Rosewill®

Wireless Router RNX-N4

User Manual

1. INTRODUCTION

The Wireless-N Gigabit Router 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, eliminates dead spots and extends 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 provide easy configuration with the web browser-based configuration utility.

The incredible speed and QoS function of 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.

This chapter describes the features & benefits, package contents, applications, and network configuration.

1.1 FEATURES & BENEFITS

Features	Benefits
High Speed Data Rate Up to 300Mbps	**Capable of handling heavy data payloads such as MPEG video streaming**
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**

1.2 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 unit must be shipped in its original package.

- One Wireless N Gigabit Router RNX-N4
- One 12V/1.25A 90V~240V Power Adapter
- Three 2dBi 2.4GHz Dipole Antennas
- One CD-ROM with User's Manual and QIG
- Once Quick Installation Guide
- One RJ45 Networking Cable

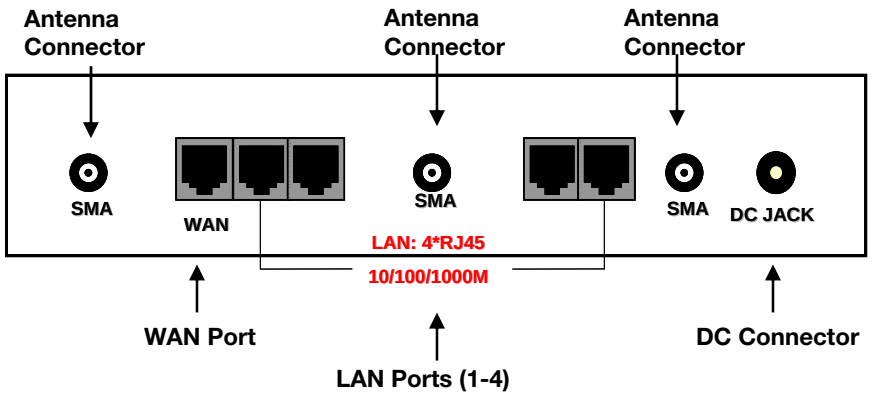
1.3 SAFETY GUIDELINES

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

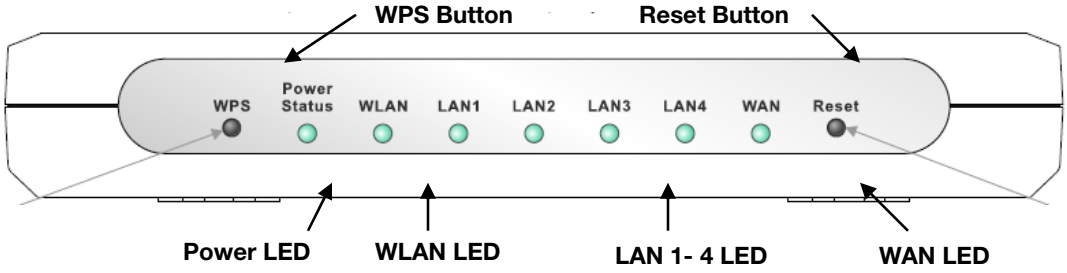
- Carefully follow the instructions in this manual; also follow all instruction labels on this device.
- Except for the power adapter supplied, this device should not be connected to any other adapters.
- Do not spill liquid of any kind on this device.
- Do not place the unit on an unstable stand or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

1.4 WIRELESS SOHO ROUTER DESCRIPTION

Rear Panel



Front Panel



Step	Label	Description
1	LAN Ports (1 – 4)	Use an Ethernet cable to connect each port to a computer on your Local Area Network (LAN).
2	WAN Port	Use an Ethernet cable to connect this port to your WAN router.
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	Antenna Connector	Connect the three antennas to the SMA connectors.
	Connection / Activity LED	This LED will light up once an Ethernet cable is connected to one of the LAN ports.
	WAN LED	This LED will light up once an Ethernet cable is connected to WAN (Internet) port.
	WLAN LED	This LED will light up once the RF (wireless LAN) feature is enabled
	Power LED	This LED will light up once the power cable is connected to the DC connector.
	Reset Button	Use this button to reset the device. You can restore the device back to its factory default settings by holding down on this button for 5 seconds.
	WPS	WPS (Wireless Push Button) is used for WiFi 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.

1.5 SYSTEM REQUIREMENTS

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

- PC/AT compatible computer with a Ethernet interface.
- Operating system that supports HTTP web-browser

1.6 APPLICATIONS

The wireless LAN products are easy to install and highly efficient. The following list describes some of the many applications made possible through the power and flexibility of wireless LANs:

- **Difficult-to-wire environments**
  There are many situations where wires cannot be laid easily. Historic buildings, older buildings, open areas and across busy streets make the installation of LANs either impossible or very expensive.
- **Temporary workgroups**
  Consider situations in parks, athletic arenas, exhibition centers, disaster-recovery, temporary offices and construction sites where one wants a temporary WLAN established and removed.
- **The ability to access real-time information**
  Doctors/nurses, point-of-sale employees, and warehouse workers can access real-time information while dealing with patients, serving customers and processing information.
- **Frequently changed environments**
  Show rooms, meeting rooms, retail stores, and manufacturing sites where frequently rearrange the workplace.
- **Small Office and Home Office (SOHO) networks**
  SOHO users need a cost-effective, easy and quick installation of a small network.
- **Wireless extensions to Ethernet networks**
  Network managers in dynamic environments can minimize the overhead caused by moves, extensions to networks, and other changes with wireless LANs.
- **Wired LAN backup**
  Network managers implement wireless LANs to provide backup for mission-critical applications running on wired networks.
- **Training/Educational facilities**
  Training sites at corporations and students at universities use wireless connectivity to ease access to information, information exchanges, and learning.

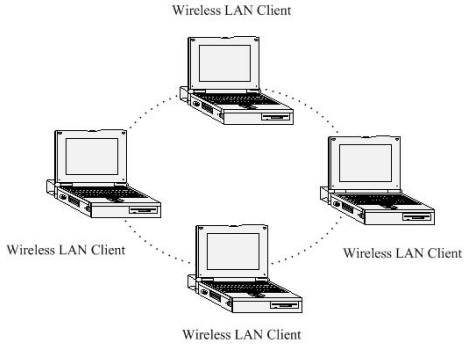
1.7 NETWORK CONFIGURATION

To better understand how the wireless LAN products work together to create a wireless network, it might be helpful to depict a few of the possible wireless LAN PC card network configurations. The wireless LAN products can be configured as:

- Ad-hoc (or peer-to-peer) for departmental or SOHO LANs.

Ad-hoc (peer-to-peer) Mode

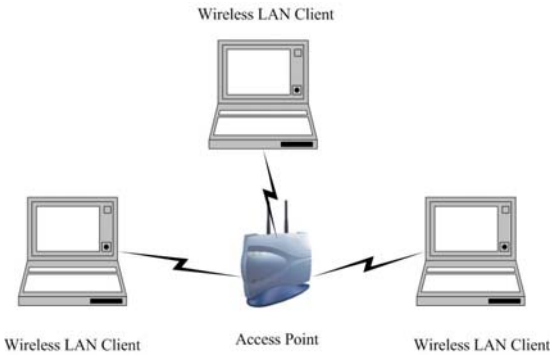
This is the simplest network configuration with several computers equipped with the PC Cards that form a wireless network whenever they are within range of one another. In ad-hoc mode, each client is peer-to-peer, would only have access to the resources of the other client and does not require an access point. This is the easiest and least expensive way for the SOHO to set up a wireless network. The image below depicts a network in ad-hoc mode.



- Infrastructure for enterprise LANs.

Infrastructure Mode

The infrastructure mode requires the use of an access point (AP). In this mode, all wireless communication between two computers has to be via the AP. It doesn't matter if the AP is stand-alone or wired to an Ethernet network. If used in stand-alone, the AP can extend the range of independent wireless LANs by acting as a repeater, which effectively doubles the distance between wireless stations. The image below depicts a network in infrastructure mode.

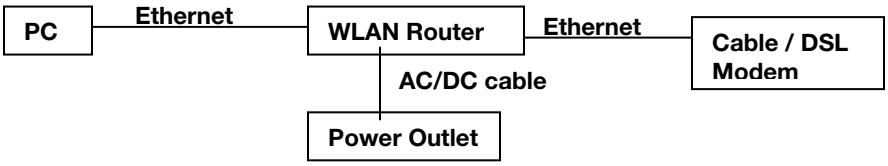


2. UNDERSTANDING THE HARDWARE

2.1 HARDWARE INSTALLATION

- Place the unit in an appropriate location after conducting a site survey.
- 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 WAN port of the device and the other end into you cable/DSL modem (Internet)
- Insert the DC-inlet of the power adapter into the port labeled “DC-IN” and the other end into the power socket on the wall.

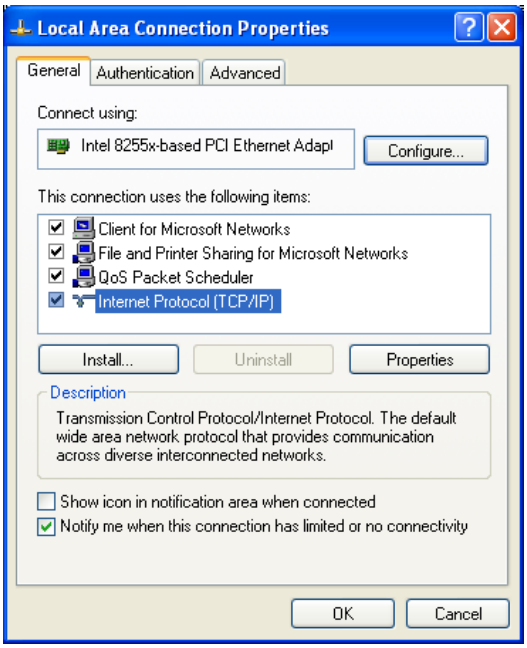
This diagram depicts the hardware configuration



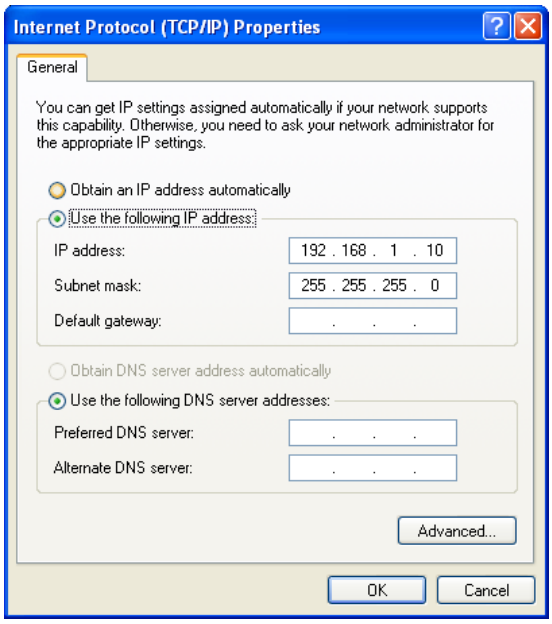
2.2 IP ADDRESS CONFIGURATION

This device can be configured as a Bridge/Router or Access Point. The default IP address of the device is **192.168.1.2** In order to log into this device, you must first configure the TCP/IP settings of your PC/Notebook.

- 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.



- 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 **Use the following IP Address** radio button and then enter the IP address and subnet mask. Ensure that the IP address and subnet mask are on the same subnet as the device.
  For Example: Device IP address: 192.168.1.2
  PC IP address: 192.168.1.10
  PC subnet mask: 255.255.255.0

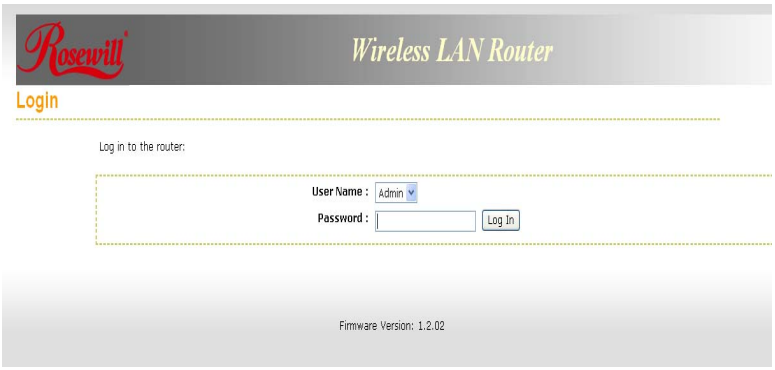
- Click on the **OK** button to close this window, and once again to close LAN properties window.

3. INTERNET CONNECTION WIZARD

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

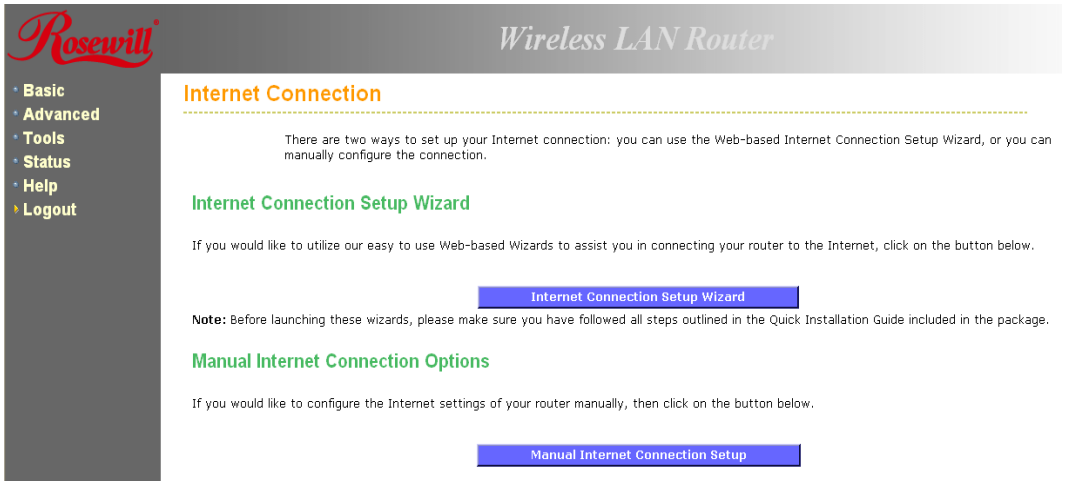
3.1 LOGGING IN

- To configure the device through the web-browser, enter the IP address of the device (**default: 192.168.1.2)** into the address bar of the web-browser and press **Enter.**
- Make sure that the device and your computers are configured on the same subnet. Refer to **Chapter 2** in order to configure the IP address of your computer.
- After connecting to the IP address, the web-browser will display the login page. Select **Admin** from the drop-down list and then leave the password field blank. Click on the Log In button to continue.

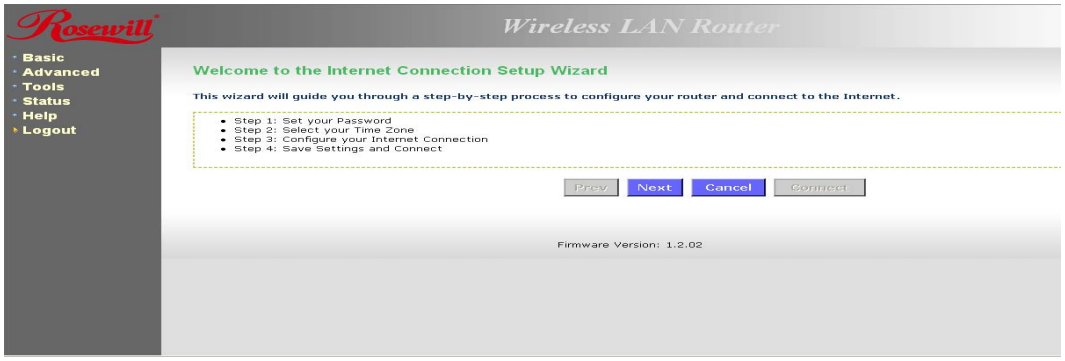


- This device supports several types of WAN connections:
  1. **DHCP Connection (Dynamic IP address)** – Choose this connection type if your ISP provides you the IP address. Most cable modems use this type of connection.
  2. **PPPoE (Poinit-to-Point Protocol over Ethernet)** – Choose this option if your internet connection requires a user name and password. Most DSL modems use this type of connection.
  3. **PPTP (Point-to-Point Tunneling Protocol)** – Choose this type of connection if your ISP requires you to use PPTP. Your ISP should provide you with a user name and password.
  4. **Static IP address** – Choose this option if you have a dedicated IP address.
  5. **BigPond** – Choose this option if you use the BigPond service in Australia.

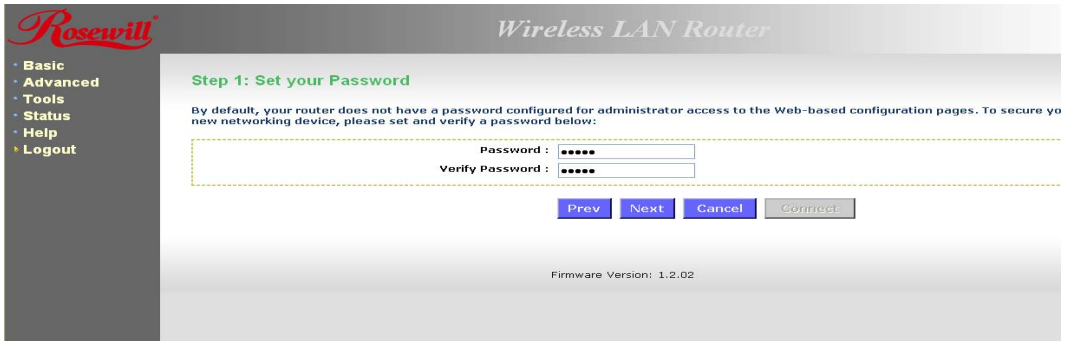
- The configuration wizard for each connection type is described below.
- Click on the **Internet Connection Setup Wizard** button to begin the process.



- Click on the **Internet Connection Setup Wizard Setup** button to begin the process.



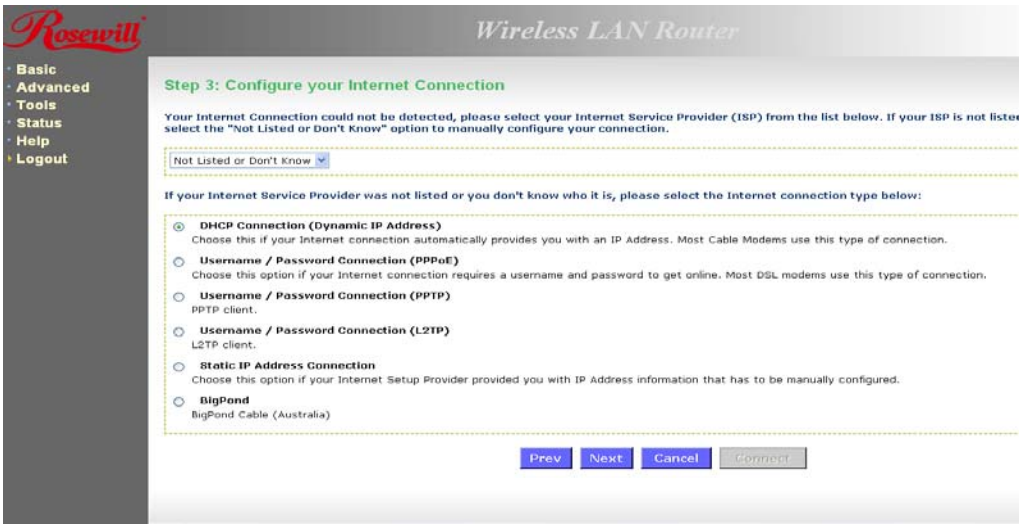
- The Wizard requires that you configure the password, time zone, and Internet (WAN) connection. Click on the **Next** button to continue.



- By default, the device does not use a password. Specify a password for administrator access to the device, then type the password once more in the **Verify Password** field. Click on the **Next** button to continue.

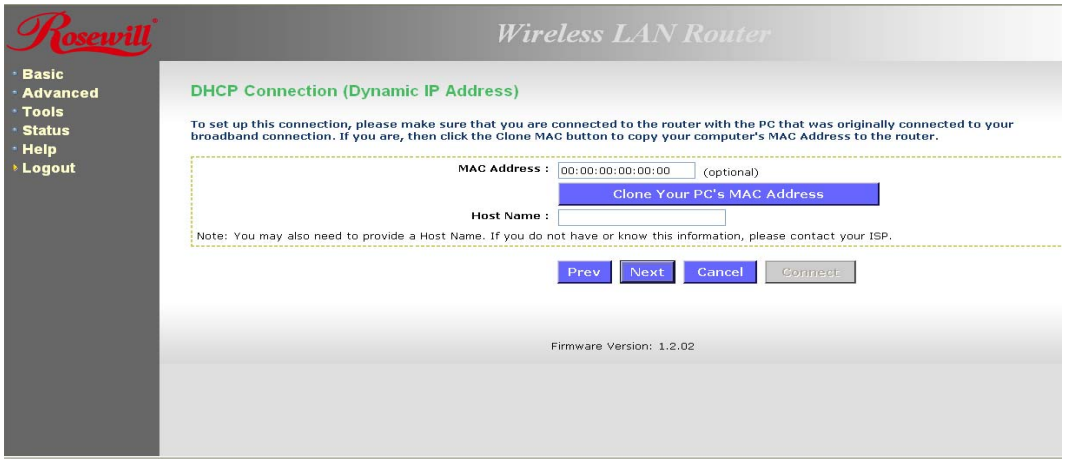
- Select your time zone from the drop-down list Click on the **Next** button to continue.

- The next step in the wizard is the Internet Connection, select the WAN connection type from the list, and then click on the **Next** button to continue with the wizard.



3.1.1 DHCP Connection (Dynamic IP Address)

- 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 **DHCP Connection (Dynamic IP Address)** radio button and then click on the **Next** button.

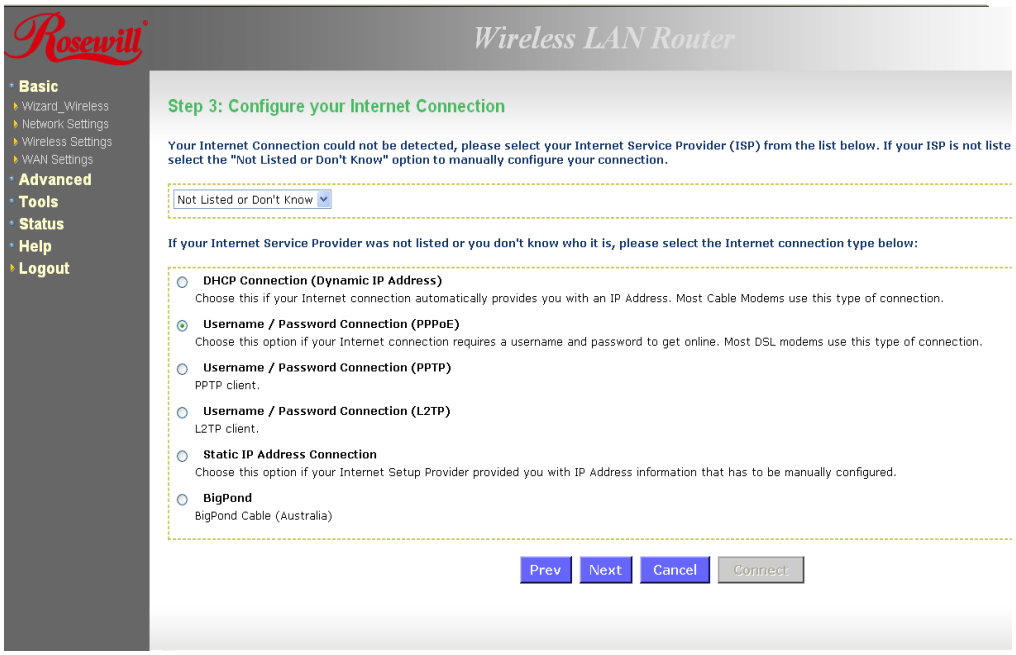


- You have the option of cloning your PCs MAC address onto the device. Click on the **Clone Your PCs MAC Address** to automatically copy the MAC address. You may also specify a host name. Click on the **Next** button to continue.

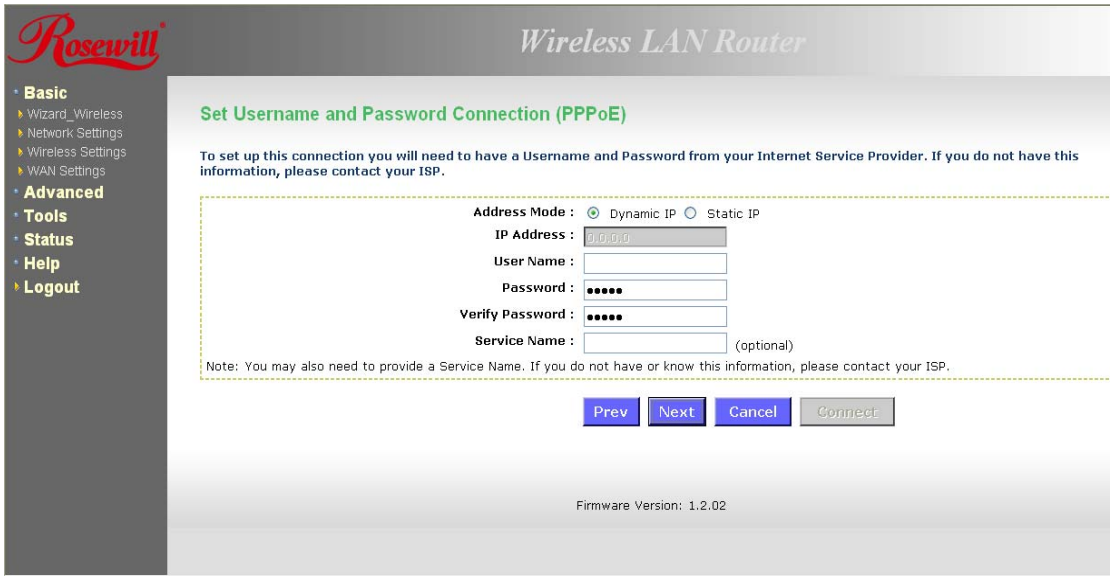
- The WAN configuration is complete. Click on the **Connect** button to connect to the Internet.

3.1.2 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 **Username / Password Connection (PPPoE)** radio button and then click on the Next button.



- **Address Mode:** PPPoE 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.
- **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

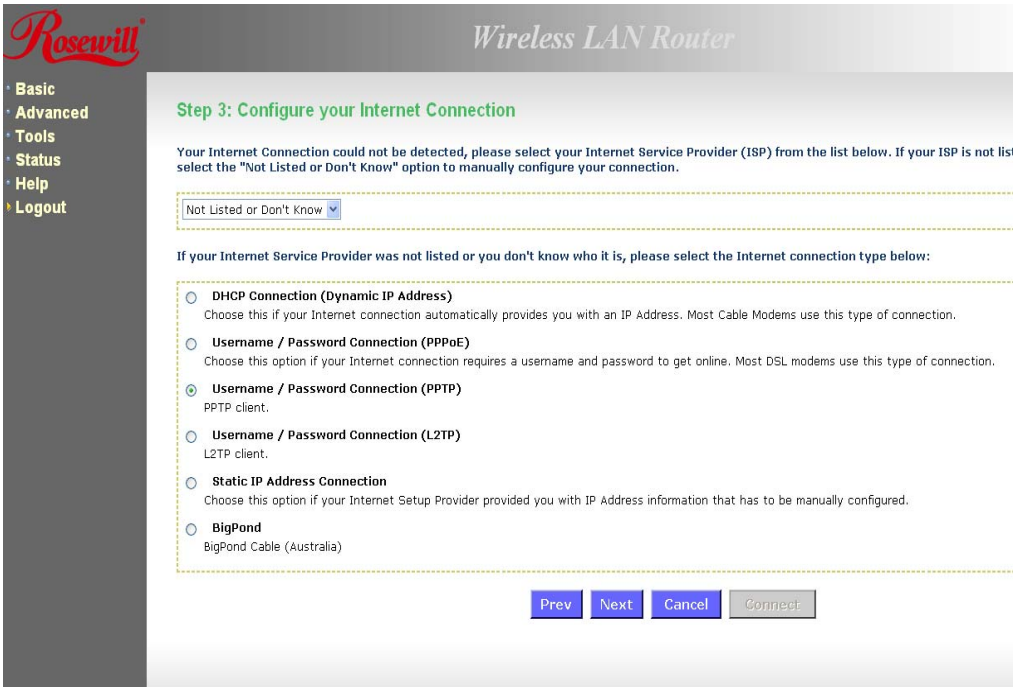
again in the next field.

- **Service Name**: Specify the name of the ISP.
- Click on the **Next** button to continue.

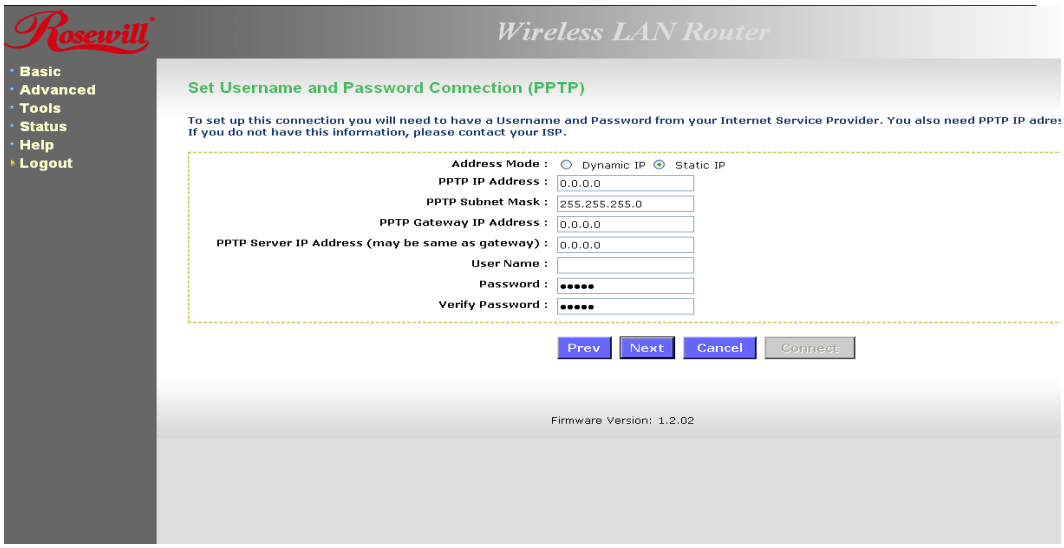
- The WAN configuration is complete. Click on the **Connect** button to connect to the Internet.

3.1.3 PPTP (Point-to-Point Tunneling Protocol)

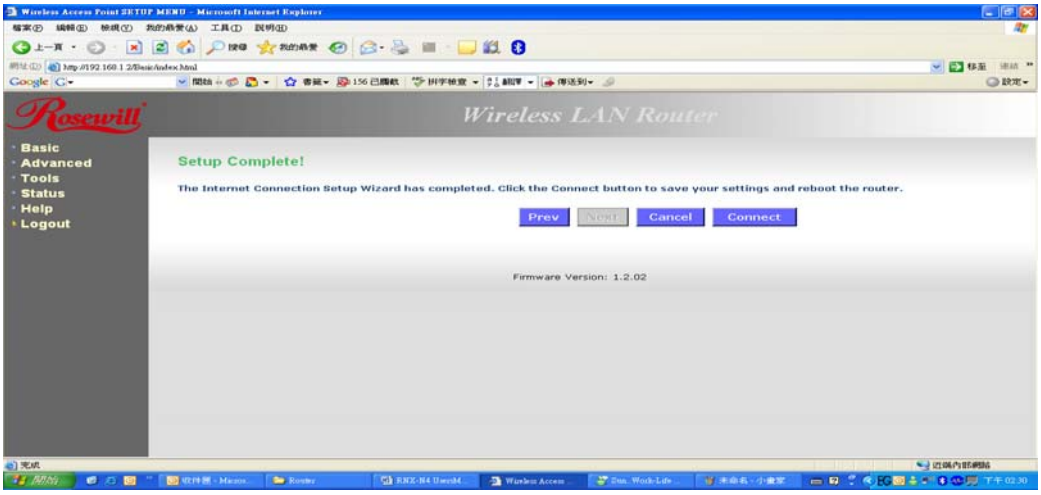
- The WAN interface can be configured as PPTP. PPTP (Point to Point Tunneling Protocol) uses a virtual private network to connect to your ISP. This method of connection is primarily used in Europe. This method of connection requires you to enter a username and password (provided by your ISP) to gain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



- Select the **Username / Password Connection (PPTP)** radio button and then click on the **Next** button.



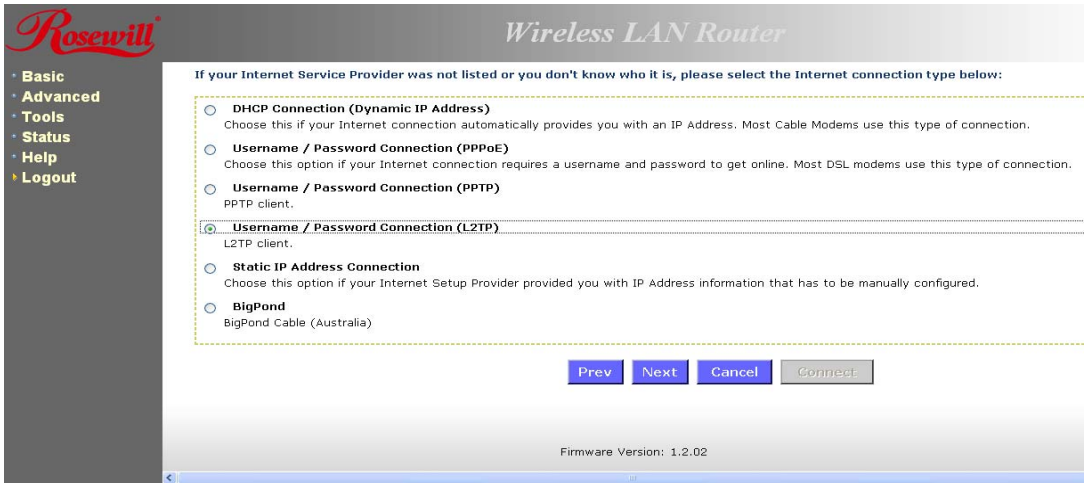
- **Address Mode**: PPTP can be used with a dynamic or static IP address. If you select the **Dynamic IP** radio button, then the IIP address in the next field is not required. However, if you select the **Static IP** radio button, then the IP address in the next field is required.
- **PPTP Address**: 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.
- Click on the **Next** button to continue.



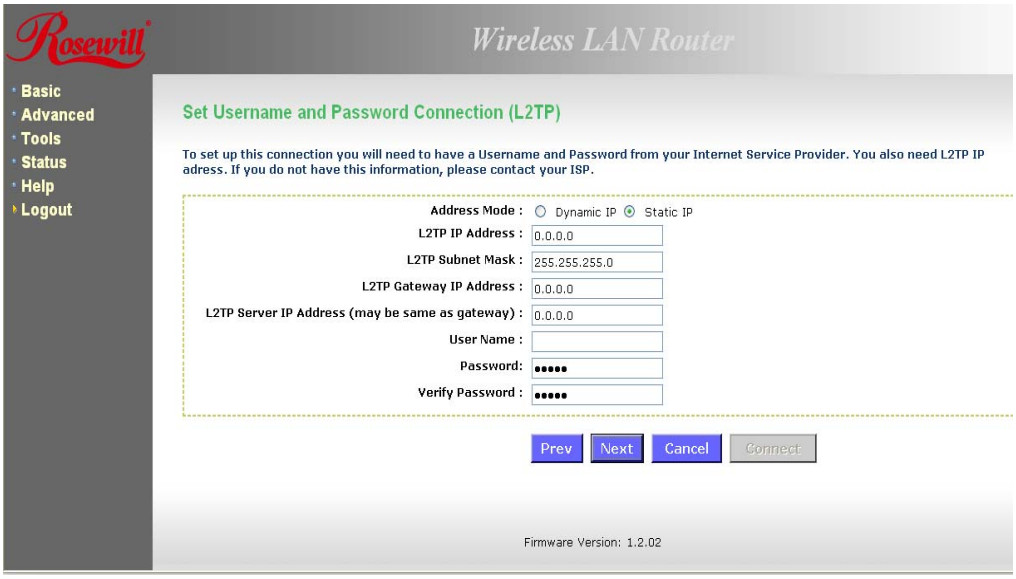
- The WAN configuration is complete. Click on the **Connect** button to connect to the Internet.

3.1.4 L2TP (Layer 2 Tunneling Protocol)

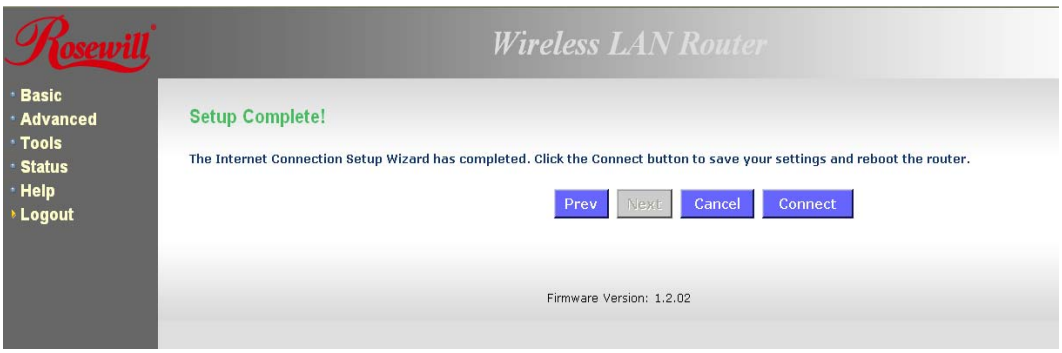
The WAN interface can be configured as L2TP. L2TP (Layer Two Tunneling Protocol) uses a virtual private network to connect to your ISP. This method of connection requires you to enter a user name and password (provided by your Internet Service Provider) to gain access to the Internet. The supported authentication protocols are PAP and CHAP.



- Select the **Username / Password Connection (L2TP)** radio button and then click on the **Next** button.



- **Address Mode:** L2TP 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.
- **L2TP Address**: Specify the IP address
- **L2TP Subnet Mask**: Specify the subnet mask for the IP address.
- **L2TP Gateway IP Address**: Specify the IP address of the L2TP gateway.
- **L2TP Server IP Address**: If the L2TP 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.
- Click on the **Nex**t button to continue.

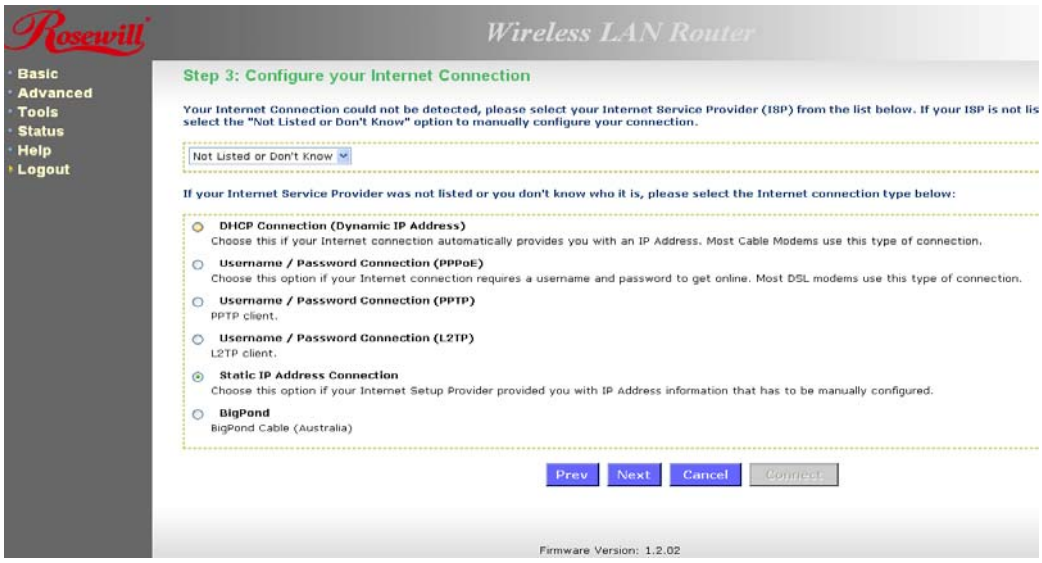


- The WAN configuration is complete. Click on the **Connect** button to connect to the Internet.

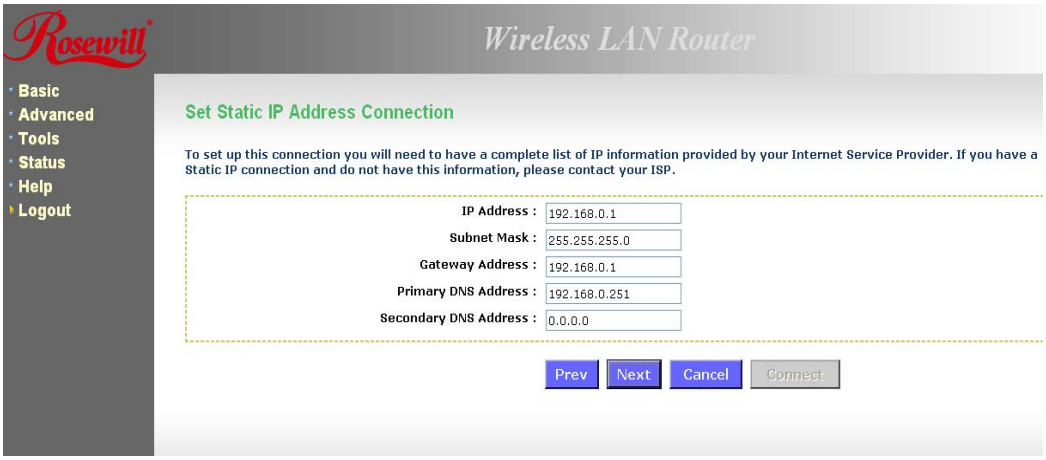
3.1.5 Static IP Address Configuration

- 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 the **Static IP Address Connection** radio button and then click on the **Next** button.



- **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.
- **Gateway Address**: 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.

- The WAN configuration is complete. Click on the **Connect** button to connect to the Internet.

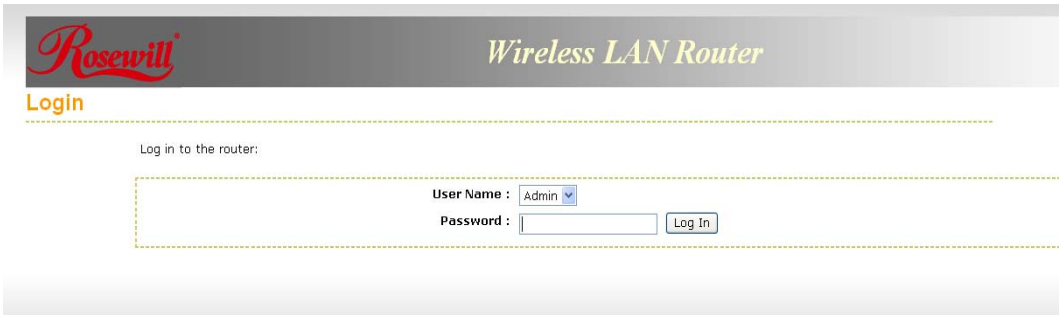
4. WI-FI PROTECTED SETUP WIZARD

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 6 in order to configure the more advanced features of the device

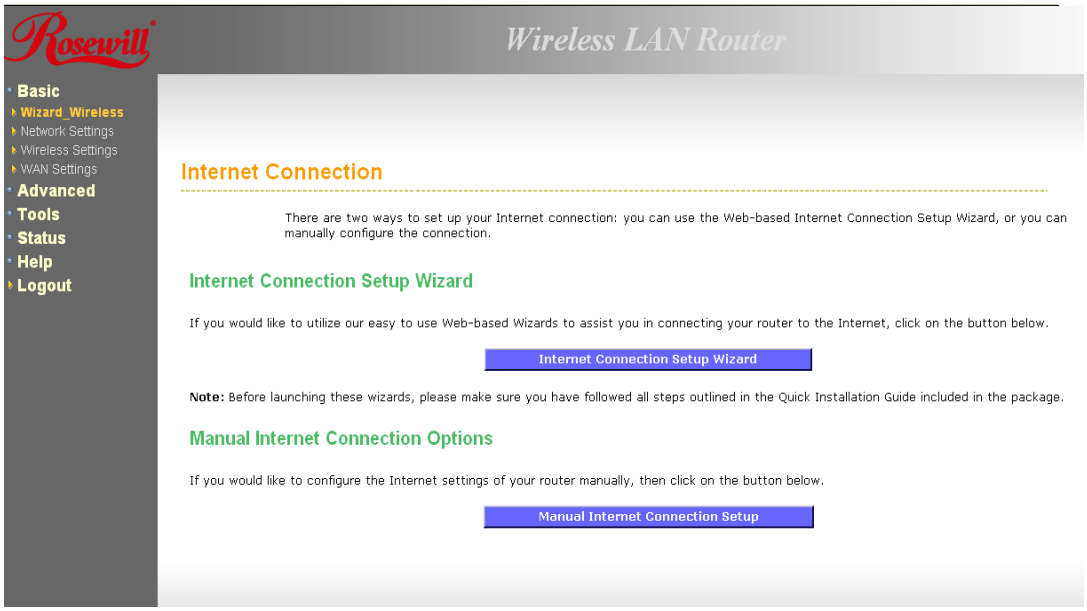
4.1 LOGGING IN

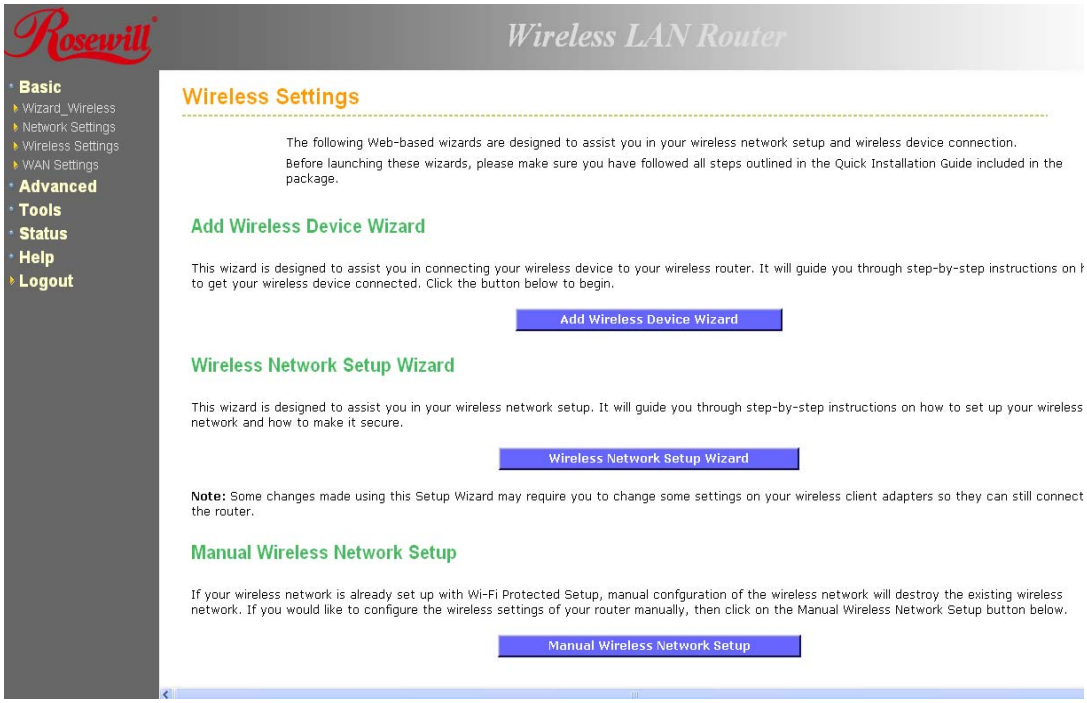
- To configure the device through the web-browser, enter the IP address of the device (default: **192.168.1.2**) into the address bar of the web-browser and press **Enter.**
- Make sure that the device and your computers are configured on the same subnet. Refer to **Chapter 2** in order to configure the IP address of your computer.
- After connecting to the IP address, the web-browser will display the login page. Select **Admin** from the drop-down list and then leave the password field blank. Click on the **Log In** button to continue.



4.2 ADD A WIRELESS DEVICE

- Click on the **Wizard_Wireless** link under the **Basic** menu, and then click on the **Add Wireless Device Wizard** button.





- The wireless wizard will inform you that there are two major steps in the process.
  1. Select the configuration method for your wireless network
  2. Connect your wireless device

- Click on the **Next** button to continue.
- You may select from three available options:
  1. **PIN**: Select this radio button if your wireless device supports PIN
  2. **Push Button**: Select this radio button if your wireless device supports push button.
  3. **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.

4.2.1 Using the PIN

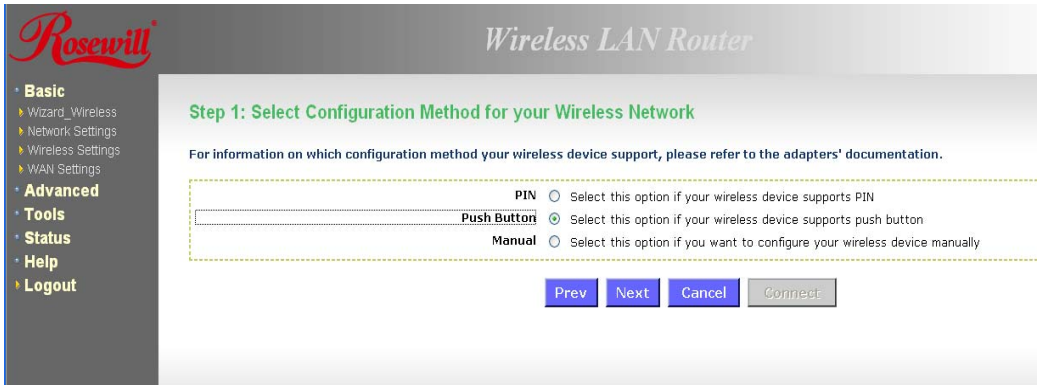
- A PIN is a unique number that can be used to add the router to an existing network or to create a new network. The default PIN may be printed on the bottom of the router. For extra security, a new PIN can be generated. You can restore the default PIN at any time. Only the Administrator ("admin" account)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

4.2.2 Using the Push Button

- WPS is used for WiFi Protected Setup. By pressing the WPS button on the front 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 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.



- 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.

5. WIRELESS NETWORK SETUP WIZARD

This wizard will guide you in the configuration of the wireless network settings such as the SSID and security (WEP/WPA).

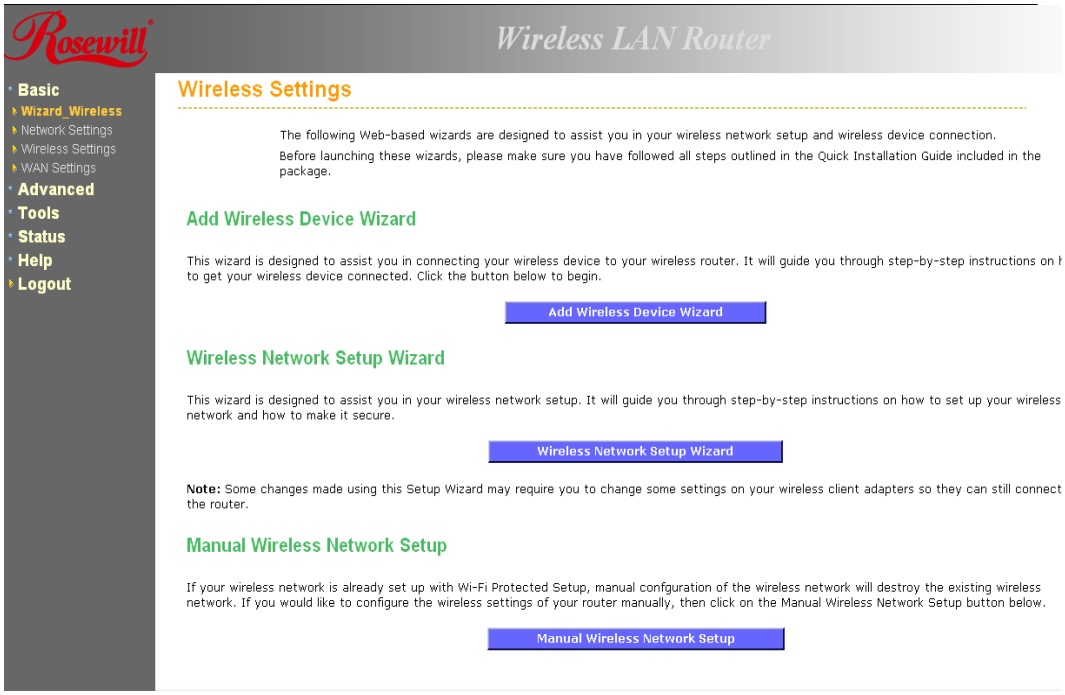
.Please refer to Chapter 6 in order to configure the more advanced features of the device

5.1 LOGGING IN

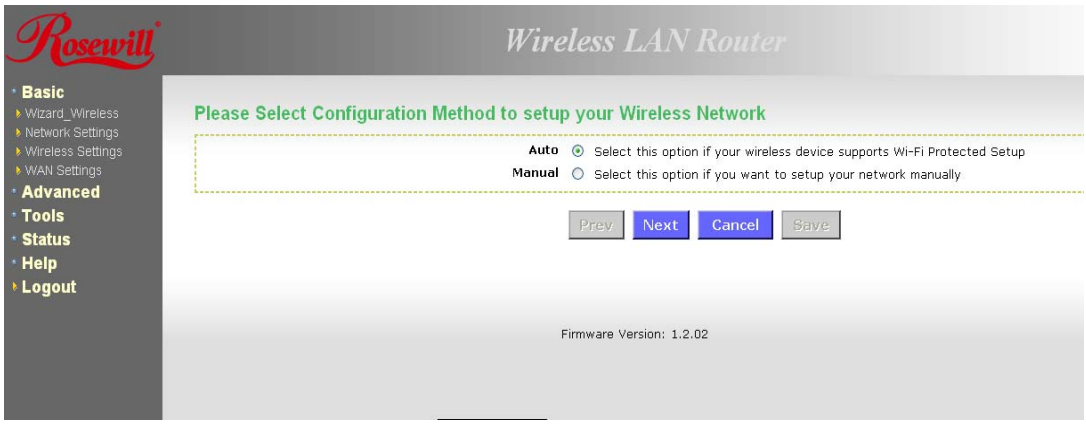
- To configure the device through the web-browser, enter the IP address of the device (default: **192.168.1.2**) into the address bar of the web-browser and press **Enter**.
- Make sure that the device and your computers are configured on the same subnet. Refer to **Chapter 2** in order to configure the IP address of your computer.
- After connecting to the IP address, the web-browser will display the login page. Select **Admin** from the drop-down list and then leave the password field blank. Click on the **Log In** button to continue.

5.2 WIRELESS NETWORK SETUP

- Click on the **Wizard_Wireless** link under the **Basic** menu, and then click on the **Wireless Network Setup Wizard** button.



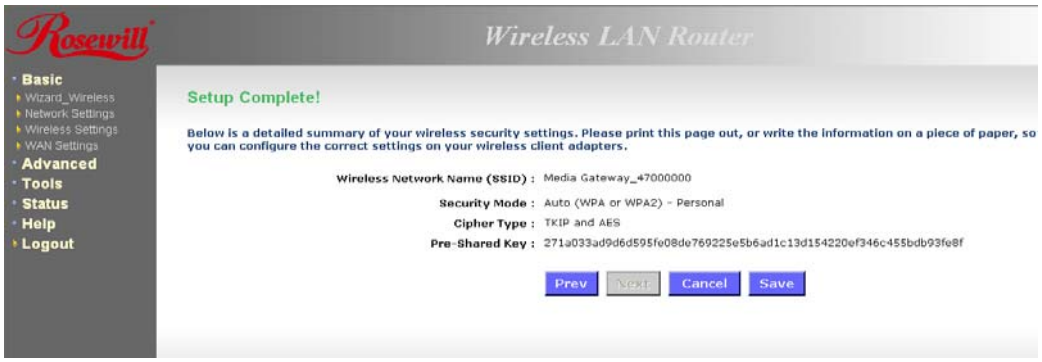
- The wizard will inform you that there are two options: auto and manual.



5.2.1 Automatic Network Setup

- If you select the Auto option, then the device will automatically configure the SSID and security mode.

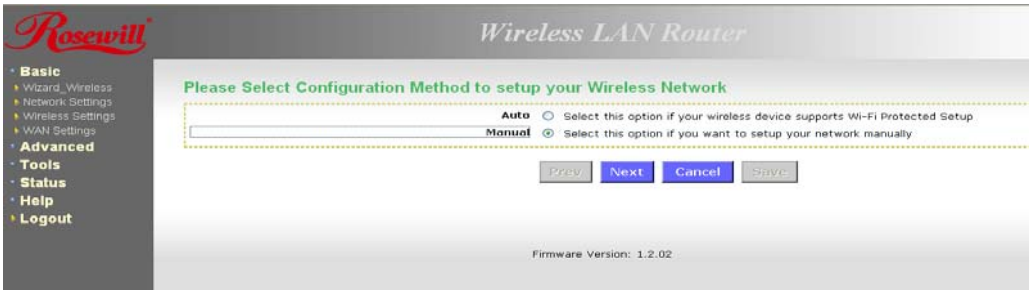
- Click on the **Next** button to continue.



- The wizard has automatically configured the SSID and security mode for the device. Click on the **Save** button to complete the setup.

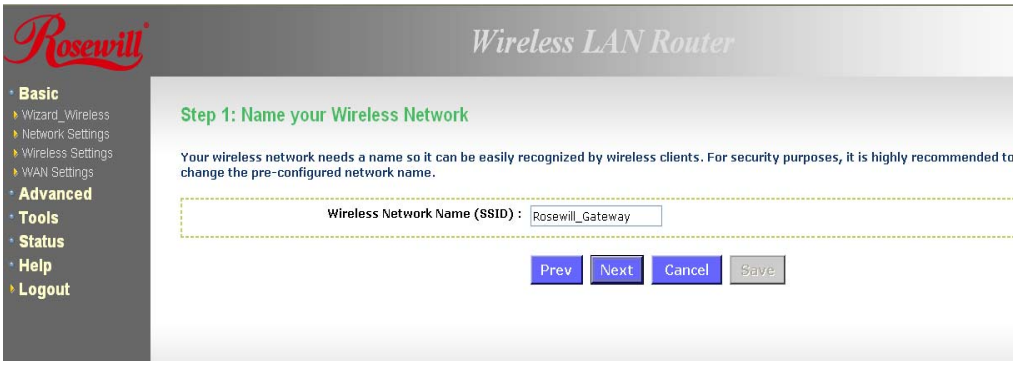
5.2.2 Manual Network Setup

- If you select the **Manual** option, then you will be required to specify the SSID and select the appropriate network security.



- Click on the **Next** button to continue.
- The wireless wizard will inform you that there are three major steps in the process.
  1. Name your wireless network
  2. Secure your wireless network
  3. Set your wireless security password

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

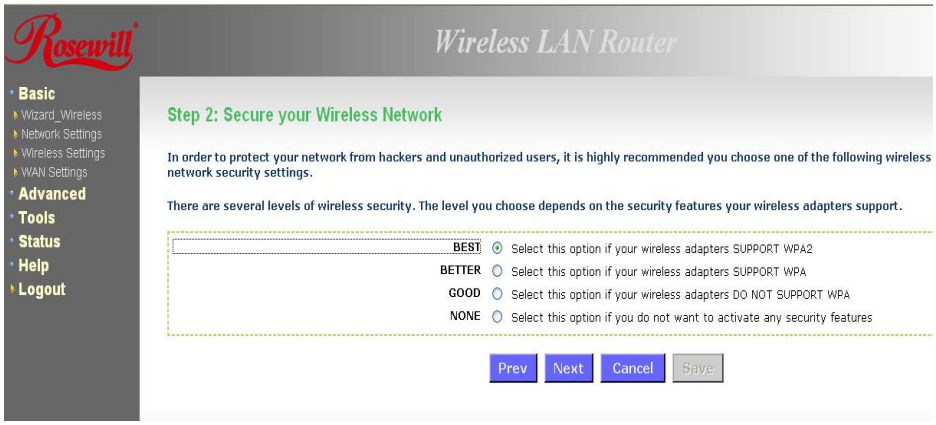


- Specify the Wireless Network Name (SSID) for the device. The SSID is a unique named shared amongst all the points of the wireless network. The SSID must be identical on all points of the wireless network and cannot exceed 32 characters. Click on the **Next** button to continue.

- This step requires that you configure the security features based on your needs. The following options are available.
  1. **BEST** – Select this option if your wireless adapters support WPA2
  2. **BETTER** – Select this option if your wireless adapters support WPA
  3. **GOOD** – Select this option if your wireless adapters do not support WPA, but support WEP instead
  4. **None**: Select this option if you do not want to activate any security features.

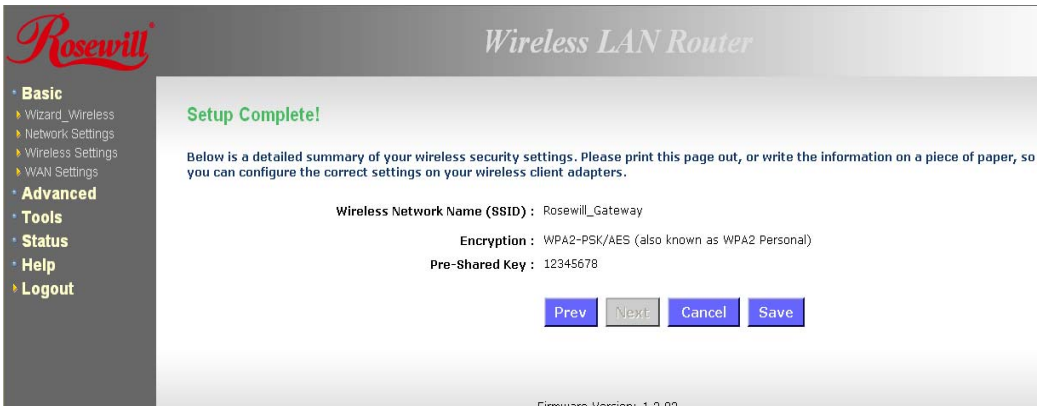
- In order to protect your network from hackers and unauthorized users, it is highly recommended to secure the network using encryption and authentication. Select a level of security and then click on the **Next** button to continue.
- If you do not want to setup security, then select the **NONE** radio button.

5.2.2.1 WIRELESS SECURITY LEVEL: BEST (WPA2)



- Select the **BEST** radio button which supports WPA2 encryption. Then click on the **Next** button.

- Enter a security password between 2 and 20 characters then click on the **Next** button.

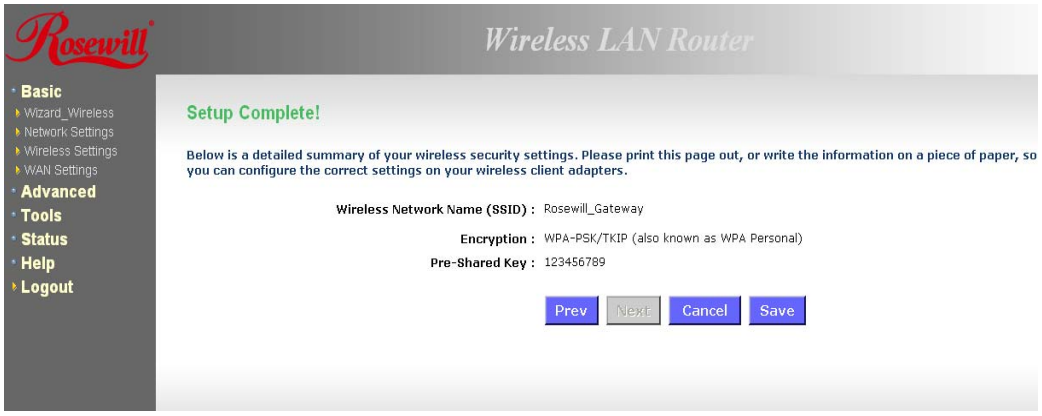


- The setup is complete. Click on the **Save** button and then reboot the device.

5.2.2.2 WIRELESS SECURITY LEVEL: BETTER (WPA)

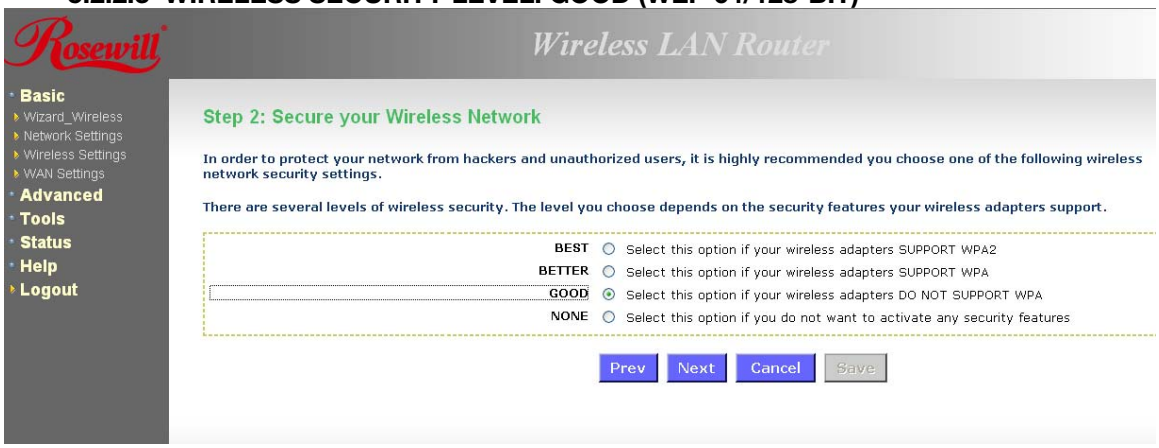
- Select the **BETTER** radio button which supports WPA encryption. Then click on the **Next** button.

- Enter a security password between 2 and 20 characters then click on the **Next** button.



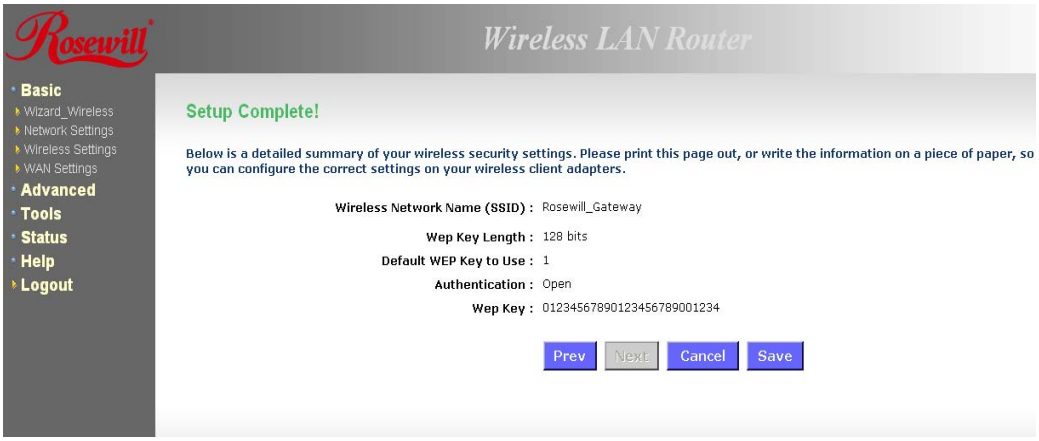
- The setup is complete. Click on the **Save** button and then reboot the device.

5.2.2.3 WIRELESS SECURITY LEVEL: GOOD (WEP 64/128-BIT)



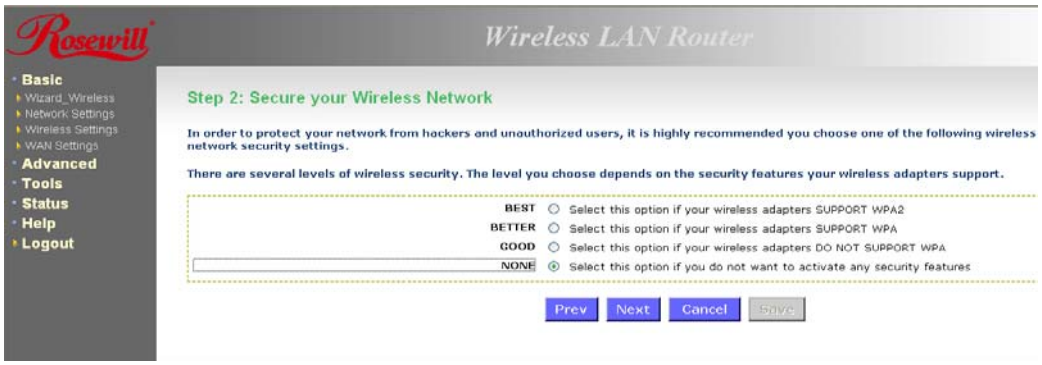
- Select the **GOOD** radio button which supports WEP encryption. Then click on the **Next** button.

- Enter a security password between 2 and 20 characters then click on the **Next** button.

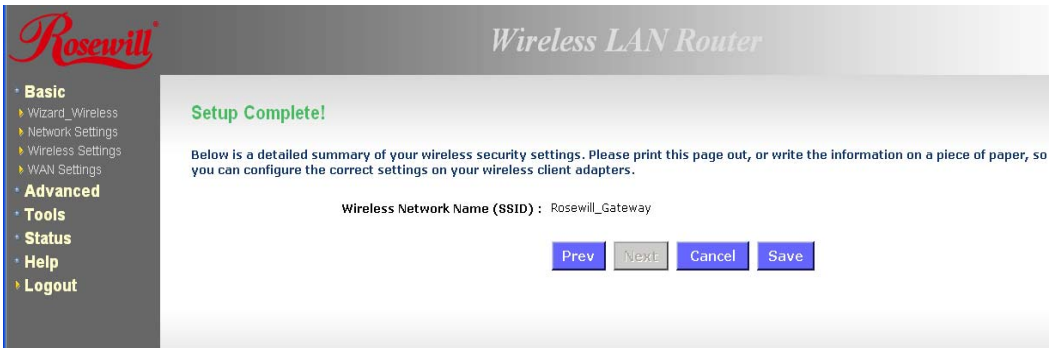


- The setup is complete. Click on the **Save** button and then reboot the device.

5.2.2.4 WIRELESS SECURITY LEVEL: NONE (SECURITY DISABLED)



- Select the **NONE** radio button if you do not want to activate any security features. Then click on the **Next** button.



- The setup is complete. Click on the **Save** button and then reboot the device.

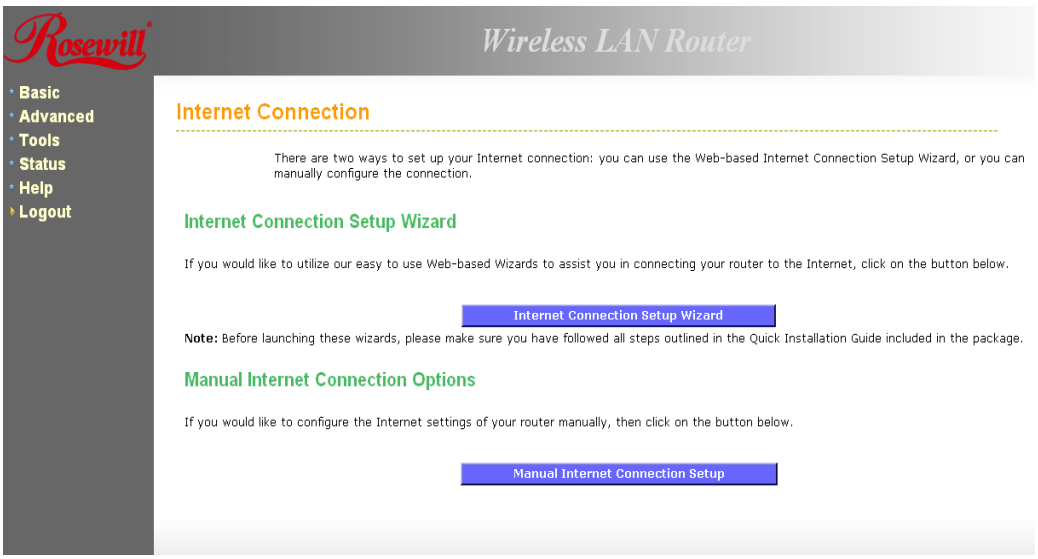
6. ADVANCED WEB CONFIGURATION

6.1 LOGGING IN

- To configure the device through the web-browser, enter the IP address of the Bridge (default: **192.168.1.2**) into the address bar of the web-browser and press **Enter**.
- Make sure that the device and your computers are configured on the same subnet. Refer to **Chapter 2** in order to configure the IP address of your computer.
- After connecting to the IP address, the web-browser will display the login page. Select **Admin** from the drop-down list and then leave the password field blank.

After logging in you will graphical user interface (GUI) of the device. The navigation drop-down menu on left is divided into six main sections:
Basic: This menu includes the wireless wizard, network settings, wireless settings, and WAN settings.

- **Advanced:** This menu includes virtual server, special applications, port forwarding, routing, access control, web filter, MAC address filter, firewall, etc.
- **Tools:** This menu includes time, firmware, system log, DDNS, schedules, etc.
- **Status**: This menu displays the wireless status, logs, statistics, routing, and internet sessions.
- **Help**: Displays the help for configuring the device.
- **Logout:** Used to logout of the device.



6.2 BASIC

Click on the **Basic** link on the navigation drop-down menu. You will then see four options: Wizard_Wireless, Network Settings, Wireless Settings, and WAN Settings.

6.2.1 Wizard_Wireless

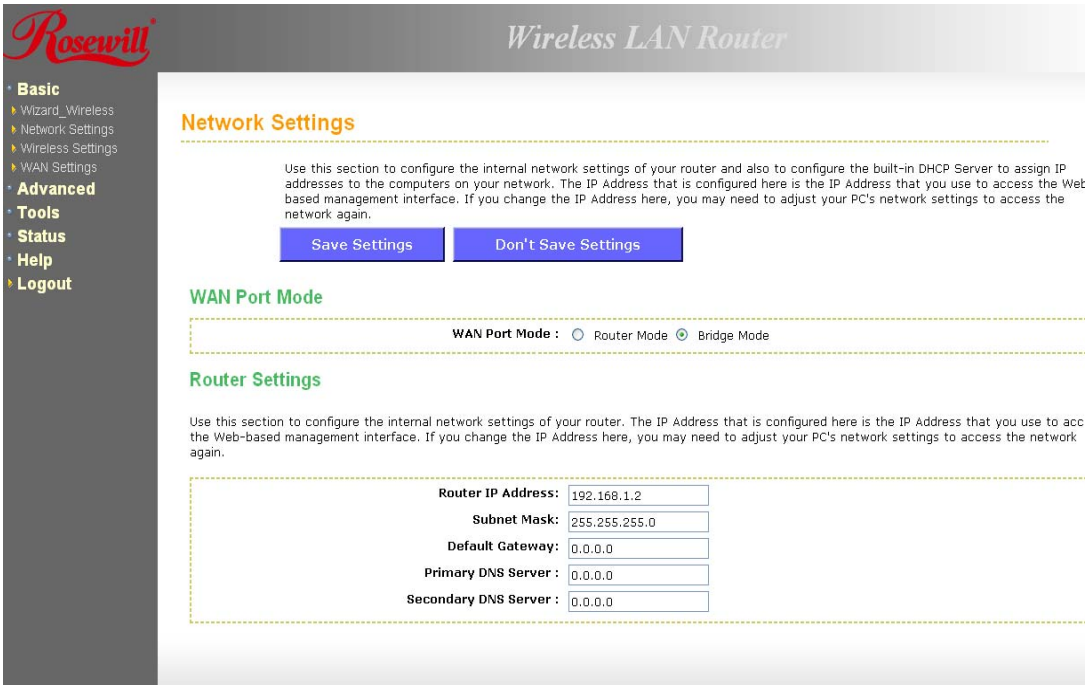
- Refer to Chapters 4 and 5 in order to use the wireless wizard. The other options are described below.

6.2.2 Network Settings

- This device can be configured at 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.

6.2.2.1 BRIDGE MODE

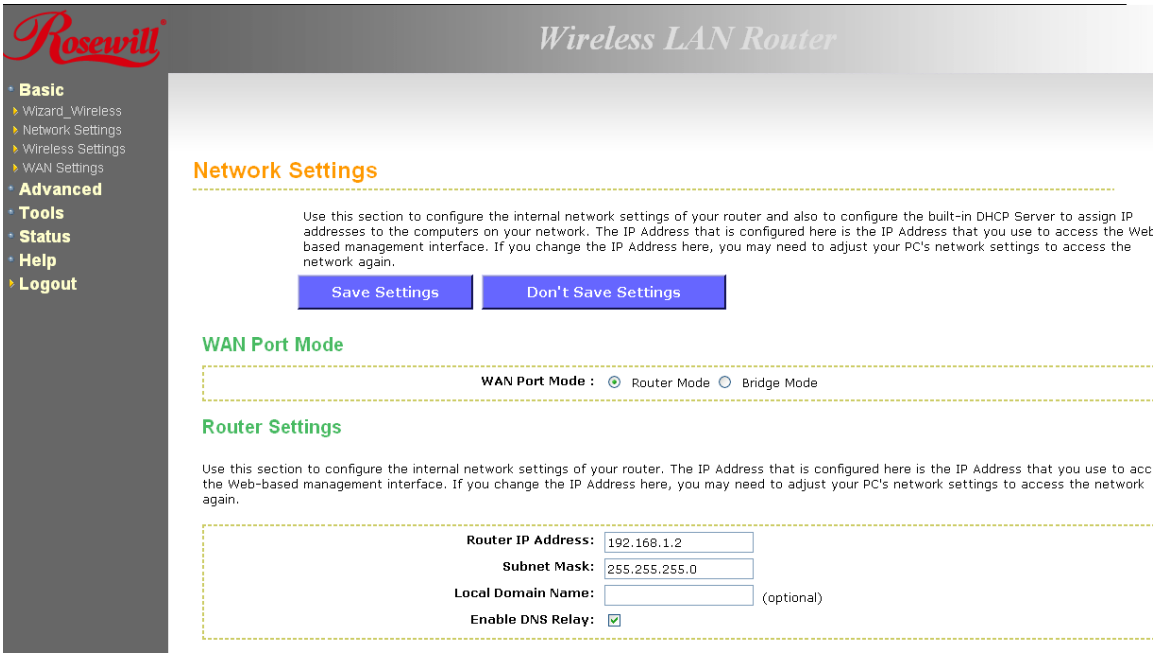
- In this mode, the device functions as a bridge between the network on its WAN port and the devices on its LAN port and those connected to it wirelessly. Select the **Bridge Mode** radio button.



- **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 **Save Changes** button to store these settings.

6.2.2.2 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 chris, that laptop will be known as chris.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 **Save Changes** button to store these settings.

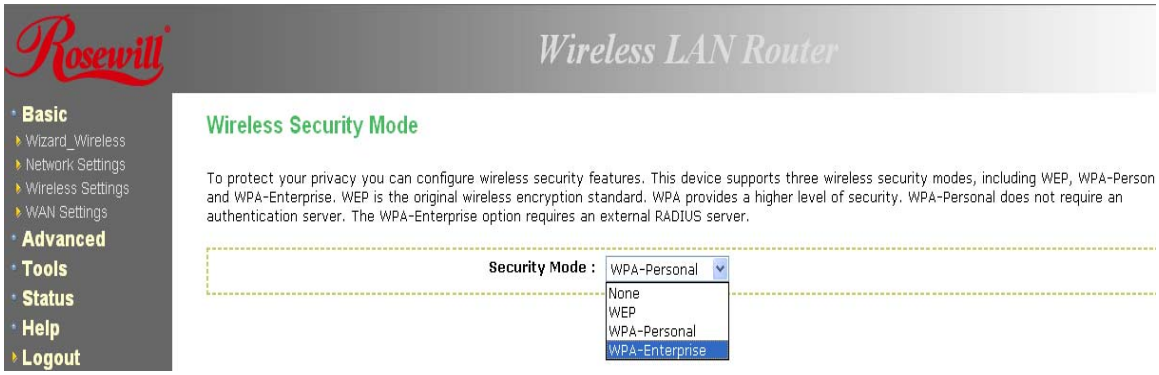
6.2.3 Wireless Settings

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

- **Enable Wireless**: Place a check in this box to enable the wireless interface, it is enabled by default.
- **Wireless Network Name**: 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.
- **Show Active Clients**: Click on this button to view a list of clients that are associated with this device.
- Click on the S**ave Changes** button to store these settings.

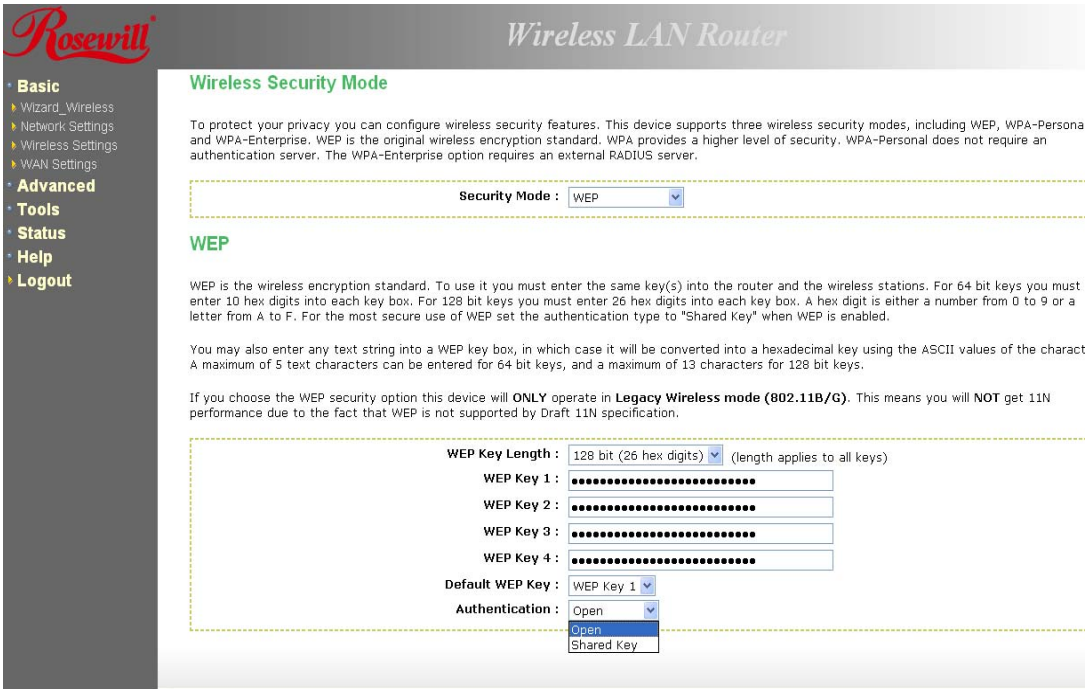
6.2.3.1 WIRELESS SECURITY MODE

- To protect your privacy this mode 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.



6.2.3.1.1 WEP (WIRED EQUIVALENT PRIVACY)

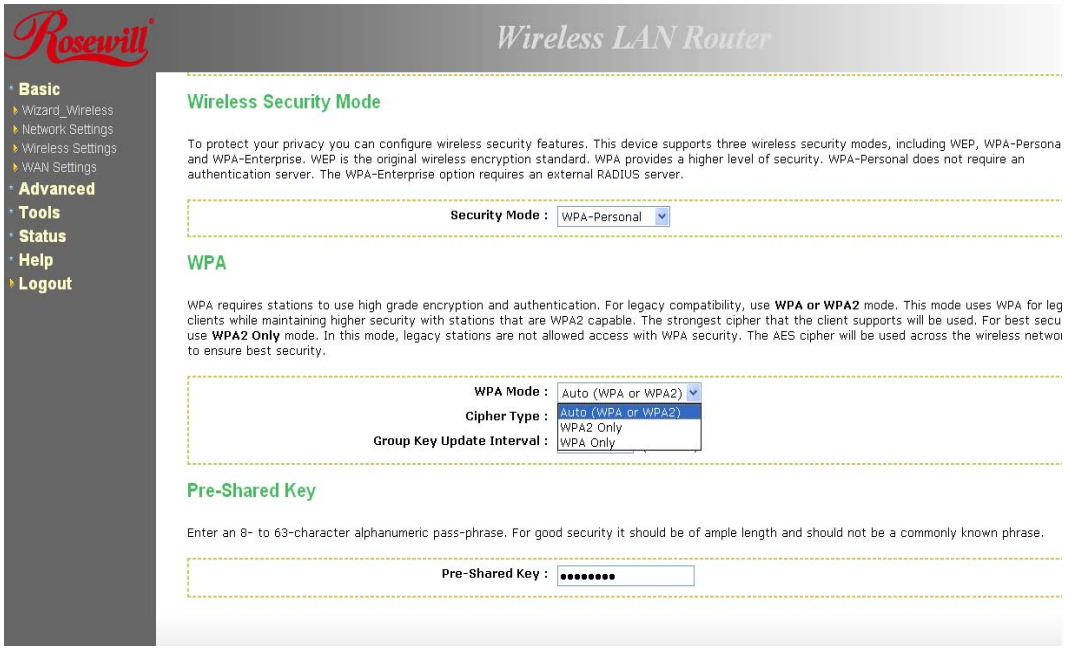
- Select the **WEP** radio button if your wireless network uses WEP encryption. WEP is an acronym for Wired Equivalent Privacy, and is a security protocol that provides the same level of security for wireless networks as for a wired network.
- WEP is not as secure as WPA encryption. To gain access to 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 **Save Changes** button to store these settings.

6.2.3.1.2 WPA PERSONAL (WI-FI PROTECTED ACCESS)

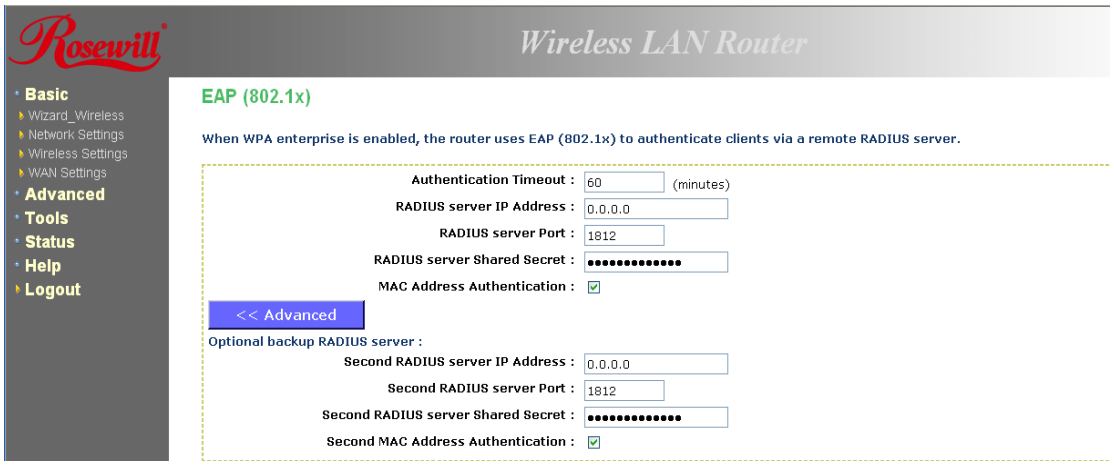
- Select the **WPA-Personal** radio button if your wireless network uses WPA encryption. WPA (Wi-Fi Protected Access) was designed to improve upon the security features of WEP (Wired Equivalent Privacy). The technology is designed to work with existing Wi-Fi products that have been enabled with WEP. 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 **Save Changes** button to store these settings.

6.2.3.1.3 WPA ENTERPRISE (WI-FI PROTECTED ACCESS & 802.1X)

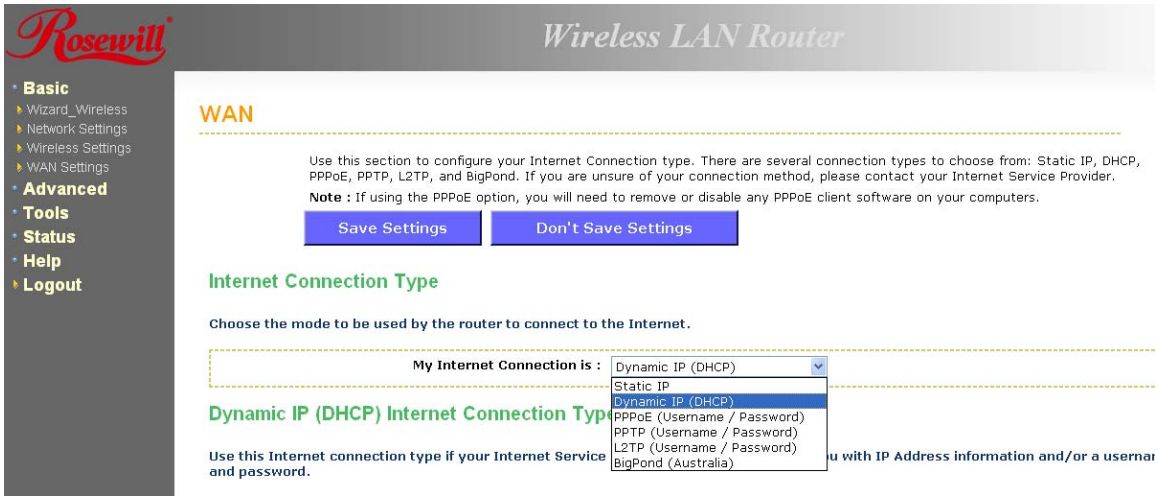
- Select the **WPA-Enterprise** radio button if your wireless network uses WPA encryption. WPA (Wi-Fi Protected Access) was designed to improve upon the security features of WEP (Wired Equivalent Privacy). The technology is designed to work with existing Wi-Fi products that have been enabled with WEP. 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 **Save Changes** button to store these settings.

6.2.4 WAN Settings

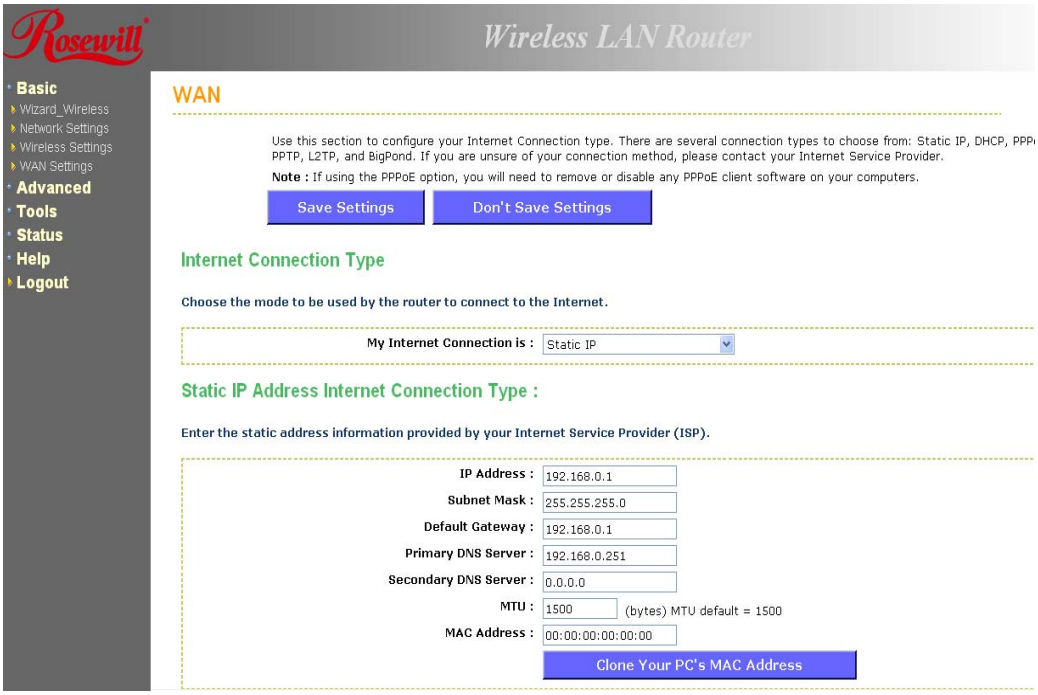
- The device offers several types of WAN connections in order to connect to the Internet.
- Static IP Address
- Dynamic IP Address
- PPPoE
- PPTP
- L2TP
- BigPond



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

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



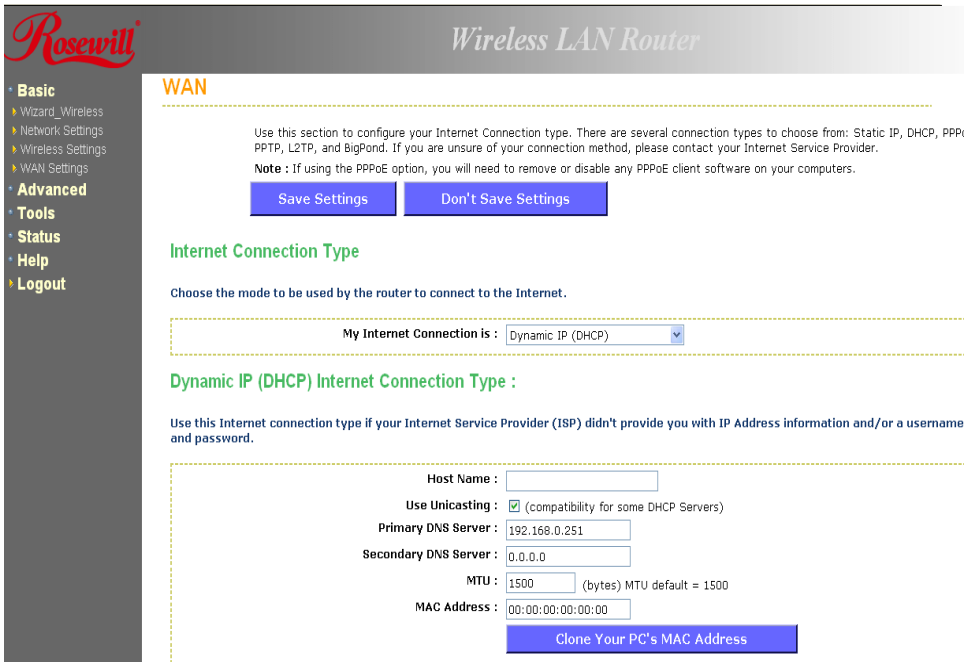
- **IP Address**: Specify the IP address for this device, which is assigned by your ISP.
- **Subnet Mask**: Specify the subnet mask for this IP address, which is assigned by your ISP.
- **Default Gateway**: Specify the IP address of the default gateway, which is assigned by

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 rounter'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 **Save Settings** button to store these settings.

6.2.4.2 DHCP CONNECTION (DYNAMIC IP ADDRESS)

- 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.

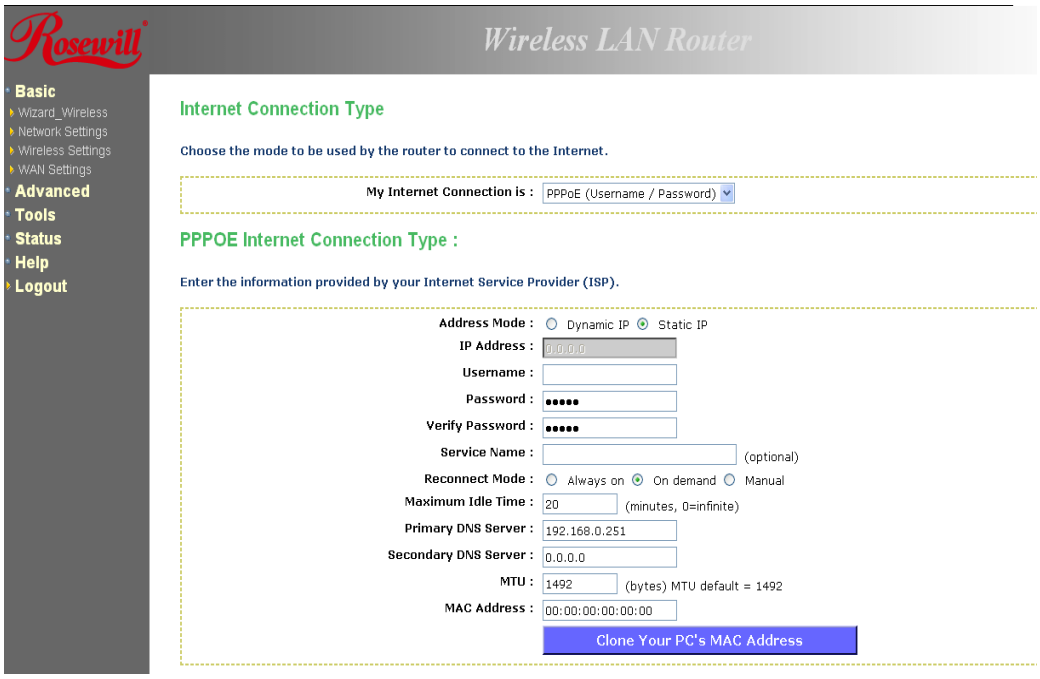


- **Host Name**: Specify a host name to define your system or connetion.
- **Use Unicasting:** This option is normally turned off, and should remain off as long as the WAN-side DHCP server correctly provides an IP address to the router. However, if the router cannot obtain an IP address from the DHCP 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 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 rounter'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 **Save Settings** button to store these settings.

6.2.4.3 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.

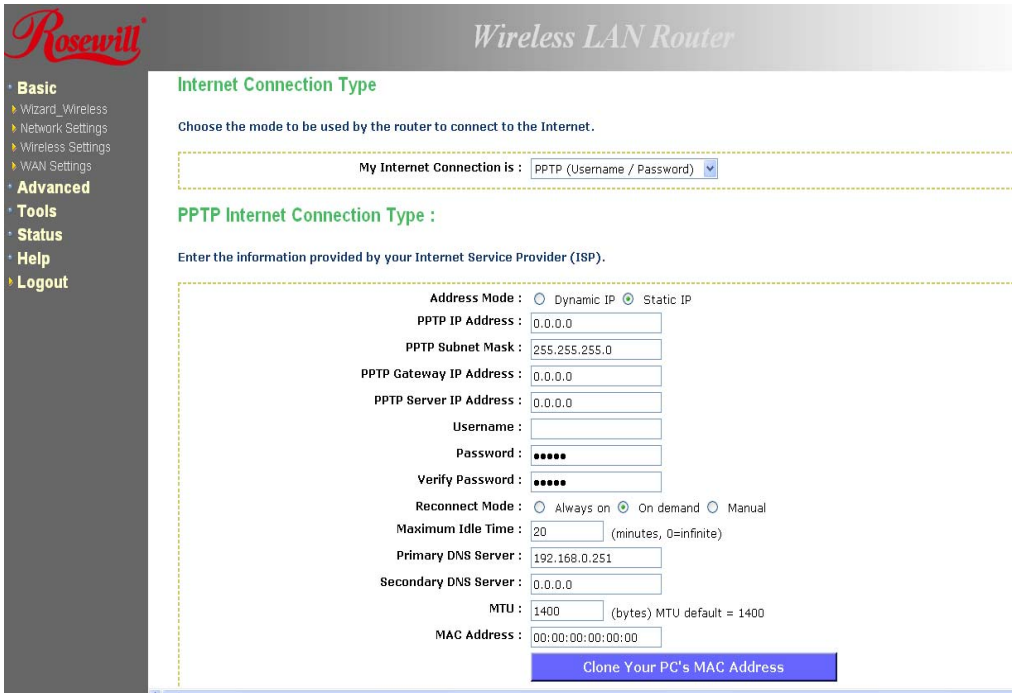


- **Address Mode**: PPPoE can be used with a dynamic or static IP address. If you select the **Dynamic IP** radio button, then the IIP address in the next field is not required. However, if you select the **Static IP** radio button, then the IP address in the next field is required.
- **User Name**: 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:**
- **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 rounter'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 **Save Settings** button to store these settings.

6.2.4.4 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.



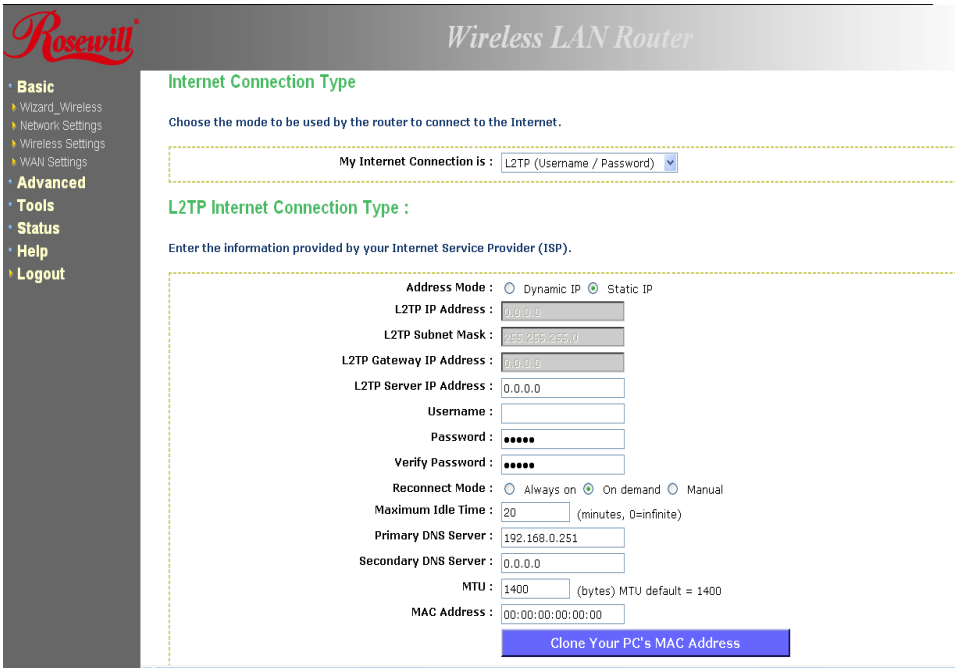
- **Address Mode:** PPTP can be used with a dynamic or static IP address. If you select the **Dynamic IP** radio button, then the IIP address in the next field is not required.

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**: Time interval the machine can be idle before the PPTP connection is disconnected. The Maximum Idle Time value is only used for the "On demand" and "Manual" reconnect modes.
- **Primary / Secondary DNS Address**s: 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 rounter'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 **Save Settings** button to store these settings.

6.2.4.2 L2TP (LAYER 2 TUNNELING PROTOCOL)

- The WAN interface can be configured as L2TP. L2TP (Layer Two Tunneling Protocol) uses a virtual private network to connect to your ISP. This method of connection requires you to enter a user name and password (provided by your Internet Service Provider) to gain access to the Internet. The supported authentication protocols are PAP and CHAP.
- Select the **L2TP** from the **My Internet Connection** drop-down list.



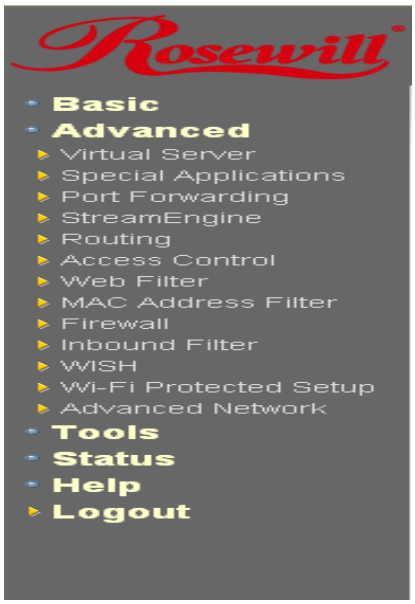
- **Address Mode:** L2TP can be used with a dynamic or static IP address. If you select the **Dynamic IP** radio button, then the IIP address in the next field is not required. However, if you select the **Static IP** radio button, then the IP address in the next field is required.
- **L2TP Address**: Specify the IP address
- **L2TP Subnet Mask**: Specify the subnet mask for the IP address.
- **L2TP Gateway IP Address**: Specify the IP address of the L2TP gateway.
- **L2TP Server IP Address**: If the L2TP 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**: Time interval the machine can be idle before the PPTP connection is disconnected. The Maximum Idle Time value is only used for the "On demand" and "Manual" reconnect modes.
- **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 rounter'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 **Save Settings** button to store these settings.

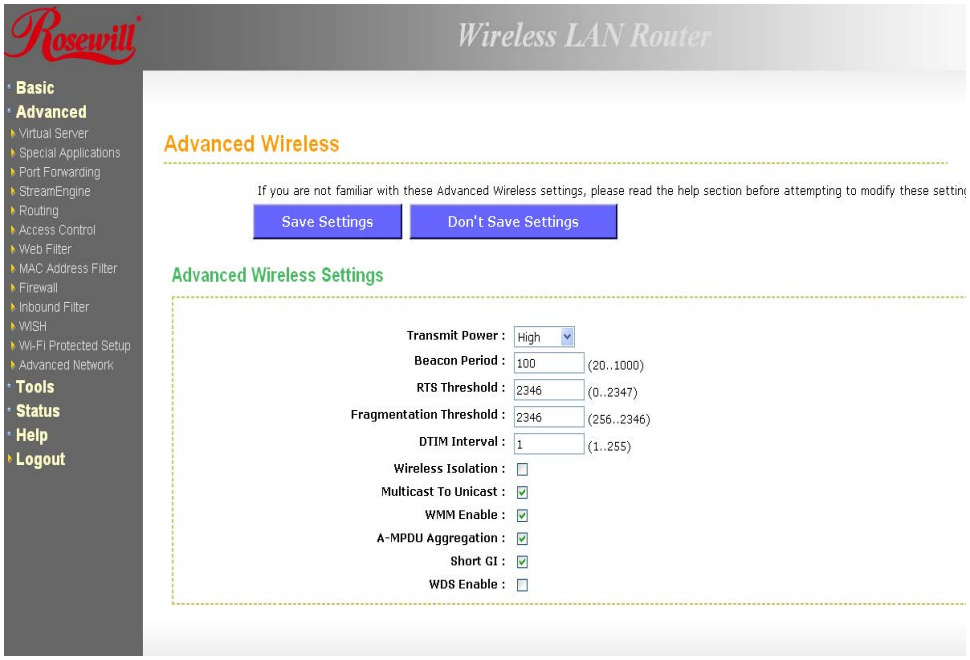
6.3 ADVANCED

- Click on the **Advanced** link on the navigation drop-down menu. You will then see thirteen options: Virtual Server, Special Applications, Port Forwarding, StreamEngine, Routing, Access Control, Web Filter, MAC Address Filter, Firewall, Inbound Filter, WISH, Wi-Fi Protected Setup and Advanced Network. The configuration steps for each option are described below.



6.3.1 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 **Save Settings** button to store these changes.

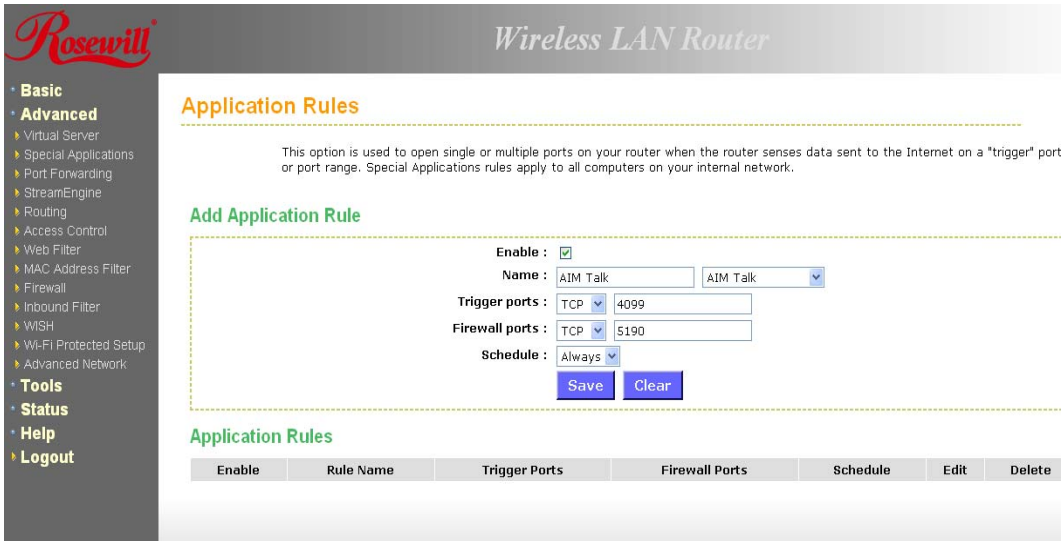
6.3.2 Virtual Server

- 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.

6.3.3 Special Applications

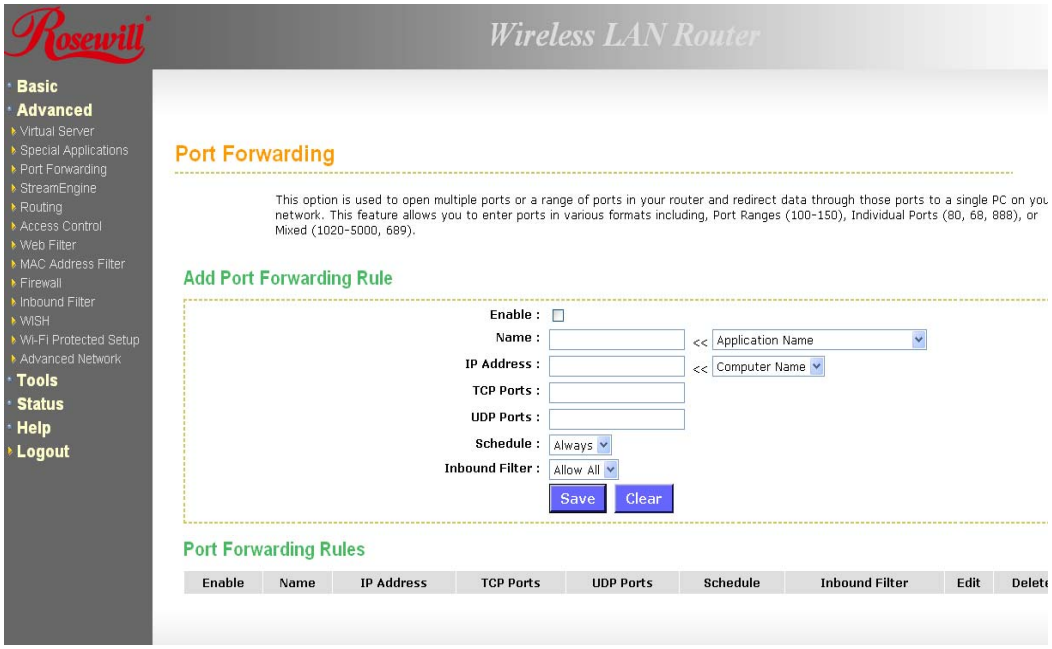
- An application rule is used to open single or multiple ports on your router when the router senses data sent to the Internet on a trigger port or port range. An application rule applies to all computers on your internal network.



- **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 prot 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.

6.3.4 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.

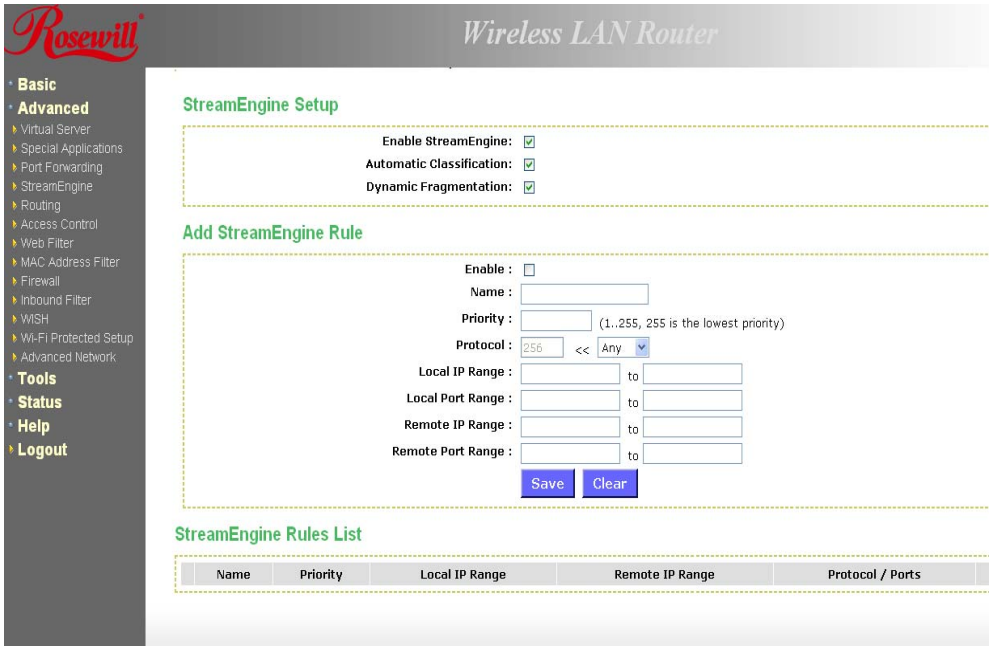


- **Enable:** Place a check in this box to enable the port forwarding rule.
- **Name**: Assign a meaningful name to the virtual server, for example Web Server. Several well-known types of virtual server are available from the **Application Name** drop-down list. Selecting one of these entries fills some 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.

6.3.5 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 options 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 **Save Settings** button to store these settings.



- **Enable StreamEngine**: Place a check in this box to enable this option. Enable this option for better performance and experience with online games and other interactive applications, such as VoIP.
- **Automatic Classification**: Place a check in this box to enable this option. This option is enabled by default so that your router will automatically determine which programs should have network priority.
- **Dynamic Fragmentation**: Place a check in this box to enable this option. This option should be enabled when you have a slow Internet uplink. It helps to reduce the impact that large low priority network packets can have on more urgent ones by breaking the large packets into several smaller packets.
- **Add StreamEngine Rule**: A StreamEngine Rule identifies a specific message flow and assigns a priority to that flow. For most applications, automatic classification will be adequate, and specific StreamEngine Rules will not be required. StreamEngine supports overlaps between rules, where more than one rule can match for a specific message flow. If more than one rule is found to match the rule with the highest priority will be used.
- **Enable**: Place a check in this box to enable the StreamEngine rule.
- **Name**: Specify a name for the rule.
- **Priority**: Specify a priority for the rule. 0 being the highest and 255 the lowest priority.
- **Protocol**: Specify a protocol or select one from the drop-down list.
- **Local IP Range**: Specify the local (LAN) IP address range.
- **Local Port Range**: Specify the local (LAN) port range.
- **Remote IP Range**: Specify the remote (WAN) IP address range.
- **Remote Port Range**: Specify the remote (WAN) port range.
- Click on the **Save button** to insert the entry into the StreamEngine list.

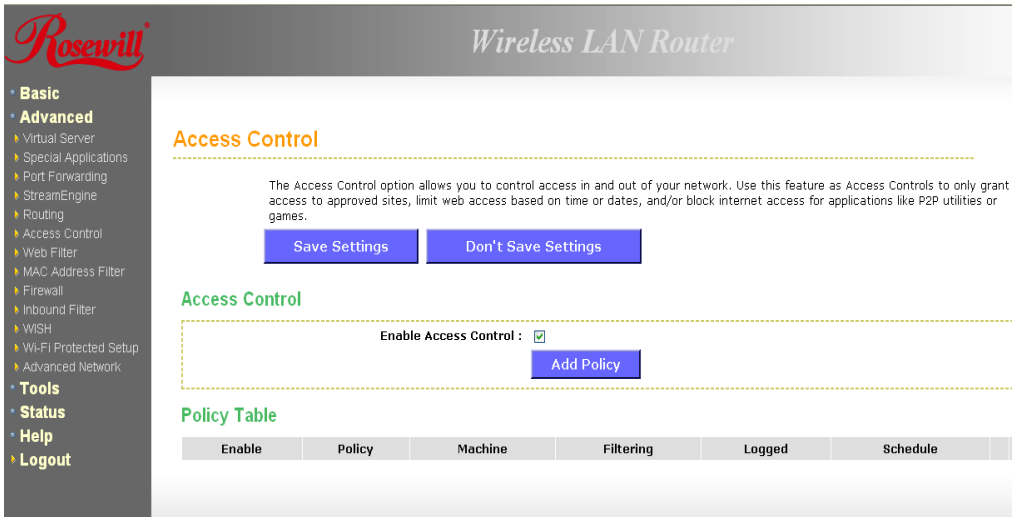
6.3.6 Routing

- This section adds a new entry into the routing table.

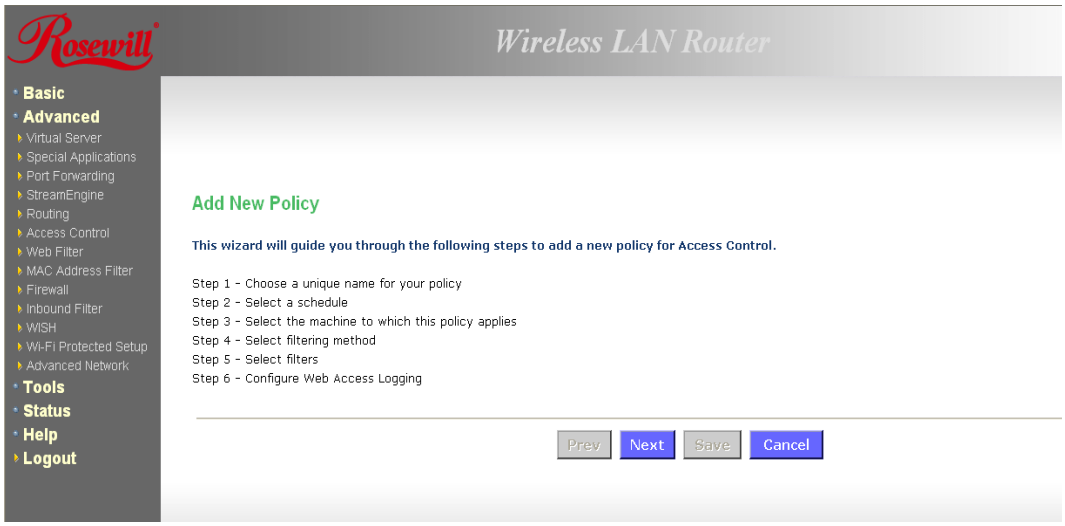
- **Enable**: Place a check in this box to enable the routing table entry.
- **Name**: Specify a name for the rule.
- **Destination IP**: Specify the destination IP address.
- **Netmask:** Specify the subnet mask for the IP address.
- **Gateway**: Specify the IP address of the gateway.
- **Metric**: 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.

6.3.7 Access Control

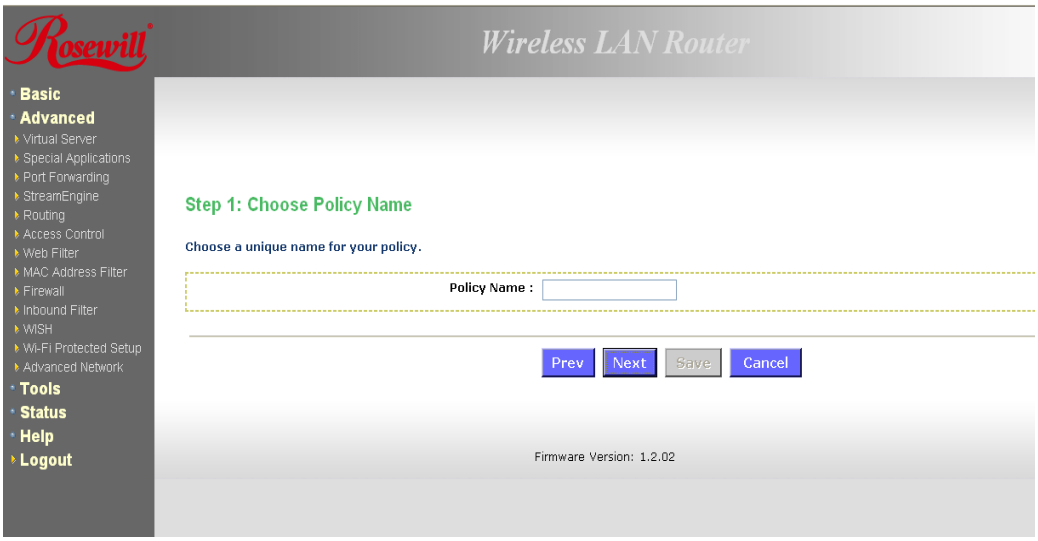
- The Access Control section allows you to control access in and out of devices on your network. Use this feature as Parental Controls to only grant access to approved sites, limit web access based on time or dates, and/or block access from applications such as peer-to-peer utilities or games.
- When 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.



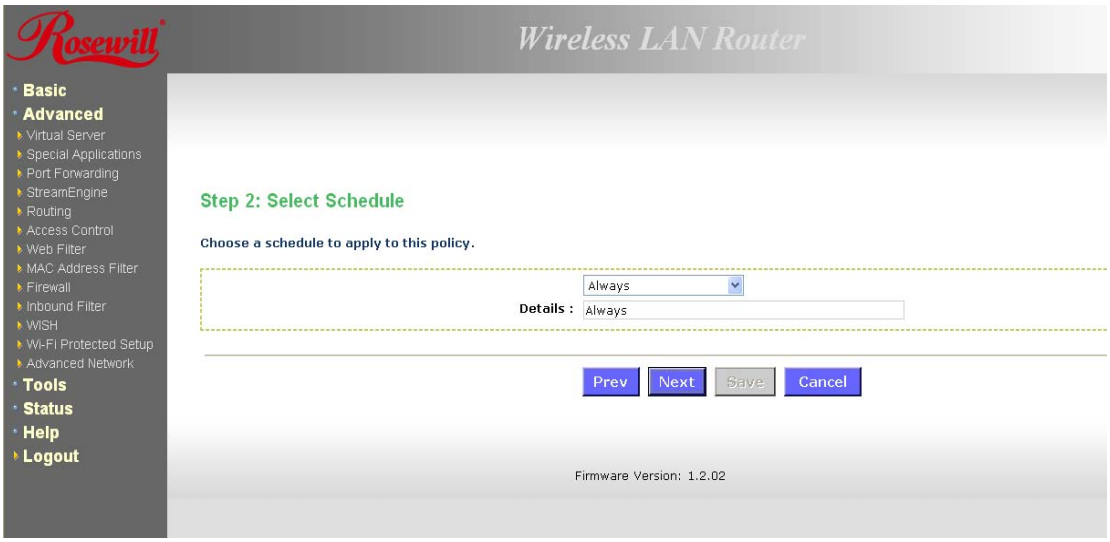
- Place a check in the **Enable Access** Control check box and then click on the **Add Policy** button. This will bring up the Add New Policy wizard.
- The wireless wizard will inform you that there are six major steps in the process.
  1. Choose a unique name for your policy
  2. Select a schedule
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



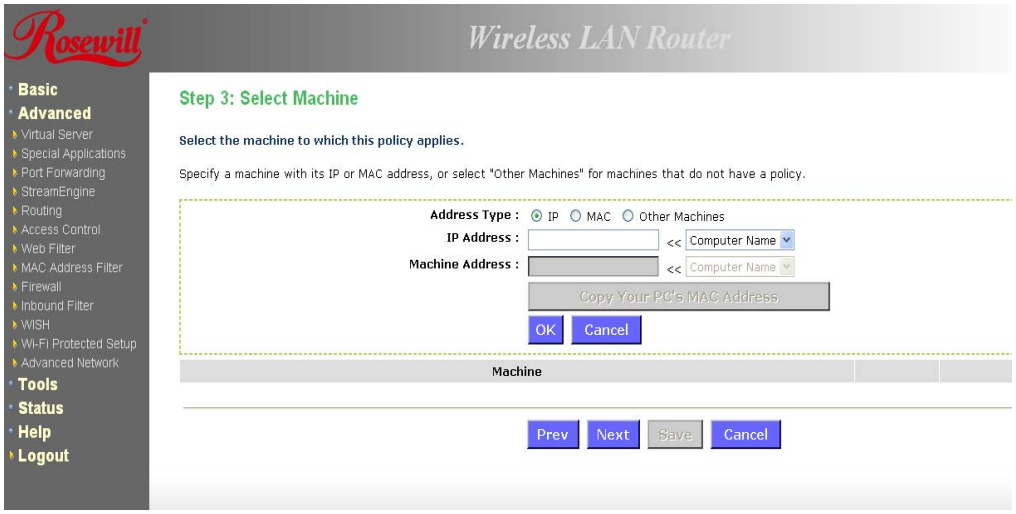
- Click on the **Next** button to continue.



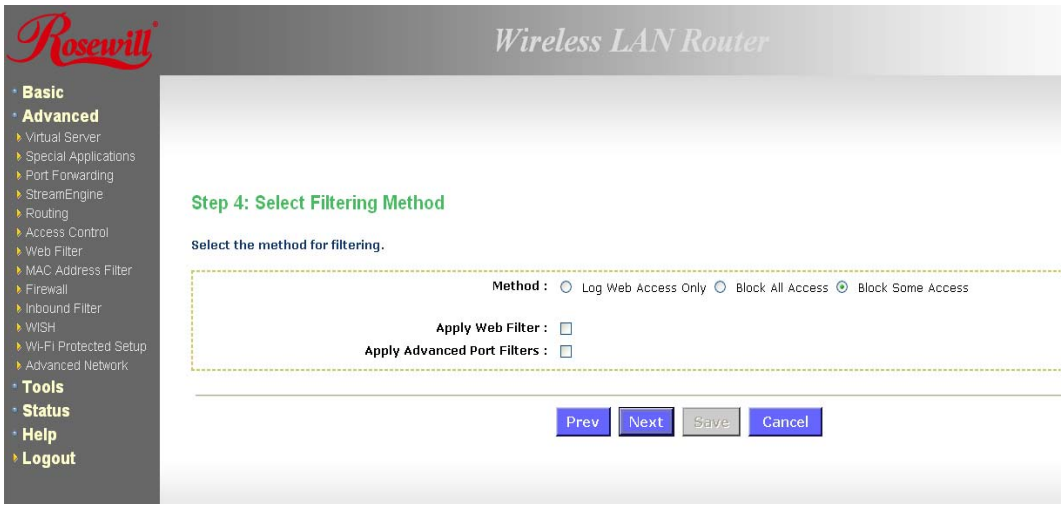
- Specify a policy name and then click on the **Next** button to continue.



- 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 rounter'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 **Save** button to store the changes.

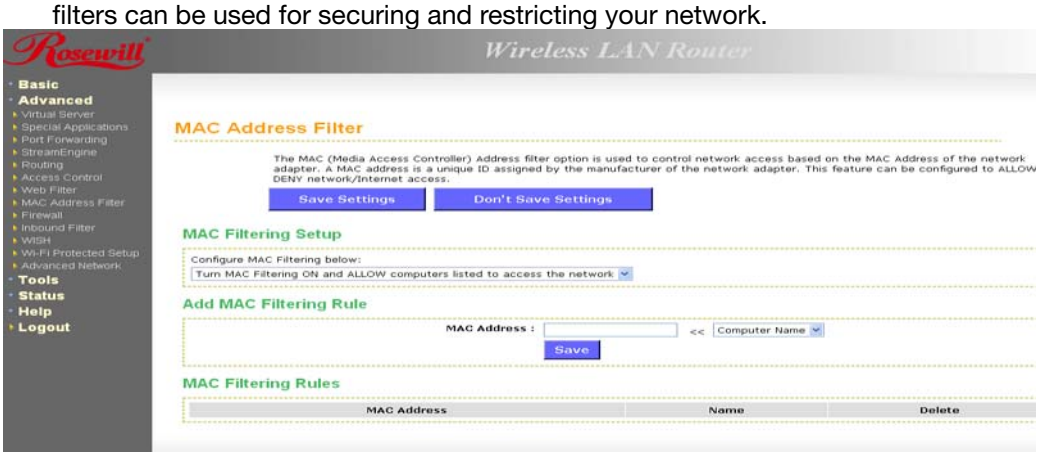
6.3.8 Web Filter

- 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.

6.3.9 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.



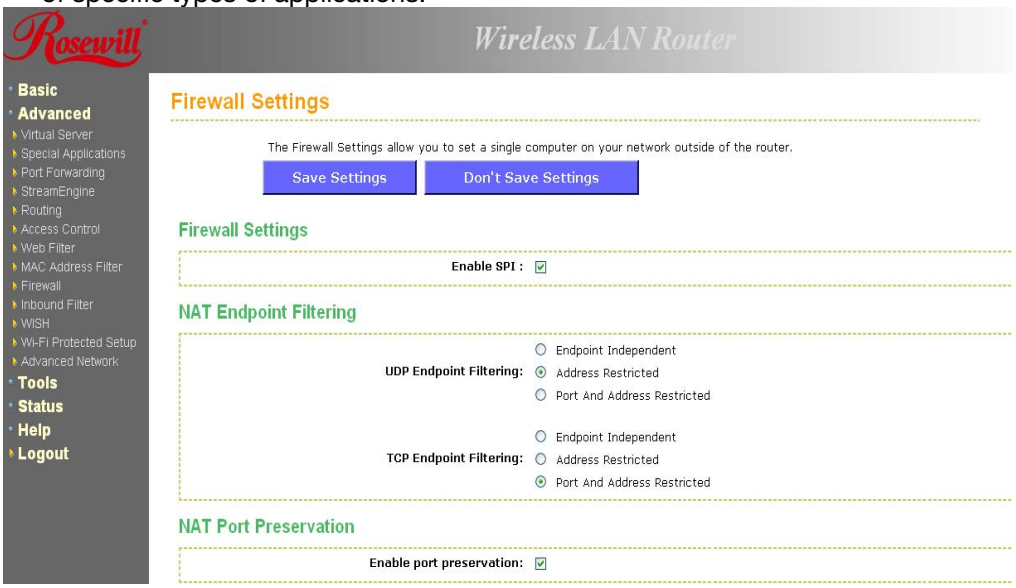
- **Configure MAC Filtering:** Select one of the options from the drop-down list.
  1. **Turn MAC Filtering OFF**: When "OFF" is selected, MAC addresses are not used to control network access.
  2. **Turn MAC Filtering ON and ALLOW computers listed to access the network:** When "ALLOW" is selected, only computers with MAC addresses listed in the

MAC Filtering Rules list are granted network access.

3. T**urn 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.
4. **MAC Address:** Specify that MAC address that you would like to filter.
5. Click on the **Save** button to store the changes.

6.3.10 Firewall

- 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.

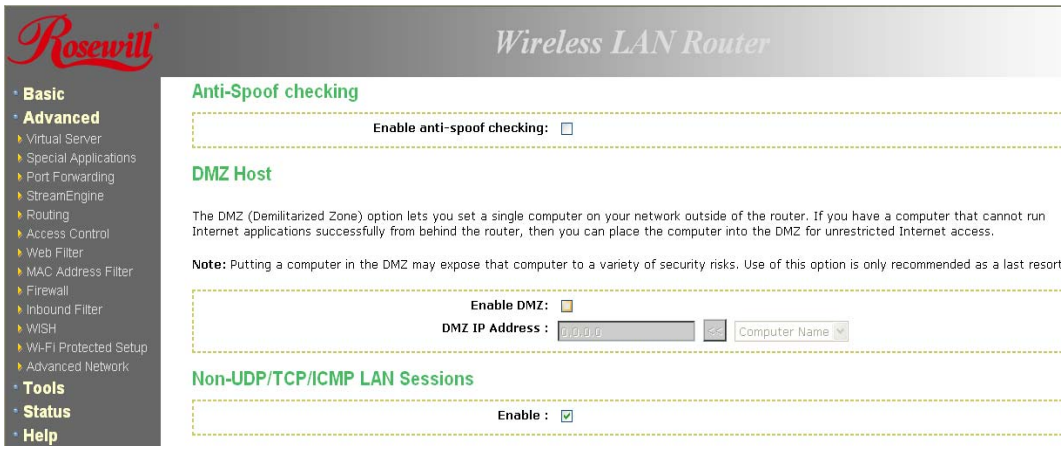


- **Enable SPI**: Place a check in this box to enable SPI. SPI ("stateful packet inspection" also known as "dynamic packet filtering") helps to prevent cyberattacks by tracking more state per session. It validates that the traffic passing through that session conforms to the protocol. When the protocol 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.
  1. **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.

2. **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.
3. **Port And Address Restricted** The NAT does not forward any incoming connection requests with the same port address as an already establish connection.

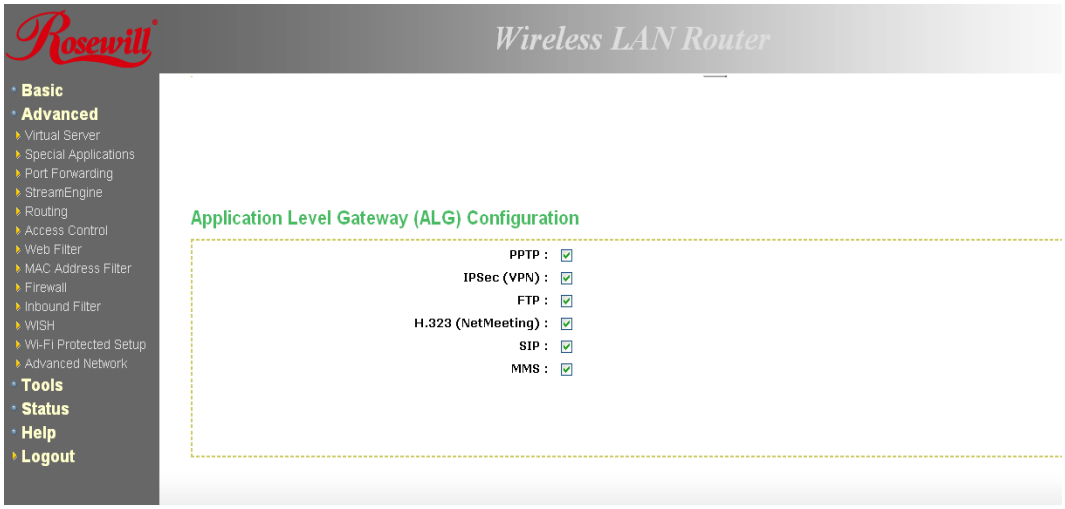
- **Note:** Some of these options can interact with other port restrictions. Endpoint Independent Filtering takes priority over inbound filters or schedules, so it is possible for an incoming session request related to an outgoing session to enter through a port in spite of an active inbound filter on 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, enble 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.
    1. **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).**
    2. **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 adminstrator of your corporate network whether your VPN client supports NAT traversal.
    3. **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.
    4. **Windows/MSN Messenger**: Supports use on LAN computers of Microsoft

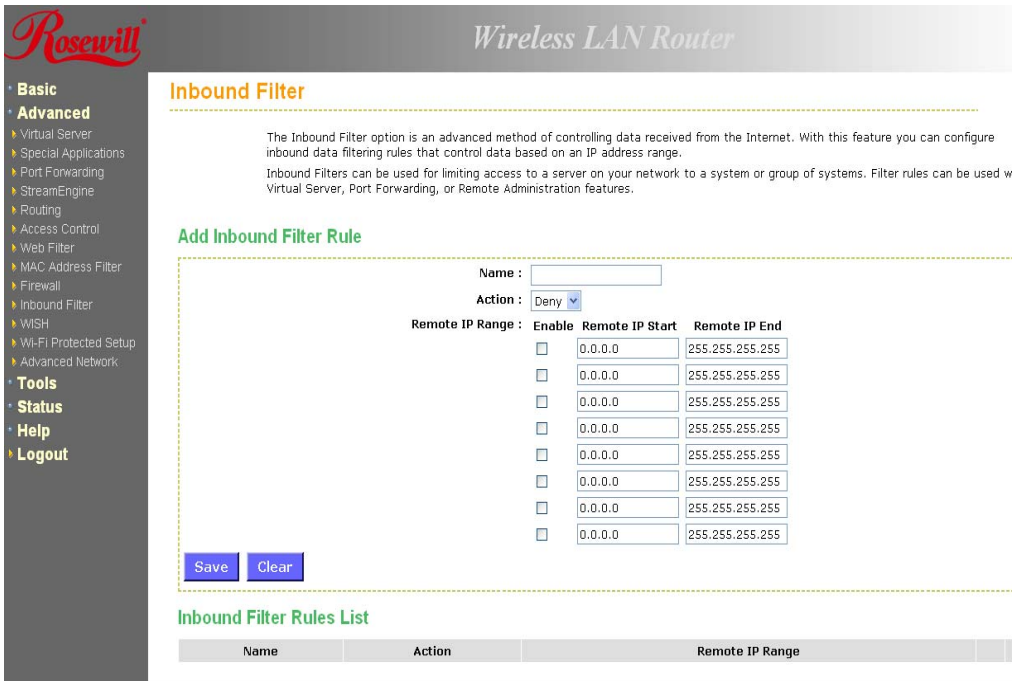
Windows Messenger (the Internet messaging client that ships with Microsoft Windows) and MSN Messenger. The SIP ALG must also be enabled when the Windows Messenger ALG is enabled.

5. **FTP:** Allows FTP clients and servers to transfer data across NAT.
6. **H.323 (Netmeeting)**: Allows H.323 (specifically Microsoft Netmeeting) clients to communicate across NAT server.
7. **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.
8. **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.
9. **MMS**: Allows Windows Media Player, using MMS protocol, to receive streaming media from the internet.

- Click on the **Save** Settings button to store these settings.

6.3.11 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 cyberattacks 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.

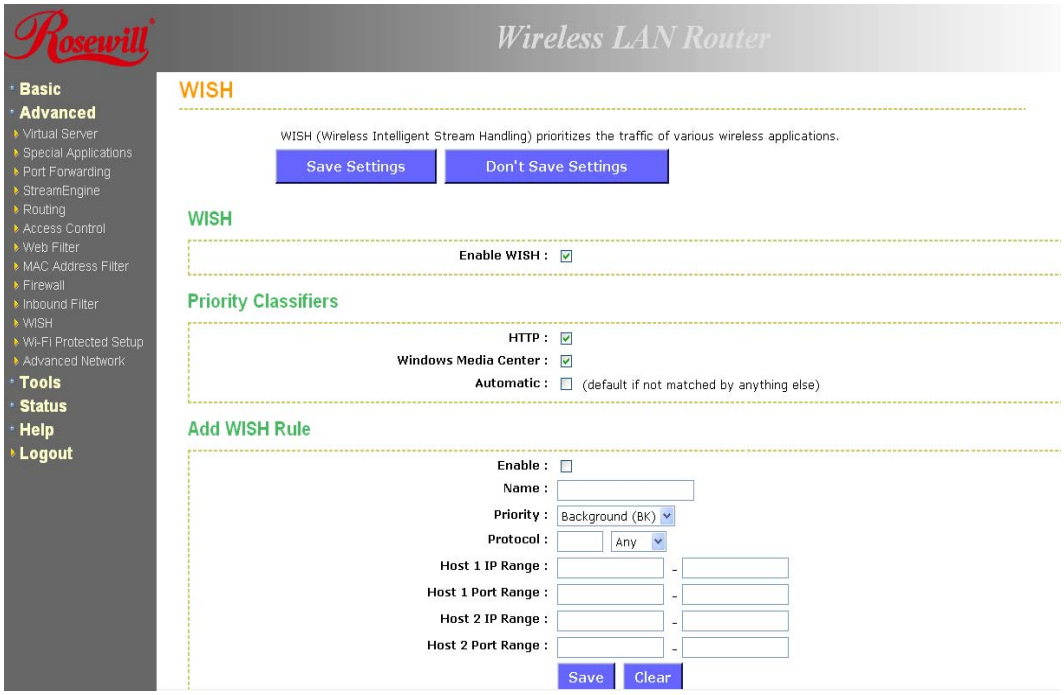


- **Name** Specify a name for the inbound filter.

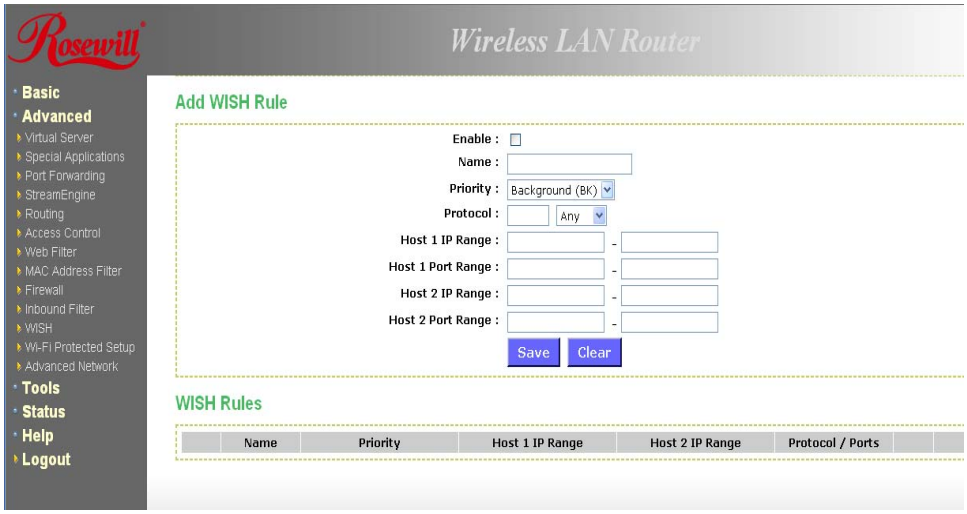
- **Action**: Select Allow or Deny from the drop-down list. This will apply the inbound filter rule on the WAN interface.
- **Remote IP Range**: Specify the remote IP address range and then click in the check box to enable the range.
- Click on the **Save** button to store the changes.

6.3.12 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.



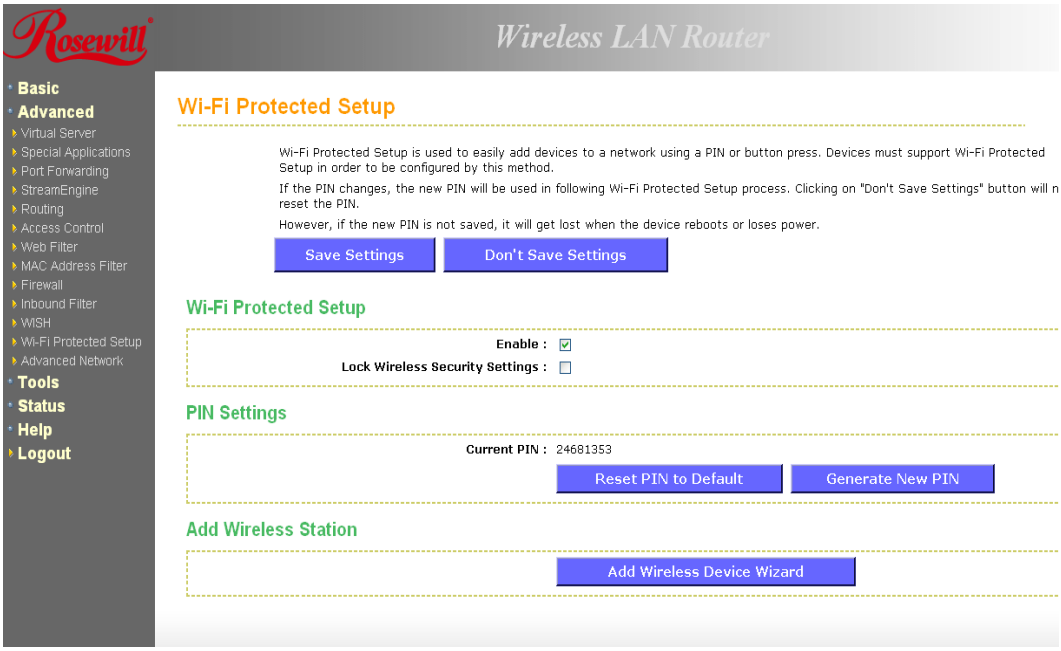
- **Enable WISH**: Place a check in this box to enable the WISH feature.
- **HTTP**: Place a check in this box to add HTTP as a classifier. This allows the device to recognize HTTP transfers for many common audio and video streams and prioritize them above other traffic. Such streams are frequently used 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 behaviour 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:
  1. **BK**: Background (least urgent).
  2. **BE**: Best Effort.
  3. **VI:** Video.
  4. **VO**: Voice (most urgent).
- **Protocol**: Select a protocol from the drop-down list.
- **Hos1 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 **Save** button to insert the entry into the WISH rules list.

6.3.13 Wi-Fi Protected Setup

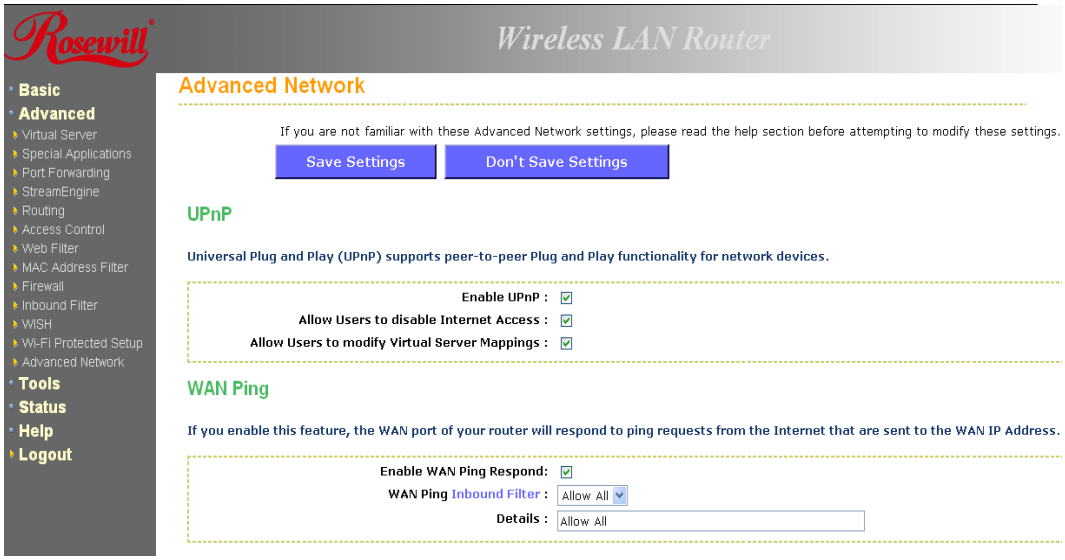
- Wi-Fi Protected Setup is a feature that locks the wireless security settings and prevents the settings from being changed by any new external registrar using its PIN. Devices can still be added to the wireless network using Wi-Fi Protected Setup.



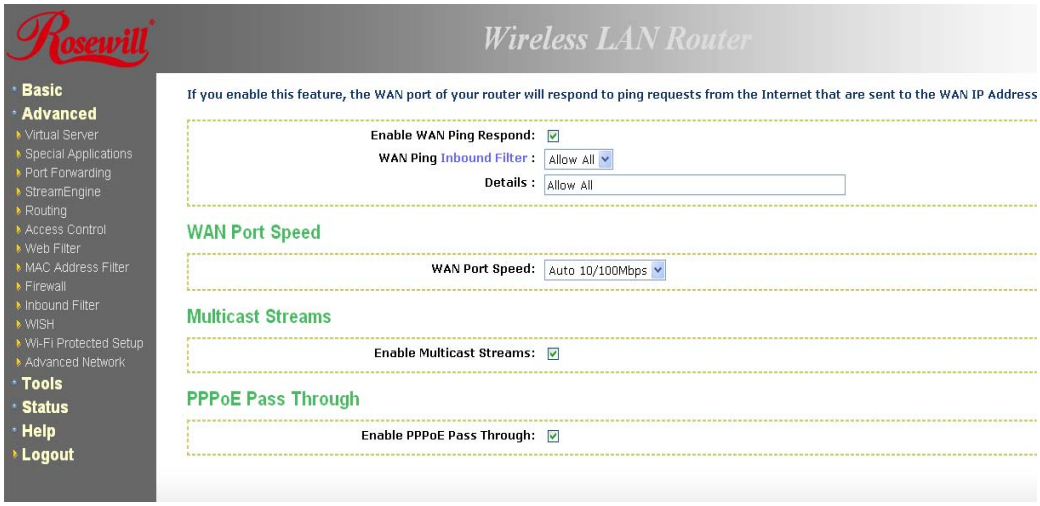
- **Enable**: Place a check in this box to enable this feature.
- **Lock**: Place a check in this box to lock the wireless security settings and prevents the settings from being changed by any new external registrar using its PIN. Devices can still be added to the wireless network using Wi-Fi Protected Setup.
- **Reset PIN to Default**: Press this button to reset the PIN to it's default setting.
- **Generate NEW PIN:** Press this button to generate a new random PIN.
- **Add Wireless Device Wizard**: Please refer to Chapter 4 in order to configure Wi-Fi Protected Setup using the Wizard.
- Click on the **Save** Settings button to store these settings.

6.3.14 Advanced Network (UPNP, WAN Ping…)

- 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.
- **Enable WAN Ping Respond**: Place a check in this box if you would like this device to be pinged from the WAN side.
- **WAN Ping Inbound Filter:** You may select the computer that may ping this device from the WAN side.



- **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.

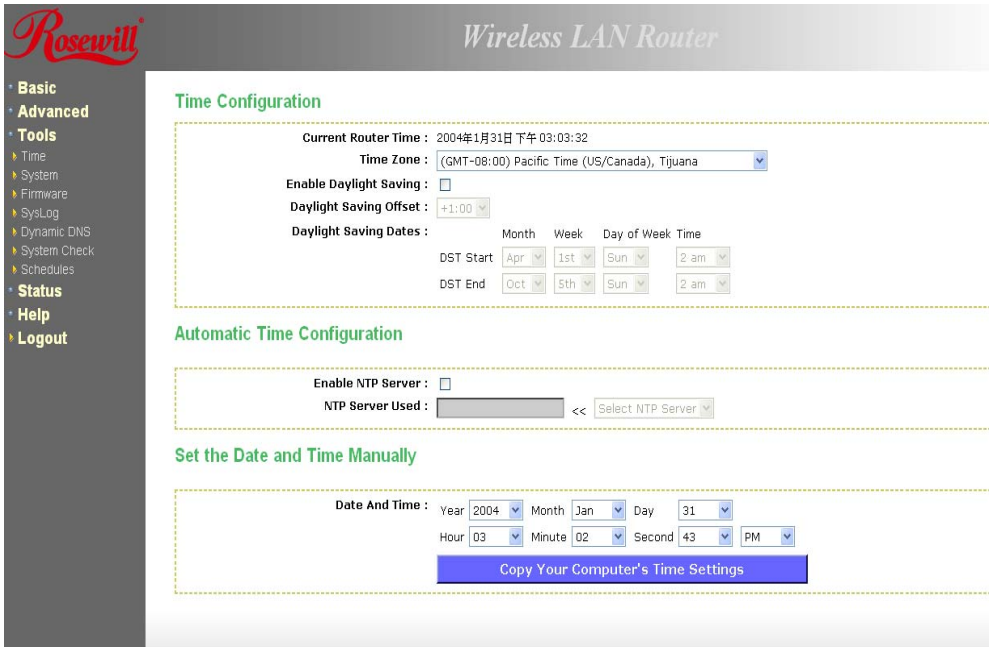
- **Enable PPPoE Pass Through:** Place a check in this box to enable PPPoE pass-through. This option controls whether LAN computers can act as PPPoE clients and negotiate the PPP sessions through the router over the WAN ethernet link. Enabling this option allows LAN computers to act as PPPoE clients. Disabling this option prevents LAN computers from establishing PPPoE pass-through connections.
- Click on the **Save Settings** button to store these settings.

6.4 TOOLS

- Click on the **Tools** link on the navigation drop-down menu. You will then see seven options: Time, System, Firmware, SysLog, Dynamic DNS, System Check, and Schedules. The configuration steps for each option are described below.

6.4.1 Time Zone Setting

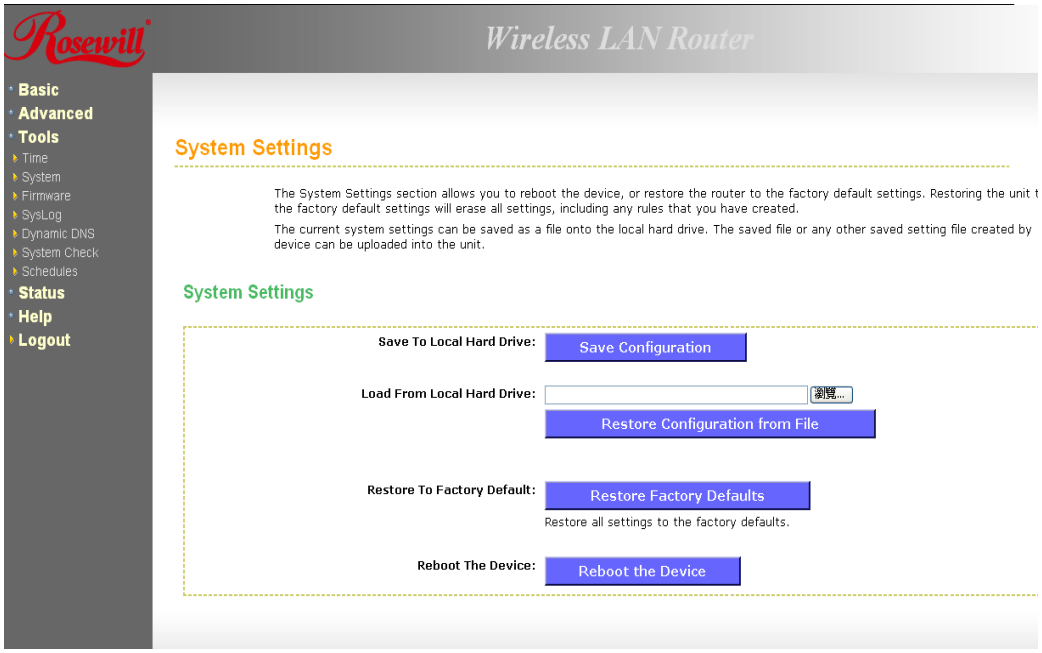
- Click on the **Time** link in the navigation menu. This feature allows you to configure, update, and maintain the correct time on the device's internal system clock as well as configure the time zone. The date and time of the device can be configured manually or by synchronizing with a time server.
  Note: If the device losses 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 loike 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 **Save Settings** button once you have modified the settings.

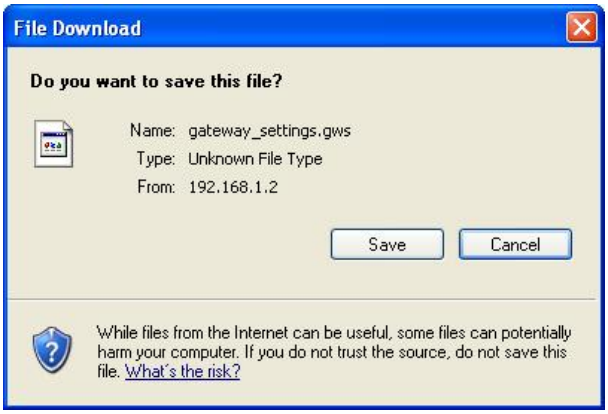
6.4.2 System

- 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.



6.4.2.1 SAVE CONFIGURATION TO A FILE

- 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.



6.4.2.2 RESTORE THE CONFIGURATION FROM A FILE

- 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 un-plug the device during this process as this may cause permanent damage.

6.4.2.3 RESTORE SETTINGS TO DEFAULT

- Click on the **Restore all Settings to Factory Defaults** button. This option restores al 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 un-plug the device during this process as this may cause permanent damage.

6.4.2.4 SYSTEM REBOOT

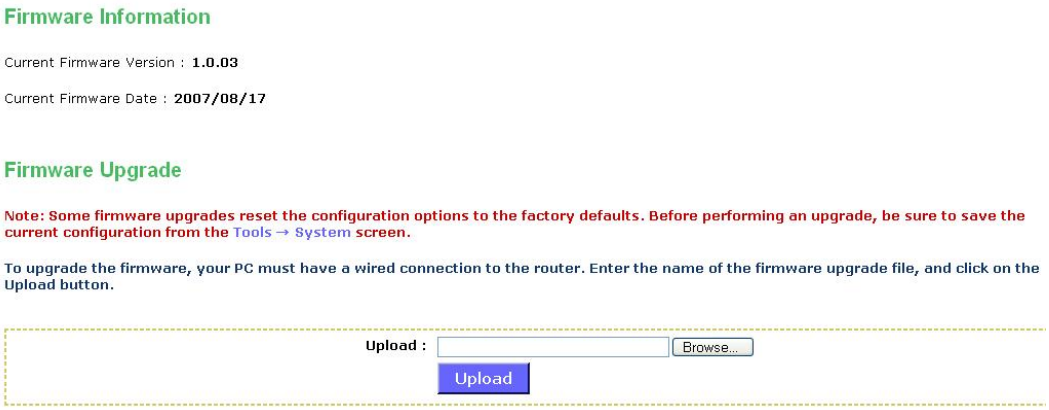
- Click on the **Reboot the Device** button to reboot the device using its current settings. Once the dialog box appears, click on the OK button to confirm the action.

- 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 un-plug the device during this process as this may cause permanent damage.

6.4.3 Firmware Upgrade

- 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.

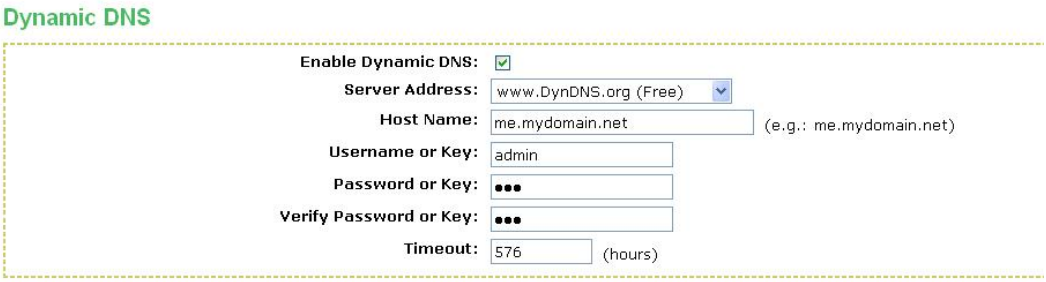
6.4.4 System Logs

- 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 **Save Settings** button once you have modified the settings.

6.4.5 Dynamic DNS

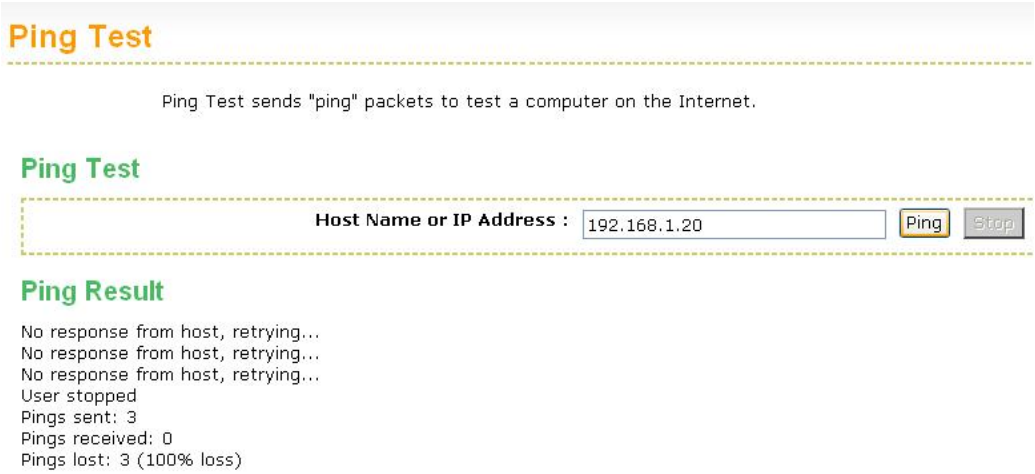
- The Dynamic DNS feature allows you to host a server (Web, FTP, Game Server, etc.) using a domain name that you have purchased with your dynamically assigned IP address. Most broadband Internet Service Providers assign dynamic (changing) IP addresses. When you use a Dynamic DNS service provider, your 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 **Save Settings** button once you have modified the settings.

6.4.6 System Check

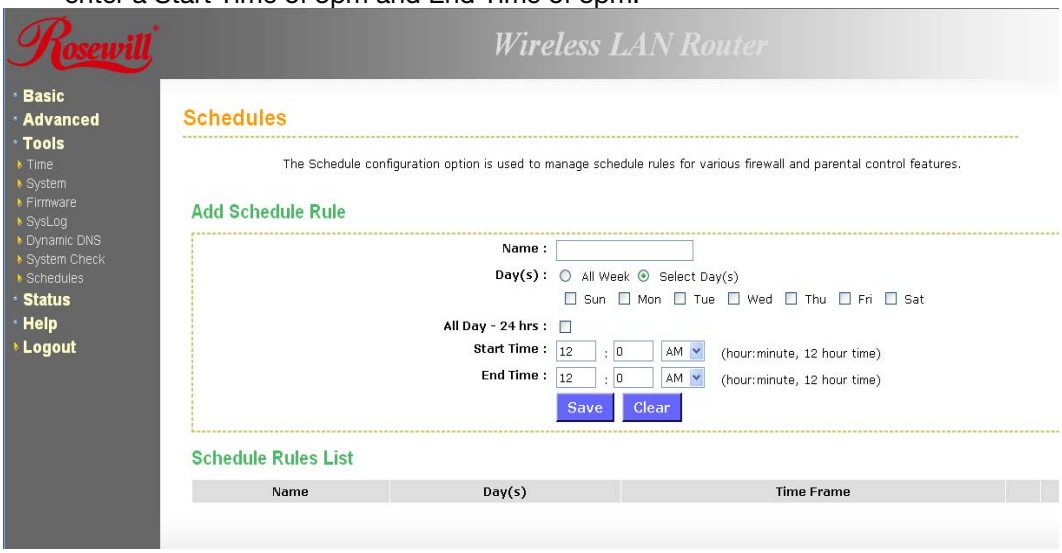
- Click on the **System** Check link in the navigation menu. This page allows you to ping a host name or IP address.



- **Host Name or IP address:** Specify the host name or IP address and then click on the Ping button.

6.4.7 Schedules

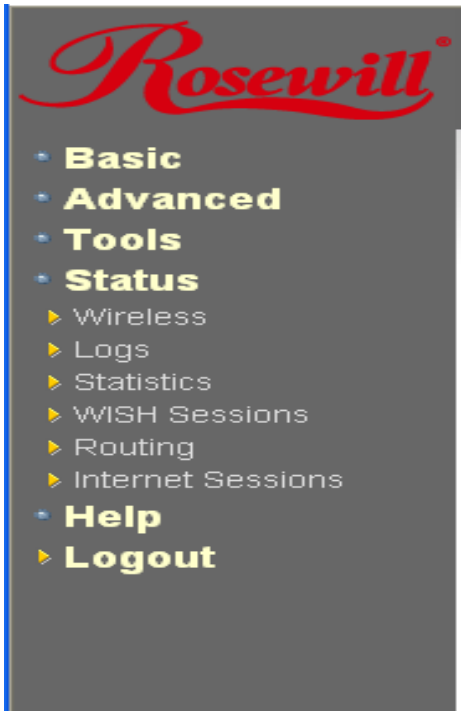
- Click on the **Schedules** link in the navigation menu. Schedules can be created for use with enforcing rules. For example, if you want to restrict web access to Mon-Fri from 3pm to 8pm, you could create a schedule selecting Mon, Tue, Wed, Thu, and Fri and enter a Start Time of 3pm and End Time of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

6.5 STATUS

- Click on the **Status** link on the navigation drop-down menu. You will then see six options: Wireless, Logs, Statistics, WISH Sessions, Routing, and Internet Sessions. The configuration steps for each option are described below.



6.5.1 Wireless Status

- 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.

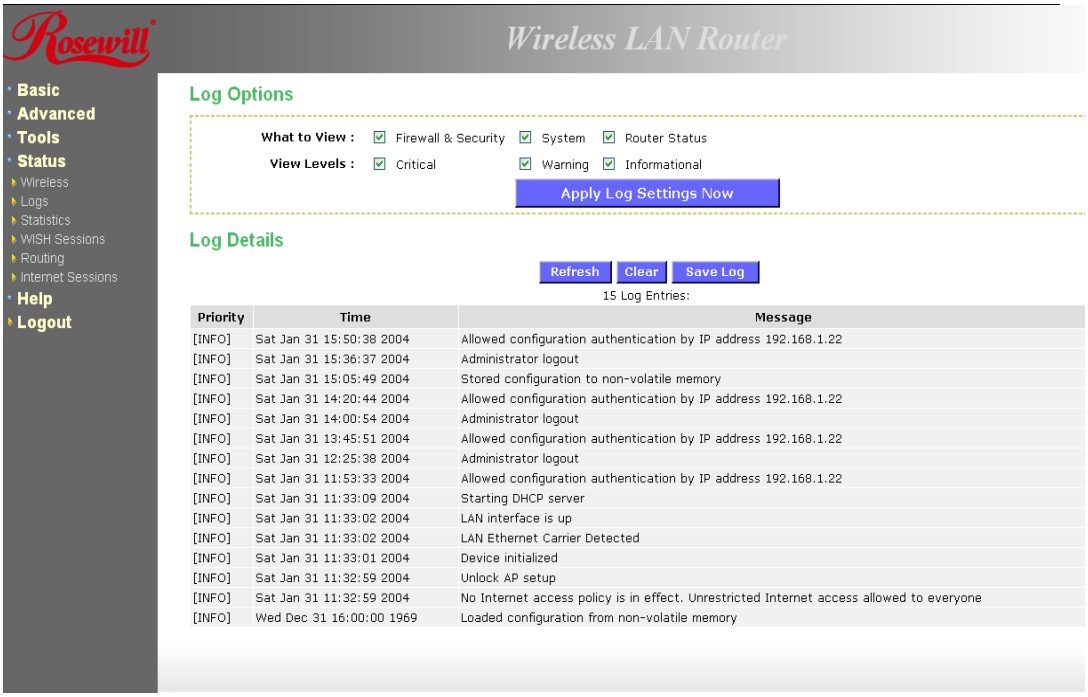
- **MAC Address**: The Ethernet ID (MAC address) of the wireless client.
- **IP Address**: The LAN-side IP address of the client.
- **Mode:** The transmission standard being used by the client. Values are 11a, 11b, 11g, or 11n

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.

6.5.2 Logs Status

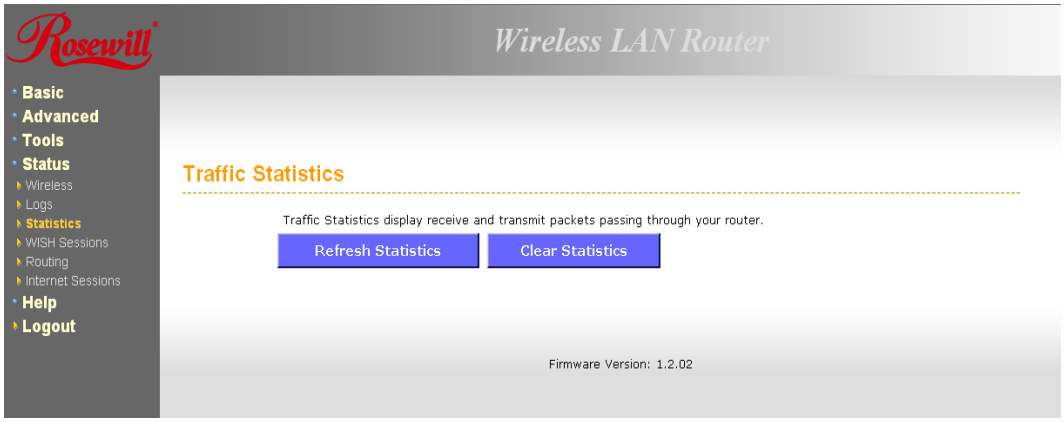
- Click on the **Logs** link in the navigation menu. The router automatically logs (records) events of possible interest in its internal memory. If there is not enough internal memory for all events, logs of older events are deleted, but logs of the latest events are retained. The Logs option allows 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.

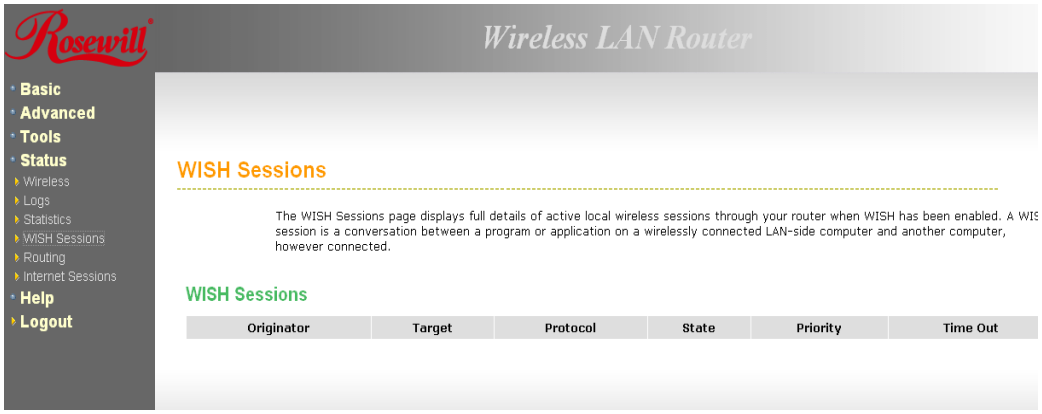
6.5.3 Statistics

- Click on the **Statistics** link in the navigation drop-down 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.



6.5.4 WISH Session Status

- Click on the **WISH Sessions** link in the navigation drop-down menu. 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.



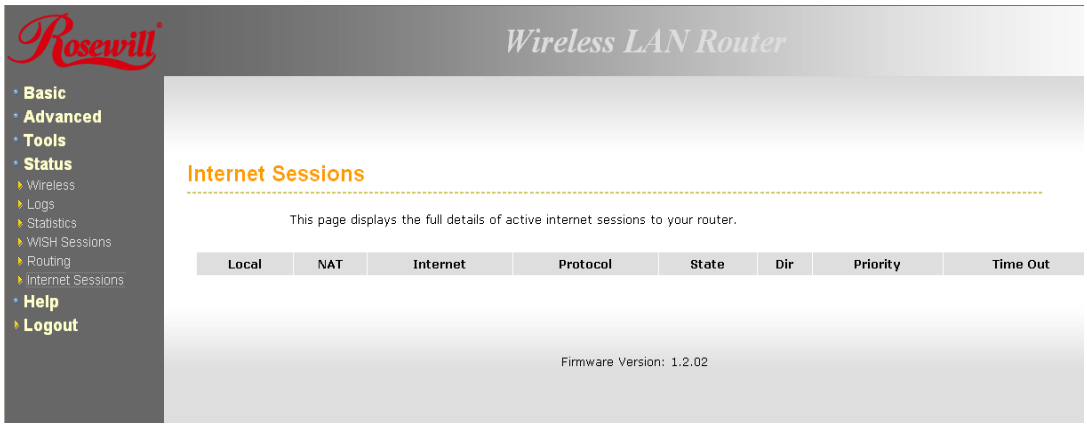
- **Originator**: The IP address and, where appropriate, port number of the computer that originated a network connection.
- **Target**: The IP address and, where appropriate, port number of the computer to which a network connection has been made.
- **Protocol:** The communications protocol used for the conversation.
- **State:** State for sessions that use the TCP protocol.
    1. **NO**: None -- This entry is used as a placeholder for a future connection that may occur.
    2. **SS:** SYN Sent -- One of the systems is attempting to start a connection.
    3. **EST**: Established -- the connection is passing data.
    4. **FW:** FIN Wait -- The client system has requested that the connection be stopped.
    5. **CW**: Close Wait -- the server system has requested that the connection be stopped.
    6. **TW:** Time Wait -- Waiting for a short time while a connection that was in FIN Wait is fully closed.

7. **LA**: Last ACK -- Waiting for a short time while a connection that was in Close Wait is fully closed.
8. **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:
  1. BK: Background (least urgent).
  2. BE: Best Effort.
  3. VI: Video.
  4. 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.
  1. **300 seconds** - UDP connections.
  2. **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.
  3. **7800 seconds** - Established or closing TCP connections.

6.5.5 Internet Session Status

- Click on the **Internet Sessions** link in the navigation drop-down menu. The Internet Sessions page displays full details of active Internet sessions through your router. An Internet session is a conversation between a program or application on a LAN-side computer and a program or application on a WAN-side computer.



- **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.
  1. **NO**: None -- This entry is used as a placeholder for a future connection that may occur.
  2. **SS**: SYN Sent -- One of the systems is attempting to start a connection.
  3. **EST**: Established -- the connection is passing data.

4. **FW**: FIN Wait -- The client system has requested that the connection be stopped.
5. **CW:** Close Wait -- the server system has requested that the connection be stopped.
6. **TW**: Time Wait -- Waiting for a short time while a connection that was in FIN Wait is fully closed.
7. **LA**: Last ACK -- Waiting for a short time while a connection that was in Close Wait is fully closed.
8. **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:
  1. **BK**: Background (least urgent).
  2. **BE**: Best Effort.
  3. **VI:** Video.
  4. **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.
  1. **300 seconds** - UDP connections.
  2. **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.
  3. **7800 seconds** - Established or closing TCP connections.

7. APPENDIX A – GLOSSARY

8

802.11
A family of specifications for wireless local area networks (WLANs) developed by a working group of the Institute of Electrical and Electronics Engineers (IEEE).

A

Access Control List
ACL. This is a database of network devices that are allowed to access resources on the network.

Access Point
AP. Device that allows wireless clients to connect to it and access the network

ActiveX
A Microsoft specification for the interaction of software components.

Address Resolution Protocol
ARP. Used to map MAC addresses to IP addresses so that conversions can be made in both directions.

Ad-hoc network
Peer-to-Peer network between wireless clients

ADSL
Asymmetric Digital Subscriber Line

Advanced Encryption Standard
AES. Government encryption standard

Alphanumeric
Characters A-Z and 0-9

Antenna
Used to transmit and receive RF signals.

AppleTalk
A set of Local Area Network protocols developed by Apple for their computer systems
AppleTalk Address Resolution Protocol
AARP. Used to map the MAC addresses of Apple computers to their AppleTalk network addresses, so that conversions can be made in both directions.

Application layer
7th Layer of the OSI model. Provides services to applications to ensure that they can communicate properly with other applications on a network.

ASCII
American Standard Code for Information Interchange. This system of characters is most commonly used for text files

Attenuation
The loss in strength of digital and analog signals. The loss is greater when the signal is being transmitted over long distances.

Authentication
To provide credentials, like a Password, in order to verify that the person or device is really who they are claiming to be

Automatic Private IP Addressing
APIPA. An IP address that that a Windows computer will assign itself when it is configured to obtain an IP address automatically but no DHCP server is available on the network

B

Backward Compatible
The ability for new devices to communicate and interact with older legacy devices to guarantee interoperability

Bandwidth
The maximum amount of bytes or bits per second that can be transmitted to and from a network device

Basic Input/Output System
BIOS. A program that the processor of a computer uses to startup the system once it is turned on

Baud
Data transmission speed

Beacon
A data frame by which one of the stations in a Wi-Fi network periodically broadcasts network control data to other wireless stations.

Bit rate
The amount of bits that pass in given amount of time

Bit/sec
Bits per second

BOOTP
Bootstrap Protocol. Allows for computers to be booted up and given an IP address with no user intervention

Bottleneck
A time during processes when something causes the process to slowdown or stop all together

Broadband
A wide band of frequencies available for transmitting data

Broadcast
Transmitting data in all directions at once

Browser
A program that allows you to access resources on the web and provides them to you graphically

C

Cable modem
A device that allows you to connect a computer up to a coaxial cable and receive Internet access from your Cable provider

CardBus
A newer version of the PC Card or PCMCIA interface. It supports a 32-bit data path, DMA, and consumes less voltage

CAT 5
Category 5. Used for 10/100 Mbps or 1Gbps Ethernet connections

Client
A program or user that requests data from a server

Collision
When do two devices on the same Ethernet network try and transmit data at the exact same time.

Cookie
Information that is stored on the hard drive of your computer that holds your preferences to the site that gave your computer the cookie

D

Data

Information that has been translated into binary so that it can be processed or moved to another device

Data Encryption Standard
Uses a randomly selected 56-bit key that must be known by both the sender and the receiver when information is exchanged

Database
Organizes information so that it can be managed updated, as well as easily accessed by users or applications.

Data-Link layer
The second layer of the OSI model. Controls the movement of data on the physical link of a network

DB-25
A 25 ping male connector for attaching External modems or RS-232 serial devices

DB-9
A 9 pin connector for RS-232 connections

dBd
Decibels related to dipole antenna

dBi
Decibels relative to isotropic radiator

dBm
Decibels relative to one milliwatt

Decrypt
To unscramble an encrypted message back into plain text

Default
A predetermined value or setting that is used by a program when no user input has been entered for this value or setting

Demilitarized zone
DMZ: A single computer or group of computers that can be accessed by both users on the Internet as well as users on the Local Network, but that is not protected by the same security as the Local Network.

DHCP
Dynamic Host Configuration Protocol: Used to automatically assign IP addresses from a predefined pool of addresses to computers or devices that request them

Digital certificate:
An electronic method of providing credentials to a server in order to have access to it or a network

Direct Sequence Spread Spectrum
DSSS: Modulation technique used by 802.11b wireless devices

DMZ
"Demilitarized Zone". A computer that logically sits in a "no-mans land" between the LAN and the WAN. The DMZ computer trades some of the protection of the router's security mechanisms for the convenience of being directly addressable from the Internet.

DNS
Domain Name System: Translates Domain Names to IP addresses

Domain name
A name that is associated with an IP address

Download
To send a request from one computer to another and have the file transmitted back to the requesting computer

DSL
Digital Subscriber Line. High bandwidth Internet connection over telephone lines

Duplex
Sending and Receiving data transmissions at the sane time

Dynamic DNS service

Dynamic DNS is provided by companies to allow users with Dynamic IP addresses to obtain a Domain Name that will always by linked to their changing IP address. The IP address is updated by either client software running on a computer or by a router that supports Dynamic DNS, whenever the IP address changes

Dynamic IP address
IP address that is assigned by a DHCP server and that may change. Cable Internet providers usually use this method to assign IP addresses to their customers.

E

EAP
Extensible Authentication Protocol

Email
Electronic Mail is a computer-stored message that is transmitted over the Internet

Encryption
Converting data into cyphertext so that it cannot be easily read

Ethernet
The most widely used technology for Local Area Networks.

F

Fiber optic
A way of sending data through light impulses over glass or plastic wire or fiber

File server
A computer on a network that stores data so that the other computers on the network can all access it

File sharing
Allowing data from computers on a network to be accessed by other computers on the network with different levels of access rights

Firewall
A device that protects resources of the Local Area Network from unauthorized users outside of the local network

Firmware
Programming that is inserted into a hardware device that tells it how to function
Fragmentation
Breaking up data into smaller pieces to make it easier to store

FTP
File Transfer Protocol. Easiest way to transfer files between computers on the Internet

Full-duplex
Sending and Receiving data at the same time

G

Gain
The amount an amplifier boosts the wireless signal

Gateway
A device that connects your network to another, like the internet

Gbps
Gigabits per second

Gigabit Ethernet
Transmission technology that provides a data rate of 1 billion bits per second

GUI
Graphical user interface

H

H.323

A standard that provides consistency of voice and video transmissions and compatibility for videoconferencing devices

Half-duplex
Data cannot be transmitted and received at the same time

Hashing
Transforming a string of characters into a shorter string with a predefined length

Hexadecimal
Characters 0-9 and A-F

Hop
The action of data packets being transmitted from one router to another

Host
Computer on a network

HTTP
Hypertext Transfer Protocol is used to transfer files from HTTP servers (web servers) to HTTP clients (web browsers)

HTTPS
HTTP over SSL is used to encrypt and decrypt HTTP transmissions

Hub
A networking device that connects multiple devices together

I

ICMP
Internet Control Message Protocol

IEEE
Institute of Electrical and Electronics Engineers

IGMP
Internet Group Management Protocol is used to make sure that computers can report their multicast group membership to adjacent routers

IIS
Internet Information Server is a WEB server and FTP server provided by Microsoft

IKE
Internet Key Exchange is used to ensure security for VPN connections

Infrastructure
In terms of a wireless network, this is when wireless clients use an Access Point to gain access to the network

Internet
A system of worldwide networks which use TCP/IP to allow for resources to be accessed from computers around the world

Internet Explorer
A World Wide Web browser created and provided by Microsoft

Internet Protocol
The method of transferring data from one computer to another on the Internet

Internet Protocol Security
IPsec provides security at the packet processing layer of network communication

Internet Service Provider
An ISP provides access to the Internet to individuals or companies

Intranet
A private network

Intrusion Detection
A type of security that scans a network to detect attacks coming from inside and outside of the network

IP
Internet Protocol

IP address

A 32-bit number, when talking about Internet Protocol Version 4, that identifies each computer that transmits data on the Internet or on an Intranet

IPsec
Internet Protocol Security

IPX
Internetwork Packet Exchange is a networking protocol developed by Novel to enable their Netware clients and servers to communicate

ISP
Internet Service Provider

J

Java
A programming language used to create programs and applets for web pages

K

Kbps
Kilobits per second

Kbyte
Kilobyte

L

L2TP
Layer 2 Tunneling Protocol

LAN
Local Area Network

Latency
The amount of time that it takes a packet to get from the one point to another on a network. Also referred to as delay

LED
Light Emitting Diode

Legacy
Older devices or technology

Local Area Network
A group of computers in a building that usually access files from a server

LPR/LPD
"Line Printer Requestor"/"Line Printer Daemon". A TCP/IP protocol for transmitting streams of printer data.

M

MAC Address
A unique hardware ID assigned to every Ethernet adapter by the manufacturer.

Mbps
Megabits per second

MDI
Medium Dependent Interface is an Ethernet port for a connection to a straight-through cable

MDIX
Medium Dependent Interface Crossover, is an Ethernet port for a connection to a crossover cable

MIB
Management Information Base is a set of objects that can be managed by using SNMP

Modem
A device that Modulates digital signals from a computer to an analog signal in order to

transmit the signal over phone lines. It also Demodulates the analog signals coming from the phone lines to digital signals for your computer

MPPE
Microsoft Point-to-Point Encryption is used to secure data transmissions over PPTP connections

MTU
Maximum Transmission Unit is the largest packet that can be transmitted on a packet-based network like the Internet

Multicast
Sending data from one device to many devices on a network

N

NAT
Network Address Translation allows many private IP addresses to connect to the Internet, or another network, through one IP address

NetBEUI
NetBIOS Extended User Interface is a Local Area Network communication protocol. This is an updated version of NetBIOS

NetBIOS
Network Basic Input/Output System

Netmask
Determines what portion of an IP address designates the Network and which part designates the Host

Network Interface Card
A card installed in a computer or built onto the motherboard that allows the computer to connect to a network

Network Layer
The third layer of the OSI model which handles the routing of traffic on a network

Network Time Protocol
Used to synchronize the time of all the computers in a network

NIC
Network Interface Card

NTP
Network Time Protocol

O

OFDM
Orthogonal Frequency-Division Multiplexing is the modulation technique for both 802.11a and 802.11g

OSI
Open Systems Interconnection is the reference model for how data should travel between two devices on a network

OSPF
Open Shortest Path First is a routing protocol that is used more than RIP in larger scale networks because only changes to the routing table are sent to all the other routers in the network as opposed to sending the entire routing table at a regular interval, which is how RIP functions

P

Password
A sequence of characters that is used to authenticate requests to resources on a network

Personal Area Network
The interconnection of networking devices within a range of 10 meters

Physical layer
The first layer of the OSI model. Provides the hardware means of transmitting electrical signals on a data carrier

Ping
A utility program that verifies that a given Internet address exists and can receive messages. The utility sends a control packet to the given address and waits for a response.

PoE
Power over Ethernet is the means of transmitting electricity over the unused pairs in a category 5 Ethernet cable

POP3
Post Office Protocol 3 is used for receiving email

Port
A logical channel endpoint in a network. A computer might have only one physical channel (its Ethernet channel) but can have multiple ports (logical channels) each identified by a number.

PPP
Point-to-Point Protocol is used for two computers to communicate with each over a serial interface, like a phone line

PPPoE
Point-to-Point Protocol over Ethernet is used to connect multiple computers to a remote server over Ethernet

PPTP
Point-to-Point Tunneling Protocol is used for creating VPN tunnels over the Internet between two networks

Preamble
Used to synchronize communication timing between devices on a network

Q

QoS
Quality of Service

R

RADIUS
Remote Authentication Dial-In User Service allows for remote users to dial into a central server and be authenticated in order to access resources on a network

Reboot
To restart a computer and reload it's operating software or firmware from nonvolatile storage.

Rendezvous
Apple's version of UPnP, which allows for devices on a network to discover each other and be connected without the need to configure any settings

Repeater
Retransmits the signal of an Access Point in order to extend it's coverage

RIP
Routing Information Protocol is used to synchronize the routing table of all the routers on a network

RJ-11
The most commonly used connection method for telephones

RJ-45
The most commonly used connection method for Ethernet

RS-232C
The interface for serial communication between computers and other related devices

RSA

Algorithm used for encryption and authentication

S

Server
A computer on a network that provides services and resources to other computers on the network

Session key
An encryption and decryption key that is generated for every communication session between two computers

Session layer
The fifth layer of the OSI model which coordinates the connection and communication between applications on both ends

Simple Mail Transfer Protocol
Used for sending and receiving email

Simple Network Management Protocol
Governs the management and monitoring of network devices

SIP
Session Initiation Protocol. A standard protocol for initiating a user session that involves multimedia content, such as voice or chat.

SMTP
Simple Mail Transfer Protocol

SNMP
Simple Network Management Protocol

SOHO
Small Office/Home Office

SPI
Stateful Packet Inspection

SSH
Secure Shell is a command line interface that allows for secure connections to remote computers

SSID
Service Set Identifier is a name for a wireless network

Stateful inspection
A feature of a firewall that monitors outgoing and incoming traffic to make sure that only valid responses to outgoing requests are allowed to pass though the firewall

Subnet mask
Determines what portion of an IP address designates the Network and which part designates the Host

Syslog
System Logger -- a distributed logging interface for collecting in one place the logs from different sources. Originally written for UNIX, it is now available for other operating systems, including Windows.

T

TCP
Transmission Control Protocol

TCP Raw
A TCP/IP protocol for transmitting streams of printer data.

TCP/IP
Transmission Control Protocol/Internet Protocol

TFTP
Trivial File Transfer Protocol is a utility used for transferring files that is simpler to use than FTP but with less features

Throughput
The amount of data that can be transferred in a given time period
Traceroute
A utility displays the routes between you computer and specific destination

U

UDP
User Datagram Protocol
Unicast
Communication between a single sender and receiver
Universal Plug and Play
A standard that allows network devices to discover each other and configure themselves to be a part of the network
Upgrade
To install a more recent version of a software or firmware product
Upload
To send a request from one computer to another and have a file transmitted from the requesting computer to the other
UPnP
Universal Plug and Play
URL
Uniform Resource Locator is a unique address for files accessible on the Internet
USB
Universal Serial Bus
UTP
Unshielded Twisted Pair

V

Virtual Private Network
VPN: A secure tunnel over the Internet to connect remote offices or users to their company's network
VLAN
Virtual LAN
Voice over IP
Sending voice information over the Internet as opposed to the PSTN
VoIP
Voice over IP

W

Wake on LAN
Allows you to power up a computer though it's Network Interface Card
WAN
Wide Area Network
WCN
Windows Connect Now. A Microsoft method for configuring and bootstrapping wireless networking hardware (access points) and wireless clients, including PCs and other devices.
WDS
Wireless Distribution System. A system that enables the interconnection of access points wirelessly.
Web browser
A utility that allows you to view content and interact with all of the information on the World Wide Web
WEP

Wired Equivalent Privacy is security for wireless networks that is supposed to be comparable to that of a wired network

Wide Area Network
The larger network that your LAN is connected to, which may be the Internet itself, or a regional or corporate network

Wi-Fi
Wireless Fidelity

Wi-Fi Protected Access
An updated version of security for wireless networks that provides authentication as well as encryption

Wireless ISP
A company that provides a broadband Internet connection over a wireless connection

Wireless LAN
Connecting to a Local Area Network over one of the 802.11 wireless standards

WISP
Wireless Internet Service Provider

WLAN
Wireless Local Area Network

WPA
Wi-Fi Protected Access. A Wi-Fi security enhancement that provides improved data encryption, relative to WEP.

X

xDSL
A generic term for the family of digital subscriber line (DSL) technologies, such as ADSL, HDSL, RADSL, and SDSL.

Y

Yagi antenna
A directional antenna used to concentrate wireless signals on a specific location

8. APPENDIX B – SPECIFICATIONS

Hardware Summary

Physical Interface	WAN: One 10/100/1000 Gigabit RJ-45 LAN: Four 10/100/1000 Gigabit RJ-45 Reset Button (1 second for Reboot, 5 second for Reset to Factory Default) Power Jack JTAG (for debug only)
LED Status	Power/ Status WAN (Internet connection) LAN1~LAN4 (10/100/1000Mbps) WLAN (Wireless Connection)
Power Requirements	Power Supply: 90 to 240 VDC ± 10% (depends on different countries) Device: 12 V/ 1.25A

Radio Specifications

Frequency Band	2.400～2.484 GHz
Media Access Protocol	Carrier sense multiple access with collision avoidance (CSMA/CA)
Modulation Technology	OFDM: BPSK, QPSK, 16-QAM, 64-QAM DBPSK, DQPSK, CCK
Operating Channels	11 for North America, 14 for Japan, 13 for Europe
Receive Sensitivity (Typical)	2.412~2.472G(IEEE802.11b) (1Rx) -93dBm @ 1Mbps -91dBm @ 11Mbps 2.412~2.472G(IEEE802.11g) (2Rx) -92dBm @ 6Mbps -79dBm @ 54Mbps 2.412~2.472G(IEEE802.11N) (2Rx) -90 dBm MCS 8 -70 dBm MCS 15
Available transmit power	2.412~2.472G(IEEE802.11b) 19dBm @1~11Mbps 2.412~2.472G(IEEE802.11g) 19 dBm @6Mbps 16 dBm @54Mbps 2.412~2.472G(IEEE802.11N) 20 dBm MCS 8 16 dBm MCS 15
Antenna Gain	Peak Gain = 2 dBi Average Gain = 1.08 dBi (@ 2.45GHz, H-Plan)

Router and Gateway

Topology	Infrastructure
Operation Mode	AP/ Router/ WDS Bridge
LAN	DHCP Server Static IP DNS

	UPNP
WAN	Static IP DHCP Client PPPoE PPTP Clone MAC DNS Relay DDNS-8 Verified Services
Router	NAT/ NAPT Static Routing- RIPv2 Dynamic Route Virtual server mapping IP address mapping Port Forwarding Port Triggering MAC address Filtering ALG(Application Layer Gateway) support (RTP/RTSP, AOL, FTP, ICMP, WMP/MMS, NetMeeting, SIP)
Firewall	Blocking Ping ICMP Bolcking SPI (Stateful Packet Inspection) Rule Based (IP Address Ranges, Port Ranges & Schedule) DMZ (Demilitarized Zone) Host Policy Based Parental Controls Time Based Internet Access Port Range / Service Filtering Internet Domain Restriction Dynamic URL Filtering (OEM subscription service)
VPN	VPN pass-through (PPTP, L2TP, IPSEC)
Wireless	64/128 bit WEP Encryption WPA Personal (WPA-PSK using TKIP or AES) WPA Enterprise (WPA-EAP using TKIP) 802.1x Authenticator Hide SSID in beacons Wi-Fi Protection Setup (WPS) Auto Channel Selection
QoS	WMM Intelligent Stream Handling/Wireless Intelligent Stream Handling Automatic Traffic Classification & Prioritization Dynamic Traffic Shaping & Packet Fragmentation Automatic Configuration

Management

Configuration	Web-based configuration (HTTP)
Firmware Upgrade	Upgrade firmware via web-browser
Administrator Setting	Administrator password change Idle time out
Reset Setting	Reboot Reset to Factory Default
System monitoring	Status and Statistics, Time Zone & NTP Client, Event Log, Email Alarm

Environment & Physical

Temperature Range	0 to 50° C (32 °F to 122 °F) - Operating -40 to 70 ° C(-40 °F to158 °F) - Storage
Humidity (non-condensing)	15%～95% typical
Dimensions	167mm (L) x 108mm (W) x 25mm (H)
Weight	295g

9. APPENDIX C – 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.

Thank you for purchasing a quality Rosewill Product.

Please register your product at : www.rosewill.com for complete warranty information and future support for your product.