Optimizing Wireless Performance

The speed and operating distance or range of your wireless connection can vary significantly based on the physical placement of the wireless router. You should choose a location for your router that will maximize the network speed.

Note: Failure to follow these guidelines can result in significant performance degradation or inability to wirelessly connect to the router. For complete range and performance specifications, click the link to the online document "Wireless Networking Basics" in Appendix B.

The following list describes how to optimize wireless router performance.

- **Identify critical wireless links.**
  If your network has several wireless devices, decide which wireless devices need the highest data rate, and locate the router near them. Many wireless products have automatic data-rate fallback, which allows increased distances without loss of connectivity. This also means that devices that are farther away might be slower. Therefore, the most critical links in your network are those where the traffic is high and the distances are great. Optimize those first.
- **Choose placement carefully.**
  For best results, place your router:
  - Near the center of the area in which your computers will operate.
  - In an elevated location such as a high shelf where the wirelessly connected computers have line-of-sight access (even if through walls).
  - Avoid obstacles to wireless signals.
  - Keep wireless devices at least 2 feet from large metal fixtures such as file cabinets, refrigerators, pipes, metal ceilings, reinforced concrete, and metal partitions.
  - Keep away from large amounts of water such as fish tanks and water coolers.
- **Reduce interference.**
  - Avoid windows unless communicating between buildings.
  - Place wireless devices away from various electromagnetic noise sources, especially those in the 2400–2500 MHz frequency band. Common noise-creating sources are:
    - Computers and fax machines (no closer than 1 foot)
    - Copying machines, elevators, and cell phones (no closer than 6 feet)

    - Microwave ovens (no closer than 10 feet)

- **Choose your settings.**
  - Use a scanning utility to determine what other wireless networks are operating nearby, and choose an unused channel.
  - Turn off SSID broadcast, and change the default SSID. Other nearby devices might automatically try to connect to your network several times a second, which can cause significant performance reduction.
- Use WMM to improve the performance of voice and video traffic over the wireless link.

Changing the MTU Size

The Maximum Transmission Unit (MTU) is the largest data packet a network device transmits. When one network device communicates across the Internet with another, the data packets travel through many devices along the way. If any device in the data path has a lower MTU setting than the other devices, the data packets must be split or “fragmented” to accommodate the one with the smallest MTU.

The best MTU setting for NETGEAR equipment is often just the default value, and changing the value might fix one problem but cause another. Leave MTU unchanged unless one of these situations occurs:

- You have problems connecting to your ISP, or other Internet service, and either the technical support of the ISP or of NETGEAR recommends changing the MTU size. These might require an MTU change:
  - A secure Web site that will not open, or displays only part of a Web page
  - Yahoo e-mail
  - MSN
  - America Online’s DSL service
- You use VPN and have severe performance problems.
- You used a program to optimize MTU for performance reasons, and now you have connectivity or performance problems.

> **Note:** An incorrect MTU setting can cause Internet communication problems such as the inability to access certain Web sites, frames within Web sites, secure login pages, or FTP or POP servers.

If you suspect an MTU problem, a common solution is to change the MTU size to 1400. If you are willing to experiment, you can gradually reduce the MTU size from the maximum value of 1500 until the problem goes away. Table 5-1 describes common MTU sizes and applications.

Table 5-1. Common MTU Sizes

MTU	Application
1500	The largest Ethernet packet size and the default value. This is the typical setting for non-PPPoE, non-VPN connections, and is the default value for NETGEAR routers, adapters, and switches.
1492	Used in PPPoE environments.
1472	Maximum size to use for pinging. (Larger packets are fragmented.)
1468	Used in some DHCP environments.
1460	Usable by AOL if you do not have large e-mail attachments, for example.
1436	Used in PPTP environments or with VPN.
1400	Maximum size for AOL DSL.
576	Typical value to connect to dial-up ISPs.

To change the MTU size:

1. In the main menu, under Advanced, select **WAN Setup**.
2. In the **MTU Size** field, enter a new size between 64 and 1500.
3. Click **Apply** to save the new configuration.

Overview of Home and Small Office Networking Technologies

Common connection types and their speed and security considerations are:

- **Broadband Internet**. Your Internet connection speed is determined by your modem type, such as ADSL or cable modem, as well as the connection speed of the sites to which you connect, and general Internet traffic. ADSL and cable modem connections are asymmetrical, meaning they have a lower data rate *to* the Internet (upstream) than *from* the Internet (downstream). Keep in mind that when you connect to another site that also has an asymmetrical connection, the data rate between your sites is limited by each side's upstream data rate. A typical residential ADSL or cable modem connection provides a downstream throughput of about 1 to 3 megabits per second (Mbps). Newer technologies such as ADSL2+ and Fiber to the Home (FTTH) will increase the connection speed to tens of Mbps.

- **Wireless**. Your N 150 Wireless Router WNR1000 v2h2 provides a wireless data throughput of up to 150 Mbps. With the introduction of the newer WPA and WPA2 encryption and authentication protocols, wireless security is extremely strong.

  To get the best performance, use RangeMax NEXT adapters such as the WN511B for your computers. Although the WNR1000 v2h2 router is compatible with older 802.11b and 802.11g adapters, the use of these older wireless technologies in your network can result in lower throughput overall (typically less than 10 Mbps for 802.11b and less than 40 Mbps for 802.11g). In addition, many older wireless products do not support the latest security protocols, WPA and WPA2.
- **Powerline**. For connecting rooms or floors that are blocked by obstructions or are distant vertically, consider networking over your building's AC wiring. NETGEAR's Powerline HD family of products delivers up to 200 Mbps to any outlet, while the older-generation XE family of products delivers 14 Mbps or 85 Mbps. Data transmissions are encrypted for security, and you can configure an individual network password to prevent neighbors from connecting.

  The Powerline HD family of products can coexist on the same network with older-generation XE family products or HomePlug 1.0 products, but they are not interoperable with these older products.
- **Wired Ethernet**. As gigabit-speed Ethernet ports (10/100/1000 Mbps) become common on newer computers, wired Ethernet remains a good choice for speed, economy, and security. Gigabit Ethernet can extend up to 100 meters with twisted-pair wiring of Cat 5e or better. A wired connection is not susceptible to interference, and eavesdropping would require a physical connection to your network.

Note: Actual data throughput will vary. Network conditions and environmental factors, including volume of network traffic, building materials and construction, and network overhead, can lower actual data throughput rate.

Assessing Your Speed Requirements

Because your Internet connection is likely to operate at a much lower speed than your local network, faster local networking technologies might not improve your Internet experience. However, many emerging home applications require high data rates. For example:

- Streaming HD video requires 10 to 30 Mbps per stream. Because latency and packet loss can disrupt your video, plan to provide at least twice the capacity you need.

- Streaming MP3 audio requires less than 1 Mbps per stream and does not strain most modern networks. Like video, however, streaming audio is also sensitive to latency and packet loss, so a congested network or a noisy link can cause problems.
- Backing up computers over the network has become popular due to the availability of inexpensive mass storage. Table 5-2 shows the time to transfer 1 gigabyte (1 GB) of data using various networking technologies.

Table 5-2. Theoretical Transfer Time for 1 Gigabyte

Network Connection	Theoretical Raw Transfer Time
Gigabit wired Ethernet	8 seconds
RangeMax NEXT Wireless-N	26 seconds
Powerline HD	40 seconds
100 Mbps wired Ethernet	80 seconds
802.11n wireless	45 seconds
802.11g wireless	150 seconds
802.11b wireless	700 seconds
10 Mbps wired Ethernet	800 seconds
Cable modem (3 Mbps)	2700 seconds
Analog modem (56 kbps)	144,000 seconds (40 hours)

Chapter 6
Using Network Monitoring Tools

This chapter describes how to use the maintenance features of your N 150 Wireless Router WNR1000 v2h2.

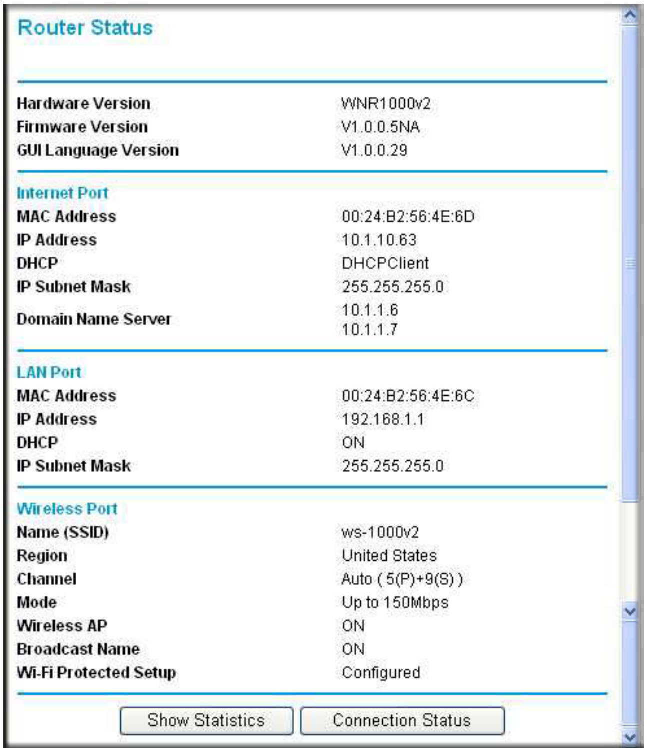
This chapter includes the following sections:

- "Viewing Wireless Router Status Information"
- "Viewing a List of Attached Devices" on page 6-7
- "Managing the Configuration File" in Chapter 6
- "Updating the Router Firmware" on page 6-9
- "Enabling Remote Management Access" on page 6-12
- "Traffic Meter" on page 6-14

Viewing Wireless Router Status Information

To view router status and usage information:

1. Select **Router Status** under Maintenance in the main menu. The Router Status screen displays.



Router Status

Hardware Version	WNR1000v2
Firmware Version	V1.0.0.5NA
GUI Language Version	V1.0.0.29

Internet Port

MAC Address	00:24:B2:56:4E:6D
IP Address	10.1.10.63
DHCP	DHCPClient
IP Subnet Mask	255.255.255.0
Domain Name Server	10.1.1.6 10.1.1.7

LAN Port

MAC Address	00:24:B2:56:4E:6C
IP Address	192.168.1.1
DHCP	ON
IP Subnet Mask	255.255.255.0

Wireless Port

Name (SSID)	ws-1000v2
Region	United States
Channel	Auto (5(P)+9(S))
Mode	Up to 150Mbps
Wireless AP	ON
Broadcast Name	ON
Wi-Fi Protected Setup	Configured

Figure 6-1

Table 6-1 describes the router status fields.

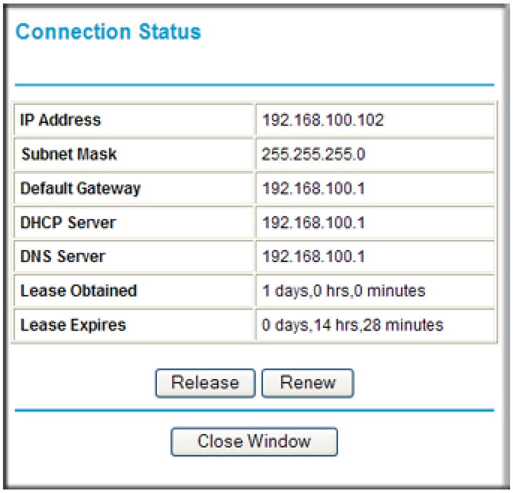
Table 6-1. Wireless Router Status Fields

Field		Description
Hardware Version		The hardware version of the router.
Firmware Version		The version of the current software installed in the router. This will change if you update your router.
Internet Port. The following settings apply to the Internet (WAN) port of the router.		
	MAC Address	The Media Access Control address. This is the unique physical address being used by the Internet (WAN) port of the router.
	IP Address	The IP address being used by the Internet (WAN) port of the router. If no address is shown, or is 0.0.0.0, the router cannot connect to the Internet.
	DHCP	If set to None, the router is configured to use a fixed IP address on the WAN. If set to DHCP Client, the router is configured to obtain an IP address dynamically from the ISP.
	IP Subnet Mask	The IP subnet mask being used by the Internet (WAN) port of the router. For an explanation of subnet masks and subnet addressing, click the link to the online document "TCP/IP Networking Basics" in Appendix B.
	Domain Name Server	The Domain Name Server addresses being used by the router. A Domain Name Server translates human-language URLs such as www.netgear.com into IP addresses.
LAN Port. The following settings apply to the Ethernet (LAN) port of the router.		
	MAC Address	The Media Access Control address. This is the unique physical address being used by the LAN port of the router.
	IP Address	The IP address being used by the Ethernet (LAN) port of the router. The default is 192.168.1.1.
	DHCP	Identifies whether the router's built-in DHCP server is active for the LAN-attached devices.
	IP Subnet Mask	The IP subnet mask being used by the Ethernet (LAN) port of the router. The default is 255.255.255.0.

Table 6-1. Wireless Router Status Fields (continued)

Field	Description
Wireless Port. The following settings apply to the wireless port of the router.	
Name (SSID)	The wireless network name (SSID) being used by the wireless port of the router. The default is NETGEAR.
Region	The geographic region where the router is being used. It might be illegal to use the wireless features of the router in some parts of the world.
Channel	Identifies the channel of the wireless port being used. Click the link to the online document “Wireless Networking Basics” in Appendix B for the frequencies used on each channel.
Mode	Indicates the wireless communication mode: • Up to 54 Mbps. • Up to 65 Mbps. • Up to 150 Mbps.
Wireless AP	Indicates whether the radio feature of the router is enabled. If not enabled, the Wireless LED on the front panel is off.
Broadcast Name	Indicates whether the router is broadcasting its SSID.
Wi-Fi Protected Setup	Indicates whether the router’s PIN is enabled and whether the router is configured for Push ‘N’ Connect (Wi-Fi Protected Setup). For more information, see “Using Push 'N' Connect (Wi-Fi Protected Setup)” on page 2-13.

2. Click **Connection Status** to display the connection status.



Connection Status

IP Address	192.168.100.102
Subnet Mask	255.255.255.0
Default Gateway	192.168.100.1
DHCP Server	192.168.100.1
DNS Server	192.168.100.1
Lease Obtained	1 days,0 hrs,0 minutes
Lease Expires	0 days,14 hrs,28 minutes

Figure 6-2

Table 6-2 describes the connection status settings.

Table 6-2. Connection Status Settings

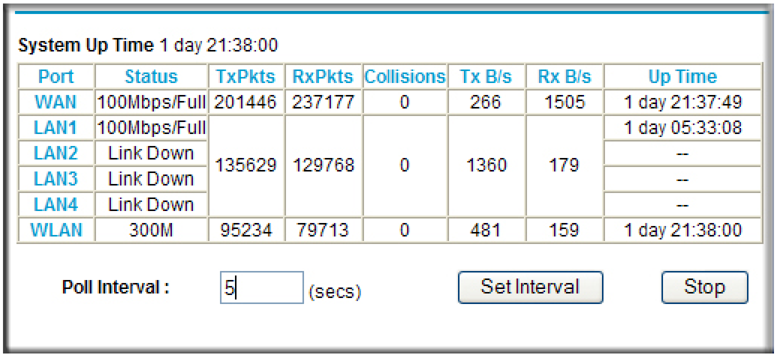
Item	Description
IP Address	The IP address that is assigned to the router.
Subnet Mask	The subnet mask that is assigned to the router.
Default Gateway	The IP address for the default gateway that the router communicates with.
DHCP Server	The IP address for the Dynamic Host Configuration Protocol server that provides the TCP/IP configuration for all the computers that are connected to the router.
DNS Server	The IP address of the Domain Name Service server that provides translation of network names to IP addresses.
Lease Obtained	The date and time that the lease was obtained.
Lease Expires	The date and time that the lease will expire.

a. Click the **Release** button to release the connection status items (that is, all items return to 0).

b. Click the **Renew** button to renew to the connection status items (that is, all items are refreshed).

c. Click the **Close Window** button to close the Connection Status screen.

3. Click **Show Statistics** to display router usage statistics.



System Up Time 1 day 21:38:00

Port	Status	TxPkts	RxPkts	Collisions	Tx B/s	Rx B/s	Up Time
WAN	100Mbps/Full	201446	237177	0	266	1505	1 day 21:37:49
LAN1	100Mbps/Full	135629	129768	0	1360	179	1 day 05:33:08
LAN2	Link Down						--
LAN3	Link Down						--
LAN4	Link Down						--
WLAN	300M	95234	79713	0	481	159	1 day 21:38:00

Poll Interval : 5 (secs)

Figure 6-3

Table 6-3 describes the router statistics.

Table 6-3. Router Statistics

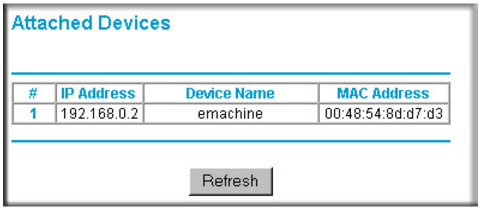
Item		Description
System Up Time		The time elapsed since the router was last restarted.
Port		The statistics for the WAN (Internet) and LAN (Ethernet) ports. For each port, the screen displays the following:
	Status	The link status of the port.
	TxPkts	The number of packets transmitted on this port since reset or manual clear.
	RxPkts	The number of packets received on this port since reset or manual clear.
	Collisions	The number of collisions on this port since reset or manual clear.
	Tx B/s	The current transmission (outbound) bandwidth used on the WAN and LAN ports.
	Rx B/s	The current reception (inbound) bandwidth used on the WAN and LAN ports.
	Up Time	The time elapsed since this port acquired the link.
Poll Interval		The intervals at which the statistics are updated in this screen.

To change the polling frequency, enter a time in seconds in the **Poll Interval** field, and click **Set Interval**.

To stop the polling entirely, click **Stop**.

Viewing a List of Attached Devices

The Attached Devices screen contains a table of all IP devices that the router has discovered on the local network. Select **Attached Devices** under Maintenance in the main menu to view the table.



#	IP Address	Device Name	MAC Address
1	192.168.0.2	emachine	00:48:54:8d:d7:d3

Figure 6-4

For each device, the table shows the IP address, NetBIOS host name or device name (if available), and the Ethernet MAC address. To force the router to look for attached devices, click **Refresh**.

➡	**Note:** If the router is rebooted, the table data is lost until the router rediscovers the devices.

Managing the Configuration File

The configuration settings of the WNR1000 v2h2 router are stored within the router in a configuration file. You can back up this file to your computer, restore it, or reset it to the factory default settings.

Select **Backup Settings** under Maintenance in the main menu to display the Backup Settings.

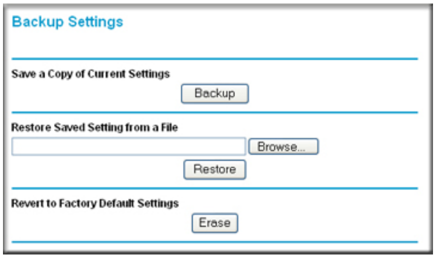

Backup Settings
Save a Copy of Current Settings
Backup
Restore Saved Setting from a File
Browse...
Restore
Revert to Factory Default Settings
Erase

Figure 6-5

The following sections describe the three available options.

Backing Up and Restoring the Configuration

The Restore and Backup options in the Settings Backup screen let you save and retrieve a file containing your router’s configuration settings.

To save your settings, click **Backup**. Your browser extracts the configuration file from the router and prompts you for a location on your computer to store the file. You can give the file a meaningful name at this time, such as comcast.cfg.

Tip: Before saving your configuration file, change the administrator password to the default, **password**. Then change it again after you have saved the configuration file. If you forget the password, you will need to reset the configuration to factory defaults.

To restore your settings from a saved configuration file, enter the full path to the file on your computer, or click **Browse** to browse to the file. When you have located it, click **Restore** to send the file to the router. The router then reboots automatically.

Warning: Do not interrupt the reboot process.

Erasing the Configuration

Under some circumstances (for example, if you move the router to a different network or if you have forgotten the password) you might want to erase the configuration and restore the factory default settings. After an erase, the router’s username is **admin**, the password is **password**, the LAN IP address is **192.168.1.1** (or **www.routerlogin.net**), and the router’s DHCP server is enabled.

To erase the configuration, click the **Erase** button in the Settings Backup screen.

To restore the factory default configuration settings when you do not know the login password or IP address, you must use the restore factory settings button on the rear panel of the router (see “Restoring the Default Configuration and Password” on page 7-12).

Updating the Router Firmware

The firmware of the WNR1000 v2h2 router is stored in flash memory, and can be updated as NETGEAR releases new firmware. You can update your firmware by logging into the router and using one of these procedures:

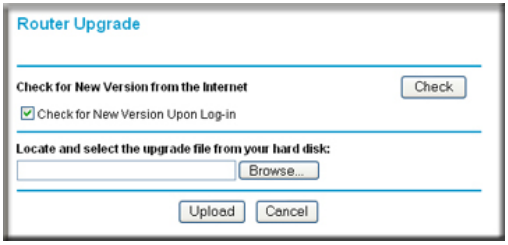
- **Enable the Check for Updated Firmware Upon Log-in check box**. Each time you log in to the router, it will automatically detect a new version of the firmware and then install it. This check box is enabled in the router's default state. See "Logging In To Your Wireless Router" on page 1-2.
- **Use the Check button in the Router Upgrade screen**. Instead of having the router check for new firmware every time you log in, you can use Router Upgrade, under Maintenance in the main menu. See "Checking for New Firmware in the Router Upgrade Screen."
- **Check for and update your firmware manually**. You can compare versions, obtain new firmware from NETGEAR's website, and then upload it. See "Updating Manually to New Router Firmware" on page 6-10.

> **Note:** Before updating the router software, NETGEAR recommends that you save your configuration settings (see "Backing Up and Restoring the Configuration" on page 6-8). A firmware update might cause the router settings to revert to the factory defaults. If this happens, after completing the update, you can restore your settings from the backup.

Checking for New Firmware in the Router Upgrade Screen

To check for new firmware and allow the router to automatically install it:

1. Select **Router Upgrade** under Maintenance in the main menu. The Router Upgrade screen displays.

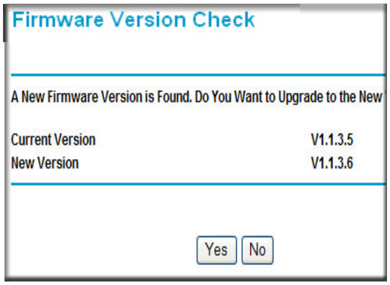

Router Upgrade
Check for New Version from the Internet
Check
Locate and select the upgrade file from your hard disk:
Browse...
Upload
Cancel

☑ Check for New Version Upon Log-in

Figure 6-6

2. Check for new software versions by clicking the **Check** button.

   - If a new version is found, information about it appears.



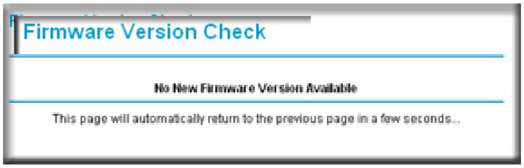
Firmware Version Check

A New Firmware Version is Found. Do You Want to Upgrade to the New

Current Version	V1.1.3.5
New Version	V1.1.3.6

Figure 6-7

   - If no new firmware version is available, a message displays and the router returns to the Firmware Update screen.



Firmware Version Check

No New Firmware Version Available

This page will automatically return to the previous page in a few seconds...

Figure 6-8

3. To update your firmware, click **Yes** and follow the prompts.

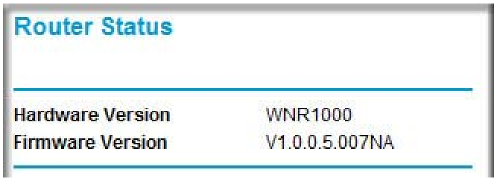
> **Warning:** When updating firmware to the WNR1000 v2h2 router, ***do not*** interrupt the Web browser by closing the window, clicking a link, or loading a new page. If the browser is interrupted, it could corrupt the firmware.

When the upload is complete, your router automatically restarts. The update process typically takes about 1 minute.

Updating Manually to New Router Firmware

To manually select, download, and install new software to your router:

1. Log in to your router, select **Router Status** under Maintenance on the main menu, and make note of the firmware version of your router.



Router Status

Hardware Version	WNR1000
Firmware Version	V1.0.0.5.007NA

Figure 6-9

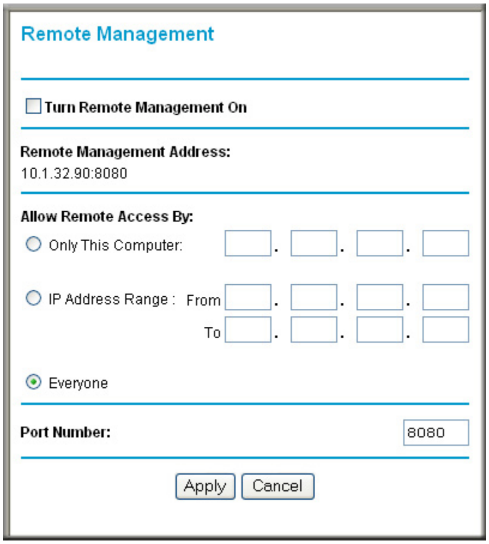
2. Go to the WNR1000 v2h2 support page on the NETGEAR website at *http://www.netgear.com/support*.
3. Compare the version number of the most recent firmware offered to the firmware version of your router. If the version on the NETGEAR website is more recent, download the file from the WNR1000 v2h2 support page to your computer.
4. Log in to your router and select **Router Upgrade** under Maintenance on the main menu.
5. Click **Browse**, and locate the firmware image that you downloaded to your computer (the file ends in .img or .chk).
6. Click **Upload** to send the firmware to the router.

⚠	**Warning:** When updating firmware to the WNR1000 v2h2 router, ***do not*** interrupt the Web browser by closing the window, clicking a link, or loading a new page. If the browser is interrupted, it could corrupt the firmware.

When the upload is complete, your router automatically restarts. The upgrade process typically takes about 1 minute.

Enabling Remote Management Access

Using the Remote Management feature, you can allow a user on the Internet to configure, upgrade, and check the status of your WNR1000 v2h2 router. Select **Remote Management** under Advanced in the main menu. The Remote Management screen displays.



Remote Management

□ Turn Remote Management On

Remote Management Address:
10.1.32.90:8080

Allow Remote Access By:

○ Only This Computer: [ ] . [ ] . [ ] . [ ]

○ IP Address Range : From [ ] . [ ] . [ ] . [ ]
To [ ] . [ ] . [ ] . [ ]

● Everyone

Port Number: 8080

Figure 6-10

Note: Be sure to change the router’s default configuration password to a very secure password. The ideal password should contain no dictionary words from any language, and should be a mixture of letters (both uppercase and lowercase), numbers, and symbols. Your password can be up to 30 characters.

To configure your router for remote management:

1. Select the **Turn Remote Management On** check box.
2. Under Allow Remote Access By, specify what external IP addresses will be allowed to access the router’s remote management.

   Note: For enhanced security, restrict access to as few external IP addresses as practical.

- To allow access from any IP address on the Internet, select **Everyone**.
- To allow access from a range of IP addresses on the Internet, select **IP Address Range**. Enter a beginning and ending IP address to define the allowed range.
- To allow access from a single IP address on the Internet, select **Only This Computer**. Enter the IP address that will be allowed access.

3. Specify the port number for accessing the management interface.

   Normal Web browser access uses the standard HTTP service port 80. For greater security, enter a custom port number for the remote management Web interface. Choose a number between 1024 and 65535, but do not use the number of any common service port. The default is 8080, which is a common alternate for HTTP.

4. Click **Apply** to have your changes take effect.

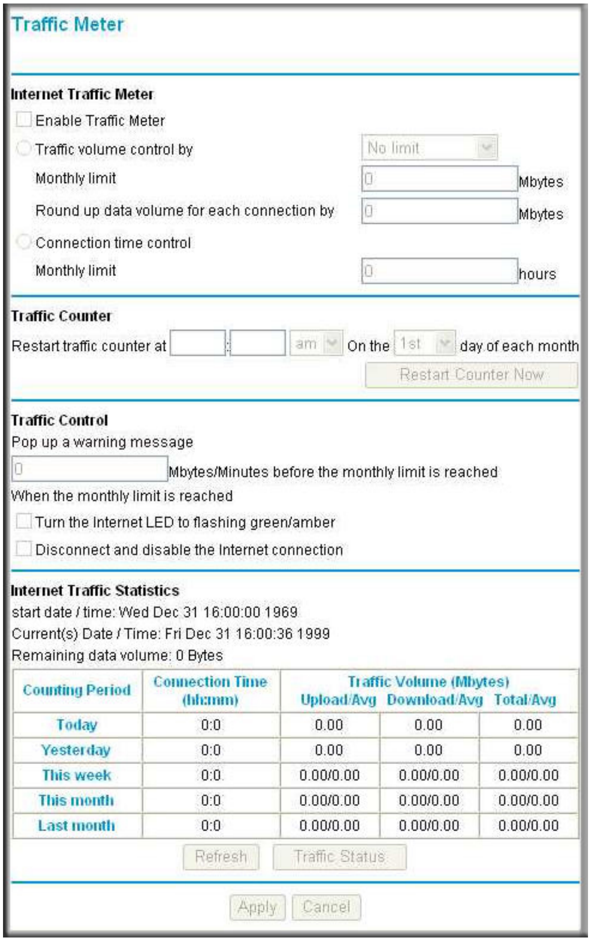
Note: When accessing your router from the Internet, enter your router’s WAN IP address into your browser’s address or location field, followed by a colon (:) and the custom port number. For example, if your external address is 134.177.0.123 and you use port number 8080, then enter **http://134.177.0.123:8080** in your browser.

Traffic Meter

Traffic Metering allows you to monitor the volume of Internet traffic passing through your router's Internet port. With the Traffic Meter utility, you can set limits for traffic volume, set a monthly limit, and get a live update of traffic usage.

To monitor traffic on your router, do the following:

1. On the Advanced menu, click **Traffic Meter**.



Traffic Meter

Internet Traffic Meter

□ Enable Traffic Meter

○ Traffic volume control by   No limit

Monthly limit   0   Mbytes

Round up data volume for each connection by   0   Mbytes

○ Connection time control

Monthly limit   0   hours

Traffic Counter

Restart traffic counter at   :   am   On the 1st day of each month

Traffic Control

Pop up a warning message

0   Mbytes/Minutes before the monthly limit is reached

When the monthly limit is reached

□ Turn the Internet LED to flashing green/amber

□ Disconnect and disable the Internet connection

Internet Traffic Statistics

start date / time: Wed Dec 31 16:00:00 1969

Current(s) Date / Time: Fri Dec 31 16:00:36 1999

Remaining data volume: 0 Bytes

Counting Period	Connection Time (hh:mm)	Traffic Volume (Mbytes)		
		Upload/Avg	Download/Avg	Total/Avg
Today	0:0	0.00	0.00	0.00
Yesterday	0:0	0.00	0.00	0.00
This week	0:0	0.00/0.00	0.00/0.00	0.00/0.00
This month	0:0	0.00/0.00	0.00/0.00	0.00/0.00
Last month	0:0	0.00/0.00	0.00/0.00	0.00/0.00

Figure 6-11

2. To enable the Traffic Meter, click the **Enable Traffic Meter** check box.

3. If you would like to record and restrict the volume of Internet traffic, click the **Traffic volume control by** radio button. You can select one of the following options for controlling the traffic volume:
   - No Limit – No restriction is applied when the traffic limit is reached.
   - Download only – The restriction is applied to incoming traffic only.
   - Both Directions – The restriction is applied to both incoming and outgoing traffic.
4. You can limit the amount of data traffic allowed per month:
   - By specifying how many Mbytes per month are allowed.
   - By specifying how many hours of traffic are allowed.
5. Set the **Traffic Counter** to begin at a specific time and date.
6. Set up **Traffic Control** to issue a warning message before the month limit of Mbytes or Hours is reached. You can select one of the following to occur when the limit is attained:
   - The Internet LED flashes green or amber.
   - The Internet connection is disconnected and disabled.
7. Set up **Internet Traffic Statistics** to monitor the data traffic.
8. Click the **Traffic Status** button if you want a live update on Internet traffic status on your router.
9. Click **Apply** to save your settings.

Chapter 7
Troubleshooting

This chapter provides information about troubleshooting your N 150 Wireless Router WNR1000 v2h2 . After each problem description, instructions are provided to help you diagnose and solve the problem. As a first step, please review the Quick Tips.

Tip: NETGEAR provides helpful articles, documentation, and the latest software updates at *http://www.netgear.com/support*.

This chapter includes the following sections:

Quick Tips

This section describes tips for troubleshooting some common problems:

Be sure to restart your network in this sequence.

1. Turn off *and* unplug the modem.

2. Turn off the wireless router and computers.

3. Plug in the modem and turn it on. Wait 2 minutes.

4. Turn on the wireless router and wait 1 minute.
5. Turn on the computers.

Make sure that the Ethernet cables are securely plugged in.

- The Internet status light on the wireless router is on if the Ethernet cable connecting the wireless router and the modem is plugged in securely and the modem and wireless router are turned on.
- For each powered-on computer connected to the wireless router by an Ethernet cable, the corresponding numbered router LAN port light is on.

Make sure that the wireless settings in the computer and router match exactly.

- For a wirelessly connected computer, the wireless network name (SSID) and WEP or WPA security settings of the router and wireless computer must match exactly.
- If you have enabled the wireless router to restrict wireless access by MAC address, you must add the wireless computer's MAC address to the router's wireless card access list.

Make sure that the network settings of the computer are correct.

- LAN connected computers must be configured to obtain an IP address automatically using DHCP. For more information, see the links in Appendix B, "Related Documents.
- Some cable modem services require you to use the MAC address of the computer registered on the account. If so, in the Router MAC Address section of the Basic Settings menu, select **Use this Computer's MAC Address**. Click **Apply** to save your settings. Restart the network in the correct sequence.

Check the Test light to verify correct router operation.

If the Test light does not turn off within 2 minutes after you turn the router on, reset the router according to the instructions in "Restoring the Default Configuration and Password" on page 7-12.

Troubleshooting Basic Functions

After you turn on power to the router, the following sequence of events should occur:

1. When power is first applied, verify that the Power light ⏻ is on.
2. Verify that the power light turns amber within a few seconds, indicating that the self-test procedure is running.

3. After approximately 20 seconds, verify that:
    a. The color of the power light changes to green.
    b. The LAN port lights are lit for any local ports that are connected.

       If a port's light is lit, a link has been established to the connected device. If a LAN port is connected to a 100 Mbps device, verify that the port's light is green. If the port is 10 Mbps, the light will be amber.
    c. The Internet port is connected and its light is lit.
4. If you have enabled WPS security, verify that the push-button stops blinking and changes to green (otherwise the push-button light should be off).

If the correct behavior does not occur, see the appropriate following section.

The Power light is not on.

If the Power and other lights are off when your router is turned on:

- Make sure that the power cord is properly connected to your router and that the power adapter is properly connected to a functioning power outlet.
- Check that you are using the power adapter supplied by NETGEAR for this product.

If the error persists, you have a hardware problem and should contact Technical Support.

The Power light blinks green slowly and continuously.

The router firmware is corrupted.

To restore your firmware:

1. Make sure your PC is connected to your router and the router is powered on.
2. Insert the *Resource CD* that came with your router into your PC.
    a. The CD will automatically start and detect the language you are using on your PC. Select a different language option, if you prefer.
    b. If the CD does not automatically start, browse the CD and double-click on N.
3. Click **Supporting Software**, then **Netgear Firmware Recovery Utility**, and follow the prompts for the recovery process.
4. After firmware recovery is completed, follow the prompts to restore your configuration settings.

The Power light stays amber.

When the router is turned on, the Power light turns amber for about 20 seconds and then turns green. If the light does not turn green, the router has a problem.

If the Power light is still amber 1 minute after turning on power to the router:

1. Turn the power off and back on to see if the router recovers.
2. Clear the router's configuration to factory defaults. This will set the router's IP address to www.routerlogin.net. This procedure is explained in "Restoring the Default Configuration and Password" on page 7-12.

If the error persists, you might have a hardware problem and should contact Technical Support.

The Internet light stays amber.

When the router is turned on, the Internet light turns amber for about 20 seconds and then turns green. If the light does not turn green, the router has a problem.

If the Internet light is still amber 1 minute after turning on power to the router:

1. The Internet is not accessible. Confirm that you have the correct internet setting.
2. Clear the router's configuration to factory defaults. This will set the router's IP address to www.routerlogin.net. This procedure is explained in "Restoring the Default Configuration and Password" on page 7-12.
3. Turn the power off and back on to see if the router recovers.

The Internet or LAN port lights are not on.

If either the LAN or Internet lights do not light when the Ethernet connection is made, check the following:

1. Make sure that the Ethernet cable connections are secure at the router and at the computer.
2. Make sure that power is turned on to the connected computer.
3. Be sure you are using Ethernet cables like the cable that was supplied with the wireless router. See the *NETGEAR Wireless Router Setup Manual* for instructions.

The Push 'N' Connect (WPS) push-button blinks amber.

If after using the WPS function the push-button blinks amber, check the following:

1. Make sure that you are using the push-button and not the router's built-in registrar.

2. Check that PIN verification has succeeded for the WPS-enabled device you are connecting to the router.
3. Make sure you have not pushed the push-button after disabling the WPS function (you logged into the router and disabled this previously).
4. Check that the router is not in the temporary AP setup locked state (if you are using the wireless repeater function).

For more information on WPS, see "Using Push 'N' Connect (Wi-Fi Protected Setup)" on page 2-13.

Login Problems

If you are unable to log in to the wireless router, check the following:

- If you are using an Ethernet-connected computer, check the Ethernet connection between the computer and the router as described in the *NETGEAR Wireless Router Setup Manual*.
- Make sure you are using the correct login information. The factory default login name is **admin** and the password is **password**. Make sure that the Caps Lock is off when entering this information.
- Make sure your computer's IP address is on the same subnet as the router. If your are using the recommended addressing scheme, your computer's address should be in the range of 192.168.1.2 to 192.168.1.254. Refer to your computer's documentation or see "Preparing Your Network" in Appendix B for help with configuring your computer.

➡	**Note:** If your computer cannot reach a DHCP server, some operating systems will assign an IP address in the range 169.254.x.x. If your IP address is in this range, verify that you have a good connection from the computer to the router, then restart (reboot) your computer.

- If your router's IP address has been changed and you don't know the current IP address, reset the router's configuration to the factory defaults. This procedure will reset the router's IP address to 192.168.1.1 (see "Default Configuration Settings" in Appendix A).
- Make sure your browser has Java, JavaScript, or ActiveX enabled. If you are using Internet Explorer, click Refresh to be sure the Java applet is loaded. Try closing the browser and reopening it again.

- If you are attempting to set up your NETGEAR router as an additional router behind an existing router in your network, consider replacing the existing router instead. NETGEAR does not support such a configuration.
- If you are attempting to set up your NETGEAR router as a replacement for an ADSL gateway in your network, the router cannot perform many gateway services, for example, converting ADSL or Cable data into Ethernet networking information. NETGEAR does not support such a configuration.

Checking the Internet Service Connection

If you can access your router, but your router is unable to access the Internet, review the topics in this section:

- "Obtaining an Internet IP Address"
- "Troubleshooting PPPoE"
- "Troubleshooting Internet Browsing"

Obtaining an Internet IP Address

If your wireless router is unable to access the Internet, and your Internet light is amber, check the wireless router to see if it is able to get an Internet IP address from your service provider. Unless you have a static IP address, your wireless router automatically requests an IP address from your service provider.

To check your wireless router's Internet IP address:

1. Log in to the wireless router.
2. Select **Router Status**, under Maintenance in the main menu, to check that an IP address is shown for the Internet Port. If 0.0.0.0 is shown, your wireless router has not obtained an IP address from your service provider.

If your router is unable to obtain an IP address from the your service provider, the problem might be one of the following:

- You might need to force your cable or DSL modem to recognize your new router by restarting your network, in the sequence described in the *NETGEAR Wireless Router Setup Manual*.
- Your service provider might require a login. Ask your service provider whether they require a PPP over Ethernet (PPPoE) login (see "Troubleshooting PPPoE" on page 7-7).
- You might have incorrectly set the service name, user name or password. Review your router's **Basic Settings** screen.
- Your service provider might check for your computer's host name. Assign the computer Host Name of your ISP account to the wireless router on the **Basic Settings** screen.
- Your service provider might only allow one Ethernet MAC address to connect to the Internet, and check for your computer's MAC address. If this is the case:
  - Inform your service provider that you have bought a new network device, and ask them to use the wireless router's MAC address, or
  - Configure your router to spoof your computer's MAC address. On the **Basic Settings** screen in the Router MAC Address section, select "Use this Computer's MAC Address" and click **Apply.** Then restart your network in the correct sequence (see the *NETGEAR Wireless Router Setup Manual* for instructions).

Troubleshooting PPPoE

If you are using PPPoE, try troubleshooting your Internet connection.

To troubleshoot a PPPoE connection:

1. Log in to the wireless router.
2. Select **Router Status** under **Maintenance** on the main menu.
3. Click **Connection Status**. If all of the steps indicate "OK," then your PPPoE connection is up and working.

   If any of the steps indicate "Failed," you can attempt to reconnect by clicking **Connect.** The wireless router will continue to attempt to connect indefinitely.

   If you cannot connect after several minutes, you might be using an incorrect service name, user name, or password. There also might be a provisioning problem with your ISP.

> **Note:** Unless you connect manually, the wireless router will not authenticate using PPPoE until data is transmitted to the network.

Troubleshooting Internet Browsing

If your wireless router can obtain an IP address but your computer is unable to load any web pages from the Internet, check the following:

- **Your computer might not recognize any DNS server addresses**. A DNS server is a host on the Internet that translates Internet names (such as www addresses) to numeric IP addresses. Typically, your ISP will provide the addresses of one or two DNS servers for your use. If you entered a DNS address during the wireless router's configuration, restart your computer. Alternatively, you can configure your computer manually with a DNS address, as explained in the documentation for your computer.
- **Your computer might not have the wireless router configured as its default gateway**. Reboot the computer and verify that the wireless router address (www.routerlogin.net) is listed by your computer as the default gateway address.
- **You might be running login software that is no longer needed**. If your ISP provided a program to log you in to the Internet (such as WinPoET), you no longer need to run that software after installing your router. You might need to go to Internet Explorer and select **Tools > Internet Options**, click the Connections tab, and select **Never dial a connection**.

If the wireless router does not save changes you have made in the browser interface, check the following:

- When entering configuration settings, be sure to click **Apply** before moving to another screen or tab, or your changes could be lost.
- Click **Refresh** or **Reload** in the Web browser. The changes might have occurred, but the Web browser might be caching the old configuration.

Troubleshooting Your Network Using the Ping Utility

Most network devices and routers contain a ping utility that sends an echo request packet to the designated device. The device then responds with an echo reply. Troubleshooting a network is made very easy by using the ping utility in your computer or workstation. This section includes:

- "Testing the LAN Path to Your Router"
- "Testing the Path from Your Computer to a Remote Device"

Testing the LAN Path to Your Router

You can ping the router from your computer to verify that the LAN path to your router is set up correctly.

To ping the router from a running Windows PC:

1. From the Windows toolbar, click Start, and then select **Run**.
2. In the field provided, type **ping** followed by the IP address of the router, as in this example:

   ```
   ping www.routerlogin.net
   ```

3. Click **OK**.

   You should see a message like this one:

   ```
   Pinging <IP address > with 32 bytes of data
   ```

   If the path is working, you see this message:

   ```
   Reply from < IP address >: bytes=32 time=NN ms TTL=xxx
   ```

   If the path is not working, you see this message:

   ```
   Request timed out
   ```

   If the path is not functioning correctly, you could have one of the following problems:

   - Wrong physical connections
     - For a wired connection, make sure that the numbered LAN port light is on for the port to which you are connected. If the light is off, follow the instructions in "Troubleshooting Basic Functions" on page 7-2.
     - Check that the appropriate LEDs are on for your network devices. If your router and computer are connected to a separate Ethernet switch, make sure that the link lights are on for the switch ports that are connected to your computer and router.
   - Wrong network configuration
     - Verify that the Ethernet card driver software and TCP/IP software are both installed and configured on your computer.
     - Verify that the IP address for your router and your computer are correct and that the addresses are on the same subnet.

Testing the Path from Your Computer to a Remote Device

After verifying that the LAN path works correctly, test the path from your computer to a remote device.

1. From the Windows toolbar, click the Start button, and then select **Run**.
2. In the Windows Run window, type:

   ```
   ping -n 10 <IP address>
   ```

   where <*IP address*> is the IP address of a remote device such as your ISP's DNS server.

If the path is functioning correctly, replies like those shown in the previous section are displayed. If you do not receive replies:

- Check that your computer has the IP address of your router listed as the default gateway. If the IP configuration of your computer is assigned by DHCP, this information is not be visible in your computer's Network Control Panel. Verify that the IP address of the router is listed as the default gateway as described in the online document you can access from "Preparing Your Network" in Appendix B.
- Check to see that the network address of your computer (the portion of the IP address specified by the subnet mask) is different from the network address of the remote device.
- Check that your cable or DSL modem is connected and functioning.
- If your ISP assigned a host name to your computer, enter that host name as the account name in the Basic Settings screen.
- Your ISP could be rejecting the Ethernet MAC addresses of all but one of your computers. Many broadband ISPs restrict access by allowing traffic only from the MAC address of your broadband modem, but some ISPs additionally restrict access to the MAC address of a single computer connected to that modem. If this is the case, you must configure your router to "clone" or "spoof" the MAC address from the authorized computer. For more information, see "Using the Setup Manual" on page 1-1.

Problems with Date and Time

Select **E-mail** under Content Filtering in the main menu to display a screen that shows the current date and time of day. The WNR1000 v2h2 router uses the Network Time Protocol (NTP) to obtain the current time from one of several network time servers on the Internet. Each entry in the log is stamped with the date and time of day. Problems with the date and time function can include the following:

- Date shown is January 1, 2000.
  Cause: The router has not yet successfully reached a network time server. Check that your Internet access settings are correct. If you have just completed configuring the router, wait at least 5 minutes, and check the date and time again.
- Time is off by one hour.
  Cause: The router does not adjust for daylight savings time. In the E-mail screen, select the **Automatically Adjust for Daylight Savings Time** check box.

Problems with Wireless Adapter Connections

If your wireless adapter is unable to connect, check its connection settings.

To check the adapter's connection settings:

1. open the adapter setup utility to check connections:
   - **NETGEAR Smart Wizard utility**. If you installed a NETGEAR wireless adapter in your computer, a Smart Wizard utility program is installed that can provide helpful information about your wireless network. You can find this program in your Windows Program menu or as an icon in your system tray. Other wireless card manufacturers might include a similar program.
   - **Windows basic setup utility**. If you have no specific wireless card setup program installed, you can use the basic setup utility in Windows:
     – Open the Windows Control Panel, and double-click **Network Connections**.
     – In the LAN section, double-click **Wireless Network Connection**.
2. Use the adapter's setup program to scan for available wireless networks, looking for the network name (SSID) of **NETGEAR**, or your custom SSID if you have changed it.
3. If your wireless network appears and has good signal strength, configure and test with the simplest wireless connection possible.

If your wireless network does not appear, check these conditions:

- Is your router's wireless radio enabled? See "Viewing Advanced Wireless Settings" on page 2-11.
- Is your router's SSID broadcast enabled? See "Viewing Advanced Wireless Settings" on page 2-11.

- Is your router set to a wireless standard that is not supported by your wireless adapter? Check the Mode setting as described in "Viewing and Configuring Basic Internet Settings" on page 1-6.

If your wireless network appears, but the signal strength is weak, check these conditions:

- Is your router too far from your adapter, or too close? Place the computer that has the adapter near the router, but at least 6 feet away, and see whether the signal strength improves.
- Is your wireless signal obstructed by objects between the router and your adapter? See "Optimizing Wireless Performance" on page 5-14.

Restoring the Default Configuration and Password

This section explains how to restore the factory default configuration settings that reset the router's user name to **admin**, the password to **password**, and the IP address to **192.168.1.1**.

⚠	**Warning:** These procedures erase all current configuration settings.

You can erase the current configuration and restore factory defaults in two ways:

- Use the Erase function of the router. To use the Erase function, see "Erasing the Configuration" on page 6-8.
- Use the restore factory settings button on the rear panel of the router. Use this method for cases when the administration password or IP address is not known.

To use the restore settings button:

1. Locate the restore factory settings button on the rear panel of the router.
2. Use a sharp object such as a pen or a paper clip to press and hold the restore factory settings button for about 5 seconds, until the Power light begins to blink.
3. Release the restore factory settings button, and wait for the router to restart, and for the Power light to stop blinking and become solid green.

   The factory default settings will be restored so that you can access the router from your Web browser using the factory defaults.

If the wireless router fails to restart, or the Power light continues to blink or turns solid amber, the unit might be defective. If the error persists, you might have a hardware problem and should contact Technical Support at *http://www.netgear.com/support*.

Appendix A
Technical Specifications

Default Configuration Settings

This appendix provides factory default settings and technical specifications for the N 150 Wireless Router WNR1000 v2h2 .

Table A-1. WNR1000 v2h2 Router Default Configuration Settings

Feature		Default Setting
Router Login		
	Router Login URL	http://www.routerlogin.net *or* http://www.routerlogin.com
	Login Name (case-sensitive) printed on product label	admin
	Login Password (case-sensitive) printed on product label	password
Internet Connection		
	WAN MAC Address	Default hardware address (on label)
	MTU Size	1500
Local Network		
	Router LAN IP address printed on product label (also known as Gateway IP address)	192.168.1.1
	Router Subnet	255.255.255.0
	DHCP Server	Enabled
	DHCP range	192.168.1.2 to 192.168.1.254
	Time Zone	GMT
	Time Zone Adjusted for Daylight Saving Time	Disabled
	Allow a Registrar to configure this router	Enabled

Table A-1. WNR1000v2 Router Default Configuration Settings (continued)

Wireless		
	Wireless Communication	Enabled
	SSID Name	NETGEAR
	Security	Disabled
	Wireless Access List (MAC Filtering)	All wireless stations allowed
	Broadcast SSID	Enabled
	Transmission Speed	Auto[*]
	Country/Region	United States (North America only; otherwise varies by country and region)
	RF Channel	Auto
	Operating Mode	Up to 150 Mbps
	Data Rate	Best
	Output Power	Full
Firewall		
	Inbound (communications coming in from the Internet)	Disabled (bars all unsolicited requests except for traffic on port 80, the http port)
	Outbound (communications going out to the Internet)	Enabled (all)

[*] Maximum Wireless signal rate derived from IEEE Standard 802.11 specifications. Actual throughput will vary. Network conditions and environmental factors, including volume of network traffic, building materials and construction, and network overhead lower actual data throughput rate.

General Specifications

Table A-2. WNR1000v2 Router General Specifications

Feature		General
Network Protocol and Standards Compatibility		
	Data and Routing Protocols	TCP/IP, RIP-1, RIP-2, DHCP, PPPoE, PPTP, Bigpond, Dynamic DNS, and UPnP
Power Adapter		
	North America	120V, 60 Hz, input
	UK, Australia	240V, 50 Hz, input
	Europe	230V, 50 Hz, input
	Japan	100V, 50/60 Hz, input
	All regions (output)	12V DC @ 1.0A, output
Physical		
	Dimensions	28 x 175 x 119 mm (1.1 x 6.89 x 4.68 in.)
	Weight	0.26 kg (0.57 lb)
Environmental		
	Operating temperature	0° to 40° C (32º to 104º F)
	Operating humidity	90% maximum relative humidity, noncondensing
Electromagnetic Emissions		
	Designed to conform to the following standards	FCC Part 15 Class B EN 55022/24 (CISPR 22/24) Class B EN 60950 (CE LVD) Class B MIC
Interface Specifications		
	LAN	10BASE-T or 100BASE-Tx, RJ-45
	WAN	10BASE-T or 100BASE-Tx, RJ-45

Appendix B
Related Documents

This appendix provides links to reference documents you can use to gain a more complete understanding of the technologies used in your NETGEAR product.

Table B-1. Reference Documents

Document	Link
TCP/IP Networking Basics	*http://documentation.netgear.com/reference/enu/tcpip/index.htm*
Wireless Networking Basics	*http://documentation.netgear.com/reference/enu/wireless/index.htm*
Preparing Your Network	*http://documentation.netgear.com/reference/enu/wsdhcp/index.htm*
Virtual Private Networking Basics	*http://documentation.netgear.com/reference/enu/vpn/index.htm*
Glossary	*http://documentation.netgear.com/reference/enu/glossary/index.htm*

In addition, you can find initial setup instructions for your wireless router in the *NETGEAR Wireless Router Setup Manual*.

Index