Chapter 4
Wireless Configuration

This chapter describes how to configure the wireless features of your WGR624v3 router. In planning your wireless network, you should consider the level of security required. You should also select the physical placement of your firewall in order to maximize the network speed. For further information on wireless networking, refer to Appendix D, “Wireless Networking Basics.

Observe Performance, Placement, and Range Guidelines

The operating distance or range of your wireless connection can vary significantly based on the physical placement of the wireless firewall. The latency, data throughput performance, and notebook power consumption of wireless adapters also vary depending on your configuration choices.

> **Note:** Failure to follow these guidelines can result in significant performance degradation or inability to wirelessly connect to the router. For complete range/ performance specifications, please see Appendix A, “Technical Specifications.”

For best results, place your firewall:

- Near the center of the area in which your computers will operate.
- In an elevated location such as a high shelf where the wirelessly connected computers have line-of-sight access (even if through walls).
- Away from sources of interference, such as computers, microwaves, and 2.4 GHz cordless phones.
- Away from large metal surfaces.

The time it takes to establish a wireless connection can vary depending on both your security settings and placement. WEP connections can take slightly longer to establish. Also, WEP encryption can consume more battery power on a notebook computer.

Implement Appropriate Wireless Security

Note: Indoors, computers can connect over 802.11b/g wireless networks at ranges of up to 300 feet. Such distances can allow for others outside of your immediate area to access your network.

Unlike wired network data, your wireless data transmissions can be received well beyond your walls by anyone with a compatible adapter. For this reason, use the security features of your wireless equipment. The WGR624v3 router provides highly effective security features which are covered in detail in this chapter. Deploy the security features appropriate to your needs.

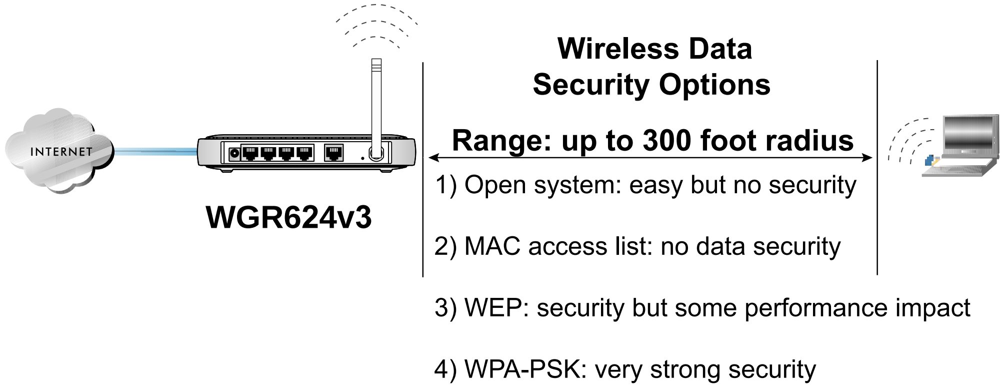

INTERNET
WGR624v3
Wireless Data
Security Options
Range: up to 300 foot radius
1) Open system: easy but no security
2) MAC access list: no data security
3) WEP: security but some performance impact
4) WPA-PSK: very strong security

Figure 4-1: WGR624v3 wireless data security options

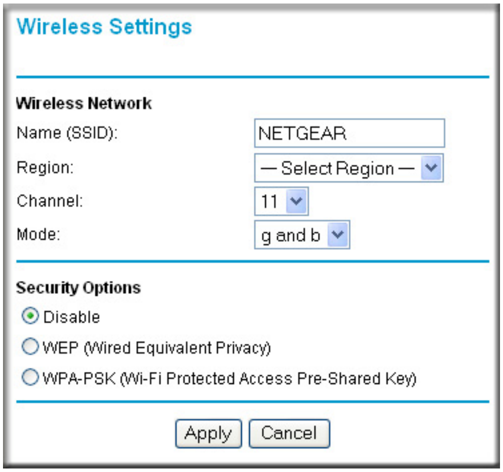
There are several ways you can enhance the security of your wireless network.

- **Restrict Access Based on MAC address.** You can restrict access to only trusted computers so that unknown computers cannot wirelessly connect to the WGR624v3. MAC address filtering adds an obstacle against unwanted access to your network, but the data broadcast over the wireless link is fully exposed.
- **Turn Off the Broadcast of the Wireless Network Name SSID.** If you disable broadcast of the SSID, only devices that have the correct SSID can connect. This nullifies the wireless network ‘discovery’ feature of some products such as Windows XP, but the data is still fully exposed to a determined snoop using specialized test equipment like wireless sniffers.
- **WEP.** Wired Equivalent Privacy (WEP) data encryption provides data security. WEP Shared Key authentication and WEP data encryption will block all but the most determined eavesdropper.

- **WPA-PSK.** Wi-Fi Protected Access (WPA) data encryption provides strong data security. WPA-PSK will block eavesdropping. Because this is a new standard, wireless device driver and software availability may be limited.
- **Turn Off the Wired LAN.** If you disable the wireless LAN, wireless devices cannot communicate with the router at all. You might choose to turn off the wireless the LAN when you are away and the others in the household all use wired connections.

Understanding Wireless Settings

To configure the Wireless settings of your firewall, click the Wireless link in the main menu of the browser interface. The Wireless Settings menu will appear, as shown below.



Wireless Settings

Wireless Network

Name (SSID): NETGEAR

Region: — Select Region —

Channel: 11

Mode: g and b

Security Options

● Disable

○ WEP (Wired Equivalent Privacy)

○ WPA-PSK (Wi-Fi Protected Access Pre-Shared Key)

Figure 4-2: Wireless Settings menu

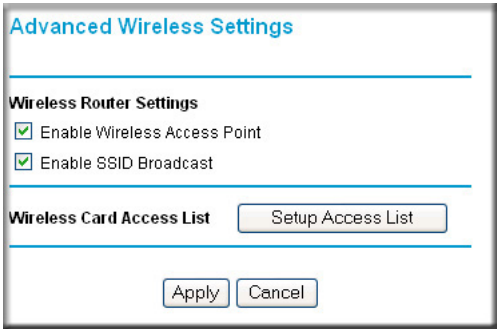
- **Name (SSID).** The SSID is also known as the wireless network name. Enter a value of up to 32 alphanumeric characters. In a setting where there is more than one wireless network, different wireless network names provide a means for separating the traffic. Any device you want to participate in a particular wireless network will need to use this SSID for that network. The WGR624v3 default SSID is: **NETGEAR**.
- **Region.** This field identifies the region where the WGR624v3 can be used. It may not be legal to operate the wireless features of the wireless router in a region other than one of those identified in this field.

- **Channel.** This field determines which operating frequency will be used. It should not be necessary to change the wireless channel unless you notice interference problems with another nearby access point. For more information on the wireless channel frequencies please refer to "Wireless Channels" on page D-2.
- **Mode.** This field determines which data communications protocol will be used. You can select "g only," "b only," or "g and b." "g only" dedicates the WGR624v3 to communicating with the higher bandwidth 802.11g wireless devices exclusively. "b only" dedicates the WGR624v3 to communicating with the higher bandwidth 802.11b wireless devices exclusively. The "g and b" mode provides backward compatibility with the slower 802.11b wireless devices while still enabling 802.11g communications.
- **Security Options.** These options are the wireless security features you can enable. The table below identifies the various basic wireless security options. A full explanation of these standards is available in Appendix D, "Wireless Networking Basics."

Table 4-1. Basic Wireless Security Options

Field	Description
Automatic	No wireless security.
WEP	WEP offers the following options: • Open System With Open Network Authentication and 64- or 128-bit WEP Data Encryption, the WGR624 v3 *does* perform 64- or 128-bit data encryption but *does not* perform any authentication. • Shared Key Shared Key authentication encrypts the SSID and data. Choose the Encryption Strength (64- or 128-bit data encryption). Manually enter the key values or enter a word or group of printable characters in the Passphrase box. Manually entered keys *are* case sensitive but passphrase characters *are not* case sensitive. **Note**: Not all wireless adapter configuration utilities support passphrase key generation. • Auto
WPA-PSK	WPA-Pre-shared Key *does* perform authentication, uses 128-bit data encryption and dynamically changes the encryption keys making it nearly impossible to circumvent. Enter a word or group of printable characters in the Password Phrase box. These characters *are* case sensitive. **Note**: Not all wireless adapter configuration utilities support WPA. Furthermore, client software is required on the client. Windows XP and Windows 2000 with Service Pack 3 do include the client software that supports WPA. Nevertheless, the wireless adapter hardware and driver must also support WPA.

To configure the advanced wireless settings of your firewall, click the Wireless Setup link in the Advanced section of the main menu of the browser interface. The Wireless Settings menu will appear, as shown below.



Advanced Wireless Settings

Wireless Router Settings

☑ Enable Wireless Access Point

☑ Enable SSID Broadcast

Wireless Card Access List

Figure 4-3: Advanced Wireless Settings menu

- **Allow Broadcast of Name (SSID).** If you disable broadcast of the SSID, only devices that have the correct SSID can connect. Disabling SSID broadcast nullifies the wireless network 'discovery' feature of some products such as Windows XP.
- **Enable Wireless Access Point.** If you disable the wireless access point, wireless devices cannot connect to the WGR624v3.
- **Wireless Card Access List.** When the Trusted PCs Only radio button is selected, the WGR624v3 checks the MAC address of the wireless station and only allows connections to computers identified on the trusted computers list.

Information to Gather Before Changing Basic Wireless Settings

Before customizing your wireless settings, print this form and record the following information. If you are working with an existing wireless network, the person who set up or is responsible for the network will be able to provide this information. Otherwise, you will choose the settings for your wireless network. Either way, record the settings for your wireless network in the spaces below.

- **Wireless Network Name (SSID)*:*** ______________________________ The SSID, identifies the wireless network. You can use up to 32 alphanumeric characters. The SSID *is* case sensitive. The SSID in the wireless adapter card must match the SSID of the wireless router. In some configuration utilities (such as in Windows XP), the term "wireless network name" is used instead of SSID.
- **If WEP Authentication is Used.** Circle one: **Open System**, **Shared Key, or Auto**.

  Note: If you select Shared Key, the other devices in the network will not connect unless they are set to Shared Key as well and are configured with the correct key.

  – **WEP Encryption key size**. Choose one: **64-bit** or **128-bit**. Again, the encryption key size must be the same for the wireless adapters and the wireless router.

  – **Data Encryption (WEP) Keys**. There are two methods for creating WEP data encryption keys. Whichever method you use, record the key values in the spaces below.

    - **Passphrase method**. ______________________________ These characters *are* case sensitive. Enter a word or group of printable characters and click the Generate Keys button. Not all wireless devices support the passphrase method.
    - **Manual method**. These values *are not* case sensitive. For 64-bit WEP, enter 10 hex digits (any combination of 0-9 or a-f). For 128-bit WEP, enter 26 hex digits.

    Key 1: ___________________________________

    Key 2: ___________________________________

    Key 3: ___________________________________

    Key 4: ___________________________________

- **If WPA-PSK Authentication is Used.**

  – **Passphrase**: ______________________________ These characters *are* case sensitive. Enter a word or group of printable characters. When you use WPA-PSK, the other devices in the network will not connect unless they are set to WPA-PSK as well and are configured with the correct Passphrase.

Use the procedures described in the following sections to configure the WGR624v3. Store this information in a safe place.

Default Factory Settings

When you first receive your WGR624v3, the default factory settings are shown below. You can restore these defaults with the Factory Default Restore button on the rear panel. After you install the WGR624v3 router, use the procedures below to customize any of the settings to better meet your networking needs.

FEATURE	DEFAULT FACTORY SETTINGS
Wireless Access Point	**Enabled**
Wireless Access List (MAC Filtering)	**All wireless stations allowed**
SSID broadcast	**Enabled**
SSID	**NETGEAR**
11b/g RF Channel	**11**
Mode	**g and b**
Authentication Type	**Open System**
WEP	**Disabled**

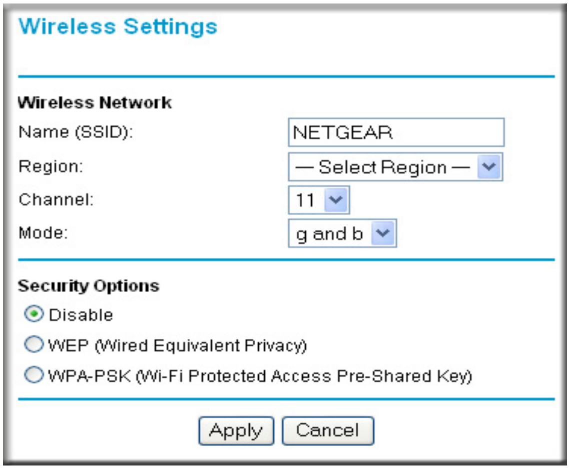
How to Set Up and Test Basic Wireless Connectivity

Note: If you use a wireless computer to configure WPA settings, you will be disconnected when you click Apply. Reconfigure your wireless adapter to match the new settings or access the wireless router from a wired computer to make any further changes.

Follow the instructions below to set up and test basic wireless connectivity. Once you have established basic wireless connectivity, you can enable security settings appropriate to your needs.

1. Log in to the WGR624v3 firewall at its default LAN address of *http://www.routerlogin.net* with its default user name of **admin** and default password of **password**, or using whatever LAN address and password you have set up.

2. Click **Wireless Settings** in the main menu of the WGR624v3 firewall.



Wireless Settings

Wireless Network

Name (SSID): NETGEAR

Region: — Select Region —

Channel: 11

Mode: g and b

Security Options

● Disable

○ WEP (Wired Equivalent Privacy)

○ WPA-PSK (Wi-Fi Protected Access Pre-Shared Key)

Figure 4-4: Wireless Settings menu

3. Choose a suitable descriptive name for the wireless network name (SSID). In the SSID box, enter a value of up to 32 alphanumeric characters. The default SSID is NETGEAR.

   Note: The SSID is case sensitive; NETGEAR is not the same as nETgear. Also, the SSID of any wireless access adapters must match the SSID you configure in the 108 Mbps Wireless Firewall Router WGR624v3. If they do not match, you will not get a wireless connection to the WGR624v3.

4. Set the Region. Select the region in which the wireless interface will operate.

5. Set the Channel. The default channel is 11.

   This field determines which operating frequency will be used. It should not be necessary to change the wireless channel unless you notice interference problems with another nearby wireless router or access point. Select a channel that is not being used by any other wireless networks within several hundred feet of your firewall. For more information on the wireless channel frequencies please refer to "Wireless Channels" on page D-2.

6. For initial configuration and test, leave the Wireless Card Access List set to "Everyone" and the Encryption Strength set to "Disabled."

7. Click **Apply** to save your changes.

➔ **Note:** If you are configuring the firewall from a wireless computer and you change the firewall's SSID, channel, or security settings, you will lose your wireless connection when you click on Apply. You must then change the wireless settings of your computer to match the firewall's new settings.

8. Configure and test your computers for wireless connectivity.

   Program the wireless adapter of your computers to have the same SSID and channel that you configured in the router. Check that they have a wireless link and are able to obtain an IP address by DHCP from the firewall.

   Warning: The Network Name (SSID) is case sensitive. If NETGEAR is the Network Name (SSID) in your wireless router, you must enter NETGEAR in your computer's wireless settings. Typing nETgear will not work.

Once your computers have basic wireless connectivity to the firewall, you can configure the advanced wireless security functions of the firewall.

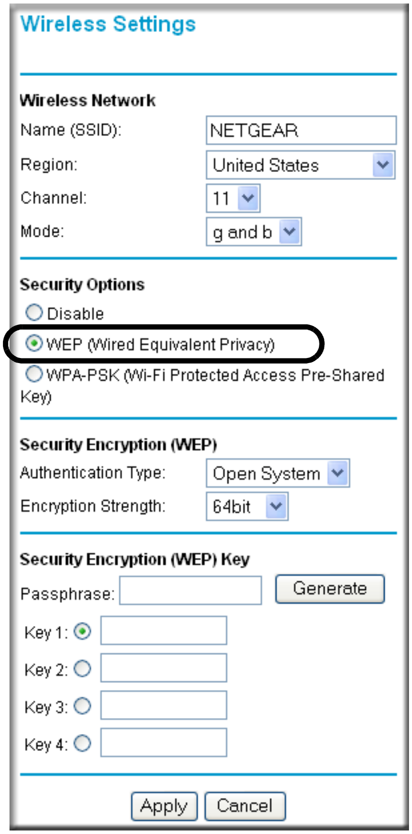
How to Configure WEP

To configure WEP data encryption, follow these steps:

➔ **Note:** If you use a wireless computer configure WEP settings, you will be disconnected when you click on Apply. You must then either configure your wireless adapter to match the wireless router WEP settings or access the wireless router from a wired computer to make any further changes.

1. Log in to the WGR624v3 firewall at its default LAN address of *http://www.routerlogin.net* with its default user name of **admin** and default password of **password**, or using whatever LAN address and password you have set up.
2. Click **Wireless Settings** in the main menu of the WGR624v3 firewall.
3. From the Security Options menu, select **WEP**. The WEP options display.

4. Select the Authentication Type and Encryptions strength from the drop-down lists.



Wireless Settings

Wireless Network

Name (SSID): NETGEAR

Region: United States

Channel: 11

Mode: g and b

Security Options

○ Disable

● WEP (Wired Equivalent Privacy)

○ WPA-PSK (Wi-Fi Protected Access Pre-Shared Key)

Security Encryption (WEP)

Authentication Type: Open System

Encryption Strength: 64bit

Security Encryption (WEP) Key

Passphrase:

Key 1: ●

Key 2: ○

Key 3: ○

Key 4: ○

Figure 4-5. Wireless Settings encryption menu

5. You can manually or automatically program the four data encryption keys. These values must be identical on all computers and Access Points in your network.
   - Automatic - Enter a word or group of printable characters in the Passphrase box and click the Generate button. The passphrase is case sensitive; NETGEAR is not the same as nETgear. The four key boxes will be automatically populated with key values.
   - Manual - Enter ten hexadecimal digits (any combination of 0-9, a-f, or A-F). These entries are not case sensitive; AA is the same as aa.
     Select which of the four keys will be active.

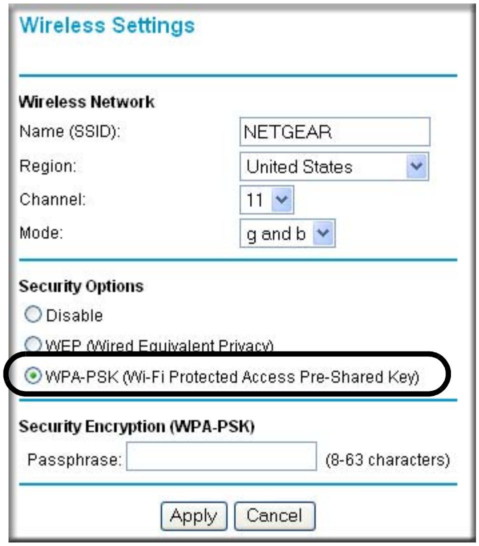
   Please refer to "WEP Wireless Security" on page D-4 for a full explanation of each of these options, as defined by the IEEE 802.11 wireless communication standard.
6. Click **Apply** to save your settings.

How to Configure WPA-PSK Wireless Security

Note: Not all wireless adapters support WPA. Furthermore, client software is also required. Windows XP and Windows 2000 with service pack 3 do include WPA support. Nevertheless, the wireless adapter hardware and driver must also support WPA. For instructions on configuring wireless computers or PDAs for WPA-PSK security, consult the documentation for the product you are using.

To configure WPA-PSK, follow these steps:

1. Click **Security Settings** in the Setup section of the main menu and select WPA-PSK for the Security Type.



Wireless Settings

Wireless Network

Name (SSID): NETGEAR

Region: United States

Channel: 11

Mode: g and b

Security Options

○ Disable

○ WEP (Wired Equivalent Privacy)

● WPA-PSK (Wi-Fi Protected Access Pre-Shared Key)

Security Encryption (WPA-PSK)

Passphrase: (8-63 characters)

Figure 4-6: WPA Settings menu

2. Enter a word or group of 8-63 printable characters in the Password Phrase box.
3. Click **Apply** to save your settings.

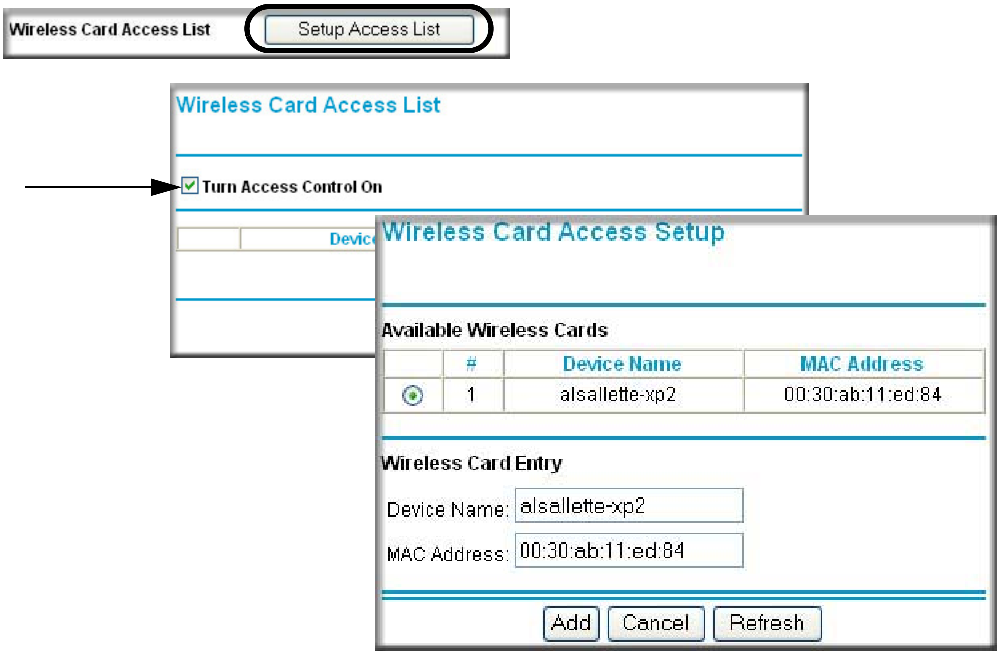
How to Restrict Wireless Access by MAC Address

To restrict access based on MAC addresses, follow these steps:

1. Log in to the WGR624v3 firewall at its default LAN address of *http://www.routerlogin.net* with its default user name of **admin** and default password of **password**, or using whatever LAN address and password you have set up.

> **Note:** When configuring the firewall from a wireless computer whose MAC address is not in the Trusted PC list, if you select Turn Access Control On, you will lose your wireless connection when you click on Apply. You must then access the wireless router from a wired computer or from a wireless computer which is on the access control list to make any further changes.

2. Click **Advanced Wireless Setup** in the main menu of the WGR624v3 firewall.
3. From the Wireless Settings menu, click **Setup Access List** to display the Wireless Access menu shown below.



☑ Turn Access Control On

	#	Device Name	MAC Address
●	1	alsallette-xp2	00:30:ab:11:ed:84

Device Name: alsallette-xp2

MAC Address: 00:30:ab:11:ed:84

Figure 4-7: Wireless Card Access List Setup

4. Click **Add** to add a wireless device to the wireless access control list. The Available Wireless Cards list displays.

5. Click the **Turn Access Control On** check box.
6. Then, either select from the list of available wireless cards the WGR624v3 has found in your area, or enter the MAC address and device name for a device you plan to use. You can usually find the MAC address printed on the wireless adapter.

   Note: You can copy and paste the MAC addresses from the firewall's Attached Devices menu into the MAC Address box of this menu. To do this, configure each wireless computer to obtain a wireless link to the firewall. The computer should then appear in the Attached Devices menu.
7. Click **Add** to add this wireless device to the Wireless Card Access List. The screen changes back to the list screen. Repeat these steps for each additional device you wish to add to the list.
8. Be sure to click **Apply** to save your wireless access control list settings.

Now, only devices on this list will be allowed to wirelessly connect to the WGR624v3.

Chapter 5
Content Filtering

This chapter describes how to use the content filtering features of the 108 Mbps Wireless Firewall Router WGR624v3 to protect your network. These features can be found by clicking on the Content Filtering heading in the Main Menu of the browser interface.

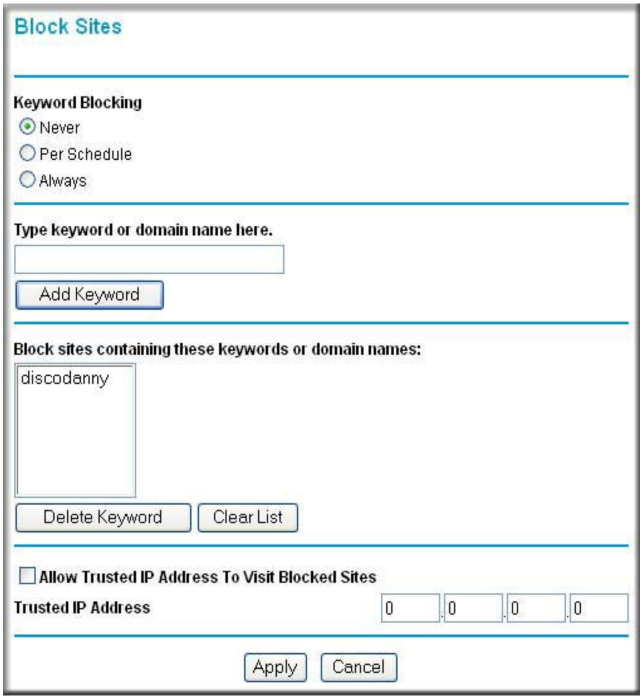
Content Filtering Overview

The 108 Mbps Wireless Firewall Router WGR624v3 provides you with Web content filtering options, plus browsing activity reporting and instant alerts via e-mail. Parents and network administrators can establish restricted access policies based on time of day, Web addresses and Web address keywords. You can also block Internet access by applications and services, such as chat or games.

To configure these features of your router, click on the subheadings under the Content Filtering heading in the Main Menu of the browser interface. The subheadings are described below:

Blocking Access to Internet Sites

The WGR624v3 router allows you to restrict access based on Web addresses and Web address keywords. Up to 255 entries are supported in the Keyword list. The Block Sites menu is shown in Figure 5-1 below:



Block Sites

Keyword Blocking

● Never

○ Per Schedule

○ Always

Type keyword or domain name here.

Block sites containing these keywords or domain names:

discodanny

□ Allow Trusted IP Address To Visit Blocked Sites

Trusted IP Address 0 . 0 . 0 . 0

Figure 5-1: Block Sites menu

To enable keyword blocking, select either “Per Schedule” or “Always”, then click Apply. If you want to block by schedule, be sure that a time period is specified in the Schedule menu.

To add a keyword or domain, type it in the Keyword box, click Add Keyword, then click Apply.

To delete a keyword or domain, select it from the list, click Delete Keyword, then click Apply.

Keyword application examples:

- If the keyword “XXX” is specified, the URL <http://www.badstuff.com/xxx.html> is blocked.

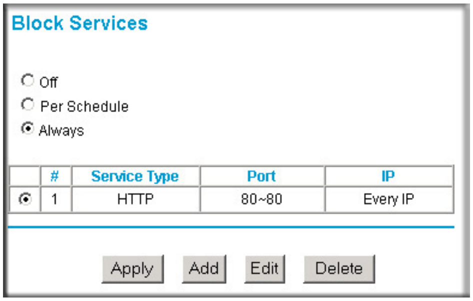
- If the keyword ".com" is specified, only Web sites with other domain suffixes (such as .edu or .gov) can be viewed.
- If you wish to block all Internet browsing access during a scheduled period, enter the keyword "." and set the schedule in the Schedule menu.

To specify a Trusted User, enter that PC's IP address in the Trusted User box and click Apply.

> You may specify one Trusted User, which is a PC that will be exempt from blocking and logging. Since the Trusted User will be identified by an IP address, you should configure that PC with a fixed IP address.

Blocking Access to Internet Services

The WGR624v3 router allows you to block the use of certain Internet services by PCs on your network. This is called services blocking or port filtering. The Block Services menu is shown below:



Block Services

○ Off
○ Per Schedule
● Always

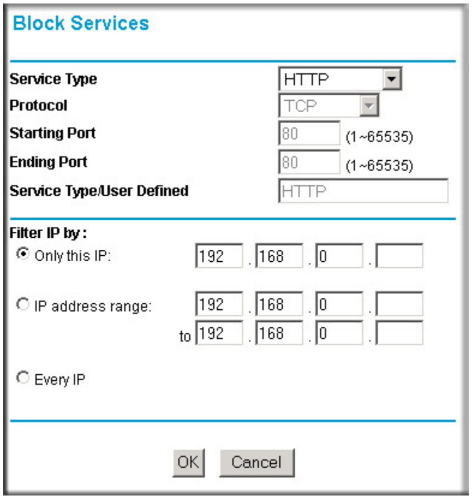
	#	Service Type	Port	IP
●	1	HTTP	80~80	Every IP

Figure 5-2: Block Services menu

Services are functions performed by server computers at the request of client computers. For example, Web servers serve Web pages, time servers serve time and date information, and game hosts serve data about other players' moves. When a computer on your network sends a request for service to a server computer on the Internet, the requested service is identified by a service or port number. This number appears as the destination port number in the transmitted IP packets. For example, a packet that is sent with destination port number 80 is an HTTP (Web server) request.

To enable service blocking, select either Per Schedule or Always, then click Apply. If you want to block by schedule, be sure that a time period is specified in the Schedule menu.

To specify a service for blocking, click Add. The Add Services menu will appear, as shown below:



Block Services

Service Type: HTTP
Protocol: TCP
Starting Port: 80 (1~65535)
Ending Port: 80 (1~65535)
Service Type/User Defined: HTTP

Filter IP by :
● Only this IP: 192 . 168 . 0 .
○ IP address range: 192 . 168 . 0 .
to 192 . 168 . 0 .
○ Every IP

Figure 5-3: Add Services menu

From the Service Type list, select the application or service to be allowed or blocked. The list already displays several common services, but you are not limited to these choices. To add any additional services or applications that do not already appear, select User Defined.

Configuring a User Defined Service

To define a service, first you must determine which port number or range of numbers is used by the application. The service numbers for many common protocols are defined by the Internet Engineering Task Force (IETF) and published in RFC1700, “Assigned Numbers.” Service numbers for other applications are typically chosen from the range 1024 to 65535 by the authors of the application. This information can usually be determined by contacting the publisher of the application or from user groups of newsgroups.

Enter the Starting Port and Ending Port numbers. If the application uses a single port number, enter that number in both boxes.

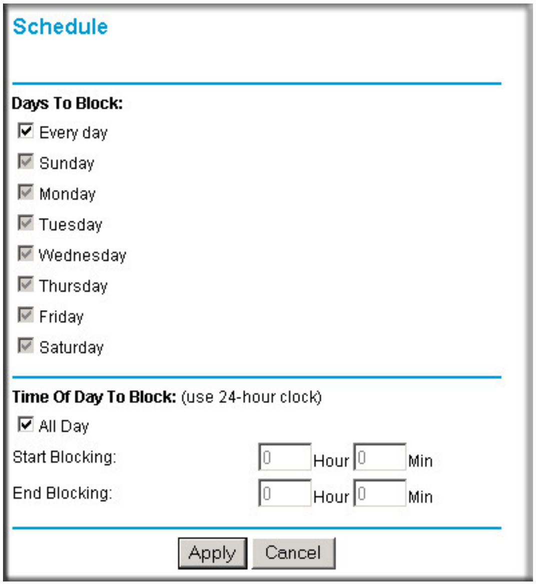
If you know that the application uses either TCP or UDP, select the appropriate protocol. If you are not sure, select Both.

Configuring Services Blocking by IP Address Range

Under “Filter Services For”, you can block the specified service for a single computer, a range of computers (having consecutive IP addresses), or all computers on your network.

Scheduling When Blocking Will Be Enforced

The WGR624v3 router allows you to specify when blocking will be enforced. The Schedule menu is shown below:



Schedule

Days To Block:

☑ Every day

☑ Sunday

☑ Monday

☑ Tuesday

☑ Wednesday

☑ Thursday

☑ Friday

☑ Saturday

Time Of Day To Block: (use 24-hour clock)

☑ All Day

Start Blocking: 0 Hour 0 Min

End Blocking: 0 Hour 0 Min

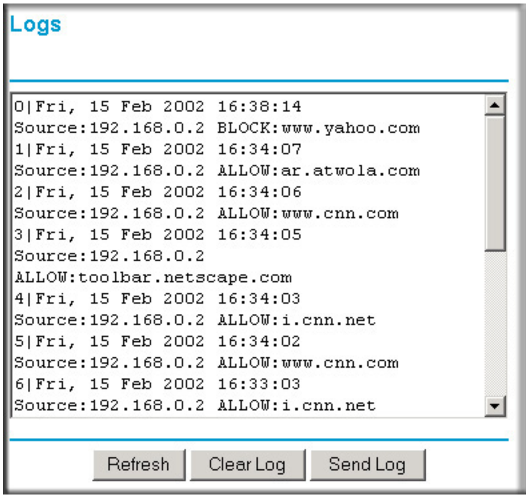
Figure 5-4: Schedule menu

- Use this schedule for blocking content. Check this box if you wish to enable a schedule for Content Filtering. Click Apply.
- Days to Block. Select days to block by checking the appropriate boxes. Select Everyday to check the boxes for all days. Click Apply.
- Time of Day to Block. Select a start and end time in 23:59 format. Select All day for 24 hour blocking. Click Apply.

Be sure to select your Time Zone in the E-Mail menu.

Viewing Logs of Web Access or Attempted Web Access

The log is a detailed record of what Web sites you have accessed or attempted to access. Up to 128 entries are stored in the log. Log entries will only appear when keyword blocking is enabled, and no log entries will be made for the Trusted User. An example is shown below:



```
0|Fri, 15 Feb 2002 16:38:14
Source:192.168.0.2 BLOCK:www.yahoo.com
1|Fri, 15 Feb 2002 16:34:07
Source:192.168.0.2 ALLOW:ar.atwola.com
2|Fri, 15 Feb 2002 16:34:06
Source:192.168.0.2 ALLOW:www.cnn.com
3|Fri, 15 Feb 2002 16:34:05
Source:192.168.0.2
ALLOW:toolbar.netscape.com
4|Fri, 15 Feb 2002 16:34:03
Source:192.168.0.2 ALLOW:i.cnn.net
5|Fri, 15 Feb 2002 16:34:02
Source:192.168.0.2 ALLOW:www.cnn.com
6|Fri, 15 Feb 2002 16:33:03
Source:192.168.0.2 ALLOW:i.cnn.net
```

Figure 5-5: Logs menu

Log entries are described in Table 5-1

Table 5-1. Log entry descriptions

Field	**Description**
Number	The index number of the content filter log entries. 128 entries are available numbered from 0 to 127. The log will keep the record of the latest 128 entries.
Date and Time	The date and time the log entry was recorded.
Source IP	The IP address of the initiating device for this log entry.
Action	This field displays whether the access was blocked or allowed.
	The name or IP address of the Web site or newsgroup visited or attempted to access.