RT210W User Manual

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November 3, 2003 Rev.20

Safety Instructions

For Installation

- Use only the type of power source indicated on the marking labels.
- Use only the power adapter supplied with the product.
- Do not overload wall outlet or extension cords as this may increase the risk of electric shock. If the power cord is frayed, replace it with a new one.
- Proper ventilation is necessary to prevent the product from overheating. Do not block or cover the slots and openings of the device, which are intended for ventilation and proper operation.
- Do not place the product near any source of heat or expose it to direct sun light.
- Do not expose the product to moisture. Never spill any liquid on the product.
- Do not attempt to connect with any computer accessory or electronic product without instructions from qualified service personnel. This may result in risk of electric shock.
- Do not place this product on an unstable stand or table.

For Using

- Power off and unplug this product from the wall outlet when it is not in use or before cleaning. Pay attention to the temperature of the power adapter. The temperature may be high.
- After powering off the product, power on the product at least 15 seconds later.
- Do not block the ventilating openings of this product.
- When the product is not in use for a period of time, unplug the power cord of the product to prevent it from damage of storm or sudden increase in ratings.

For Service

Do not attempt to disassemble or open the cover of this unit yourself. You should not attempt to service the product yourself, which may void the user's authority to operate it. Contact qualified service personnel under the following conditions:

- If the power cord or plug is damaged or frayed.
- If liquid has been spilled into the product.
- If the product has been exposed to rain or water.
- If the product does not operate normally when the operating instructions are followed.
- If the product has been dropped or the case has been damaged.
- If the product exhibits a distinct change in performance.

FCC Information

FCC 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 communication. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- 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 conditions

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.
2. This device must accept any interference received, including interference that may cause undesired operation.

FCC Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator & your body.

About This User Manual

For brevity, throughout this manual the “Wireless Broadband Router” is referred to as “the router” or “the device” and following terms or abbreviations are used interchangeably:

- Access Point – AP
- Wireless LAN – WLAN
- Ethernet network – LAN – network

Note and **Caution** in this manual are highlighted with graphics as below to indicate important information.

Note

Contains related information that corresponds to a topic.

Caution

Represents essential steps, actions, or messages that should not be ignored.

This User Manual contains information on how to install and configure your Wireless Broadband Router to get your network started accessing the Internet. It will guide you through the correct configuration steps to get your device up and running.

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1 Introduction

1.1 Overview

Thank you for choosing this Wireless Broadband Router. This Wireless Broadband Router is a multi-function device featuring a wireless 54Mbps Access Point, a 4-port LAN switch and a WAN port, which extends the existing broadband Cable/ADSL connection. It allows the Internet connection to be shared through either the 54Mbps Access Point feature or the 10/100Base-TX Ethernet switch, which also eliminates the purchase of additional hub or switch. Now the wired and wireless networks are integrated to allow various applications to access the Internet.

With the support of the newly emerged 802.11g standard, the Access Point provides data transfer of up to 54 Mbps, up to 5 times faster than 802.11b. Since 802.11g operates on the same frequency of 2.4 GHz as 802.11b, it is backwards compatible with existing Wi-Fi 802.11b devices. The benefit is that you can preserve the existing 802.11b infrastructure while migrating to the new 802.11g infrastructure.

The router has a DHCP server that automatically assigns IP addresses to your LAN or WLAN devices. With the built-in Network Address Translation (NAT) function, your LAN/WLAN can access the Internet through a single external IP address and at the same time protected from outside intruders. The router can also be configured to filter internal access to the Internet. It is designed to provide a reliable Internet access solution for the corporate environment as well as for the small office home office (SOHO).

1.2 Features

- One 10/100 Base-TX RJ-45 auto sensing and crossover Ethernet WAN port for Broadband connection (Cable/DSL or direct Ethernet)
- Four RJ-45 LAN ports for 10/100Base-TX auto sensing & crossover Ethernet Switch LAN connection
- 802.11g Wireless LAN
- Two external antennas for wireless technology
- PPPoE (PPP over Ethernet) Client with Keep Alive/Connect On Demand Support
- PAP and CHAP Authentication
- DHCP Client
- MAC Address Cloning
- DHCP Server
- NAT
- Firewall Support
- Bridge Mode Support
- 802.1D Spanning Tree Bridging
- IP Filtering, IP Forwarding
- DMZ Hosting
- IEEE 802.1X
- WPA/WPA-PSK
- ASCII/HEX Format 64/128 Bit WEP Key for Wireless LAN
- Allow/Deny List for Wireless LAN
- Configurable through Web Browser via WAN/LAN
- Software Upgrade
- NTP

1.3 Package Contents

Check the contents of the package. If any item is missing, please contact the dealer from whom the equipment was purchased.

- Wireless Broadband Router x1
- Power Adapter and Cord x1
- CD x1
- RJ-45 Ethernet Cable x1
- Quick Installation Guide x1

1.4 System Requirements

- Cable/ADSL modem and an Internet access account for Internet connection
- One computer with 10/100Base-T Ethernet card and TCP/IP protocol installed for initial setup
- Internet Explorer 5.0 or higher for Web configuration
- 802.11g or 802.11b compliant wireless adapters (for wireless connection)

2 Hardware Description & Installation

2.1 Physical Outlook

Front Panel

The following illustration shows the front panel of the Wireless Broadband Router:

Figure 2-1 LED Indicator

LED Indicator

The Wireless Broadband Router is equipped with seven LEDs on the front panel as described in the table below (from left to right):

LEDs	Color	Status	Description
PWR	Green	Off	No power is supplied to the unit.
		Solid	Power is connected to the unit.
WLAN	Green	Off	WLAN interface is not initialized properly.
		On	WLAN interface is initialized properly and ready.
		Blinking	Transmitting/receiving packets wirelessly.
LAN 1-4	Green/Amber	Off	No Ethernet device is connected.

LEDs	Color	Status	Description
		Solid	Ethernet connection is established. • Amber - 100 Mbps Ethernet connection • Green - 10 Mbps Ethernet connection.
		Blinking	Transmitting/receiving packets on the LAN port.
WAN	Green	Off	Power is off or no broadband device is connected.
		On	Broadband device is connected.
		Blinking	Transmitting/receiving packets on the WAN port.

Rear Panel and Connector

The following figure illustrates the rear panel of the Wireless Broadband Router.

Figure 2-2 Rear Panel and Connector

- **DC 5V**: Power connector
- **LAN Ports 1-4**: RJ-45 Connector. Integrated 4-port 10/100BaseT switch. Connects to a hub, switch or NIC-equipped PC in your network. The LAN ports has Auto-MDI/MDIX feature that supports either crossover or straight-through cables.
- **WAN**: RJ-45 connector. Connects to the Cable/ADSL Modem. The WAN port also has Auto-MDIX feature that supports either crossover or straight-trough cables.
- **reset**: Dual-function button:

- *Reboot*. Insert a straightened paperclip into the **reset** hole to press the button. This will reboot the Wireless Broadband Router.
- *Restore to the factory defaults*. Insert a straightened paperclip into the **reset** hole to press the button. Keep pressing and power cycle (off and on) the device. Wait for at least 5 seconds to release the button. Then wait for the device to finish booting. This operation erases all previous settings entered by the administrator.

2.2 Hardware Connection

Choosing a Place for the Wireless Broadband Router

- Place the device close to the power outlet for the cable to reach it easily.
- Avoid placing the device in places where people may walk on the cables.
- Keep the device away from direct sunlight or heat sources.
- Place the device on a flat and stable stand.

Connecting the Wireless Broadband Router

Prior to connecting the hardware, make sure to power off your Ethernet device, Cable/ADSL modem and Wireless Broadband Router. Then follow the steps below to connect the related devices.

Step 1 **Connecting wired device to the LAN port.**

Attach one end of the Ethernet cable with RJ-45 connectors to your hub, switch or a PC's Ethernet port, and the other end to the **LAN** port of the Wireless Broadband Router.

Step 2 **Connecting Cable/ADSL Modem to the WAN port.**

Connect the Ethernet cable attaching to your Cable/ADSL modem to the **WAN** port of your Wireless Broadband Router.

Step 3 **Connecting the power adapter.**

Connect the single DC output connector of the power adapter to the power jack on the back of the Wireless Broadband Router. Then connect the supplied power cord to the power adapter and the other end to an AC outlet.

Caution

Only use the adapter supplied with the Wireless Broadband Router. Connecting another adapter can cause permanent damage to the device.

The figure below illustrates a connection diagram example:

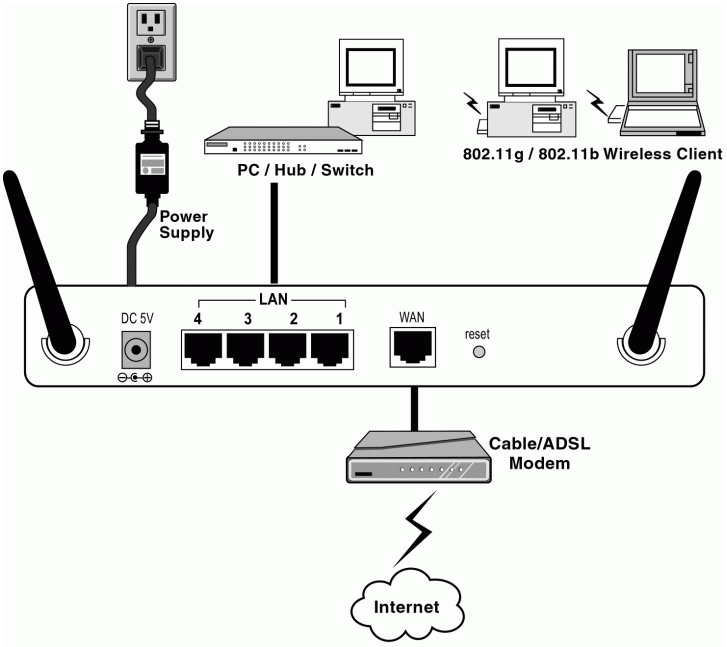


Figure 2-3 Typical Connection Diagram

3 Configuring Local Computer to Access the Wireless Router

This chapter describes how to configure a computer for initial connection to the device.

3.1 Overview

To access the Wireless Broadband Router's Web-based Configuration Utility, at least one properly configured PC must be connected to the device and reside on the same subnet with the Wireless Broadband Router. The easiest way to make the connection is attaching your host computer's network card directly to the LAN port of the device.

Whatever your connection method is, the computer's Ethernet /wireless interface must be on the same subnet as the router. As the Wireless Broadband Router is configured with these default values:

- **IP address**: 192.168.1.1
- **Subnet mask**: 255.255.255.0
- **DHCP server**: Enabled with the IP address pool from 192.168.1.100 to 192.168.1.150.

So you should set up your NIC or wireless adapter's TCP/IP settings as one of the following:

1. To use dynamic IP: Set your PC to be DHCP client to accept the dynamic IP from the router's DHCP server.
2. To use static IP: Set the IP address as **192.168.1.x** (x is between 2 and 254), subnet mask as **255.255.255.0** and the gateway as **192.168.1.1**

The default TCP/IP setting for Windows is acting as a DHCP client. Please proceed to the next section to verify or, if necessary, to configure the TCP/IP settings.

3.2 Setting up TCP/IP

Before proceeding, make sure your computer is equipped with Ethernet network card or wireless adapter and has appropriate network card driver and TCP/IP installed.

Note

1. If TCP/IP protocol is not installed on your PC, refer to Windows documentations for installation instructions.
2. For initial configuration, it' s recommended to connect only one PC directly to the LAN port on the Wireless Broadband Router.

For Windows 98/ME

Step 1 Click on the **Start** menu, point to **Settings** and click on **Control Panel**.

Step 2 Double-click the **Network** icon.

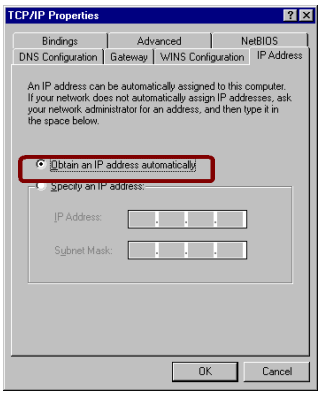
Step 3 In the **Network** window, highlight **TCP/IP** protocol for your NIC or wireless adapter and click **Properties**.

Step 4 Choose one of the methods as required:

Option A: Using DHCP

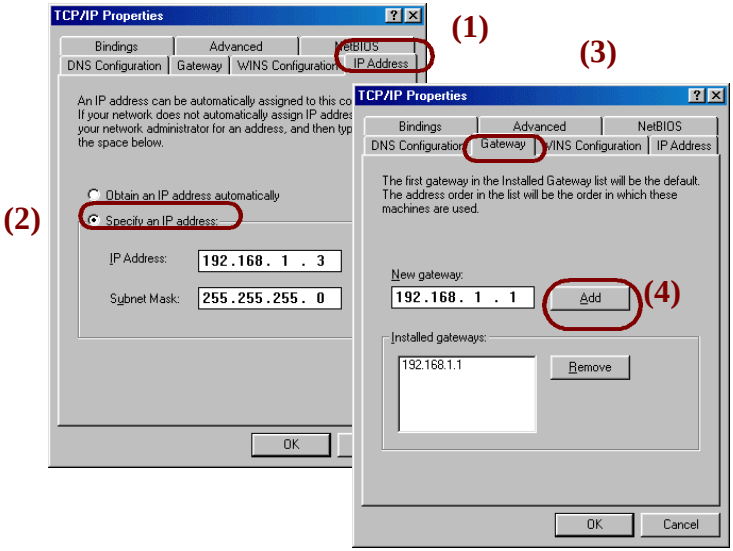
On the **IP Address** tab, select **Obtain an IP address automatically** and click **OK**.

Then an IP address will be automatically assigned to your computer.



Option B: Using Fixed IP Address

- On the **IP Address** tab, select **Specify an IP address**.
- Then set the IP address as **192.168.1.x** (x is between 2 and 254), subnet mask as **255.255.255.0**.
- Select the **Gateway** tab and set the gateway to **192.168.1.1**.



Step 5 Click **OK** twice to finish the configuration. If prompted to restart your computer, click **Yes**.

Check/Renew IP Address under Windows 98/ME

The following steps help you verify if your network adapter gets an IP address within the DHCP IP pool range (192.168.1.100 ~ 192.168.1.150 by default) of the router. If not, you may need to renew the IP information.

Step 1 From the **Start** menu, click **Run** to open the **Run** dialog box.

Step 2 Enter **winipcfg** in the dialog box and then click **OK**.

Step 3 Select the Ethernet or WLAN adapter from the drop-down list to show the IP address. If necessary, click **Release** and then **Renew** to get a new IP address.

For Windows 2000/XP

Step 1 Click on the **Start** menu, point to **Settings** and click on **Control Panel**.

Step 2 Double-click the **Network and Dial-up Connections** or **Network Connections** icon.

Step 2 Right-click the **Local Area Connection** icon for your NIC or wireless adapter and then click **Properties**.

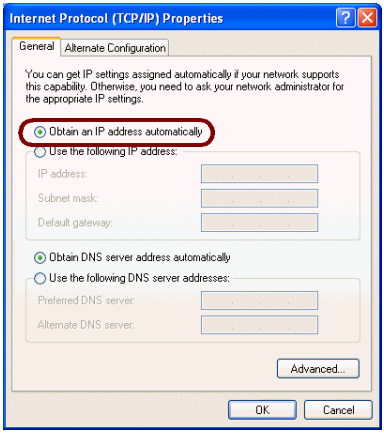
Step 3 On the **General** tab, highlight **Internet Protocol (TCP/IP)** and then click **Properties**.

Step 4 Choose one of the methods as required:

Option A: Using DHCP

On the **IP Address** tab, enable **Obtain an IP address automatically** and then click **OK**.

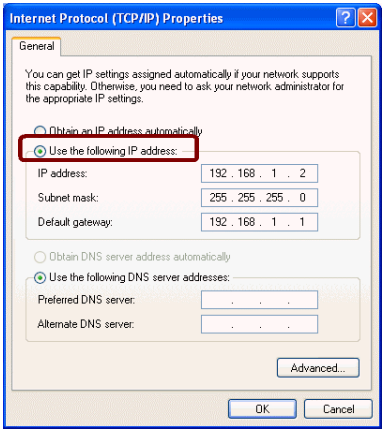
Then an IP address will be automatically assigned to your computer.



Option B: Using Fixed IP Address

Select **Use the following IP address** and enter these settings:

- **IP address**: 192.168.1.x (x is between 2 and 254)
- **Subnet mask**: 255.255.255.0
- **Default Gateway**: 192.168.1.1



Step 5 Click OK twice to finish the configuration.

Check/Renew IP Address under Windows 2000/XP

The following steps help you to verify whether the network adapter gets an IP address within the DHCP IP pool range (192.168.1.100 ~ 192.168.1.150 by default) of the router. If not, you may need to renew the IP information.

Step 1 Click **Run** from the **Start** menu to open the **Run** dialog box.

Step 2 Type **cmd** in the dialog box and then click **OK**.

Step 3 At DOS command prompt, type **ipconfig** to see the IP information from DHCP server.

Step 4 If you want to get a new IP address, type **ipconfig /release** to release the previous IP address and then type **ipconfig /renew** to get a new one.

3.3 Additional Settings for Wireless Client

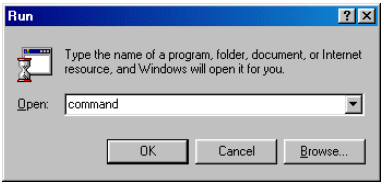
If you choose to access the router via a wireless client, also verify the following:

1. Make sure your PC is equipped with 802.11g or 802.11b wireless adapter and has appropriate WLAN card driver/utility and TCP/IP installed.
2. Set the wireless adapter to use appropriate TCP/IP settings as described in previous section.
3. Launch the wireless adapter's provided utility and verify that your wireless client is configured with these settings:
   - **Operation Mode**: Infrastructure
   - **SSID**: wireless
   - **Authentication**: Open
   - **WEP Mode**: Disabled

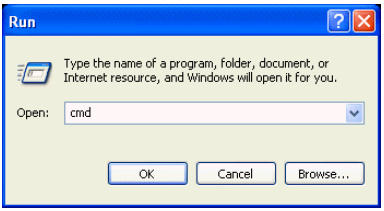
3.4 Checking Connection with the Wireless Broadband Router

You can use the PING command to verify whether or not the Ethernet/Wireless client can communicate with the device.

1. Open the DOS command window.
   - For Windows 98/Me: **Start** > **Run**. Type ***command*** and click **OK**.

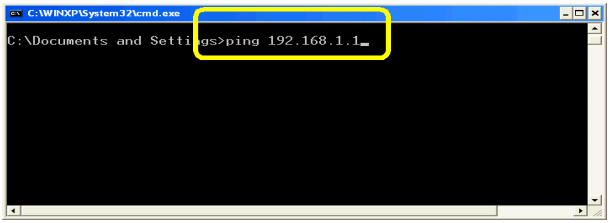


   - For Windows 2000/XP: **Start** > **Run**. Type ***cmd*** and click **OK**.

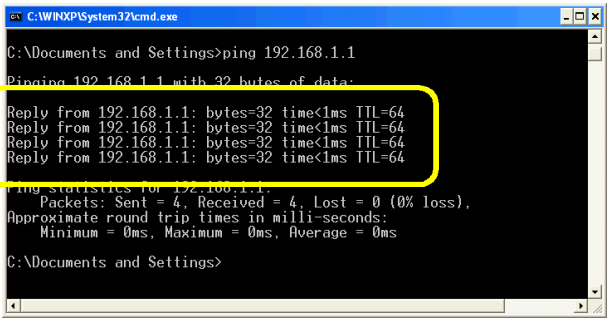


2. Type the ping command and enter the IP address of the Wireless Broadband Router. The factory default value is: 192.168.1.1. If you have changed the IP of the device, then type the new IP address of the Wireless Broadband Router.

   For example: **C:\ping 192.168.1.1**



3. The Wireless Broadband Router shall reply and a similar screen as below is shown.



This indicates the Wireless Broadband Router and the wired/wireless host can communicate. If you get a failed ping response such as:

Request time out
Request time out
Request time out
Request time out

or

Destination host unreachable
Destination host unreachable
Destination host unreachable
Destination host unreachable

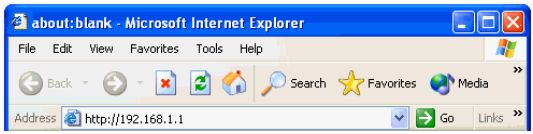
Then the connection has failed. Verify whether the network setting is correct. For Ethernet client, also check the cable between the router and the PC. Restart the computer if necessary.

4 Web Configuration

4.1 Accessing Web-Based Configuration Utility

Once your PC is properly configured as described in Chapter 3 “Configuring Local Computer to Access the Wireless Router,” you can proceed to setup the initial web configuration:

1. Start your Web browser and type **http://192.168.1.1** in the Address field. This address is the default private IP of your router.



Note

If the router’ s LAN port has been changed with new IP address, enter the new IP address instead.

2. When prompted with the following screen, leave the username empty and enter the default password of **admin**.

After successful login, you will be able to see the Wireless Broadband Router's web-based configuration utility. From now on the Wireless Broadband Router acts as a Web server sending HTML pages/forms at your request. You can click the menu options at the top to start the configuration task.

Making the Changes Effective

After the settings have been customized, click the **Apply** button, the Wireless Broadband Router will register and commit the new settings. Wait for a few seconds for the device to commit changes to permanent storage. During this process, do not power on or off the Wireless Broadband Router, otherwise permanent damage may occur to the device.

After the settings have been registered, the screen will return to the previous page and the settings will be in effect. You may then proceed with other configuration tasks.

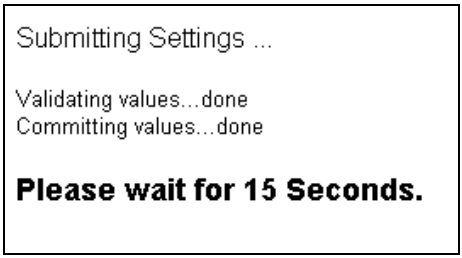


Figure 4-1 Applying Changes

4.2 General Information

System Overview in the menu bar, displays general information of the Wireless Broadband Router, including the System, WAN/LAN interface, Wireless LAN interface, and Connection Log information (available only when operating in router mode). Under this screen there are three buttons.

- **Update**. Refreshes the web-page utility to display the current status of the Wireless Broadband Router' s settings.
- **Release**. Available only when operiating as DHCP client. Releases the current WAN port information such as IP Address, Subnet Mask, Domain Name...assigned by a DHCP server.
- **Renew**. Available only when operating as DHCP client. Requests new information for the WAN port such as IP Address, Subnet Mask, DNS... from the DHCP server.

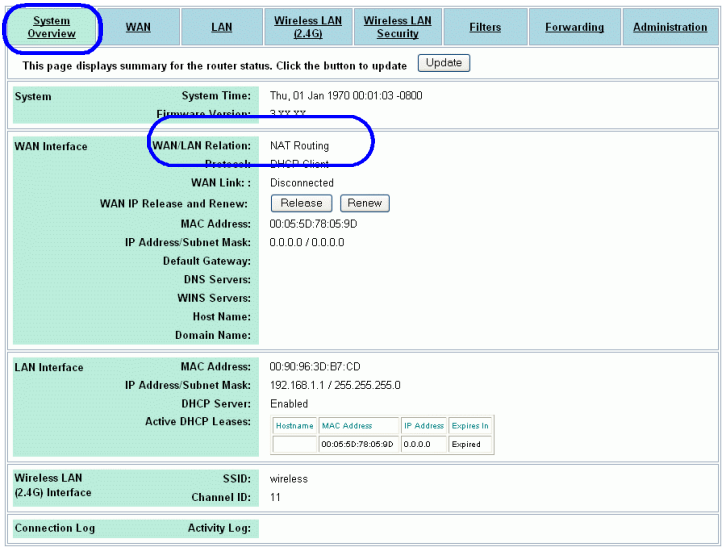


Figure 4-2 System Overview – Router Mode

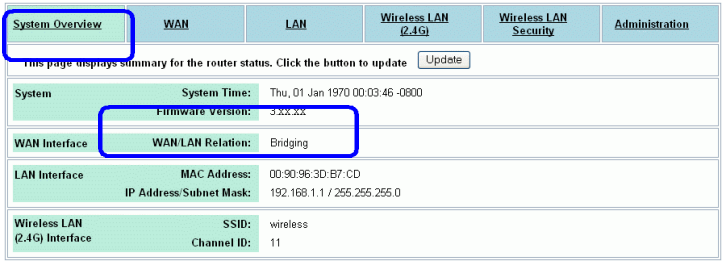


Figure 4-3 System Overview – Bridge Mode

4.3 WAN Configuration – Router Mode

Prior to configuring the Wireless Broadband Router, you must decide whether to configure the device as a router or as a bridge. This section only describes how to set up the device to act as a router. For bridge configuration, see "4.4 WAN Configuration – Bridge Mode" for instructions.

NAT Routing allows the device to act as a router and use the built-in NAT function to translate your multiple private IP addresses into a single public IP address. However, only outgoing requests are allowed to pass through the device unless you specify otherwise, see "4.8 Filters (Router Mode Only)". Outside users cannot see your private local IP addresses. This leaves your home or business network hidden from outside intruders, see "4.9 Forwarding (Router Mode Only)".

Click **WAN** in the configuration menu to enter the WAN configuration page and carry out the procedures below.

Part 1 Configuring general settings

1. **WAN/LAN Relation**: select the **NAT Routing** option (factory default option).
2. **Protocol**: select a protocol type to indicate how the Wireless Broadband Router connects with the existing network environment.
3. **MAC Address**: Leave the default values if it is not necessary to enter another MAC address. This field allows cloning another network adapter's MAC address to the Wireless Broadband Router's address. Some ISPs use the MAC address of NIC, which is connected to your Cable/ADSL modem, for static mapping and thus giving you the same IP address each time the Cable/ADSL modem requests for IP address for the Ethernet port. If this is the case, this feature eliminates the need of asking the ISP or network administrator to change the registered MAC address and you can still use the same given IP for the router's WAN port.

3. **Host Name**: If required, enter a host name for this router. Some ISPs only respond to a DHCP request with a valid "Host Name". If a host name is not necessary for your ISP/network environment, just leave it blank.

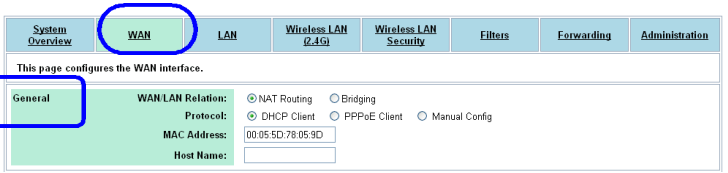


Figure 4-4 WAN Configuration – General

Part 2. Configuring protocol-specific settings

According to the Protocol selected above, enter the related parameters.

▶ *DHCP Client*

If DHCP Client is your option, no other configuration is needed. You may just click **Apply** to end your WAN settings. After the connection with the ISP is established, the information provided by the ISP will be displayed in the **Status** section.

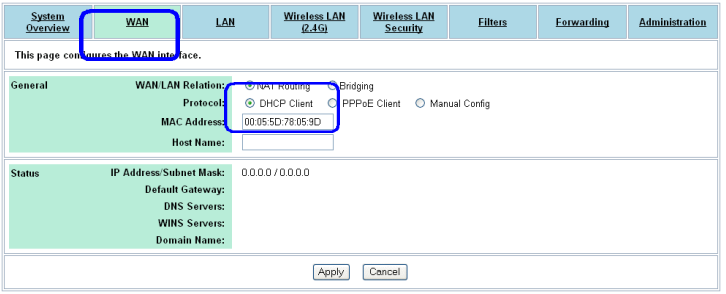


Figure 4-5 WAN Configuration – DHCP Client

▶ *PPPoE Client*

Theses parameters are provided by the Internet Service Provider.

Username/Password: Enter the username and password provided by the ISP used to log on to the Internet.

Connection Mode: Select your PPP connection from these options:

Keep Alive: This feature will keep your Internet connection always alive. The Wireless Broadband Router sends echo requests periodically to the ISP to prevent the connection from being terminated by the ISP.

Connect on Demand: If enabled, the router will trigger a PPP session for connection to the Internet if any client PC on your WLAN/LAN sends out a request for Internet access. However, the router automatically disconnects the PPP session after the WAN connection has been idle for the amount of time you specified in the **Max Idle Time** box (default, 300 seconds). If your Internet account is billed based on the amount of time of your Internet connection, you probably want to enable this option and enter an idle time value best suitable for your network.

MTU/MRU: Allows you to adjust the Maximum Transmission/Receive Unit in bytes for the WAN interface. The packets larger than the specified values will be fragmented before being transmitted. It's suggested not to modify the MTU/MRU settings unless instructed by the ISP.

After you finish the WAN settings, click **Apply** to enable the changes.

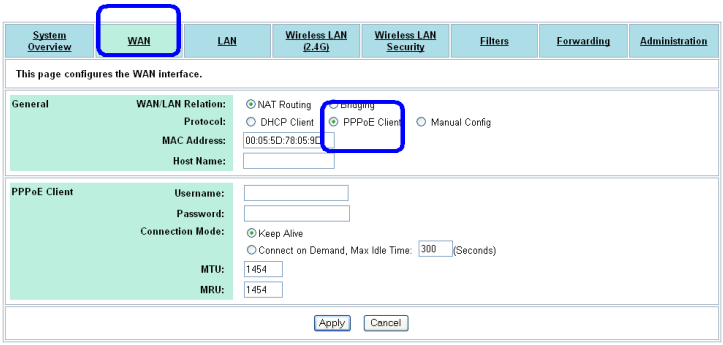


Figure 4-6 WAN Configuration – PPPoE Client

▶ ***Manual Config***

If Manual Config is your option, configure these fields as required by your ISP.

IP Address/Subnet Mask/Default Gateway: Enter the IP address, subnet mask, and default gateway given by the ISP in respective fields.

DNS Servers: Specifies the IP address of the Domain Name Server. Your LAN side DHCP clients use the DNS to map a domain name to its corresponding IP address and vice versa. Up to three DNS servers are allowed. If no DNS server is specified or the specified servers are not available, the router will automatically assign a DNS server to the DHCP clients.

WINS Servers: Optional for Windows Internet Name Service. Enter the IP addresses of WINS servers if required.

Domain Name: Optional. Enter the domain name for the router.

After you finish the WAN settings, click **Apply** to enable the changes.

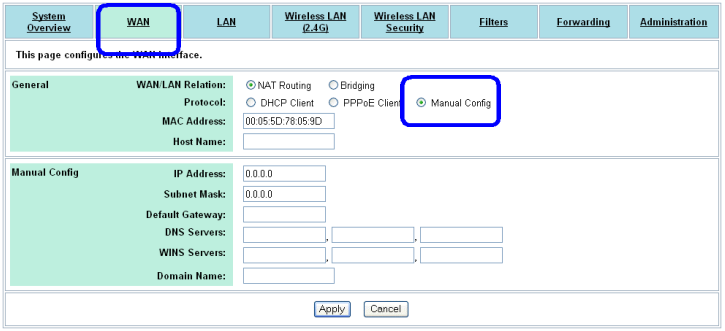


Figure 4-7 WAN Configuration – Manual Config

4.4 WAN Configuration – Bridge Mode

A bridge connects two or more LANs together and bases the forwarding decision on the MAC address. Under Bridge mode, filters

and forwarding are not applicable. To set up Wireless Broadband Router to operate in bridge mode, perform the procedures below.

Go to the WAN configuration page and select the **Bridging** option as the **WAN/LAN relation** and then click **Apply** to commit the changes.

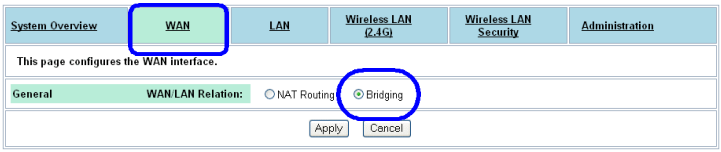


Figure 4-8 Enabling Bridging Mode

4.5 LAN Configuration

The Wireless Broadband Router communicates with the wired/wireless clients through its LAN port. The LAN configuration page allows you to define the private IP address and DHCP server (NAT Routing only) settings over the LAN interface.

▶ ***Manual Config***

IP Address/Subnet Mask. Enter the IP address and subnet mask for the Wireless Broadband Router LAN port. All local wired/wireless devices communicate with the device through this port. It is also the IP address of the Web-based Configuration Utility. By default, the IP address and subnet mask of the LAN port is **192.168.1.1** and **255.255.255.0** respectively. Note that if you change the private IP address and apply the changes, the PC from which you configure the router will lose the communication to the router. To reconnect, you will need to renew the IP address of the PC or change to an IP address compatible with the new LAN port IP address.

▶ ***DHCP Server* (Router Mode Only)**

Services: Select whether to enable DHPC service for LAN and WLAN. The Wireless Broadband Router implements a built-in DHCP (Dynamic Host Configuration Protocol) server on its LAN and WLAN interface, which dynamically assigns IP addresses to the DHCP clients on the LAN / WLAN. The DHCP server also provides a default gateway (the router's LAN IP address) and DNS addresses for DHCP clients to access the Internet. DHCP function spares you the hassle of manually assigning a fixed IP address to each PC on the LAN / WLAN. If you already have a DHCP server on your network you should disable this function. DHCP server is enabled by default.

Note

It is not allowed to have two DHCP servers running on one LAN at the same time. If you decide to enable the DHCP on this router, remember to disable the DHCP function of the other device.

If DHCP server is enabled, enter the fields below:

DHCP Lease Time: Specify the time that a network device can use a private IP address before the DHCP server reassigns the IP address.

IP Pool Range: Specify the starting and ending IP address of the IP address pool. Whenever a network device requests an Internet session, the router will allocate an unused IP address from this pool and lease them to the device for a specified amount of time.

▶ *LAN Spanning Tree Protocol* (Router Mode Only)

Select whether to enable or disable this function. Spanning Tree Protocol stops network loops from occurring in a bridged LAN. It finds the redundant link and closes it.

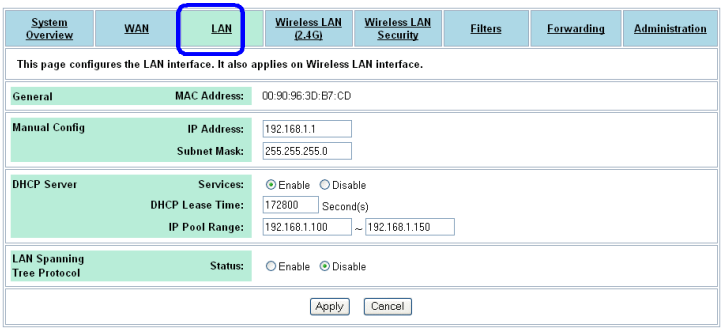


Figure 4-9 LAN Configuration – Router Mode

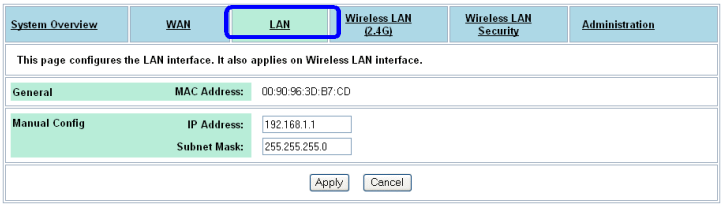


Figure 4-10 LAN Configuration – Bridge Mode

Viewing Current DHCP Assignments (Router Mode Only)

When DHCP server function is enabled, the router keeps a record of any machine (either Ethernet or Wireless node) that has leased IP from the specified IP pool. The DHCP lease table is displayed under **System Overview** page.

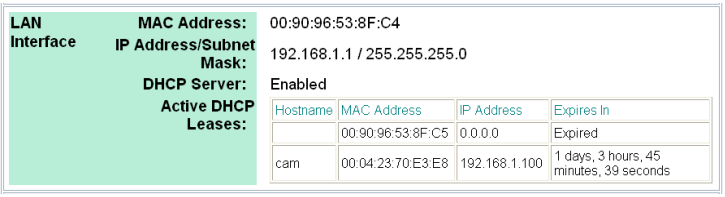


Figure 4-11 DHCP Lease Table

4.6 Wireless LAN (2.4G) Configuration

The Wireless Broadband Router implements Access Point capability, which connects wireless clients to a wired LAN. It allows wireless stations to access network resources and share the broadband Internet connection.

▶ ***Wireless Interface***: Displays the MAC address of the wireless interface.

▶ ***Basic Configuration***

SSID: Service Set ID. It uniquely identifies a logical network domain name of your WLAN. The default value is **wireless**.

Network Type: An **Open** AP will periodically broadcast its SSID to inform the wireless clients of its presence. When set to **Closed**, the Access Point does not broadcast its presence. Wireless clients must know in advance the SSID of the AP in order to establish the connection.

Country: Select the country where this device is operating. The AP uses only the legal frequency channels allowed in that regulatory domain.

▶ ***Wireless Bridge***

AP Mode: Select wireless operating mode of the Wireless Broadband Router. The Wireless Broadband Router can work as Access Point or Wireless Bridge.

- **Access Point**. When operating as an access point, the router provides connection between the wired and the 802.11 b/g wireless devices. This is the default operating mode.

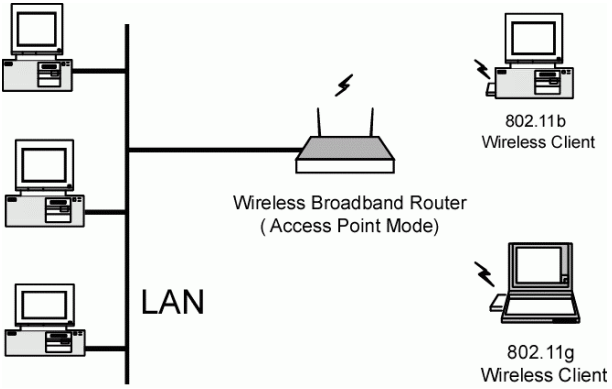


Figure 4-12 Access Point Mode

- **Wireless Bridge**. Provides wireless connectivity between two or more wired segment. When operating as Wireless Bridge, the device does not accept association request from wireless stations. All bridging devices must use the same channel in order to communicate with each other.

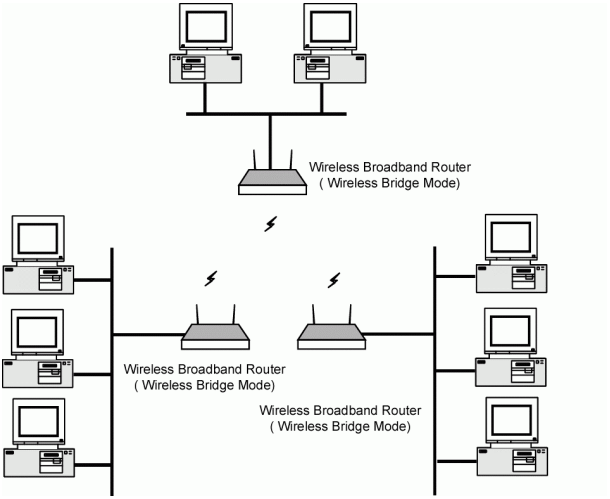


Figure 4-13 Wireless Bridge Mode

Bridge Restrict: Select whether to enable or disable this function. When set to enabled, all devices operating in Wireless Bridge mode must have others' Wireless Interface MAC addresses in their respective **Remote Bridges** table in order to establish the connection with each other (more secure). When set to disabled, only one device is required to have the **Remote Bridges** table filled with the Wireless Interface MAC address of other Wireless Broadband Router in order to establish the connection.

Remote Bridges: Enter the Wireless Interface's MAC address of the remote Wireless Broadband Router in this field. The remote device should also enter this Access Point's MAC address in its **Remote Bridges** table if the **Bridge Restrict** is enabled. Enter up to four MAC address of the remote bridge. To find the MAC address of this device, see **Wireless Interface**, in the beginning of this section.

▶ ***Access Control***

MAC Address Access Control: This AP has the capability to control the wireless client access based on the MAC address of the wireless client. The users have the flexibility to customize their own control policy based on these options:

- **Allow**: If selected, only the wireless client whose MAC address is in the **Allow List** is allowed to access this AP.
- **Deny**: If selected, only the wireless client whose MAC address is in the **Allow List** is NOT allowed to access this AP. Others clients are granted access.
- **Disable**: No access control. All the clients are allowed to access this AP.

When entering MAC address in the list, up to 16 MAC entries are allowed.

▶ ***Advanced Configuration***

It' s not recommended to modify the **Advanced** parameters unless specific requirement is needed. The parameters are described as below:

Radio: Choose whether to enable or disable the RF (Radio Frequency) of the AP.

Band: Displays the operating frequency of the AP.

Channel: Varies according to the specified **Country**.

Rate: The default setting, **Auto**, allows the AP to automatically use the fastest possible data rate. Selecting a specific rate forces the AP to transmit at a particular speed.

Basic Rate Set: The **Default** option uses 1 or 2 Mbps for 802.11b and 6, 12 or 24Mbps for 802.11g as the basic rate of your wireless network. The **All** option uses 1, 2, 5.5, 6, 9, 11, 12, 18, 24, 36, 48, or 54Mbps. The wireless clients must support the basic rate to successfully associate with the AP.

Fragment Threshold: It determines whether packets will be fragmented and at what size. On an 802.11 wireless LAN, packets

exceeding the fragmentation threshold are fragmented, i.e., split into, smaller units suitable for the circuit size. On the other hand, packets smaller than the specified fragmentation threshold value are not fragmented.

RTS Threshold: Request to send threshold. It specifies the packet size beyond which the AP invokes its RTS/CTS mechanism. Packets that exceed the specified RTS threshold trigger the RTS/CTS mechanism.

DTIM: Specifies the Deferred Traffic Indicator Map (DTIM) period. This value determines at which interval the AP will send its broadcast traffic. The default value is 3.

Beacon Interval: Defines the periodic interval at which the Access Point sends out a beacon.

54g™ Mode: This item allows you to choose from these communication options:

- **54g Auto**: Both 802.11g and 802.11b clients can communicate with this AP. The data rate will be automatically adjusted.
- **54g Performance**: Only 802.11g wirless clients can communicate with the AP.
- **54g LRS**: LRS stands for Limited Rate Support. This option is intended to support legacy clients (802.11b). Select this option if wireless clients are experiencing difficulties to associate with the AP. This option supports both 802.11g and 802.11b clients.
- **802.11b Only**: Both 802.11g and 802.11b clients can communicate with this AP. The data rate will be automatically adjusted to the one supported by the 802.11b standard.

54g Protection: Select Off or Auto. The default value is set to Off. When set to Auto, a protection mechanism will ensure that 802.11b wireless devices will connect to the Access Point when many 802.11g wireless devices are present. However, performance of your 802.11g wireless devices may be decreased.

Enable Xpress ™Technology: Select Off or Auto. When set to Auto, it increases the bandwidth availability that enables more

wireless clients to share the network. In other words, it improves wireless network efficiency and boosts throughput.

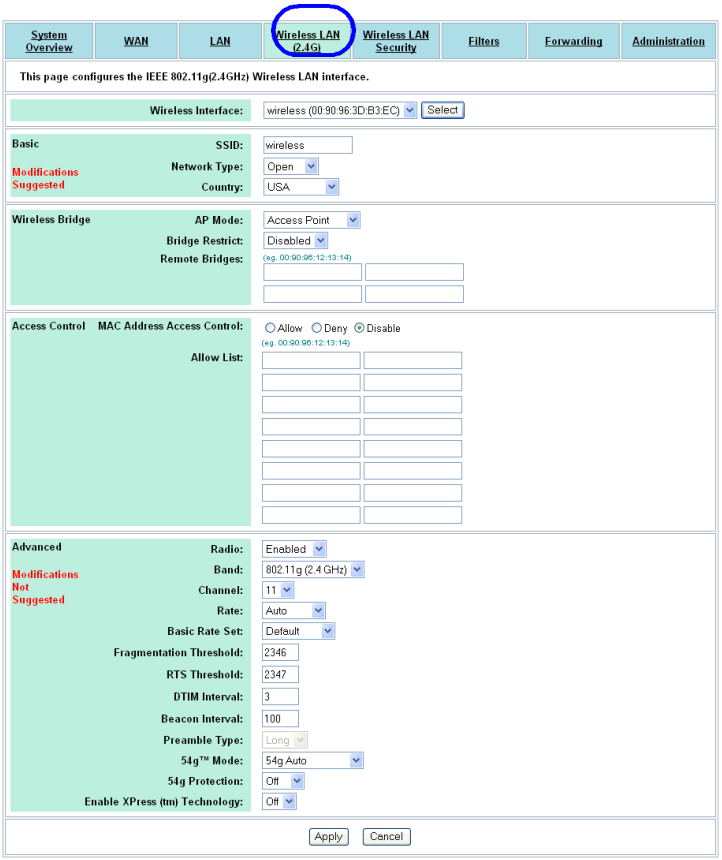


Figure 4-14 Wireless LAN (2.4 GHz)

4.7 Wireless LAN Security

This page configures the wireless security mode.

▶ *Network Authentication*

Network Authentication: Disabled by default. If the local network has an authentication server such as Radius server, the user can

enable this function by choosing either **802.1X** or **WPA**. This option fulfills the security that an enterprise needs. If the local network does not have an authentication server, it's recommended to use **WPA-PSK** (Pre-Shared Key). This option is commonly used in small office home office (SOHO) environments.

WPA Pre-Shared Key: If WPA-PSK is the network authentication option, enter a secret key. Check the table below for instructions when entering the key.

Format	Minimum Characters	Maximum Characters
ASCII	8	63
Hexadecimal	8	64

WPA Group ReKey Interval: For **WPA** and **WPA-PSK** only. Specifies the timer the WPA key must changes. The change is done automatically between the server and the client.

Radius Server: For **802.1X** and **WPA** only. Enter the IP Address of the authentication server, commonly the Radius server.

Radius Port: Enter the port number of the authentication server. The default port number is 1812.

Radius Key: Enter the same key as the Radius server's.

▶ ***WEP***

Data Encryption: Specifies the encryption mode that the AP uses to transmit the data. Encryption type changes according to the **Network Authentication** mode. Encryption protects your wireless network against eavesdropping.

- **Off**: The data is not encrypted when it is transferred from one station to another. This is the default option.
- **WEP**: Only for **802.1X** or when authentication is disabled. The data is encrypted with the WEP algorithm before being transmitted. If WEP is selected, enter the values in the **Network Key** fields.
- **TKIP**: Only for **WPA** and **WPA-PSK**. Temporal Key

Integrity Protocol (TKIP) utilizes a stronger encryption algorithm and includes Message Integrity Code (MIC) to provide protection against hackers.

- **AES**: Only for **WPA** and **WPA-PSK**. Advanced Encryption System (AES) utilizes a symmetric 128-Bit block data encryption. It's the strongest encryption currently available.

Shared Key Authentication: Authentication is a process in which the AP validates whether the wireless client is qualified to access the AP's service. Select **Optional** or **Required**.

- **Optional**: The authentication is done through a pseudo process, accepting all kinds of requests, mainly used in cases where connectivity is more important than security.
- **Required**: Utilizes WEP capability to further verify if a wireless client is authorized to share this AP's resource. If the client has the wrong key or no key, the authentication will fail and will not be allowed to associate with the AP.

If you select **Optional**, wireless stations with or without correct WEP keys can be authenticated by the AP.

If **Required** is selected, you must enable WEP function and define your WEP keys. The keys are used both to authenticate wireless clients and encrypt outgoing data.

Network Key 1~4: Enter one to four WEP keys in either ASCII or Hexadecimal format. You can use 64 bits or 128 bits as the encryption algorithm.

Note that when using Hexadecimal format, only digits 0-9 and letters A-F, a-f are allowed. Valid key length for each encryption type is as below:

Key Length	HEX Format	ASCII Format
64 Bit	10 hexadecimal digits	5 ASCII characters
128 Bit	26 hexadecimal digits	13 ASCII characters

Current Network Key: Aside from entering the WEP keys, select one of the entered keys to encrypt the data before transmission. The AP always transmits data encrypted using the selected WEP Key. The receiving station will use the key number to determine which

key to use for decryption. If the key value does not match with the transmitting station, the decryption will fail. To ensure successful decryption, have your wireless stations set identical key tables.

Note

All Wireless Stations must use identical encryption/authentication method and Key values (same key position in its key table) to ensure successful data transmission.

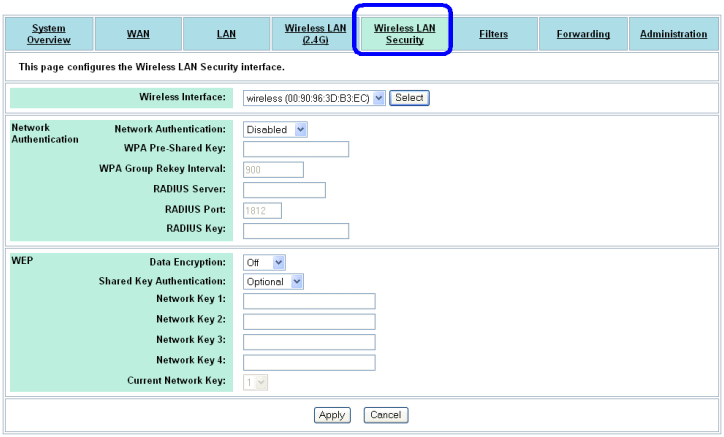


Figure 4-15 Wireless LAN Security

4.8 Filters (Router Mode Only)

This page configures the LAN filters. The LAN machines blocked by the filters will not be able to communicate through the WAN. The administrator can block the LAN users from accessing some Internet services such as FTP, SMTP (e-mail), HTTP or configure the filter policy based on MAC address of the clients. Regardless of the filtering policy, LAN users will be able to communicate with each other and with the router itself.

▶ ***General***

Firewall: Select whether to Enable or Disable this function.

WAN Port: The default value is 80. This field defines the WAN port of the Wireless Broadband Router.

When accessing the web page utility using a non-80 port, the router's HTTP service (Web-based Configuration Utility) will be accessible via the router's WAN port IP address following by a colon and the non-80 port:

http://<WAN IP address>:<non-80 port>

For example, if *1234* is entered, a remote user can access and configure the router at *http://203.1.2.3:1234* where *1234* indicates the WAN port number.

Syslog IP Address: If applicable, enter the IP address of the syslog server. This feature informs the system administrator of all accepted/denied attempts to access the WAN port.

Connection Logging:

- **Disabled**. The log feature is disabled.
- **Denied**. All denied requests is sent to log server.
- **Accepted**. All accepted requestes is sent to the log server.
- **Both**. All denied and accepted request is sent to the log server.

▶ *LAN MAC Filter*

LAN MAC Filter Mode: This filter mode is based on the MAC address of client computers. By default, this feature is disabled. To activate this function, select:

- **Allow**: Requests from computers with matching MAC address specified in the **LAN MAC Filters** table is allowed to pass through the WAN port.
- **Deny**: Requests from computers with matching MAC address specified in the **LAN MAC Filters** table is NOT allowed to pass through the WAN port.

LAN MAC Filters: Enter the MAC address of the computer(s) (e.g. 00:90:96:12:13:14) in the table. To find the MAC address of the client computers, see the section "Viewing Current DHCP Assignments (Router Mode Only)" on page 30.

▶ *LAN Client Filter*

LAN Client Filters: The filter mode is based on the IP address of the client' s computers. Enter the following information:

Label	Description
LAN IP Address Range	The range of IP addresses of the LAN machines from which packets will be affected.
Protocol	Select TCP or UDP. For example, if FTP services shall be blocked, then select **TCP**.
Destination Port Range	Specifies the start and the end of the Port range that shall be blocked. For example, 21 ~ 21 blocks FTP services. Clients cannot access any application from this port.
From Day / To Day	Select the days of the week this filter shall apply.
From Hour / To Hour	Select the hours of the day this filter shall apply.

Enabled	Check this option to enable this setting and remember to click **Apply** to save and activate the changes.

Note

LAN MAC Filter demands higher priority than **LAN Client Filter**.

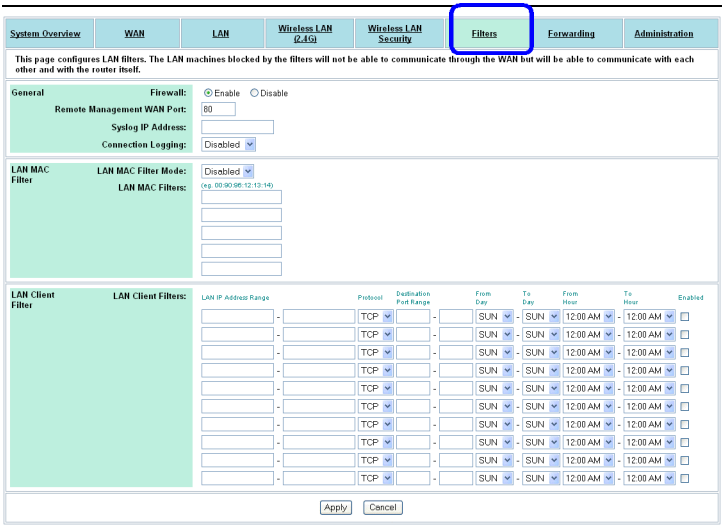


Figure 4-16 Filters

4.9 Forwarding (Router Mode Only)

This page allows you to configure the Forwarding feature. Unlike Filter, which governs outgoing traffic, Forwarding is used to control external access to the local network. This is commonly used when you have publicly accessible virtual servers on your local network.

By default, forwarding entry is empty and any external access to your LAN is blocked. Once you define a forwarding entry, incoming packets (identified by its port number) that match your Forwarding criteria will be forwarded to the port range of the specified local machine. Otherwise packets are blocked. Forwarding serves as a

measure of security that protects your network from hazardous packets.

However, if you designate a DMZ (De-Militarized Zone) IP Address, incoming packets that do not match the forwarding criteria will be redirected to the DMZ IP address. That is, forwarding demands a higher priority than DMZ.

▶ ***DMZ IP Address***

DMZ allows specifying a local machine to be exposed to the Internet. If you specify a DMZ host here, the incoming packets containing no port information specified in the Forwarding table are forwarded to the DMZ host.

▶ ***Port Forwards***

Define the port range for the incoming TCP/UDP service you want to forward to a specific computer on the LAN side.

Item	Description
Protocol	Specifies the incoming packet protocol. TCP or UDP
WAN Port Start/End	Enter the port range for the incoming request you want to forward.
LAN IP Address	Enter the IP address of the virtual server to which packets are forwarded.
LAN Port Start/End	Enter the port range for the service on the virtual server.
Enabled	Select this option and click **Apply** to activate the configuration.

▶ ***Application Specific Port Forwards***

Some applications, such as Internet games and videoconferencing, require multiple ports for data transmission. If there is any application that cannot be properly accessed on the private network, you may need to establish application specific port forwarding for that application. Essentially, application specific port forwarding tells

the Wireless Broadband Router how to direct traffic across networks.

Item	Description
Outbound Protocol	Specifies the protocol the application uses. TCP or UDP
Outbound Port Start/End	Enter the WAN port range from which data that follows that particular protocol should be sent.
Inbound Protocol	Select the protocol (UDP or TCP) for the port.
Inbound Port Start/End	Enter the WAN port range from which data that follows that particular protocol will return.
To Port Start/End	Enter the LAN port range.
Enabled	Select this option and click **Apply** to activate the configuration.

▶ ***Static Routes***

In this section, the user can define static routes for incoming packets. To define a static route, enter the following information:

Item	Description
IP Address	Enter the network address of the destination computer.
Subnet Mask	Enter the subnet mask of the destination computer's network address
Gateway	Enter the router's IP for the destination computer.
Metric	Enter the number of transmission hops (range 0 ~ 15).
Interface	Select whether the destination computer is located on the WAN or LAN interface.

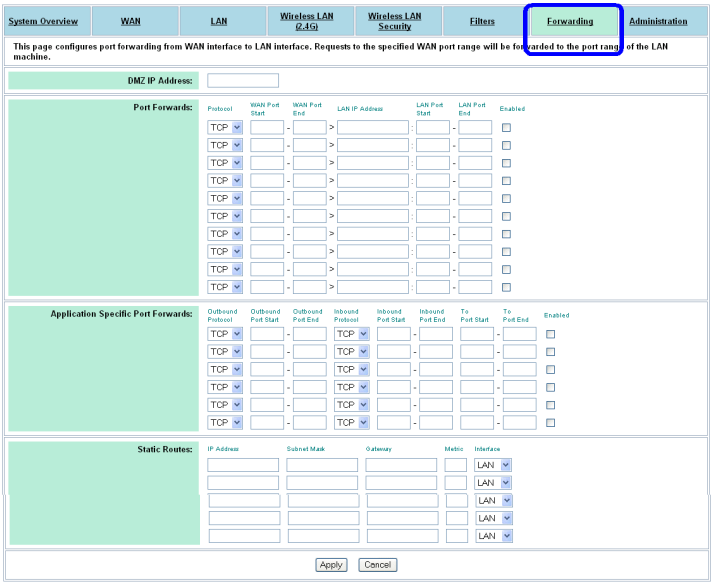


Figure 4-17 Forwarding

5.0 Administration

This page allows the administrator to perform the following settings:

▶ *System Clock*

Network administrators may synchronize date and time among network devices by synchronizing the local clock to an available NTP (Network Time Protocol) server.

NTP Server: Enter IP address of the NTP server. Up to three entries are allowed.

Time Zone: From the drop-down menu, select a time zone according to your geographic location.

▶ ***Management Setup***

Specifies the username and password that grant the access to the Wireless Broadband Router' web page. By factory default, the user name is empty and the password is **admin**.

Username: Enter the username (case sensitive).

Password/Re-enter Password: Enter the password (case sensitive).

UPnP: UPnP stands for Universal Plug and Play. Select whether to enable or disable this feature. This function automatically opens the required ports to support voice and video applications such as Windows Messenger, multi-player games, and real-time communications.

▶ ***Firmware Upgrade***

From time to time, the vendor may release new firmware for the Wireless Broadband Router. To upgrade, download the required firmware file to your PC and follow the steps below:

1. In the **Locate New Firmware** field, click **Browse** to locate the downloaded firmware file.
2. Click the **Upgrade** button to start the upgrade and wait for a few seconds. You will return to the Administration page when the process is complete. After upgrading, your customized configuration still remains.

Caution

Do not interrupt the upgrade process; otherwise it may cause permanent damage to the Wireless Broadband Router.

Figure 4-18 Upgrading

After upgrading, the new firmware version number is displayed in **Current Firmware version** field.

▶ *Restore Factory Defaults*

All settings set by the administrator will be erased. This option restores all the settings back to factory defaults. To perform this operation, click the **Restore** button and then wait for a few seconds. You will return to the Administration page when the process is complete. This feature is basically the same as resetting via the reset button (see "Rear Panel and Connector") on the device but it allows you to remotely perform the reset task.

▶ *System*

Reboot: Reboot the Wireless Broadband Router. This feature is basically the same as resetting via the Load Default button (see "Rear Panel and Connector") on the device but it allows you to remotely perform the reset task.

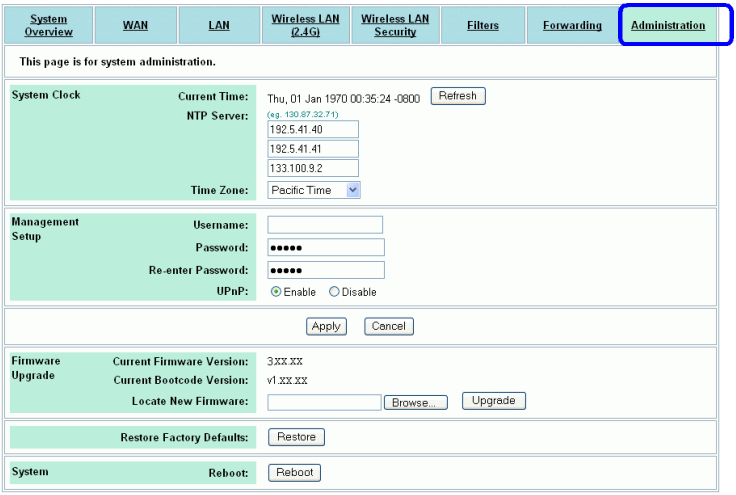


Figure 4-19 Administration

5 Troubleshooting

I cannot access the Web-based Configuration Utility from the Ethernet computer used to configure the router.

- Check that the LAN LED is on. If the LED is not on, verify that the cable for the LAN connection is firmly connected.
- Check whether the computer resides on the same subnet with the router's LAN IP address.
- If the computer act as a DHCP client, check whether the computer has been assigned an IP address from the DHCP server. If not, you will need to renew the IP address. See the check/renew IP address section under '3.2 Setting up TCP/IP' for instructions.
- Use the ping command to ping the router's LAN IP address to verify the connection.
- Make sure your browser is not configured to use a proxy server.
- Check that the IP address you entered is correct. If the router's LAN IP address has been changed, you should enter the reassigned IP address instead.

I can browse the router's Web-based Configuration Utility but cannot access the Internet.

- Check if the WAN LED is ON. If not, verify that the physical connection between the router and the DSL/Cable modem is firmly connected. Also ensure the DSL/Cable modem is working properly.
- If WAN LED is ON, open the **System Overview** page of the Web configuration utility and check the status group to see if the router's WAN port has successfully obtained an IP address.
- Make sure you are using the correction method (DHCP client, PPPoE client, or Manual Config) as required by the ISP. Also ensure you have entered the correct settings

provided by the ISP.

- For cable users, if your ISP requires a registered Ethernet card MAC address, make sure you have cloned the network adapter's MAC address to the WAN port of the router. (See the **MAC Address** field in **WAN** page.)

My wireless client cannot communicate with another Ethernet computer.

- Ensure the wireless adapter functions properly. You may open the **Device Manager** in Windows to see if the adapter is properly installed.
- Make sure the wireless client uses the same SSID and security settings (if enabled) as the Wireless Broadband Router.
- Ensure that the wireless adapter's TCP/IP settings are correct as required by your network administrator.
- If you are using a 802.11b wireless adapter, check that the **54g™ Mode** item, in **Wireless LAN (2.4G)** page, is not configured to use **54g Performace**.
- Use the ping command to verify that the wireless client is able to communicate with the router' s LAN port and with the remote computer. If the wireless client can successfully ping the router's LAN port but fails to ping the remote computer, then verify the TCP/IP settings of the remote computer.

6 Specification

6.1 Hardware

- 125MHz MIPS CPU
- 16MB SDRAM
- 4MB Flash Memory
- 802.11g: Broadcom (BCM4306, BCM2050)
- Two external antennas for wireless technology

Interface

- One 10/100 Base-TX RJ-45 auto sensing and crossover Ethernet WAN port for Broadband connection (Cable/DSL or direct Ethernet)
- Four RJ-45 LAN ports for 10/100Base-TX auto sensing & crossover Ethernet Switch LAN connection
- 802.11g wireless LAN
- Two external antennas for wireless technology

Physical

- Front Panel: 7 LEDs (Power x 1, LAN x 4, WAN x 1, Wireless x 1)
- Back Panel: Reset button, Power Jack, RJ-45 LAN Port x 4, RJ-45 WAN Port x 1
- Dimensions: 145 mm(L) x 240 mm(W) x 40 mm(H)
- Case type: Lay down

Power Adapter and Environmental Requirement

- DC Adaptor: Output 5V DC, 2A
- Temperature: 0 to 40°C (operation), -20 to 70 °C (storage)
- Relative Humidity: 5% to 90% (non-condensing)

Electromagnetic Compliance

- FCC Part 15 Class B
- CE
- EMI/Immunity: VCCI class B
- PTT: JATE

6.2 Software

WAN Port Features

- PPPoE (PPP over Ethernet) Client with Keep Alive/Connect On Demand Support
- PAP and CHAP Authentication
- DHCP Client
- MAC Address Cloning
- Settable and Changeable IP Address

LAN Port Features

- DHCP Server
- Settable and Changeable IP Address

Router Features

- NAT
- Firewall Support
- Bridge Mode Support
- 802.1D Spanning Tree Bridging
- IP Filtering, IP Forwarding
- DMZ Hosting
- DNS Forwarding
- UPnP Support
- Microsoft NetMeeting Passthrough Support
- Microsoft XP Messenger Passthrough Support

Security Features

- PAP and CHAP Authentication
- ASCII/HEX Format 64/128 Bit WEP Key for Wireless LAN
- Allow/Deny List for Wireless LAN
- Supports IP packets filtering based on IP address, port number, and protocol

Wireless LAN Features

- Fully compatible with 802.11g standard
- Direct Sequence Spread Spectrum (DSSS) technology exploitation
- Seamless roaming within wireless LAN infrastructure
- Low power consumption via efficient power management

Configuration and Management Features

- Configurable through Web Browser via WAN/LAN
- Software Upgrade
- DHCP Server function for IP distribution to local network users
- NTP
- Event Log

7 Appendix A

Technical Support

E-mail: support@airlinkplus.com

Toll Free: 1-888-746-3238

Web Site: www.airlinkplus.com