

User Guide



Wireless-B

Broadband Router



Model **NWR11B**

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FCC STATEMENT

The Wireless-B Broadband Router 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

NWR11B-UG-31030NC BW

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Chapter 1: Introduction

The Wireless Broadband Router

The Wireless Router lets you securely share your DSL or Cable Modem Internet connection with all the computers in the house, both wireless and wired. You can connect four computers directly to the Router by Ethernet cables, and daisy-chain out to more hubs and switches to create as big a network as you need.

Or, use the Router's built-in Wireless Access Point to connect your PC to the network without stringing any wires. Just plug a wireless network adapter into your notebook through a PC Card slot, and you're ready to go. Wireless networking doesn't get any easier.

Of course, you can connect more computers to the Router and your high-speed Internet link -- just provide a wired or wireless network adapter for each one. And once your computers are connected to the Router, they can communicate with each other too, sharing resources like printers and all kinds of files -- music, digital pictures, and documents.

To protect your data and privacy, all wireless communications can be protected by 128-bit encryption, while the Router helps keep Internet intruders out of your computers. It's all easier than you think -- the included Setup Wizards walk you through configuring the Router, step by step.

With the Wireless-B Broadband Router, you're ready to start sharing printers, files, and your Internet connection, the easy way.

Features

- 11 Mbps High-Speed Data Transfer Rate with Automatic Fallback
- Plug-and-Play Operation Provides Easy Setup
- 802.11b, DSSS, 2.4GHz-Compliant
- Supports up to 128-bit WEP Encryption Security
- Compatible with Virtually All Major Network Operating Systems
- Free Driver Upgrades via Web
- Remote administration and upgrade feature
- Integrated Equalizer Recovers Weak Signals and Enhances Sensitivity
- Sturdy Metal Design with Integrated Antenna
- Works with All Standard Internet Applications
- Clear Channel Assessment Increases Network Throughput
- Hardware Buffer Chaining Provides High Performance While Reading and Writing Buffers

An Introduction to LANs and WANs

Simply put, a router is a network device that connects two networks together.

In this instance, the Router connects your Local Area Network (LAN), or the group of PCs in your home or office, to the Wide Area Network (WAN) that is the Internet. The Router processes and regulates the data that travels between these two networks.

Think of the Router as a network device with two sides. The first side is made up of your private Local Area Network (LAN) of PCs. The other, public side is the Internet, or the Wide Area Network (WAN), outside of your home or office.

The Router's firewall (NAT) protects your network of PCs so users on the public, Internet side cannot "see" your PCs. This is how your LAN, or network, remains private. The Router protects your network by inspecting the first packet coming in from the Internet port before delivery to the final destination on the LAN port. The Router inspects Internet port services like the web server, ftp server, or other Internet applications, and, if allowed, it will forward the packet to the appropriate PC on the LAN side.

IP Addresses

What's an IP Address?

IP stands for Internet Protocol. Every device on an IP-based network, including PCs, print servers, and routers, requires an IP address to identify its "location," or address, on the network. This applies to both the Internet and LAN connections.

There are two ways of assigning an IP address to your network devices.

Static IP Addresses

A static IP address is a fixed IP address that you assign manually to a PC or other device on the network. Since a static IP address remains valid until you disable it, static IP addressing insures that the device assigned it will have that same IP address until you change it. Static IP addresses are commonly used with network devices such as server PCs or print servers.

If you use the Router to share your cable or DSL Internet connection, contact your ISP to find out if they have assigned a static IP address to your account. If so, you will need that static IP address when configuring the Router. You can get the information from your ISP.

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Note: Since the Router is a device that connects two networks, it needs two IP addresses—one for the LAN side, and one for the Internet side. In this User Guide, you'll see references to the "Internet IP address" and the "LAN IP address."

Since the Router has firewall security (NAT), only the Router's Internet IP address can be seen from the Internet.

However, even the Internet IP address can be blocked, so that the Router and network seem invisible to the Internet—This is shown in the Filters section in "Chapter 5: The Router's Web-Based Utility".

Dynamic IP Addresses

A dynamic IP address is automatically assigned to a device on the network, such as PCs and print servers. These IP addresses are called "dynamic" because they are only *temporarily* assigned to the PC or device. After a certain time period, they expire and may change. If a PC logs on to the network (or the Internet) and its dynamic IP address has expired, the DHCP server will assign it a new dynamic IP address.

For DSL users, many ISPs may require you to log on with a user name and password to gain access to the Internet. This is called "Point to Point Protocol over Ethernet" or PPPoE. PPPoE is similar to a dial-up connection but does not have a phone number to dial into, and PPPoE is a dedicated high-speed connection. PPPoE also will provide the Router with a dynamic IP address to establish a connection to the Internet.

DHCP (Dynamic Host Configuration Protocol) Servers

DHCP frees you from having to assign IP addresses manually every time a new user is added to your network. PCs and other network devices using dynamic IP addressing are assigned a new IP address by a DHCP server. The PC or network device obtaining an IP address is called the DHCP client. The Router's Internet port is, by default, set as a DHCP client.

DHCP servers can either be a designated PC on the network or another network device, such as the Router. By default, a DHCP server is enabled on your Router's LAN ports. If you already have a DHCP server running on your network, you *must* disable one of the two DHCP servers. If you run more than one DHCP server on your network, you will experience network errors, such as conflicting IP addresses. To disable the Router's DHCP function, see the DHCP section in Chapter 5: The Router's Web-Based Utility.



Note: Even if you assign a static IP address to a PC, other PCs can still use DHCP's dynamic IP addressing, as long as the static IP is not within the DHCP range of the LAN IP Address.

If the Router's DHCP function fails to provide a dynamic IP address for any reason, please refer to Appendix A: Troubleshooting.

The Router's Ports



Figure 1-1

The Router's rear panel (as shown in Figure 1-1) is where all of its connections are made.

Internet The Internet Port is where you will connect your cable or DSL modem with an Ethernet cable. *Your modem connection will not work from any other port.*

Ports 1, 2, 3, 4 These four LAN (Local Area Network) ports are where you will connect networked devices, such as PCs, print servers, and any other Ethernet devices you want to put on your network.

Power The Power Port is where you will connect the included AC Power adapter.

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The Reset Button

Pressing the Reset Button and holding it in for a few seconds will clear all of the Router's data and restore the factory defaults. This should be done only if you are experiencing heavy routing problems, and only after you have exhausted all of the other troubleshooting options. By resetting the Router, you run the risk of creating conflicts between your PCs' actual IP Addresses and what the Router thinks their IP Addresses should be. You may be forced to reboot each network PC.

If the Router locks up, simply press the reset button or power it down for three to five seconds by removing the power cable from the Router's Power Port. Leaving the power off for too long could result in the loss of network connections.

The Router's LEDs

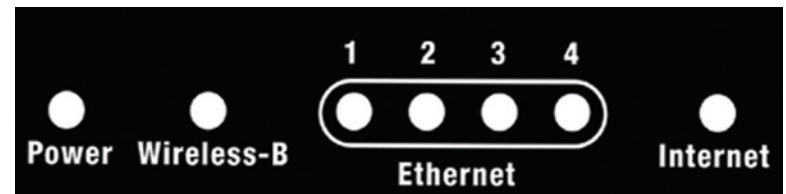


Figure 1-2

The LAN Indicators, shown in Figure 1-2, show the status of information being transmitted within your local network

Wireless-B *Green.* This LED indicates that the Router's wireless functions have been enabled through the Web-based utility and there is wireless activity.

Power *Green.* This LED indicates that the Router's power is on. When blinking, this LED indicates that the Router is in self-diagnosis mode during boot-up and restart. It will stop blinking after completing the diagnosis. If this LED blinks for more than five seconds, refer to the Troubleshooting Appendix.

Ethernet *Green.* This LED serves two purposes. When this LED is lit continuously, this indicates that the Router is connected to a device through the corresponding port (1, 2, 3, or 4). A blinking LED indicates that the Router is actively sending or receiving data over that port.

The Internet indicators, shown in Figure 1-2, show the status of information being transmitted to and from the Internet.

Internet *Green.* This LED indicates a connection between the Router and your broadband device or network.

Chapter 2: Planning Your Wireless Network

Network Topology

A wireless LAN is exactly like a regular LAN, except that each computer in the LAN uses a wireless adapter to connect to the network through a wireless connection. Computers in a wireless LAN must be configured to share the same radio channel.

The wireless adapter provides LAN access for wireless workstations. An integrated wireless and wired LAN is called an Infrastructure configuration. A group of wireless adapter users and this Router compose a Basic Service Set (BSS). Each PC equipped with a wireless adapter in a BSS can talk to any computer in a wired LAN infrastructure via this Router.

An infrastructure configuration extends the accessibility of a PC with a wireless adapter to a wired LAN, and doubles the effective wireless transmission range for two PCs equipped with a wireless adapter

Roaming

Infrastructure mode also supports roaming capabilities for mobile users. More than one BSS can be configured as an Extended Service Set (ESS). This continuous network allows users to roam freely within an ESS. All PCs that are equipped with a wireless adapter, and are within one ESS, must be configured with the same ESS ID.

Before enabling an ESS with roaming capability, it is recommended to select a feasible radio channel and optimum Router position. Proper positioning combined with a clear radio signal will greatly enhance performance.

Chapter 3: Connecting the Router

Before You Start

Before plugging everything together, it's always a good idea to have everything you'll need to get the Router up and running. Depending upon how you configure the Router in Chapter 5: The Router's Web-based Utility, you may need some of the following values from your ISP:

When connecting through a Static IP connection, be sure to have 1) Your broadband-configured PC's fixed Internet IP Address, 2) Your broadband-configured PC's Computer Name and Workgroup Name, 3) Your Subnet Mask, 4) Your Default Gateway, and 5) Your Primary DNS IP address.

When connecting through a PPPoE connection, be sure to have 1) Your PPPoE User Name and 2) Your PPPoE Password.

The installation technician from your ISP should have left this information with you after installing your broadband connection. If not, you can call your ISP to request the data.

Once you have the above values, you can begin the Router's installation and setup.

Connecting Your Hardware Together and Booting Up

Once you are sure that you have the above values on hand, you can begin the Installation and Setup of the Router.

1. Power everything down, including your PCs, your cable or DSL modem and the Router.
2. Connect an Ethernet cable from one of your PC's Ethernet ports to one of the Router's Ethernet ports. Do the same with all the PCs you wish to connect to the Router.

In addition to accessing the Router through an Ethernet connection, a wireless connection can be used to access the Router. See the "For Wireless Connections" note that follows these connection instructions.

3. Connect another Ethernet cable from your cable or DSL modem to the Router's **Internet** port.

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4. Connect the Power Adapter (included) to the Router's Power port and plug the other end into a power outlet.
 - The Power LED will blink green as soon as the power adapter is connected.
5. Power on the cable or DSL modem. Verify that the power is on by checking the **Internet** LED in the Internet column on the front of the Router. The Link LED will be illuminated if the power is on and the modem is ready.
6. Press the Reset button on the back of the Router. Hold the button in for three seconds. This restores the Router's default settings.
7. Power on your PC.

**The Router is now connected.
Continue to the next chapter to configure your PCs.**

For Wireless Connections: In addition to accessing the Router through an Ethernet connection, a wireless connection can be used to access the Router. After powering on the Router and connecting it to your modem, enter the Router's IP Address in the Address field of your wireless PC's web-browser as follows: **http://192.168.1.1** and press **Enter**.



Important: The Router is configured by default to work out of the box with all Network Everywhere Wireless Adapters. If you have changed the defaults on your Network Everywhere Wireless Adapters, or are using other wireless adapters, you must temporarily change your wireless adapter settings to: (SSID = wireless) in order to initially access the Router wirelessly. After you have accessed the Router with the default settings, you can change the Router's settings to coincide with your Network settings and reset your adapters.



Important: Some ISPs—most notably some cable providers—configure their networks so that you do not have to enter a full Internet address into your web browser or e-mail application to reach your home page or receive your e-mail. If your Internet home page address is something very simple, such as "www", rather than "www.networkeverywhere.com", or your e-mail server's address is something similar to "e-mail" or "pop3", rather than "pop.mail.networkeverywhere.com", you won't be able to properly configure the Router until you determine the actual Internet addresses of your Web and e-mail connections.

You **must** obtain this information prior to connecting the Router to your network. You can obtain this information by contacting your ISP.

Chapter 4: Configuring the PCs

Overview

These instructions will help you configure each of your computers to communicate with the Router.

To do this, you will need to configure your PC's network settings to obtain an IP (or TCP/IP) address automatically. Computers use IP addresses to communicate with each other across a network or the Internet.

You will need to know which operating system your computer is running, such as Windows 98 SE, Millennium, 2000, or XP. You can find out by clicking the **Start** button and then selecting the **Settings** option. (If your Start menu doesn't have a Settings option, you're running Windows XP. You can select the Control Panel directly from the Start Menu.) Then, click **Control Panel** and double-click the **System** icon. Click the **Cancel** button when done.

Once you know which Windows operating system you are running, follow the directions in this step for your computer's operating system. If your PC is not configured with the TCP/IP protocol, you will need to do this for each computer you are connecting to the Router.

The next few pages tell you, step by step, how to configure your TCP/IP settings based on the type of Windows operating system you are using. Once you've configured your computers, continue to Chapter 5: The Router's Web-based Utility.

Configuring Windows 98 SE and Millennium PCs

1. Click the **Start** button, click **Settings** and open the **Control Panel**. From there, double-click the **Network** icon to open the Network screen.

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2. Select the Configuration tab and highlight the **TCP/IP line** for the applicable Ethernet adapter (as shown in Figure 4-1). If the word **TCP/IP** appears by itself, select that line. (Note: If there is no TCP/IP line listed, refer to your Ethernet adapter's documentation to install TCP/IP now.) Then, click the **Properties** button.

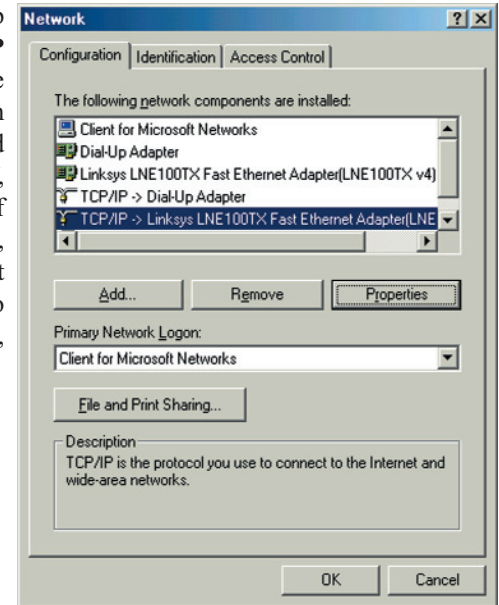


Figure 4-1

3. Click the **IP Address** tab and select **Obtain an IP address automatically** (as shown in figure 4-2).

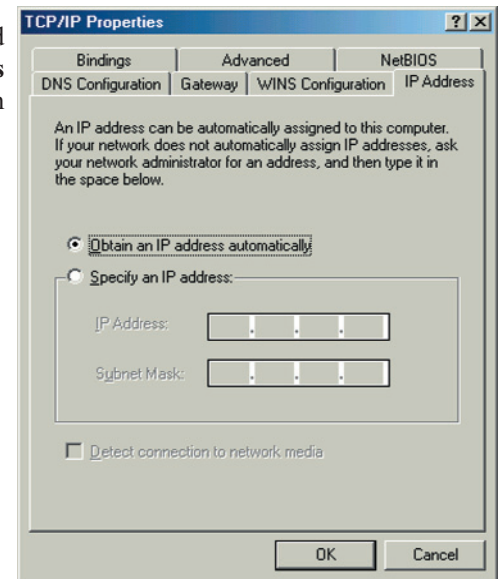


Figure 4-2

4. Click the **Gateway** tab and verify that the Installed Gateway field is blank. Click the **OK** button.

- Click the **OK** button again. Windows may ask you for the original Windows installation disk or additional files. Supply them by pointing to the correct file location, e.g., D:\win98, D:\win9x, c:\windows\options\cabs, etc. (This assumes that “D” is the letter of your CD-ROM drive).
- If Windows asks you to restart your PC, click the **Yes** button. If Windows does not ask you to restart, restart your computer anyway.

Repeat steps 1-6 for each PC on your network. When all of your PCs are configured, proceed to Chapter 5: The Router’s Web-based Utility.

Configuring Windows 2000 PCs

- Click the **Start** button, click **Settings** and open the **Control Panel**. From there, double-click the **Network and Dial-up Connections** icon. This will display the Network screen.

- Select the **Local Area Connection** icon for the applicable Ethernet adapter (usually it is the first Local Area Connection listed).

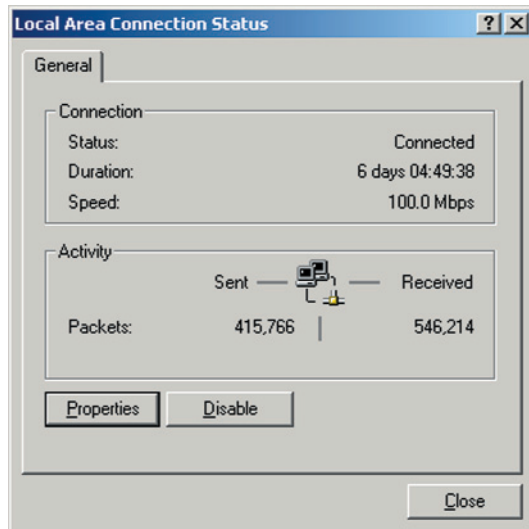


Figure 4-3

- When the Local Area Connection Status screen appears, click the **Properties** button. (See Figure 4-3.)

- Select **Internet Protocol (TCP/IP)** (as shown in Figure 4-4) and click the **Properties** button.

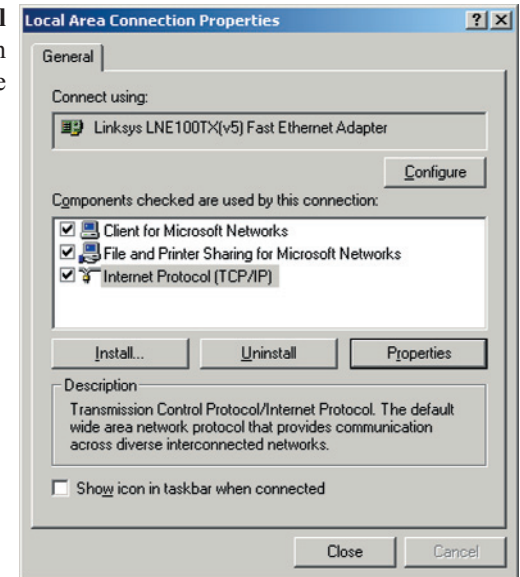


Figure 4-4

- Select **Obtain an IP address automatically** and verify that **Obtain DNS server address automatically** is selected (as shown in Figure 4-5). Then, click the **OK** button and click the **OK** button on the subsequent screens to complete the PC’s configuration.

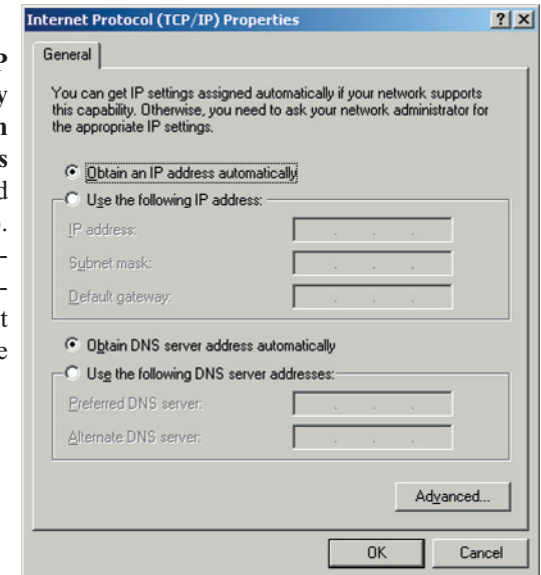


Figure 4-5

Repeat steps 1-5 for each PC on your network. When all of your PCs are configured, proceed to Chapter 5: The Router’s Web-based Utility.

Configuring Windows XP PCs

The following instructions assume you are running Windows XP's 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 the **Start** button, open the **Control Panel**, and click the **Network and Internet Connections** icon. Then, click the **Network Connections** icon to display the Network screen.

2. Select the **Local Area Connection** icon for the applicable Ethernet adapter (usually it is the first Local Area Connection listed).

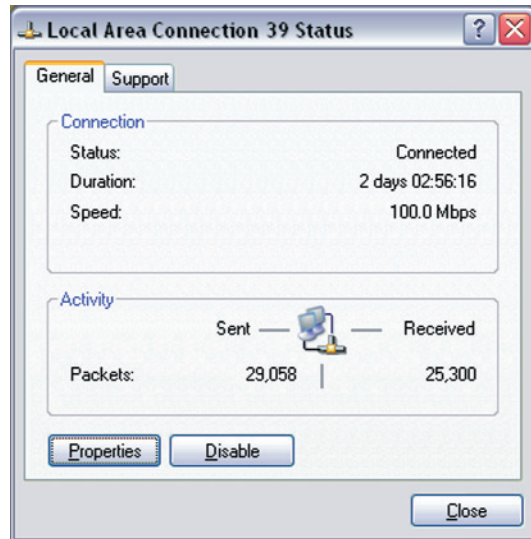


Figure 4-6

3. When the Local Area Connection Status screen appears, click the **Properties** button. (See Figure 4-6.)

4. Select **Internet Protocol (TCP/IP)** (as shown in Figure 4-7) and click the **Properties** button.

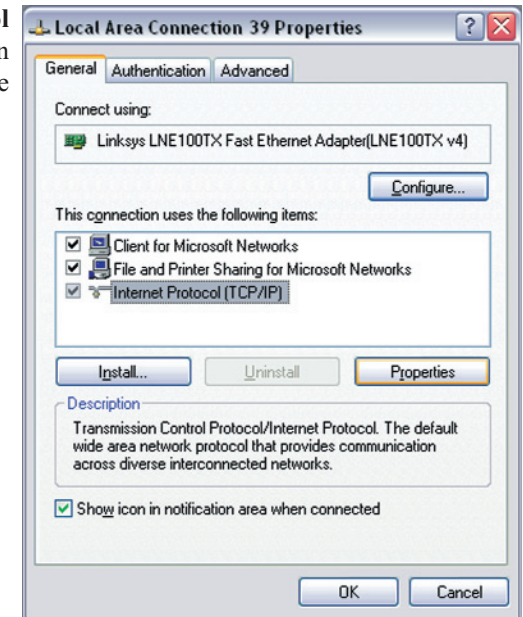


Figure 4-7

5. Select **Obtain an IP address automatically** and verify that **Obtain DNS server address automatically** is selected (as shown in Figure 4-8). Then, click the **OK** button and click the **OK** button on the subsequent screens to complete the PC's configuration.

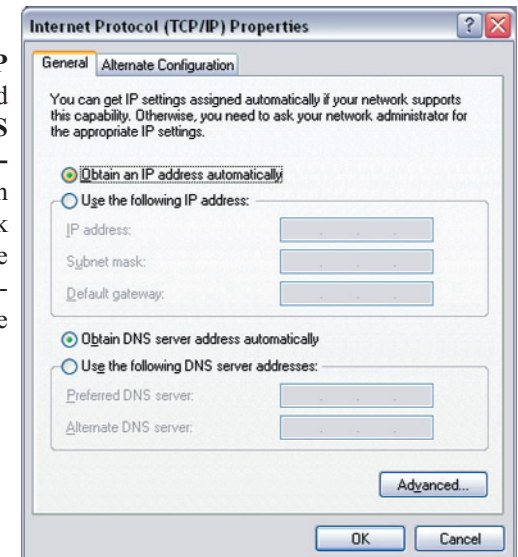


Figure 4-8

Repeat steps 1-5 for each PC on your network. When all of your PCs are configured, proceed to Chapter 5: The Router's Web-based Utility.

Chapter 5: The Router's Web-based Utility

Overview

Use the Router's web-based utility to administer it. This chapter will describe each web page in 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 network setup, most users only have to use the following screens of the utility:

- **Setup** Enter the settings provided by your ISP.
- **Password** The Router's default password is **admin**. To secure the Router, change the Password from its default.

The WEP, Status, DHCP, Log, and Help tabs are also available for basic setup. For advanced setup, click the Advanced Setup tab to access these screens: Filters, Forwarding, Dynamic Routing, Static Routing, DMZ Host, MAC Addr Clone, and Wireless.

Logging In

To access the web-based utility of the Router, launch Internet Explorer or Netscape Navigator, and enter the Router's default IP address, **192.168.1.1**, in the Address field, as shown in Figure 5-1. Then, press **Enter**.



Figure 5-1



Note: If your PC's Windows operating system supports Universal Plug and Play (UPnP), Windows will offer to create a desktop shortcut to the Router. Click the **OK** button to create the desktop icon, and then double-click the icon to connect to the Router. Otherwise, connect to the Router manually, as directed in steps 1 and 2.

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Upon entering the address into the web browser, a password request page will pop up, as shown in Figure 5-2a. (Windows XP users will see a "Connect to 192.168.1.1" window, shown in Figure 5-2b.)

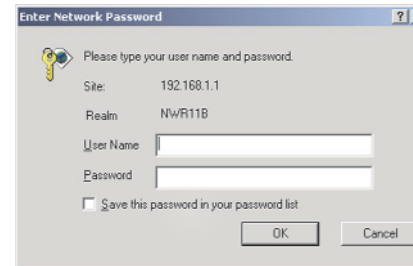


Figure 5-2a

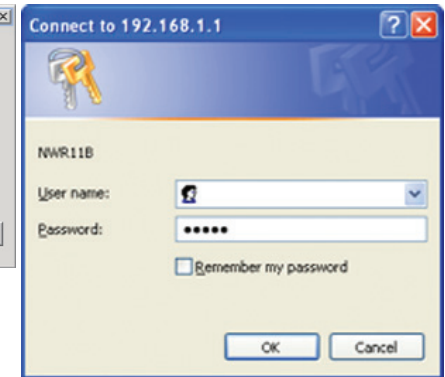


Figure 5-2b

Leave the User Name field empty, and enter **admin** (the default password) in lowercase letters in the Password field. Then, click the **OK** button.

To apply any of the settings you change on a page of the Utility, click the **Apply** button. To cancel any values you've entered on any page of the Utility, click the **Cancel** button.

Setup

The Setup screen, shown in Figure 5-3, is the first screen you see when you access the web-based utility. If you have already installed and set up the Router, you have already seen this screen and properly configured all of the screen's values. Some options on this screen remain the same while the Internet Connection option will change depending on how you connect to the Internet.

The main options are described first, with all of the Internet Connection types following.

Host Name/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.

The screenshot displays the 'Wireless-B Broadband Router Basic Setup' interface. At the top, there are tabs for 'Setup', 'Password', 'Status', 'DHCP', 'Log', 'Help', and 'Advanced Setup'. The 'Setup' tab is active. Below the tabs, there's a 'Broadband Networking' section with a 'SETUP' sub-section. The main content area contains several configuration fields: 'Host Name' and 'Domain Name' (both with empty text boxes and '(Required by some ISPs)' notes); 'Firmware Version' showing '1.00.2, Oct 24 2003'; 'LAN IP Address' with fields for 'Device IP Address' (192.168.1.1) and 'Subnet Mask' (255.255.255.0); 'Wireless' settings including 'SSID' (linksys), 'SSID Broadcast' (Enable), 'Channel' (6), and 'WEP' (Disable); and 'Internet connection Type' (Obtain an IP automatically). At the bottom, there are 'Apply', 'Cancel', and 'Help' buttons.

Figure 5-3

Firmware Version This entry shows the version and date of the firmware the Router is using. Future versions of the Router's firmware will be posted and available for download on the Network Everywhere website at www.NetworkEverywhere.com.

LAN IP Address The values for the Router's IP Address and Subnet Mask are shown here. The default values are 192.168.1.1 for the Device IP Address and 255.255.255.0 for the Subnet Mask.

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Wireless (Enable/Disable). In order to utilize the Router's wireless functions, select **Enable**. If you do not wish to utilize any wireless functions, make sure **Disable** is selected. (*Note: No other wireless functions will be available unless you enable this setting.*)

SSID: The SSID is a unique name for your wireless network. It is case sensitive and must not exceed 32 characters. The default SSID is "wireless " but you should change this to a personal wireless network name. All wireless points in your network must use the same SSID. Verify that you are using the correct SSID and click the **Apply** button to set it.

SSID Broadcast - Allows the SSID to be broadcast on your network. You may want to enable this function while configuring the Router, but make sure that you disable it when you are finished. With this enabled, someone could easily obtain the SSID information with site survey software and gain unauthorized access to your network. Click **Enable** to broadcast. Click **Disable** to increase network security and prevent the SSID from being seen on networked PCs.

Channel Select the appropriate channel from the list provided to correspond with your network settings, between 1 and 11. All points in your wireless network must use the same channel in order to function correctly. Verify that the correct channel is selected and click the **Apply** button to set it.

WEP (Mandatory/Disable). In order to utilize WEP encryption, select **Enable**. If you do not wish to utilize WEP encryption, make sure **Disable** is selected.



Note: To configure WEP encryption, see Appendix C: Configuring Wireless Security.

Internet Connection Type The Router supports three connection types: DHCP, PPPoE, and Static IP. Each Setup screen and available features will differ depending on what kind of connection type you select.

Obtain an IP Address Automatically

By default, the Router's Internet Connection is set to Obtain an IP automatically, as shown in Figure 5-3, and it should be used only if your ISP supports DHCP.

To apply any of the settings you've changed on this page, click the **Apply** button. To cancel any values you've entered on this page, click the **Cancel** button. If you should need any further information about anything on this screen, click the **Help** button.

Static IP

If you are required to use a permanent IP address, then select **Static IP address**, shown in Figure 5-4.



Figure 5-4

IP Address This is the Router's IP address, when seen from the Internet, or 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.

Default Gateway Address Your ISP will provide you with the Default Gateway Address, which is the ISP's IP address.

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



Note: Successfully connection to the Internet means these settings are correct.

To apply any of the settings you've changed on this page, click the **Apply** button.. To cancel any values you've entered on this page, click the **Cancel** button. If you should need any further information about anything on this screen, click the **Help** button.

PPPoE

Some DSL-based ISPs use PPPoE (Point-to-Point Protocol over Ethernet) to establish Internet connections. If you are connected to the Internet through a DSL line, check with your ISP to see if they use PPPoE. If they do, you will have to enable PPPoE, shown in Figure 5-5.

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

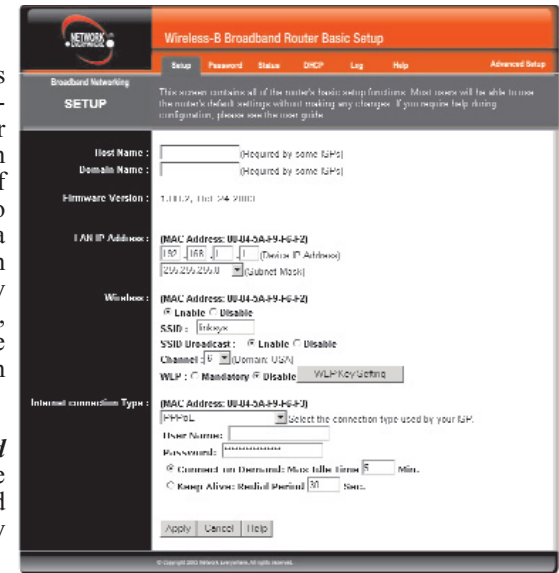


Figure 5-5



Important: If you enable PPPoE, remember to remove any PPPoE applications that are already installed on any of your PCs.

Connect on Demand: Max Idle Time You can configure the Router to cut the connection with your ISP after a specified period of time (Max Idle Time). If you have been disconnected due to inactivity, Connect on Demand enables the Router to automatically re-establish your connection as soon as you attempt to access the Internet again. If you wish to activate Connect on Demand, click the radio button. In the Max Idle Time field, enter the number of minutes you want to have elapsed before your Internet access disconnects.

Keep Alive Option: Redial Period If you select this option, the Router will periodically check your Internet connection. If you are disconnected, then the Router will automatically re-establish your connection. To use this option, click the radio button next to **Keep Alive**. In the Redial Period field, enter the number of seconds you want the Redial Period to last. The default Redial Period is 30 seconds.

To apply any of the settings you've changed on this page, click the **Apply** button. To cancel any values you've entered on this page, click the **Cancel** button. If you should need any further information about anything on this screen, click the **Help** button.



Note: Successfully connection to the Internet means these settings are correct.

Password

The Password screen, shown in Figure 5-6, allows you to set up a password and UPnP Services. You can also restore default settings on the Router.

Figure 5-6

Router Password Set a password for the Router. You can use up to 64 alphanumeric characters. The default password is **admin**. If you don't change the password, all users on your network will be able to access the Router using the default password. For greater security, you should change the password from its default setting.

UPnP Services Universal Plug and Play (UPnP) allows Windows XP to automatically configure the Router for various Internet applications, such as gaming and videoconferencing. Click the radio button next to **Enable** to enable UPnP Services, or **Disable** to disable UPnP Services.

Restore Factory Defaults If you select the **Restore Factory Defaults** option and click the **Apply** button, you will clear all of the Router's settings. Do not restore the factory defaults unless you are having difficulties with the Router and have exhausted all other troubleshooting measures. Once the Router is reset, you will have to re-enter all of your configuration data.

To apply any of the settings you've changed on this page, click the **Apply** button. To cancel any values you've entered on this page, click the **Cancel** button. If you should need any further information about anything on this screen, click the **Help** button.

Status

The Status screen, shown in Figure 5-7 displays the Router's current status; it reflects the data and selections you've entered using the Setup screen.

All of the information provided on this screen is read-only. To make changes, select the Setup tab.

Figure 5-7



Note: The information provided and buttons available will vary depending on the Router's settings.

Host Name This field shows the Router's name.

Firmware Version This field shows the installed version and date of the firmware.

Login This indicates if you are using a dial-up style connection, e.g., PPPoE. For PPPoE only, there is a **Connect** button to click if you are disconnected and want to re-establish a connection.

LAN These fields display the Router's current MAC Address, IP Address, and Subnet Mask, as seen by users on your local area network. The DHCP Server field shows the status of the Router's DHCP server function, which is either enabled or disabled.

Internet These fields display the Router's current MAC Address, IP Address, Subnet Mask, and Default Gateway IP Address, as seen by external users on the Internet. The DNS (Domain Name System) fields show the IP address(es) of

the DNS server(s) currently used by the Router. Multiple DNS IP settings are common. In most cases, the first available DNS entry is used. The DHCP Server, DHCP leased Time, and DHCP Time Remaining are also shown.

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 that is connected to the Router's Internet port with a new IP address.

DHCP Clients Table Click the **DHCP Clients Table** button to view the list of PCs that were given IP addresses by the Router.

DHCP

The screenshot shows the DHCP configuration interface. At the top, there's a navigation bar with 'Setup', 'Password', 'Status', 'DHCP', 'Log', 'Help', and 'Advanced Setup'. Below that, a 'Broadband Networking' section contains the 'DHCP' sub-section. A descriptive text explains that the router can act as a DHCP server. The configuration options include:

- DHCP Server:** Radio buttons for 'Enable' (selected) and 'Disable'.
- Starting IP Address:** A text field containing '192.168.1.100'.
- Number of DHCP Users:** A spin box set to '50'.
- DNS 1:** Four input boxes for IP address (0, 0, 0, 0) with '(required)' label.
- DNS 2:** Four input boxes for IP address (0, 0, 0, 0) with '(optional)' label.
- DNS 3:** Four input boxes for IP address (0, 0, 0, 0) with '(optional)' label.

 At the bottom, there are buttons for 'DHCP Clients Table', 'Apply', 'Cancel', and 'Help'. A copyright notice '© Copyright 2003 Network Everywhere. All rights reserved.' is visible at the very bottom.

Figure 5-8

From the DHCP screen, shown in Figure 5-8, you can configure the settings to your DHCP server. A Dynamic Host Configuration Protocol (DHCP) server automatically assigns an IP address to each PC on your network for you. Unless you already have one, it is highly recommended that you leave the Router enabled as a DHCP server.

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

Starting IP Address Enter a value for the DHCP server to start with when issuing IP addresses. This value must be 192.168.1.2 or greater, because the Router's default IP address is **192.168.1.1**.

Number of DHCP Users (Optional) Enter the maximum number of PCs for the DHCP server to assign IP addresses. This number cannot be greater than 253.

DNS 1-3 The Domain Name System (DNS) is how the Internet translates domain or website names into Internet addresses or URLs. Your ISP will provide you with at least one DNS Server IP Address. If you wish to use another, type that IP Address in one of these fields. You can type up to three DNS Server IP Addresses here. The Router will use these for quicker access to functioning DNS servers.

DHCP Clients Table Click the **DHCP Clients Table** button to show the current DHCP Client data. (This data is stored in temporary memory and changes periodically.)

To apply any of the settings you've changed on this page, click the **Apply** button. To cancel any values you've entered on this page, click the **Cancel** button. If you should need any further information about anything on this screen, click the **Help** button.

Log

The Log tab, shown in Figure 5-9, provides you with a log of all incoming and outgoing URLs or IP addresses for your Internet connection.

Access Log To access activity logs, select the **Enable** option next to Access Log. This function can be disabled by clicking the **Disable** radio button.

Temporary logs can be accessed from the Log screen by clicking either the **Incoming Access Log** or **Outgoing Access Log** button. The Incoming Access Log gives you a log of all the incoming Internet traffic while the Outgoing Access Log lists all the URLs and IP addresses of Internet sites that users on your network have accessed.

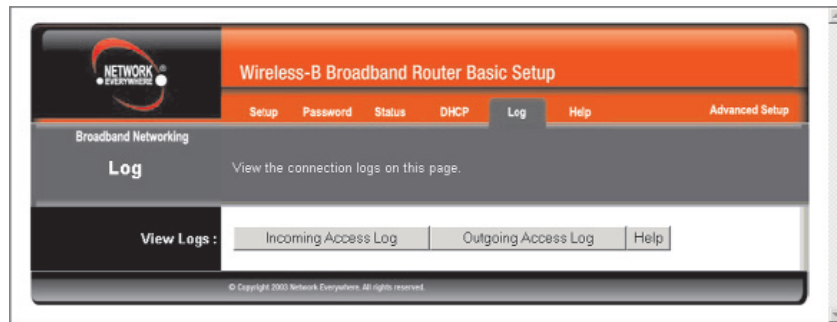


Figure 5-9

If you should need any further information about anything on this screen, click the **Help** button.

Help

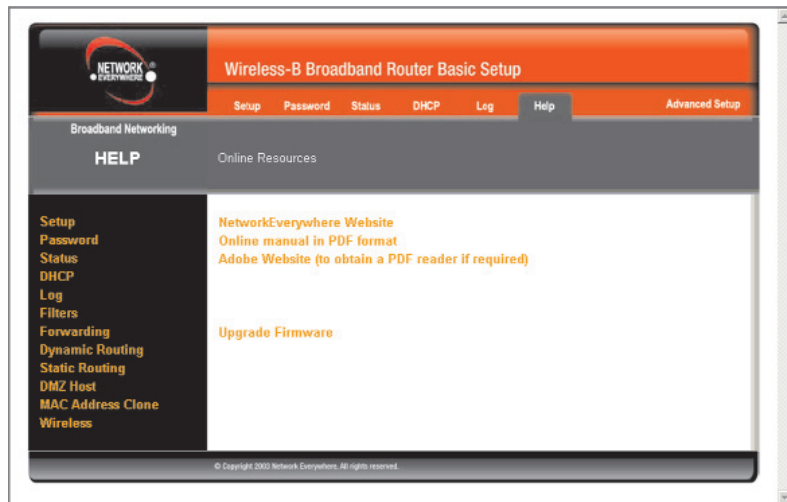


Figure 5-10

Under the Help tab, shown in Figure 5-10, you'll find links to all of the utility's internal support documentation along the left margin, including the following:

Network Everywhere Website Clicking this link will take you to Network Everywhere's website, www.NetworkEverywhere.com, provided you are connected to the Internet.

Online manual in PDF format and Adobe Website Clicking the Online manual in PDF format link will take you to the latest version of the user guide for this Router. The guide will be in Adobe Acrobat Portable Document File (.pdf) format. You will need the Adobe Acrobat Reader to view this pdf. If you do not have the Acrobat Reader, click the Adobe Website link to download it. These links work only if you are connected to the Internet.

Upgrade Firmware New firmware versions are posted at www.NetworkEverywhere.com and can be downloaded for free. If the Router can access the Internet already, there's no need to download a newer firmware version, unless that version has a new feature that you want to use. (To learn about any new firmware with new features, visit www.NetworkEverywhere.com.) Loading new firmware onto the Router does not always enhance the speed or the quality of your connection.

To upgrade the Router's firmware:

1. Download the firmware upgrade file from www.NetworkEverywhere.com, and extract the file using archive software such as WinZip.

2. Select the **Help** tab (see Figure 5-10).



Note: By upgrading the Router's firmware, you may lose the Router's configuration settings.

3. Click **Upgrade Firmware** to display a new window.
4. Click the **Browse** button to find the firmware upgrade file you extracted.
5. Double-click the **firmware file** you extracted. Click the **Upgrade** button and follow the on-screen instructions.

Advanced Setup

The following instructions are for advanced users or users whose setup require special configuration. When you click the Advanced Setup tab, you will be able to set up these features. There are seven additional tabs available.

- **Filters** - Filters block specific internal users from Internet access and enable Virtual Private Network (VPN) sessions.
- **Forwarding** - Sets up public services on your network.

- Dynamic Routing - Sets up the Router so it will automatically adjust to physical changes in the network's layout.
- Static Routing - Sets up static routes needed when network information must travel to a specific host or network.
- DMZ Host - Allows one local user to be exposed to the Internet for use of special-purpose services such as online gaming or videoconferencing.
- MAC Address Cloning - Allows you to “clone” your Ethernet adapter's MAC address onto the Router.
- Wireless - Allows you to set up advanced wireless settings.

Filters

From the Filters screen, shown in Figure 5-11, you can block specific internal users from accessing the Internet and enable Virtual Private Network (VPN) sessions. You can set up filters by using IP addresses or network port numbers (or a range of ports).

Filtered Private IP Range To set up a filter using IP addresses, enter the range of IP addresses you wish to filter in the IP address fields. Users with filtered IP addresses will not be able to access the Internet at all. If you only want to filter one IP address instead of a range of IP addresses, enter the same value into both fields. For instance, if you wish to filter the PC with the IP address of 192.168.1.5, enter **5** into both fields on one line: 192.168.1.5 ~ 192.168.1.5. Click the **Apply** button when finished.

Filtered Private Port Range To filter users by network port number, enter a network port number or a range of network ports. Select the protocol for each port number you want to filter, **TCP** or **UDP**. Enter the port numbers you want to filter in the port numbers fields. Users connected to the Router will no longer be able to access any port number listed there. Click the **Apply** button when you're done.

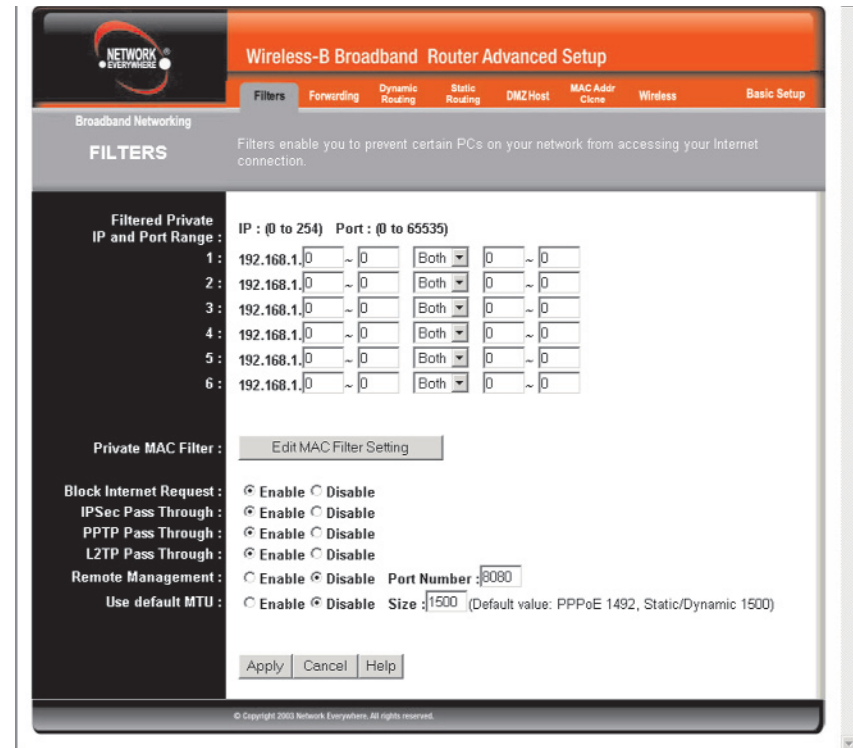


Figure 5-11

Private MAC Filter This feature filters the Ethernet adapter's specific MAC address from going out to the Internet.

To check your Ethernet adapter's MAC address, run **wiipcfg** or **ipconfig** in the command prompt, depending on which Windows operating system you are using. To set the MAC filter, click the **Edit MAC Filter Setting** button. When a second window appears (see Figure 5-14), select the range in the drop-down box, and at the MAC number prompt, enter the 12-digit MAC address you want to filter. Click the **Apply** button and the **Continue** button, before closing the window. For information on obtaining a MAC address, go to “Appendix D: Finding the MAC Address and IP Address for Your Ethernet Adapter.”

Block WAN Requests By enabling the Block WAN Request feature, you can prevent your network from being “pinged,” or detected, by other Internet users. The Block WAN Request feature also reinforces your network security by hiding your network ports. Both functions of the Block WAN Request feature make it more difficult for outside users to work their way into your network. This feature is enabled by default.

IPSec Pass Through This feature lets you use IPSec Pass Through. IPSec Pass Through is enabled by default.

To disable IPSec Pass Through, click on **Disable**.

PPTP Pass Through Point-to-Point Tunneling Protocol is the method used to enable VPN sessions. PPTP Pass Through is enabled by default.

To disable this feature, click on **Disable** next to **PPTP Pass Through**.

L2TP Pass Through This feature lets you use L2TP Pass Through. L2TP Pass Through is enabled by default.

To disable this feature, click on **Disable** next to **L2TP Pass Through**.

Remote Management This feature allows you to manage the Router from a remote location, via the Internet. To enable this feature, click on **Enable**, and enter the desired port number (default is 8080). Click the **Apply** button and then the **Continue** button. Remote Management must be activated before you can manage the Router from a remote location. If you wish to use this feature on the browser, enter **http://<WAN IP Address>:8080**. (Enter your specific Internet IP Address in place of <WAN IP Address>.) Remote Management involves an inherent security risk and should not be enabled without first changing the Password (from the Setup screen) from its default settings.

To disable this feature, click on **Disable**.

Use default MTU (Maximum Transmission Unit) This feature specifies the largest packet size permitted for network transmission. Select **Enable** and enter the value desired. You should leave this value in the 1200 to 1500 range. Most DSL users should use the value **1492**. For static and dynamic connections, the default MTU value is set at **1500** when disabled. For PPPoE connections, the default MTU value is set at **1492** when disabled.

To apply any of the settings you’ve changed on this page, click the **Apply** button. To cancel any values you’ve entered on this page, click the **Cancel** button. If you should need any further information about anything on this screen, click the **Help** button.

Forwarding

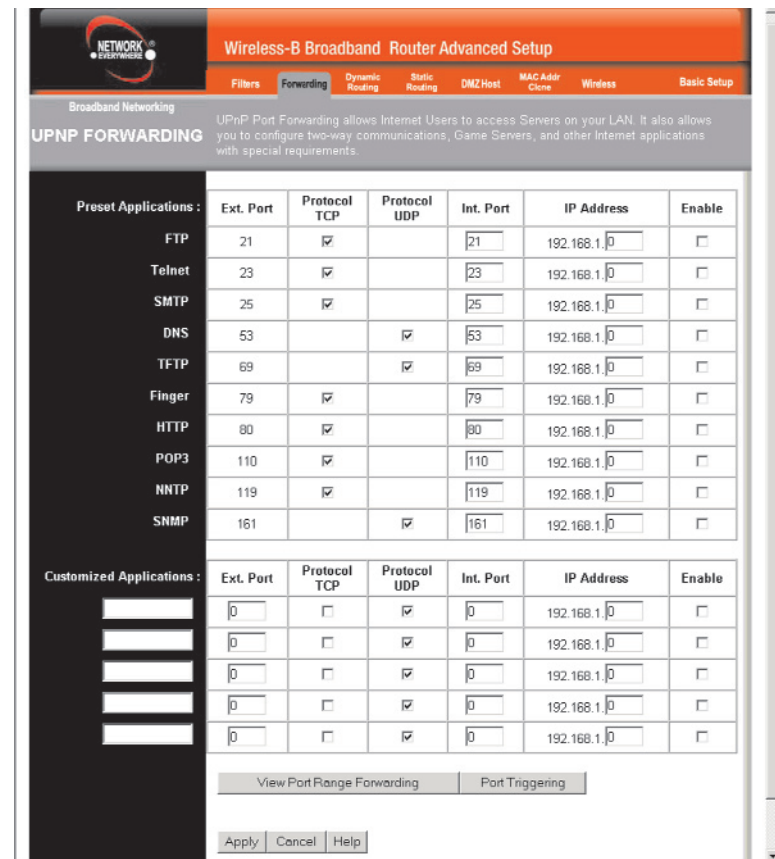


Figure 5-12

UPnP Forwarding

Clicking the Forwarding tab will access the UPnP Forwarding screen, shown in Figure 5-12. This screen displays preset application settings as well as options for customization of port services for other applications.

The Preset Applications at the top of the list are among the most widely used Internet applications. They include the following:

- **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, web developers typically upload the files to the web server using FTP. FTP includes functions to log onto the network, list directories, and copy files. FTP operations can be performed by typing commands at a command prompt or via an FTP utility running under a graphical interface such as Windows. FTP transfers can also be initiated from within a web browser by entering the URL preceded by ftp://.
- **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.
- **DNS** (Domain Name System) The way that Internet domain names are located and translated into IP addresses. A domain name is a meaningful and easy-to-remember “handle” for an Internet address.
- **TFTP** (Trivial File Transfer Protocol) A version of the TCP/IP FTP protocol that has no directory or password capability.
- **Finger** A UNIX command widely used on the Internet to find out information about a particular user, such as his or her telephone number, whether the user is currently logged on, and the last time the user was logged on. The person being “fingered” must have placed his or her profile on the system in order for the information to be available. Fingering requires entering the full user@domain address, for example, name@universityname.edu.
- **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.
- **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 selectivity. All pending messages and attachments are downloaded at the same time. POP3 uses the SMTP messaging protocol. (SMTP may also need to be forwarded.)

- **NNTP** (Network News Transfer Protocol) The protocol used to connect to Usenet groups on the Internet.
- **SNMP** (Simple Network Management Protocol) A widely used network monitoring and control protocol. Data is passed from SNMP agents, which are hardware and/or software processes reporting activity in each network device (switch, router, bridge, etc.) to the workstation console used to oversee the network. The agents return information contained in a MIB (Management Information Base), which is a data structure that defines what is obtainable from the device and what can be controlled (turned off, on, etc.).

Enter the **number** of the internal port used by the server in the Int. Port column. Check with the Internet application software documentation for more information.

Enter the IP address of the server that you want the Internet users to be able to access. For information about finding the IP address, go to “Appendix D: Finding the MAC Address and IP Address for Your Ethernet Adapter.”

You must check the **Enable** box to enable the applications you have defined.

To add a Customized Application using UPnP Forwarding:

1. Enter the **name** of the application in the appropriate Customized Applications field.
2. Next to the name of the application, enter the **number** of the external port used by the server in the Ext. Port column. Check with the Internet application software documentation for more information.
3. On the same line, select **Protocol TCP** or **Protocol UDP**.
4. Enter the **number** of the internal port used by the server in the Int. Port column. Check with the Internet application software documentation for more information.
5. Enter the IP address of the server that you want the Internet users to be able to access. For information about finding the IP address, go to “Appendix D: Finding the MAC Address and IP Address for Your Ethernet Adapter.”
6. Check the **Enable** box to enable the services you have defined. UPnP Forwarding will not function if the **Enable** button is left unchecked. This is disabled (unchecked) by default.

To apply any of the settings you've changed on this page, click the **Apply** button. To cancel any values you've entered on this page, click the **Cancel** button. If you should need any further information about anything on this screen, click the **Help** button.

Port Range Forwarding

Click the **View Port Range Forwarding** button to access the Port Range Forwarding screen, shown in Figure 5-13. To return to the UPnP Forwarding screen, click the **View UPnP Forwarding** button.

Wireless-B Broadband Router Advanced Setup

Filters Forwarding Dynamic Routing Static Routing DMZ Host MAC Addr Clone Wireless Basic Setup

Broadband Networking
PORT RANGE FORWARDING

Port Range Forwarding allows Internet Users to access Servers on your LAN. It also allows you to configure two-way communications, Game Servers, and other Internet applications with special requirements.

Customized Applications :	Ext. Port	Protocol TCP	Protocol UDP	IP Address	Enable
<input type="text"/>	<input type="text"/> to <input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>	192.168.1. <input type="text"/>	<input type="checkbox"/>
<input type="text"/>	<input type="text"/> to <input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>	192.168.1. <input type="text"/>	<input type="checkbox"/>
<input type="text"/>	<input type="text"/> to <input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>	192.168.1. <input type="text"/>	<input type="checkbox"/>
<input type="text"/>	<input type="text"/> to <input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>	192.168.1. <input type="text"/>	<input type="checkbox"/>
<input type="text"/>	<input type="text"/> to <input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>	192.168.1. <input type="text"/>	<input type="checkbox"/>
<input type="text"/>	<input type="text"/> to <input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>	192.168.1. <input type="text"/>	<input type="checkbox"/>
<input type="text"/>	<input type="text"/> to <input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>	192.168.1. <input type="text"/>	<input type="checkbox"/>
<input type="text"/>	<input type="text"/> to <input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>	192.168.1. <input type="text"/>	<input type="checkbox"/>
<input type="text"/>	<input type="text"/> to <input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>	192.168.1. <input type="text"/>	<input type="checkbox"/>
<input type="text"/>	<input type="text"/> to <input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>	192.168.1. <input type="text"/>	<input type="checkbox"/>

View UPnP Forwarding Port Triggering

Apply Cancel Help

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Figure 5-13

Port Range Forwarding sets up public services on your network, such as web servers, ftp servers, e-mail servers, or other specialized Internet applications. (Specialized Internet applications are any applications that use Internet access to perform functions such as videoconferencing or online gaming. Some Internet applications may not require any forwarding.) When users send this type of request to your network via the Internet, the Router will forward those requests to the appropriate PC. Before using Forwarding, the Router's DHCP function must be disabled under the DHCP tab and the Router must be assigned a new static LAN IP address because the IP address may change when using the DHCP server.

If you need to forward all ports to one PC, see the "DMZ" section.

To add a Customized Application using Port Range Forwarding:

1. Enter the **name** of the application in the appropriate Customized Application field.
2. Next to the name of the application, enter the **number** of the external port used by the server in the Ext. Port column. Check with the Internet application software documentation for more information.
3. On the same line, select **Protocol TCP** or **Protocol UDP**.
4. Enter the **IP address** of the server that you want the Internet users to be able to access. For information about finding the IP address, go to "Appendix D: Finding the MAC Address and IP Address for Your Ethernet Adapter."
5. Check the **Enable** box to enable the services you have defined. Port Range Forwarding will not function if the **Enable** button is left unchecked. This is disabled (unchecked) by default.
6. Configure as many entries as needed—the Router supports up to 10 ranges of ports. Click the **Apply** button.

To apply any of the settings you've changed on this page, click the **Apply** button. To cancel any values you've entered on this page, click the **Cancel** button. If you should need any further information about anything on this screen, click the **Help** button.

Port Triggering

From the *Port Range Forwarding* or *UPnP Forwarding* screens, click the **Port Triggering** button to access the Port Triggering screen, shown in Figure 5-14. This 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.

Application Name	Trigger Port Range	Incoming Port Range
1:	0 ~ 0	0 ~ 0
2:	0 ~ 0	0 ~ 0
3:	0 ~ 0	0 ~ 0
4:	0 ~ 0	0 ~ 0
5:	0 ~ 0	0 ~ 0
6:	0 ~ 0	0 ~ 0
7:	0 ~ 0	0 ~ 0
8:	0 ~ 0	0 ~ 0
9:	0 ~ 0	0 ~ 0
10:	0 ~ 0	0 ~ 0

Figure 5-14

1. Enter the **Application Name** of the trigger.
2. Enter the **Trigger Port Range** used by the application. Check with the Internet application for the port number needed.
3. Enter the **Incoming Port Range** used by the application. Check with the Internet application for the port number needed.
4. Click the **Apply** button. Click the **Cancel** button to cancel any values you've entered.

Dynamic Routing

Figure 5-15

From the Dynamic Routing screen, shown in Figure 5-15, you can enable the Router to automatically adjust to physical changes in the network's layout. The Router, using the RIP protocol, determines the network packets' route based on the fewest number of hops between the source and the destination. The RIP protocol regularly broadcasts routing information to other routers on the network. To set up Dynamic Routing:

1. Choose the correct **Working Mode**. **Gateway** mode should be used if the Router is hosting your network's connection to the Internet. **Router** mode should be selected if the Router exists on a network with other routers. In Router Mode, any computer connected to the Router will not be able to connect to the Internet unless you have another router functioning in the Gateway mode.
2. Choose a **Dynamic Routing path protocol** for either transmission (TX:) or reception (RX:) of network data by selecting **Enabled**.

Click the **Show Routing Table** button to open a chart displaying how data is routed through your LAN.

To apply any of the settings you've changed on this page, click the **Apply** button. To cancel any values you've entered on this page, click the **Cancel** button. If you should need any further information about anything on this screen, click the **Help** button.

Static Routing

Figure 5-16

If the Router is connected to more than one network, it may be necessary to set up a static route between them. This can be accomplished from the Static Routing screen, shown in Figure 5-16. A static route is a pre-determined pathway that network information must travel to reach a specific host or network. From the Static Routing tab, click the **Show Routing Table** button to view the current static routing configuration.

To create a static route entry:

1. Select a **Static Route Entry** from the drop-down list. The Router supports up to 20 static route entries.

To delete a Static Routing entry, select an **entry**, and click the **Delete this entry** button.

2. Enter the following data to create a new static route.

Destination LAN IP: The Destination LAN IP 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 here. If you are building a route to an entire network, be sure that the network portion of the IP address is set to 0. For example, the Router's standard IP address is 192.168.1.1. Based on this address, the address of the routed network is 192.168.1.x, with the last digit "x" determining the Router's place on the network. Therefore you would enter the IP address 192.168.1.0 if you wanted to route to the Router's entire network, rather than just to the Router.

Subnet Mask: The Subnet Mask determines which portion of an IP address is the network portion, and which portion is the host portion. Take, for example, a network in which the Subnet Mask is 255.255.255.0. This determines (by using the values 255) that the first three numbers of a network IP address identify this particular network, while the last digit (from 1 to 254) identifies the specific host.

Default Gateway: This IP address should be 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. The maximum metric, or measure, of hops is 15.

Interface: Select **LAN** or **WAN**, depending on the location of the static route's final destination.

To apply any of the settings you've changed on this page, click the **Apply** button. To cancel any values you've entered on this page, click the **Cancel** button. If you should need any further information about anything on this screen, click the **Help** button.

DMZ Host

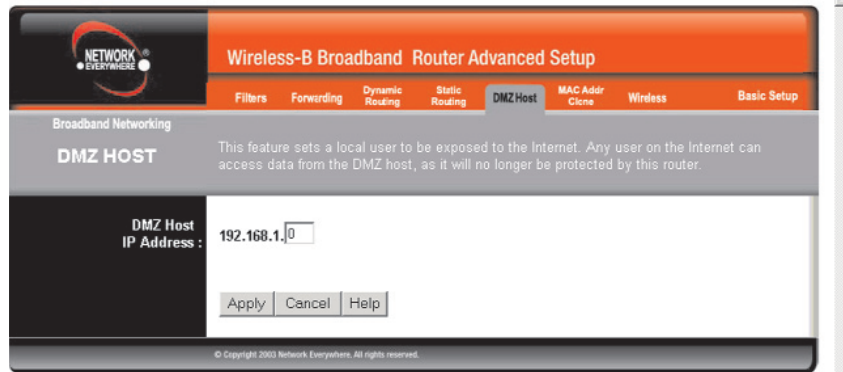


Figure 5-17

From the DMZ Host screen, shown in Figure 5-17, you can expose one local user to the Internet for a special-purpose service such as Internet gaming and videoconferencing.

Port Range Forwarding forwards a maximum of 10 ranges of ports, and DMZ Hosting forwards all the ports for one PC at the same time. DMZ Hosting is less secure.

- To expose one PC, enter the computer's IP address. For more information about finding a computer's IP address, refer to "Appendix D: Finding the MAC Address and IP Address for Your Ethernet Adapter."
- Deactivate DMZ by entering **0** in the field. (This is the default setting.)

To apply any of the settings you've changed on this page, click the **Apply** button. To cancel any values you've entered on this page, click the **Cancel** button. If you should need any further information about anything on this screen, click the **Help** button.

MAC Address Clone

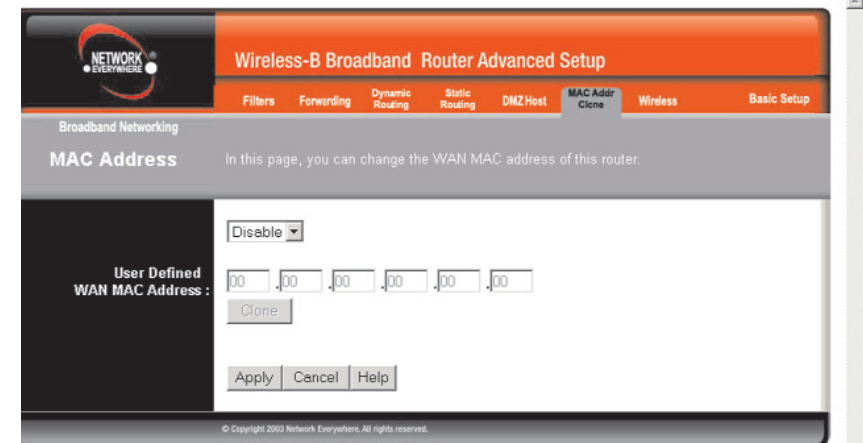


Figure 5-18

The Router's **MAC address** is a 12-digit code assigned to a unique piece of hardware for identification, like a social security number. If your ISP requires MAC address registration, find your adapter's MAC address by following the instructions in "Appendix D: Finding the MAC Address and IP Address for Your Ethernet Adapter."

Enter the 12 digits of your adapter's MAC address in the on-screen fields (see Figure 5-18). This "clones" your Ethernet adapter's MAC address onto the Router, so you do NOT have to call your ISP to change the registered MAC address to the Router's MAC address.

To apply any of the settings you've changed on this page, click the **Apply** button. To cancel any values you've entered on this page, click the **Cancel** button. If you should need any further information about anything on this screen, click the **Help** button.

Wireless

The screenshot shows the 'Wireless-B Broadband Router Advanced Setup' interface. The 'Wireless' tab is selected, and the following settings are visible:

- Beacon Interval:** 100 (msec, *100)
- RTS Threshold:** 2432 (range: 256~2432, *2432)
- Fragmentation Threshold:** 2346 (range: 256~2346, *2346, even number only)
- DTIM Interval:** 1 (range: 1~65535, *3)
- Basic Rates:** 1-2(MBps) 1-2-5.5-11(MBps) (*1-2(MBps))
- TX Rates:** 1-2(MBps) 1-2-5.5-11(MBps) (*1-2-5.5-11(MBps))
- Preamble Type:** Short Preamble Long Preamble (*Long Preamble)
- Authentication Type:** Open System Shared Key Both (*Both)
- Starting MAC Filter:** Enable Disable

Buttons for 'Active MAC Table', 'Edit MAC Filter Setting', 'Apply', 'Cancel', and 'Help' are present at the bottom of the configuration area.

Figure 5-19

Before making any changes to the Wireless tab, shown in Figure 5-19, please check the wireless settings for all your wireless PCs, as these changes will alter the Router's effectiveness. In most cases, these settings do not need to be changed.

- **Beacon Interval.** This value indicates the frequency interval of the beacon. A beacon is a packet broadcast by the Router to keep the network synchronized. A beacon includes the wireless LAN service area, the IP address, the Broadcast destination addresses, a time stamp, Delivery Traffic Indicator Maps, and the Traffic Indicator Message (TIM).

- **RTS Threshold.** This value should remain at its default setting of 2,346. Should you encounter inconsistent data flow, only minor modifications are recommended.
- **Fragmentation Threshold.** This value indicates how much of the Router's resources are devoted to recovering packet errors. The value should remain at its default setting of 2,346. If you have decreased this value and experience high packet error rates, you can increase it again, but it will likely decrease overall network performance. Only minor modifications of this value are recommended.
- **DTIM Interval.** This value 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. Clients for the Router hear the beacons and awaken to receive the broadcast and multicast messages.
- **Basic Rates.** The basic transfer rates should be set depending on the speed of your wireless network. You must select **1-2 (Mbps)** if you have older 802.11 compliant equipment on your network, such as wireless adapters that support only 1 or 2 Mbps. Selecting 1-2 (Mbps), however, does **not** limit the basic transfer rates of faster adapters.
- **TX Rates.** Select all the rate at which you wish the Router to communicate within your wireless network.
- **Preamble Type.** The preamble defines the length of the CRC block for communication between the Router and the roaming Network Card. (High network traffic areas should use the shorter preamble type.) Select the appropriate preamble type and click the **Apply** button to set it.
- **Authentication Type.** You may choose between **Open System**, **Shared Key**, and **Both**. The Authentication Type default is set to **Open System**, in which the sender and the recipient do NOT share a secret key. Each party generates its own key-pair and asks the receiver to accept the randomly-generated key. Once accepted, this key is used for a short time only. Then a new key is generated and agreed upon. **Shared Key** is when both the sender and the recipient share a secret key.