Wireless Access Extension

Instantly add wireless capability to any TJ700x cable modem.

WX-54G

User's Guide

TERAYON

CE

FCC Compliance

This equipment has been tested and found to comply within the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case users will be required to correct the interference at their own expense.

Manufacturer warrants to buyer that products are free from substantial defect in materials and workmanship under normal usage, given proper installation and maintenance for the specified warranty period.

Buyer will promptly notify Manufacturer of any defect in the product. Manufacturer or its agents will have the right to inspect the product or workmanship on buyer's or buyer's customer's premises. Manufacturer has the option of (a) repairing, replacing, or servicing, at its factory or on the premises, the product or workmanship found to be defective; or (b) crediting buyer for the product in accordance with Manufacturer's depreciation policy. Refurbished material may be used to repair or replace the product. Products returned to Manufacturer for repair, replacement, or credit will be shipped prepaid by buyer.

WX-54G User's Guide

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Contacting Terayon Communication Systems

You can contact Terayon Communication Systems as follows:

- Telephone: (866) 483-7296 or (408) 235-500
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- Postal mail:

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  4988 Great America Parkway
  Santa Clara, CA 95054, U.S.A.

- e-mail: ***data-support@terayon.com*** (for technical support)
  marketing@terayon.com (for product information)
- Feedback and suggestions to Technical Publications Group:
  techpubs@terayon.com
- Worldwide Web: ***http://www.terayon.com***

Table of Contents

Chapter 1

Introduction

The Terayon WX-54G is an Access Point designed to be fully compliant with IEEE pre802.11g and 802.11b standards. 802.11g is a new extension to 802.11b (used in the majority of wireless LANs today) that broadens 802.11b's data rates to 54 Mbps within the 2.4 GHz band using Orthogonal Frequency Division Multiplexing (OFDM) technology. 802.11g allows backward compatibility with 802.11b devices but only at 11 Mbps or lower, depending on the range and whether obstructions are present. Wireless LANs are complementary extensions to existing wired LANs, offering complete mobility while maintaining continuous network connectivity to both corporate and home Intranets. Wireless LANs add a new level of convenience for LAN users; PC users stay connected to the network throughout a building without being bound by wires.

The WX-54G has a built-in Internet gateway capability, which allows you to share a broadband modem and one ISP account simultaneously and wirelessly.

System Requirements

To use the Terayon WX-54G, your system must have the following minimum requirements:

- A Terayon TeraJet 700 Series cable modem
- An Ethernet (10Base-T or 10/100Base-TX) adapter for wired clients
- At least one 802.11g (54Mbps) or one 802.11b (11Mbps) wireless adapter for wireless mobile clients
- TCP/IP and an installed Internet browser

Package Contents

Your Terayon WX-54G package should contain:

- One Terayon WX-54G Wireless Access Extension
- One Terayon WX-54G Quick Start Guide
- Two antennas
- One support CD (utilities and user's manual)

Wireless Performance

This section provides the user with ideas for how to improve the performance of a Terayon WLAN network, and covers the following topics:

- Site Topography
- Range
- WX-54G Status Indicators
- Power Requirements

Site Topography

For optimal performance, locate wireless mobile clients and the Terayon WX-54G away from transformers, heavy-duty motors, fluorescent lights, microwave ovens, refrigerators, and other industrial equipment. Signal loss can occur when metal, concrete, walls or floors block transmission.

NOTE

Microwave ovens operate in the same frequency band as the WX-54G. Therefore, if you use a microwave within range of the WX-54G you may notice network performance degradation. However, both your microwave and your the WX-54G will continue to function.

Range

Every environment is unique and presents different obstacles. Therefore, it is difficult to determine the exact range that can be achieved without testing. However, Terayon has developed some guidelines to estimate the range that you will see when you install the WX-54G, but there are no hard and fast specifications.

Radio signals may reflect off of some obstacles or be absorbed by others depending on their construction. For example, with two 802.11b units, you may achieve up to 1000' in

open space where two devices have a line of sight. However, the same two units may only achieve up to 300' of range when used indoors.

By default, the Terayon WX-54G will automatically adjust the data rate to maintain a usable radio connection. Therefore, a client that is close to the WX-54G may operate at higher speeds while a client that is on the fringe of coverage may operate at lower speeds.

WX-54G Status Indicators

There are three LEDs on the front of the Terayon WX-54G AP, as shown here:

Ready LED	OFF: No power or performing boot sequence
	ON: System ready
	Blinking: Firmware upgrade failed
Wireless LED	OFF: No Power
	ON: Wireless function ready
	Blinking: Transmitting or receiving data (wireless)
Ethernet LED	OFF: No Power
	ON: Has physical connection to an Ethernet network
	Blinking: Transmitting or receiving data (through Ethernet cable)

Power Requirements

The Terayon WX-54G requires power from the external power supply that is provided with the TeraJet 700 Series cable modem.

Chapter 2

Hardware Installation

This chapter describes the hardware installation procedures for the Terayon WX-54G Wireless Access Extension.

System Requirements

To use the Terayon WX-54G, you must have the following minimum requirements:

- A Terayon TeraJet 700 Series Cable Modem
- An Ethernet (10Base-T or 10/100Base-TX) adapter for wired clients
- At least one 802.11g (54Mbps) or one 802.11b (11Mbps) wireless adapter for wireless mobile clients
- TCP/IP and an installed internet browser

Package Contents

Each Terayon WX-54G comes with:

- One Terayon WX-54G Wireless Access Extension
- One Terayon WX-54G Quick Start Guide
- Two external antennas
- One support CD (utilities and user's manual)

WX-54G Status Indicators

There are three LEDs on the front of the Terayon WX-54G, as shown here:

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	ON: Wireless function ready
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Ethernet LED	OFF: No Power or not connected to an Ethernet network
	ON: Has physical connection to an Ethernet network
	Blinking: Transmitting or receiving data (through Ethernet cable)

Power Requirements

The Terayon WX-54G requires power from an external power supply that is provided with the TeraJet 700 Series cable modem.

Hardware Installation Procedure:

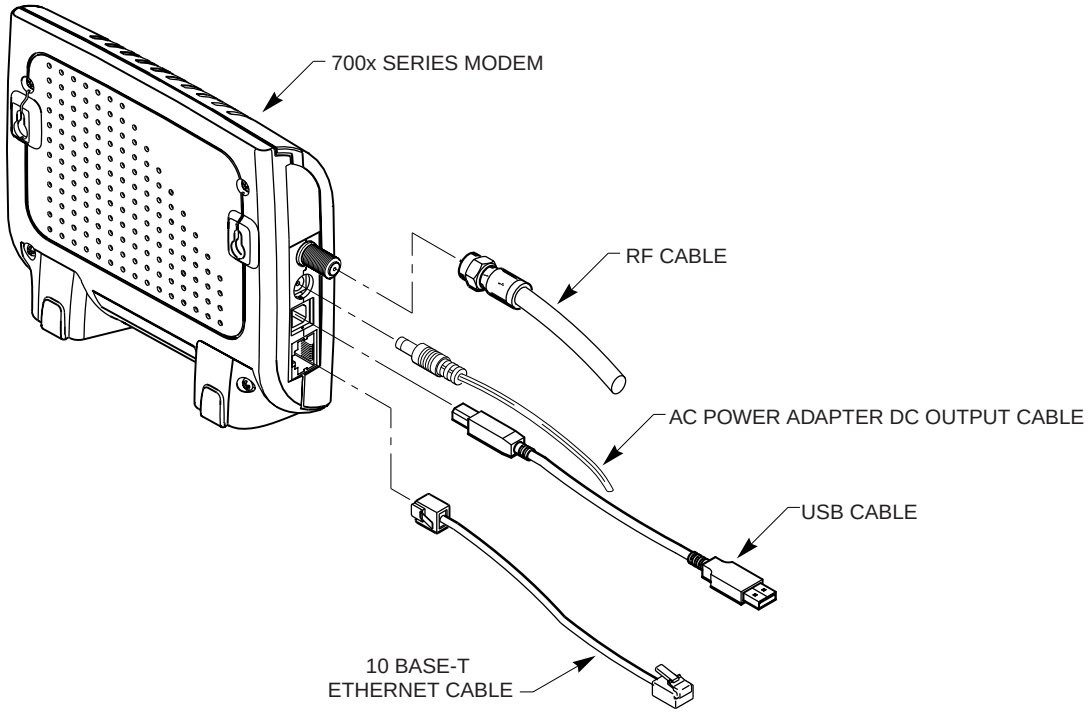
Follow these steps to install the Terayon WX-54G

1. Before installing the WX-54G, verify that your modem is working. The Power, Cable, and PC LEDs should all be solid, and the Data light will blink if data is being transferred.
2. Determine the best location for the Terayon WX-54G. Keep in mind the following considerations:
   - Centrally locate the WX-54G or its antenna so that it will provide coverage to all of the wireless mobile devices in the area.
   - Use only the power supply that came with your modem. Other power supplies may fit but the voltage and power may not be compatible.
   - Make sure that you keep your modem and the WX-54G in an upright position. Laying the modem and WX-54G on their sides will block the vents and may cause the WX-54G to overheat.

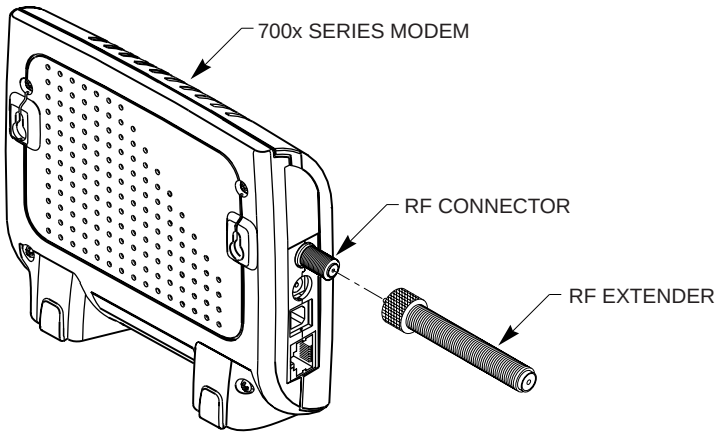
NOTE

It is the responsibility of the installer and users of the WX-54G to guarantee that the antenna is operated at least 20 centimeters from any person. This is necessary to insure that the product is operated in accordance with the RF Guidelines for Human Exposure that have been adopted by the Federal Communications Commission.

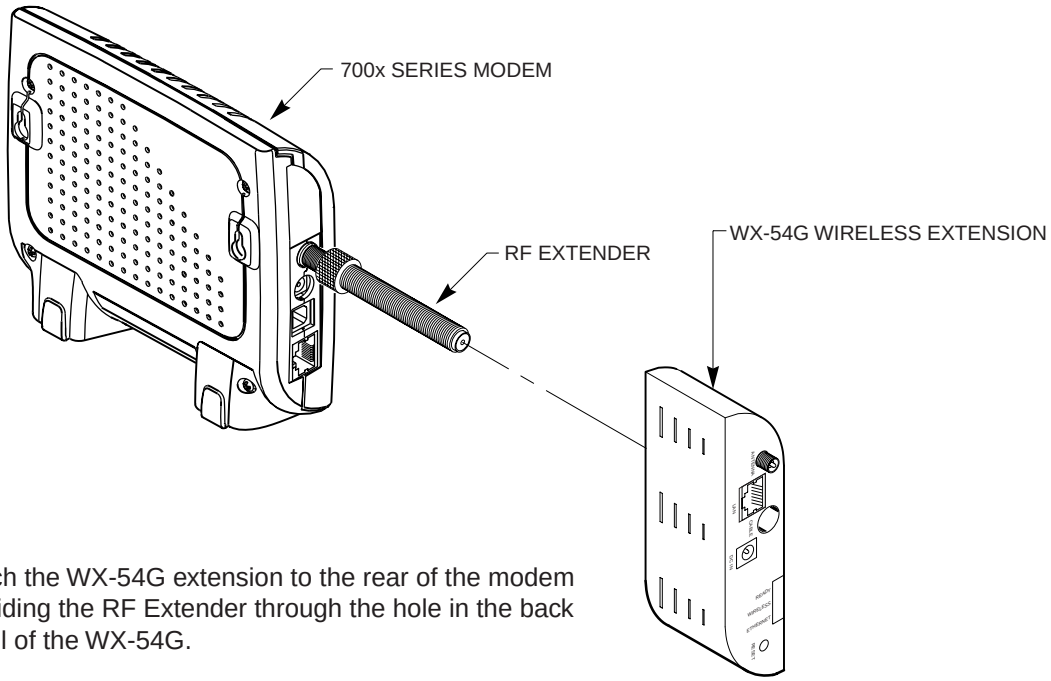
3. Disconnect all cables from the TJ700x cable modem.



4. Attach the "RF coax extender" to the RF connector on the rear of the cable modem. Leave the hex nut and washer off at this time.

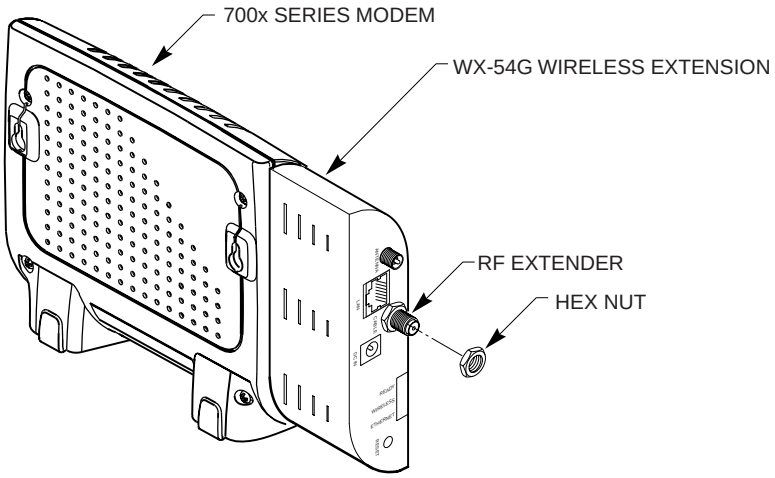


5. Attach the WX-54G extension to the rear of the TJ700x cable modem, sliding the "RF coax extender" through the hole in the WX-54G. Align the power and Ethernet connectors with their mates on the rear of the cable modem.

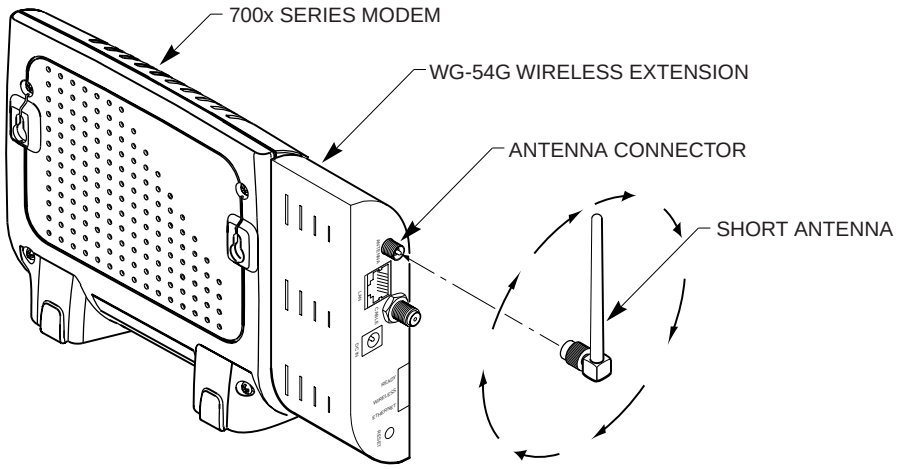


- Attach the WX-54G extension to the rear of the modem by sliding the RF Extender through the hole in the back panel of the WX-54G.

6. Place the washer and hex nut onto the "RF coax extender" and finger tighten to secure the WX-54G to the cable modem.



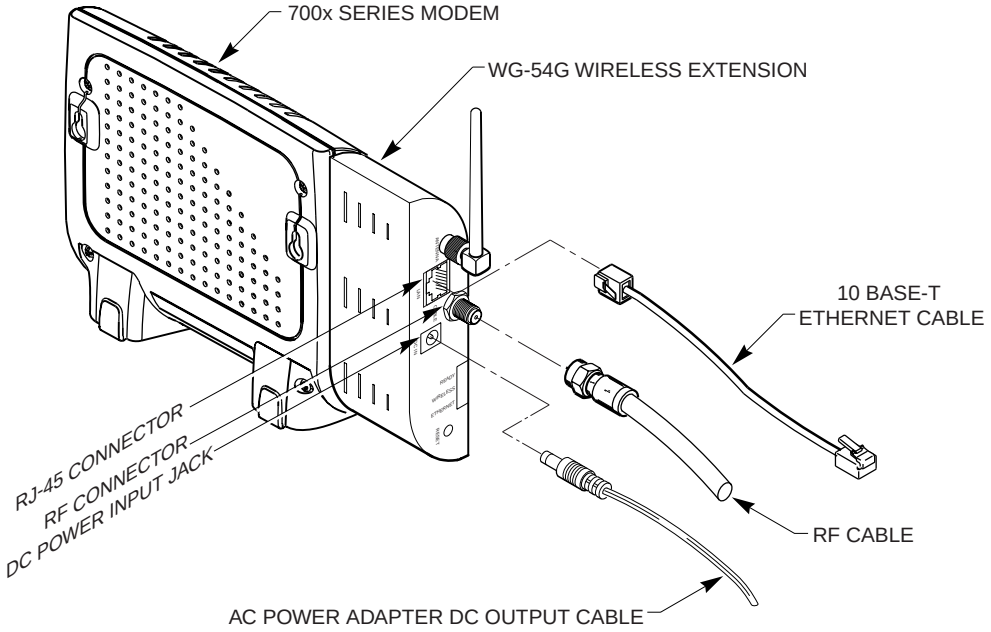
- Thread the compact antenna on to the WX-54G by threading it onto the Antenna connector:



CAUTION

You may tighten the compact antenna by rotating it as shown above, but only if the WX-54G is not yet attached to the modem. If the WX-54G is attached to the modem, then tighten the compact antenna by turning the nut at the antenna connector, and not the antenna itself. You could damage the antenna if you try to bend it around the RF coax extender.

7. Attach the RF coax, Ethernet, and DC power cables to the WX-54G.



8. Attach one end of an RJ-45 Ethernet cable to the WX-54G and attach the other end to the RJ-45 10Base-T port of a network hub, switch, router, or patch panel.
9. Apply power to the WX-54G, which will also power the cable modem and cause it to connect to the cable network.
10. The WX-54G should boot and the cable modem successfully connect to the cable network within 60 seconds. If the modem does not connect within five minutes, follow the directions in *"Attaching the Coax Cable Antenna"* below.

The Ready LED on the front of the WX-54G will light up when the modem is powered ON. In addition, the orange Ethernet LED will turn ON to indicate that the WX-54G has a physical Ethernet network connection.

Attaching the Coax Cable Antenna

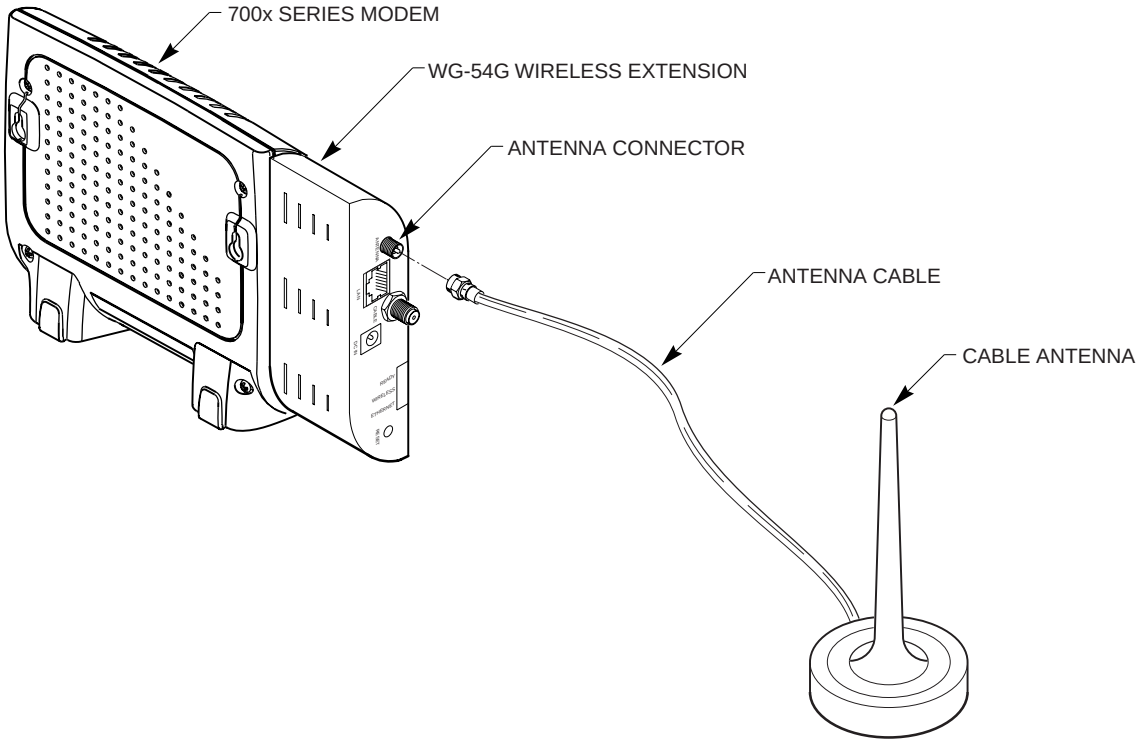
A small number of cable modems experience interference from the compact antenna on the WX-54G. If this is the case, your cable modem may not be able to connect with the cable network or may experience poor performance. To remedy this, you should use the coax cable antenna supplied with the the WX-54G.

The coax cable antenna can also extend the range of the WX-54G wireless signal because it allows you to place the antenna in a location that provides good wireless coverage in your home.

To install the cable antenna (and troubleshoot any connectivity problems):

1. To remove the compact antenna, it will be necessary to remove all the cables from the WX-54G. It may also be necessary to remove the WX-54G from the cable modem to prevent bending the antenna when unscrewing it from the antenna connector.
2. Once the antenna is removed, check to see if your modem registers with the cable network. This should take approximately 60 seconds. If the modem still does not register, unplug and then replug in the power supply. The modem should register and become operational within 30 seconds.

3. Thread the coax cable antenna onto the antenna nut.



Cable antenna must be placed a minimum of 2 feet (60.9 cm) away from the WX-54G Wireless Extension.

4. Make sure there is at least two feet of separation between the antenna and the modem.
5. Power up the modem and check for connectivity. The modem should register with the cable network in approximately 60 seconds. When the modem is working, the Power, Cable, and PC LEDs should be solid, while the Data LED should blink as data is being transferred.

Chapter 3

Software Installation

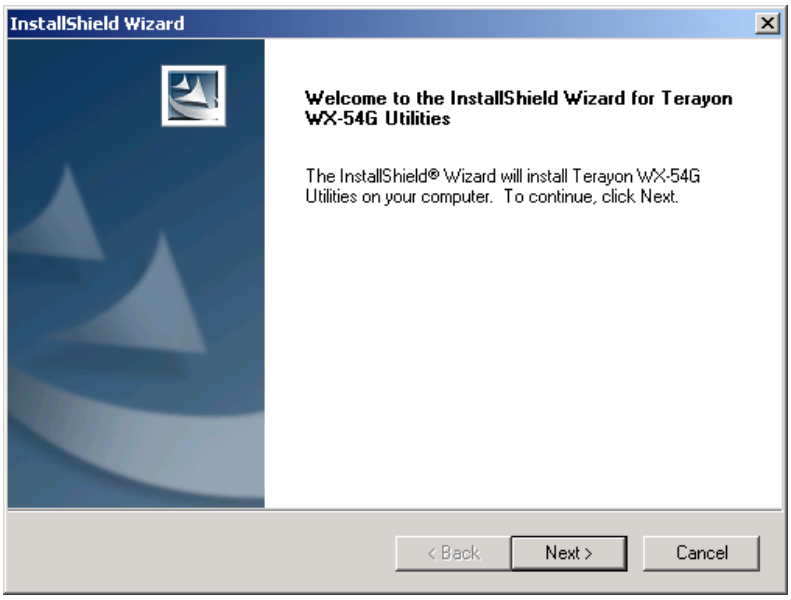
This chapter describes the software installation procedure for the Terayon WX-54G Wireless Access Extension.

Software Installation Procedure

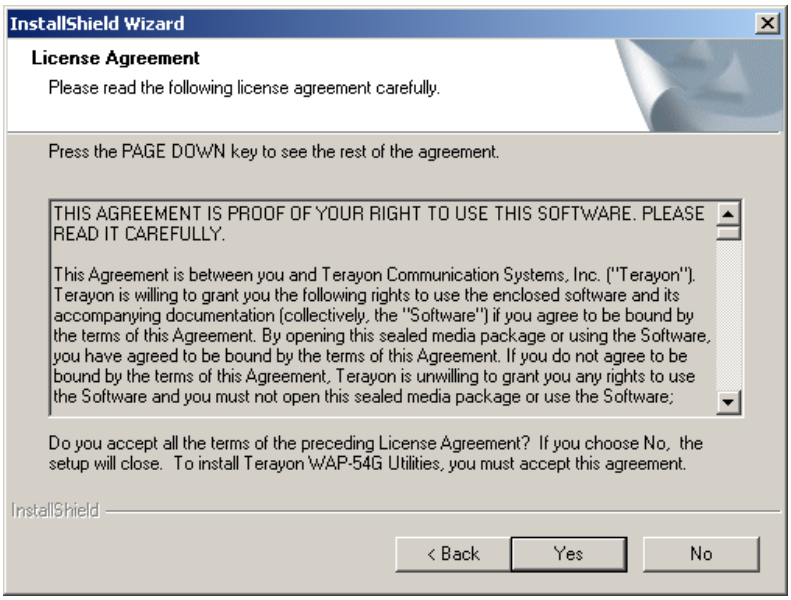
Follow these steps to install the Terayon WX-54G Utilities in Microsoft Windows:

1. Insert the support CD. If your CD auto-run has been disabled, double-click the **`setup.exe`** application in the root directory of the support CD. The following screen appears:

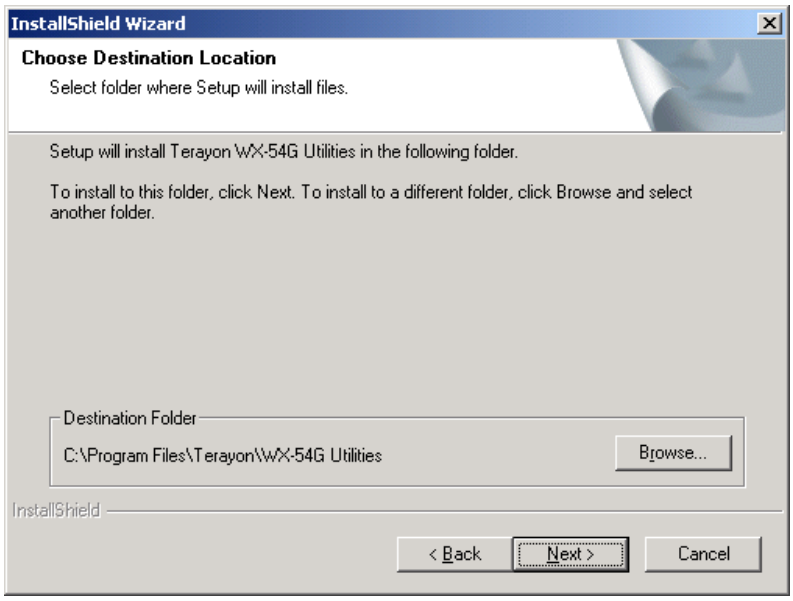
2. Click **Install WX-54G Utilities**. The Welcome screen appears:



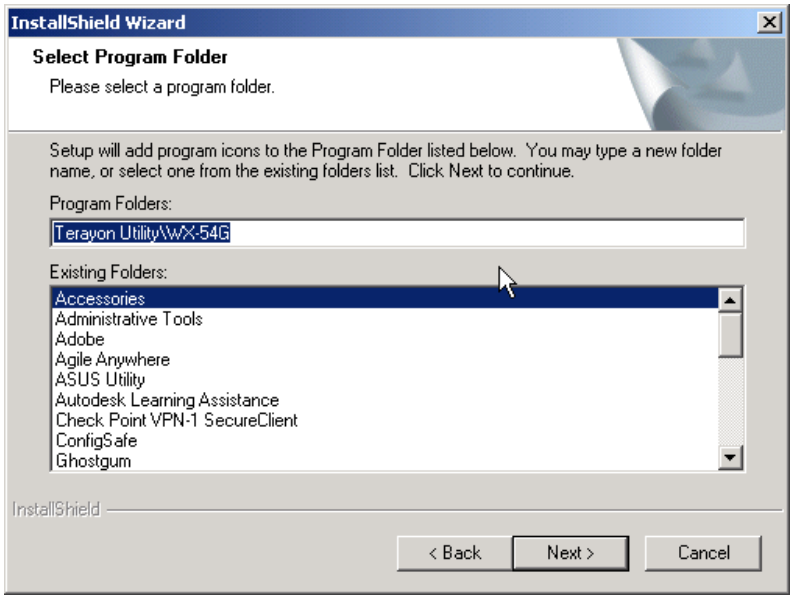
3. Click **Next** after reading the Welcome screen. The license agreement screen is shown:



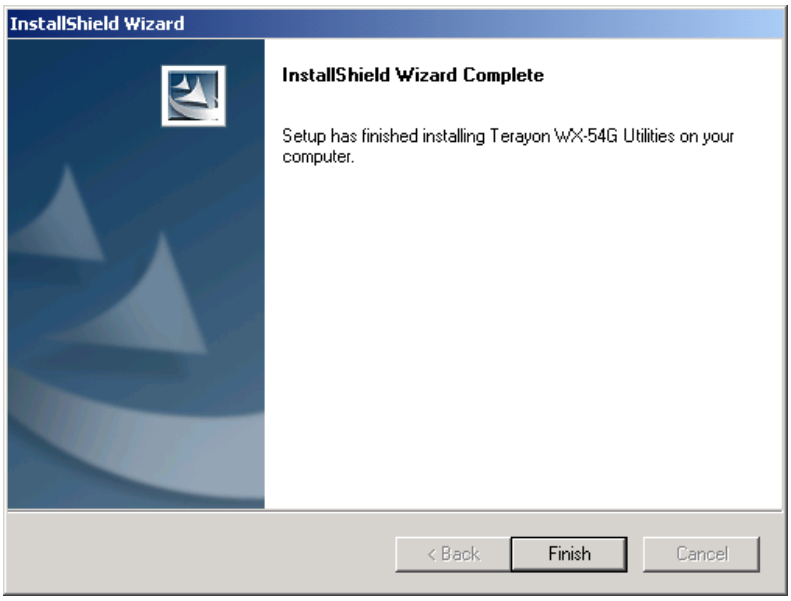
4. Click **Yes** after reading the license agreement. The Destination Folder screen is shown:



5. Click **Next** to accept the default program folder or click **Browse** and select another destination folder. The Select Folder Screen is displayed:



6. Click **Next** to accept the default destination folder or click Browse to specify another path. The Setup Complete screen is displayed:



7. Click **Finish** to complete the software installation.

Chapter 4

Configuring the Terayon WX-54G

The Terayon WX-54G can be configured for various uses. Some of the factory default settings may suit your needs; however, others may need changing. Prior to using the Terayon WX-54G, you should check the basic settings to guarantee it will work in your environment.

Configuring the Terayon WX-54G is done through a web browser. You need a notebook PC or desktop PC connected to the Terayon WX-54G (either directly or through a hub) and running a web browser as a configuration terminal. The connection can be wired or wireless. For the wireless connection, you need an IEEE 802.11g/b compatible device, for example a Terayon WLAN Card (WLA-54G), installed in your notebook PC. You should also disable WEP and set the SSID to "default" for your wireless LAN device.

If you want to configure the Terayon WX-54G or want to access the Internet through the WX-54G, your TCP/IP settings must be correct. Normally, the TCP/IP setting should be on the IP subnet of the WX-54G unit.

NOTE

Changing TCP/IP settings may require rebooting your PC. When rebooting, the Terayon WX-54G should be switched ON and in the ready state.

Advanced IP Settings

If you want to set your IP address manually, the following default settings for the Terayon WX-54G should be used:

IP Address: 192.168.1.1
Subnet Mask: 255.255.255.0.

If you set your computer's IP manually, it needs to be on the same subnet. For example:

- The IP address must be in the 192.168.1.xxx range (xxx can be any number between 2 and 254 that is not used by another device)
- The subnet mask must be 255.255.255.0 (same as the Terayon WX-54G)

To set your IP settings manually, use the following procedure:

1. Right click on the **My Network Places** icon on your desktop.
2. Select **Properties** from the drop-down menu.
3. Double-click on the desired local area connection.
4. In the Local Area Connection Dialog, select **Internet Protocol (TCP/IP)**.
5. Click **Properties**.
6. In the Internet Protocol (TCP/IP) Properties dialog, set the IP settings as described above.

NOTE

If you are attaching the WX-54G to a network with an existing router, you should check to see which IP address the router is using. Many routers use a default IP address of 192.168.1.1, which will conflict with the WX-54G. In this case, you should change the IP address of the WX-54G before attaching it to the network.

Chapter 5

Terayon WX-54G Utilities

After installation, you can launch the utilities through the **Start > Programs > Terayon Utility > WX-54G > Device Discovery** menu.

Connecting to the Terayon WX-54G Web Manager

You can connect to the Web Manager in the following two ways:

- Wired Ethernet Connection
- Wireless Connection

Wired Ethernet Connection

Besides using a network hub, you can also connect a LAN cable from your computer to the Terayon WX-54G using either a straight or crossover cable because the WX-54G has auto-crossover capability.

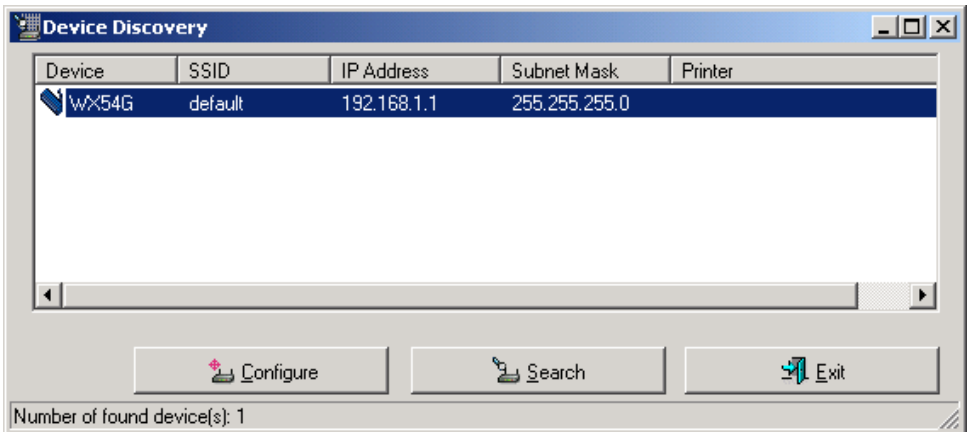
Wireless Connection

If you are using a Notebook PC with a wireless adapter, you can connect to the Terayon WX-54G Web Manager without a wired Ethernet connection. Just make sure your TCP/IP settings are set correctly.

Device Discovery

The easiest way to connect to the WX-54G's Web Manager is to use the Device Discovery Utility. This application will locate all Terayon wireless access points that are attached to your network, and display the name, SSID, and IP address for each access point.

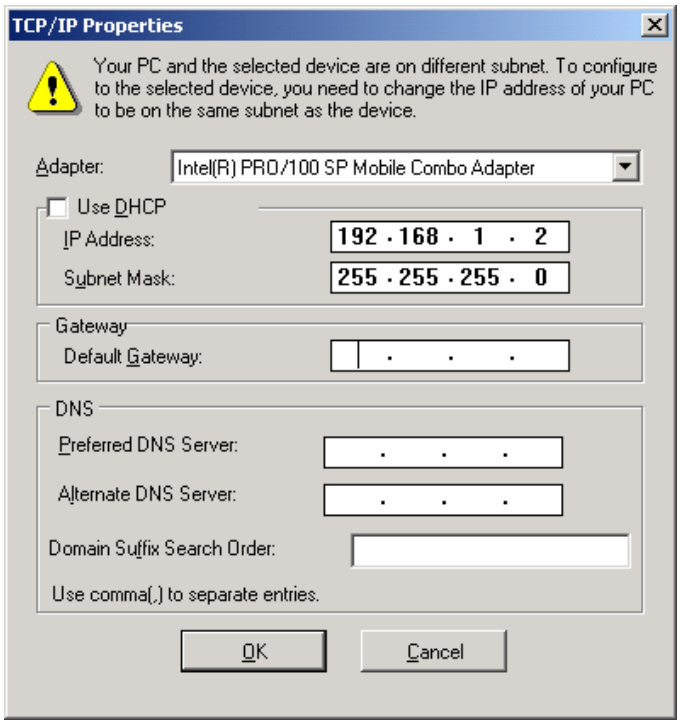
Run the Terayon WX-54G Device Discovery from the Wireless Connection menu. The following screen is displayed:



Select a device and click **Configure**. Follow the steps in Quick Setup to initially configure your Terayon WX-54G unit. For more information, see *"Using Quick Setup"* on page 5-5.

Manually Entering the IP Address

You can also open your PC's web browser and enter the IP address of the Terayon WX-54G: **http://192.168.1.1**.



If your computer's IP address is not on the same subnet as the Terayon WX-54G (192.168.1.X), you will be asked to change it. The IP address can be any address from 192.168.1.2 to 192.168.1.254 that is not being used by another device. The Gateway address is not required.

NOTE

You can also change your TCP/IP settings through Windows network properties as shown in "Advanced IP Settings" on page 4-2.

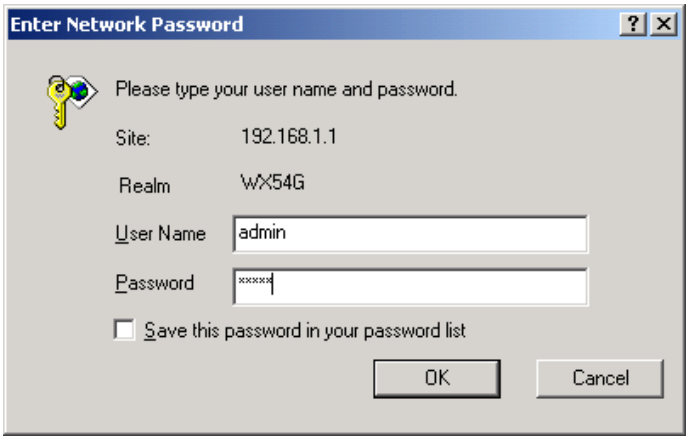
Restart your system if prompted.

NOTE

If you cannot find any Terayon 802.11g units due to a problem with the IP settings, push and hold the "Reset" button on the Terayon WX-54G for more than five seconds to restore the factory default settings. **This will reset the WX-54G's IP address to 192.168.1.1.**

Logging In

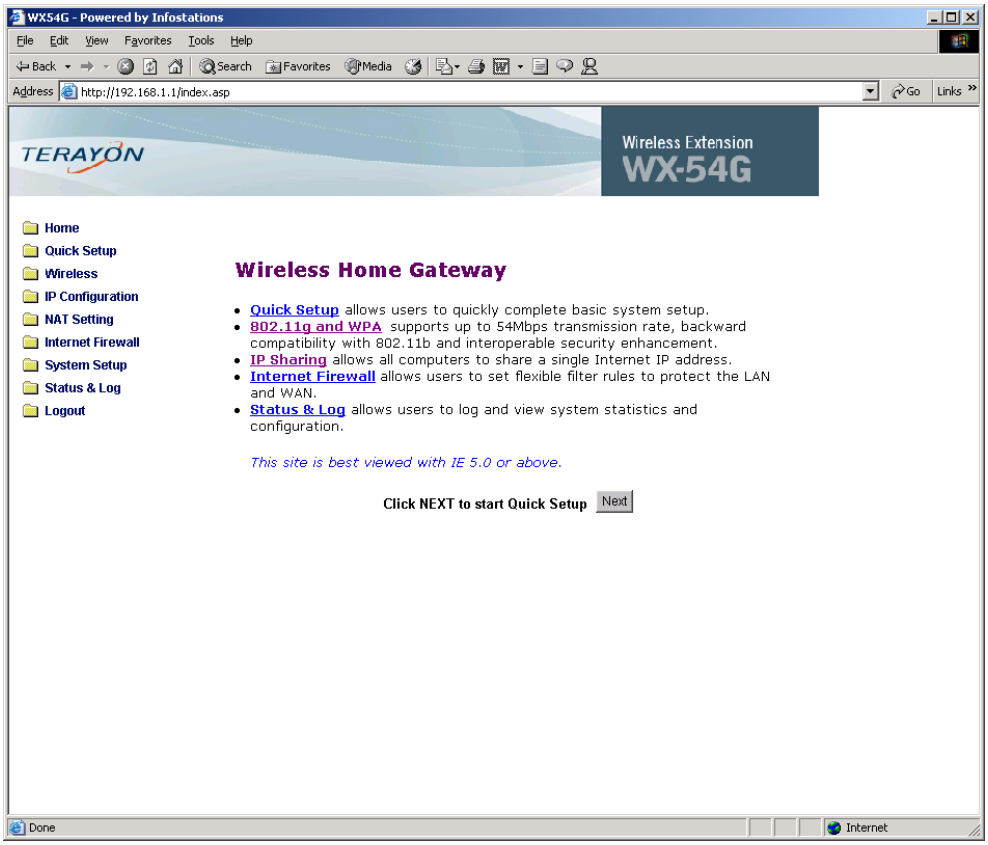
Once connected to the Terayon WX-54G, the following screen will prompt you for your user name and password:



The factory default values are "admin" and "admin".

Displaying the Home Page

After logging in, the Terayon WX-54G home page is displayed.



From here you can perform the following tasks:

- Using Quick Setup
- Configuring Advanced Wireless Parameters

Using Quick Setup

From the WX-54G Home Page, click on **Next** to access the Quick Setup page.

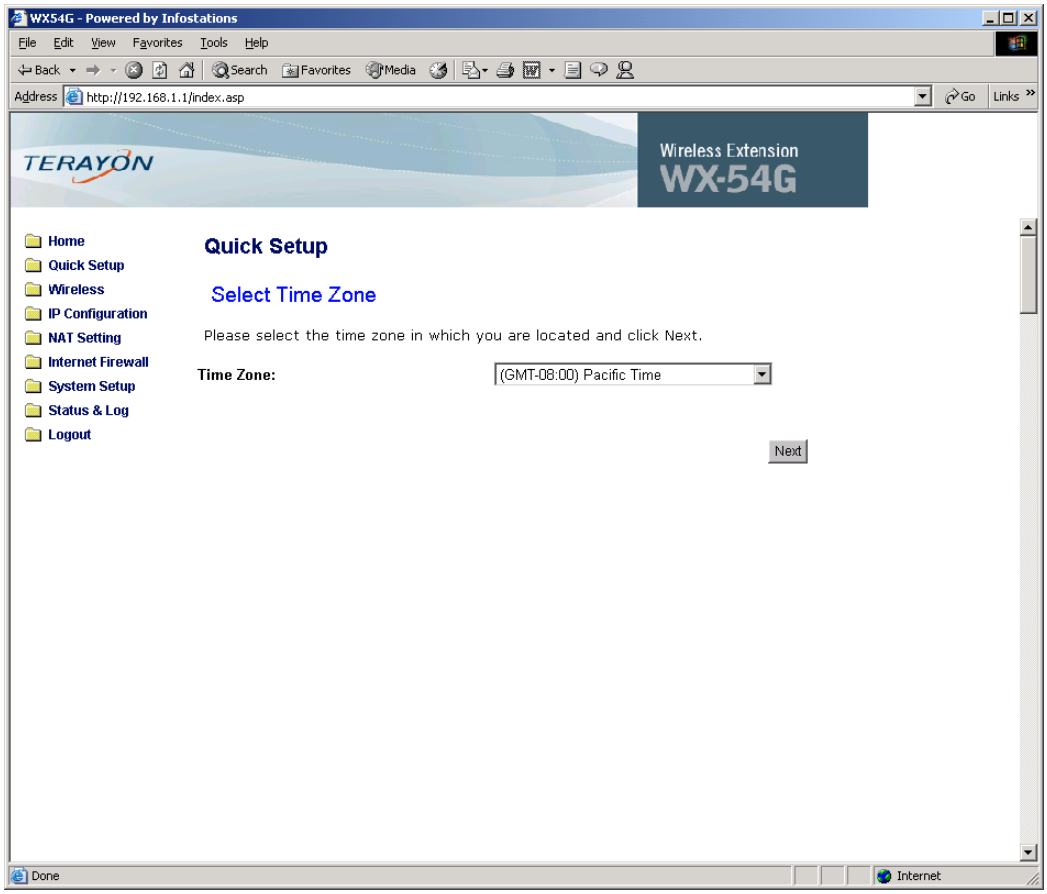
From here, you can configure the basic wireless interface using the following steps:

- Selecting the Time Zone
- Configuring Wireless Access and Security

These are discussed in the following sections.

Selecting the Time Zone

Use the Select Time Zone screen to enter your local time zone.

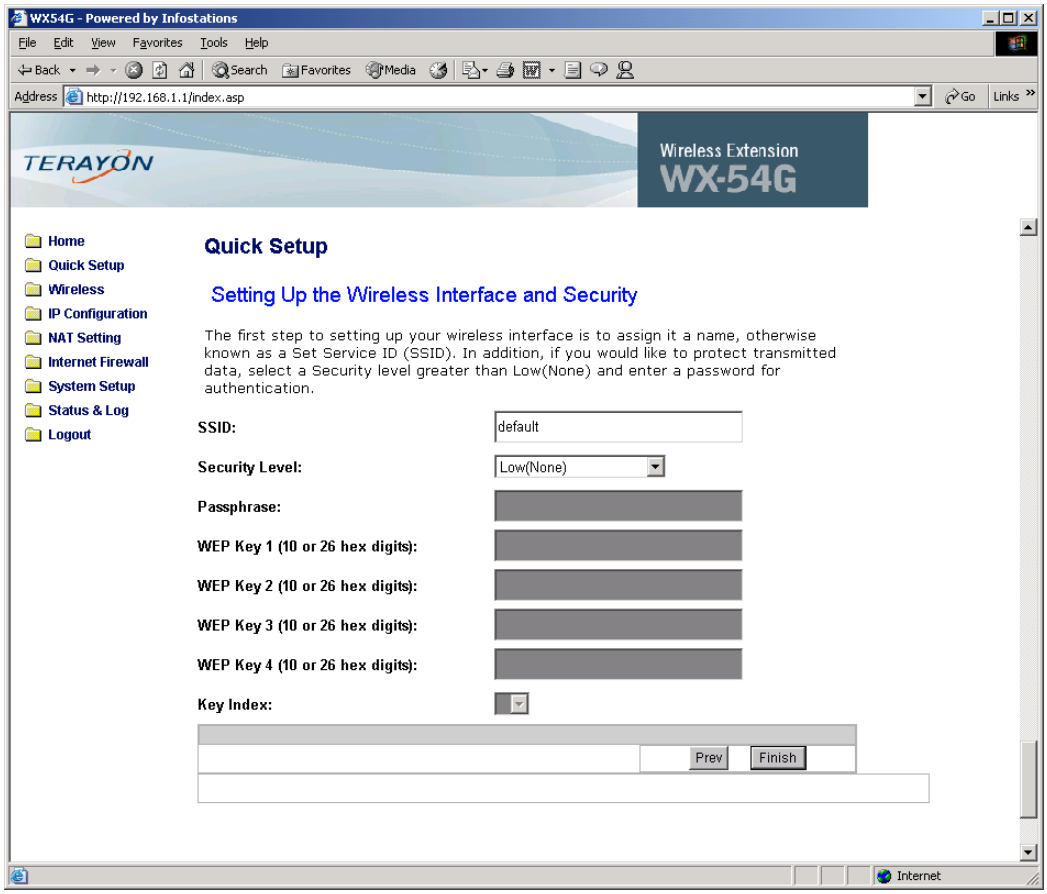


Using the pull-down menu, select your local time zone.

Click **Next** to display the Configuring Wireless Access and Security screen.

Configuring Wireless Access and Security

Use the following screen to assign a name, otherwise known as a Set Service ID (SSID), for the WX-54G. This will distinguish the WX-54G from other wireless access points that may be operating in the area.



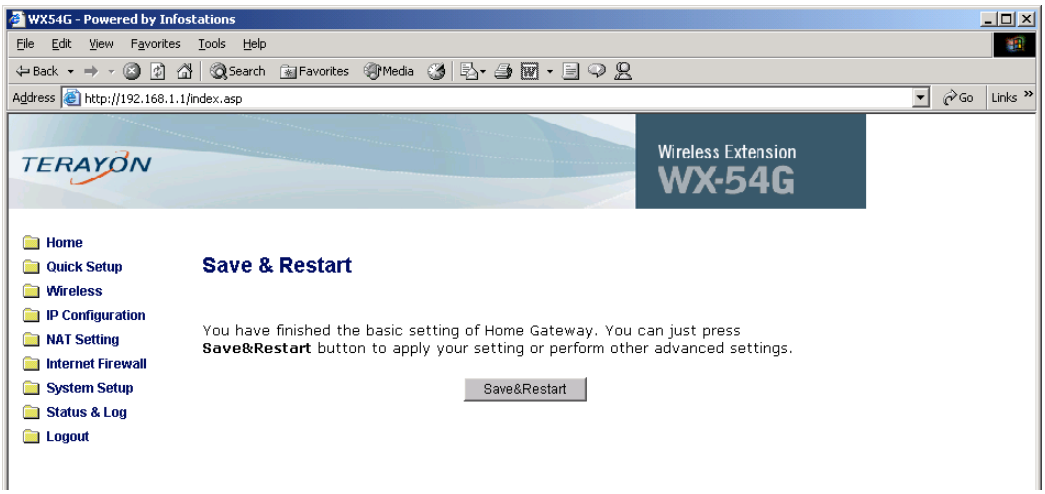
Set the Security Level to Low, Medium, or High. Selecting:

Low	Allows any user to connect to your WX-54G and transmit data without encryption.
Middle	Allows only those users with the same WEP key to connect to your WX-54G and to transmit data with WEP encryption.
High	Allows only those users with the same WPA pre-shared key to connect to your WX-54G and to transmit data with TKIP encryption.

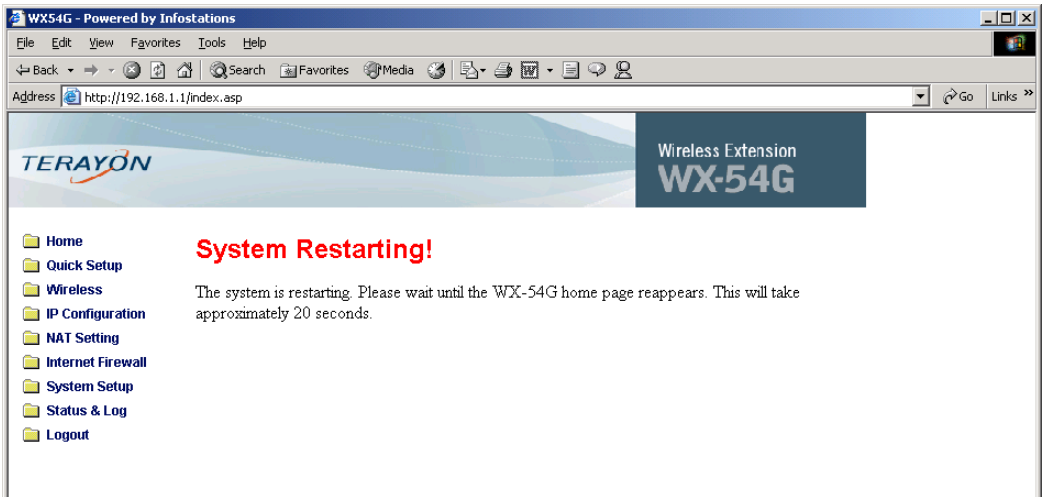
NOTE

It is recommended that you set the security level to "Low" until you have verified that your wireless clients are able to communicate on the wireless network.

When you have finished the basic settings for the Terayon WX-54G, click the **Finish** button to apply your settings, or you can perform other advanced settings. You will be prompted to click the **Save & Restart** button:



The System Restarting screen will appear.



After 20 seconds or so, the Main web interface page for the WX-54G will reappear and you can start to configure advanced parameters.

Configuring Advanced Wireless Parameters

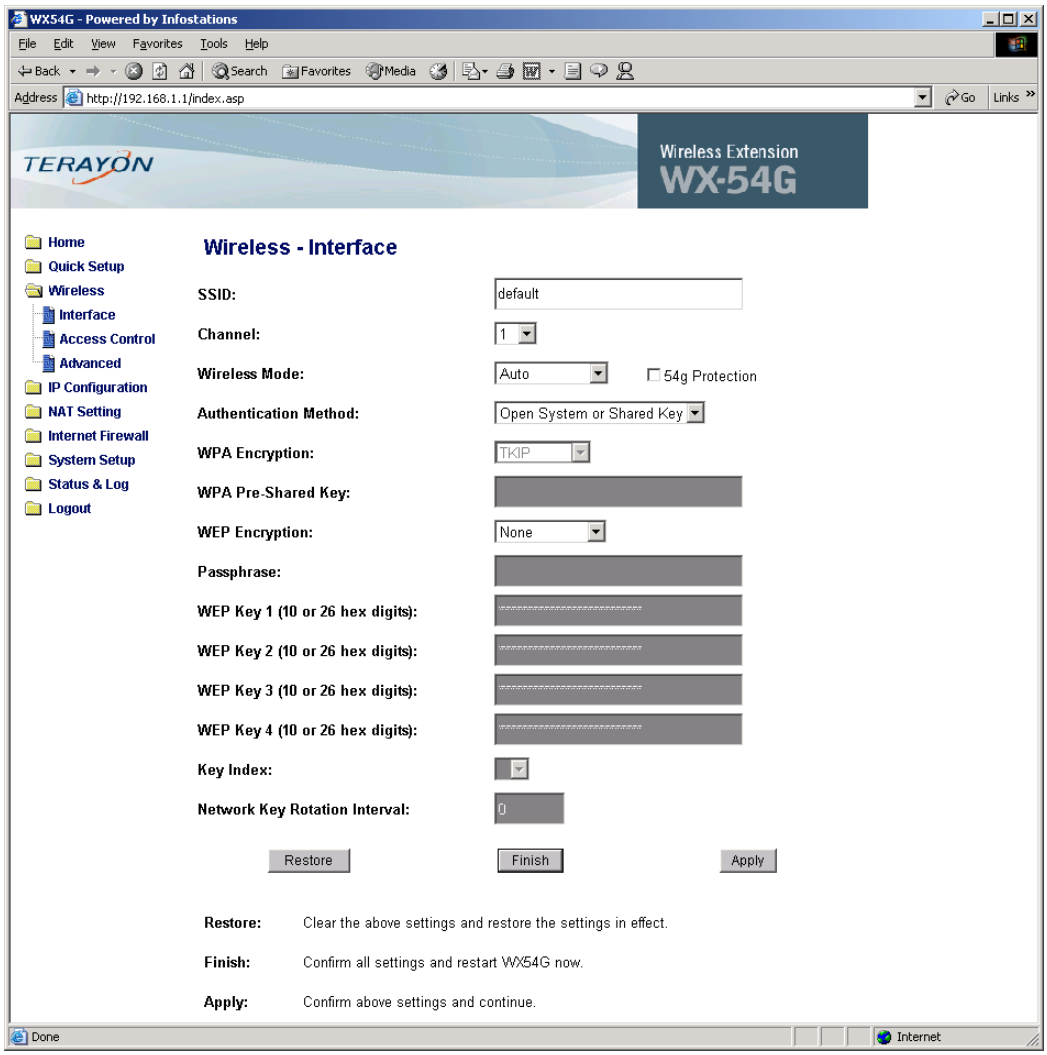
After you have configured the basic parameters using Quick Setup, you can click on the Wireless menu on the Wireless screen to perform advanced wireless configuration.

A drop-down list is displayed, allowing you to perform the following tasks:

- Configuring Interface Parameters
- Setting Up Access Control
- Setting Advanced Parameters

Configuring Interface Parameters

Click on the Interface menu item to display the Wireless - Interface screen:



From here, you can configure the following parameters:

SSID

Set the Set Service ID (SSID) for your WX-54G in this field. The SSID is an identification string of up to 32 ASCII characters that differentiate one Terayon WX-54G from another manufacturer's access point. The SSID is also referred to as the "ESSID" or "Extended Service Set ID." You can use the default SSID and radio channel unless more than one WX-54G or access point is deployed in the same area. In that case, you should use a different SSID and radio channel for each WX-54G.. All Terayon WX-54G and wireless client adapters must have the same SSID to allow a mobile wireless client to roam between access points. The factory setting for the SSID is "default".

Channel

Set the channel for your WX-54G in this field. The default channel is 1.

IEEE 802.11g and 802.11b devices are direct sequence spread spectrum devices that spread a radio signal over a range of frequencies. The range of frequencies used by a direct sequence device is called a channel.

The 802.11g and 802.11b specifications support up to 14 overlapping channels for radio communication. But only 11 channels are supported in the United States and therefore on the Terayon WX-54G. To minimize interference, configure each WX-54G to use non-overlapping channels.

Non-overlapping channels have 25Mhz separation beginning at the first channel allowed for that country (for the US and most of Europe, channels 1, 6 & 11 are the first used).

Make sure that the Terayon WX-54G units sharing the same channel (or channels close in number) are as far away from each other as possible.

Wireless Mode

Set the mode of the wireless interface in this field. Select "Auto" to allow 802.11g and 802.11b clients to connect to the Terayon WX-54G. Select "54g Only" to maximizes performance, but 802.11b clients will not be allowed to connect to the Terayon WX-54G. Check "54g Protection" to enable G-Mode protection of 802.11g traffic in the presence of 802.11b traffic. That is, any 802.11g data transfers are completed before downgrading the transfer rate to allow 802.11b traffic.

Authentication Method

Select the authentication method in this field. Selecting "Shared Key Only" is recommended for greater security. If you select "Open System" or "Shared Key", the Terayon WX-54G may accept connection requests from unauthorized wireless clients as well as clients using WEP.

WPA Encryption

Use this field to select the encryption method used to encrypt data when WPA encryption is enabled. The default method is Temporal Key Integrity Protocol. (TKIP--formerly WEP-2)

WPA Pre-Shared Key

Use this field to select the WPA pre-shared key when WPA encryption is enabled. The pre-shared key should be between 7 and 64 characters. If this field is left blank, a value of 00000000 will be assigned by the system.

WEP Encryption

The IEEE 802.11b standard specifies an optional encryption feature, known as Wired Equivalent Privacy (WEP) that is designed to provide a wireless LAN with a security level equal to what is found on a wired Ethernet network.

WEP encrypts the data portion of each packet exchanged on the 802.11b/g network using either a 64-bit or 128-bit encryption algorithm. In addition, WEP is also used in conjunction with the optional Shared Key Authentication algorithm to prevent unauthorized devices from associating with an 802.11b/g network.

Enabling WEP can protect your data from eavesdroppers. The Terayon WX-54G supports both 64-bit and 128-bit encryption algorithms. Select the type of encryption you want to use (64 or 128 bit) and configure one to four WEP Keys along with setting the "Default Key" to one of the keys. The "128-bit" method is considerably more secure than the "64-bit".

If you do not need this feature, select "None" to prevent setting the keys.

Passphrase

Enter a passphrase to automatically generate four WEP keys. A WEP key is either 10 or 26 hexadecimal digits (0~9, a~f, and A~F) depending on whether you selected 64 bit or 128 bit in the WEP pull-down menu. Type a combination of up to 64 letters, numbers, or symbols in the Passphrase field. The Terayon WX-54G Manager uses an algorithm to generate four WEP keys for encryption. If you want to type in the keys manually, leave this field blank.

The Terayon wireless family of products all use the same algorithm. Therefore the same phrase can be used to generate the same WEP keys for all devices.

NOTE

The Passphrase feature is provided to easily generate WEP keys; however, this is not as secure as manual assignment.

WEP Key

Set your WEP keys in these fields if you have not selected a passphrase and want to set the WEP keys manually. At most four keys can be set. A WEP key is either 10 or 26 hexadecimal digits (0~9, a~f, and A~F) depending on whether you select 64 bit or 128 bit in the WEP pull-down menu. The Terayon WX-54G and **all** of its wireless clients **must** have at least the same default key.

Key Index

Use this field to specify which of the four encryption keys you use to transmit data on your wireless LAN. As long as the Terayon WX-54G and the wireless mobile client with which you are communicating have the same keys in the same position, you can use any of the keys as the default key. If the Terayon WX-54G and **all** of its wireless clients use the same four WEP keys, set the "Network Key Rotation Interval" to maximize security. Otherwise, choose one key shared by all clients as the default key.

Network Key Rotation Interval

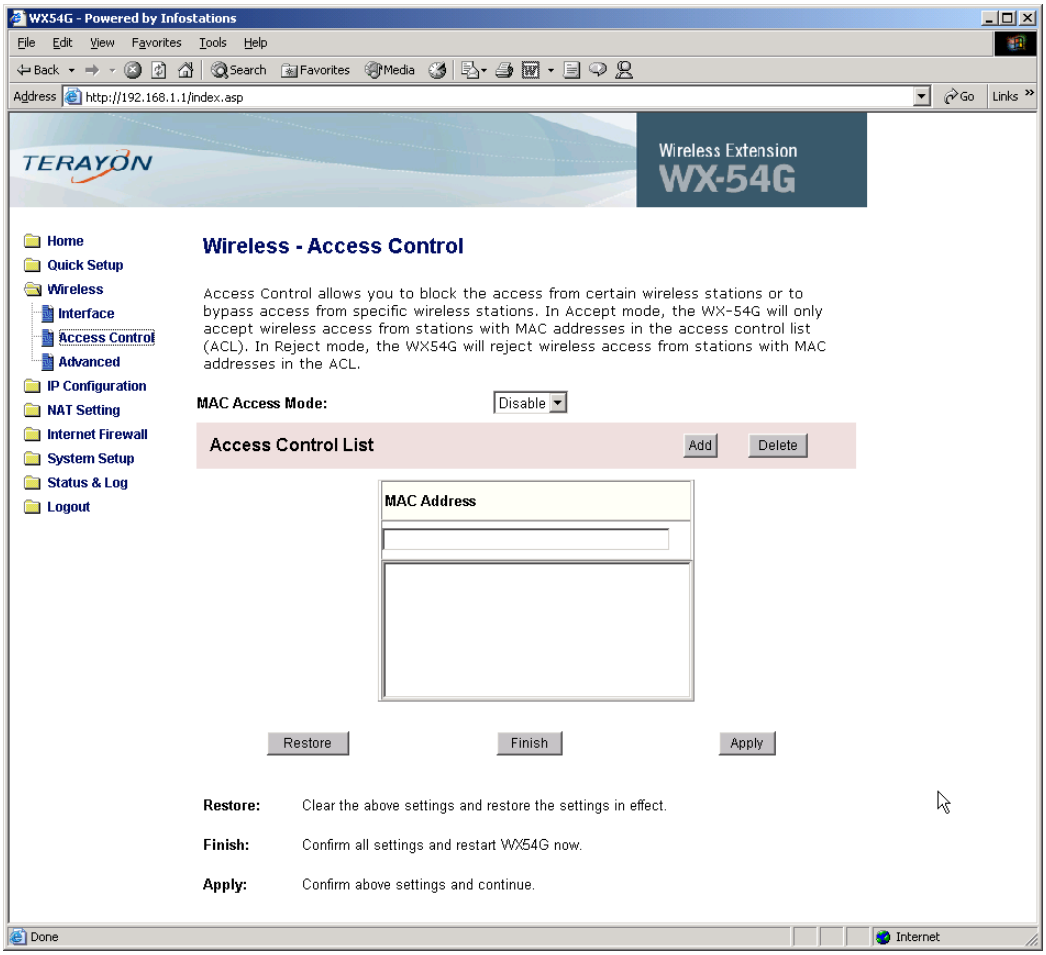
Use this field to set the time interval, in seconds, in which the WPA group key is changed. Set this interval only if the Terayon WX-54G and **all** of its wireless clients use the same four WEP keys. 0 (zero) indicates that no periodic key change is required

Relationship Among Keys

Authentication Method	Encryption	Pass phrase	WEP Key 1~4
Open or Shared Key	None	Not required	Not required
WEP-64 bits	1~64 characters	10 hex	
WEP-128 bits	1~64 characters	26 hex	
Shared Key	WEP-64 bits	1~64 characters	10 hex
	WEP-128 bits	1~64 characters	26 hex
WPA-PSK	TKIP only	8-63 characters	Not required
	AES only	8-63 characters	Not required
WPA	TKIP only	Not required	Not required
	AES only	Not required	Not required

Setting Up Access Control

Select Access Control from the Wireless Interface screen to display the Access Control screen. Use this screen set up an Access Control List (ACL) to accept or reject specific network clients trying to connect to the WX-54G.



From here you can select from three pull down menu items:

Disable

Set the Access Mode to Disable if you want the WX-54G to allow any wireless client to associate with it. This is the default setting.

Accept

Set the Access Mode to Accept if you want only those clients with their MAC addresses listed in the Access Control List to associate with the WX-54G.

Reject

Set the Access Mode to Reject if you want clients with their MAC addresses listed in the Access Control List to deny clients from connecting to the WX-54G.

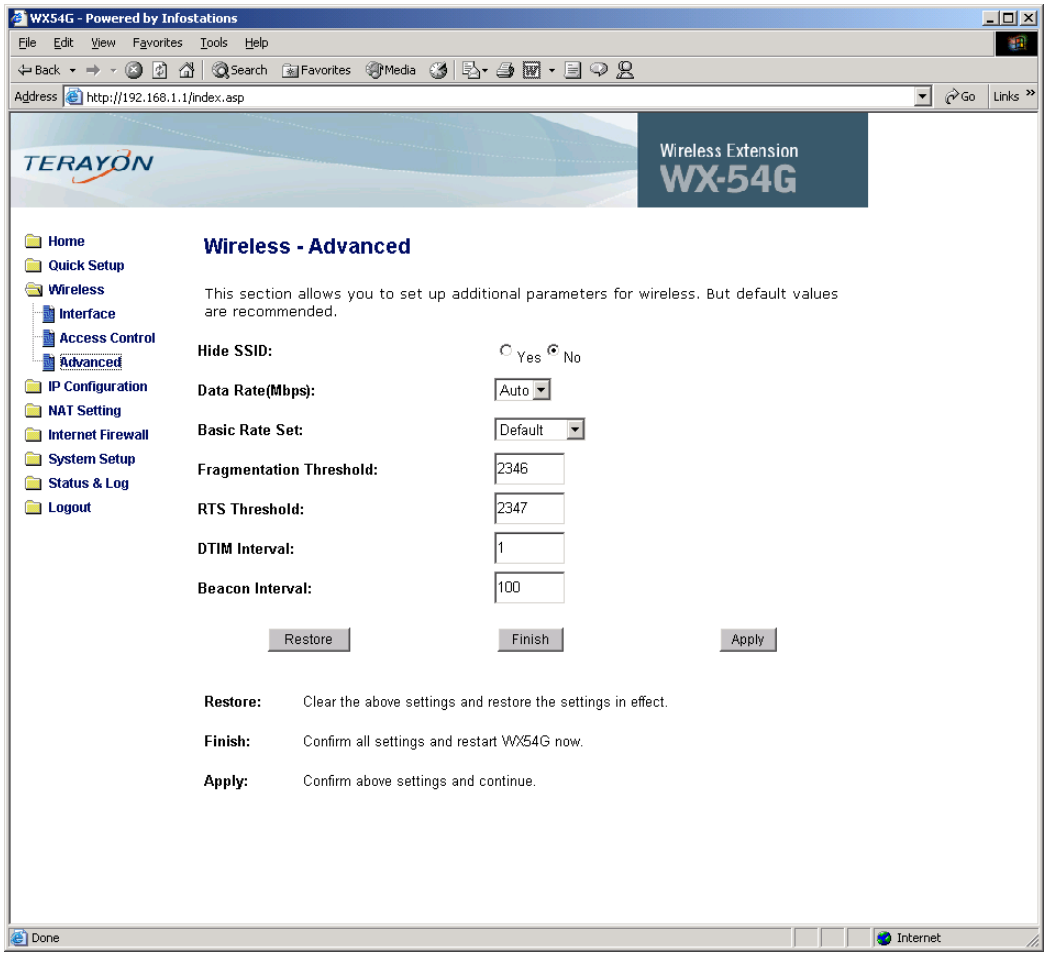
Adding or Removing a MAC Address in the Access Control List

To add a MAC address in the ACL, enter the 12 hexadecimal characters into the white box below **MAC Address:** and click **Add**. The MAC address will be placed in the control list below. A total of 31 MAC addresses can be entered into this page, so determine which will be greater: the number of clients you want to accept or the number of clients you want to reject. To remove an entry from the ACL, highlight it in the box and click **Delete**.

Setting Advanced Parameters

Use this screen to set up additional parameters for your wireless connection. The default values are recommended, however.

Select the **Advanced** menu item from the Wireless-Interface screen to display the Advanced screen:



From here, you can set the following parameters:

NOTE

You should only change these settings if you are experienced with these parameters.

Hide SSID

Select Yes to hide your WX-54G from clients that query for the WX-54G by broadcasting packets. This permits only clients that are aware of the SSID of the WX-54G to connect to it.

Data Rate (Mbps)

Specify the transmission rate in this field. Leave this on "Auto" to maximize performance versus distance.

Basic Rate Set

Use this field to set the basic rates that wireless clients must support. Use"1 & 2 Mbps" only when backward compatibility is needed for older wireless LAN cards with a maximum bit rate of 2Mbps.

Fragmentation Threshold

Use this field to enable fragmentation by setting a specific packet size threshold. Fragmentation is used to divide 802.11 frames into smaller pieces (fragments) that are sent separately to the destination. Using fragmentation can increase the reliability of frame transmissions. The default value of 2346 is recommended.

RTS Threshold

Use this field to enable RTS/CTS (Request to Send/Clear to Send) by setting a specific packet size threshold. RTS/CTS is used to minimize collisions among wireless stations. If you enable RTS/CTS, it will wait to send a data frame until another RTS/CTS handshake is completed. The default value of 2347 is recommended.

DTIM Interval

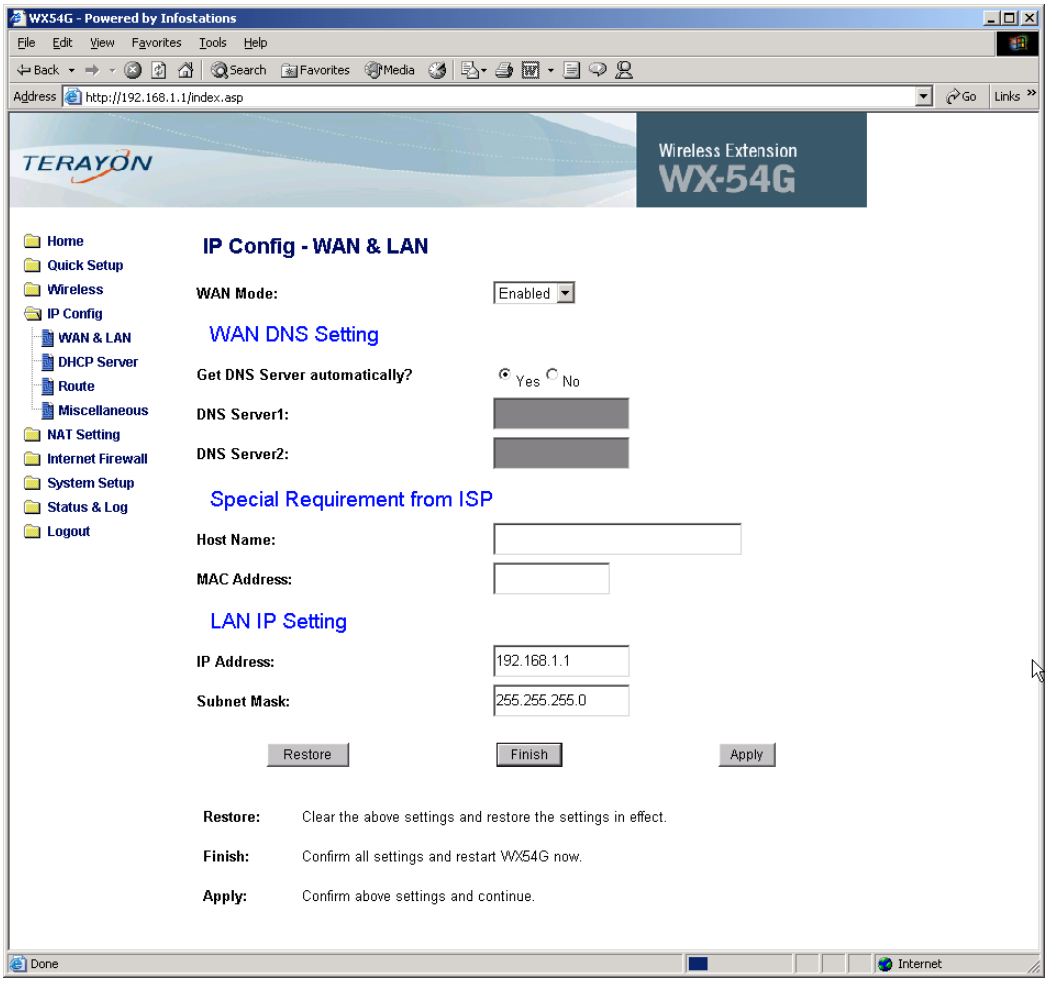
Use this field to set the time interval in Beacon Interval units that the system broadcasts DTIM (Delivery Traffic Indication Message) for clients in Power Saving Mode. DTIM is a wireless message used to inform clients in Power Saving Mode when they should wake up to receive broadcast and multicast messages. The default value of 1 is recommended.

Beacon Interval

Use this field to set the time interval in milliseconds that the system broadcast packets to synchronize the wireless network. The default value of 100 milliseconds is recommended.

Configuring the IP WAN and LAN

Click on the IP Config menu item to display the IP Config WAN & LAN screen:



From here you can configure the following parameters:

WAN Mode

Select "Enabled" to configure the WX-54G as a router with NAT functionality. Select "Disabled" to configure the WX-54G as an access point and disable the WAN port.

Get DNS Server Automatically?

Select Yes to have the WX-54G automatically search for available DNS servers. Select No to manually enter the IP address(es) of your DNS server(s).

DNS Server

Enter the IP address(es) of the DNS server(s) to which the WX-54G connects. These fields become active if you select No in the Get DNS Server Automatically field above.

Host Name

Enter the host name of the WX-54G in this field if requested by your ISP.

MAC Address

Enter the MAC address of your WX-54G in this field if requested by your ISP.

IP Address

Enter the IP address of the WX-54G in this field as it is seen in your local network. The default value is 192.168.1.1.

Subnet Mask

Enter the subnet mask of the WX-54G in this field as it is seen in your local network. The default is 255.255.255.0.

Configuring NAT Settings

Use the following screens to set up Network Address Translation (NAT) for the WX-54G.

NAT is a program used to translate an IP address from a private address to a public address in real time. This allows multiple PCs in a home network to share a single public IP address. It also protects the PCs from being accessed from the outside network.

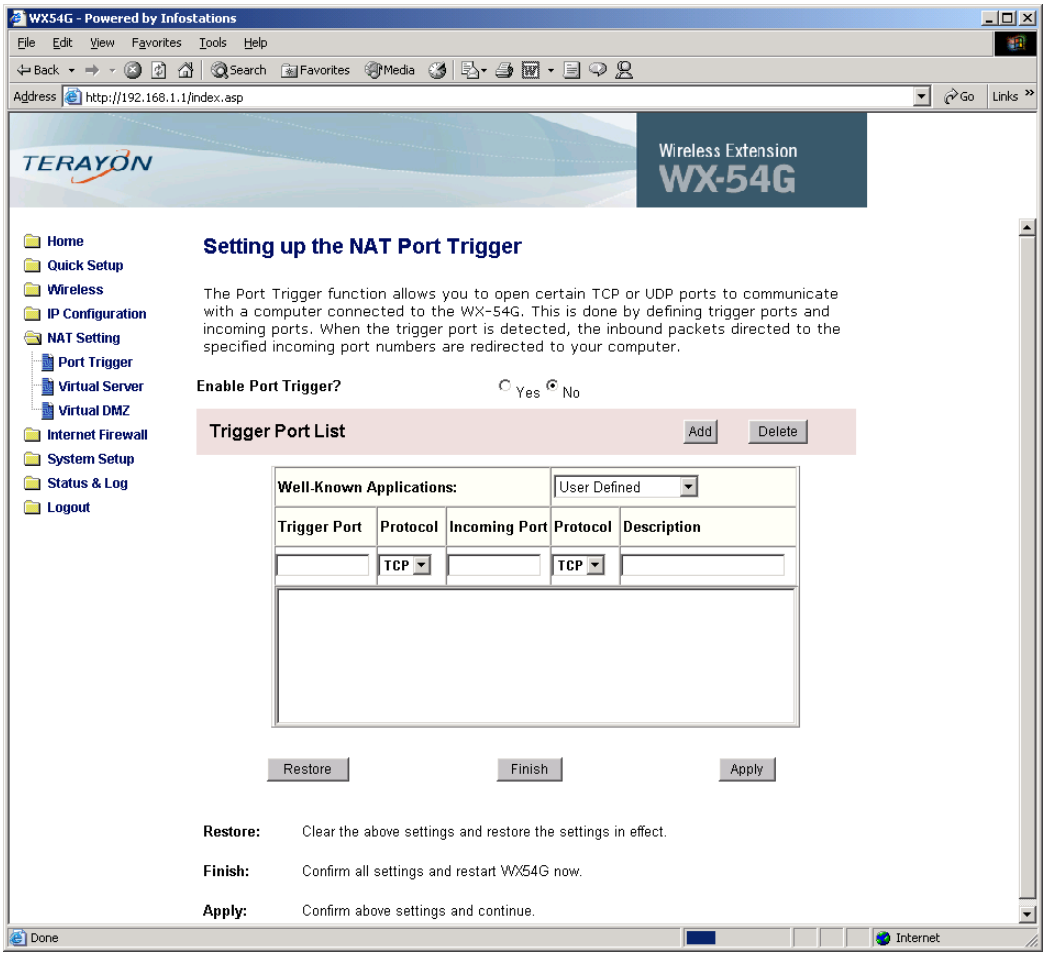
Use the NAT screens to do the following:

- Configuring the NAT Port Trigger
- Configuring the NAT Virtual Server
- Configuring the NAT Virtual Data Management Zone (DMZ)

These are discussed in the following sections.

Configuring the NAT Port Trigger

Use the Port Trigger function to open specific UDP or TCP ports to communicate with computers connected to the WX-54G. Use this screen to define trigger ports and incoming ports. When the trigger port is detected, the incoming packets to the specified incoming port numbers are redirected to your computer.



From this screen, you may configure the following:

Enable Port Trigger?

Select "Yes" to apply all rules of the Port Trigger List to the WX-54G. Select "No" to disable the port trigger.

Trigger Port

Enter the port or port range of the outgoing packets that will trigger port redirection in this field.

Protocol

Select the protocol of the incoming or outgoing packets from each respective drop-down list, either TCP or UDP.

Incoming Port

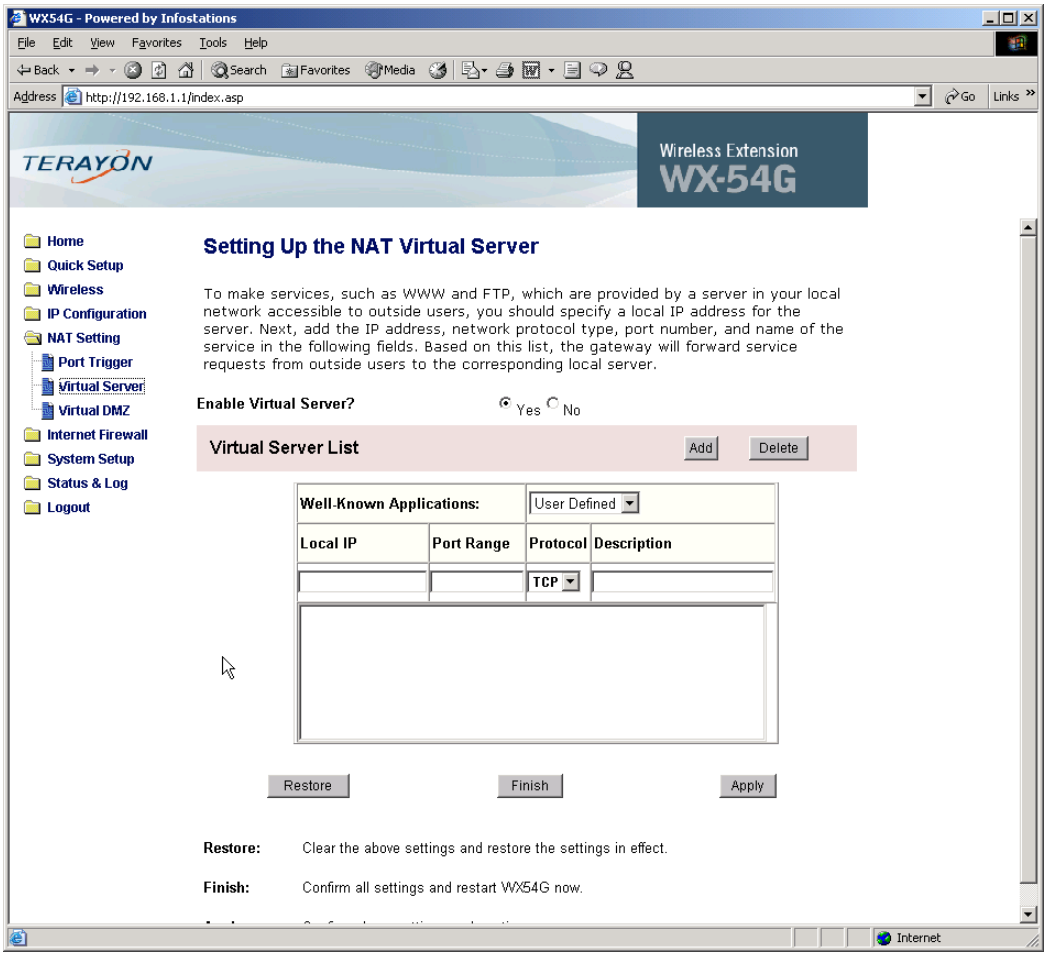
Enter the port or port range of the the incoming packets to be redirected to your computer.

Description

Enter a brief description of each trigger port rule, if desired.

Configuring the NAT Virtual Server

Use this screen to make services, such as WWW and FTP, which are provided by a server in your local network accessible to outside users,..



The following fields are configurable from this screen:

Enable Virtual Server?

Select "Yes" to apply all rules in the Virtual Server List to the WX-54G.

Local IP

Enter the IP address to which you would like to redirect the matched packets.

Port Range

Enter the port or port range for the incoming packets.

Protocol

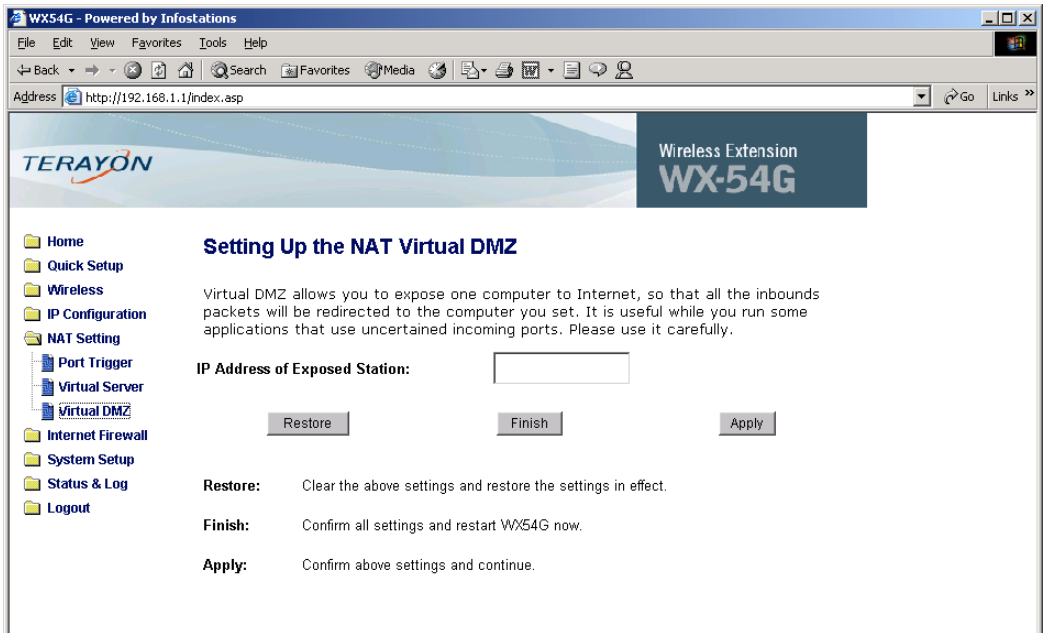
Use this drop-down list to select the protocol of the incoming packets, either TCP or UDP.

Description

Enter a brief description of each virtual server rule, if desired.

Configuring the NAT Virtual Data Management Zone (DMZ)

The Virtual Data Management Zone (DMZ) allows you to expose one computer to the Internet to which all inbound packets will be redirected. A Virtual DMZ is basically a group virtual server. All traffic that has not already been sent to the NAT virtual server can be sent to a computer on the local network that has been defined as the Virtual DMZ.



From here you may set the following field.

IP Address of Exposed Stations

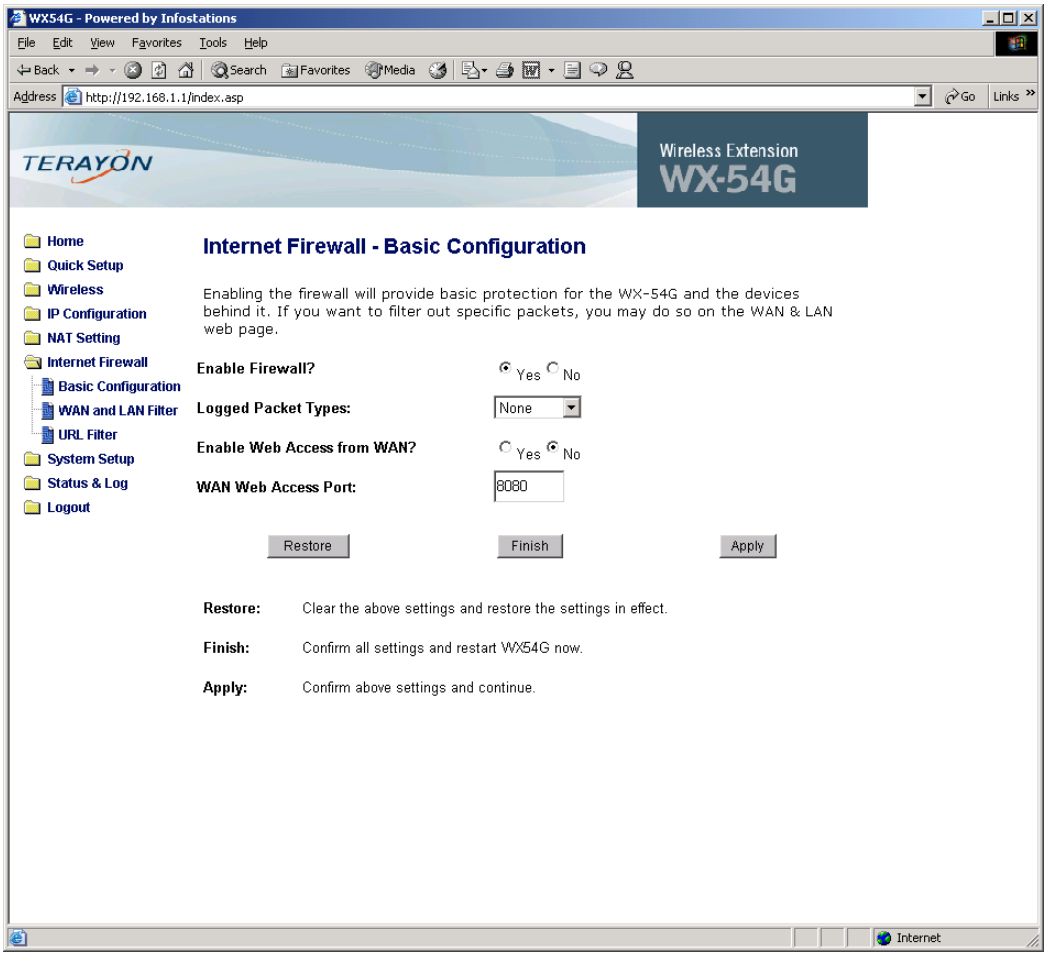
Enter the IP address of the computer you wish to expose to the Internet here.

Setting up the Internet Firewall

Enabling the firewall will provide basic protection for the WX-54G and the devices behind it. To filter specific packets, use the Configuring WAN & LAN Filtering web page.

Configuring the Internet Firewall Basics

Use the following screen to do basic configuration of the internet firewall.



From this screen, you can configure the following:

Enable Firewall

Select Yes to enable general Stateful Packet Inspection (SPI) rules. The subsequent options become available once the firewall is enabled. Select No to disable the Internet firewall.

Logged Packet Type

Use this field to indicate which packets between the WAN and LAN will be logged. The packet types are: None, Dropped, Accepted, or Both. If you select:

None	No packets will be logged.
Dropped	Dropped packets will be logged.
Accepted	Accepted packets will be logged.
Both	Both accepted and dropped packets will be logged.

Enable Web Access from WAN

Select Yes to enable web access from the WAN, or No to disable web access.

Port of Web Access from WAN

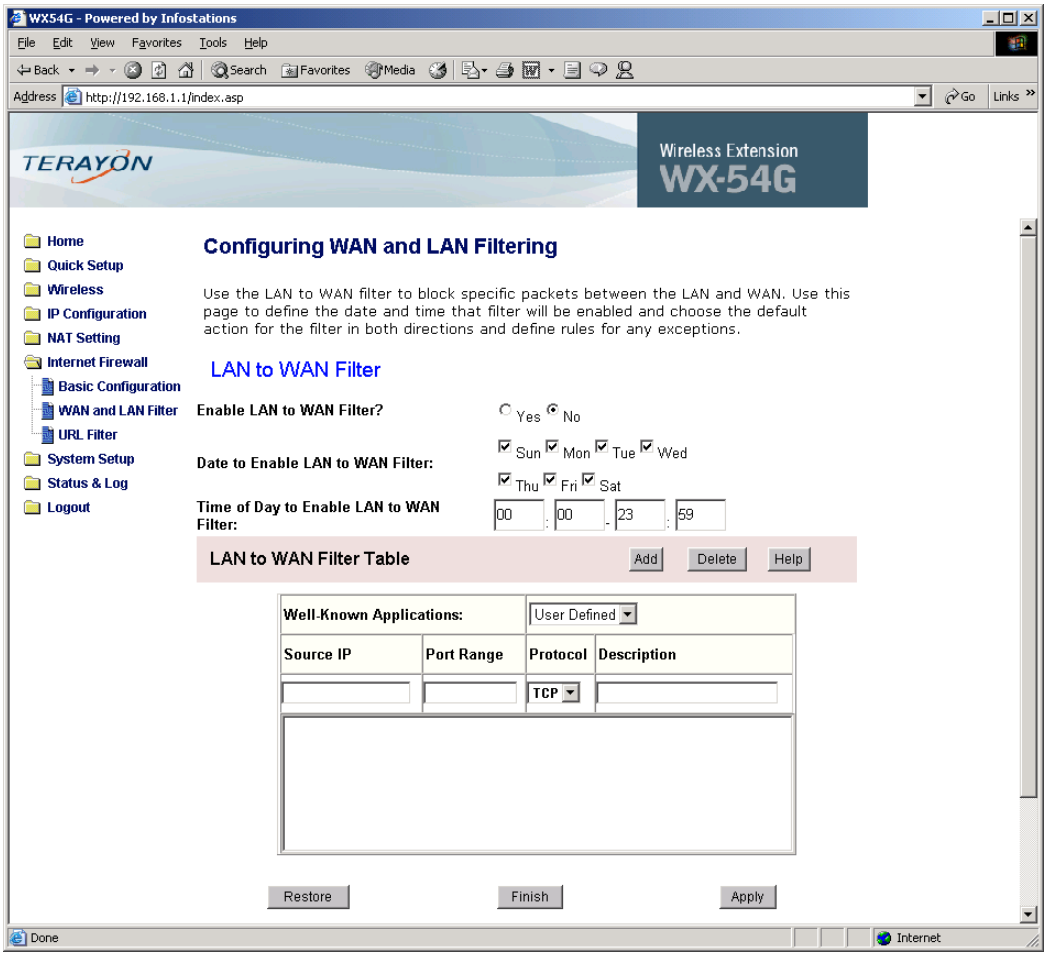
Use this field to specify the port used to access the WX-54G web server from the Internet. The default value is 8080.

Configuring the WAN and LAN Filter for the Internet Firewall

Use the following screen to configure the WAN and LAN filters for the internet firewall. The LAN to WAN filter allows you to block specific packets between the LAN and WAN. You can define:

- The date and time that the filter will be enabled
- The default action for the filter in both direction
- Any exceptions to the rules

.



From this screen you can configure the following:

Enable LAN to WAN Filter

Select Yes to block specific packets between the LAN and WAN, as defined by the rules below.

Date to Enable LAN to WAN Filter

Use this field to define the dates during which the LAN and WAN filtering will be enabled.

Time of Day to Enable LAN to WAN Filter

Use this field to define the time interval during which the LAN and WAN filtering will be enabled.

Well Known Applications

Use this field to define the application(s) for which the filtering rules apply, such as FTP or TELNET.

Source IP

Use this field to filter a specific IP address, or a range of IP addresses. For example, 198.169.123.10, or 198.169.123.*.

Port Range

Use this field to filter a source or destination port range. You can input a specific port, such as 95, or ports within a range, such as "103:315", ">100", or "<65535."

Protocol

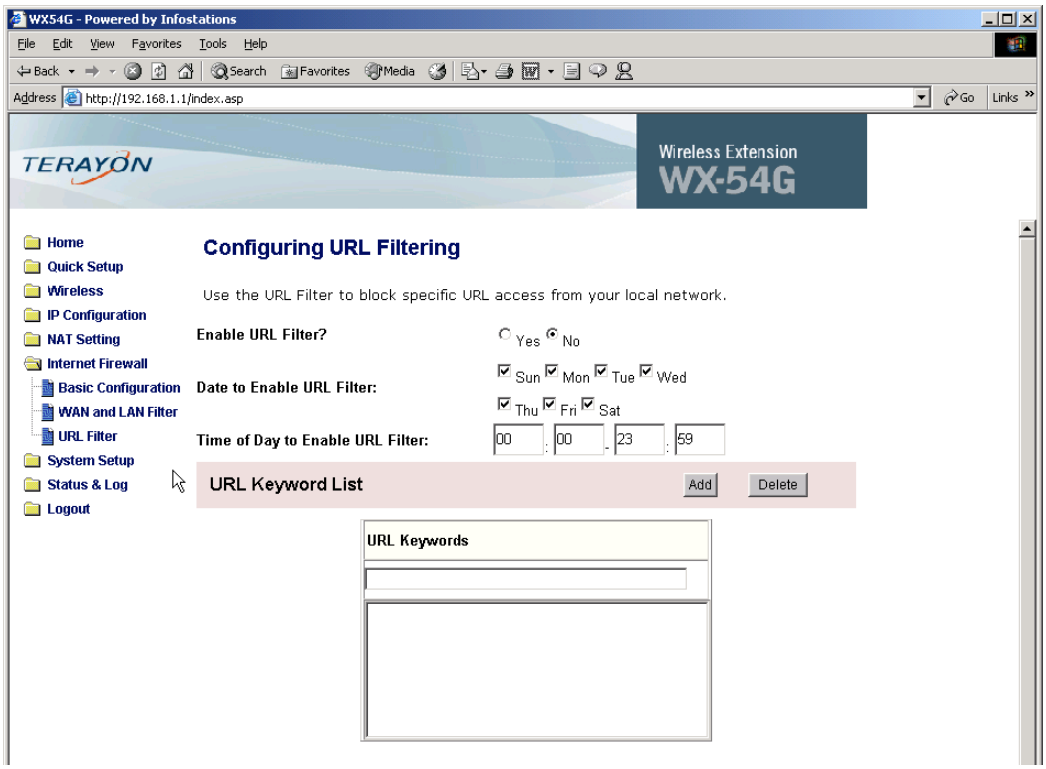
Use this field to indicate the protocol type of the packets to be filtered, either TCP or UDP.

Description

Use this field to provide a brief description of the filter, if desired.

Configuring the URL Filter for the Internet Firewall

Use the URL Filter to block specific URL access from your local network. For example, you could block access to specific web sites from your home network. Use this page to enable and configure URL filtering



From this screen you can configure the following:

Enable URL Filter

Use this field to block access from your local network to a specific URL.

Date to Enable LAN to WAN Filter

Use this field to define the dates during which the URL filtering will be enabled.

Time of Day to Enable URL Filter

Use this field to define the time interval during which the URL filtering will be enabled.

URL Keyword List

Use this field to specify keywords in URLs to be blocked. Enter a keyword in the field and click Add to enter it into the list. To delete a keyword, highlight it in the list and click Delete.

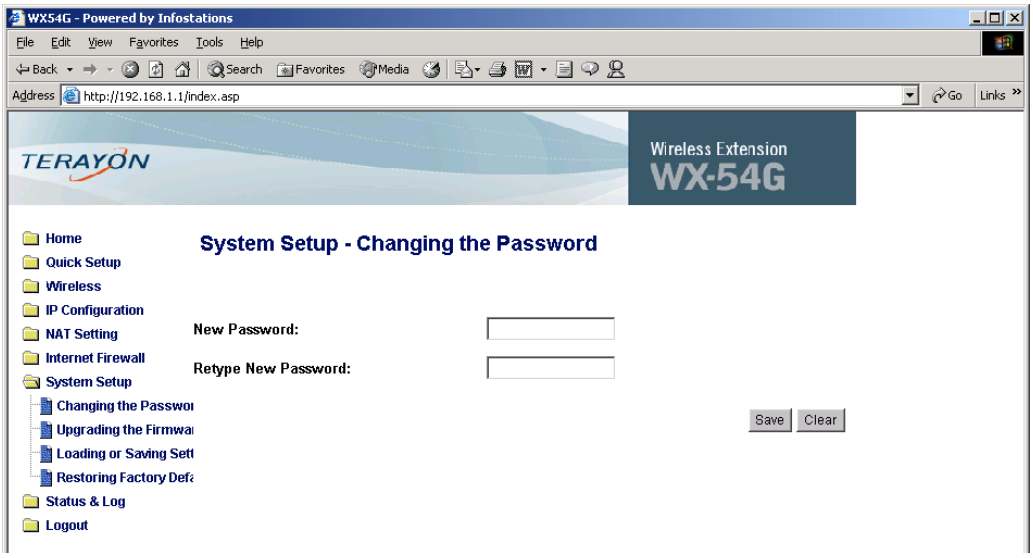
System Setup

Use the System Setup menus to do the following on the WX-54G:

- Changing the Password
- Upgrading the Firmware
- Saving Current Settings to a File or Loading Settings from a File
- Restoring Factory Default Settings

Changing the Password

Use this screen to change the default password "admin" (lowercase). The password can be between 1 and 16 characters long. You cannot use spaces, and the password field cannot be left blank.



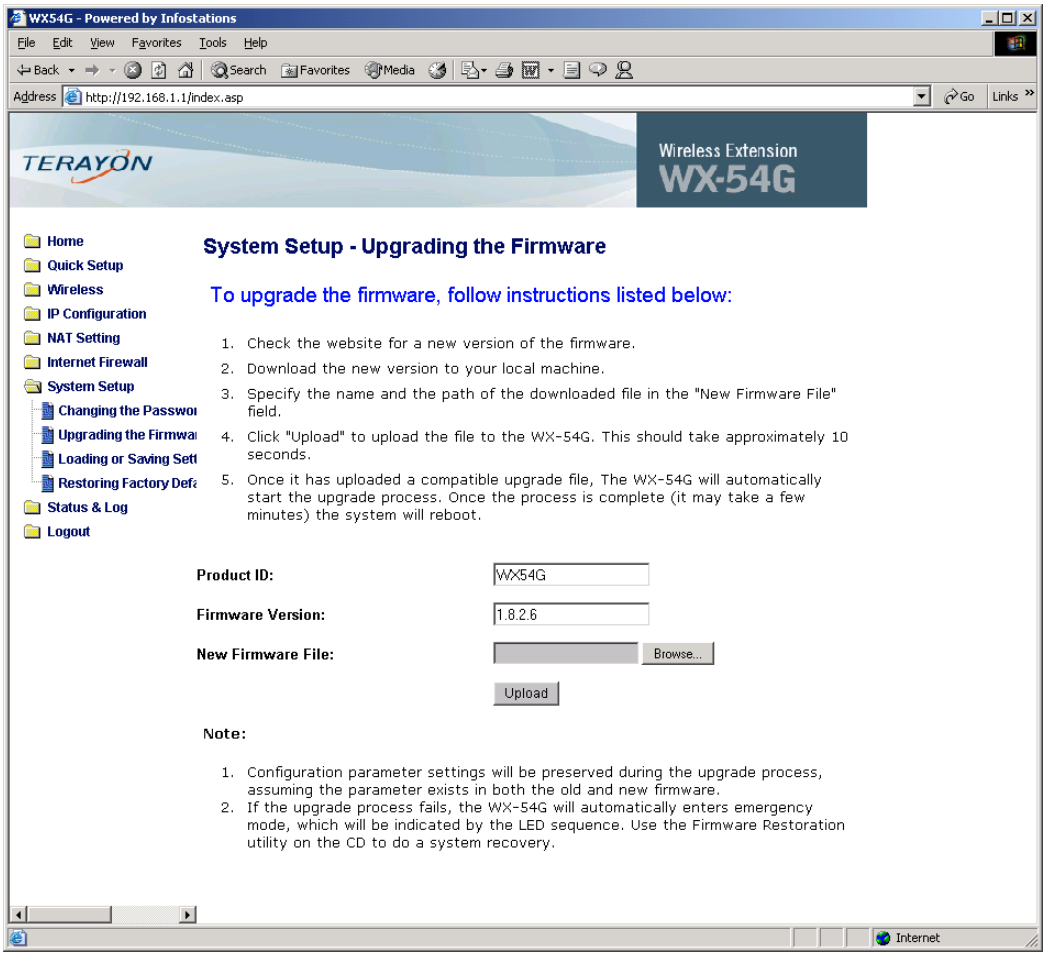
Click **Save** to save your new password. If you forget your password, you can reset the WX-54G to its factory settings (see *"Restoring Factory Default Settings"* on page 5-28.

NOTE

The password is case sensitive

Upgrading the Firmware

Select **Firmware Upgrade** from the **System Setup** menu. The following page is displayed:



This page displays the Flash Code (Firmware) version installed in the Terayon WX-54G. Periodically, new firmware will be available for the WX-54Gs on Terayon's Web site.

To upgrade the firmware, follow the steps as listed on the Web page.

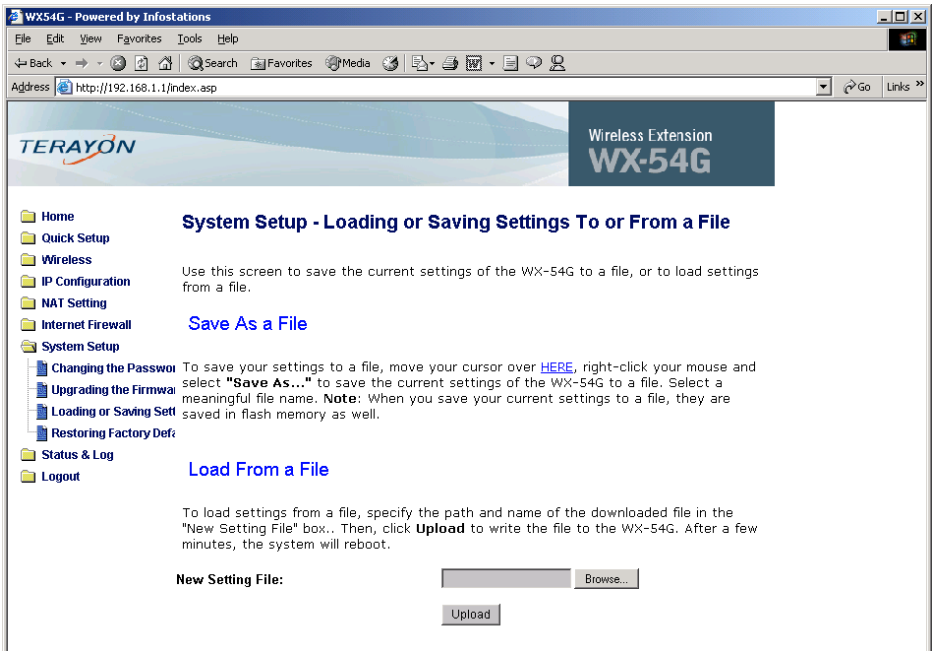
If you are experiencing a problem with your WX-54G, a Technical Support representative may ask you to provide the version of your firmware to identify on what flash code you are operating.

NOTE

The firmware upgrade takes approximately 60 to 90 seconds. When the firmware upgrade is completed, you will be directed to the home page.

Saving Current Settings to a File or Loading Settings from a File

Use this page to save current system settings to a file, or load settings from a file. You may wish to reload settings from a known working configuration in the rare case that you experience problems after changing settings.



Save As a File

Move your cursor over the **HERE** link on the web page. Click the right mouse button and select **Save As...** to save current setting into a file.

NOTE

When the current settings are saved to a file, they will be saved to flash memory as well.

Load From a File

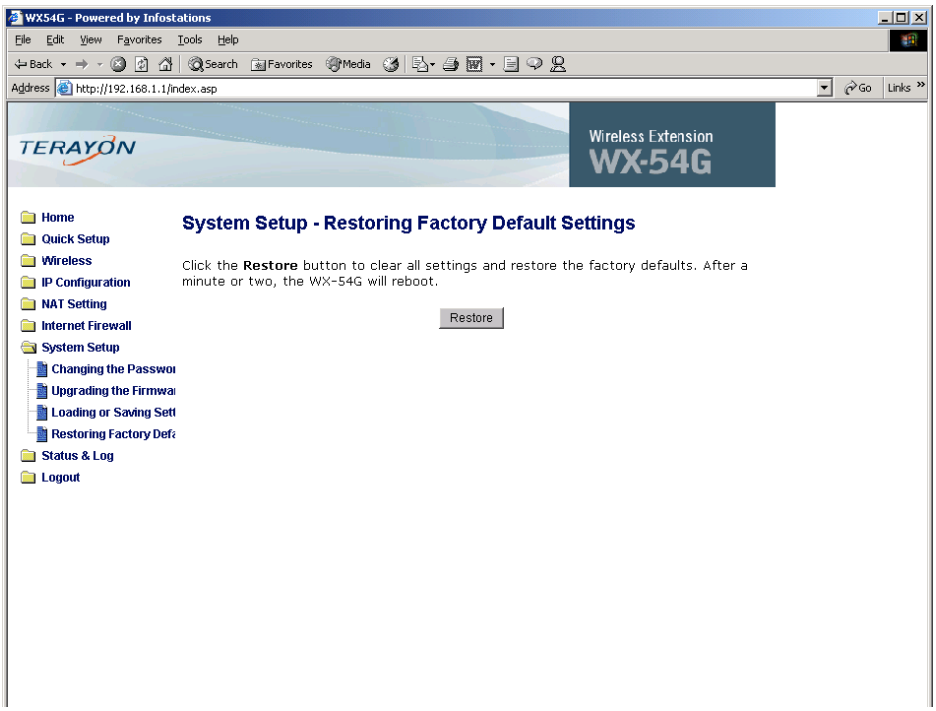
Specify the path of and name of the file to be downloaded in the **New Setting File** box at the bottom of the screen. Then, click **Upload** to write the file to flash memory. When the process is finished, the system will reboot.

Restoring Factory Default Settings

This section describes the two ways you can restore factory default settings: either through the Web Manager, or through the hardware.

Restoring Factory Default Settings via the Web Manager

You can reset all settings to their factory defaults through the web manager using the Restoring Factory Default Settings page.



Click **Restore.** The system will reboot. Wait 60 to 90 seconds before trying to access the Terayon WX-54G.

NOTE

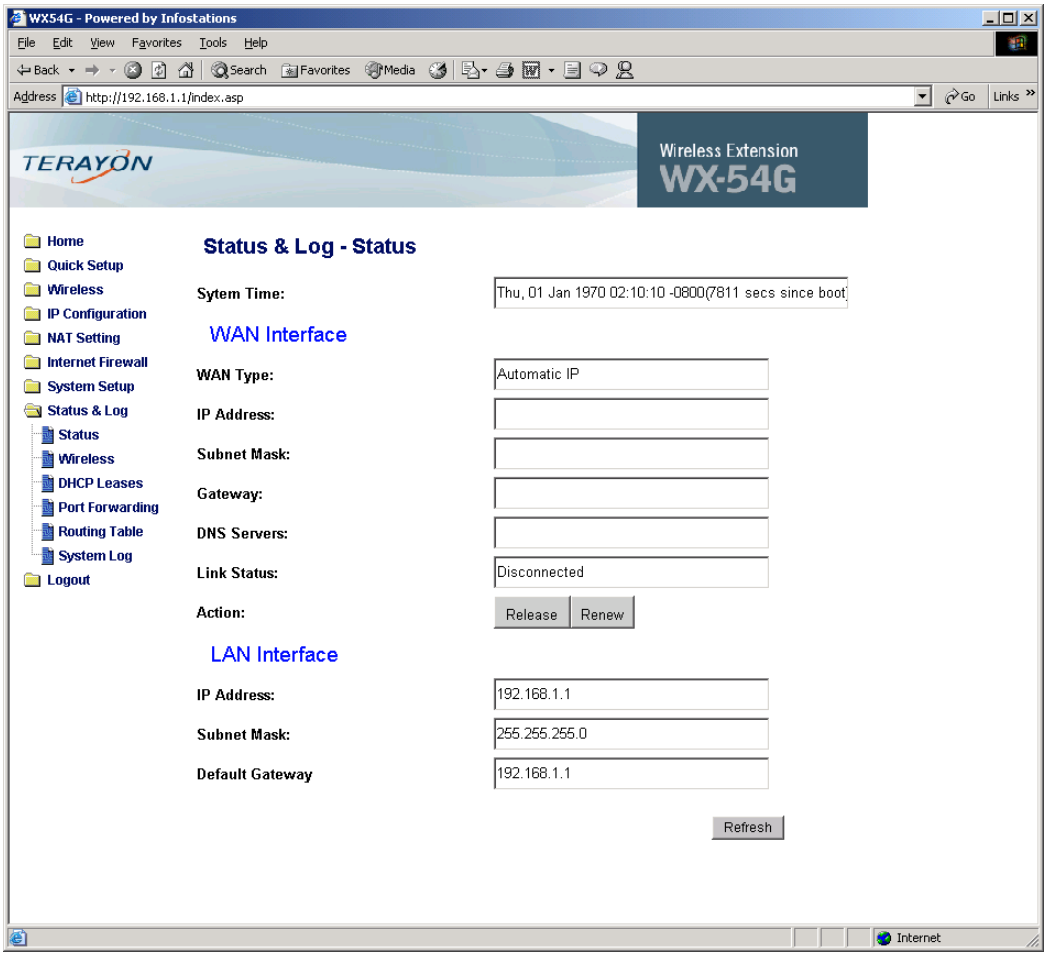
You will be notified when factory default settings are restored when using the Web Manager.

Restoring Factory Default Settings Using Hardware

You can reset all settings to their factory defaults manually by pushing the Reset button in the hole next to the LEDs on the Terayon WX-54G while it is powered on. Use a pen or straightened paper clip to hold the Reset button depressed for more than 5 seconds until the Ready LED on the front of the WX-54G starts blinking.

Displaying System Status and Logging

To display the system status, select Status from the Status & Log submenu. System status and logs are useful tools when trying to debug any system problems. A screen similar to the following is displayed:



The following information is displayed:

System Time

Shows how long the Terayon WX-54G has been running since the last boot-up.

WAN Type

Displays the WAN type, either dynamically assigned IP, or static IP.

IP Address

Shows the IP address of the Terayon WX-54G. When getting the IP assignments automatically, it is necessary to go to this page to see the IP address.

Subnet Mask

Displays the IP subnetwork mask of the Terayon WX-54G.

Gateway

Shows the default gateway IP address if entered. This can be blank.

DNS Servers

Displays the IP address of the DNS server(s) used by the WX-54G.

Link Status

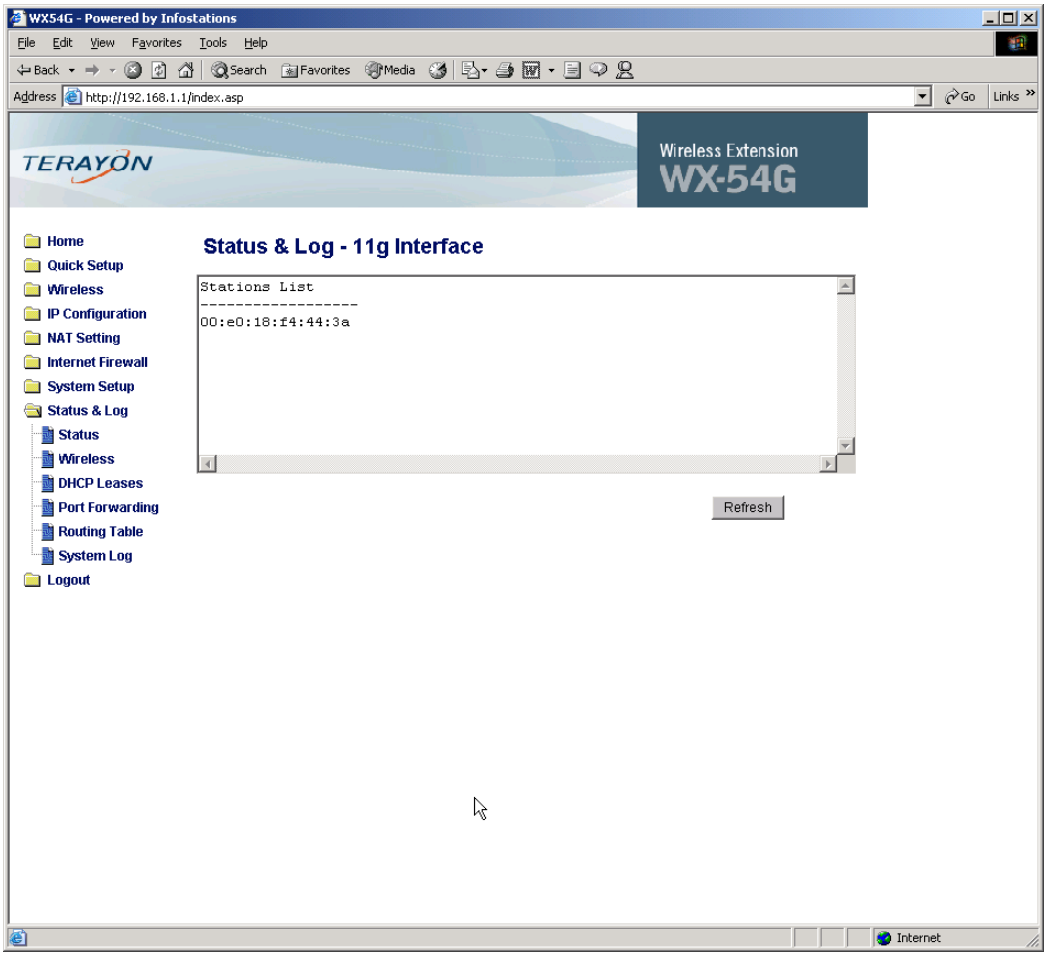
Displays the link status of the WX-54G, either connected or disconnected.

Action

Click Release to release IP address of the WX-54G, or click Renew to renew the IP address of the WX-54G.

Displaying Wireless Status

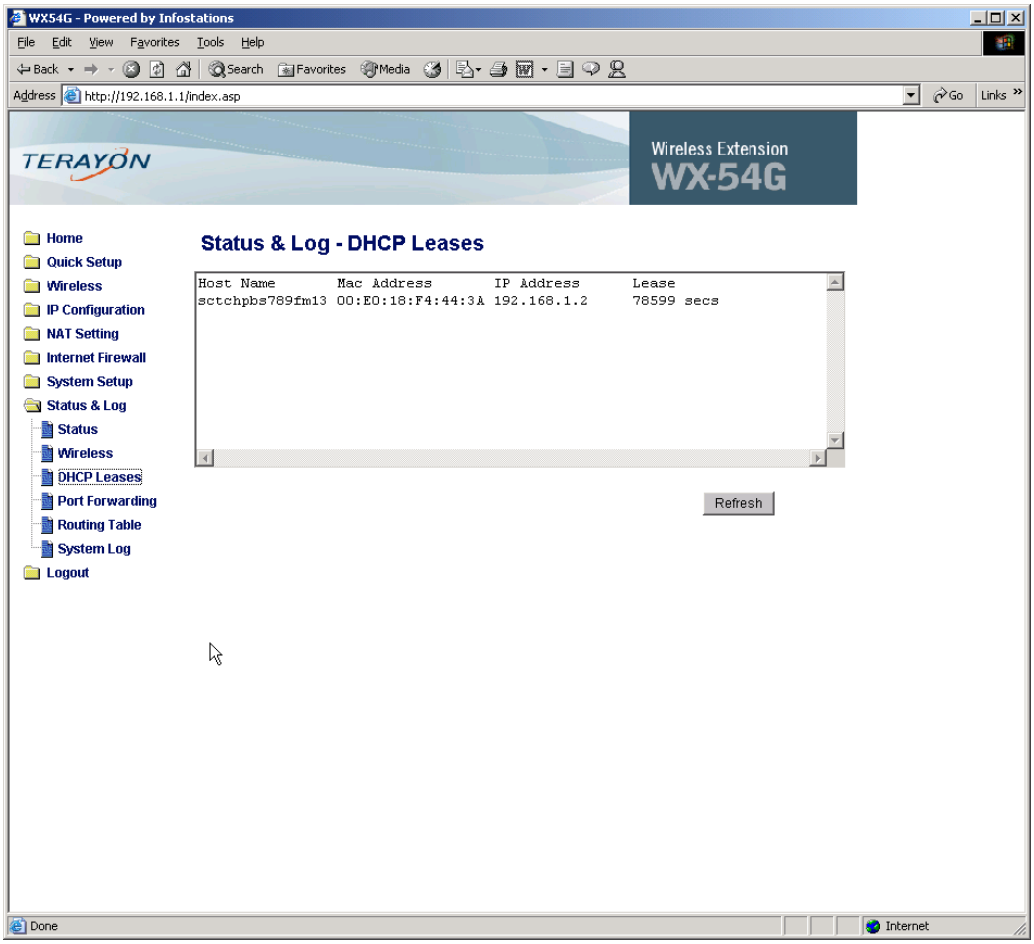
To display the MAC addresses of the wireless stations connected to the WX-54G, select Wireless from the Status & Log submenu. A screen similar to the following is displayed:



This screen displays a list of the wireless stations connected to the WX-54G by MAC addresses in hexadecimal format. Click Refresh to refresh the display.

Displaying DHCP Lease Status

Use the DHCP Lease screen to display the DHCP lease status of each machine connected to the WX-54G.



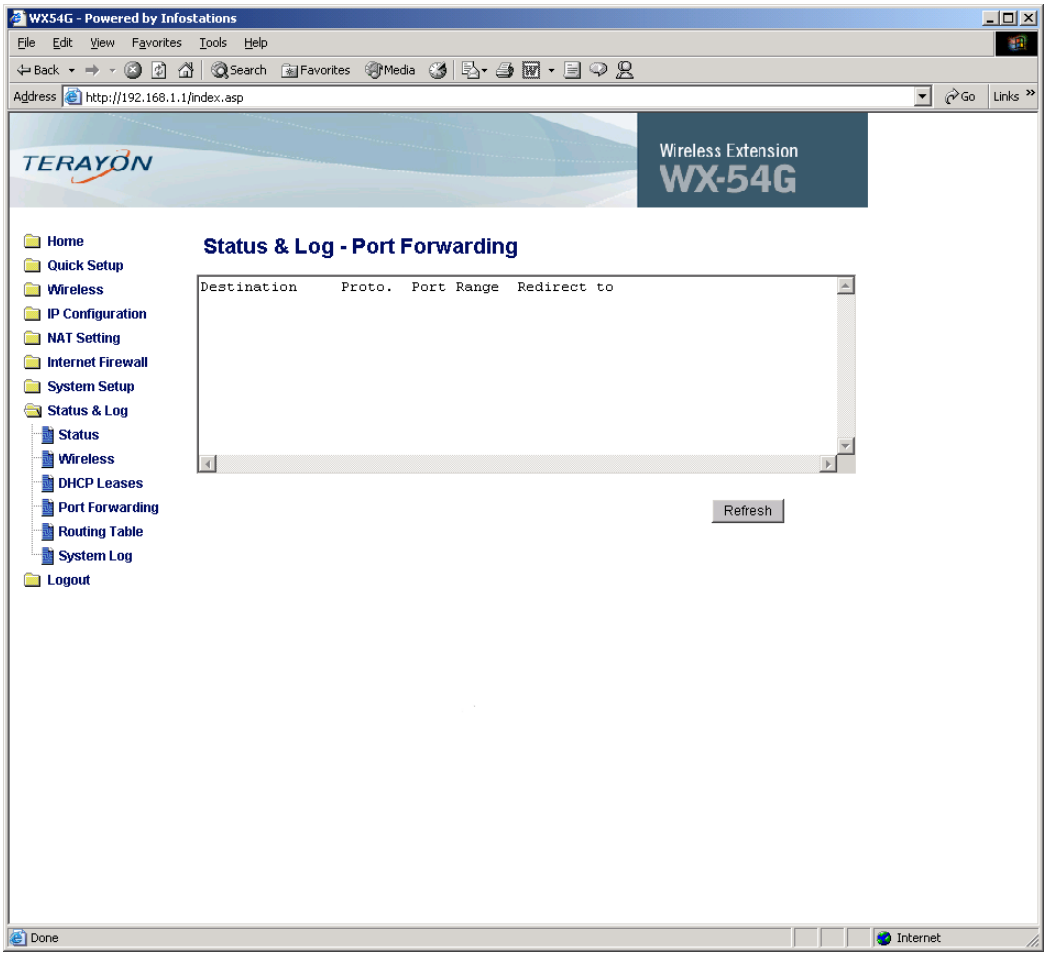
For each DHCP lease, the following information is displayed:

- Host Name
- MAC Address
- IP Address
- Lease Time (in seconds)

Click Refresh to update the list of DHCP leases.

Displaying Port Forwarding Status

Use the Port Forwarding screen to display port forwarding status, which is active when Port Mapping, Virtual Server, or Virtual DMZ is enabled.



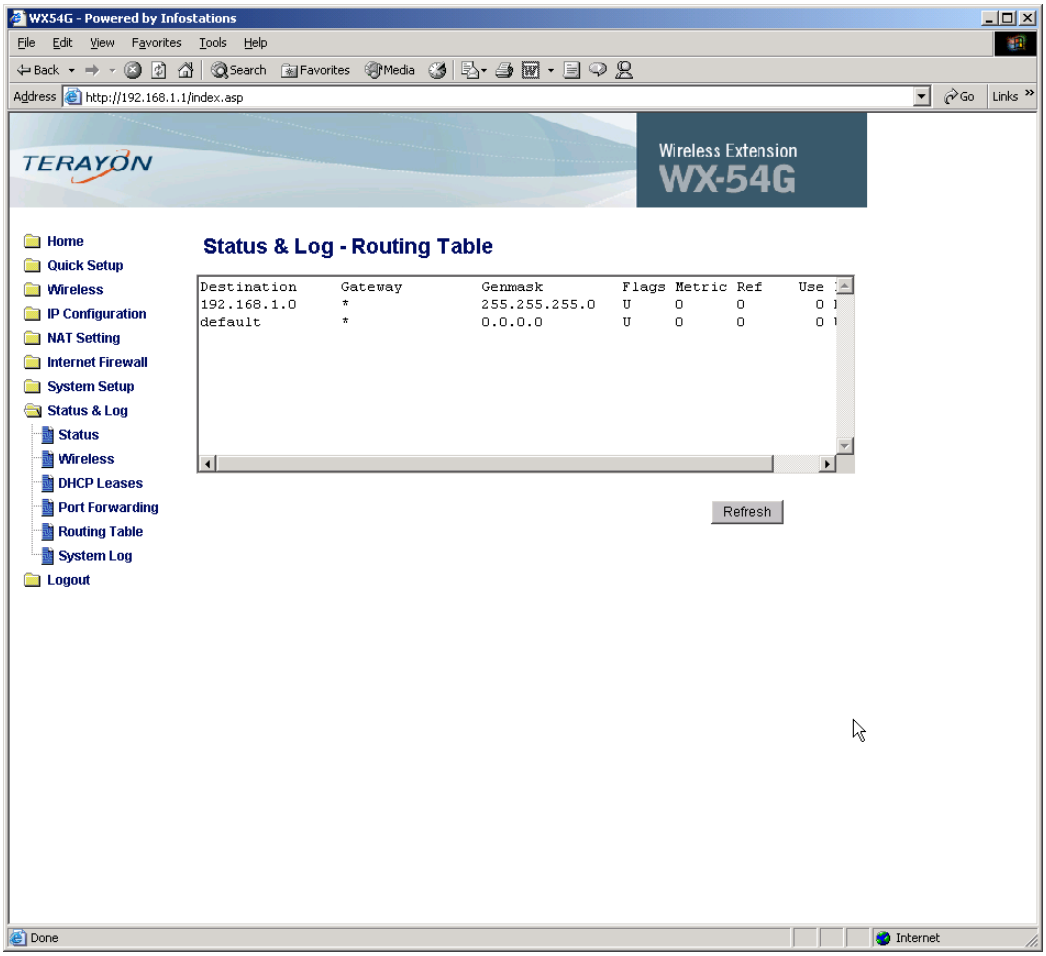
The following information is displayed for each port forwarding filter:

- The original packet destination
- The protocol being filtered
- The port range being filtered
- The IP address of the computer to which the traffic is forwarded

Click Refresh to update the Port Forwarding screen.

Displaying the Routing Table

Use the Routing Table screen to display routing information for the WX-54G. Static routing rules or dynamic routing rules updated by RIP are displayed on this page. This information can be useful when debugging routing problems.



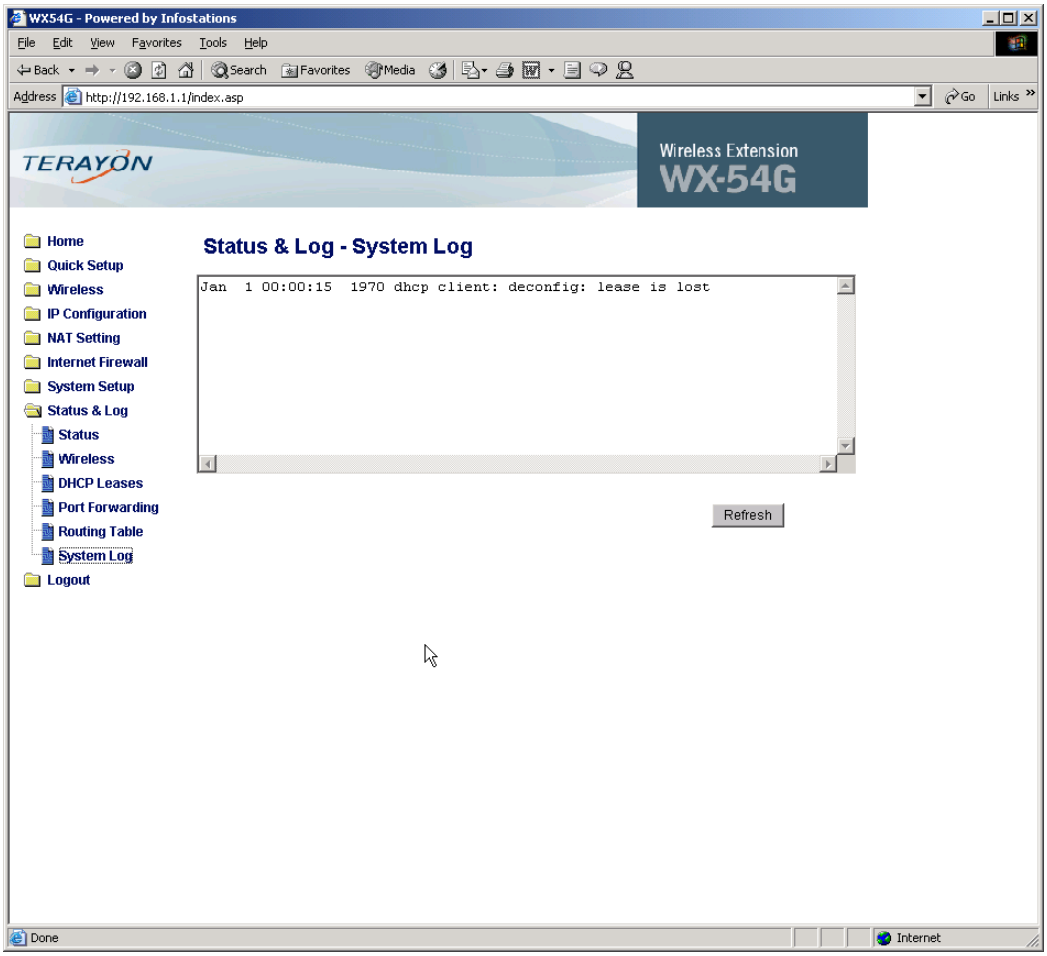
The following information is displayed:

- Destination
- Gateway
- Genmask
- Flags
- Metric
- Ref
- Use
- Interface, either WAN or LAN

Click Refresh to update the routing table.

Displaying the System Log

Use this page to view the last 1024 system log entries. Log entries are useful when debugging system problems.



This screen will hold the 1024 most current log entries. As newer log entries are added, the oldest log entries will be discarded. Click Refresh to view the most recent log entries.

Chapter 6

Troubleshooting

The Terayon WX-54G is designed to be very easy to install and operate. However, if you experience difficulties, use the information in this chapter to help diagnose and solve problems. If you cannot resolve a problem, contact Technical Support.

Common Problems and Solutions

1. **Problem**

   The Terayon WX-54G does not power up.

   Solution

   Confirm that there is AC power available at the power outlet being used.

2. **Problem**

   Cannot communicate with the Terayon WX-54G through a wired network connection. The default IP address is 192.168.1.1.

   Solution

   - Verify the network configuration by ensuring that there are no duplicate IP addresses. Power down the device in question and ping the assigned IP address of the device. Ensure that no other device responds to that address.
   - Check that the cables have proper pin outs and connectors, or use another LAN cable.
   - Check that the hub, switch, or computer to which the Terayon WX-54G is connected and that all devices support 10 Mbps speed.

   This is what you will see if you connect the Terayon WX-54G to a:

	10/100 Mbps Hub	Pure 100 Mbps Hub
Hub LED	ON	OFF
Ethernet LED	ON	ON

Since you will not know if the connection is bad from the Terayon WX-54G Ethernet LED alone, you will have to look at the Hub LED if you are not sure what kind of hub to which the WX-54G is attached.

3. **Problem**

   The Terayon WX-54G Device Discovery application still cannot find or connect to the Terayon WX-54G after verifying the IP address and LAN cable, changes cannot be made, or the password is lost.

   Solution

   In case the Terayon WX-54G is inaccessible, you can restore the Terayon WX-54G factory default settings. Use a straightened paper clip to press the Reset button located next to the LEDs on the Terayon WX-54G and keep it depressed for more 5 seconds. The WX-54G will reboot and the Ready LED will darken and then light up when the reset is successful.

   For more information, see *"Default Factory Settings"* on page 6-4.

4. **Problem**

   My WLAN Card will not associate with the Terayon WX-54G.

   Solution

   Check the following:

   - Bring the devices closer together; the WLAN Card may be out of range of the Terayon WX-54G.
   - Confirm that the Terayon WX-54G and WLAN Card have the same SSID.
   - Confirm that the Terayon WX-54G and WLAN Card have the same Encryption settings, if enabled.
   - Confirm that the Terayon WX-54G Wireless and Ethernet LEDs are solid green.
   - Confirm that the Access Control List includes the MAC address of the WLAN Card if the Access Control feature is enabled.

5. **Problem**

   The throughput seems slow.

   Solution

   To achieve maximum throughput, verify that your antennas are well-placed, not behind metal, and do not have too many obstacles between them. If you move the client closer to the Terayon WX-54G and throughput increases, you may want to consider adding a second WX-54G and implementing roaming.

   - Check the antenna, connectors and cabling.
   - Verify that network traffic does not exceed 37% of bandwidth.
   - Check to see that the wired network does not exceed 10 broadcast messages per second.
   - Verify the wired network topology and configuration.

6. **Problem**

   I cannot find the Terayon WX-54G using the Terayon Device Discovery.

   Solution

   To configure the Terayon WX-54G through an WLAN Card, your computer must be on the same subnet as the Terayon WX-54G. You cannot find the Terayon WX-54G on a different subnet from your computer within the same gateway. You must change your computer to the same subnet as the Terayon WX-54G. The factory default subnet of the Terayon WX-54G is "192.168.1.x".

7. **Problem**

   How do I upgrade the firmware on the Terayon WX-54G?

   Solution

   Periodically, new Flash Code is available for the Terayon WX-54G on the ftp site at ftp://ftp.terayon.com. You can update the WX-54G Flash Code using the software described in *"Upgrading the Firmware"* on page 5-26.

Default Factory Settings

The following are factory default values. You can restore your Terayon WX-54G to these values if you press the Reset button on the Terayon WX-54G for more than 5 seconds, or if you restore factory settings through the Terayon WX-54G software.

Name	Default Value
Wireless - Interface	
SSID	default
Channel	6
Encryption (WEP)	None
Broadcast SSID	No
Wireless - Bridge	
AP MOD	Access Point Only
Wireless - Access Control	
MAC Access Mode	Disabled
IP Config LAN	
IP Address	192.168.1.1
Get IP Address Automatically	Yes
Subnet Mask	255.255.255.0
Gateway	blank
System Setup - Password	
Operation Mode	Access Point
User Name	admin
Password	admin

Appendix A

Specifications and Safety Information

Notices

Federal Communications Commission Statement

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

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to Part 15 of the Federal Communications Commission (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 separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

CAUTION

You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

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Safety Statements

Regulatory Information/Disclaimers

Installation and use of this Wireless LAN device must be in strict accordance with the instructions included in the user documentation provided with the product. Any changes or modifications (including the antennas) made to this device that are not expressly approved by the manufacturer may void the user's authority to operate the equipment. The manufacturer is not responsible for any radio or television interference caused by unauthorized modification of this device, or the substitution of the connecting cables and equipment other than manufacturer specified. It is the responsibility of the user to correct any interference caused by such unauthorized modification, substitution or attachment. Manufacturer and its authorized resellers or distributors will assume no liability for any damage or violation of government regulations arising from failing to comply with these guidelines.

CAUTION

To maintain compliance with FCC's RF exposure guidelines, this equipment should be installed and operated with minimum distance [20cm] between the radiator and your body. Use only the supplied antenna. Unauthorized antenna, modification, or attachments could damage the transmitter and may violate FCC regulations.

Safety Information

In order to maintain compliance with the FCC RF exposure guidelines, this equipment should be installed and operated with minimum distance [20cm] between the radiator and your body. Use only with the supplied antenna.

Unauthorized antenna, modification, or attachments could damage the transmitter and may violate FCC regulations.

CAUTION

Any changes or modifications not expressly approved in this manual could void your authorization to use this devices.

MPE Statement

Your device contains a low power transmitter. When the device is transmitting it sends out Radio Frequency (RF) signal.

FCC Radio Frequency Exposure

This Wireless LAN radio device has been evaluated under FCC Bulletin OET 65C and found compliant to the requirements as set forth in CFR 47 Sections 2.1091, 2.1093, and 15.247(b)(4) addressing RF Exposure from radio frequency devices. The radiation output power of this Wireless LAN device is far below the FCC radio frequency exposure limits. Nevertheless, this device shall be used in such a manner that the potential for human contact during normal operation – as a mobile or portable device but use in a body-worn way is strictly prohibit. When using this device, a certain separation distance between antenna and nearby persons has to be kept to ensure RF exposure compliance. In order to comply with the RF exposure limits established in the ANSI C95.1 standards, the distance between the antennas and the user should not be less than [20cm].

RF Exposure

The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Glossary

A

Access Point (AP) — A networking device that seamlessly connects wired and wireless networks. Access Points combined with a distributed system support the creation of multiple radio cells that enable roaming throughout a facility.

Ad Hoc — A wireless network composed solely of stations within mutual communication range of each other (no Access Point).

Advance Encryption Standard (AES) — AES is the U.S. government's next-generation cryptography algorithm, which will replace DES and 3DES. This encryption key protocol is applied in the 802.1i standard to improve WLAN security. AES will require new hardware, unlike Temporal Key Integrity Protocol (TKIP) that can be used on existing wireless devices.

B

Basic Service Area (BSS) — A set of stations controlled by a single coordination function.

Broadband — A type of data transmission in which a single medium (such as cable) carries several channels of data at once.

C

Channel — An instance of medium usage for the purpose of passing protocol data units that may be used simultaneously, in the same volume of space, with other instances of medium usage (on other channels) by other instances of the same physical layer, with an acceptably low frame error ratio due to mutual interference.

Client — A client is the desktop or mobile PC that is connected to your network

COFDM (for 802.11a or 802.11g)

Signal power alone is not enough to maintain 802.11b-like distances in an802.11a/g environment. To compensate, a new physical-layer encoding technology was designed that departs from the traditional direct-sequence technology being deployed today. This technology is called COFDM (coded OFDM). COFDM was developed specifically for indoor wireless use and offers performance much superior to that of spread-spectrum solutions. COFDM works by breaking one high-speed data carrier into several lower-speed sub-carriers, which are then transmitted in parallel. Each high-speed carrier is20 MHz wide and is broken up into 52 sub channels, each approximately 300KHz wide. COFDM uses 48 of these sub channels for data, while the remaining four are used for error correction. COFDM delivers higher data rates and a high degree of multi-path reflection recovery, due to its encoding scheme and error correction.
Each sub channel in the COFDM implementation is about 300 KHz wide. At the low end of the speed gradient, BPSK (binary phase shift keying) is used to encode 125 Kbps of data per channel, resulting in a 6,000-Kbps, or 6 Mbps, data rate. Using quadrature phase shift keying, you can double the amount of data encoded to 250 Kbps per channel, yielding a 12-Mbps data rate. And by using 16-level quadrature amplitude modulation encoding 4 bits per hertz, you can achieve a data rate of 24 Mbps. The 802.11a/g standard specifies that all802.11a/g-compliant products must support these basic data rates. The standard also lets the vendor extend the modulation scheme beyond 24 Mbps. Remember, the more bits per cycle (hertz) that are encoded, the more susceptible the signal will be to interference and fading, and ultimately, the shorter the range, unless power output is increased.

D

Device Name

Also known as DHCP client ID or network name. Sometimes provided by an ISP when using DHCP to assign addresses.

Digital Subscriber Line (DSL) Modem

A DSL modem uses your existing phone lines to transmit data at high speeds.

Direct-Sequence Spread Spectrum (for 802.11b)	Spread spectrum (broadband) uses a narrowband signal to spread the transmission over a segment of the radio frequency band or spectrum. Direct sequence is a spread spectrum technique where the transmitted signal is spread over a particular frequency range. Direct-sequence systems communicate by continuously transmitting a redundant pattern of bits called a chipping sequence. Each bit of transmitted data is mapped into chips and rearranged into a pseudorandom spreading code to form the chipping sequence. The chipping sequence is combined with a transmitted data stream to produce the output signal. Wireless mobile clients receiving a direct-sequence transmission use the spreading code to map the chips within the chipping sequence back into bits to recreate the original data transmitted by the wireless device. Intercepting and decoding a direct-sequence transmission requires a predefined algorithm to associate the spreading code used by the transmitting wireless device to the receiving wireless mobile client. This algorithm is established by IEEE 802.11b specifications. The bit redundancy within the chipping sequence enables the receiving wireless mobile client to recreate the original data pattern, even if bits in the chipping sequence are corrupted by interference. The ratio of chips per bit is called the spreading ratio. A high spreading ratio increases the resistance of the signal to interference. A low spreading ratio increases the bandwidth available to the user. The wireless device uses a constant chip rate of 11Mchips/s for all data rates, but uses different modulation schemes to encode more bits per chip at the higher data rates. The wireless device is capable of an 11 Mbps data transmission rate, but the coverage area is less than a 1 or 2 Mbps wireless device since coverage area decreases as bandwidth increases.
Domain Name System (DNS) Server Address	DNS allows Internet host computers to have a domain name and one or more IP addresses. A DNS server keeps a database of host computers and their respective domain names and IP addresses, so that when a user enters a domain name into the Internet browser, the user is sent to the proper IP address. The DNS server address used by the computers on your home network is the location of the DNS server your ISP has assigned.
Dynamic Host Configuration Protocol (DHCP)	This protocol allows a computer (or many computers on your network) tube automatically assigned a single IP address from a DHCP server.

E

Encryption — This provides wireless data transmissions with a level of security.

Ethernet — The most widely used LAN access method, which is defined by the IEEE802.3 standard. Ethernet is normally a shared media LAN meaning all devices on the network segment share total bandwidth. Ethernet networks operate at10Mbps using CSMA/CD to run over 10-BaseT cables.

Extended Service Set (ESS) — A set of one or more interconnected basic service set (BSSs) and integrated local area networks (LANs) can be configured as an Extended Service Set.

Extended Service Set Identifier (ESSID) — You must have the same ESSID entered into the gateway and each of its wireless clients. The ESSID is a unique identifier for your wireless network.

F

Firewall — A firewall determines which information passes in and out of a network. NAT can create a natural firewall by hiding a local network's IP addresses from the Internet. A Firewall prevents anyone outside of your network from accessing your computer and possibly damaging or viewing your files.

G

Gateway — A network point that manages all the data traffic of your network, as well as to the Internet and connects one network to another.

I

IEEE — The Institute of Electrical and Electronics Engineers. The IEEE sets standards for networking, including Ethernet LANs. IEEE standards ensure interoperability between systems of the same type.

IEEE 802.11 — IEEE 802.xx is a set of specifications for LANs from the Institute of Electrical and Electronic Engineers (IEEE). Most wired networks conform to 802.3, the specification for CSMA/CD based Ethernet networks or 802.5, the specification for token ring networks. 802.11 defines the standard for wireless LAN encompassing three incompatible (non-interoperable) technologies: Frequency Hopping Spread Spectrum (FHSS), Direct Sequence Spread Spectrum (DSSS), and Infrared. 802.11 specifies a carrier sense media access control and physical layer specifications for 1 and 2 Mbps wireless LANs.

IEEE 802.11a (54Mbits/sec)

Compared with 802.11b, the 802.11b standard was designed to operate in the 2.4-GHz ISM (Industrial, Scientific and Medical) band using direct-sequence spread-spectrum technology. The 802.11a standard, on the other hand, was designed to operate in the more recently allocated 5-GHz UNII (Unlicensed National Information Infrastructure) band. And unlike 802.11b, the 802.11a standard departs from the traditional spread-spectrum technology, instead using a frequency division multiplexing scheme that's intended to be friendlier to office environments.

The 802.11a standard, which supports data rates of up to 54 Mbps, is the Fast Ethernet analog to 802.11b, which supports data rates of up to 11 Mbps. Like Ethernet and Fast Ethernet, 802.11b and 802.11a use an identical MAC (Media Access Control). However, while Fast Ethernet uses the same physical-layer encoding scheme as Ethernet (only faster), 802.11a uses an entirely different encoding scheme, called OFDM (orthogonal frequency division multiplexing). The 802.11b spectrum is plagued by saturation from wireless phones, microwave ovens and other emerging wireless technologies, such as Bluetooth. In contrast, 802.11a spectrum is relatively free of interference. The 802.11a standard gains some of its performance from the higher frequencies at which it operates. The laws of information theory tie frequency, radiated power and distance together in an inverse relationship. Thus, moving up to the5-GHz spectrum from 2.4 GHz will lead to shorter distances, given the same radiated power and encoding scheme.

Compared with 802.11g, 802.11a is a standard for access points and radio NICs that is ahead of 802.11g in the market by about six months. 802.11a operates in the 5GHz frequency band with twelve separate non-overlapping channels. As a result, you can have up to twelve access points set to different channels in the same area without them interfering with each other. This makes access point channel assignment much easier and significantly increases the throughput the wireless LAN can deliver within a given area. In addition, RF interference is much less likely because of the less-crowded 5 GHz band.

IEEE 802.11b (11Mbits/sec)

In 1997, the Institute of Electrical and Electronics Engineers (IEEE) adopted the 802.11 standard for wireless devices operating in the 2.4 GHz frequency band. This standard includes provisions for three radio technologies: direct sequence spread spectrum, frequency hopping spread spectrum, and infrared. Devices that comply with the 802.11 standard operate at a data rate of either 1or 2 Mbps.
In 1999, the IEEE created the 802.11b standard. 802.11b is essentially identical to the 802.11 standard except 802.11b provides for data rates of up to 11 Mbps for direct sequence spread spectrum devices. Under 802.11b, direct sequence devices can operate at 11 Mbps, 5.5 Mbps, 2 Mbps, or 1 Mbps. This provides interoperability with existing 802.11 direct sequence devices that operate only at 2 Mbps. Direct sequence spread spectrum devices spread a radio signal over a range of frequencies. The IEEE 802.11b specification allocates the 2.4 GHz frequency band into 14 overlapping operating Channels. Each Channel corresponds to a different set of frequenciesPARA802.11g is a proposed (to be finalized) new extension to 802.11b (used in a majority of wireless LANs today) that broadens 802.11b's data rates to 54Mbps within the 2.4 GHz band using OFDM (orthogonal frequency division multiplexing) technology. 802.11g allows backward compatibility with 802.11bdevices but only at 11 Mbps or lower, depending on the range and presence of obstructions.

Infrastructure

A wireless network centered about an access point. In this environment, the access point not only provides communication with the wired network but also mediates wireless network traffic in the immediate neighborhood.

Internet Protocol (IP)

The TCP/IP standard protocol that defines the IP datagram as the unit of information passed across an Internet that provides the basis for connectionless packet delivery service. IP includes the ICMP control and error message protocol as an integral part. It provides the functional equivalent of ISO OSI Network Services.

IP Address

An IP address is a 32-bit number that identifies each sender or receiver of information that is sent across the Internet. An IP address has two parts: the identifier of a particular network on the Internet and an identifier of the particular device (which can be a server or a workstation) within that network.

Industrial, Scientific, and Medicine (ISM) Bands	Radio frequency bands that the Federal Communications Commission (FCC) authorized for wireless LANs. The ISM bands are located at 902 MHz, 2.400GHz, and 5.7 GHz.
Internet Service Provider (ISP)	A company that provides access to the Internet. Small ISPs provide service via modem and ISDN while the larger ones also offer private line hook-ups. (T1, fractional T1, and so forth.).

L

LAN (Local Area Network	A communications network that serves users within a defined geographical area. The benefits include the sharing of Internet access, files and equipment like printers and storage devices. Special network cabling (10 Base-T) is often used to connect the PCs together.

M

MAC (Media Access Control) Address	A MAC address is the hardware address of a device connected to a network.

N

Network Address Translation (NAT)	NAT masks a local network's group of IP addresses from the external network, allowing a local network of computers to share a single ISP account. This process allows all of the computers on your home network to use one IP address. This will enable access to the Internet from any computer on your home network without having to purchase more IP addresses from your ISP.
Network Interface Card (NIC)	A network adapter plugged into a computer so that the computer can be connected to a network. It is responsible for converting data from stored in the computer to the form transmitted or received.

P

Packet	A basic message unit for communication across a network. A packet usually includes routing information, data, and sometimes error detection information.

Personal Computer Memory Card International Association (PCMCIA)

The Personal Computer Memory Card International Association (PCMCIA), develops standards for PC cards, formerly known as PCMCIA cards. These cards are available in three types, and are about the same length and width as credit cards. However, the different width of the cards ranges in thickness from3.3 mm (Type I) to 5.0 mm (Type II) to 10.5 mm (Type III). These cards can be used for various functions, including memory storage, land line modems and wireless modems.

Point-to-Point Protocol (PPP)

PPP is a protocol for communication between computers using a serial interface, typically a personal computer connected by phone line to a server.

Point-to-Point Protocol over Ethernet (PPPoE)

Point-to-Point Protocol is a method of secure data transmission. It consists of PPP using the Ethernet to connect to an ISP.

R

Radio Frequency (RF) Terms: GHz, MHz, Hz

The international unit for measuring frequency is Hertz (Hz), equivalent to the older unit of cycles per second. One megahertz (MHz) is one million Hertz. One gigahertz (GHz) is one billion Hertz. The standard US electrical power frequency is 60 Hz, the AM broadcast radio frequency band is 0.55-1.6 MHz, the FM broadcast radio frequency band is 88-108 MHz, and wireless 802.11LANs operate at 2.4 GHz.

Routing Information Protocol (RIP)

Routing Information Protocol(RIP1) is defined as a means by which routing equipment can find the best path for transmitting data packets from one network to another. Upgrades have been made to the RIP1 protocol, resulting in Routing Information Protocol Version 2 (RIP2). RIP2 was developed to cover some of the inefficiencies of RIP1.

RIP Metric

The RIP metric is a value of distance for the network. Usually RIP increments the metric when the network information is received. Redistributed routes' default metric offset is set to 1. These rules can be used to change the metric offset only for the matched networks specified or excluded in the Route Metric Offset table. But the metric offset of other networks is still set to 1.

S

Service Set ID (SSID)	SSID is a group name shared by every member of a wireless network. Only client PCs with the same SSID are allowed to establish a connection.
Station	Any device that conforms to the IEEE 802.11 wireless medium access standard.
Subnet Mask	A subnet mask is a set of four numbers configured like an IP address. It is used to create IP address numbers used only within a particular network.

T

Transmission Control Protocol (TCP)	The standard transport level protocol that provides the full duplex, stream service on which many application protocols depend. TCP allows a process or one machine to send a stream of data to a process on another. Software implementing usually resides in the operating system and uses the IP to transmit information across the network.
Temporal Key Integrity Protocol (TKIP)	TKIP is used in WPA to replace WEP with a new encryption algorithm that's stronger than the WEP algorithm but that uses the calculation facilities present on existing wireless devices to perform encryption operations.

W

Wide Area Network (WAN)	A system of LANs, connected together. It is a network that connects computers located in separate areas, (that is, different buildings, cities, and countries). The Internet is a wide area network.
Wireless Ethernet Compatibility Alliance (WECA)	An industry group that certifies cross-vender interoperability and compatibility of IEEE 802.11b wireless networking products that promotes that standard for enterprise, small business, and home environments.

Wired Equivalent Privacy (WEP)	The IEEE 802.11b standard specifies an optional encryption feature, known as Wired Equivalent Privacy or WEP, that is designed to provide a wireless LAN with a security level equal to what is found on a wired Ethernet network. WEP encrypts the data portion of each packet exchanged on the802.11b network using either a 64-bit or 128-bit encryption algorithm. In addition, WEP is also used in conjunction with the optional Shared Key Authentication algorithm to prevent unauthorized devices from associating with an 802.11b network.
Wireless Local Area Network (WLAN)	This is a group of computers and other devices connected wirelessly in a small area. A wireless network is referred to as LAN or WLAN.
Wi-Fi Protected Access (WPA)	Wi-Fi Protected Access is a specification, which offsets encryption and authentication improvements that are stronger than the Wireless Encryption Protocol (WEP), which it is meant to replace.
Wi-Fi Protected Access - Pre-Shared Key (WPA-PSK)	WPA-PSK is a special mode of WPA for home environment without a Remote Authentication Dial-In User Service (RADIUS). It is required to enter a password into their access point or home wireless gateway and each clients that is on the wireless network to keeps out eavesdroppers and other unauthorized users by requiring all devices to have the matching password