SMC ®
N e t w o r k s

USER GUIDE

SMCWBR14-N2 | Barricade™ N
2.4GHz Draft 11n
Wireless 4-port Broadband Router

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* SMC will provide warranty service for one year following discontinuance from the active SMC price list. Under the limited lifetime warranty, internal and external power supplies, fans, and cables are covered by a standard one-year warranty from date of purchase.

<div align="center">

SMC Networks, Inc.
20 Mason
Irvine, CA 92618

</div>

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 or more of the following measures:
• Reorient or relocate the receiving antenna.
• Increase the distance between the equipment and receiver.
• Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
• Consult the dealer or an experienced radio/TV technician for help.
FCC Caution: To assure continued compliance, (example - use only shielded interface cables when connecting to computer or peripheral devices) any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

IMPORTANT NOTE
FCC Radiation Exposure Statement:
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

CE Mark Declaration of Conformance for EMI and Safety (EEC)
This device complies with the essential requirements of the R&TTE Directive 1999/5/EC.
The following references have been applied in order to prove presumption of compliance with the R&TTE Directive 1999/5/EC:

• EN 300 328
• EN 301 489-1
• EN 301 489-17
• EN 60950-1

Table of Contents

Getting Started with the SMCWBR14-N2

Congratulations on purchasing the SMCWBR14-N2. This manual provides information for setting up and configuring the SMCWBR14-N2. This manual is intended for both home users and professionals.

The following conventions are used in this manual:

THE NOTE SYMBOL INDICATES ADDITIONAL INFORMATION ON THE TOPIC AT HAND.

THE TIP SYMBOL INDICATES HELPFULL INFORMATION AND TIPS TO IMPROVE YOUR NETWORK EXPERIENCE.

THE CAUTION SYMBOL ALERTS YOU TO SITUATIONS THAT MAY DEGRADE YOUR NETWORKING EXPERIENCE OR COMPROMISE

LIKE NOTES AND TIPS, THE IMPORTANT SYMBOL INDICATES INFORMATION THAT CAN IMPROVE NETWORKING. THIS INFORMATION SHOULD NOT BE OVERLOOKED.

Package Contents

- Barricade™ N Broadband Router (SMCWBR14-N2)

- Yellow RJ-45 Ethernet Cable

- Power Adapter (12V, 1A)

- Documentation CD

- Quick Installation Guide

- Warranty registration card

 CAUTION Using a power supply with a different voltage than the one included with your product will cause damage and void the warranty for this product.

Minimum System Requirements

- Broadband (Cable/xDSL) Internet service and Modem with Ethernet connection.

- 2.4GHz 802.11n draft wireless adapter or 2.4GHz 802.11b/g wireless adapter installed on each PC. Alternatively an Ethernet adapter can be used.

- Internet Explorer 5.5 or above, Netscape 4.7 or above, Mozilla Firefox 1.0 or above

Wireless LAN Networking

This section provides background information on wireless LAN networking technology. Consult the **Glossary** for definitions of the terminology used in this section.

> ⚠️
> **CAUTION**
>
> THE INFORMATION IN THIS SECTION IS FOR YOUR REFERENCE. CHANGING NETWORK SETTINGS AND PARTICULARLY SECURITY SETTTINGS SHOULD ONLY BE DONE BY AN AUTHORIZED ADMINISTRATOR.

Transmission Rate (Transfer Rate)

The SMCWBR14-N2 provides various transmission (data) rate options for you to select. In most networking scenarios, the factory default Best (automatic) setting proves the most efficient. This setting allows your SMCWBR14-N2 to operate at the maximum transmission (data) rate. When the communication quality drops below a certain level, the SMCWBR14-N2 automatically switches to a lower transmission (data) rate. Transmission at lower data speeds is usually more reliable. However, when the communication quality improves again, the SMCWBR14-N2 gradually increases the transmission (data) rate again until it reaches the highest available transmission rate.

Types of Wireless Networks

Wireless LAN networking works in either of the two modes: ad-hoc and infrastructure. In infrastructure mode, wireless devices communicate to a wired LAN via access points. Each access point and its wireless devices are known as a Basic Service Set (BSS). An Extended Service Set (ESS) is two or more BSSs in the same subnet. In ad hoc mode (also known as peer-to-peer mode), wireless devices communicate with each other directly and do not use an access point. This is an Independent BSS (IBSS).

To connect to a wired network within a coverage area using access points, set the operation mode to Infrastructure (BSS). To set up an independent wireless workgroup without an access point, use Ad-hoc (IBSS) mode.

AD-HOC (IBSS) NETWORK

Ad-hoc mode does not require an access point or a wired network. Two or more wireless stations communicate directly to each other. An ad-hoc network may sometimes be referred to as an Independent Basic Service Set (IBSS).
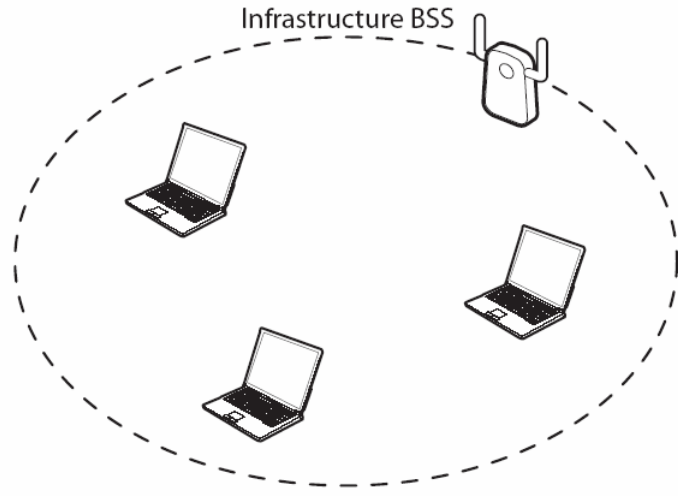
To set up an ad-hoc network, configure all the stations in ad-hoc mode. Use the same SSID and

channel for each station.

Ad-hoc IBSS
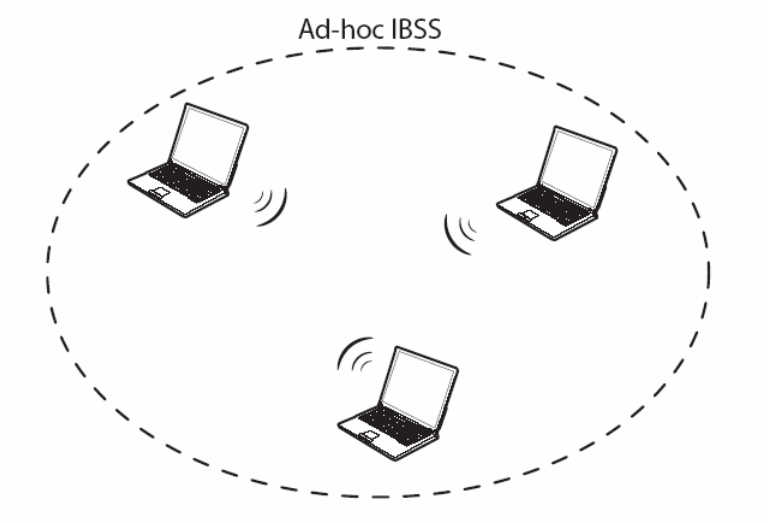
Ad-hoc (also known as peer-to-peer) network diagram

When a number of wireless stations are connected using a single access point, you have a Basic Service Set (BSS).

Infrastructure BSS

Infrastructure (IBSS) network diagram

In the ESS diagram below, communication is done through the access points, which relay data packets to other wireless stations or devices connected to the wired network. Wireless stations can then access resources, such as a printer, on the wired network.

Ethernet

❶ BSS ❷ BSS

A B C

ESS
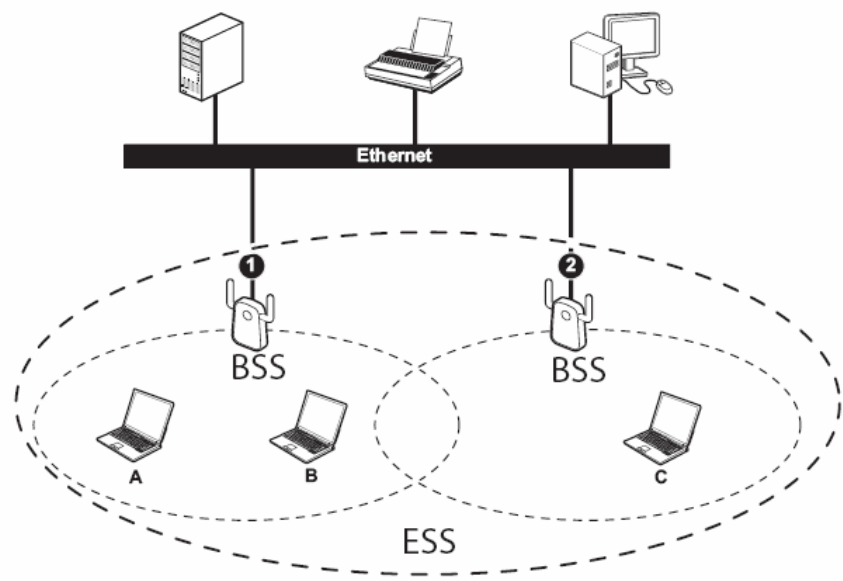
Infrastructure (ESS) network diagram

In an ESS environment, users are able to move from one access point to another without losing the connection. In the diagram below, when the user moves from BSS (1) to BSS (2) the WLAN client devices automatically switches to the channel used in BSS (2).
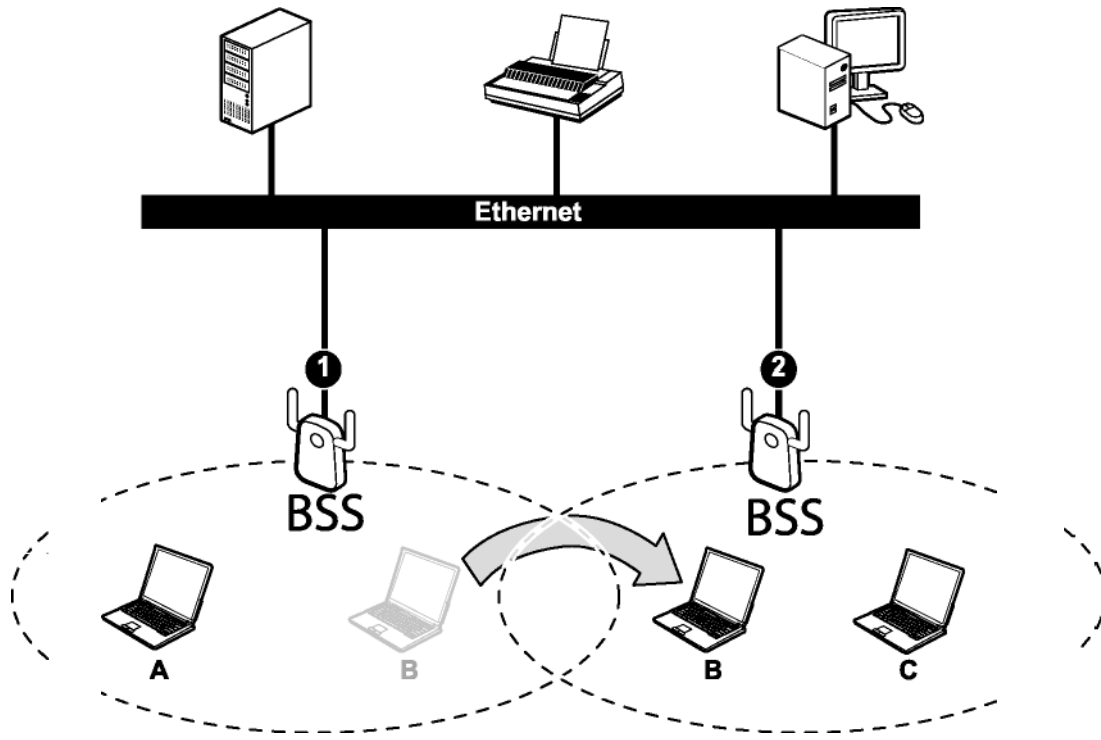
Roaming in an ESS network diagram

Introduction

The SMCWBR14-N2 is a high-performance, wireless router that supports high-speed wireless networking at home, at work or in public places.

Unlike most routers, the SMCWBR14-N2 provides data transfers at up to 300Mbps when using 11n (Draft) connection. This router is also backwards compatible with 802.11g or 11b devices. This means that you do not need to change your entire network to maintain connectivity. You may sacrifice some of 11n's (Draft) speed when you mix 11n (Draft) and 11b/g devices, but you will not lose the ability to communicate when you incorporate the 11n (Draft) standard into your 11b/g network. You may choose to slowly change your network by gradually replacing the 11b/g devices with 11n (Draft) devices.

Features

- ➢ Wi-Fi Compliant with IEEE 802.11n (draft) and IEEEE 802.11b/g Standards
- ➢ 2.412 to 2.484GHz frequency band operation
- ➢ Compliant with IEEE 802.3 & 3u standards
- ➢ Support OFDM and CCK modulation
- ➢ High-Speed up to 300Mbps Data Rate using IEEE 802.11n (draft) connection
- ➢ Supports Cable/DSL Modems with Dynamic IP, Static IP, PPPoE, PPTP, L2TP or BigPond Connection Types
- ➢ Firewall features Network Address Translation (NAT), and Stateful Packet Inspection (SPI) protects against Dos attacks
- ➢ Traffic Control with Virtual Server (max 64 configurable servers) and DMZ
- ➢ UPnP (Universal Plug & Play) and ALGs Support for Internet applications such as Email, FTP, Gaming, Remote Desktop, Net Meeting, Telnet, and more
- ➢ Provides Additional Security of Enable/Disable SSID, Internet Access Control (Services, URL and MAC Filtering)
- ➢ Supports Multiple and Concurrent IPSec, L2TP and PPTP VPN Pass-Through Sessions
- ➢ Flash Memory for Firmware Upgrade, Save/Restore Settings
- ➢ Easy Management via Web Browser (HTTP) and Remote Management
- ➢ Supports 64/128-bit WEP, WPA/WPA2, and WPA-PSK/WPA2-PSK
- ➢ Compliant with Windows 98/NT/2000/XP/2003 Server, Linux and Mac OS
- ➢ Support 4 x 10/100Mbps Auto-MDIX LAN Port and 1 x 10/100Mbps WAN Port (Internet)
- ➢ Built-in 3 External Antennas to support high speed performance and great coverage

Hardware Overview

Back/Side Panel

POWER

The Power input connector is a single jack socket to supply power to the SMCWBR14-N2.

Please use the Power Adapter provided in the SMCWBR14-N2 package.

RESET

Pressing the reset button restores the router to its original factory default settings.

WLAN ON/OFF

The WLAN ON/OFF slide switch can be used to turn the wireless AP function ON/OFF

WAN (Auto MDI/MDIX)

The WAN port is used to connect to an Ethernet Cable or xDSL modem

LAN1-4 (Auto MDI/MDIX)

The LAN ports are used for connecting networking devices such as PC's, Printers & Switches. The LAN ports automatically sense the cable type when connecting to Ethernet enabled computers.

LAN1-4 (Auto MDI/MDIX)

The LAN ports are used for connecting networking devices such as PC's, Printers & Switches. The LAN ports automatically sense the cable type when connecting to Ethernet enabled computers.

WPS

When prompted press the WPS button to configure wireless security.

Front Panel LED's
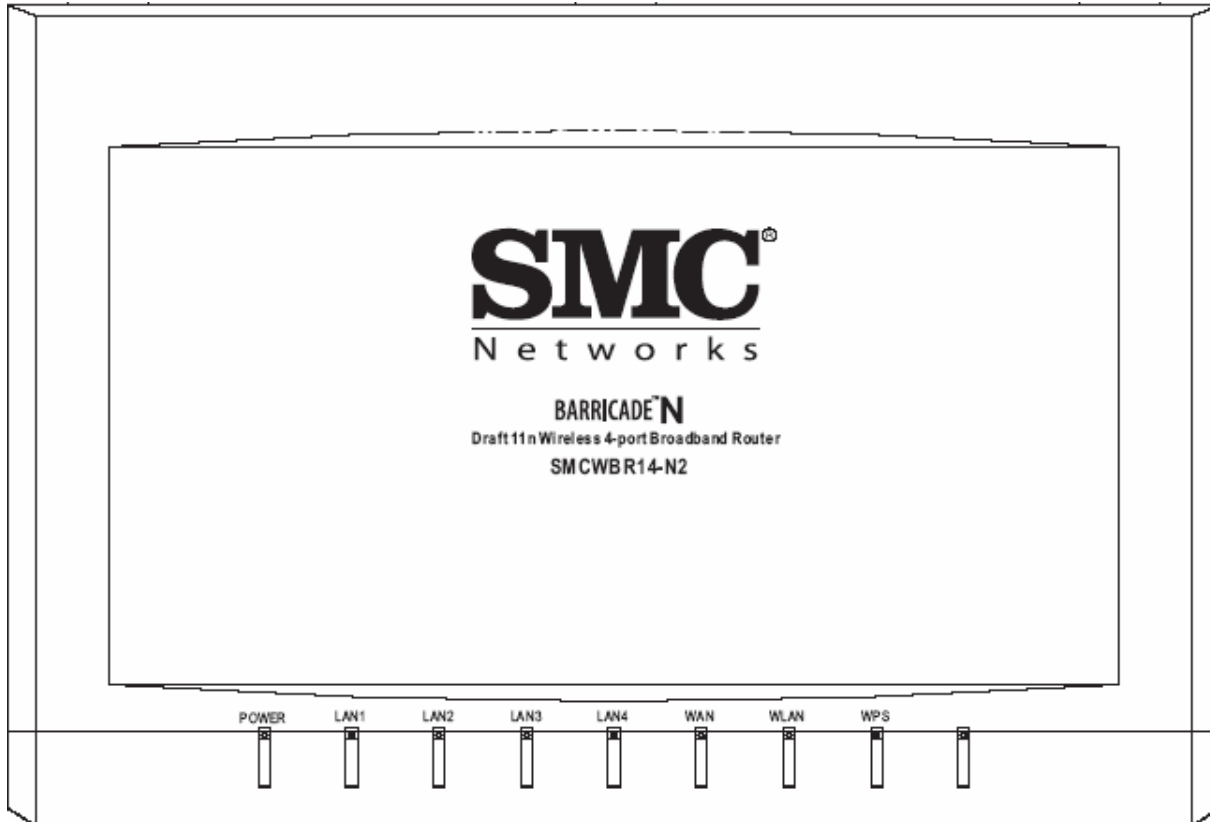
POWER

A solid green LED indicates the SMCWBR14-N2 is receiving power – normal operation. If the LED is off there is no power to device or failure.

LAN1-4

A solid green LED indicates the corresponding LAN port connection is established. The LED blinks when data is transmitted. If the LED is off there is no link for corresponding LAN port.

WAN

A solid green LED indicates the WAN port connection is established. The LED blinks when data is transmitted. If the LED is off there is no link for the WAN port.

WLAN

A solid green LED indicates the wireless AP is ready. The LED blinks when wireless data is transmitted.

WPS

After pressing the WPS button the WPS LED will blink continually. When a client joins the network successfully the LED will stop blinking and become solid until the next WPS action or the device is rebooted. If no client joins the LED will stop blinking and switch off after 4 minutes.

Installation Considerations

The SMCWBR14-N2 lets you access your network, using a wireless connection, from virtually anywhere within its operating range. Keep in mind, however, that the number, thickness and location of walls, ceilings, or other objects that the wireless signals must pass through, may limit the range. Typical ranges vary depending on the types of materials and background RF (radio frequency) noise in your home or business. The key to maximizing wireless range is to follow these basic guidelines:

1   Keep the number of walls and ceilings between the SMCWBR14-N2 and other network devices to a minimum - each wall or ceiling can reduce your wireless product's range from 3-90 feet (1-30 meters.) Position your devices so that the number of walls or ceilings is minimized.

2   Be aware of the direct line between network devices. A wall that is 1.5 feet thick (.5 meters), at a 45-degree angle appears to be almost 3 feet (1 meter) thick. At a 2-degree angle it looks over 42 feet (14 meters) thick! Position devices so that the signal will travel straight through a wall or ceiling (instead of at an angle) for better reception.

3   Building Materials can impede the wireless signal - a solid metal door or aluminum studs may have a negative effect on range. Try to position wireless devices and computers with wireless adapters so that the signal passes through drywall or open doorways and not other materials.

4   Keep your product away (at least 3-6 feet or 1-2 meters) from electrical devices or appliances that generate extreme RF noise.

Getting Started
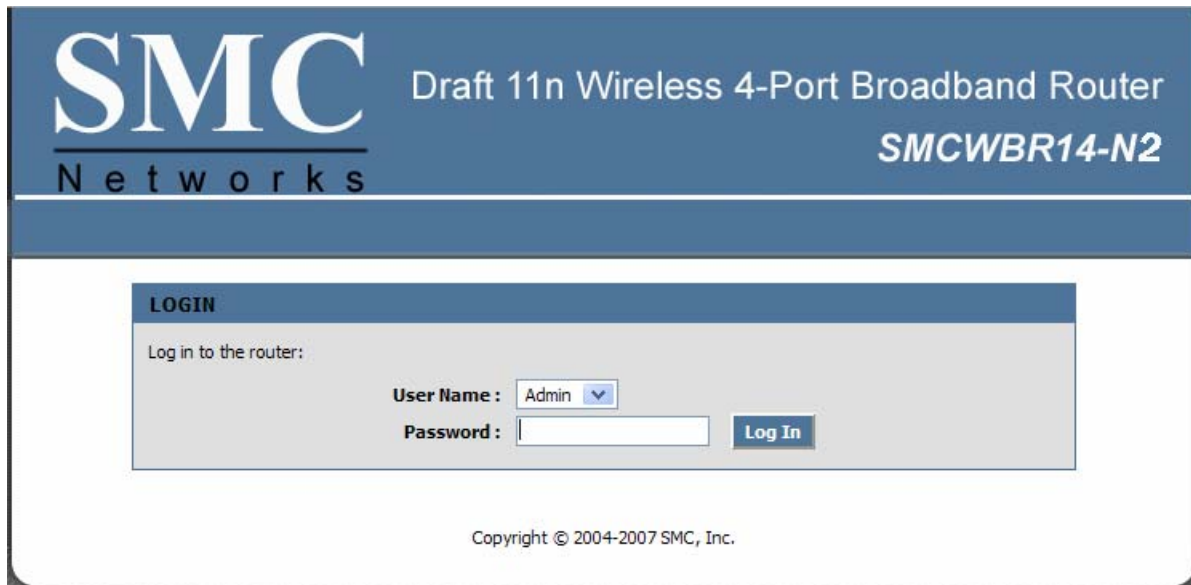
For a typical home setup, you will need a Broadband (Cable/xDSL) Internet service and Modem with Ethernet connection. Consult with your Cable or xDSL provider for proper installation of the modem. Please do the following:

1. Connect your Broadband modem (Cable/xDSL) to the blue WAN port on the Barricade™

2. Connect the network card of your PC to the yellow LAN port on the Barricade™ using the yellow RJ-45 cable provided. Now connect the power adapter.

3. Reboot PC. Start web browser and enter address http://192.168.2.1. When prompted enter password smcadmin then click [Log In]. Note: The User Name must be set to Admin.

4. Click [BASIC], then [Setup Wizard], then [Launch Internet Connection Setup Wizard]. Follow the on screen instructions to complete the set-up and reboot the Barricade™. You are now ready to enjoy your Internet connection.

Using the Configuration Menu

Whenever you want to configure your SMCWBR14-N2, you can access the Configuration Menu through your PC by opening the Web-browser and typing in the IP Address of the SMCWBR14-N2. The SMCWBR14-N2 default IP address is: http://192.168.2.1

➢ Open the Web browser.
➢ Type in the **IP Address** of the Router (http://192.168.2.1).

If you have changed the default IP Address assigned to the SMCWBR14-N2, make sure you enter the correct IP Address.

➢ Select **Admin** in the **User Name** field.
➢ Enter **Password:** smcadmin (default).
➢ Click **Log In.**

If you have changed the default password assigned to the SMCWBR14-N2, make sure you enter the correct password.

Basic

The Basic tab provides the following configuration options: INTERNET, WIRELESS and NETWORK SETTINGS.

Basic_Internet

Setup Wizard

> If you are new to networking and have never configured a router before, click on **Setup Wizard** and the router will guide you through a few simple steps to get your network up and running.

Manual Configure

> If you consider yourself an advanced user and have configured a router before, click **Manual**

Configure to input all the settings manually.

Basic_Wireless

The wireless section is used to configure the wireless settings for your router. Note that changes made in this section may also need to be duplicated on wireless clients that you want to connect to your wireless network.

To protect your privacy, use the wireless security mode to configure the wireless security features. This device supports three wireless security modes including: WEP, WPA-Personal, and WPA-Enterprise. WEP is the original wireless encryption standard. WPA-Enterprise provides a higher level of security. WPA-Personal does not require an authentication server. The WPA-Enterprise option requires a RADIUS authentication server.

Enable Wireless

This option allows you to enable/disable the wireless AP function. The wireless can also be turned ON/OFF by the slide switch on the back panel. When the wireless is enabled, the following parameters are in effect.

Wireless Network Name

When you are browsing for available wireless networks, this is the name that will appear in the list (unless Visibility Status is set to Invisible, see below). This name is also referred to as the SSID. For security purposes, it is highly recommended to change from the pre-configured network name.

Enable Auto Channel Scan

If you select this option, the router automatically finds the channel with least interference and uses that channel for wireless networking. If you disable this option, the router uses the channel that you specify with the following **Wireless Channel** option.

Wireless Channel

A wireless network uses specific channels in the wireless spectrum to handle communication between clients. Some channels in your area may have interference from other electronic devices. Choose the clearest channel to help optimize the performance and coverage of your wireless network.

802.11 Mode

If all of the wireless devices you want to connect with this router can connect in the same transmission mode, you can improve performance slightly by choosing the appropriate "Only" mode. If you have some devices that use a different transmission mode, choose the appropriate "Mixed" mode.

Channel Width

The "Auto 20/40 MHz" option is usually best. The other options are available for special circumstances. Note that when 20/40MHz option is selected, an extended channel will be used to extend the data rate.

Transmission Rate

By default the fastest possible transmission rate will be selected. You have the option of selecting the speed if necessary.

Visibility Status

The Invisible option allows you to hide your wireless network. When this option is set to Visible, your wireless network name is broadcast to anyone within the range of your signal. If you're not using encryption then they could connect to your network. When Invisible mode is enabled, you must enter the Wireless Network Name (SSID) on the client manually to connect to the network.

Security Mode (NONE, WEP, WPA-Personal, WPA-Enterprise)

Unless one of these encryption modes is selected, wireless transmissions to and from your wireless network can be easily intercepted and interpreted by unauthorized users.

WEP

A method of encrypting data for wireless communication intended to provide the same level of privacy as a wired network. WEP is not as secure as WPA encryption. To gain access to a WEP network, you must know the key. The key is a string of characters that you create. When using WEP, you must determine the level of encryption. The type of encryption determines the key length. 128-bit encryption requires a longer key than 64-bit encryption. Keys are defined by entering in a string in HEX (hexadecimal - using characters 0-9, A-F) or ASCII (American Standard Code for Information Interchange - alphanumeric characters) format. ASCII format is provided so you can enter a string that is easier to remember. The ASCII string is converted to HEX for use over the network. Four keys can be defined so that you can change keys easily. A default key is selected for use on the network.

Example:

64-bit hexadecimal keys are exactly 10 characters in length. (12345678FA is a valid string of 10 characters for 64-bit encryption.)

128-bit hexadecimal keys are exactly 26 characters in length. (456FBCDF123400122225271730 is a valid string of 26 characters for 128-bit encryption.)

64-bit ASCII keys are up to 5 characters in length (DMODE is a valid string of 5 characters for 64-bit encryption.)

128-bit ASCII keys are up to 13 characters in length (2002HALOSWIN1 is a valid string of 13 characters for 128-bit encryption.)

Note that, if you enter fewer characters in the WEP key than required, the remainder of the key is automatically padded with zeros.

WPA-Personal and WPA-Enterprise

Both of these options select some variant of Wi-Fi Protected Access (WPA) -- security standards published by the Wi-Fi Alliance. The **WPA Mode** further refines the variant that the router should employ.

WPA Mode: WPA is the older standard; select this option if the clients that will be used with the router only support the older standard. WPA2 is the newer implementation of the stronger IEEE 802.11i security standard. With the "WPA or WPA2" option, the router tries WPA2 first, but falls back to WPA if the client only supports WPA. The strongest cipher that the client supports will be used. With the "WPA2 Only" option, the router associates only with clients that also support WPA2 security. If the clients support the AES cipher, it will be used across the wireless network to ensure best security.

Group Key Update Interval: The amount of time before the group key used for broadcast and multicast data is changed.

WPA-Personal

This option uses Wi-Fi Protected Access with a Pre-Shared Key (PSK).

Pre-Shared Key: The key is entered as a pass-phrase of up to 63 alphanumeric characters in ASCII (American Standard Code for Information Interchange) format at both ends of the wireless connection. It cannot be shorter than eight characters, although for proper security it needs to be of ample length and should not be a commonly known phrase. This phrase is used to generate session keys that are unique for each wireless client.

Example:

WPA-Enterprise

This option works with a RADIUS Server to authenticate wireless clients. Wireless clients should have established the necessary credentials before attempting to authenticate to the Server through this Gateway. Furthermore, it may be necessary to configure the RADIUS Server to allow this Gateway to authenticate users.

Authentication Timeout: Amount of time before a client will be required to re-authenticate.

RADIUS Server IP Address: The IP address of the authentication server.

RADIUS Server Port: The port number used to connect to the authentication server.

RADIUS Server Shared Secret: A pass-phrase that must match with the authentication server.

MAC Address Authentication: If this is selected, the user must connect from the same computer whenever logging into the wireless network.

Advanced:

Optional Backup RADIUS Server

This option enables configuration of an optional second RADIUS server. A second RADIUS server can be used as backup for the primary RADIUS server. The second RADIUS server is consulted only when the primary server is not available or not responding. The fields **Second RADIUS Server IP Address**, **RADIUS Server Port**, **Second RADIUS server Shared Secret**, **Second MAC Address Authentication** provide the corresponding parameters for the second RADIUS Server.

Basic_Network Settings

Use this section to configure the internal network settings of your router. The IP Address that is configured here is the IP Address that you use to access the Web-based management interface. If you change the IP Address here, you may need to adjust your PC's network settings to access the network again.

Router Settings

These are the settings of the LAN (Local Area Network) interface for the router. The router's local network (LAN) settings are configured based on the IP Address and Subnet Mask assigned in this section. The IP address is also used to access this Web-based management interface. It is recommended that you use the default settings if you do not have an existing network.

IP Address

The IP address of your router on the local area network. Your local area network settings are based on the address assigned here. For example, 192.168.2.1.

Subnet Mask

The subnet mask of your router on the local area network.

Local Domain Name

This entry is optional. Enter a domain name for the local network. The router's DHCP server will give this domain name to the computers on the wireless LAN. So, for example, if you enter **mynetwork.net** here, and you have a wireless laptop with a name of **chris**, that laptop will be known as **chris.mynetwork.net**. Note, however, if the router's settings specify "DHCP (Dynamic)" Address, and the router's DHCP server assigns a domain name to the AP, that domain name will override any name you enter here.

DNS Relay

When DNS Relay is enabled, the router plays the role of a DNS server. DNS requests sent to the router are forwarded to the ISP's DNS server. This provides a constant DNS address that LAN computers can use, even when the router obtains a different DNS server address from the ISP upon re-establishing the WAN connection. You should disable DNS relay if you implement a LAN-side DNS server as a virtual server.

RIP (Routing Information Protocol)

Used to broadcast routing information among routers.

Enable RIP

Enable RIP if required by the ISP, if the LAN has multiple routers, or if the LAN has auto-IP devices.

RIP Operating mode

This router supports both version 2 and version 1 of the RIP specification.

V1. Use if none of the routers supports Version 2.

V2 Broadcast. Use if some routers are capable of Version 2, but some are only capable of Version 1.

V2 Multicast. Use if this is the only router on the LAN or if all the routers support Version 2.

Router Metric

The additional cost of routing a packet through this router. The normal value for a simple network is 1. This metric is added to routes learned from other routers; it is not added to static or system routes.

Act as default router

Make this router the preferred destination for packets that are not otherwise destined.

Allow RIP updates from WAN

For security, disable this option unless required by the ISP.

RIP Password

RIP Version 2 supports the use of a password to limit access to routers through the RIP protocol. If the ISP or other LAN router requires a RIP password, enter the password here.

DHCP Server Settings

DHCP stands for Dynamic Host Configuration Protocol. The DHCP section is where you configure the built-in DHCP Server to assign IP addresses to the computers and other devices on your local area network (LAN).

Enable DHCP Server

Once your router is properly configured and this option is enabled, the DHCP Server will manage the IP addresses and other network configuration information for computers and other devices connected to your Local Area Network. There is no need for you to do this yourself.

The computers (and other devices) connected to your LAN also need to have their TCP/IP configuration set to "DHCP" or "Obtain an IP address automatically".

When you set **Enable DHCP Server**, the following options are displayed.

DHCP IP Address Range

These two IP values (*from* and *to*) define a range of IP addresses that the DHCP Server uses when assigning addresses to computers and devices on your Local Area Network. Any addresses that are outside of this range are not managed by the DHCP Server; these could, therefore, be used for manually configured devices or devices that cannot use DHCP to obtain network address details automatically.

It is possible for a computer or device that is manually configured to have an address that does reside within this range. In this case the address should be reserved (see Static DHCP Client below), so that the DHCP Server knows that this specific address can only be used by a specific computer or device.

Your router, by default, has a static IP address of 192.168.2.1. This means that addresses 192.168.2.2 to 192.168.2.254 can be made available for allocation by the DHCP Server.

Example:

Your router uses 192.168.2.1 for the IP address. You've assigned a computer that you want to designate as a Web server with a static IP address of 192.168.2.3. You've assigned another computer that you want to designate as an FTP server with a static IP address of 192.168.2.4. Therefore the starting IP address for your DHCP IP address range needs to be 192.168.2.5 or greater.

Example:

Suppose you configure the DHCP Server to manage addresses From: 192.168.2.100 To: 192.168.2.199. This means that 192.168.2.3 to 192.168.2.99 and 192.168.2.200 to 192.168.2.254 are NOT managed by the DHCP Server. Computers or devices that use addresses from these ranges are to be manually configured. Suppose you have a web

server computer that has a manually configured address of 192.168.2.100. Because this falls within the "managed range" be sure to create a reservation for this address and match it to the relevant computer (see Static DHCP Client below).

DHCP Lease Time

The amount of time that a computer may have an IP address before it is required to renew the lease. The lease functions just as a lease on an apartment would. The initial lease designates the amount of time before the lease expires. If the tenant wishes to retain the address when the lease is expired then a new lease is established. If the lease expires and the address is no longer needed than another tenant may use the address.

Always Broadcast

If all the computers on the LAN successfully obtain their IP addresses from the router's DHCP server as expected, this option can remain disabled. However, if one of the computers on the LAN fails to obtain an IP address from the router's DHCP server, it may have an old DHCP client that incorrectly turns off the broadcast flag of DHCP packets. Enabling this option will cause the router to always broadcast its responses to all clients, thereby working around the problem, at the cost of increased broadcast traffic on the LAN.

Add/Edit DHCP Reservation

This option lets you reserve IP addresses, and assign the same IP address to the network device with the specified MAC address any time it requests an IP address. This is almost the same as when a device has a static IP address except that the device must still request an IP address from the router. The router will provide the device the same IP address every time. DHCP Reservations are helpful for server computers on the local network that are hosting applications such as Web and FTP. Servers on your network should either use a static IP address or use this option.

Computer Name

You can assign a name for each computer that is given a reserved IP address. This may help you keep track of which computers are assigned this way. Example: **Game Server**.

IP Address:

The LAN address that you want to reserve.

MAC Address

To input the MAC address of your system, enter it in manually or connect to the router's Web-Management interface from the system and click the **Copy Your PC's MAC Address** button.

A MAC address is usually located on a sticker on the bottom of a network device. The MAC address is comprised of twelve digits. Each pair of hexadecimal digits are usually separated by dashes or colons such as 00-0D-88-11-22-33 or 00:0D:88:11:22:33. If your network device is a computer and the network card is already located inside the computer, you can connect to the router from the computer and click the **Copy Your PC's MAC Address** button to enter the MAC address.

As an alternative, you can locate a MAC address in a specific operating system by following the steps below:

Windows 98 Windows Me	Go to the Start menu, select Run, type in **winipcfg**, and hit Enter. A popup window will be displayed. Select the appropriate adapter from the pull-down menu and you will see the Adapter Address. This is the MAC address of the device.
Windows 2000 Windows XP	Go to your Start menu, select Programs, select Accessories, and select Command Prompt. At the command prompt type **ipconfig /all** and hit Enter. The physical address displayed for the adapter connecting to the router is the MAC address.
Mac OS X	Go to the Apple Menu, select System Preferences, select Network, and select the Ethernet Adapter connecting to the router. Select the Ethernet button and the Ethernet ID will be listed. This is the same as the MAC address.

DHCP Reservations List

This shows clients that you have specified to have reserved DHCP addresses. An entry can be changed by clicking the Edit icon, or deleted by clicking the Delete icon. When you click the Edit icon, the item is highlighted, and the "Edit DHCP Reservation" section is activated for editing.

Number of Dynamic DHCP Clients

In this section you can see what LAN devices are currently leasing IP addresses.

Revoke

The **Revoke** option is available for the situation in which the lease table becomes full or nearly full, you need to recover space in the table for new entries, and you know that some of the currently allocated leases are no longer needed. Clicking **Revoke** cancels the lease for a specific LAN device and frees an entry in the lease table. Do this only if the device no longer needs the leased IP address, because, for example, it has been removed from the network.

Reserve

The **Reserve** option converts this dynamic IP allocation into a DHCP Reservation and adds the corresponding entry to the DHCP Reservations List.

Advanced

The Advanced tab provides the following configuration options: **Virtual Server, Special Applications, Gaming, StreamEngine, Routing, Access Control, WEB Filter, MAC Address Filter, Firewall, Inbound Filter, Advanced Wireless and Advanced Network.**

Advanced_Virtual Server

The Virtual Server option gives Internet users access to services on your LAN. This feature is useful for hosting online services such as FTP, Web, or game servers. For each Virtual Server, you define a public port on your router for redirection to an internal LAN IP Address and LAN port.

Example:

You are hosting a Web Server on a PC that has LAN IP Address of 192.168.2.50 and your ISP is blocking Port 80.

1. Name the Virtual Server (for example: **Web Server**)

2. Enter the IP Address of the machine on your LAN (for example: **192.168.2.50**

3. Enter the Private Port as [80]

4. Enter the Public Port as [8888]

5. Select the Protocol (for example **TCP**).

6. Ensure the schedule is set to **Always**

7. Click **Save** to add the settings to the Virtual Servers List

8. Repeat these steps for each Virtual Server Rule you wish to add. After the list is complete, click **Save Settings** at the top of the page.

With this Virtual Server entry, all Internet traffic on Port 8888 will be redirected to your internal web server on port 80 at IP Address 192.168.2.50.

Virtual Server Parameters

Name

Assign a meaningful name to the virtual server, for example **Web Server**. Several well-known types of virtual server are available from the "Application Name" drop-down list. Selecting one of these entries fills some of the remaining parameters with standard values for that type of server.

IP Address

The IP address of the system on your internal network that will provide the virtual service, for example **192.168.2.50**. You can select a computer from the list of DHCP clients in the "Computer Name" drop-down menu, or you can manually enter the IP address of the server computer.

Protocol

Select the protocol used by the service. The common choices -- UDP, TCP, and both UDP and TCP -- can be selected from the drop-down menu. To specify any other protocol, select "Other" from the list, then enter the corresponding protocol number (as assigned by the IANA) in the **Protocol** box.

Private Port

The port that will be used on your internal network.

Public Port

The port that will be accessed from the Internet.

Inbound Filter

Select a filter that controls access as needed for this virtual server. If you do not see the filter you need in the list of filters, go to the Advanced → Inbound Filter screen and create

a new filter.

Schedule

Select a schedule for when the service will be enabled. If you do not see the schedule you need in the list of schedules, go to the [Tools → Schedules](#) screen and create a new schedule.

Add/Edit Virtual Server

In this section you can add an entry to the Virtual Servers List below or edit an existing entry.

Enable

Entries in the list can be either active (enabled) or inactive (disabled).

Save

Saves the new or edited virtual server entry in the following list. When finished updating the virtual server entries, you must still click the **Save Settings** button at the top of the page to make the changes effective and permanent.

Virtual Servers List

The section shows the currently defined virtual servers. A Virtual Server can be changed by clicking the Edit icon, or deleted by clicking the Delete icon. When you click the Edit icon, the item is highlighted, and the "Edit Virtual Server" section is activated for editing.

NOTE

You might have trouble accessing a virtual server using its public identity (WAN-side IP-address of the gateway or its dynamic DNS name) from a machine on the LAN. Your requests may not be looped back or you may be redirected to the "Forbidden" page.

This will happen if you have an Access Control Rule configured for this LAN machine.

The requests from the LAN machine will not be looped back if Internet access is blocked at the time of access. To work around this problem, access the LAN machine using its LAN-side identity.

Requests may be redirected to the "Forbidden" page if web access for the LAN machine is restricted by an Access Control Rule. Add the WAN-side identity (WAN-side IP-address of the router or its dynamic DNS name) on the [Advanced → Web Filter](#) screen to work around this problem.

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Advanced_Special Applications

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

Parameters for an Application Rule

    Example:

        You need to configure your router to allow a software application running on any computer on your network to connect to a web-based server or another user on the Internet.

    Name

        Enter a name for the Special Application Rule, for example **Game App**, which will help you identify the rule in the future. Alternatively, you can select from the **Application** list of common applications.

    Application

Instead of entering a name for the Special Application rule, you can select from this list of common applications, and the remaining configuration values will be filled in accordingly.

Trigger Port Range

Enter the outgoing port range used by your application (for example **6500-6700**).

Trigger Protocol

Select the outbound protocol used by your application (for example **Both**).

Input Port Range

Enter the port range that you want to open up to Internet traffic (for example **6000-6200**).

Input Protocol

Select the protocol used by the Internet traffic coming back into the router through the opened port range (for example **Both**).

Schedule

Select a schedule for when this rule is in effect. If you do not see the schedule you need in the list of schedules, go to the <u>Tools → Schedules</u> screen and create a new schedule.

With the above example application rule enabled, the router will open up a range of ports from 6000-6200 for incoming traffic from the Internet, whenever any computer on the internal network opens up an application that sends data to the Internet using a port in the range of 6500-6700.

Add/Edit Special Applications Rule

This section is where you define and edit Special Applications Rules.

Save

Saves the new or edited Special Applications Rule in the following list. When finished updating the special applications rules, you must still click the **Save Settings** button at the top of the page to make the changes effective and permanent.

Special Applications Rules List

The section shows the currently defined special applications rules. A special applications rule can be changed by clicking the Edit icon, or deleted by clicking the Delete icon. When you click the Edit icon, the item is highlighted, and the "Edit Special Applications Rule" section is activated for editing.

Advanced_Gaming

Multiple connections are required by some applications, such as internet games, video conferencing, Internet telephony, and others. These applications have difficulties working through NAT (Network Address Translation). This section is used to open multiple ports or a range of ports in your router and redirect data through those ports to a single PC on your network. You can enter ports in various formats:

Range (50-100)
Individual (80, 68, 888)
Mixed (1020-5000, 689)

Example:

> Suppose you are hosting an online game server that is running on a PC with a private IP Address of 192.168.2.50. This game requires that you open multiple ports (6159-6180, 99) on the router so Internet users can connect.

Port Forwarding Fields

Name

Give the rule a name that is meaningful to you, for example **Game Server**. You can also select from a list of popular games, and many of the remaining configuration values will be filled in accordingly. However, you should check whether the port values have changed since this list was created, and you must fill in the IP address field.

IP Address

Enter the local network IP address of the system hosting the server, for example **192.168.2.50**.

TCP Ports To Open

Enter the TCP ports to open (for example **6159-6180, 99**).

UDP Ports To Open

Enter the UDP ports to open (for example **6159-6180, 99**).

Inbound Filter

Select a filter that controls access as needed for this rule. If you do not see the filter you need in the list of filters, go to the <u>Advanced → Inbound Filter</u> screen and create a new filter.

Schedule

Select a schedule for the times when this rule is in effect. If you do not see the schedule you need in the list of schedules, go to the <u>Tools → Schedules</u> screen and create a new schedule.

With the above example values filled in and this Gaming Rule enabled, all TCP and UDP traffic on ports 6159 through 6180 and port 99 is passed through the router and redirected to the Internal Private IP Address of your Game Server at 192.168.2.50.

Edit/Add Game Rule

Here you can add entries to the Game Rules List below, or edit existing entries.

Enable

Each entry in Game Rules List can be active (enabled) or inactive (disabled)

Save

Saves the new or edited Game Rule in the following list. When finished updating the game rules, you must still click the **Save Settings** button at the top of the page to make the changes effective and permanent.

Game Rules List

The section shows the currently defined game rules. A game rule can be changed by clicking the Edit icon, or deleted by clicking the Delete icon. When you click the Edit icon, the item is highlighted, and the "Edit Game Rule" section is activated for editing.

Advanced_StreamEngine

The StreamEngine feature helps improve your network gaming performance by prioritizing the data flows of network applications.

StreamEngine Setup

    Enable StreamEngine

        Enable this option for better performance and experience with online games and other interactive applications, such as VoIP.

Automatic Classification

This option is enabled by default so that your router will automatically determine which programs should have network priority.

Dynamic Fragmentation

This option should be enabled when you have a slow Internet uplink. It helps to reduce the impact that large low priority network packets can have on more urgent ones by breaking the large packets into several smaller packets.

Automatic Uplink Speed

When enabled, this option causes the router to automatically measure the useful uplink bandwidth each time the WAN interface is re-established (after a reboot, for example).

Measured Uplink Speed

This is the uplink speed measured when the WAN interface was last re-established. The value may be lower than that reported by your ISP as it does not include all of the network protocol overheads associated with your ISP's network. Typically, this figure will be between 87% and 91% of the stated uplink speed for xDSL connections and around 5 kbps lower for cable network connections.

Manual Uplink Speed

If Automatic Uplink Speed is disabled, this options allows you to set the uplink speed manually. Uplink speed is the speed at which data can be transferred from the router to your ISP. This is determined by your ISP. ISPs often specify speed as a downlink/uplink pair; for example, 1.5Mbps/284kbps. For this example, you would enter "284". Alternatively you can test your uplink speed with a service such as www.dslreports.com. Note however that sites such as DSL Reports, because they do not consider as many network protocol overheads, will generally note speeds slightly lower than the Measured Uplink Speed or the ISP rated speed.

Connection Type

By default, the router automatically determines whether the underlying connection is an xDSL/Frame-relay network or some other connection type (such as cable modem or Ethernet), and it displays the result as **Detected xDSL or Frame Relay Network**. If you have an unusual network connection in which you are actually connected via xDSL but for which you configure either "Static" or "DHCP" in the WAN settings, setting this option to **xDSL or Other Frame Relay Network** ensures that the router will recognize that it needs to shape traffic slightly differently in order to give the best performance. Choosing **xDSL or Other Frame Relay Network** causes the measured uplink speed to be reported slightly lower than before on such connections, but gives much better results.

Detected xDSL or Frame Relay Network

When **Connection Type** is set to **Auto-detect**, the automatically detected connection type is displayed here.

StreamEngine Rules

A StreamEngine Rule identifies a specific message flow and assigns a priority to that flow. For most applications, automatic classification will be adequate, and specific StreamEngine Rules will not be required.

Conflicting rules are not permitted. Conflicting rules are those that share any combination of source address/port, destination address/port, and protocol. Rejecting conflicting rules ensures

that every flow defined in a rule receives the expected priority and avoids indeterminate prioritization that could reduce QoS effectiveness.

Name

Create a name for the rule that is meaningful to you.

Priority

The priority of the message flow is entered here -- 1 receives the highest priority (most urgent) and 255 receives the lowest priority (least urgent). Priority 0 is reserved. Flows that are not prioritized by any rule receive lowest priority.

Protocol

The protocol used by the messages. The common choices can be selected from the drop-down menu. To specify any other protocol, enter its protocol number ([as assigned by the IANA](#)) in the **Protocol** box.

Source IP Range

The rule applies to a flow of messages whose LAN-side IP address falls within the range set here.

Source Port Range

The rule applies to a flow of messages whose LAN-side port number is within the range set here.

Destination IP Range

The rule applies to a flow of messages whose WAN-side IP address falls within the range set here.

Destination Port Range

The rule applies to a flow of messages whose WAN-side port number is within the range set here.

Add/Edit StreamEngine Rule

Enable

Each entry in StreamEngine Rules List can be active (enabled) or inactive (disabled)

Save

Saves the new or edited StreamEngine Rule in the following list. When finished updating the StreamEngine rules, you must still click the **Save Settings** button at the top of the page to make the changes effective and permanent.

StreamEngine Rules List

The section shows the currently defined StreamEngine rules. A StreamEngine rule can be changed by clicking the Edit icon, or deleted by clicking the Delete icon. When you click the Edit icon, the item is highlighted, and the "Edit StreamEngine Rule" section is activated for editing.

Advanced_Routing

Add/Edit Route

Adds a new route to the IP routing table or edits an existing route.

Enable: Specifies whether the entry will be enabled or disabled.

Destination IP: The IP address of packets that will take this route.

Netmask: One bits in the mask specify which bits of the IP address must match.

Gateway: Specifies the next hop to be taken if this route is used. A gateway of 0.0.0.0 implies there is no next hop, and the IP address matched is directly connected to the router on the interface specified: LAN or WAN.

Interface: Specifies the interface -- LAN or WAN -- that the IP packet must use to transit out of the router, when this route is used.

Metric: The route metric is a value from 1 to 16 that indicates the cost of using this route. A value of 1 is the lowest cost, and 15 is the highest cost. A value of 16 indicates that the route is not reachable from this router. When trying to reach a particular destination, computers on your network will select the best route, ignoring unreachable routes.

Save: Saves the new or edited route in the following list. When finished updating the routing table, you must still click the **Save Settings** button at the top of the page to make the changes effective and permanent.

Routes List

The section shows the current routing table entries. Certain required routes are predefined and cannot be changed. Routes that you add can be changed by clicking the Edit icon, or deleted by clicking the Delete icon. When you click the Edit icon, the item is highlighted, and the "Edit Route" section is activated for editing.

Advanced_Access Control

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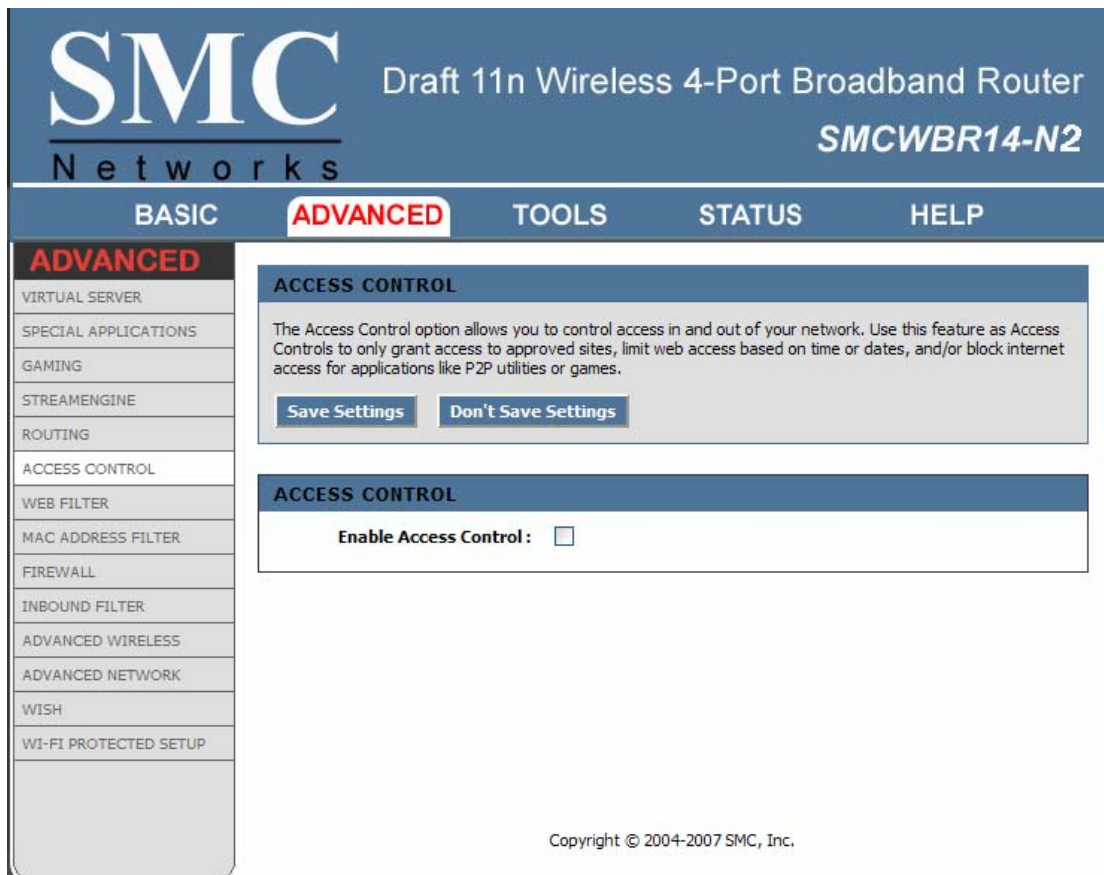
Enable

> By default, the Access Control feature is disabled. If you need Access Control, check this option.

> When Access Control is disabled, every device on the LAN has unrestricted access to the Internet. However, if you enable Access Control, Internet access is restricted for those devices that have an Access Control Policy configured for them. All other devices have unrestricted access to the Internet.

Policy Wizard

> The Policy Wizard guides you through the steps of defining each access control policy. A policy is the "Who, What, When, and How" of access control -- whose computer will be affected by the control, what internet addresses are controlled, when will the control be in effect, and how is the control implemented. You can define multiple policies. The Policy Wizard starts when you click the button below and also when you edit an existing policy.

Add Policy

> Click this button to start creating a new access control policy.

Policy Table

This section shows the currently defined access control policies. A policy can be changed by clicking the Edit icon, or deleted by clicking the Delete icon. When you click the Edit icon, the Policy Wizard starts and guides you through the process of changing a policy. You can enable or disable specific policies in the list by clicking the "Enable" checkbox.

Advanced_WEB Filter

This section is where you add the Web sites to be used for Access Control. The Web sites listed here are used when the Web Filter option is enabled in Access Control.

The Web Filter section is one of two means by which you can specify the web sites you want to allow. You also have the alternative of using the Sentinel Parental Controls Service, which allows you to specify broad categories of web sites and saves you the trouble of entering specific web site URLs. For more information about the Sentinel service, refer to Tools → Sentinel.
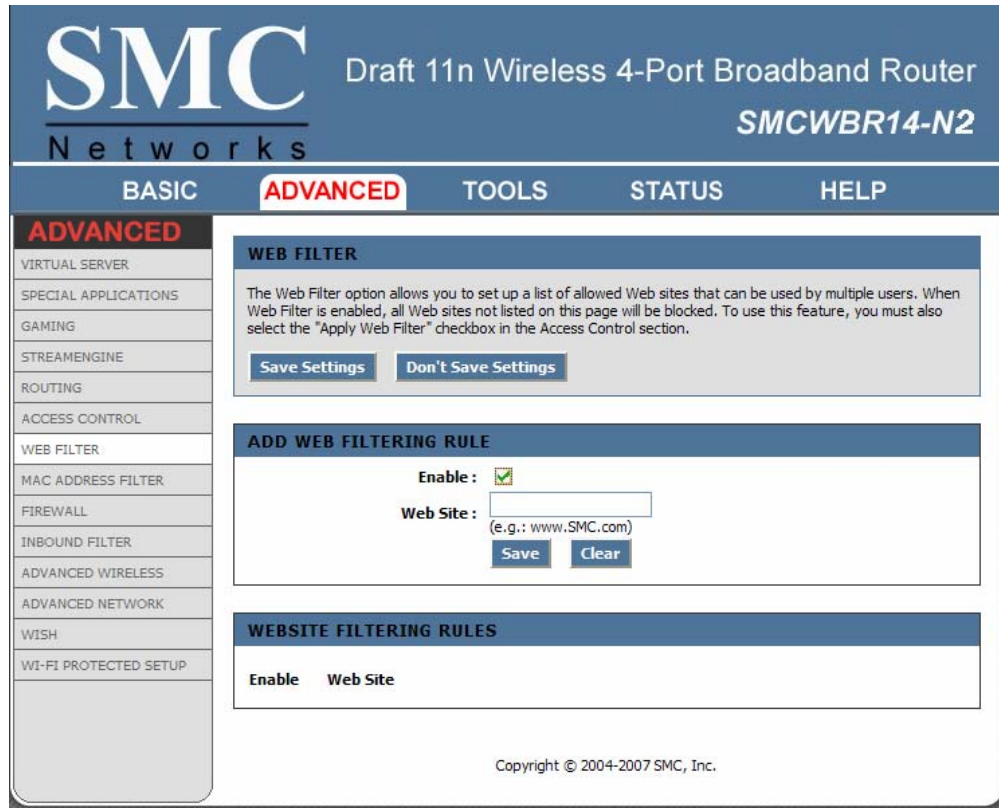
Web Filter Parameters

> **Web Site**
>
> > Enter the address of the web site that you want to allow; for example: **google.com**. Do not enter the **http://** preceding the address. Enter the most inclusive domain; for example, enter **u-media.com** and access will be permitted to both **www.u-media.com** and **support.u-media.com**.
> >
> > Many web sites construct pages with images and content from other web sites. Access will be forbidden if you do not enable all the web sites used to construct a page. For example, to access **my.yahoo.com**, you need to enable access to **yahoo.com**, **yimg.com**, and **doubleclick.net**.

Add/Edit Web Site

> This is where you can add Web sites to the Allowed Web Site List or change entries in the Allowed Web Site List.

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Enable

Entries in the Allowed Web Site List can be activated or deactivated with this checkbox. New entries are activated by default.

Save

Saves the new or edited Allowed Web Site in the following list. When finished updating the Allowed Web Site List, you must still click the **Save Settings** button at the top of the page to make the changes effective and permanent.

Allowed Web Site List

The section lists the currently allowed web sites. An allowed web site can be changed by clicking the Edit icon, or deleted by clicking the Delete icon. When you click the Edit icon, the item is highlighted, and the "Edit Web Site" section is activated for editing.

Advanced_MAC Address Filter

The MAC address filter section can be used to filter network access by machines based on the unique MAC addresses of their network adapter(s). It is most useful to prevent unauthorized wireless devices from connecting to your network. A MAC address is a unique ID assigned by the manufacturer of the network adapter.
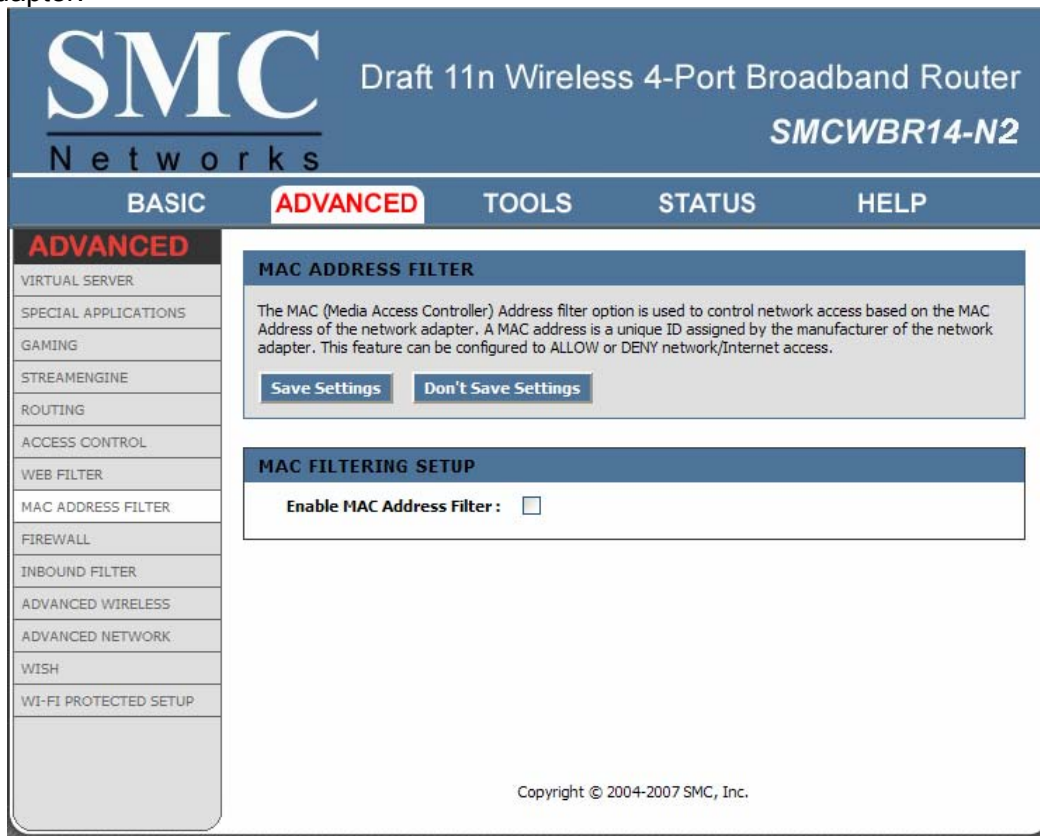
Enable MAC Address Filter

> When this is enabled, computers are granted or denied network access depending on the mode of the filter.

> Misconfiguration of this feature can prevent any machine from accessing the network. In such a situation, you can regain access by activating the factory defaults button on the router itself.

Filter Settings

Mode

> When "only allow listed machines" is selected, only computers with MAC addresses listed in the MAC Address List are granted network access. When "only deny listed machines" is selected, any computer with a MAC address listed in the MAC Address List is refused access to the network.

Filter Wireless Clients

> When this is selected, the MAC address filters will be applied to wireless network clients.

Filter Wired Clients

When this is selected, the MAC address filters will be applied to wired network clients.

Add/Edit MAC Address

In this section, you can add entries to the MAC Address List below, or edit existing entries.

Enable

MAC address entries can be activated or deactivated with this checkbox.

MAC Address

Enter the MAC address of the desired computer or connect to the router from the desired computer and click the **Copy Your PC's MAC Address** button.

Save

Saves the new or edited MAC Address entry in the following list. When finished updating the MAC Address List, you must still click the **Save Settings** button at the top of the page to make the changes effective and permanent.

MAC Address List

The section lists the current MAC Address filters. A MAC Address entry can be changed by clicking the Edit icon, or deleted by clicking the Delete icon. When you click the Edit icon, the item is highlighted, and the "Edit MAC Address" section is activated for editing.

Advanced_Firewall

The router provides a tight firewall by virtue of the way NAT works. Unless you configure the router to the contrary, the NAT does not respond to unsolicited incoming requests on any port, thereby making your LAN invisible to Internet cyber attackers. However, some network applications cannot run with a tight firewall. Those applications need to selectively open ports in the firewall to function correctly. The options on this page control several ways of opening the firewall to address the needs of specific types of applications. See also Virtual Server, Port Forwarding, Application Rules, and UPnP for related options.

Firewall Settings

Enable SPI

SPI ("stateful packet inspection" also known as "dynamic packet filtering") helps to prevent cyber attacks by tracking more state per session. It validates that the traffic passing through that session conforms to the protocol. When the protocol is TCP, SPI checks that packet sequence numbers are within the valid range for the session, discarding those packets that do not have valid sequence numbers.

Whether SPI is enabled or not, the router always tracks TCP connection states and ensures that each TCP packet's flags are valid for the current state.

NAT Endpoint Filtering

The NAT Endpoint Filtering options control how the router's NAT manages incoming connection requests to ports that are already being used.

Endpoint Independent

Once a LAN-side application has created a connection through a specific port, the NAT will forward any incoming connection requests with the same port to the LAN-side application regardless of their origin. This is the least restrictive option, giving the best connectivity and allowing some applications (P2P applications in particular) to behave almost as if they are directly connected to the Internet.

Address Restricted

The NAT forwards incoming connection requests to a LAN-side host only when they come from the same IP address with which a connection was established. This allows the remote application to send data back through a port different from the one used when the outgoing session was created.

Port And Address Restricted

The NAT does not forward any incoming connection requests with the same port address as an already establish connection.

Note that some of these options can interact with other port restrictions. Endpoint Independent Filtering takes priority over inbound filters or schedules, so it is possible for an incoming session request related to an outgoing session to enter through a port in spite of an active inbound filter on that port. However, packets will be rejected as expected when sent to blocked ports (whether blocked by schedule or by inbound filter) for which there are no active sessions. Port and Address Restricted Filtering ensures that inbound filters and schedules work precisely, but prevents some level of connectivity, and therefore might require the use of port triggers, virtual servers, or port forwarding to open the ports needed by the application. Address Restricted Filtering gives a compromise position, which avoids problems when communicating with certain other types of NAT router (symmetric NATs in particular) but leaves inbound filters and scheduled access working as expected.

UDP Endpoint Filtering

Controls endpoint filtering for packets of the UDP protocol.

TCP Endpoint Filtering

Controls endpoint filtering for packets of the TCP protocol.

DMZ Host

DMZ means "Demilitarized Zone." If an application has trouble working from behind the router, you can expose one computer to the Internet and run the application on that computer.

When a LAN host is configured as a DMZ host, it becomes the destination for all incoming packets that do not match some other incoming session or rule. If any other ingress rule is in place, that will be used instead of sending packets to the DMZ host; so, an active session, virtual server, active port trigger, or port forwarding rule will take priority over sending a packet to the DMZ host. (The DMZ policy resembles a default port forwarding rule that forwards every port that is not specifically sent anywhere else.)

The router provides only limited firewall protection for the DMZ host. The router does not forward a TCP packet that does not match an active DMZ session, unless it is a connection establishment packet (SYN). Except for this limited protection, the DMZ host is effectively "outside the firewall". Anyone considering using a DMZ host should also consider running a firewall on that DMZ host system to provide additional protection.

Packets received by the DMZ host have their IP addresses translated from the WAN-side IP address of the router to the LAN-side IP address of the DMZ host. However, port numbers are not translated; so applications on the DMZ host can depend on specific port numbers.

The DMZ capability is just one of several means for allowing incoming requests that might appear unsolicited to the NAT. In general, the DMZ host should be used only if there are no other alternatives, because it is much more exposed to cyber attacks than any other system on the LAN. Thought should be given to using other configurations instead: a virtual server, a port forwarding rule, or a port trigger. Virtual servers open one port for incoming sessions bound for a specific application (and also allow port redirection and the use of ALGs). Port forwarding is rather like a selective DMZ, where incoming traffic targeted at one or more ports is forwarded to a specific LAN host (thereby not exposing as many ports as a DMZ host). Port triggering is a special form of port forwarding, which is activated by outgoing traffic, and for which ports are only forwarded while the trigger is active.

Few applications truly require the use of the DMZ host. Following are examples of when a DMZ host might be required:

- A host needs to support several applications that might use overlapping ingress ports such that two port forwarding rules cannot be used because they would potentially be in conflict.

- To handle incoming connections that use a protocol other than ICMP, TCP, UDP, and IGMP (also GRE and ESP, when these protocols are enabled by the PPTP and IPSec ALGs).

Enable DMZ

Putting a computer in the DMZ may expose that computer to a variety of security risks. Use of this option is only recommended as a last resort.

DMZ IP Address

Specify the LAN IP address of the LAN computer that you want to have unrestricted Internet communication. If this computer obtains its address Automatically using DHCP,

then you may want to make a static reservation on the <u>Basic → Network Settings</u> page so that the IP address of the DMZ computer does not change.

Non-UDP/TCP/ICMP LAN Sessions

When a LAN application that uses a protocol other than UDP, TCP, or ICMP initiates a session to the Internet, the router's NAT can track such a session, even though it does not recognize the protocol. This feature is useful because it enables certain applications (most importantly a single VPN connection to a remote host) without the need for an ALG.

Note that this feature does not apply to the DMZ host (if one is enabled). The DMZ host always handles these kinds of sessions.

Enable

Enabling this option (the default setting) enables single VPN connections to a remote host. (But, for multiple VPN connections, the appropriate VPN ALG must be used.) Disabling this option, however, only disables VPN if the appropriate VPN ALG is also disabled.

Application Level Gateway (ALG) Configuration

Here you can enable or disable ALGs. Some protocols and applications require special handling of the IP payload to make them work with network address translation (NAT). Each ALG provides special handling for a specific protocol or application. A number of ALGs for common applications are enabled by default.

PPTP

Allows multiple machines on the LAN to connect to their corporate networks using PPTP protocol. When the PPTP ALG is enabled, LAN computers can establish PPTP VPN connections either with the same or with different VPN servers. When the PPTP ALG is disabled, the router allows VPN operation in a restricted way -- LAN computers are typically able to establish VPN tunnels to different VPN Internet servers but not to the same server. The advantage of disabling the PPTP ALG is to increase VPN performance. Enabling the PPTP ALG also allows incoming VPN connections to a LAN side VPN server (refer to <u>Virtual Server</u>).

IPSec (VPN)

Allows multiple VPN clients to connect to their corporate networks using IPSec. Some VPN clients support traversal of IPSec through NAT. This option may interfere with the operation of such VPN clients. If you are having trouble connecting with your corporate network, try disabling this option.

Check with the system administrator of your corporate network whether your VPN client supports NAT traversal.

Note that L2TP VPN connections typically use IPSec to secure the connection. To achieve multiple VPN pass-through in this case, the IPSec ALG must be enabled.

RTSP

Allows applications that use Real Time Streaming Protocol to receive streaming media from the internet. QuickTime and Real Player are some of the common applications using this protocol.

Windows/MSN Messenger

Supports use on LAN computers of Microsoft Windows Messenger (the Internet messaging client that ships with Microsoft Windows) and MSN Messenger. The SIP ALG

must also be enabled when the Windows Messenger ALG is enabled.

FTP

Allows FTP clients and servers to transfer data across NAT. Refer to the Advanced → Virtual Server page if you want to host an FTP server.

H.323 (Netmeeting)

Allows H.323 (specifically Microsoft Netmeeting) clients to communicate across NAT. Note that if you want your buddies to call you, you should also set up a virtual server for NetMeeting. Refer to the Advanced → Virtual Server page for information on how to set up a virtual server.

SIP

Allows devices and applications using VoIP (Voice over IP) to communicate across NAT. Some VoIP applications and devices have the ability to discover NAT devices and work around them. This ALG may interfere with the operation of such devices. If you are having trouble making VoIP calls, try turning this ALG off.

Wake-On-LAN

This feature enables forwarding of "magic packets" (that is, specially formatted wake-up packets) from the WAN to a LAN computer or other device that is "Wake on LAN" (WOL) capable. The WOL device must be defined as such on the Advanced → Virtual Server page. The LAN IP address for the virtual server is typically set to the broadcast address 192.168.2.255. The computer on the LAN whose MAC address is contained in the magic packet will be awakened.

MMS

Allows Windows Media Player, using MMS protocol, to receive streaming media from the internet.

Advanced_Inbound Filter

When you use the Virtual Server, Gaming, or Remote Administration features to open specific ports to traffic from the Internet, you could be increasing the exposure of your LAN to cyber attacks from the Internet. In these cases, you can use Inbound Filters to limit that exposure by specifying the IP addresses of internet hosts that you trust to access your LAN through the ports that you have opened. You might, for example, only allow access to a game server on your home LAN from the computers of friends whom you have invited to play the games on that server.

Inbound Filters can be used for limiting access to a server on your network to a system or group of systems. Filter rules can be used with Virtual Server, Gaming, or Remote Administration features. Each filter can be used for several functions; for example a "Game Clan" filter might allow all of the members of a particular gaming group to play several different games for which gaming entries have been created. At the same time an "Admin" filter might only allows systems from your office network to access the WAN admin pages and an FTP server you use at home. If you add an IP address to a filter, the change is effected in all of the places where the filter is used.

Add/Edit Inbound Filter Rule

Here you can add entries to the Inbound Filter Rules List below, or edit existing entries.

Name

Enter a name for the rule that is meaningful to you.

Action

The rule can either Allow or Deny messages.

Source IP Range

Define the ranges of Internet addresses this rule applies to. For a single IP address, enter the same address in both the **Start** and **End** boxes. Up to eight ranges can be entered. The **Enable** checkbox allows you to turn on or off specific entries in the list of ranges.

Save

Saves the new or edited Inbound Filter Rule in the following list. When finished updating the Inbound Filter Rules List, you must still click the **Save Settings** button at the top of the page to make the changes effective and permanent.

Inbound Filter Rules List

The section lists the current Inbound Filter Rules. An Inbound Filter Rule can be changed by clicking the Edit icon, or deleted by clicking the Delete icon. When you click the Edit icon, the item is highlighted, and the "Edit Inbound Filter Rule" section is activated for editing.

In addition to the filters listed here, two predefined filters are available wherever inbound filters can be applied:

Allow All

Permit any WAN user to access the related capability.

Deny All

Prevent all WAN users from accessing the related capability. (LAN users are not affected by Inbound Filter Rules.)

Advanced_Advanced Wireless

Transmit Power

Normally the wireless transmitter operates at 100% power. In some circumstances, however, there might be a need to isolate specific frequencies to a smaller area. By reducing the power of the radio, you can prevent transmissions from reaching beyond your corporate/home office or designated wireless area.

Beacon Period

Beacons are packets sent by a wireless router to synchronize wireless devices. Specify a Beacon Period value between 20 and 1000. The default value is set to 100 milliseconds.

RTS Threshold

This setting should remain at its default value of 2346. If you encounter inconsistent data flow, only minor modifications to the value are recommended.

Fragmentation Threshold

This setting should remain at its default value of 2346. Setting the Fragmentation value too low may result in poor performance.

DTIM Interval

A DTIM is a countdown informing clients of the next window for listening to broadcast and multicast messages. When the wireless router has buffered broadcast or multicast messages

for associated clients, it sends the next DTIM with a DTIM Interval value. Wireless clients detect the beacons and awaken to receive the broadcast and multicast messages. The default value is 1. Valid settings are between 1 and 255.

802.11d Enable

Enables 802.11d operation. 802.11d is a wireless specification for operation in additional regulatory domains. This supplement to the 802.11 specifications defines the physical layer requirements (channelization, hopping patterns, new values for current MIB attributes, and other requirements to extend the operation of 802.11 WLANs to new regulatory domains (countries). The current 802.11 standard defines operation in only a few regulatory domains (countries). This supplement adds the requirements and definitions necessary to allow 802.11 WLAN equipment to operate in markets not served by the current standard. Enable this option if you are operating in one of these "additional regulatory domains".

WMM Enable

Enabling WMM can help control latency and jitter when transmitting multimedia content over a wireless connection.

Short GI

Using a short (400ns) guard interval can increase throughput. However, it can also increase error rate in some installations, due to increased sensitivity to radio-frequency reflections. Select the option that works best for your installation.

Extra Wireless Protection

Extra protection for neighboring 11b wireless networks. Turn this option off to reduce the adverse effect of legacy wireless networks on 802.11ng performance.

WDS Enable

When WDS is enabled, this access point functions as a wireless repeater and is able to wirelessly communicate with other APs via WDS links. Note that WDS is incompatible with WPA -- both features cannot be used at the same time. A WDS link is bidirectional; so this AP must know the MAC Address (creates the WDS link) of the other AP, and the other AP must have a WDS link back to this AP. Make sure the APs are configured with same channel number.

WDS AP MAC Address

Specifies one-half of the WDS link. The other AP must also have the MAC address of this AP to create the WDS link back to this AP. Enter a MAC address for each of the other APs that you want to connect with WDS.

Advanced_Network

UPnP

> UPnP is short for Universal Plug and Play, which is a networking architecture that provides compatibility among networking equipment, software, and peripherals. This router has optional UPnP capability, and can work with other UPnP devices and software.

> **Enable UPnP**

>> If you need to use the UPnP functionality, you can enable it here.

WAN Ping

> Pinging public WAN IP addresses is a common method used by hackers to test whether your WAN IP address is valid.

> **Enable WAN Ping Respond**

>> If you leave this option unchecked, you are causing the router to ignore **ping** commands for the public WAN IP address of the router.

WAN Port Speed

Normally, this is set to "auto". If you have trouble connecting to the WAN, try the other settings.

Multicast Streams

The router uses the IGMP protocol to support efficient multicasting -- transmission of identical content, such as multimedia, from a source to a number of recipients.

Enable Multicast Streams

This option must be enabled if any applications on the LAN participate in a multicast group. If you have a multimedia LAN application that is not receiving content as expected, try enabling this option.

Advanced_WISH

WISH is short for Wireless Intelligent Stream Handling, a technology developed to enhance your experience of using a wireless network by prioritizing the traffic of different applications.

WISH

Enable WISH

Enable this option if you want to allow WISH to prioritize your traffic.

Priority Classifiers

HTTP

Allows the router to recognize HTTP transfers for many common audio and video streams and prioritize them above other traffic. Such streams are frequently used by digital media players.

Windows Media Center

Enables the router to recognize certain audio and video streams generated by a Windows Media Center PC and to prioritize these above other traffic. Such streams are used by systems known as Windows Media Extenders, such as the Xbox 360.

Automatic

When enabled, this option causes the router to automatically attempt to prioritize traffic streams that it doesn't otherwise recognize, based on the behaviour that the streams exhibit. This acts to deprioritize streams that exhibit bulk transfer characteristics, such as file transfers, while leaving interactive traffic, such as gaming or VoIP, running at a normal priority.

Add/Edit WISH Rule

A WISH Rule identifies a specific message flow and assigns a priority to that flow. For most applications, the priority classifiers ensure the right priorities and specific WISH Rules are not required.

WISH supports overlaps between rules. If more than one rule matches for a specific message flow, the rule with the highest priority will be used.

Enable

Specifies whether the entry will be active or inactive.

Name

Create a name for the rule that is meaningful to you.

Priority

The priority of the message flow is entered here. Four priorities are defined:

- BK: Background (least urgent).

- BE: Best Effort.

- VI: Video.

- VO: Voice (most urgent).

Protocol

> The protocol used by the messages.

Host 1 IP Range

> The rule applies to a flow of messages for which one computer's IP address falls within the range set here.

Host 1 Port Range

> The rule applies to a flow of messages for which host 1's port number is within the range set here.

Host 2 IP Range

> The rule applies to a flow of messages for which the other computer's IP address falls within the range set here.

Host 2 Port Range

> The rule applies to a flow of messages for which host 2's port number is within the range set here.

Save/Update

> Record the changes you have made into the following list.

Clear

> Re-initialize this area of the screen, discarding any changes you have made.

WISH Rules

This section lists the defined WISH Rules. Click the Enable checkbox at the left to directly activate or de-activate the entry. An entry can be changed by clicking the Edit icon or can be deleted by clicking the Delete icon. When you click the Edit icon, the item is highlighted, and the "Edit WISH Rule" section is activated for editing.

Advanced_Wi-Fi PROTECTED SETUP

Wi-Fi Protected Setup

> **Enable**
>
>> Enable the Wi-Fi Protected Setup feature.
>
> **Lock Wireless Security Settings**
>
>> Locking the wireless security settings prevents the settings from being changed by any new external registrar using its PIN. Devices can still be added to the wireless network using Wi-Fi Protected Setup. It is still possible to change wireless network settings with Manual Wireless Network Setup, Wireless Network Setup Wizard, or an existing external WLAN Manager Registrar.

PIN Settings

> A PIN is a unique number that can be used to add the router to an existing network or to create a new network. The default PIN may be printed on the bottom of the router. For extra security,

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a new PIN can be generated. You can restore the default PIN at any time. Only the Administrator ("admin" account) can change or reset the PIN.

Current PIN

Shows the current value of the router's PIN.

Reset PIN to Default

Restore the default PIN of the router.

Generate New PIN

Create a random number that is a valid PIN. This becomes the router's PIN. You can then copy this PIN to the user interface of the registrar.

Add Wireless Station

This Wizard helps you add wireless devices to the wireless network.

The wizard will either display the wireless network settings to guide you through manual configuration, prompt you to enter the PIN for the device, or ask you to press the configuration button on the device. If the device supports Wi-Fi Protected Setup and has a configuration button, you can add it to the network by pressing the configuration button on the device and then on the router within 60 seconds. The WPS status LED on the router will become solid if the device has been successfully added to the network.

There are several ways to add a wireless device to your network. Access to the wireless network is controlled by a "registrar". A registrar only allows devices onto the wireless network if you have entered the PIN, or pressed a special Wi-Fi Protected Setup button on the device. The router acts as a registrar for the network, although other devices may act as a registrar as well.

Add Wireless Device Wizard

Start the wizard.

Tools

The Tools tab provides the following configuration options: **Admin, Time, Syslog, Email Settings, System, Firmware, Dynamic DNS, Windows Connect Now, System Check & Schedules.**

Tools_Admin

The Admin option is used to set a password for access to the Web-based management. By default there is no password configured. It is highly recommended that you create a password to keep your new router secure.

Admin Password

Enter a password for the user "admin", who will have full access to the Web-based management interface.

User Password

Enter a password for the user "user", who will have read-only access to the Web-based management interface.

Gateway Name

The name of the router can be changed here.

Enable Remote Management

Enabling Remote Management allows you to manage the router from anywhere on the Internet. Disabling Remote Management allows you to manage the router only from computers on your LAN.

Remote Admin Port

The port that you will use to address the management interface from the Internet. For example, if you specify port 1080 here, then, to access the router from the Internet, you would use a URL of the form: **http://my.domain.com:1080/**.

Remote Admin Inbound Filter

Select a filter that controls access as needed for this admin port. If you do not see the filter you need in the list of filters, go to the <u>Advanced → Inbound Filter</u> screen and create a new filter.

Tools_Time

The Time Configuration option allows you to configure, update, and maintain the correct time on the router's internal system clock. From this section you can set the time zone that you are in and set the Time Server. Daylight saving can also be configured to automatically adjust the time when needed.

Time Configuration

Current Router Time

Displays the time currently maintained by the router. If this is not correct, use the following options to configure the time correctly.

Time Zone

Select your local time zone from pull down menu.

Enable Daylight Saving

Check this option if your location observes daylight saving time.

Daylight Saving Offset

Select the time offset, if your location observes daylight saving time.

DST Start and DST End

Select the starting and ending times for the change to and from daylight saving time. For example, suppose for DST Start you select Month="Oct", Week="3rd", Day="Sun" and Time="2am". This is the same as saying: "Daylight saving starts on the third Sunday of October at 2:00 AM."

Automatic Time Configuration

Enable NTP Server

Select this option if you want to synchronize the router's clock to a Network Time Server over the Internet. If you are using schedules or logs, this is the best way to ensure that the schedules and logs are kept accurate.

NTP Server Used

Select a Network Time Server for synchronization. You can type in the address of a time server or select one from the list. If you have trouble using one server, select another.

Set the Date and Time Manually

If you do not have the NTP Server option in effect, you can either manually set the time for your router here, or you can click the **Copy Your Computer's Time Settings** button to copy the time from the computer you are using. (Make sure that computer's time is set correctly.)

If the router loses power for any reason, it cannot keep its clock running, and will not have the correct time when it is started again. To maintain correct time for schedules and logs, either you must enter the correct time after you restart the router, or you must enable the **NOTE** NTP Server option.

Tools_Syslog

This section allows you to archive your log files to a Syslog Server.

Enable Logging to Syslog Server

Enable this option if you have a syslog server currently running on the LAN and wish to send log messages to it.

Syslog Server IP Address

Enter the LAN IP address of the Syslog Server.

Tools_Email Settings

The Email feature can be used to send the system log files, router alert messages, and firmware update notification to your email address.
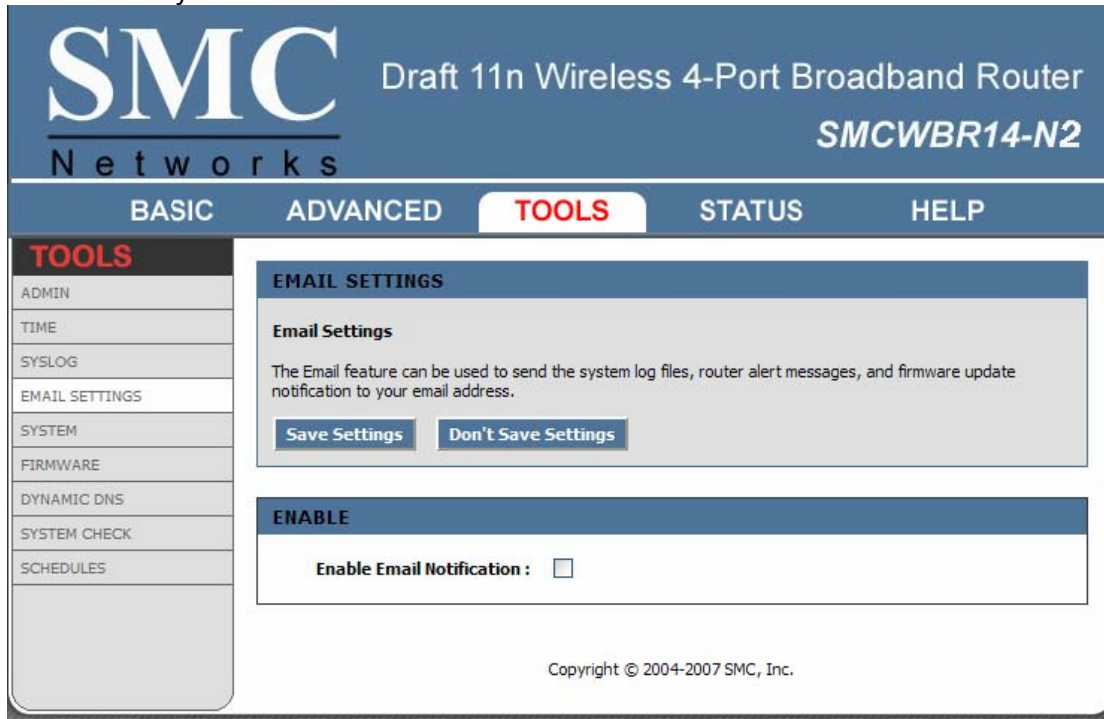
Enable

Enable Email Notification

When this option is enabled, router activity logs or firmware upgrade notifications can be emailed to a designated email address, and the following parameters are displayed.

Email Settings

From Email Address

This email address will appear as the sender when you receive a log file or firmware upgrade notification via email.

To Email Address

Enter the email address where you want the email sent.

SMTP Server Address

Enter the SMTP server address for sending email.

Enable Authentication

If your SMTP server requires authentication, select this option.

Account Name

Enter your account for sending email.

Password

Enter the password associated with the account.

Verify Password

Re-type the password associated with the account.

Email Log When Full or on Schedule

On Log Full

Select this option if you want logs to be sent by email when the log is full.

On Schedule

Select this option if you want logs to be sent by email according to a schedule.

Schedule

If you selected the On Schedule option, select one of the defined schedule rules. If you do not see the schedule you need in the list of schedules, go to the Tools -> Schedules screen and create a new schedule.

NOTE

Normally email is sent at the start time defined for a schedule, and the schedule end time is not used. However, rebooting the router during the schedule period will cause additional emails to be sent.

Tools_System

This section allows you to manage the router's configuration settings, reboot the router, and restore the router to the factory default settings. Restoring the unit to the factory default settings will erase all settings, including any rules that you've created.
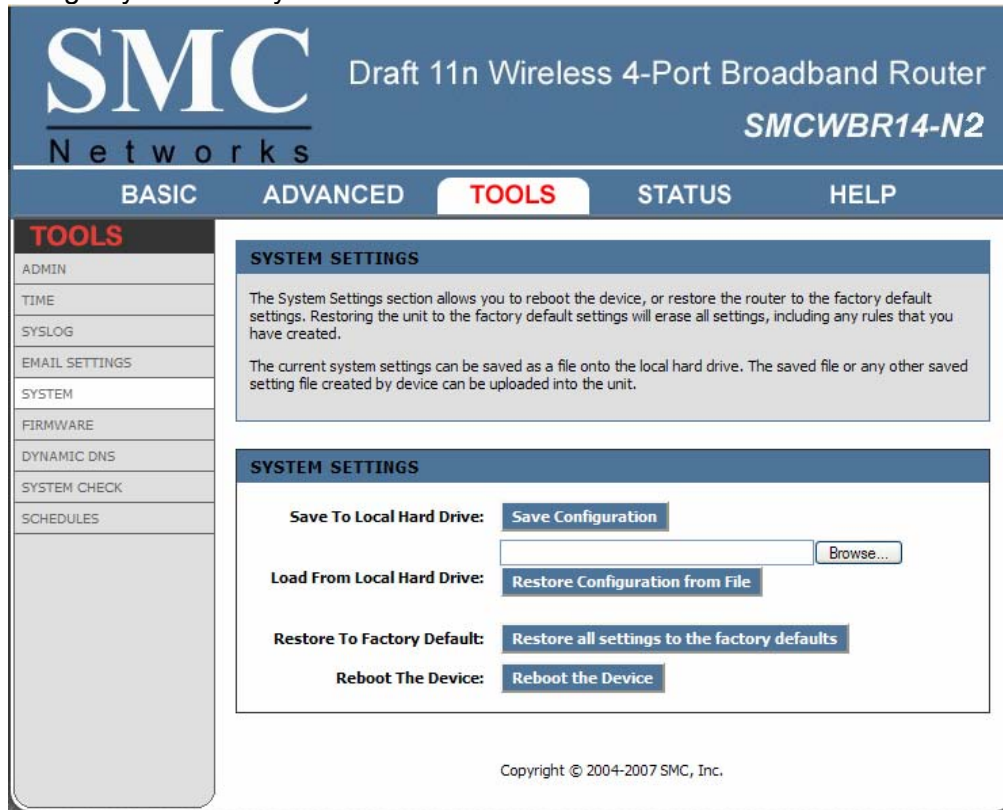
Save Settings To Local Hard Drive

> This option allows you to save the router's configuration to a file on your computer. Be sure to save the configuration before performing a firmware upgrade.

Load Settings From Local Hard Drive

> Use this option to restore previously saved router configuration settings.

Restore To Factory Default Settings

> This option restores all configuration settings back to the settings that were in effect at the time the router was shipped from the factory. Any settings that have not been saved will be lost. If you want to save your router configuration settings, use the Save Settings option above.

Reboot The Device

> This restarts the router. Useful for restarting when you are not near the device.

Tools_Firmware

The Firmware Upgrade section can be used to update to the latest firmware code to improve functionality and performance. To check for the latest firmware, click the **Check Online Now** button. If you would like to be notified when new firmware is released, place a checkmark in the box next to **Email Notification of Newer Firmware Version**.

To upgrade the firmware, follow these steps:

1. Click the **Browse** button to locate the upgrade file on your computer.
2. Once you have found the file to be used, click the **Upload** button below to start the firmware upgrade process. This can take a minute or more.
3. Wait for the router to reboot. This can take another minute or more.
4. Confirm updated firmware revision on status page.

Firmware Information

Here are displayed the version numbers of the firmware currently installed in your router and the most recent upgrade that is available.

Check Online

This option will check support site to see if you have the latest version of the firmware available. If a newer version is available, download instructions will be displayed.

Firmware Upgrade

Firmware upgrade cannot be performed from a wireless device. To perform an upgrade, ensure that you are using a PC that is connected to the router by wire.

Some firmware upgrades reset the configuration options to the factory defaults. Before performing an upgrade, be sure to save the current configuration from the Tools -> Admin screen.

Upload

Once you have a firmware update on your computer, use this option to browse for the file and then upload the information into the router.

Tools_Dynamic DNS

The Dynamic DNS feature allows you to host a server (Web, FTP, Game Server, etc.) using a domain name that you have purchased (www.whateveryournameis.com) with your dynamically assigned IP address. Most broadband Internet Service Providers assign dynamic (changing) IP addresses. When you use a Dynamic DNS service provider, your friends can enter your host name to connect to your server, no matter what your IP address is.
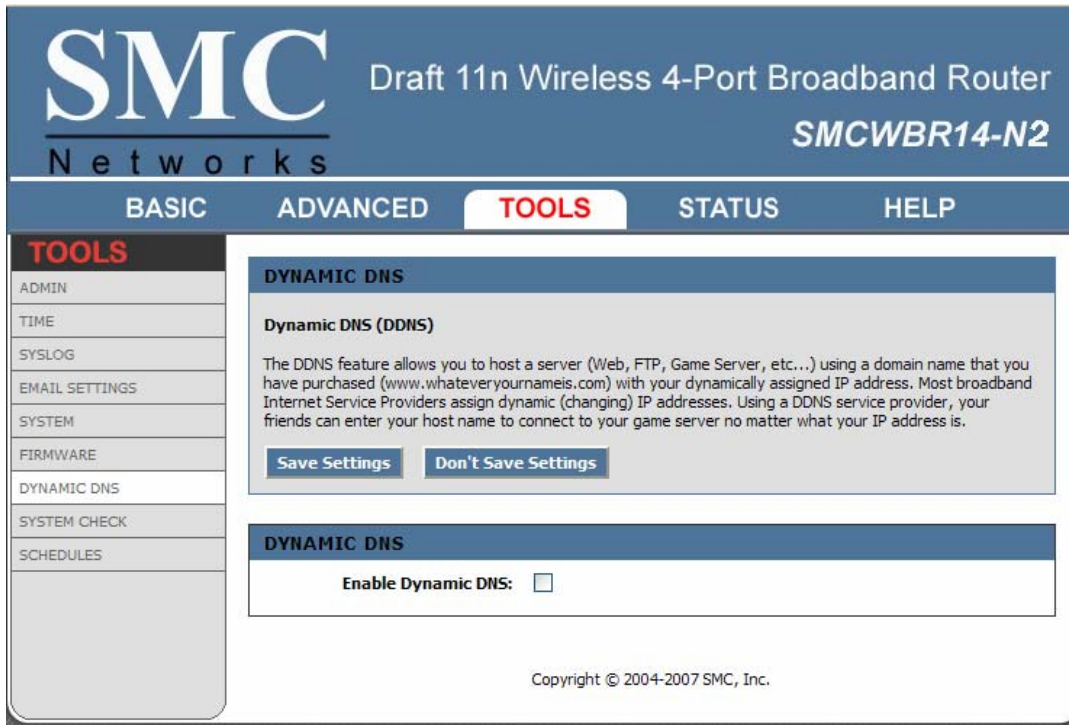
Enable Dynamic DNS

> Enable this option only if you have purchased your own domain name and registered with a dynamic DNS service provider. The following paramters are displayed when the option is enabled.

Server Address

> Select a dynamic DNS service provider from the pull-down list.

Host Name

> Enter your host name, fully qualified; for example: **myhost.mydomain.net**.

Username or Key

> Enter the username or key provided by your service provider. If the Dynamic DNS provider supplies only a key, enter that key in all three fields.

Password or Key

> Enter the password or key provided by your service provider. If the Dynamic DNS provider supplies only a key, enter that key in all three fields.

Verify Password or Key

Re-type the password or key provided by your service provider. If the Dynamic DNS provider supplies only a key, enter that key in all three fields.

Timeout

The time between periodic updates to the Dynamic DNS, if your dynamic IP address has not changed. The timeout period is entered in hours.

If a dynamic DNS update fails for any reason (for example, when incorrect parameters are entered), the router automatically disables the Dynamic DNS feature and records the failure in the log.

After configuring the router for dynamic DNS, you can open a browser and navigate to the URL for your domain (for example **http://www.mydomain.info**) and the router will attempt to forward the request to port 80 on your LAN. If, however, you do this from a LAN-side computer and there is no virtual server defined for port 80, the router will return the router's configuration home page. Refer to the <u>Advanced -> Virtual Server</u> configuration page to set up a virtual server.

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Tools_System Check
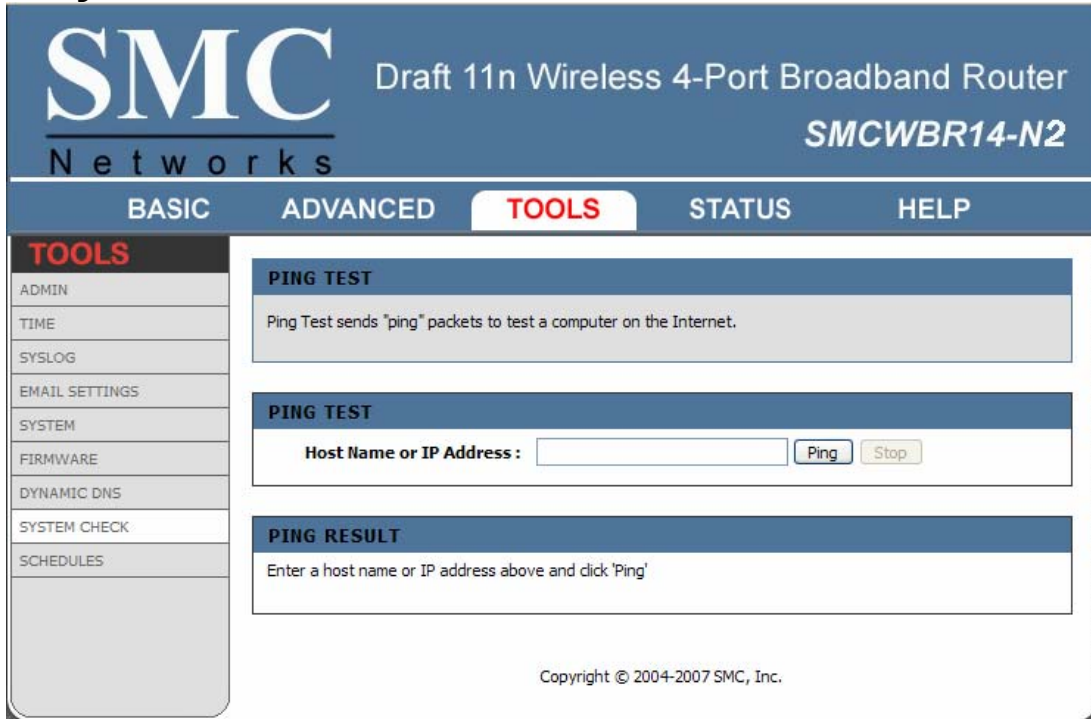
Ping Test

"Ping" is an Internet utility function that sends a series of short messages to a target computer and reports the results. You can use it to test whether a computer is running, and to get an idea of the quality of the connection to that computer, based on the speed of the responses.

Host Name or IP Address

Enter either the IP address of the target computer or enter its fully qualified domain name.

Ping

Start pinging the specified host.

Stop

The host is pinged repeatedly until you press this button.

Example:

Host Name or IP Address

www.whitehouse.gov

Ping Result

Please wait, resolving www.whitehouse.gov....
Resolved to 205.161.7.102.
Response from 205.161.7.102 received in 7 milliseconds.
Response from 205.161.7.102 received in 6 milliseconds.
Response from 205.161.7.102 received in 7 milliseconds.
User stopped ping.

Tools_Schedules

Schedules can be created for use with enforcing rules. For example, if you want to restrict web access to Mon-Fri from 3pm to 8pm, you could create a schedule selecting Mon, Tue, Wed, Thu, and Fri and enter a Start Time of 3pm and End Time of 8pm.
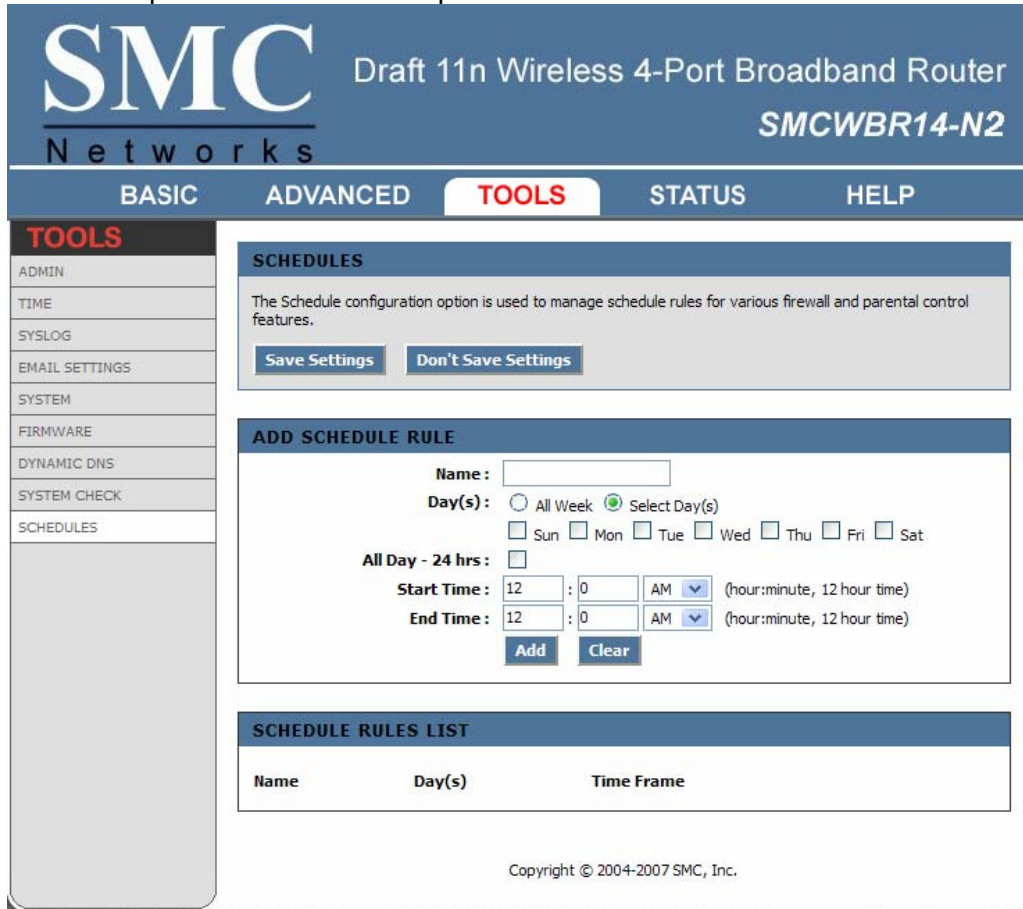
Add/Edit Schedule Rule

In this section you can add entries to the Schedule Rules List below or edit existing entries.

Name

Give the schedule a name that is meaningful to you, such as "Weekday rule".

Day(s)

Place a checkmark in the boxes for the desired days or select the All Week radio button to select all seven days of the week.

All Day - 24 hrs

Select this option if you want this schedule in effect all day for the selected day(s).

Start Time

If you don't use the All Day option, then you enter the time here. The start time is entered in two fields. The first box is for the hour and the second box is for the minute. Email events are normally triggered only by the start time.

End Time

The end time is entered in the same format as the start time. The hour in the first box and the minutes in the second box. The end time is used for most other rules, but is not normally used for email events.

Save

Saves the new or edited Schedule Rule in the following list. When finished updating the Schedule Rules, you must still click the **Save Settings** button at the top of the page to make the changes effective and permanent.

Schedule Rules List

This section shows the currently defined Schedule Rules. A Schedule Rule can be changed by clicking the Edit icon, or deleted by clicking the Delete icon. When you click the Edit icon, the item is highlighted, and the "Edit Schedule Rule" section is activated for editing.

Status

The Status tab provides the following configuration options: **Device Info, Wireless, Routing, Logs, Statistics and Active Sessions.**

Status_Device info

All of your Internet and network connection details are displayed on the Device Info page. The firmware version is also displayed here.

NOTE

Some browsers have limitations that make it impossible to update the WAN status display when the status changes. Some browsers require that you refresh the display to obtain updated status. Some browsers report an error condition when trying to obtain WAN status.

Depending on the type of WAN connection, you can take one of the following sets of actions:

DHCP Connection

Clicking the **DHCP Release** button unassigns the router's IP address. The router will not respond to IP messages from the WAN side until you click the **DHCP Renew** button or power-up the router again. Clicking the **DHCP Renew** button causes the router to request a new IP address from the ISP's server.

PPPoE, PPTP, L2TP Connection

Depending on whether the WAN connection is currently established, you can click either the **Connect** to attempt to establish the WAN connection or the **Disconnect** to break the WAN connection.

BigPond Connection

Depending on whether you are currently logged in to BigPond, you can click either the **BigPond Login** to attempt to establish the WAN connection or the **BigPond Logout** to break the WAN connection.

LAN Computers

This area of the screen continually updates to show all DHCP enabled computers and devices connected to the LAN side of your router. The detection "range" is limited to the address range as configured in DHCP Server. Computers that have an address outside of this range will not show. If the DHCP Client (i.e. a computer configured to "Automatically obtain an address") supplies a Host Name then that will also be shown. Any computer or device that has a static IP address that lies within the detection "range" may show, however its host name will not.

IGMP Multicast memberships

If IGMP is enabled, this area of the screen show all multicast groups of which any LAN devices are members.

Status_Wireless

The wireless section allows you to view the wireless clients that are connected to your wireless router.
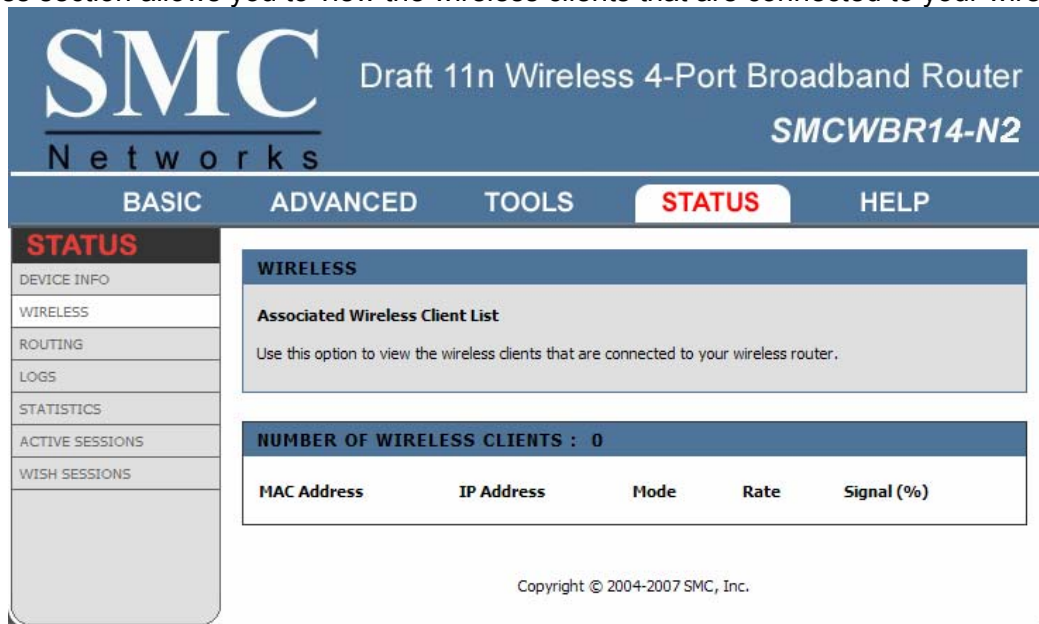
MAC Address

    The Ethernet ID (MAC address) of the wireless client.

IP Address

    The LAN-side IP address of the client.

Mode

    The transmission standard being used by the client. Values are 11a, 11b, or 11g for 802.11a, 802.11b, or 802.11g respectively.

Rate

    The actual transmission rate of the client in megabits per second.

Signal

    This is a relative measure of signal quality. The value is expressed as a percentage of theoretical best quality. Signal quality can be reduced by distance, by interference from other radio-frequency sources (such as cordless telephones or neighboring wireless networks), and by obstacles between the router and the wireless device.

Status_Routing

The routing section displays all of the routing details configured for your router.

A value of 0.0.0.0 for gateway means there is no next hop, and the IP address is directly connected to the router on the interface specified: LAN or WAN. A value of 0.0.0.0 in both the destination IP and netmask means that this is the default route.

Status_Logs

The router automatically logs (records) events of possible interest in its internal memory. If there is not enough internal memory for all events, logs of older events are deleted, but logs of the latest events are retained. The Logs option allows you to view the router logs. You can define what types of events you want to view and the level of events to view. This router also has external Syslog Server support so you can send the log files to a computer on your network that is running a Syslog utility.
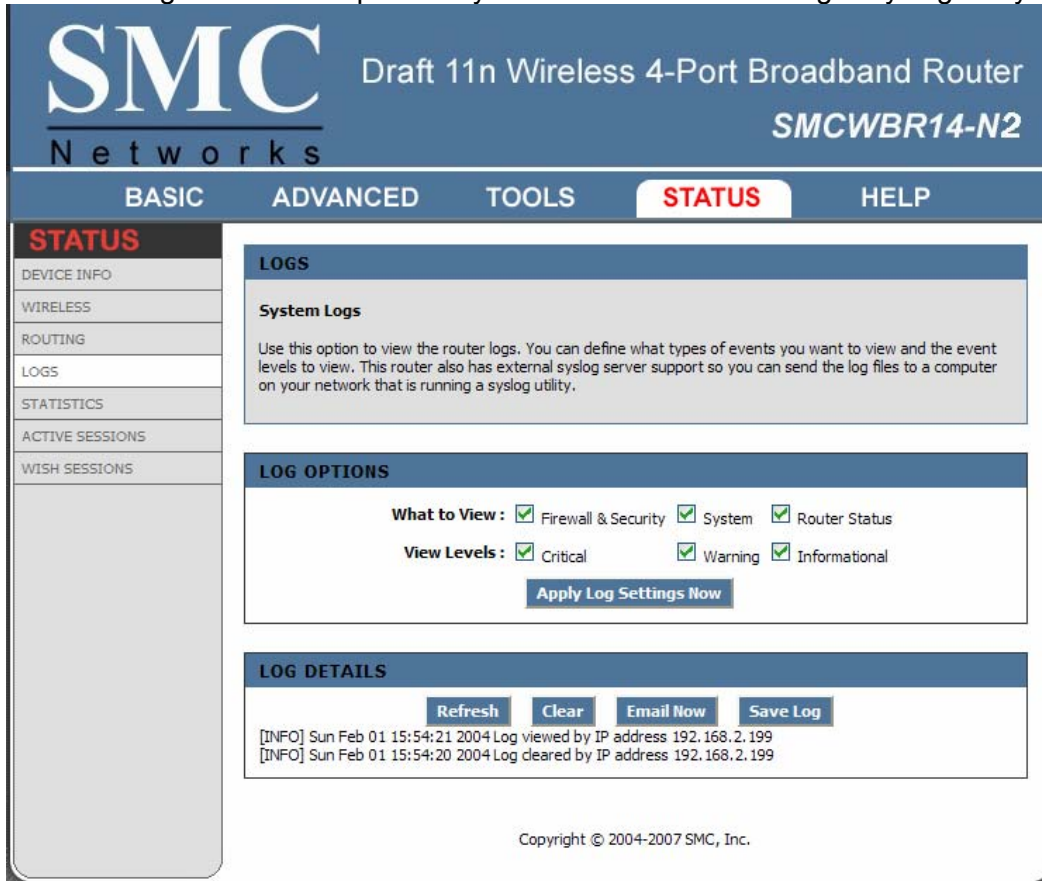
What to View

> Select the kinds of events that you want to view.

- Firewall and Security

- System

- Router Status

View Levels

> Select the level of events that you want to view.

- Critical

- Warning

- Informational

Apply Log Settings Now

Click this button after changing Log Options to make them effective and permanent.

Refresh

Clicking this button refreshes the display of log entries. There may be new events since the last time you accessed the log.

Clear

Clicking this button erases all log entries.

Email Now

If you provided email information with the [Tools -> Email](#) screen, clicking the **Email Now** button sends the router log to the configured email address.

Save Log

Select this option to save the router log to a file on you computer.

Status_Statistics

The Statistics page displays all of the LAN, WAN, and Wireless packet transmit and receive statistics.

Sent

> The number of packets sent from the router.

Received

> The number of packets received by the router.

TX Packets Dropped

> The number of packets that were dropped while being sent, due to errors, collisions, or router resource limitations.

RX Packets Dropped

> The number of packets that were dropped while being received, due to errors, collisions, or router resource limitations.

Collisions

> The number of packets that were dropped due to Ethernet collisions (two or more devices attempting to use an Ethernet circuit at the same time).

Errors

> The number of transmission failures that cause loss of a packet. A noisy radio-frequency environment can cause a high error rate on the wireless LAN.

Status_Active Sessions

The Active Sessions page displays full details of active sessions through your router. A session is a conversation between a progam or application on a LAN-side computer and a program or application on a WAN-side computer.

Internal

> The IP address and port number of the LAN-side application.

Protocol

> The communications protocol used for the conversation.

External

> The IP address and port number of the WAN-side application.

NAT

> The port number of the LAN-side application as viewed by the WAN-side application.

Priority

> The preference given to outbound packets of this conversation by the StreamEngine logic. Smaller numbers represent higher priority.

State

> State for sessions that use the TCP protocol.

> - NO: None -- This entry is used as a placeholder for a future connection that may occur.

- SS: SYN Sent -- One of the systems is attempting to start a connection.

- EST: Established -- the connection is passing data.

- FW: FIN Wait -- The client system has requested that the connection be stopped.

- CW: Close Wait -- the server system has requested that the connection be stopped.

- TW: Time Wait -- Waiting for a short time while a connection that was in FIN Wait is fully closed.

- LA: Last ACK -- Waiting for a short time while a connection that was in Close Wait is fully closed.

- CL: Closed -- The connection is no longer active but the session is being tracked in case there are any retransmitted packets still pending.

Dir

The direction of initiation of the conversation:

Out

Initiated from LAN to WAN.

In

Initiated from WAN to LAN.

Time Out

The number of seconds of idle time until the router considers the session terminated. The initial value of Time Out depends on the type and state of the connection.

300 seconds

UDP connections.

20 seconds

Reset or closed TCP connections. The connection does not close instantly so that lingering packets can pass or the connection can be re-established.

120 seconds

Opening or closing TCP connections.

7800 seconds

Established TCP connections.

Status_WISH Sessions

The WISH Sessions page displays full details of active local wireless sessions through your router when WISH has been enabled. A WISH session is a conversation between a program or application on a wirelessly connected LAN-side computer and another computer, however connected.

Originator

The IP address and, where appropriate, port number of the computer that originated a network connection.

Target

The IP address and, where appropriate, port number of the computer to which a network connection has been made.

Protocol

The communications protocol used for the conversation.

State

State for sessions that use the TCP protocol.

- NO: None -- This entry is used as a placeholder for a future connection that may occur.

- SS: SYN Sent -- One of the systems is attempting to start a connection.

- EST: Established -- the connection is passing data.

- FW: FIN Wait -- The client system has requested that the connection be stopped.

- CW: Close Wait -- the server system has requested that the connection be stopped.

- TW: Time Wait -- Waiting for a short time while a connection that was in FIN Wait is fully closed.

- LA: Last ACK -- Waiting for a short time while a connection that was in Close Wait is fully closed.

- CL: Closed -- The connection is no longer active but the session is being tracked in case there are any retransmitted packets still pending.

Priority

The priority given to packets sent wirelessly over this conversation by the WISH logic. The priorities are:

- BK: Background (least urgent).

- BE: Best Effort.

- VI: Video.

- VO: Voice (most urgent).

Time Out

The number of seconds of idle time until the router considers the session terminated. The initial value of Time Out depends on the type and state of the connection.

300 seconds

UDP connections.

240 seconds

Reset or closed TCP connections. The connection does not close instantly so that lingering packets can pass or the connection can be re-established.

7800 seconds

Established or closing TCP connections.

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Glossary

Access Control List

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

Access Point

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

ActiveX

A Microsoft specification for the interaction of software components.

Ad-hoc network

Peer-to-Peer network between wireless clients

Address Resolution Protocol

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

ADSL

Asymmetric Digital Subscriber Line

Advanced Encryption Standard

AES. Government encryption standard

Alphanumeric

Characters A-Z and 0-9

Antenna

Used to transmit and receive RF signals.

AppleTalk

A set of Local Area Network protocols developed by Apple for their computer systems

AppleTalk Address Resolution Protocol

AARP. Used to map the MAC addresses of Apple computers to their AppleTalk network addresses, so that conversions can be made in both directions.

Application layer

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

ASCII

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

Attenuation

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

Authentication

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

Automatic Private IP Addressing

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

B

Backward Compatible

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

Bandwidth

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

Basic Input/Output System

BIOS. A program that the processor of a computer uses to startup the system once it is turned on

Baud

Data transmission speed

Beacon

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

Bit rate

The amount of bits that pass in given amount of time

Bit/sec

Bits per second

BOOTP

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

Bottleneck

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

Broadband

A wide band of frequencies available for transmitting data

Broadcast

Transmitting data in all directions at once

Browser

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

C

Cable modem

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

CardBus

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

CAT 5

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

Client

A program or user that requests data from a server

Collision

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

Cookie

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

D

Data

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

Data Encryption Standard

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

Data-Link layer

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

Database

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

DB-25

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

DB-9

A 9 pin connector for RS-232 connections

dBd

Decibels related to dipole antenna

dBi

Decibels relative to isotropic radiator

dBm

Decibels relative to one milliwatt

Decrypt

To unscramble an encrypted message back into plain text

Default

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

Demilitarized zone

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

DHCP

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

Digital certificate:

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

Direct Sequence Spread Spectrum

DSSS: Modulation technique used by 802.11b wireless devices

DMZ

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

DNS

Domain Name System: Translates Domain Names to IP addresses

Domain name

A name that is associated with an IP address

Download

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

DSL

Digital Subscriber Line. High bandwidth Internet connection over telephone lines

Duplex

Sending and Receiving data transmissions at the sane time

Dynamic DNS service

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

Dynamic IP address

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

E

EAP

Extensible Authentication Protocol

Email

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

Encryption

Converting data into cyphertext so that it cannot be easily read

Ethernet

The most widely used technology for Local Area Networks.

F

Fiber optic

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

File server

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

File sharing

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

Firewall

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

Firmware

Programming that is inserted into a hardware device that tells it how to function

Fragmentation

Breaking up data into smaller pieces to make it easier to store

FTP

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

Full-duplex

Sending and Receiving data at the same time

G

Gain

The amount an amplifier boosts the wireless signal

Gateway

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

Gbps

Gigabits per second

Gigabit Ethernet

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

GUI

Graphical user interface

H

H.323

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

Half-duplex

Data cannot be transmitted and received at the same time

Hashing

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

Hexadecimal

Characters 0-9 and A-F

Hop

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

Host

Computer on a network

HTTP

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

HTTPS

HTTP over SSL is used to encrypt and decrypt HTTP transmissions

Hub

A networking device that connects multiple devices together

I

ICMP

Internet Control Message Protocol

IEEE

Institute of Electrical and Electronics Engineers

IGMP

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

IIS

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

IKE

Internet Key Exchange is used to ensure security for VPN connections

Infrastructure

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

Internet

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

Internet Explorer

A World Wide Web browser created and provided by Microsoft

Internet Protocol

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

Internet Protocol Security

IPsec provides security at the packet processing layer of network communication

Internet Service Provider

An ISP provides access to the Internet to individuals or companies

Intranet

A private network

Intrusion Detection

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

IP

Internet Protocol

IP address

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

IPsec

Internet Protocol Security

IPX

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

ISP

Internet Service Provider

J

Java

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

Kbps

Kilobits per second

Kbyte

Kilobyte

LAN

Local Area Network

Latency

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

LED

Light Emitting Diode

Legacy

Older devices or technology

Local Area Network

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

LPR/LPD

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

L2TP

Layer 2 Tunneling Protocol

MAC address

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

Mbps

Megabits per second

MDI

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

MDIX

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

MIB

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

Modem

A device that Modulates digital signals from a computer to an analog signal in order to transmit the signal over phone lines. It also Demodulates the analog signals coming from the phone lines to digital signals for your computer

MPPE

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

MTU

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

Multicast

Sending data from one device to many devices on a network

N

NAT

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

NetBEUI

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

NetBIOS

Network Basic Input/Output System

Netmask

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

Network Interface Card

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

Network Layer

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

Network Time Protocol

Used to synchronize the time of all the computers in a network

NIC

Network Interface Card

NTP

Network Time Protocol

OFDM

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

OSI

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

OSPF

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

Password

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

Personal Area Network

The interconnection of networking devices within a range of 10 meters

Physical layer

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

Ping

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

PoE

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

POP3

Post Office Protocol 3 is used for receiving email

Port

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

PPP

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

PPPoE

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

PPTP

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

Preamble

Used to synchronize communication timing between devices on a network

Q

QoS

Quality of Service

R

RADIUS

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

Reboot

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

Rendezvous

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

Repeater

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

RIP

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

RJ-11

The most commonly used connection method for telephones

RJ-45

The most commonly used connection method for Ethernet

RS-232C

The interface for serial communication between computers and other related devices

RSA

Algorithm used for encryption and authentication

Server

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

Session key

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

Session layer

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

Simple Mail Transfer Protocol

Used for sending and receiving email

Simple Network Management Protocol

Governs the management and monitoring of network devices

SIP

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

SMTP

Simple Mail Transfer Protocol

SNMP

Simple Network Management Protocol

SOHO

Small Office/Home Office

SPI

Stateful Packet Inspection

SSH

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

SSID

Service Set Identifier is a name for a wireless network

Stateful inspection

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

Subnet mask

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

Syslog

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

T

TCP

Transmission Control Protocol

TCP/IP

Transmission Control Protocol/Internet Protocol

TCP Raw

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

TFTP

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

Throughput

The amount of data that can be transferred in a given time period

Traceroute

A utility displays the routes between you computer and specific destination

U

UDP

User Datagram Protocol

Unicast

Communication between a single sender and receiver

Universal Plug and Play

A standard that allows network devices to discover each other and configure themselves to be a part of the network

Upgrade

To install a more recent version of a software or firmware product

Upload

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

UPnP

Universal Plug and Play

URL

Uniform Resource Locator is a unique address for files accessible on the Internet

USB

Universal Serial Bus

UTP

Unshielded Twisted Pair

V

Virtual Private Network

VPN: A secure tunnel over the Internet to connect remote offices or users to their company's network

VLAN

Virtual LAN

Voice over IP

Sending voice information over the Internet as opposed to the PSTN

VoIP

Voice over IP

W

Wake on LAN

Allows you to power up a computer though it's Network Interface Card

WAN

Wide Area Network

WCN

Windows Connect Now. A Microsoft method for configuring and bootstrapping wireless networking hardware (access points) and wireless clients, including PCs and other devices.

WDS

Wireless Distribution System. A system that enables the interconnection of access points wirelessly.

Web browser

A utility that allows you to view content and interact with all of the information on the World Wide Web

WEP

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

Wi-Fi

Wireless Fidelity

Wi-Fi Protected Access

An updated version of security for wireless networks that provides authentication as well as encryption

Wide Area Network

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

Wireless ISP

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

Wireless LAN

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

WISP

Wireless Internet Service Provider

WLAN

Wireless Local Area Network

WPA

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

X

xDSL

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

Y

Yagi antenna

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

Z

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802.11

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

SMC Networks

SMCWBR14-N2