IEEE 802.11a+g WLAN Router

USER'S GUIDE

VERSION 2.0, JULY. 2004

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Chapter 1

Introducing the 802.11a+g Router

This manual gives a basic introduction to 802.11a+g Wireless Router. It provides information to configure the 802.11a+g Router to operate in common applications such as connecting to the Internet.

We'll describe how to use your web browser to configure the 802.11a+g Router and to perform various management functions, e.g. upgrading the software, or viewing the system log, a task that can be useful in ongoing operations.

This manual consists of the following chapters and appendixes:

Chapter One, *Introductio*n, summarizes features and capabilities of the 802.11a+g Router.

Chapter Two, *Installing the 802.11a+g Router*, gives steps you should follow to install the 802.11a+g Router and configure your PCs.

Chapter Three, *Configuring the 802.11a+g Router*, describes how to log in to the Web Manager, the browser screen, and steps needed to configure your 802.11a+g Router for specific applications. It gives easy-to-follow instructions for quick Internet access and provides a guide to basic 802.11a+g Router configuration.

Chapter Four, *Advanced Configuratio*n, provides information on advanced router configuration.

Chapter Five, *Managing your 802.11a+g Router*, explains other management features of the 802.11a+g Router.

Overview of the 802.11a+g Router

The 802.11a+g Router is a small desktop router that sits between your local Ethernet network and a remote network (e.g., the Internet). The 802.11a+g Router contains a WAN port connecting to an external ADSL/Cable modem, a four-port 10/100Mbps Ethernet switch for connection to PCs on your local wired network, and two wireless interfaces for connection to your local wireless network: one supports 802.11a, another can be configured to support either both 802.11b and 802.11g or 802.11g only (both radios support a data rate of up to 54 Mbps).

Data comes into the 802.11a+g Router from the local wired and wireless LAN and then is "routed" to the Internet, and vice versa.

802.11a+g Router Applications

ACCESSING THE INTERNET

The most common use of the 802.11a+g Router is to provide shared Internet access to allow everyone on your LAN to surf the web and send/receive emails or files. The 802.11a+g Router can automatically acquire a public IP address when connecting to the Internet. In turn, it will automatically assign IP addresses to PCs (requesting DHCP client devices) on your LAN - you don't have to apply for and assign IP addresses to PCs on your network.

ACCESSING SERVERS FROM THE PUBLIC NETWORK

If you want special servers to be accessible to remote users across the Internet (e.g., an e-mail server, an FTP server, or a web server), you can configure the 802.11a+g Router to *proxy* the service using its (public) IP address. It means a remote user can access the server by using the 802.11a+g Router's IP address. Upon receiving a request, the 802.11a+g Router will re-direct the request to the actual server on your local network.

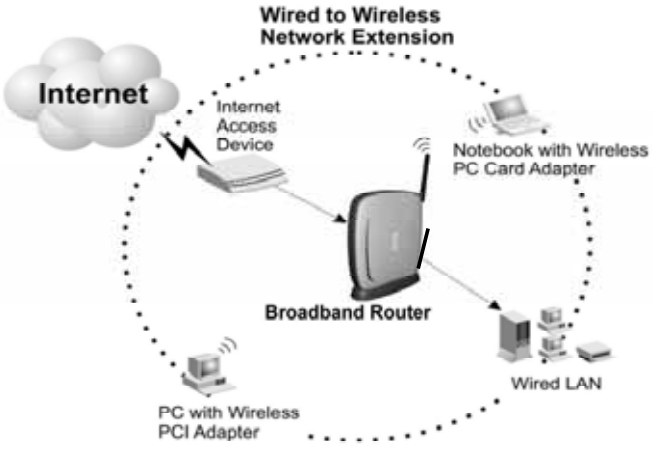
OPERATING AS AN ACCESS POINT

Additionally, the Wireless Router can also be configured as an Access Point, and acts as the central point of your local wireless network supporting a data rate of up to 54 Mbps. It allows client devices on

your wireless network to access the Internet, to communicate with other wireless devices on your wireless network, or to communicate with devices on your wired LAN network.

Since 802.11g is based on the same 2.4GHz radio band as the 802.11b technology, the 802.11a+g Router can inter-operate with existing 11Mbps 802.11b devices. Therefore you can protect your existing investment in 802.11b client cards, and migrate to the high-speed 802.11g standard as your needs grow.

Besides, the 802.11a+g Router also provides connection to 802.11a client devices. It can provide both 802.11a and 802.11b/g connections simultaneously.



Making WLAN Connections

A Security Overview

More and more people are concerned about protecting your local network from the Internet. The 802.11a+g Router provides several ways to keep your network secure:

- Devices on your wired or wireless network are assigned private IP addresses; therefore remote users from the Internet cannot see nor access them.
- The 802.11a+g Router implements IP packet filtering with SPI (Stateful Packet Inspection) capabilities, which you can use to selectively filter (discard) packets to/from the Internet.
- You can selectively restrict management from remote devices.

To address the growing security concern in a wireless LAN environment, different levels of security can also be enabled in the 802.11a+g Router, including:

- To disable SSID broadcast so to restrict association to only client stations that are already pre-configured with correct SSIDs
- To enable WEP (Wireless Encryption Protocol) encryption to implement privacy of your data
- Support of Access Control List to allow you to grant/deny access to/from specified wireless stations (using MAC addresses)
- Provisioning of centralized authentication through 802.1x and RADIUS Server(s).

- To enable WPA (WiFi Protected Access) to assure authorized access as well as to implement privacy of your data. WPA comes with two modes: 802.1x for enterprise users and PSK (Pre-Shared Key) for SOHO users.

802.11a+g Router Features

- Compliant with 802.11a, 802.11b, and 802.11g standards with roaming capability
- Support of NAT for multiple users to share Internet access
- IP routing (RIP1/RIP2) support
- VPN (Virtual Private Network) support for PPTP pass-through
- Support of PPPoE and PPTP client function for xDSL connections
- Support of Internet Games (WarCraftIII, AOEII) pass-through.
- Support of the Virtual Server function
- Support of the standard Access Point mode for connection to wireless clients
- Built-in DHCP server to assign IP addresses to DHCP client devices on both wired and wireless LAN
- Multiple security measures: to enable IP packet filtering, to disable SSID broadcast, to define Access Control List, to enable WEP based encryption (up to 152 bits), to enable WPA, plus enhanced Security with 802.1x using a primary and a backup RADIUS Server
- Extensive monitoring capability such as event logging, traffic/error statistics monitoring
- Easy configuration and monitoring through the use of a Web-browser based GUI (only support IE6.0 or above) or SNMP commands from a remote SNMP management station
- Setup Wizard for easy configuration/installation

Setting Up the device

A local PC on either the wired or wireless LAN network can manage the 802.11a+g Router. To do this, the 802.11a+g Router must have an IP address, which can be statically configured, or is dynamically obtained from a DHCP server on the LAN.

Chapter 2

Installing the 802.11a+g Router

This section describes the installation procedure for your 802.11a+g Router. It starts with a summary of the content of the package you have purchased, followed by steps of how to connect and power up your 802.11a+g Router. Finally, it describes how to configure a Windows PC to communicate with your 802.11a+g Router.

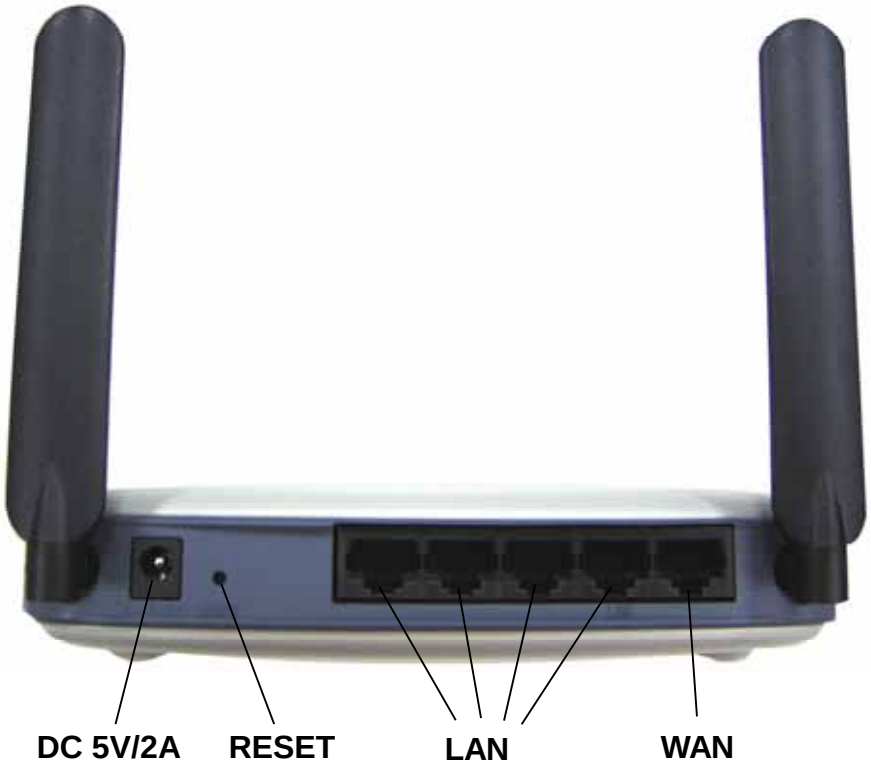
What's in the Box?

The 802.11a+g Router package comes with the following items:

- One 802.11a+g Router
- One 5V DC/2A power adapter with a barrel connector
- One CD contains 802.11a+g Router User' Guide

A physical look at the back panel

The following illustration shows the rear panel of 802.11a+g Router.



(1) 4 RJ-45 10/100 Switch connectors for connecting to PCs and workstations or connecting external Ethernet hub, or switch with auto-sensing.

(2) 1 RJ-45 WAN connector for connecting to Internet via ADSL/Cable modem.

(3) 1 DC 5V/2A power connector for connecting through a DC power adapter (included as part of the product) to the wall power outlet.

(4) 1 Reset button to restore the device back to the factory settings.

A physical look at the front panel

The LEDs on the front of the 802.11a+g Router reflect the operational status of the unit.

802.11a+g Router LED Description

Label	LAN	WAN	11g (WLAN)	11a (WLAN)	Power
Steady Green	Link is active	Link is active	Link is active	Link is active	System boot-up OK
OFF	No LAN connection	No connection	Radio off	Radio off	No Power
Flashing Green	XMT/RCV Data	XMT/RCV Data	XMT/RCV Data	XMT/RCV Data	Under boot-up

Connecting the Cables

Follow these steps to install your 802.11a+g Router:

Step 1. Connect ADSL/Cable modem to the Wireless Router WAN port using CAT5 UTP LAN cable.

Step 2. Connect a PC/Workstation to one of the LAN ports of the Wireless Router.

Step 3. Connect one end of the DC adapter to the Wireless Router and plug the other end into an electrical outlet.

High Level Configuration Steps Required for the 802.11a+g Router

This section describes configuration required for the 802.11a+g Router before it can work properly in your network.

Normally, devices on both LANs (except for servers) are configured to obtain their IP addresses automatically. Depending on whether there is a separate DHCP server available in your LAN environment network, thus to determine if you need to enable the built-in DHCP server in the Wireless Router. The following configuration step assumes that the router's built-in DHCPS will be used.

Additionally, since you need to perform various configuration changes to the 802.11a+g Router, including the SSID, Channel number, the WEP key, …, etc., it is necessary to associate a fixed IP address with the 802.11a+g Router, which is why the 802.11a+g Router will be shipped with a factory default private IP address of 192.168.1.1 (and a network mask of 255.255.255.0).

Setting up a Windows PC or wireless client as DHCP clients

The following will give detailed steps of how to configure a PC or a wireless client to "obtain IP addresses automatically". For other types of configuration, please refer to the corresponding user manual.

For the case of using a LAN attached PC, the PC must have an Ethernet interface installed properly, be connected to the 802.11a+g Router either directly or through an external LAN switch, and have TCP/IP installed and configured to obtain an IP address automatically from a DHCP server in the network.

For the case of using a wireless client, the client must also have a wireless interface installed properly, be physically within the radio range of the 802.11a+g Router, and have TCP/IP installed and configured to obtain an IP address automatically from a DHCP server in the network.

Configuring a PC running MS-Windows 95/98/Me:

1. Click the Start Button, and select Settings.
2. Click the Control Panel. The Win95/98/Me Control Panel will appear.
3. Open the Network setup window by double-clicking the Network icon.
4. Check your list of Network items. If TCP/IP is already installed, proceed to step 5. Otherwise: (You may need your Windows CD to complete the installation of TCP/IP.)
   - Click the ADD button.
   - In the Network Component Type dialog box, select Protocol.
   - In the Select Network Protocol dialog box, select Microsoft.
   - In the Network Protocols area of the same dialog box, select TCP/IP and click OK.
5. With TCP/IP installed, select TCP/IP from the list of Network Components.
6. In the TCP/IP window, check each of the tabs and verify the following settings:
   Bindings: Select Client for Microsoft Networks and Files and printer sharing for Microsoft Networks
   Gateway: All fields are blank.
   DNS Configuration: Select Disable DNS.
   WINS Configuration: Select Use DHCP for WINS Resolution.
   IP address: Select the Obtain IP address automatically radio button.
7. Reboot the PC.

Configuring a PC running MS-Windows XP/2000:

1. Click the Start button, and choose Control Panel (in Classic View).
2. In the Control Panel, double-click Network Connections.
3. Double-click Local Area Connection.
4. In the LAN Area Connection Status window, select Internet Protocol (TCP/IP) and click Properties.
5. Select the Obtain an IP address automatically and the Obtain DNS server address automatically radio buttons.
6. Click OK to finish the configuration.

Confirming your PC's IP Configuration:

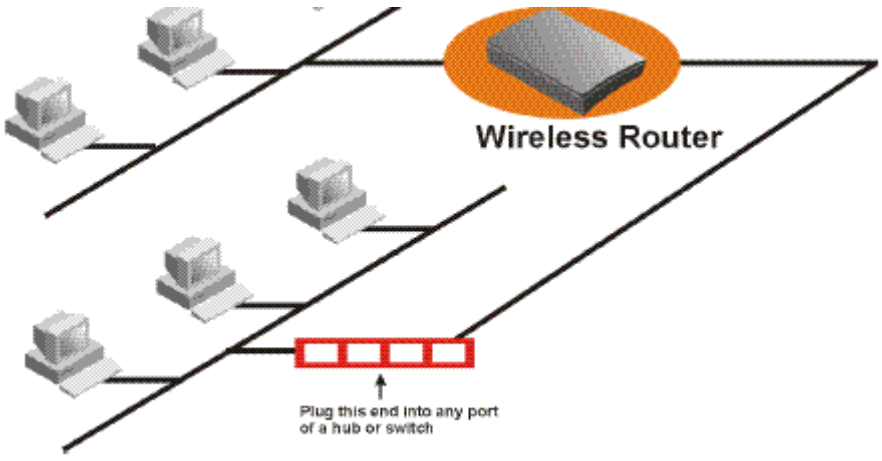
There are two tools useful for finding out a computer's IP address and default gateway:

WINIPCFG (for Windows 95/98/Me) Select the Start button, and choose Run. Type winipcfg, and a window will appear listing the IP configuration. You can also type winipcfg in the MS-DOS prompt.

The procedure required to set a static IP address is not too much different from the procedure required to set to "obtain IP addresses dynamically" - except that instead of selecting "obtain IP addresses dynamically, you should specify the IP address explicitly.

Connecting More Devices Through A Hub To The 802.11a+g Router

The Wireless Router provides four LAN ports to allow up to four PCs or Workstations to be connected to it directly. If you want to connect more devices, you can connect an external hub or switch to any of the LAN ports using a LAN cable.



Chapter

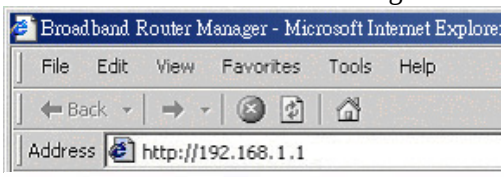
3

Basic Configuration of the 802.11a+g Router

This section contains basic configuration procedure for the 802.11a+g Router. It describes how to set up the 802.11a+g Router for Internet Access operation, and how to set up the LAN configuration.

The 802.11a+g Router is designed so that all basic configuration may be easily invoked through the a standard Web browser such as Internet Explorer. Currently only the Internet Explorer 6.0 (or above) is supported.

To access the WLAN 11a+g Router's management interface for the first time, enter the default IP address of the WLAN 11a+g Router in your Web browser http://192.168.1.1/.



Note: The IP address of your PC must be in the same IP subnet as the 802.11a+g Router. It is preferred that you configure the PC to obtain an IP address automatically from the 802.11a+g Router.

The **Home Page** of the 802.11a+g Router screen will appear, with its main menu displayed on the screen, showing the following top-level choices: Setup Wizard, Device Status, System Tools, Advanced Settings, and Help. Selecting any will allow you to navigate to other configuration menus.

Logging On

When you attempt to access a configuration screen from the browser menu, an administrator login screen will appear, prompting you to enter your password to log on. Once you are logged in, you will not be asked to log in again unless your "session" expires such as due to inactivity timeout.

If you are logging in for the first time after you received your 802.11a+g Router, you should use the factory default password, "**password**" to log in. (You should change it as soon as after you log in.)

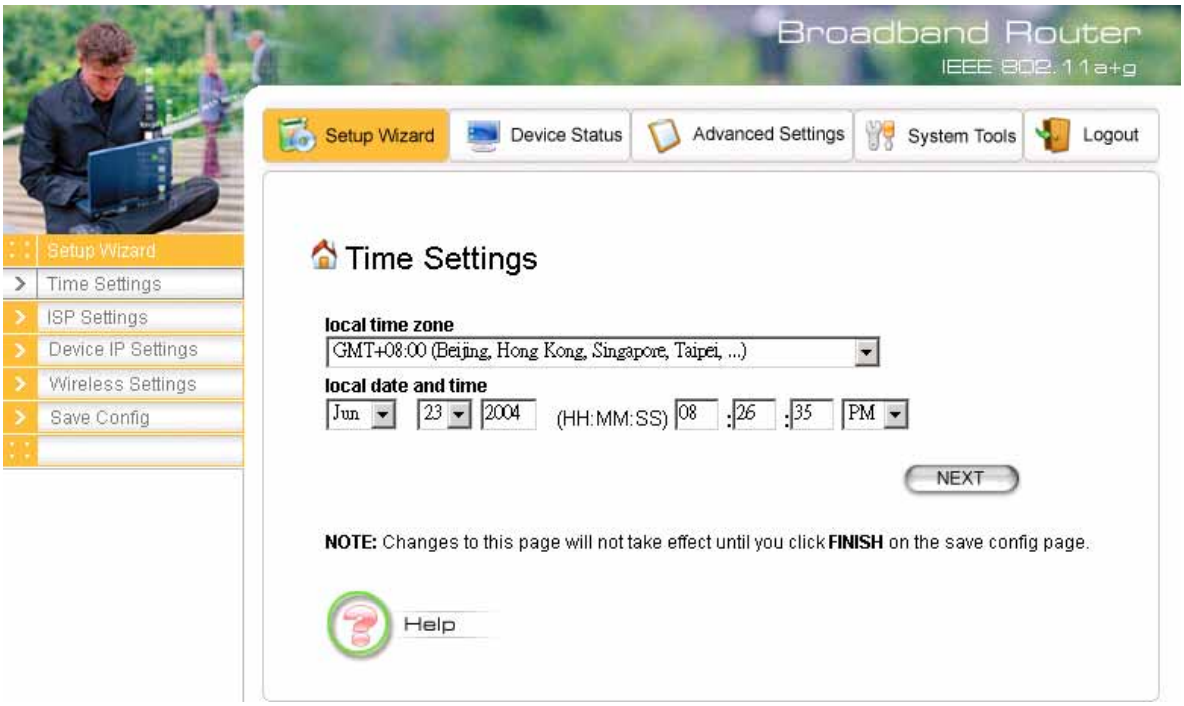
Characters you type (as your password) will be echoed back as a string of asterisks ("*") for security reasons. After you enter the password, clicking the **LOG ON** button will begin the password verification process and, if successful, your configuration session can begin.

Note: Should there be no settings or access on the web management screen, system will logout automatically in 10 minutes.

The Setup Wizard will guide you through a series of configuration screens to set up the basic configuration of your 802.11a+g Router. At the end of the Setup Wizard screens, you should press the "**finish**" button, and all your configuration modifications will take effect.

SET UP YOUR LOCAL TIME ZONE AND DATE/TIME

After logging in, the **Time Settings** page appears. The router time will first be set to the local time of the PC (on which the browser is running). If this time is not correct, modify the appropriate fields as necessary, and then click "NEXT".



CONFIGURE THE ISP PROFILE

In the following configuration screen, as with the usual convention, radio buttons are used to make a selection when only one out of multiple mutually exclusive choices can be selected, while square check boxes can be used to select multiple non-mutually-exclusive choices.

When configuring the device for Internet access, decide which one of the following multiple choices to select (through radio buttons):

1. You can use a **static IP address** provided by your ISP to connect to the Internet. In this case, you need to configure the following information:
   - **IP Address Assigned by Your ISP**: the IP address of the WAN interface of your router.
   - **IP Subnet Mask**: the IP subnet mask of the WAN interface of your router.
   - **ISP Gateway IP Address**: the IP address of your ISP's Gateway.
   - **DNS IP Address**: the IP address of the DNS server.

2. You use the user name and password assigned by your ISP to connect to the Internet (required for the underlying **PPPoE** protocol). In this case, you need to configure the following information:
   - **User Name**: the username of your ISP account.
   - **Password**: the password of your ISP account.
   - **Service Name**: the service name of your ISP account
   - **Connection Type**: There are 3 options for this option.
     Always on: the connection is always on no matter there is traffic or not. If the connection is lost (e.g. the PPPoE server is down or the ADSL/Cable line is disconnected), the connection will be brought up right after the connection is recovered.

     Demand Dialing: the connection will be brought up only when there is traffic. That is, it requires an outgoing packet to trigger the connection.

     Manual: Users have to bring up and take down the connection manually.
   - **MTU/MRU**: This is to set the values of MTU (Maximum Transmit Unit) and MRU (Maximum Receive Unit) that is used between the 802.11 a+g Router and the ISP device at the other side. Users are not encouraged to change these values unless you know what you are doing.
   - **Session Type**: There are 3 options for this setting.
     Normal: This option only supports one PPPoE session.

     Unnumbered Link: This option can let your LAN be a public IP subnet. That is, PC's on the LAN can be configured with public IP addresses provided by your ISP. You can put your own servers on the LAN, and then people on the Internet can access these servers. The source IP address of the traffic from these PC's to the Internet is not modified (i.e. NAT is not applied) either. If you still want to keep a private LAN, you can check the **Maintain Private LAN** setting and enter the **IP Address** and **IP Subnet Mask** of your

private LAN. If you do not keep a private LAN, the “Device IP Settings” menu at the left side will disappear.

Multiple PPPoE: You can define more than one PPPoE sessions by using this option. The primary session is configured at the **ISP Settings** page, and other sessions are configured at the **Multiple PPPoE** page.

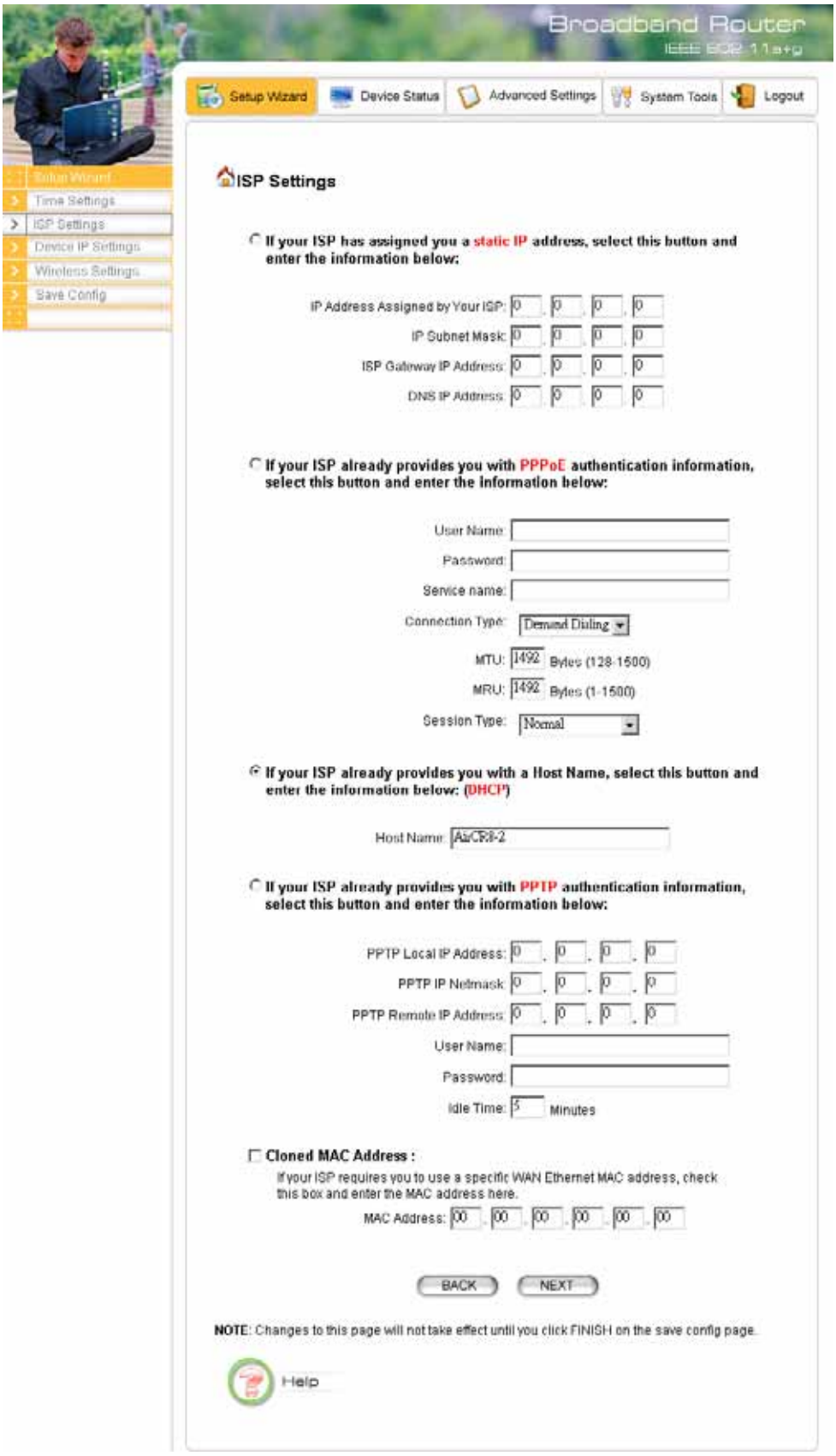
3. You use **DHCP** to connect to the Internet (most likely through a cable modem connection). In this case, your ISP **may** require you to configure the Host Computer Name:
   - **Host Name**: The Host Name provided by your ISP.

4. You use **PPTP** to connect to the Internet. In this case, your ISP requires you to configure PPTP's tunnel IP address, the username, and password. In this case, configure the static IP address as in the above and then configure the following information:
   - **PPTP Local IP Address**: the IP address on the local side of the PPTP tunnel provided by your ISP.
   - **PPTP IP Netmask**: the Netmask on the local side of the PPTP tunnel provided by your ISP.
   - **PPTP Remote IP Address**: the IP address of the remote side of the PPTP tunnel provided by your ISP.
   - **User Name**: the username of your ISP account.
   - **Password**: the password of your ISP account.
   - **Idle time**: The Idle Timeout is the number of seconds of "inactivity" before the PPTP connection is taken down.

     Its value should be between 0 to 60 minutes, with 5 (minutes) being the default value, and 0 meaning the connection will never time out.

5. **Cloned MAC Address**: Some ISPs expect a PC to be connected to their service, and use the MAC address of this PC’s LAN card for identification purposes. By checking the following “**Cloned MAC address**” square check box, your 802.11a+g Router allows a MAC address to be configured and “cloned” in the router to simulate a PC.

If the device is a PC based on WIN 95/98/Me, you can run **winipcfg** to find out the MAC Address of its LAN card. If the device is a PC based on WIN 2000/NT/XP, you need to run "**ipconfig/all**" to find out the MAC address of its LAN card.


Broadband Router
IEEE 802.11a+g
Setup Wizard
Device Status
Advanced Settings
System Tools
Logout
Setup Wizard
Time Settings
ISP Settings
Device IP Settings
Wireless Settings
Save Config
ISP Settings
If your ISP has assigned you a static IP address, select this button and enter the information below:
IP Address Assigned by Your ISP:
IP Subnet Mask:
ISP Gateway IP Address:
DNS IP Address:
If your ISP already provides you with PPPoE authentication information, select this button and enter the information below:
User Name:
Password:
Service name:
Connection Type:
Demand Dialing
MTU:
1492
Bytes (128-1500)
MRU:
1492
Bytes (1-1500)
Session Type:
Normal
If your ISP already provides you with a Host Name, select this button and enter the information below: (DHCP)
Host Name:
AirCR-II-2
If your ISP already provides you with PPTP authentication information, select this button and enter the information below:
PPTP Local IP Address:
PPTP IP Netmask:
PPTP Remote IP Address:
User Name:
Password:
Idle Time:
5
Minutes
Cloned MAC Address :
If your ISP requires you to use a specific WAN Ethernet MAC address, check this box and enter the MAC address here.
MAC Address:
BACK
NEXT
NOTE: Changes to this page will not take effect until you click FINISH on the save config page.
Help

MULTIPLE PPPOE SETTINGS

If you have selected **PPPoE** with **Multiple PPPoE** type at the **ISP Settings** page, you will see the **Multiple PPPoE** settings page where you can add more PPPoE sessions.

For each PPPoE session, you have to assign a mnemonic name and configure similar settings as in the primary session. In addition, you can configure LAN Type and Traffic Pattern in order to use an added session.

LAN Type: If you enable LAN Type, you can have another subnet on your LAN environment. Some ISP provides Group Access function that gives you a subnet to assign on your LAN environment, and ISP will make all such subnets belonging to the same Group connected together. A PC on such subnets can reach other PCs on the Internet within the same Group through the session configured without NAT; it also can do the normal Internet access through the primary PPPoE session.

Traffic Pattern: You have to configure traffic pattern(s) in order to use PPPoE sessions other than the primary session. Any outgoing packet matching one of the traffic pattern configured will be sent out using the corresponding PPPoE session. There are four types of traffic patterns that you can use. After you checked a traffic pattern and clicked the **APPLY** button you have to configure the details by selecting the item in the **Session Table** and click the **EDIT TRAFFIC PATTERN** button.

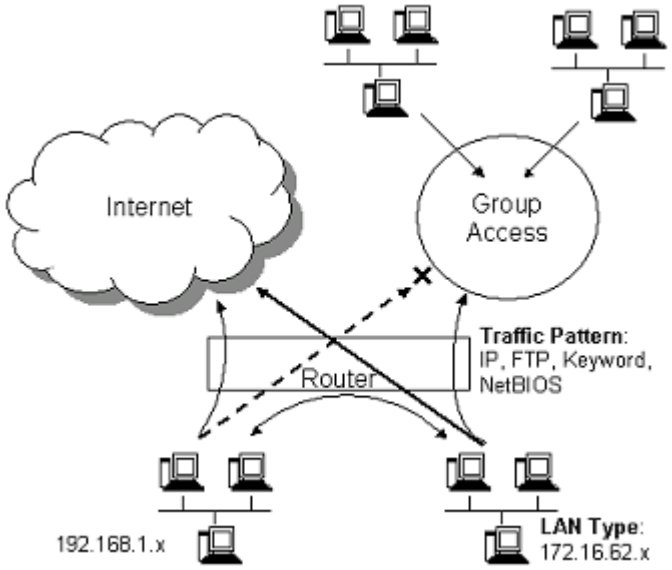
IP Address Range/Network: Packets with destination IP address within the range or network configured are matched.

Port Range: TCP/UDP packets with the source or destination port in the configured range are matched.

Keyword: IP packets with a payload containing a string matching the configured keyword are matched.

NetBIOS: NetBIOS packets are matched.

Multiple PPPoE usage can be well illustrated by the following diagram.



Associated session name: 2nd Session

IP Address Range : ADD

IP Network : ADD

Keyword : ADD

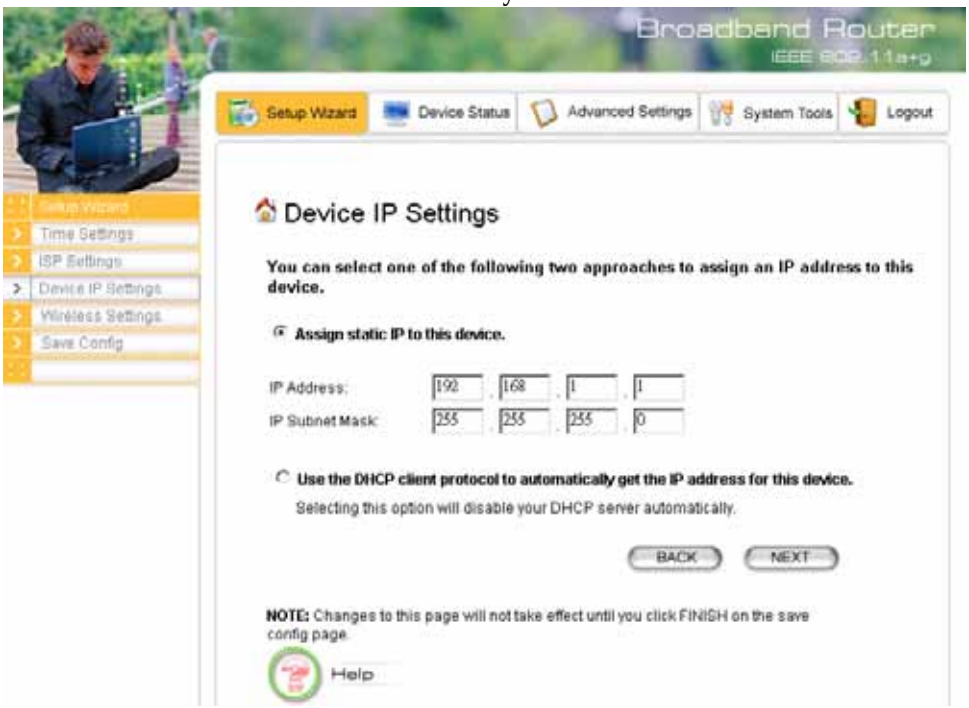
Port Range : ADD

Select	Type	Pattern
-	-	-

DELETE SELECTED

DEVICE IP SETTINGS

The **Device IP setting** screen allows you to configure the IP address and subnet mask of your 802.11a+g Router: you can configure a static IP address and a subnet mask, or configure it to obtain an IP address and a subnet mask automatically from a DHCP server on the local network.



If you choose to assign a static IP address manually, check the button that says, "**Assign static IP to this device**" and then fill in the following fields

IP Address and **IP Subnet Mask:** These values default to 192.168.1.1 and 255.255.255.0, respectively.

This IP address can be modified if necessary, to either a different address in this same subnet or to an address in a different subnet.

When you modify it, if the DHCP server function of your 802.11a+g Router is enabled, the pool of IP addresses it will use for assignment purposes will also be automatcailly adjusted accordingly. For example, if the default IP address is used, the IP address pool for assignment consists of addresses from 192.168.1.2 to 192.168.1.254. However, please do not change the default IP address unless you know exactly what you want to achieve.

Then you should press **Next** to get to the next screen.

If you choose to use an external DHCP Server to automatically assign an IP address to your 802.11a+g Router, check the button that says, "**Use the DHCP protocol to automatically get the IP address for this device**", and then press **Next** to the next screen.

When an IP address is *dynamically* assigned to the router, its value can change depending on the IP address assignment policy used by the DHCP server in the network. Since you need to use an IP address to control and manage your 802.11a+g Router, without the knowledge of its IP address, in order to access it, you will need to use UPnP (Universal Plug and Play) or other management tools that do not depend on a fixed IP address.

It is strongly recommended that you select the manual static IP address.

In the following configuration screen, you can configure wireless related parameters of your 802.11a+g Router:

Network Name (SSID): The SSID is the network name used to identify a wireless network. The SSID must be the same for all devices in the wireless network. Several Routers on a network can have the same SSID. The SSID can be up to 32 characters long. This SSID is used for both radios (i.e. 802.11a and 802.11 b/g).

Disable SSID Broadcasting: An access point periodically broadcasts its SSID, along with other information, which allows client stations to learn its existence while searching for Routers in the wireless network. Select **Disable** if you do not want the device to broadcast the SSID.

Regulatory Domain: This place shows the regulatory domain where the device is running. This field cannot be changed by regulation.

WLAN standard for Radio 1/2: Here you can set the configuration for each radio.

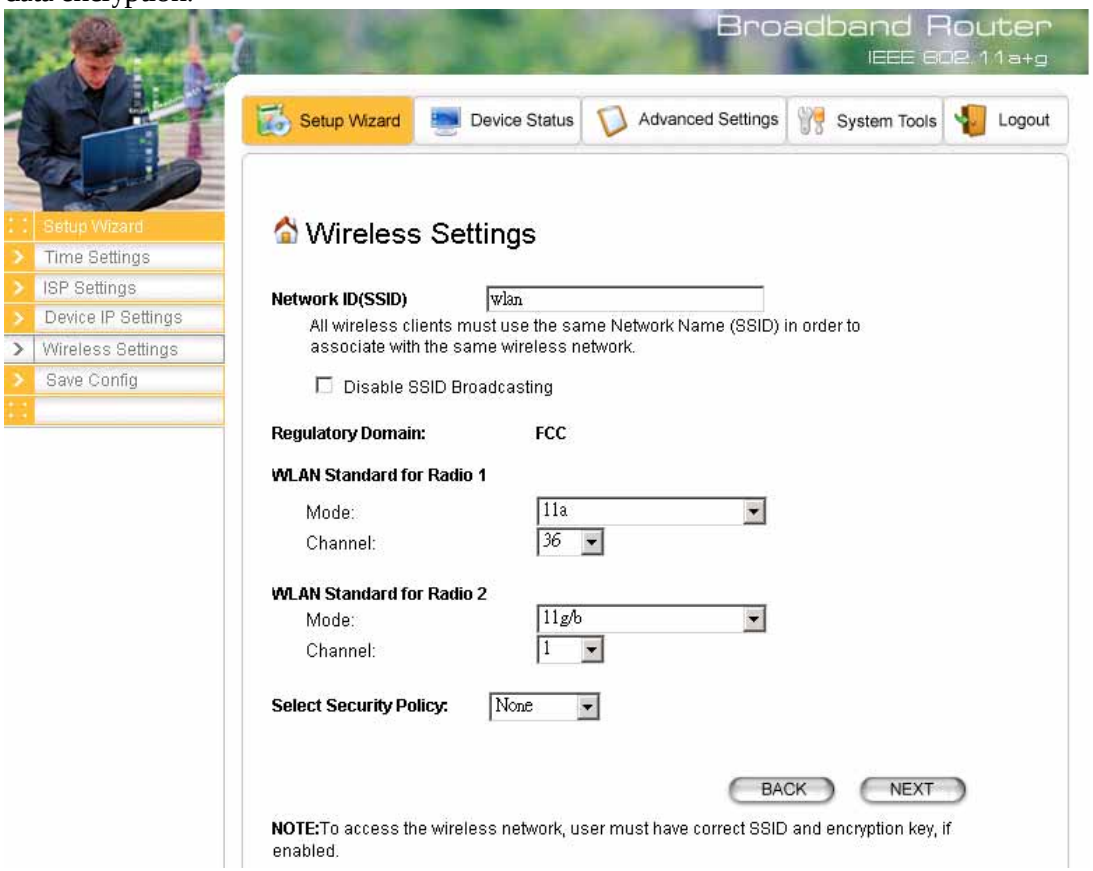
Mode: For the radio 1, you can select it to run the **802.11a** protocol or **802.11a turbo** (if the regulation allows) protocol.

For the radio 2, you can select it to run the **802.11g only** protocol or the **802.11b/g** (mix mode) – allowing both 802.11b and 802.11g to co-exist.

Channel: Select the channel from the available list to match your network settings. All devices in the wireless network must use the same channel and share the total bandwidth available.

Note: The available channels are different from country to country and for different WLAN mode.

Security Policy: You can select different security policy to provide association authentication and/or data encryption.



WEP

You can use WEP encryption to protect your data when you are transmitting data in the wireless network. There are 3 types of keys: 64 (**WEP64**), 128 (**WEP128**), and 152 (**WEP152**) bits. You can configure up to 4 keys using either **ASCII** or **Hex**adecimal format.

Key Settings: For WEP64 and WEP128, you can enter a "Passphrase" (a key of up to 32 alphanumerical characters), choose 64-bit, and press the **Generate** button to generate four WEP64 keys in the entries below, or choose 128-bit, and press the **Generate** button to generate one WEP128 key in the first entry.

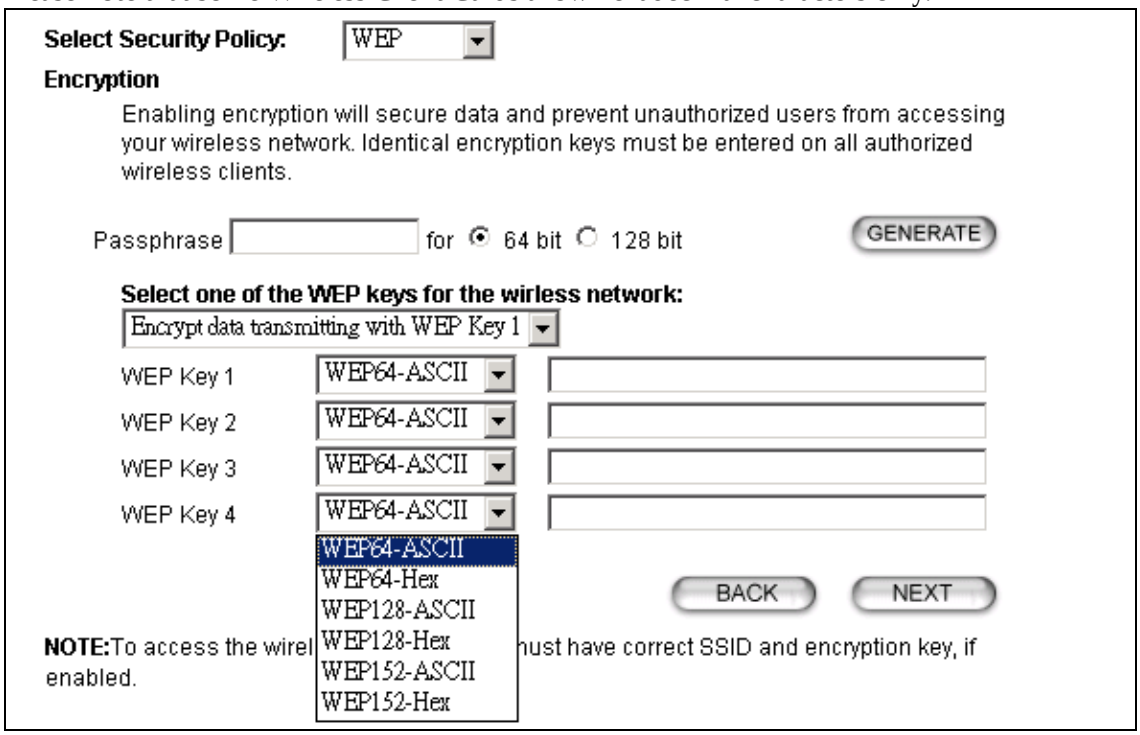
Alternatively, and for WEP152, you can manually configure each of them.

When you manually configure a key, the length for a WEP64 key must be equal to 5, for a WEP128 key it must be equal to 13, and for a WEP152 key it must be equal to 16. Once you enable the WEP function, please make sure that exactly the same WEP key is configured in both the Wireless Router and client stations.

You can define a key using ASCII or hex characters. A WEP128 ASCII key looks like "An ASCII key!" (13 characters), while a WEP64 hex key looks like "44-12-24-A8-B2" (5 bytes) and "11-22-33-44-55-66-77-88-99-00-A3-BB-2C" as WEP128 hex key. Each set of hexadecimal numbers should be separated by "-"(dash).

Key Index: You have to specify which of the four keys will be active.

Please note that some Wireless Client Cards allow hexadecimal characters only.



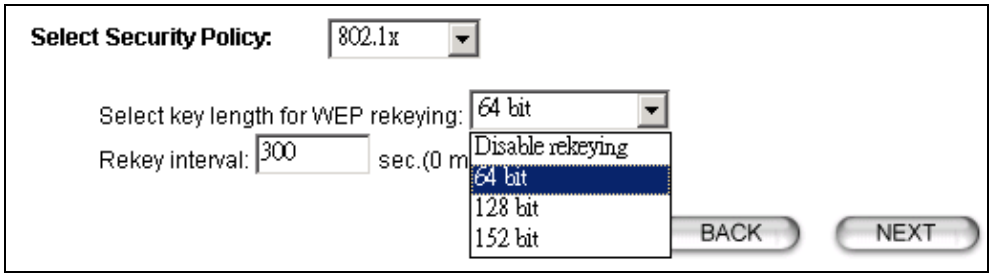
802.1x

IEEE 802.1x is an IEEE standard which is based on a framework that involves stations to be authenticated (called Supplicant), an authentication server (a RADIUS Server) that provides authentication services, and an authenticator that provides necessary translation and mediating functions between the authentication server and stations to be authenticated, in this case your 802.11a+g Router.

During EAP authentication, the 802.11a+g Router relays authentication messages between the RADIUS server and clients being authenticated.

802.1x allows users to leverage a RADIUS server to do association authentications. You can also enable dynamic WEP keys (64, 128, 152-bit) to have data encryption. Then you do not have to enter the WEP key manually because it will be generated automatically and dynamically.

Note: After you have finished the configuration wizard, you have to configure the Radius Settings in Advanced Settings in order to make the 802.1x function work.



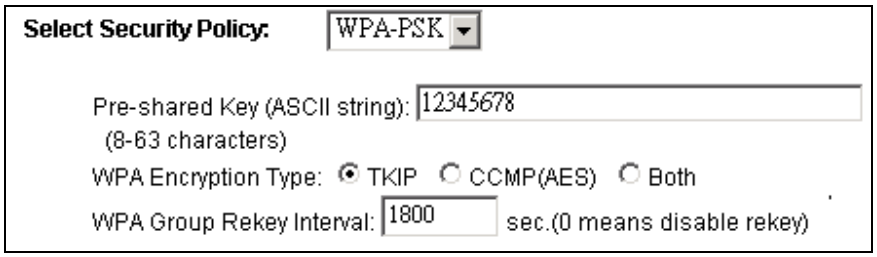
WPA-PSK

Wi-Fi Protected Access (WPA) with Pre-Shared Key (PSK) provides better security than WEP keys. It does not require a RADIUS server in order to provide association authentication, but you do have to enter a shared key for the authentication purpose. The encryption key is generated automatically and dynamically.

Pre-shared Key: This is an ASCII string with 8 to 63 characters. Please make sure that the 802.11a+g Router and the wireless client stations use the same key.

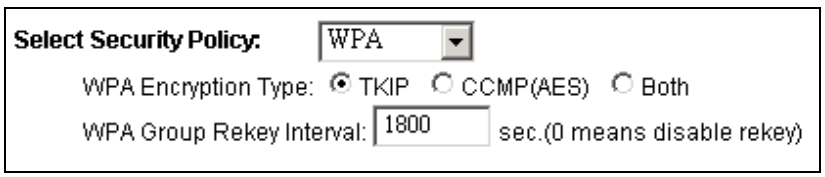
Encryption Type: There are two encryption types **TKIP** and **CCMP (AES)**. While CCMP provides better security than TKIP, some wireless client stations may not be equipped with the hardware to support it. You can select **Both** to allow TKIP clients and CCMP clients to connect to the Access Point at the same time.

Group Rekey Interval: A group key is used for multicast/broadcast data, and the rekey interval is time period that the system will change the group key periodically. The shorter the interval is, the better the security is. 60 seconds is a reasonable time, and it is used by default.



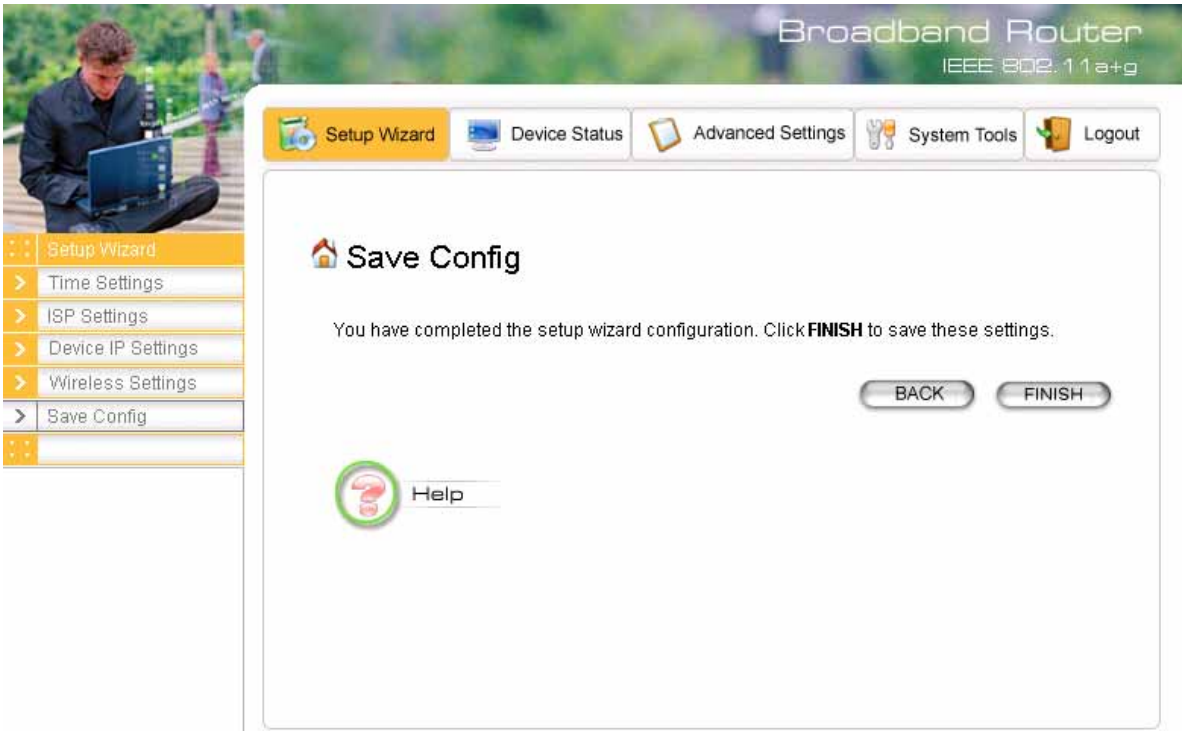
WPA

Wi-Fi Protected Access (WPA) requires a RADIUS server available in order to do authentication (same as 802.1x), thus there is no shared key required.
The **Encryption Type** and **Group Rekey Interval** settings are same as **WPA-PSK**.



FINISH SETUP WIZARD AND SAVE YOUR SETTINGS

After stepping through the Wizard's pages, you can press the **FINISH** button for your modification to take effect. This will also cause your new settings to be saved into your system permanently.



Alternatively, you can also click the "Back" button to go back to previous configuration screens for more changes.

Note: If you change the router's IP address to a different IP network address space, as soon as you click on FINISH you will no longer be able to communicate with your 802.11a+g Router. You need to change your IP address and then re-boot your computer in order to resume the communication.

Chapter

4

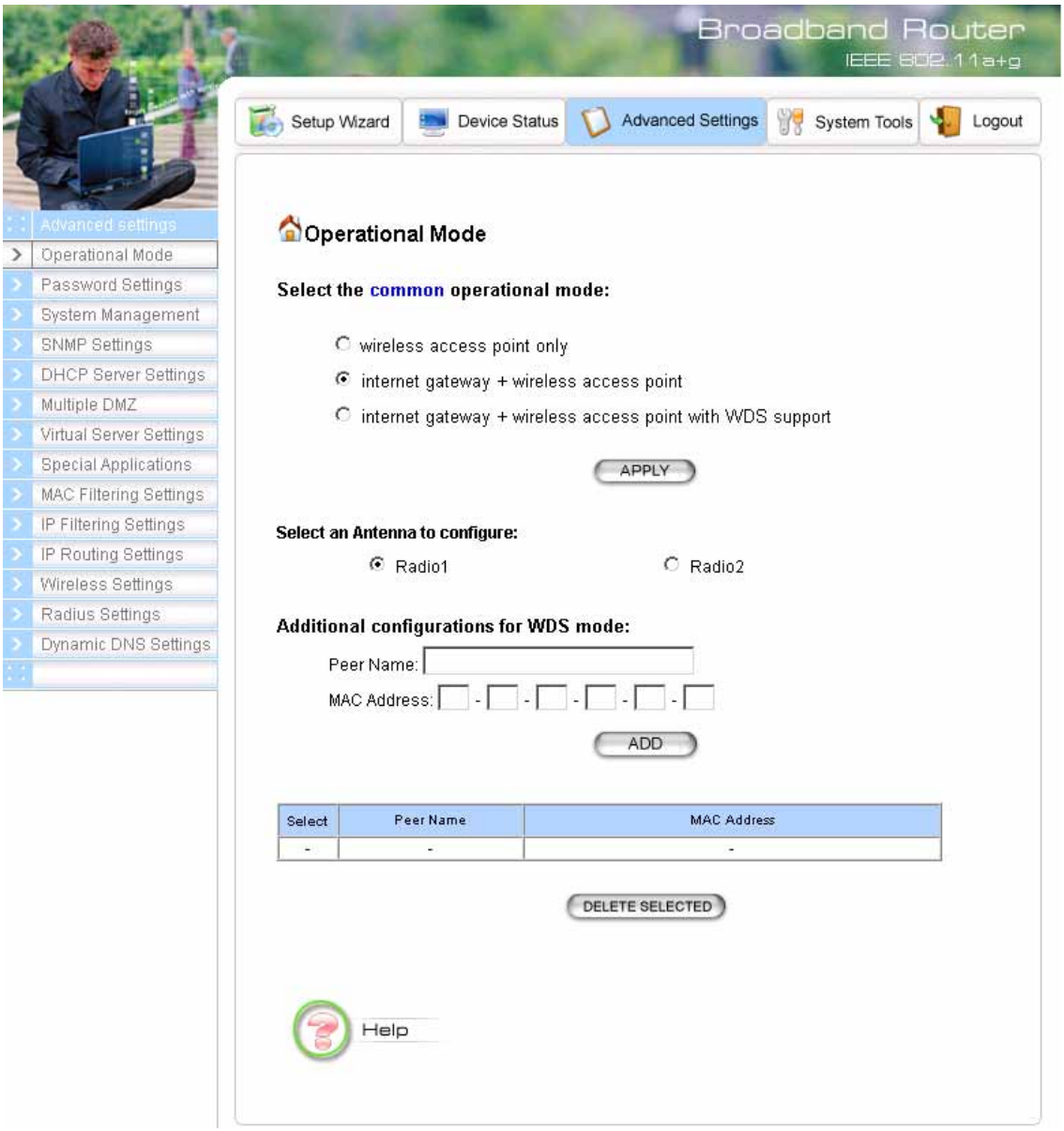
Advanced Settings

This section contains advanced setting procedures for the 802.11a+g Router. It describes modifications that normally you may not need for basic system operation. One exception is changing your password: it is highly recommended that you change the default factory setting as soon as you start to use your 802.11a+g Router.

Operational Mode

Before you start to use the device, you need to select the operational mode to be wireless AP only or both Internet gateway and wireless AP:

- **Wireless Access Point only**: When this is selected, the router operates in the AP-only Mode, and connects Wireless Client Users to the Ethernet (WAN).
- **Internet Gateway + Wireless Access Point**: When this is selected, the router will function as an Internet access sharing device as well as a wireless AP.
- **Internet Gateway + Wireless Access Point with WDS Support:** When this is selected, the router will function as an Internet access sharing device as well as a wireless AP, plus the mode to participate in the wireless distribution system. This could broaden the WLAN scope across several AP's. You should add all the WDS participants' MAC addresses with a mnemonic name in addition.
  When adding a WDS participant, you also have to select the radio (i.e. Radio1 or Radio2) that the participant will be connected with.


Broadband Router
IEEE 802.11a+g
Setup Wizard
Device Status
Advanced Settings
System Tools
Logout
Advanced settings
Operational Mode
Password Settings
System Management
SNMP Settings
DHCP Server Settings
Multiple DMZ
Virtual Server Settings
Special Applications
MAC Filtering Settings
IP Filtering Settings
IP Routing Settings
Wireless Settings
Radius Settings
Dynamic DNS Settings
Operational Mode
Select the common operational mode:
wireless access point only
internet gateway + wireless access point
internet gateway + wireless access point with WDS support
APPLY
Select an Antenna to configure:
Radio1
Radio2
Additional configurations for WDS mode:
Peer Name:
MAC Address:
ADD
Select
Peer Name
MAC Address
DELETE SELECTED
Help

Password Settings

Your 802.11a+g Router comes with a default factory password of “password”. After you start using the router, you should change the default password.

To change the password, press the **Password Settings** button to enter the **Password Settings** screen, enter the current password followed by the new password twice. The entered characters will appear as asterisks.

If you forgot the password, the only way to recover it is to return the device to its default state as shipped from the factory. To restore the password to the default password, please refer to the section, "What if I forgot the Password?" in the user manual.

System Management

Clicking the **System Management** button allows system related parameters to be configured for the 802.11a+g Router.

Remote Management: The remote management feature allows you to manage your 802.11a+g Router remotely through the use of an HTTP browser.

The system allows you to (1) **allow remote management from all WAN IP addresses**, to (2) **allow remote management from up to two WAN IP addresses**, or to (3) **disallow remote management from any WAN IP addresses**.

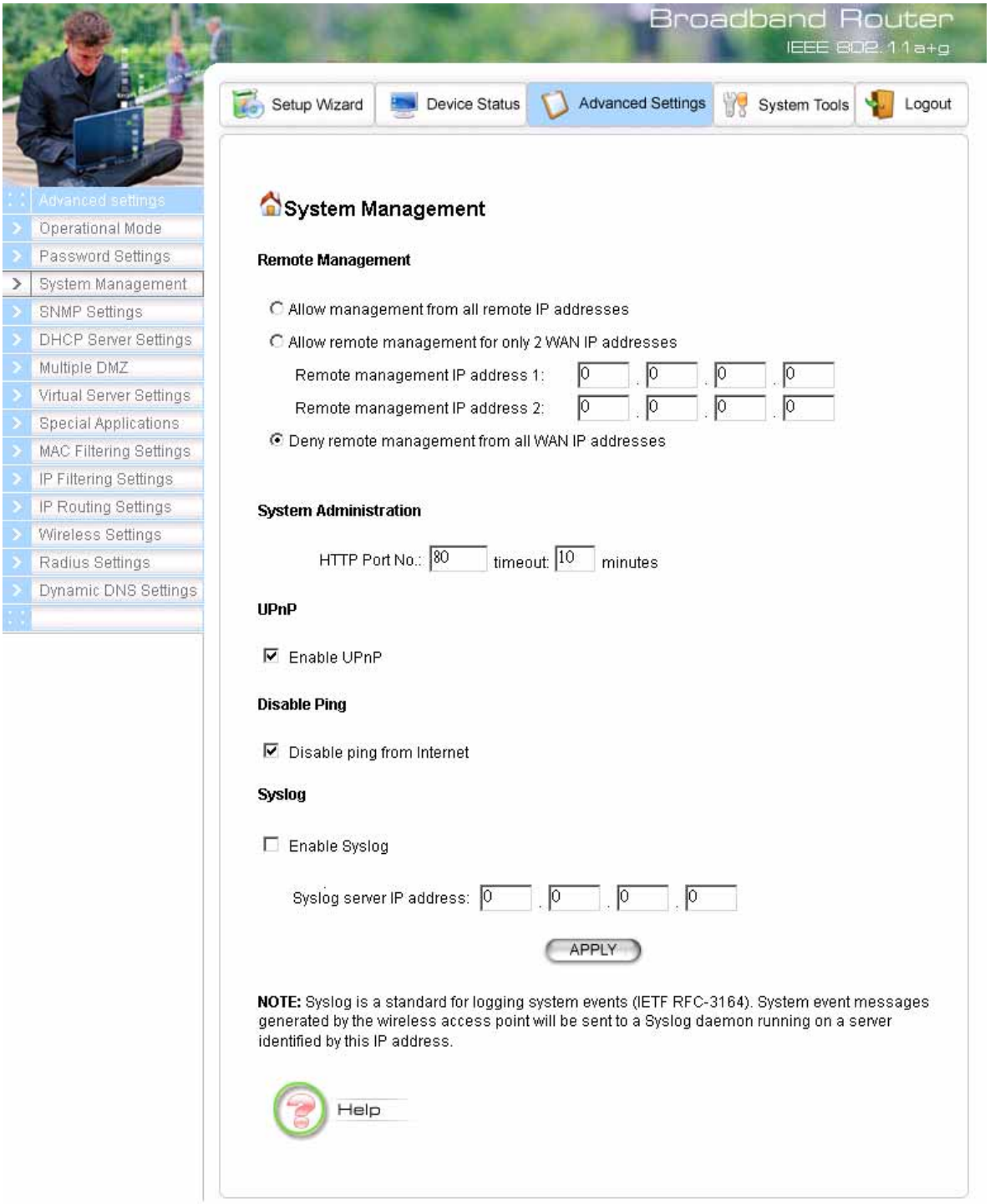
System Administration: The router allows you to designate special port numbers other than the standard 80 for **http** for remote management. It also allows you to specify the duration of idle time (inactivity) before a web browser session times out. The default time-out value is 10 minutes.

UPnP: The router's Universal Plug and Play (UPnP) feature allows a Windows XP/ME PC to discover the router and automatically show an icon in the task bar on the screen. You can double-click the icon to access the router directly (without having to specify its IP address).

Disable Ping: "Ping" is a utility for testing the connectivity. Response to a ping can be disabled, such as when you do not want the router to be accessed (e.g., attacked) from the Internet.

Syslog: Syslog is an IETF (Internet Engineering Task Force - the Internet standards body)-conformant standard for logging system events (RFC-3164). When the 802.11a+g Router encounters an error or warning condition (e.g., a log-in attempt with an invalid password), it will create a log in the system log table. To be able to remotely view such system log events, you need to check the **Enable Syslog** box, configure the IP address of a PC where a Syslog daemon is running in the background. When doing so, the 802.11a+g Router will send logged events over the network to the PC for future viewing.

Syslog server IP address: The IP address of the PC where the Syslog daemon is running.


Broadband Router
IEEE 802.11a+g
Setup Wizard
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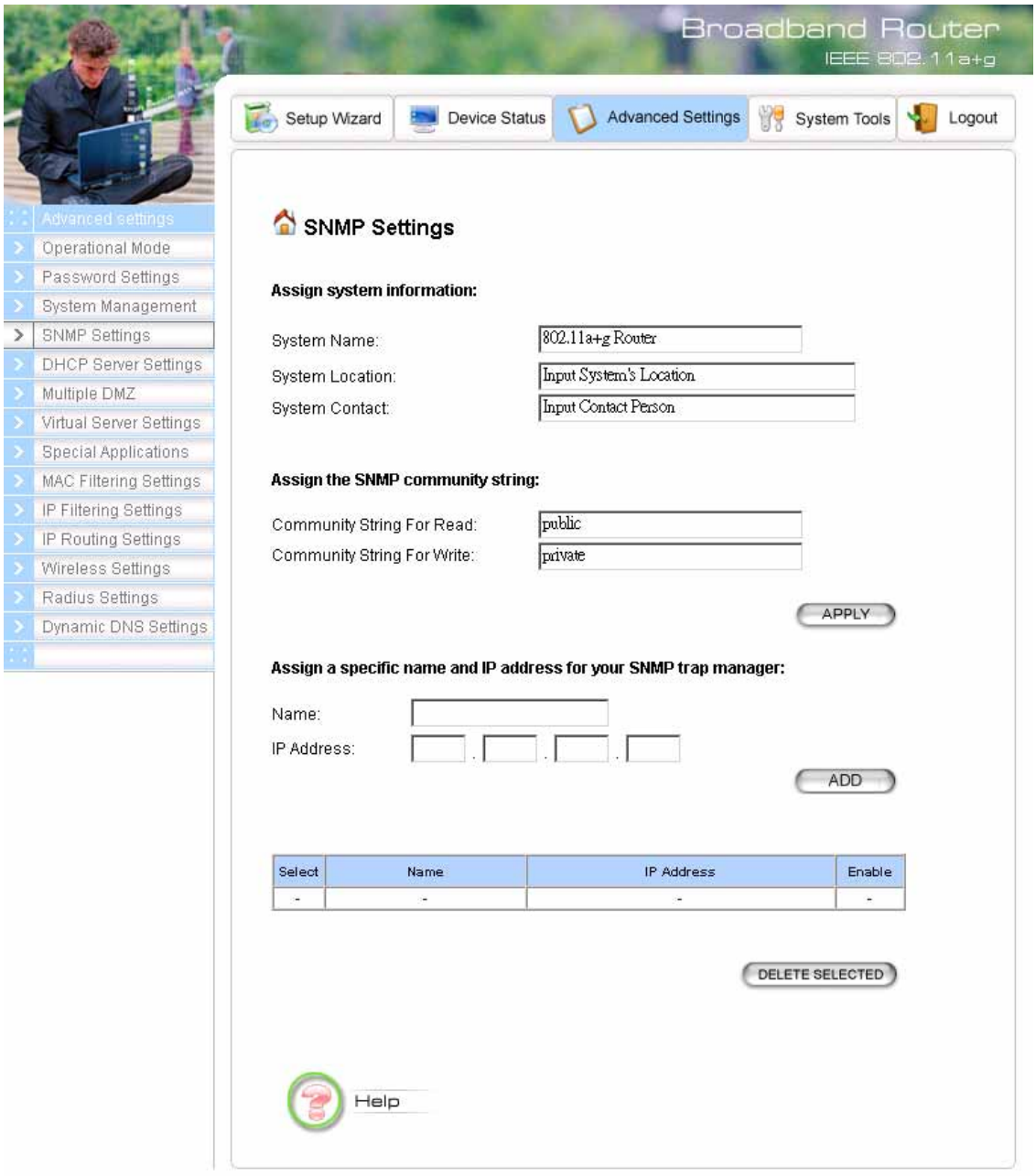
SNMP Settings
DHCP Server Settings
Multiple DMZ
Virtual Server Settings
Special Applications
MAC Filtering Settings
IP Filtering Settings
IP Routing Settings
Wireless Settings
Radius Settings
Dynamic DNS Settings
System Management
Remote Management
Allow management from all remote IP addresses
Allow remote management for only 2 WAN IP addresses
Remote management IP address 1: 0 . 0 . 0 . 0
Remote management IP address 2: 0 . 0 . 0 . 0
Deny remote management from all WAN IP addresses
System Administration
HTTP Port No.: 80 timeout: 10 minutes
UPnP
Enable UPnP
Disable Ping
Disable ping from Internet
Syslog
Enable Syslog
Syslog server IP address: 0 . 0 . 0 . 0
APPLY
NOTE: Syslog is a standard for logging system events (IETF RFC-3164). System event messages generated by the wireless access point will be sent to a Syslog daemon running on a server identified by this IP address.
Help

SNMP Settings

This screen allows you to configure SNMP parameters including the system name, the location and contact information. Additionally, you can configure the 802.11a+g Router to send SNMP Traps to remote SNMP management stations. Traps are unsolicited alert messages that 802.11a+g Router sends to remote management stations.



System Name: A name that you assign to your 802.11a+g Router. It is an alphanumeric string of up to 30 characters.

System Location: Description of where your 802.11a+g Router is physically located. It is an alphanumeric string of up to 60 characters.

System Contact: Contact information for the system administrator responsible for managing your 802.11a+g Router. It is an alphanumeric string of up to 60 characters.

Community String For Read: If you intend the router to be managed from a remote SNMP management station, you need to configure a read-only "community string" for read-only operation. The community string is an alphanumeric string of up to 15 characters.

Community String For Write: For read-write operation, you need to configure a write "community string".

A trap manager is a remote SNMP management station where special SNMP trap messages are generated (by the router) and sent to in the network.

You can define trap managers in the system.

You can add a trap manager by entering a **name**, an **IP address**, followed by pressing the **ADD** button.

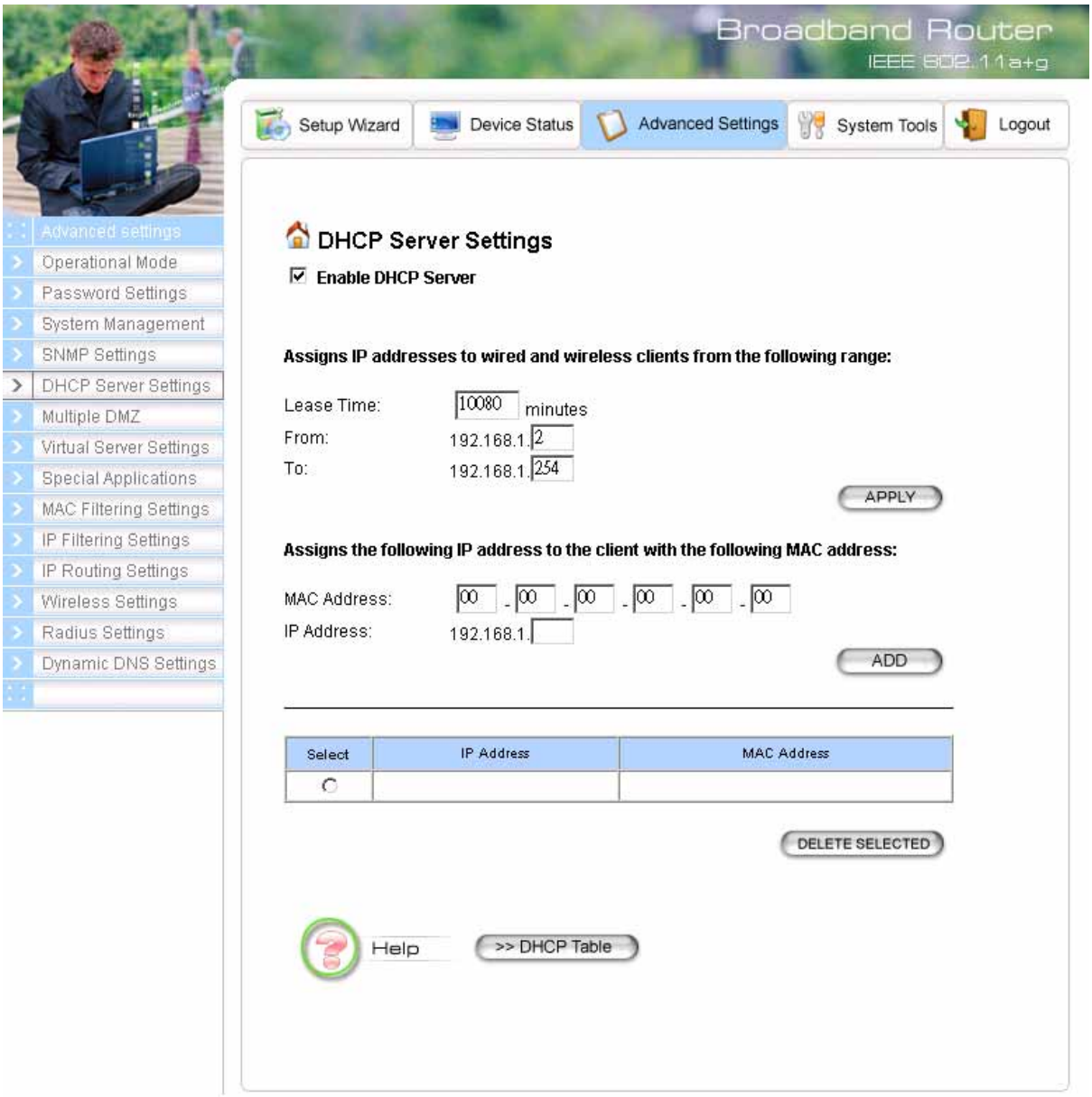
You can delete a trap manager by selecting the corresponding entry and press the **DELETE SELECTED** button.

You enable a trap manager by checking the **Enable** box in the corresponding entry or disable the trap manager by un-checking the Enable box.

DHCP Server Settings

The DHCP server option allows the 802.11a+g Router to assign IP addresses to DHCP client devices on your wired or wireless LAN to obtain IP addresses automatically.

If you want the Router to act as a DHCP server and assign private IP addresses to requesting DHCP clients on the LAN, you need to check the **Enable DHCP Server** box.



You can select one of the following two ways to assign IP addresses:

Assigns IP addresses to wired or wireless clients from the following range:

When IP addresses are assigned to a requesting DHCP client, after the "**lease time**", the client is expected to renew the lease. Its default value is 10080 minutes.

The **from** and **to** range of IP addresses to be assigned to requesting DHCP clients can be configured manually, with the default being 2 to 254.

After you enter the information, you should press **APPLY**.

Assigns the following IP address to the client with the following MAC address:

You can also specify the **IP address** to be assigned to a device with a pre-configured **MAC address**.

You can add such a mapping by entering a MAC address, and the IP address to be assigned, followed by pressing the **ADD** button. Up to 20 mappings can be added.

You can delete a mapping by **select**ing the corresponding entry and press the **DELETE SELECTED** button.

DHCP Table: Press this button will cause the screen to jump to DHCP client table page.

Multiple DMZ

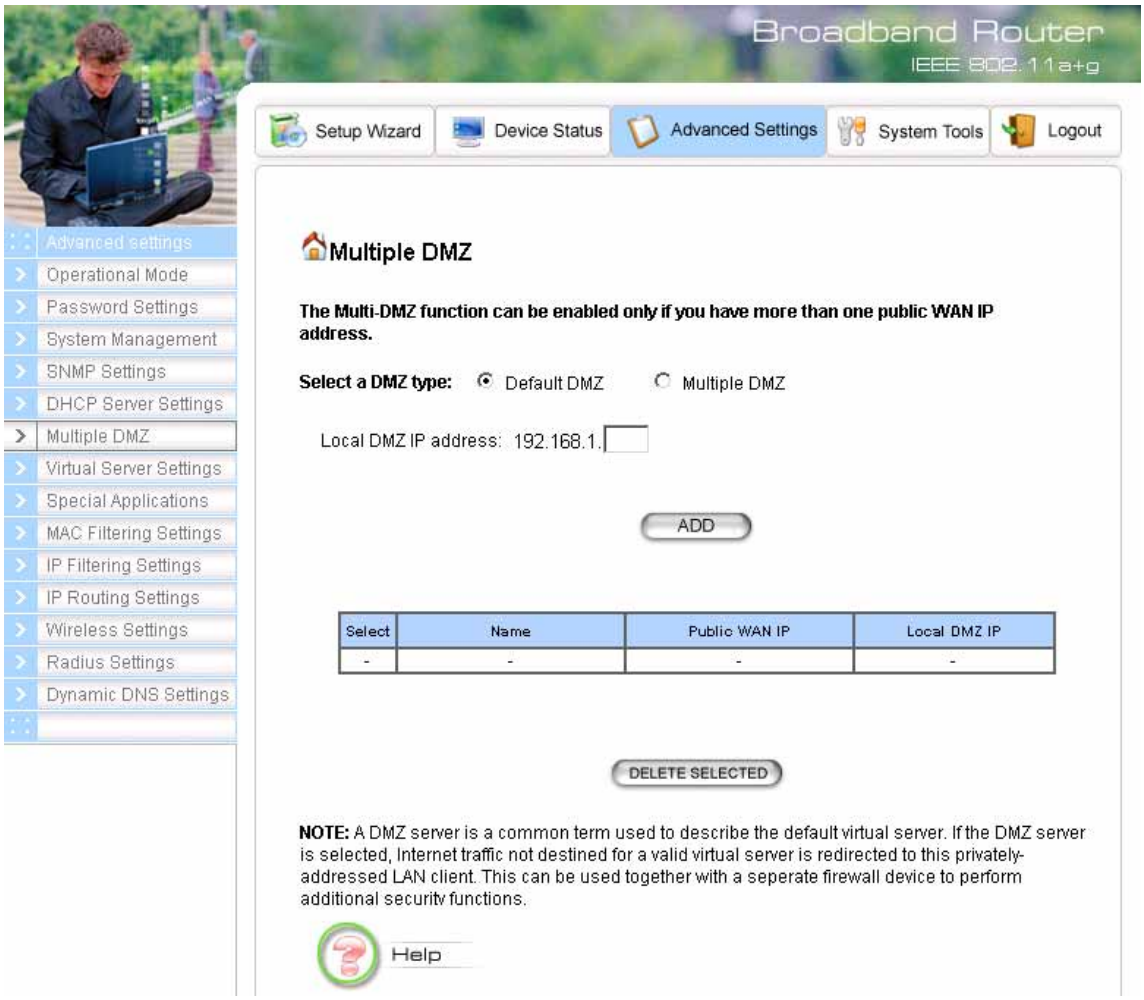
The router supports multiple software DMZ ports, and they are implemented through software.

When the router receives incoming data from the Internet, it will search through an internal address translation table to perform address translation function. If a match can be found, the data will be forwarded to the corresponding device in your local LAN, otherwise the data will be dropped or forwarded to the default DMZ if it is configured.

An additional feature is to allow devices with WAN IP addresses to be used by the Internet users to access private devices in your local LAN. In this case, you need to configure the mapping between the WAN IP address and the private IP address.

To add the default DMZ, you need to select "**Default DMZ**" and enter the **local DMZ IP address**, followed by pressing the **ADD** button.

To add a device for multiple DMZ, first select "**Multiple DMZ**", add a mnemonic name, a **public WAN IP address**, and the **local DMZ IP** address on the LAN, followed by pressing the **ADD** button.
You can delete a DMZ entry by **select**ing the corresponding entry and press the **DELETE SELECTED** button.



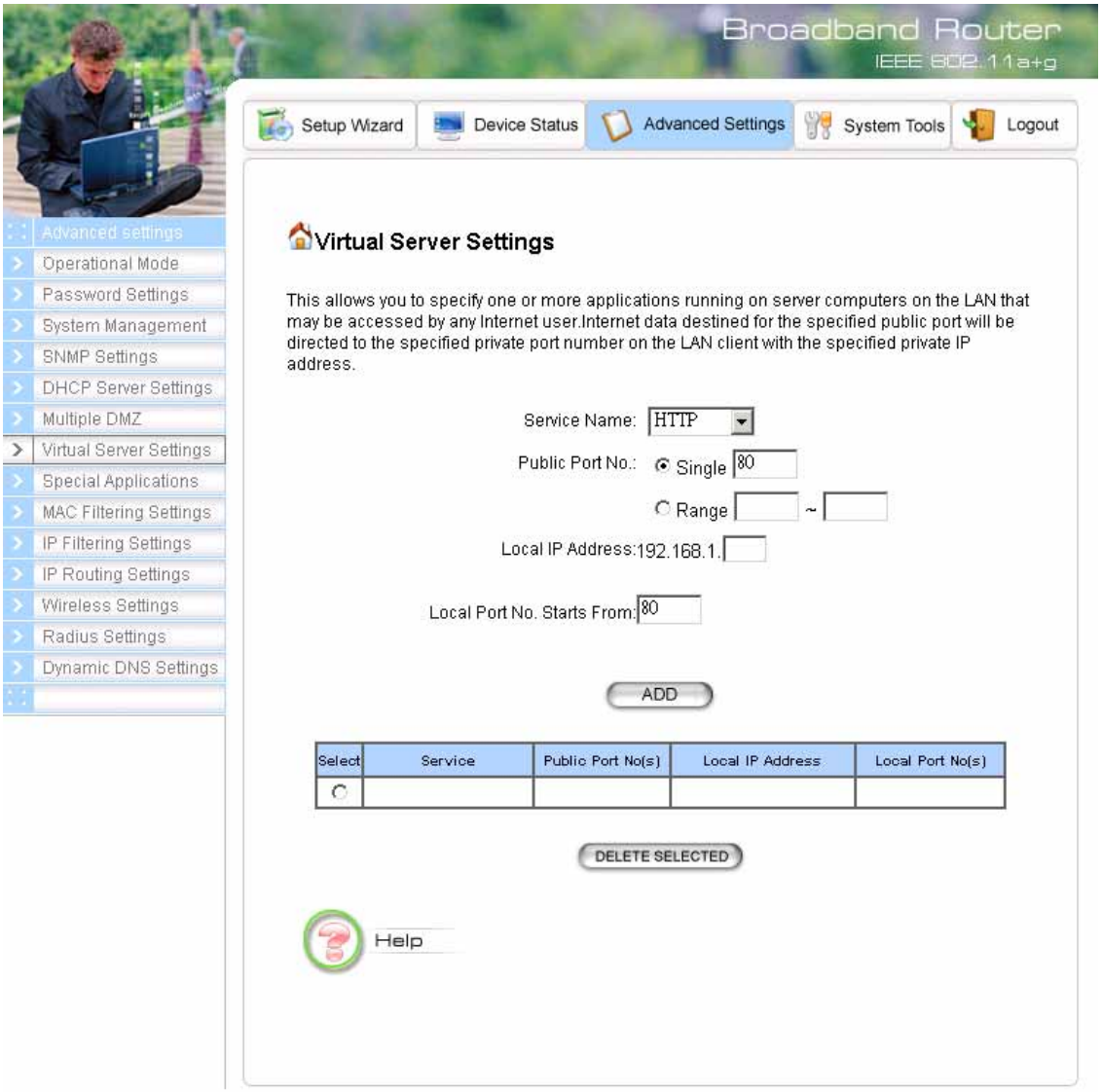
Virtual Server Settings

A Virtual Server is a server built on a single or a cluster of real servers. A DMZ server is a term commonly used to describe the default Virtual Server - the router will redirect all traffic from the Internet without a valid port address mapping to this device. An HTTP server with a private IP address on the LAN allows access from the Internet by mapping a special port to the HTTP server. In this case, the HTTP service will be mapped to a special port of the Router.

You can add a virtual server mapping by (1) selecting the **service name** (such as HTTP, FTP, TELNET, SMTP, POP3, CUSTOM), (2) enter the **public port number** to be used (either a **single** port number or a **range**), (3) enter the **local IP address** of the server on your LAN, (4) enter its **local port number** to map to (either a single port number or the starting port number of a range), (5) followed by pressing the **ADD** button.

You can delete a mapping by **select**ing the corresponding entry and press the **DELETE SELECTED** button.

Note: Virtual Server Setting and IP Filtering may affect with each other.



Special Applications

Special applications such as some Internet games are getting to be increasingly popular. These applications usually work in the following manner:

A client can start an Internet game by first registering with a game server on the Internet. Other clients can, using the corresponding protocol, join the game by checking with the server and deciding if to join the game. A client can "leave" the game at any time.

If the initiating client is behind your router, you need to add the application by performing the following configuration:

Select an application: Select an application that you want to add to the supported list. You should choose "Other" if your application is not explicitly shown in the list.

Name: You can provide a mnemonic name.

Trigger Port: You need to specify, based on instructions provided by your application's user manual, the (UDP/TCP) port number in the router that the initiating client uses to start an Internet game.

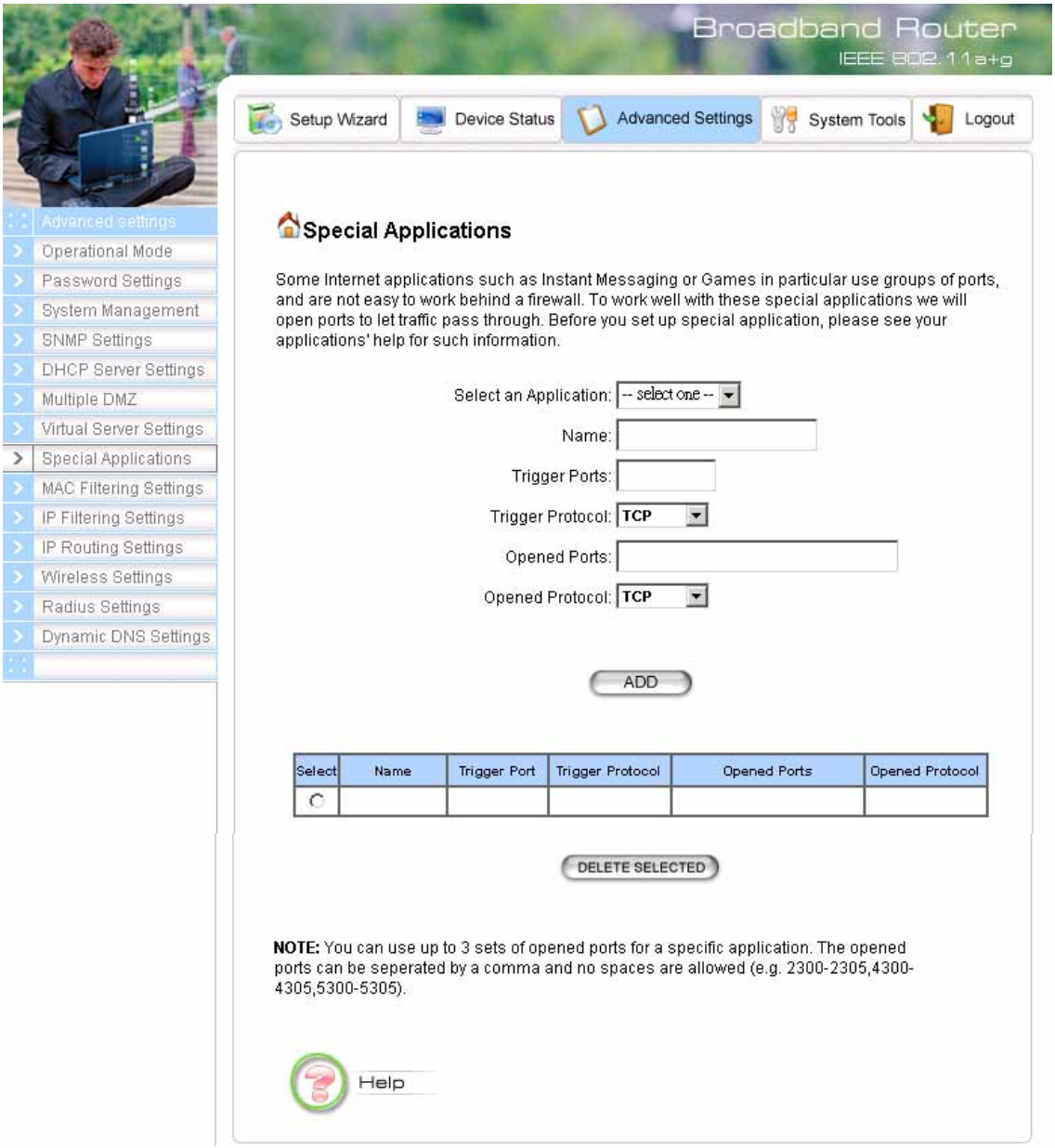
Trigger Type: Select UDP, TCP, or both for the trigger port.

Opened ports: You need to specify the port numbers in the router that joining clients can use to communicate with the initiating client, again based on instructions provided by your application user manual.

Public Type: Select UDP, TCP, or both for the Opened ports.

After you finish the above, you press the **ADD** button to add an entry to the table.

You can delete an entry by **select**ing the corresponding entry and press the **DELETE SELECTED** button.


Broadband Router
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IP Filtering Settings
IP Routing Settings
Wireless Settings
Radius Settings
Dynamic DNS Settings
Special Applications
Some Internet applications such as Instant Messaging or Games in particular use groups of ports, and are not easy to work behind a firewall. To work well with these special applications we will open ports to let traffic pass through. Before you set up special application, please see your applications' help for such information.
Select an Application: -- select one --
Name:
Trigger Ports:
Trigger Protocol: TCP
Opened Ports:
Opened Protocol: TCP
ADD
Select
Name
Trigger Port
Trigger Protocol
Opened Ports
Opened Protocol
DELETE SELECTED
NOTE: You can use up to 3 sets of opened ports for a specific application. The opened ports can be seperated by a comma and no spaces are allowed (e.g. 2300-2305,4300-4305,5300-5305).
Help

MAC Filtering Settings

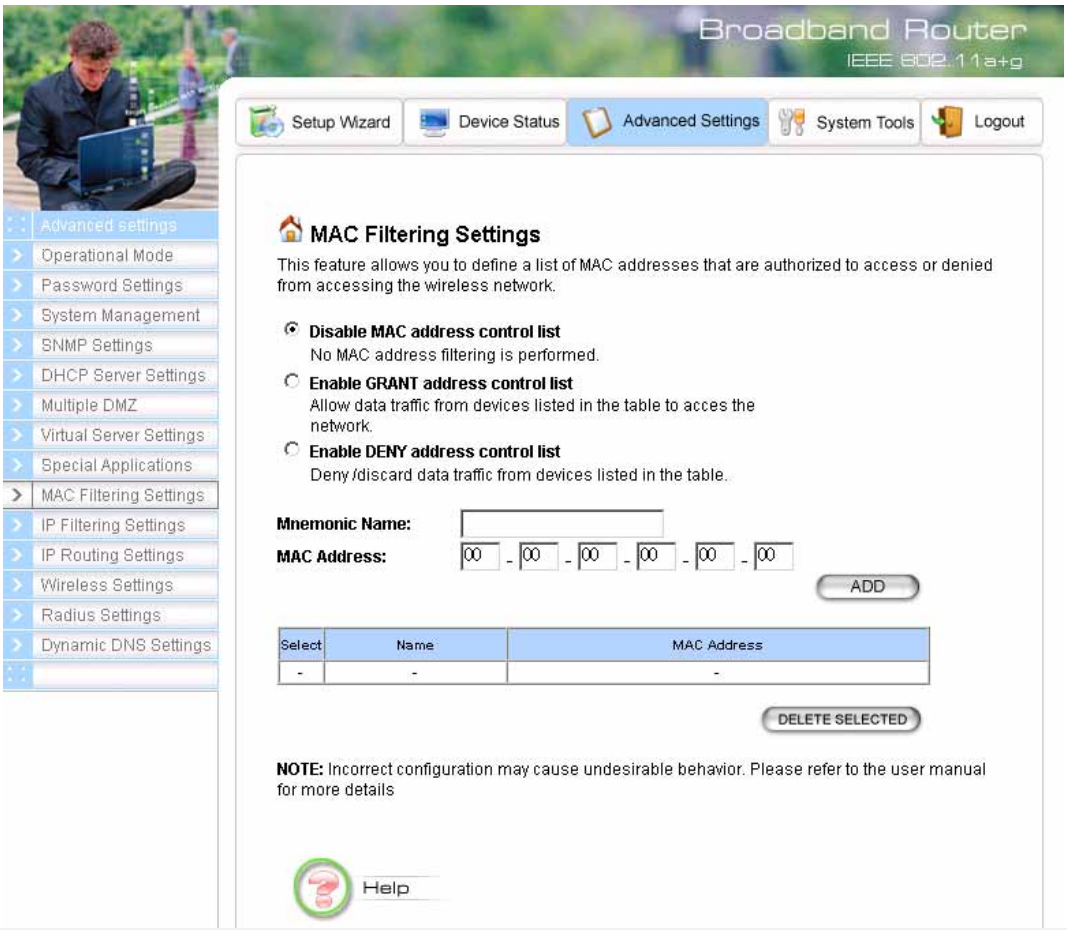
The 802.11a+g Router allows you to define a list of MAC addresses. One of three mutually exclusive rules can be selected to forward/filter data packets based on these MAC addresses.

- **Disable MAC address control list**: When this radio button is selected, no MAC address filtering will be performed.
- **Enable GRANT address control list**: When this radio button is selected, only packets received from the wireless LAN interface with the configured MAC addresses will be allowed/forwarded.
- **Enable DENY address control list**: When this radio button is selected, only packets received from the wireless LAN interface with the configured MAC addresses will be denied/filtered.

Once a choice is made, the choice applies to all filtering rules.
To add a filtering rule, configure the following:
Mnemonic Name: the name to identify the filter

MAC Address: the MAC address for grant or deny.

After you finish the above, you press the **ADD** button to add the entry to the table. There are up to 32 MAC filtering rules could be configured.
You can delete an entry by selecting the corresponding entry and press the **DELETE SELECTED** button.



IP Filtering Settings

Three mutually exclusive rules can be defined to forward/filter IP packets based on their IP address and/or port numbers.

- **Disable IP filtering**: If this is selected, the IP filtering feature is disabled. No IP filtering will be performed.
- **GRANT IP access**: When this is elected, packets received from/transmitted to WAN with specified (source or destination) IP addresses will be allowed/forwarded.
- **DENY IP access**: Packets received from/transmitted to WAN with the specified IP addresses will be denied/filtered.

Once a choice is made, the choice applies to all filtering rules.

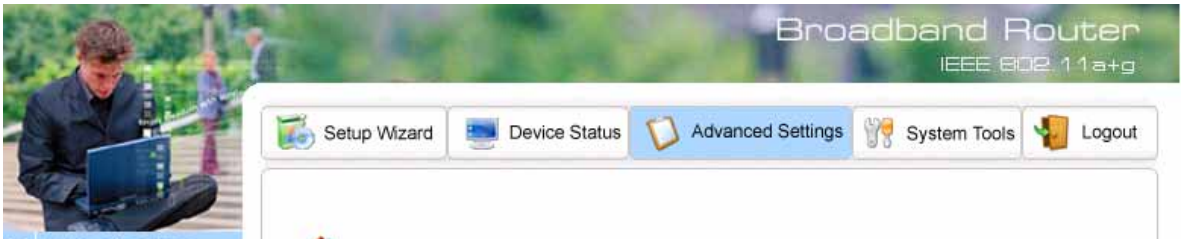
To define/add an IP filtering rule, enter the following information

- **Name**: The name of the filter
- **IP Protocol:** TCP or UDP
- **Apply to**: You need to select whether the filtering rule should apply to packets outbound for the Internet or inbound from the Internet.
- **Source IP address**: you can select **Any**, **Single IP**, or a **Network** (of source IP addresses).
- **Source Port**: you can select **Any**, **Single**, or a **Range** of port numbers.
- **Destination IP address**: **Any**, **Single IP**, or a **Network** (of destination IP addresses).
- **Destination Port**: you can select **Any**, **Single**, or a **Range** of port numbers.

After you finish the above, you press the **ADD** button to add the entry to the table. There are up to 32 IP filtering rules could be configured.

You can delete an entry by selecting the corresponding entry and press the **DELETE SELECTED** button.

Please Note that IP filtering is a sophisticated feature that can severely impact your Router operation. Please be sure that you fully understand it before you use this feature. If you make any mistakes, it can produce dramatic and potentially undesirable results.



- Advanced settings
- Operational Mode
- Password Settings
- System Management
- SNMP Settings
- DHCP Server Settings
- Multiple DMZ
- Virtual Server Settings
- Special Applications
- MAC Filtering Settings
- IP Filtering Settings
- IP Routing Settings
- Wireless Settings
- Radius Settings
- Dynamic DNS Settings

IP Filtering Settings

This allows you to define rules for allowing / denying access from / to the Internet.

- **Disable IP filtering**
  No IP filtering is performed.
- **Grant IP access**
  Data traffic satisfying rules below are allowed/forwarded.
- **Deny IP access**
  Data traffic satisfying rules below are denied/filtered.

Define an IP filtering rule:

Name:

IP Protocol: TCP

Apply to : Outbound to the Internet / Inbound from the Internet

Source IP Address: Any / Single IP / Network (IP: / Netmask:)

Source Port: Any / Single / Range (From: / To:)

Dest. IP Address: Any / Single IP / Network (IP: / Netmask:)

Dest. Port: Any / Single / Range (From: / To:)

ADD

Select	Name	IP Protocol	Apply to	Source IP Address(es)	Source Port(s)	Dest. IP Address(es)	Dest. Port(s)
-	-	-	-	-	-	-	-

DELETE SELECTED

NOTE: Incorrect configuration may cause undesirable behavior. Please refer to the user manual for more details.

Help

IP Routing Settings

Dynamic Routing: enable gateway to exchange the routing table dynamically through LAN port. Currently you can choose to use RIPv1 or RIPv2 with Send enabled (active mode) or disabled (passive mode).

Static Routing: If you have routers on your LAN or WAN, you can configure static routes on the 802.11a+g Router to route network traffic to a specific, predefined destination. The 802.11a+g Router routes packets based only on the packet's destination not on the source of a packet.

Static Routes are configured when network traffic is directed to a specific destination on the network whether it is the LAN or WAN. For instance, you can configure the 802.11a+g Router to route traffic destined to a particular network to a specific router on the LAN or WAN using the following steps:

1. Enter the IP address of the destination network in the Destination Network field.

2. Enter the subnet in the Subnet Mask field.

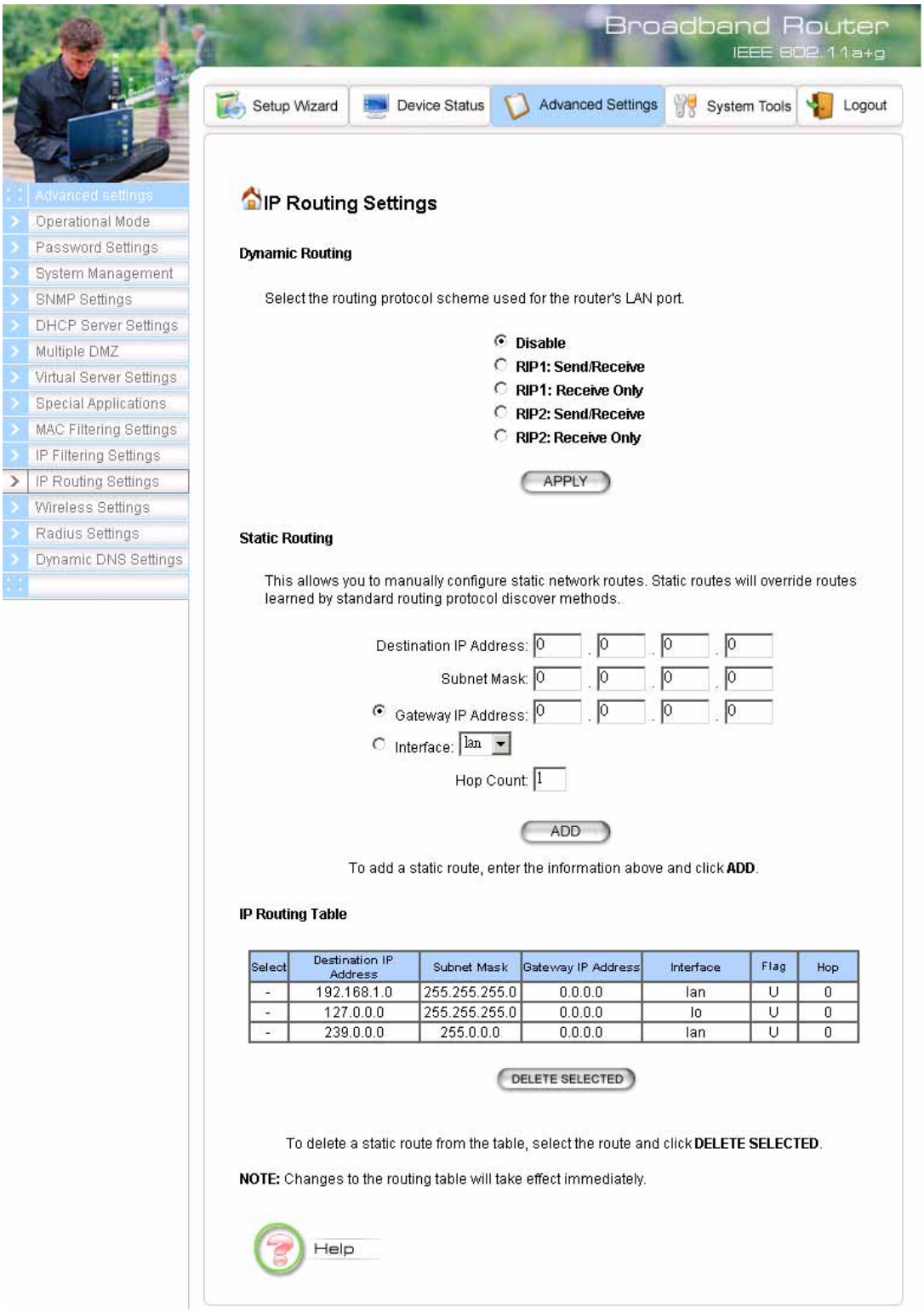
3. Enter the IP address of the specific router in the Gateway IP Address field.

4. Select LAN or WAN, where is the specific router is, from the Interface menu.

6. Click Add.

IP Routing Table: The Routing Table shows a list of destinations that the IP software maintains on each host and router. The destination network IP address, subnet mask, gateway address, and the corresponding interface are displayed.

Note: The 802.11a+g Router can support up to 128 static route entries.


Broadband Router
IEEE 802.11a+g
Setup Wizard
Device Status
Advanced Settings
System Tools
Logout
Advanced settings
Operational Mode
Password Settings
System Management
SNMP Settings
DHCP Server Settings
Multiple DMZ
Virtual Server Settings
Special Applications
MAC Filtering Settings
IP Filtering Settings
IP Routing Settings
Wireless Settings
Radius Settings
Dynamic DNS Settings
IP Routing Settings
Dynamic Routing
Select the routing protocol scheme used for the router's LAN port.
Disable
RIP1: Send/Receive
RIP1: Receive Only
RIP2: Send/Receive
RIP2: Receive Only
APPLY
Static Routing
This allows you to manually configure static network routes. Static routes will override routes learned by standard routing protocol discover methods.
Destination IP Address: 0 . 0 . 0 . 0
Subnet Mask: 0 . 0 . 0 . 0
Gateway IP Address: 0 . 0 . 0 . 0
Interface: lan
Hop Count: 1
ADD
To add a static route, enter the information above and click ADD.
IP Routing Table
Select
Destination IP Address
Subnet Mask
Gateway IP Address
Interface
Flag
Hop
- 192.168.1.0 255.255.255.0 0.0.0.0 lan U 0
- 127.0.0.0 255.255.255.0 0.0.0.0 lo U 0
- 239.0.0.0 255.0.0.0 0.0.0.0 lan U 0
DELETE SELECTED
To delete a static route from the table, select the route and click DELETE SELECTED.
NOTE: Changes to the routing table will take effect immediately.
Help

Wireless Settings

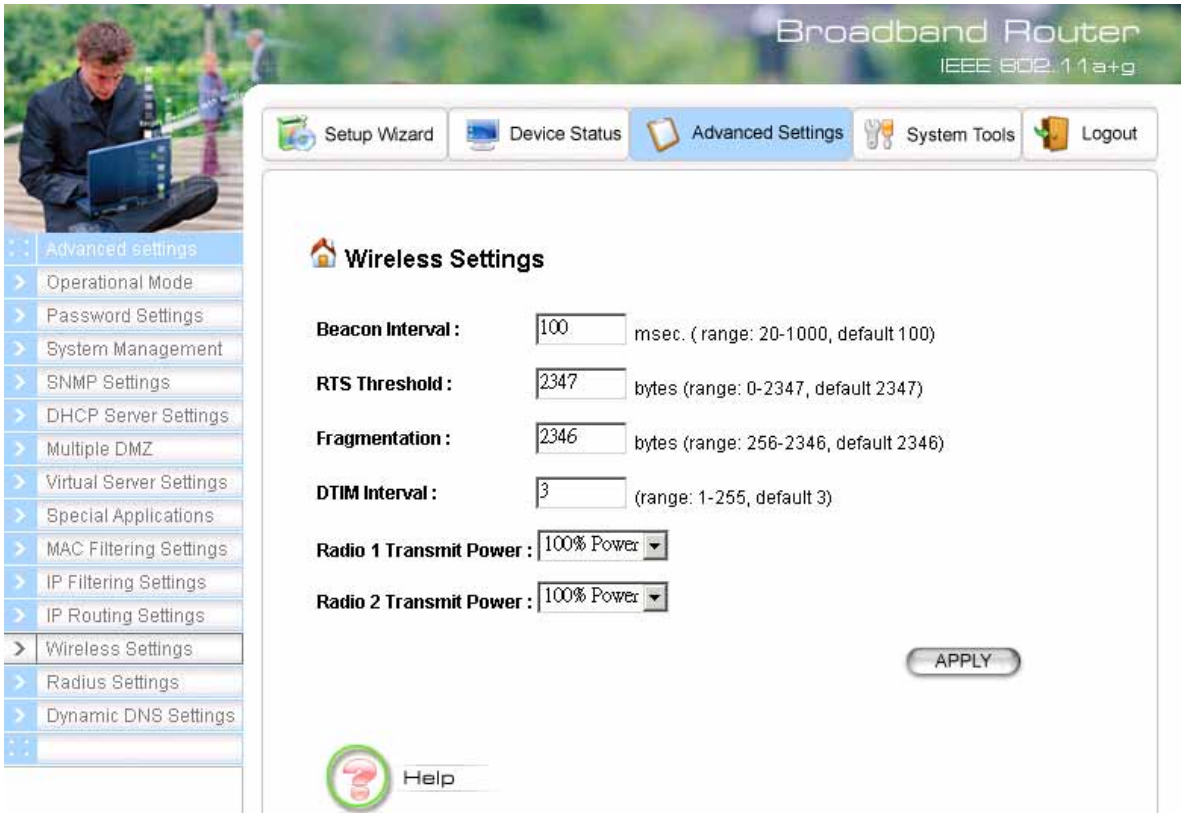
You can use this screen to configure various parameters of your 802.11a+g Router.

Beacon Interval: The 802.11a+g Router broadcasts beacon frames regularly to announce its existence. The beacon Interval specifies how often beacon frames are transmitted - in time unit of milliseconds. Its default value is 100; a valid value should be between 20 and 1000.

RTS Threshold: RTS/CTS frames are used to gain control of the medium for transmission. Any unicast (data or control) frames larger than the specified RTS threshold must be transmitted following the RTS/CTS handshake exchange mechanism. The RTS threshold should have a value between 0 and 2347 bytes, with a default value of 2347. A value of zero activates the RTS/CTS handshake before every transmission. It is recommended that this value does not deviate from the default too much.

Fragmentation: When the size of a unicast frame exceeds the fragmentation threshold, the frame will be fragmented before transmission. The threshold should have a value of 256-2346 bytes, with a default value of **2346**. If you experience a high packet error rate, you should slightly decrease the Fragmentation Threshold.

DTIM Interval: The 802.11a+g Router buffers packets for stations that operate in the power-saving mode. A Delivery Traffic Indication Message (DTIM) contains information on which power-conserving stations have packets waiting to be received. The DTIM interval specifies how often beacon frames should contain DTIMs. It should have a value between 1 and 255, with a default value of **3**.



RADIUS Settings

RADIUS (Remote Access Dial-In User Service) servers provide centralized authentication services to wireless clients. Up to two RADIUS servers can be defined, one acting as a primary, and the other as a backup.

Enable Primary Server: To configure the primary server, check the "Enable Primary Server" box, and configure the following parameters:

Server IP: The IP address of the RADIUS server

Port Number: The port number your RADIUS server uses for authentication. The default setting is 1812.

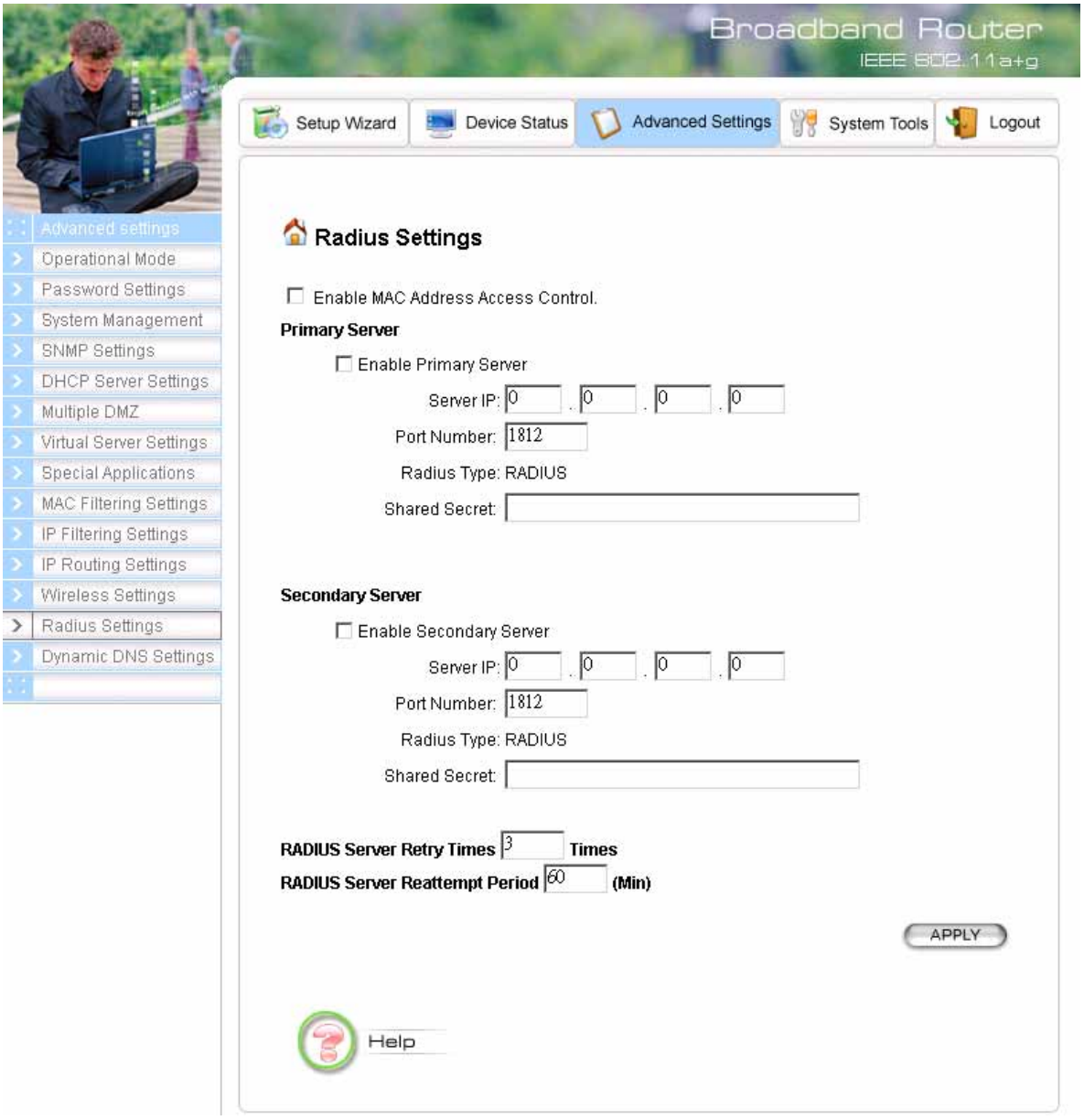
Shared Secret: This is used by your RADIUS server in the Shared Secret field in RADIUS protocol messages. The shared secret configured in the 802.11a+g Router must match the shared secret configured in the RADIUS server. The shared secret can contain up to 64 alphanumeric characters.

Enable Secondary Server: To configure the secondary server, check the "Enable Secondary Server" box, and configure the same parameters as for the primary server.

RADIUS Server Retry Times: The number of times the 802.11a+g Router should attempt to contact the primary server before giving up.

RADIUS Server Reattempt Period: After failed to contact the primary RADIUS server, the 802.11a+g Router will re-attempt to contact the primary server every this mount of minutes.

Enable MAC Address Access Control: MAC address filtering requires a MAC address filter table to be created in either the 802.11a+g Router and/or the RADIUS server. During the 802.11 Authentication phase, the MAC address filter table is searched for a match against the wireless client's MAC address to determine whether the station is to be allowed or denied to access the network. To leverage a RADIUS server for MAC address access control, check the box here.


Broadband Router
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SNMP Settings
DHCP Server Settings
Multiple DMZ
Virtual Server Settings
Special Applications
MAC Filtering Settings
IP Filtering Settings
IP Routing Settings
Wireless Settings
Radius Settings
Dynamic DNS Settings
Radius Settings
Enable MAC Address Access Control.
Primary Server
Enable Primary Server
Server IP: 0 . 0 . 0 . 0
Port Number: 1812
Radius Type: RADIUS
Shared Secret:
Secondary Server
Enable Secondary Server
Server IP: 0 . 0 . 0 . 0
Port Number: 1812
Radius Type: RADIUS
Shared Secret:
RADIUS Server Retry Times 3 Times
RADIUS Server Reattempt Period 60 (Min)
APPLY
Help

Dynamic DNS Settings

Some people advertise the IP addresses of their routers so that Internet users can access these routers (which is actually to access virtual servers behind these routers) using these IP addresses. However, for those routers that are assigned dynamic IP addresses from the ISP, this approach requires additional work (since the addresses assigned are not always the same).

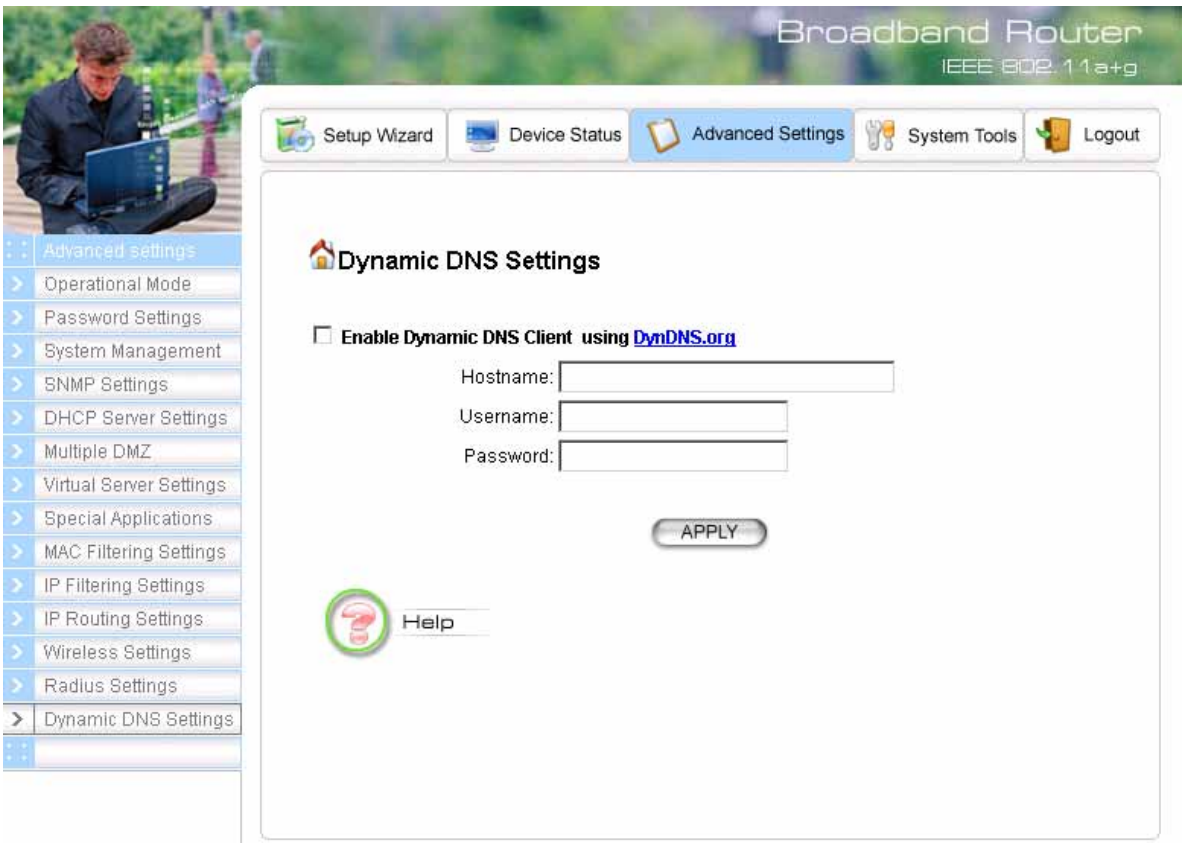
The 802.11a+g Router implements the dynamic DNS feature so that each time it is booted, it will re-register its domain-name-to-IP-address mapping with the dynamic DNS server you use (currently only DynDNS.org is supported), the service provider that provides domain name to IP address mapping. This is so that you can advertise your router by providing your domain name, while Internet users can access the router using the domain name, not the router's IP address.

To activate this feature, you need to check the "**Enable Dynamic DNS Client using DynDNS.org**" box first, and then configure the following parameters:

Hostname: the hostname (domain name) registered with DynDNS.org by you.

Username: the username required to log in to the domain name server maintained by DynDNS.org.

Password: the password required to log in to the domain name server maintained by DynDNS.org.



Chapter

5

Managing your 802.11a+g Router

This Chapter covers other management aspects of your 802.11a+g Router:

- How to view the device status
- How to view the system log
- How to upgrade your 802.11a+g Router firmware
- How to save or restore configuration changes
- How to reboot your 802.11a+g Router
- What if you forgot the password

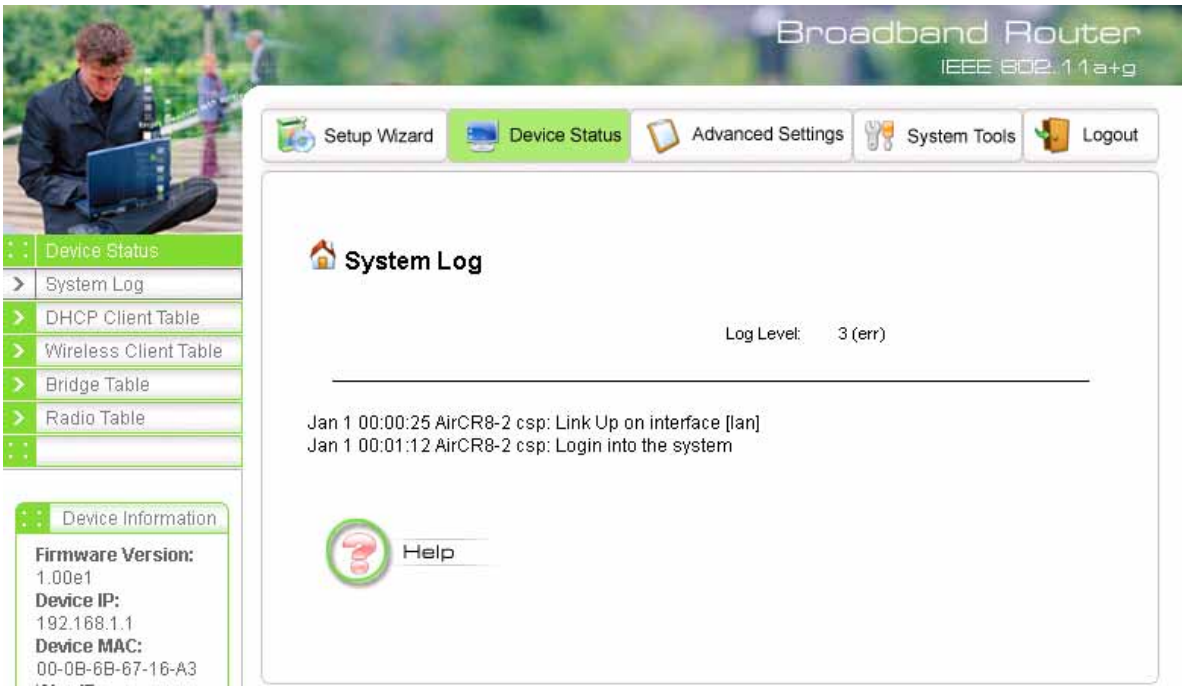
How to View the device Status

You can monitor the system status and get general device information from the **Device Information** screen:

How to View the System Log

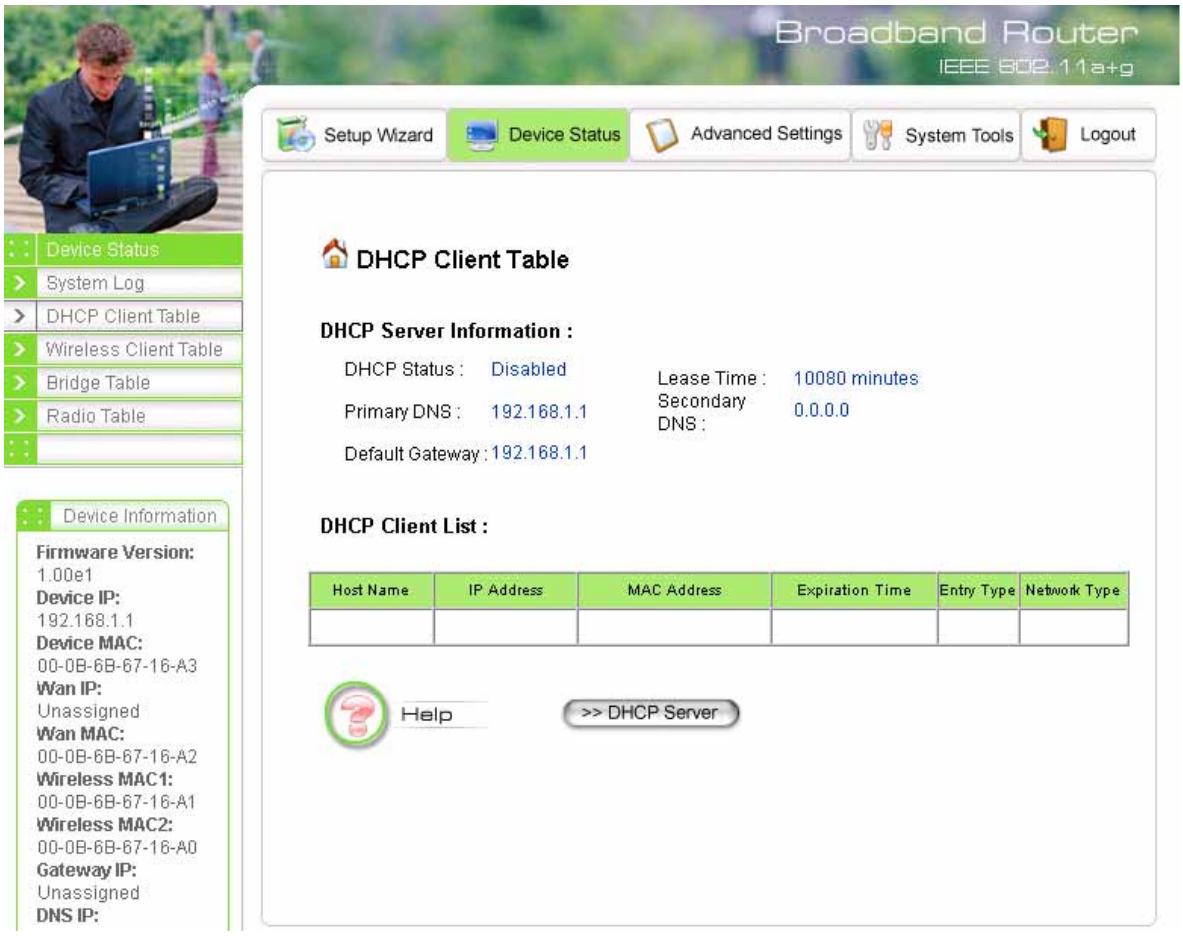
The 802.11a+g Router maintains a system log that you can use to track events that have occurred in the system. Such event messages can sometimes be helpful in determining the cause of a problem that you may have encountered.

You can select System Log on the left to view log events recorded in the system. The System Log entries are shown in the main screen along with the log level, the severity level of messages that are being displayed (a low number such as 2 means critical), and the uptime, the amount of time since the 802.11a+g Router was last reset. The maximum number of entries is 128. If there are more than 128 entries, older entries will be deleted.



DHCP Client Table

The DHCP client table lists current DHCP clients connected with its host name, IP address, MAC address, expiration time, and entry type.

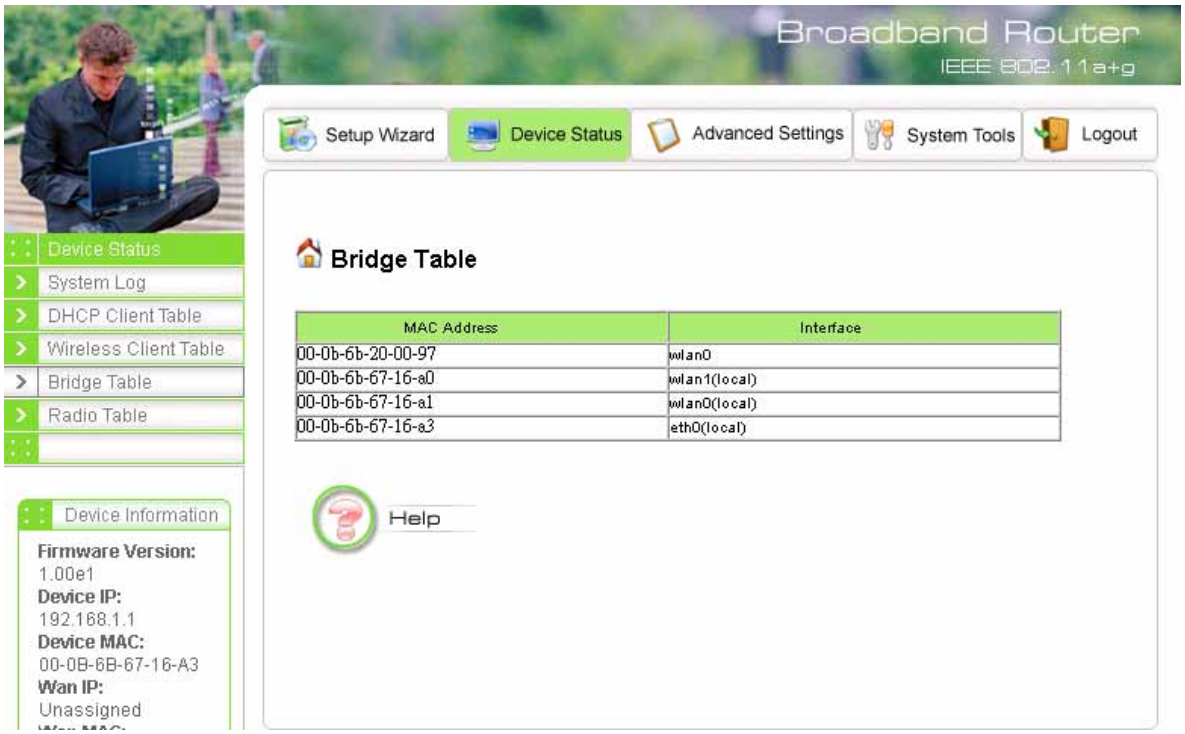


Wireless Client Table

The wireless client table lists the current wireless clients with the radio it is associated with, its MAC address, state, transmitted packets, and received packets.

Bridge Table

The bridge table shows all MAC entries learned from the wired LAN interface, wireless clients, and WDS peers.



Radio Table

The radio table shows the information of each radio, including the current mode, channel, number of clients associated, number of packets transmitted and received, and number of errors happened.

Upgrading Firmware

You can upgrade your 802.11a+g Router's firmware (the software that controls your 802.11a+g Router's operation). Normally, this is done when a new version of firmware offers new features that you want, or solves problems you have encountered when using the current version. System upgrade can be performed through the System Upgrade option as follows:

Step 1 Select **System Tools,** then **Firmware Upgrade** from the menu and the following screen displays:

Step 2: To update the 802.11a+g Router firmware, first download the firmware from the distributor's web site to your local disk. Then from the above screen enter the path and filename of the firmware (or click **Browse** to select the path and filename of the firmware). Next, Click the **Upgrade** button.

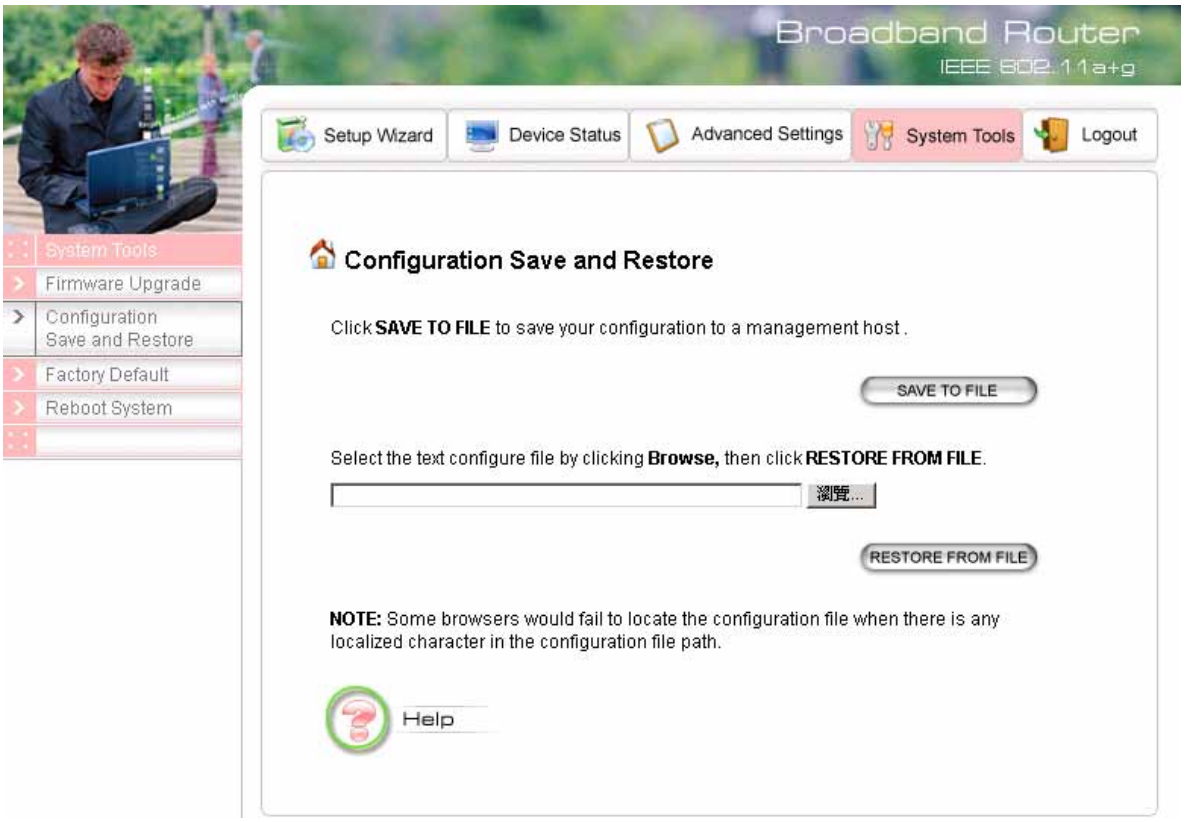
The new firmware will begin loading to your 802.11a+g Router. After a message appears telling you that the operation is complete, you need to reset the system to have the new firmware take effect.

Note: It is recommended that you do not upgrade your 802.11a+g Router if you are happy with its operation.

How to Save or Restore Configuration Changes

You can save system configuration settings to a file, and later download it back to the 802.11a+g Router system by following the steps below.

Step 1 Select **Configuration Save and Restore** from the **System Tools** menu and the following screen displays:

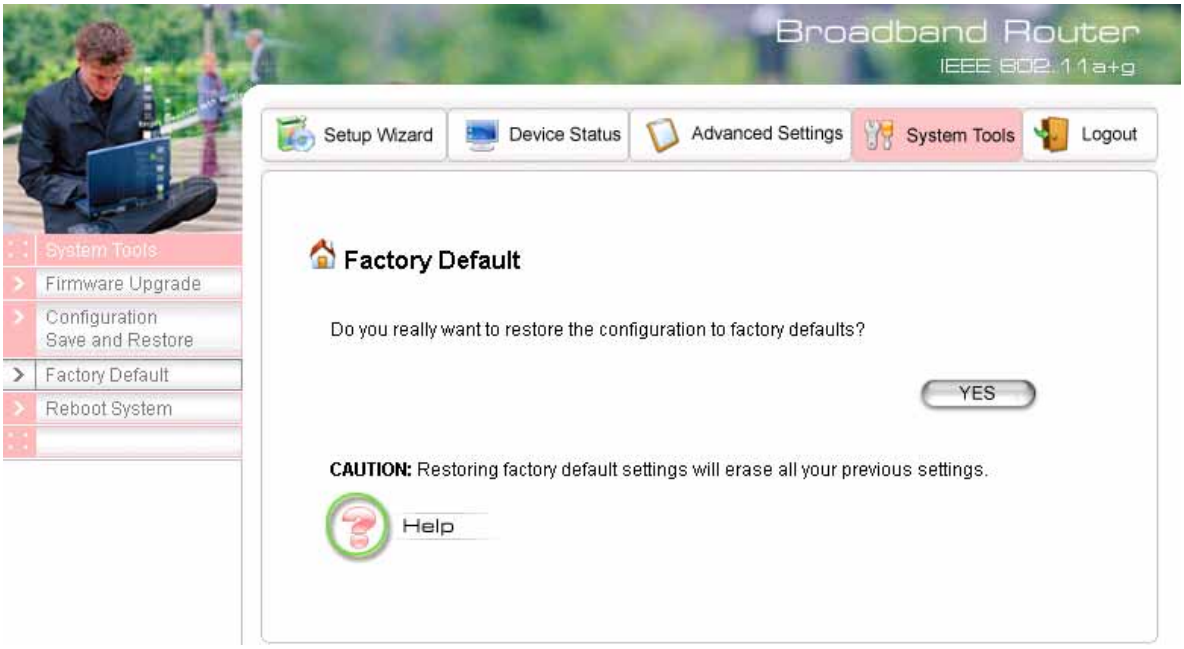


Step 2 Click **SAVE TO FILE** and then select a local file to save to, or click **RESTORE FROM FILE** and then select a local file to upload.

How to Restore the System Settings to the Factory Defaults

You can restore the system settings to the factory defaults.

Step 1 Select **Factory Default** from the **System Tools** menu and the following screen displays:

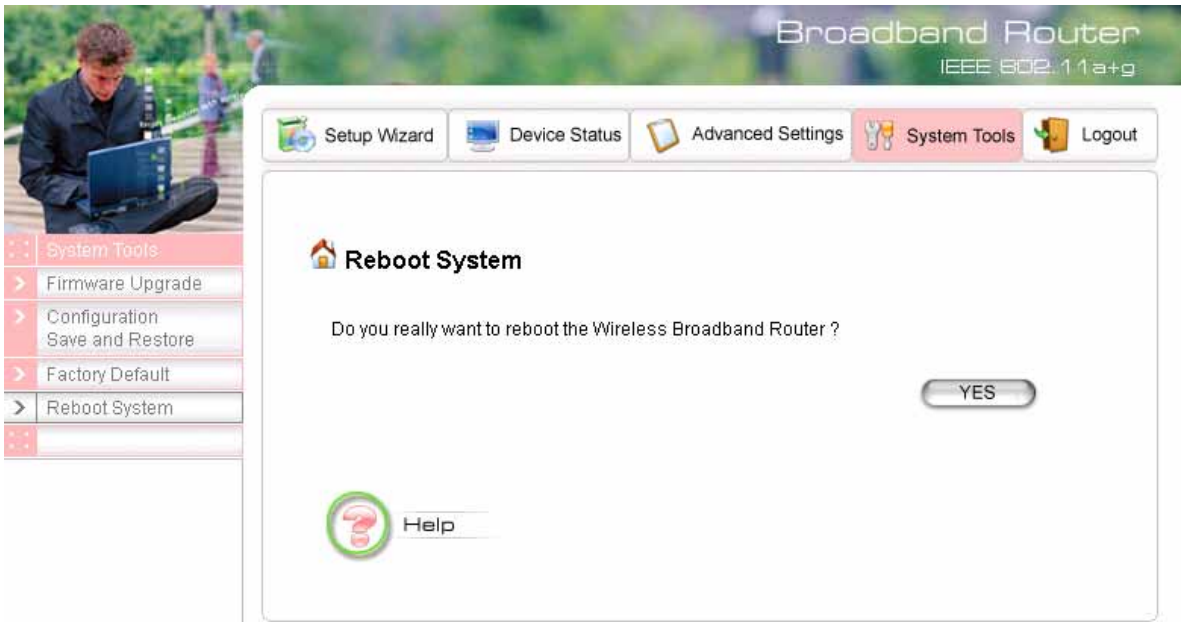


Step 2 Click **YES** to restore the system configurations to the factory defaults, and the system will reboot automatically.

How to Reboot your 802.11a+g Router

You can reset your 802.11a+g Router from the Brower. To reset it:

Step 1 Select **Reboot System** from the **System Tools** menu, the following screen shows:



Step 2 Click **YES** to reset the 802.11a+g Router.

Note: Resetting the 802.11a+g Router disconnects any active clients, and therefore will disrupt any current data traffic.

What if you Forgot the Password?

If you forgot the password, the only way to recover is to clear the device configuration and return the unit to its original state as shipped from the factory. You can do this by pressing the hardware "restore" button on the device for "**2 seconds**". Please note that this will require you to re-enter all of your configuration data.

Specification

Product Name	IEEE 802.11a+g Wireless LAN Router
OS	Linux® 2.4.18
Standard	• IEEE 802.11a • IEEE 802.11b • IEEE 802.11g • IEEE 802.1x • IEEE 802.3u
WLAN Network Architecture Type	• Infrastructure • Bridge Mode (WDS)
Wireless Transfer Data Rate for IEEE 802.11a Draft Standard	IEEE 802.11a Standard: 54, 48, 36, 24, 18, 12, 9 & 6 Mbps with auto fallback
Wireless Transfer Data Rate for IEEE 802.11g Draft Standard	IEEE 802.11g Standard: 54, 48, 36, 24, 18, 12, 9 & 6 Mbps with auto fallback
Wireless Transfer Data Rate for IEEE 802.11b	11, 5.5, 2 & 1 Mbps with auto fallback
Physical Specification	• External Power Adapter with DC5v/2A Input • Dimension: 164.3(L) x 170(W) x 36.5(H) mm • Desktop Installation • Wall/Ceiling Mountable
Hardware & Antenna	• 3 x RJ45 (4x 10/100 Mbps Ethernet Switch Auto MDI/MDI-X) for LAN ports • 1 x RJ45 for WAN • 1 x RJ45 for DMZ • 1 x Reset Button • 2x External Antenna • 9 x LED: 1 x Power; 1 x Diag; 1 x WLAN; 1 x WAN (LINK/ACT); 4 x LAN (LINK/ACT); 1 x DMZ (LINK/ACT)
DHCP Server	• Build-in DHCP server • Support static DHCP assignment
Security, VPN Support	• IP Sec, L2TP, PPTP pass through
NAT & Firewall	• Support special applications including H323, NetMeeting, internet gaming • Default private receiver (Software DMZ) • Virtual server • IP Filtering
IP Routing	• Rip v1 & v2 • Static and default route
Management	• Web-Based Management Tool • UPnP • SNMP V1 & V2 • MIB: Ethernet, MIB II, 802.11 • Command line interface with Telenet • Upload & download test-based configuration file vis HTTP browser • Firmware upgrade via HTTP browser • SysLog
DNS	• DNS relay & Dynamic DNS
WAN Encapsulation	• Static IP • DHCP client; PPPoE client • PPTP client
IP Address Assignment	• DHCP Client • Static IP Address
Environmental Specification	• Operation Temperature: 0^0 ~40^0 C. • Storage Temperature: -20^0 ~ 65^0 C • Operating Humidity: 10% ~90% (without Condensation)
EMC Certification	• FCC, UL, CE
Certificate	• Wi-Fi Class 5 GHz 802.11a, Wi-Fi Class 2.4 GHz 802.11g (Planning)