



Barricade™ N
Draft 11n Wireless Broadband Router

SMCWBR14S-N3



Draft 11n Wireless Broadband Router User Guide

SMC[®]

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Compliances

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

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.

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

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 and your body. End users must follow the specific operating instructions for satisfying RF exposure compliance.

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

IEEE 802.11b, 802.11g or 802.11n operation of this product in the U.S.A. is firmware-limited to channels 1 through 11.

The availability of some specific channels and/or operational frequency bands are country dependent and are firmware programmed at the factory to match the intended destination. The firmware setting is not accessible by the end user.

EC Conformance Declaration

Marking by the above symbol indicates compliance with the Essential Requirements of the R&TTE Directive of the European Union (1999/5/EC). This equipment meets the following conformance standards:

- EN 60950-1: 2006
Safety of Information Technology Equipment
- EN 50385: 2002
Generic standard to demonstrate the compliance of electronic and electrical apparatus with the basic restrictions related to human exposure to electromagnetic fields (0 Hz - 300 GHz)
- EN 300328 V1.7.1 (2006)
Electromagnetic compatibility and Radio spectrum Matters (ERM); Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using wide band modulation techniques; Harmonized EN covering essential requirements under article 3.2 of the R&TTE Directive
- EN 301 489-1 V1.8.1 (2008-04) and EN 301 489-17 V1.3.2 (2008-4)
Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for 2,4 GHz wideband transmission systems and 5 GHz high performance RLAN equipment

This device is a 2.4 GHz wideband transmission system (transceiver), intended for use in all EU member states and EFTA countries, except in France and Italy where restrictive use applies.

In Italy the end-user should apply for a license at the national spectrum authorities in order to obtain authorization to use the device for setting up outdoor radio links and/or for supplying public access to telecommunications and/or network services.

This device may not be used for setting up outdoor radio links in France and in some areas the RF output power may be limited to 10 mW EIRP in the frequency range of 2454 - 2483.5 MHz. For detailed information the end-user should contact the national spectrum authority in France.

This device is intended for use in the following European Community and EFTA countries:

Czech Česky	SMC tímto prohlašuje, že tento <i>Radio LAN device</i> je ve shodě se základními požadavky a dalšími příslušnými ustanoveními směrnice 1999/5/ES.
Estonian <i>Eesti</i>	Käesolevaga kinnitab SMC seadme Radio LAN device vastavust direktiivi 1999/5/EÜ põhinõuetele ja nimetatud direktiivist tulenevatele teistele asjakohastele sätetele.
English	Hereby, SMC, declares that this Radio LAN device is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

Finnish <i>Suomi</i>	SMC vakuuttaa täten että Radio LAN device tyyppinen laite on direktiivin 1999/5/EY oleellisten vaatimusten ja sitä koskevien direktiivin muiden ehtojen mukainen.
Dutch Nederlands	Hierbij verklaart SMC dat het toestel Radio LAN device in overeenstemming is met de essentiële eisen en de andere relevante bepalingen van richtlijn 1999/5/EG
French Français	Par la présente SMC déclare que l'appareil Radio LAN device est conforme aux exigences essentielles et aux autres dispositions pertinentes de la directive 1999/5/CE
Swedish Svenska	Härmed intygar SMC att denna Radio LAN device står i överensstämmelse med de väsentliga egenskapskrav och övriga relevanta bestämmelser som framgår av direktiv 1999/5/EG.
Danish Dansk	Undertegnede SMC erklærer herved, at følgende udstyr Radio LAN device overholder de væsentlige krav og øvrige relevante krav i direktiv 1999/5/EF
German <i>Deutsch</i>	Hiermit erklährt SMC, dass sich dieser/diese/dieses Radio LAN device in Übereinstimmung mit den grundlegenden Anforderungen und den anderen relevanten Vorschriften der Richtlinie 1999/5/EG befindet". (BMW i)
Greek ελληνικά	Με την παρουσία smc δηλώνει ότι radio LAN device συμμορφώνεται προς τις ουσιαστικές απαιτήσεις και τις λοιπές σχετικές διατάξεις της οδηγίας 1999/5/εκ
Hungarian <i>Magyar</i>	Alulírott, SMC nyilatkozom, hogy a Radio LAN device megfelel a vonatkozó alapvető követelményeknek és az 1999/5/EC irányelv egyéb előírásainak.
Italian <i>Italiano</i>	Con la presente SMC dichiara che questo Radio LAN device è conforme ai requisiti essenziali ed alle altre disposizioni pertinenti stabilite dalla direttiva 1999/5/CE.
Latvian <i>Latviski</i>	Ar šo SMC deklarē, ka <i>Radio LAN device</i> atbilst Direktīvas 1999/5/EK būtiskajām prasībām un citiem ar to saistītajiem noteikumiem.
Lithuanian Lietuvių	Šiuo SMC deklaruoja, kad šis Radio LAN device atitinka esminius reikalavimus ir kitas 1999/5/EB Direktyvos nuostatas.
Maltese <i>Malti</i>	Hawnhekk, SMC, jiddikjara li dan <i>Radio LAN devvice</i> jikkonforma mal-htigijiet essenzjali u ma prowedimenti oħrajn relevanti li hemm fid-Dirrettiva 1999/5/EC.
Spanish <i>Español</i>	Por medio de la presente SMC declara que el Radio LAN device cumple con los requisitos esenciales y cualesquiera otras disposiciones aplicables o exigibles de la Directiva 1999/5/CE

Polish <i>Polski</i>	Niniejszym SMC oświadcza, że <i>Radio LAN device</i> jest zgodny z zasadniczymi wymogami oraz pozostałymi stosownymi postanowieniami Dyrektywy 1999/5/EC.
Portuguese <i>Português</i>	SMC declara que este <i>Radio LAN device</i> está conforme com os requisitos essenciais e outras disposições da Directiva 1999/5/CE.
Slovak <i>Slovensky</i>	SMC týmto vyhlasuje, že <i>Radio LAN device</i> spĺňa základné požiadavky a všetky príslušné ustanovenia Smernice 1999/5/ES.
Slovenian <i>Slovensko</i>	SMC izjavlja, da je ta <i>Radio LAN device</i> v skladu z bistvenimi zahtevami in ostalimi relevantnimi določili direktive 1999/5/ES.

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About This Guide

Purpose

This guide details the hardware features of the wireless AP/Router, including its physical and performance-related characteristics, and how to install the device and use its configuration software.

Audience

This guide is for PC users with a working knowledge of computers. You should be familiar with Windows operating system concepts.

Conventions

The following conventions are used throughout this guide to show information:

Note: Emphasizes important information or calls your attention to related features or instructions.

Caution: Alerts you to a potential hazard that could cause loss of data, or damage the system or equipment.

Warning: Alerts you to a potential hazard that could cause personal injury.

Related Publications

The following publication gives basic information on how to install and use the wireless AP/Router.

Quick Installation Guide

Also, as part of the wireless AP/Router's software, there is online help that describes all configuration related features.

Revision History

This section summarizes the changes in each revision of this guide.

June 2009 Revision

This is the first revision of this guide. This guide is valid for software release v1.0.0.13.

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Glossary

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Chapter 1: Introduction

The SMCWBR14S-N3 wireless AP/Router is an IEEE 802.11n wireless gateway router that connects your Internet access device (cable or ADSL modem) to your PC or local area network, or to its own secure wireless network.

The wireless AP/Router can be automatically configured with other Wi-Fi Protected Setup (WPS) devices by simply pressing its WPS button. For more detailed configuration, the unit can also be set up through its easy-to-use web interface.

Package Checklist

The wireless AP/Router package includes:

- 802.11b/g/n wireless AP/Router (SMCWBR14S-N3)
- RJ-45 Category 5 network cable
- AC power adapter
- Quick Installation Guide
- User Guide CD

Inform your dealer if there are any incorrect, missing or damaged parts. If possible, retain the carton, including the original packing materials. Use them again to repack the product in case there is a need to return it.

Hardware Description

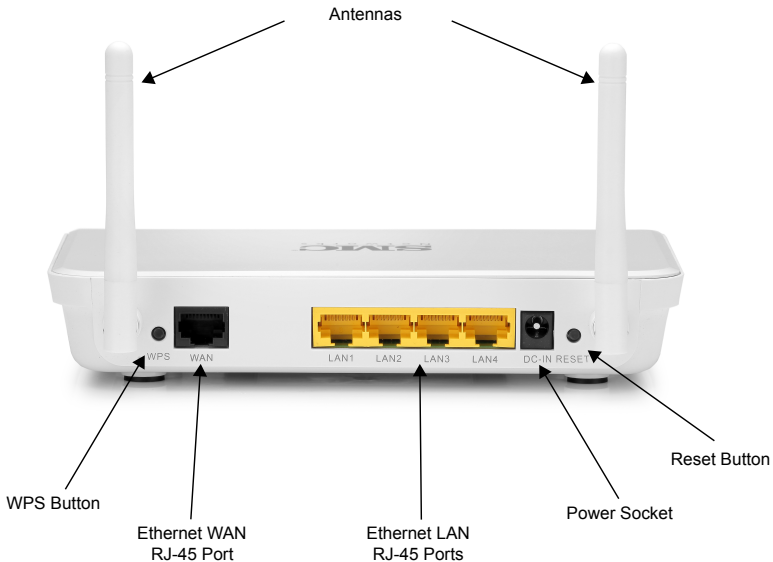


Figure 1-1. Rear Panel

Antennas

The access point includes integrated MIMO antennas for wireless communications. A MIMO antenna system uses two or more identical antennas to receive and transmit signals, helping to increase data throughput and range. The antennas transmit the outgoing signal as a toroidal sphere (doughnut shaped), with the coverage extending most in a direction perpendicular to the antenna. The antenna should be adjusted to an angle that provides the appropriate coverage for the service area.

LED Indicators

The wireless AP/Router includes eight status LED indicators, as described in the following figure and table.

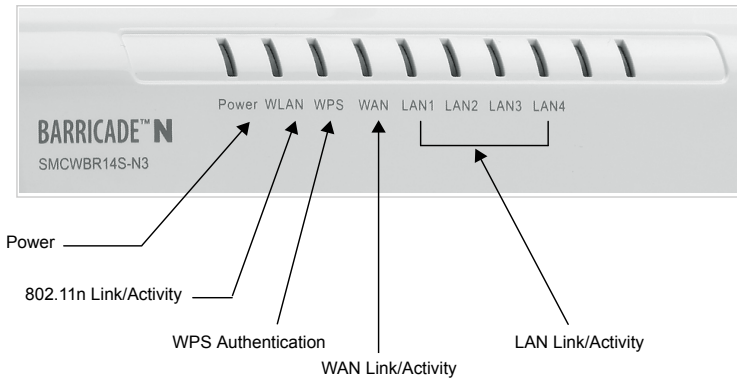


Figure 1-2. LED Indicators

LED	Status	Description
POWER	On Blue	Indicates that the system is working normally.
WAN	On Blue	Indicates a valid link on the WAN Ethernet port. Flashing indicates network activity.
	Blinking Blue	Indicates the data is being transmitting or receiving.
	Off	The Ethernet port has no valid link.
LAN (4 LEDs)	On Blue	Indicates a valid link on the LAN Ethernet port. Flashing indicates network activity.
	Blinking Blue	Indicates the Ethernet port is connected and is transmitting or receiving.
	Off	The Ethernet port has no valid link.
WLAN	On Blue	Indicates the 802.11n radio is enabled. Flashing indicates wireless network activity.
	Blinking Blue	Indicates the AP/Router has an established connection and is transmitting and receiving data.
	Off	Indicates the 802.11n radio is disabled.
WPS	On	Indicates the WPS authentication of a device has been successfully completed.
	Fast Blinking Blue**	Indicates the WPS authentication of a client device is in progress. If the WPS authentication of a device does not complete after 120 seconds, the LED changes to Slow Blinking.
	Slow Blinking Blue*	Indicates the WPS authentication of a device did not complete after 120 seconds. The LED status does not change until the user restarts or disables the WPS connection.
	Off	Indicates that WPS is not in progress.

*Slow blinking is an on-off cycle of once every 2 seconds.

**Fast blinking is an on-off cycle of once of every 0.5 seconds.

Ethernet RJ-45 Ports

The wireless AP/Router has the following RJ-45 ports:

- The four RJ-45 LAN ports are for connections to PCs or to a 10/100 Mbps network switch.
- The RJ-45 WAN port is for connection to a DSL or cable modem, or to a LAN or other device that provides your Internet access.

All RJ-45 ports auto-negotiate the operating speed to 10/100 Mbps, the mode to half/full duplex, and the pin signals to MDI/MDI-X. Automatic MDI/MDI-X support enables you to use straight-through cables for all network connections to PCs, switches, or hubs.

Power Socket

The wireless AP/Router does not have a power switch. It is powered on when connected to the AC power adapter, and the power adapter is connected to a power source. The power adapter automatically adjusts to any voltage between 100-240 volts at 50 or 60 Hz. No voltage range settings are required.

Reset Button

The Reset button can be used to restart the wireless AP/Router or restore the factory default configuration. If you press the button for less than 5 seconds, the wireless AP/Router will restart. If you press and hold down the button for 5 seconds or more, any configuration changes you may have made are removed and the wireless AP/Router is restored to its factory default configuration.

WPS Button

Use the WPS button on the wireless AP/Router to automatically connect devices to the network. Within two minutes, press the physical or virtual button on a single wireless client device to enable it to join the WLAN.

The WPS configuration process may be initiated on any device. Only one client device can connect with the wireless AP/Router after the WPS button is pressed. There is no restriction to the order in which buttons are pressed.

Note: Any WPS-compatible devices could unintentionally join the WLAN if they are within range during the two-minute set up period after the WPS button is pressed. Note that only one device at a time can join the network when using the WPS button.

Hardware Installation

1. **Select a Site** – Choose a proper place for the wireless AP/Router. In general, the best location is at the center of your wireless coverage area, within line of sight of all wireless devices. For optimum performance, consider these points:
 - Mount the wireless AP/Router as high as possible above any obstructions in the coverage area.
 - Avoid mounting next to or near building support columns or other obstructions that may cause reduced signal or null zones in parts of the coverage area.
 - Mount away from any signal absorbing or reflecting structures (such as those containing metal).

Note: When choosing a site for mounting the router on a wall, consider the accessibility for network cabling.

2. **Mount the Wireless AP/Router** – The wireless AP/Router can be mounted on any horizontal surface.

Mounting on a horizontal surface – To keep the access point from sliding on the surface, attach the four rubber feet provided in the accessory kit to the marked circles on the bottom of the access point.

Mounting on a wall or wood surface – The access point should be mounted only to a wall or wood surface that is at least 1/2-inch plywood or its equivalent.

- For wall or wood surface mounting, use a cross-head screwdriver and the 20-mm M4 tap screws (not included). Or, drill two holes and insert two hooks.
- Mount the access point to the screws or hooks.

Note: Mount the router with the front panel facing upward so that the status LED indicators are clearly visible.

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Introduction

Chapter 2: Installation

The wireless AP/Router has two basic operating modes that can be set through the web-based management interface. For information on setting the mode suitable for your network environment, see “Operation Mode configuration” on page 5-4.

- **Gateway Mode** — Normal gateway mode that connects a wired LAN and wireless clients to an Internet access device, such as a cable or DSL modem. This is the factory set default mode.
- **Bridge Mode** — An access point mode that extends a wired LAN to wireless clients.

In addition to these basic operating modes, each wireless interface supports a Wireless Distribution System (WDS) link to another wireless AP/Router. These advanced configurations are not described in this section. See “Network Planning” on page 3-1 for more information.

In a basic configuration, how the wireless AP/Router is connected depends on the operating mode. The following sections describe connections for basic Gateway Mode and Bridge Mode operation.

Gateway Mode

In its default Gateway Mode, the wireless AP/Router forwards traffic between an Internet connected cable or ADSL modem, and wired or wireless PCs or notebooks. The basic connections are illustrated in the figure below.

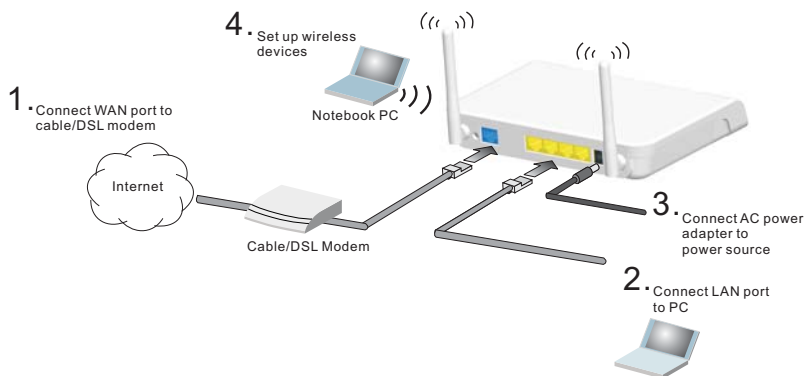


Figure 2-1. Gateway Mode Connection

To connect the wireless AP/Router in Gateway Mode for use as an Internet gateway, follow these steps:

1. Connect an Ethernet cable from the wireless AP/Router's WAN port to your Internet connected cable or ADSL modem.
2. Connect an Ethernet cable from the wireless AP/Router's LAN port to your PC. Alternatively, you can connect to a workgroup switch to support multiple users. The wireless AP/Router can support up to 253 wired and wireless users.
3. Power on the wireless AP/Router by connecting the AC power adapter and plugging it into a power source.

Caution: Use ONLY the power adapter supplied with the wireless AP/Router. Otherwise, the product may be damaged.

When you power on the wireless AP/Router, verify that the Power LED turns on and that the other LED indicators start functioning as described under "LED Indicators" on page 1-3.

4. Set up wireless devices by pressing the WPS button on the wireless AP/Router or by using the web interface. See "Initial Configuration" on page 4-1 for more information on accessing the web interface.

Bridge Mode

In Bridge Mode, the wireless AP/Router operates as a wireless access point, extending a local wired network to associated wireless clients (PCs or notebooks with wireless capability). From any nearby location, you can then make a wireless connection to the wireless AP/Router and access the wired network resources, including local servers and the Internet.

In Bridge Mode, the wireless AP/Router does not support gateway functions on its WAN port. Both the LAN port and the WAN ports can be connected to a local Ethernet LAN.

Note: Bridge Mode is not the factory default mode and must be manually set using the web management interface.

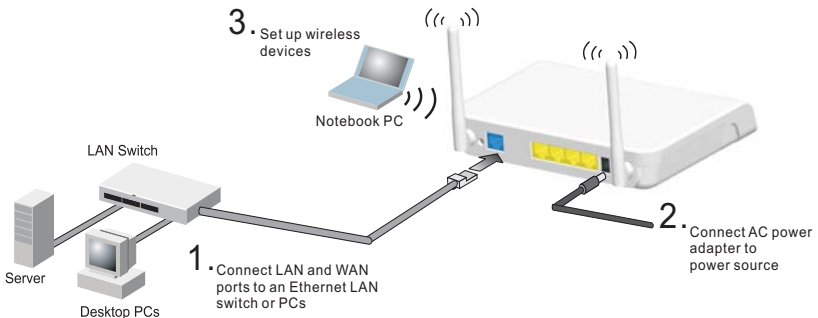


Figure 2-2. Bridge Mode Connection

To connect the wireless AP/Router for use as an access point, follow these steps:

1. Using Ethernet cables, connect the wireless AP/Router's LAN and WAN ports to PCs or a LAN switch.
2. Power on the wireless AP/Router by connecting the AC power adapter and plugging it into a power source.

Caution: Use ONLY the power adapter supplied with the wireless AP/Router. Otherwise, the product may be damaged.

When you power on the wireless AP/Router, verify that the Power LED turns on and that the other LED indicators start functioning as described under "LED Indicators" on page 1-3.

3. Set up wireless devices by pressing the WPS button on the wireless AP/Router or by using the web interface. See "Initial Configuration" on page 4-1 for more information on accessing the web interface.

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Installation

Chapter 3: Network Planning

The wireless AP/Router is designed to be very flexible in its deployment options. It can be used as an Internet gateway for a small network, or as an access point to extend an existing wired network to support wireless users. It also supports use as a wireless bridge to connect two wired LANs.

This chapter explains some of the basic features of the wireless AP/Router and shows some network topology examples in which the device is implemented.

Internet Gateway Router

The wireless AP/Router can connect directly to a cable or DSL modem to provide an Internet connection for multiple users through a single service provider account. Users connect to the wireless AP/Router either through a wired connection to a LAN port, or through the device's own wireless network. The wireless AP/Router functions as an Internet gateway when set to Gateway Mode.

An Internet gateway employs several functions that essentially create two separate Internet Protocol (IP) subnetworks; a private internal network with wired and wireless users, and a public external network that connects to the Internet. Network traffic is forwarded, or routed, between the two subnetworks.

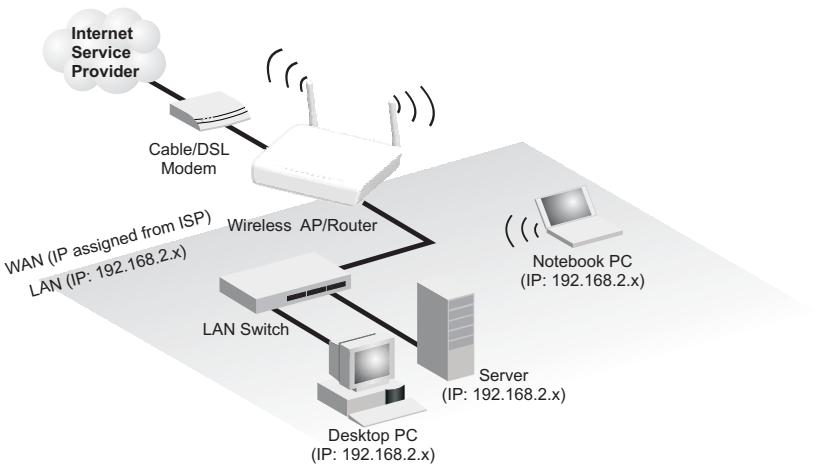


Figure 3-1. Operating as an Internet Gateway Router

The private local network, connected to the LAN port or wireless interface, provides a Dynamic Host Configuration Protocol (DHCP) server for allocating IP addresses to local PCs and wireless clients, and Network Address Translation (NAT) for mapping the multiple "internal" IP addresses to one "external" IP address.

The public external network, connected to the WAN port, supports DHCP client, Point-to-Point Protocol over Ethernet (PPPoE) and static IP for connection to an Internet service provider (ISP) through a cable or DSL modem.

LAN Access Point

The wireless AP/Router can provide an access point service for an existing wired LAN, creating a wireless extension to the local network. The wireless AP/Router functions as purely an access point when set to Bridge Mode. When used in this mode, there are no gateway functions between the WAN port and the LAN and wireless interface.

A Wi-Fi wireless network is defined by its Service Set Identifier (SSID) or network name. Wireless clients that want to connect to a network must set their SSID to the same SSID of the network service. The wireless AP/Router supports two separate wireless interfaces, that is two SSIDs or Virtual Access Points (VAPs). The two VAP interfaces can be configured separately to support different security settings or other wireless functions.

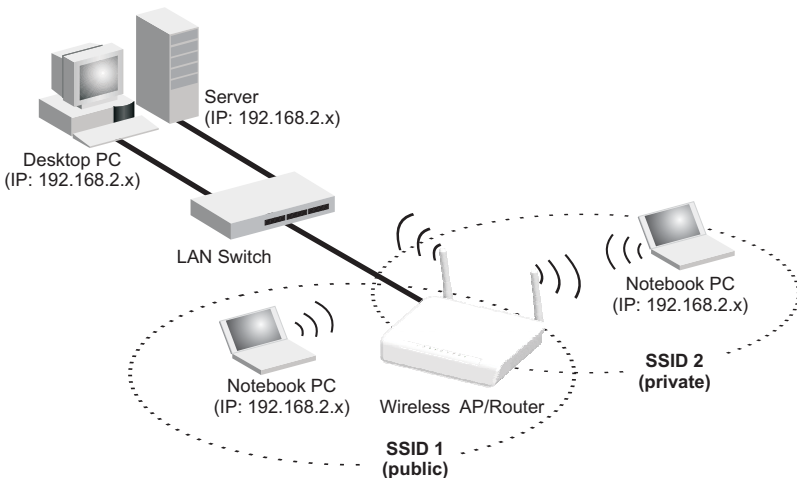


Figure 3-2. Operating as an Access Point

Wireless Bridge

The IEEE 802.11 standard defines a Wireless Distribution System (WDS) for bridge connections between access points. The wireless AP/Router can use WDS to forward traffic on links between units.

A single WDS bridge link can be specified for the WLAN1 interface. One end of a link must be configured as the “WDS Parent” and the other as the “WDS Child.”

Note: The network domain of WDS child has to be the same as WDS parent.

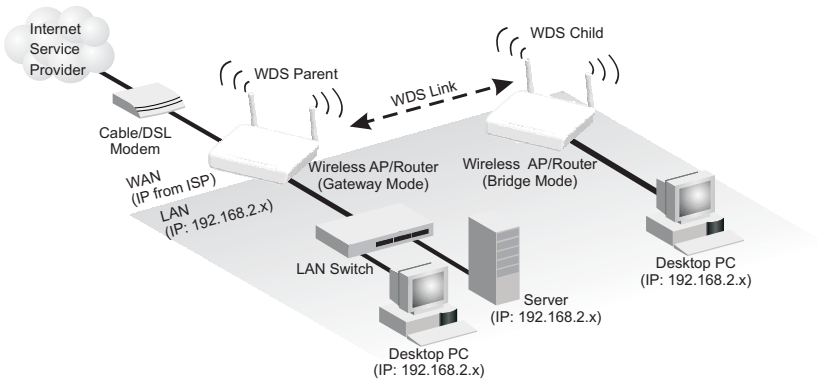


Figure 3-3. Operating as a Wireless Bridge

3

Network Planning

Chapter 4: Initial Configuration

The wireless AP/Router offers a user-friendly web-based management interface for the configuration of all the unit's features. Any PC directly attached to the unit can access the management interface using a web browser, such as Internet Explorer (version 6.0 or above).

This chapter describes the wireless AP/Router's configurable features, all of which may be accessed through the web interface.

It is recommended to make initial configuration changes by connecting a PC directly to one of the wireless AP/Router's LAN ports. The wireless AP/Router has a default IP address of 192.168.2.1 and a subnet mask of 255.255.255.0. If your PC is set to "Obtain an IP address automatically" (that is, set as a DHCP client), you can connect immediately to the web interface. Otherwise, you must set your PC IP address to be on the same subnet as the wireless AP/Router (that is, the PC and wireless AP/Router addresses must both start 192.168.2.x).

To access the configuration menu, follow these steps:

1. Use your web browser to connect to the management interface using the default IP address of 192.168.2.1.
2. Log into the wireless AP/Router management interface by entering the default username "admin" and password "smcadmin", then click OK.

Note: It is strongly recommended to change the default user name and password the first time you access the web interface. For information on changing user names and passwords, See "Administrator Settings" on page 5-47.

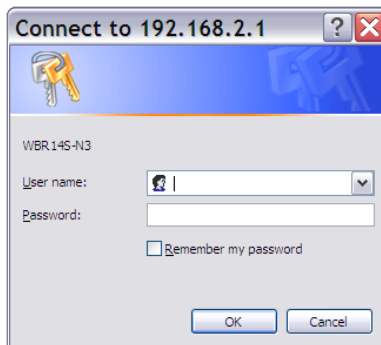


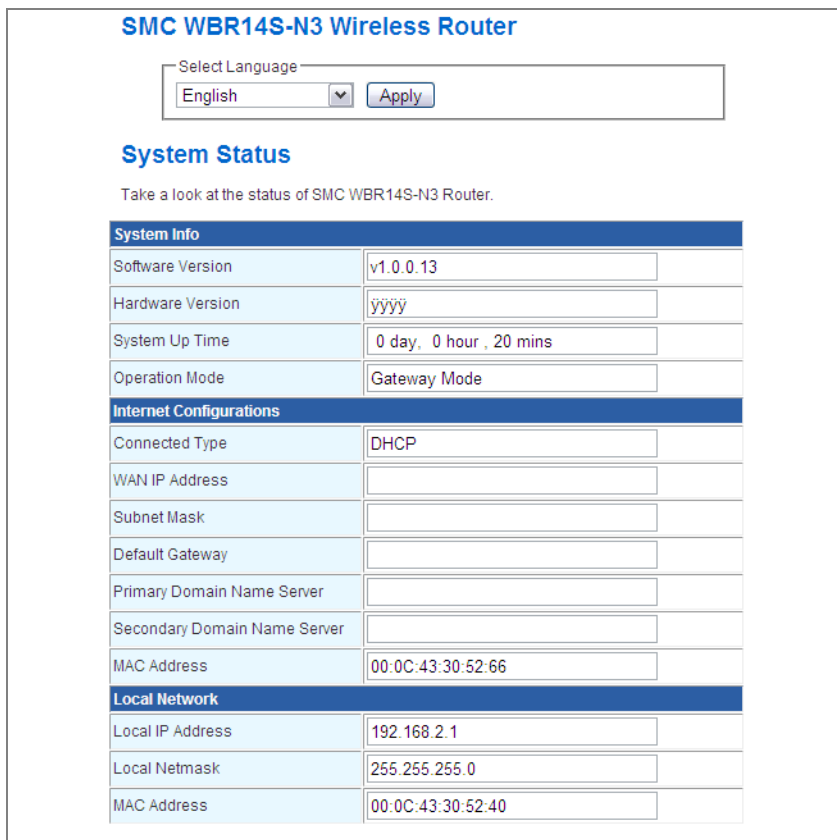
Figure 4-1. Login Page

Using the Setup Wizard

There are only a few basic steps you need to set up the wireless AP/Router and provide a connection for network access for other wireless stations.

The Setup Wizard takes you through configuration procedures for the general network settings. Follow these steps:

1. **Launch the Setup Wizard** – Click “Setting Wizard” on the left side of the screen to enter the setup wizard page. Click Next to begin the setup.



SMC WBR14S-N3 Wireless Router

Select Language
English

System Status

Take a look at the status of SMC WBR14S-N3 Router.

System Info	
Software Version	v1.0.0.13
Hardware Version	yyyy
System Up Time	0 day, 0 hour, 20 mins
Operation Mode	Gateway Mode
Internet Configurations	
Connected Type	DHCP
WAN IP Address	
Subnet Mask	
Default Gateway	
Primary Domain Name Server	
Secondary Domain Name Server	
MAC Address	00:0C:43:30:52:66
Local Network	
Local IP Address	192.168.2.1
Local Netmask	255.255.255.0
MAC Address	00:0C:43:30:52:40

Figure 4-2. Home Page

- 2. Operation Mode Configuration** – Select the operation mode required for the network environment.

The screenshot shows the 'Operation Mode Configuration' screen. At the top, the title 'Operation Mode Configuration' is displayed in blue. Below the title, a subtitle reads 'You may configure the operation mode suitable for your environment.' A horizontal line separates the subtitle from the options. There are two radio button options: 'Bridge:' with the text 'All ethernet and wireless interfaces are bridged into a single bridge interface.' and 'Gateway:' with the text 'The first ethernet port is treated as WAN port. The other ethernet ports and the wireless interface are bridged together and are treated as LAN ports.' The 'Gateway:' option is selected. Below the options, there is a 'NAT Enabled' label followed by a dropdown menu showing 'Enable'. At the bottom, there are two buttons: 'Next' and 'Cancel'.

Figure 4-3. Setup Wizard - Operation Mode

- 3. NTP Setting** – Select a time zone according to where the device is operated. Click Next after completing the setup.

The screenshot shows the 'NTP Setting' screen. At the top, the title 'NTP Setting' is displayed in blue. Below the title, a subtitle reads 'You may configure NTP Setting here.' A horizontal line separates the subtitle from the settings. There is a blue header bar labeled 'NTP Settings'. Below the header, there is a 'Time Zone:' label followed by a dropdown menu showing '(GMT-11:00) Midway Island, Samoa'. At the bottom, there are two buttons: 'Next' and 'Cancel'.

Figure 4-4. Setup Wizard - NTP Setting

- 4. **WAN Configuration** – Specifies the Internet connection parameters for the wireless AP/Router is WAN port. Click Next after completing the setup.

WAN Connection Type — By default, the access point WAN port is configured with DHCP enabled. After you have network access to the access point, you can use the web browser interface to modify the initial IP configuration, if needed. The options are Static IP, DHCP, PPPoE (ADSL), L2TP and PPTP. Each option changes the parameters displayed below it. (Default: DHCP)

DHCP

Enables Dynamic Host Configuration Protocol (DHCP) for the WAN port. This setting allows the wireless AP/Router to automatically obtain an IP address from a DHCP server normally operated by the Internet Service Provider (ISP).

Wide Area Network (WAN) Settings

You may choose different connection type suitable for your environment. Besides, you may also configure parameters according to the selected connection type.

WAN Connection Type:

DHCP Mode

Hostname (optional)

MAC Clone

MAC Clone Mode

Figure 4-5. Setup Wizard - WAN DHCP

- **Hostname** – The hostname of the DHCP client.
- **MAC Clone Mode** – Some ISPs limit Internet connections to a specified MAC address of one PC. This setting allows you to manually change the MAC address of the wireless AP/Router's WAN interface to match the PC's MAC address provided to your ISP for registration. You can enter the registered MAC address manually by typing it in the boxes provided. Otherwise, connect only the PC with the registered MAC address to the wireless AP/Router, then click the "Fill My MAC" (Default: Disable)

Note: If you are unsure of the PC MAC address originally registered by your ISP, call your ISP and request to register a new MAC address for your account. Register the default MAC address of the wireless AP/Router.

Static IP

Configures a static IP for the WAN port.

Wide Area Network (WAN) Settings

You may choose different connection type suitable for your environment. Besides, you may also configure parameters according to the selected connection type.

WAN Connection Type: ▼

Static Mode	
IP Address	<input type="text"/>
Subnet Mask	<input type="text"/>
Default Gateway	<input type="text"/>
Primary DNS Server	<input type="text"/>
Secondary DNS Server	<input type="text"/>
MAC Clone	
MAC Clone Mode	<input type="text" value="Enable"/> ▼
MAC Address	<input type="text"/> <input type="button" value="Fill My MAC"/>

Figure 4-6. Setup Wizard - WAN Static IP

- **IP Address** – The IP address of the wireless AP/Router. Valid IP addresses consist of four decimal numbers, 0 to 255, separated by periods.
- **Subnet Mask** – The mask that identifies the host address bits used for routing to specific subnets.
- **Default Gateway** – The IP address of the gateway router for the wireless AP/Router, which is used if the requested destination address is not on the local subnet.
- **Primary DNS Server** – The IP address of the Primary Domain Name Server on the network. A DNS maps numerical IP addresses to domain names and can be used to identify network hosts by familiar names instead of the IP addresses. If you have one or more DNS servers located on the local network, type the IP addresses in the text fields provided. Otherwise, leave the addresses as all zeros (0.0.0.0).
- **Secondary DNS Server** – The IP address of the Secondary Domain Name Server on the network.

4 Initial Configuration

- **MAC Clone Mode** – Some ISPs limit Internet connections to a specified MAC address of one PC. This setting allows you to manually change the MAC address of the wireless AP/Router's WAN interface to match the PC's MAC address provided to your ISP for registration. You can enter the registered MAC address manually by typing it in the boxes provided. Otherwise, connect only the PC with the registered MAC address to the wireless AP/Router, then click the "Fill My MAC" (Default: Disable)

PPPoE

Enable the wireless AP/Router IP address to be assigned automatically from an Internet service provider (ISP) through an ADSL modem using Point-to-Point Protocol over Ethernet (PPPoE).

Wide Area Network (WAN) Settings

You may choose different connection type suitable for your environment. Besides, you may also configure parameters according to the selected connection type.

WAN Connection Type:

PPPoE Mode

User Name:

Password:

Verify Password:

MAC Clone

MAC Clone Mode:

MAC Address:

Figure 4-7. Setup Wizard - WAN PPPoE

- **PPPoE Username** – Sets the PPPoE user name for the WAN port. (Default: pppoe_user; Range: 1~32 characters)
- **PPPoE Password** – Sets a PPPoE password for the WAN port. (Default: pppoe_password; Range: 1~32 characters)
- **Verify Password** – Prompts you to re-enter your chosen password.
- **MAC Clone Mode** – Some ISPs limit Internet connections to a specified MAC address of one PC. This setting allows you to manually change the MAC address of the wireless AP/Router's WAN interface to match the PC's MAC address provided to your ISP for registration. You can enter the registered MAC address manually by typing it in the boxes provided. Otherwise, connect only the PC with the registered MAC address to the wireless AP/Router, then click the "Fill My MAC" (Default: Disable)

L2TP

Enables the Layer Two Tunneling Protocol (L2TP) for implementing virtual private networks. The service is provided in many European countries.

Wide Area Network (WAN) Settings

You may choose different connection type suitable for your environment. Besides, you may also configure parameters according to the selected connection type.

WAN Connection Type: ▼

L2TP Mode	
Server IP	<input type="text" value="l2tp_server"/>
User Name	<input type="text" value="l2tp_user"/>
Password	<input type="password" value="••••••••"/>
Verify Password	<input type="password" value="••••••••"/>
Address Mode	<input type="text" value="Static"/> ▼
IP Address	<input type="text" value="192.168.1.1"/>
Subnet Mask	<input type="text" value="255.255.255.0"/>
Default Gateway	<input type="text" value="192.168.1.254"/>
MAC Clone	
MAC Clone Mode	<input type="text" value="Enable"/> ▼
MAC Address	<input type="text"/> <input type="button" value="Fill My MAC"/>

Figure 4-8. Setup Wizard - WAN L2TP

- **Server IP** – Sets the L2TP server IP Address. (Default: l2tp_server; Range: 1~32 characters)
- **Username** – Sets the L2TP user name for the WAN port. (Default: l2tp_user; Range: 1~32 characters)
- **Password** – Sets a L2TP password for the WAN port. (Default: l2tp_password; Range: 1~32 characters)
- **Verify Password** – Prompts you to re-enter your chosen password.
- **Address Mode** – Sets a L2TP network mode. (Default: Static)
- **IP Address** – Sets the static IP address. (Default: 0.0.0.0, available when L2TP Network Mode is set to static IP.)
- **Subnet Mask** – Sets the static IP subnet mask. (Default: 255.255.255.0, available when L2TP Network Mode is set to static IP.)

4 Initial Configuration

- **Default Gateway** – The IP address of the gateway router for the wireless AP/Router, which is used if the requested destination address is not on the local subnet.
- **MAC Clone Mode** – Some ISPs limit Internet connections to a specified MAC address of one PC. This setting allows you to manually change the MAC address of the wireless AP/Router's WAN interface to match the PC's MAC address provided to your ISP for registration. You can enter the registered MAC address manually by typing it in the boxes provided. Otherwise, connect only the PC with the registered MAC address to the wireless AP/Router, then click the "Fill My MAC" (Default: Disable)

PPTP

Enables the Point-to-Point Tunneling Protocol (PPTP) for implementing virtual private networks. The service is provided in many European countries.

Wide Area Network (WAN) Settings

You may choose different connection type suitable for your environment. Besides, you may also configure parameters according to the selected connection type.

WAN Connection Type:

PPTP Mode	
Server IP	<input type="text" value="pptp_server"/>
User Name	<input type="text" value="pptp_user"/>
Password	<input type="password" value="••••••••"/>
Verify Password	<input type="password" value="••••••••"/>
Address Mode	<input type="text" value="Static"/>
IP Address	<input type="text" value="192.168.1.1"/>
Subnet Mask	<input type="text" value="255.255.255.0"/>
Default Gateway	<input type="text" value="192.168.1.254"/>
MAC Clone	
MAC Clone Mode	<input type="text" value="Enable"/>
MAC Address	<input type="text"/> <input type="button" value="Fill My MAC"/>

Figure 4-9. Setup Wizard - WAN PPTP

- **Server IP** – Sets the PPTP server IP Address. (Default: pptp_server)
 - **Username** – Sets the PPTP user name for the WAN port. (Default: pptp_user; Range: 1~32 characters)
 - **Password** – Sets a PPTP password for the WAN port. (Default: pptp_password; Range: 1~32 characters)
 - **Verify Password** – Prompts you to re-enter your chosen password.
 - **Address Mode** – Sets a PPTP network mode. (Default: Static)
 - **IP Address** – Sets the static IP address. (Default: 0.0.0.0, available when PPTP Network Mode is set to static IP.)
 - **Subnet Mask** – Sets the static IP subnet mask. (Default: 255.255.255.0, available when PPTP Network Mode is set to static IP.)
 - **Default Gateway** – The IP address of the gateway router for the wireless AP/Router, which is used if the requested destination address is not on the local subnet.
 - **MAC Clone Mode** – Some ISPs limit Internet connections to a specified MAC address of one PC. This setting allows you to manually change the MAC address of the wireless AP/Router's WAN interface to match the PC's MAC address provided to your ISP for registration. You can enter the registered MAC address manually by typing it in the boxes provided. Otherwise, connect only the PC with the registered MAC address to the wireless AP/Router, then click the "Fill My MAC" (Default: Disable)
5. **Basic Wireless Settings** – Configures the SSID and sets for the wireless security policy. Click Apply after completing the setup.

Basic Wireless Settings

You could configure the minimum number of Wireless settings for communication, such as Network Name (SSID) and Security. The Access Point can be set simply with only the minimum setting items.

Network Name(SSID)	
Network Name(SSID)	WBR14S_N3_AP

Security Policy --	
Security Mode	Disable ▼

Figure 4-10. Setup Wizard - Basic Wireless Settings

4

Initial Configuration

- **Network Name (SSID)** – The name of the wireless network service provided by the VAP. Clients that want to connect to the network must set their SSID to the same as that of the VAP interface. (Default: "WBR14S_N3_AP"; Range: 1-32 characters)
- **Security Policy** – Configures the security mode used by clients. See "WLAN Security" on page 5-30.

Chapter 5: System Configuration

The wireless AP/Router offers a user-friendly web-based management interface for the configuration of all the unit's features. Any PC directly attached to the unit can access the management interface using a web browser, such as Internet Explorer (version 6.0 or above).

This chapter describes the wireless AP/Router's configurable features, all of which may be accessed through the web interface.

It is recommended to make initial configuration changes by connecting a PC directly to one of the wireless AP/Router's LAN ports. The wireless AP/Router has a default IP address of 192.168.2.1 and a subnet mask of 255.255.255.0. If your PC is set to "Obtain an IP address automatically" (that is, set as a DHCP client), you can connect immediately to the web interface. Otherwise, you must set your PC IP address to be on the same subnet as the wireless AP/Router (that is, the PC and wireless AP/Router addresses must both start 192.168.2.x).

To access the configuration menu, follow these steps:

1. Use your web browser to connect to the management interface using the default IP address of 192.168.2.1.
2. Log into the wireless AP/Router management interface by entering the default username "admin" and password "smcadmin," then click Login.

Note: It is strongly recommended to change the default user name and password the first time you access the web interface. For information on changing user names and passwords, See "Administrator Settings" on page 5-47

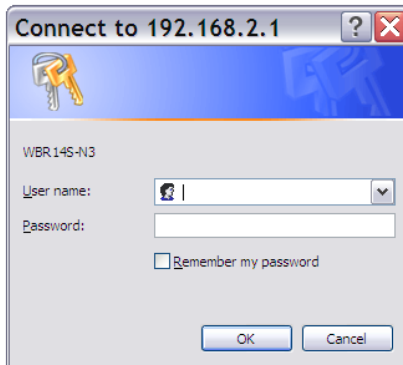


Figure 5-1. Login Page

The System Information page displays the System, Internet Configuration, and Local Network Settings.

SMC WBR14S-N3 Wireless Router

Select Language
English Apply

System Status

Take a look at the status of SMC WBR14S-N3 Router.

System Info	
Software Version	v1.0.0.13
Hardware Version	yyyy
System Up Time	0 day, 0 hour, 20 mins
Operation Mode	Gateway Mode
Internet Configurations	
Connected Type	DHCP
WAN IP Address	
Subnet Mask	
Default Gateway	
Primary Domain Name Server	
Secondary Domain Name Server	
MAC Address	00:0C:43:30:52:66
Local Network	
Local IP Address	192.168.2.1
Local Netmask	255.255.255.0
MAC Address	00:0C:43:30:52:40

Figure 5-2. System Information (Gateway Mode)

The information in this chapter is organized to reflect the structure of the web management screens for easy reference.

The Configuration pages include the options in the table below. For details on configuration for each feature, see the corresponding page number.

Note: The displayed pages and settings may differ depending on whether the unit is in Gateway or Bridge Mode.

Table 5-1. Advanced Settings			
Menu	Description	Mode	Page
<i>Operation Mode</i>			5-4
Operation Mode	Sets the operating modes	Both	5-4
<i>Internet Settings</i>			5-5
WAN	Configures settings for the wide area network	Gateway	5-5
LAN	Sets the unit's IP address and enables DNS	Gateway	5-13
Advanced Routing	Configures Static and Dynamic Routing settings	Gateway	5-15
QoS	Configures Quality of Service (QoS) for wireless traffic	Gateway	5-17
ALG	Enables the Application Layer Gateway (ALG) functions	Gateway	5-18
<i>Wireless Settings</i>			5-19
Basic Setting	Configures wireless transmission method, frequency and SSID	Both	5-20
Advanced Setting	Configures advanced wireless transmission values	Both	5-25
Security	Configures radio security parameters for the VAP interface	Both	5-30
WPS	Configures WPS settings	Both	5-37
Station List	Displays the station list	Both	5-39
<i>Firewall</i>			5-40
MAC/IP/Port Filtering	Configures MAC/IP/Port filtering settings	Gateway	5-40
Virtual Server	Configures Virtual Server (Port Forwarding) settings	Gateway	5-42
DMZ	Configures the De-Militarized Zone settings	Gateway	5-43
System Security	Enables intrusion detection	Gateway	5-44
Content Filtering	Configures content filtering settings	Gateway	5-45
<i>Administration</i>			5-46
System Management	Configures administrator account, password, Date/Time, Dynamic DNS Settings and Green AP settings.	Both	5-46
Upgrade Firmware	Upgrades system software from a local file and enables provisioning updates	Both	5-49
Configuration	Backups and restores the configuration data and restores the factory defaults	Both	5-50
System Status	Displays the current system status	Both	5-50
Statistics	Displays packet statistics	Both	5-52
DHCP Clients	Displays the DHCP clients table	Both	5-53
System Log	Displays the system message log	Both	5-54
Reboot	Reboots the wireless AP/Router	Both	5-54

Operation Mode configuration

The Operation Mode Configuration pages allow you to setup the mode suitable for your network environment.

Operation Mode Configuration

You may configure the operation mode suitable for your environment.

Bridge:
All ethernet and wireless interfaces are bridged into a single bridge interface.

Gateway:
The first ethernet port is treated as WAN port. The other ethernet ports and the wireless interface are bridged together and are treated as LAN ports.

NAT Enabled

Figure 5-3. System Information (Gateway Mode)

- **Bridge Mode** – An access point mode that extends a wired LAN to wireless clients.
- **Gateway Mode** – Normal gateway mode that connects a wired LAN and wireless clients to an Internet access device, such as a cable or DSL modem. This is the factory set default mode.
- **NAT** – Enable NAT settings.

Internet Settings

The Internet Settings pages allow you to manage basic system configuration settings.

Note: In Bridge mode, the wireless AP/Router's Internet Settings options are significantly reduced.

WAN Setting

Specifies the Internet connection parameters. Click on "Internet Settings" followed by "WAN".

WAN Connection Type — By default, the access point WAN port is configured with DHCP enabled. After you have network access to the access point, you can use the web browser interface to modify the initial IP configuration, if needed. The options are Static IP, DHCP, PPPoE (ADSL), L2TP, and PPTP. Each option changes the parameters displayed below it. (Default: DHCP)

DHCP

Enables Dynamic Host Configuration Protocol (DHCP) for the WAN port. This setting allows the wireless AP/Router to automatically obtain an IP address from a DHCP server normally operated by the Internet Service Provider (ISP).

Wide Area Network (WAN) Settings

You may choose different connection type suitable for your environment. Besides, you may also configure parameters according to the selected connection type.

WAN Connection Type:

DHCP Mode

Hostname (optional)

MAC Clone

MAC Clone Mode:

MAC Address:

Figure 5-4. Setup Wizard - WAN DHCP

- **Hostname (Optional)** – The hostname of the DHCP client.
- **MAC Clone Mode** – Some ISPs limit Internet connections to a specified MAC address of one PC. This setting allows you to manually change the MAC address of the wireless AP/Router's WAN interface to match the PC's MAC address provided to your ISP for registration. You can enter the registered MAC address manually by typing it in the boxes provided. Otherwise, connect only the PC with the registered MAC address to the wireless AP/Router, then click the "Fill My MAC" (Default: Disable)

Note: If you are unsure of the PC MAC address originally registered by your ISP, call your ISP and request to register a new MAC address for your account. Register the default MAC address of the wireless AP/Router.

Static IP

Configures a static IP for the WAN port.

Wide Area Network (WAN) Settings

You may choose different connection type suitable for your environment. Besides, you may also configure parameters according to the selected connection type.

WAN Connection Type:	STATIC (Fixed IP) ▼
Static Mode	
IP Address	<input type="text"/>
Subnet Mask	<input type="text"/>
Default Gateway	<input type="text"/>
Primary DNS Server	<input type="text"/>
Secondary DNS Server	<input type="text"/>
MAC Clone	
MAC Clone Mode	Enable ▼
MAC Address	<input type="text"/> <input type="button" value="Fill My MAC"/>

Figure 5-5. Setup Wizard - WAN Static IP

- **IP Address** – The IP address of the wireless AP/Router. Valid IP addresses consist of four decimal numbers, 0 to 255, separated by periods.
- **Subnet Mask** – The mask that identifies the host address bits used for routing to specific subnets.

- **Default Gateway** – The IP address of the gateway router for the wireless AP/Router, which is used if the requested destination address is not on the local subnet.
- **Primary DNS Server** – The IP address of the Primary Domain Name Server on the network. A DNS maps numerical IP addresses to domain names and can be used to identify network hosts by familiar names instead of the IP addresses. If you have one or more DNS servers located on the local network, type the IP addresses in the text fields provided. Otherwise, leave the addresses as all zeros (0.0.0.0).
- **Secondary DNS Server** – The IP address of the Secondary Domain Name Server on the network.
- **MAC Clone Mode** – Some ISPs limit Internet connections to a specified MAC address of one PC. This setting allows you to manually change the MAC address of the wireless AP/Router's WAN interface to match the PC's MAC address provided to your ISP for registration. You can enter the registered MAC address manually by typing it in the boxes provided. Otherwise, connect only the PC with the registered MAC address to the wireless AP/Router, then click the "Fill My MAC" (Default: Disable)

PPPoE

Enable the wireless AP/Router IP address to be assigned automatically from an Internet service provider (ISP) through an ADSL modem using Point-to-Point Protocol over Ethernet (PPPoE).

Wide Area Network (WAN) Settings

You may choose different connection type suitable for your environment. Besides, you may also configure parameters according to the selected connection type.

WAN Connection Type:	PPPoE (ADSL) ▼	
PPPoE Mode		
User Name	<input type="text" value="pppoe_user"/>	
Password	<input type="password" value="....."/>	
Verify Password	<input type="password" value="....."/>	
Operation Mode	Keep Alive ▼	
	Keep Alive Mode: Redial Period	<input type="text" value="60"/> seconds
	On demand Mode: Idle Time	<input type="text" value="5"/> minutes
MAC Clone		
MAC Clone Mode	Enable ▼	
MAC Address	<input type="text"/>	<input type="button" value="Fill My MAC"/>

Figure 5-6. Setup Wizard - WAN PPPoE

- **PPPoE Username** – Sets the PPPoE user name for the WAN port. (Default: pppoe_user; Range: 1~32 characters)
- **PPPoE Password** – Sets a PPPoE password for the WAN port. (Default: pppoe_password; Range: 1~32 characters)
- **Verify Password** – Prompts you to re-enter your chosen password.
- **Operation Mode** – Selects the operation mode as Keep Alive, On Demand or Manual. (Default: Keep Alive)
 - **Keep Alive Mode**: The wireless AP/Router will periodically check your Internet connection and automatically re-establish your connection when disconnected. (Default: 60 seconds)
 - **On Demand Mode**: The maximum length of inactive time the unit will stay connected to the DSL service provider before disconnecting. This feature only works when Connect Type is set to “Auto-Connect.” (Default: 5 minutes)
- **MAC Clone Mode** – Some ISPs limit Internet connections to a specified MAC address of one PC. This setting allows you to manually change the MAC address of the wireless AP/Router's WAN interface to match the PC's MAC address provided to your ISP for registration. You can enter the registered MAC address manually by typing it in the boxes provided. Otherwise, connect only the PC with the registered MAC address to the wireless AP/Router, then click the “Fill My MAC” (Default: Disable)

L2TP

Enables the Layer Two Tunneling Protocol (L2TP) for implementing virtual private networks. The service is provided in many European countries.

Wide Area Network (WAN) Settings

You may choose different connection type suitable for your environment. Besides, you may also configure parameters according to the selected connection type.

WAN Connection Type:	L2TP ▼
L2TP Mode	
Server IP	<input style="width: 80%;" type="text" value="l2tp_server"/>
User Name	<input style="width: 80%;" type="text" value="l2tp_user"/>
Password	<input style="width: 80%;" type="password" value="••••••••"/>
Address Mode	Static ▼
IP Address	<input style="width: 80%;" type="text" value="192.168.1.1"/>
Subnet Mask	<input style="width: 80%;" type="text" value="255.255.255.0"/>
Default Gateway	<input style="width: 80%;" type="text" value="192.168.1.254"/>
Operation Mode	Keep Alive ▼
	Keep Alive Mode: Redial Period <input style="width: 30px;" type="text" value="60"/> seconds
	On demand Mode: Idle Time <input style="width: 30px;" type="text" value="5"/> minutes
MAC Clone	
MAC Clone Mode	Enable ▼
MAC Address	<input style="width: 80%;" type="text"/> <input style="width: 100px;" type="button" value="Fill My MAC"/>

Figure 5-7. Setup Wizard - WAN L2TP

- **Server IP** – Sets the L2TP server IP Address. (Default: l2tp_server; Range: 1~32 characters)
- **Username** – Sets the L2TP user name for the WAN port. (Default: l2tp_user; Range: 1~32 characters)
- **Password** – Sets a L2TP password for the WAN port. (Default: l2tp_password; Range: 1~32 characters)
- **Verify Password** – Prompts you to re-enter your chosen password.
- **Address Mode** – Sets a L2TP network mode. (Default: Static)
- **IP Address** – Sets the static IP address. (Default: 0.0.0.0, available when L2TP Network Mode is set to static IP.)

- **Subnet Mask** – Sets the static IP subnet mask. (Default: 255.255.255.0, available when L2TP Network Mode is set to static IP.)
- **Default Gateway** – The IP address of the gateway router for the wireless AP/Router, which is used if the requested destination address is not on the local subnet.
- **Operation Mode** – Selects the operation mode as Keep Alive, On Demand or Manual. (Default: Keep Alive)
 - **Keep Alive Mode:** The wireless AP/Router will periodically check your Internet connection and automatically re-establish your connection when disconnected. (Default: 60 seconds)
 - **On Demand Mode:** The maximum length of inactive time the unit will stay connected to the DSL service provider before disconnecting. This feature only works when Connect Type is set to “Auto-Connect.” (Default: 5 minutes)
- **MAC Clone Mode** – Some ISPs limit Internet connections to a specified MAC address of one PC. This setting allows you to manually change the MAC address of the wireless AP/Router's WAN interface to match the PC's MAC address provided to your ISP for registration. You can enter the registered MAC address manually by typing it in the boxes provided. Otherwise, connect only the PC with the registered MAC address to the wireless AP/Router, then click the “Fill My MAC” (Default: Disable)

PPTP

Enables the Point-to-Point Tunneling Protocol (PPTP) for implementing virtual private networks. The service is provided in many European countries.

Wide Area Network (WAN) Settings

You may choose different connection type suitable for your environment. Besides, you may also configure parameters according to the selected connection type.

WAN Connection Type:	<input type="text" value="PPTP"/>	
PPTP Mode		
Server IP	<input type="text" value="pptp_server"/>	
User Name	<input type="text" value="pptp_user"/>	
Password	<input type="password" value="....."/>	
Address Mode	Static <input type="text"/>	
IP Address	<input type="text" value="192.168.1.1"/>	
Subnet Mask	<input type="text" value="255.255.255.0"/>	
Default Gateway	<input type="text" value="192.168.1.254"/>	
Operation Mode	Keep Alive <input type="text"/>	
	Keep Alive Mode: Redial Period	<input type="text" value="60"/> seconds
	On demand Mode: Idle Time	<input type="text" value="5"/> minutes
MAC Clone		
MAC Clone Mode	Enable <input type="text"/>	
MAC Address	<input type="text"/>	<input type="button" value="Fill My MAC"/>

Figure 5-8. Setup Wizard - WAN PPTP

- **Server IP** – Sets a PPTP server IP Address. (Default: pptp_server)
- **Username** – Sets the PPTP user name for the WAN port. (Default: pptp_user; Range: 1~32 characters)
- **Password** – Sets a PPTP password for the WAN port. (Default: pptp_password; Range: 1~32 characters)
- **Verify Password** – Prompts you to re-enter your chosen password.
- **Address Mode** – Sets a PPTP network mode. (Default: Static)
- **IP Address** – Sets the static IP address. (Default: 0.0.0.0, available when PPTP Network Mode is set to static IP.)
- **Subnet Mask** – Sets the static IP subnet mask. (Default: 255.255.255.0, available when PPTP Network Mode is set to static IP.)

- **Default Gateway** – The IP address of the gateway router for the wireless AP/Router, which is used if the requested destination address is not on the local subnet.
- **Operation Mode** – Selects the operation mode as Keep Alive, On Demand or Manual. (Default: Keep Alive)
 - **Keep Alive Mode:** The wireless AP/Router will periodically check your Internet connection and automatically re-establish your connection when disconnected. (Default: 60 seconds)
 - **On Demand Mode:** The maximum length of inactive time the unit will stay connected to the DSL service provider before disconnecting. This feature only works when Connect Type is set to "Auto-Connect." (Default: 5 minutes)
- **MAC Clone Mode** – Some ISPs limit Internet connections to a specified MAC address of one PC. This setting allows you to manually change the MAC address of the wireless AP/Router's WAN interface to match the PC's MAC address provided to your ISP for registration. You can enter the registered MAC address manually by typing it in the boxes provided. Otherwise, connect only the PC with the registered MAC address to the wireless AP/Router, then click the "Fill My MAC" (Default: Disable)

LAN Setting

The wireless AP/Router must have a valid IP address for management using a web browser and to support other features. The unit has a default IP address of 192.168.2.1. You can use this IP address or assign another address that is compatible with your existing local network. Click on “Internet Settings” followed by “LAN.”

Local Area Network (LAN) Settings

You may enable/disable networking functions and configure their parameters as your wish.

LAN Setup	
IP Address	<input type="text" value="192.168.2.1"/>
Subnet Mask	<input type="text" value="255.255.255.0"/>
MAC Address	<input type="text" value="00:0C:43:30:52:40"/>
DHCP Type	Server <input type="button" value="v"/>
Start IP Address	<input type="text" value="192.168.2.100"/>
End IP Address	<input type="text" value="192.168.2.200"/>
Primary DNS Server	<input type="text" value="168.192.1.1"/>
Secondary DNS Server	<input type="text" value="168.95.1.1"/>
Default Gateway	<input type="text" value="192.168.2.1"/>
Lease Time	<input type="text" value="86400"/>
Statically Assigned	MAC: <input type="text"/> IP: <input type="text"/>
Statically Assigned	MAC: <input type="text"/> IP: <input type="text"/>
Statically Assigned	MAC: <input type="text"/> IP: <input type="text"/>
LLTD	Disable <input type="button" value="v"/>
IGMP Proxy	Disable <input type="button" value="v"/>
UPNP	Disable <input type="button" value="v"/>
Router Advertisement	Disable <input type="button" value="v"/>
PPPoE Relay	Disable <input type="button" value="v"/>
DNS Proxy	Disable <input type="button" value="v"/>

Figure 5-9. LAN Settings (Gateway Mode)

- **LAN IP Address** – Valid IP addresses consist of four decimal numbers, 0 to 255, separated by periods. The default setting is 192.168.2.1.
- **Subnet Mask** – Indicate the local subnet mask. (Default: 255.255.255.0.)
- **MAC Address** – The shared physical layer address for the wireless AP/Router's LAN ports.
- **DHCP Type** – Select this option to obtain the IP settings for the access point from a DHCP (Dynamic Host Configuration Protocol) server. The IP address, subnet mask, default gateway, and Domain Name Server (DNS) address are dynamically assigned to the access point by the network DHCP server. (Options: Server/Disable)
- **Start/End IP Address** – Specify the start and end IP addresses of a range that the DHCP server can allocate to DHCP clients. Note that the address pool range is always in the same subnet as the unit's IP setting. The maximum clients that the unit can support is 253.
- **Primary DNS Server** – The IP address of Domain Name Servers on the network. A DNS maps numerical IP addresses to domain names and can be used to identify network hosts by familiar names instead of the IP addresses.
- **Secondary DNS Server** – The IP address of the Secondary Domain Name Server on the network.
- **Default Gateway** – The default gateway is the IP address of the router for the wireless AP/Router, which is used if the requested destination address is not on the local subnet.
- **Lease Time** – Select a time limit for the use of an IP address from the IP pool. When the time limit expires, the client has to request a new IP address. The lease time is expressed in seconds. (Default: 86400 seconds; Range: 60~864000 seconds)
- **Statically Assigned** – Up to three devices with specific MAC addresses can be assigned static IP addresses. That is, the DHCP server always assigns these devices the same IP addresses.
- **LLTD** – Link Layer Topology Discovery (LLTD) is a Microsoft proprietary discovery protocol which can be used for both wired and wireless networks. (Options: Disable/Enable, Default: Disable)
- **IGMP Proxy** – Enables IGMP proxy on the wireless AP/Router. (Options: Disable/Enable, Default: Disable)
- **UPNP** – Allows the device to advertise its UPnP capabilities. (Default: Disable)
- **Router Advertisement** – Enables the sending and receiving of routing advertisements to discover the existence of neighboring routers. (Options: Disable/Enable, Default: Disable)
- **PPPoE Relay** – When enabled, the wireless AP/Router will forward PPPoE messages to clients. Clients are then able to connect to the PPPoE service through the WAN port. (Options: Disable/Enable, Default: Disable)

- **DNS Proxy** – Enables DNS proxy on the LAN port. DNS Proxy receives DNS queries from the local network and forwards them to an Internet DNS server. (Default: Disable)

Advanced Routing

Routing setup allows a manual method to set up routing between networks. The network administrator configures static routes by entering routes directly into the routing table. Static routing has the advantage of being predictable and easy to configure.

Static Routing Settings

This screen is used to manually configure static routes to other IP networks, subnetworks, or hosts. Click “Internet Settings” followed by “Advanced Routing”. (Maximum 32 entries are allowed.)

Static Routing Settings

You may add and remove custom Internet routing rules, and/or enable dynamic routing exchange protocol here.

Add Routing Rule	
Destination	<input style="width: 90%;" type="text"/>
Type	Host ▼
Gateway	<input style="width: 90%;" type="text"/>
Interface	LAN ▼ <input style="width: 40%;" type="text"/>
Comment	<input style="width: 90%;" type="text"/>

Figure 5-10. Static Route (Gateway Mode)

- **Destination** – A destination network or specific host to which packets can be routed.
- **Type** – Defines the type of destination. (Options: Host/Net, Default: Host)
- **Gateway** – The IP address of the router at the next hop to which matching frames are forwarded.
- **Interface** – The selected interface to which a static routing subnet is to be applied.
- **Comment** – Enters a useful comment to help identify this route.

Routing Table

This page displays the information necessary to forward a packet along the best path toward its destination. Each packet contains information about its origin and destination. When a packet is received, a network device examines the packet and matches it to the routing table entry providing the best match for its destination. The table then provides the device with instructions for sending the packet to the next hop on its route across the network.

Note: The Routing Table is only available when the wireless AP/Router is set to Gateway Mode.

Current Routing Table									
No.	Destination	Netmask	Gateway	Flags	Metric	Ref	Use	Interface	Comment
1	255.255.255.255	255.255.255.255	0.0.0.0	5	0	0	0	LAN (br0)	
2	239.255.255.250	255.255.255.255	0.0.0.0	5	0	0	0	LAN (br0)	
3	192.168.2.0	255.255.255.0	0.0.0.0	1	0	0	0	LAN (br0)	

Figure 5-11. Routing Table (Gateway Mode)

- **Destination** – Displays all destination networks or specific hosts to which packets can be routed.
- **Netmask** – Displays the subnetwork associated with the destination.
- **Gateway** – Displays the IP address of the router at the next hop to which matching frames are forwarded.
- **Flags** – Possible flags include: 1: U, 3: UG, 5: UH, 7: UGH, 0: ! (Definition: U: route is up, H: target is a host, G: use gateway and !: Reject route.)
- **Metric** – A number used to indicate the cost of the route so that the best route, among potentially multiple routes to the same destination, can be selected.
- **Ref** – Number of references to this route.
- **Use** – Count of lookups for the route.
- **Interface** – Interface to which packets for this route will be sent.
- **Comment** – Displays a useful comment to identify the routing rules.

Dynamic Route

The wireless AP/Router supports RIP 1 and RIP 2 dynamic routing protocol. Routing Information Protocol (RIP) is the most widely used method for dynamically maintaining routing tables. RIP uses a distance vector-based approach to routing. Routes are chosen to minimize the distance vector, or hop count, which serves as a rough estimate of transmission cost. Each router broadcasts its advertisement every 30 seconds, together with any updates to its routing table. This allows all routers on the network to build consistent tables of next hop links which lead to relevant subnets.

The screenshot shows a web interface titled "Dynamic Routing Settings". Under the heading "Dynamic Routing Protocol", there is a text input field containing "RIP" and a dropdown menu set to "Disable". Below these fields are two buttons: "Apply" and "Reset".

Figure 5-12. Dynamic Route (Gateway Mode)

- **RIP** – Enables or disable the RIP protocol for the WAN or LAN interface. (Options: Disable/v1/v2, Default: Disable)

QoS Setting

The QoS setting page is used to configure Quality of Service (QoS) for Traffic Prioritization and Bandwidth Management. Quality of Service (QoS) provides users the control over which type of outgoing data traffic is given priority by the router. The throughput rate of the upload data passed through the wireless AP/Router can be throttled. Click on "Internet Settings" followed by "QoS".

The screenshot shows a web interface titled "Quality of Service Settings". Below the title is a paragraph: "You may setup rules to provide Quality of Service guarantees for specific applications. You can use default settings first." Below this is a horizontal line. Under the heading "QoS Setup", there are two rows of settings. The first row has a text input field for "Quality of Service" and a dropdown menu set to "Enable". The second row has a text input field for "Upload Bandwidth:" and a dropdown menu set to "User defined", followed by a text input field and the label "Bits/sec". Below these settings is a "Submit" button.

Figure 5-13. QoS Settings (Gateway Mode)

Bandwidth QoS Setting — The maximum upload speed of the Internet connection on the WAN port.

- **Quality of Service** – Enables the QoS. (Default: Enable)
- **Upload Bandwidth** – Sets the maximum upload bandwidth. (Default: user defined)

ALG

The application gateway settings provide a filter for certain protocol data (such as FTP and SIP) to pass through the wireless AP/Router NAT and firewall restrictions.

Application Level Gateways (ALGs)

Application gateway allows customized NAT traversal filters to be plugged into the gateway to support address and port translation for certain application layer control/data protocols such as FTP, SIP applications, etc. Legitimate application data can thus be passed through the security checks of the firewall or NAT that would have otherwise restricted the traffic for not meeting its limited filter criteria.

ALG Management	
FTP Support	Enable ▾
TFTP Support	Enable ▾
H.323 Support	Enable ▾
SIP Support	Enable ▾
VPN-passthrough (L2TP, IPSEC, PPTP) support	Enable ▾

Figure 5-14. ALG Settings

- **FTP Support** – Allows FTP packets to pass through the wireless AP/Router.
- **TFTP Support** – Allows TFTP packets to pass through the wireless AP/Router.
- **H.323 Support** – Allows H.323 packets to pass through the wireless AP/Router to support audio, data and video conferencing for teleconferencing.
- **SIP Support** – Allows SIP packets to pass through the wireless AP/Router.
- **VPN-passthrough Support (L2TP, IPSEC, PPTP)** – Allows L2TP, IPsec, and PPTP packets to pass through the wireless AP/Router.

Wireless Settings

The IEEE 802.11n interfaces include configuration options for radio signal characteristics and wireless security features.

The wireless AP/Router can operate in five modes, mixed 802.11b/g/n, mixed 802.11b/g, 802.11b only, 802.11g only or 802.11n only. Also note that 802.11g is backward compatible with 802.11b, and 802.11n is backward compatible with both 802.11b/g at slower data transmit rates.

Each radio supports two virtual access point (VAP) interfaces, referred to as WLAN1 and WLAN2. Each VAP functions as a separate access point, and can be configured with its own Service Set Identification (SSID) and security settings. However, most radio signal parameters apply to both VAP interfaces. The configuration options are nearly identical, and are therefore both covered in this section of the manual.

Traffic to specific VAPs can be segregated based on user groups or application traffic. Both VAPs can have up to 64 wireless clients, whereby the clients associate with these VAPs the same as they would with a physical access point.

Note: The radio channel settings for the access point are limited by local regulations, which determine the number of channels that are available. See “Specifications” on page B-1 for additional information on the maximum number channels available.

Basic Settings

The Basic Setting page allows you to enable the wireless interface, select which radio mode to use, choose the transmit frequency and configure SSIDs.

Click on “Wireless Settings,” followed by “Basic”.

Note: There are several variables to consider when selecting a radio mode that make it fully functional. Simply selecting the mode you want is not enough to ensure full compatibility for that mode. Information on these variables may be found in the Advanced Setting section.

Basic Wireless Settings

You could configure the minimum number of Wireless settings for communication, such as Network Name (SSID) and Channel. The Access Point can be set simply with only the minimum setting items.

Wireless Network	
Radio On/Off	<input type="button" value="Disable"/>
Network Mode	11b/g/n mixed mode ▾
Network Name(SSID)	WBR14S_N3_AP
Multiple SSID1	<input type="text"/>
Broadcast Network Name (SSID)	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
AP Isolation	<input type="radio"/> Enable <input checked="" type="radio"/> Disable
MBSSID AP Isolation	<input type="radio"/> Enable <input checked="" type="radio"/> Disable
BSSID	00:0C:43:30:52:40
Frequency (Channel)	2437MHz (Channel 6) ▾

Figure 5-15. Basic Wireless Settings

- **Radio On/Off** – Enables or Disable the radio. (Default: Enable)
- **Network Mode** – Defines the radio mode for the VAP interface. (Default: 802.11b/g/n Mixed)

Note: Enabling the wireless AP/Router to communicate with 802.11b/g clients in both 802.11b/g/n Mixed and 802.11n modes also requires that HT Operation in the Advanced Settings menu be set to Mixed. Setting HT Operation to Green Field is exclusive for 802.11n client communication only and prevents 802.11 b/g communication.

- **802.11b/g Mixed:** Both 802.11b and 802.11g clients can communicate with the wireless AP/Router (up to 108 Mbps), but data transmission rates may be slowed to compensate for 802.11b clients. Any 802.11n clients will also be able to communicate with the wireless AP/Router, but they will be limited to 802.11g protocols and data transmission rates.
- **802.11b only:** All 802.11b, 802.11g, and 802.11n clients will be able to communicate with the wireless AP/Router, but the 802.11g and 802.11n clients will be limited to 802.11b protocols and data transmission rates (up to 11 Mbps).
- **802.11g only:** Both 802.11g and 802.11n clients will be able to communicate with the wireless AP/Router, but the 802.11n clients will be limited to 802.11g protocols and data transmission rates (up to 54 Mbps). Any 802.11b clients will not be able to communicate with the wireless AP/Router.
- **802.11b/g/n Mixed:** All 802.11b/g/n clients can communicate with the wireless AP/Router (up to 300 Mbps), but data transmission rates may be slowed to compensate for 802.11b/g clients.

Wireless Network	
Radio On/Off	Disable
Network Mode	11b/g/n mixed mode ▼
Network Name (SSID)	11b/g mixed mode
	11b only
	11g only
Multiple SSID1	11b/g/n mixed mode

- **Network Name (SSID)** – The name of the wireless network service provided by the VAP. Clients that want to connect to the network must set their SSID to the same as that of the VAP interface. (Default: “WBR14S_N3_AP”; Range: 1-32 characters)
 - **Multiple SSID** – The number of wireless network interfaces (SSIDs) supported on the device.
- **Broadcast Network Name (SSID)** – The wireless AP/Router will broadcast its SSID.
- **AP Isolation** – The wireless AP/Router will isolate wireless clients in order to protect them. Normally for users who are at hotspots.
- **MBSSID AP Isolation** – The wireless AP/Router will isolate wireless clients from different SSID.
- **BSSID** – The identifier (MAC address) of a wireless AP/Router in a Basic Service Set (BSS) network.
- **WLAN Frequency** – The radio channel that the wireless AP/Router uses to communicate with wireless clients. When multiple access points are deployed in the same area, set the channel on neighboring access points at least five channels apart to avoid interference with each other. For example, you can deploy up to three access points in the same area using channels 1, 6, 11. Note that wireless clients automatically set the channel to the same as that used by the wireless AP/Router to which it is linked. Selecting Auto Select enables the wireless AP/Router to automatically select an unoccupied

Multiple SSID2	AutoSelect
	2412MHz (Channel 1)
	2417MHz (Channel 2)
Multiple SSID3	2422MHz (Channel 3)
	2427MHz (Channel 4)
Broadcast Network Name (SSID)	2432MHz (Channel 5)
	2437MHz (Channel 6)
AP Isolation	2442MHz (Channel 7)
MBSSID AP Isolation	2447MHz (Channel 8)
	2452MHz (Channel 9)
BSSID	2457MHz (Channel 10)
	2462MHz (Channel 11)
Frequency (Channel)	2442MHz (Channel 7) ▼

radio channel. (The supported channels are dependent on the country code setting.)

Wireless Distribution System (WDS)

The WLAN1 radio interface can be configured to operate in a mode that allows it to forward traffic directly to other access point units. To set up links between access point units, you must configure the Wireless Distribution System (WDS) forwarding table by specifying the wireless MAC address of all units to which you want to forward traffic.

Traffic forwarded to WDS links is automatically converted to 802.11 four-address format frame. This uses the MAC addresses of the station and that of the AP connected to it on the transmitting LAN, and the MAC addresses of the AP functioning as a wireless repeater/bridge and that of the station connected to it on a neighboring LAN in the 802.11 frame header. Ethernet traffic follows a three-address format that is reconstructed for WDS transmission. The wireless AP/Router will reconstruct the frame format upon receipt and transmission using the criteria of the receiving and forwarding port location and whether it is Ethernet or wireless in type.

Note: The wireless AP/Router does not support the spanning tree algorithm. WDS links should be configured appropriately to avoid causing loops on the network.

Up to four WDS links can be specified for each unit in the WDS network.

The WDS link can be configured in the following combinations:

1. Both two units are configured as Gateway Mode
2. One unit is Gateway Mode and one unit is Bridge Mode
3. Both two units are configured as Bridge Mode

When both units are set to Gateway Mode, be sure to check these settings:

- Be sure each unit is configured with a different LAN IP address.
- Be sure that only one unit has Internet access on its WAN port.
- Be sure the DHCP server is enabled only on one unit. If one unit is providing Internet access, enable the DHCP server on that unit.

Note: WDS Settings only apply to WLAN1. WLAN2 is pre-configured to Bridge mode unless WLAN1 is configured to act as a bridge, in which case WLAN2 is disabled.

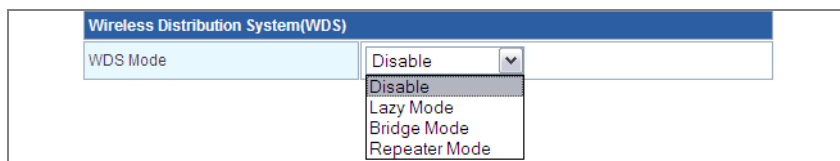


Figure 5-16. WDS Settings

WDS Setting — Configures WDS related parameters. Up to four MAC addresses can be specified for each unit in the WDS network. WDS links may either be manually configured (Bridge and Repeater modes) or auto-discovered (Lazy mode).

- **WDS Mode** – Selects the WDS mode of WLAN1. (Options: Disable/Lazy/Bridge/ Repeater. Default: Disable)
 - **Disable:** WDS is disabled.
 - **Lazy:** Operates in an automatic mode that detects and learns WDS peer addresses from received WDS four-address format frame packets, without the need to configure a WDS MAC list entry. This feature allows the wireless AP/ Router to associate with other wireless AP/Routers in the network and use their WDS MAC list. In Lazy mode the wireless AP/Router sends a beacon.
 - **Bridge:** Operates as a standard bridge that forwards traffic between WDS links (links that connect to other AP/wireless bridges, or units in Repeater or Lazy mode) and an Ethernet port. Only data destined for stations which are known to be on the peer Ethernet link, multicast data or data with unknown destinations, need to be forwarded through the WDS link. The Bridge mode does not transmit a beacon, unlike the other three modes. In this mode the wireless AP/Router may also function as a repeater.

Note: Enabling “Bridge” mode disables WLAN2.

- **Repeater:** Operates as a wireless repeater, extending the range for remote wireless clients and connecting them to an AP connected to the wired network. WDS peers must be registered with the wireless AP/Router. Repeater mode also supports the dual capability of the VAP functioning as an AP. In this mode, traffic is not forwarded to the Ethernet port from the radio interface. In Repeater mode the wireless AP/Router transmits a beacon.

HT Physical Mode Settings

HT Physical Mode	
Operating Mode	<input checked="" type="radio"/> Mixed Mode <input type="radio"/> Green Field
Channel BandWidth	<input type="radio"/> 20 <input checked="" type="radio"/> 20/40
Guard Interval	<input type="radio"/> Long <input checked="" type="radio"/> Auto
MCS	Auto <input type="button" value="v"/>
Reverse Direction Grant(RDG)	<input type="radio"/> Disable <input checked="" type="radio"/> Enable
Extension Channel	2422MHz (Channel 3) <input type="button" value="v"/>
Aggregation MSDU(A-MSDU)	<input checked="" type="radio"/> Disable <input type="radio"/> Enable
Auto Block ACK	<input type="radio"/> Disable <input checked="" type="radio"/> Enable
Decline BA Request	<input checked="" type="radio"/> Disable <input type="radio"/> Enable

Figure 5-17. HT Physical Mode Settings

- **HT Operation Mode** – Packets from 802.11n clients are referred to as High Throughput (HT) Greenfield packets, in other words packets that can be transmitted at rates of up to 300 Mbps assuming that HT Channel Bandwidth is set to 20/40MHz, see HT Channel Bandwidth next page.

Note: Some 802.11n wireless clients may be capable of transmission rates of up to 600 Mbps, however the wireless AP/Router will only be able to connect to them at a maximum transmission rate of 300 Mbps.

802.11b/g packets are referred to as non-HT packets, being transmitted at lower throughput rates. HT mixed format frames contain a preamble compatible with the non-HT receivers. HT Greenfield frames do not contain a non-HT compatible part. Support for HT Greenfield format is optional. An HT station that does not support the reception of an HT Greenfield format frame must be able to detect that an HT Greenfield format frame is an HT transmission (as opposed to a non-HT transmission). In this case the receiver must decode the high throughput signal (HT-SIG) in the packet header and determine if the HT-SIG cyclic redundancy check (CRC) passes. (Default: Mixed)

- **HT Channel Bandwidth** – The wireless AP/Router provides a channel bandwidth of 40 MHz by default giving an 802.11g connection speed of 108 Mbps (sometimes referred to as Turbo Mode) and a 802.11n connection speed of up to 300 Mbps. Setting the HT Channel Bandwidth to 20 MHz slows connection speed for 802.11g and 802.11n to 54 Mbps and 74 Mbps respectively and ensures backward compliance for slower 802.11b devices. (Default: 20/40MHz)
- **Guard Interval** – The guard interval between symbols helps receivers overcome the effects of multipath delays. When you add a guard time, the back portion of useful signal time is copied and appended to the front. (Default: Auto)
- **MCS** – The Modulation and Coding Scheme (MCS) is a value that determines the modulation, coding and number of spatial channels. (Options: value [range] = 0~7 (1 Tx Stream), 8~15 (2 TxStream), 32 and auto (33). Default: auto)
- **Reverse Direction Grant (RDG)** – When enables Reverse Direction Grant, the wireless AP/Router can reduce the transmitted data packet collision by using the reverse direction protocol. During TXOP (Transmission Opportunity) period, the receiver could use remaining transmission time to transmit data to a sender. The RDG improves transmission performance and scalability in a wireless environment.
- **Extension Channel** – When 20/40MHz channel bandwidth has been set, the extension channel option will be enabled. The extension channel will allow you to get extra bandwidth. (Options: 2417MHz/Channel 2, 2457MHz/Channel 10. Default: 2457MHz/Channel 10.)
- **Aggregate MSDU (A-MSDU)** – This option enables Mac Service Data Unit (MSDU) aggregation. (Default: Disable)
- **Auto Block ACK** – Select to block ACK (Acknowledge Number) or not during data transferring.
- **Decline BA Request** – Select to reject peer BA-Request or not.

Other HT Settings

Other	
HT TxStream	2 ▼
HT RxStream	2 ▼

Figure 5-18. HT Physical Mode Settings

- **HT TxStream** – HT means High Throughput. The number of HT TxStream means how many antennas will transmit data simultaneously. (Options: 1 or 2. Default: 2)
- **HT RxStream** – The number of HT RxStream means how many antennas will receive data simultaneously. (Options: 1 or 2. Default: 2)

Advanced Wireless Settings

The Advanced Setting page allows you to configure the more advanced radio settings, many of which are enabled by default.

Click “Wireless Settings” followed by “Advanced”.

Advanced Wireless Settings

Use the Advanced Setup page to make detailed settings for the Wireless. Advanced Setup includes items that are not available from the Basic Setup page, such as Beacon Interval, Control Tx Rates and Basic Data Rates.

Advanced Wireless	
BG Protection Mode	Auto ▼
Beacon Interval	100 ms (range 20 - 999, default 100)
Data Beacon Rate (DTIM)	1 ms (range 1 - 255, default 1)
Fragment Threshold	2346 (range 256 - 2346, default 2346)
RTS Threshold	2347 (range 1 - 2347, default 2347)
TX Power	100 (range 1 - 100, default 100)
Short Preamble	<input type="radio"/> Enable <input checked="" type="radio"/> Disable
Short Slot	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
Tx Burst	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
Pkt_Aggregate	<input checked="" type="radio"/> Enable <input type="radio"/> Disable

Figure 5-19. Advanced Wireless Settings

- **BG Protection** – Enables a backward compatible protection system for 802.11b clients. There are three modes. (Default: Auto):

Advanced Wireless	
BG Protection Mode	Auto ▾
Beacon Interval	Auto On Off

- **Auto:** The wireless AP/Router enables its protection mechanism for 802.11b clients when they are detected in the network. When 802.11b clients are not detected, the protection mechanism is disabled.
- **On:** Forces the unit to always use protection for 802.11b clients, whether they are detected in the network or not.
- **Off:** Forces the unit to never use protection for 802.11b clients. This prevents 802.11b clients from connecting to the network.

Note: Enabling “On” b/g Protection can slow throughput for 802.11g/n clients by as much as 50%.

- **Beacon Interval** – The rate at which beacon signals are transmitted from the access point. The beacon signals allow wireless clients to maintain contact with the access point. They may also carry power-management information. (Range: 20-999 TUs; Default: 100 TUs)
- **Data Beacon Rate (DTIM)** – The rate at which stations in sleep mode must wake up to receive broadcast/multicast transmissions. Known also as the Delivery Traffic Indication Map (DTIM) interval, it indicates how often the MAC layer forwards broadcast/multicast traffic, which is necessary to wake up stations that are using Power Save mode. The default value of 2 indicates that the access point will save all broadcast/multicast frames for the Basic Service Set (BSS) and forward them after every second beacon. Using smaller DTIM intervals delivers broadcast/multicast frames in a more timely manner, causing stations in Power Save mode to wake up more often and drain power faster. Using higher DTIM values reduces the power used by stations in Power Save mode, but delays the transmission of broadcast/multicast frames. (Range: 1-255 beacons; Default: 1 beacon)
- **Fragment Threshold** – Configures the minimum packet size that can be fragmented when passing through the access point. Fragmentation of the PDUs (Package Data Unit) can increase the reliability of transmissions because it increases the probability of a successful transmission due to smaller frame size. If there is significant interference present, or collisions due to high network utilization, try setting the fragment size to send smaller fragments. This will speed up the retransmission of smaller frames. However, it is more efficient to set the fragment size larger if very little or no interference is present because it requires overhead to send multiple frames. (Range: 256-2346 bytes; Default: 2346 bytes)

- **RTS Threshold** – Sets the packet size threshold at which a Request to Send (RTS) signal must be sent to a receiving station prior to the sending station starting communications. The access point sends RTS frames to a receiving station to negotiate the sending of a data frame. After receiving an RTS frame, the station sends a CTS (clear to send) frame to notify the sending station that it can start sending data. If the RTS threshold is set to 0, the access point always sends RTS signals. If set to 2347, the access point never sends RTS signals. If set to any other value, and the packet size equals or exceeds the RTS threshold, the RTS/CTS (Request to Send / Clear to Send) mechanism will be enabled. The access points contending for the medium may not be aware of each other. The RTS/CTS mechanism can solve this “Hidden Node Problem.” (Range: 0-2347 bytes)
- **TX Power** – Adjusts the power of the radio signals transmitted from the access point. The higher the transmission power, the farther the transmission range. Power selection is not just a trade off between coverage area and maximum supported clients. You also have to ensure that high-power signals do not interfere with the operation of other radio devices in the service area. (Options: 100%, 50%, 25%, 12%, minimum; Default: 100%)
- **Short Preamble** – Enables the length of the signal preamble that is used at the start of a data transmission. (Default: Disable)
- **Short Slot** – Sets the basic unit of time the wireless AP/Router’s uses for calculating waiting times before data is transmitted. Enabling a short slot time can increase data throughput on the wireless AP/Router, but requires that all clients can support a short slot time (that is, 802.11g-compliant clients must support a short slot time). (Default: Enable)
- **Tx Burst** – Enables data transmission bursting to boost throughput for high data transmissions. (Default: Enable)
- **Pkt_aggregation** – Enables grouping together of some packets and sending them together to boost bandwidth. (Default: Enable)

Configuring Wi-Fi Multimedia

Wireless networks offer an equal opportunity for all devices to transmit data from any type of application. Although this is acceptable for most applications, multimedia applications (with audio and video) are particularly sensitive to the delay and throughput variations that result from this equal opportunity wireless access method. For multimedia applications to run well over a wireless network, a Quality of Service (QoS) mechanism is required to prioritize traffic types and provide an enhanced opportunity wireless access method. The access point implements QoS using the Wi-Fi Multimedia (WMM) standard. Using WMM, the access point is able to prioritize traffic and optimize performance when multiple applications compete for wireless network bandwidth at the same time. WMM employs techniques that are a subset of the developing IEEE 802.11e QoS standard and it enables the access point to inter operate with both WMM enabled clients and other devices that may lack any WMM functionality.

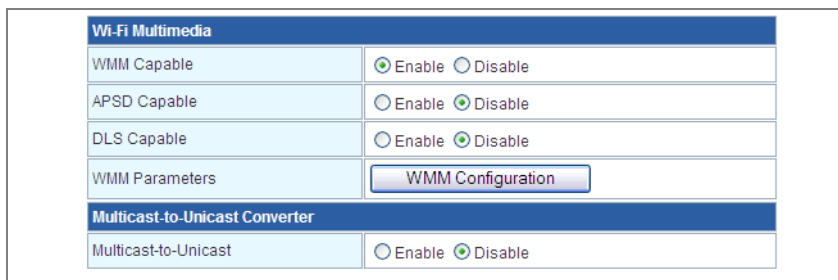


Figure 5-20. Wi-Fi Multimedia Settings

- **WMM Capable** – Wi-Fi Multimedia (WMM), also known as Wireless Multimedia Extensions (WME), is a Wi-Fi Alliance interoperability certification. It provides basic Quality of Service (QoS) features for IEEE 802.11 wireless network. Enabling WMM support provides prioritization of Wi-Fi data packets on four categories voice, video, best effort, and background. (Default: Enabled)
- **APSD Capable** – Auto Power Save Delivery is used for saving power consumption. APSD allows a longer beacon interval until the traffic arrives. (Default: Disable., See “Beacon Interval” on page 5-26)
- **DLS Capable** – The Direct Link Setup (DLS) allows all clients transfer data more effectively. When enables DLS, the wireless AP/Router will all clients on this unit to establish directly connection and speed up the data transmission, especially for multimedia data files. (Default: Disable)
- **WMM Parameters** – Display the WMM Parameters.

Access Categories – WMM defines four access categories (ACs): voice, video, best effort, and background. These categories correspond to traffic priority levels and are mapped to IEEE 802.1D priority tags (see Table 5-1). The direct mapping of the four ACs to 802.1D priorities is specifically intended to facilitate inter operability with other wired network QoS policies. While the four ACs are specified for specific types of traffic, WMM allows the priority levels to be configured to match any network-wide QoS policy. WMM also specifies a protocol that access points can use to communicate the configured traffic priority levels to QoS-enabled wireless clients.

Table 5-2. WMM Access Categories

Access Category	WMM Designation	Description	802.1D Tags
AC_VO (AC3)	Voice	Highest priority, minimum delay. Time-sensitive data such as VoIP (Voice over IP) calls.	7, 6
AC_VI (AC2)	Video	High priority, minimum delay. Time-sensitive data such as streaming video.	5, 4

Access Category	WMM Designation	Description	802.1D Tags
AC_BE (AC0)	Best Effort	Normal priority, medium delay and throughput. Data only affected by long delays. Data from applications or devices that lack QoS capabilities.	0, 3
AC_BK (AC1)	Background	Lowest priority. Data with no delay or throughput requirements, such as bulk data transfers.	2, 1

WMM Operation — WMM uses traffic priority based on the four ACs; Voice, Video, Best Effort, and Background. The higher the AC priority, the higher the probability that data is transmitted. When the access point forwards traffic, WMM adds data packets to four independent transmit queues, one for each AC, depending on the 802.1D priority tag of the packet. Data packets without a priority tag are always added to the Best Effort AC queue. From the four queues, an internal “virtual” collision resolution mechanism first selects data with the highest priority to be granted a transmit opportunity. Then the same collision resolution mechanism is used externally to determine which device has access to the wireless medium.

WMM Parameters of Access Point						
	Aifsn	CWMin	CWMax	Txop	ACM	AckPolicy
AC_BE	3	15	63	0	<input type="checkbox"/>	<input type="checkbox"/>
AC_BK	7	15	1023	0	<input type="checkbox"/>	<input type="checkbox"/>
AC_VI	1	7	15	94	<input type="checkbox"/>	<input type="checkbox"/>
AC_VO	1	3	7	47	<input checked="" type="checkbox"/>	<input type="checkbox"/>

WMM Parameters of Station					
	Aifsn	CWMin	CWMax	Txop	ACM
AC_BE	3	15	1023	0	<input type="checkbox"/>
AC_BK	7	15	1023	0	<input type="checkbox"/>
AC_VI	2	7	15	94	<input type="checkbox"/>
AC_VO	2	3	7	47	<input type="checkbox"/>

Figure 5-21. WMM Parameters

WMM Acknowledge Policy – By default, all wireless data transmissions require the sender to wait for an acknowledgement from the receiver. WMM allows the acknowledgement wait time to be turned off for each Access Category (AC). Although this increases data throughput, it can also result in a high number of errors when traffic levels are heavy. (Default: Acknowledge)

WMM BSS Parameters – These parameters apply to the wireless clients.

WMM AP Parameters – These parameters apply to the access point.

- **logCWMin** (Minimum Contention Window) – The initial upper limit of the random backoff wait time before wireless medium access can be attempted. The initial wait time is a random value between zero and the CWMin value. Specify the CWMin value in the range 0-15 microseconds. Note that the CWMin value must be equal or less than the CWMax value.
- **logCWMax** (Maximum Contention Window) – The maximum upper limit of the random backoff wait time before wireless medium access can be attempted. The contention window is doubled after each detected collision up to the CWMax value. Specify the CWMax value in the range 0-15 microseconds. Note that the CWMax value must be greater or equal to the CWMin value.
- **AIFS** (Arbitration Inter-Frame Space) – The minimum amount of wait time before the next data transmission attempt. Specify the AIFS value in the range 0-15 microseconds.
- **TXOP Limit** (Transmit Opportunity Limit) – The maximum time an AC transmit queue has access to the wireless medium. When an AC queue is granted a transmit opportunity, it can transmit data for a time up to the TxOpLimit. This data bursting greatly improves the efficiency for high data-rate traffic. Specify a value in the range 0-65535 microseconds.
- **Admission Control** – The admission control mode for the access category. When enabled, clients are blocked from using the access category. (Default: Disable)

WLAN Security

The wireless AP/Router's wireless interface is configured by default as an "open system," which broadcasts a beacon signal including the configured SSID. Wireless clients with a configured SSID of "ANY" can read the SSID from the beacon, and automatically set their SSID to allow immediate connection to the wireless network.

To improve wireless network security, you have to implement two main functions:

- **Authentication** – It must be verified that clients attempting to connect to the network are authorized users.
- **Traffic Encryption** – Data passing between the unit and clients must be protected from interception and eavesdropping.

For a more secure network, the wireless AP/Router can implement one or a combination of the following security mechanisms:

- Wired Equivalent Privacy (WEP)
- IEEE 802.1X
- Wi-Fi Protected Access (WPA) or WPA2

The security mechanisms that may be employed depend on the level of security required, the network and management resources available, and the software support provided on wireless clients. Click on “Wireless Settings,” followed by “Security”.

Security

The wireless AP/Router supports two virtual access point (VAP) interfaces referred to as WLAN1 and WLAN2. Each VAP functions as a separate access point, and can be configured with its own security settings.

Note: WDS settings may only be configured for WLAN1. See “Wi-Fi Protected Setup (WPS)” on page 5-37. WLAN2 only operates as an access point service.

Note: Configuring WLAN1 to operate in WDS “Bridge” mode automatically disables WLAN2.

Click on “Wireless Settings,” followed by “Security”.

Wireless Security/Encryption Settings

Setup the wireless security and encryption to prevent from unauthorized access and monitoring.

Select SSID	
SSID	WBR14S_N3_AP ▼

"WBR14S_N3_AP"	
Security Mode	OPEN ▼
Encrypt Type	None ▼

Access Policy	
Policy	Disable ▼
Add a Station Mac	<input type="text"/>

Figure 5-22. Wireless Security Settings

Security Settings — The security settings determine the authentication mode and enable WEP keys.

- **Authentication Mode** – Configures the authentication mode used by clients. (WLAN1/WLAN2 Defaults: Open)

"WBR14S_N3_AP"	
Security Mode	OPEN
Encrypt Type	<div style="border: 1px solid black; padding: 2px;"> OPEN SHARED WEPAUTO WPA WPA-PSK WPA2 WPA2-PSK WPAPSK/WPA2PSK WPA1/WPA2 802.1X </div>

- **Open:** Open-system authentication accepts any client attempting to connect the wireless AP/Router without verifying its identity. In this mode the default encryption type is "None."

"WBR14S_N3_AP"	
Security Mode	OPEN
Encrypt Type	None

- **Shared:** The shared-key approach uses Wired Equivalent Privacy (WEP) to verify client identity by distributing a shared key to clients before attempting authentication.

"WBR14S_N3_AP"			
Security Mode	SHARED		
Wire Equivalence Protection (WEP)			
Default Key	Key 1		
WEP Keys	WEP Key 1:	<input type="text"/>	Hex
	WEP Key 2:	<input type="text"/>	Hex
	WEP Key 3:	<input type="text"/>	Hex
	WEP Key 4:	<input type="text"/>	Hex

- **WEP Auto:** Allows WLAN clients to associate using Open-WEP (uses WEP for encryption only) or Shared-WEP (uses WEP for authentication and encryption). If enabled, you must configure at least one key for the VAP interface and all its clients. Wired Equivalent Privacy (WEP) provides a basic level of security, preventing unauthorized access to the network and encrypting data transmitted between wireless clients and the wireless AP/Router. WEP uses static shared keys (fixed-length hexadecimal or alphanumeric strings) that are manually distributed to all clients that want to use the network.

"WBR14S_N3_AP"		
Security Mode	WEPAUTO	
Wire Equivalence Protection (WEP)		
Default Key	Key 1	
WEP Keys	WEP Key 1 :	<input type="text"/> Hex
	WEP Key 2 :	<input type="text"/> Hex
	WEP Key 3 :	<input type="text"/> Hex
	WEP Key 4 :	<input type="text"/> Hex

- **WPA-PSK or WPA2-PSK or WPA-PSK/WPA2-PSK:** The WPA or WPA2 mode uses a common password phrase, called a Pre-Shared Key, that must be manually distributed to all clients that want to connect to the network. Specify a key as an easy-to-remember form of letters and numbers. The WPA Preshared Key can be input as ASCII string (8-63 characters) or Hexadecimal format (length is 64). All wireless clients must be configured with the same key to communicate with the VAP interface.

"WBR14S_N3_AP"	
Security Mode	WPAPSKWPA2PSK
WPA	
WPA Algorithms	<input type="radio"/> TKIP <input type="radio"/> AES <input type="radio"/> TKIPAES
Pass Phrase	12345678
Key Renewal Interval	3600 seconds

- **WPA2:** The WPA Enterprise mode uses IEEE 802.1X as its basic framework for user authentication and dynamic key management. IEEE 802.1X access security uses Extensible Authentication Protocol (EAP) and requires a configured RADIUS authentication server to be accessible in the enterprise network. If you select WPA or WPA2 Enterprise mode, be sure to configure the RADIUS settings. See “RADIUS” on page 5-36 for more information.

"WBR14S_N3_AP"	
Security Mode	WPA2
WPA	
WPA Algorithms	<input type="radio"/> TKIP <input type="radio"/> AES <input type="radio"/> TKIPAES
Key Renewal Interval	3600 seconds
PMK Cache Period	10 minute
Pre-Authentication	<input checked="" type="radio"/> Disable <input type="radio"/> Enable
Radius Server	
IP Address	
Port	1812
Shared Secret	
Session Timeout	0

- **WPA or WPA1/WPA2:** Defines a transitional mode of operation for networks moving from WPA security to WPA2. WPA1/WPA2 Enterprise Mode allows both WPA1 and WPA2 clients to associate to a common SSID interface. In WPA1/WPA2 mixed mode, the unicast encryption cipher (TKIP or AES-CCMP) is negotiated for each client. The access point advertises its supported encryption ciphers in beacon frames and probe responses. WPA1 and WPA2 clients select the cipher they support and return the choice in the association request to the access point. For mixed-mode operation, the cipher used for broadcast frames is always TKIP. WEP encryption is not allowed.

"WBR14S_N3_AP"	
Security Mode	WPA1WPA2
WPA	
WPA Algorithms	<input type="radio"/> TKIP <input type="radio"/> AES <input type="radio"/> TKIPAES
Key Renewal Interval	3600 seconds

- **802.1x:** IEEE 802.1X is a standard framework for network access control that uses a central RADIUS server for user authentication. This control feature prevents unauthorized access to the network by requiring an 802.1X client application to submit user credentials for authentication. The 802.1X standard uses the Extensible Authentication Protocol (EAP) to pass user credentials (either digital certificates, user names and passwords, or other) from the client to the RADIUS server. Client authentication is then verified on the RADIUS server before the access point grants client access to the network.

"WBR14S_N3_AP"	
Security Mode	802.1X
802.1x WEP	
WEP	<input type="radio"/> Disable <input type="radio"/> Enable
Radius Server	
IP Address	<input type="text"/>
Port	1812
Shared Secret	<input type="text"/>
Session Timeout	0

- **Encryption Type** – Selects the data encryption type to use. (Default: determined by the Authentication Mode selected)
 - **None:** Disables data encryption.
 - **WEP:** Selects WEP keys for data encryption.
 - **TKIP:** Uses Temporal Key Integrity Protocol (TKIP) keys for encryption. WPA specifies TKIP as the data encryption method to replace WEP. TKIP avoids the problems of WEP static keys by dynamically changing data encryption keys.
 - **AES:** Uses Advanced Encryption Standard (AES) keys for encryption. WPA2 uses AES Counter-Mode encryption with Cipher Block Chaining Message Authentication Code (CBC-MAC) for message integrity. The AES Counter-Mode/CBCMAC Protocol (AES-CCMP) provides extremely robust data confidentiality using a 128-bit key. Use of AES-CCMP encryption is specified as a standard requirement for WPA2. Before implementing WPA2 in the network, be sure client devices are upgraded to WPA2-compliant hardware.
 - **TKIP/AES:** Uses either TKIP or AES keys for encryption. WPA/WPA2 mixed modes allow both WPA and WPA2 clients to associate to a common SSID interface. In mixed mode, the unicast encryption cipher (TKIP or AES-CCMP) is negotiated for each client.

- **Default Key ID** – Sets the WEP key used for authentication.
(Default: 1; Range: 1~4)

Wire Equivalence Protection (WEP)	
Default Key	Key 1
WEP Keys	WEP Key 1 : <input type="text"/>
	WEP Key 2 : <input type="text"/>
	WEP Key 3 : <input type="text"/>
	WEP Key 4 : <input type="text"/>

- **Key 1 ~ Key 4** – Sets WEP key values. The user must first choose between ASCII or Hexadecimal keys. At least one key must be specified. Each WEP key has an index number. The selected key is used for authentication and encryption on the VAP interface. Enter key values that match the key type and length settings. Standard keys are either 5 or 13 alphanumeric characters; or 10 or 26 hexadecimal digits. (Default: ASCII, no preset value)

Default Key	Key 1
WEP Key 1 :	<input type="text"/>
WEP Key 2 :	<input type="text"/>
WEP Key 3 :	<input type="text"/>
WEP Key 4 :	<input type="text"/>

RADIUS

Remote Authentication Dial-in User Service (RADIUS) is an authentication protocol that uses software running on a central server to control access to RADIUS-aware devices on the network. An authentication server contains a database of user credentials for each user that requires access to the network.

A RADIUS server must be specified for the access point to implement IEEE 802.1X network access control and Wi-Fi Protected Access (WPA) wireless security.

Click “WLAN1/WLAN2 Security” and be sure that an ‘Enterprise’ mode is selected.

Note: This guide assumes that you have already configured RADIUS server(s) to support the access point. Configuration of RADIUS server software is beyond the scope of this guide, refer to the documentation provided with the RADIUS server software.

Radius Server	
IP Address	<input type="text"/>
Port	1812
Shared Secret	<input type="text"/>
Session Timeout	0

Figure 5-23. RADIUS Settings

RADIUS Setting — Configures RADIUS server settings.

Note: RADIUS settings only apply to WPA, WPA2, or WPA/WPA2 Enterprise modes.

- **RADIUS Server IP Address** – Specifies the IP address of the RADIUS server.
- **RADIUS Server Port** – The User Datagram Protocol (UDP) port number used by the RADIUS server for authentication messages. (Range: 1024-65535; Default: 1812)
- **RADIUS Server Shared Secret** – A shared text string used to encrypt messages between the access point and the RADIUS server. Be sure that the same text string is specified on the RADIUS server. Do not use blank spaces in the string. (Maximum length: 20 characters)
- **RADIUS Server Session Timeout** – Number of seconds the access point waits for a reply from the RADIUS server before resending a request. (Range: 1-60 seconds; Default: 0)

Wi-Fi Protected Setup (WPS)

Wi-Fi Protected Setup (WPS) is designed to ease installation and activation of security features in wireless networks. WPS has two basic modes of operation, Push-button Configuration (PBC) and Personal Identification Number (PIN). The WPS PIN setup is optional to the PBC setup and provides more security. The WPS button on the wireless AP/Router can be pressed at any time to allow a single device to easily join the network.

Note: WPS settings only apply to WLAN1.

The WPS Settings page includes configuration options for setting WPS device PIN codes and activating the virtual WPS button.

Click on “Wireless Settings,” followed by “WPS”.

Wi-Fi Protected Setup

You could setup security easily by choosing PIN or PBC method to do Wi-Fi Protected Setup.

WPS Config

WPS: ▼

WPS Summary

WPS Current Status	Idle
WPS Configured	No
WPS SSID	WBR14S_N3_AP
WPS Auth Mode	Open
WPS Encryp Type	None
WPS Default Key Index	1
WPS Key (ASCII)	
AP PIN	31667845

Figure 5-24. WPS Settings

WPS Settings — Enables WPS, locks security settings, and refreshes WPS configuration information.

- **WPS Config** – Enables WPS. (Default: Disable)

WPS Summary – Provides detailed WPS statistical information.

- **WPS Current Status** – Displays if there is currently any WPS traffic connecting to the wireless AP/Router. (Options: Start WSC Process; Idle; Default: Idle)
- **WPS Configured** – States if WPS for wireless clients has been configured for this device. (Default: no)
- **WPS SSID** – The service set identifier for WLAN1. (Default: WBR14S_N3_AP)
- **WPS Auth Mode** – The method of authentication used. (Default: Open)
- **WPS Encryp Type** – The encryption type used for WLAN1. (Default: None)
- **WPS Default Key Index** – Displays the WEP default key (1~4).
- **WPS Key (ASCII)** – Displays the WPS security key (ASCII) which can be used to ensure the security of the wireless network.
- **AP PIN** – Displays the PIN Code for the wireless AP/Router. The default is exclusive for each unit. (Default: 31667845)

WPS Progress

WPS mode PIN PBC

PIN

WPS Status

WSC: Idle

Figure 5-25. WPS Progress Settings

WPS Config — Configures WPS settings for the wireless AP/Router.

- **WPS Mode** – Selects between methods of broadcasting the WPS beacon to network clients wanting to join the network:
 - **PIN:** The wireless AP/Router, along with other WPS devices, such as notebook PCs, cameras, or phones, all come with their own eight-digit PIN code. When one device, the WPS enrollee, sends a PIN code to the wireless AP/Router, it becomes the WPS registrar. After configuring PIN-Code information you must press “start WPS Config” to send the beacon, after which you have up to two minutes to activate WPS on devices that need to join the network.
 - **PBC:** This has the same effect as pressing the physical WPS button that is located on the front of the wireless AP/Router. After checking this option and clicking “Start WPS Config” you have up to two minutes to activate WPS on devices that need to join the network.

Station List

Display the station information which associated to this wireless AP/Router.

Station List

You could monitor stations which associated to this AP here.

Wireless Network							
MAC Address	Aid	PSM	MimoPS	MCS	BW	SGI	STBC

Figure 5-26. Station List

Firewall

The wireless AP/Router provides extensive firewall protection by restricting connection parameters to limit the risk of intrusion and defending against a wide array of common hacker attacks.

MAC/IP/Port Filtering

MAC/IP/Port filtering restricts connection parameters to limit the risk of intrusion and defends against a wide array of common hacker attacks. IP/Port filtering allows the unit to permit, deny or proxy traffic through its MAC addresses, IP addresses and ports.

The wireless AP/Router allows you define a sequential list of permit or deny filtering rules (up to 32). This device tests ingress packets against the filter rules one by one. A packet will be accepted as soon as it matches a permit rule, or dropped as soon as it matches a deny rule. If no rules match, the packet is either accepted or dropped depending on the default policy setting.

MAC/IP/Port Filtering Settings

You may setup firewall rules to protect your network from virus, worm and malicious activity on the Internet.

Basic Settings	
MAC/IP/Port Filtering	Disable ▾
Default Policy -- The packet that don't match with any rules would be:	Dropped ▾

MAC/IP/Port Filter Settings	
MAC address	<input type="text"/>
Dest IP Address	<input type="text"/>
Source IP Address	<input type="text"/>
Protocol	None ▾
Dest Port Range	<input type="text"/> - <input type="text"/>
Source Port Range	<input type="text"/> - <input type="text"/>
Action	Accept ▾
Comment	<input type="text"/>

(The maximum rule count is 32.)

Figure 5-27. MAC/IP/Port Filtering Settings

- **MAC/IP/Port Filtering** – Enables or disables MAC/IP/Port Filtering. (Default: Disable)
- **Default Policy** – When MAC/IP/Port Filtering is enabled, the default policy will be enabled. If you set the default policy to “Dropped”, all incoming packets that don’t match the rules will be dropped and vice versa. (Default: Disable)
- **MAC Address** – Specifies the MAC address to block or allow traffic from.
- **Destination IP Address** – Specifies the destination IP address to block or allow traffic from.
- **Source IP Address** – Specifies the source IP address to block or allow traffic from.
- **Protocol** – Specifies the destination port type, TCP, UDP or ICMP. (Default: None).
- **Destination Port Range** – Specifies the range of destination port to block traffic from the specified LAN IP address from reaching.
- **Source Port Range** – Specifies the range of source port to block traffic from the specified LAN IP address from reaching.
- **Action** – Specifies if traffic should be accepted or dropped. (Default: Accept)

Comment – Enter a useful comment to help identify the filtering rules.

Current MAC/IP/Port Filtering Rules									
No.	MAC address	Dest IP Address	Source IP Address	Protocol	Dest Port Range	Source Port Range	Action	Comment	Pkt Cnt
Others would be dropped									-
					<input type="button" value="Delete Selected"/> <input type="button" value="Reset"/>				

Figure 5-28. MAC/IP/Port Filtering Rules

Current Filter Rules

The Current Filter Table displays the configured IP addresses and ports that are permitted or denied access to and from the ADSL/Router.

- **Select** – Selects a table entry.
- **MAC Address** – Displays a MAC address to filter.
- **Destination IP Address** – Displays the destination IP address.
- **Source IP Address** – Displays the source IP address.
- **Protocol** – Displays the destination port type.
- **Destination Port Range** – Displays the destination port range.
- **Source Port Range** – Displays the source port range.
- **Action** – Displays if the specified traffic is accepted or dropped.
- **Comment** – Displays a useful comment to identify the routing rules.

Virtual Server Settings (Port Forwarding)

Virtual Server (sometimes referred to as Port Forwarding) is the act of forwarding a network port from one network node to another. This technique can allow an external user to reach a port on a private IP address (inside a LAN) from the outside through a NAT-enabled router. (Maximum 32 entries are allowed.)

Virtual Server Settings (Port Forwarding)

You may setup Virtual Servers to provide services on Internet.

Virtual Server Settings	
Virtual Server Settings	Enable <input type="button" value="v"/>
IP Address	<input type="text"/>
Port Range	<input type="text"/> - <input type="text"/>
Protocol	TCP&UDP <input type="button" value="v"/>
Comment	<input type="text"/>

(The maximum rule count is 32.)

Current Virtual Servers				
No.	IP Address	Port Range	Protocol	Comment
<input type="button" value="Delete Selected"/> <input type="button" value="Reset"/>				

Figure 5-29. Virtual Server Settings (Port Forwarding)

- **Virtual Server Setting** – Selects between enabling or disabling port forwarding the virtual server. (Default: Disable)
- **IP Address** – Specifies the IP address on the local network to allow external access to.
- **Port Range** – Specifies the port range through which traffic is forwarded.
- **Protocol** – Specifies a protocol to use for port forwarding, either TCP, UDP or both.
- **Comment** – Enter a useful comment to help identify the forwarded port service on the network.

Current Port Forwarding Table

The Current Port Forwarding Table displays the entries that are allowed to forward packets through the wireless AP/Router's firewall.

- **Select** – Selects an entry in the Current Port Forwarding Table.
- **IP Address** – Displays an IP address on the local network to allow external access to.
- **Port Range** – Displays the local port range.
- **Protocol** – Displays the protocol used for forwarding of this port.
- **Comment** – Displays a useful comment to identify the nature of the port to be forwarded.

DMZ

Enables a specified host PC on the local network to access the Internet without any firewall protection. Some Internet applications, such as interactive games or video conferencing, may not function properly behind the wireless AP/Router's firewall. By specifying a Demilitarized Zone (DMZ) host, the PC's TCP ports are completely exposed to the Internet, allowing open two-way communication. The host PC should be assigned a static IP address (which is mapped to its MAC address) and this must be configured as the DMZ IP address.

DMZ Settings

You may setup a De-militarized Zone (DMZ) to separate internal network and Internet.

DMZ Settings	
DMZ Settings	Disable ▾
DMZ IP Address	<input type="text"/>

Figure 5-30. DMZ Settings

- **DMZ Settings** – Sets the DMZ status to enabled, but changes do not take affect until the Apply changes button has been pressed and changes are saved to the running configuration. (Default: Disable)
- **DMZ IP Address** – Specifies an IP address on the local network allowed unblocked access to the WAN.

System Security

The ADSL/Router includes the facility to manage it from a remote location. The unit can also be sent a ping message from a remote location.

The screenshot shows a web interface titled "System Security Settings". Below the title is a descriptive sentence: "You may configure the system firewall to protect AP/Router itself from attacking." The interface is divided into three sections, each with a blue header bar and a light blue input field with a dropdown menu:

- Remote management**: The input field is labeled "Remote management (via WAN)" and the dropdown menu is set to "Deny".
- Ping form WAN Filter**: The input field is labeled "Ping form WAN Filter" and the dropdown menu is set to "Disable".
- Stateful Packet Inspection (SPI)**: The input field is labeled "SPI Firewall" and the dropdown menu is set to "Disable".

At the bottom of the form are two buttons: "Apply" and "Reset".

Figure 5-31. System Security Settings

- **Remote Management** – Denies or allows a remote access via WAN. (Default: Deny)
- **Ping from WAN Filter** – Sends a ping request on the WAN port to test for connectivity. (Default: Disable)
- **Stateful Packet Inspection (SPI)** – The Stateful Packet Inspection (SPI) firewall protects your network and computers against attacks and intrusions. A stateful packet firewall looks at packet contents to check if the traffic may involve some type of security risk. (Default: Disable)

Content Filtering

The wireless AP/Router provides a variety of options for blocking Internet access based on content, URL and host name.

Webs Content Filter Settings

You can setup Content Filter to restrict the improper content access.

Webs Content Filter

Filters:	<input type="checkbox"/> Proxy <input type="checkbox"/> Java <input type="checkbox"/> ActiveX
----------	---

Webs URL Filter Settings

Current Webs URL Filters:

No.	URL
-----	-----

Add a URL filter:

URL:	
------	--

Webs Host Filter Settings

Current Website Host Filters:

No.	Host(Keyword)
-----	---------------

Add a Host(keyword) Filter:

Keyword	
---------	--

Figure 5-32. Filter Settings

Webs Content Filter Settings — The wireless AP/Router blocks access to specific traffic such as proxies, Java Applets and ActiveX. Check the box for whichever service to be blocked then click “Apply”.

- Content Filter – Selects Webs content filters. (Options: Proxy/Java/ActivX)

Webs URL Filter Settings — By filtering inbound Uniform Resource Locators (URLs) the risk of compromising the network can be reduced. URLs are commonly used to point to websites. By specifying a URL or a keyword contained in a URL traffic from that site may be blocked.

- **Current URL Filters** – Displays current URL filter.
- **Add a URL Filter** – Adds a URL filter to the settings. For example, myhost.example.com.

Webs Host Filter Settings — The wireless AP/Router allows Internet content access to be restricted based on web address keywords and web domains. A domain name is the name of a particular web site. For example, for the address www.FUNGAMES.com, the domain name is FUNGAMES.com. Enter the Keyword then click “Add”.

- **Current Host Filters** – Displays current Host filter.
- **Add a Host Filter** – Enters the keyword for a host filtering.

Administration Settings

The wireless AP/Router’s Administration Settings menu provides the same configuration options in both Gateway and Bridge Mode. These settings allow you to configure a management access password, set the system time, upgrade the system software, display the system status and statistics.

System Management

System Management

You may configure administrator account and password, NTP settings, and Dynamic DNS settings here.

Language Setting

Select Language: English

Apply Cancel

Administrator Settings

Account: admin

Password:

Confirm New Password:

Apply Cancel

Figure 5-33. System Management Settings

Language Settings

You can change the language displayed in web interface. Chooses the appropriate language of your choice from the drop-down list, then click “Apply”. (Options: English/Traditional Chinese/Simplified Chinese. Default: English)

Administrator Settings

To protect access to the management interface, you need to configure a new Administrator's user name and password as soon as possible. If a new user name and password are not configured, then anyone having access to the wireless AP/ Router may be able to compromise the unit's security by entering the default values. Once a new Administrator has been configured, you can delete the default "admin" user name from the system.

- **Username** – The name of the user. The default names preset for access to the unit is "admin". (Length: 3-16 characters, case sensitive)
- **Password** – The password for management access. The default password preset for access to the unit is "smcadmin" (Length: 3-16 characters, case sensitive)
- **Confirm Password** – Prompts you to enter the password again for verification.

NTP Settings

The System Management page allows you to manually configure time settings or enable the use of an Network Time Protocol (NTP) server.

NTP Settings	
Current Time	Sat Jan 1 00:14:30 UTC 2000 <input type="button" value="Sync with host"/>
Time Zone	(GMT-11:00) Midway Island, Samoa <input type="button" value="v"/>
Primary NTP Server	<input type="text"/> ex: time.nist.gov time.stdtime.gov.tw
Secondary NTP Server	<input type="text"/>
<input type="button" value="Apply"/> <input type="button" value="Cancel"/>	

Figure 5-34. NTP Settings

- **Date Time Set By** – Allows you to manually configure time settings or select the use of an NTP server.
- **Time Zone** – Specifies the time zone in Greenwich Mean Time (GMT).
- **NTP Server Primary/Secondary** – The IP address or URL of the NTP server to be used.

Green AP Settings

The GreenAP feature is used for reducing the wireless AP/Router's power consumption. Before setting the Green AP duration, you need to configure the NTP settings first, then choose one of the options from Action drop-down list. The WiFi Tx Power indicates how much antenna power you want to use. Less power means the wireless AP/Router can only cover a shorter range. The final step is to set the GreenAP duration. For example, you might set the TxPower 25% during your sleeping hours, or TxPower OFF while you are away.

Green AP	
Duration	Action
23 : 00 ~ 07 : 00	WiFi TxPower OFF
08 : 00 ~ 10 : 00	WiFi TxPower 75%
00 : 00 ~ 00 : 00	Disable
00 : 00 ~ 00 : 00	Disable

Figure 5-35. Green AP Settings

DDNS Settings

Dynamic DNS (DDNS) provides users on the Internet with a method to tie a specific domain name to the unit's dynamically assigned IP address. DDNS allows your domain name to follow your IP address automatically by changing your DNS records when your IP address changes.

The wireless AP/Router provides access to three DDNS service providers, DynDns.org, Non-IP.com and ZoneEdit.com. To set up an DDNS account, visit the websites of these service providers at www.dyndns.org, www.non-ip.com, or www.zoneedit.com.

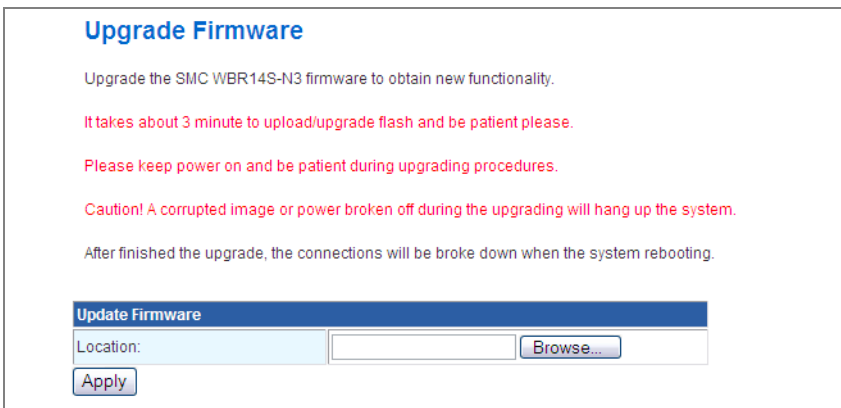
DDNS Settings	
Dynamic DNS Provider	None
Account	
Password	
DDNS	

Figure 5-36. DDNS Setting (Gateway Mode)

- **Dynamic DNS Provider** – Specifies the DDNS service provider, DynDns.org, Freedns.afraid.org, ZoneEdit.com or Non-IP.com. (Default: DynDns.org)
- **DDNS Account** – Specifies your username for the DDNS service.
- **DDNS Password** – Specifies your password for the DDNS service.
- **Apply** – Saves and sends the enabled DDNS configuration to the DDNS server.
- **Cancel** – Cancels the previous DDNS configuration information.

Upgrade Firmware

You can update the wireless AP/Router firmware by using the Firmware Update facility.



The screenshot shows a web interface for upgrading firmware. At the top, the title "Upgrade Firmware" is displayed in blue. Below the title, there are several lines of text: "Upgrade the SMC WBR14S-N3 firmware to obtain new functionality.", "It takes about 3 minute to upload/upgrade flash and be patient please.", "Please keep power on and be patient during upgrading procedures.", and "Caution! A corrupted image or power broken off during the upgrading will hang up the system." Below this text, a note states "After finished the upgrade, the connections will be broke down when the system rebooting." The interface includes a blue header bar with the text "Update Firmware". Below the header, there is a "Location:" label, a text input field, and a "Browse..." button. At the bottom left, there is an "Apply" button.

Figure 5-37. Upgrade Firmware

Update Firmware — Allows you to upload new firmware manually by specifying a file path. Make sure the firmware you want to use is on the local computer by clicking Browse to search for the firmware to be used for the update.

- **Browse** – Opens a directory on the local hard drive for specifying the path of the file to upload.
- **Apply** – Starts the upload procedure.

Configuration Settings

The Configuration Setting page allows you to save the wireless AP/Router's current configuration or restore a previously saved configuration back to the device.

Settings Management

You might save system settings by exporting them to a configuration file, restore them by importing the file, or reset them to factory default.

Load Factory Defaults	
Load Default Button	<input type="button" value="Load Default"/>

Export Settings	
Export Button	<input type="button" value="Export"/>

Warning! To import the incorrect configuration file will lose your settings.

Import Settings	
Setting file location	<input style="width: 100%;" type="text"/> <input style="float: right;" type="button" value="Browse..."/>

Figure 5-38. Configuration Settings

- **Load Factory Defaults** – Restores the factory defaults.
- **Export** – Saves the current configuration to a file locally.
- **Import** – Allows the user to load previously saved configuration files from a local source.

System Status

The System Information page displays basic system information and the displayed settings are for status information only and are not configurable on this page. This information is split into the three sections that follow.

System Status

Take a look at the status of SMC WBR14S-N3 Router.

System Info	
Software Version	v1.0.0.13
Hardware Version	yyyy
System Up Time	0 day, 2 hours, 51 mins
Operation Mode	Gateway Mode

Figure 5-39. System Information - Basic Information

System Info — Displays the basic system information in both Bridge and Gateway Modes:

- **Software Version** – The version number of the current wireless AP/Router software.
- **Hardware Version** – The version number of the current wireless AP/Router hardware.
- **System Up Time** – Length of time the management agent has been up, specified in hours and minutes.
- **Operation Mode** – Displays the hardware setting determined by the switch on the base of the unit.

Internet Configurations	
Connected Type	DHCP
WAN IP Address	
Subnet Mask	
Default Gateway	
Primary Domain Name Server	
Secondary Domain Name Server	
MAC Address	00:0C:43:30:52:66

Figure 5-40. System Information - Internet Configuration (Gateway Mode)

Internet Configurations — Displays the basic WAN information:

- **Connected Type** – Displays the WAN connected mode. (Default: DHCP)
- **WAN IP Address** – IP address of the WAN port for this device.
- **Subnet Mask** – The mask that identifies the host address bits used for routing to the WAN port.
- **Default Gateway** – The default gateway is the IP address of the router for the wireless AP/Router, which is used if the requested destination address is not on the local subnet.
- **Primary DNS Server / Secondary DNS Server** – The IP address of Domain Name Servers on the network. A DNS maps numerical IP addresses to domain names and can be used to identify network hosts by familiar names instead of the IP addresses.
- **MAC Address** – The shared physical layer address for the wireless AP/Router's LAN ports.

Local Network	
Local IP Address	192.168.2.1
Local Netmask	255.255.255.0
MAC Address	00:0C:43:30:52:40

Figure 5-41. System Information - Local Network (Gateway Mode)

Local Network — Displays the basic LAN information:

- **Local IP Address** – The IP address configured on the wireless AP/Router.
- **Local Netmask** – The mask that identifies the host address bits used for routing to the LAN port.
- **MAC Address** – The shared physical layer address for the wireless AP/Router's LAN ports.

Statistics

The wireless AP/Router Traffic Statistics - Interfaces window displays received and transmitted packet statistics for all interfaces on the wireless AP/Router.

Statistic	
Take a look at the SMC WBR14S-N3 statistics.	
Memory	
Memory total:	11896 kB
Memory left:	2084 kB
WAN/LAN	
WAN Rx packets:	0
WAN Rx bytes:	0
WAN Tx packets:	9
WAN Tx bytes:	2274
LAN Rx packets:	155
LAN Rx bytes:	17254
LAN Tx packets:	196
LAN Tx bytes:	117478
Interfaces	
Name	eth2
LAN Rx packets:	164
LAN Rx bytes:	21020
LAN Tx packets:	201
LAN Tx bytes:	117872

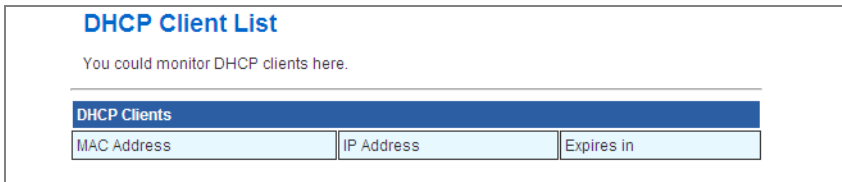
Figure 5-42. Statistic

The following items are displayed on this page:

- **Memory total** – The total memory of this wireless AP/Router.
- **Memory left** – The available memory of this wireless AP/Router.
- **Interface** – Displays the interface on which traffic is being monitored.
- **Rx packets** – Displays the total number of packets received by the specified interface.
- **Rx bytes** – Displays the total number of bytes transmitted by the specified interface.
- **Tx packets** – Displays the total number of packets transmitted by the specified interfaces.
- **Tx bytes** – Displays the total number of bytes transmitted by the specified interface.

DHCP Clients

Lists information about associated DHCP clients.



DHCP Client List		
You could monitor DHCP clients here.		
DHCP Clients		
MAC Address	IP Address	Expires in

Figure 5-43. DHCP Client List (Gateway Mode)

- **MAC Address** – The MAC address of the DHCP client.
- **IP Address** – The IP address of the DHCP client.
- **Expires in** – The time after which the connection will expire and the DHCP client must request a new IP address.

System Log

The wireless AP/Router supports a logging process that controls error messages saved to memory or sent to a Syslog server. The logged messages serve as a valuable tool for isolating wireless AP/Router and network problems. The System Log page displays the latest messages logged in chronological order, from the newest to the oldest. Log messages saved in the wireless AP/Router's memory are erased when the device is rebooted.

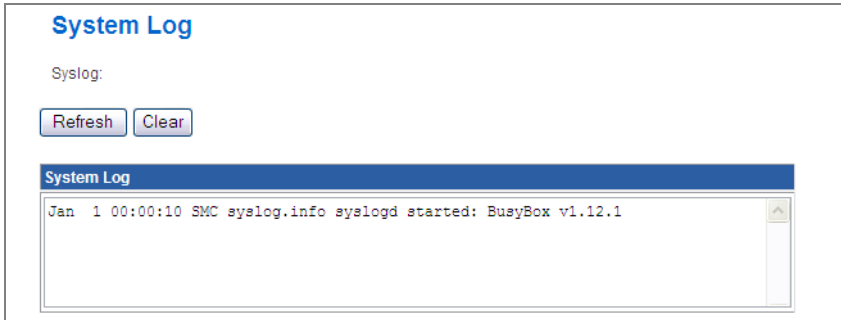


Figure 5-44. System Logs

- **Refresh** – Sends a request to add the latest entries to the System Log Table.
- **Clear** – Removes the current system log messages from the System Log Table.

Reboot

- **Reboot** – Click the button to reboot the wireless AP/Router.

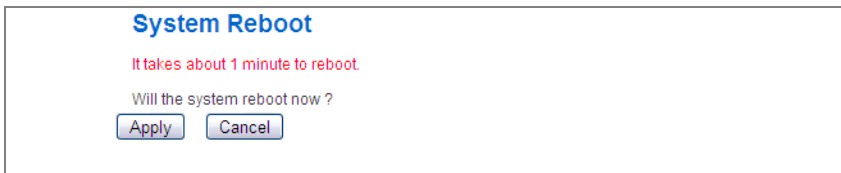


Figure 5-45. System Reboot

Appendix A: Troubleshooting

Check the following items before you contact local Technical Support.

1. If wireless clients cannot access the network, check the following:
 - Be sure the access point and the wireless clients are configured with the same Service Set ID (SSID).
 - If authentication or encryption are enabled, ensure that the wireless clients are properly configured with the appropriate authentication or encryption keys.
2. If the wireless AP/Router cannot be configured using a web browser:
 - Be sure to have configured the access point with a valid IP address, subnet mask and default gateway.
 - If you are connecting to the wireless AP/Router through the wired Ethernet interface, check the network cabling between the management station and the wireless AP/Router. If you are connecting to wireless AP/Router from a wireless client, ensure that you have a valid connection to the wireless AP/Router.
3. If you forgot or lost the password:
 - Set the wireless AP/Router to its default configuration by pressing the reset button on the bottom panel for 5 seconds or more. Connect to the web management interface using the default IP address 192.168.2.1. Then set up a new user name and password to access the management interface.
4. If all other recovery measure fail, and the wireless AP/Router is still not functioning properly, take any of these steps:
 - Reset the wireless AP/Router's hardware using the web interface or through a power reset.
 - Reset the wireless AP/Router to its default configuration by pressing the reset button on the back panel for 5 seconds or more. Connect to the web management interface using the default IP address 192.168.2.1, then setup a user name and password.

Diagnosing LED Indicators

Troubleshooting Chart	
Symptom	Action
POWER LED is Off	<ul style="list-style-type: none">• The AC power adapter may be disconnected. Check connections between the wireless AP/Router, the power adapter, and the wall outlet.
WLAN LED is Off	<ul style="list-style-type: none">• The wireless AP/Router's radio has been disabled through it's web management interface. Access the management interface using a web browser to enable the radio.
LAN/WAN LED is Off (when port connected)	<ul style="list-style-type: none">• Verify that the wireless AP/Router and attached device are powered on.• Be sure the cable is plugged into both the wireless AP/Router and corresponding device.• Verify that the proper cable type is used and its length does not exceed specified limits.• Check the cable connections for possible defects. Replace the defective cable if necessary.

Appendix B: Specifications

Operating Frequency

802.11b/g/n:

2.412 ~ 2.462 GHz (USA, Canada Ch1- Ch11)

2.412 ~ 2.472 GHz (Europe Ch1- Ch13)

2.412 ~ 2.484 GHz (Japan Ch1- Ch14)

2.412 ~ 2.462 GHz (Taiwan Ch1-Ch11)

Data Rate

802.11b: 1, 2, 5.5, 11 Mbps per channel

802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps per channel

Draft 802.11n (20MHz, 400ns GI): 7.2, 14.4, 21.7, 28.9, 43.3, 57.8, 65, 72.2, 14.4, 28.9, 43.3, 57.8, 86.7, 115.6, 130, 144.4 Mbps per channel

Draft 802.11n (40MHz, 400ns GI): 15, 30, 45, 60, 90, 120, 135, 150, 30, 60, 90, 120, 180, 240, 270, 300 Mbps per channel

Operating Channels

802.11b/g/n compliant:

11 channels (US, Canada)

13 channels (ETSI)

14 channels (Japan)

11 channels (Taiwan)

Modulation Type

CCK, DQPSK, DBPSK for DSSS

64QAM, 16QAM, QPSK, BPSK for OFDM

Frequency Range

FCC/NCC: 2412MHz ~ 2462MHz

CE: 2412MHz ~ 2472MHz

AC Power Adapter

Input: 110 or 240 VAC, 50-60 Hz

Output: 5V, 2A

LED Indicators

POWER, LAN (Ethernet Link/Activity), WAN, (Ethernet Link/Activity), WLAN (Wireless Link/Activity), WPS (WPS in progress)

Network Management

Web-browser

Temperature

Operating: 0 to 45 °C (32 to 113 °F)

Storage: 0 to 45 °C (32 to 113 °F)

Humidity

5% to 95% (non-condensing)

Compliances

FCC Part 15B Class B

EN 55022

EN 55024

EN61000-3-2

EN61000-3-3

Radio Signal Certification

FCC Part 15C 15.247, 15.207 (2.4 GHz)

EN 300 328

EN 301 489-1

EN 301 489-17

Standards

IEEE 802.11b/g

IEEE 802.11n draft v2.0

Physical Size

184 x 130 x 34.6 mm (7.24 x 5.11 x 1.36 in)

Weight

255 g (9.0 oz)

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Glossary

10BASE-T

IEEE 802.3-2005 specification for 10 Mbps Ethernet over two pairs of Category 3 or better UTP cable.

100BASE-TX

IEEE 802.3-2005 specification for 100 Mbps Fast Ethernet over two pairs of Category 5 or better UTP cable.

Access Point

An internetworking device that seamlessly connects wired and wireless networks. Access points attached to a wired network, support the creation of multiple radio cells that enable roaming throughout a facility.

Advanced Encryption Standard (AES)

An encryption algorithm that implements symmetric key cryptography. AES provides very strong encryption using a completely different ciphering algorithm to TKIP and WEP.

Authentication

The process to verify the identity of a client requesting network access. IEEE 802.11 specifies two forms of authentication: open system and shared key.

Backbone

The core infrastructure of a network. The portion of the network that transports information from one central location to another central location where it is unloaded onto a local system.

Beacon

A signal periodically transmitted from the access point that is used to identify the service set, and to maintain contact with wireless clients.

Broadcast Key

Broadcast keys are sent to stations using dynamic keying. Dynamic broadcast key rotation is often used to allow the access point to generate a random group key and periodically update all key-management capable wireless clients.

Dynamic Host Configuration Protocol (DHCP)

Provides a framework for passing configuration information to hosts on a TCP/IP network. DHCP is based on the Bootstrap Protocol (BOOTP), adding the capability of automatic allocation of reusable network addresses and additional configuration options.

Encryption

Data passing between the access point and clients can use encryption to protect from interception and eavesdropping.

Ethernet

A popular local area data communications network, which accepts transmission from computers and terminals.

File Transfer Protocol (FTP)

A TCP/IP protocol used for file transfer.

Hypertext Transfer Protocol (HTTP)

HTTP is a standard used to transmit and receive all data over the World Wide Web.

IEEE 802.11b

A wireless standard that supports wireless communications in the 2.4 GHz band using Direct Sequence Spread Spectrum (DSSS). The standard provides for data rates of 1, 2, 5.5, and 11 Mbps.

IEEE 802.11g

A wireless standard that supports wireless communications in the 2.4 GHz band using Orthogonal Frequency Division Multiplexing (OFDM). The standard provides for data rates of 6, 9, 11, 12, 18, 24, 36, 48, 54 Mbps. IEEE 802.11g is also backward compatible with IEEE 802.11b.

IEEE 802.11n

A wireless standard that supports wireless communications in the 2.4 GHz band using Orthogonal Frequency Division Multiplexing (OFDM). The standard provides for data rates of 27, 54, 81, 108, 162, 216, 243, 270, 300 Mbps. IEEE 802.11n is also backward compatible with IEEE 802.11b/g.

Infrastructure

An integrated wireless and wired LAN is called an infrastructure configuration.

Local Area Network (LAN)

A group of interconnected computer and support devices.

MAC Address

The physical layer address used to uniquely identify network nodes.

Network Time Protocol (NTP)

NTP provides the mechanisms to synchronize time across the network. The time servers operate in a hierarchical-master-slave configuration in order to synchronize local clocks within the subnet and to national time standards via wire or radio.

Open System

A security option which broadcasts a beacon signal including the access point's configured SSID. Wireless clients can read the SSID from the beacon, and automatically reset their SSID to allow immediate connection to the nearest access point.

Orthogonal Frequency Division Multiplexing (OFDM)

OFDM allows multiple users to transmit in an allocated band by dividing the bandwidth into many narrow bandwidth carriers.

Repeater and Bridge

Repeater and bridge can provide an extended link to a remote access point from the wired LAN. Access Point working in this mode could connect to another AP in Access Point mode or Repeater and Bridge mode. Whenever there are two APs having wireless link together (one in Access Point or Repeater and Bridge mode, another using Repeater and Bridge mode), and also have wired link separately, these two APs are also working as "bridging" for the two wired links.

Service Set Identifier (SSID)

An identifier that is attached to packets sent over the wireless LAN and functions as a password for joining a particular radio cell; i.e., Basic Service Set (BSS).

Session Key

Session keys are unique to each client, and are used to authenticate a client connection, and correlate traffic passing between a specific client and the access point.

Shared Key

A shared key can be used to authenticate each client attached to a wireless network. Shared Key authentication must be used along with the 802.11 Wireless Equivalent Privacy algorithm.

Simple Network Time Protocol (SNTP)

SNTP allows a device to set its internal clock based on periodic updates from a Network Time Protocol (NTP) server. Updates can be requested from a specific NTP server, or can be received via broadcasts sent by NTP servers.

Temporal Key Integrity Protocol (TKIP)

A data encryption method designed as a replacement for WEP. TKIP avoids the problems of WEP static keys by dynamically changing data encryption keys.

Trivial File Transfer Protocol (TFTP)

A TCP/IP protocol commonly used for software downloads.

Virtual Access Point (VAP)

Virtual AP technology multiplies the number of Access Points present within the RF footprint of a single physical access device. With Virtual AP technology, WLAN users within the device's footprint can associate with what appears to be different access points and their associated network services. All the services are delivered using a single radio channel, enabling Virtual AP technology to optimize the use of limited WLAN radio spectrum.

Wi-Fi Protected Access

WPA employs 802.1X as its basic framework for user authentication and dynamic key management to provide an enhanced security solution for 802.11 wireless networks.

Wired Equivalent Privacy (WEP)

WEP is based on the use of security keys and the popular RC4 encryption algorithm. Wireless devices without a valid WEP key will be excluded from network traffic.

WPA Pre-shared Key (WPA-PSK)

WPA-PSK can be used for small office networks with a limited number of users that may not need a high level of security. WPA-PSK provides a simple security implementation that uses just a pre-shared password for network access.

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TECHNICAL SUPPORT

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