** button to insert the entry into the Port Forwarding list.

Access Control

The Access Control section allows you to control access in and out of devices on your network. Use this feature as Parental Controls to only grant access to approved sites, limit web access based on time or dates, and/or block access from applications such as peer-to-peer utilities or games.
When Access Control is disabled, every device on the LAN has unrestricted access to the Internet. However, if you enable Access Control, Internet access is restricted for those devices that have an Access Control Policy configured for them. All other devices have unrestricted access to the Internet.



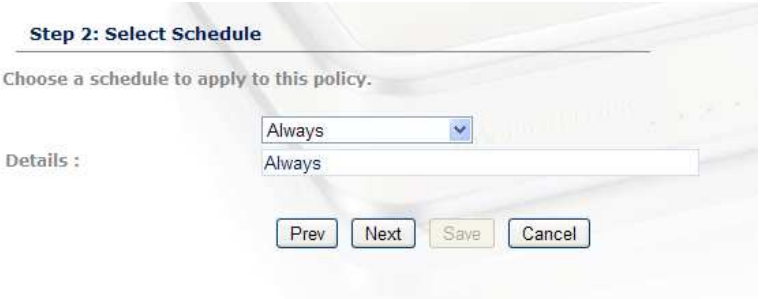
- Place a check in the **Enable Access Control** check box and then click on the **Add Policy** button. This will bring up the **Add New Policy** wizard.
- The wireless wizard will inform you that there are six major steps in the process.
    - Choose a unique name for your policy
    - Select a schedule
    - Select the machine to which the policy applies
    - Select filtering method
    - Configure web access logging



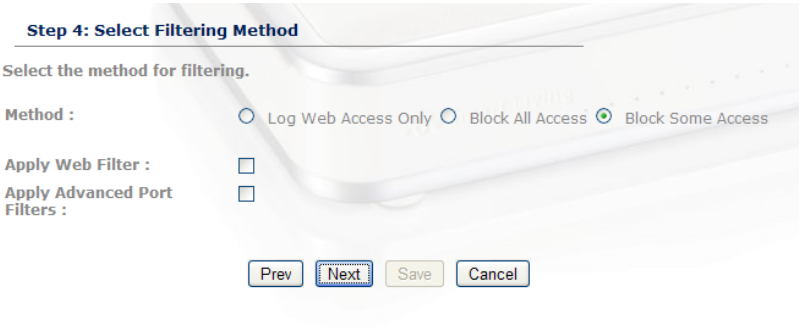
- Click on the **Next** button to continue.

- Specify a policy name and then click on the **Next** button to continue.

- Select a schedule from the drop-down list: **Always** or **Never**, or you may define a new schedule. Click on the **Next** button to continue.



- Select a machine to which the policy applies.
- **Address Type**: Select the IP address or MAC address radio button.
- **IP Address**: If you selected IP address above, then specify the IP address here.
- **MAC Address**: If you need to change the MAC address of the router's WAN-side Ethernet interface, either type in an alternate MAC address (for example, the MAC address of the router initially connected to the ISP) or click on **Clone Your PCs MAC Address**.
- Click on the **OK** button to insert the entry into the table.
- Click on the **Next** button to continue.

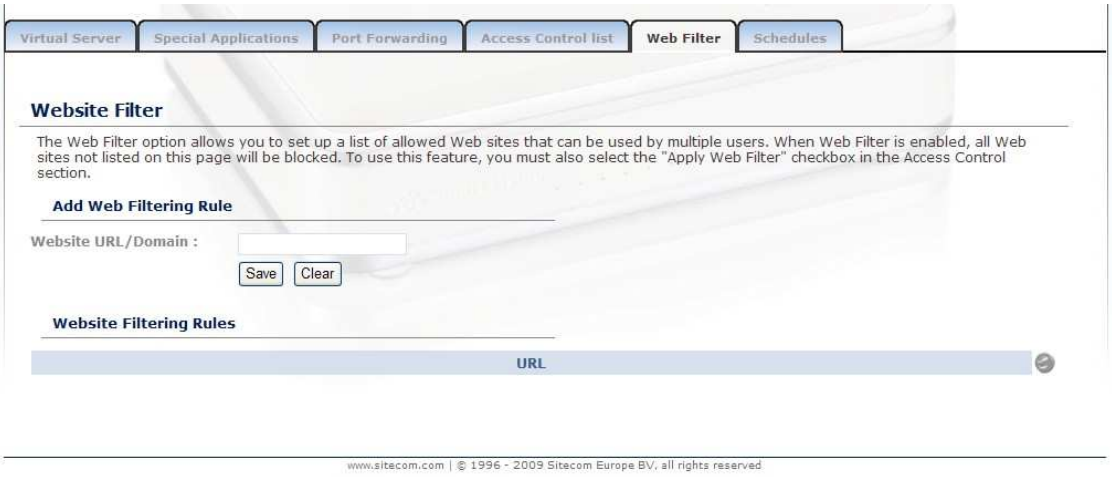


- Select a filtering method:
- **Log Web Access Only**: Select this radio but in order to log web access.
- **Block All Access**: Select this radio but in order to block all web access.
- **Block Some Access**: Select this radio but in order to block some web access.

Click on the **Apply** button to store the changes.

Website Filter

This is a type of parental control feature used to restrict certain websites form being accessed through your network. These filters can be used for securing and restricting your network.

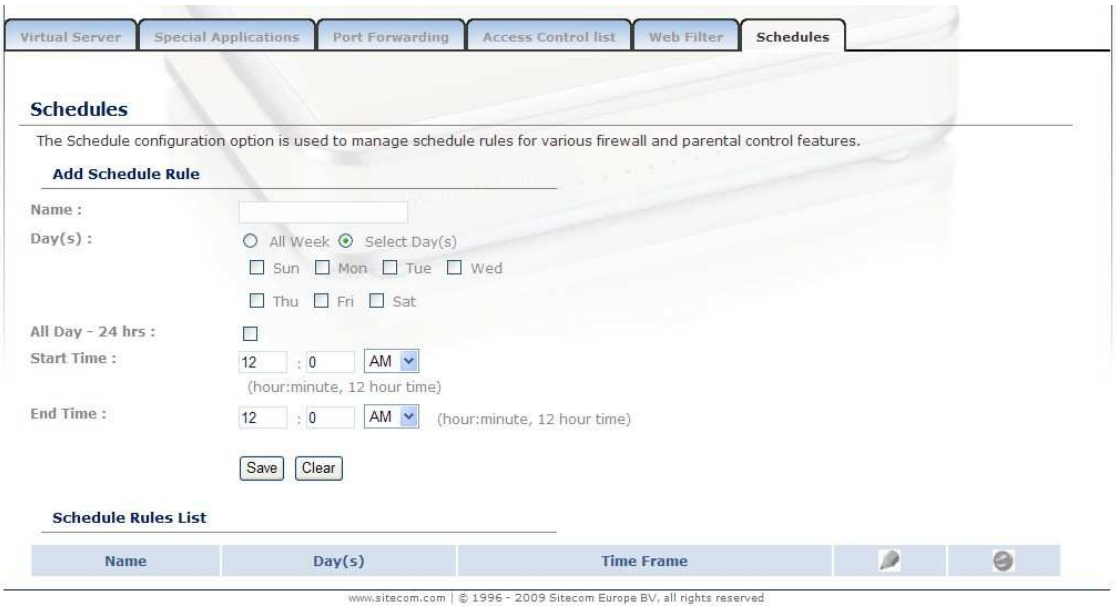


- **Website/URL/Domain**: Specify the web address that you would like to filter. Do not use "http://"

Click on the **Save** button to store the changes.

Schedules

Click on the **Schedules** link in the navigation menu. Schedules can be created for use with enforcing rules. For example, if you want to restrict web access to Mon-Fri from 3pm to 8pm, you could create a schedule selecting Mon, Tue, Wed, Thu, and Fri and enter a Start Time of 3pm and End Time of 8pm.



- **Name**: Specify a name for the schedule.
- **Day(s)**: Select the days at which you would like the schedule to be effective.
- **All Day – 24 hrs**: Place a check in this box if you would like the schedule to be active for 24 hours.
- **Start Time**: If you do not use the 24 hours option, you may specify a start time.
- **End Time**: If you do not use the 24 hours option, you may specify an end time.

Click on the **Save** button to add this schedule into the list.

4.4 Advanced Settings

Dynamic DNS

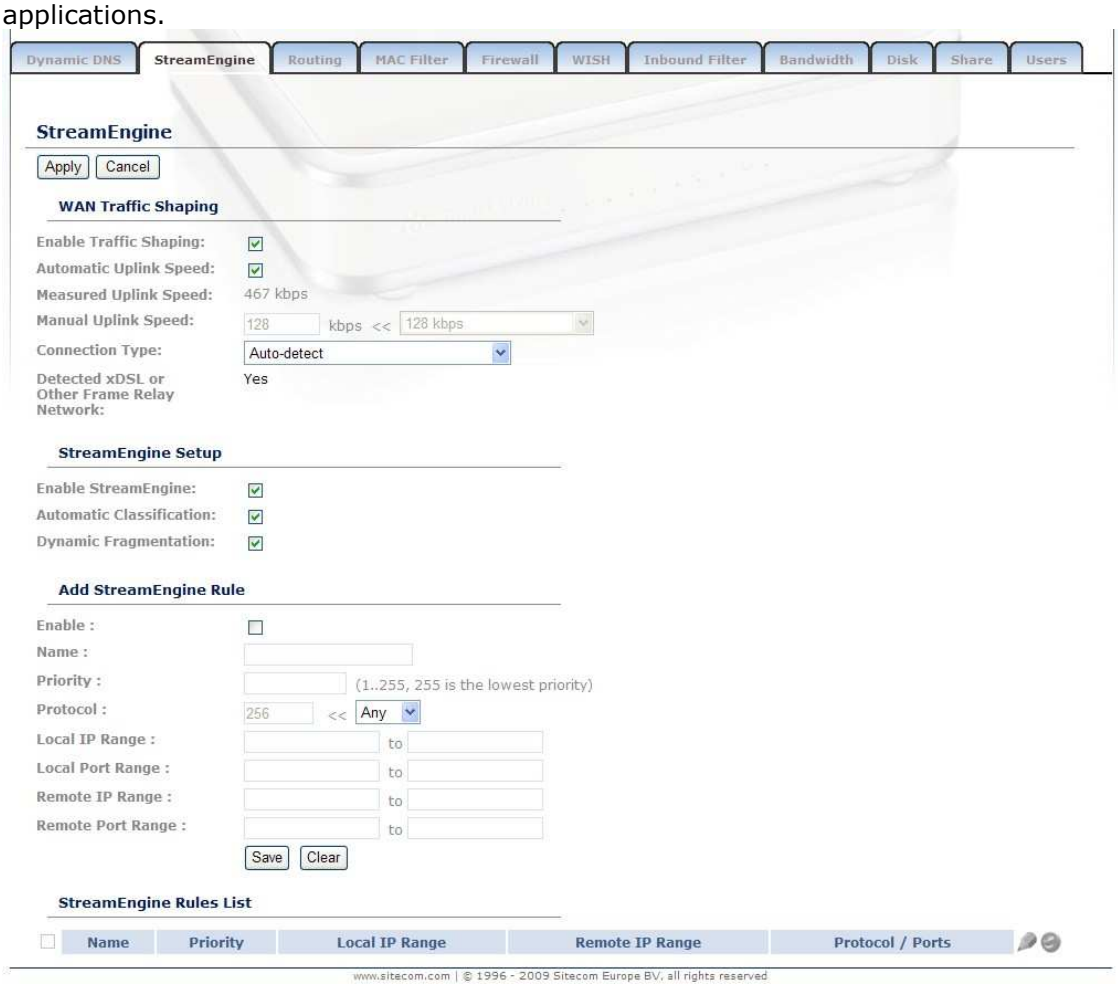
The Dynamic DNS feature allows you to host a server (Web, FTP, Game Server, etc.) using a domain name that you have purchased with your dynamically assigned IP address. Most broadband Internet Service Providers assign dynamic (changing) IP addresses. When you use a Dynamic DNS service provider, your friends can enter your host name to connect to your server, no matter what your IP address is.

- **Enable Dynamic DNS**: Place a check in this box to enable the DDNS feature.
- **Service Address**: Select a DDNS service provider from the drop-down list. DynDNS is a free service while TZO offers a 30 day free trial.
- **Host Name**: Specify the website URL.
- **User Name**: Specify the user name for the DDNS service.
- **Password**: Specify the password for the DDNS service and verify it once again in the next field.
- **Timeout**: Specify the time between periodic updates to the Dynamic DNS, if the dynamic IP address has not changed. The timeout period is entered in hours.

Click on the **Apply** button once you have modified the settings.

StreamEngine

The StreamEngine feature helps improve the network performance by prioritizing applications.



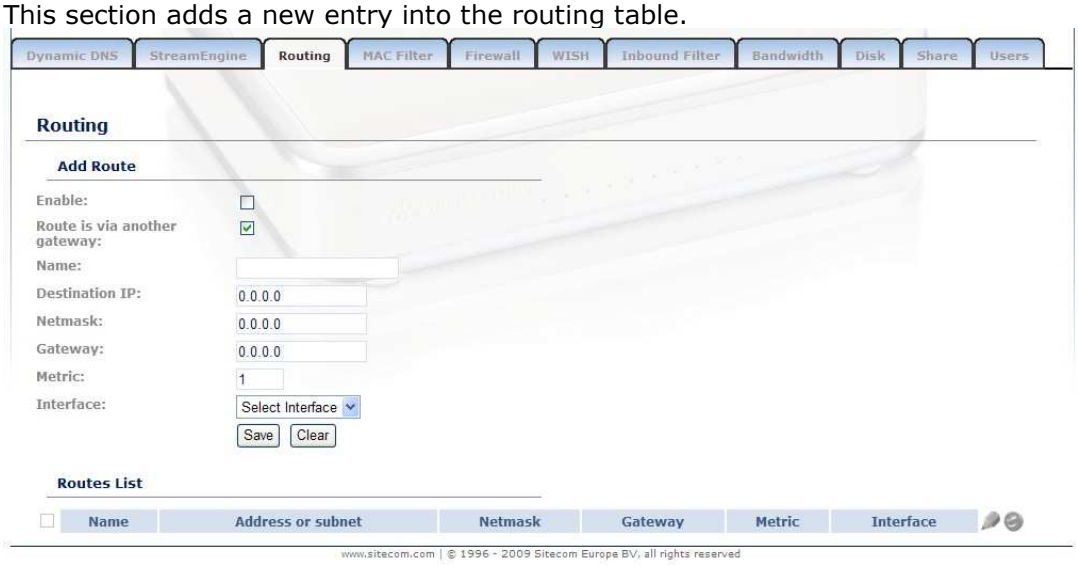
- **Enable Traffic Shaping**: Place a check in the box to enable traffic shaping. When this option is enabled, the router restricts the flow of outbound traffic so as not to exceed the WAN uplink bandwidth.
- **Automatic Uplink Speed**. Place a check in this box to enable automatic uplink speed. When enabled, this option causes the router to automatically measure the useful uplink bandwidth each time the WAN interface is re-established (after a reboot, for example).
- **Measured Uplink Speed**: Displays the uplink speed. This is the uplink speed measured when the WAN interface was last re-established. The value may be lower than that reported by your ISP as it does not include all of the network protocol overheads associated with your ISP's network. Typically, this figure will be between 87% and 91% of the stated uplink speed for xDSL connections and around 5 kbps lower for cable network connections.
- **Manual Uplink Speed**: Specify an uplink speed or select it from the drop-down list. If Automatic Uplink Speed is disabled, this option allows you to set the uplink speed manually. Uplink speed is the speed at which data can be transferred from the router to your ISP.

- **Connection Type**: By default, the router automatically determines whether the underlying connection is an xDSL/Frame-relay network or some other connection type (such as cable modem or Ethernet), and it displays the result as Detected xDSL or Frame Relay Network. If you have an unusual network connection in which you are actually connected via xDSL but for which you configure either Static or DHCP in the WAN settings, setting this option to xDSL or Other Frame Relay Network ensures that the router will recognize that it needs to shape traffic slightly differently in order to give the best performance. Choosing xDSL or Other Frame Relay Network causes the measured uplink speed to be reported slightly lower than before on such connections, but gives much better results.

Click on the **Apply** button to store these settings.

Routing

This section adds a new entry into the routing table.

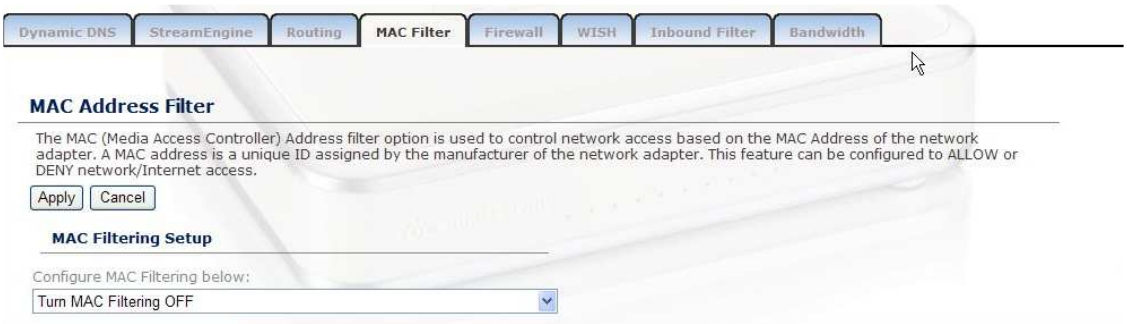


- **Enable**: Place a check in this box to enable the routing table entry.
- **Name**: Specify a name for the rule.
- **Destination IP**: Specify the destination IP address.
- **Netmask**: Specify the subnet mask for the IP address.
- **Gateway**: Specify the IP address of the gateway.
- **Metric**: Specify the number of routing hops. The route metric is a value from 1 to 16 that indicates the cost of using this route. A value of 1 is the lowest cost, and 15 is the highest cost. A value of 16 indicates that the route is not reachable from this router. When trying to reach a particular destination, computers on your network will select the best route, ignoring unreachable routes.
- **Interface**: Select the interface from the drop-down list.

Click on the **Save** button to insert the entry into the Routing table.

MAC Address Filter

This feature is used to restrict certain MAC address from accessing the Internet. These filters can be used for securing and restricting your network.

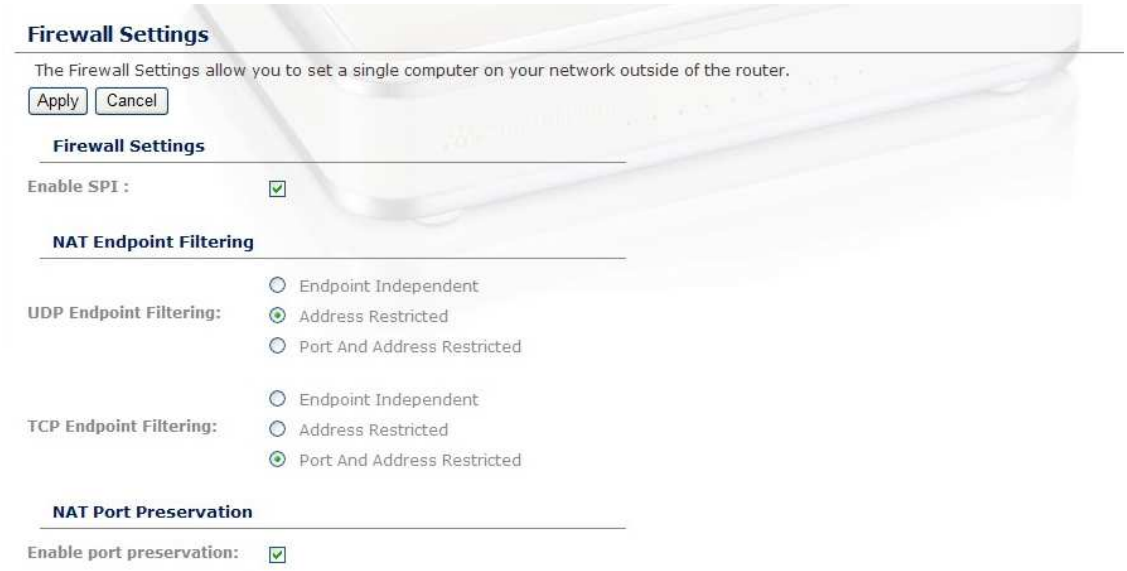


- **Configure MAC Filtering**: Select one of the options from the drop-down list.
  - **Turn MAC Filtering OFF:** When "OFF" is selected, MAC addresses are not used to control network access.
  - **Turn MAC Filtering ON and ALLOW computers listed to access the network:** When "ALLOW" is selected, only computers with MAC addresses listed in the MAC Filtering Rules list are granted network access.
  - **Turn MAC Filtering ON and DENY computers listed to access the network:** When "DENY" is selected, any computer with a MAC address listed in the MAC Filtering Rules list is refused access to the network.
- **MAC Address**: Specify that MAC address that you would like to filter.

Click on the **Apply** button to store the changes.

Firewall Settings

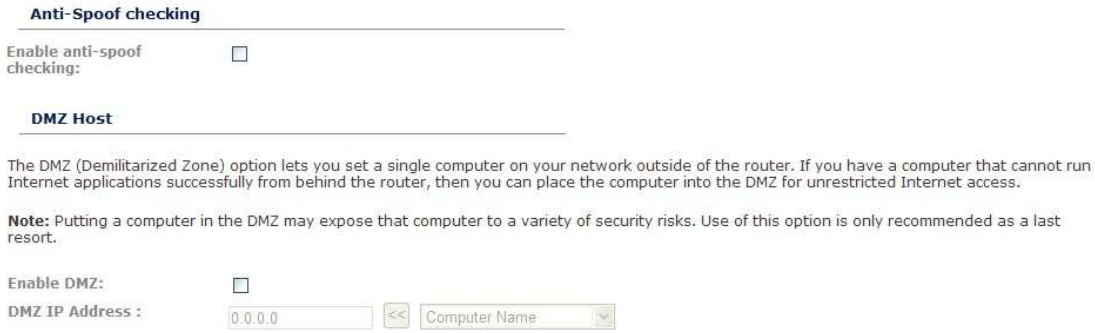
The device provides a tight firewall by virtue of the way NAT works. Unless you configure the router to the contrary, the NAT does not respond to unsolicited incoming requests on any port, thereby making your LAN invisible to Internet cyber attacks. However, some network applications cannot run with a tight firewall. Those applications need to selectively open ports in the firewall to function correctly. The options on this page control several ways of opening the firewall to address the needs of specific types of applications.



- **Enable SPI**: Place a check in this box to enable SPI. SPI ("stateful packet inspection" also known as "dynamic packet filtering") helps to prevent cyber attacks by tracking more state per session. It validates that the traffic passing through that session conforms to the protocol. When the protocol is TCP, SPI checks that packet sequence numbers are within the valid range for the session, discarding those packets that do not have valid sequence numbers. Whether SPI is enabled or not, the router always tracks TCP connection states and ensures that each TCP packet's flags are valid for the current state.
- **TCP / UDP NAT Endpoint Filtering** options control how the router's NAT manages incoming connection requests to ports that are already being used. Select one of the radio buttons.
    - **End Point Independent** Once a LAN-side application has created a connection through a specific port, the NAT will forward any incoming connection requests with the same port to the LAN-side application regardless of their origin. This is the least restrictive option, giving the best connectivity and allowing some applications (P2P applications in particular) to behave almost as if they are directly connected to the Internet.
    - **Address Restricted** The NAT forwards incoming connection requests to a LAN-side host only when they come from the same IP address with which a connection was established. This allows the remote application to send data back through a port different from the one used when the outgoing session was created.

- **Port And Address Restricted** The NAT does not forward any incoming connection requests with the same port address as an already establish connection.

- **Note**: Some of these options can interact with other port restrictions. Endpoint Independent Filtering takes priority over inbound filters or schedules, so it is possible for an incoming session request related to an outgoing session to enter through a port in spite of an active inbound filter on that port. However, packets will be rejected as expected when sent to blocked ports (whether blocked by schedule or by inbound filter) for which there are no active sessions. Port and Address Restricted Filtering ensures that inbound filters and schedules work precisely, but prevents some level of connectivity, and therefore might require the use of port triggers, virtual servers, or port forwarding to open the ports needed by the application. Address Restricted Filtering gives a compromise position, which avoids problems when communicating with certain other types of NAT router (symmetric NATs in particular) but leaves inbound filters and scheduled access working as expected.
- **Enable Port Preservation**: Place a check in this box to enable Port Preservation. NAT Port preservation (on by default) tries to ensure that, when a LAN host makes an Internet connection, the same LAN port is also used as the Internet visible port. This ensures best compatibility for internet communications. Under some circumstances it may be desirable to turn off this feature.



- **Enable anti-spoof checking**: Place a check in this box to enable anti-spoof checking. Enabling this option can provide protection from certain kinds of "spoofing" attacks. However, enable this option with care. With some modems, the WAN connection may be lost when this option is enabled. In that case, it may be necessary to change the LAN subnet to something other than 192.168.0.x (192.168.2.x, for example), to re-establish the WAN connection.
- **Enable DMZ Host**: Place check in this box to enable DMZ host. DMZ host is a demilitarized zone used to provide Internet services without sacrificing unauthorized access to its local private network. Typically, the DMZ host contains devices accessible to Internet traffic, such as web, FTP, email and DNS servers.
- **DMZ IP Address**: Specify the IP address of the DMZ host.
- **Non-UDP/TCP/ICMP LAN Sessions**: Place a check in this box to enable this feature. When a LAN application that uses a protocol other than UDP, TCP,

or ICMP initiates a session to the Internet, the router's NAT can track such a session, even though it does not recognize the protocol. This feature is useful because it enables certain applications (most importantly a single VPN connection to a remote host) without the need for an ALG.

- **Note**: This feature does not apply to the DMZ host (if one is enabled). The DMZ host always handles these kinds of sessions.

- Enabling this option (the default setting) enables single VPN connections to a remote host. (But, for multiple VPN connections, the appropriate VPN ALG must be used.) Disabling this option, however, only disables VPN if the appropriate VPN ALG is also disabled.

- **Application Layer Gateway (ALG)** Configuration: Place a check in appropriate feature boxes to enable them. . Some protocols and applications require special handling of the IP payload to make them work with network address translation (NAT). Each ALG provides special handling for a specific protocol or application. A number of ALGs for common applications are enabled by default.
  - **PPTP**: Allows multiple machines on the LAN to connect to their corporate networks using PPTP protocol. When the PPTP ALG is enabled, LAN computers can establish PPTP VPN connections either with the same or with different VPN servers. When the PPTP ALG is disabled, the router allows VPN operation in a restricted way -- LAN computers are typically able to establish VPN tunnels to different VPN Internet servers but not to the same server. The advantage of disabling the PPTP ALG is to increase VPN performance. Enabling the PPTP ALG also allows incoming VPN connections to a LAN side VPN server (refer to Advanced > Virtual Server).
  - **IPSec**: (VPN) Allows multiple VPN clients to connect to their corporate networks using IPSec. Some VPN clients support traversal of IPSec through NAT. This option may interfere with the operation of such VPN clients. If you are having trouble connecting with your corporate network, try disabling this option. Check with the system administrator

of your corporate network whether your VPN client supports NAT traversal.

- **RTSP**: Allows applications that use Real Time Streaming Protocol to receive streaming media from the internet. QuickTime and Real Player are some of the common applications using this protocol.
- **Windows/MSN Messenger**: Supports use on LAN computers of Microsoft Windows Messenger (the Internet messaging client that ships with Microsoft Windows) and MSN Messenger. The SIP ALG must also be enabled when the Windows Messenger ALG is enabled.
- **FTP**: Allows FTP clients and servers to transfer data across NAT.
- **H.323 (Netmeeting)**: Allows H.323 (specifically Microsoft Netmeeting) clients to communicate across NAT server.
- **SIP**: Allows devices and applications using VoIP (Voice over IP) to communicate across NAT. Some VoIP applications and devices have the ability to discover NAT devices and work around them. This ALG may interfere with the operation of such devices. If you are having trouble making VoIP calls, try turning this ALG off.
- **Wake-On-LAN**: This feature enables forwarding of "magic packets" (that is, specially formatted wake-up packets) from the WAN to a LAN computer or other device that is "Wake on LAN" (WOL) capable.
- **MMS**: Allows Windows Media Player, using MMS protocol, to receive streaming media from the internet.

Click on the **Apply** button to store these settings.

WISH

WISH is short for Wireless Intelligent Stream Handling, a technology developed to enhance your experience of using a wireless network by prioritizing the traffic of different applications.

- **Enable WISH**: Place a check in this box to enable the WISH feature.
- **HTTP**: Place a check in this box to add HTTP as a classifier. This allows the device to recognize HTTP transfers for many common audio and video streams and prioritize them above other traffic. Such streams are frequently used by digital media players.
- **Windows Media Center**: Place a check in this box to add HTTP as a classifier. This enables the router to recognize certain audio and video streams generated by a Windows Media Center PC and to prioritize these above other traffic. Such streams are used by systems known as Windows Media Extenders, such as the Xbox 360.
- **Automatic**: Place a check in this box for the device to automatically configure the classifiers. When enabled, this option causes the router to automatically attempt to prioritize traffic streams that it doesn't otherwise recognize, based on the behavior that the streams exhibit. This acts to deprioritize streams that exhibit bulk transfer characteristics, such as file transfers, while leaving interactive traffic, such as gaming or VoIP, running at a normal priority.

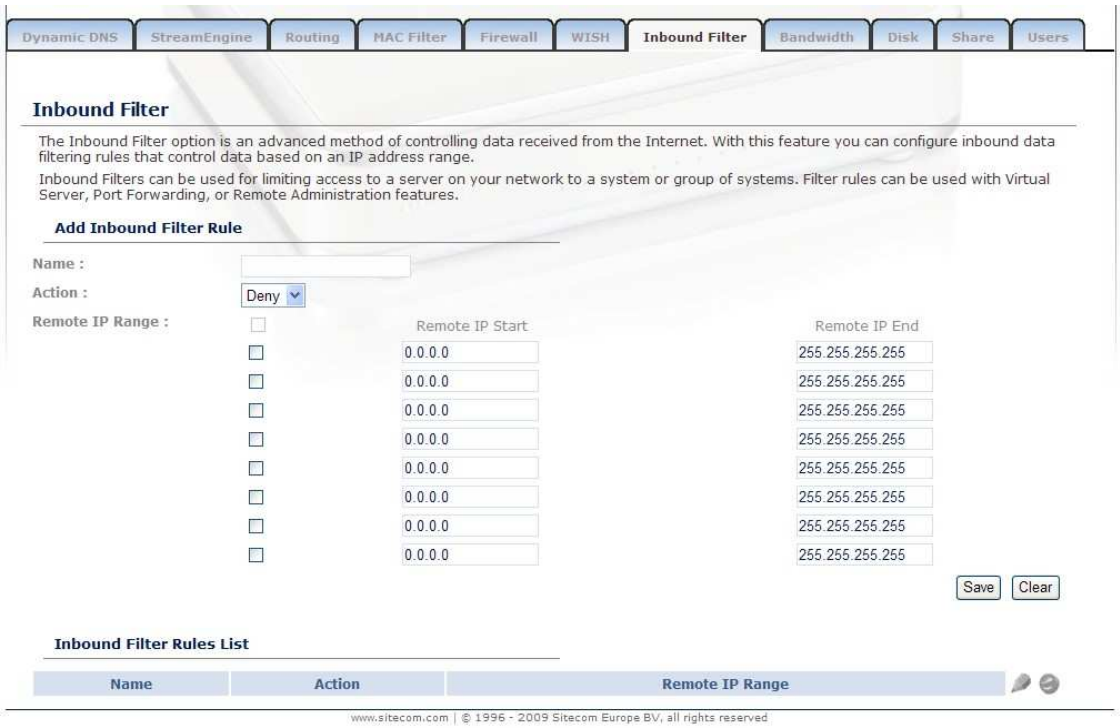
- **Enable**: Place a check in this box to enable the WISH rule. A WISH Rule identifies a specific message flow and assigns a priority to that flow. For most applications, the priority classifiers ensure the right priorities and specific WISH Rules are not required. WISH supports overlaps between rules. If more than one rule matches for a specific message flow, the rule with the highest priority will be used.
- **Name**: Assign a meaningful name to the WISH rule.
- **Priority**: Select a priority from the drop-down list. The four priority message flows are:
    - BK: Background (least urgent).
    - BE: Best Effort.
    - VI: Video.
    - VO: Voice (most urgent).
- **Protocol**: Select a protocol from the drop-down list.
- **Host 1 IP Range**: Specify the IP range for the rule.
- **Host 1 Port Range**: Specify the port range for the rule.
- **Host 2 IP Range**: Specify the IP range for the rule.
- **Host 2 Port Range**: Specify the port range for the rule.

Click on the **Apply** button to insert the entry into the WISH rules list.

Inbound Filter

When you use the Virtual Server, Port Forwarding, or Remote Administration features to open specific ports to traffic from the Internet, you could be increasing the exposure of your LAN to cyber attacks from the Internet. In these cases, you can use Inbound Filters to limit that exposure by specifying the IP addresses of internet hosts that you trust to access your LAN through the ports that you have opened.

Inbound Filters can be used for limiting access to a server on your network to a system or group of systems. Filter rules can be used with Virtual Server, Gaming, or Remote Administration features.



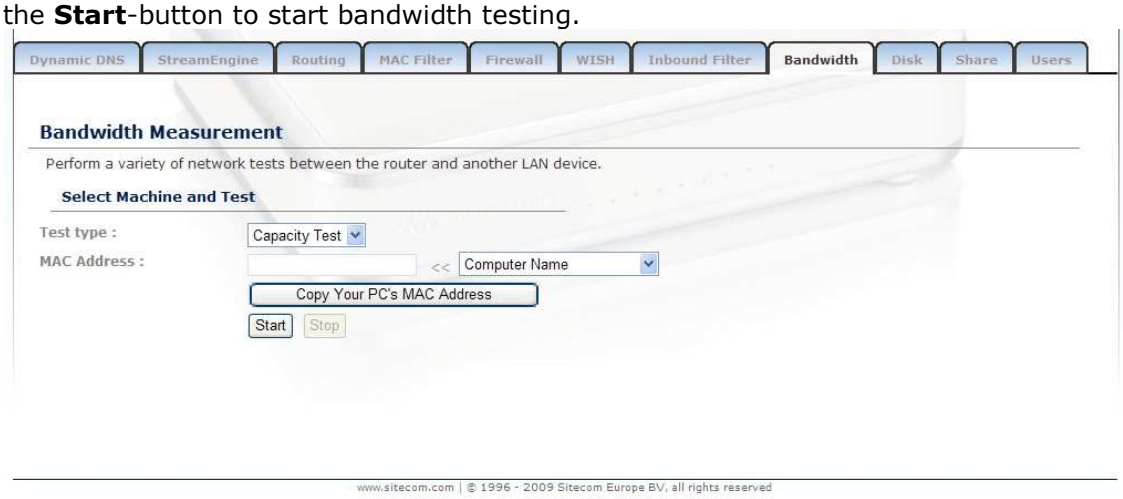
- **Name** Specify a name for the inbound filter.
- **Action:** Select Allow or Deny from the drop-down list. This will apply the inbound filter rule on the WAN interface.
- **Remote IP Range:** Specify the remote IP address range and then click in the check box to enable the range.

Click on the **Save** button to store the changes.

Bandwidth

Using this page, it's possible to perform a variety of network tests between the router and other LAN devices.

Choose the **Test Type,** select a computer (or enter it's MAC address), and click the **Start**-button to start bandwidth testing.



Disk

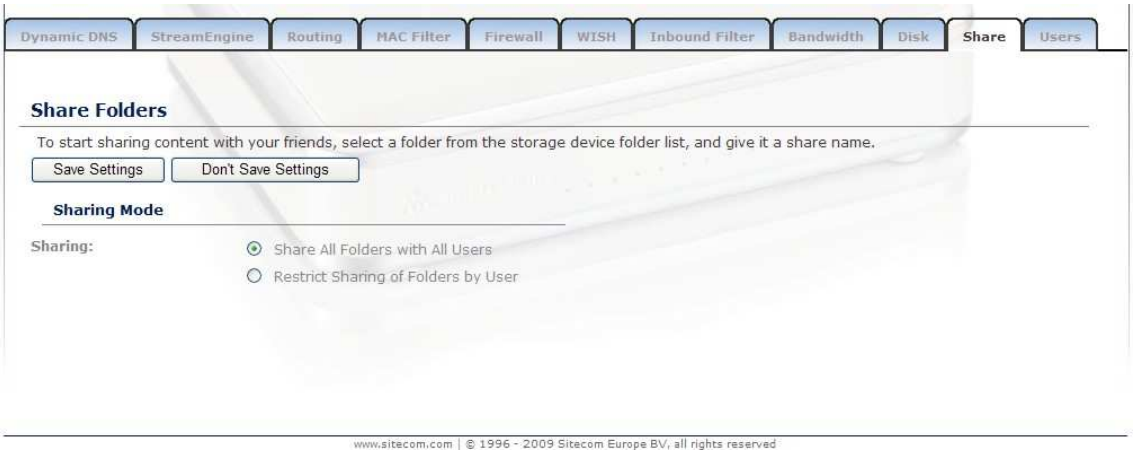
This page shows information regarding the attached storage devices. File system type, total space on the device, and available space is shown in the table.

Click the "**Safely remove**" button, to safely remove the USB disk.

Note: Only FAT12, FAT16, and FAT32 drives are supported. For information regarding partitioning and formatting of a drive, see the manual of your operating system.

Share

On this page, the sharing mode can be changed. Choose to share all folders with all users, or to restrict the sharing of folders. When Sharing-mode is set to "restrict", shares can be added and changed.



Users

You can add new users and configure user rights for the storage device.

- **Password**: Enter a password for the selected user.

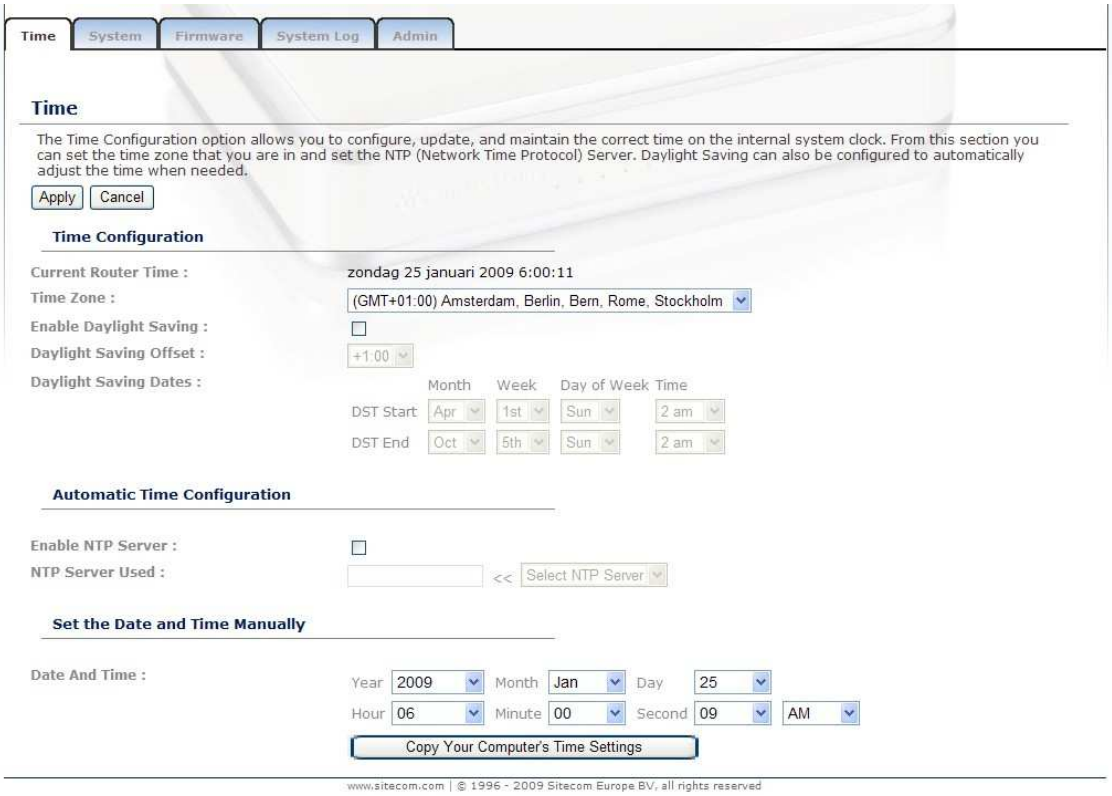
- **Share Name**: Select a shared folder. The Shared folders can be configured on the "Share" tab.
- **Access**: Select "Read Only" to allow the user to read files in the selected share. Select "Read/Write" to also allow users to write to the selected share.

4.5 Toolbox

Time Configuration

Click on the **Time** link in the navigation menu. This feature allows you to configure, update, and maintain the correct time on the device's internal system clock as well as configure the time zone. The date and time of the device can be configured manually or by synchronizing with a time server.

Note: If the device loses power for any reason, it will not be able to keep its clock running, and will not display the correct time once the device has been restarted. Therefore, you must re-enter the correct date and time.



- **Current Router Time**: Displays the current time on the device.
- **Time Zone**: Select your time zone from the drop-down list.
- **Enable Daylight Saving**: Place a check in this box to enable daylight savings time.
- **Daylight Saving Offset**: Select the offset from the drop-down list.
- **Daylight Saving Date**: Select the daylight savings date from the drop-down list. Select the starting and ending times for the change to and from daylight saving time. For example, suppose for DST Start you select Month="Oct", Week="3rd", Day="Sun" and Time="2am". This is the same as saying: "Daylight saving starts on the third Sunday of October at 2:00 AM."
- **Enable NTP Server**: Place a check in this box if you would like to synchronize the device's clock to a Network Time Server over the Internet. If

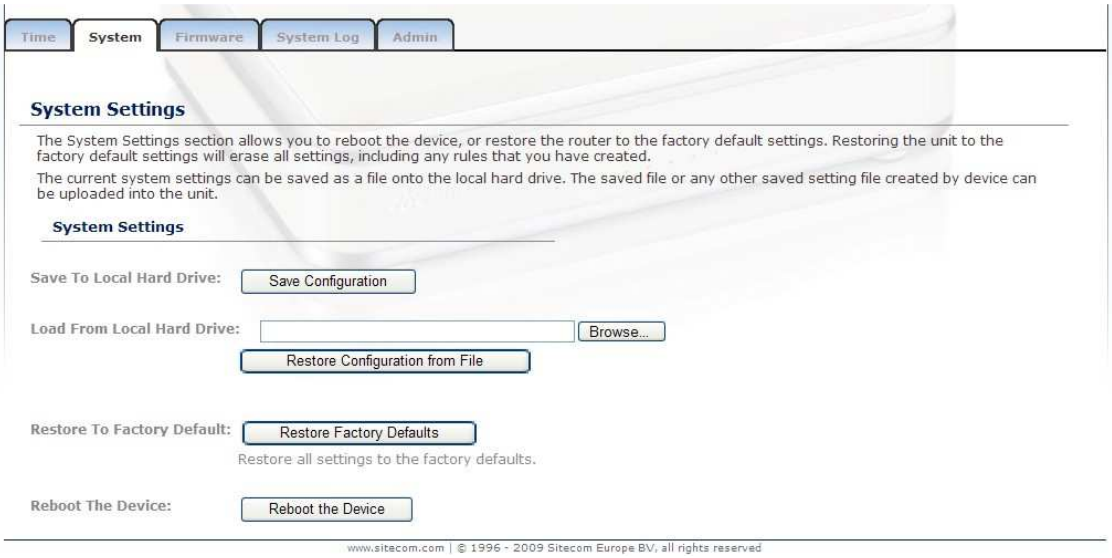
you are using schedules or logs, this is the best way to ensure that the schedules and logs are kept accurate.

- **NTP Server Used**: Specify the NTP server or select one from the drop-down list.
- **Set the Date and Time**: Select a date and time from the drop-down list or do to use computer's time and date click on the **Copy Your Computer's Time Settings** button.

Click on the **Apply** button once you have modified the settings.

System Settings

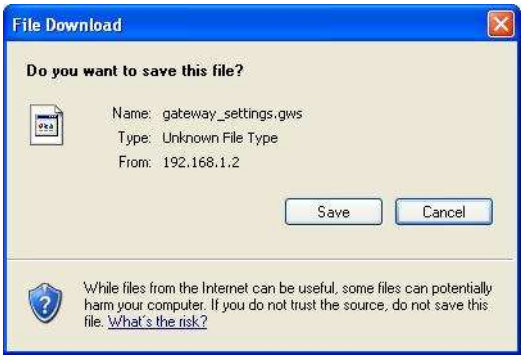
Click on the **System** link in the navigation menu. This page allows you to reboot the device using the current settings or restore all the settings to the factory defaults.



Save To Local Hard Drive

This option allows you to save the current configuration of the device into a file. Click on the **Save Configuration** button to begin.

Save the file on your local disk by using the **Save** or **Save to Disk** button in the dialog box.



Load From Local Hard Drive

This option allows you to restore a backup configuration from a file to the device. Click on the **Browse** button to select the file and then click on **Restore Configuration from a File** button.

The system then prompts you to reboot the device.

Click on the **OK** button to continue. You will then see the **Rebooting** page.

Please wait while the system is rebooting.
Note: Do no unplug the device during this process as this may cause permanent damage.

Restore To Factory Default

Click on the **Restore all Settings to Factory Defaults** button. This option restores all configuration settings back to the settings that were in effect at the time when the device was shipped from the factory.

Once the dialog box appears, click on the **OK** button to confirm the action.
Note: The current settings will be lost.

Click on the **OK** button to continue. You will then see the **Rebooting** page.

Please wait while the system is rebooting.
Note: Do no unplug the device during this process as this may cause permanent damage.

Reboot The Device

Click on the **Reboot the Device** button to reboot the device using its current settings. Once the dialog box appears, click on the **OK** button to confirm the action.

Once the dialog box appears, click on the **OK** button to confirm the action.
Note: The current settings will be lost.

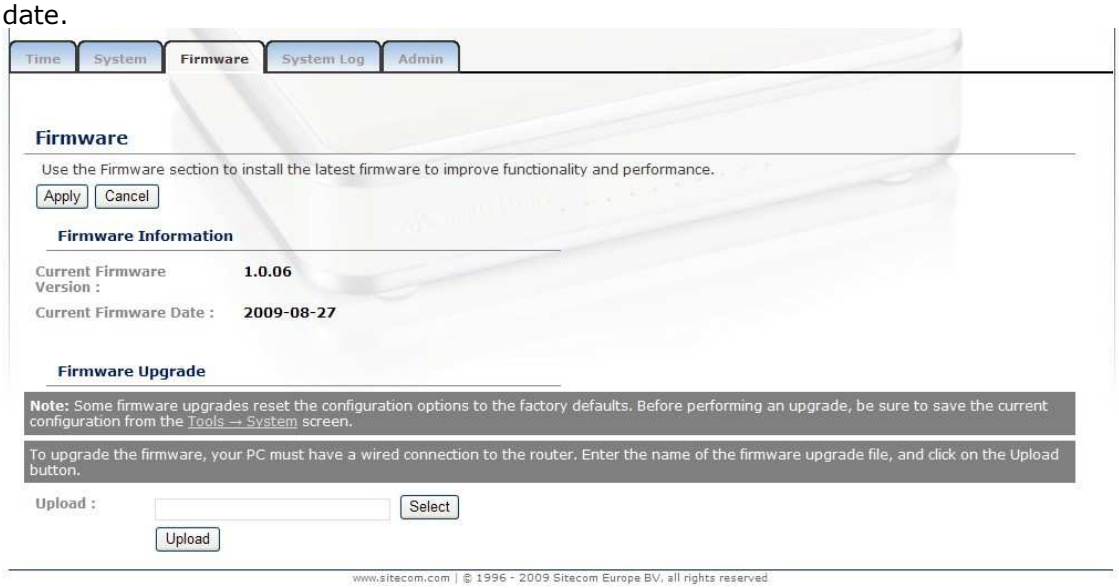
Click on the **OK** button to continue. You will then see the **Rebooting** page.

Please wait while the system is rebooting.

Note: Do no unplug the device during this process as this may cause permanent damage.

Firmware

Click on the **Firmware** link in the navigation menu. This page allows you to upgrade the firmware of the device in order to improve the functionality and performance. This page also displays the current firmware version and its release date.



Ensure that you have downloaded the appropriate firmware from the vendor's website. Connect the device to your PC using an Ethernet cable, as the firmware cannot be upgraded using the wireless interface.

Click on the **Browse** button to select the firmware and then click on the **Upload** button.

Syslog

Logs display a list of events that are triggered on the Ethernet and Wireless interface. This log can be referred when an unknown error occurs on the system or when a report needs to be sent to the technical support department for debugging purposes

- **Enable Logging to a Syslog Server:** Place a check in this box to enable Syslog logging.
- **Syslog Server IP Address:** Specify the IP address of the Syslog server.

Click on the **Apply** button once you have modified the settings.

Administrator Settings

Admin Password

You can change the password required to log into the broadband router's system web-based management. By default, the password is: "admin". Passwords can contain 0 to 12 alphanumeric characters, and are case sensitive.

Username: Fill in the current username (default: admin).
Password: Enter your new password.
Verify Password: Enter your new password again for verification purposes.

System Name

Gateway Name: Name of your router.

Remote Management

The remote management function allows you to configure the Broadband router from a remote site.

Inactivity Time Out: Time after which you will be automatically logged out of the web-interface.
HTTPS Server: Enable HTTPS connection for the web-interface.
Enable Remote Management: Select "Enabled" to enable the remote management function.
Remote Admin Port: The port number of the remote management web interface.

Click **Apply** at the top of the screen to save the above configurations.

Appendix A FCC Interference Statement

Federal Communication Commission Interference Statement

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 installation. 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.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

IMPORTANT NOTE:
FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.
This device complies with FCC RF Exposure limits set forth for an uncontrolled environment, under 47 CFR 2.1093 paragraph (d)(2).
This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.