

LINKSYS®

A Division of Cisco Systems, Inc.



2.4GHz
802.11g

Wireless-G

Broadband Router with 2 Phone Ports

VoIP
Voice

User Guide

Model No. **WRT54G**

CISCO SYSTEMS



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WARNING: This product contains chemicals, including lead, known to the State of California to cause cancer, and birth defects or other reproductive harm. ***Wash hands after handling.***

How to Use this Guide

Your guide to the Wireless-G Broadband Router with 2 Phone Ports has been designed to make understanding networking with the Router easier than ever. Look for the following items when reading this guide:



This exclamation point means there is a caution or warning and is something that could damage your property or the Router.



This question mark provides you with a reminder about something you might need to do while using the Router.



This checkmark means there is a note of interest and is something you should pay special attention to while using the Router.

In addition to these symbols, there are definitions for technical terms that are presented like this:

word: definition.

Also, each figure (diagram, screenshot, or other image) is provided with a figure number and description, like this:

Figure 0-1: Sample Figure Description

Figure numbers and descriptions can also be found in the “List of Figures” section.

Wireless-G Broadband Router with 2 Phone Ports

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Chapter 1: Introduction

Welcome

Thank you for choosing the Linksys Wireless-G Broadband Router with 2 Phone Ports. This Router will allow you to network wirelessly better than ever, sharing Internet access, files and fun, easily and securely. Plus, after you have set up your Internet phone service, you can make phone or fax calls using your Internet connection.

How does the Router do all of this? A router is a device that allows access to an Internet connection over a network. With the Wireless-G Broadband Router with 2 Phone Ports, this access can be shared over the four switched ports or via the wireless broadcast at either up to 11Mbps for Wireless-B or up to 54Mbps for Wireless-G. In addition, the WPA standard provides greater security opportunities while the whole network is protected through NAT technology. All of these security features, as well as full configurability, are accessed through the easy-to-use browser-based utility.

But what does all of this mean?

Networks are useful tools for sharing Internet access and computer resources. Multiple computers can share Internet access, so you don't need more than one high-speed Internet connection. After you have set up your Internet phone service account, you can also use your Internet access to make Internet phone or fax calls, even while you're surfing the Internet. Plus, you can access one printer from different computers and access data located on another computer's hard drive. Networks are even used for playing multiplayer video games. All the while, the Router protects your networks from unauthorized and unwelcome users. So, networks not only are useful in homes and offices, but also can be fun.

PCs on a wired network create a LAN, or Local Area Network. They are connected with Ethernet cables, which is why the network is called "wired".

wpa (*wi-fi protected access*): a wireless security protocol using TKIP (Temporal Key Integrity Protocol) encryption, which can be used in conjunction with a RADIUS server.

nat (*network address translation*): NAT technology translated IP addresses of a local area network to a different IP address for the Internet.

mbps: one million bits per second; a unit of measurement for data transmission.

browser: an application program that provides a way to look at and interact with all the information on the World Wide Web.

lan (*local area network*): the computers and networking products that make up the network in your home or office.

ethernet: an IEEE standard network protocol that specifies how data is placed on and retrieved from a common transmission medium.

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PCs equipped with wireless cards or adapters can communicate without cumbersome cables. By sharing the same wireless settings, within their transmission radius, they form a wireless network, which is sometimes called a Wireless Local Area Network (WLAN). The Router bridges wireless networks of both 802.11b and 802.11g standards and wired networks, allowing them to communicate with each other.

To create your network, install and set up the Router. To guide you through the process, Linksys strongly recommends that you run the Setup Wizard on the Setup CD-ROM. If you prefer to manually set up the Router, use the instructions in this User Guide to help you. These instructions should be all you need to get the most out of the Wireless-G Broadband Router with 2 Phone Ports.

What's in this Guide?

This guide covers the basic steps for setting up a network with a router. After going through “Chapter 3: Getting to Know the Router,” most users will only need to use the following chapters:

- **Chapter 4: Connecting the Router**
This chapter instructs you on how to connect the Router to your cable or DSL modem, PCs, and telephones (or fax machines).
- **Chapter 5: Configuring the Router**
This chapter explains how to configure the Router using your web browser and the Router's Web-based Utility. You will configure the Router using the settings provided by your ISP.

When you're finished with the basic steps, then you are ready to connect to the Internet.

You also have other chapters available for reference:

- **Chapter 1: Introduction**
This chapter describes the Router's applications and this Installation and Troubleshooting Guide.
- **Chapter 2: Planning Your Wireless Network**
This chapter describes the basics of wireless networking.
- **Appendix A: Troubleshooting**
This appendix describes some possible problems and solutions, as well as frequently asked questions, regarding installation and use of the Router.
- **Appendix B: Wireless Security**
This appendix explains the risks of wireless networking and some solutions to reduce the risks.
- **Appendix C: Finding the MAC Address and IP Address for Your Ethernet Adapter**
This appendix instructs you on how to find the MAC address or Ethernet address of your PC's Ethernet network adapter.
- **Appendix D: Windows Help**
This appendix describes how you can use Windows Help for instructions about networking, such as installing the TCP/IP protocol.
- **Appendix E: Glossary**
This appendix gives a brief glossary of terms frequently used in networking.
- **Appendix F: Specifications**
This appendix provides the technical specifications for the Router.
- **Appendix G: Warranty Information**
This appendix supplies the warranty information for the Router.

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- **Appendix H: Regulatory Information**
This appendix supplies the regulatory information regarding the Router.
- **Appendix I: Contact Information**
This appendix provides contact information for a variety of Linksys resources, including Technical Support.

Chapter 2: Planning Your Wireless Network

Network Topology

A wireless local area network (WLAN) is exactly like a regular local area network (LAN), except that each computer in the WLAN uses a wireless device to connect to the network. Computers in a WLAN share the same frequency channel and SSID, which is an identification name shared by the wireless devices belonging to the same wireless network.

Ad-Hoc versus Infrastructure Mode

Unlike wired networks, wireless networks have two different modes in which they may be set up: infrastructure and ad-hoc. An infrastructure configuration is a WLAN and wired LAN communicating to each other through an access point. An ad-hoc configuration is wireless-equipped computers communicating directly with each other. Choosing between these two modes depends on whether or not the wireless network needs to share data or peripherals with a wired network or not.

If the computers on the wireless network need to be accessible by a wired network or need to share a peripheral, such as a printer, with the wired network computers, the wireless network should be set up in Infrastructure mode. The basis of Infrastructure mode centers around an access point or wireless router, such as the Wireless-G Broadband Router with 2 Phone Ports, which serves as the main point of communications in a wireless network. The Router transmits data to PCs equipped with wireless network adapters, which can roam within a certain radial range of the Router. You can arrange the Router and multiple access points to work in succession to extend the roaming range, and you can set up your wireless network to communicate with your Ethernet hardware as well.

network: a series of computers or devices connected for the purpose of data sharing, storage, and/or transmission between users.

ssid: your wireless network's name.

ad-hoc: a group of wireless devices communicating directly to each other (peer-to-peer) without the use of an access point.

infrastructure: a wireless network that is bridged to a wired network via an access point.

ethernet: IEEE standard network protocol that specifies how data is placed on and retrieved from a common transmission medium.

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If the wireless network is relatively small and needs to share resources only with the other computers on the wireless network, then the Ad-Hoc mode can be used. Ad-Hoc mode allows computers equipped with wireless transmitters and receivers to communicate directly with each other, eliminating the need for a wireless router or access point. The drawback of this mode is that in Ad-Hoc mode, wireless-equipped computers are not able to communicate with computers on a wired network. And, of course, communication between the wireless-equipped computers is limited by the distance and interference directly between them.

access point: a device that allows wireless-equipped computers and other devices to communicate with a wired network. Also used to expand the range of a wireless network.

Network Layout

The Wireless-G Broadband Router with 2 Phone Ports has been specifically designed for use with both your 802.11b and 802.11g products. It is compatible with all 802.11b and 802.11g adapters, such as the Notebook Adapters for your laptop computers, PCI Adapters for your desktop PCs, and USB Adapters when you want to enjoy USB connectivity. The Broadband Router will also communicate with the Wireless PrintServer and Wireless Ethernet Bridges.

When you wish to connect your wireless network with your wired network, you can use the Broadband Router's four Ethernet network ports. To add more ports, any of the Broadband Router's Ethernet network ports can be connected to any of Linksys's switches.

With these, and many other, Linksys products, your networking options are limitless. Go to the Linksys website at www.linksys.com for more information about products that work with the Wireless-G Broadband Router with 2 Phone Ports.

Chapter 3: Getting to Know the Router

The Back Panel

The Router's ports and the Reset button are located on the back panel of the Router.



Figure 3-1: Back Panel

Internet	This Internet port connects to your cable or DSL modem.
Phone1	For your primary Internet phone line, the Phone1 port allows you to connect the Router to your phone (or fax machine) using an RJ-11 phone cable (not included).
Phone2	If you have a second Internet phone line, the Phone2 port allows you to connect the Router to your second phone (or fax machine) using an RJ-11 phone cable (not included).
Ethernet 1-4	These four Ethernet ports connect to network devices, such as PCs or more switches.
Reset Button	There are two ways to reset the Router to its router factory defaults. Either press the Reset Button for five seconds, or restore the defaults from the Router's Web-based Utility.
Power	The Power port is where you will connect the power adapter.



NOTE: The Internet port only accepts a straight-through cable. Do NOT connect a crossover cable to the Internet port.



NOTE: If you want to reset the Router to its voice factory default settings, then you will need to use the Router's Web-based Utility and obtain a user name and password available only from your Internet phone service provider. Contact your provider for more information.

The Front Panel

The Router's LEDs, which inform you about network activities, are located on the front panel.



Figure 3-2: Front Panel

- POWER** Blue/Red. The **POWER** LED lights up blue when the Router is powered on. If the blue LED is flashing, the Router is booting up or upgrading its firmware. If the LED lights up red, then disconnect the power, and wait five seconds. Then reconnect the power.
- ETHERNET 1-4** Blue. The **ETHERNET** LED lights up when there is an active connection through the corresponding port. If the LED is flashing, then there is traffic moving through that port.
- WIRELESS** Blue. The **WIRELESS** LED lights up when there is an active wireless connection. If the LED is flashing, the Router is sending or receiving data over the wireless network.
- PHONE 1-2** Blue. The **PHONE** LED is solidly lit when a telephone or fax machine has an active or registered connection to your Internet phone service provider through the corresponding port (PHONE 1 or 2). It flashes when the phone is being used or is off the hook.
- INTERNET** Blue. The **INTERNET** LED lights up when the Router is connected to your cable or DSL modem. If the LED is flashing, the Router is sending or receiving data over the Internet port.

Proceed to “**Chapter 4: Connecting the Router.**”

Chapter 4: Connecting the Router

Overview

To begin installation of the Router, you will connect the Router to your PCs, telephone(s) or fax machine(s), and cable or DSL modem. The following connection diagram illustrates a basic network setup with wired connections to one desktop PC and telephone and a wireless connection to one notebook PC.



NOTE: If you already have a router in your network, then replace your existing router with the Wireless-G Broadband Router with 2 Phone Ports.

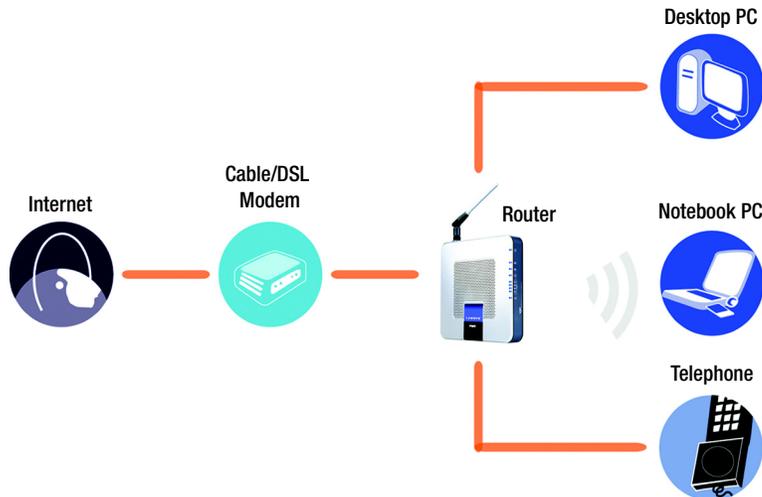


Figure 4-1: Router Connection Diagram

Connection Instructions

1. Make sure that all of your hardware is powered off, including the Router, PCs, and broadband modem.
2. Attach the antenna to the Router's antenna port.
3. Connect your broadband modem's Ethernet cable to the Router's Internet port.
4. Connect one end of an Ethernet network cable to one of the numbered ports on the back of the Router. Connect the other end to an Ethernet port on a network device, e.g., a PC, print server, or switch.

Repeat this step to connect more PCs or other network devices to the Router.

5. Power on the broadband modem.
6. Connect the included power adapter to the Router's Power port, and then plug the power adapter into an electrical outlet. The Power LED on the front panel will light up when the adapter is connected properly.
7. Power on your PC(s).
8. Plug a standard telephone into the Router's Phone1 port.



IMPORTANT: Do not connect the Phone port to a telephone wall jack. Make sure you only connect a telephone or fax machine to the Phone port. Otherwise, the Router or the telephone wiring in your home or office may be damaged.

9. If you have a second Internet phone or fax line, repeat step 8 to connect a telephone or fax machine to the Router's Phone2 port.

Proceed to the following section, "Placement Options."



NOTE: Make sure your telephone is set to its tone setting (not pulse).

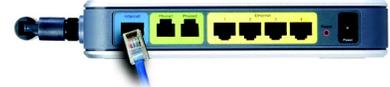


Figure 4-2: Connect the Modem



Figure 4-3: Connect a PC



Figure 4-4: Connect the Power



Figure 4-5: Connect a Telephone

Placement Options

There are two ways to place the Router. The first way is to place it horizontally on a surface, so it sits on its four rubber feet. The second way is to mount it on a wall. This option uses the Router's four wall-mount slots on its bottom panel. The distance between two adjacent slots is 62 mm (2.44 inches).

To use the wall-mount option, follow these instructions:

1. Make sure you have four screws that are size #4—this indicates a diameter measurement of 2.845 mm (0.112 inches).
2. Determine where you want to mount the Router.
3. Drill four holes into the wall. Make sure adjacent holes are 62 mm (2.44 inches) apart.
4. Insert a screw into each hole, and leave 5 mm (0.2 inches) of its head exposed.
5. Maneuver the Router so the wall-mount slots line up with the four screws.
6. Place the wall-mount slots over the screws and slide the Router down until the screws fit snugly into the wall-mount slots.

Proceed to “Chapter 5: Configuring the Router.”



Figure 4-6: Measurement between Wall-Mount Slots

Chapter 5: Configuring the Router

Overview

Linksys recommends using the Setup CD-ROM for first-time installation of the Router. If you do not wish to run the Setup Wizard on the Setup CD-ROM, then you can use the Web-based Utility to configure the Router. For advanced users, you may configure the Router's advanced settings through the Web-based Utility.

This chapter will describe each web page on the Utility and each page's key functions. The Utility can be accessed via your web browser through use of a computer connected to the Router. For a basic wireless network setup, most users only have to use the following screens of the Utility:

- **Basic Setup.** On the *Basic Setup* screen, enter the Internet connection settings provided by your ISP. If you do not have this information, you can call your ISP to request the settings. Once you have the setup information for your specific type of Internet connection, then you can configure the Router.
- **Management.** Click the **Administration** tab and then the **Management** tab. The Router's default user name and password is **admin**. To secure the Router, change the User Name and Password from their defaults.
- **Wireless.** On the *Basic Wireless Settings* screen, set the basic configuration for your wireless network.

There are eight main tabs: Setup, Wireless, Security, Access Restrictions, Applications & Gaming, Administration, Status, and Voice. Additional tabs will be available after you click one of the main tabs.

Setup

- **Basic Setup.** Enter the Internet connection and network settings on this screen.
- **DDNS.** Enable the Router's Dynamic Domain Name System (DDNS) feature on this screen.
- **MAC Address Clone.** If you need to clone a MAC address onto the Router, use this screen.
- **Advanced Routing.** On this screen, you can alter firewall, Network Address Translation (NAT), Dynamic Routing, and Static Routing configurations.

Wireless

- **Basic Wireless Settings.** Enter the basic settings for your wireless network on this screen.
- **Wireless Security.** Enable and configure the security settings for your wireless network.
- **Wireless MAC Filter.** To permit or deny wireless network access for specific devices, set up MAC address filtering.
- **Advanced Wireless Settings.** Advanced users can alter data transmission settings on this screen.

Security

- **Firewall.** To enable certain types of web filters, use this screen.
- **VPN Pass-through.** To enable passthrough, use this screen.

Access Restrictions

- **Filter.** To block specific users from Internet access, you can set up IP address, port, and MAC address filtering.

Applications & Gaming

- **Port Range Forwarding.** Set up public services or other specialized Internet applications on your network.
- **Port Triggering.** To set up triggered ranges and forwarded ranges for Internet applications, click this tab.
- **DMZ.** Click this tab to allow one local user to be exposed to the Internet for use of special-purpose services.
- **QoS.** Enable QoS (Quality of Service) to maximize network performance.

Administration

- **Management.** On this screen, alter the Router's user name, password, and UPnP settings.
- **Log.** If you want to view or save activity logs, click this tab.
- **Factory Defaults.** If you want to reset the Router to its router factory default settings, then use this screen. If you want to reset the Router to its voice factory default settings, then you will need a user name and password available only from your Internet phone service provider. Contact your provider for more information.

Status

- Local Network. This provides status information about the local network.
- Router. This screen provides status information about the Router.
- Wireless. This screen provides status information about the Router's wireless network.

Voice

Access to the Voice tab is restricted by your Internet phone service provider. Contact your provider for more information.

How to Access the Web-based Utility

To access the Web-based Utility of the Router, launch Internet Explorer or Netscape Navigator, and enter the Router's default IP address, **192.168.15.1**, in the *Address* field. Press the **Enter** key.

The *Login* screen will appear asking you for your User name and Password. Enter **admin** in the *User Name* and *Password* fields. Then click the **Log In** button. Click the **Cancel** button to exit the *Login* screen.

Make the necessary changes through the Utility. When you have finished making changes to a screen, click the **Save Settings** button to save the changes, or click the **Cancel Changes** button to undo your changes. Help information is shown on the right-hand side of a screen. For additional help on a tab, click **More**.



Figure 5-1: Router's IP Address



Figure 5-2: Router Login

The Setup Tab - Basic Setup

The *Basic Setup* screen is the first screen you see when you access the Web-based Utility.

Internet Setup

The Internet Setup section configures the Router for your Internet connection type. This information can be obtained from your ISP.

Internet Connection Type

The Router supports three connection types: Obtain an IP automatically, Static IP, and PPPoE. Each *Basic Setup* screen and available features will differ depending on what kind of connection type you select.

Obtain an IP automatically

By default, the Router's Internet Connection Type is set to **Obtain an IP automatically**, and it should be used only if your ISP supports DHCP or you are connecting through a dynamic IP address.

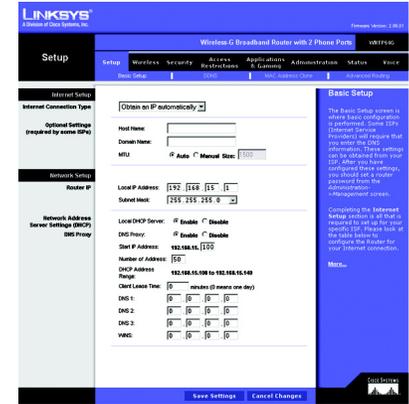


Figure 5-3: Setup Tab - Basic Setup (Obtain an IP automatically)

Static IP

If you are required to use a permanent IP address, then select **Static IP**.

IP Address. This is the IP address that the Router has, when seen from the Internet. Your ISP will provide you with the IP Address you need to specify here.

Subnet Mask. This is the Router's Subnet Mask, as seen by external users on the Internet (including your ISP). Your ISP will provide you with the Subnet Mask.

Gateway. Your ISP will provide you with the Default Gateway Address.

DNS 1-3. Your ISP will provide you with at least one DNS (Domain Name System) Server IP Address.

WINS. The Windows Internet Naming Service (WINS) converts NetBIOS names to IP addresses. If you use a WINS server, enter that server's IP address here. Otherwise, leave this field blank.

PPPoE

Some DSL-based ISPs use PPPoE (Point-to-Point Protocol over Ethernet) to establish Internet connections for end-users. If you use a DSL line, check with your ISP to see if they use PPPoE. If they do, you will have to enable it.

User Name and Password. Enter the User Name and Password provided by your ISP.

Static IP				
IP Address:	0	0	0	0
Subnet Mask:	0	0	0	0
Gateway:	192	168	6	254
DNS 1:	192	168	50	1
DNS 2:	0	0	0	0
DNS 3:	0	0	0	0
WINS:	0	0	0	0

Figure 5-4: Static IP

static ip address: a fixed address assigned to a computer or device connected to a network.

subnet mask: an address code that determines the size of the network.

default gateway: a device that forwards Internet traffic from your local area network.

pppoe: a type of broadband connection that provides authentication (username and password) in addition to data transport.

Keep Alive and Redial Period. This option keeps your Internet access connected indefinitely, even when it sits idle. If you select this option, the Router will periodically check your Internet connection. If the connection is down, then the Router will automatically re-establish the connection. To use this option, click the radio button next to *Keep Alive*. The default Redial Period is **45** seconds.

When you are finished, click the **Save Settings** button. Then click the **Status** tab, and click the **Connect** button to start the connection.

Optional Settings

Some of these settings may be required by your ISP. Verify with your ISP before making any changes.

Host Name and Domain Name. These fields allow you to supply a host and domain name for the Router. Some ISPs require these names as identification. You may have to check with your ISP to see if your broadband Internet service has been configured with a host and domain name. In most cases, leaving these fields blank will work.

MTU. The MTU (Maximum Transmission Unit) setting specifies the largest packet size permitted for network transmission. Select **Auto** to have the Router automatically select the MTU value, or select **Manual** and enter the value desired. It is recommended that you leave this value in the 1200 to 1500 range. For two Internet connection types, Obtain an IP automatically and Static IP, the MTU's default value is **1500**. For PPPoE, the MTU's default value is **1492**.

Network Setup

The Network Setup section allows you to change the Router's local network settings.

PPPoE

User Name:

Password:

Keep Alive: Redial Period Sec.

Figure 5-5: PPPoE



NOTE: For DSL users, if you need to enable PPPoE support, remember to remove any PPPoE applications that are installed on your PCs.

packet: a unit of data sent over a network.

Router IP

The values for the Router's Local IP Address and Subnet Mask are shown here. In most cases, keeping the default values will work.

Local IP Address. The default value is **192.168.15.1**.

Subnet Mask. The default value is **255.255.255.0**.

Network Address Server Settings (DHCP)

These settings allow you to configure the Router's Dynamic Host Configuration Protocol (DHCP) server function. The Router can be used as a DHCP server for your network. A DHCP server automatically assigns an IP address to each computer on your network. Unless you already have one, it is highly recommended that you leave the Router enabled as a DHCP server.

Local DHCP Server. DHCP is enabled by factory default. If you already have a DHCP server on your network, set the Router's DHCP option to **Disable**. If you disable DHCP, remember to assign a static IP address to the Router.

DNS Proxy. DNS Proxy is enabled by factory default.

Start IP Address. Enter a value for the DHCP server to start with when issuing IP addresses. Because the default IP address for the Router is 192.168.15.1, the Start IP Address must be 192.168.15. 101 or greater, but smaller than 192.168.15.254. The default Start IP Address is **192.168.15.100**.

Number of Address (Optional). Enter the maximum number of PCs that you want the DHCP server to assign IP addresses to. This number cannot be greater than 253. The default is **50**.

DHCP Address Range. The range of DHCP addresses is displayed here.

Client Lease Time. The Client Lease Time is the amount of time a network user will be allowed connection to the Router with their current dynamic IP address. Enter the amount of time, in minutes, that the user will be “leased” this dynamic IP address. After the dynamic IP address has expired, the user will be automatically assigned a new dynamic IP address. The default is **0** minutes, which means one day.

dynamic ip address: a temporary IP address assigned by a DHCP server.

WINS. The Windows Internet Naming Service (WINS) converts NetBIOS names to IP addresses. If you use a WINS server, enter that server’s IP address here. Otherwise, leave this field blank.

The Setup Tab - DDNS

The Router offers a Dynamic Domain Name System (DDNS) feature. DDNS lets you assign a fixed host and domain name to a dynamic Internet IP address. It is useful when you are hosting your own website, FTP server, or other server behind the Router.

ddns: allows the hosting of a website, FTP server, or e-mail server with a fixed domain name (e.g., www.xyz.com) and a dynamic IP address.

Before you can use this feature, you need to sign up for DDNS service at one of two DDNS service providers, DynDNS.org or TZO.com. If you do not want to use this feature, keep the default setting, **Disable**.

Wireless-G Broadband Router with 2 Phone Ports DDNS

DDNS Service. If you use DynDNS.org, then select **DynDNS.org**. If you use TZO, then select **TZO.com**. The features available on the *DDNS* screen will vary, depending on which DDNS service provider you use.

DynDNS.org

User Name, Password, and Host Name. Enter the User Name, Password, and Host Name of the account you set up with DynDNS.org.

Internet IP Address. The Router's current Internet IP Address is displayed here. Because it is dynamic, this will change.

Status. The status of the DDNS service connection is displayed here.

TZO.com

E-mail Address, Password, and Domain Name. Enter the Email Address, Password, and Domain Name of the service you set up with TZO.

Internet IP Address. The Router's current Internet IP Address is displayed here. Because it is dynamic, this will change.

Status. The status of the DDNS service connection is displayed here.

When you have finished making changes to this screen, click the **Update** button to save the changes, or click the **Cancel Changes** button to undo your changes.



Figure 5-6: Setup Tab - DDNS (DynDNS.org)



Figure 5-7: Setup Tab - DDNS (TZO.com)

The Setup Tab - MAC Address Clone

A MAC address is a 12-digit code assigned to a unique piece of hardware for identification, like a social security number. Some ISPs will require you to register a MAC address in order to access the Internet. If you do not wish to re-register the MAC address with your ISP, you may assign the MAC address you have currently registered with your ISP to the Router with the MAC Address Clone feature.

MAC Clone

MAC Clone Service. To use MAC address cloning, select **Enable**.

MAC Address. Enter the MAC Address registered with your ISP. Then click the **Save Settings** button.

Clone. If you want to clone the MAC address of the PC you are currently using to configure the Router, then click the **Clone** button. The Router will automatically detect your PC's MAC address, so you do NOT have to call your ISP to change the registered MAC address to the Router's MAC address. It is recommended that the PC registered with the ISP is used to open the *MAC Address Clone* screen.

When you have finished making changes to this screen, click the **Save Settings** button to save the changes, or click the **Cancel Changes** button to undo your changes.

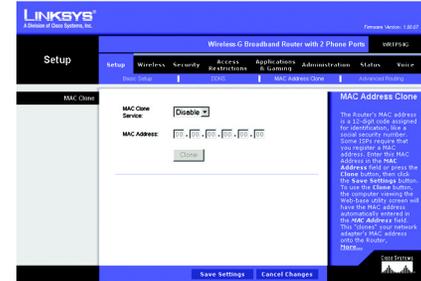


Figure 5-8: Setup Tab - MAC Address Clone

mac address: the unique address that a manufacturer assigns to each networking device.

The Setup Tab - Advanced Routing

The *Advanced Routing* screen allows you to configure the firewall, Network Address Translation (NAT), dynamic routing, and static routing settings.

Advanced Routing

Firewall & NAT. The Stateful Packet Inspection (SPI) firewall reviews data packets entering your network. NAT is a security feature that enables the Router to translate IP addresses of your local area network to a different IP address for the Internet. These features are enabled by default. To disable the firewall and NAT, click the **Disable** radio button. (When NAT is disabled, the DHCP server feature is also disabled.)

Dynamic Routing. This feature enables the Router to automatically adjust to physical changes in the network's layout and exchange routing tables with the other router(s). The Router determines the network packets' route based on the fewest number of hops between the source and the destination. To enable Dynamic Routing, click the **Enable** radio button. To disable this feature, click the **Disable** radio button.

Transmit RIP Version. To use dynamic routing for transmission of network data, select the protocol you want, **RIP v1**, **RIP v1 Compatible**, or **RIP v2**.

Static Routing. Use this feature to set up a static router between the Router and another network. (A static route is a pre-determined pathway that network information must travel to reach a specific host or network.) To create a static route, alter the following settings:

Select Entry. Select the number of the static route from the drop-down menu. The Router supports up to 20 static route entries.

Destination LAN IP. The Destination LAN IP Address is the address of the remote network or host to which you want to assign a static route. Enter the IP address of the host for which you wish to create a static route.

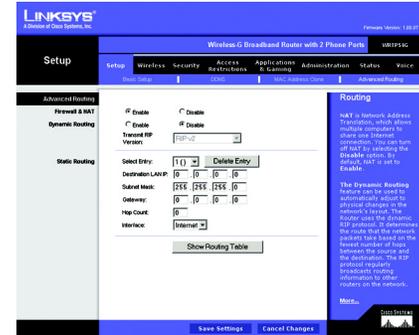


Figure 5-9: Setup Tab - Advanced Routing

Subnet Mask. The Subnet Mask determines which portion of a Destination IP address is the network portion, and which portion is the host portion.

Gateway. This is the IP address of the gateway device that allows for contact between the Router and the remote network or host.

Hop Count. This determines the maximum number of steps between network nodes that data packets will travel. A node is any device on the network, such as PCs, print servers, routers, etc.

Interface. Select **Local** or **Internet**, depending on the location of the static route's final destination.

Delete Entry. If you need to delete a route, select its number from the drop-down menu, and click the **Delete Entry** button.

Show Routing Table. Click the **Show Routing Table** button to open a screen displaying how data is routed through your local network. For each route, the Destination LAN IP address, Default Gateway, Subnet Mask, Flags, Metric, Ref (Reference), User, and Interface are displayed. Click the **Refresh** button to update the information.

When you have finished making changes to this screen, click the **Save Settings** button to save the changes, or click the **Cancel Changes** button to undo your changes.

Destination LAN IP	Default Gateway	Subnet Mask	Flags	Metric	Ref	User	Interface
192.168.0.0	0.0.0.0	255.255.255.0	0	0	0	0	eth0
192.168.25.0	0.0.0.0	255.255.255.0	0	0	0	0	br0
192.168.4.254	0.0.0.0	255.255.255.0	0	1	0	0	br0
0.0.0.0	192.168.4.254	0.0.0.0	0	0	0	0	eth0

Figure 5-10: Routing Table Entry List

The Wireless Tab - Basic Wireless Settings

The basic settings for wireless networking are set on this screen.

Wireless Settings

Wireless Network Mode. From this drop-down menu, you can select the wireless standards running on your network. If you have both 802.11g and 802.11b devices in your network, keep the default setting, **Mixed**. If you have only 802.11g devices, select **G-Only**. If you have only 802.11b devices, select **B-Only**. If you do not have any 802.11g and 802.11b devices in your network, select **Disable**.

Wireless Network Name (SSID). The SSID is the network name shared among all points in a wireless network. The SSID must be identical for all devices in the wireless network. It is case-sensitive and must not exceed 32 characters (use any of the characters on the keyboard). Make sure this setting is the same for all points in your wireless network. For added security, you should change the default SSID (**linksys**) to a unique name.

Wireless Channel. Select the appropriate channel from the list provided to correspond with your network settings. All devices in your wireless network must be broadcast on the same channel in order to function correctly.

Wireless SSID Broadcast. When wireless clients survey the local area for wireless networks to associate with, they will detect the SSID broadcast by the Router. To broadcast the Router's SSID, keep the default setting, **Enable**. If you do not want to broadcast the Router's SSID, then select **Disable**.

When you have finished making changes on this screen, click the **Save Settings** button to save the changes, or click the **Cancel Changes** button to undo your changes.



Figure 5-11: Wireless Tab - Basic Wireless Settings

The Wireless Tab - Wireless Security

The Wireless Security settings configure the security of your wireless network. If you do not want to use wireless security, keep the default, **Disabled**. There are four wireless security mode options supported by the Router: WPA Pre-Shared Key, WPA RADIUS, RADIUS, and WEP. (WPA stands for Wi-Fi Protected Access, which is a security standard stronger than WEP encryption. WEP stands for Wired Equivalent Privacy, while RADIUS stands for Remote Authentication Dial-In User Service.) These three are briefly discussed here. For detailed instructions on configuring wireless security for the Router, proceed to “Appendix B: Wireless Security.”

Wireless Security

WPA-Preshared Key. Select **TKIP** or **AES** from the *WPA Algorithm* drop-down menu. Enter a WPA Shared Key of 8-32 characters. Then enter the Group Key Renewal period, which instructs the Router how often it should change the encryption keys.

When you have finished making changes on this screen, click the **Save Settings** button to save the changes, or click the **Cancel Changes** button to undo your changes.

wpa (wi-fi protected access): a wireless security protocol using **TKIP (Temporal Key Integrity Protocol) encryption**, which can be used in conjunction with a **RADIUS server**.

wep (wired equivalent privacy): a method of encrypting network data transmitted on a wireless network for greater security.



Figure 5-12: Wireless Tab - Wireless Security (WPA-Preshared Key)

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WPA-RADIUS. This option features WPA used in coordination with a RADIUS server. (This should only be used when a RADIUS server is connected to the Router.) Select **TKIP** or **AES** from the *WPA Algorithm* drop-down menu. Enter the RADIUS server's IP address and port number, along with the Shared Key, which is the key shared between the Router and the server. Last, enter the Key Renewal Timeout period, which instructs the Router how often it should change the encryption keys.

When you have finished making changes on this screen, click the **Save Settings** button to save the changes, or click the **Cancel Changes** button to undo your changes.



Figure 5-13: Wireless Tab - Wireless Security (WPA-RADIUS)

radius: a protocol that uses an authentication server to control network access.

RADIUS. This option features WEP encryption used in coordination with a RADIUS server. (This should only be used when a RADIUS server is connected to the Router.) Enter the RADIUS server's IP address and port number, along with the Shared Key, which is the key shared between the Router and the server.

To indicate which WEP key to use, select the appropriate *Default Transmit Key* number. Select a level of WEP encryption, **64 bits 10 hex digits** or **128 bits 26 hex digits**. If you want to use a Passphrase, then enter it in the *Passphrase* field and click the **Generate** button. If you want to enter the WEP key(s) manually, then enter it in the *Key 1-4* field(s).

When you have finished making changes on this screen, click the **Save Settings** button to save the changes, or click the **Cancel Changes** button to undo your changes.

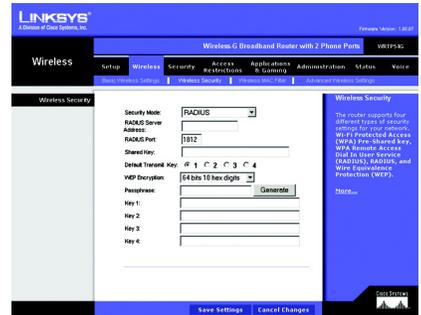


Figure 5-14: Wireless Tab - Wireless Security (RADIUS)

WEP. WEP is a basic encryption method, which is not as secure as WPA. To indicate which WEP key to use, select the appropriate *Default Transmit Key* number. Select a level of WEP encryption, **64 bits 10 hex digits** or **128 bits 26 hex digits**. If you want to use a Passphrase, then enter it in the *Passphrase* field and click the **Generate** button. If you want to enter the WEP key(s) manually, then enter it in the *Key 1-4* field(s).

When you have finished making changes on this screen, click the **Save Settings** button to save the changes, or click the **Cancel Changes** button to undo your changes.

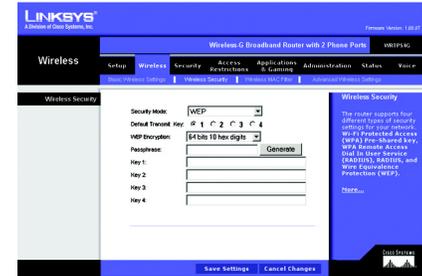


Figure 5-15: Wireless Tab - Wireless Security (WEP)

The Wireless Tab - Wireless MAC Filter

Wireless MAC Filter

Wireless MAC Filter. If you want to filter wireless access by MAC address, select **Enable**. Otherwise, select **Disable**.

Click **Prevent** to block access for the designated computers, or click **Permit only** to permit access for the designated computers. Click the **Update Filter List** button, and the *Mac Address Filter List* screen will appear.

Enter the MAC addresses of the computers you want to designate. To see a list of MAC addresses for wireless computers or clients, click the **Wireless Client MAC List** button.

The *Wireless Client MAC List* screen will list Client Host Names, IP Addresses, and MAC Addresses for your wireless devices. Click the **Refresh** button to get the most up-to-date information. To add a specific computer to the Mac Address Filter List, click the **Enable MAC Filter** checkbox and then the **Update Filter List** button. Click the **Close** button to return to the *MAC Address Filter List* screen.

On the *MAC Address Filter List* screen, click the **Save Settings** button to save this list, or click the **Cancel Changes** button to remove your entries.

When finished making your changes on this tab, click the **Save Settings** button to save these changes, or click the **Cancel Changes** button to undo your changes.



Figure 5-16: Wireless Tab - Wireless MAC Filter

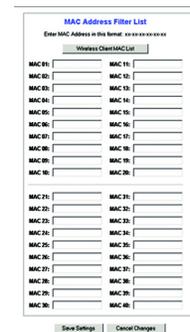


Figure 5-17: MAC Address Filter List



Figure 5-18: Wireless Client MAC List

The Wireless Tab - Advanced Wireless Settings

This tab is used to set up the Router's advanced wireless functions. These settings should only be adjusted by an expert administrator as incorrect settings can reduce wireless performance.

Advanced Wireless Settings

Preamble Type. The preamble defines the length of the CRC block for communication between the Router and the roaming wireless adapters. (High network traffic areas should use the shorter preamble type.) Select the appropriate preamble type for your network. If you are not sure which setting to select, then keep the default setting, **Long Preamble**.

Authentication Type. The default is set to **Auto**, which allows Open System and Shared Key authentication. For Open System authentication, the sender and the recipient do not use a WEP key for authentication but can use WEP for data encryption. For Shared Key authentication, the sender and recipient use a WEP key for both authentication and data encryption. To only allow Open System authentication, select **Open**. To only allow Shared Key authentication, select **Shared Key**. In most cases, you should keep the default setting, **Auto**, because some clients cannot be configured for Shared Key.

CTS Protection Mode. CTS (Clear-To-Send) Protection Mode function boosts the Router's ability to catch all Wireless-G transmissions but will severely decrease performance. Keep the default setting, **Auto**, so the Router can use this feature as needed, when the Wireless-G products are not able to transmit to the Router in an environment with heavy 802.11b traffic.

CTS Protection Type. CTS Protection Type specifies the type of traffic covered by the CTS Protection Mode. Select **CTS-only** or **RTS-CTS** from the drop-down menu. If you are not sure which setting to select, then keep the default setting, **CTS-only**.

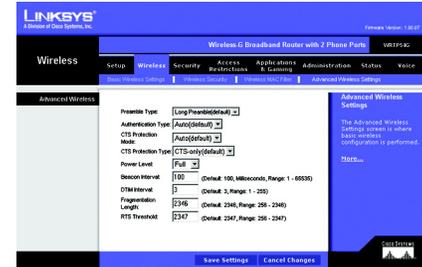


Figure 5-19: Wireless Tab - Advanced Wireless Settings

cts (*clear to send*): a signal sent by a wireless device, signifying that it is ready to receive data.

beacon interval: data transmitted on your wireless network that keeps the network synchronized.

Power Level. You can adjust the output power of the Router to get the appropriate coverage for your wireless network. Select the percentage of power you need for your environment. If you are not sure which setting to select, then keep the default setting, **Full**.

Beacon Interval. The Beacon Interval value indicates the frequency interval of the beacon. A beacon is a packet broadcast by the Router to synchronize the wireless network. The default value is **100**.

DTIM Interval. This indicates the interval of the Delivery Traffic Indication Message (DTIM). A DTIM field is a countdown field informing clients of the next window for listening to broadcast and multicast messages. When the Router has buffered broadcast or multicast messages for associated clients, it sends the next DTIM with a DTIM Interval value. Its clients hear the beacons and awaken to receive the broadcast and multicast messages. The default value is **3**.

Fragmentation Length. This value specifies the maximum size for a packet before data is fragmented into multiple packets. If you experience a high packet error rate, you may slightly increase the Fragmentation Threshold. Setting the Fragmentation Length too low may result in poor network performance. Only minor reduction of the default value is recommended. In most cases, it should remain at its default value of **2346**.

RTS Threshold. Should you encounter inconsistent data flow, only minor reduction of the default value, **2347**, is recommended. If a network packet is smaller than the preset RTS threshold size, the RTS/CTS mechanism will not be enabled. The Router sends Request to Send (RTS) frames to a particular receiving station and negotiates the sending of a data frame. After receiving an RTS, the wireless station responds with a Clear to Send (CTS) frame to acknowledge the right to begin transmission. In most cases, keep the default value, **2347**.

When you have finished making changes on this screen, click the **Save Settings** button to save the changes, or click the **Cancel Changes** button to undo your changes.

***dtim:** a message included in data packets that can increase wireless efficiency.*

***fragmentation:** breaking a packet into smaller units when transmitting over a network medium that cannot support the original size of the packet.*

***rts (request to send):** a networking method of coordinating large packets through the RTS Threshold setting.*

The Security Tab - Firewall

When you click the Security tab, you will see the *Firewall* screen. You can use this screen to enable a variety of web filters, which will enhance the firewall protecting your network.

Web Filters

Filter Proxy. Use of WAN proxy servers may compromise the Gateway's security. Denying Filter Proxy will disable access to any WAN proxy servers. To enable proxy filtering, click the checkbox.

Filter Java Applets. Java is a programming language for websites. If you deny Java Applets, you run the risk of not having access to Internet sites created using this programming language. To enable Java Applet filtering, click the checkbox.

Filter Pop-Ups. When you use the Internet, sometimes unwanted pop-up screens may appear on your screen. To enable pop-up filtering, click the checkbox.

Filter Cookies. A cookie is data stored on your computer and used by Internet sites when you interact with them. To enable cookie filtering, click the checkbox.

Filter ActiveX. ActiveX is a programming language for websites. If you deny ActiveX, you run the risk of not having access to Internet sites created using this programming language. To enable ActiveX filtering, click the checkbox.

When you have finished making changes on this screen, click the **Save Settings** button to save the changes, or click the **Cancel Changes** button to undo your changes.

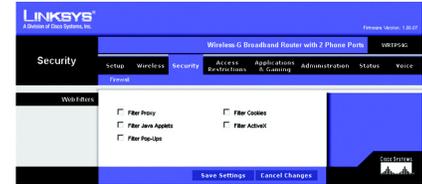


Figure 5-20: Security Tab - Firewall

The Security Tab - VPN Passthrough

Use the settings on this tab to allow VPN tunnels using IPSec, PPPoE, or PPTP protocols to pass through the Router's firewall.

IPSec Pass-through. Internet Protocol Security (IPSec) is a suite of protocols used to implement secure exchange of packets at the IP layer. To allow IPSec tunnels to pass through the Router, click **Enable**. IPSec Pass-Through is enabled by default.

PPPoE Pass-through. Point-to-Point over Ethernet (PPoE) allows your PCs to use the PPPoE client software provide by your ISP. Some ISPs may request that you use this feature on th Router. To allow PPPoE tunnels to pass through the Router, click **Enable**. PPPoE Pass-Through is enabled by default.

PPTP Pass-through. Point-to-Point Tunneling Protocol (PPTP) allows the Point-to-Point Protocol (PPP) to be tunneled through an IP network. To allow PPTP tunnels to pass through the Router, click **Enable**. PPTP Pass-Through is enabled by default.

Change these settings as described here and click the **Save Settings** button to apply your changes or **Cancel Changes** to cancel your changes.

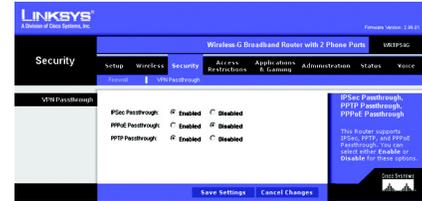


Figure 5-21: Security Tab - VPN Passthrough

The Access Restrictions Tab - Filter

Filters can block specific internal users from accessing the Internet, anonymous Internet requests, and/or multicasting.

Filter IP Address Range

You can create up to five different IP Address filters. To set up a filter, enter the IP address you wish to filter in the field provided. Users who have filtered IP addresses will not be able to access the Internet at all.

Filter Port Range

You can create up to five different Port Range filters. To filter users by network port number, select the protocol you want to filter, **TCP**, **UDP**, or **Both**, from the *Protocol* drop-down menu. Enter the port numbers you want to filter in the *Start* and *End* fields. Users connected to the Router will no longer be able to access any port number listed there.

Filter MAC Address

This feature blocks computers with specific MAC addresses from going out to the Internet. For information on obtaining a MAC address, go to “Appendix C: Finding the MAC Address and IP Address for Your Ethernet Adapter.” To set the MAC filter, click the **Edit MAC Filter Setting** button.

Edit MAC Filter Setting. Click the **Edit MAC Filter Setting** button. Select the range of MAC address entries in the drop-down box. In each *mac* field, enter the MAC address you want to filter. Click the **Apply** button before closing the window. To cancel changes, click the **Undo** button.

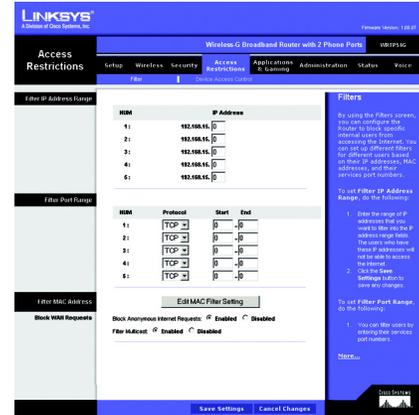


Figure 5-22: Access Restrictions Tab - Filter

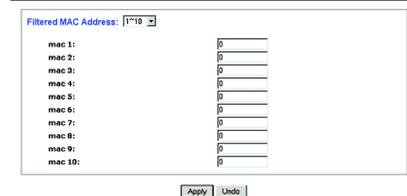


Figure 5-23: Filtered MAC Address

Block WAN Requests

Use these features to enhance your network's security and filter multicasting.

Block Anonymous Internet Requests. This keeps your network from being “pinged” or detected and reinforces your network security by hiding your network ports, so it is more difficult for intruders to work their way into your network. Select **Enabled** to block anonymous Internet requests, or **Disabled** to allow anonymous Internet requests.

Filter Multicast. Multicasting allows for multiple transmissions to specific recipients at the same time. If multicasting is permitted, then the Router will allow IP multicast packets to be forwarded to the appropriate computers. Select **Enabled** to filter multicasting, or **Disabled** to disable this feature.

When you have finished making changes to this screen, click the **Save Settings** button to save the changes, or click the **Cancel Changes** button to undo your changes.

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Enable. Check the **Enable** box to enable the services you have defined. Port Range Forwarding will not function if the Enabled button is left unchecked. This is disabled (unchecked) by default.

When you have finished making changes to this screen, click the **Save Settings** button to save the changes, or click the **Cancel Changes** button to undo your changes.

The Applications & Gaming Tab - Port Triggering

The *Port Triggering* screen allows the Router to watch outgoing data for specific port numbers. The IP address of the computer that sends the matching data is remembered by the Router, so that when the requested data returns through the Router, the data is pulled back to the proper computer by way of IP address and port mapping rules.

Port Triggering

Application. Enter the application name of the trigger.

Triggered Range

For each application, list the triggered port number range. Check with the Internet application documentation for the port number(s) needed.

Start Port. Enter the starting port number of the Triggered Range.

End Port. Enter the ending port number of the Triggered Range.

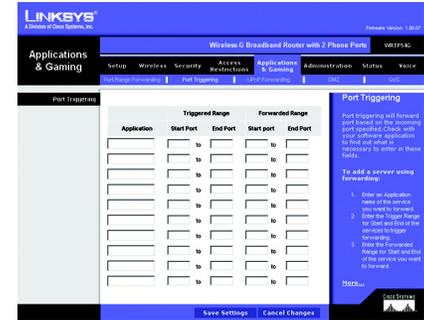


Figure 5-25: Applications & Gaming Tab - Port Triggering

Forwarded Range

For each application, list the forwarded port number range. Check with the Internet application documentation for the port number(s) needed.

Start Port. Enter the starting port number of the Forwarded Range.

End Port. Enter the ending port number of the Forwarded Range.

When you have finished making changes to this screen, click the **Save Settings** button to save the changes, or click the **Cancel Changes** button to undo your changes.

The Applications & Gaming Tab - QoS

Quality of Service (QoS) ensures better service to high-priority types of network traffic, which may involve demanding, real-time applications, such as Internet phone calls or videoconferencing.

Enabled/Disabled. To limit outgoing bandwidth for the QoS policies in use, select Enable. Otherwise, select Disable.

Depending on the settings of the QoS screen, this feature will assign information a high, medium or low priority for the five preset applications and three additional applications that you specify. For each application, select **High**, **Medium**, or **Low** for Priority. For Specific Port#, you can add three additional applications by entering their respective port numbers in the Specific Port# fields.

- FTP (File Transfer Protocol). A protocol used to transfer files over a TCP/IP network (Internet, UNIX, etc.). For example, after developing the HTML pages for a website on a local machine, they are typically uploaded to the web server using FTP.
- HTTP (HyperText Transport Protocol). The communications protocol used to connect to servers on the World Wide Web. Its primary function is to establish a connection with a web server and transmit HTML pages to the client web browser.
- Telnet. A terminal emulation protocol commonly used on Internet and TCP/IP-based networks. It allows a user at a terminal or computer to log onto a remote device and run a program.
- SMTP (Simple Mail Transfer Protocol). The standard e-mail protocol on the Internet. It is a TCP/IP protocol that defines the message format and the message transfer agent (MTA), which stores and forwards the mail.
- POP3 (Post Office Protocol 3). A standard mail server commonly used on the Internet. It provides a message store that holds incoming e-mail until users log on and download it. POP3 is a simple system with little

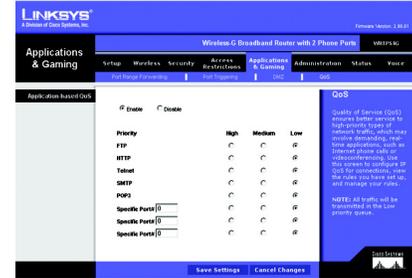


Figure 5-27: Applications & Gaming Tab - QoS

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selectivity. All pending messages and attachments are downloaded at the same time. POP3 uses the SMTP messaging protocol.

When you have finished making changes to this screen, click the **Save Settings** button to save the changes, or click the **Cancel Changes** button to undo your changes.

The Administration Tab - Management

When you click the Administration tab, you will see the *Management* screen. This screen allows you to change the Router's access settings as well as configure the UPnP (Universal Plug and Play) feature.

Router Password

Local Router Access

To ensure the Router's security, you will be asked for your user name and password when you access the Router's Web-based Utility. The default user name and password is **admin**.

User Name. It is recommended that you change the default user name to one of your choice.

Router Password. It is recommended that you change the default password to one of your choice.

Re-enter to confirm. Re-enter the Router's new Password to confirm it.

Idle Timeout. When you use the Router's Web-based Utility, your session can remain idle for a specified length of time. Enter the length of time you want to allow. The default is **10** minutes.

Remote Router Access

Web. To be able to access the Router remotely through the web, select **Enabled**.

Administration Port. Enter the port you want to access.

Secure Shell (SSH). To remotely access your Router using Secure Shell security, click **Enabled**.

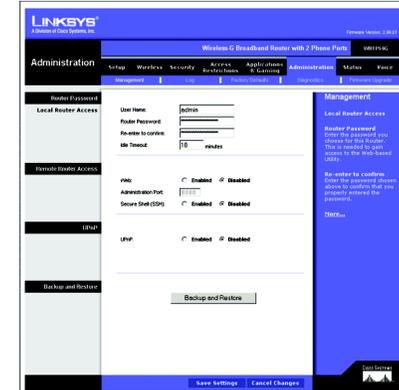


Figure 5-28: Administration Tab - Management

UPnP

UPnP. UPnP allows Windows Me or XP to automatically configure the Router for various Internet applications, such as gaming and videoconferencing. To enable UPnP, click the **Enabled** radio button. To disable this feature, click the **Disabled** radio button.



NOTE: The PC that receives these logs must be running a SYSLOG application. Linksys offers free software that can view system logs. You can download Logviewer software at www.linksys.com.

When you have finished making changes to this screen, click the **Save Settings** button to save the changes, or click the **Cancel Changes** button to undo your changes.

Backup & Restore

To back up or restore your the Router's configuration settings, click the **Backup & Restore** button and follow the on-screen instructions.

The Administration Tab - Log

When you click the Administration tab, you will see the *Log* screen. You can select which PC will receive the specified type of system logs for your Internet connection.

Log

Log Level. There are a variety of log levels available, from most urgent to least urgent. Select the appropriate level: **Panic, Alert, Critical, Error, Warning, Notice, Info, or Debug**, from the drop-down menu.

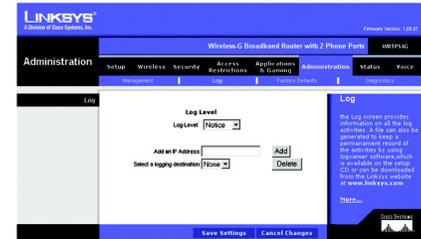


Figure 5-29: Administration Tab - Log

Add an IP Address. In this field, enter the fixed IP address of the PC that will receive the logs. Then click the **Add** button. The Router will now send updated logs to that PC.

Select a logging destination. If you add an IP address, then that IP address automatically becomes the logging destination. If you want to delete a destination, then select it and click the **Delete** button.

When you have finished making changes to this screen, click the **Save Settings** button to save the changes, or click the **Cancel Changes** button to undo your changes.

The Administration Tab - Factory Defaults



The *Factory Defaults* screen allows you to reset the Router to its router factory defaults. If you want to reset the Router to its voice factory defaults, then you need a user name and password available only from your Internet phone service provider. Contact your provider for more information.

Factory Defaults

Restore Router Factory Defaults. If you wish to reset the Router to its router factory defaults, click the **Yes** radio button and then the **Save Settings** button. Then follow the on-screen instructions.

Restore Voice Factory Defaults. If you click the **Yes** radio button and then the **Save Settings** button, you will see a screen asking for a user name and password. Enter the user name and password provided by your Internet phone service provider, and follow the on-screen instructions.

When you have finished making changes to this screen, click the **Save Settings** button to save the changes, or click the **Cancel Changes** button to undo your changes.

NOTE: Any custom settings you have saved will be lost when the default settings are restored, so before you restore the router factory defaults, write down any settings you may need later.



Figure 5-30: Administration Tab - Factory Defaults

The Administration Tab - Diagnostics

The diagnostic tests allow you to check the connections of your network components.

Ping Test

Ping Parameters. The Ping test will check the status of a connection. Click the **Ping** button to open the *Ping Test* screen. Enter the IP address or domain name of the PC whose connection you wish to test. Enter the size of the test packet. Then select the number of times you want the ping to occur. Click the **Ping** button. The *Ping Test* screen will then display the test results. Click the **Close** button to return to the *Diagnostics* screen.

Traceroute Test

Traceroute Parameters. To test the performance of a connect, click the **Traceroute** button. Enter the IP address or domain name of the PC whose connection you wish to test. Click the **Traceroute** button. The *Traceroute Test* screen will then display the test results. Click the **Close** button to return to the *Diagnostics* screen.



Figure 5-31: Administration Tab - Diagnostics

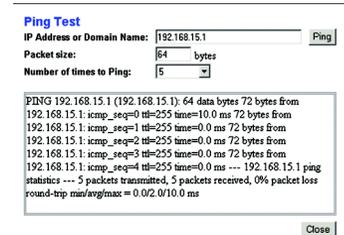


Figure 5-32: Ping Test

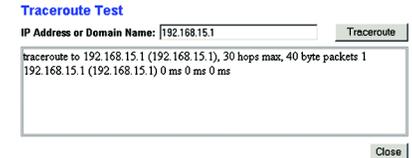


Figure 5-33: Traceroute Test

The Administration Tab - Firmware Upgrade

Upgrading the Router's firmware requires a password available only from your Internet phone service provider. Contact your provider for more information.



Figure 5-34: Firmware Upgrade

The Status Tab - Local Network

The *Local Network* screen displays information about the local network.

Local Network

MAC Address. The MAC Address of the Router's LAN (local area network) interface is displayed here.

IP Address. The Router's local IP Address is shown here.

Subnet Mask. The Router's Subnet Mask is shown here.

DHCP Server. The status of the DHCP server is displayed here.

DHCP Clients Table. Click the **DHCP Clients Table** button to view a list of PCs that have been assigned IP addresses by the Router. The *DHCP Active IP Table* screen lists the DHCP Server IP Address, Client Host Names, IP Addresses, MAC Addresses, and Lease Times. Click the **Refresh** button to update the information. Click the **Close** button to close this screen.

Click the **Refresh** button to update the on-screen information.



Figure 5-35: Status Tab - Local Network

Client Host Name	IP Address	MAC Address	Lease Time
94030-PC	192.168.15.100	00a01ec814a7	0 days 22:54:15

Figure 5-36: DHCP Active IP Table

The Status Tab - Router

The *Router* screen displays information about the Router and its current settings. The on-screen information will vary depending on the Internet Connection Type selected on the *Setup* screen.

Information

Firmware Version. This shows the version number of the installed firmware.

Current Time. The current time and date are displayed here.

MAC Address. The MAC Address of the Router's Internet interface is displayed here. (When you sign up for your Internet phone service account, you will need to provide the MAC address of the Router.)

Status

Login Type. This indicates the type of Internet connection you are using.

Login Status. The status is displayed only for the dial-up style connection, PPPoE. There is a Connect button to click if there is no Internet connection and you want to re-connect.

Internet IP Address. The Router's Internet IP Address is displayed here.

Subnet Mask and Default Gateway. The Router's Subnet Mask and Default Gateway address are displayed here for DHCP and static IP connections.

DNS 1-3. Shown here are the DNS (Domain Name System) IP addresses currently used by the Router.

MTU. Shown here is the MTU value currently used by the Router.

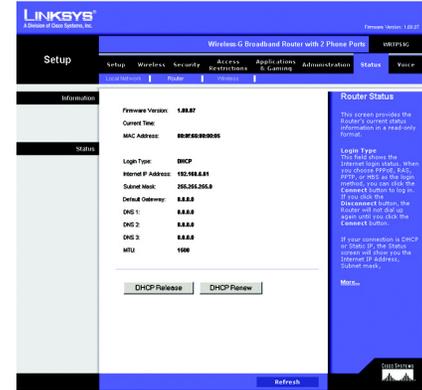


Figure 5-37: Status Tab - Router

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DHCP Release. Available for a DHCP connection, click the **DHCP Release** button to release the current IP address of the device connected to the Router's Internet port.

DHCP Renew. Available for a DHCP connection, click the **DHCP Renew** button to replace the current IP address—of the device connected to the Router's Internet port—with a new IP address.

Click the **Refresh** button to update the on-screen information.

The Status Tab - Wireless

The *Wireless* screen displays status information about your wireless network.

Wireless

Wireless Firmware Version. This shows the version number of the wireless firmware.

MAC Address. The MAC Address of the Router's wireless network interface is displayed here.

Status. This shows the status of your wireless network.

Mode. As selected from the Wireless tab, this will display the wireless mode (Mixed, G-Only, B-Only, or Disabled) used by the network.

SSID. As entered on the Wireless tab, this will display the wireless network name or SSID.

Channel. As entered on the Wireless tab, this will display the channel on which your wireless network is broadcasting.

Encryption Function. As selected on the Wireless Security tab, this will display whether or not wireless security is enabled on the Router.

Active Client List. Click this button to view a list of active wireless computers and other wireless devices.

Click the **Refresh** button to update the on-screen information.



Figure 5-38: Status Tab - Wireless

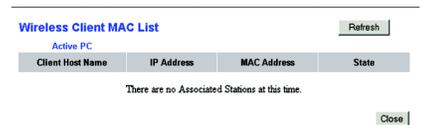


Figure 5-39: Wireless Client MAC List

The Voice Tab

Access to the Voice tab is restricted by your Internet phone service provider. Contact your provider for more information.



Figure 5-40: Voice Tab

Appendix A: Troubleshooting

This appendix provides solutions to problems that may occur during the installation and operation of the Router. Read the description below to solve your problems. If you can't find an answer here, check the website of your Internet phone service provider or the Linksys website at www.linksys.com.

Common Problems and Solutions

1. *I don't hear a dial tone, and the PHONE1 (or PHONE2) LED is not lit.*

Go through this checklist until your problem is solved:

- Make sure the telephone is plugged into the appropriate port, Phone 1 or Phone 2.
- Disconnect and re-connect the RJ-11 telephone cable between the Router and telephone.
- Make sure your telephone is set to its tone setting (not pulse).
- Make sure your network has an active Internet connection. Try to access the Internet, and check to see if the Router's Internet LED is lit. If you do not have a connection, power off your network devices, including the Router and cable/DSL modem. Wait 30 seconds, and power on the cable/DSL modem first. Then power on the Router and other network devices.
- Verify your account information and confirm that the phone line is registered with your Internet phone service provider.

2. *I'm trying to access the Router's Web-based Utility, but I do not see the login screen. Instead, I see a screen saying, "404 Forbidden."*

If you are using Windows Explorer, perform the following steps until you see the Web-based Utility's login screen (Netscape Navigator will require similar steps):

- A. Click **File**. Make sure *Work Offline* is NOT checked.

- B. Press **CTRL + F5**. This is a hard refresh, which will force Windows Explorer to load new webpages, not cached ones.
- C. Click **Tools**. Click **Internet Options**. Click the **Security** tab. Click the **Default level** button. Make sure the security level is Medium or lower. Then click the **OK** button.

3. I need to set a static IP address on a PC.

The Router, by default, assigns an IP address range of 192.168.15.100 to 192.168.15.150 using the DHCP server on the Router. To set a static IP address, you can only use the ranges 192.168.15.2 to 192.168.15.99 and 192.168.15.151 to 192.168.15.254. Each PC or network device that uses TCP/IP must have a unique address to identify itself in a network. If the IP address is not unique to a network, Windows will generate an IP conflict error message. You can assign a static IP address to a PC by performing the following steps:

For Windows 98 and Millennium:

- A. Click **Start**, **Setting**, and **Control Panel**. Double-click **Network**.
- B. In *The following network components are installed* box, select the **TCP/IP->** associated with your Ethernet adapter. If you only have one Ethernet adapter installed, you will only see one TCP/IP line with no association to an Ethernet adapter. Highlight it and click the **Properties** button.
- C. In the *TCP/IP properties* window, select the **IP address** tab, and select **Specify an IP address**. Enter a unique IP address that is not used by any other computer on the network connected to the Router. You can only use an IP address in the ranges 192.168.15.2 to 192.168.15.99 and 192.168.15.151 to 192.168.15.254. Make sure that each IP address is unique for each PC or network device.
- D. Click the **Gateway** tab, and in the *New Gateway* prompt, enter **192.168.15.1**, which is the default IP address of the Router. Click the **Add** button to accept the entry.
- E. Click the **DNS** tab, and make sure the **DNS Enabled** option is selected. Enter the Host and Domain names (e.g., John for Host and home for Domain). Enter the DNS entry provided by your ISP. If your ISP has not provided the DNS IP address, contact your ISP to get that information or go to its website for the information.

- F. Click the **OK** button in the *TCP/IP properties* window, and click **Close** or the **OK** button for the *Network* window.
- G. Restart the computer when asked.

For Windows 2000:

- A. Click **Start**, **Settings**, and **Control Panel**. Double-click **Network and Dial-Up Connections**.
- B. Right-click the **Local Area Connection** that is associated with the Ethernet adapter you are using, and select the **Properties** option.
- C. In the *Components checked are used by this connection* box, highlight **Internet Protocol (TCP/IP)**, and click the **Properties** button. Select **Use the following IP address** option.
- D. Enter a unique IP address that is not used by any other computer on the network connected to the Router. You can only use an IP address in the ranges 192.168.15.2 to 192.168.15.99 and 192.168.15.151 to 192.168.15.254.
- E. Enter the Subnet Mask, **255.255.255.0**.
- F. Enter the Default Gateway, **192.168.15.1** (Router's default IP address).
- G. Toward the bottom of the window, select **Use the following DNS server addresses**, and enter the Preferred DNS server and Alternative DNS server (provided by your ISP). Contact your ISP or go on its website to find the information.
- H. Click the **OK** button in the *Internet Protocol (TCP/IP) Properties* window, and click the **OK** button in the *Local Area Connection Properties* window.
- I. Restart the computer if asked.

For Windows XP:

The following instructions assume you are running Windows XP with the default interface. If you are using the Classic interface (where the icons and menus look like previous Windows versions), please follow the instructions for Windows 2000.

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- A. Click **Start** and **Control Panel**.
- B. Click the **Network and Internet Connections** icon and then the **Network Connections** icon.
- C. Right-click the **Local Area Connection** that is associated with the Ethernet adapter you are using, and select the **Properties** option.
- D. In the *This connection uses the following items* box, highlight **Internet Protocol (TCP/IP)**. Click the **Properties** button.
- E. Enter a unique IP address that is not used by any other computer on the network connected to the Router. You can only use an IP address in the ranges 192.168.15.2 to 192.168.15.99 and 192.168.15.151 to 192.168.15.254.
- F. Enter the Subnet Mask, **255.255.255.0**.
- G. Enter the Default Gateway, **192.168.15.1** (Router's default IP address).
- H. Toward the bottom of the window, select **Use the following DNS server addresses**, and enter the Preferred DNS server and Alternative DNS server (provided by your ISP). Contact your ISP or go on its website to find the information.
- I. Click the **OK** button in the *Internet Protocol (TCP/IP) Properties* window. Click the **OK** button in the *Local Area Connection Properties* window.

4. I want to test my Internet connection.

- A. Check your TCP/IP settings.

For Windows 98 and Millennium:

Refer to Windows Help for details. Make sure **Obtain IP address automatically** is selected in the settings.

For Windows 2000:

1. Click **Start**, **Settings**, and **Control Panel**. Double-click **Network and Dial-Up Connections**.
2. Right-click the **Local Area Connection** that is associated with the Ethernet adapter you are using, and select the **Properties** option.

3. In the *Components checked are used by this connection* box, highlight **Internet Protocol (TCP/IP)**, and click the **Properties** button. Make sure that **Obtain an IP address automatically** and **Obtain DNS server address automatically** are selected.
4. Click the **OK** button in the *Internet Protocol (TCP/IP) Properties* window, and click the **OK** button in the *Local Area Connection Properties* window.
5. Restart the computer if asked.
6. Click the **OK** button in the *Internet Protocol (TCP/IP) Properties* window, and click the **OK** button in the *Local Area Connection Properties* window.
7. Restart the computer if asked.

For Windows XP:

The following instructions assume you are running Windows XP with the default interface. If you are using the Classic interface (where the icons and menus look like previous Windows versions), please follow the instructions for Windows 2000.

1. Click **Start** and **Control Panel**.
 2. Click the **Network and Internet Connections** icon and then the **Network Connections** icon.
 3. Right-click the **Local Area Connection** that is associated with the Ethernet adapter you are using, and select the **Properties** option.
 4. In the *This connection uses the following items* box, highlight **Internet Protocol (TCP/IP)**, and click the **Properties** button. Make sure that **Obtain an IP address automatically** and **Obtain DNS server address automatically** are selected.
- B. Open a command prompt.
- For Windows 98 and Millennium, click **Start** and **Run**. In the *Open* field, type **command**. Press the **Enter** key or click the **OK** button.

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- For Windows 2000 and XP, click **Start** and **Run**. In the *Open* field, type **cmd**. Press the **Enter** key or click the **OK** button.
 - C. In the command prompt, type **ping 192.168.15.1** and press the **Enter** key.
 - If you get a reply, the computer is communicating with the Router.
 - If you do **NOT** get a reply, check the cable, and make sure **Obtain an IP address automatically** is selected in the TCP/IP settings for your Ethernet adapter.
 - D. In the command prompt, type **ping** followed by your Internet IP address and press the **Enter** key. The Internet IP Address can be found in the web interface of the Router. For example, if your Internet IP address is 1.2.3.4, you would enter **ping 1.2.3.4** and press the **Enter** key.
 - If you get a reply, the computer is connected to the Router.
 - If you do **NOT** get a reply, try the ping command from a different computer to verify that your original computer is not the cause of the problem.
 - E. In the command prompt, type **ping www.linksys.com** and press the **Enter** key.
 - If you get a reply, the computer is connected to the Internet. If you cannot open a webpage, try the ping command from a different computer to verify that your original computer is not the cause of the problem.
 - If you do **NOT** get a reply, there may be a problem with the connection. Try the ping command from a different computer to verify that your original computer is not the cause of the problem.
- 5. I am not getting an IP address on the Internet with my Internet connection.**
- A. Refer to “Problem #4, I want to test my Internet connection” to verify that you have connectivity.
 - B. If you need to register the MAC address of your Ethernet adapter with your ISP, please see “Appendix C: Finding the MAC Address and IP Address for Your Ethernet Adapter.” If you need to clone the MAC address of your Ethernet adapter onto the Router, see the MAC Address Clone section of “Chapter 5: Configuring the Router” for details.

- C. Make sure you are using the right Internet settings. Contact your ISP to see if your Internet connection type is DHCP, Static IP Address, or PPPoE (commonly used by DSL consumers). Please refer to the Basic Setup section of “Chapter 5: Configuring the Router” for details on Internet Connection Type settings.
- D. Make sure you use the right cable. Check to see if the Internet LED is solidly lit.
- E. Make sure the cable connecting from your cable or DSL modem is connected to the Router’s Internet port. Verify that the Status page of the Router’s Web-based Utility shows a valid IP address from your ISP.
- F. Turn off the computer, Router, and cable/DSL modem. Wait 30 seconds, and then turn on the Router, cable/DSL modem, and computer. Check the Status tab of the Router’s Web-based Utility to see if you get an IP address.

6. I am not able to access the Router’s Web-based Utility Setup page.

- A. Refer to “Problem #4, I want to test my Internet connection” to verify that your computer is properly connected to the Router.
- B. Refer to “Appendix C: Finding the MAC Address and IP Address for Your Ethernet Adapter” to verify that your computer has an IP Address, Subnet Mask, Gateway, and DNS.
- C. Set a static IP address on your system; refer to “Problem #3: I need to set a static IP address on a PC.”
- D. Refer to “Problem #12: I am a PPPoE user, and I need to remove the proxy settings or the dial-up pop-up window.”

7. I can’t get my Virtual Private Network (VPN) to work through the Router.

Access the Router’s web interface by going to <http://192.168.15.1> or the IP address of the Router, and go to the **Security => VPN Passthrough** tab. Make sure you have IPsec passthrough and/or PPTP passthrough enabled.

VPNs that use IPSec with the ESP (Encapsulation Security Payload known as protocol 50) authentication will work fine. At least one IPSec session will work through the Router; however, simultaneous IPSec sessions may be possible, depending on the specifics of your VPNs.

VPNs that use IPSec and AH (Authentication Header known as protocol 51) are incompatible with the Router. AH has limitations due to occasional incompatibility with the NAT standard.

Change the IP address for the Router to another subnet to avoid a conflict between the VPN IP address and your local IP address. For example, if your VPN server assigns an IP address 192.168.15.X (X is a number from 1 to 254) and your local LAN IP address is 192.168.15.X (X is the same number used in the VPN IP address), the Router will have difficulties routing information to the right location. If you change the Router's IP address to 192.168.2.1, that should solve the problem. Change the Router's IP address through the Basic Setup tab of the Web-based Utility. If you assigned a static IP address to any computer or network device on the network, you need to change its IP address accordingly to 192.168.2.Y (Y being any number from 1 to 254). Note that each IP address must be unique within the network.

Your VPN may require port 500/UDP packets to be passed to the computer that is connecting to the IPSec server. Refer to "Problem #9, I need to set up online game hosting or use other Internet applications" for details. Check the Linksys website at www.linksys.com for more information.

8. I need to set up a server behind my Router.

To use a server like a web, ftp, or mail server, you need to know the respective port numbers they are using. For example, port 80 (HTTP) is used for web; port 21 (FTP) is used for FTP, and port 25 (SMTP outgoing) and port 110 (POP3 incoming) are used for the mail server. You can get more information by viewing the documentation provided with the server you installed. Follow these steps to set up port forwarding through the Router's Web-based Utility. We will be setting up web, ftp, and mail servers.

- A. Access the Router's Web-based Utility by going to **http://192.168.15.1** or the IP address of the Router. Go to the **Applications & Gaming => Port Range Forwarding** tab.
- B. Enter any name you want to use for the Application.

- C. Enter the port range of the service you are using. For example, if you have a web server, you would enter the range 80 to 80.
- D. Select the protocol you will be using, **TCP** or **UDP**, or select **Both**.
- E. Enter the IP address of the PC or network device that you want the port server to go to. For example, if the web server's Ethernet adapter IP address is 192.168.15.100, you would enter 100 in the field provided. Check "Appendix C: Finding the MAC Address and IP Address for Your Ethernet Adapter" for details on getting an IP address.
- F. Check the **Enabled** option for the port services you want to use. Consider the examples below:

Application	Start and End	Protocol	IP Address	Enabled
Web server	80 to 80	Both	192.168.15.100	X
FTP server	21 to 21	TCP	192.168.15.101	X
SMTP (outgoing)	25 to 25	Both	192.168.15.102	X
POP3 (incoming)	110 to 110	Both	192.168.15.102	X

When you have completed the configuration, click the **Save Settings** button.

9. I need to set up online game hosting or use other Internet applications.

If you want to play online games or use Internet applications, most will work without doing any port forwarding or DMZ hosting. There may be cases when you want to host an online game or Internet application. This would require you to set up the Router to deliver incoming packets or data to a specific computer. This also applies to the Internet applications you are using. The best way to get the information on what port services to use is to go to the website of the online game or application you want to use. Follow these steps to set up online game hosting or use a certain Internet application:

- A. Access the Router's Web-based Utility by going to **http://192.168.15.1** or the IP address of the Router. Go to the **Applications & Gaming => Port Range Forwarding** tab.
- B. Enter any name you want to use for the Application.
- C. Enter the port range of the service you are using. For example, if you have a web server, you would enter the range 80 to 80.
- D. Select the protocol you will be using, **TCP** or **UDP**, or select **Both**.
- E. Enter the IP address of the PC or network device that you want the port server to go to. For example, if the web server's Ethernet adapter IP address is 192.168.15.100, you would enter 100 in the field provided. Check "Appendix C: Finding the MAC Address and IP Address for Your Ethernet Adapter" for details on getting an IP address.
- F. Check the **Enabled** option for the port services you want to use. Consider the examples below:

Application	Start and End	Protocol	IP Address	Enabled
UT	7777 to 27900	Both	192.168.15.100	X
Halfiife	27015 to 27015	Both	192.168.15.105	X
PC Anywhere	5631 to 5631	UDP	192.168.15.102	X
VPN IPSEC	500 to 500	UDP	192.168.15.100	X

When you have completed the configuration, click the **Save Settings** button.

10. I can't get the Internet game, server, or application to work.

If you are having difficulties getting any Internet game, server, or application to function properly, consider exposing one PC to the Internet using DeMilitarized Zone (DMZ) hosting. This option is available when an

application requires too many ports or when you are not sure which port services to use. Make sure you disable all the forwarding entries if you want to successfully use DMZ hosting, since forwarding has priority over DMZ hosting. (In other words, data that enters the Router will be checked first by the forwarding settings. If the port number that the data enters from does not have port forwarding, then the Router will send the data to whichever PC or network device you set for DMZ hosting.) Follow these steps to set DMZ hosting:

- A. Access the Router's Web-based Utility by going to **http://192.168.15.1** or the IP address of the Router. Go to the **Applications & Gaming => Port Range Forwarding** tab.
- B. Disable or remove the entries you have entered for forwarding. Keep this information in case you want to use it at a later time.
- C. Click the **DMZ** tab.
- D. Enter the Ethernet adapter's IP address of the computer you want exposed to the Internet. This will bypass the NAT security for that computer. Please refer to "Appendix C: Finding the MAC Address and IP Address for Your Ethernet Adapter" for details on getting an IP address.

Once completed with the configuration, click the **Save Settings** button.

11. I forgot my password, or the password prompt always appears when saving settings to the Router.

Reset the Router to factory defaults by pressing the Reset button for five seconds and then releasing it. If you are still getting prompted for a password when saving settings, then perform the following steps:

- A. Access the Router's web interface by going to **http://192.168.15.1** or the IP address of the Router. Enter the default password admin, and click the **Administration => Management** tab.
- B. Enter a different password in the *Router Password* field, and enter the same password in the second field to confirm the password.
- C. Click the **Save Settings** button.

12. I am a PPPoE user, and I need to remove the proxy settings or the dial-up pop-up window.

If you have proxy settings, you need to disable these on your computer. Because the Router is the gateway for the Internet connection, the computer does not need any proxy settings to gain access. Please follow these directions to verify that you do not have any proxy settings and that the browser you use is set to connect directly to the LAN.

For Microsoft Internet Explorer 5.0 or higher:

- A. Click **Start**, **Settings**, and **Control Panel**. Double-click **Internet Options**.
- B. Click the **Connections** tab.
- C. Click the **LAN settings** button and remove anything that is checked.
- D. Click the **OK** button to go back to the previous screen.
- E. Click the option **Never dial a connection**. This will remove any dial-up pop-ups for PPPoE users.

For Netscape 4.7 or higher:

- A. Start **Netscape Navigator**, and click **Edit**, **Preferences**, **Advanced**, and **Proxies**.
- B. Make sure you have **Direct connection to the Internet** selected on this screen.
- C. Close all the windows to finish.

13. To start over, I need to set the Router to its router factory defaults.

Hold the Reset button for approximately five seconds and then release it. This will return the password, forwarding, and other settings on the Router to the factory default settings. In other words, the Router will revert to its original factory configuration.

14. My DSL service's PPPoE is always disconnecting.

PPPoE is not actually a dedicated or always-on connection. The DSL ISP can disconnect the service after a period of inactivity, just like a phone dial-up connection to the Internet. There is a setup option to "keep alive" the connection. This may not always work, so you may need to re-establish connection periodically.

- A. To connect to the Router, go to the web browser, and enter **http://192.168.15.1** or the IP address of the Router.
- B. Enter the password, if asked. (The default password is admin.)
- C. On the *Basic Setup* tab, select the option **Keep Alive**, and set the *Redial Period* option at **20** (seconds).
- D. Click the **Save Settings** button.
- E. Click the **Status** tab, and click the **Connect** button.
- F. You may see the login status display as Connecting. Press the **F5** key to refresh the screen, until you see the login status display as Connected.

If the connection is lost again, follow steps E and F to re-establish connection.

15. I can't access my email, web, or VPN, or I am getting corrupted data from the Internet.

The Maximum Transmission Unit (MTU) setting may need to be adjusted. By default, the MTU is set at 1500. For most DSL users, it is strongly recommended to use MTU 1492. If you are having some difficulties, perform the following steps:

- A. To connect to the Router, go to the web browser, and enter **http://192.168.15.1** or the IP address of the Router.
- B. Enter the password, if asked. (The default password is **admin**.)
- C. On the *Basic Setup* tab, look for the MTU option, and select **Enable**. In the *Size* field, enter 1492.
- D. Click the **Save Settings** button to continue.

If your difficulties continue, change the Size to different values. Try this list of values, one value at a time, in this order, until your problem is solved:

1462
1400
1362
1300

16. I need to use port triggering.

Port triggering looks at the outgoing port services used and will trigger the Router to open a specific port, depending on which port an Internet application uses. Follow these steps:

- A. To connect to the Router, go to the web browser, and enter **http://192.168.15.1** or the IP address of the Router.
- B. Enter the password, if asked. (The default password is **admin**.)
- C. Click the **Applications & Gaming => Port Triggering** tab.
- D. Enter any name you want to use for the Application Name.
- E. Enter the Start and End Ports of the Triggered Port Range. Check with your Internet application provider for more information on which outgoing port services it is using.
- F. Enter the Start and End Ports of the Forwarded Port Range. Check with your Internet application provider for more information on which incoming port services are required by the Internet application.

17. When I enter a URL or IP address, I get a time-out error or am prompted to retry.

Go through this checklist until your problem is solved:

- Check if other PCs work. If they do, ensure that your workstation's IP settings are correct (IP Address, Subnet Mask, Default Gateway, and DNS). Restart the computer that is having a problem.
- If the PCs are configured correctly, but still not working, check the Router. Ensure that it is connected and powered on. Connect to it and check its settings. (If you cannot connect to it, check the LAN and power connections.)
- If the Router is configured correctly, check your Internet connection (DSL/cable modem, etc.) to see if it is working correctly. You can remove the Router to verify a direct connection.
- Manually configure the TCP/IP with a DNS address provided by your ISP.
- Make sure that your browser is set to connect directly and that any dial-up is disabled. For Internet Explorer, click **Tools, Internet Options**, and then the **Connection** tab. Make sure that Internet Explorer is set to **Never dial a connection**. For Netscape Navigator, click **Edit, Preferences, Advanced**, and **Proxy**. Make sure that Netscape Navigator is set to **Direct connection to the Internet**.

Frequently Asked Questions

How do I make a phone call?

Pick up the phone and dial. Use 7-, 10-, or 11-digit dialing for calls within the same area code as your Internet phone number. Use 10- or 11-digit dialing for calls outside of your area code.

Can I make calls if my Internet connection is down?

No. Your high-speed Internet connection must be active when you make Internet phone or fax calls.

Can I make calls while I'm browsing the Internet?

Yes. You can make Internet phone or fax calls while browsing the Internet. However, your web browsing may affect the quality of your telephone call, depending on the amount of upstream data traffic passing through your Internet connection.

Can I receive calls while my network is down?

You cannot directly receive calls while your network is down. However, your Internet phone service provider can forward calls to a different telephone number, such as a cellular phone number, if you activate a feature called Network Availability Number. You can configure this feature through your service account.

What is the maximum number of IP addresses that the Router will support?

The Router will support up to 253 IP addresses.

Where is the Router installed on the network?

In a typical environment, the Router is installed between the cable/DSL modem and the local area network (LAN). Plug the Router into the cable/DSL modem's Ethernet port.

Does the Router support IPX or AppleTalk?

No. TCP/IP is the only protocol standard for the Internet and has become the global standard for communications. IPX, a NetWare communications protocol used only to route messages from one node to another, and AppleTalk, a communications protocol used on Apple and Macintosh networks, can be used for LAN to LAN connections, but those protocols cannot connect from the Internet to the LAN.

What is Network Address Translation and what is it used for?

Network Address Translation (NAT) translates multiple IP addresses on the private LAN to one public address that is sent out to the Internet. This adds a level of security since the address of a PC connected to the private LAN is never transmitted on the Internet. Furthermore, NAT allows the Router to be used with low cost Internet accounts, such as DSL or cable modems, when only one TCP/IP address is provided by the ISP. The user may have many private addresses behind this single address provided by the ISP.

Does the Router support any operating system other than Windows 98, Millennium, 2000, or XP?

Yes, but Linksys does not, at this time, provide technical support for setup, configuration or troubleshooting of any non-Windows operating systems.

Does the Router support ICQ send file?

Yes, with the following fix: click **ICQ menu => preference => connections tab=>**, and check **I am behind a firewall or proxy**. Then set the firewall time-out to 80 seconds in the firewall setting. The Internet user can then send a file to a user behind the Router.

I set up an Unreal Tournament Server, but others on the LAN cannot join. What do I need to do?

If you have a dedicated Unreal Tournament server running, you need to create a static IP for each of the LAN computers and forward ports 7777, 7778, 7779, 7780, 7781, and 27900 to the IP address of the server. You can also use a port forwarding range of 7777 to 27900. If you want to use the UT Server Admin, forward another port (8080 usually works well but is used for remote admin. You may have to disable this.), and then in the

[UWeb.WebServer] section of the server.ini file, set the ListenPort to 8080 (to match the mapped port above) and ServerName to the IP assigned to the Router from your ISP.

Can multiple gamers on the LAN get on one game server and play simultaneously with just one public IP address?

It depends on which network game or what kind of game server you are using. For example, Unreal Tournament supports multi-login with one public IP.

How do I get Half-Life: Team Fortress to work with the Router?

The default client port for Half-Life is 27005. The computers on your LAN need to have "+clientport 2700x" added to the HL shortcut command line; the x would be 6, 7, 8, and on up. This lets multiple computers connect to the same server. One problem: Version 1.0.1.6 won't let multiple computers with the same CD key connect at the same time, even if on the same LAN (not a problem with 1.0.1.3). As far as hosting games, the HL server does not need to be in the DMZ. Just forward port 27015 to the local IP address of the server computer.

How can I block corrupted FTP downloads?

If you are experiencing corrupted files when you download a file with your FTP client, try using another FTP program.

The web page hangs; downloads are corrupt, or nothing but junk characters are being displayed on the screen. What do I need to do?

Force your Ethernet adapter to 10Mbps or half duplex mode, and turn off the "Auto-negotiate" feature of your Ethernet adapter as a temporary measure. (Please look at the Network Control Panel in your Ethernet adapter's Advanced Properties tab.) Make sure that your proxy setting is disabled in the browser. Check our website at www.linksys.com for more information.

If all else fails in the installation, what can I do?

Reset the Router by holding down the Reset button for approximately five seconds. Reset your cable or DSL modem by powering the unit off and then on. Contact your Internet phone service provider for assistance. Refer to “Appendix H: Contact Information” for contact information.

Will the Router function in a Macintosh environment?

Yes, but the Router’s setup pages are accessible only through Internet Explorer 5.0 or Netscape Navigator 5.0 or higher for Macintosh.

I am not able to get the web configuration screen for the Router. What can I do?

You may have to remove the proxy settings on your Internet browser, e.g., Netscape Navigator or Internet Explorer. Or remove the dial-up settings on your browser. Check with your browser documentation, and make sure that your browser is set to connect directly and that any dial-up is disabled. Make sure that your browser is set to connect directly and that any dial-up is disabled. For Internet Explorer, click **Tools, Internet Options**, and then the **Connection** tab. Make sure that Internet Explorer is set to **Never dial a connection**. For Netscape Navigator, click **Edit, Preferences, Advanced**, and **Proxy**. Make sure that Netscape Navigator is set to **Direct connection to the Internet**.

What is DMZ Hosting?

Demilitarized Zone (DMZ) allows one IP address (computer) to be exposed to the Internet. Some applications require multiple TCP/IP ports to be open. It is recommended that you set your computer with a static IP if you want to use DMZ Hosting. To get the LAN IP address, see “Appendix C: Finding the MAC Address and IP Address for Your Ethernet Adapter.”

If DMZ Hosting is used, does the exposed user share the public IP with the Router?

No.

Is the Router cross-platform compatible?

Any platform that supports Ethernet and TCP/IP is compatible with the Router.

How many ports can be simultaneously forwarded?

Theoretically, the Router can establish 520 sessions at the same time, but you can only forward 10 ranges of ports.

Does the Router replace a modem? Is there a cable or DSL modem in the Router?

No, this version of the Router must work in conjunction with a cable or DSL modem.

Which modems are compatible with the Router?

The Router is compatible with virtually any cable or DSL modem that supports Ethernet.

How can I check whether I have static or DHCP IP addresses?

Ask your ISP to find out.

How do I get mIRC to work with the Router?

Under the Applications & Gaming => Port Range Forwarding tab, set port forwarding to **113** for the PC on which you are using mIRC.

Can I run an application from a remote computer over the wireless network?

This will depend on whether or not the application is designed to be used over a network. Consult the application's documentation to determine if it supports operation over a network.

What is the IEEE 802.11b standard?

It is one of the IEEE standards for wireless networks. The 802.11b standard allows wireless networking hardware from different manufacturers to communicate, provided that the hardware complies with the 802.11b

standard. The 802.11b standard states a maximum data transfer rate of 11Mbps and an operating frequency of 2.4GHz.

What is the IEEE 802.11g standard?

It is one of the IEEE standards for wireless networks. The 802.11g standard allows wireless networking hardware from different manufacturers to communicate, provided that the hardware complies with the 802.11g standard. The 802.11g standard states a maximum data transfer rate of 54Mbps and an operating frequency of 2.4GHz.

What IEEE 802.11b features are supported?

The product supports the following IEEE 802.11b functions:

- CSMA/CA plus Acknowledge protocol
- Multi-Channel Roaming
- Automatic Rate Selection
- RTS/CTS feature
- Fragmentation
- Power Management

What IEEE 802.11g features are supported?

The product supports the following IEEE 802.11g functions:

- CSMA/CA plus Acknowledge protocol
- OFDM protocol
- Multi-Channel Roaming
- Automatic Rate Selection
- RTS/CTS feature
- Fragmentation
- Power Management

What is ad-hoc mode?

When a wireless network is set to ad-hoc mode, the wireless-equipped computers are configured to communicate directly with each other. The ad-hoc wireless network will not communicate with any wired network.

What is infrastructure mode?

When a wireless network is set to infrastructure mode, the wireless network is configured to communicate with a wired network through a wireless access point.

What is roaming?

Roaming is the ability of a portable computer to communicate continuously while moving freely throughout an area greater than that covered by a single access point. Before using the roaming function, the user must make sure that the computer uses the same channel number that is used by the access point of the dedicated coverage area.

To achieve true seamless connectivity, the wireless LAN must incorporate a number of different functions. Each node and access point, for example, must always acknowledge receipt of each message. Each node must maintain contact with the wireless network even when not actually transmitting data. Achieving these functions simultaneously requires a dynamic RF networking technology that links access points and nodes. In such a system, the user's end node undertakes a search for the best possible access to the system. First, it evaluates such factors as signal strength and quality, as well as the message load currently being carried by each access point and the distance of each access point to the wired backbone. Based on that information, the node next selects the right access point and registers its address. Communications between end node and host computer can then be transmitted up and down the backbone.

As the user moves on, the end node's RF transmitter regularly checks the system to determine whether it is in touch with the original access point or whether it should seek a new one. When a node no longer receives

acknowledgment from its original access point, it undertakes a new search. Upon finding a new access point, it then re-registers, and the communication process continues.

What is ISM band?

The FCC and their counterparts outside of the U.S. have set aside bandwidth for unlicensed use in the ISM (Industrial, Scientific and Medical) band. Spectrum in the vicinity of 2.4 GHz, in particular, is being made available worldwide. This presents a truly revolutionary opportunity to place convenient high-speed wireless capabilities in the hands of users around the globe.

What is Spread Spectrum?

Spread Spectrum technology is a wideband radio frequency technique developed by the military for use in reliable, secure, mission-critical communications systems. It is designed to trade off bandwidth efficiency for reliability, integrity, and security. In other words, more bandwidth is consumed than in the case of narrowband transmission, but the trade-off produces a signal that is, in effect, louder and thus easier to detect, provided that the receiver knows the parameters of the spread-spectrum signal being broadcast. If a receiver is not tuned to the right frequency, a spread-spectrum signal looks like background noise. There are two main alternatives, Direct Sequence Spread Spectrum (DSSS) and Frequency Hopping Spread Spectrum (FHSS).

What is DSSS? What is FHSS? And what are their differences?

Frequency-Hopping Spread-Spectrum (FHSS) uses a narrowband carrier that changes frequency in a pattern that is known to both transmitter and receiver. Properly synchronized, the net effect is to maintain a single logical channel. To an unintended receiver, FHSS appears to be short-duration impulse noise. Direct-Sequence Spread-Spectrum (DSSS) generates a redundant bit pattern for each bit to be transmitted. This bit pattern is called a chip (or chipping code). The longer the chip, the greater the probability that the original data can be recovered. Even if one or more bits in the chip are damaged during transmission, statistical techniques embedded in the radio can recover the original data without the need for retransmission. To an unintended receiver, DSSS appears as low power wideband noise and is rejected (ignored) by most narrowband receivers.

What is WEP?

WEP is Wired Equivalent Privacy, a data privacy mechanism based on a shared key algorithm, as described in the IEEE 802.11 standard.

What is WPA?

WPA is Wi-Fi Protected Access, a wireless security protocol that can be used in conjunction with a RADIUS server.

What is a MAC Address?

The Media Access Control (MAC) address is a unique number assigned by the manufacturer to any Ethernet networking device, such as a network adapter, that allows the network to identify it at the hardware level. For all practical purposes, this number is usually permanent. Unlike IP addresses, which can change every time a computer logs onto the network, the MAC address of a device stays the same, making it a valuable identifier for the network.

How do I reset the Router?

Press the Reset button on the back panel for about five seconds. This will reset the Router to its default settings.

How do I resolve issues with signal loss?

There is no way to know the exact range of your wireless network without testing. Every obstacle placed between the Router and a wireless PC will create signal loss. Lead glass, metal, concrete floors, water and walls will inhibit the signal and reduce range. Start with the Router and your wireless PC in the same room and move it away in small increments to determine the maximum range in your environment.

You may also try using different channels, as this may eliminate interference affecting only one channel.

I have excellent signal strength, but I cannot see my network.

Wireless security is probably enabled on the Router, but not on your wireless adapter (or vice versa). Verify that the same wireless security settings are being used by all devices in your wireless network.

How many channels/frequencies are available with the Router?

There are eleven available channels, ranging from 1 to 11 (in North America).

Appendix B: Wireless Security

Linksys wants to make wireless networking as safe and easy for you as possible. The current generation of Linksys products provide several network security features, but they require specific action on your part for implementation. So, keep the following in mind whenever you are setting up or using your wireless network.

Security Precautions

The following is a complete list of security precautions to take (at least steps 1 through 5 should be followed):

1. Change the default SSID.
2. Disable SSID Broadcast.
3. Change the default password for the Administrator account.
4. Enable MAC Address Filtering.
5. Change the SSID periodically.
6. Use the highest encryption algorithm possible. Use WPA if it is available. Please note that this may reduce your network performance.
7. Change the WEP encryption keys periodically.

For information on implementing these security features, refer to “Chapter 6: Configuring the Router.”



NOTE: Some of these security features are available only through the network router or access point. Refer to the router or access point's documentation for more information.

Security Threats Facing Wireless Networks

Wireless networks are easy to find. Hackers know that in order to join a wireless network, wireless networking products first listen for “beacon messages”. These messages can be easily decrypted and contain much of the network’s information, such as the network’s SSID (Service Set Identifier). Here are the steps you can take:

Change the administrator’s password regularly. With every wireless networking device you use, keep in mind that network settings (SSID, WEP keys, etc.) are stored in its firmware. Your network administrator is the only person who can change network settings. If a hacker gets a hold of the administrator’s password, he, too, can change those settings. So, make it harder for a hacker to get that information. Change the administrator’s password regularly.

SSID. There are several things to keep in mind about the SSID:

1. Disable Broadcast
2. Make it unique
3. Change it often

Most wireless networking devices will give you the option of broadcasting the SSID. While this option may be more convenient, it allows anyone to log into your wireless network. This includes hackers. So, don’t broadcast the SSID.

Wireless networking products come with a default SSID set by the factory. (The Linksys default SSID is “linksys”.) Hackers know these defaults and can check these against your network. Change your SSID to something unique and not something related to your company or the networking products you use.

Change your SSID regularly so that any hackers who have gained access to your wireless network will have to start from the beginning in trying to break in.

MAC Addresses. Enable MAC Address filtering. MAC Address filtering will allow you to provide access to only those wireless nodes with certain MAC Addresses. This makes it harder for a hacker to access your network with a random MAC Address.

WEP Encryption. Wired Equivalent Privacy (WEP) is often looked upon as a cure-all for wireless security concerns. This is overstating WEP's ability. Again, this can only provide enough security to make a hacker's job more difficult.

There are several ways that WEP can be maximized:

1. Use the highest level of encryption possible
2. Use "Shared Key" authentication
3. Change your WEP key regularly

WPA. Wi-Fi Protected Access (WPA) is the newest and best available standard in Wi-Fi security. Two modes are available: Pre-Shared Key and RADIUS. Pre-Shared Key gives you one encryption methods: TKIP (Temporal Key Integrity Protocol), which utilizes a stronger encryption method and incorporates Message Integrity Code (MIC) to provide protection against hackers.

WPA Pre-Shared Key. If you do not have a RADIUS server, Select the type of algorithm, TKIP or AES, enter a password in the Pre-Shared key field of 8-64 characters, and enter a Group Key Renewal period time between 0 and 99,999 seconds, which instructs the Router or other device how often it should change the encryption keys.



IMPORTANT: Always remember that each device in your wireless network **MUST** use the same encryption method and encryption key or your wireless network will not function properly.

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WPA RADIUS. WPA used in coordination with a RADIUS server. (This should only be used when a RADIUS server is connected to the Router or other device.) First, select the type of WPA algorithm, **TKIP** or **AES**. Enter the RADIUS server's IP Address and port number, along with a key shared between the device and the server. Last, enter a Group Key Renewal period, which instructs the device how often it should change the encryption keys.

Implementing encryption may have a negative impact on your network's performance, but if you are transmitting sensitive data over your network, encryption should be used.

These security recommendations should help keep your mind at ease while you are enjoying the most flexible and convenient technology Linksys has to offer.

Appendix C: Finding the MAC Address and IP Address for Your Ethernet Adapter

This section describes how to find the MAC address for your computer's Ethernet adapter so you can use the MAC filtering and/or MAC address cloning feature of the Router. You can also find the IP address of your computer's Ethernet adapter. This IP address is used for the Router's filtering, forwarding, and/or DMZ features. Follow the steps in this appendix to find the adapter's MAC or IP address in Windows 98, Me, 2000, or XP.

Windows 98 or Me Instructions

1. Click **Start** and **Run**. In the *Open* field, enter **winipcfg**. Then press the **Enter** key or the **OK** button.
2. When the *IP Configuration* screen appears, select the Ethernet adapter you have connected to the Router via a CAT 5 Ethernet network cable.
3. Write down the Adapter Address as shown on your computer screen. This is the MAC address for your Ethernet adapter and is shown as a series of numbers and letters.

The MAC address/Adapter Address is what you will use for MAC address cloning or MAC filtering.

The example shows the Ethernet adapter's IP address as 192.168.1.100. Your computer may show something different.

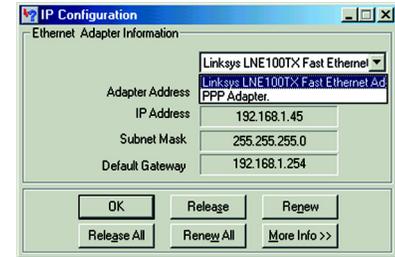


Figure C-1: IP Configuration Screen

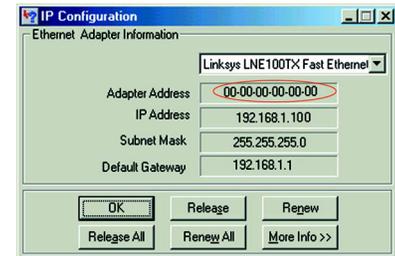


Figure C-2: MAC/Adapter Address

Windows 2000 or XP Instructions

1. Click **Start** and **Run**. In the *Open* field, enter **cmd**. Press the **Enter** key or click the **OK** button.
2. At the command prompt, enter **ipconfig /all**. Then press the **Enter** key.
3. Write down the Physical Address as shown on your computer screen; it is the MAC address for your Ethernet adapter. This appears as a series of numbers and letters.

The MAC address/Physical Address is what you will use for MAC address cloning or MAC filtering.

The example shows the Ethernet adapter's IP address as 192.168.1.100. Your computer may show something different.

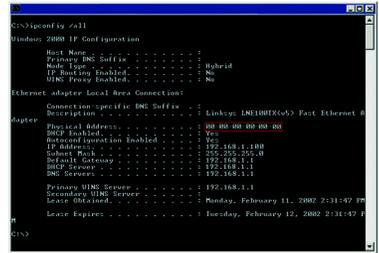


Figure C-3: MAC/Physical Address



Figure C-4: MAC Address Clone

For the Router's Web-based Utility

For MAC address cloning, enter the 12-digit MAC address in the fields provided, two digits per field.

For MAC filtering, enter the 12-digit MAC address in this format, XXXXXXXXXXXX, WITHOUT the hyphens.



Figure C-5: MAC Address Filter

Appendix D: Windows Help

Almost all Linksys products require Microsoft Windows. Windows is the most used operating system in the world and comes with many features that help make networking easier. These features can be accessed through Windows Help and are described in this appendix.

TCP/IP

Before a computer can communicate with a network router, TCP/IP must be enabled. TCP/IP is a set of instructions, or protocol, all PCs follow to communicate over a network. This is true for wireless networks as well. Your PCs will not be able to utilize wireless networking without having TCP/IP enabled. Windows Help provides complete instructions on enabling TCP/IP.

Shared Resources

If you wish to share printers, folder, or files over your network, Windows Help provides complete instructions on utilizing shared resources.

Network Neighborhood/My Network Places

Other PCs on your network will appear under Network Neighborhood or My Network Places (depending upon the version of Windows you're running). Windows Help provides complete instructions on adding PCs to your network.

Appendix E: Glossary

This glossary contains some basic networking terms you may come across when using this product. For more advanced terms, see the complete Linksys glossary at <http://www.linksys.com/glossary>.

Access Point - A device that allows wireless-equipped computers and other devices to communicate with a wired network. Also used to expand the range of a wireless network.

Ad-hoc - A group of wireless devices communicating directly with each other (peer-to-peer) without the use of an access point.

AES (Advanced Encryption Standard) - A security method that uses symmetric 128-bit block data encryption.

Bandwidth - The transmission capacity of a given device or network.

Bit - A binary digit.

Boot - To start a device and cause it to start executing instructions.

Broadband - An always-on, fast Internet connection.

Browser - An application program that provides a way to look at and interact with all the information on the World Wide Web.

Byte - A unit of data that is usually eight bits long.

Cable Modem - A device that connects a computer to the cable television network, which in turn connects to the Internet.

Daisy Chain - A method used to connect devices in a series, one after the other.

DDNS (Dynamic Domain Name System) - Allows the hosting of a website, FTP server, or e-mail server with a fixed domain name (e.g., www.xyz.com) and a dynamic IP address.

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Default Gateway - A device that forwards Internet traffic from your local area network.

DHCP (Dynamic Host Configuration Protocol) - A networking protocol that allows administrators to assign temporary IP addresses to network computers by “leasing” an IP address to a user for a limited amount of time, instead of assigning permanent IP addresses.

DMZ (Demilitarized Zone) - Removes the Router's firewall protection from one PC, allowing it to be “seen” from the Internet.

DNS (Domain Name Server) - The IP address of your ISP's server, which translates the names of websites into IP addresses.

Domain - A specific name for a network of computers.

Download - To receive a file transmitted over a network.

DSL (Digital Subscriber Line) - An always-on broadband connection over traditional phone lines.

Dynamic IP Address - A temporary IP address assigned by a DHCP server.

Encryption - Encoding data transmitted in a network.

Ethernet - IEEE standard network protocol that specifies how data is placed on and retrieved from a common transmission medium.

Firewall - A set of related programs located at a network gateway server that protects the resources of a network from users from other networks.

Firmware - The programming code that runs a networking device.

FTP (File Transfer Protocol) - A protocol used to transfer files over a TCP/IP network.

Full Duplex - The ability of a networking device to receive and transmit data simultaneously.

Gateway - A device that interconnects networks with different, incompatible communications protocols.

Half Duplex - Data transmission that can occur in two directions over a single line, but only one direction at a time.

HTTP (HyperText Transport Protocol) - The communications protocol used to connect to servers on the World Wide Web.

Infrastructure - A wireless network that is bridged to a wired network via an access point.

IP (Internet Protocol) - A protocol used to send data over a network.

IP Address - The address used to identify a computer or device on a network.

IPCONFIG - A Windows 2000 and XP utility that displays the IP address for a particular networking device.

IPSec (Internet Protocol Security) - A VPN protocol used to implement secure exchange of packets at the IP layer.

ISP (Internet Service Provider) - A company that provides access to the Internet.

LAN - The computers and networking products that make up your local network.

MAC (Media Access Control) Address - The unique address that a manufacturer assigns to each networking device.

Mbps (MegaBits Per Second) - One million bits per second; a unit of measurement for data transmission.

NAT (Network Address Translation) - NAT technology translates IP addresses of a local area network to a different IP address for the Internet.

Network - A series of computers or devices connected for the purpose of data sharing, storage, and/or transmission between users.

Packet - A unit of data sent over a network.

Passphrase - Used much like a password, a passphrase simplifies the WEP encryption process by automatically generating the WEP encryption keys for Linksys products.

Ping (Packet INternet Groper) - An Internet utility used to determine whether a particular IP address is online.

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POP3 (Post Office Protocol 3) - A standard mail server commonly used on the Internet.

Port - The connection point on a computer or networking device used for plugging in cables or adapters.

Power over Ethernet (PoE) - A technology enabling an Ethernet network cable to deliver both data and power.

PPPoE (Point to Point Protocol over Ethernet) - A type of broadband connection that provides authentication (username and password) in addition to data transport.

PPTP (Point-to-Point Tunneling Protocol) - A VPN protocol that allows the Point to Point Protocol (PPP) to be tunneled through an IP network. This protocol is also used as a type of broadband connection in Europe.

RADIUS (Remote Authentication Dial-In User Service) - A protocol that uses an authentication server to control network access.

RJ-45 (Registered Jack-45) - An Ethernet connector that holds up to eight wires.

Roaming - The ability to take a wireless device from one access point's range to another without losing the connection.

Router - A networking device that connects multiple networks together.

Server - Any computer whose function in a network is to provide user access to files, printing, communications, and other services.

SMTP (Simple Mail Transfer Protocol) - The standard e-mail protocol on the Internet.

SNMP (Simple Network Management Protocol) - A widely used network monitoring and control protocol.

SPI (Stateful Packet Inspection) Firewall - A technology that inspects incoming packets of information before allowing them to enter the network.

SSID (Service Set Identifier) - Your wireless network's name.

Static IP Address - A fixed address assigned to a computer or device that is connected to a network.

Static Routing - Forwarding data in a network via a fixed path.

Subnet Mask - An address code that determines the size of the network.

Switch - 1. A data switch that connects computing devices to host computers, allowing a large number of devices to share a limited number of ports. 2. A device for making, breaking, or changing the connections in an electrical circuit.

TCP (Transmission Control Protocol) - A network protocol for transmitting data that requires acknowledgement from the recipient of data sent.

TCP/IP (Transmission Control Protocol/Internet Protocol) - A set of instructions PCs use to communicate over a network.

Telnet - A user command and TCP/IP protocol used for accessing remote PCs.

TFTP (Trivial File Transfer Protocol) - A version of the TCP/IP FTP protocol that has no directory or password capability.

Throughput - The amount of data moved successfully from one node to another in a given time period.

TKIP (Temporal Key Integrity Protocol) - a wireless encryption protocol that provides dynamic encryption keys for each packet transmitted.

Topology - The physical layout of a network.

TX Rate - Transmission Rate.

Upgrade - To replace existing software or firmware with a newer version.

Upload - To transmit a file over a network.

URL (Uniform Resource Locator) - The address of a file located on the Internet.

VPN (Virtual Private Network) - A security measure to protect data as it leaves one network and goes to another over the Internet.

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WAN (Wide Area Network)- The Internet.

WEP (Wired Equivalent Privacy) - A method of encrypting network data transmitted on a wireless network for greater security.

WLAN (Wireless Local Area Network) - A group of computers and associated devices that communicate with each other wirelessly.

WPA (Wi-Fi Protected Access) - A wireless security protocol using TKIP (Temporal Key Integrity Protocol) encryption, which can be used in conjunction with a RADIUS server.

Appendix F: Specifications

Model	WRTP54G	Network Protocols	TCP/IP
Standards	IEEE 802.3, IEEE 802.3u, 802.11b, 802.11g	Voice Protocol	Session Initiation Protocol (SIP v2)
Channels	11 Channels (US, Canada)	Voice Codecs	G.711 a-law, G.711 μ -Law, G.726, G.729 A/B/E, and G.723.1
Transmit Power	18 dBm for 802.11b and 16 for 802.11g @ Normal Temp Range	Ringer Equivalence Number (REN)	3 REN per RJ-11 port
Ports	One 10/100 RJ-45 Internet Port, Four 10/100 RJ-45 Network Ports, Two Standard Phone Ports, One Power Port	On-Hook Voltage	40-50 Vrms
Button	Reset	FXS Port Impedance	600 ohm resistive or 270 ohm + 750 ohm/150 nF complex impedance
Cabling Type	RJ-45 Ethernet Category 5, RJ-11 Standard Phone Cable	Ring Frequency	25 Hz
LEDs	INTERNET, PHONE1, PHONE2, WIRELESS ETHERNET (1-4), POWER	Ring Voltage	40-50 Vrms
UPnP able/cert	Certified	Dimensions (W x H x D)	6.69" x 6.69" x 1.22" (170 mm x 170 mm x 31 mm)
		Unit Weight	13.60 oz. (0.39 kg)

Wireless-G Broadband Router with 2 Phone Ports

Power	External, 12V DC, 1.0A
Certifications	FCC, CE, cUL
Operating Temp.	0° to 40°C (32° to 104°F)
Storage Temp.	-20° to 60°C (-4° to 140°F)
Operating Humidity	10 to 85%, Non-Condensing
Storage Humidity	5 to 90%, Non-Condensing
Warranty	1-Year Limited

Appendix G: Warranty Information

LIMITED WARRANTY

Your Internet phone service provider warrants to You that, for a period of one year (the “Warranty Period”), your Linksys Product will be substantially free of defects in materials and workmanship under normal use. Your exclusive remedy and Your Internet phone service provider's entire liability under this warranty will be for Your Internet phone service provider at its option to repair or replace the Product or refund Your purchase price less any rebates. This limited warranty extends only to the original purchaser.

If the Product proves defective during the Warranty Period call Your Internet phone service provider Technical Support in order to obtain a Return Authorization Number, if applicable. If You are requested to return the Product, mark the Return Authorization Number clearly on the outside of the package. You are responsible for shipping defective Products to Your Internet phone service provider.

ALL IMPLIED WARRANTIES AND CONDITIONS OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE LIMITED TO THE DURATION OF THE WARRANTY PERIOD. ALL OTHER EXPRESS OR IMPLIED CONDITIONS, REPRESENTATIONS AND WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF NON-INFRINGEMENT, ARE DISCLAIMED. Some jurisdictions do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to You. This warranty gives You specific legal rights, and You may also have other rights which vary by jurisdiction.

This warranty does not apply if the Product (a) has been altered, except by Your Internet phone service provider, (b) has not been installed, operated, repaired, or maintained in accordance with instructions supplied by Your Internet phone service provider, or (c) has been subjected to abnormal physical or electrical stress, misuse, negligence, or accident. In addition, due to the continual development of new techniques for intruding upon and attacking networks, Your Internet phone service provider does not warrant that the Product will be free of vulnerability to intrusion or attack.

TO THE EXTENT NOT PROHIBITED BY LAW, IN NO EVENT WILL YOUR INTERNET PHONE SERVICE PROVIDER BE LIABLE FOR ANY LOST DATA, REVENUE OR PROFIT, OR FOR SPECIAL, INDIRECT, CONSEQUENTIAL, INCIDENTAL OR PUNITIVE DAMAGES, REGARDLESS OF THE THEORY OF LIABILITY (INCLUDING NEGLIGENCE), ARISING OUT OF OR RELATED TO THE USE OF OR INABILITY TO USE THE PRODUCT (INCLUDING ANY SOFTWARE), EVEN IF Your Internet phone service provider HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. IN NO EVENT WILL Your Internet phone service provider' LIABILITY EXCEED THE AMOUNT PAID BY YOU FOR THE PRODUCT. The foregoing limitations will apply even if any warranty or remedy provided under this Agreement fails of its essential purpose. Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to You.

Please contact your Internet phone service provider regarding the warranty for the Product.

Appendix H: Regulatory Information

FCC Statement

This product has been tested and complies with the specifications for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used according to 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 is found 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 or devices
- Connect the equipment to an outlet other than the receiver's
- Consult a dealer or an experienced radio/TV technician for assistance

FCC Part 68 Statement

This equipment complies with Part 68 of the FCC Rules. A label is attached to the equipment that contains, among other information, its FCC registration number and ringer equivalence number. If requested, this information must be provided to the telephone company.

This equipment uses the following USOC Jack: RJ-11.

An FCC compliant telephone cord and modular plug is provided with this equipment. This equipment is designed to be connected to the telephone network or premises wiring using a compatible modular jack, which is FCC Part 68 compliant. Connection to the telephone network should be made by using the standard modular telephone jack.

The REN is useful to determine the quantity of devices that may be connected to the telephone line and still have all of those devices ring when your telephone number is called. In most, but not all areas, the sum of RENs should not exceed 5. To be certain of the number of devices that may be connected to the line, as determined by the total RENs, contact the telephone company to determine the maximum REN for the calling area.

If this equipment causes harm to the telephone network, the telephone company may discontinue your service temporarily. If advance notice is not practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the operation of the equipment. If this happens, the telephone company will provide advance notice in order for you to make the necessary modifications in order to maintain uninterrupted service.

In the event this equipment should fail to operate properly, disconnect the unit from the telephone line. Try using another FCC approved device in the same telephone jack. If the trouble persists, call the telephone company repair service bureau. If the trouble does not persist and appears to be with this unit, disconnect the unit from the telephone line and discontinue use of the unit until it is repaired. Please note that the telephone company may ask that you disconnect the equipment from the telephone network until the problem has been corrected or until you are sure that the equipment is not malfunctioning. The user must use the accessories and cables supplied by the manufacturer to get optimum performance from the product.

No repairs may be done by the customer. If trouble is experienced with this equipment, please contact your authorized support provider for repair and warranty information. If the trouble is causing harm to the telephone network, the telephone company may request you remove the equipment from the network until the problem is resolved. This equipment cannot be used on telephone company provided coin service. Connection to Party Line Service is subject to state tariffs.

Safety Notices

Caution: To reduce the risk of fire, use only No.26 AWG or larger telecommunication line cord.

Do not use this product near water, for example, in a wet basement or near a swimming pool.

Avoid using this product during an electrical storm. There may be a remote risk of electric shock from lightning.

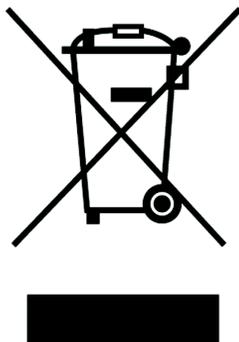
Industry Canada (Canada)

This device complies with Canadian ICES-003 rule.

Cet appareil est conforme à la norme NMB-003 d'Industry Canada.

User Information for Consumer Products Covered by EU Directive 2002/96/EC on Waste Electric and Electronic Equipment (WEEE)

This document contains important information for users with regards to the proper disposal and recycling of Linksys products. Consumers are required to comply with this notice for all electronic products bearing the following symbol:



English

Environmental Information for Customers in the European Union

European Directive 2002/96/EC requires that the equipment bearing this symbol on the product and/or its packaging must not be disposed of with unsorted municipal waste. The symbol indicates that this product should be disposed of separately from regular household waste streams. It is your responsibility to dispose of this and other electric and electronic equipment via designated collection facilities appointed by the government or local authorities. Correct disposal and recycling will help prevent potential negative consequences to the environment and human health. For more detailed information about the disposal of your old equipment, please contact your local authorities, waste disposal service, or the shop where you purchased the product.

Ceština/Czech

Informace o ochraně životního prostředí pro zákazníky v zemích Evropské unie

Evropská směrnice 2002/96/ES zakazuje, aby zařízení označené tímto symbolem na produktu anebo na obalu bylo likvidováno s netříděným komunálním odpadem. Tento symbol udává, že daný produkt musí být likvidován odděleně od běžného komunálního odpadu. Odpovídáte za likvidaci tohoto produktu a dalších elektrických a elektronických zařízení prostřednictvím určených sběrných míst stanovených vládou nebo místními úřady. Správná likvidace a recyklace pomáhá předcházet potenciálním negativním dopadům na životní prostředí a lidské zdraví. Podrobnější informace o likvidaci starého vybavení si laskavě vyžádejte od místních úřadů, podniku zabývajícího se likvidací komunálních odpadů nebo obchodu, kde jste produkt zakoupili.

Dansk/Danish**Miljøinformation for kunder i EU**

EU-direktiv 2002/96/EF kræver, at udstyr der bærer dette symbol på produktet og/eller emballagen ikke må bortskaffes som usorteret kommunalt affald. Symbolet betyder, at dette produkt skal bortskaffes adskilt fra det almindelige husholdningsaffald. Det er dit ansvar at bortskaffe dette og andet elektrisk og elektronisk udstyr via bestemte indsamlingssteder udpeget af staten eller de lokale myndigheder. Korrekt bortskaffelse og genvinding vil hjælpe med til at undgå mulige skader for miljøet og menneskers sundhed. Kontakt venligst de lokale myndigheder, renovationstjenesten eller den butik, hvor du har købt produktet, angående mere detaljeret information om bortskaffelse af dit gamle udstyr.

Deutsch/German**Umweltinformation für Kunden innerhalb der Europäischen Union**

Die Europäische Richtlinie 2002/96/EC verlangt, dass technische Ausrüstung, die direkt am Gerät und/oder an der Verpackung mit diesem Symbol versehen ist nicht zusammen mit unsortiertem Gemeindeabfall entsorgt werden darf. Das Symbol weist darauf hin, dass das Produkt von regulärem Haushaltsmüll getrennt entsorgt werden sollte. Es liegt in Ihrer Verantwortung, dieses Gerät und andere elektrische und elektronische Geräte über die dafür zuständigen und von der Regierung oder örtlichen Behörden dazu bestimmten Sammelstellen zu entsorgen. Ordnungsgemäßes Entsorgen und Recyceln trägt dazu bei, potentielle negative Folgen für Umwelt und die menschliche Gesundheit zu vermeiden. Wenn Sie weitere Informationen zur Entsorgung Ihrer Altgeräte benötigen, wenden Sie sich bitte an die örtlichen Behörden oder städtischen Entsorgungsdienste oder an den Händler, bei dem Sie das Produkt erworben haben.

Eesti/Estonian**Keskkonnaalane informatsioon Euroopa Liidus asuvatele klientidele**

Euroopa Liidu direktiivi 2002/96/EU nõuete kohaselt on seadmeid, millel on tootel või pakendil käesolev sümbol, keelatud kõrvaldada koos sorteerimata olmejäätmetega. See sümbol näitab, et toode tuleks kõrvaldada eraldi tavalistest olmejäätmevoogudest. Olete kohustatud kõrvaldama käesoleva ja ka muud elektri- ja elektroonikaseadmed riigi või kohalike ametiasutuste poolt ette nähtud kogumispunktide kaudu. Seadmete korrektnet kõrvaldamine ja ringlussevõtt aitab vältida võimalikke negatiivseid tagajärgi keskkonnale ning inimeste tervisele. Vanade seadmete kõrvaldamise kohta täpsema informatsiooni saamiseks võtke palun ühendust kohalike ametiasutustega, jäätmeäitlusfirmaga või kauplusega, kust te toote ostsite.

Español/Spanish**Información medioambiental para clientes de la Unión Europea**

La Directiva 2002/96/CE de la UE exige que los equipos que lleven este símbolo en el propio aparato y/o en su embalaje no deben eliminarse junto con otros residuos urbanos no seleccionados. El símbolo indica que el producto en cuestión debe separarse de los residuos domésticos convencionales con vistas a su eliminación. Es responsabilidad suya desechar este y cualesquiera otros aparatos eléctricos y electrónicos a través de los puntos de recogida que ponen a su disposición el gobierno y las autoridades locales. Al desechar y reciclar correctamente estos aparatos estará contribuyendo a evitar posibles consecuencias negativas para el medio ambiente y la salud de las personas. Si desea obtener información más detallada sobre la eliminación segura de su aparato usado, consulte a las autoridades locales, al servicio de recogida y eliminación de residuos de su zona o pregunte en la tienda donde adquirió el producto.

Ελληνικά/Greek

Στοιχεία περιβαλλοντικής προστασίας για πελάτες εντός της Ευρωπαϊκής Ένωσης

Η Κοινοτική Οδηγία 2002/96/ΕΚ απαιτεί ότι ο εξοπλισμός ο οποίος φέρει αυτό το σύμβολο στο προϊόν και/ή στη συσκευασία του δεν πρέπει να απορρίπτεται μαζί με τα μικτά κοινотικά απορρίμματα. Το σύμβολο υποδεικνύει ότι αυτό το προϊόν θα πρέπει να απορρίπτεται ξεχωριστά από τα συνήθη οικιακά απορρίμματα. Είστε υπεύθυνος για την απόρριψη του παρόντος και άλλου ηλεκτρικού και ηλεκτρονικού εξοπλισμού μέσω των καθορισμένων εγκαταστάσεων συγκέντρωσης απορριμμάτων οι οποίες παρέχονται από το κράτος ή τις αρμόδιες τοπικές αρχές. Η σωστή απόρριψη και ανακύκλωση συμβάλλει στην πρόληψη πιθανών αρνητικών συνεπειών για το περιβάλλον και την υγεία. Για περισσότερες πληροφορίες σχετικά με την απόρριψη του παλιού σας εξοπλισμού, παρακαλώ επικοινωνήστε με τις τοπικές αρχές, τις υπηρεσίες απόρριψης ή το κατάστημα από το οποίο αγοράσατε το προϊόν.

Français/French

Informations environnementales pour les clients de l'Union européenne

La directive européenne 2002/96/CE exige que l'équipement sur lequel est apposé ce symbole sur le produit et/ou son emballage ne soit pas jeté avec les autres ordures ménagères. Ce symbole indique que le produit doit être éliminé dans un circuit distinct de celui pour les déchets des ménages. Il est de votre responsabilité de jeter ce matériel ainsi que tout autre matériel électrique ou électronique par les moyens de collecte indiqués par le gouvernement et les pouvoirs publics des collectivités territoriales. L'élimination et le recyclage en bonne et due forme ont pour but de lutter contre l'impact néfaste potentiel de ce type de produits sur l'environnement et la santé publique. Pour plus d'informations sur le mode d'élimination de votre ancien équipement, veuillez prendre contact avec les pouvoirs publics locaux, le service de traitement des déchets, ou l'endroit où vous avez acheté le produit.

Italiano/Italian

Informazioni relative all'ambiente per i clienti residenti nell'Unione Europea

La direttiva europea 2002/96/EC richiede che le apparecchiature contrassegnate con questo simbolo sul prodotto e/o sull'imballaggio non siano smaltite insieme ai rifiuti urbani non differenziati. Il simbolo indica che questo prodotto non deve essere smaltito insieme ai normali rifiuti domestici. È responsabilità del proprietario smaltire sia questi prodotti sia le altre apparecchiature elettriche ed elettroniche mediante le specifiche strutture di raccolta indicate dal governo o dagli enti pubblici locali. Il corretto smaltimento ed il riciclaggio aiuteranno a prevenire conseguenze potenzialmente negative per l'ambiente e per la salute dell'essere umano. Per ricevere informazioni più dettagliate circa lo smaltimento delle vecchie apparecchiature in Vostro possesso, Vi invitiamo a contattare gli enti pubblici di competenza, il servizio di smaltimento rifiuti o il negozio nel quale avete acquistato il prodotto.

Latviešu valoda/Latvian

Ekoloģiska informācija klientiem Eiropas Savienības jurisdikcijā

Direktīvā 2002/96/EK ir prasība, ka aprīkojumu, kam pievienota zīme uz paša izstrādājuma vai uz tā iesaiņojuma, nedrīkst izmest nešķirotā veidā kopā ar komunālajiem atkritumiem (tiem, ko rada vietēji iedzīvotāji un uzņēmumi). Šī zīme nozīmē to, ka šī ierīce ir jāizmet atkritumos tā, lai tā nenonāktu kopā ar parastiem mājaisaimniecības atkritumiem. Jūsu pienākums ir šo un citas elektriskas un elektroniskas ierīces izmest atkritumos, izmantojot īpašus atkritumu savākšanas veidus un līdzekļus, ko nodrošina valsts un pašvaldību iestādes. Ja izmešana atkritumos un pārstrāde tiek veikta pareizi, tad mazinās iespējams kaitējums dabai un cilvēku veselībai. Sīkākas ziņas par novecojuša aprīkojuma izmešanu atkritumos jūs varat saņemt vietējā pašvaldībā, atkritumu savākšanas dienestā, kā arī veikalā, kur iegādājāties šo izstrādājumu.

Lietuvškai/Lithuanian**Aplinkosaugos informacija, skirta Europos Sąjungos vartotojams**

Europos direktyva 2002/96/EC numato, kad įrangos, kuri ir (arba) kurios pakuotė yra pažymėta šiuo simboliu, negalima šalinti kartu su nerūšiuotomis komunalinėmis atliekomis. Šis simbolis rodo, kad gaminių reikia šalinti atskirai nuo bendro buitinių atliekų srauto. Jūs privalote užtikrinti, kad ši ir kita elektros ar elektroninė įranga būtų šalinama per tam tikras nacionalinės ar vietinės valdžios nustatytas atliekų rinkimo sistemas. Tinkamai šalinant ir perdurbant atliekas, bus išvengta galimos žalos aplinkai ir žmonių sveikatai. Daugiau informacijos apie jūsų senos įrangos šalinimą gali pateikti vietinės valdžios institucijos, atliekų šalinimo tarnybos arba parduotuvės, kuriose įsigijote tą gaminį.

Malti/Maltese**Informazzjoni Ambjentali għal Kliġenti fl-Unjoni Ewropea**

Id-Direttiva Ewropea 2002/96/KE titlob li t-tagħmir li jkun fih is-simbolu fuq il-prodott u/jew fuq l-ippakkjar ma jistax jintrema ma' skart municiġpali li ma għex isseparat. Is-simbolu jindika li dan il-prodott għandu jintrema separatament minn ma' l-skart domestiku regolari. Hija responsabbiltà tiegħek li tarmi dan il-tagħmir u kull tagħmir iehor ta' l-elettriku u elettroniku permezz ta' facilitajiet ta' għbir appuntati apposta mill-gvern jew mill-awtoritajiet lokali. Ir-rimi b' mod korrett u r-riciklagg jgħin jipprevjeni konsegwenzi negattivi potenzjali għall-ambjent u għas-saħħa tal-bniedem. Għal aktar informazzjoni dettaljata dwar ir-rimi ta' tagħmir antik tiegħek, jekk jogħġbok ikkuntattja lill-awtoritajiet lokali tiegħek, is-servizzi għar-rimi ta' l-skart, jew il-hanut minn fejn xtrajt il-prodott.

Magyar/Hungarian**Környezetvédelmi információ az európai uniós vásárlók számára**

A 2002/96/EC számú európai uniós irányelv megkívánja, hogy azokat a termékeket, amelyekben, és/vagy amelyek csomagolásán az alábbi címke megjelenik, tilos a többi szelektálatlan lakossági hulladékkal együtt kidobni. A címke azt jelöli, hogy az adott termék kidobásakor a szokványos háztartási hulladékéhszállítási rendszerektől elkülönített eljárást kell alkalmazni. Az Ön felelőssége, hogy ezt, és más elektromos és elektronikus berendezéseit a kormányzati vagy a helyi hatóságok által kijelölt gyűjtőrendszereken keresztül számolja fel. A megfelelő hulladékfeldolgozás segít a környezetre és az emberi egészségre potenciálisan ártalmas negatív hatások megelőzésében. Ha elavult berendezéseinek felszámolásához további részletes információra van szüksége, kérjük, lépjen kapcsolatba a helyi hatóságokkal, a hulladékfeldolgozási szolgálattal, vagy azzal üzlettel, ahol a terméket vásárolta.

Nederlands/Dutch**Milieu-informatie voor klanten in de Europese Unie**

De Europese Richtlijn 2002/96/EC schrijft voor dat apparatuur die is voorzien van dit symbool op het product of de verpakking, niet mag worden ingezameld met niet-gescheiden huishoudelijk afval. Dit symbool geeft aan dat het product apart moet worden ingezameld. U bent zelf verantwoordelijk voor de vernietiging van deze en andere elektrische en elektronische apparatuur via de daarvoor door de landelijke of plaatselijke overheid aangewezen inzamelingskanalen. De juiste vernietiging en recycling van deze apparatuur voorkomt mogelijke negatieve gevolgen voor het milieu en de gezondheid. Voor meer informatie over het vernietigen van uw oude apparatuur neemt u contact op met de plaatselijke autoriteiten of afvalverwerkingsdienst, of met de winkel waar u het product hebt aangeschaft.

Norsk/Norwegian

Miljøinformasjon for kunder i EU

EU-direktiv 2002/96/EF krever at utstyr med følgende symbol avbildet på produktet og/eller pakningen, ikke må kastes sammen med usortert avfall. Symbolet indikerer at dette produktet skal håndteres atskilt fra ordinær avfallsinnsamling for husholdningsavfall. Det er ditt ansvar å kvitte deg med dette produktet og annet elektrisk og elektronisk avfall via egne innsamlingsordninger slik myndighetene eller kommunene bestemmer. Korrekt avfallshåndtering og gjenvinning vil være med på å forhindre mulige negative konsekvenser for miljø og helse. For nærmere informasjon om håndtering av det kasserte utstyret ditt, kan du ta kontakt med kommunen, en innsamlingsstasjon for avfall eller butikken der du kjøpte produktet.

Polski/Polish

Informacja dla klientów w Unii Europejskiej o przepisach dotyczących ochrony środowiska

Dyrektywa Europejska 2002/96/EC wymaga, aby sprzęt oznaczony symbolem znajdującym się na produkcie i/lub jego opakowaniu nie był wyrzucany razem z innymi niesortowanymi odpadami komunalnymi. Symbol ten wskazuje, że produkt nie powinien być usuwany razem ze zwykłymi odpadami z gospodarstw domowych. Na Państwu spoczywa obowiązek wyrzucania tego i innych urządzeń elektrycznych oraz elektronicznych w punktach odbioru wyznaczonych przez władze krajowe lub lokalne. Pozbywanie się sprzętu we właściwy sposób i jego recykling pomogą zapobiec potencjalnie negatywnym konsekwencjom dla środowiska i zdrowia ludzkiego. W celu uzyskania szczegółowych informacji o usuwaniu starego sprzętu, prosimy zwrócić się do lokalnych władz, służb oczyszczania miasta lub sklepu, w którym produkt został nabyty.

Português/Portuguese

Informação ambiental para clientes da União Europeia

A Directiva Europeia 2002/96/CE exige que o equipamento que exhibe este símbolo no produto e/ou na sua embalagem não seja eliminado junto com os resíduos municipais não separados. O símbolo indica que este produto deve ser eliminado separadamente dos resíduos domésticos regulares. É da sua responsabilidade eliminar este e qualquer outro equipamento eléctrico e electrónico através das instalações de recolha designadas pelas autoridades governamentais ou locais. A eliminação e reciclagem correctas ajudarão a prevenir as consequências negativas para o ambiente e para a saúde humana. Para obter informações mais detalhadas sobre a forma de eliminar o seu equipamento antigo, contacte as autoridades locais, os serviços de eliminação de resíduos ou o estabelecimento comercial onde adquiriu o produto.

Slovenčina/Slovak

Informácie o ochrane životného prostredia pre zákazníkov v Európskej únii

Podľa európskej smernice 2002/96/ES zariadenie s týmto symbolom na produkte a/alebo jeho balení nesmie byť likvidované spolu s netriedeným komunálnym odpadom. Symbol znamená, že produkt by sa mal likvidovať oddelene od bežného odpadu z domácností. Je vašou povinnosťou likvidovať toto i ostatné elektrické a elektronické zariadenia prostredníctvom špecializovaných zberných zariadení určených vládou alebo miestnymi orgánmi. Správna likvidácia a recyklácia pomôže zabrániť prípadným negatívnym dopadom na životné prostredie a zdravie ľudí. Ak máte záujem o podrobnejšie informácie o likvidácii starého zariadenia, obráťte sa, prosím, na miestne orgány, organizácie zaoberajúce sa likvidáciou odpadov alebo obchod, v ktorom ste si produkt zakúpili.

Slovenčina/Slovene**Okoljske informacije za stranke v Evropski uniji**

Evropska direktiva 2002/96/EC prepoveduje odlaganje opreme, označene s tem simbolom – na izdelku in/ali na embalaži – med običajne, nerazvrščene odpadke. Ta simbol opozarja, da je treba izdelek odvreči ločeno od preostalih gospodinjstvih odpadkov. Vaša odgovornost je, da to in preostalo električno in elektronsko opremo odnesete na posebna zbirališča, ki jih določijo državne ustanove ali lokalna uprava. S pravilnim odlaganjem in recikliranjem boste preprečili morebitne škodljive vplive na okolje in zdravje ljudi. Če želite izvedeti več o odlaganju stare opreme, se obrnite na lokalno upravo, odpad ali trgovino, kjer ste izdelek kupili.

Suomi/Finnish**Ympäristöä koskevia tietoja EU-alueen asiakkaille**

EU-direktiivi 2002/96/EY edellyttää, että jos laitteistossa on tämä symboli itse tuotteessa ja/tai sen pakkauksessa, laitteistoa ei saa hävittää lajittelemattoman yhdyskuntajätteen mukana. Symboli merkitsee sitä, että tämä tuote on hävitettävä erillään tavallisesta kotitalousjätteestä. Sinun vastuullasi on hävittää tämä elektroniikkatuote ja muut vastaavat elektroniikkatuotteet viemällä tuote tai tuotteet viranomaisten määräämään keräyspisteeseen. Laitteiston oikea hävittäminen estää mahdolliset kielteiset vaikutukset ympäristöön ja ihmisten terveyteen. Lisätietoja vanhan laitteiston oikeasta hävitystavasta saa paikallisilta viranomaisilta, jätteenhävityspalvelusta tai siitä myymälästä, josta ostit tuotteen.

Svenska/Swedish**Miljöinformation för kunder i Europeiska unionen**

Det europeiska direktivet 2002/96/EC kräver att utrustning med denna symbol på produkten och/eller förpackningen inte får kastas med osorterat kommunalt avfall. Symbolen visar att denna produkt bör kastas efter att den avskiljts från vanligt hushållsavfall. Det faller på ditt ansvar att kasta denna och annan elektrisk och elektronisk utrustning på fastställda insamlingsplatser utsedda av regeringen eller lokala myndigheter. Korrekt kassering och återvinning skyddar mot eventuella negativa konsekvenser för miljön och personhälsa. För mer detaljerad information om kassering av din gamla utrustning kontaktar du dina lokala myndigheter, avfallshanteringen eller butiken där du köpte produkten.

Appendix I: Contact Information

Need to contact Linksys?

Visit us online for information on the latest products and updates to your existing products at:

<http://www.linksys.com> or
[ftp.linksys.com](ftp://ftp.linksys.com)

Can't find information about a product you want to buy on the web? Do you want to know more about networking with Linksys products? Give our advice line a call at:
Or fax your request in to:

800-546-5797 (LINKSYS)
949-823-3002

If you experience problems with any Linksys product, you can e-mail us at:

support@linksys.com

www.linksys.com