NETGEAR RangeMax NEXT Wireless PCI Adapter WN311B User Manual

NETGEAR

NETGEAR, Inc.
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202-10203-02
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Technical Support

Please refer to the support information card that shipped with your product. By registering your product at *http://www.netgear.com/register*, we can provide you with faster expert technical support and timely notices of product and software upgrades.

NETGEAR, INC. Support Information

Phone: 1-888-NETGEAR, for US & Canada only. For other countries, see your Support information card.

E-mail: support@netgear.com

Website: *http://www.netgear.com*

Statement of Conditions

In the interest of improving internal design, operational function, and/or reliability, NETGEAR reserves the right to make changes to the products described in this document without notice.

NETGEAR does not assume any liability that may occur due to the use or application of the product(s) or circuit layout(s) described herein.

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Maximum Wireless Signal Rate Derived from IEEE Standard 802.11 Specifications

Actual data 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.

Safety and Regulatory Notices

FCC Statement

Certification ID: FCC: PY306100041

IC: 4054A-06100041

The WN311B has been tested and complies with the specifications for a Class B digital device, pursuant to Part 15 of the FCC Rules.

Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and

(2) This device must accept any interference received, including interference that may cause undesired operation.

These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used according to the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television

reception, which is found by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment or devices
- Connect the equipment to an outlet other than the receiver's
- Consult a dealer or an experienced radio/TV technician for assistance

FCC Caution: Any change or modification to the product not expressly approved by Netgear could void the user's authority to operate the device.

FCC RF Radiation Exposure

RF Exposure Information

The radio module has been evaluated under FCC Bulletin OET 65C (01-01) and found to be compliant to the requirements as set forth in CFR 47 Sections, 2.1093, and 15.247 (b) (4) addressing RF Exposure from radio frequency devices. This model meets the applicable government requirements for exposure to radio frequency waves.

Canadian Department of Communications Industry Canada (IC) Notice

This Class B digital apparatus complies with Canadian ICES-003 and RSS-210. Cet appareil numérique de la classe B est conforme à la norme NMB-003 et CNR-210 du Canada.

"To prevent radio interference to the licensed service, this device is intended to be operated indoors and away from windows to provide maximum shielding. Equipment (or its transmit antenna) that is installed outdoors is subject to licensing."

"Pour empêcher que cet appareil cause du brouillage au service faisant l'objet d'une licence, il doit être utilisé à l'intérieur et devrait être placé loin des fenêtres afin de fournir un écran de blindage maximal. Si le matériel (ou son antenne d'émission) est installé à l'extérieur, il doit faire l'objet d'une licence."

Europe - EU Declaration of Conformity

A printed copy of the EU Declaration of Conformity certificate for this product is provided in the WN311B product package.

Èesky [Czech]	NETGEAR, Inc. tímto prohlašuje, že tento NETGEAR RangeMax NEXT Wireless PCI Adapter WN311B je ve shodì se základními požadavky a dalšími pøíslušnými ustanoveními smìrnice 1999/5/ES.
Dansk [Danish]	Undertegnede NETGEAR, Inc. erklærer herved, at følgende udstyr NETGEAR RangeMax NEXT Wireless PCI Adapter WN311B overholder de væsentlige krav og øvrige relevante krav i direktiv 1999/5/EF.
Deutsch [German]	Hiermit erklärt NETGEAR, Inc., dass sich das Gerät NETGEAR RangeMax NEXT Wireless PCI Adapter WN311B in Übereinstimmung mit den grundlegenden Anforderungen und den übrigen einschlägigen Bestimmungen der Richtlinie 1999/5/EG befindet.

Eesti [Estonian]	Käesolevaga kinnitab NETGEAR, Inc. seadme NETGEAR RangeMax NEXT Wireless PCI Adapter WN311B vastavust direktiivi 1999/5/EÜ põhinõuetele ja nimetatud direktiivist tulenevatele teistele asjakohastele sätetele.
English	Hereby, NETGEAR, Inc., declares that this NETGEAR RangeMax NEXT Wireless PCI Adapter WN311B is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.
Español [Spanish]	Por medio de la presente NETGEAR, Inc. declara que el NETGEAR RangeMax NEXT Wireless PCI Adapter WN311B cumple con los requisitos esenciales y cualesquiera otras disposiciones aplicables o exigibles de la Directiva 1999/5/CE.
Ελληνική [Greek]	ΜΕ ΤΗΝ ΠΑΡΟΥΣΑ NETGEAR, Inc. ΔΗΛΩΝΕΙ ΟΤΙ NETGEAR RangeMax NEXT Wireless PCI Adapter WN311B ΣΥΜΜΟΡΦΩΝΕΤΑΙ ΠΡΟΣ ΤΙΣ ΟΥΣΙΩΔΕΙΣ ΑΠΑΙΤΗΣΕΙΣ ΚΑΙ ΤΙΣ ΛΟΙΠΕΣ ΣΧΕΤΙΚΕΣ ΔΙΑΤΑΞΕΙΣ ΤΗΣ ΟΔΗΓΙΑΣ 1999/5/ΕΚ.
Français [French]	Par la présente NETGEAR, Inc. déclare que l'appareil NETGEAR RangeMax NEXT Wireless PCI Adapter WN311B est conforme aux exigences essentielles et aux autres dispositions pertinentes de la directive 1999/5/CE.
Italiano [Italian]	Con la presente NETGEAR, Inc. dichiara che questo NETGEAR RangeMax NEXT Wireless PCI Adapter WN311B è conforme ai requisiti essenziali ed alle altre disposizioni pertinenti stabilite dalla direttiva 1999/5/CE.
Latviski [Latvian]	Ar šo NETGEAR, Inc. deklarç, ka NETGEAR RangeMax NEXT Wireless PCI Adapter WN311B atbilst Direktîvas 1999/5/EK bûtiskajâm prasîbâm un citiem ar to saistîtajiem noteikumiem.
Lietuviø [Lithuanian]	Šiuo NETGEAR, Inc. deklaruoja, kad šis NETGEAR RangeMax NEXT Wireless PCI Adapter WN311B atitinka esminius reikalavimus ir kitas 1999/5/EB Direktyvos nuostatas.
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Malti [Maltese]	Hawnhekk, NETGEAR, Inc., jiddikjara li dan NETGEAR RangeMax NEXT Wireless PCI Adapter WN311B jikkonforma mal-tiijiet essenzjali u ma provvedimenti orajn relevanti li hemm fid-Dirrettiva 1999/5/EC.
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Português [Portuguese]	NETGEAR, Inc. declara que este NETGEAR RangeMax NEXT Wireless PCI Adapter WN311B está conforme com os requisitos essenciais e outras disposições da Directiva 1999/5/CE.
Slovensko [Slovenian]	NETGEAR, Inc. izjavlja, da je ta NETGEAR RangeMax NEXT Wireless PCI Adapter WN311B v skladu z bistvenimi zahtevami in ostalimi relevantnimi doloèili direktive 1999/5/ES.

Slovensky [Slovak]	NETGEAR, Inc. týmto vyhlasuje, že NETGEAR RangeMax NEXT Wireless PCI Adapter WN311B spåòa základné požiadavky a všetky príslušné ustanovenia Smernice 1999/5/ES.
Suomi [Finnish]	NETGEAR, Inc. vakuuttaa täten että NETGEAR RangeMax NEXT Wireless PCI Adapter WN311B tyyppinen laite on direktiivin 1999/5/EY oleellisten vaatimusten ja sitä koskevien direktiivin muiden ehtojen mukainen.
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Product and Publication Details

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About This Manual

The *NETGEAR® RangeMax™ NEXT Wireless PCI Adapter WN311B User Manual* describes how to install, configure and troubleshoot the NETGEAR RangeMax NEXT Wireless PCI Adapter WN311B. The information in this manual is intended for readers with intermediate computer and Internet skills.

Conventions, Formats and Scope

The conventions, formats, and scope of this manual are described in the following paragraphs:

- **Typographical Conventions.** This manual uses the following typographical conventions:

Italics	Emphasis, books, CDs, URL names
Bold	User input
`Fixed`	Screen text, file and server names, extensions, commands, IP addresses

- **Formats.** This manual uses the following formats to highlight special messages:

	Note: This format is used to highlight information of importance or special interest.

	Tip: This format is used to highlight a procedure that will save time or resources.

- **Scope.** This manual is written for the WN311B Wireless PCI Adapter according to these specifications:

Product Version	NETGEAR RangeMax NEXT Wireless PCI Adapter WN311B
Manual Publication Date	February 2007

For more information about network, Internet, firewall, and VPN technologies, see the links to the NETGEAR website in Appendix B, "Related Documents".

	Note: Product updates are available on the NETGEAR, Inc. website at *http://kbserver.netgear.com/products/WN311B.asp*.

How to Use This Manual

The HTML version of this manual includes the following:

- Buttons, and , for browsing forwards or backwards through the manual one page at a time
- A button that displays the table of contents and an button. Double-click on a link in the table of contents or index to navigate directly to where the topic is described in the manual.
- A button to access the full NETGEAR, Inc. online knowledge base for the product model.
- Links to PDF versions of the full manual and individual chapters.

How to Print this Manual

To print this manual you can choose one of the following several options, according to your needs.

- **Printing a Page in the HTML View**.

  Each page in the HTML version of the manual is dedicated to a major topic. Use the *Print* button on the browser toolbar to print the page contents.

- **Printing a Chapter**.

  Use the *PDF of This Chapter* link at the top left of any page.

  – Click the *PDF of This Chapter* link at the top left of any page in the chapter you want to print. The PDF version of the chapter you were viewing opens in a browser window.

  – Your computer must have the free Adobe Acrobat reader installed in order to view and print PDF files. The Acrobat reader is available on the Adobe website at *http://www.adobe.com*.

– Click the print icon in the upper left of the window.

Tip: If your printer supports printing two pages on a single sheet of paper, you can save paper and printer ink by selecting this feature.

- **Printing the Full Manual**.

  Use the *Complete PDF Manual* link at the top left of any page.

  – Click the Complete PDF Manual link at the top left of any page in the manual. The PDF version of the complete manual opens in a browser window.

  – Click the print icon in the upper left of the window.

Tip: If your printer supports printing two pages on a single sheet of paper, you can save paper and printer ink by selecting this feature.

Chapter 1
Basic Setup

The WN311B Wireless PCI Adapter lets you connect a PC computer to wireless networks. It is designed for PC computers running Microsoft Windows. For information about product features and compatible NETGEAR products, see the NETGEAR website at *http://www.netgear.com*.

This chapter describes how to install your Wireless PCI Adapter and set up basic wireless connectivity on your Wireless Local Area Network (WLAN). Advanced wireless network set up is covered in Chapter 2, "Network Connections and Wireless Security".

What Is in the Box

The product package should contain the following items:

- NETGEAR RangeMax NEXT Wireless PCI Adapter WN311B
- The antenna
- *NETGEAR RangeMax NEXT Wireless PCI Adapter WN311T Installation Guide*
- *Resource CD*, including:
  - Driver software
  - Smart Wizard setup software
  - Documentation including the *NETGEAR RangeMax NEXT Wireless PCI Adapter WN311T Installation Guide*, and the *NETGEAR RangeMax NEXT Wireless PCI Adapter WN311B User Manual* (this document)
- Warranty card
- Support information card

If any of the parts are incorrect, missing, or damaged, contact your NETGEAR dealer. Keep the carton, including the original packing materials, in case you need to return the product for repair.

What You Need Before You Begin

You need to verify that your computer meets the minimum system requirements and get the wireless network configuration settings of the WLAN where you will connect before you can configure your wireless PCI adapter and connect.

Verify System Requirements

Before installing the WN311B Wireless PCI Adapter, please make sure that these minimum requirements have been met:

- Pentium® III class computer with an available PCI slot
- CD drive
- 20 Mbytes of free hard disk space
- Some versions of Windows may ask for the original Windows operating system installation files to complete the installation of the WN311B driver software

Observe Wireless Location and Range Guidelines

Computers can connect over wireless networks indoors at a range which vary significantly based on the physical location of the computer with the WN311B Wireless PCI Adapter. For best results, avoid potential sources of interference, such as:

- Large metal surfaces
- Microwaves
- 2.4 GHz Cordless phones

In general, wireless devices can communicate through walls. However, if the walls are constructed with concrete, or have metal, or metal mesh, the effective range will decrease if such materials are between the devices.

WN311B Default Wireless Settings

If this is a new wireless network installation, use the factory default settings to set up the network and verify wireless connectivity. If this is an addition to an existing wireless network, you will need to identify the wireless network and wireless security settings that are already defined.

Your WN311B Wireless PCI Adapter factory default basic settings are:

- Network Name Service Set Identification (SSID): **Any** (First available network)

> **Note:** In order for the WN311B Wireless PCI Adapter to communicate with a wireless access point or wireless adapter, all devices must be set up to use the same wireless network name (SSID).

- Network Mode (Infrastructure or Ad-hoc): **Infrastructure**
- Data security WEP, WPA2-PSK, or WPA-PSK encryption: **Disabled**

Installation

The instructions in this chapter explain how to install the WN311B to connect to a network with an access point or router. Wireless security, advanced settings, and Computer-to-Computer (Ad Hoc) instructions are covered in Chapter 2, “Network Connections and Wireless Security”.

To install the WN311B Wireless PCI Adapter:

1. First, install the WN311B software.

Insert the NETGEAR CD. If the CD main page does not appear, double click Autorun.exe on the CD.

a. Click Install the Software.The Check for Updates window opens.

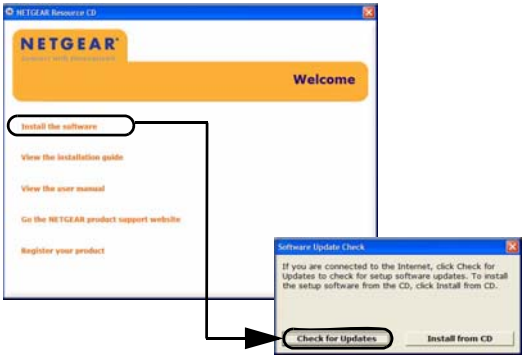

Figure 1-1

b. If you are connected to the Internet, click Check for Updates. If not, you can choose to install from the CD.

c. Follow the Wizard steps and click Next to continue, and to install the software.

2. Now, insert the wireless PCI adapter.

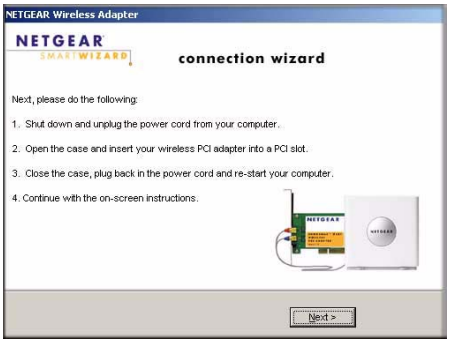

Figure 1-2

a. When prompted, shut down the computer.

b. Unplug the computer, open the case, and install the WN311B into a PCI slot.

c. Connect the antenna to the adapter and position the antenna to the up position.

d. Close the case, plug the power cord back in, and restart your computer.

3. Use the Smart Wizard to set up your wireless PCI adapter

a. Windows 2000 users go to Step b. Windows XP or Vista users can set up the wireless adapter either with the NETGEAR Smart Wizard (recommended) or the Windows configuration utilities.

Figure 1-3

- **NETGEAR Smart Wizard:** Reveals more information about each network and makes it easier to troubleshoot network connection problems.

- **Windows configuration utilities:** See the Windows documentation or "Using Windows XP and Vista Wireless Configuration Utilities" at: *http://documentation.netgear.com/reference/enu/winzerocfg/index.htm*

b. Click Next to accept the NETGEAR Smart Wizard. You will be prompted to let the wizard help you connect to a network (recommended).

Figure 1-4

c. Click **Next** to accept.

4. Connect to a wireless network.

a. Select the wireless network from the drop-down list, and the wizard records your choice.

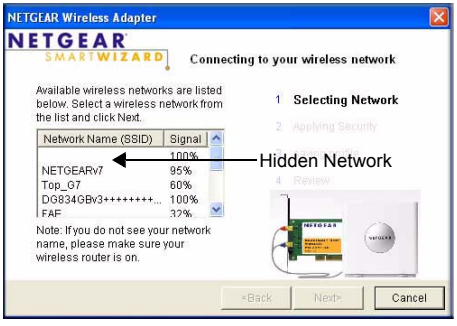

Figure 1-5

	Note: Hidden networks do not broadcast the Network Name (SSID). These networks are in the drop-down list, but the Network Name (SSID) is blank.

b. The Smart Wizard detects if the network uses security or not. Follow the Wizard steps for Security (if used) and for saving a Profile.

c. After you have reviewed the settings, click Finish.

The WN311B icon appears in the system tray and on the desktop, and the Settings page opens. The wizard initiates your wireless connection. It could take up to a minute for your wireless connection to be established. See "Connecting to Wireless Networks and the Internet" on page 1-6.

Connecting to Wireless Networks and the Internet

The WN311B Wireless PCI Adapter has indicators in these locations that show the status of your connection to a wireless network and to the Internet:

- **WN311B Icon:** After you install the WN311B software, the icon appears on the desktop and in the lower right of the Windows task bar. It is color coded to show the status of the connection. See "The WN311B Icon Colors" on page 1-7.
- **Smart Wizard Status Bar:** Clicking on the system tray icon opens the Smart Wizard. The status bar at the bottom of the page shows details about your wireless and Internet connection. See "Smart Wizard Status Bar" on page 1-7.
- **WN311B Wireless PCI Adapter LEDs:** The LEDs on the wireless PCI adapter show the network connection.
  - The LEDs show an alternate blink when the wireless PCI adapter is looking for a network association.
  - When there is a good connection, the LEDs blink together.
  - If the LEDs are off, then the WN311B is not properly seated in the computer.

The WN311B Icon Colors

The WN311B icon is on the desktop and in the Windows System Tray. The System Tray is located on one end of the taskbar in the Microsoft Windows desktop.

Color	Condition	Description
Red	The wireless PCI adapter has no connection to any other wireless node.	The WN311B Wireless PCI Adapter cannot link to any other wireless node or the link is lost. Check your configuration or try moving to a location where the wireless signal quality is better.
Yellow	The wireless PCI adapter has a connection with another wireless node.	The wireless link is weak. You may need to move to a better spot, such as closer to the wireless access point. Also, look for possible interference such as a 2.4 GHz cordless phone or large metal surface.
Green	The wireless PCI adapter has a connection with another wireless node.	The wireless PCI adapter has established good communication with an access point and the signal quality is strong.

Smart Wizard Status Bar

The status bar is located at the bottom of the Settings page.

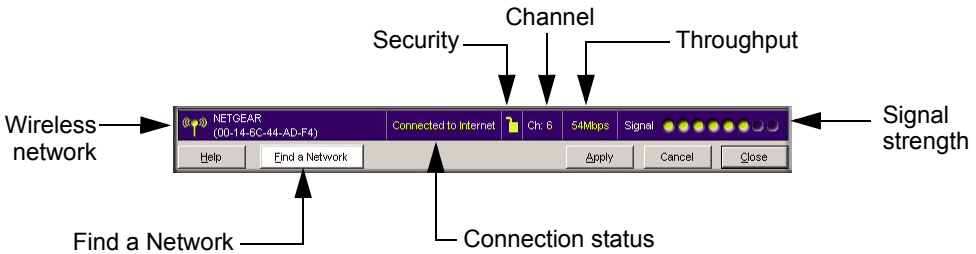

Figure 1-6

Understanding the Status Bar	
Wireless network	Identifies which wireless network you have joined.
Security	• Locked: security enabled. • Unlocked: security not enabled.
Channel	The wireless channel used by the network. If many wireless networks in your area use the same channel they can interfere with one another.

Understanding the Status Bar (continued)	
Throughput	• Wireless throughput measured in Mega bits per second. To optimize throughput, connect to a network with a high-speed router or access point, and a high-speed Internet connection. See Chapter 3, "Wireless Network Performance". • If your computer has a USB v1.1 port, the WN311B is limited to that port's maximum speed, which is 14 Mbps.
Signal strength	More dots indicates a stronger signal. Usually, you will experience higher throughput when the signal is strongest.
Find a Network	Click **Find a Network** to open the Connection Wizard.
Connection status	Identifies the status of your network connection. • **Connected to Internet:** Wireless Internet connection is OK. • **Connected to Router:** Wireless connection to the router is OK but the router is not connected to the Internet. • **169.254.x.x or ___.___.___.___ :** The wireless connection to the router is OK but there is a problem with the router. See Chapter 4, "Troubleshooting".

If you right-click in the system tray icon, you can disable the Internet notification feature by clearing check mark on this line. If you do so, then only the IP address is shown.

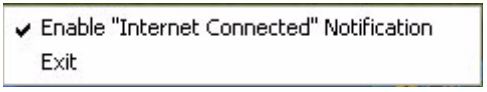

Figure 1-7

Removing the WN311B Software

You can remove the wireless adapter software in these two ways:

- Navigate the Windows Start menu to the WN311B Wireless PCI Adapter program group, select the uninstall option, and follow the screen prompts.
- Navigate the Windows Start menu to the Control Panel Add or Remove Program item, select the WN311B Wireless PCI Adapter option, and follow the screen prompts.

Upgrading the WN311B Software

Upgrades may be available at the NETGEAR website. To install an upgrade, follow these steps.

1. Write down the settings for any profiles that you want to save. They will not be retained.
2. Download the upgrade from the NETGEAR website Support page.
3. Remove the WN311B software from your computer.
4. Remove the WN311B Wireless PCI Adapter adapter from your computer, and restart your computer.
5. Run the installer that you downloaded (the file ends in .exe).
6. Follow the installer instructions, and then restart your computer.

Chapter 2
Network Connections and Wireless Security

This chapter explains how to use your WN311B Wireless PCI Adapter to connect to your Wireless Local Area Network (WLAN) and how to set up wireless security for the Wireless USB 2.0 Adapter so that it matches the wireless security settings for your network.

If you chose the Windows XP or Windows Vista Zero Configuration utility during installation, and now you want to use the Smart Wizard, then you need to disable the Windows utility. If you are working with the Vista configuration utility, see the online document: *http://documentation.netgear.com/reference/enu/winzerocfg/index.htm*

Disabling the Windows Zero Configuration Utility

To disable the Windows Zero Configuration utility:

1. Attach the wireless adapter to a USB port for your computer.
2. Go to Windows Start menu and select Network Connections.
3. On the Network connections page, select the Wireless Network Connection and right-click to choose the Properties option.

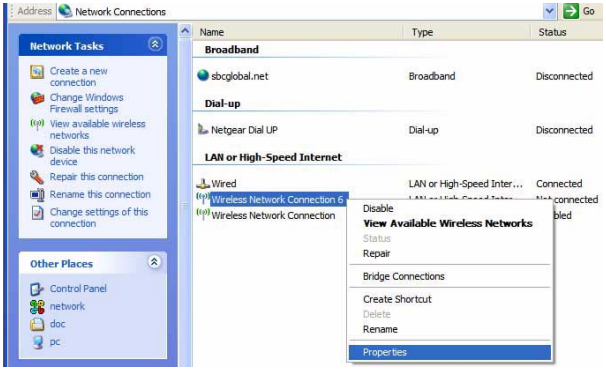

Figure 2-1

4. Click the Wireless Networks tab. Then clear the “Use Windows to configure my wireless settings” check box.

Understanding the Smart Wizard

These instructions explain how to use the NETGEAR WN311B Smart Wizard to change the WN311B Wireless PCI Adapter wireless settings.

When you have installed the software from the *Resource CD*, the icon appears on your desktop and in the Windows System Tray. The Windows System Tray is located on the Windows taskbar. You can either double-click this icon on the desktop, or click it in the System Tray at any time, to use the Smart Wizard. This software automatically restarts when you reboot your computer.

The Smart Wizard provides a complete and easy to use set of tools to:

- View details about wireless networks in your area.
- Choose the network that you want to use.
- Configure wireless settings for your wireless PCI adapter
- Save your wireless network settings in profiles.
- Remove or reinstall the wireless adapter software.

The following sections in this chapter explain how to use the Smart Wizard.

Viewing Wireless Networks in Your Area

You can use the Networks tab to view all available wireless networks in your area. You can also scan to search for wireless networks and refresh the page.

To view information about wireless networks:

1. Use the icon to open the Smart Wizard. The Settings tab page opens.

2. Click the Networks tab to view the following page:

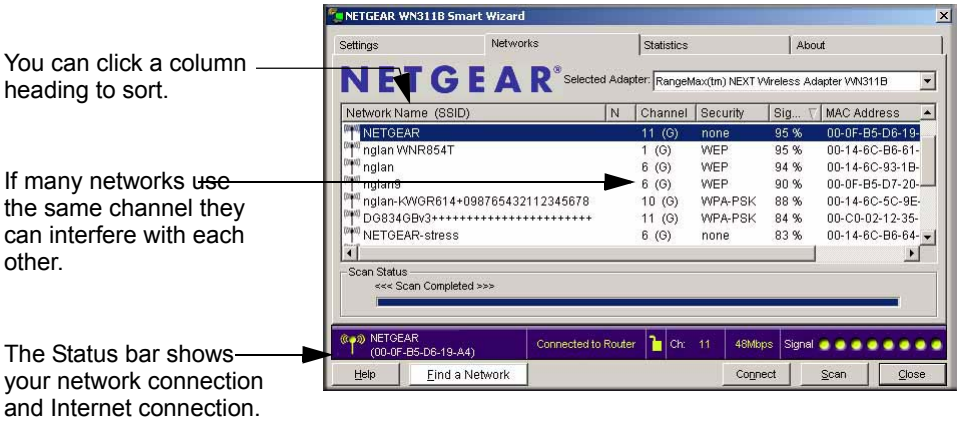

Figure 2-2

The screen shows the following information for each network scanned:

- **Network Name (SSID):** The name assigned to a wireless network. This is the same as the SSID or ESSID configuration parameter. Note that as a security measure, some wireless access points do not broadcast their SSID. In such cases, the SSID field will be blank even though the rest of the information will still be displayed.
- **Channel:** The channel determines which operating frequency will be used.
- **Security:** Identifies whether the wireless network uses security settings such as WEP, WPA2-PSK, or WPA-PSK.
- **Signal:** Identifies the signal strength of the communications.
- **MAC Address:** Identifies the hardware address (MAC Address) of the wireless device broadcasting this information.
- **Mode:** Identifies the type of wireless network — Access Point (Infrastructure) or Computer-to-Computer (Ad Hoc)

The buttons located at the bottom of the Networks tab are:

- **Help:** Display online help.
- **Find a Network:** Find and connect to a network. See “Finding a Network” on page 2-4.
- **Connect:** Connect to the network that you selected.
- **Scan:** Check for wireless networks. Clicking Scan refreshes the page.
- **Close:** Close the window of the Wizard.

Finding a Network

During the WN311B software installation, the Smart Wizard lists the available networks. After installation you can use the Find a Network button on the Network tab at any time to view the available networks and select the one that you want to use.

Note: Make sure that you know the security settings for the network that you want to use. For example, if WEP is used then you need to know the WEP key. If you use secure networks frequently, set up profiles for each network with the wireless network and security settings.

To find a network:

1. Use the icon to open the Smart Wizard, and the Settings tab page opens.
2. On the Networks tab page, click Find a Network.

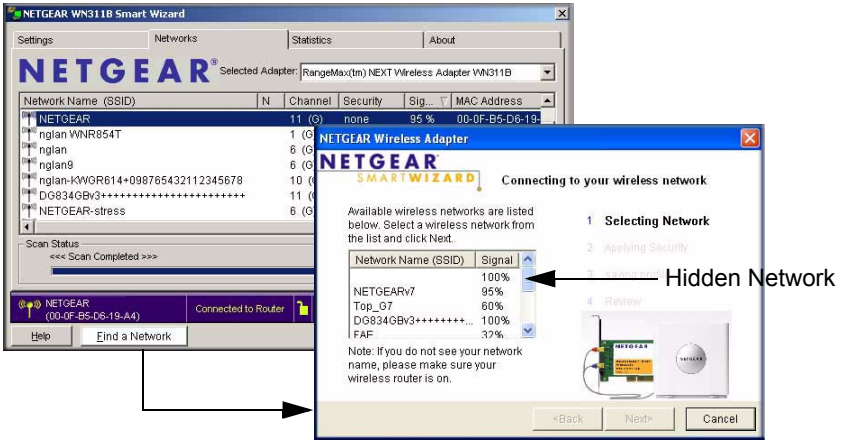

Figure 2-3

3. Select a network from the drop-down list. If you select a hidden network then you must enter the SSID. Click Next.
4. Follow the steps of the wizard to specify the wireless security if used, and to create a profile.
5. Review you settings, and click Finish.

The Smart Wizard initiates your wireless connection. You can use the Status Bar to verify your network connection. For more information, see “Smart Wizard Status Bar” on page 1-7.

Profiles

The WN311B Smart Wizard uses profiles to store all the settings for a particular wireless network. There are two special profile names: Default and Profile.

- **Default:** The Profile named Default automatically scans for any available network. You cannot change this profile name.
- **Profile:** If you do not enter a name in the Profile Name box, then the name Profile is used to save your settings. If you do this more than once then you will be asked if you want to replace the previous settings stored in Profile.

Adding Profiles

You can store multiple profiles and recall the one which matches the network you want to join. If you use your computer to connect to different wireless networks, you can create a profile for each wireless network. Then, you can easily load the profile that has all the settings that you need to join the network you are using at the time.

There are two types of wireless network profiles that you can set up:

- **Access Point (Infrastructure) —** connect to an access point or router with the 802.11 infrastructure mode.
- **Computer-to-Computer (Ad Hoc) —** connect directly to another computer with the 802.11 ad hoc mode.

For more information on 802.11 wireless network modes, see the wireless reference document at: *http://documentation.netgear.com/reference/enu/wireless/index.htm*

Setting up a Profile to Connect to an Access Point or Router

Follow these instructions to set up the WN311B Wireless PCI Adapter to connect to a wireless access point or router.

1. Use the icon to open the Smart Wizard. The Settings page opens.

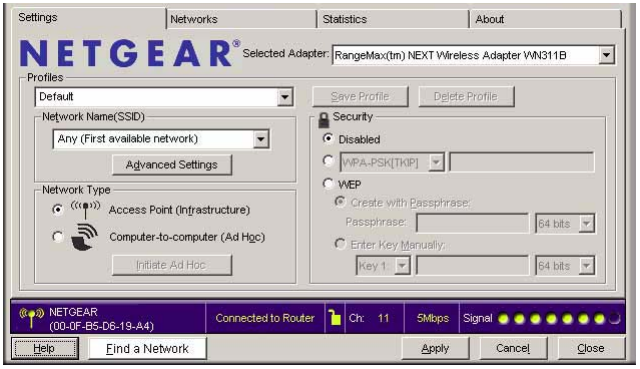

Figure 2-4

2. Enter the network settings.
   a. In the Network Type section, be sure that Access Point (Infrastructure) is selected.
   b. In the Profiles box, type the name of the profile.
   c. In the Network Name (SSID) field select a network or enter the SSID.

	Note: You will not get a wireless network connection unless the network SSID matches exactly the SSID used by the access point.

3. Save your settings in a Profile.
   a. Click the Save Profile button.

      All the configuration settings are saved in this profile.
   b. Click **Apply**.
   c. Click Close to exit the wizard, or Cancel to return to the previous settings.
4. Verify wireless connectivity to your network.

Use a browser such as Netscape or Internet Explorer to connect to the Internet, or check for file and printer access on your network. You can check the status bar in the Smart Wizard for the current connection status.

Note: If you cannot connect, see Chapter 4, "Troubleshooting" . For problems with accessing network resources, the Windows Client and File and Print Sharing software might not be installed and configured properly on your computers. Refer to "Internet Networking and TCP/IP Addressing:" in Appendix B.

Setting up a Computer-to-Computer (Ad Hoc) Profile

The Computer-to-Computer setting uses Ad Hoc mode. Ad Hoc mode is an 802.11 networking framework in which devices or computers communicate directly with each other, without the use of an access point. For example, this mode is used when two Windows computers are configured with file and print sharing enabled and you want to exchange files directly between them.

Note: Ad Hoc mode will not work using DHCP. You must set up static IP addresses (such as **192.168.0.1**) or the IPX protocol. For help setting up static IP addresses on a Windows PC, see the PC Networking Tutorial on the *Resource CD*.

To create an Ad Hoc mode profile:

1. Use the icon to open the Smart Wizard. The Settings page opens:

Figure 2-5

2. Enter the network settings.

a. Select Computer-to-Computer (Ad Hoc) for the Network Type.

b. Select or enter the Network Name (SSID) for the Ad Hoc network.

c. In the Profiles box, type the name of the profile.

d. Click **Apply**.

3. Save your settings in a Profile.

a. Click the Save Profile button.

All the configuration settings are saved in this profile.

b. Click **Apply**.

c. Click Close to exit the Smart Wizard, or Cancel to return to the previous settings.

4. Configure the PC network settings.

a. Configure each PC with either a static IP address or with the IPX protocol.

	Note: For instructions on configuring static IP addresses, refer to the networking tutorial on your *Resource CD*.

b. Restart the PCs.

1. Verify wireless connectivity between your peer devices with the Ping program:

a. On the Windows taskbar click the Start button, and then click Run.

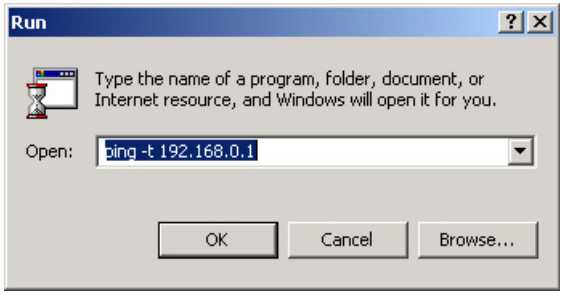

Figure 2-6

b. Assuming the target PC is configured with 192.168.0.1 as its IP address, type **`ping -t 192.168.0.1`** and then click OK.

c. This will cause a continuous ping to be sent to the device with the 192.168.0.1 static IP address. The ping response should change to "reply."

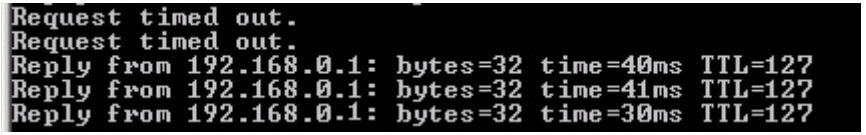

Figure 2-7

At this point the connection is established.

Note: If you cannot connect, see "Removing the WN311B Software" in Chapter 1. For problems with accessing network resources, the Windows Client and File and Print Sharing software might not be installed and configured properly on your computers. See the link to "Internet Networking and TCP/IP Addressing:" in Appendix B.

Starting a Computer-to-Computer (Ad Hoc) Network Connection

1. On the Settings tab page of the Smart Wizard, select or type the Network Name (SSID).
2. Select the Computer-to-Computer (Ad Hoc) network type.
3. Click Initiate Ad Hoc. The Ad Hoc Setting dialog box opens:

Figure 2-8

4. In the Start Ad Hoc field, choose the wireless standard (802.11a, 802.11b, or 802.11g) for your Ad Hoc computer-to-computer network.
5. In the Channel field, Automatic should work. If there are interference problems with another nearby wireless device, select a channel that is not being used by other wireless networks near your wireless adapter. Use the Networks tab to view channels in use in your area.

6. Click OK.

	Note: The channel number differs depending on the country. The connection speed automatically defaults to the highest speed.

Wireless Security

Many networks use wireless security to encrypt wireless data communications. If you try to connect to a network with wireless security the Smart Wizard detects it. Before you can use that network you must set up the WN311B with exactly the same kind of wireless security settings. The WN311B supports the following types of wireless security:

- Wi-Fi Protected Access 2 Pre-Shared Key (WPA2-PSK)
- Wi-Fi Protected Access Pre-Shared Key (WPA-PSK)
- Wired Equivalent Privacy (WEP)

For more information about wireless security, see the wireless reference document at: *http://documentation.netgear.com/reference/enu/wireless/index.htm*

In addition to the wireless security features, networks should use LAN network security features such as requiring a user name and password to access the shared resources in the network.

Using Wireless Security Features

You can strengthen the security of your wireless connection by enabling Wired Equivalent Privacy (WEP) encryption of the wireless data communications. Or, you can use WPA-PSK (Wi-Fi Protected Access Pre-Shared Key) encryption. For more information about wireless security, see the Web link to “Wireless Communications:” in Appendix B.

In addition to wireless security features, you should also configure appropriate LAN network security features such as requiring a user name and password to access the shared resources in your network.

Wireless Network Name (SSID) and Security Settings

Print this form, fill in the configuration parameters and put it in a safe place for possible future reference. For an existing wireless network, the person who set up the network will be able to provide this information.

- ***Network Name (SSID):*** The Service Set Identification (SSID) identifies the wireless local area network. **Any (First available network)** is the default WN311B wireless network name (SSID). You may customize it using up to 32 alphanumeric characters. Write your customized wireless network name (SSID) on the line below.

Note: The SSID in the wireless access point is the SSID you configure in the wireless PCI adapter. For the access point and wireless nodes to communicate with each other, all must be configured with the same SSID.

Wireless network name (SSID): _____

- **If WEP Authentication is Used.**
  - **WEP Encryption key size**. Identify one: **64-bit** or **128-bit**. The encryption key size must match the wireless network settings.
  - **Data Encryption (WEP) Keys**. There are two methods for creating WEP data encryption keys. Whichever method you use, record the key values in the spaces below.
    - **Passphrase method**. _____ These characters *are* case sensitive. Enter a word or group of printable characters and click the Generate Keys button. Not all wireless devices support the passphrase method.
    - **Manual method**. These values *are not* case sensitive. For 64-bit WEP, enter 10 hex digits (any combination of 0-9 or a-f). For 128-bit WEP, enter 26 hex digits.

    Key 1: _____ Key 2: _____

    Key 3: _____ Key 4: _____

- **If WPA2-PSK or WPA-PSK Authentication is Used.**
  - **Passphrase**: _____ These characters *are* case sensitive. Enter a word or group of printable characters. When you use WPA-PSK, the other devices in the network will not connect unless they are set to WPA-PSK as well and are configured with the correct Passphrase.

Setting up WEP Encryption Security

To set up WEP Encryption Security:

1. Run the WN311B Smart Wizard.
   a. Make sure that the WN311B software is installed and the WN311B Wireless PCI Adapter is installed in a PCI slot in your computer.
   b. Use the icon to open the Smart Wizard. The Settings tab page opens:

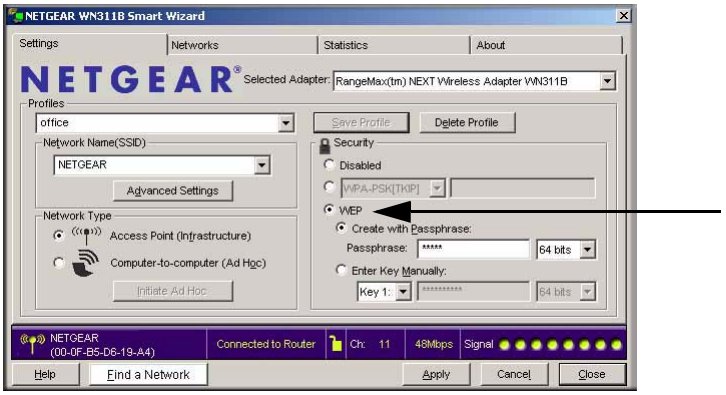

Figure 2-9

2. Configure the Security settings.
   a. In the Profiles box, select the profile or type in a profile name.
   b. In the Network Name (SSID) field select the network, or enter the SSID.

> **Note:** You will not get a wireless network connection unless the network SSID matches exactly what is configured in the access point.

   c. In the Security section, select WEP.
3. Select the WEP encryption strength you will use.

- 64-bit WEP data encryption
- 128-bit WEP data encryption

	Note: Larger encryption keys require more processing and may slow the communications response times.

4. Select Create with Passphrase and enter the passphrase. The configuration utility will automatically generate the WEP keys.

	Note: The characters are case sensitive. Be sure to use the same passphrase for all the wireless devices in the network.

   If the passphrase method is not available in the other devices, you must manually enter the keys to match exactly what is in the access point and other 802.11b/g wireless devices.

5. Save your settings in a Profile.
   a. Click the Save Profile button. All the configuration settings are saved in this profile.
   b. Click **Apply**, and then click Close to exit the Smart Wizard.

Setting up WPA2-PSK Security

To set up WPA2-PSK Security:

1. Run the WN311B Smart Wizard.
   a. Make sure the WN311B software is installed and the WN311B Wireless PCI Adapter is properly installed in the PCI slot in your computer.

b. Use the icon to open the Smart Wizard. The Settings tab page opens.

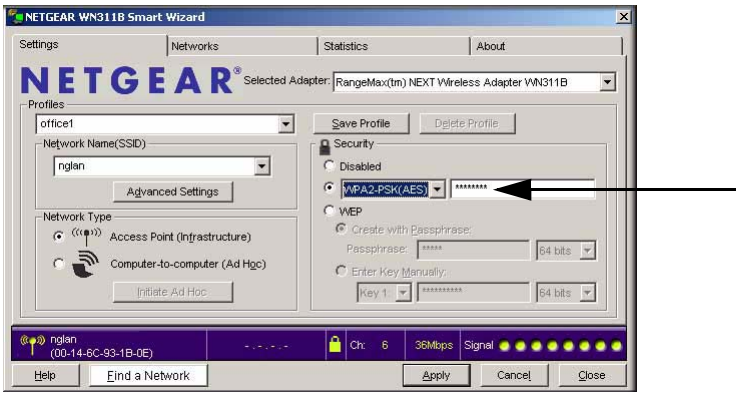

Figure 2-10

2. Configure the Security settings.

a. In the Profiles box, select the profile or type in a profile name.

b. In the Network Name (SSID) field select the network, or enter the SSID.

	Note: You will not get a wireless network connection unless the network SSID matches exactly what is configured in the access point.

c. In the Security section, select WPA2-PSK [AES], and enter the passphrase.

The passphrase can be a word or group of printable characters. For more information about WPA2-PSK security, see the Web link to "Wireless Communications:" in Appendix B.

3. Save your settings in a Profile.

a. Click the Save Profile button. All the configuration settings are saved in this profile.

b. Click **Apply**, and then click Close to exit the Smart Wizard.

Setting up WPA-PSK Security

To set up WPA-PSK Security:

1. Run the WN311B Smart Wizard.

a. Make sure the WN311B software is installed and the WN311B Wireless PCI Adapter is properly installed in a PCI slot in your computer.

b. Use the icon to open the Smart Wizard. The Settings tab page opens.

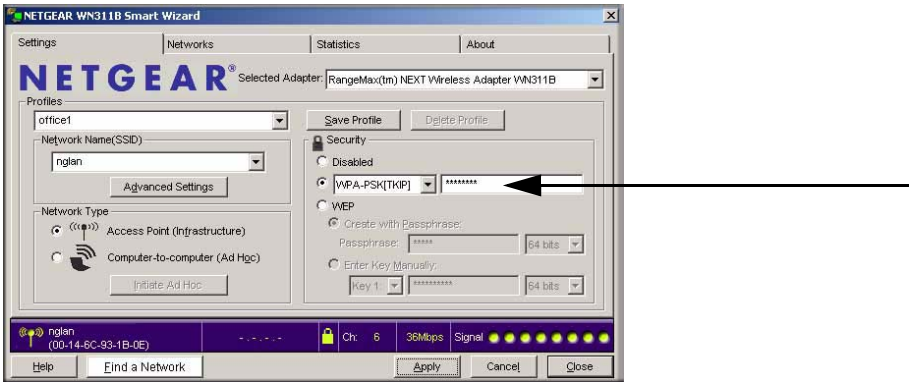

Figure 2-11

2. Configure the Security settings.

a. In the Profiles box, select the profile or type in a profile name.

b. In the Network Name (SSID) field select the network, or enter the SSID.

	Note: You will not get a wireless network connection unless the network SSID matches exactly what is configured in the access point.

c. In the Security section, select WPA-PSK [TKIP] and enter the passphrase.

The passphrase can be a word or group of printable characters. For more information on WPA security, see the Web link to "Wireless Communications:" in Appendix B.

3. Save your settings in a Profile.

a. Click the Save Profile button. All the configuration settings are saved in this profile.

b. Click **Apply**, and then click Close to exit the Smart Wizard.

Advanced Settings

The Advanced Settings normally work in their default settings. To view Advanced Settings, click the Advanced Settings button on the Settings tab. Changing these settings is only recommended for advanced users who have a specific reason to adjust them.

Statistics Page

The Statistics page provides real-time and historical trend information on the data traffic and performance of your wireless adapter.

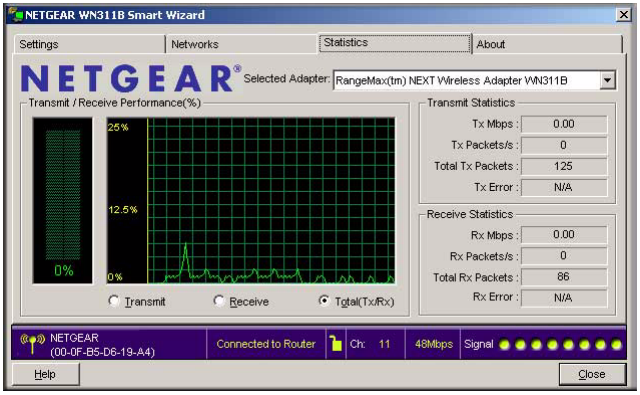

Figure 2-12

- **Transmit/Receive Performance (%):** A real time graph identifying the total, receive, and transmit utilization as a percentage the total possible.
- **Transmit, Receive, and Total (TxRx):** Radio buttons let you select whether to display the transmit performance, the receive performance, or both in the same graph.
- **Transmit Statistics:** Identifies transmit megabits per second (Mbps), transmit packets per second (Tx Packets/s), total transmitted packets, and transmit errors.
- **Receive Statistics:** Identifies receive megabits per second (Mbps), receive packets per second (Rx Packets/s), total received packets, and reception errors.

About Page

The About page displays the current software version information.

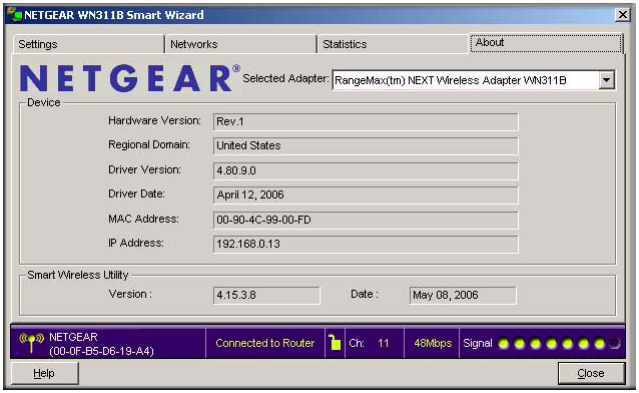

Figure 2-13

The following information is displayed in the About page:

- **Regional Domain:** This is the region setting for the wireless adapter. The approved channels for the region are automatically scanned. Governments regulate the channels used for wireless transmission. Operating the wireless adapter in a different region may violate local laws.
- **Driver Version:** The wireless adapter driver version.
- **Driver Date:** The wireless adapter driver release date.
- **MAC Address:** The MAC address of the adapter. The Media Access Control address is a unique 48-bit hardware address assigned to every network interface card. Some wireless networks will restrict access based on a list of known MAC addresses. If you are communicating with such a network, you would have to provide the address shown here to the network administrator before you would be allowed to connect. Restricting access by MAC address adds an obstacle against unwanted access to your network. However, unless you use data encryption security, the data broadcast over the wireless link is fully exposed.
- **IP Address:** The IP address assigned to this adapter.
- **Smart Wireless Utility:** The version and release date of the Smart Wizard.

Chapter 3
Wireless Network Performance

This chapter explains how to use your WN311T Wireless PCI Adapter to connect to your Wireless Local Area Network (WLAN) and how to set up wireless security for the WN311T Wireless PCI Adapter so that it matches the wireless security settings for your network.

Optimizing Wireless Performance

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

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 losing connectivity. This also means that devices that are further away may 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 two 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 one 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 may automatically try to connect to your network several times a second, which can cause significant performance reduction.

Optimizing Your Network Bandwidth

The speed of network connections depends on the type of equipment that you use. Try to use high-speed technologies for network connections with the heaviest traffic to avoid lower-speed bottlenecks in the path. The following figure shows a home network that includes many different connection speeds.

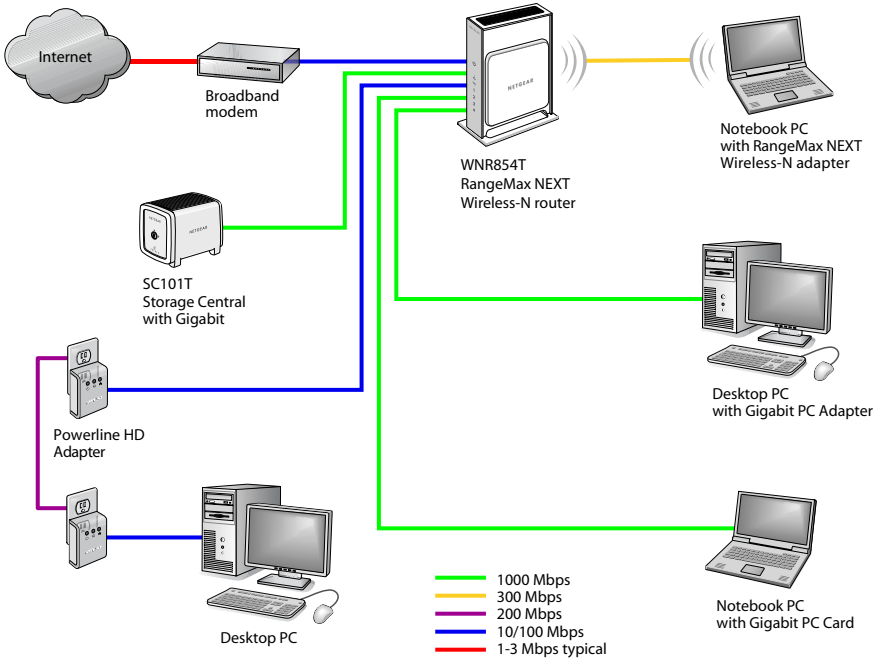

Figure 3-1

In the network shown in Figure 3-1, the two PCs with gigabit (1000 Mbps) Ethernet adapters have a gigabit connection through the router to the storage server. With a high-speed router this connection allows for extremely fast backups or quick access to large files on the server. The PC connected through a pair of Powerline HD adapters is limited to the 200 Mbps speed of the Powerline HD connection. Although any of the links in this example would be sufficient for high-traffic applications such as streaming HD video, the use of older devices such as 10 Mbps Ethernet or 802.11b wireless would create a significant bottleneck.

In planning your network, think about which tasks will have the heaviest traffic flow between them. Examples are:

- A media center in one room streaming high-definition video from a server in another room
- A storage device that is used for backing up your computers

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 someone else who 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 cablemodem connection provides a downstream throughput of about one to three 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**
  A high-speed wireless router can provide a wireless data throughput of up to 300 Mbps using technology called Multiple-Input Multiple-Output (MIMO), in which multiple antennas transmit multiple streams of data. The use of multiple antennas also provides excellent range and coverage. With the introduction of the newer WPA and WPA2 encryption and authentication protocols, wireless security is extremely strong.

To get the best performance, use newer adapters such as RangeMax adapters for your computers. A high-speed router may be compatible with older 802.11b and 802.11g adapters, but 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 Ethernet ports 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 may 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 3-1 shows the time to transfer one gigabyte (1 GB) of data using various networking technologies.

Table 3-1. 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
802.11g 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 4
Troubleshooting

This chapter provides information about troubleshooting your WN311B Wireless PCI Adapter. For information about connecting to wireless networks and the Internet, see "Connecting to Wireless Networks and the Internet" on page 1-6.

Troubleshooting Tips

Use the information below to solve common problems you may encounter. Also, refer to the knowledge base on the NETGEAR website at *http://www.netgear.com/support/main.asp*.

Table 4-1. Troubleshooting Tips

Problem	Action
The LEDs are not lit.	The WN311B is not installed in the PCI slot properly or the WN311B software is not loaded. • Remove and reinstall the WN311B. • Check the Windows device manager to see if the WN311B is recognized and enabled. Reload the WN311B software, if necessary. • Try to install the WN311B in a different PCI slot in your computer if one is available.
The wireless LEDs show an alternate blink and the WN311B is not connected to an access point.	The WN311B is trying to connect to an access point, but cannot. • The access point may not be powered on. • Or, the access point and the WN311B are not configured with the same wireless parameters. Check the SSID and wireless security settings.
I cannot connect to an access point. The access point is available and there is good signal strength.	• If the access point is WPA-PSK protected, you need the correct WPA-PSK passphrase. Otherwise, the WN311B will still be connected to the previous access point and you will not be able to change to the WPA-PSK access point. • If the access point is WEP protected (either 64 or 128 bit encryption), you will be prompted to enter the WEP encryption security information.

Table 4-1. Troubleshooting Tips (continued)

Problem	Action
Throughput is only 54 Mbps.	The WN311B Wireless PCI Adapter can operate at faster speeds. You are probably connecting to a standard 802.11g network. See Chapter 3, "Wireless Network Performance" for help in understanding how to get the best performance from your WN311B Wireless PCI Adapter.
The Smart Wizard keeps asking me to save settings.	If you change the settings the Smart Wizard offers you the chance to save the changes. To avoid this prompt, simply click **Apply** before you close the Smart Wizard.
Two WN311B icons are in the system tray.	You have an older software version installed on your system and it needs to be removed. See "Removing the WN311B Software" in Chapter 1 or "Upgrading the WN311B Software" in Chapter 1.
I can connect to the access point, but not the other computers on the network or to the Internet.	This could be a physical layer problem or a network configuration problem. 1. Check to make sure that the access point is physically connected to the Ethernet network. 2. Make sure that the IP addresses and the Windows networking parameters are all configured correctly. See the link to "Internet Networking and TCP/IP Addressing:" in Appendix B. 3. Restart the cable or DSL modem, router, access point, and computer.
Viewing the IP address.	To view the WN311B Wireless PCI Adapter IP address, click the WN311B icon to open the Smart Wizard. Then check the IP address in the About page.
No IP address is assigned to the WN311B Wireless PCI Adapter.	This may occur if you upgraded your WN311B Wireless PCI Adapter software and did not reboot your system. • Either restart your computer, or connect to a different access point. • It does not usually help to shut down the Smart Wizard or disable/enable the card.

Ad Hoc Mode Is Not Working Correctly

You need to click the Initiate Ad Hoc button before you click **Apply**. Here is how you start an Ad Hoc network:

1. Fill in the Network Name (SSID).
2. Select the Computer-to-Computer (Ad Hoc) Network Type.
3. Click Initiate Ad Hoc.
4. Accept the default settings or make your changes and click OK.
5. Click **Apply**.

	Note: Be sure all computers in your Ad Hoc network are configured with static IP addresses in the same subnet.

Windows XP Occasional Connection Problems

Windows XP users who apply Windows XP Hotfix (SP2) Q815485 from the Windows XP Update Service may not be able to connect to the Internet, may have dropped wireless connections, or both when using the WN311B Wireless PCI Adapter. You can delete this Hotfix from the Add or Remove Program utility in the Control Panel.

To delete Windows XP Hotfix (SP2) Q815485:

1. Click Start, point to Control Panel, and then double click Add/Remove Programs.
2. Click Windows XP Hotfix (SP2) Q815485, and then click Remove.
   - You may receive an error message that states that some program on the computer may not work correctly if the update is removed.
   - You can ignore this error message, and then click Yes to remove the update.
3. Restart your computer and rerun the Smart Display Setup Wizard.

This should solve your connection issue. You can restore this hotfix by following the link below: *http://microsoft.com/downloads/details.aspx?FamilyId=009D8425-CE2B-47A4-ABEC-274845DC9E91&displaylang=en*

Appendix A
Default Settings and Technical Specifications

Default Settings

The following table lists the default settings of your Wireless USB 2.0 Adapter.

Feature		Description
Smart Wizard		Enabled
Wireless		
	Wireless Communication	Enabled
	Wireless Network Name (SSID)	Any (first available network)
	Security	Disabled
	Network Type	Infrastructure
	Transmission Speed	Auto*
	Country/Region	United States (varies by region)
	Operating Mode	g and b, up to 270 Mbps, g only up to 270 Mbps
	Data Rate	up to 270 Mbps

*. Maximum wireless signal rate (IEEE Standard 802.11n draft specification). 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.

Technical Specifications

This table below describes technical specifications for the NETGEAR RangeMax NEXT Wireless PCI Adapter WN311B.

Antennas	Detachable antenna
Standards	802.11g, 802.11b
Radio Data Rate	1, 2, 5.5, 6, 6.5, 9, 11, 12, 13, 13.5, 18, 19.5, 24, 26, 27, 36, 39, 40.5, 48, 52, 54, 58.5, 65, 81,104, 108, 117, 121.5, 130, 135, 162, 216, 243, and 270 Mbps
Frequency	2.4GHz to 2.5GHz CCK, BPSK, QPSK, 16-QAM, 64-QAM Modulations
LED	Single LED • Solid indicates connected to network. • Blinking indicates attempting to connect to network.
Power	3.3V bus powered
Emissions	FCC Part 15 Class B, CE
Bus interface	PCI
Provided drivers	Microsoft Vista, Windows XP, and Windows 2000
Operating Environment	Operating temperature: 0 to 45 degrees C, 32 to 113 degrees F
Encryption	40-bit (also called 64-bit) and 128-bit WEP data encryption, WPA2-PSK, and WPA-PSK
Warranty	Limited 1-year warranty

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.

Document	Link
Windows XP and Vista Wireless Configuration Utilities	*http://documentation.netgear.com/reference/enu/winzerocfg/index.htm*
Internet Networking and TCP/IP Addressing:	*http://documentation.netgear.com/reference/enu/tcpip/index.htm*
Wireless Communications:	*http://documentation.netgear.com/reference/enu/wireless/index.htm*
Preparing a Computer for Network Access:	*http://documentation.netgear.com/reference/enu/wsdhcp/index.htm*
Virtual Private Networking (VPN):	*http://documentation.netgear.com/reference/enu/vpn/index.htm*
Glossary:	*http://documentation.netgear.com/reference/enu/glossary/index.htm*