802.11 a/g
Super A/G Intelligent WLAN Router

USER'S GUIDE

Model

CRP-1

VERSION 1.0, APR. 2004

Copyright Statement

Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

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

FCC Caution: To assure continued compliance, (example - use only shielded interface cables when connecting to computer or peripheral devices) any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and
(2) This device must accept any interference received, including interference that may cause undesired operation.

IMPORTANT NOTE:
FCC Radiation Exposure Statement:

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

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

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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.

Chapter Six, *Command Line Interface*, explains the syntax and describes the function of CLI commands, which is invoked through a TELNET client.

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 DMZ port, a four-port 10/100Mbps Ethernet switch for connection to PCs on your local wired network, and one wireless interfaces for connection to your local wireless 802.11a/b/g network supporting a data rate of up to 108 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.

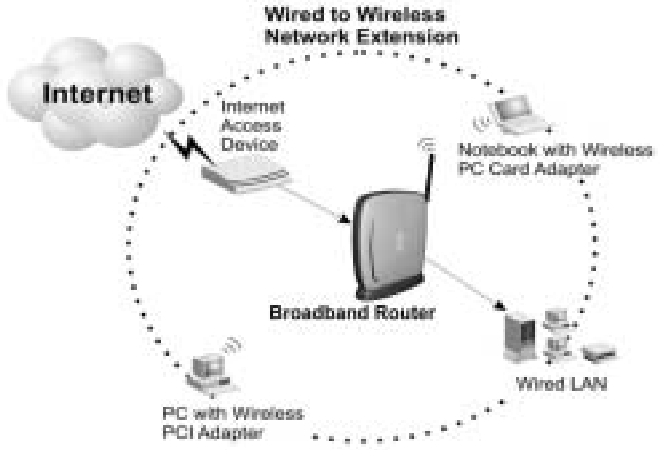
Accessing Servers from the Public Network

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 108 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. Alternatively, you can configure the 802.11a/g Router to provide an 802.11a WLAN environment.



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. This provide a firewall between your local LAN and the Internet.
- 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 to 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 the correct SSID.
- 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/IPSec pass-through.
- Support of PPPoE (multiple sessions and unnumbered IP) and PPTP client function for xDSL connections
- Support of multimedia applications (NetMeeting, CUSeeMe, Quick Time, etc) 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 the 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

The 802.11a/g Router can be managed by a local PC on either the wired or wireless LAN network. 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. For reasons to be given in Chapter 3, static IP address assignment is much preferred.

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.

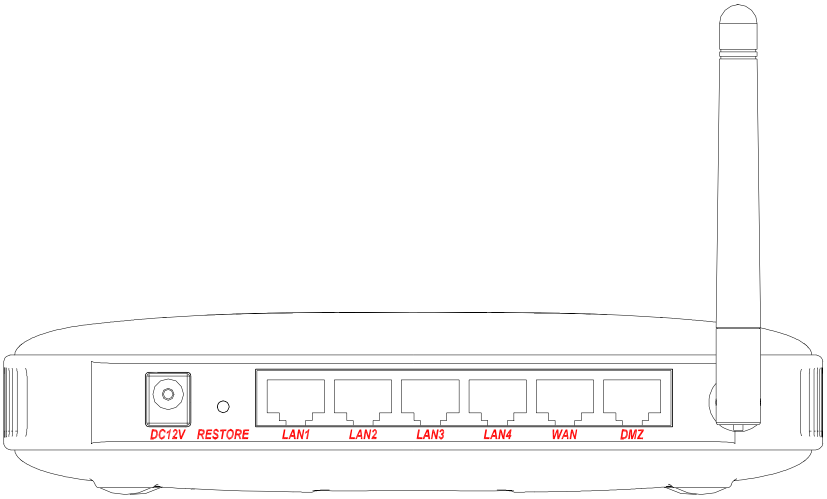
What's in the Box?

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 Category-5 LAN cable with RJ-45 connectors
- One copy of the 802.11a/g Router User' Guide

A physical look at the back panel

The following illustration shows the rear panel of Wireless 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

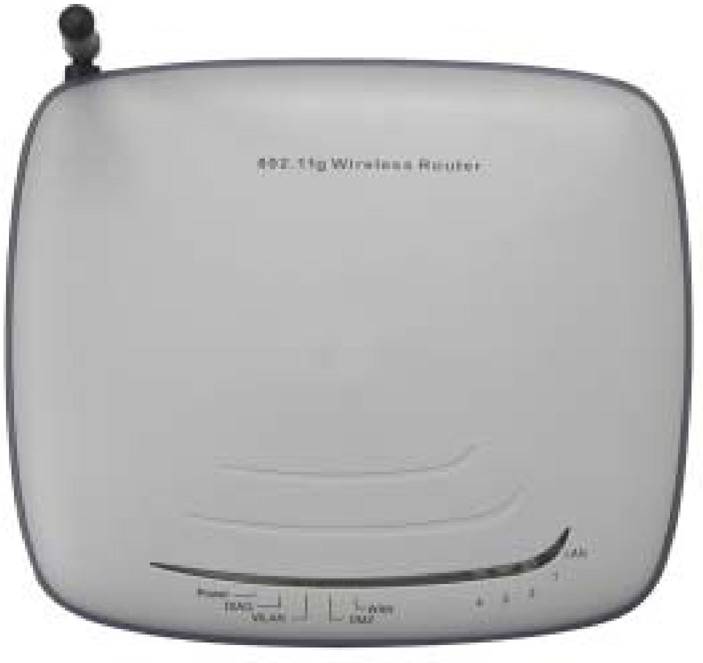
(3) 1 RJ-45 DMZ connector for connecting to an internal DMZ network or a PC

(4) 1 5V DC/2A power connector for connecting through a DC power adapter (included as part of the product) to the wall power outlet

(5) 1 Restore 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/DMZ	WLAN	DIAG	POWER
Steady Green	Link is active	Link is active	Link is active	3 seconds after powered on	Power
OFF	No LAN connection	No connection	No Wireless connection	Checked OK	No Power
FLASH	XMT/RCV Data	XMT/RCV Data	XMT/RCV Data	N/A	N/A

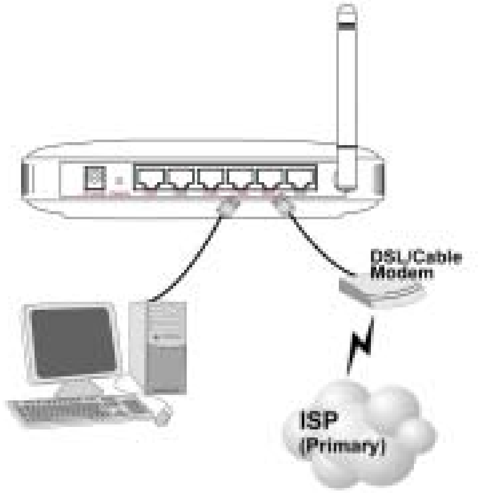
Connecting the Cables

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, such as port 1 or port 2.

Step 3 Connect the DC adapter to the Wireless Router and 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 a LAN (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:

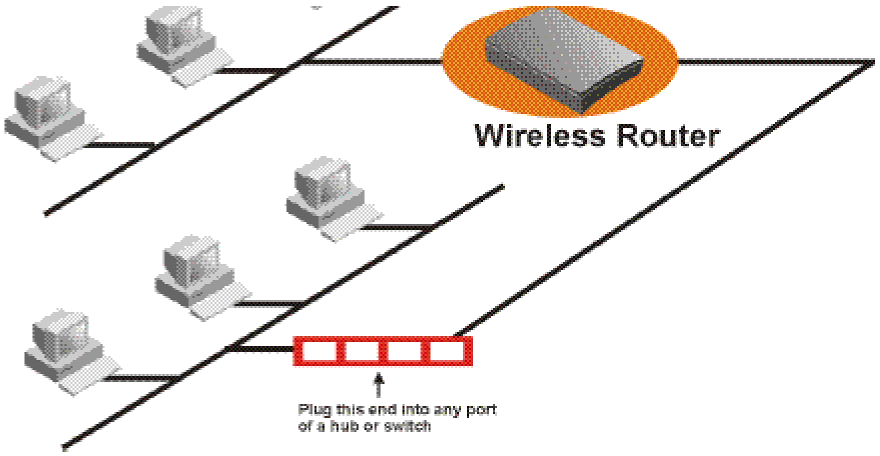
There are two tools useful for finding out a computer's IP address and default gateway:

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 at the end of step 7, instead of selecting “obtain IP addresses dynamically, you should specify the IP address explicitly.

Connecting More Devices Through A Switch/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.



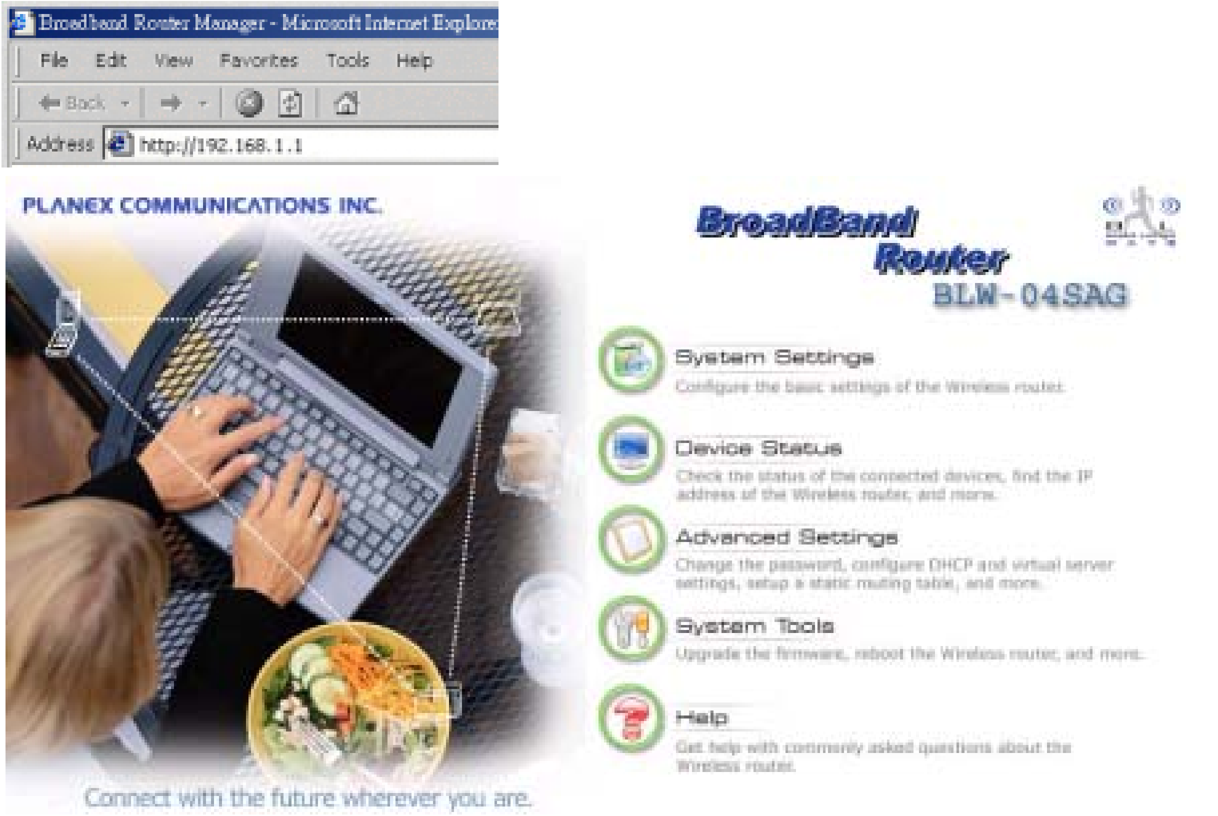
Chapter 3

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/.


Broadband Router Manager - Microsoft Internet Explorer
File
Edit
View
Favorites
Tools
Help
Back
PLANEX COMMUNICATIONS INC.
BroadBand Router
BLW-04SAG
Connect with the future wherever you are.

Address http://192.168.1.1

System Settings
Configure the basic settings of the Wireless router.

Device Status
Check the status of the connected devices, find the IP address of the Wireless router, and more.

Advanced Settings
Change the password, configure DHCP and virtual server settings, setup a static routing table, and more.

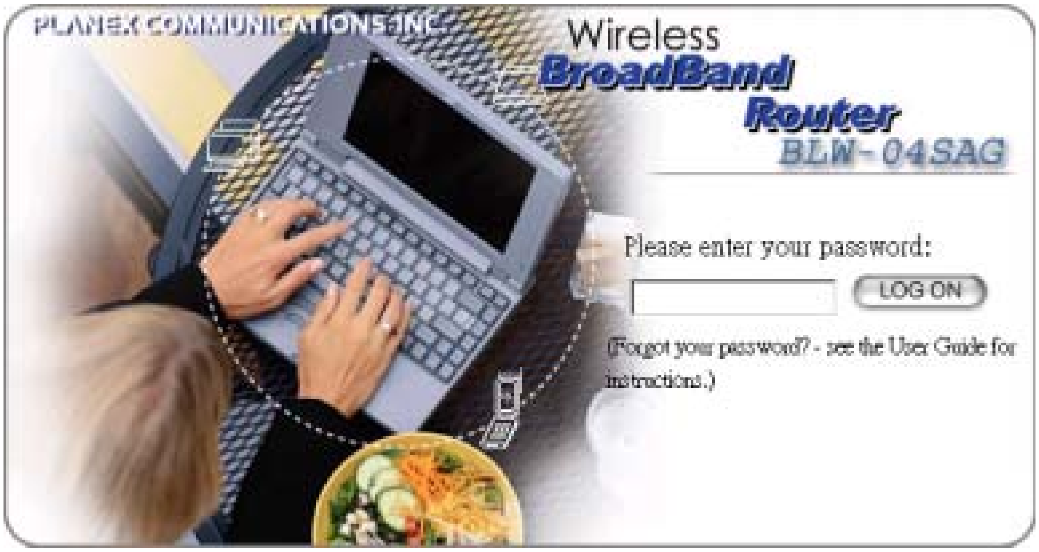
System Tools
Upgrade the firmware, reboot the Wireless router, and more.

Help
Get help with commonly asked questions about the Wireless router.

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



Please enter your password:

(Forgot your password? - see the User Guide for instructions.)

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.

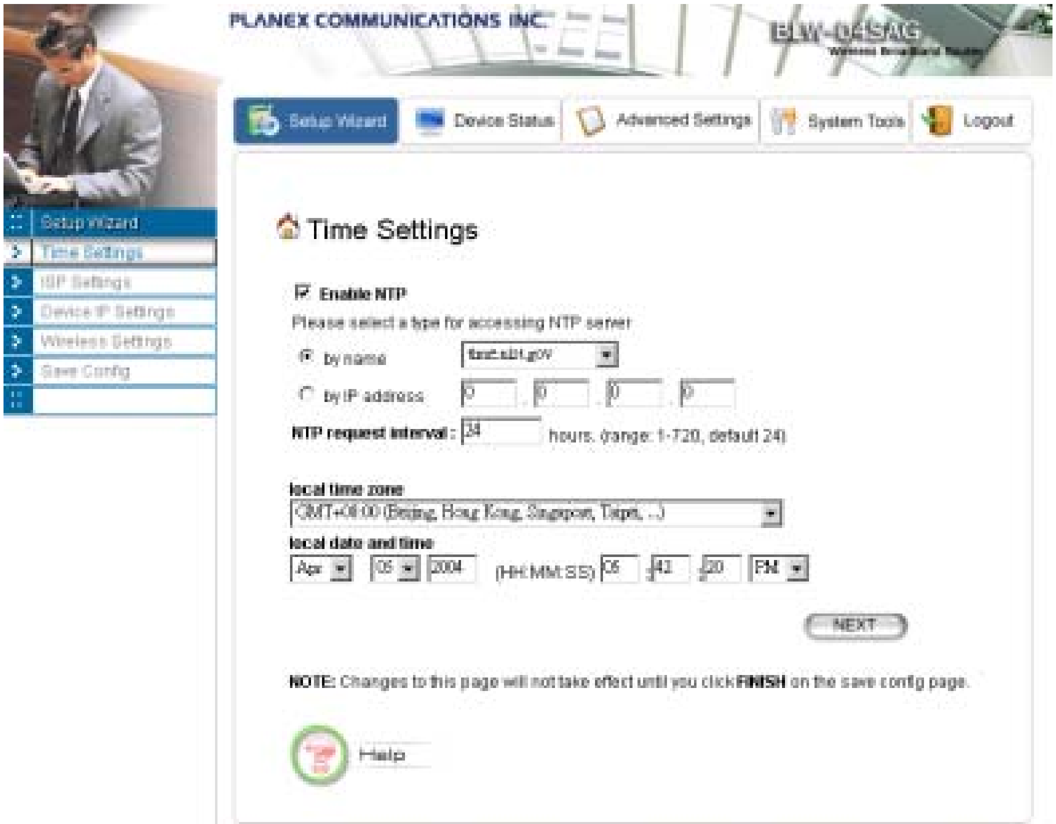
Setup Wizard

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.

SETTING 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".

Since the device does not have a real time clock on it, the system time needs to be set every time the device is booted up. You can enable the NTP (Network Time Protocol) function, which will set the system time periodically to the time queried from the NTP server configured. You can specify the NTP server to be queried either by selecting a well-known server or by entering the IP address of the server. The 802.11a/g Router will query the configured NTP server for the current time periodically according to the **NTP request interval** configured.



Time Settings

☑ Enable NTP

Please select a type for accessing NTP server

● by name: time.nist.gov

○ by IP address: 0 . 0 . 0 . 0

NTP request interval : 24 hours. (range: 1-720, default 24)

local time zone: GMT+08:00 (Beijing, Hong Kong, Singapore, Taipei, ...)

local date and time: Apr 05 2004 (HH:MM:SS) 05 : 42 : 20 PM

NOTE: Changes to this page will not take effect until you click **FINISH** on the save config page.

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.

  Manually: the connection will not be brought up until you manually connect it at the **WAN Status** page (described in **How To View The Device Status** section).
- **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:

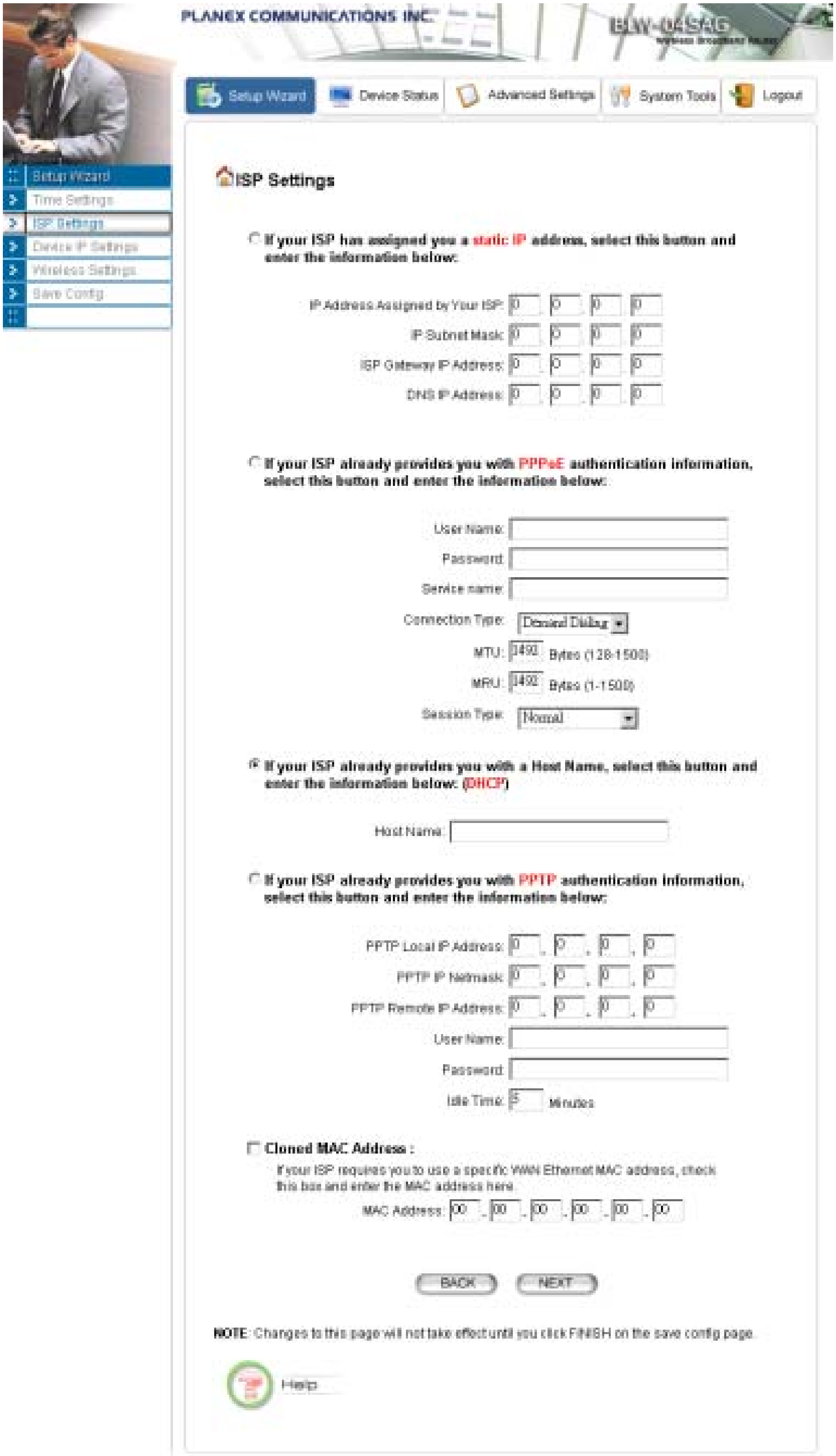
   - **PPTP Local IP Address**: the IP address on the local side of the PPTP tunnel provided by your ISP.
   - **PPTP IP Netmask**: the Netmask on the local side of the PPTP tunnel provided by your ISP.
   - **PPTP Remote IP Address**: the IP address of the remote side of the PPTP tunnel provided by your 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.

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.



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:	0	0	0	0
IP Subnet Mask:	0	0	0	0
ISP Gateway IP Address:	0	0	0	0
DNS IP Address:	0	0	0	0

○ 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:

○ If your ISP already provides you with PPTP authentication information, select this button and enter the information below:

PPTP Local IP Address:	0	0	0	0
PPTP IP Netmask:	0	0	0	0
PPTP Remote IP Address:	0	0	0	0

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: 00 - 00 - 00 - 00 - 00 - 00

NOTE: Changes to this page will not take effect until you click FINISH on the save config page.

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.

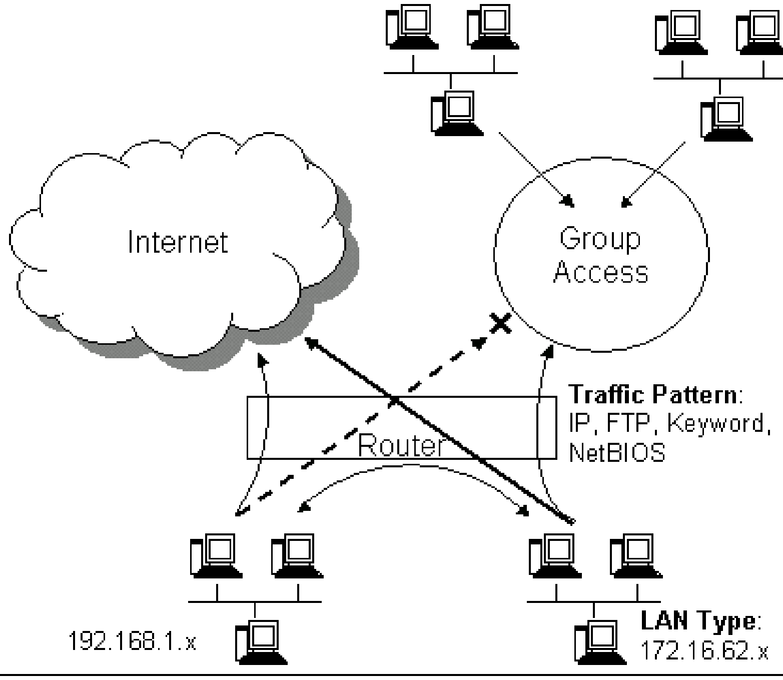
IP Address Range/Network: Packets with destination IP address within the range or network configured are matched.

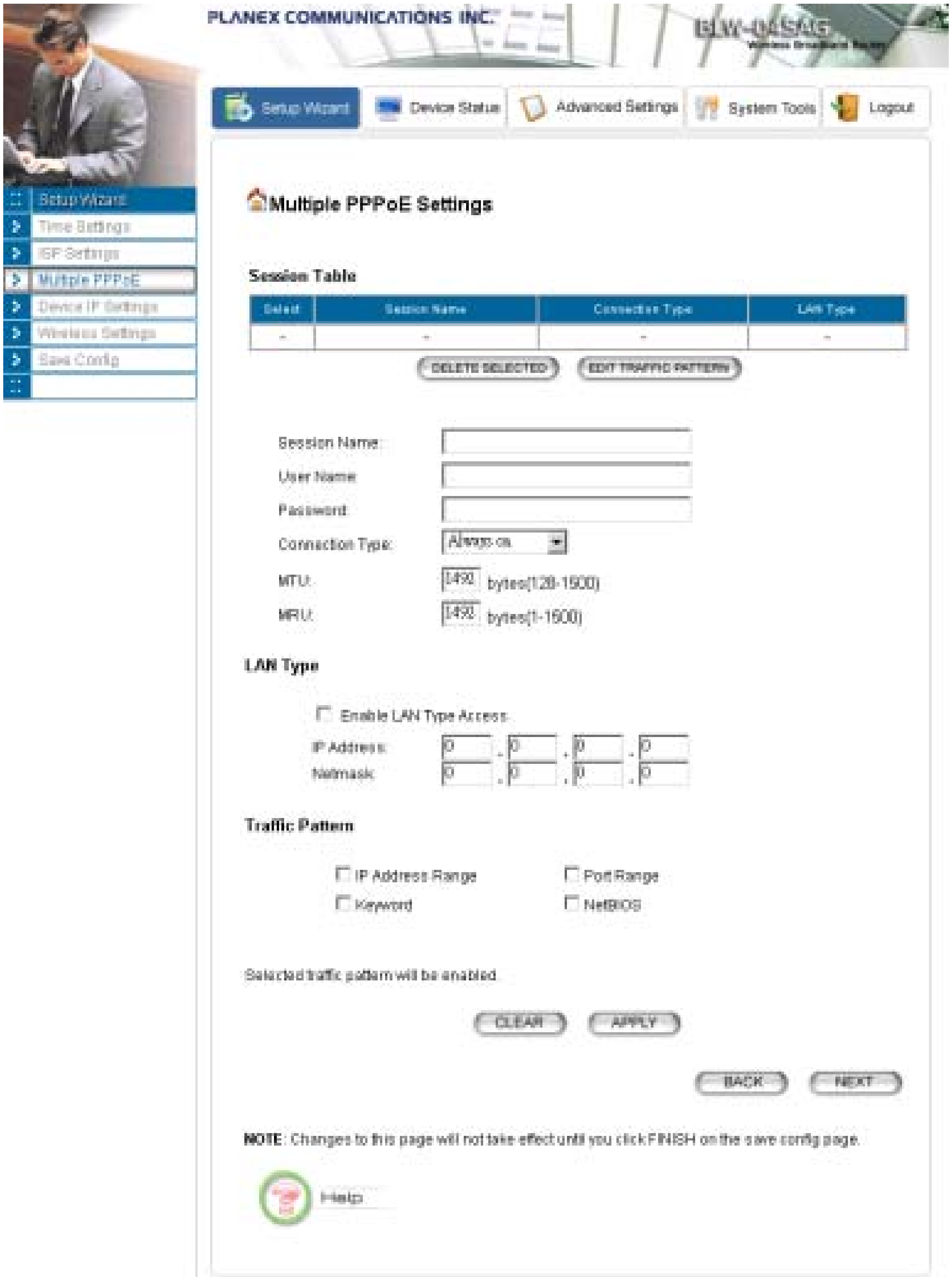
Port Range: TCP/UDP packets with the source or destination port in the configured range are matched.

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.





Multiple PPPoE Settings

Session Table

Select	Session Name	Connection Type	LAN Type
-	-	-	-

Session Name:

User Name:

Password:

Connection Type: Always on

MTU: 1492 bytes(128-1500)

MRU: 1492 bytes(1-1500)

LAN Type

□ Enable LAN Type Access

IP Address: 0 . 0 . 0 . 0

Netmask: 0 . 0 . 0 . 0

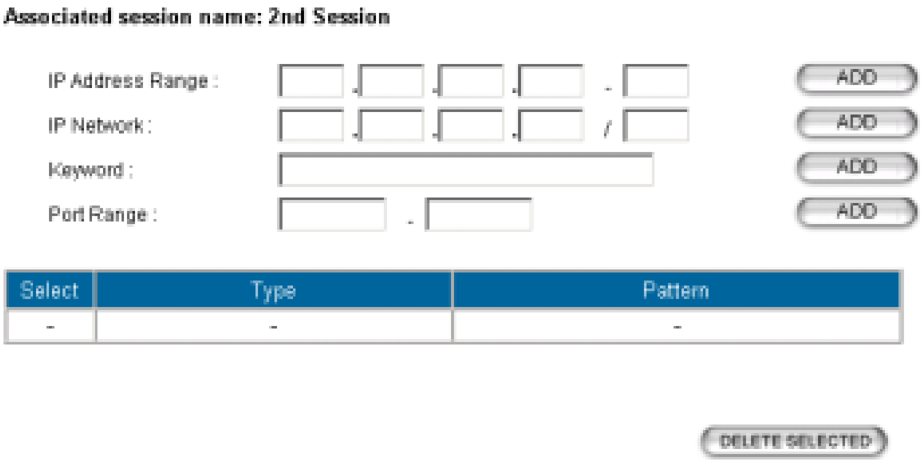
Traffic Pattern

□ IP Address Range □ Port Range

□ Keyword □ NetBIOS

Selected traffic pattern will be enabled.

NOTE: Changes to this page will not take effect until you click FINISH on the save config page.



Associated session name: 2nd Session

IP Address Range : . . . -

IP Network : . . . /

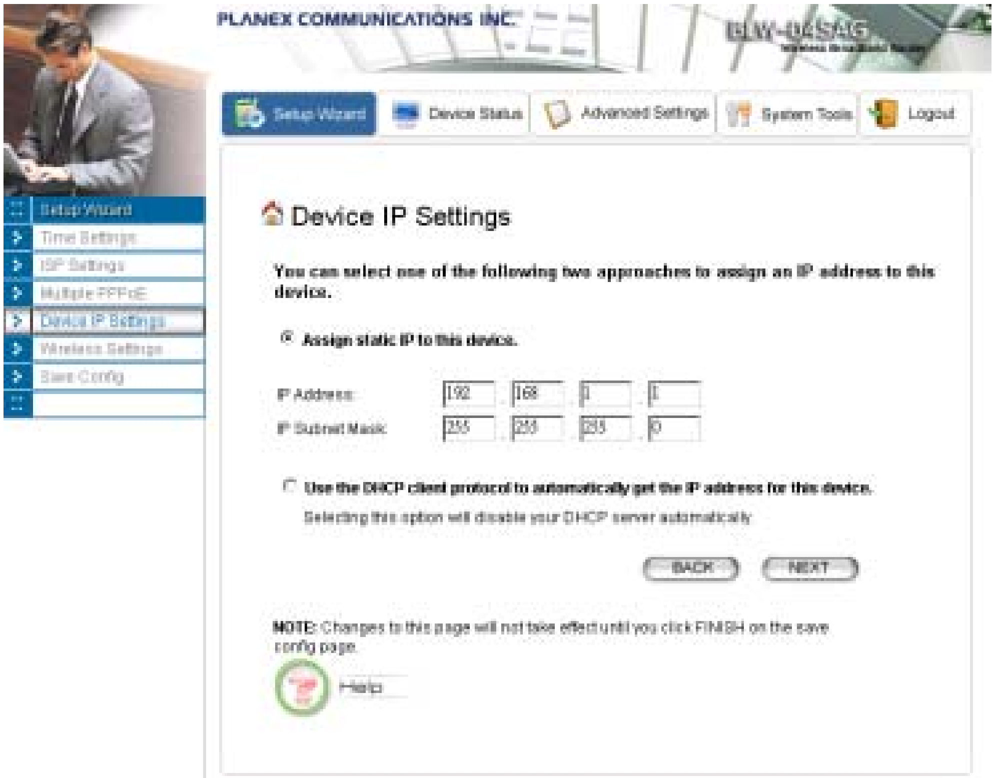
Keyword :

Port Range : -

Select	Type	Pattern
-	-	-

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.



Device IP Settings

You can select one of the following two approaches to assign an IP address to this device.

● Assign static IP to this device.

IP Address: 192 . 168 . 1 . 1
IP Subnet Mask: 255 . 255 . 255 . 0

○ Use the DHCP client protocol to automatically get the IP address for this device.
Selecting this option will disable your DHCP server automatically

NOTE: Changes to this page will not take effect until you click FINISH on the save config page.

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.

CONFIGURE YOUR WIRELESS LAN CONNECTION

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.

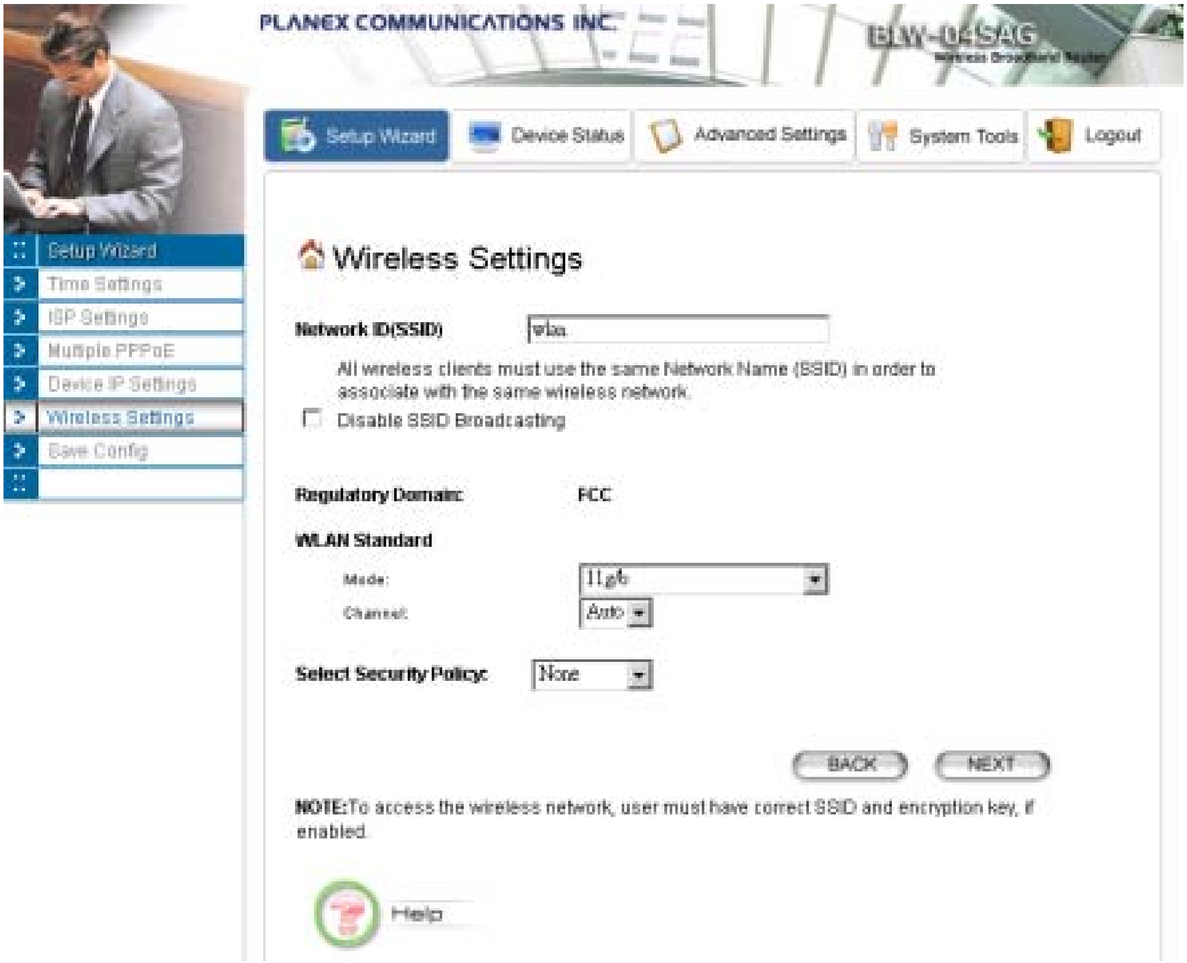
WLAN standard: Here you can set the configuration for the radio.

Mode: You can select the radio to run the **802.11b/g** (mix mode – allowing both 802.11b and 802.11g to co-exist), **802.11g only**, **802.11g turbo**, s**uper g without turbo**, **super g with dynamic turbo**, **super g with static turbo**, **802.11a**, **802.11a turbo**, **super a without turbo**, **super a with dynamic turbo**, or **super a with static turbo** protocol (the **turbo** mode is only applied where the regulation allows).

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.



Wireless Settings

Network ID(SSID): wlan

All wireless clients must use the same Network Name (SSID) in order to associate with the same wireless network.

□ Disable SSID Broadcasting

Regulatory Domain: FCC

WLAN Standard

Mode: 11g/b

Channel: Auto

Select Security Policy: None

NOTE: To access the wireless network, user must have correct SSID and encryption key, if enabled.

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.

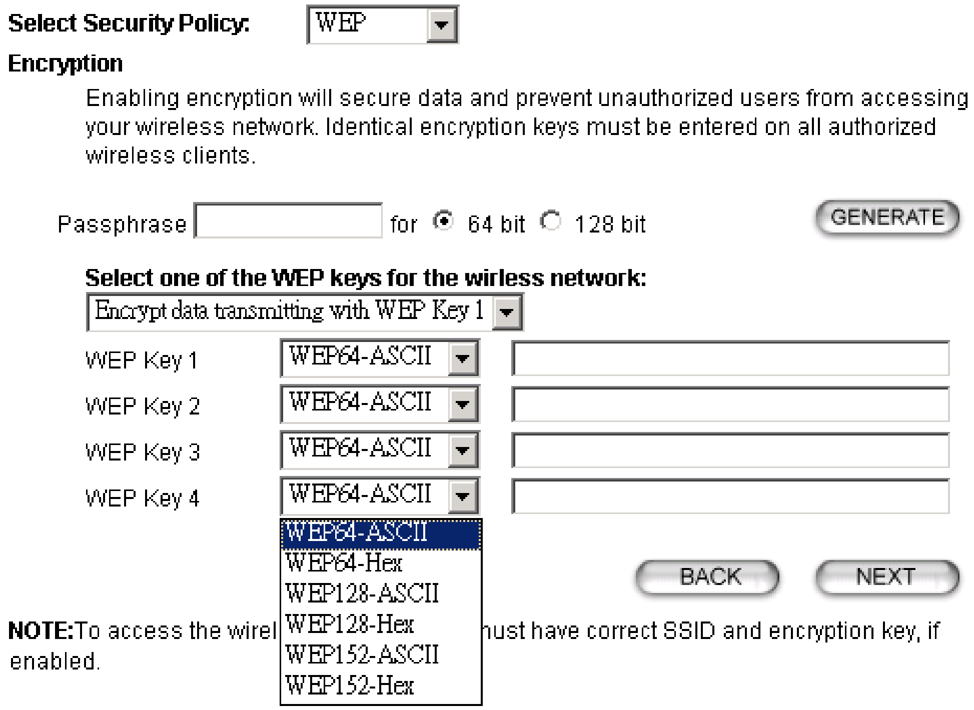
Alternatively, and for WEP152, you can manually configure each of them.

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.



Select Security Policy: WEP

Encryption

Enabling encryption will secure data and prevent unauthorized users from accessing your wireless network. Identical encryption keys must be entered on all authorized wireless clients.

Passphrase ______ for ● 64 bit ○ 128 bit

Select one of the WEP keys for the wirless network:

Encrypt data transmitting with WEP Key 1

WEP Key 1 WEP64-ASCII

WEP Key 2 WEP64-ASCII

WEP Key 3 WEP64-ASCII

WEP Key 4 WEP64-ASCII

NOTE: To access the wirel ust have correct SSID and encryption key, if enabled.

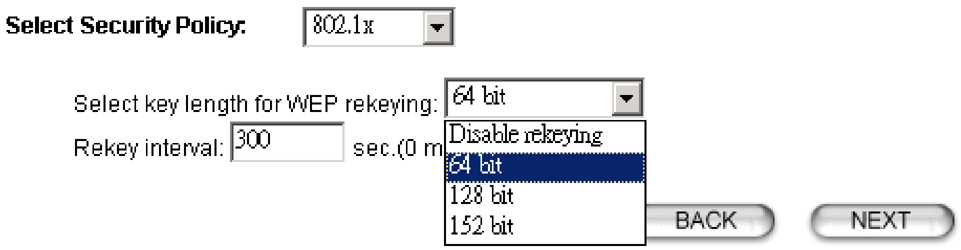
802.1x

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.



Select Security Policy: 802.1x

Select key length for WEP rekeying: 64 bit

Rekey interval: 300 sec.(0 m

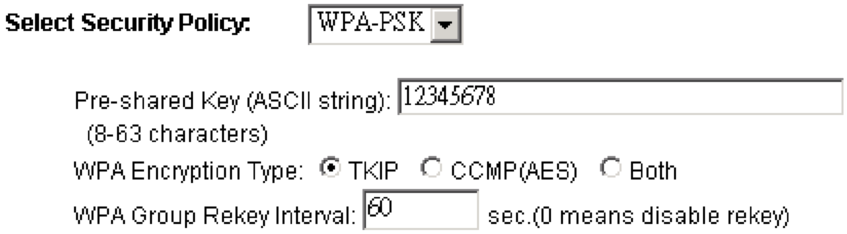
WPA-PSK

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.



Select Security Policy: WPA-PSK

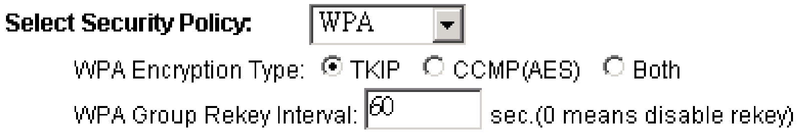
Pre-shared Key (ASCII string): 12345678
(8-63 characters)

WPA Encryption Type: ● TKIP ○ CCMP(AES) ○ Both

WPA Group Rekey Interval: 60 sec.(0 means disable rekey)

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**.



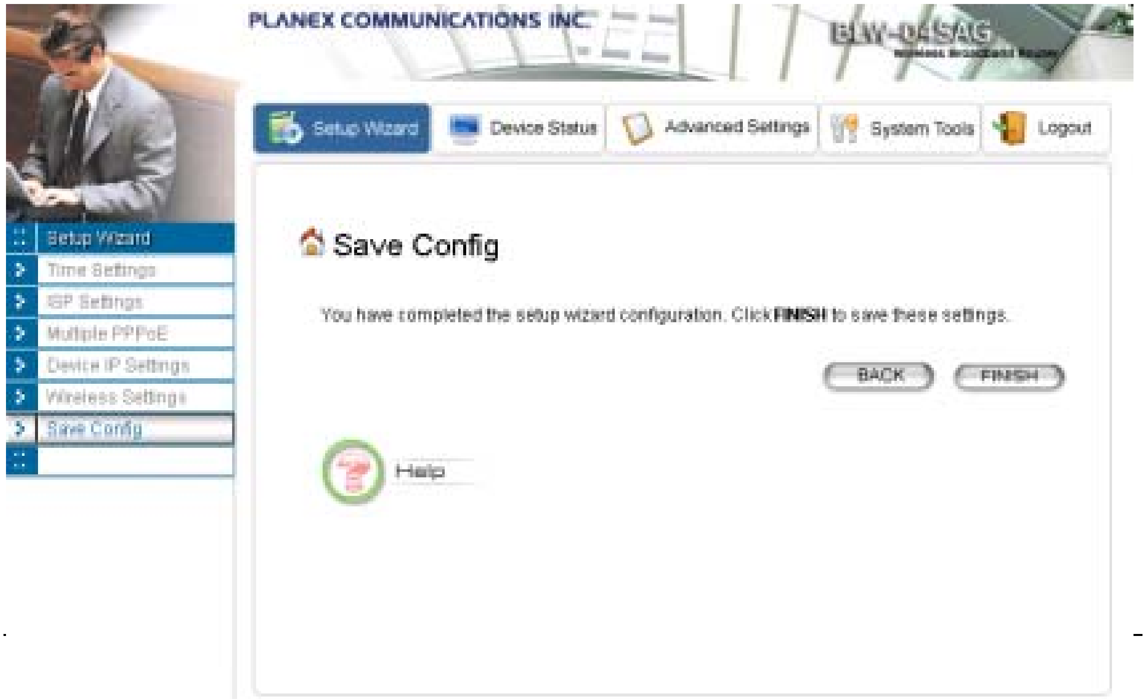
Select Security Policy: WPA

WPA Encryption Type: ● TKIP ○ CCMP(AES) ○ Both

WPA Group Rekey Interval: 60 sec.(0 means disable rekey)

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.



Save Config

You have completed the setup wizard configuration. Click FINISH to save these settings.

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

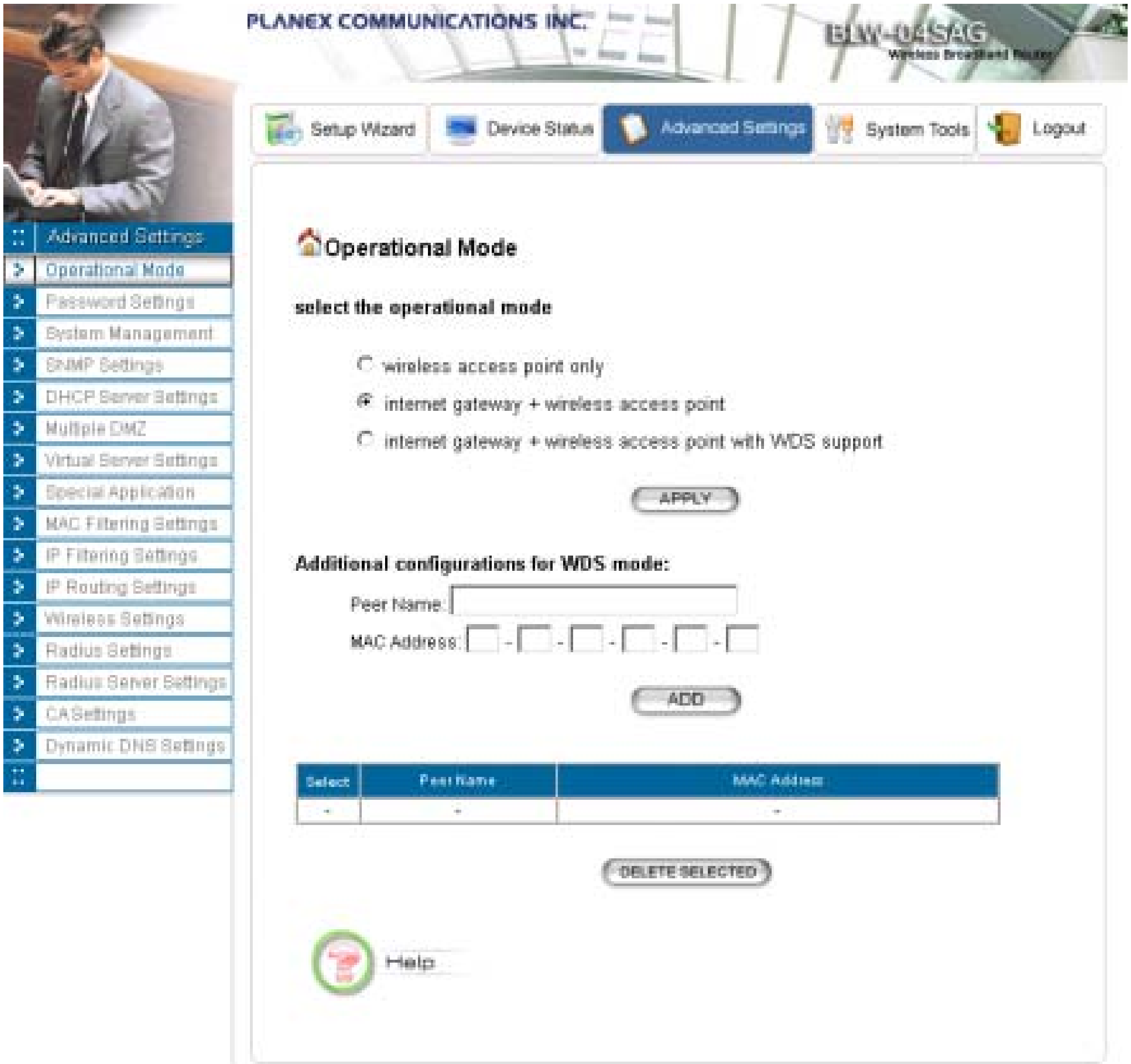
Advanced Settings

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.



Operational Mode

select the operational mode

○ wireless access point only
● internet gateway + wireless access point
○ internet gateway + wireless access point with WDS support

Additional configurations for WDS mode:

Peer Name:

MAC Address: □ - □ - □ - □ - □ - □

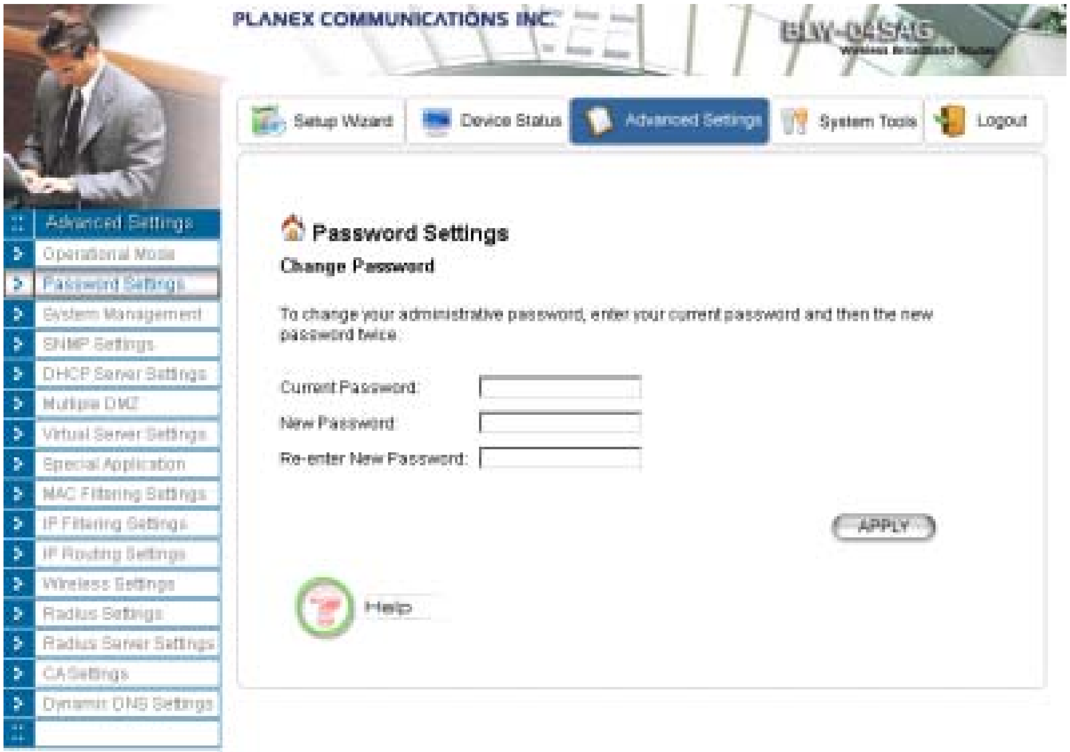
Select	Peer Name	MAC Address
-	-	-

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.



Password Settings

Change Password

To change your administrative password, enter your current password and then the new password twice.

Current Password:

New Password:

Re-enter New Password:

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.

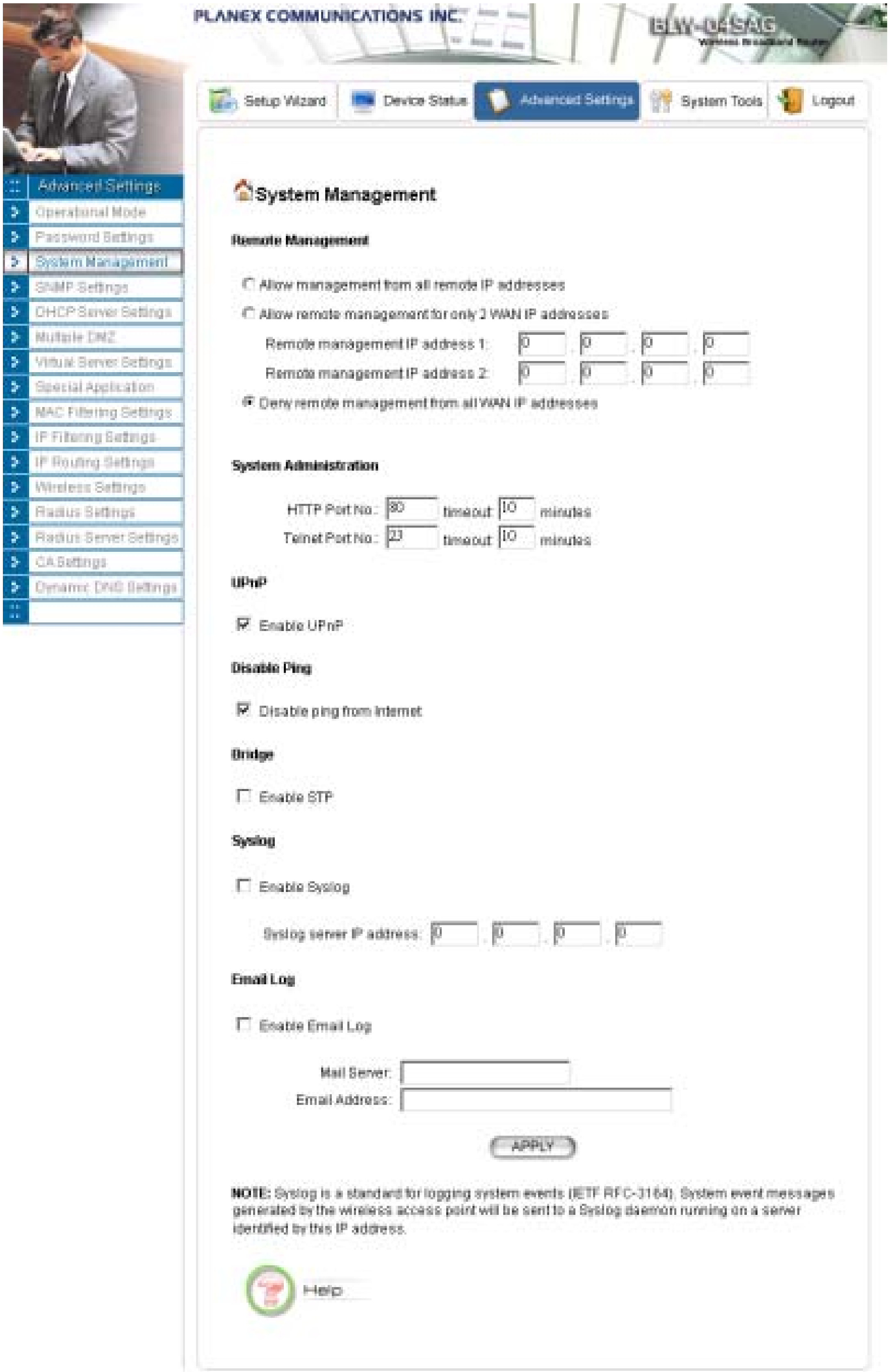
The system allows you to (1) **allow remote management from all WAN IP addresses**, to (2) **allow remote management from up to two WAN IP addresses**, or to (3) **disallow remote management from any WAN IP addresses**.

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.

Bridge: You can enable/disable the 802.1d STP (Spanning Tree Protocol) function on the bridge of WLAN and Ethernet (i.e. the LAN interface). Enable this function can detect loops in your LAN environment and then protect the LAN from being saturated with infinite loop traffic.



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

Telnet Port No.: 23 timeout: 10 minutes

UPnP

☑ Enable UPnP

Disable Ping

☑ Disable ping from Internet

Bridge

□ Enable STP

Syslog

□ Enable Syslog

Syslog server IP address: 0 . 0 . 0 . 0

Email Log

□ Enable Email Log

Mail Server:

Email Address:

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.

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.

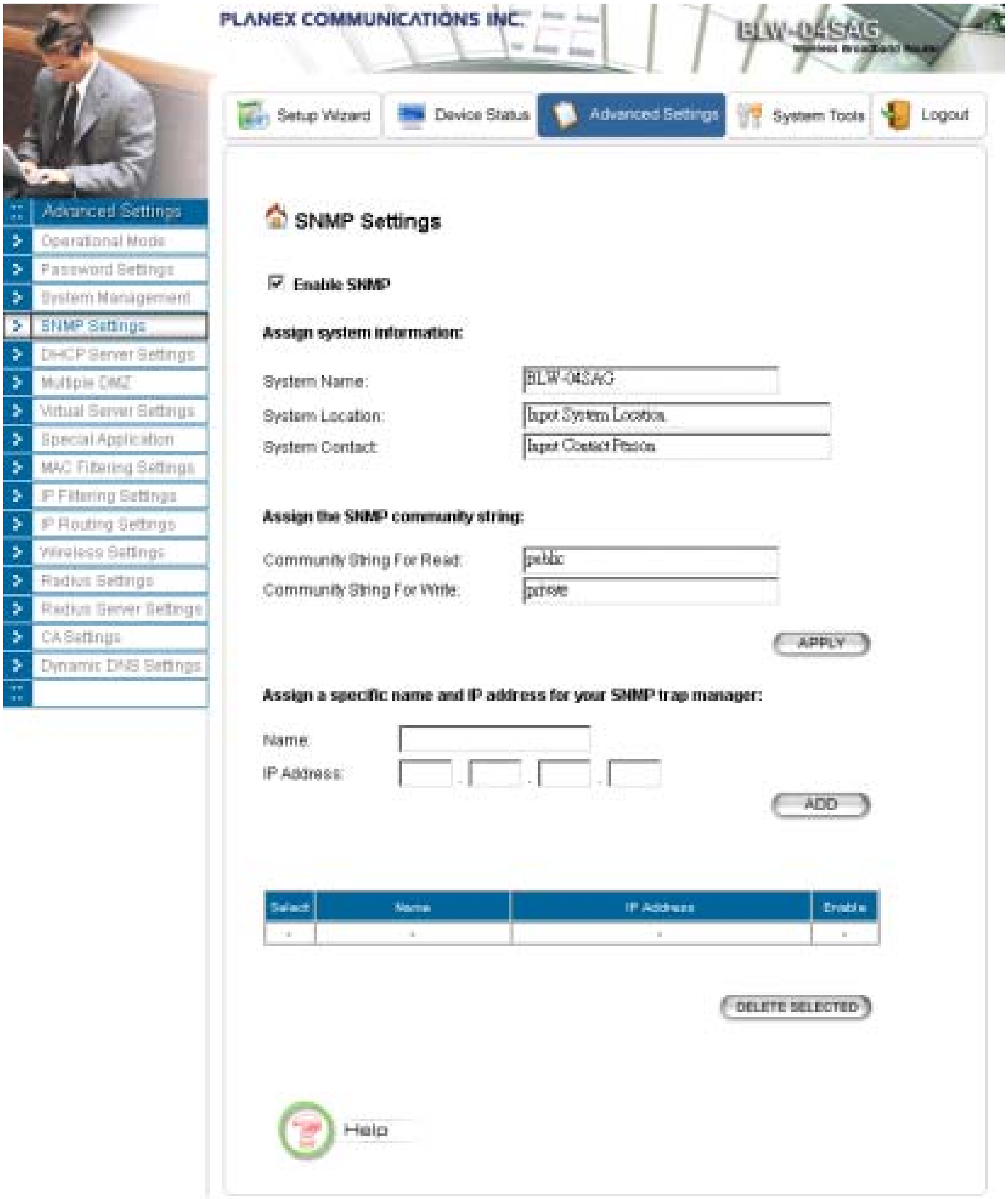
Email Log: If the Email Log function is enabled, every system log message will be sent to the configured email address through the configured mail server.

Mail Server: the mail server domain name that you use to send syslog emails.

Email Address: the email address that syslog emails will be sent to.

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 802.11g Router sends to remote management stations.



SNMP Settings

☑ Enable SNMP

Assign system information:

System Name: BLW-04SAG

System Location: Input System Location

System Contact: Input Contact Person

Assign the SNMP community string:

Community String For Read: public

Community String For Write: private

Assign a specific name and IP address for your SNMP trap manager:

Name:

IP Address: . . .

Select	Name	IP Address	Enable
-	-	-	-

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**.

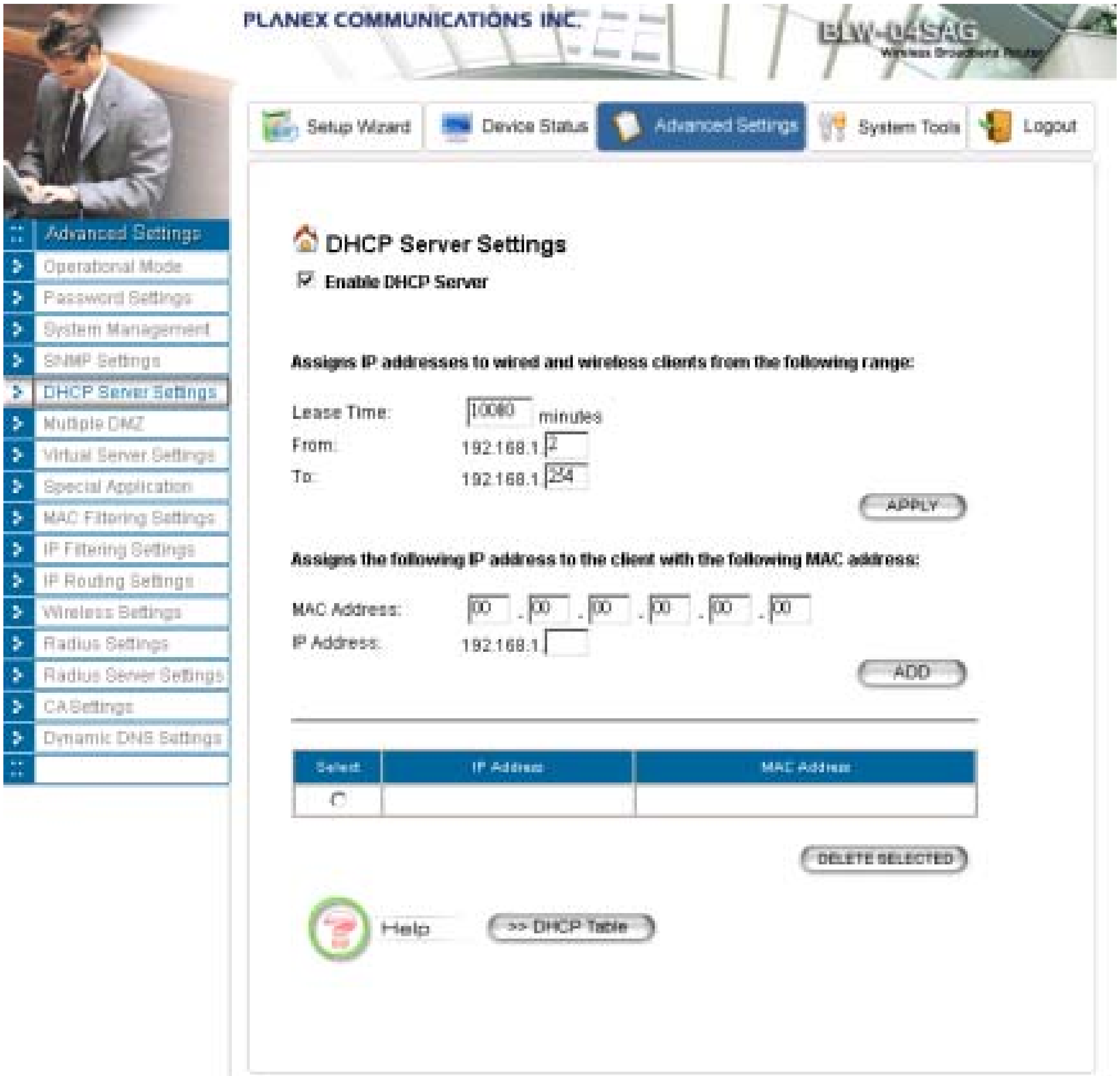
Assigns the following IP address to the client with the following MAC address:

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.



DHCP Server Settings

☑ Enable DHCP Server

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

Lease Time: 10080 minutes
From: 192.168.1.2
To: 192.168.1.254

APPLY

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

MAC Address: 00 . 00 . 00 . 00 . 00 . 00
IP Address: 192.168.1.

ADD

Select	IP Address	MAC Address
○		

DELETE SELECTED

Help >> DHCP Table

Multiple DMZ

The router supports one hardware DMZ port, multiple software DMZ ports, plus one default DMZ port.

The hardware DMZ is implemented through the hardware: the router has a separate hardware Ethernet port, to which multiple devices with public IP addresses assigned by the ISP can be connected. Incoming data for these devices from the Internet will be sent by the router to the hardware Ethernet port directly. No configuration would be required.

Both the default and multiple DMZ ports are implemented through software.

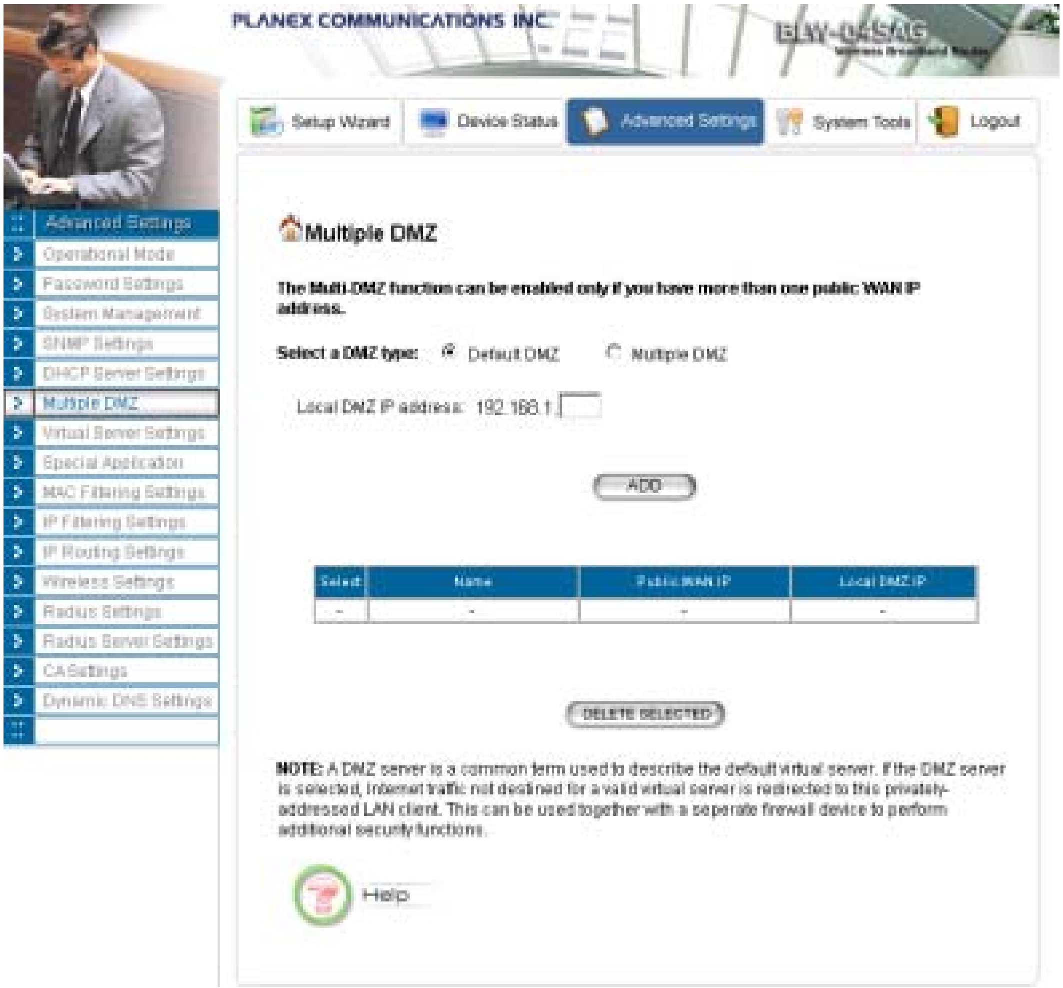
When the router receives incoming data from the Internet, it will search through an internal address translation table to perform address translation function. If a match can be found, the data will be forwarded to the corresponding device in your local LAN, otherwise the data will be dropped or forwarded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



Multiple DMZ

The Multi-DMZ function can be enabled only if you have more than one public WAN IP address.

Select a DMZ type: ● Default DMZ ○ Multiple DMZ

Local DMZ IP address: 192.168.1.

Select	Name	Public WAN IP	Local DMZ IP
-	-	-	-

NOTE: A DMZ server is a common term used to describe the default virtual server. If the DMZ server is selected, Internet traffic not destined for a valid virtual server is redirected to this privately-addressed LAN client. This can be used together with a seperate firewall device to perform additional security functions.

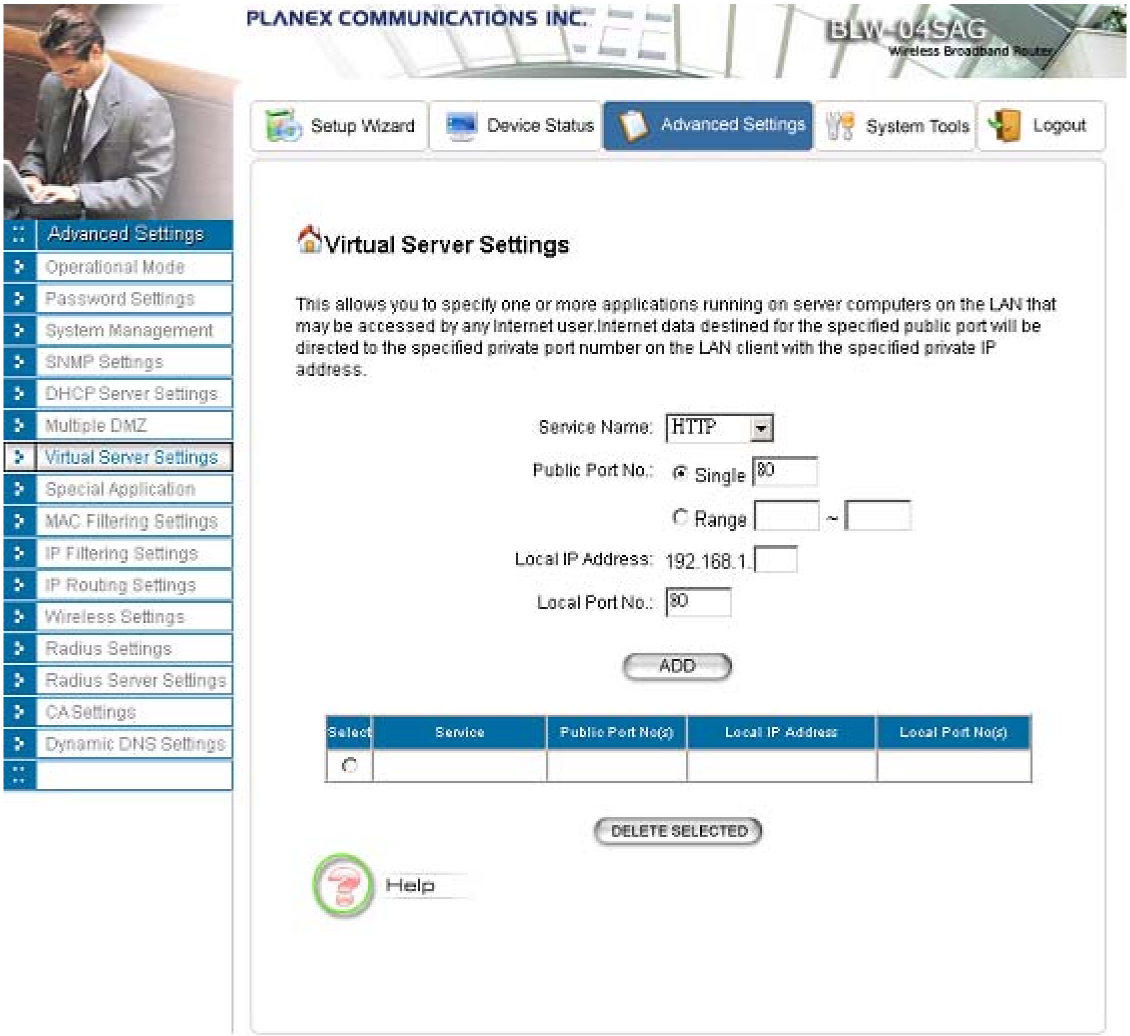
Virtual Server Settings

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 (if is **public port number** a range, **local port number** is not allowed to specify), (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.



Virtual Server Settings

This allows you to specify one or more applications running on server computers on the LAN that may be accessed by any Internet user.Internet data destined for the specified public port will be directed to the specified private port number on the LAN client with the specified private IP address.

Service Name: HTTP

Public Port No.: ● Single 80

○ Range ~

Local IP Address: 192.168.1.

Local Port No.: 80

Select	Service	Public Port No(s)	Local IP Address	Local Port No(s)
○				

Special Applications

Special applications such as the Microsoft instant messaging or 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.

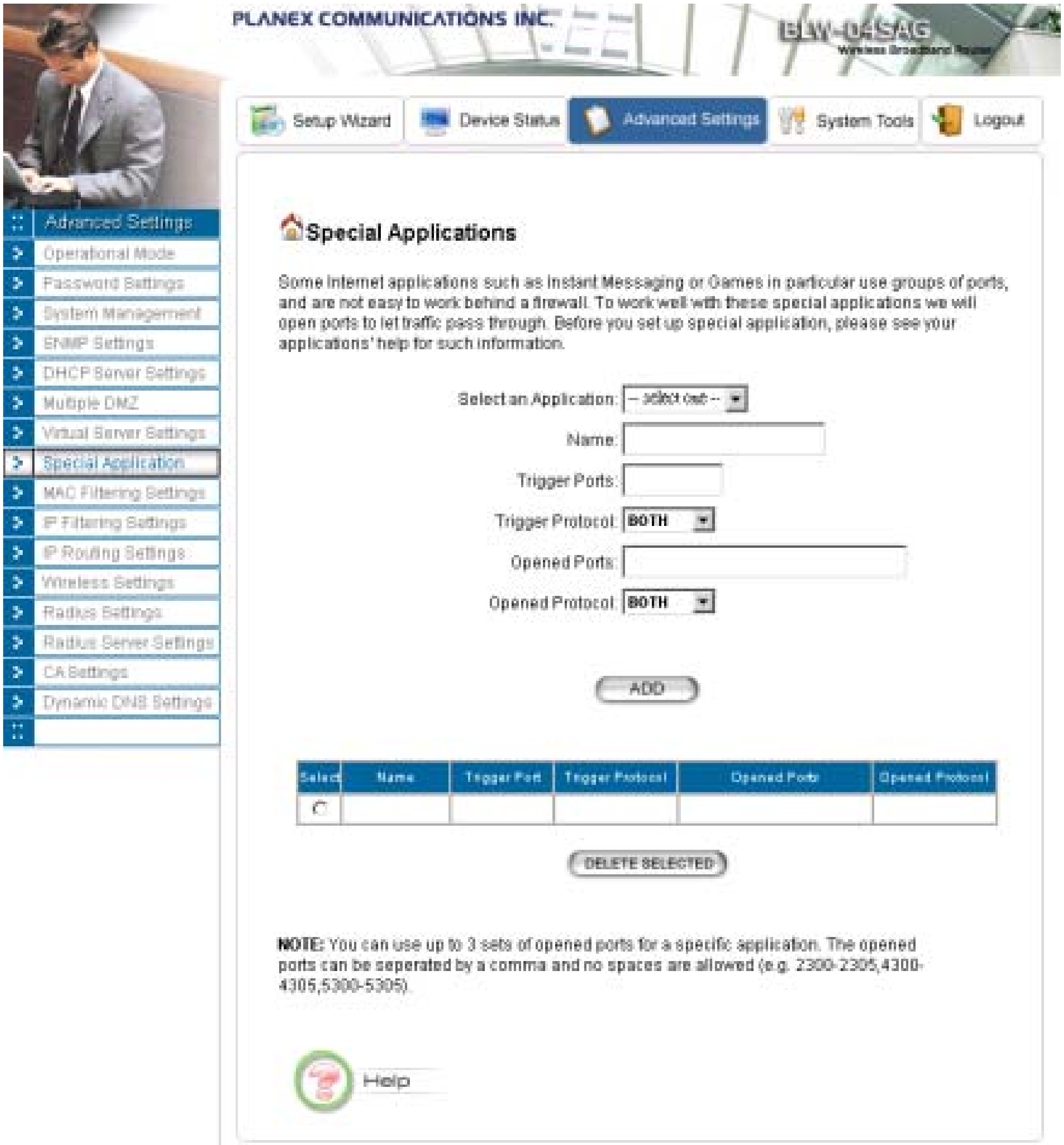
Trigger Type: Select UDP, TCP, or both for the trigger port.

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.



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: BOTH

Opened Ports:

Opened Protocol: BOTH

Select	Name	Trigger Port	Trigger Protocol	Opened Ports	Opened Protocol
○					

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).

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.

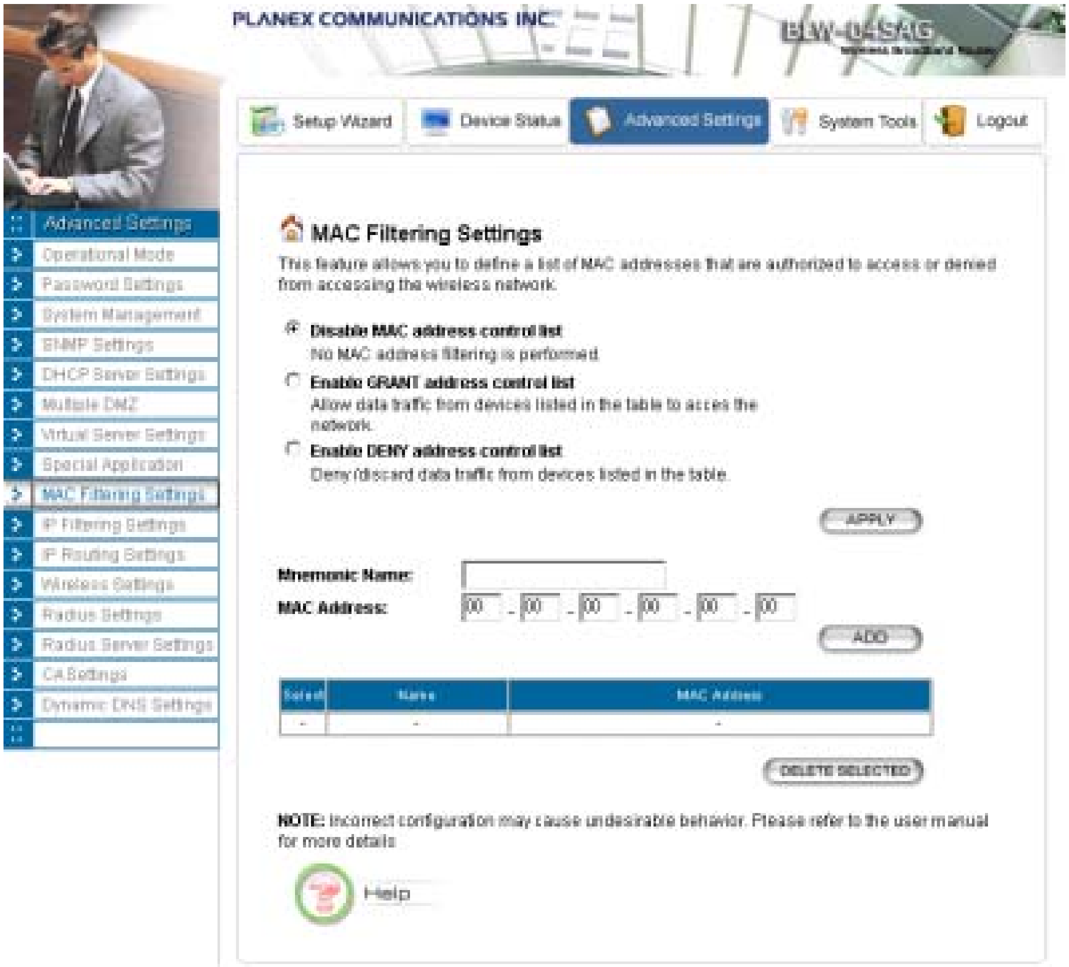
To add a filtering rule, configure the following:

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 **select**ing the corresponding entry and press the **DELETE SELECTED** button.



MAC Filtering Settings

This feature allows you to define a list of MAC addresses that are authorized to access or denied from accessing the wireless network.

● Disable MAC address control list
No MAC address filtering is performed.

○ Enable GRANT address control list
Allow data traffic from devices listed in the table to acces the network.

○ Enable DENY address control list
Deny/discard data traffic from devices listed in the table.

APPLY

Mnemonic Name:
MAC Address: 00 - 00 - 00 - 00 - 00 - 00

ADD

Select	Name	MAC Address
-	-	-

DELETE SELECTED

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

Help

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.

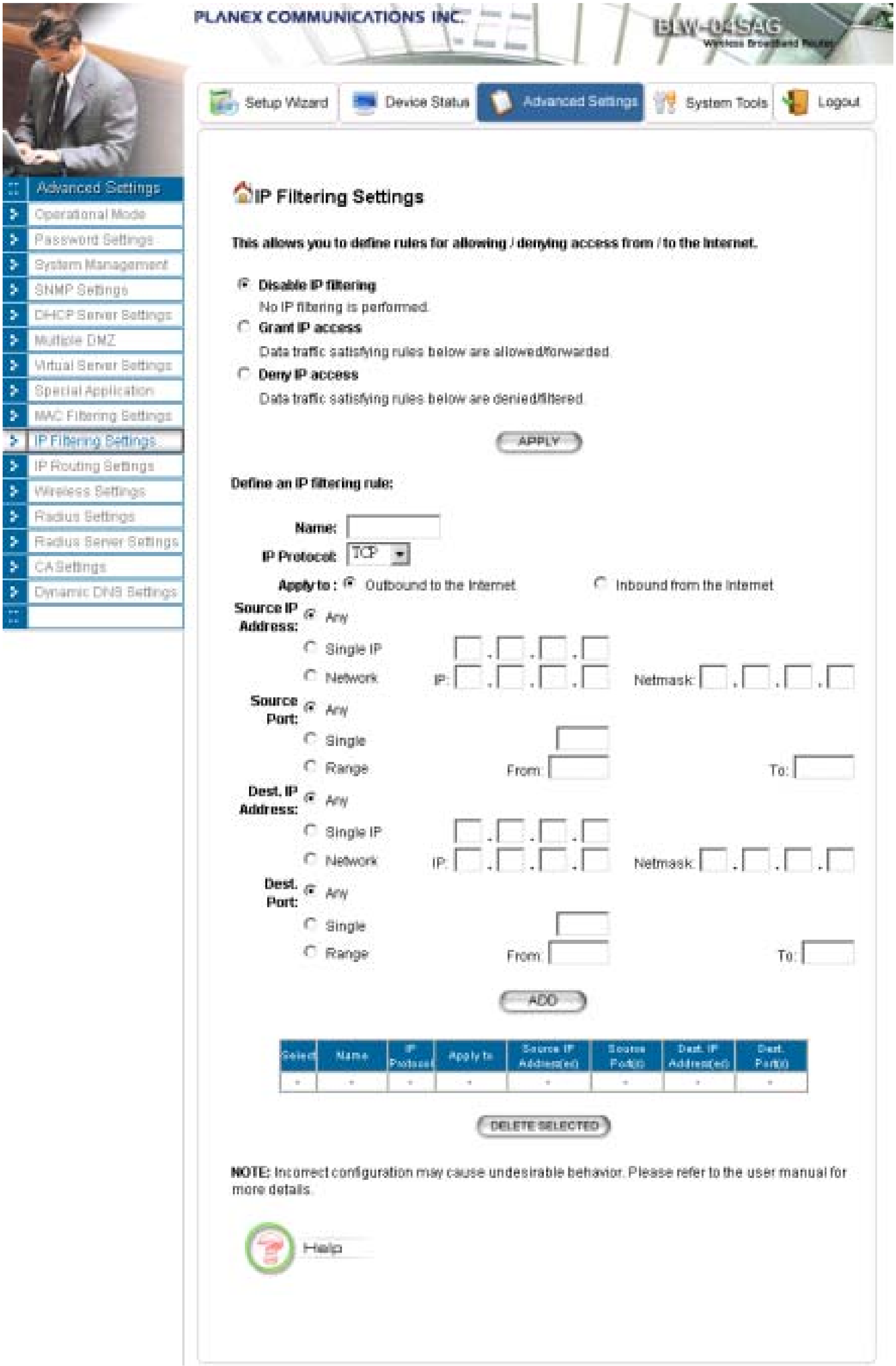
To define/add an IP filtering rule, enter the following information

- **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.



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: □

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

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

IP Routing Settings

Dynamic Routing: Enable gateway to exchange the routing table dynamically with other routing devices. Currently you can select either RIP or OSPF as the routing protocol.

RIP: When RIP is selected, you can choose to run **RIP1** or **RIP2** with active mode (**Send/Receive**) or passive mode (**Receive Only**). With active mode, the 802.11a/g Router will send out RIP packets describing its routing database, and it will also update the database according to the received RIP packets from other routing devices. With passive mode, the 802.11a/g Router will only update the database according to the RIP packets received, it will not send out any RIP packets.

OSPF: When OSPF is selected. You can select the interface (LAN and/or WAN) to run OSPF.
For each interface where OSPF is enabled, you have to configure the Area that the interface belongs to by specifying the **Area ID**, the Area type (either **Regular** or **Stub**), and the **priority** of the 802.11a/g Router on the segment the interface belongs to. Also, for the segment that an OSPF enabled interface, you have to configure the **Hello interval** and **Dead interval** on the segment, the **Cost** for transmitting a packet on the segment, and the **Authentication** method used on the segment. If an authentication method is used, either **Simple Password** or **MD5**, a shared secret has to be configured for the authentication purpose.

OSPF Summarization can be enabled to consolidate multiple routes into one single advertisement and hence reduce the routing database make routing simpler and faster. When this function is enabled, it will only be effective when the 802.11a/g Router is an ABR (Area Border Rouer), that is, at least two OSPF enabled interface are configured with different Area IDs.
For each summarization entry, you have to enter the **Area ID** such that routes from the Area falling into the specified subnet (**IP address/Netmask**) will be summarized into a single route to the specified subnet and it is the single route instead of the individual route to be injected into other Areas.

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 must be defined if the LAN or WAN are segmented into subnets. For example, a subnet can be created to isolate a section of a company, such as finance, from traffic on the rest of the LAN or WAN.

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.

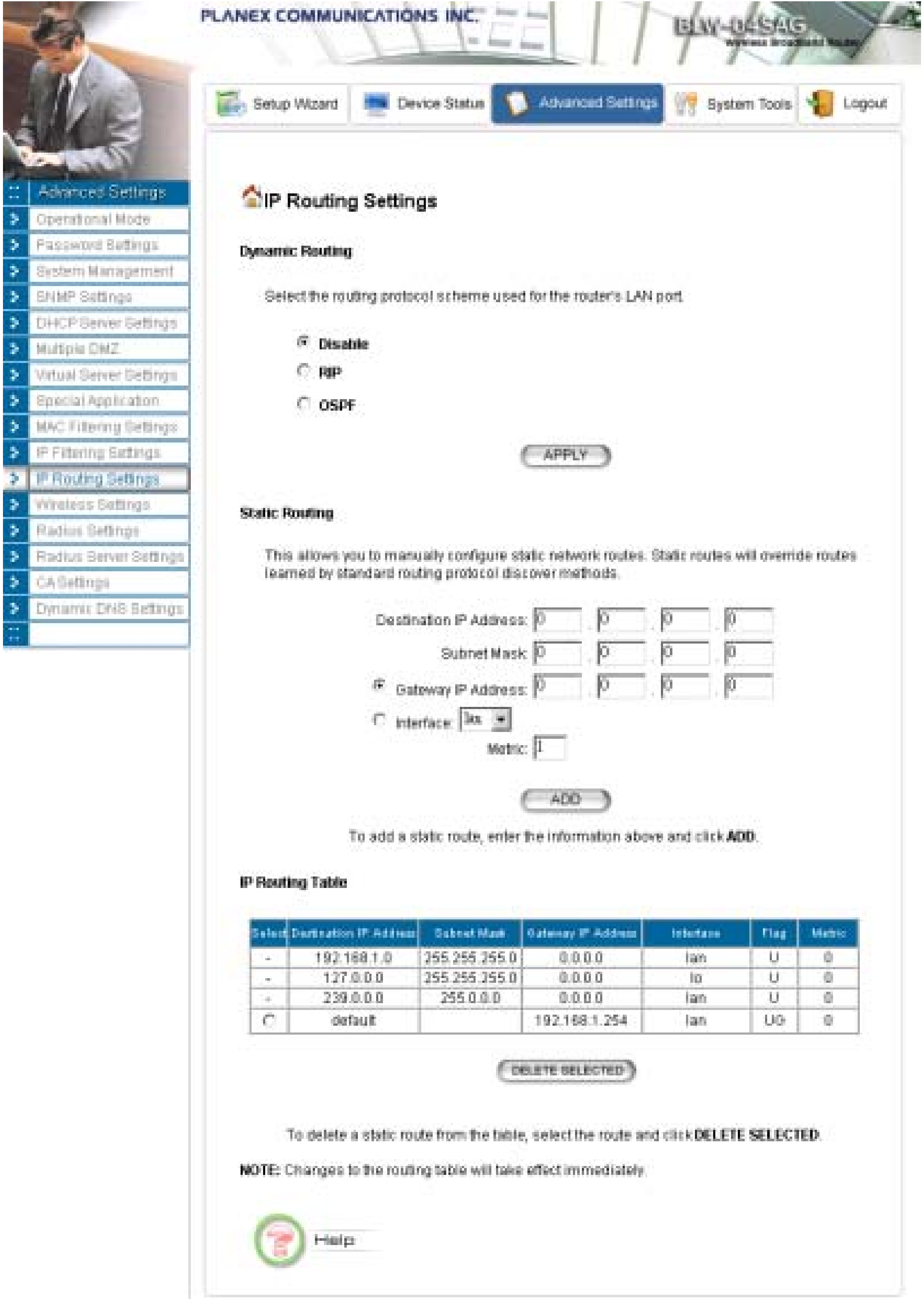
4. Select LAN or WAN, where is the specific router is, from the Interface menu.

5. Enter the metric (cost) for sending a packet following this route.

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.



IP Routing Settings

Dynamic Routing

Select the routing protocol scheme used for the router's LAN port

● Disable
○ RIP
○ OSPF

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
Metric: 1

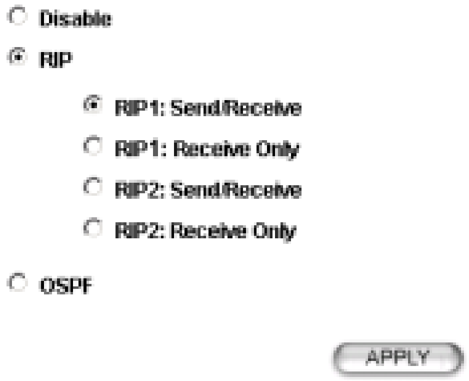
To add a static route, enter the information above and click **ADD**.

IP Routing Table

Select	Destination IP Address	Subnet Mask	Gateway IP Address	Interface	Flag	Metric
-	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
○	default		192.168.1.254	lan	UG	0

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.

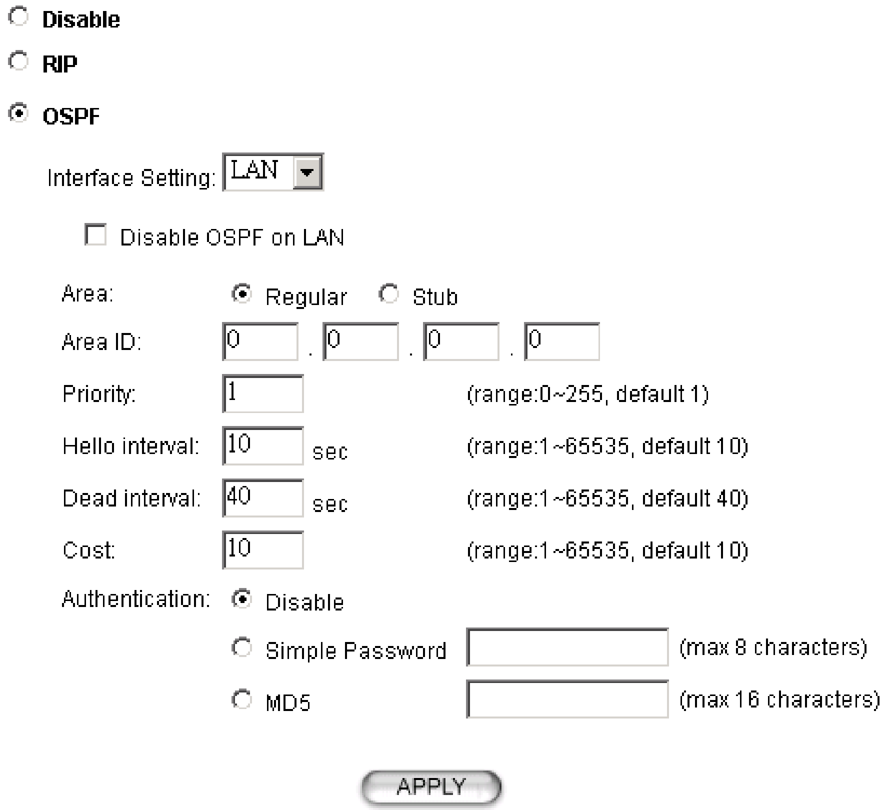


○ Disable

● RIP

- ● RIP1: Send/Receive
- ○ RIP1: Receive Only
- ○ RIP2: Send/Receive
- ○ RIP2: Receive Only

○ OSPF



○ Disable

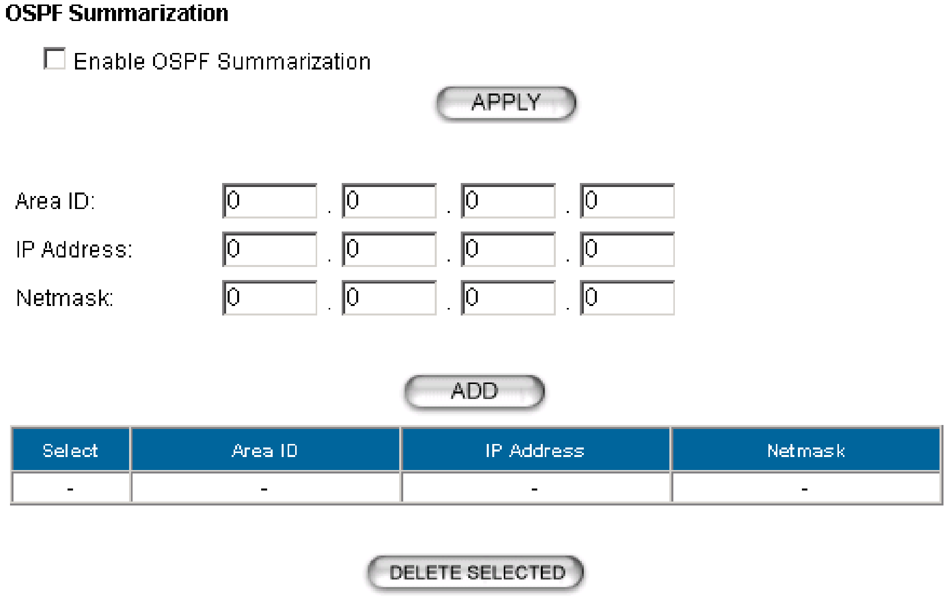
○ RIP

● OSPF

Interface Setting: LAN

□ Disable OSPF on LAN

Area:	● Regular ○ Stub	
Area ID:	0 . 0 . 0 . 0	
Priority:	1	(range:0~255, default 1)
Hello interval:	10 sec	(range:1~65535, default 10)
Dead interval:	40 sec	(range:1~65535, default 40)
Cost:	10	(range:1~65535, default 10)
Authentication:	● Disable	
	○ Simple Password	(max 8 characters)
	○ MD5	(max 16 characters)



OSPF Summarization

□ Enable OSPF Summarization

Area ID:	0 . 0 . 0 . 0
IP Address:	0 . 0 . 0 . 0
Netmask:	0 . 0 . 0 . 0

Select	Area ID	IP Address	Netmask
-	-	-	-

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.

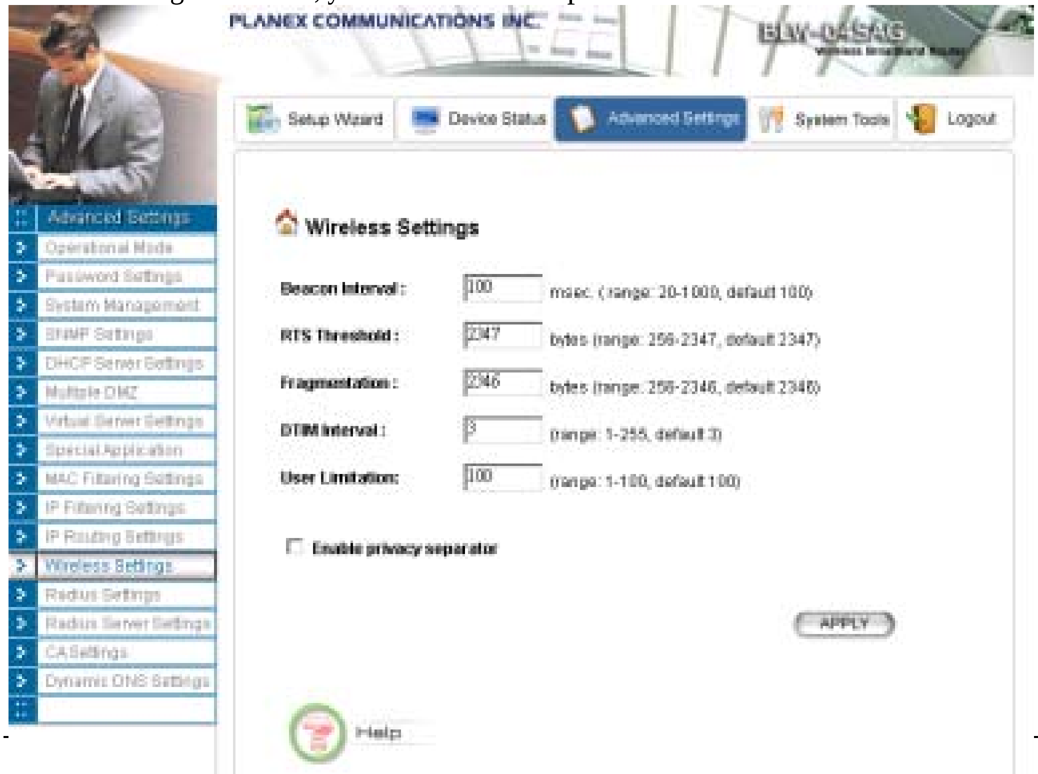
RTS Threshold: RTS/CTS frames are used to gain control of the medium for transmission. Any unicast (data or control) frames larger than the specified RTS threshold must be transmitted following the RTS/CTS handshake exchange mechanism. The RTS threshold should have a value between 0 and 2347 bytes, with 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**.

User Limitation: You can limit the number of stations that can get associated with the 802.11 a/g Router; the purpose is to assure the WLAN service quality provided.

Enable privacy separator: To increase the security and prevent any two WLAN connected device from accessing each other, you can check this option.



Wireless Settings

Beacon Interval : 100 msec. (range: 20-1000, default 100)

RTS Threshold : 2347 bytes (range: 256-2347, default 2347)

Fragmentation : 2346 bytes (range: 256-2346, default 2346)

DTIM Interval : 3 (range: 1-255, default 3)

User Limitation: 100 (range: 1-100, default 100)

□ Enable privacy separator

RADIUS Settings

RADIUS (Remote Access Dial-In User Service) servers provide centralized authentication services to wireless clients. For the WLAN security policy 802.1x and WPA, a RADIUS server is required for the authentication purpose. Users can use the built-in RADIUS server and/or configure up to two RADIUS servers can be used, one acting as a primary, and the other as a backup.

Use Built-in Radius Server: The built-in RADIUS server can be used for the 802.1x and WPA security policies. When this option is checked, the primary/secondary RADIUS server would be used only if the built-in RADIUS server is not enabled. The built-in RADIUS server can be enabled at the "Radius Server Settings" page. However, when you check the "Enable Built-in Certificate Authority" option at the "Radius Server Settings" page, this option "Use Built-in Radius Server" will be checked automatically.

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.

To use this feature, you have to configure the MAC addresses of authorized WLAN clients as the user name and password in the RADIUS server you use, and the RADIUS server should support PAP authentication.

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

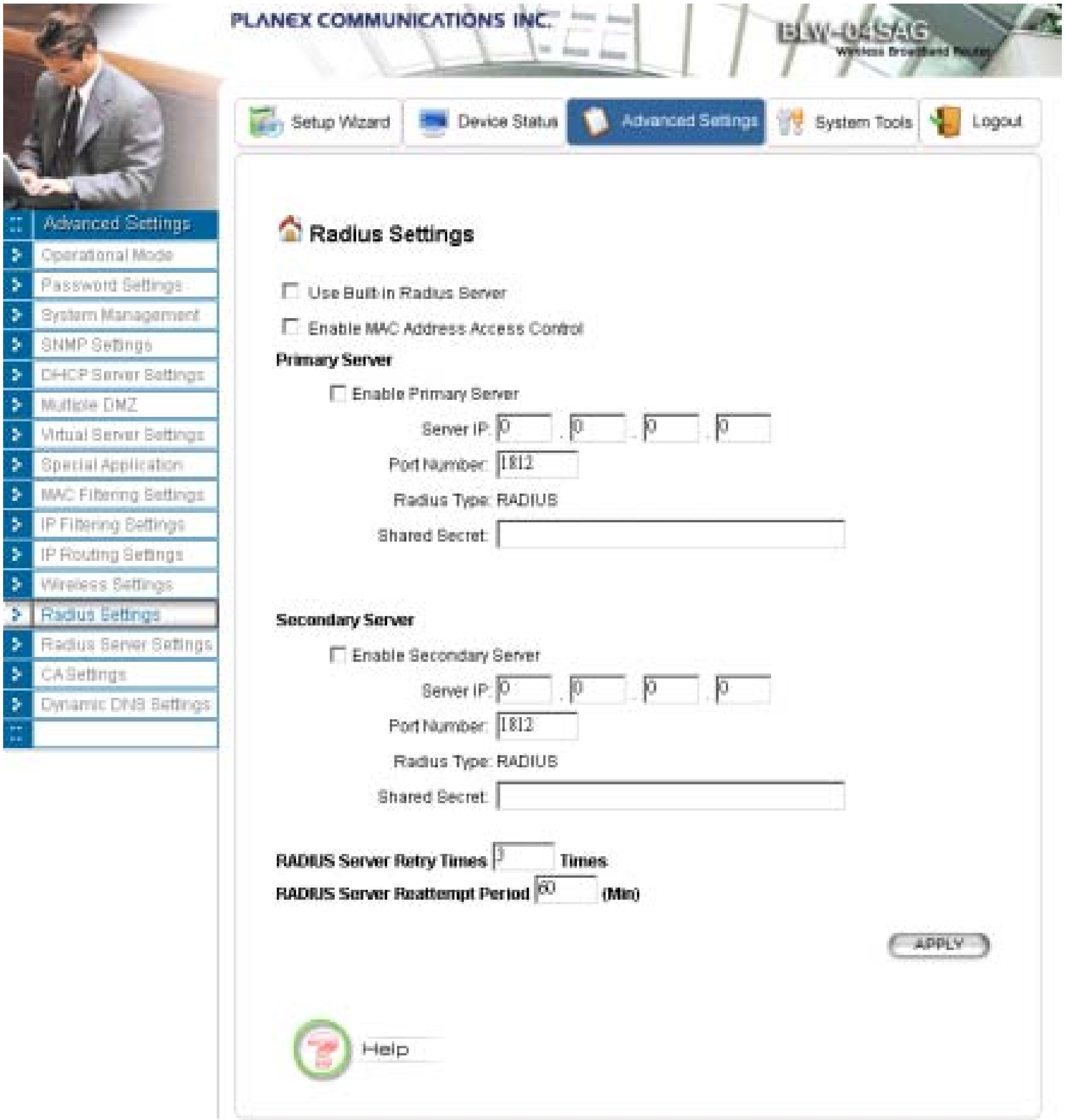
Port Number: The port number your RADIUS server uses for authentication. The default setting is 1812.

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 a RADIUS server before giving up and try the next RADIUS server. The contact sequence is Built-in server (if used) → Primary server (if enabled) → Secondary server (if enabled).

RADIUS Server Reattempt Period: After failed to contact the first RADIUS server (the built-in server, or the Primary server if the built-in server is not used), the 802.11a/g Router will re-attempt to contact the first server every this mount of minutes even if the server being used is still working.



Radius Settings

□ Use Built-in Radius Server

□ 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)

Radius Server Settings

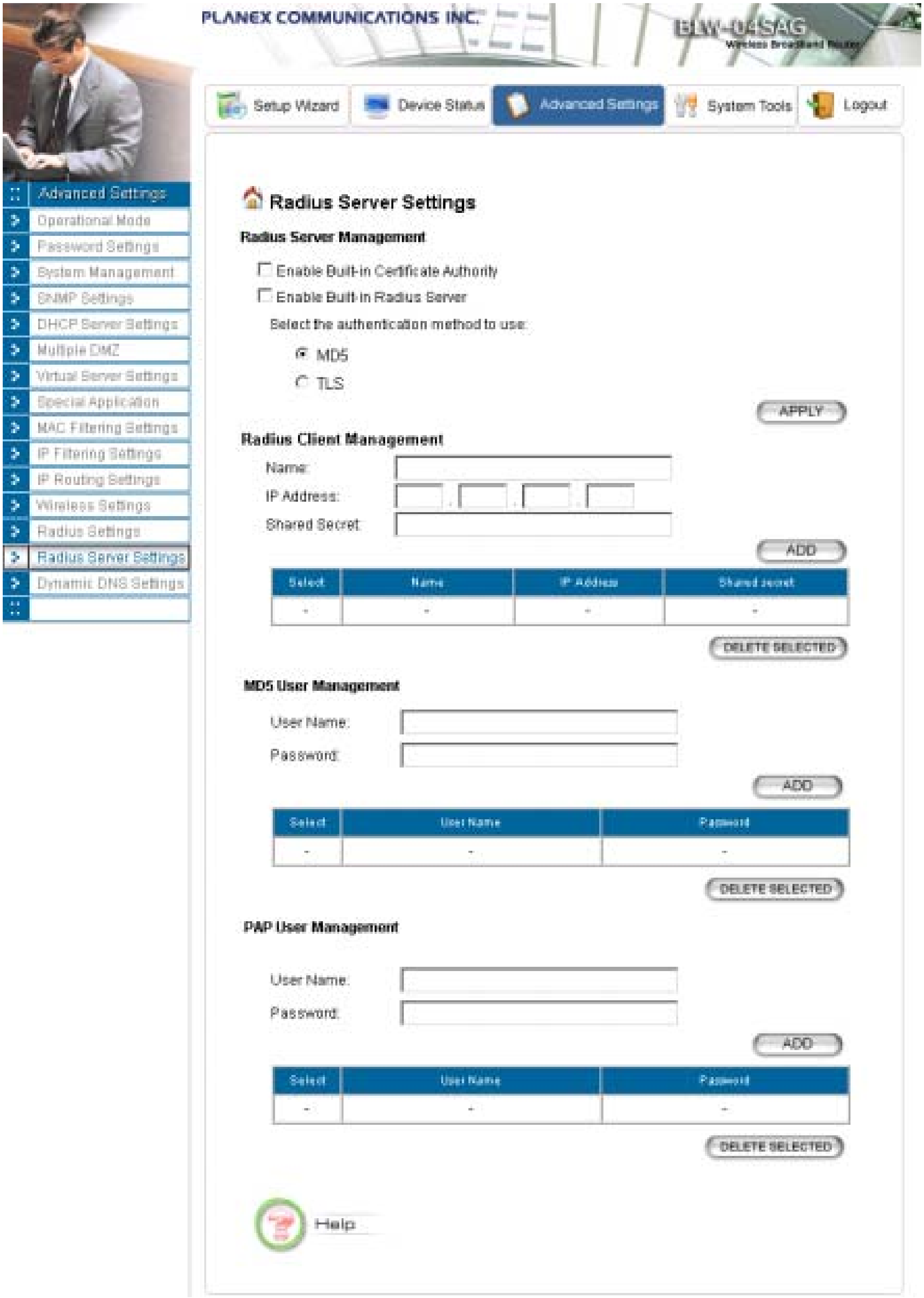
The 802.11a/g Router has a built-in RADIUS server so users don't have to setup a separate RADIUS for the use of WLAN 802.1x and WPA security policies and MAC address access control. To use the built-in RADIUS server, users have to select the "**Enable Built-in Radius Server**" check box. The built-in RADIUS server currently provides two types of authentication methods for EAP authentication: **MD5** and **TLS** (i.e. EAP-MD5 or EAP-TLS). The way to configure the setting for the TLS type depends on whether the built-in CA (certificate authority) is enabled. The built-in CA is enabled by selecting the "**Enable Built-in Certificate Authority**" option. If the built-in CA is enabled, the built-in RADIUS server will use the built-in CA to issue its own certificate and requires all the user certificates issued by the built-in CA. So when the built-in CA is enabled, users do not have to configure anything for the TLS type. If the built-in CA is not enabled, users have to enter the built-in RADIUS server's certificate issued by an external CA (by specifying "**Certificate Path**"), the password to use the certificate (by specifying "**Password**"), and the certificate of the CA issuing all the user certificates (by specifying "**Root CA Certificate Path**"). The expected format for the built-in RADIUS server's certificate is PEM (extension file name: .pem) and the expected format for the CA's certificate is DER encoded binary X.509 (extension file name: .CER). Click the APPLY button to make the settings effective. Once the built-in RADIUS server is enabled, the "Use Built-in Radius Server" option at the "Radius Settings" page is automatically checked.

The built-in RADIUS server does not require a user listed in its user database when TLS type is being used. So when the TLS type is selected, users do not have to add any user information into the built-in RADIUS server's database.

When the MD5 type is selected, users have to add the **User Name** and **Password** for each user into the built-in RADIUS server's database. The database management is in the **MD5 User Management** section. A MD5 user can be removed from the database by selecting the user in the table and clicking the DELETE SELECTED button.

For each RADIUS client that will use the built-in RADIUS server, users have to add a client entry in the "**Radius Client Management**" section.
Name: a mnemonic name for the RADIUS client.
IP Address: the IP address of the RADIUS client.
Shared Secret: the shared secret pass phrase used to authenticate the RADIUS client.

When the built-in RADIUS server is enabled, the PAP authentication function is always enabled. The PAP authentication function is used for WLAN MAC address control (the "Enable MAC Address Access Control" option at the "Radius Settings" page); in this case, the MAC address of an authorized WLAN client is used as both user name and password. A PAP user can be added in the **PAP User Management** section with the **User Name** and **Password** entered. A PAP user can be removed from the database by selecting the user in the table and clicking the DELETE SELECTED button.



Radius Server Settings

Radius Server Management

□ Enable Built-in Certificate Authority

□ Enable Built-in Radius Server

Select the authentication method to use:

● MD5

○ TLS

Radius Client Management

Name:

IP Address: . . .

Shared Secret:

Select	Name	IP Address	Shared secret
-	-	-	-

MD5 User Management

User Name:

Password:

Select	User Name	Password
-	-	-

PAP User Management

User Name:

Password:

Select	User Name	Password
-	-	-

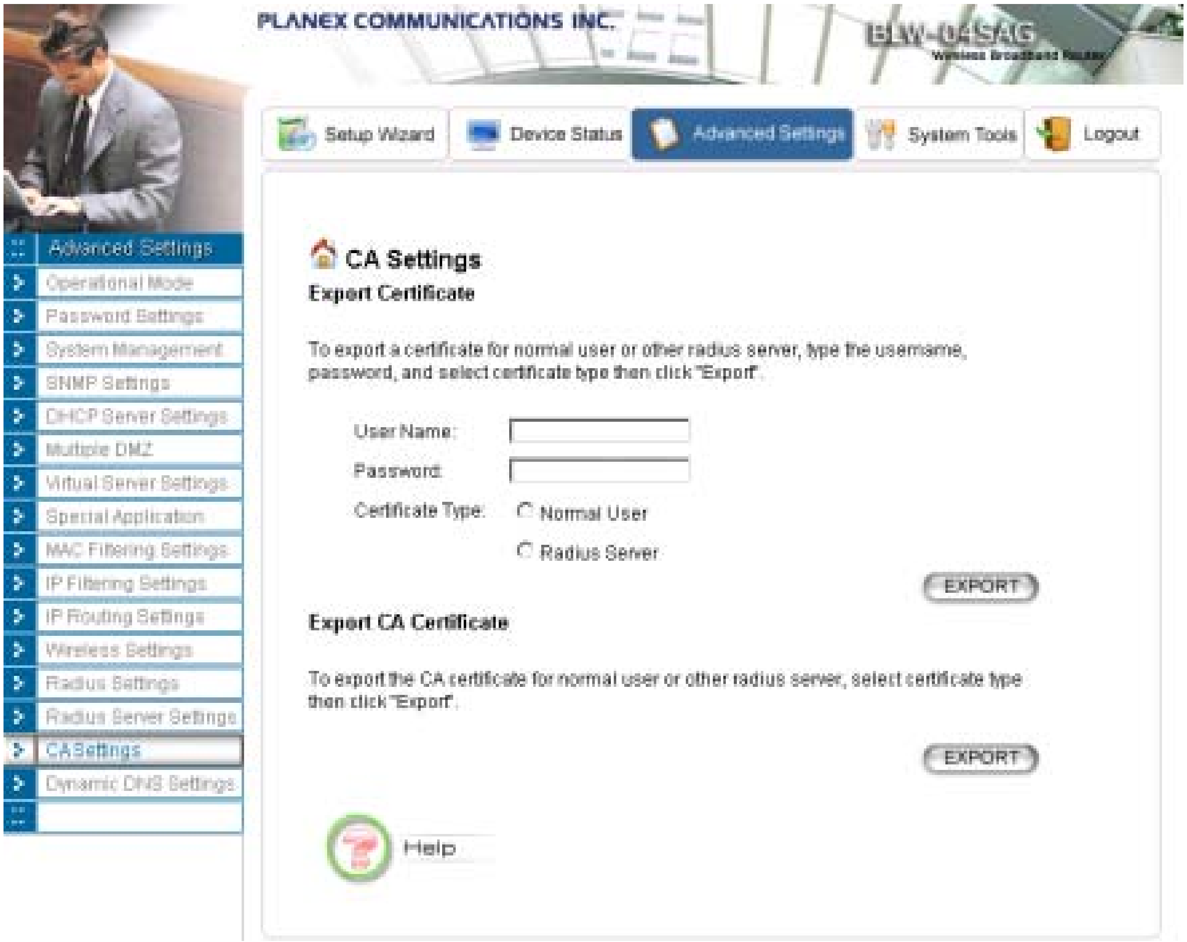
CA Settings

If you enable the "Built-in Certificate Authority" function at the "Radius Server Settings" page, you can see the "CA Settings" in the left side menu on "Advanced Settings" pages.

The CA (Certification Authority) allows you to request certificates for WLAN clients/stations and for RADIUS servers. A certificate is required for a WLAN client and/or the RADIUS server when the WLAN security policy is 802.1x or WPA with the EAP type as TLS, PEAP, and TTL…. In the case where the RADIUS server will authenticate a WLAN client, the WLAN client needs to have a certificate for itself, and the RADIUS server needs to have the certificate of the CA issuing the client's certificate. In the case where a WLAN client will authenticate the RADIUS server, the RADIUS server needs to have a certificate for itself, and the WLAN client needs to have the certificate of the CA issuing the RADIUS server's certificate.

To acquire a certificate for a WLAN client or a RADIUS server, enter the name and password for the client or server, and select the corresponding certificate type ("**Normal User**" for a WLAN client and "**Radius Server**" for a RADIUS server). Then click the **EXPORT** button and specify the file path to save the certificate on your PC. The **User Name** is used to identify the holder of the certificate to be issued, and the holder need the **Password** in order to use the issued certificate (so people not knowing the password cannot use the certificate). Currently the supported format for a "Normal User" certificate is PKCS #12 (extension file name: .p12), and the supported format for a "Radius Server" certificate is PEM (extension file name: .pem).

To get the CA's certificate, just click the **EXPORT** button and specify the file path to save the certificate on your PC. The format for the CA's certificate is DER encoded binary X.509 (extension file name: .CER).



CA Settings

Export Certificate

To export a certificate for normal user or other radius server, type the username, password, and select certificate type then click "Export".

User Name:

Password:

Certificate Type: ○ Normal User ○ Radius Server

Export CA Certificate

To export the CA certificate for normal user or other radius server, select certificate type then click "Export".

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).

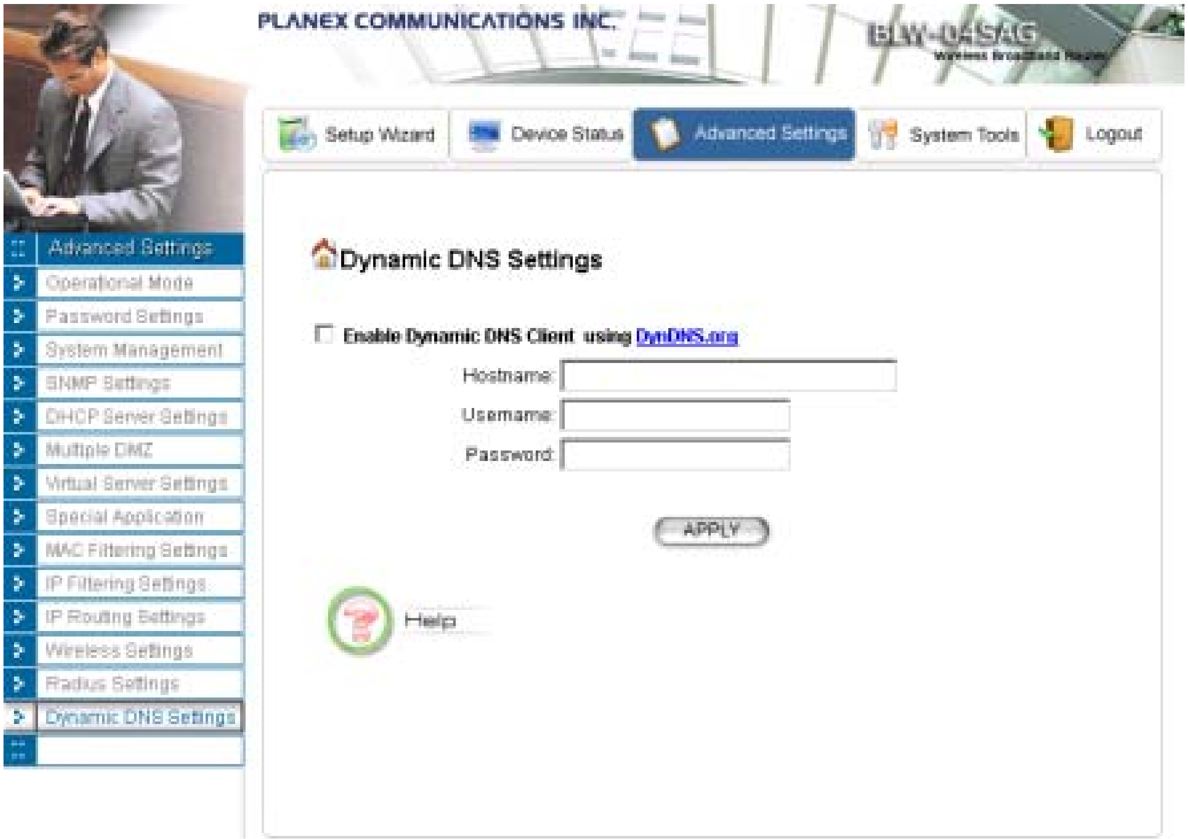
The 802.11a/g Router implements the dynamic DNS feature so that each time it is booted, it will re-register its domain-name-to-IP-address mapping with the dynamic DNS server you use (currently only DynDNS.org is supported), the service provider that provides domain name to IP address mapping. This is 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.



Dynamic DNS Settings

□ Enable Dynamic DNS Client using DynDNS.org

Hostname:

Username:

Password:

Chapter

5

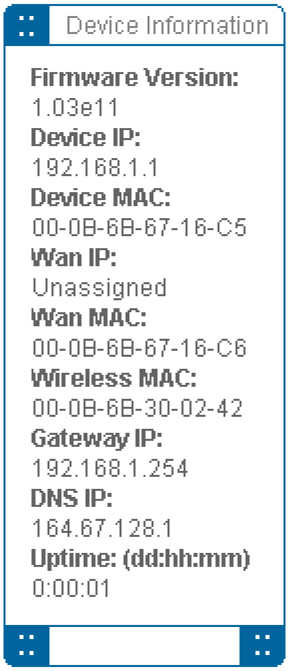
Managing your 802.11a/g Router

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:

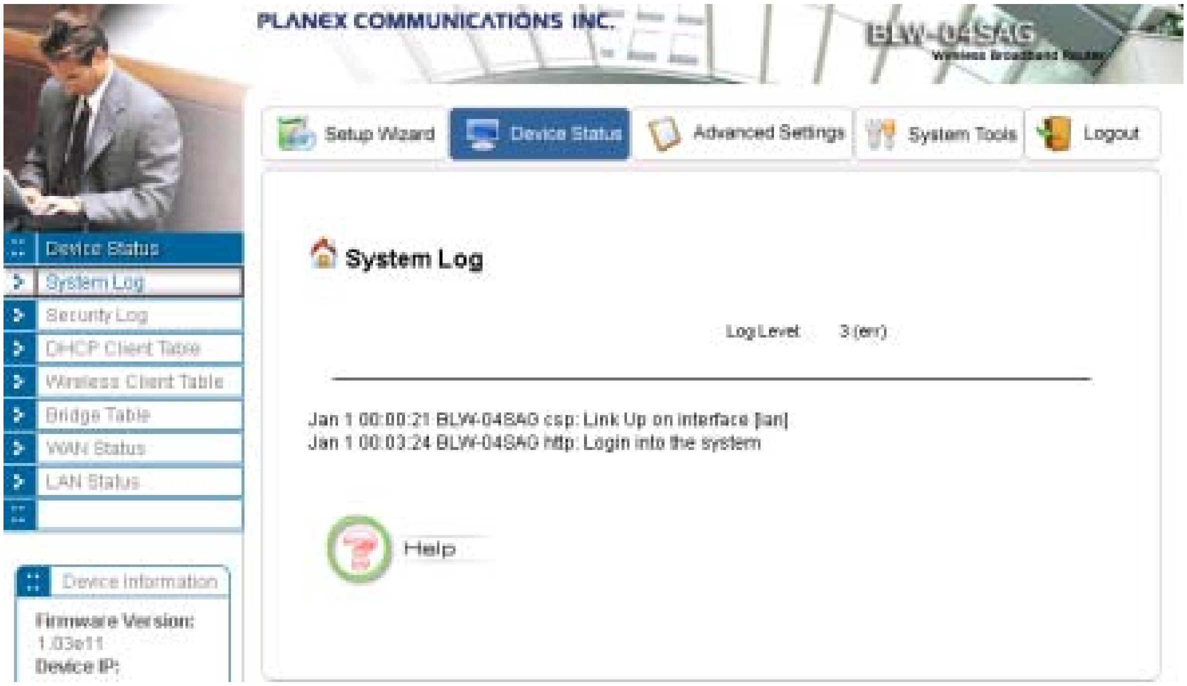

Device Information

Firmware Version:
1.03e11
Device IP:
192.168.1.1
Device MAC:
00-0B-6B-67-16-C5
Wan IP:
Unassigned
Wan MAC:
00-0B-6B-67-16-C6
Wireless MAC:
00-0B-6B-30-02-42
Gateway IP:
192.168.1.254
DNS IP:
164.67.128.1
Uptime: (dd:hh:mm)
0:00:01

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.



System Log

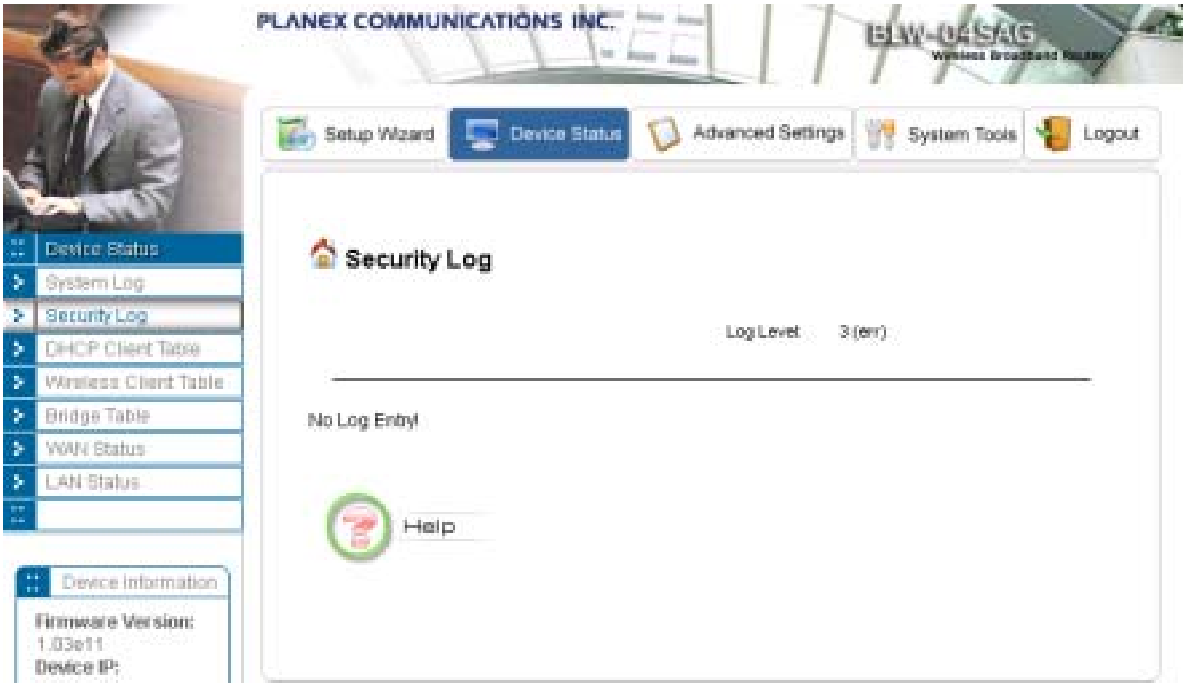
Log Level 3 (err)

```
Jan 1 00:00:21 BLW-04SAG csp: Link Up on interface [lan]
Jan 1 00:03:24 BLW-04SAG http: Login into the system
```

Firmware Version:
1.03e11
Device IP:

Security Log

The 802.11 a/g Router maintains another log table for security logs. For each filter rule configured, the 802.11 a/g Router will monitor the traffic matching the rule. Once the rule's hitting rate exceeds a certain degree (twice per 10 seconds, that is, more than one packet matching the rule in 10 seconds), a security log is generated and stored in the security log table. A security log entry contains a description regarding the event and a time stamp when the event happened. You can see the current logged security events from this page. Those log entries are not saved into flash, so all log messages are removed after the system reboot. The maximum number of entries is 128. If there are more than 128 entries, older entries will be deleted.



Security Log

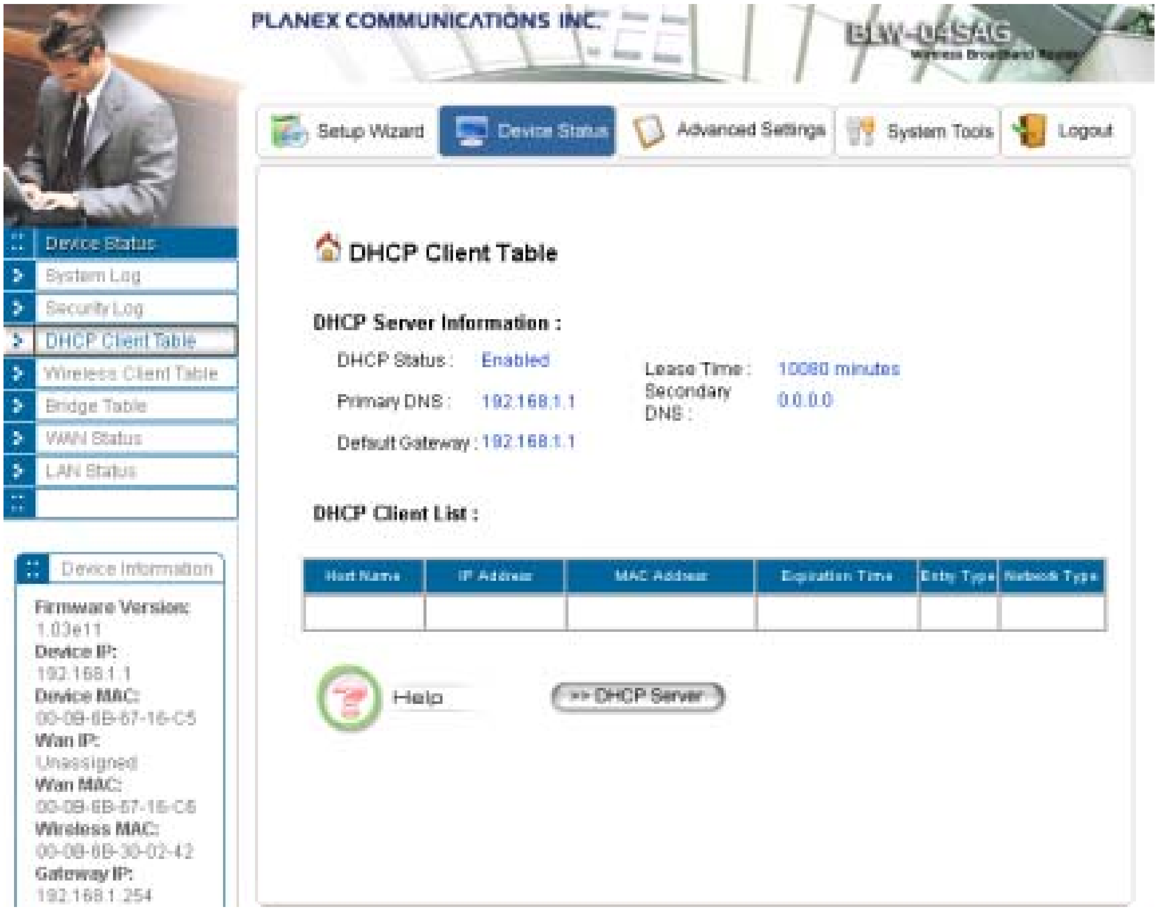
Log Level 3 (err)

No Log Entry!

Firmware Version:
1.03e11
Device IP:

DHCP Client Table

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



DHCP Client Table

DHCP Server Information :

DHCP Status : Enabled

Primary DNS : 192.168.1.1

Default Gateway : 192.168.1.1

Lease Time : 10080 minutes

Secondary DNS : 0.0.0.0

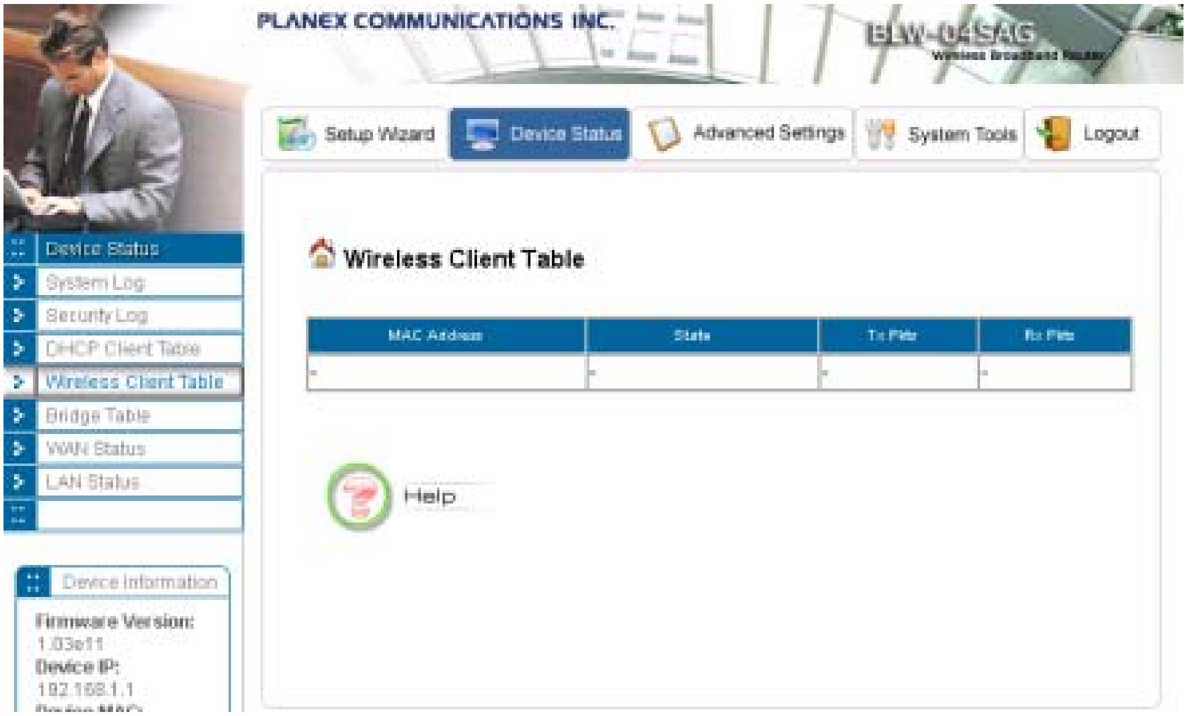
DHCP Client List :

Host Name	IP Address	MAC Address	Expiration Time	Entry Type	Network Type

Firmware Version:
1.03e11
Device IP:
192.168.1.1
Device MAC:
00-0B-6B-67-16-C5
Wan IP:
Unassigned
Wan MAC:
00-0B-6B-67-16-C6
Wireless MAC:
00-0B-6B-30-02-42
Gateway IP:
192.168.1.254

Wireless Client Table

The wireless client table lists the current wireless clients with its MAC address, state, number of transmitted packets, and number of received packets.



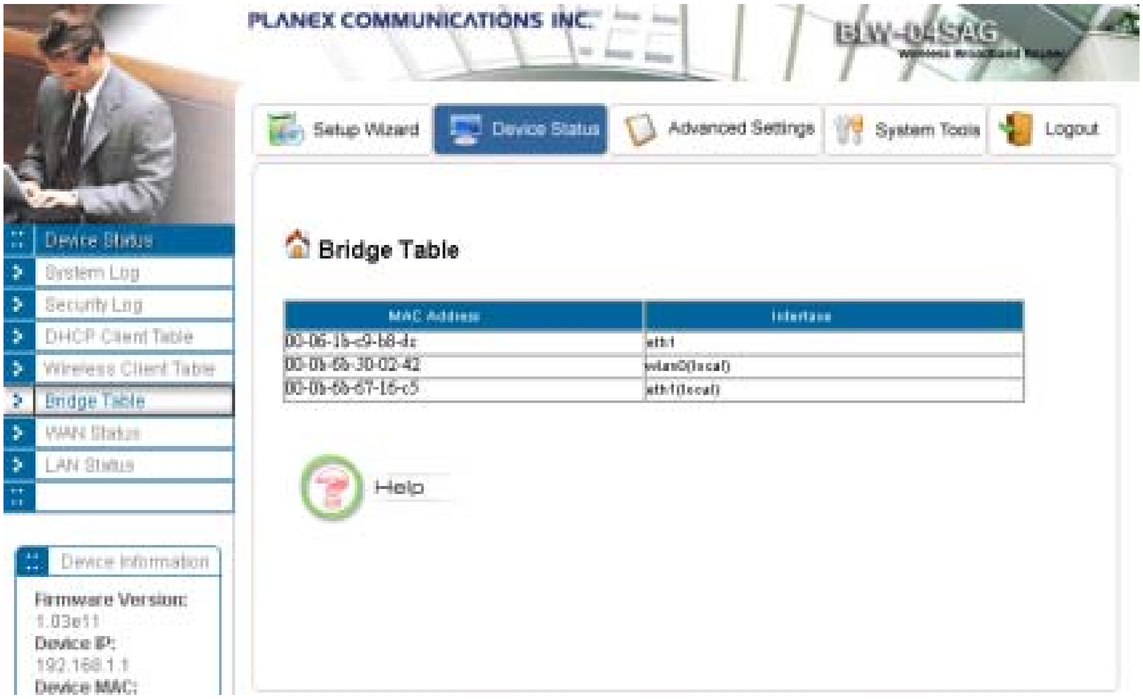
Wireless Client Table

MAC Address	State	Tx Pkts	Rx Pkts
-	-	-	-

Firmware Version:
1.03e11
Device IP:
192.168.1.1

Bridge Table

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



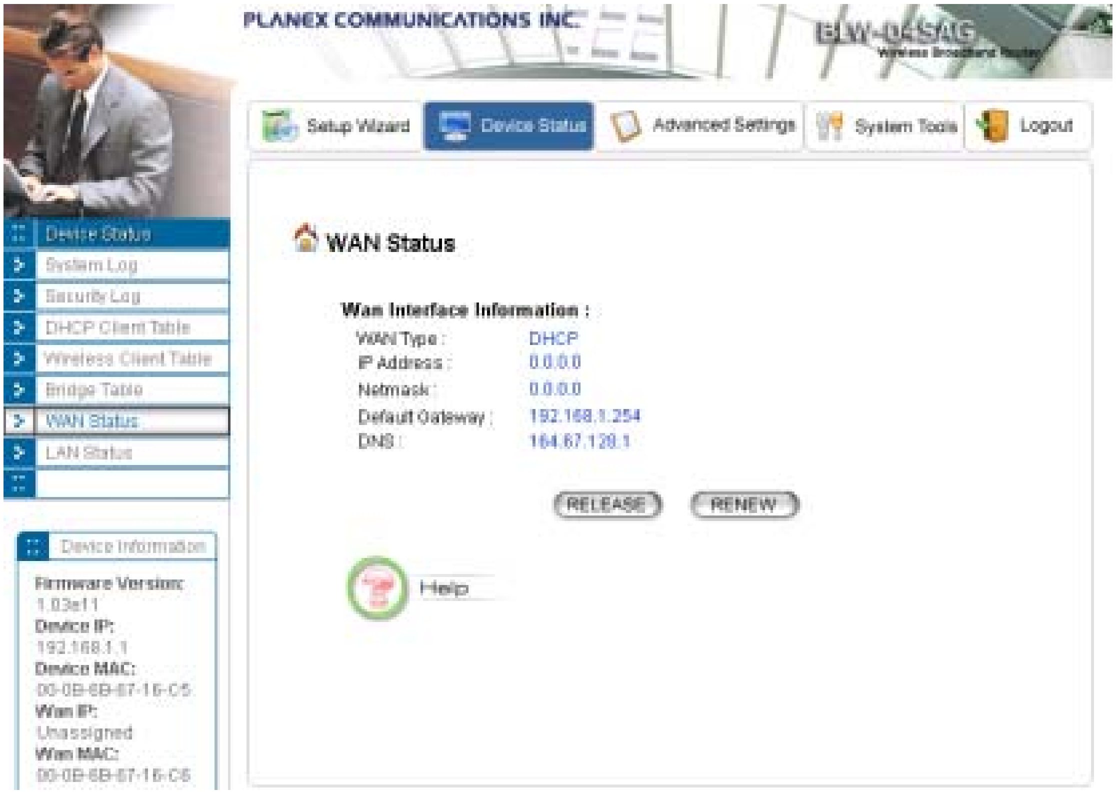
Bridge Table

MAC Address	Interface
00-06-1b-c9-b8-4c	eth1
00-0b-6b-30-02-42	wlan0(local)
00-0b-6b-67-16-c5	eth1(local)

Firmware Version:
1.03e11
Device IP:
192.168.1.1
Device MAC:

WAN Status

The WAN Status page shows the WAN connection status, including the public IP address assigned from the ISP and the DNS address. For the DCHP client connection, you can release and renew the WAN IP address; for the PPPoE connection, you can disconnect and connect the link.



WAN Status

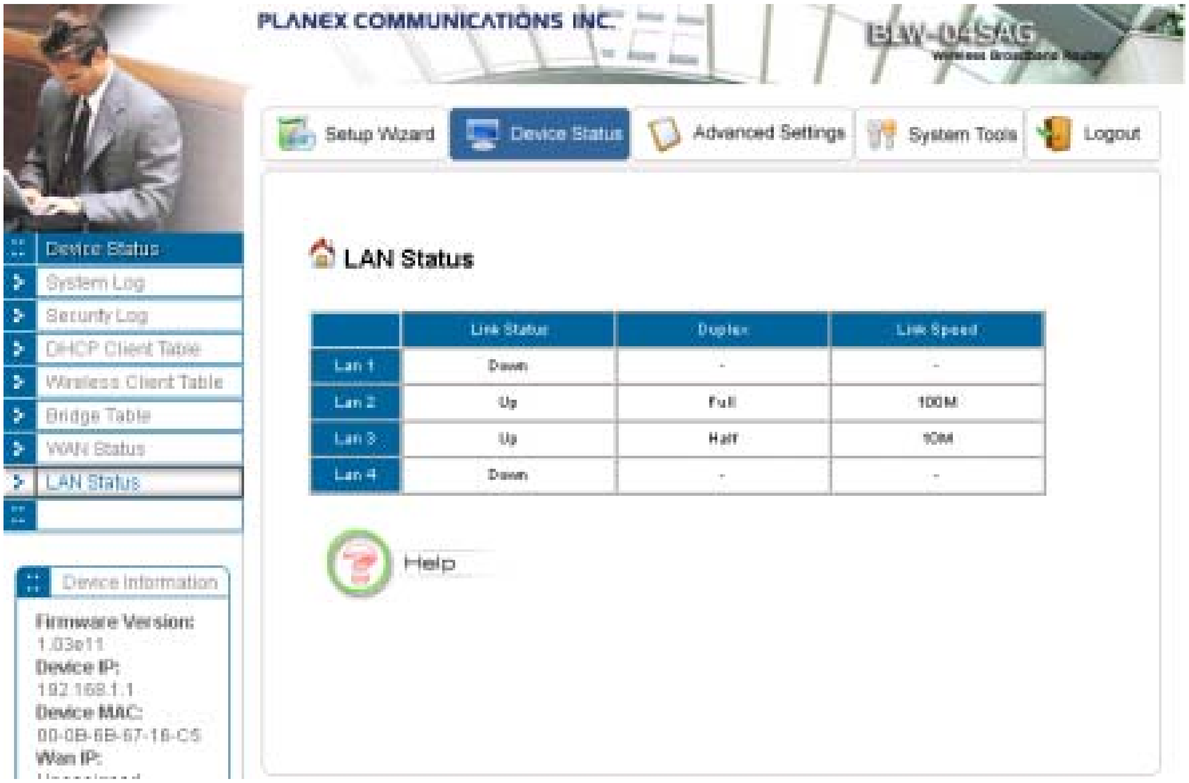
Wan Interface Information :

WAN Type : DHCP
IP Address : 0.0.0.0
Netmask : 0.0.0.0
Default Gateway : 192.168.1.254
DNS : 164.67.128.1

Firmware Version: 1.03e11
Device IP: 192.168.1.1
Device MAC: 00-0B-6B-67-16-C5
Wan IP: Unassigned
Wan MAC: 00-0B-6B-67-16-C6

LAN Status

This page displays the status of the 4 LAN ports. For each port, you can see the link status (Up/Down), duplex mode (Full/Half), and speed (10M/100M bps).



LAN Status

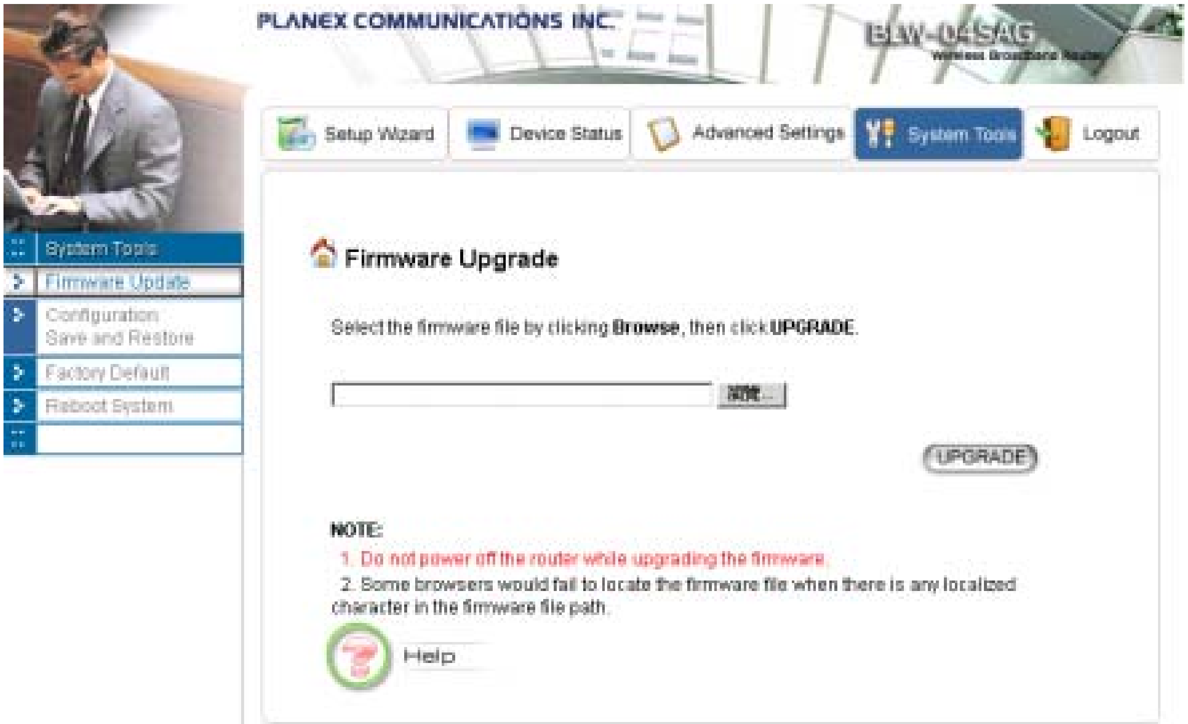
	Link Status	Duplex	Link Speed
Lan 1	Down	-	-
Lan 2	Up	Full	100M
Lan 3	Up	Half	10M
Lan 4	Down	-	-

Firmware Version:
1.03e11
Device IP:
192.168.1.1
Device MAC:
00-0B-6B-67-16-C5
Wan IP:

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 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:



Firmware Upgrade

Select the firmware file by clicking **Browse**, then click **UPGRADE**.

NOTE:
1. Do not power off the router while upgrading the firmware.
2. Some browsers would fail to locate the firmware file when there is any localized character in the firmware file path.

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.

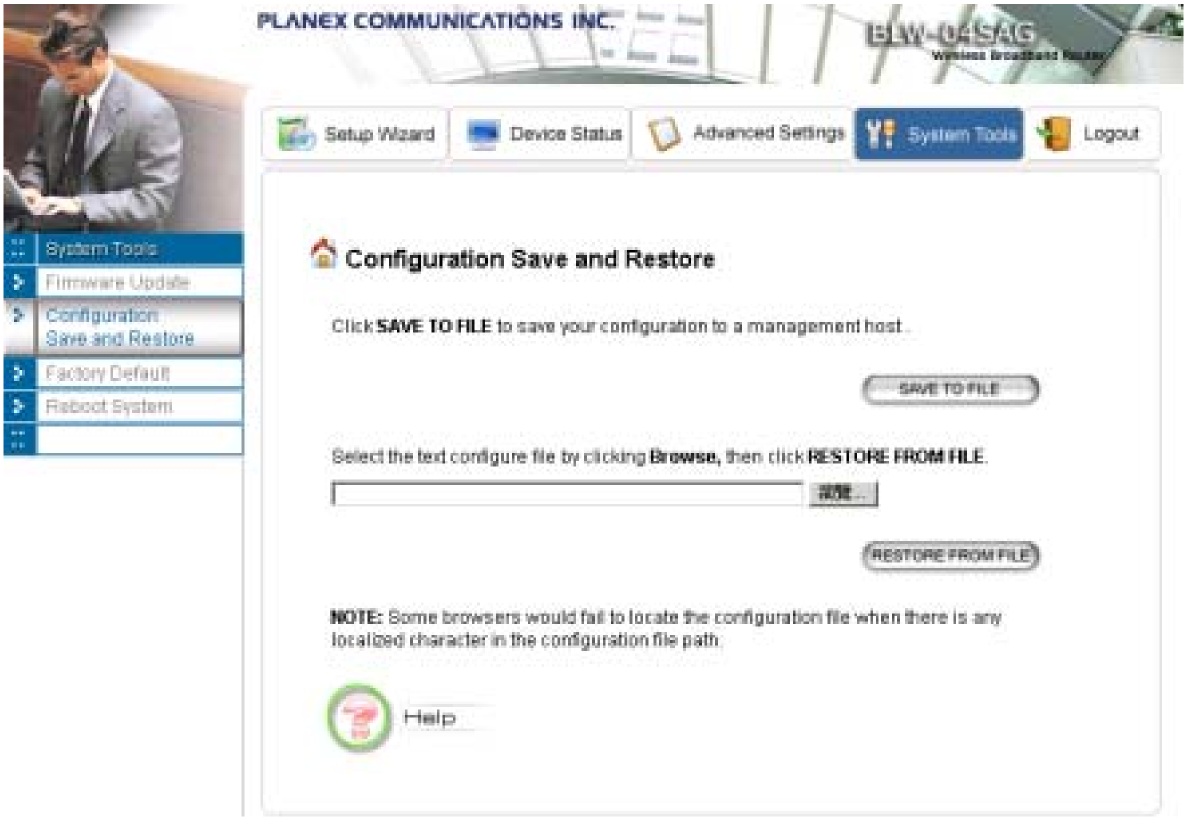
The new firmware will begin loading to your 802.11a/g Router. After a message appears telling you that the operation is complete, you need to reset the system to have the new firmware take effect.

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:



Configuration Save and Restore

Click **SAVE TO FILE** to save your configuration to a management host.

Select the text configure file by clicking **Browse,** then click **RESTORE FROM FILE**.

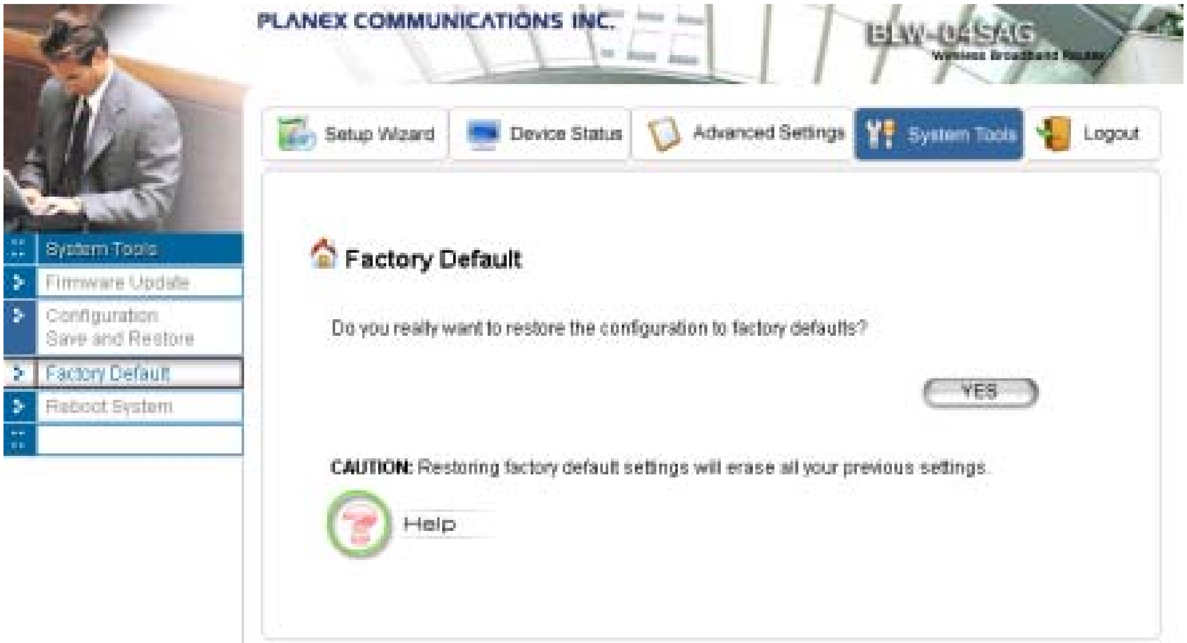
NOTE: Some browsers would fail to locate the configuration file when there is any localized character in the configuration file path.

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

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:



Factory Default

Do you really want to restore the configuration to factory defaults?

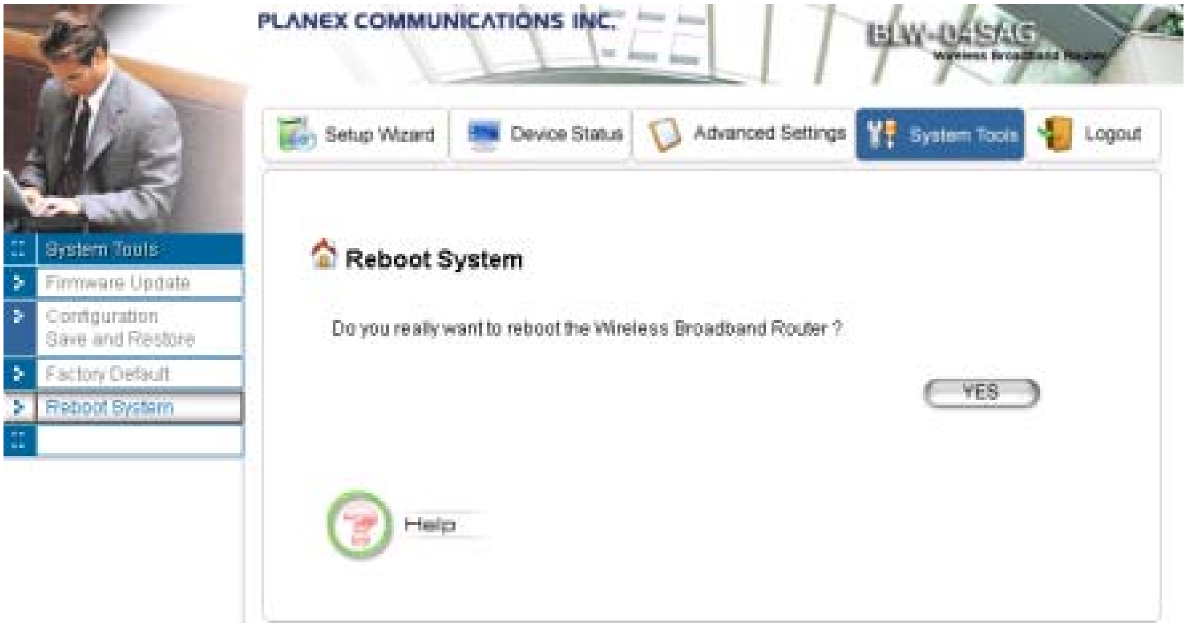
CAUTION: Restoring factory default settings will erase all your previous settings.

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:



Reboot System

Do you really want to reboot the Wireless Broadband Router ?

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.

Chapter 6

Command Line Interface

This chapter describes the Command Line Interface (CLI) for the 802.11 a/g Router. The CLI is accessible through a Telnet session.

General guidelines

When the 802.11 a/g Router is powered up, the user can use a standard telnet application from a PC connected to the network to perform configuration and management functions. This is done by typing the telnet command, “telnet <the 802.11 a/g Router’s ip>” (the default is 192.168.1.1) and pressing a return key, the user will see a system sign-on message followed by a password prompt as follows.

```
Router Manager Console <rev_no>
  please enter your password:
```

A default password “*password*” has been pre-configured with the system. The user should use it to log into the system until the password is explicitly changed using the ***change password*** command. Note that the entered password is case-sensitive. This password may also be changed using the browser-based GUI configuration utility.

The password entered will be echoed back as asterisks (*). After the Carriage Return is entered, if the password string is validated, the command prompt ***Command>*** will be displayed, and the user can then issue other commands. Otherwise, the password prompt will be redisplayed.

Most commands are single-line commands, and commands are not context sensitive: each command is independent of other commands before or after it.

The command syntax is straightforward.

The following briefly summarizes the guideline for the interface.

- At any time, the user can type a “**?**” (preceded by a space) to request context-sensitive help on what the user can enter next.
- At any time, the user can type control-p (^p, by pressing both the Ctrl key and the p key at the same time) to repeat the previous command, or control n to return to the following (next) command. At startup, typing ^p or ^n will not cause anything to happen - since previous commands do not yet exist. In normal operation, typing ^p will cause the previous command to show, and the cursor will sit at the end of the command. At this point, the user can either type a carriage return to accept the command, or type backspaces to edit the command from the end. Up to 15 previously entered commands can be invoked through ^p’s and ^n’s.

- If a keyword is expected when the user types “ ?”, all valid keywords will be displayed. The command typed in so far will then be displayed again along with the cursor sitting at the end, waiting for the user to continue.
- If the user types in part of the keyword but does not type in the entire word, the user can then enter a tab or space for the system to automatically complete the keyword if the characters typed in so far can uniquely identify the keyword. If the characters typed in so far do not uniquely identify a keyword, a list of possible keywords will be displayed.

If the user is not sure what to type next, he or she can type "?” to display the possible keywords that match the current CLI command input.

If an interactive mode is entered, the system will prompt for each required parameter, such as:

```
      …
Command> add radius server primary
 enter server IP (Unspecified): 192.168.1.10
 enter port number (1812, 1-65535): 1812
 enter shared secret:
      …
```

The first prompt means current IP setting is not specified yet, and there is no default for that. The second prompt means a number between 1 and 65535 is expected, with 1812 being the default.

During the first time a particular parameter is configured, typing a carriage return will cause the default value to be selected. Otherwise, typing a carriage return means no change to the current value.

Express Mode vs. Advanced Mode of operation

The Command Line Interface operates in one of two modes: ***Express Mode*** or ***Advanced Mode***. In Express Mode, not all parameters are displayed. Default values are set for those parameters not displayed in multi-line commands. In Advanced Mode, users have the option to modify all possible values appropriate to each operation.

The user can toggle between Express Mode and Advanced Mode by typing ^E (Control-E) at any time. Normally, the system prompt will be changed by appending “>>” to the configured prompt when in Advanced Mode.

Conventions

The following notations will be used:

- lan means the LAN port;
- wlan means the Wireless port;

- <> specifies the arguments of the command, <1-4> means a number between 1 to 4;
- [ ] indicates an optional parameter
- | is used to separate alternative choices of parameters or keywords;
- {} encloses all alternative keywords;
- MacAddr, or XX-XX-XX-XX-XX-XX means any MAC address in hexadecimal format, where each XX can be 00, 01, ... 99, 0A, 0B, 0C, 0D, 0E, 0F, 10, 11,… FF;
- ipAddr, netmask, or xxx.xxx.xxx.xxx means any ip address or network mask, where xxx is a decimal integer between 0 and 255;
- The term *string* means a string of characters up to the specified length, which may be enclosed in double quotes (“) (required if the string contains embedded blanks);
- Names representing filters and MAC addresses could be up to 30 characters in length; password and SNMP community read/write strings are up to 15 characters in length. When the password and SNMP community write string are entered, they are echoed back as a string of “*”s for protection, while other parameters, such as WEP keys, are echoed back the way they are typed (in clear text).

List of Commands

From a functional point of view, CLI commands will be grouped into the following categories:

(1) System

(2) IP

(3) Filtering

(4) DHCP Server

(5) SNMP

(6) Diagnostics

(7) Security

The command format will be described in the following sections.

(1) System Commands

```
clear config
```

Description: Reset the system configuration to the factory default.

```
disable ntp client
```

Description: Disable the NTP (Network Time Protocol) client function.

```
disable upnp
```

Description: Disable the UPnP function.

```
enable ntp client
```

Description: Enable the NTP (Network Time Protocol) client function.

```
enable upnp
```

Description: Enable the UPnP function.

```
help
```

Description: Show help descriptions on CLI.

```
logout
```

Description: Logout the current CLI management session.

```
ping <IP address>
```

Description: Show help descriptions on CLI.

```
reset system
```

Description: Reboot the system. Any configuration not saved (e.g. by "save config") will be lost.

```
save config
```

Description: Save the current configuration onto the flash, so the configuration will be kept after the system is rebooted.

```
set http port <port number, 1-65535>
```

Description: Set the HTTP server port (for device management) to the one specified.

```
set http timeout <timeout value in minutes, 1-60>
```

Description: Set the timeout value for the HTTP management session.

```
set ntp client
```

Description: Configure the NTP (Network Time Protocol) client related settings. This is a multi-line command, and you need to enter the time zone of the device, the NTP server name or IP address, NTP request interval, and enable the NTP client function or not.

```
set prompt <string up to 15 characters>
```

Description: Set the command line prompt.

```
set system contact <string up to 60 characters>
```

Description: Configure a string describing the system contact information. This is the value of the SNMP system contact MIB.

```
set system ip
```

Description: Set the IP address for the device LAN interface.

```
set system location <string up to 60 characters>
```

Description: Configure a string describing the system location information. This is the value of the SNMP system location MIB.

```
set system name <string up to 30 characters>
```

Description: Configuring a string for the system name. This is also the value of the SNMP system name MIB.

```
set telnet port <port number, 1-65535>
```

Description: Set the TELNET server port (for device management) to the one specified.

```
set telnet timeout <timeout value in minutes, 1-60>
```

Description: Set the timeout value for a TELNET management session.

```
show arp table
```

Description: Display the ARP table of the system.

```
show http
```

Description: Display the current configurations of the HTTP management function.

```
show ntp client
```

Description: Display the current configurations of the NTP client function.

```
show system
```

Description: Display the current basic system configurations.

```
show system ip
```

Description: Display the current device IP settings of the system.

```
show telnet
```

Description: Display the current configurations of the TELNET management function.

```
show upnp
```

Description: Display the current configurations of the UPnP function.

(2) IP Commands

```
add ip default route <gateway address>
```

Description: Add an IP default route to go to the specified gateway IP address.

```
add ip route <destination IP> <destination netmask> <gateway
address/interface name> <hop counts>
```

Description: add an IP route to the destination network specified through the specified gateway or interface with the specified cost. A <destination netmask> is in the format of xxx.xxx.xxx.xxx, for example, 255.255.254.0.

```
delete ip default route
```

Description: Delete the IP default route.

```
delete ip route <destination IP> <destination netmask>
```

Description: Delete the IP to the specified network.

```
disable rip <interface name, string up to 15 characters>
```

Description: Disable the RIP function on the specified interface.

```
enable {rip1 | rip2} {active | passive} [<interface name, string up to 15 characters>]
```

Description: Enable and set RIP mode as RIP1/RIP2 active/passive on the specified interface. If no interface is specified, this setting applied to all interfaces.

```
show ip routing table
```

Description: Display the system IP routing table.

```
show rip [<interface name, string up to 15 characters>]
```

Description: Display the current RIP settings on the specified interface. If no interface is specified, this command displays the current RIP settings on all the interfaces.

(3) Filtering Commands

```
add mac filter <string up to 30 characters> <MAC address, XX-XX-XX-XX-XX-XX>
```

Description: Add a MAC filter with the specified name (a mnemonic name) and MAC address.

```
delete mac filter <string up to 30 characters>
```

Description: Delete the MAC filter with the specified name.

```
set mac filter mode <MAC filter mode, disabled/grant/deny>
```

Description: Set the MAC filter mode.

```
show mac filter [<string up to 30 characters>]
```

Description: Display the MAC filter entry with the specified name. If no name is specified, this command display all currently configured MAC filter entries.

```
show mac filter mode
```

Description: Display the currently configured MAC filter mode.

(4) DHCP Server Commands

```
add dhcp static <IP address> <MAC address, XX-XX-XX-XX-XX-XX>
```

Description: Add a static DHCP client entry with the specified IP address and MAC address.

```
delete dhcp static <IP address>
```

Description: Delete the static DHCP client entry with the specified IP address.

```
disable dhcp server
```

Description: Disable the DHCP server function.

```
enable dhcp server
```

Description: Enable the DHCP server function.

```
set dhcp server
```

Description: Configure the DHCP server related settings. This is a multi-line command, and you have to enter the IP address pool range, gateway IP address, and lease period.

```
show dhcp client table
```

Description: Display the current dynamic DHCP clients.

```
show dhcp server
```

Description: Display the current DHCP server settings.

```
show dhcp static
```

Description: Display the current static DHCP clients.

(5) SNMP Commands

```
disable snmp
```

Description: Disable the SNMP function.

```
enable snmp
```

Description: Enable the SNMP function.

```
set community string {read | write} <string up to 15 characters>
```

Description: Configure the SNMP READ/WRITE community string.

```
show community string read
```

Description: Display the SNMP READ community string.

```
show snmp
```

Description: Display the current SNMP settings.

```
show snmp statistics
```

Description: Display the current SNMP statistics.

```
show trap manager [<string up to 30 characters>]
```

Description: Display the settings of the specified SNMP trap manager. If no trap manager is specified, this command displays the settings of all trap managers.

(6) Diagnostics Commands

```
disable log <facility>
```

Description: Disable the log function on the specified facility.

```
disable syslogd
```

Description: Disable the remote log function.

```
disable trace <facility>
```

Description: Disable the trace function on the specified facility.

```
enable log <facility> [<log level, 1-7>]
```

Description: Enable the log function with the specified log level on the specified facility. If no log level is specified, the previously configured log level is used.

```
enable syslogd
```

Description: Enable the remote log function.

```
enable trace <facility> [<log level, 1-7>]
```

Description: Enable the trace function with the specified log level on the specified facility. If no log level is specified, the previously configured log level is used.

```
set log level <log level, 1-7>
```

Description: Set the log level.

```
set syslogd <IP address>
```

Description: Configure the IP address of the remote syslog daemon. This is used for the remote syslog function.

```
show log level
```

Description: Display the current log level.

```
show log table [<facility>]
```

Description: Display the current logged events of the specified facility. If no facility is specified, this command displays all logged events.

```
show syslogd
```

Description: Display the current configuration of the remote log function.

(7) Security Commands

```
add radius server {primary | secondary}
```

Description: Configure the primary/secondary RADIUS server settings. This is a multi-line command, and you have to enter the IP address and port number of the server, shared secret, and enable/disable.

```
change password
```

Description: Change the password for management, including HTTP and TELNET.

```
disable radius mac authentication
```

Description: Disable the use of external RADIUS servers for MAC address access control.

```
disable radius server {primary | secondary}
```

Description: Disable the use of the primary/secondary RADIUS server.

```
enable radius mac authentication
```

Description: Enable the use of external RADIUS servers for MAC address access control.

```
enable radius server {primary | secondary}
```

Description: Enable the use of the primary/secondary RADIUS server.

```
set radius server reattempt <reattempt interval in minutes, 5-60>
```

Description: Configure the reattempt time for the system to contact the primary RADIUS server after the primary RADIUS server was down.

```
set radius server retry <retry interval in times, 1-5>
```

Description: Configure the number of retries after which the system may think the RADIUS server is down.

```
show radius server [{primary | secondary}]
```

Description: Display the configuration of the specified RADIUS server. If no server is specified, this command displays the configurations of all RADIUS servers.

Chapter 6

Text Configuration

The text configuration provides another way for users to configure the 802.11 a/g Router. Users can save the system current configuration onto a file on PC, edit the configuration file, and then restore the system configuration with the configuration file. For details regarding the save and restore configuration operations, please read the HOW TO SAVE OR RESTORE CONFIGURATION CHANGES section in the MANAGING YOUR 802.11A/G ROUTER chapter. This chapter describes the syntax and semantics of a text configuration file.

General guidelines

The format of a text configuration file is like the Microsoft Window® INI (extension file name: .ini) file format. The basic file structure can be divided into the following parts:

1. **Sections**
   A section name is enclosed in square brackets, alone on a line. Section names are allowed to contain any character but square brackets or linefeeds. For example: "[sectionName]". Basically a section corresponds to a configuration item, a section contains zero or more key and value pairs that are the settings for the configuration item. A section name is case insensitive.

2. **Keys and Values**
   A section contains zero or more key and value pairs, declared with the syntax "key = value". A key is a string without space and the value consists of all characters at the right hand side of the equal sign. That is, a key starts with the first non-blank ASCII character at the right hand side of an equal sign and extends to a comment mark (if there is one) or the end of the line. So blanks are allowed among non-blank characters. A key string is case insensitive.

3. **Comments**
   A comment starts with a semicolon or a hash sign and extends to the end of the line.

List of Sections

Section & Examples	Description
[Manufacture]	This is used by the system itself, and this should be

Version = 1.00	put as the first section in a configuration file. Users should not modify anything in this section.
[Password] Password=000000	Password: the password for system management.

[Time]
TimeZone = +09:00
NTPstate=disable
NTPstate=enable
NTPServerType =ip
NTPServerIP=192.43.244.18
NTPServerType =name
NTPServerName=time.nist.gov
RequestInterval=24
	TimeZone: the time zone of the system. Possible values are -12:00, -11:00, -10:00, …, +00:00, +01:00, …, +13:00.
	NTPstate: enable NTP client function or not (‘enable’ or ‘disable’).
	If ‘NTPstate’ is ‘enable’:
	NTPServerType: how to specify the NTP server (‘ip’ or ‘name’).
	NTPServerIP: the IP address of the NTP server (if ‘NTPServerType’ is ‘ip’).
	NTPServerName: the domain name of the NTP server (if ‘NTPServerType’ is ‘name’).
	RequestInterval: the interval that the NTP client will query the server periodically (unit: hours).

[Device]
IPType=static
IPAddress=192.168.1.1
IPNetmask=255.255.255.0
IPType=dhcp
	LAN Interface Configuration
	IPType: the LAN IP type (‘static’ or ‘dhcp’)
	For ‘static’ type:
	IPAddress: the IP address of LAN
	IPNetmask: subnet mask of LAN

[ISP]
ISPType=static
ISPStaticIP=100.0.0.1
ISPNetmask=255.255.0.0
ISPGateway=100.0.0.2
ISPDNSIP=123.0.0.1
ISPType=dhcp
Hostname=name
ISPType=pppoe
PPPoEUserName=name
PPPOEPassword=password
PPPOEServiceName=service
PPPOEConnectionType=demand_dialing
PPPOEMTU=1492
PPPOEMRU=1492
PPPOESessionType=normal
	WAN Interface Configuration
	ISPType: the WAN connection type (‘static’, ‘dhcp’, ‘pppoe’, ‘pptp’).
	For ‘static’ type:
	ISPStaticIP: the IP address assigned by ISP.
	ISPNetmask: the netmask assigned by ISP.
	ISPGateway: the default gateway address assigned by ISP.
	ISPDNSIP: the DNS server address assigned by ISP.
	For ‘dhcp’ type:
	Hostname: the host name (if any) assigned by your ISP.
	For ‘pppoe’ type:
	PPPoEUserName: user name of the ISP account
	PPPOEPassword: password for the ISP account

PPPOESessionType=unnumbered_link
KeepPrivateLan=enable/disable
UnnumberedIP=192.168.1.1
UnnumberedNetmask=255.255.255.0
 	
ISPType=pptp
PPTPLocalIP=11.0.0.10
PPTPNetmask=255.255.255.0
PPTPRemoteIP=11.0.0.1
PPTPUserName=name
PPTPPassword=password
PPTPIdleTimeout=time
	PPPOEServiceName: service name for the connection
	PPPOEConnectionType: type of the PPP connection (‘demand_dialing’, ‘always_on’, ‘manually’).
	PPPOEMTU/PPPOEMRU: the MTU/MRU for the connection (unit: byte).
	PPPOESessionType: type of the PPPoE session (‘normal’, ‘multiple_pppoe’, ‘unnumbered_link’).
	
	For PPPoE ‘unnumbered_link’ session type:
	KeepPrivateLan: keep the private LAN or not (‘enable’ or ‘disable’).
	UnnumberedIP: the IP address of the private LAN if ‘KeepPrivateLan’ is ‘enable’
	UnnumberedNetmask: the subnet mask of the private LAN if ‘KeepPrivateLan’ is ‘enable’
	
	For ‘pptp’ type:
	PPTPLocalIP: the local IP address for establishing the PPTP tunnel.
	PPTPNetmask: the subnet mask of the WAN interface where the PPTP tunnel is established.
	PPTPRemoteIP: the remote IP address for establishing the PPTP tunnel.
	PPTPUserName: the user name of the ISP account.
	PPTPPassword: the password name of the ISP account.
	PPTPIdleTimeout: the maximum idle time before the connection is taken down (unit: minute).

[MultiplePPPoEEntry]
MpppoeSessionName=session name
MpppoeUserName=name
MpppoePassword=password
MpppoeConnectionType=manually
MpppoeMTU=1492
MpppoeMRU=1492
 	
MpppoeLanType=enable
MpppoeLanIP=2.2.0.0
MpppoeLanNetmask=255.255.0.0
 	
TPIPRange=enable
TPPortRange=disable
TPKeyword=disable
TPNetBios=enable
 	
TPRuleIPRange=50.0.0.0-20
	Multiple PPPoE Sessions Configuration
	
	There could be multiple entries (max 7 entries), each entry contains the following items:
	
	MpppoeSessionName: a mnemonic name for this entry.
	MpppoeUserName: the user name for the ISP account.
	MpppoePassword: the password for the ISP account.
	MpppoeConnectionType: type of the PPP connection (‘demand_dialing’, ‘always_on’, ‘manually’).
	MpppoeMTU/MpppoeMRU: the MTU/MRU for the connection (unit: byte).
	MpppoeLanType: Enable the LAN type access on the session or not (‘enable’ or ‘disable’)
	MpppoeLanIP: the IP address of the LAN type network if ‘MpppoeLanType’ is ‘enable’.
	MpppoeLanNetmask: the subnet mask of the LAN

TPRuleNetwork=60.0.0.0/24
TPRulePortRange=40000-50000
TPRuleKeyword=key pattern
	type network if 'MpppoeLanType' is 'enable'.
	TPIPRange: whether enable IP address range and network traffic pattern on the session ('enable', 'disable').
	TPPortRange: whether enable port range traffic pattern on the session ('enable', 'disable').
	TPKeyword: whether enable keyword traffic pattern on the session ('enable', 'disable').
	TPNetBios: whether enable NetBIOS traffic pattern on the session ('enable', 'disable').
	The following items can appear more than one in a multiple PPPoE entry:
	TPRuleIPRange: specify an IP address range traffic pattern.
	TPRuleNetwork: specify an IP network traffic pattern.
	TPRulePortRange: specify a port range traffic pattern.
	TPRuleKeyword: specify a keyword traffic pattern.

[CloneMAC]
CloneMACState=disable
CloneMAC=00-01-02-03-04-05
	Clone MAC Configuration
	CloneMACState: whether enable the clone MAC function ('disable', 'enable').
	CloneMAC: the MAC address to be cloned.

[Radio]
SSID=wlan
SSIDBoradcast=enable
RadioMode=11g/b
Channel=auto
PrivSeparatorState=disable
BeaconInterval=100
RTSThreshold=2347
Fragmentation=2346
DTIMInterval=3
UserLimit=100
	WLAN Configuration
	SSID: SSID of the WLAN.
	SSIDBoradcast: whether enable SSID broadcast.
	RadioMode: radio mode ('11a', '11at'-a turbo, '11sa'-super a without turbo, '11sast'-super a with static turbo, '11sadt'-super a with dynamic turbo, '11g/b'-11g or 11b, '11g', '11gt'-g turbo, '11sg'-super g without turbo, '11sgst'-super g with static turbo, '11sgdt'-super g with dynamic turbo).
	Channel: channel number (1, 2, 3… or 'auto').
	PrivSeparatorState: whether enable privacy separator ('enable', 'disable').
	BeaconInterval: beacon interval (unit: msec).
	RTSThreshold: RTS threshold (unit: byte).
	Fragmentation: fragmentation threshold (unit: byte).
	DTIMInterval: DTIM interval.
	UserLimit: user limitation count.

[SecurityPolicy] SecurityPolicy=none	**WLAN Security Policy** SecurityPolicy: security policy ('none', 'wep')

SecurityPolicy=wep
 	
WEPAutoGenerateKey=enable
WEPPassPhrase=pass phrase
WEPPassPhraseLength=64
 	
WEPAutoGenerateKey=disable
WEPKey1Type=ascii-64
WEPKey1=12345
WEPKey2Type=hex-128
WEPKey2=f1-05-a1-50-21-f0-d1-b8-83-4e-43-ef-d1
WEPKey3Type=hex-152
WEPKey3=f1-05-a1-50-21-f0-d1-b8-83-4e-43-ef-d1-14-15-16
WEPKey4Type=ascii-152
WEPKey4=this is key- 152
 	
WEPSelectKey=1
 	
SecurityPolicy=802.1x
8021xRekeyLen=128
8021xRekeyInterval=300
 	
SecurityPolicy=wpa-psk
WPAPSKKey=12345678
WPAEncryptionType=tkip
WPAGroupRekeyInterval=60
 	
SecurityPolicy=wpa
WPAEncryptionType=ccmp
WPAGroupRekeyInterval=60
	For ‘wep’ type,
	WEPAutoGenerateKey: whether use a pass phrase to generate WEP keys (‘enable’, ‘disable’).
	WEPPassPhrase: WEP key pass phrase if ‘WEPAutoGenerateKey’ is ‘enable’.
	WEPPassPhraseLength: the length of keys that should be generated from the pass phrase if ‘WEPAutoGenerateKey’ is ‘enable’.
	
	If ‘WEPAutoGenerateKey’ is ‘disable’, the 4 WEP keys should be specified. For each WEP key *i*, WEPKey*i*Type specifies the key type, including length and format, and WEPKey*i* specifies the key value. The key length can be 64, 128, or 158. The format can be ASCII or HEX. So the available key type is ‘ascii-64’, ‘ascii-128’, ‘ascii-152’, ‘hex-64’, ‘hex-128’, and ‘hex-152’. For an ASCII format key, the key value is the string at the right hand side of the equal sign. For a HEX format key, the format is like xx-xx-…-xx, where each xx is one byte and represented in 2 hexadecimal digits.
	
	WEPSelectKey: select which key to use (1, 2, 3, 4).
	
	For ‘802.1x’ type,
	8021xRekeyLen: the key length for dynamic re-keying, disable means no re-key (‘disable’, 64, 128, 152).
	8021xRekeyInterval: re-key interval if ‘8021xRekeyLen’ is not ‘disable’, 0 means only setting key once (unit: sec).
	
	For ‘wpa-psk’ type,
	WPAPSKKey: the pre-shared key (8 ~63 characters)
	
	For both ‘wpa-psk’ and ‘wpa’ types
	WPAEncryptionTypp: encryption protocol types (‘tkip’, ‘ccmp’, ‘both’).
	WPAGroupRekeyInterval: group key re-key interval (unit: sec).

[OperationMode] OpMode=gateway	Operational Mode Configuration OpMode: the operational mode setting (‘ap’ – WLAN access point only, ‘gateway’ – internet gateway + WLAN access point, ‘wds’ – internet gateway + wireless access point with WDS support).
[WDSEntry]	WDS Entry Configuration

WDSName=wds peer
WDSMAC=00-11-22-33-44-55
	There could be multiple entries (max 8 entries), each entry contains the following items:
	
	WDSName: a mnemonic name for the peer.
	WDSMAC: the MAC address of the peer.

[SystemManagement]
HTTPPort=80
HTTPTimeout=10
TELNETPort=23
TELNETTimeout=10
	System Management Configuration
	
	HTTPPort: HTTP server port number.
	HTTPTimeout: idle time out value for a HTTP management session (unit: minute).
	TELNETPort: TELNET server port number.
	TELNETTimeout: idle time out value for a TELNET management session (unit: minute).

[RemoteManagement]
RemoteManageType=deny_all
RemoteManageIP1=1.1.1.1
RemoteManageIP2=2.2.2.2
RemotePingState=disable
	Remote Management Configuration
	
	RemoteManageType: set remote management type ('allow_all' – allow management from all remote IP addresses, 'allow_2' – allow management only from two remote IP addresses , 'deny_all' – deny management from all remote IP addresses)
	RemoteManageIP1/RemoteManageIP2: the two remote IP addresses allowed to do remote management if 'RemoteManageType' is 'allow_2'.
	RemotePingState: whether enable PING traffic from the Internet ('enable', 'disable').

[UPNP] UPNPState=enable	**UPnP Configuration** UPNPState: whether enable the UPnP function ('enable', 'disable')

[Syslog]
SyslogLevel=3
SyslogState=disable
 	
SyslogState=enable
SyslogdIP=102.2.2.2
	Syslog Configuration
	
	SyslogLevel: syslog level, lower is severer and less events will be logged.
	SyslogState: whether enable the remote log function ('enable', 'disable').
	SyslogdIP: the IP address of the remote syslog daemon if 'SyslogState' is 'enable'.

[EmailLog]
 	
EmailLogState=enable
EmailLogServer=sned.mail.com
EmailLogMailAddr=user@recvmail.com
	Email Log Configuration
	
	EmailLogState: whether enable the Email Log function ('enable', 'disable').
	EmailLogServer: the domain name of the mail server for sending log mails

	EmailLogMailAddr: the Email address that the log mails will be sent to.
[STP] STPState=disable	**STP (Spanning Tree Protocol) Configuration** STPState: whether the STP function is enabled (‘enable’, ‘disable’).

[SNMP]
SnmpState=enable
SysName=name
SysLocation=Input System Location
SysContact=Input Contact Person
ReadCommunity=public
WriteCommunity=private
	SNMP Configuration
	
	SnmpState: whether the SNMP function is enabled (‘enable’, ‘disable’).
	
	If ‘SnmpState’ is ‘enable’, the following items can be included:
	SysName: system name string.
	SysLocation: system location description.
	SysContact: system contact description.
	ReadCommunity: SNMP read-only community string.
	WriteCommunity: SNMP write community string.

[TrapEntry]
TrapManagerName=Sigma
TrapManagerIP=192.168.1.9
TrapManagerState=enable
	SNMP Trap Manager Configuration
	
	There could be multiple entries (max 3 entries), each entry contains the following items:
	
	TrapManagerName: the mnemonic name for the trap manager.
	TrapManagerIP: the IP address of the trap manager.
	TrapManagerState: whether the trap manager is enabled (‘enable’, ‘disable’).

[DHCPServer]
DHCPServerState=enable
LeaseTime=10080
AssignRangeFrom=3
AssignRangeTo=100
	DHCP Server Configuration
	
	DHCPServerState: whether the DHCP server is enabled (‘enable’, ‘disable’).
	LeaseTime: the lease time for each leased address (unit: minute).
	AssignRangeFrom/AssignRangeTo: the last octet of the first/last available IP address. For example, if the LAN IP address is 192.168.1.1 and AssignRangeFrom/AssignRangeTo is 3/100, then the available IP address range is 192.168.1.3 ~ 192.168.1.100.

[DHCPStaticEntry]
DHCPSStaticMAC=00-12-00-34-00-56
DHCPSStaticIP=192.168.1.23
	DHCP Server Static Entry Configuration
	
	There could be multiple entries (max 20 entries), each entry contains the following items:

	DHCPSStaticMAC: the MAC address of the static assigned machine. DHCPSStaticIP: the IP address assigned to the machine with the MAC address.
[DefultDMZ] DDMZLocalIP =192.168.1.13	**Defult DMZ Configuration** DDMZLocalIP: the IP address of the local machine corresponding to the default DMZ.

[MultipleDMZEntry]
DMZName=aaa
DMZPublicIP=77.0.0.1
DMZLocalIP=192.168.1.17
	Multiple DMZ Entry Configuration
	
	There could be multiple entries (max 6 entries), each entry contains the following items:
	
	DMZName: a mnemonic name for this DMZ entry.
	DMZPublicIP: the public IP address of the DMZ.
	DMZLocalIP: the IP address of the local machine corresponding to the DMZ.

[VirtulServerEntry]
VSServiceName=HTTP
VSPortNo=80
VSLocalIP=172.16.60.55
VSLocalPort=2
 	
VSPortNo=2000-3000
	Virtual Server Configuration
	
	There could be multiple entries (max 45 entries: Special Application [see the next section] + Virtual Server), each entry contains the following items:
	
	VSServiceName: the service name for the virtual server ('HTTP', 'FTP', 'TELNET', 'SMTP', 'POP3', 'CUSTOM').
	VSPortNo: the public port number(s) of the virtual server. It can be a single port number (e.g. 80) or a range of ports (e.g. 2000-3000).
	VSLocalIP: the local IP address of the machine corresponding to the virtual server.
	VSLocalPort: the local port number on the virtual server local machine. If 'VSPortNo' is a range, then 'VSLocalPort' is not allowed to configure.

[SpecialApplicationEntry]
SPName=game
TriggerPort=6762
TriggerProtocol=TCP
OpenedPort=6768
OpenedProtocol=UDP
 	
TriggerPort=5000-6000
 	
OpenedPort=2000-3000
OpenedPort=4010-4020,4030-
	Special Application Configuration
	
	There could be multiple entries (max 45 entries: Special Application [see the next section] + Virtual Server), each entry contains the following items:
	
	SPName: a mnemonic name for the application.
	TriggerPort: the trigger ports of the application, this could be a single port or a range of ports.
	TriggerProtocol: the trigger protocol of the application ('TCP', 'UDP', 'BOTH').

4040,1080-1090	OpenedPort: the opened ports for the application, this could be a single port, a range of ports, or several ranges of ports. OpenedProtocol: the opened protocol for the application (‘TCP’, ‘UDP’, ‘BOTH’).
[MACFilter] MACFilterPolicy =disable	**MAC Filter Configuration** MACFilterPolicy: MAC Filter policy (‘disable’, ‘deny’, ‘grant’).

[MACFilterEntry]
MACFilterName=name
MACFilterMAC=00-01-30-05-70-aa
	MAC Filter Entry Configuration
	
	There could be multiple entries (max 32 entries), each entry contains the following items:
	
	MACFilterName: a mnemonic name for the entry.
	MACFilterMAC: the MAC address that the filter will be applied on.

[IPFilter] IPFilterPolicy=deny	**IP Filter Configuration** IPFilterPolicy: IP Filter policy (‘disable’, ‘deny’, ‘grant’).

[IPFilterEntry]
 	
IPFilterName=ipf name
IPFProtocol=tcp
IPFDirection=outbound
IPFSourceIP=1.1.1.1
IPFSourcePort=any
IPFDestIP=2.2.0.0/255.255.0.0
IPFDestPort=100-200
 	
IPFSourceIP=any
IPFSourcePort=1213
	IP Filter Entry Configuration
	
	There could be multiple entries (max 32 entries), each entry contains the following items:
	
	IPFilterName: a mnemonic name for the filter.
	IPFProtocol: the protocol that the filter will match (‘any’, ‘tcp’, ‘udp’, ‘icmp’, ‘igmp’).
	IPFDirection: the matching direction of the filter (‘inbound’, ‘outbound’)
	IPFSourceIP/IPFDestIP: the source/destination IP address the filter will match, this could be a single IP address, a network address, or any address.
	IPFSourcePort/IPFDestPort: the source/destination port the filter will match. This is only valid when the ‘IPFProtocol’ is ‘tcp’ or ‘udp’. The value could be a single port number, a range of ports, or any port.

[StaticRoutingEntry]
RouteDestIP=101.200.60.0
RouteNetmask=255.255.254.0
RouteInterface=lan
RouteMetric=1
 	
RouteGateway=172.16.60.170
	Static Route Entry Configuration
	
	There could be multiple entries (max 20 entries), each entry contains the following items:
	
	RouteDestIP: the IP address of the destination network for the route.

	RouteNetmask: the netmask of the destination network for the route. RouteInterface: the interface name that the route will go through. RouteGateway: the next gateway that the route will go through. RouteMetric: the metric for this route. Note: Either 'RouteInterface' or 'RouteGateway' can exist in an entry, not both nor none.
[DynamicRouting] RoutingType=RIP RIPType=RIP2Active RoutingType=OSPF OSPFLan/OSPFWan=enable OSPFLanAreaID/OSPFWanAreaID=0.0.0.1 OSPFLanAreaType/OSPFWanAreaType=regular OSPFLanPriority/OSPFWanPriority=1 OSPFLanHelloInterval/OSPFWanHelloInterval=10 OSPFLanDeadInterval/OSPFWanDeadInterval=40 OSPFLanCost/OSPFWanCost=10 OSPFLanAuthType/OSPFWanAuthType=SP OSPFLanSPKey/OSPFWanmd5key=password OSPFWanMD5key=password OSPFRangeRule=enable OSPFRangeEntryAreaID=0.0.0.2 OSPFRangeEntryIPaddr=10.1.1.1 OSPFRangeEntryNetmask=255.255.255.0	**Dynamic Routing Configuration** RoutingType: dynamic routing type ('disable', 'RIP', 'OSPF'). When 'RoutingType' is 'RIP': RIPType: the RIP mode ('RIP1Active', 'RIP1Passive', 'RIP2Active', 'RIP2Passive'). When 'RoutingType' is 'OSPF': OSPFLan/OSPFWan: whether enable OSPF on the LAN/WAN interface ('enable', 'disable'). If 'OSPFLan'/'OSPFWan' is 'enable', the following items are required. OSPFLanAreaID/OSPFWanAreaID: the Area ID that the LNA/WAN interface belongs to. OSPFLanAreaType/OSPFWanAreaType: the type of the area that the LAN/WAN interface belongs to ('regular', 'stub'). OSPFLanPriority/OSPFWanPriority: the priority of the router on the LAN/WAN segment. OSPFLanHelloInterval/OSPFWanHelloInterval: the Hello interval on the LAN/WAN segment (unit: sec). OSPFLanDeadInterval/OSPFWanDeadInterval: the dead interval on the LAN/WAN segment (unit: sec). OSPFLanCost/OSPFWanCost: the cost to send a packet over the LAN/WAN interface. OSPFLanAuthType/OSPFWanAuthType: the authentication type of OSPF on the LAN/WAN segment ('SP': simple password, 'MD5'). OSPFLanSPKey/OSPFWanSPkey: the password used for authentication if 'OSPFLanAuthType'/'OSPFWanAuthType' is 'SP'. OSPFLanMD5Key/OSPFWanMD5key: the

	password used for authentication if ‘OSPFLanAuthType’/’OSPFWanAuthType’ is ‘MD5’. OSPFRangeRule: whether enable route summarization (‘enable’, ‘disable’). OSPFRangeEntryAreaID/OSPFRangeEntryIPaddr/OSPFRangeEntryNetmas: a route destined to the specified area and matching the specified network address will be summarized.

[RADIUS]
RadiusRetryTimes=3
RadiusReattempPeriod=60
RadiusMACACLState=enable
RadiusUseBuiltinServer=disable
	RADIUS Configuration
	
	RadiusRetryTimes: number of retries before giving up.
	RadiusReattempPeriod: re-attempt period (unit: minute).
	RadiusMACACLState: whether enable MAC address access control (‘enable’, ‘disable’)
	RadiusUseBuiltinServer: whether use the built-in RADIUS server first, if it exists (‘enable’, ‘disable’).

[PrimaryRADIUS]
[SecondaryRADIUS]
RadiusPrimaryState=enable
RadiusPrimaryIP=1.1.1.1
RadiusPrimaryPort=1812
RadiusPrimarySharedSecret=1111
 	
RadiusSecondaryState=enable
RadiusSecondaryIP=2.2.2.2
RadiusSecondaryPort=1812
RadiusSecondarySharedSecret=2222
	External Primary/Secondary RADIUS Server Configuration
	
	RadiusPrimaryState/RadiusSecondaryState: whether use the external primary/secondary RADIUS server (‘enable’, ‘disable’).
	
	If the ‘RadiusPrimaryState’/’RadiusSecondaryState’ is ‘enable’, the following items have to be configured:
	
	RadiusPrimaryIP/RadiusSecondaryIP: the IP address of the external primary/secondary RADIUS server.
	RadiusPrimaryPort/RadiusSecondaryPort: the port number on the external primary/secondary RADIUS server.
	RadiusPrimarySharedSecret/RadiusSecondarySharedSecret: the shared secret used for authentication with the external primary/secondary RADIUS server.

[RadiusServer]
RadiusSvrState=enable
RadiusSvrCAState=disable
RadiusSvrEAPAuthType=md5
 	
RadiusSvrCertPasswd=passphrase
RadiusSvrCert=Bag Attributes localKeyID:…
RadiusSvrCACert= Bag Attributes
	Built-in RADIUS Server Configuration
	
	RadiusSvrState: whether enable the built-in RADIUS server (‘enable’, ‘disable’).
	RadiusSvrCAState: whether enable the built-in Certificate Authority (‘enable’, ‘disable’).
	RadiusSvrEAPAuthType: the authentication method used by the EAP function (‘md5’, ‘tls’).

localKeyID:…	When 'RadiusSvrCAState' is 'disable' and 'RadiusSvrEAPAuthType' is 'tls', the following items should be configured: RadiusSvrCert: the certificate of the built-in RADIUS server. RadiusSvrCertPasswd: the password to use the built-in RADIUS server's certificate. RadiusSvrCACert: the certificate of the CA issuing the built-in RADIUS server's certificate.

[RadiusClient]
RadiusCltName=client1
RadiusCltIP=192.168.1.10
RadiusSecret=password
	RADIUS Client Database Configuration
	There could be multiple entries (max 20 entries), each entry contains the following items:
	RadiusCltName: a mnemonic name for the RADIUS client.
	RadiusCltIP: the IP address of the RADIUS client.
	RadiusSecret: the shared secret to authenticate the RADIUS client.

[RadiusMD5UserEntry]
RadiusMD5UserName=md5user
RadiusMD5Passwd=password
	RADIUS MD5 User Database Configuration
	There could be multiple entries (max 20 entries), each entry contains the following items:
	RadiusMD5UserName/RadiusMD5Passwd: the user name and password for the MD5 user.

[RadiusPAPUserEntry]
RadiusPAPUserName=papuser
RadiusPAPPasswd=password
	RADIUS PAP User Database Configuration
	There could be multiple entries (max 20 entries), each entry contains the following items:
	RadiusPAPUserName/RadiusPAPPasswd: the user name and password for the PAP user.

[CA] CACertificate=-----BEGIN RSA PRIVATE KEY-----…	**Certificate Authority** This section is used by the system to store the certificate of the built-in CA, no matter the built-in CA is enabled or not. Users should not modify the content this section.

[DDNS]
DDNSState=enable
DDNSHostname=myname.mydomain.com
	Dynamic DNS Configuration
	DDNSState: whether the Dynamic DNS function is enabled ('enable', 'disable').

DDNSUserName=name
DDNSPassword=password
	If ‘DDNSState’ is ‘enable’, following items have to be configured:
	DDNSHostname: the domain to use, which should be registered at DynDNS.org.
	DDNSUserName/DDNSPassword: the user name and password at DynDNS.org.

[End]	This is a dummy section that must be put at the end of a text configuration file. There is no key and value in this section, and any line below this section will be ignored.

Specification

Product Name	**802.11 a/g Super A/G Intelligent WLAN Router**
Core Logic, CPU	IDT @ 438 200MHz
Core Logic, WLAN	Atheros 5112 (802.11a/b/g), Atheros 5213
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	• 4 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) • Hardware 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)