

NETGEAR RangeMax™ Dual Band Wireless-N Router WNDR3300 Reference Manual



NETGEAR®

NETGEAR, Inc.
4500 Great America Parkway
Santa Clara, CA 95054 USA

202-10301-01
February 2008
v1.0

© 2008 by NETGEAR, Inc. All rights reserved.

Product Registration, Support, and Documentation

Register your product at <http://www.NETGEAR.com/register>. Registration is required before you can use our telephone support service. Product updates and Web support are always available by going to:

<http://www.netgear.com/support>.

Setup documentation is available on the CD, on the support website, and on the documentation website. When the wireless router is connected to the Internet, click the Knowledgebase or the Documentation link under Web Support in the main menu to view support information.

Trademarks

NETGEAR and the NETGEAR logo are registered trademarks, and RangeMax and Smart Wizard are trademarks of NETGEAR, Inc. in the United States and/or other countries. Microsoft, Windows, and Windows NT are registered trademarks and Windows Vista is a trademark of Microsoft Corporation. Other brand and product names are registered trademarks or trademarks of their respective holders.

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.

Certificate of the Manufacturer/Importer

It is hereby certified that the RangeMax Dual Band Wireless-N Router WNDR3300 has been suppressed in accordance with the conditions set out in the BMPT-AmtsblVfg 243/1991 and Vfg 46/1992. The operation of some equipment (for example, test transmitters) in accordance with the regulations may, however, be subject to certain restrictions. Please refer to the notes in the operating instructions.

Federal Office for Telecommunications Approvals has been notified of the placing of this equipment on the market and has been granted the right to test the series for compliance with the regulations.

Bestätigung des Herstellers/Importeurs

Es wird hiermit bestätigt, daß das RangeMax Dual Band Wireless-N Router WNDR3300 gemäß der im BMPT-AmtsblVfg 243/1991 und Vfg 46/1992 aufgeführten Bestimmungen entstört ist. Das vorschriftsmäßige Betreiben einiger Geräte (z.B. Testsender) kann jedoch gewissen Beschränkungen unterliegen. Lesen Sie dazu bitte die Anmerkungen in der Betriebsanleitung.

Das Bundesamt für Zulassungen in der Telekommunikation wurde davon unterrichtet, daß dieses Gerät auf den Markt gebracht wurde und es ist berechtigt, die Serie auf die Erfüllung der Vorschriften hin zu überprüfen.

Regulatory Compliance Information

This section includes user requirements for operating this product in accordance with National laws for usage of radio spectrum and operation of radio devices. Failure of the end-user to comply with the applicable requirements may result in unlawful operation and adverse action against the end-user by the applicable National regulatory authority.

NOTE: This product's firmware limits operation to only the channels allowed in a particular Region or Country. Therefore, all options described in this user's guide may not be available in your version of the product.

Europe – EU Declaration of Conformity

Marking by the above symbol indicates compliance with the Essential Requirements of the R&TTE Directive of the European Union (1999/5/EC). This equipment meets the following conformance standards:

EN300 328, EN301 893, EN301 489-17, EN60950

A printed copy of the EU Declaration of Conformity certificate for this product is provided in the WNDR3300 product package.

Europe – Declaration of Conformity in Languages of the European Community

Cesky [Czech]	<i>NETGEAR Inc.</i> tímto prohlašuje, že tento Radiolan je ve shode se základními požadavky a dalšími příslušnými ustanoveními smernice 1999/5/ES..
Dansk [Danish]	Undertegnede <i>NETGEAR Inc.</i> erklærer herved, at følgende udstyr Radiolan overholder de væsentlige krav og øvrige relevante krav i direktiv 1999/5/EF.
Deutsch [German]	Hiermit erklärt <i>NETGEAR Inc.</i> , dass sich das Gerät Radiolan in Übereinstimmung mit den grundlegenden Anforderungen und den übrigen einschlägigen Bestimmungen der Richtlinie 1999/5/EG befindet.
Eesti [Estonian]	Käesolevaga kinnitab <i>NETGEAR Inc.</i> seadme Radiolan vastavust direktiivi 1999/5/EÜ põhinõuetele ja nimetatud direktiivist tulenevatele teistele asjakohastele sätetele.
English	Hereby, <i>NETGEAR Inc.</i> , declares that this Radiolan is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.
Español [Spanish]	Por medio de la presente <i>NETGEAR Inc.</i> declara que el Radiolan cumple con los requisitos esenciales y cualesquiera otras disposiciones aplicables o exigibles de la Directiva 1999/5/CE.
Ελληνική [Greek]	ΜΕ ΤΗΝ ΠΑΡΟΥΣΑ <i>NETGEAR Inc.</i> ΔΗΛΩΝΕΙ ΟΤΙ Radiolan ΣΥΜΜΟΡΦΩΝΕΤΑΙ ΠΡΟΣ ΤΙΣ ΟΥΣΙΩΔΕΙΣ ΑΠΑΙΤΗΣΕΙΣ ΚΑΙ ΤΙΣ ΛΟΙΠΕΣ ΣΧΕΤΙΚΕΣ ΔΙΑΤΑΞΕΙΣ ΤΗΣ ΟΔΗΓΙΑΣ 1999/5/EK.
Français [French]	Par la présente <i>NETGEAR Inc.</i> déclare que l'appareil Radiolan est conforme aux exigences essentielles et aux autres dispositions pertinentes de la directive 1999/5/CE.
Italiano [Italian]	Con la presente <i>NETGEAR Inc.</i> dichiara che questo Radiolan è conforme ai requisiti essenziali ed alle altre disposizioni pertinenti stabilite dalla direttiva 1999/5/CE.
Latviski [Latvian]	Ar šo <i>NETGEAR Inc.</i> deklarē, ka Radiolan atbilst Direktīvas 1999/5/EK būtiskajām prasībām un citiem ar to saistītajiem noteikumiem.
Lietuvių [Lithuanian]	Šiuo <i>NETGEAR Inc.</i> deklaruoja, kad šis Radiolan atitinka esminius reikalavimus ir kitas 1999/5/EB Direktyvos nuostatas.

Nederlands [Dutch]	Hierbij verklaart <i>NETGEAR Inc.</i> dat het toestel Radiolan in overeenstemming is met de essentiële eisen en de andere relevante bepalingen van richtlijn 1999/5/EG.
Malti [Maltese]	Hawnhekk, <i>NETGEAR Inc.</i> , jiddikjara li dan Radiolan jikkonforma mal-htigijiet essenzjali u ma provvedimenti oħrajn rilevanti li hemm fid-Dirrettiva 1999/5/EC.
Magyar [Hungarian]	Alulírott, <i>NETGEAR Inc.</i> nyilatkozom, hogy a Radiolan megfelel a vonatkozó alapvető követelményeknek és az 1999/5/EC irányelv egyéb előírásainak.
Polski [Polish]	Niniejszym <i>NETGEAR Inc.</i> oświadcza, że Radiolan jest zgodny z zasadniczymi wymogami oraz pozostałymi stosownymi postanowieniami Dyrektywy 1999/5/EC.
Português [Portuguese]	<i>NETGEAR Inc.</i> declara que este Radiolan está conforme com os requisitos essenciais e outras disposições da Directiva 1999/5/CE.
Slovensko [Slovenian]	<i>NETGEAR Inc.</i> izjavlja, da je ta Radiolan v skladu z bistvenimi zahtevami in ostalimi relevantnimi določili direktive 1999/5/ES.
Slovensky [Slovak]	<i>NETGEAR Inc.</i> týmto vyhlasuje, že Radiolan spĺňa základné požiadavky a všetky príslušné ustanovenia Smernice 1999/5/ES.
Suomi [Finnish]	<i>NETGEAR Inc.</i> vakuuttaa täten että Radiolan tyyppinen laite on direktiivin 1999/5/EY oleellisten vaatimusten ja sitä koskevien direktiivin muiden ehtojen mukainen.
Svenska [Swedish]	Härmed intygar <i>NETGEAR Inc.</i> att denna Radiolan står i överensstämmelse med de väsentliga egenskapskrav och övriga relevanta bestämmelser som framgår av direktiv 1999/5/EG.
Íslenska [Icelandic]	Hér með lýsir <i>NETGEAR Inc.</i> yfir því að Radiolan er í samræmi við grunnkröfur og aðrar kröfur, sem gerðar eru í tilskipun 1999/5/EC.
Norsk [Norwegian]	<i>NETGEAR Inc.</i> erklærer herved at utstyret <i>Radiolan</i> er i samsvar med de grunnleggende krav og øvrige relevante krav i direktiv 1999/5/EF.

FCC Requirements for Operation in the United States

FCC Information to User

This product does not contain any user serviceable components and is to be used with approved antennas only. Any product changes or modifications will invalidate all applicable regulatory certifications and approvals

FCC Guidelines for Human Exposure

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 20 cm between the radiator and your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

FCC Declaration Of Conformity

We NETGEAR, Inc., 4500 Great America Parkway, Santa Clara, CA 95054, declare under our sole responsibility that the model WNDR3300 RangeMax Dual Band Wireless-N Router WNDR3300 complies with Part 15 of FCC Rules. Operation is subject to the following two conditions:

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

FCC Radio Frequency Interference Warnings & Instructions

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following methods:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and the receiver
- Connect the equipment into an electrical outlet on a circuit different from that which the radio receiver is connected
- Consult the dealer or an experienced radio/TV technician for help.

RangeMax Dual Band Wireless-N Router



Tested to Comply
with FCC Standards
FOR HOME OR OFFICE USE

Modifications made to the product, unless expressly approved by NETGEAR, Inc., could void the user's right to operate the equipment.

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.

Product and Publication Details

Model Number:	WNDR3300
Publication Date:	February 2008
Product Family:	Wireless Router
Product Name:	RangeMax Dual Band Wireless-N Router WNDR3300
Home or Business Product:	Home
Language:	English
Publication Part Number:	202-10301-01

Contents

About This Manual

Conventions, Formats, and Scope	xi
How to Use This Manual	xii
How to Print This Manual	xii
Revision History	xiii

Chapter 1

Configuring Basic Connectivity

Using the Setup Manual	1-1
Logging In to Your Wireless Router	1-2
Configuring Your Internet Connection Using the Smart Setup Wizard	1-5
Viewing and Configuring Basic ISP Settings	1-5

Chapter 2

Safeguarding Your Network

Choosing Appropriate Wireless Security	2-1
Recording Basic Wireless Settings Setup Information	2-4
Changing Basic Wireless Settings	2-5
Viewing Basic Wireless Settings	2-6
Configuring WEP Wireless Security	2-8
Configuring WPA-PSK, WPA2-PSK, or WPA-PSK+WPA2-PSK Wireless Security	2-10
Viewing Advanced Wireless Settings	2-11
Using WPS Security (Wi-Fi Protected Setup)	2-12
Push Button Configuration	2-13
PIN Entry	2-14
Configuring the WPS Settings	2-14
Connecting Additional Wireless Client Devices after WPS Setup	2-15
Adding Additional WPS-Enabled Clients	2-16
Adding Additional Non-WPS-Enabled Clients	2-16
Restricting Wireless Access by MAC Address	2-17

Changing the Administrator Password	2-19
Backing Up Your Configuration	2-20
Understanding Your Firewall	2-21

Chapter 3

Restricting Access From Your Network

Content Filtering Overview	3-1
Blocking Access to Internet Sites	3-1
Blocking Access to Internet Services	3-3
Configuring a User-Defined Service	3-4
Blocking Services by IP Address Range	3-5
Scheduling Blocking	3-5
Viewing Logs of Web Access or Attempted Web Access	3-6
Configuring E-mail Alert and Web Access Log Notifications	3-7
Setting the Time	3-9

Chapter 4

Customizing Your Network Settings

Using the LAN Setup Options	4-1
Configuring a Device Name	4-2
Configuring LAN TCP/IP Setup Parameters	4-2
Using the Router as a DHCP Server	4-3
Using Address Reservation	4-4
Using a Dynamic DNS Service	4-5
Configuring the WAN Setup Options	4-7
Disabling the SPI Firewall	4-7
Setting Up a Default DMZ Server	4-7
Responding to a Ping on the Internet (WAN) Port	4-8
Setting the MTU Size	4-8
Configuring NAT Filtering	4-9
Configuring Static Routes	4-9

Chapter 5

Fine-Tuning Your Network

Allowing Inbound Connections To Your Network	5-1
How Your Computer Communicates with a Remote Computer through Your Router	5-2
How Port Triggering Changes the Communication Process	5-3
How Port Forwarding Changes the Communication Process	5-5

How Port Forwarding Differs from Port Triggering	5-6
Configuring Port Forwarding to Local Servers	5-6
Adding a Custom Service	5-7
Editing or Deleting a Port Forwarding Entry	5-8
Application Example: Making a Local Web Server Public	5-8
Configuring Port Triggering	5-9
Using Universal Plug and Play	5-12
Optimizing Wireless Performance	5-13
Configuring Quality of Service	5-14
Using WMM QoS for Wireless Multimedia Applications	5-15
Configuring QoS for Internet Access	5-16
QoS for Applications and Online Gaming	5-16
QoS for a Router LAN Port	5-17
QoS for a MAC Address	5-18
Editing or Deleting an Existing QoS Policy	5-19
Changing the MTU	5-20
Optimizing Your Network Bandwidth	5-21
Overview of Home and Small Office Networking Technologies	5-23
Assessing Your Speed Requirements	5-24

Chapter 6

Using Network Monitoring Tools

Viewing Wireless Router Status Information	6-1
Viewing a List of Attached Devices	6-7
Managing the Configuration File	6-7
Backing Up and Restoring the Configuration	6-8
Erasing the Configuration	6-9
Upgrading the Router Software	6-9
Upgrading Automatically to New Router Software	6-11
Upgrading Manually to New Router Software	6-12
Enabling Remote Management Access	6-13

Chapter 7

Troubleshooting

Troubleshooting Quick Tips	7-1
Be sure to restart your network in this sequence.	7-1
Make sure that the Ethernet cables are securely plugged in.	7-2

Make sure that the wireless settings in the computer and router match exactly.	7-2
Make sure that the network settings of the computer are correct.	7-2
Check the Test light to verify correct router operation.	7-2
Troubleshooting Basic Functions	7-2
The Power light is not on or is blinking.	7-3
The lights never turn off.	7-3
The Internet or Ethernet port lights are not on.	7-3
The Wireless light is not on.	7-4
Troubleshooting the Web Configuration Interface	7-4
Troubleshooting the Internet Connection	7-5
Troubleshooting a Network Using the Ping Utility	7-6
Testing the LAN Path to Your Router	7-7
Testing the Path from Your Computer to a Remote Device	7-8
Problems with Date and Time	7-8
Solving Wireless Connection Problems	7-9
Using Your Wireless Card Setup Program	7-9
Setting Up and Testing Basic Wireless Connectivity	7-10
Restoring the Default Configuration and Password	7-13

Appendix A

Technical Specifications

Default Configuration Settings	A-1
Restoring the Default User Name and Password	A-4

Appendix B

Related Documents

Index

About This Manual

The user manual provides information for configuring the features of the NETGEAR® RangeMax Dual Band Wireless-N Router WNDR3300 beyond initial configuration settings. Initial configuration instructions can be found in the *NETGEAR Wireless Router Setup Manual*. You should have basic to 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:

<i>Italic</i>	Emphasis, books, CDs
Bold	User input, IP addresses, GUI screen text
Fixed	Command prompt, CLI text, code
<i>Italic</i>	URL links

- **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.
---	--

	Warning: Ignoring this type of note might result in a malfunction or damage to the equipment, a breach of security, or a loss of data.
---	---



Danger: This is a safety warning. Failure to take heed of this notice might result in personal injury or death.

- **Scope.** This manual is written for the WNDR3300 router according to these specifications:

Product Version	RangeMax Dual Band Wireless-N Router WNDR3300
Manual Publication Date	February 2008






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://www.netgear.com/support>.

How to Use This Manual

The HTML version of this manual includes the following:

- Buttons,  and , for browsing forward or backward through the manual one page at a time.
- A  button that displays the table of contents and an  button that displays an index. Double-click 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 options, according to your needs.

- **Printing a page from HTML.** Each page in the HTML version of the manual is dedicated to a major topic. Select File > Print from the browser menu to print the page contents.

- **Printing from PDF.** Your computer must have the free Adobe Acrobat Reader installed for you to view and print PDF files. The Acrobat Reader is available on the Adobe website at <http://www.adobe.com>.
- **Printing a PDF 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.
 - Click the print icon in the upper left of your browser window.
- **Printing a PDF version of the complete 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 your browser 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.

Revision History

NETGEAR, Inc. is constantly searching for ways to improve its products and documentation. The following table indicates any changes that might have been made since the WNDR3300 router was introduced.

Table 1-1. Publication Revision History

Version	Date	Description
v1.0	February 2008	Original publication.

Chapter 1

Configuring Basic Connectivity

This chapter describes the settings for your Internet connection and your wireless local area network (LAN) connection. When you perform the initial configuration of your wireless router using the *Resource CD* as described in the *NETGEAR Wireless Router Setup Manual*, these settings are specified automatically for you. This chapter provides further details about these connectivity settings, as well as instructions on how to log in to the router for further configuration.



Note: NETGEAR recommends using the Smart Wizard™ on the *Resource CD* for initial configuration, as described in the *NETGEAR Wireless Router Setup Manual*.

This chapter includes the following sections:

- [“Using the Setup Manual”](#)
- [“Logging In to Your Wireless Router”](#) on page 1-2
- [“Configuring Your Internet Connection Using the Smart Setup Wizard”](#) on page 1-5
- [“Viewing and Configuring Basic ISP Settings”](#) on page 1-5

Using the Setup Manual

For first-time installation of your wireless router, refer to the *NETGEAR Wireless Router Setup Manual*. The *Setup Manual* explains how to launch the NETGEAR Smart Wizard on the *Resource CD* to step you through the procedure to connect your router, modem, and computers. The Smart Wizard assists you in configuring your wireless settings and enabling wireless security for your network. After initial configuration using the *Setup Manual*, you can use the information in this *Reference Manual* to configure additional features of your wireless router.

For installation instructions in a language other than English, refer to the language options on the *Resource CD*.

Logging In to Your Wireless Router


When the wireless router is connected to your network, you can access and configure the router using your browser.

To access the Web Configuration Manager:


1. Connect to the wireless router by typing **http://www.routerlogin.net** or the router's LAN IP address (default is 192.168.1.1) in the address field of your browser, and then press Enter. A login window displays:



Figure 1-1

	<p>Tip: You can connect to the wireless router by typing either of these URLs in the address field of your browser, and then pressing Enter:</p> <ul style="list-style-type: none">• http://www.routerlogin.net• http://www.routerlogin.com <p>If these URLs do not work, you must type the IP address of the router, for example, http://www.192.168.1.1.</p>
--	---

2. Enter **admin** for the router user name and your password (or the default, **password**). For information about how to change the password, see “[Changing the Administrator Password](#)” on page 2-19.

	<p>Note: The router user name and password are not the same as any other user name or password you might use to log in to your Internet connection.</p>
---	--

The Checking for Firmware Updates screen displays unless you previously cleared the **Check for Updated Firmware Upon Log-in** check box.

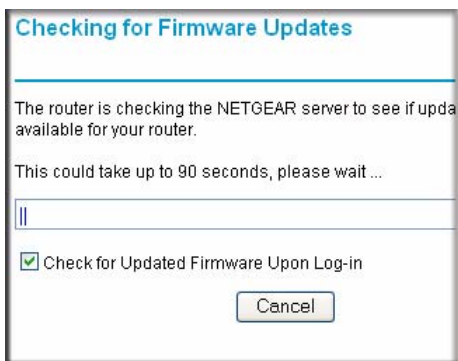


Figure 1-2

If the router discovers a newer version of the software, you are asked if you want to upgrade to the new software (see [“Upgrading the Router Software”](#) on page 6-9 for details). If no new firmware is available, the following message displays.

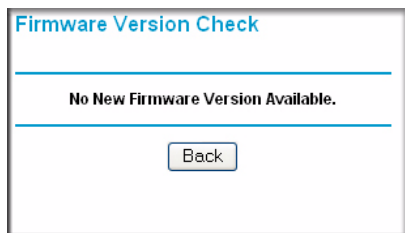


Figure 1-3

3. In the main menu on the left, select **Basic Settings** under Setup. The Basic Settings screen displays showing the wireless router's home page and suggested default settings.

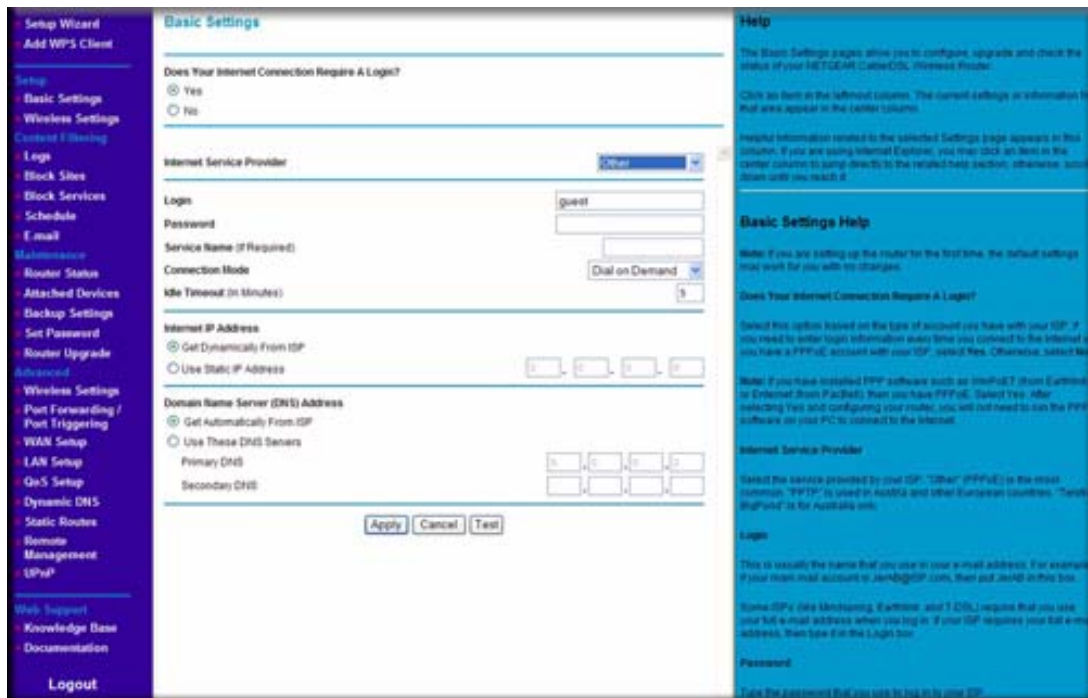



Figure 1-4

 **Note:** If the **Check for New Version Upon Log-in** check box is selected, the home page is the Router Upgrade screen. Otherwise, it is the Basic Settings screen.

If the wireless router is connected to the Internet, you can click the **Knowledge Base** link or the **Documentation** link under Web Support to view support information or the documentation for the wireless router.

If you do not click **Logout**, the wireless router will wait for 5 minutes after no activity before it automatically logs you out.

Configuring Your Internet Connection Using the Smart Setup Wizard

You can manually configure your Internet connection using the Basic Settings screen, or you can allow the Smart Setup Wizard to determine your Internet Service Provider (ISP) configuration.

The Smart Setup Wizard searches your Internet connection for servers and protocols to determine your ISP configuration. This feature is not the same as the Smart Wizard configuration assistant that appears only when the router is in its factory default state. To use the Smart Setup Wizard to assist with configuration or to verify the Internet connection settings, follow this procedure:

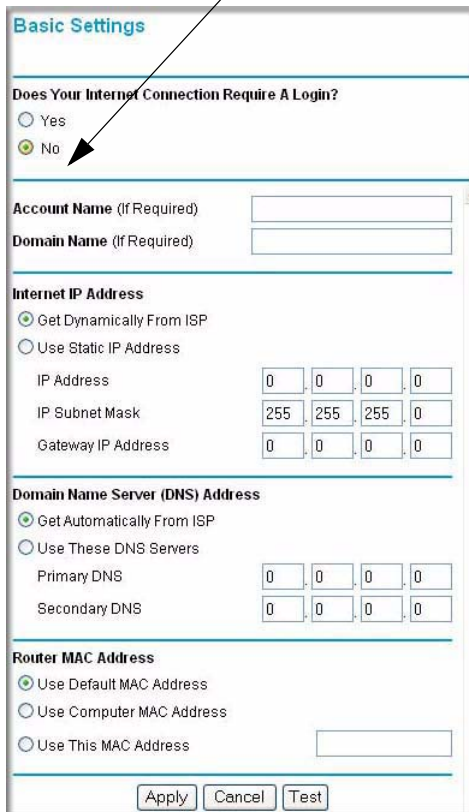
1. From the top of the main menu of the browser interface, click **Setup Wizard**.
2. Click **Next** to proceed. Enter your ISP settings, as needed.
3. At the end of the Setup Wizard, click **Test** to verify your Internet connection. If you have trouble connecting to the Internet, see [Chapter 7, “Troubleshooting.”](#)

Viewing and Configuring Basic ISP Settings

Settings related to your Internet service are specified in the Basic Settings screen. To access the Basic Settings screen, from the main menu of the router’s Web Configuration Interface, under Setup, select **Basic Settings**.

The content you see in the Basic Settings screen depends on whether your ISP requires that you log in with a user name and password for Internet access.

- **No login required by ISP.** If no login is required by your ISP, the following settings appear in the Basic Settings screen.

ISP does not require login

Basic Settings

Does Your Internet Connection Require A Login?

Yes

No

Account Name (If Required)

Domain Name (If Required)

Internet IP Address

Get Dynamically From ISP

Use Static IP Address

IP Address

IP Subnet Mask

Gateway IP Address

Domain Name Server (DNS) Address

Get Automatically From ISP

Use These DNS Servers

Primary DNS

Secondary DNS

Router MAC Address

Use Default MAC Address

Use Computer MAC Address

Use This MAC Address

Figure 1-5

- **Account Name** (might also be called Host Name). The account name is provided to the ISP during a DHCP request from your router. In most cases, this setting is not required, but some ISPs require it for access to ISP services such as mail or news servers.
- **Domain Name**. The domain name is provided by your router to computers on your LAN when the computers request DHCP settings from your router. In most cases, this setting is not required.
- **Internet IP Address**. Determines how your router obtains an IP address for Internet access.
 - If your ISP assigns an IP address dynamically (by DHCP), select **Get Dynamically From ISP**.

- If your ISP has assigned you a permanent, fixed (static) IP address for your computer, select **Use Static IP Address**. Enter the IP address that your ISP assigned. Also, enter the subnet mask and the gateway IP address. The gateway is the ISP's router to which your router will connect.
- **Domain Name Server (DNS) Address**. If you know that your ISP does not automatically transmit DNS addresses to the router during login, select **Use These DNS Servers**, and enter the IP address of your ISP's primary DNS server. If a secondary DNS server address is available, enter it also.



Note: If you enter or change a DNS address, restart the computers on your network so that these settings take effect.

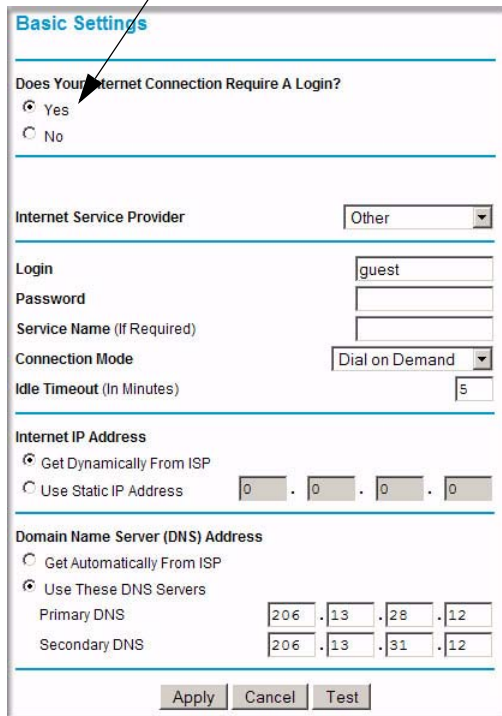
- **Router MAC Address**. This section determines the Ethernet MAC address that the router will use on the Internet port. Typically, you would leave **Use Default Address** selected. However, some ISPs (especially cable modem providers) register the Ethernet MAC address of the network interface card in your computer when your account is first opened. They then accept only traffic from the MAC address of that computer. This feature allows your router to masquerade as that computer by “cloning” or “spoofing” its MAC address. To change the MAC address, select one of the following methods:
 - Select **Use Computer MAC Address**. The router will then capture and use the MAC address of the computer that you are now using. You must be using the one computer that is allowed by the ISP.
 - Select **Use This MAC Address**, and type it in here.
- **Does Your Internet Connection Require A Login?** If you usually must use a login program such as WinPOET to access the Internet, your Internet connection requires a login. After you select **Yes**, the Basic Settings screen displays, as shown in the following figure.



Note: After you finish setting up your router, you will no longer need to start the ISP's login program on your computer to access the Internet. When you start an Internet application, your router will automatically log you in.

If a login is required by your ISP, the following settings appear in the Basic Settings screen:

ISP does require login



The screenshot shows the 'Basic Settings' configuration page. At the top, the question 'Does Your Internet Connection Require A Login?' is displayed with two radio buttons: 'Yes' (selected) and 'No'. Below this, the 'Internet Service Provider' is set to 'Other'. The 'Login' field contains 'guest', and the 'Password' field is empty. The 'Service Name (If Required)' field is also empty. The 'Connection Mode' is set to 'Dial on Demand' and the 'Idle Timeout (In Minutes)' is set to '5'. Under 'Internet IP Address', 'Get Dynamically From ISP' is selected, and the IP address fields are all '0'. Under 'Domain Name Server (DNS) Address', 'Use These DNS Servers' is selected. The 'Primary DNS' is '206.13.28.12' and the 'Secondary DNS' is '206.13.31.12'. At the bottom are 'Apply', 'Cancel', and 'Test' buttons. An arrow from the text above points to the 'Yes' radio button.

Figure 1-6

- **Internet Service Provider.** This drop-down list contains a few ISPs that need special protocols for connection. The list includes:
 - **PPTP** (Point to Point Tunneling Protocol), used primarily in Austrian DSL services
 - **Telstra Bigpond**, an Australian residential cable modem service.




Note: The Telstra Bigpond setting is only for older cable modem service accounts that still require a Bigpond Login utility. Telstra has discontinued this type of account. Those with Telstra DSL accounts and newer cable modem accounts should select **No** for Does Your Internet Connection Require ALogin?.

- **Other**, which selects PPPoE (Point to Point Protocol over Ethernet), the protocol used by most DSL services worldwide

The screenshot shows the 'Basic Settings' page for configuring an Internet Service Provider. The 'Does Your Internet Connection Require A Login?' section has 'Yes' selected. The 'Internet Service Provider' dropdown menu is open, showing options: 'Other' (selected), 'PPTP', 'Telstra Bigpond', and 'Other'. The 'Login' field contains 'guest' and the 'Password' field is empty. The 'Service Name (If Required)' field is empty. The 'Idle Timeout (In Minutes)' is set to 5. The 'Internet IP Address' section has 'Get Dynamically From ISP' selected. The 'Domain Name Server (DNS) Address' section has 'Get Automatically From ISP' selected. At the bottom are 'Apply', 'Cancel', and 'Test' buttons.

Figure 1-7

	Note: Not all ISPs are listed here. The ones on this list have special requirements.
---	---

- **Login and Password.** This is the user name and password provided by your ISP. This name and password are used to log in to the ISP server.
- **Service Name.** If your connection is capable of connecting to multiple Internet services, this setting specifies which service to use.

- **Connection Mode.** This drop-down list (shown in [Figure 1-6 on page 1-8](#)) specifies when the router will connect to and disconnect from the Internet. The list includes:
 - **Always On.** The router logs in to the Internet immediately after booting and never disconnects.
 - **Dial on Demand.** The router logs in only when outgoing traffic is present and logs out after the idle time-out.
 - **Manually Connect.** The router logs in or logs out only when the user clicks **Connect** or **Disconnect** in the Router Status screen.
- **Idle Timeout.** Your Internet connection is logged out if there is no data transfer during the specified time interval.
- **Domain Name Server (DNS) Address.** If you know that your ISP does not automatically transmit DNS addresses to the router during login, select **Use These DNS Servers**, and enter the IP address of your ISP's primary DNS server. If a secondary DNS server address is available, enter it also.



Note: If you enter or change a DNS address, restart the computers on your network so that these settings take effect.

Chapter 2

Safeguarding Your Network

The RangeMax Dual Band Wireless-N Router WNDR3300 provides highly effective security features, which are covered in detail in this chapter.

This chapter includes the following sections:

- [“Choosing Appropriate Wireless Security”](#)
- [“Recording Basic Wireless Settings Setup Information” on page 2-4](#)
- [“Changing Basic Wireless Settings” on page 2-5](#)
- [“Viewing Advanced Wireless Settings” on page 2-11](#)
- [“Using WPS Security \(Wi-Fi Protected Setup\)” on page 2-12](#)
- [“Restricting Wireless Access by MAC Address” on page 2-17](#)
- [“Changing the Administrator Password” on page 2-19](#)
- [“Backing Up Your Configuration” on page 2-20](#)
- [“Understanding Your Firewall” on page 2-21](#)

Choosing Appropriate Wireless Security


Unlike wired networks, wireless networks allow anyone with a compatible adapter to receive your wireless data transmissions well beyond your walls. Operating an unsecured wireless network creates an opportunity for outsiders to eavesdrop on your network traffic or to enter your network to access your computers and files. Indoors, computers can connect over 802.11g/n wireless networks at ranges of up to 300 feet. Such distances can allow for others outside your immediate area to access your network. Use the security features of your wireless equipment that are appropriate to your needs.

The time it takes to establish a wireless connection can vary depending on both your security settings and router placement.

Stronger security methods can entail a cost in terms of throughput, latency, battery consumption, and equipment compatibility. In choosing an appropriate security level, you can also consider the effort compared to the reward for a hacker to break into your network. As a minimum, however,

NETGEAR recommends using WEP with Shared Key authentication. Do not run an unsecured wireless network unless it is your intention to provide free Internet access for the public.

WEP connections can take slightly longer to establish. Also, WEP, WPA-PSK, and WPA2-PSK encryption can consume more battery power on a notebook computer, and can cause significant performance degradation with a slow computer.

	<p>Note: NETGEAR recommends that you change the administration password of your router. Default passwords are well known, and an intruder can use your administrator access to read or disable your security settings. For information about how to change the administrator password, see “Changing the Administrator Password” on page 2-19.</p>
---	---



Note: Use these with other features that enhance security ([Table 2-2 on page 2-3](#)).

Figure 2-1

The WNDR3300 router provides two screens for configuring the wireless settings, the basic Wireless Settings screen, which you access under Setup in the main menu ([“Changing Basic Wireless Settings”](#) on page 2-5), and the advanced Wireless Settings screen, which you access under Advanced ([“Changing Basic Wireless Settings”](#) on page 2-5).

Basic security options are listed in order of increasing effectiveness in [Table 2-1](#). Other features that affect security are listed in [Table 2-2](#). For more details on wireless security methods, click the link to the online document [“Wireless Networking Basics”](#) in [Appendix B](#).

Table 2-1. Wireless Security Options

Security Type	Description
None.	No wireless security. Recommended only for troubleshooting wireless connectivity. Do not run an unsecured wireless network unless it is your intention to provide free Internet access for the public.
WEP. Wired Equivalent Privacy.	Wired Equivalent Privacy (WEP) data encryption provides moderate data security. WEP Shared Key authentication and WEP data encryption can be defeated by a determined eavesdropper using publicly available tools. For more information, see “Configuring WEP Wireless Security” on page 2-8.
WPA-PSK (TKIP). WPA-PSK standard encryption with TKIP encryption type. WPA2-PSK (AES). Wi-Fi Protected Access version 2 with Pre-Shared Key; WPA2-PSK standard encryption with the AES encryption type. WPA-PSK (TKIP) + WPA2-PSK (AES). Mixed mode.	Wi-Fi Protected Access with Pre-Shared Key (WPA-PSK and WPA2-PSK) data encryption provides extremely strong data security, very effectively blocking eavesdropping. Because WPA and WPA2 are relatively new standards, older wireless adapters and devices might not support them. For more information, see “Configuring WPA-PSK, WPA2-PSK, or WPA-PSK+WPA2-PSK Wireless Security” on page 2-10.

Table 2-2. Other Features That Enhance Security

Security Type	Description
Disable the wireless router radio.	If you disable the wireless router radio, wireless devices cannot communicate with the router at all. You might disable this when you are away or when other users of your network all use wired connections. For more information, see “Viewing Advanced Wireless Settings” on page 2-11.
Turn off the broadcast of the wireless network name SSID.	If you disable the broadcast of the SSID, only devices that know the correct SSID can connect. This nullifies the wireless network discovery feature of some products such as Windows XP, but your data is still fully exposed to an intruder using available wireless eavesdropping tools. For more information, see “Viewing Advanced Wireless Settings” on page 2-11.

Table 2-2. Other Features That Enhance Security (continued)


Security Type	Description
Restrict access based on MAC address.	You can restrict access to only trusted computers so that unknown computers cannot wirelessly connect to the WNDR3300 router. MAC address filtering adds an obstacle against unwanted access to your network by the general public, but the data broadcast over the wireless link is fully exposed. This data includes your trusted MAC addresses, which can be read and impersonated by a hacker. For more information, see "Restricting Wireless Access by MAC Address" on page 2-17.
Modify your firewall's rules.	By default, the firewall allows any outbound traffic and prohibits any inbound traffic except for responses to your outbound traffic. However, you can modify the firewall's rules. For more information, see "Understanding Your Firewall" on page 2-21.
Use WPS (Wi-Fi Protected Setup).	Wi-Fi Protected Setup provides easy setup by means of a push button. Older wireless adapters and devices might not support this. Check whether devices are WPS enabled. For more information, see "Using WPS Security (Wi-Fi Protected Setup)" on page 2-12.

Recording Basic Wireless Settings Setup Information

Before customizing your wireless settings, print this section, and record the following information. If you are working with an existing wireless network, the person who set up or is responsible for the network can provide this information. Otherwise, you must choose the settings for your wireless network. Either way, record the settings for your wireless network in the spaces provided.

- **11N Wireless Network Name (SSID).** _____ The SSID identifies the wireless network. You can use up to 32 alphanumeric characters. The SSID is case-sensitive. The SSID in the wireless adapter card must match the SSID of the wireless router. In some configuration utilities (such as in Windows XP), the term "wireless network name" is used instead of SSID.
- **11G Wireless Network Name (SSID).** _____

- If **WEP Authentication** is used, circle one: **Open System**, **Shared Key**, or **Auto**.

	Note: If you select Shared Key, the other devices in the network will not connect unless they are also set to Shared Key and are configured with the correct key.
---	--

- **WEP Encryption Key Size.** Choose one: **64-bit** or **128-bit**. Again, the encryption key size must be the same for the wireless adapters and the wireless router.
- **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 provided.
 - **Passphrase Method.** _____ These characters *are* case-sensitive. Enter a word or group of printable characters and click Generate Keys. Not all wireless devices support the passphrase method.
 - **Manual Method.** These values *are not* case-sensitive. For 64-bit WEP, enter 10 hexadecimal digits (any combination of 0–9, A–F, or a–f). For 128-bit WEP, enter 26 hexadecimal digits.

Key 1. _____

Key 2. _____

Key 3. _____

Key 4. _____

- If WPA-PSK or WPA2-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 also set to WPA-PSK and are configured with the correct passphrase. Similarly, when you use WPA2-PSK, the other devices in the network will not connect unless they are also set to WPA2-PSK and are configured with the correct passphrase.

Use the procedures described in the following sections to configure the WNDR3300 router. Store this information in a safe place.

Changing Basic Wireless Settings

This section describes the wireless settings that you can view and configure in the Wireless Settings screen, which you access under Setup in the main menu.

Viewing Basic Wireless Settings

To configure the wireless security settings of your router:

1. Log in to the router as described in [“Logging In to Your Wireless Router”](#) on page 1-2.
2. Select **Wireless Settings** under Setup in the main menu.

The screenshot shows the 'Wireless Settings' configuration page. It includes fields for SSID names, region, mode, and channels, along with radio button options for security settings.

Figure 2-2

The available settings in this screen are:

- **Name (11N SSID)** or **Name (11G SSID)**. These are the names of the 11N and 11G wireless networks. The SSID is also known as the wireless network name. Enter a value of up to 32 alphanumeric characters. When more than one wireless network is active, different wireless network names provide a way to separate the traffic. For a wireless device to participate in a particular wireless network, it must be configured with the SSID for that network. The WNDR3300 router default SSID names are:
 - 11N SSID. **NETGEAR-DualBand-N**
 - 11G SSID. **NETGEAR-2.4-G**

These SSIDs are broadcast by the router so that nearby wireless devices can discover your network. You can disable this broadcast as described in [“Viewing Advanced Wireless Settings”](#) on page 2-11.

- **Region.** This field identifies the region where the WNDR3300 router can be used. It might not be legal to operate the wireless features of the wireless router in a region other than one of those identified in this field.



Note: The region selection feature might not be available in all countries.

- **Mode.** This field determines which 802.11 data communications protocol is used. You can select one of the following modes:
 - **Up to 270 Mbps at 2.4 GHz**
 - **Up to 270 Mbps at 5 GHz and 54 Mbps at 2.4 GHz.** This is the default mode.
 - **Up to 130 Mbps at 2.4 GHz**
 - **Up to 130 Mbps at 5 GHz and 54 Mbps at 2.4 GHz**

The following information might help you to decide which mode to select:

- **Up To 54 Mbps.** Legacy mode, for compatibility with the slower 802.11b and 802.11g wireless devices.
- **Up To 130 Mbps.** Neighbor Friendly mode, for reduced interference with neighboring wireless networks. Provides two transmission streams with different data on the same channel at the same time, but also allows 802.11b and 802.11g wireless devices.
- **Up To 270 Mbps.** Performance mode, using channel expansion to achieve the 270 Mbps data rate. The WNDR3300 router uses the channel you selected as the primary channel and expands to the secondary channel (primary channel +4 or -4) to achieve a 40 MHz frame-by-frame bandwidth. The WNDR3300 router detects channel usage and disables frame-by-frame expansion if the expansion would result in interference with the data transmission of other access points or clients.



Note: The maximum wireless signal rate is derived from the 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.

- **11N Channel or 11G Channel.** These fields determine which operating frequency is used for the 11N or 11G wireless networks. It should not be necessary to change the wireless channel unless you notice interference problems with another nearby wireless network. For more information about the wireless channel frequencies, click the link to the online document [“Wireless Networking Basics” in Appendix B](#).
- **Security Options.** These options are the wireless security features that you can enable. The security options displayed in this screen might change depending on the wireless mode you select.
 - For a detailed explanation of security standards, see [“Choosing Appropriate Wireless Security” on page 2-1](#), and the online document you can access from [“Wireless Networking Basics” in Appendix B](#), as defined by the IEEE 802.11 wireless communication standard.
 - For information about configuring WEP, see [“Configuring WEP Wireless Security” on page 2-8](#).
 - For information about configuring WPA, see [“Configuring WPA-PSK, WPA2-PSK, or WPA-PSK+WPA2-PSK Wireless Security” on page 2-10](#).

3. Click **Apply** to save your settings.

Configuring WEP Wireless Security

WEP Shared Key authentication and WEP data encryption can be defeated by a determined eavesdropper using publicly available tools.

WEP offers the following options:

- **Open System.** With Open System authentication and 64 or 128 bit WEP data encryption, the WNDR3300 *does* perform data encryption but *does not* perform any authentication. Anyone can join the network. This setting provides very little practical wireless security.
- **Shared Key.** With Shared Key authentication, a wireless device must know the WEP key to join the network. Select the encryption strength (64 or 128 bit data encryption). Manually enter the key values, or enter a word or group of printable characters in the **Passphrase** field. Manually entered keys *are not* case-sensitive, but passphrase characters *are* case-sensitive.
- **Automatic.** The wireless router automatically detects whether Open System or Shared Key is used.

To configure WEP data encryption:



Note: If you use a wireless computer to configure WEP settings, you will be disconnected when you click **Apply**. You must then either configure your wireless adapter to match the wireless router WEP settings or access the wireless router from a wired computer to make any further changes. Not all wireless adapter configuration utilities support passphrase key generation.

1. Select **Wireless Settings** under Setup in the main menu.
2. In the Security Options area, select **WEP**. The WEP options display.

Wireless Settings

Wireless Network

Name (11N SSID):

Name (11G SSID):

Region:

Mode:

11N Channel:

11G Channel:

Security Options

None

WEP

WPA-PSK [TKIP]

WPA2-PSK [AES]

WPA-PSK [TKIP] + WPA2-PSK [AES]

Security Encryption (WEP)

Authentication Type:

Encryption Strength:

Security Encryption (WEP) Key

Passphrase:

Key 1:

Key 2:

Key 3:

Key 4:

Figure 2-3

3. Select the authentication type and encryption strength.

4. You can manually or automatically program the four data encryption keys. These values must be identical on all computers and access points in your network.
 - **Automatic.** In the **Passphrase** field, enter a word or group of printable characters, and click **Generate**. The passphrase is case-sensitive. For example, NETGEAR is not the same as nETgear. The four key fields are automatically populated with key values.
 - **Manual.** Enter 10 hexadecimal digits (any combination of 0–9, a–f, or A–F). These entries are not case-sensitive. For example, AA is the same as aa. Select which of the four keys to activate.
5. Click **Apply** to save your settings.

Configuring WPA-PSK, WPA2-PSK, or WPA-PSK+WPA2-PSK Wireless Security

Wi-Fi Protected Access with Pre-Shared Key (WPA-PSK and WPA2-PSK) data encryption provides extremely strong data security, very effectively blocking eavesdropping. Because WPA and WPA2 are relatively new standards, older wireless adapters and devices might not support them. Check whether newer drivers are available from the manufacturer.

WPA–Pre-Shared Key *does* perform authentication. WPA-PSK uses TKIP (Temporal Key Integrity Protocol) data encryption, and WPA2-PSK uses AES (Advanced Encryption Standard) data encryption. Both methods dynamically change the encryption keys making them nearly impossible to circumvent.

Mixed mode allows clients using either WPA-PSK (TKIP) or WPA2-PSK (AES). This provides the most reliable security, and is easiest to implement, but it might not be compatible with older adapters.



Note: Not all wireless adapters support WPA. Furthermore, client software is also required. Windows XP with Service Pack 2 does include WPA support. Nevertheless, the wireless adapter hardware and driver must also support WPA. For instructions on configuring wireless computers or PDAs (personal digital assistants) for WPA-PSK security, consult the documentation for the product you are using.

To configure WPA-PSK, WPA2-PSK or WPA-PSK+WPA2-PSK:

1. Select **Wireless Settings** under Setup in the main menu.

2. Select one of the WPA-PSK or WPA2-PSK options for the security type. The third option (WPA-PSK [TKIP] + WPA2-PSK [AES]) is the most flexible, since it allows clients using either WPA-PSK or WPA2-PSK.
3. In the **Passphrase** field, enter a word or group of 8–63 printable characters. The passphrase is case-sensitive.

Wireless Settings

Wireless Network

Name (11N SSID):

Name (11G SSID):

Region:

Mode:

11N Channel:

11G Channel:

Security Options

None

WEP

WPA-PSK [TKIP]

WPA2-PSK [AES]

WPA-PSK [TKIP] + WPA2-PSK [AES]

Security Options (WPA-PSK + WPA2-PSK)

Passphrase: (8-63 characters or 64 hex digits)

Figure 2-4

4. Click **Apply** to save your settings.

Viewing Advanced Wireless Settings

This section describes the wireless settings that you can view and specify in the Wireless Settings screen, which you access under Advanced in the main menu.

To configure the advanced wireless security settings of your router:

1. Log in to the router as described in [“Logging In to Your Wireless Router”](#) on page 1-2.

2. Select **Wireless Settings** under Advanced in the main menu.


The screenshot shows the 'Advanced Wireless Settings' page. It is divided into three main sections: 'Wireless Router Settings', 'WPS Settings', and 'Wireless Card Access List'.
- **Wireless Router Settings:** Includes a checked 'Enable Wireless Router Radio' box, a checked 'Enable SSID Broadcast' box, 'Fragmentation Threshold (256 - 2346):' set to 2346, 'CTS/RTS Threshold (1 - 2347):' set to 2347, and 'Preamble Mode' set to 'Long Preamble'.
- **WPS Settings:** Shows 'Router's PIN:' as 97674955, an unchecked 'Disable Router's PIN' box, and a checked 'Keep Existing Wireless Settings' box.
- **Wireless Card Access List:** Features a 'Setup Access List' button.
At the bottom are 'Apply' and 'Cancel' buttons.

Figure 2-5

The available settings in this screen are:

- **Enable Wireless Router Radio.** If you disable the wireless router radio, wireless devices cannot connect to the WNDR3300 router. If you will not be using your wireless network for a period of time, you can clear this check box and disable all wireless connectivity.
- **Enable SSID Broadcast.** Clear this check box to disable broadcast of the SSID, so that only devices that know the correct SSID can connect. Disabling SSID broadcast nullifies the wireless network discovery feature of some products such as Windows XP.
- **WPS Settings.** For information about these settings, see the following section, [“Using WPS Security \(Wi-Fi Protected Setup\).”](#)
- **Wireless Card Access List.** For information about this list, see [“Restricting Wireless Access by MAC Address”](#) on page 2-17.

Using WPS Security (Wi-Fi Protected Setup)

If a wireless client supports WPS, you can use this feature to connect the wireless client securely and easily to the router. Look for the  symbol. WPS automatically specifies the network names (SSIDs) and wireless security settings for the wireless client. After WPS is set up, the method of security is Wi-Fi Protected Access with Pre-Shared Key (WPA-PSK and WPA2-PSK) data

encryption. The WNDR3300 router and any connected clients share the same network names (SSIDs), for both 11N and 11G. Note that WPS is not a new security feature—it makes existing security features easier to configure.



Note: Using WPS security might disconnect devices you already have connected to your router. When you add wireless clients, whether or not they are WPS enabled, the added devices must share the same network names (SSIDs) and security passphrase. For more information, see [“Connecting Additional Wireless Client Devices after WPS Setup”](#) on page 2-15.

The WNDR3300 router provides two methods for connecting to a wireless client that supports WPS: push button configuration or PIN entry.

Push Button Configuration

To enable a wireless client to join a network using the menu options in the router’s menu:

1. Log in to the router.
2. Select **Add WPS Client** in the main menu, and click **Next**.
3. Select the **Push Button** setup method.

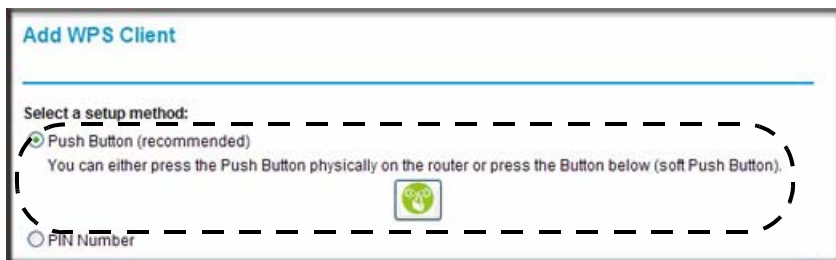



Figure 2-6

4. Press the dome on the WNDR3300 router for over 5 seconds, or click the  button in the Add WPS Client screen.

The dome lights begin to blink in a regular pattern. While the dome lights are blinking, you have 2 minutes to enable WPS on the device you are trying to connect to the router.

5. On the wireless client, press the hardware button, or click the button in the Add WPS Client screen.

The WNDR3300 router's dome lights cease blinking when one of these conditions occurs:

- The router and the client establish a wireless connection.
- The 2-minute window period expires for establishing a WPS connection. If the connection is not established, no WPS security settings will be configured in the WNDR3300 router.

PIN Entry

To enable a wireless client to join a network using a PIN:

1. Select **Add WPS Client** in the main menu, and click **Next**.
2. Select the **PIN Number** setup method.



Figure 2-7

3. On the utility GUI for the wireless client, generate a client security PIN.
4. On the Add WPS Client screen of the WNDR3300 router, enter the client security PIN in the **Enter Client's PIN** field. The Smart Wizard initiates the wireless connection.

Configuring the WPS Settings

1. Log in to the router as described in [“Logging In to Your Wireless Router”](#) on page 1-2.

2. Select **Wireless Settings** under Advanced in the main menu.

Advanced Wireless Settings

Wireless Router Settings

Enable Wireless Router Radio

Enable SSID Broadcast

Fragmentation Threshold (256 - 2346):

CTS/RTS Threshold (1 - 2347):

Preamble Mode:

WPS Settings

Router's PIN: **97674955**

Disable Router's PIN

Keep Existing Wireless Settings

Wireless Card Access List:

Figure 2-8

These options are available under WPS Settings:

- **Router's PIN.** The PIN is displayed so that you can use it to configure the router through WPS (Wi-Fi Protected Setup). It is also displayed on the router's label.
- **Disable Router's PIN.** If the router's PIN is disabled, you cannot configure the router's wireless settings with WPS, but if your settings are already configured, you can still add WPS-enabled wireless clients. The router might disable the PIN if it detects suspicious attempts to break into your wireless settings; this can happen if the check box is selected. You can enable the PIN by clearing the check box and clicking **Apply**.
- **Keep Existing Wireless Settings.** This check box is automatically selected after WPS is enabled to prevent unwanted settings changes, and is also selected if you have already specified wireless security settings or your SSIDs without using WPS. When this check box is *not* selected, adding a new wireless client using the push button or the Add WPS Client screen (see [“Push Button Configuration” on page 2-13](#)) changes the router's SSIDs and security passphrase. You might need to clear it if you are using certain registrars, such as for a Windows Vista PC, to configure the router through WPS.

Connecting Additional Wireless Client Devices after WPS Setup

You can add WPS-enabled and non-WPS-enabled client devices.

Adding Additional WPS-Enabled Clients

To add an additional wireless client device that is WPS enabled:



Note: Your wireless settings do not change when you add an additional WPS-enabled client unless you have cleared the **Keep Existing Wireless Settings** check box (in the Wireless Settings screen). If you do clear the check box, new SSIDs and a passphrase are generated, and all existing connected wireless clients are disassociated and disconnected from the router.

1. Follow the procedures in [“Push Button Configuration” on page 2-13](#) or [“PIN Entry” on page 2-14](#).
2. For information about how to view a list of all devices connected to your router (including wireless and Ethernet-connected), see [“Viewing a List of Attached Devices” on page 6-7](#).

Adding Additional Non-WPS-Enabled Clients

If you are connecting a combination of WPS-enabled clients and clients that are not WPS enabled, you cannot use the WPS setup procedures to add clients that are not WPS enabled. You need to record and then manually enter your security settings (see [“Recording Basic Wireless Settings Setup Information” on page 2-4](#)).

To connect non-WPS-enabled and WPS-enabled clients to the WNDR3300 router:

1. Restore the router to factory default settings (see [Appendix A, “Technical Specifications”](#)).
After you restore factory settings, all existing connected wireless clients are disassociated and disconnected from the router.
2. Configure the network names (SSIDs) and security passphrase of the WNDR3300 router (shown in the Wireless Settings screen) as appropriate, and record that information. See [“Viewing Basic Wireless Settings” on page 2-6](#).
3. For the non-WPS-enabled devices that you wish to connect, open the networking utility, and follow the utility’s instructions to enter security settings.
4. For the WPS-enabled devices that you wish to connect, follow the procedures in [“Push Button Configuration” on page 2-13](#) or [“PIN Entry” on page 2-14](#).
5. For information about how to view a list of all devices connected to your router (including wireless and Ethernet connected), see [“Viewing a List of Attached Devices” on page 6-7](#).

Restricting Wireless Access by MAC Address

When a Wireless Card Access List is configured and enabled, the router checks the MAC address of any wireless device attempting a connection and allows only connections to computers identified on the trusted computers list.

The Wireless Card Access List displays a list of wireless computers that you allow to connect to the router based on their MAC addresses. These wireless computers must also have the correct SSID and wireless security settings to access the wireless router.

The MAC address is a network device's unique 12-character physical address, containing the hexadecimal characters 0–9, a–f, or A–F only, and separated by colons (for example, 00:09:AB:CD:EF:01). It can usually be found on the bottom of the wireless card or network interface device. If you do not have access to the physical label, you can display the MAC address using the network configuration utilities of the computer. In WindowsXP, for example, typing the **ipconfig/all** command in an MSDOS command prompt window displays the MAC address as Physical Address. You might also find the MAC addresses in the router's Attached Devices screen.

To restrict access based on MAC addresses:

1. Select **Wireless Settings** under Advanced in the main menu.
2. In the Wireless Settings screen, click **Setup Access List** to display the Wireless Card Access List.



Figure 2-9

3. Click **Add** to add a wireless device to the wireless access control list. The Wireless Card Access Setup screen opens and displays a list of currently active wireless cards and their Ethernet MAC addresses.

	Device Name	MAC Address
<input type="radio"/>	9300UNIT2	00:0f:b5:0d:ab:19

Wireless Card Entry

Device Name:

MAC Address:

Figure 2-10

4. If the computer you want appears in the Available Wireless Cards list, you can select the radio button of that computer to capture its MAC address; otherwise, you can manually enter a name and the MAC address of the authorized computer. You can usually find the MAC address on the bottom of the wireless device.



Tip: You can copy and paste the MAC addresses from the router's Attached Devices screen into the MAC Address field of this screen. To do this, configure each wireless computer to obtain a wireless link to the router. The computer should then appear in the Attached Devices screen.

5. Click **Add** to add this wireless device to the Wireless Card Access List. The screen changes back to the list screen.
6. Repeat [step 3](#) through [step 5](#) for each additional device you want to add to the list.

7. Select the **Turn Access Control On** check box.



Note: When configuring the router from a wireless computer whose MAC address is not in the Trusted PC list, if you select **Turn Access Control On**, you lose your wireless connection when you click **Apply**. You must then access the wireless router from a wired computer or from a wireless computer that is on the access control list to make any further changes.

8. Click **Apply** to save your Wireless Card Access List settings.

Now, only devices on this list are allowed to wirelessly connect to the WNDR3300 router.



Warning: MAC address filtering adds an obstacle against unwanted access to your network by the general public. However, because your trusted MAC addresses appear in your wireless transmissions, an intruder can read them and impersonate them. Do not rely on MAC address filtering alone to secure your network.

Changing the Administrator Password

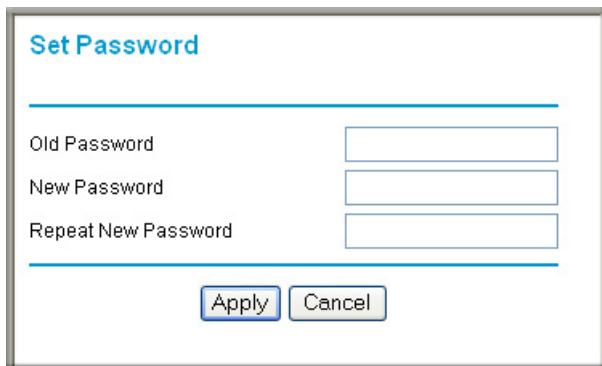
The default password for the router's Web Configuration Manager is **password**. NETGEAR recommends that you change this password to a more secure password.



Tip: Before changing the router password, back up your configuration settings with the default password of **password**. If you save the settings with a new password, and then you later forget the new password, you will have to reset the router back to the factory defaults, and log in using the default password of **password**. This means you will have to re-enter all the router configuration settings. For information about how to back up your settings, see [“Backing Up and Restoring the Configuration” on page 6-8](#).

To change the administrator password:

1. On the main menu, under Maintenance, select **Set Password** to display the Set Password screen.



The screenshot shows a web browser window with the title "Set Password". The page has a light blue header with the title. Below the header, there are three text input fields labeled "Old Password", "New Password", and "Repeat New Password". At the bottom of the form, there are two buttons: "Apply" and "Cancel".

Figure 2-11

2. To change the password, first enter the old password, then enter the new password twice.
3. Click **Apply**.

Backing Up Your Configuration

The configuration settings of the WNDR3300 router are stored within the router in a configuration file. You can back up (save) this file and retrieve it later. NETGEAR recommends that you save your configuration file after you complete the configuration. If the router fails or becomes corrupted, or an administrator password is lost, you can easily re-create your configuration by restoring the configuration file.

For instructions on saving and restoring your configuration file, see [“Managing the Configuration File” on page 6-7](#).



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 save the file with a new password, and then you later forget the new password, you will have to reset the router back to the factory defaults and log in using the default password of **password**. This means you will have to re-enter all the router configuration settings.

Understanding Your Firewall

Your RangeMax Dual Band Wireless-N Router WNDR3300 contains a true firewall to protect your network from attacks and intrusions. A firewall is a device that protects one network from another while allowing communication between the two. Using a process called Stateful Packet Inspection, the firewall analyzes all inbound and outbound traffic to determine whether or not it will be allowed to pass through.

By default, the firewall allows any outbound traffic and prohibits any inbound traffic except for responses to your outbound traffic. However, you can modify the firewall's rules to achieve the following behavior:

- **Blocking sites.** Block access from your network to certain Web locations based on Web addresses and Web address keywords. This feature is described in [“Blocking Access to Internet Sites” on page 3-1](#).
- **Blocking services.** Block the use of certain Internet services by specific computers on your network. This feature is described in [“Blocking Access to Internet Services” on page 3-3](#).
- **Scheduled blocking.** Block sites and services according to a daily schedule. This feature is described in [“Scheduling Blocking” on page 3-5](#).
- **Allow inbound access to your server.** To allow inbound access to resources on your local network (for example, a Web server or remote desktop program), you can open the needed services by configuring port forwarding as described in [“Allowing Inbound Connections To Your Network” on page 5-1](#).
- **Allow certain games and applications to function correctly.** Some games and applications need to allow additional inbound traffic to function. Port triggering can dynamically allow additional service connections, as described in [“Allowing Inbound Connections To Your Network” on page 5-1](#). Another feature to solve application conflicts with the firewall is Universal Plug and Play (UPnP), described in [“Using Universal Plug and Play” on page 5-12](#).

Chapter 3

Restricting Access From Your Network

This chapter describes how to use the content filtering and reporting features of the RangeMax Dual Band Wireless-N Router WNDR3300 to protect your network. You can find these features by selecting the items under Content Filtering in the main menu of the browser interface.

This chapter includes the following sections:

- [“Content Filtering Overview”](#)
- [“Blocking Access to Internet Sites”](#)
- [“Blocking Access to Internet Services”](#) on page 3-3
- [“Scheduling Blocking”](#) on page 3-5
- [“Viewing Logs of Web Access or Attempted Web Access”](#) on page 3-6
- [“Configuring E-mail Alert and Web Access Log Notifications”](#) on page 3-7
- [“Setting the Time”](#) on page 3-9

Content Filtering Overview

The RangeMax Dual Band Wireless-N Router WNDR3300 provides you with Web content filtering options, plus browser activity reporting and instant alerts through e-mail. Parents and network administrators can establish restricted access policies based on time of day, Web addresses, and Web address keywords. You can also block Internet access by applications and services, such as chat rooms or games.

To configure these features of your router, select the items under Content Filtering in the main menu of the browser interface. This chapter describes the screens that display.

Blocking Access to Internet Sites

The WNDR3300 router allows you to restrict access based on Web addresses and Web address keywords. Up to 255 entries are supported in the Keyword list.

Here are some keyword application examples:

- If the keyword **XXX** is specified, the URL www.zzzzyyqq.com/xxx.html is blocked.
- If the keyword **.com** is specified, only websites with other domain suffixes (such as .edu, .org, or .gov) can be viewed.

To block access to Internet sites:

1. Select **Block Sites** under Content Filtering in the main menu. The Block Sites screen displays.

Block Sites

Keyword Blocking

Never
 Per Schedule
 Always

Type keyword or domain name here.

Add Keyword

Block sites containing these keywords or domain names:
discodanny
Delete Keyword Clear List

Allow Trusted IP Address To Visit Blocked Sites
Trusted IP Address

Apply Cancel

Figure 3-1

2. Enable keyword blocking by selecting either **Per Schedule** or **Always**.

To block by schedule, be sure to specify a time period in the Schedule screen. For information about scheduling, see [“Scheduling Blocking” on page 3-5](#).

Block all access to Internet browsing during a scheduled period by entering a dot (.) as the keyword, and then set a schedule in the Schedule screen.

3. Add a keyword or domain by entering it in the keyword field and clicking **Add Keyword**. The keyword or domain name then appears the **Block sites containing these keywords or domain names** list.

Delete a keyword or domain name by selecting it from the list and clicking **Delete Keyword**.

4. You can specify one trusted user, which is a computer that is exempt from blocking and logging. Specify a trusted user by entering that computer's IP address in the **Trusted IP Address** fields.

Since the trusted user is identified by IP address, you should configure that computer with a fixed IP address.

5. Click **Apply** to save all your settings in the Block Sites screen.

Blocking Access to Internet Services

The WNDR3300 router allows you to block the use of certain Internet services by computers on your network. This is called service blocking or port filtering. Services are functions performed by server computers at the request of client computers. For example, Web servers serve Web pages, time servers serve time and date information, and game hosts serve data about other players' moves. When a computer on your network sends a request for service to a server computer on the Internet, the requested service is identified by a service or port number. This number appears as the destination port number in the transmitted IP packets. For example, a packet that is sent with destination port number 80 is an HTTP (Web server) request.

To block access to Internet services:

1. Select **Block Services** under Content Filtering in the main menu. The Block Services screen displays.

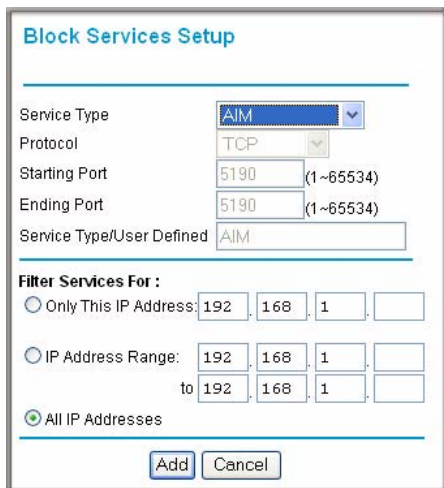
#	Service Type	Port	IP
---	--------------	------	----

Figure 3-2

2. Enable service blocking by selecting either **Per Schedule** or **Always**, and then click **Apply**.

To block by schedule, be sure to specify a time period in the Schedule screen. For information about scheduling, see [“Scheduling Blocking” on page 3-5](#).

3. Specify a service for blocking by clicking **Add**. The Block Services Setup screen displays.



Block Services Setup

Service Type: AIM
Protocol: TCP
Starting Port: 5190 (1~65534)
Ending Port: 5190 (1~65534)
Service Type/User Defined: AIM

Filter Services For :

Only This IP Address: 192 . 168 . 1 .
 IP Address Range: 192 . 168 . 1 .
to 192 . 168 . 1 .
 All IP Addresses

Add Cancel

Figure 3-3

4. From the **Service Type** list, select the application or service to be allowed or blocked. The list already displays several common services, but you are not limited to these choices. To add any additional services or applications that do not already appear, select **User Defined**.
5. Select the radio button for the IP address configuration you want to block, and then enter the IP addresses in the appropriate fields.
6. Click **Add** to enable your Block Services Setup selections.

Configuring a User-Defined Service

To define a service, first you must determine which port number or range of numbers is used by the application. The service port numbers for many common protocols are defined by the Internet Engineering Task Force (IETF) and published in RFC1700, “Assigned Numbers.” Service numbers for other applications are typically chosen from the range 1024 to 65535 by the authors of the application. You can often determine port number information by contacting the publisher of the application, by asking user groups or newsgroups, or by searching.

- Enter the starting port and ending port numbers. If the application uses a single port number, enter that number in both fields.
- If you know that the application uses either TCP or UDP, select the appropriate protocol. If you are not sure, select **Both**.

Blocking Services by IP Address Range

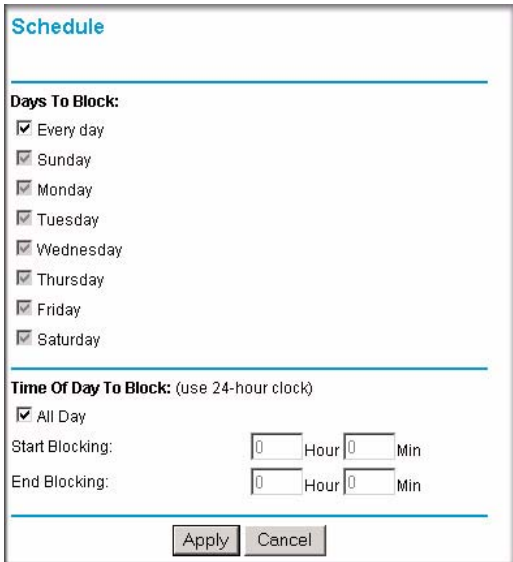
In the Filter Services For area, you can block the specified service for a single computer, a range of computers (having consecutive IP addresses), or all computers on your network.

Scheduling Blocking

The WNDR3300 router allows you to specify when blocking is enforced.

To schedule blocking:

1. Select **Schedule** under Content Filtering in the main menu. The Schedule screen displays.



The screenshot shows the 'Schedule' configuration page. It has a title 'Schedule' in blue. Below the title is a horizontal line. Underneath, the section 'Days To Block:' is followed by seven checkboxes, all of which are checked: 'Every day', 'Sunday', 'Monday', 'Tuesday', 'Wednesday', 'Thursday', and 'Saturday'. Another horizontal line follows. The section 'Time Of Day To Block: (use 24-hour clock)' is followed by a checked checkbox for 'All Day'. Below this are two rows of input fields: 'Start Blocking:' and 'End Blocking:'. Each row has two numeric input boxes for 'Hour' and 'Min', followed by the labels 'Hour' and 'Min'. At the bottom of the form are two buttons: 'Apply' and 'Cancel'.

Figure 3-4

2. Configure the schedule for blocking keywords and services:

- a. **Days to Block.** Select days on which you want to apply blocking by selecting the appropriate check boxes. Select **Every Day** to select the check boxes for all days. Click **Apply**.
- b. **Time of Day to Block.** Select a start and end time in 24-hour format. Select **All Day** for 24-hour blocking. Click **Apply**.

Be sure to select your time zone in the E-mail screen as described in [“Setting the Time” on page 3-9](#).

3. Click **Apply** to save your settings.

Viewing Logs of Web Access or Attempted Web Access

The log is a detailed record of the websites you have accessed or attempted to access. Up to 128 entries are stored in the log. Log entries appear only when keyword blocking is enabled and no log entries are made for the trusted user.

Select **Logs** under Content Filtering in the main menu. The Logs screen displays.

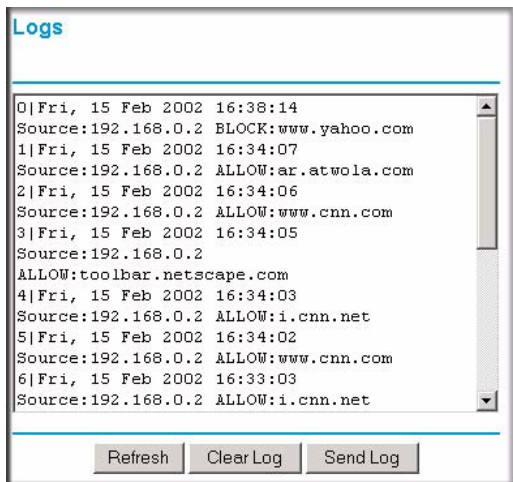


Figure 3-5

Table 3-1 describes the log entries.

Table 3-1. Log Entry Descriptions

Field	Description
Date and time	The date and time the log entry was recorded.
Source IP	The IP address of the initiating device for this log entry.
Target address	The name or IP address of the website or newsgroup visited or to which access was attempted.
Action	Whether the access was blocked or allowed.

To refresh the log screen, click the **Refresh** button.

To clear the log entries, click the **Clear Log** button.

To e-mail the log immediately, click the **Send Log** button.

Configuring E-mail Alert and Web Access Log Notifications

To receive logs and alerts by e-mail, you must provide your e-mail account information.

To configure e-mail alert and web access log notifications:

1. Select **E-mail** under Content Filtering in the main menu. The E-mail screen displays.

The screenshot shows the 'E-mail' configuration page. At the top, there is a checkbox labeled 'Turn E-mail Notification On'. Below this is a section titled 'Send Alerts and Logs Via E-mail' which contains several input fields: 'Your Outgoing Mail Server', 'Send To This E-mail Address', 'User Name', and 'Password'. There is also a checkbox for 'My Mail Server requires authentication'. A section titled 'Send Alert Immediately' has a checkbox and the text 'When Someone Attempts To Visit A Blocked Site.'. Below that is a section 'Send Logs According to this Schedule' with dropdown menus for 'None', 'Day', and 'Time', and radio buttons for 'a.m.' and 'p.m.'. A 'Time Zone' dropdown menu is set to '(GMT-08:00) Pacific Time (US Canada)', with a checkbox for 'Automatically Adjust for Daylight Savings Time'. At the bottom, the 'Current Time' is displayed as 'Saturday, 29 Dec 2007 13:08:21'. 'Apply' and 'Cancel' buttons are at the very bottom.

Figure 3-6

2. To receive e-mail logs and alerts from the router, select the **Turn E-mail Notification On** check box.
 - a. Enter the name of your ISP's outgoing (SMTP) mail server (such as **mail.myISP.com**) in the **Your Outgoing Mail Server** field. You might be able to find this information in the configuration screen of your e-mail program. If you leave this field blank, log and alert messages will not be sent by e-mail.
 - b. Enter the e-mail address to which logs and alerts are sent in the **Send To This E-mail Address** field. This e-mail address will also be used as the From address. If you leave this field blank, log and alert messages will not be sent by e-mail.
3. If your e-mail server requires authentication, select the **My Mail Server requires authentication** check box.
 - a. Enter your user name for the e-mail server in the **User Name** field.
 - b. Enter your password for the e-mail server in the **Password** field.

4. You can specify that logs are automatically sent by e-mail with these options:
- **Send alert immediately.** Select this check box for immediate notification of attempted access to a blocked site or service.
 - **Send Logs According to this Schedule.** Specifies how often to send the logs: Hourly, Daily, Weekly, or When Full.
 - **Day.** Specifies which day of the week to send the log. Relevant when the log is sent weekly or daily.
 - **Time.** Specifies the time of day to send the log. Relevant when the log is sent daily or weekly.

If you select the Weekly, Daily, or Hourly option and the log fills up before the specified period, the log is automatically e-mailed to the specified e-mail address. After the log is sent, the log is cleared from the router's memory. If the router cannot e-mail the log file, the log buffer might fill up. In this case, the router overwrites the log and discards its contents.

5. Click **Apply** to save your settings.

So that the log entries are properly time-stamped and sent at the correct time, be sure to set the time as described in the next section.

Setting the Time

The WNDR3300 router uses the Network Time Protocol (NTP) to obtain the current time and date from one of several network time servers on the Internet. To localize the time for your log entries, you must specify your time zone:

- **Time Zone.** Select your local time zone. This setting is used for the blocking schedule and for time-stamping log entries.
- **Automatically Adjust for Daylight Savings Time.** Select this check box if your region supports daylight savings time. The router will automatically adjust the time at the start and end of the daylight savings time period.

Chapter 4

Customizing Your Network Settings

This chapter describes how to configure advanced networking features of the RangeMax Dual Band Wireless-N Router WNDR3300, including LAN, WAN, and routing settings.

It contains the following sections:

- [“Using the LAN Setup Options”](#)
- [“Using a Dynamic DNS Service” on page 4-5](#)
- [“Configuring the WAN Setup Options” on page 4-7](#)
- [“Configuring Static Routes” on page 4-9](#)

Using the LAN Setup Options

The LAN Setup screen allows configuration of LAN IP services such as Dynamic Host Configuration Protocol (DHCP) and Routing Information Protocol (RIP).

To configure LAN IP settings:

From the main menu of the browser interface, under Advanced, click **LAN Setup**. The following screen displays:

LAN Setup

Device Name

LAN TCP/IP Setup

IP Address . . .

IP Subnet Mask . . .

RIP Direction

RIP Version

Use Router as DHCP Server

Starting IP Address . . .

Ending IP Address . . .

Address Reservation

#	IP Address	Device Name	Mac Address
---	------------	-------------	-------------

Figure 4-1

Configuring a Device Name

The device name is a user-friendly name for the router. This name is shown in the Network on Windows Vista and the Network Explorer on all Windows systems. The **Device Name** field cannot be blank.

Configuring LAN TCP/IP Setup Parameters

The router is shipped preconfigured to use private IP addresses on the LAN side and to act as a DHCP server. The router's default LAN IP configuration is:

- LAN IP address: **192.168.1.1**
- Subnet mask: **255.255.255.0**

These addresses are part of the designated private address range for use in private networks and should be suitable for most applications. If your network has a requirement to use a different IP addressing scheme, you can make those changes in this screen.

The LAN IP settings are:

- **IP Address.** The LAN IP address of the router.

- **IP Subnet Mask.** The LAN subnet mask of the router. Combined with the IP address, the IP subnet mask allows a device to know which other addresses are local to it, and which must be reached through a gateway or router.
- **RIP Direction.** RIP allows a router to exchange routing information with other routers. The RIP Direction selection controls how the router sends and receives RIP packets. **Both** is the default.
 - When set to **Both** or **Out Only**, the router broadcasts its routing table periodically.
 - When set to **Both** or **In Only**, the router incorporates the RIP information that it receives.
 - When set to **None**, the router does not send any RIP packets and ignores any RIP packets received.
- **RIP Version.** This controls the format and the broadcasting method of the RIP packets sent by the router. (It recognizes both formats when receiving.) The default setting is **RIP-1**.
 - **RIP-1** is universally supported. RIP-1 is usually adequate unless you have an unusual network setup.
 - **RIP-2** carries more information. **RIP-2B** uses subnet broadcasting.



Note: If you change the LAN IP address of the router while connected through the browser, you will be disconnected. You must then open a new connection to the new IP address and log in again.

Using the Router as a DHCP Server

By default, the router functions as a DHCP server, allowing it to assign IP, DNS server, and default gateway addresses to all computers connected to the router's LAN. The assigned default gateway address is the LAN address of the router. The router assigns IP addresses to the attached computers from a pool of addresses specified in this screen. Each pool address is tested before it is assigned to avoid duplicate addresses on the LAN.

For most applications, the default DHCP and TCP/IP settings of the router are satisfactory. Click the link to the online document [“TCP/IP Networking Basics” in Appendix B](#) for an explanation of DHCP and information about how to assign IP addresses for your network.

Specify the pool of IP addresses to be assigned by setting the starting IP address and ending IP address. These addresses should be part of the same IP address subnet as the router's LAN IP address. Using the default addressing scheme, you should define a range between 192.168.1.2 and 192.168.1.254, although you might wish to save part of the range for devices with fixed addresses.

The router delivers the following parameters to any LAN device that requests DHCP:

- An IP Address from the range you have defined
- Subnet Mask
- Gateway IP Address (the router's LAN IP address)
- Primary DNS Server (if you entered a primary DNS address in the Basic Settings screen; otherwise, the router's LAN IP address)
- Secondary DNS Server (if you entered a secondary DNS address in the Basic Settings screen)

To use another device on your network as the DHCP server, or to manually configure the network settings of all of your computers, clear the **Use Router as DHCP Server** check box. Otherwise, leave it selected. If this service is not selected and no other DHCP server is available on your network, you will need to set your computers' IP addresses manually or they will not be able to access the router.

Using Address Reservation

When you specify a reserved IP address for a computer on the LAN, that computer always receives the same IP address each time it accesses the router's DHCP server. Reserved IP addresses should be assigned to computers or servers that require permanent IP settings.

To reserve an IP address:

1. Click **Add**.
2. In the **IP Address** field, type the IP address to assign to the computer or server. (Choose an IP address from the router's LAN subnet, such as **192.168.1.x**.)
3. Type the MAC address of the computer or server.



Tip: If the computer is already present on your network, you can copy its MAC address from the Attached Devices screen and paste it here.

4. Click **Apply** to enter the reserved address into the table.



Note: The reserved address is not assigned until the next time the computer contacts the router's DHCP server. Reboot the computer or access its IP configuration and force a DHCP release and renew.

To edit or delete a reserved address entry:

1. Select the radio button next to the reserved address you want to edit or delete.
2. Click **Edit** or **Delete**.

Using a Dynamic DNS Service

If your Internet Service Provider (ISP) gave you a permanently assigned IP address, you can register a domain name and have that name linked with your IP address by public Domain Name Servers (DNS). However, if your Internet account uses a dynamically assigned IP address, you do not know in advance what your IP address will be, and the address can change frequently. In this case, you can use a commercial Dynamic DNS service, which allows you to register your domain to their IP address, and forwards traffic directed at your domain to your frequently changing IP address.



Note: If your ISP assigns a private WAN IP address (such as 192.168.x.x or 10.x.x.x), the Dynamic DNS service will not work because private addresses are not routed on the Internet.

Your router contains a client that can connect to the Dynamic DNS service provided by DynDNS.org. You must first visit their website at www.dyndns.org and obtain an account and host name, which you configure in the router. Then, whenever your ISP-assigned IP address changes, your router automatically contacts the Dynamic DNS service provider, logs in to your account, and registers your new IP address. If your host name is hostname, for example, you can reach your router at hostname.dyndns.org.

From the main menu of the browser interface, under Advanced, select **Dynamic DNS** to display the Dynamic DNS screen.



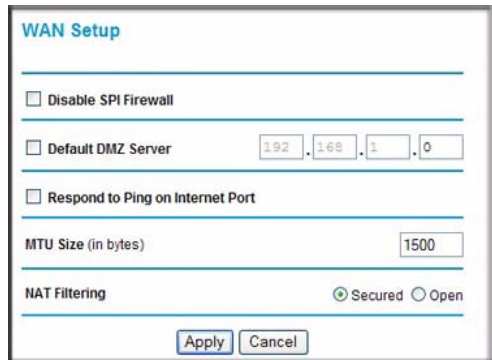
Figure 4-2

To configure Dynamic DNS:

1. Register for an account with one of the Dynamic DNS service providers whose names appear in the **Service Provider** list. For example, for DynDNS.org, select **www.dyndns.org**.
2. Select the **Use a Dynamic DNS Service** check box.
3. Select the name of your Dynamic DNS service provider.
4. Type the host name (or domain name) that your Dynamic DNS service provider gave you.
5. Type the user name for your Dynamic DNS account. This is the name that you use to log in to your account, not your host name.
6. Type the password (or key) for your Dynamic DNS account.
7. If your Dynamic DNS provider allows the use of wildcards in resolving your URL, you can select the **Use Wildcards** check box to activate this feature.
For example, the wildcard feature causes *.yourhost.dyndns.org to be aliased to the same IP address as yourhost.dyndns.org.
8. Click **Apply** to save your configuration.

Configuring the WAN Setup Options

The WAN Setup options let you configure a DMZ (demilitarized zone) server, change the Maximum Transmit Unit (MTU) size, and enable the wireless router to respond to a ping on the WAN (Internet) port. From the main menu of the browser interface, under Advanced, click **WAN Setup** to view the WAN Setup screen.



The screenshot shows the WAN Setup configuration interface. It includes the following elements:

- Disable SPI Firewall:** An unchecked checkbox.
- Default DMZ Server:** An unchecked checkbox followed by an IP address field containing "192.168.1.0".
- Respond to Ping on Internet Port:** An unchecked checkbox.
- MTU Size (in bytes):** A text input field containing the value "1500".
- NAT Filtering:** Two radio buttons, "Secured" (which is selected) and "Open".
- Buttons:** "Apply" and "Cancel" buttons at the bottom.

Figure 4-3

Disabling the SPI Firewall

The Stateful Packet Inspection (SPI) firewall protects your network and computers against attacks and intrusions. A stateful packet firewall carefully inspects incoming traffic packets, looking for known exploits such as malformed, oversized, or out-of-sequence packets. The firewall should be disabled only in special circumstances, such as when you are troubleshooting application issues.

Setting Up a Default DMZ Server

The default DMZ server feature is helpful when you are using some online games and videoconferencing applications that are incompatible with Network Address Translation (NAT). The router is programmed to recognize some of these applications and to work correctly with

them, but there are other applications that might not function well. In some cases, one local computer can run the application correctly if that computer's IP address is entered as the default DMZ server.



Warning: DMZ servers pose a security risk. A computer designated as the default DMZ server loses much of the protection of the firewall and is exposed to exploits from the Internet. If compromised, the DMZ server computer can be used to attack other computers on your network.

Incoming traffic from the Internet is usually discarded by the router unless the traffic is a response to one of your local computers or a service that you have configured in the Port Forwarding/Port Triggering screen. Instead of discarding this traffic, you can have it forwarded to one computer on your network. This computer is called the default DMZ server.

The WAN Setup screen lets you configure a default DMZ server.

To assign a computer or server to be a default DMZ server:

1. In the last **Default DMZ Server** field, type the last digit of the IP address for that computer. To remove the default DMZ server, enter 0 (zero).
2. Select the **Default DMZ Server** check box, and click **Apply**.

Responding to a Ping on the Internet (WAN) Port

If you want the router to respond to a ping from the Internet, select the **Respond to Ping on Internet Port** check box. This should be used only as a diagnostic tool, since it allows your router to be discovered by Internet scanners. Do not select this check box unless you have a specific reason to do so, such as when troubleshooting your connection.

Setting the MTU Size

The normal MTU value for most Ethernet networks is 1500 bytes, 1492 bytes for PPPoE connections, or 1450 for PPTP connections. For some ISPs, you might need to reduce the MTU, but this is rarely required and should not be done unless you are sure it is necessary for your ISP connection. For more information, see [“Changing the MTU” on page 5-20](#).

To change the MTU size:

1. In the **MTU Size** field, enter a new size between 64 and 1500.
2. Click **Apply** to save the new configuration.

Configuring NAT Filtering

Network Address Translation (NAT) determines how the router processes inbound traffic. Secured NAT provides a secured firewall to protect the computers on the LAN from attacks from the Internet, but might prevent some Internet games, point-to-point applications, or multimedia applications from functioning. Open NAT provides a much less secured firewall, but allows almost all Internet applications to function. For more information about NAT, see [“How Your Computer Communicates with a Remote Computer through Your Router”](#) on page 5-2.

To change the NAT option:

1. In the NAT Filtering area, select either the **Secured** or the **Open** radio button.
2. Click **Apply** to save the new configuration.

Configuring Static Routes

Static routes provide additional routing information to your router. Under usual circumstances, the router has adequate routing information after it has been configured for Internet access, and you do not need to configure additional static routes. You must configure static routes only for unusual cases such as multiple routers or multiple IP subnets located on your network.

As an example of when a static route is needed, consider the following case:

- Your primary Internet access is through a cable modem to an ISP.
- You have an ISDN router on your home network for connecting to the company where you are employed. This router’s address on your LAN is 192.168.1.100.
- Your company’s network address is 134.177.0.0.

When you first configured your router, two implicit static routes were created. A default route was created with your ISP as the gateway, and a second static route was created to your local network for all 192.168.1.x addresses. With this configuration, if you attempt to access a device on the 134.177.0.0 network, your router forwards your request to the ISP. The ISP forwards your request to the company where you are employed, and the request is likely to be denied by the company’s firewall.

In this case you must define a static route, telling your router that 134.177.0.0 should be accessed through the ISDN router at 192.168.1.100.

In this example:

- The **Destination IP Address** and **IP Subnet Mask** fields specify that this static route applies to all 134.177.x.x addresses.

- The **Gateway IP Address** field specifies that all traffic for these addresses should be forwarded to the ISDN router at 192.168.1.100.
- A **Metric** value of 1 will work since the ISDN router is on the LAN.
- **Private** is selected only as a precautionary security measure in case RIP is activated.

Select **Static Routes** under Advanced in the main menu. The Static Routes screen displays.



Figure 4-4

To add or edit a static route:

1. Click **Add** to open the Static Routes screen.

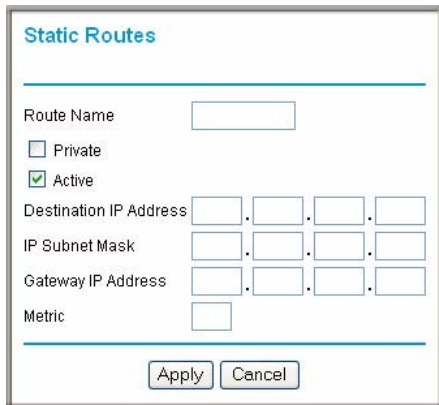


Figure 4-5

2. In the **Route Name** field, type a name for this static route. (This is for identification purposes only.)
3. Select the **Private** check box if you want to limit access to the LAN only. If Private is selected, the static route is not reported in RIP.
4. Select the **Active** check box to make this route effective.

5. Type the destination IP address of the final destination.
6. Type the IP subnet mask for this destination.
If the destination is a single host, type 255.255.255.255.
7. Type the gateway IP address, which must be a router on the same LAN segment as the WNDR3300 router.
8. Type a number between 1 and 15 as the metric value.
This represents the number of routers between your network and the destination. Usually, a setting of 2 or 3 works, but if this is a direct connection, set it to 1.
9. Click **Apply** to have the static route entered into the table.

Chapter 5

Fine-Tuning Your Network

This chapter describes how to modify the configuration of the RangeMax Dual Band Wireless-N Router WNDR3300 to allow specific applications to access the Internet or to be accessed from the Internet, and how to make adjustments to enhance your network's performance.

This chapter includes the following sections:

- [“Allowing Inbound Connections To Your Network”](#)
- [“Configuring Port Forwarding to Local Servers”](#) on page 5-6
- [“Configuring Port Triggering”](#) on page 5-9
- [“Using Universal Plug and Play”](#) on page 5-12
- [“Optimizing Wireless Performance”](#) on page 5-13
- [“Changing the MTU”](#) on page 5-20
- [“Optimizing Your Network Bandwidth”](#) on page 5-21
- [“Overview of Home and Small Office Networking Technologies”](#) on page 5-23

Allowing Inbound Connections To Your Network

By default, the WNDR3300 router blocks any inbound traffic from the Internet to your computers except for replies to your outbound traffic. However, you might need to create exceptions to this rule for the following purposes:

- To allow remote computers on the Internet to access a server on your local network.
- To allow certain applications and games to work correctly when their replies are not recognized by your router.

Your router provides two features for creating these exceptions: port forwarding and port triggering. This section explains how a normal outbound connection works, followed by two examples explaining how port forwarding and port triggering operate and how they differ.

How Your Computer Communicates with a Remote Computer through Your Router

When a computer on your network needs to access a computer on the Internet, your computer sends your router a message containing source and destination address and process information. Before forwarding your message to the remote computer, your router must modify the source information and must create and track the communication session so that replies can be routed back to your computer.

Here is an example of normal outbound traffic and the resulting inbound responses:

1. You open Internet Explorer, beginning a browser session on your computer. Invisible to you, your operating system assigns a service number (port number) to every communication process running on your computer. In this example, let's say Windows assigns port number 5678 to this browser session.
2. You ask your browser to get a Web page from the Web server at www.example.com. Your computer composes a Web page request message with the following address and port information:
 - The source address is your computer's IP address.
 - The source port number is 5678, the browser session.
 - The destination address is the IP address of www.example.com, which your computer finds by asking a DNS server.
 - The destination port number is 80, the standard port number for a Web server process.

Your computer then sends this request message to your router.

3. Your router creates an entry in its internal session table describing this communication session between your computer and the Web server at www.example.com. Before sending the Web page request message to www.example.com, your router stores the original information and then modifies the source information in the request message, performing Network Address Translation (NAT):
 - The source address is replaced with your router's public IP address. This is necessary because your computer uses a private IP address that is not globally unique and cannot be used on the Internet.
 - The source port number is changed to a number chosen by the router, such as 33333. This is necessary because two computers could independently be using the same session number.

Your router then sends this request message through the Internet to the Web server at www.example.com.

4. The Web server at `www.example.com` composes a return message with the requested Web page data. The return message contains the following address and port information:
 - The source address is the IP address of `www.example.com`.
 - The source port number is 80, the standard port number for a Web server process.
 - The destination address is the public IP address of your router.
 - The destination port number is 33333.

The Web server then sends this reply message to your router.

5. Upon receiving the incoming message, your router checks its session table to determine whether there is an active session for port number 33333. Finding an active session, the router then modifies the message, restoring the original address information replaced by NAT. The message now contains the following address and port information:
 - The source address is the IP address of `www.example.com`.
 - The source port number is 80, the standard port number for a Web server process.
 - The destination address is your computer's IP address.
 - The destination port number is 5678, the browser session that made the initial request.

Your router then sends this reply message to your computer, which displays the Web page from `www.example.com`.

6. When you finish your browser session, your router eventually senses a period of inactivity in the communications. Your router then removes the session information from its session table, and incoming traffic is no longer accepted on port number 33333.

How Port Triggering Changes the Communication Process

In the preceding example, requests are sent to a remote computer by your router from a particular service port number, and replies from the remote computer to your router are directed to that port number. If the remote server sends a reply back to a different port number, your router does not recognize it and discards it. However, some application servers (such as FTP and IRC servers) send replies back to multiple port numbers. Using the port triggering function of your router, you can tell the router to open additional incoming ports when a particular outgoing port originates a session.

An example is Internet Relay Chat (IRC). Your computer connects to an IRC server at destination port 6667. The IRC server not only responds to your originating source port, but also sends an “identify” message to your computer on port 113. Using port triggering, you can tell the router,

“When you initiate a session with destination port 6667, you must also allow incoming traffic on port 113 to reach the originating computer.” Using steps similar to the preceding example, the following sequence shows the effects of the port triggering rule that you have defined:

1. You open an IRC client program, beginning a chat session on your computer.
2. Your IRC client composes a request message to an IRC server using a destination port number of 6667, the standard port number for an IRC server process. Your computer then sends this request message to your router.
3. Your router creates an entry in its internal session table describing this communication session between your computer and the IRC server. Your router stores the original information, performs Network Address Translation (NAT) on the source address and port, and sends this request message through the Internet to the IRC server.
4. Noting your port triggering rule, and having observed the destination port number of 6667, your router creates an additional session entry to send any incoming port 113 traffic to your computer.
5. The IRC server sends a return message to your router using the NAT-assigned source port (as in the previous example, let’s say port 33333) as the destination port. The IRC server also sends an “identify” message to your router with destination port 113.
6. Upon receiving the incoming message to destination port 33333, your router checks its session table to determine whether there is an active session for port number 33333. Finding an active session, the router restores the original address information replaced by NAT and sends this reply message to your computer.
7. Upon receiving the incoming message to destination port 113, your router checks its session table and learns that there is an active session for port 113, associated with your computer. The router replaces the message’s destination IP address with your computer’s IP address and forwards the message to your computer.
8. When you finish your chat session, your router eventually senses a period of inactivity in the communications. The router then removes the session information from its session table, and incoming traffic is no longer accepted on port numbers 33333 or 113.

To configure port triggering, you need to know which inbound ports the application needs. Also, you need to know the number of the outbound port that will trigger the opening of the inbound ports. You can usually determine this information by contacting the publisher of the application or user groups or newsgroups.



Note: Only one computer at a time can use the triggered application.

How Port Forwarding Changes the Communication Process

In both of the preceding examples, your computer initiates an application session with a server computer on the Internet. However, you might need to allow a client computer on the Internet to initiate a connection to a server computer on your network. Usually, your router ignores any inbound traffic that is not a response to your own outbound traffic. You can configure exceptions to this default rule by using the port forwarding feature.

A typical application of port forwarding can be shown by reversing the client-server relationship from our previous Web server example. In this case, a remote computer's browser needs to access a Web server running on a computer in your local network. Using port forwarding, you can tell the router, "When you receive incoming traffic on port 80 (the standard port number for a Web server process), forward it to the local computer at 192.168.1.123." The following sequence shows the effects of the port forwarding rule that you have defined:

1. The user of a remote computer opens Internet Explorer and requests a Web page from www.example.com, which resolves to the public IP address of your router. The remote computer composes a Web page request message with the following destination information:
 - The destination address is the IP address of www.example.com, which is the address of your router.
 - The destination port number is 80, the standard port number for a Web server process.

The remote computer then sends this request message through the Internet to your router.

2. Your router receives the request message and looks in its rules table for any rules covering the disposition of incoming port 80 traffic. Your port forwarding rule specifies that incoming port 80 traffic should be forwarded to local IP address 192.168.1.123. Therefore, your router modifies the destination information in the request message:

The destination address is replaced with 192.168.1.123.

Your router then sends this request message to your local network.

3. Your Web server at 192.168.1.123 receives the request and composes a return message with the requested Web page data. Your Web server then sends this reply message to your router.
4. Your router performs Network Address Translation (NAT) on the source IP address, and sends this request message through the Internet to the remote computer, which displays the Web page from www.example.com.

To configure port forwarding, you need to know which inbound ports the application needs. You can usually determine this information by contacting the publisher of the application or user groups or newsgroups.

How Port Forwarding Differs from Port Triggering

The following points summarize the differences between port forwarding and port triggering:

- Port triggering can be used by any computer on your network, although only one computer can use it at a time.
- Port forwarding is configured for a single computer on your network.
- Port triggering does not need to know the computer's IP address in advance. The IP address is captured automatically.
- Port forwarding requires that you specify the computer's IP address during configuration, and the IP address must never change.
- Port triggering requires specific outbound traffic to open the inbound ports, and the triggered ports are closed after a period of no activity.
- Port forwarding is always active and does not need to be triggered.

Configuring Port Forwarding to Local Servers

Using the port forwarding feature, you can allow certain types of incoming traffic to reach servers on your local network. For example, you might make a local Web server, FTP server, or game server visible and available to the Internet.

Use the Port Forwarding screen to configure the router to forward specific incoming protocols to computers on your local network. In addition to servers for specific applications, you can also specify a default DMZ server to which all other incoming protocols are forwarded. The DMZ server is configured in the WAN Setup screen, as discussed in [“Setting Up a Default DMZ Server” on page 4-7](#).

Before starting, you need to determine which type of service, application, or game you will provide, and the local IP address of the computer that will provide the service. Be sure that the computer's IP address never changes.



Tip: To ensure that your server computer always has the same IP address, use the reserved IP address feature of your WNDR3300 router. See [“Using Address Reservation” on page 4-4](#) for instructions on how to use reserved IP addresses.

To configure port forwarding to a local server:

1. Select **Port Forwarding/Port Triggering** under Advanced in the main menu. The Forwarding/Port Triggering screen displays.

#	Service Name	Start Port	End Port	Server IP Address
---	--------------	------------	----------	-------------------

Figure 5-1

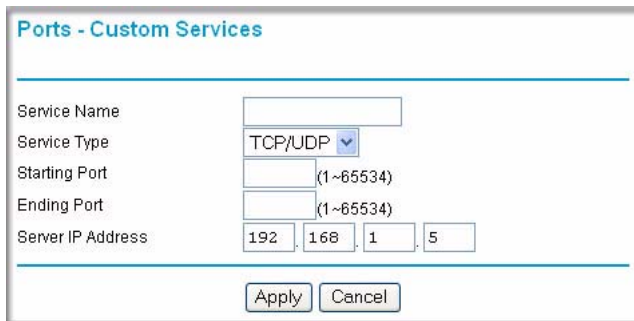
2. From the **Service Name** list, select the service or game that you will host on your network. If the service does not appear in the list, see the following section, [“Adding a Custom Service.”](#)
3. In the corresponding **Server IP Address** field, enter the last digit of the IP address of your local computer that will provide this service.
4. Click **Add**. The service appears in the list in the screen.

Adding a Custom Service

To define a service, game, or application that does not appear in the Service Name list, you must first determine which port number or range of numbers is used by the application. You can usually determine this information by contacting the publisher of the application or user groups or newsgroups. When you have the port number information, follow these steps:

1. Select **Port Forwarding/Port Triggering** under Advanced in the main menu. The Forwarding/Port Triggering screen displays.

2. Click **Add Custom Service**. The Ports - Custom Services screen displays.



The screenshot shows a web-based configuration interface titled "Ports - Custom Services". It contains the following fields and controls:

- Service Name:** A text input field.
- Service Type:** A dropdown menu currently set to "TCP/UDP".
- Starting Port:** A text input field with a range indicator "(1~65534)".
- Ending Port:** A text input field with a range indicator "(1~65534)".
- Server IP Address:** Four separate input fields containing the values "192", "168", "1", and "5".
- Buttons:** "Apply" and "Cancel" buttons at the bottom.

Figure 5-2

3. In the **Service Name** field, type a descriptive name.
4. In the **Service Type** list, select the protocol. If you are unsure, select **TCP/UDP**.
5. In the **Starting Port** field, type the beginning port number.
 - If the application uses only a single port, type the same port number in the **Ending Port** field.
 - If the application uses a range of ports, type the ending port number of the range in the **Ending Port** field.
6. In the **Server IP Address** field, type the IP address of your local computer that will provide this service.
7. Click **Apply**. The service appears in the list in the Port Forwarding/Port Triggering screen.

Editing or Deleting a Port Forwarding Entry

To edit or delete a port forwarding entry:

1. In the table, select the radio button next to the service name.
2. Click **Edit Service** or **Delete Service**.

Application Example: Making a Local Web Server Public

If you host a Web server on your local network, you can use port forwarding to allow Web requests from anyone on the Internet to reach your Web server.

To make a local Web server public:

1. Assign your Web server either a fixed IP address or a dynamic IP address using DHCP address reservation, as explained in [“Using Address Reservation” on page 4-4](#). In this example, your router always gives your Web server an IP address of 192.168.1.33.
2. Configure the Port Forwarding screen to forward the HTTP service to the local address of your Web server at **192.168.1.33**.
HTTP (port 80) is the standard protocol for Web servers.
3. (Optional) Register a host name with a Dynamic DNS service, and configure your router to use the name as described in [“Using a Dynamic DNS Service” on page 4-5](#).
To access your Web server from the Internet, a remote user must know the IP address that has been assigned by your ISP. However, if you use a Dynamic DNS service, the remote user can reach your server by a user-friendly Internet name, such as mynetgear.dyndns.org.

Configuring Port Triggering

Port triggering is a dynamic extension of port forwarding that is useful in these cases:

- More than one local computer needs port forwarding for the same application (but not simultaneously).
- An application needs to open incoming ports that are different from the outgoing port.

When port triggering is enabled, the router monitors outbound traffic looking for a specified outbound “trigger” port. When the router detects outbound traffic on that port, it remembers the IP address of the local computer that sent the data. The router then temporarily opens the specified incoming port or ports, and forwards incoming traffic on the triggered ports to the triggering computer.

While port forwarding creates a static mapping of a port number or range to a single local computer, port triggering can dynamically open ports to any computer that needs them and can close the ports when they are no longer needed.



Note: If you use applications such as multiplayer gaming, peer-to-peer connections, real-time communications such as instant messaging, or remote assistance (a feature in Windows XP), you should also enable Universal Plug and Play (UPnP) according to the instructions in [“Using Universal Plug and Play” on page 5-12](#).

To configure port triggering, you need to know which inbound ports the application needs. Also, you need to know the outbound port number that will trigger the opening of the inbound ports. You can usually determine this information by contacting the publisher of the application or user groups or newsgroups.

To set up port triggering:

1. Select **Port Forwarding/Port Triggering** under Advanced in the main menu. The Forwarding/Port Triggering screen displays.
2. Select the **Port Triggering** radio button. The port triggering information displays.

Port Forwarding / Port Triggering

Please select the service type

Port Forwarding

Port Triggering

Disable Port Triggering

Port Triggering Timeout (in minutes)

Port Triggering Portmap Table

	#	Enable	Service Name	Service Type	Inbound Connection	Service User
<input type="radio"/>	1	<input checked="" type="checkbox"/>	dialpad_1	TCP:51200	TCP/UDP:51200	ANY
<input type="radio"/>	2	<input checked="" type="checkbox"/>	dialpad_2	TCP:51201	TCP/UDP:51201	ANY
<input type="radio"/>	3	<input checked="" type="checkbox"/>	paltalk_1	TCP:2090	TCP/UDP:2090	ANY
<input type="radio"/>	4	<input checked="" type="checkbox"/>	paltalk_2	TCP:2091	TCP/UDP:2091	ANY
<input type="radio"/>	5	<input checked="" type="checkbox"/>	quicktime	TCP:554	TCP/UDP:6970..6990	ANY
<input type="radio"/>	6	<input checked="" type="checkbox"/>	starcraft	TCP:6112	TCP/UDP:6112	ANY

Figure 5-3

3. Clear the **Disable Port Triggering** check box.



Note: If the Disable Port Triggering check box is selected after you configure port triggering, port triggering is disabled. However, any port triggering configuration information you added to the router is retained even though it is not used.

- In the **Port Triggering Timeout** field, enter a value up to 9999 minutes. This value controls the inactivity timer for the designated inbound ports. The inbound ports close when the inactivity timer expires. This is required because the router cannot be sure when the application has terminated.
- Click **Add Service**.

Port Triggering - Services

Service

Service Name

Service User

. . .

Service Type

Triggering Port

Required Inbound Connection

Connection Type

Starting Port

Ending Port

Figure 5-4

- In the **Service Name** field, type a descriptive service name.
- In the **Service User** list, select **Any** (the default) to allow this service to be used by any computer on the Internet. Otherwise, select **Single address**, and enter the IP address of one computer to restrict the service to a particular computer.
- Select the service type, either **TCP** or **UDP** or both (**TCP/UDP**). If you are not sure, select **TCP/UDP**.
- In the **Triggering Port** field, enter the number of the outbound traffic port that will cause the inbound ports to be opened.
- Enter the inbound connection port information in the **Connection Type**, **Starting Port**, and **Ending Port** fields.
- Click **Apply**. The service appears in the Port Triggering Portmap table.

Using Universal Plug and Play

Universal Plug and Play (UPnP) helps devices, such as Internet appliances and computers, to access the network and connect to other devices as needed. UPnP devices can automatically discover the services from other registered UPnP devices on the network.



Note: If you use applications such as multiplayer gaming, peer-to-peer connections, real-time communications such as instant messaging, or remote assistance (a feature in Windows XP), you should enable UPnP.

To turn on Universal Plug and Play:

1. From the main menu of the browser interface, under Advanced, click **UPnP**. The UPnP screen displays.

Active	Protocol	Int. Port	Ext. Port	IP Address
Yes	TCP	9198	11913	192.168.0.2
Yes	UDP	5339	7102	192.168.0.2

Figure 5-5

2. The available settings and information in this screen are:
 - **Turn UPnP On.** UPnP can be enabled or disabled for automatic device configuration. The default setting for UPnP is disabled. If this check box is not selected, the router does not allow any device to automatically control the resources, such as port forwarding (mapping) of the router.

- **Advertisement Period.** The advertisement period is how often the router broadcasts its UPnP information. This value can range from 1 to 1440 minutes. The default period is 30 minutes. Shorter durations ensure that control points have current device status at the expense of additional network traffic. Longer durations might compromise the freshness of the device status but can significantly reduce network traffic.
- **Advertisement Time To Live.** The time to live for the advertisement is measured in hops (steps) for each UPnP packet sent. The time to live hop count is the number of steps a broadcast packet is allowed to propagate for each UPnP advertisement before it disappears. The number of hops can range from 1 to 255. The default value for the advertisement time to live is 4 hops, which should be fine for most home networks. If you notice that some devices are not being updated or reached correctly, then it might be necessary to increase this value.
- **UPnP Portmap Table.** The UPnP Portmap Table displays the IP address of each UPnP device that is currently accessing the router and which ports (Internal and External) that device has opened. The UPnP Portmap Table also displays what type of port is open and whether that port is still active for each IP address.

3. Click **Apply** to save your settings.

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 wireless devices 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.

Configuring Quality of Service

Quality of Service (QoS) is an advanced feature that can be used to prioritize some types of traffic ahead of others. The WNDR3300 router can provide QoS prioritization over the wireless link and on the Internet connection. To configure QoS, use the QoS Setup screen.

From the main menu of the browser interface, under Advanced, select **QoS Setup**. The QoS Setup screen displays:

#	QoS Policy	Priority	Description
1	MSN Messenger	High	MSN Messenger application
2	Skype	Highest	Skype application
3	Yahoo Messenger	High	Yahoo Messenger application
4	IP Phone	Highest	IP Phone application
5	Vonage IP Phone	Highest	Vonage IP Phone application
6	NetMeeting	High	NetMeeting application
7	AIM	High	AIM application
8	Google Talk	Highest	Google Talk application
9	Counter Strike	High	On-line gaming Counter Strike
10	Ages of Empires	High	On-line gaming Age of Empires
11	Diablo II	High	On-line gaming Diablo II
12	Everquest	High	On-line gaming Everquest
13	Half Life	High	On-line gaming Half Life
14	Quake 2	High	On-line gaming Quake 2
15	Quake 3	High	On-line gaming Quake 3
16	Unreal Tourment	High	On-line gaming Unreal Tourment
17	Warcraft	High	On-line gaming Warcraft
18	Return to Castle Wolfenstein	High	On-line gaming Return to Castle Wolfenstein

Figure 5-6

Using WMM QoS for Wireless Multimedia Applications

The WNDR3300 router supports Wi-Fi Multimedia Quality of Service (WMM QoS) to prioritize wireless voice and video traffic over the wireless link. WMM QoS provides prioritization of wireless data packets from different applications based on four access categories: voice, video, best effort, and background. For an application to receive the benefits of WMM QoS, both it and the client running that application must be WMM enabled. Legacy applications that do not support WMM, and applications that do not require QoS, are assigned to the best effort category, which receives a lower priority than voice and video.

WMM QoS is enabled by default. You can disable it in the QoS Setup screen, shown in [Figure 5-6 on page 5-15](#), by clearing the **Enable WMM** check box and clicking **Apply**.

Configuring QoS for Internet Access

You can give prioritized Internet access to the following types of traffic:

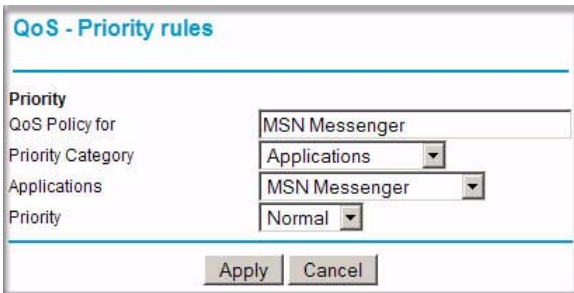
- For specific applications
- For specific online games
- On individual Ethernet LAN ports of the router
- From a specific device by MAC address

To specify prioritization of traffic, you must create a policy for the type of traffic and add the policy to the QoS Policy table in the QoS Setup screen. For convenience, the QoS Policy table lists many common applications and online games that can benefit from QoS handling.

QoS for Applications and Online Gaming

To create a QoS policy for applications and online games:

1. From the main menu, under Advanced, select **QoS Setup**. The QoS Setup screen displays, as shown in [Figure 5-6 on page 5-15](#).
2. Click **Add Priority Rule**. The QoS - Priority Rules screen displays.



The screenshot shows the 'QoS - Priority rules' configuration window. It contains four main fields: 'QoS Policy for' (text input containing 'MSN Messenger'), 'Priority Category' (dropdown menu with 'Applications' selected), 'Applications' (dropdown menu with 'MSN Messenger' selected), and 'Priority' (dropdown menu with 'Normal' selected). At the bottom of the window are two buttons: 'Apply' and 'Cancel'.

Figure 5-7

3. In the **Priority Category** list, select either **Applications** or **Online Gaming**. In either case, a list of predefined applications or games displays in the **Applications** drop-down list.
4. From the **Applications** list, you can select an existing item, or you can scroll to the bottom of the list and select **Add a New Application** or **Add a New Game**.

- a. If you select to add a new entry, the screen expands as shown:

QoS - Priority rules

Priority

QoS Policy for

Priority Category

Applications

Priority

Specified port range

Connection Type

Starting Port (1-65535)

Ending Port (1-65535)

Figure 5-8

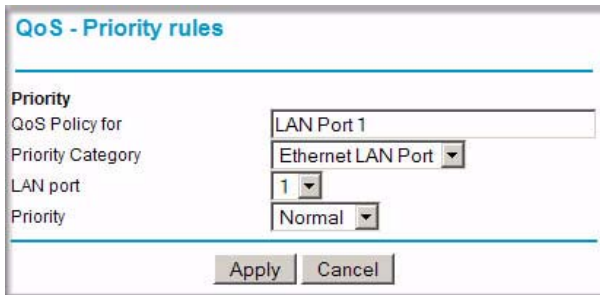
- b. In the **QoS Policy for** field, enter a descriptive name for the new application or game.
- c. Select the packet type, either **TCP**, **UDP**, or both (**TCP/UDP**), and specify the port number or range of port numbers used by the application or game.
5. From the **Priority** drop-down list, select the priority that this traffic should receive relative to other applications and traffic when accessing the Internet. The options are Low, Normal, High, and Highest.
6. Click **Apply** to save this rule to the QoS Policy list and return to the QoS Setup screen.
7. In the QoS Setup screen, select the **Turn Internet Access QoS On** check box.
8. Click **Apply**.

QoS for a Router LAN Port

To create a QoS policy for a device connected to one of the router's LAN ports:

1. From the main menu, under Advanced, select **QoS Setup**. The QoS Setup screen displays, as shown in [Figure 5-6 on page 5-15](#).
2. Click **Add Priority Rule**.

- From the **Priority Category** list, select **Ethernet LAN Port**. The QoS - Priority Rules screen changes:



QoS - Priority rules

Priority
QoS Policy for: LAN Port 1
Priority Category: Ethernet LAN Port
LAN port: 1
Priority: Normal

Apply Cancel

Figure 5-9

- From the **LAN port** list, select the LAN port that will have a QoS policy.
- From the **Priority** drop-down list, select the priority that this port's traffic should receive relative to other applications and traffic when accessing the Internet. The options are Low, Normal, High, and Highest.
- Click **Apply** to save this rule to the QoS Policy list and return to the QoS Setup screen.
- In the QoS Setup screen, select the **Turn Internet Access QoS On** check box.
- Click **Apply**.

QoS for a MAC Address

To create a QoS policy for traffic from a specific MAC address, follow these steps:

- From the main menu, under Advanced, select **QoS Setup**. The QoS Setup screen displays, as shown in [Figure 5-6 on page 5-15](#).
- Click **Add Priority Rule**.

- From the **Priority Category** list, select **MAC Address**. The QoS - Priority Rules screen changes:

QoS - Priority rules

Priority
QoS Policy for

Priority Category

MAC Device List

	QoS Policy	Priority	Device Name	MAC Address
<input type="radio"/>	Pri_MAC_59F408	Normal	DELL	00:0D:56:59:F4:08

MAC Address

Device Name

Priority

Figure 5-10

- If the device to be prioritized appears in the MAC Device List, select it. The information from the MAC Device List will be used to populate the policy name, MAC Address, and Device Name fields. If the device does not appear in the MAC Device List, click **Refresh**. If it still does not appear, you must complete these fields manually.
- From the **Priority** drop-down list, select the priority that this device's traffic should receive relative to other applications and traffic when accessing the Internet. The options are Low, Normal, High, and Highest.
- Click **Apply** to save this rule to the QoS Policy list and return to the QoS Setup screen.
- In the QoS Setup screen, select the **Turn Internet Access QoS On** check box.
- Click **Apply**.

Editing or Deleting an Existing QoS Policy

To edit or delete an existing QoS policy:

- From the main menu, under Advanced, select **QoS Setup**. The QoS Setup screen displays, as shown in [Figure 5-6 on page 5-15](#).
- Select the radio button next to the QoS policy to be edited or deleted, and do one of the following:

- Click **Delete** to remove the QoS policy.
 - Click **Edit** to edit the QoS policy. Follow the instructions in the preceding sections to change the policy settings.
3. Click **Apply** in the QoS Setup screen to save your changes.

Changing the MTU

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 the technical support of either the ISP or NETGEAR recommends changing the MTU setting. These might require an MTU change:
 - A secure Web site that won’t 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 to 1400. If you are willing to experiment, you can gradually reduce the MTU 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 ping. (Larger packets are fragmented.)
1468	Used in some DHCP environments.
1460	Usable by AOL if you don't 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.

Optimizing Your Network Bandwidth

As your network grows, it might consist of several segments of different networking technologies, each providing different throughput. In planning your network, you should first consider which devices 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

Next, consider the throughput of your network devices. Where possible, make the heaviest-traffic connections using higher-speed technologies, with no lower-speed bottlenecks in the path.

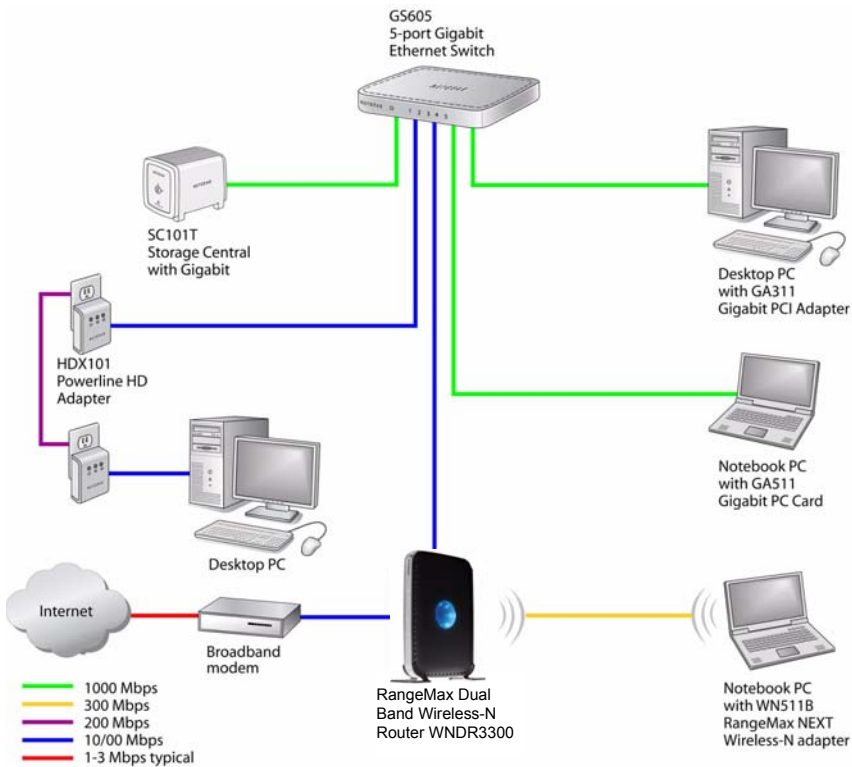


Figure 5-11

Figure 5-11 shows a sample network using multiple networking technologies. In this network, the two PCs with Gigabit (1000 Mbps) Ethernet adapters have a gigabit connection through the GS605 switch to the storage server. This connection should allow 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.

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 RangeMax Dual Band Wireless-N Router WNDR3300 provides 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 RangeMax NEXT adapters such as the WN511B for your computers. Although the RangeMax NEXT 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 (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 RangeMax Dual Band Wireless-N Router WNDR3300. You can access these features by selecting the items under Maintenance in the main menu of the browser interface.

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” on page 6-7](#)
- [“Erasing the Configuration” on page 6-9](#)
- [“Upgrading the Router Software” on page 6-9](#)
- [“Enabling Remote Management Access” on page 6-13](#)

Viewing Wireless Router Status Information

To view router status and usage information:

1. From the main menu of the browser interface, under Maintenance, select **Router Status**. The Router Status screen displays.

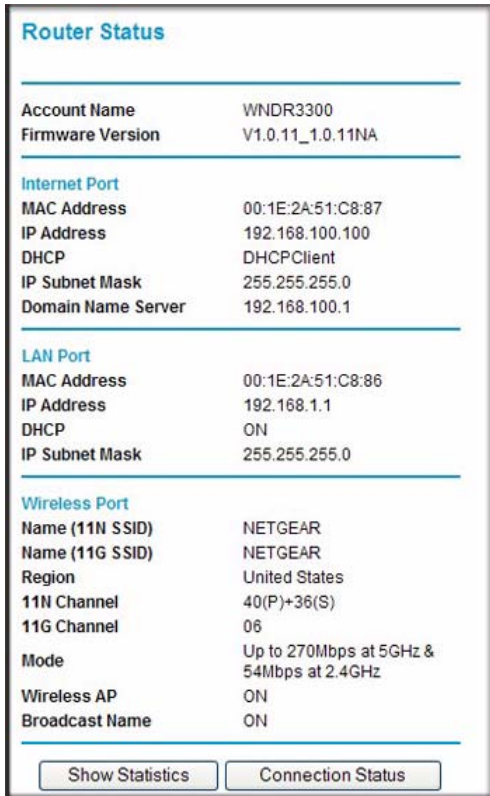


Figure 6-1

Table 6-1 describes the router status fields.

Table 6-1. Wireless Router Status Fields

Field	Description
Account Name	The host name assigned to the router.
Firmware Version	The version of the current software installed in the router. This will change if you upgrade your router.
Internet Port	These settings apply to the Internet (WAN) port of the router:

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

Field		Description
	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		These 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 Ethernet (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	These settings apply to the wireless port of the router:
Name (11N SSID)	The 11N wireless network name (SSID) being used by the wireless port of the router. The default is NETGEAR-DualBand-N.
Name (11G SSID)	The 11G wireless network name (SSID) being used by the wireless port of the router. The default is NETGEAR-2.4-G.
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.
11N Channel	Identifies the 11N 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. In Up to 270Mbps at 5GHz & 54Mbps at 2.4GHz mode, there are two channels: a primary channel (P) and a secondary channel (S).
11G Channel	Identifies the 11G 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. In Up to 270Mbps at 2.4GHz mode and Up to 130Mbps at 2.4GHz mode, the 11G channel is not active.
Mode	Indicates the wireless communication mode: <ul style="list-style-type: none"> • Up to 270Mbps at 2.4GHz • Up to 270Mbps at 5GHz & 54Mbps at 2.4GHz (default) • Up to 130Mbps at 2.4GHz • Up to 130Mbps at 5GHz & 54Mbps at 2.4GHz
Wireless AP	Indicates whether the radio feature of the router is enabled. If this feature is not enabled, the Wireless light on the front panel is off.
Broadcast Name	Indicates whether the router is broadcasting its SSID.

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

The screenshot shows a window titled "Connection Status" with a table of network parameters and three buttons at the bottom.

Connection Status	
IP Address	192.168.100.100
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, 23 hrs, 4 minutes

Buttons: Release, Renew, Close Window

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.

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

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

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

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

Port	Status	TxPkts	RxPkts	Collisions	Tx B/s	Rx B/s	Up Time
WAN	100M/Full	62229	57509	0	432	666	17:52:30
LAN1	Link Down						--
LAN2	Link Down						--
LAN3	Link Down	85910	71681	0	535	445	--
LAN4	100M/Full						17:52:34
WLAN (11N)	270M	11270	5737	0	154	15	17:52:38
WLAN (11G)	11M/54M	49611	3288	0	100	6	17:52:38

Poll Interval : (secs)

Figure 6-3

Table 6-3 describes the router statistics.

Table 6-3. Router Statistics

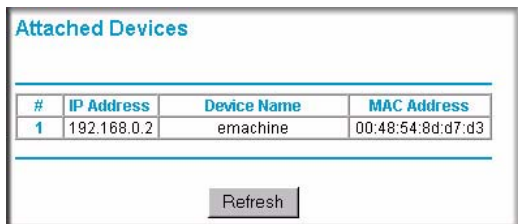
Item	Description
System Up Time	The time elapsed since the router was last restarted.
Port	The statistics for the WAN (Internet) and LAN (Ethernet) ports. For each port, the screen displays:
Status	The link status of the port.
TxPkts	The number of packets transmitted on this port since reset or manual 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 table contains a table of all IP devices that the router has discovered on the local network. From the main menu of the browser interface, under **Maintenance**, select **Attached Devices** to view the table.



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

Refresh

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 WNDR3300 router are stored within the router in a configuration file. You can back up (save) this file to your computer, restore it, or reset it to the factory default settings.

From the main menu of the browser interface, under Maintenance, select **Backup Settings**.

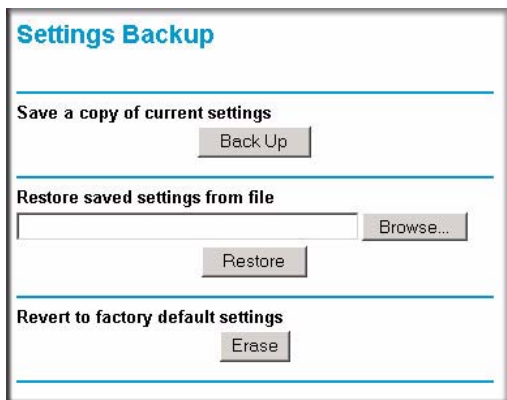


Figure 6-5

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 **Back Up**. 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 user name 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 7-13).

Upgrading the Router Software

The routing software (also called firmware) of the WNDR3300 router is stored in flash memory, and can be upgraded as NETGEAR releases new software. Your router can download and install the new software, or you can download upgrade files from the NETGEAR website and manually send the upgrade file to the router using your browser.



Tip: To ensure that you are always using the latest router firmware, enable the Firmware Upgrade Assistant feature so that the router will automatically detect a new version of the firmware on the Internet and alert you to its availability.

The Checking for Firmware Updates screen appears at login unless you clear the **Check for Updated Firmware Upon Log-in** check box.



Figure 6-6

A screen is also provided for upgrading the router. From the main menu of the browser interface, under Maintenance, select **Router Upgrade** to display the Router Upgrade screen.

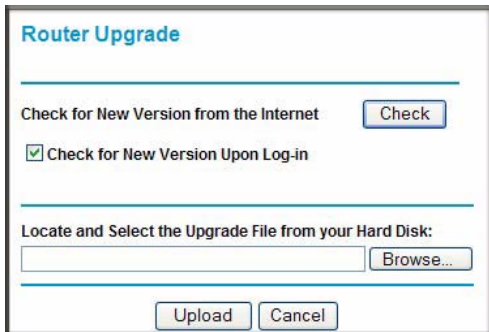


Figure 6-7

From this screen, you can check for new software versions by clicking the **Check** button. If a new version is found, you can download and install it in one step. To enable the Smart Wizard to automatically check for a new software version upon login, select the **Check for New Version Upon Log-in** check box .

Alternatively, you can manually install an upgrade file stored on your computer.



Tip: Before upgrading the router software, use the router Settings Backup screen to save your configuration settings. A router upgrade might cause the router settings to revert to the factory defaults. If this happens, after completing the upgrade, you can restore your settings from the backup.

Upgrading Automatically to New Router Software

If you have selected **Check for New Version Upon Log-in**, your router alerts you to the new software when you log in. Otherwise, you can click the **Check** button in the Router Upgrade screen to search for new software.

If the router discovers a newer version of software, the message on the left displays when you log in. If no new firmware is available, the message on the right displays.

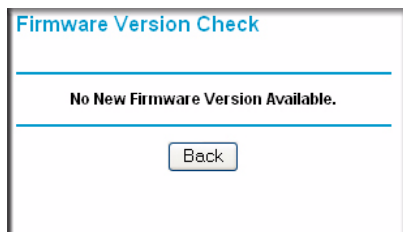
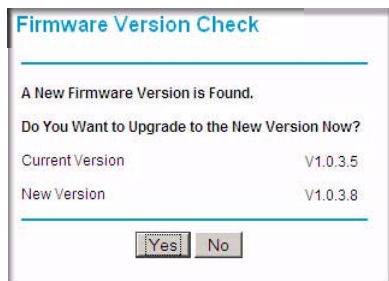


Figure 6-8

To automatically upgrade to the new software, click **Yes** to allow the router to download and install the new software file from NETGEAR.



Warning: When uploading software to the WNDR3300 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 software.

When the upload is complete, your router automatically restarts. The upgrade process typically takes about one minute. Read the new software release notes to determine whether you must reconfigure the router after upgrading.

Upgrading Manually to New Router Software

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

1. Under Maintenance on the main menu, select **Router Status**. Note the version number of your router firmware.
2. Go to the WNDR3300 support page on the NETGEAR website at <http://www.netgear.com/support>.
3. Check the most recent firmware version offered against the firmware version shown in the Router Status screen.
4. If the version on the NETGEAR website is more recent, download the file to your computer.
5. Under Maintenance on the main menu, select **Router Upgrade**.
6. Click **Browse**, and locate the firmware image that you downloaded to your PC (the file ends in .img or .chk).
7. Click **Upload** to send the firmware to the router.

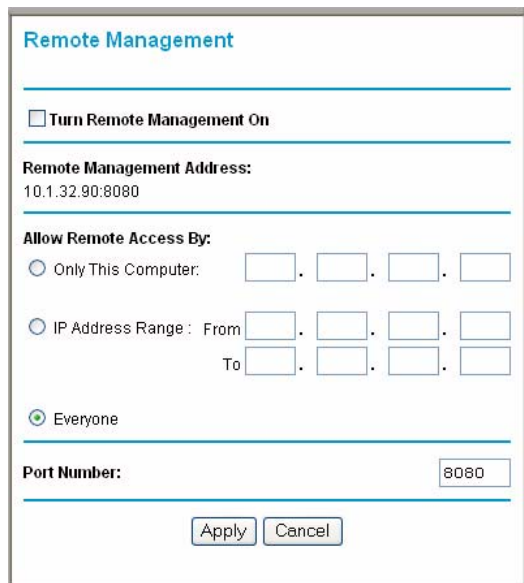


Warning: When uploading software to the WNDR3300 router, *do not* interrupt the Web browser by closing the window, clicking a link, or loading a new page. If the browser is interrupted, it could corrupt the software.

When the upload is complete, your router automatically restarts. The upgrade process typically takes about one minute. Read the new software release notes to determine whether you must reconfigure the router after upgrading.

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 WNDR3300 router. From the main menu of the browser interface, under Advanced, select **Remote Management**.



The screenshot shows the 'Remote Management' configuration page. At the top, there is a title 'Remote Management'. Below it is a horizontal line, followed by a checkbox labeled 'Turn Remote Management On'. Another horizontal line follows. The 'Remote Management Address:' is set to '10.1.32.90:8080'. Below this is another horizontal line. The section 'Allow Remote Access By:' has three radio button options: 'Only This Computer:' with four empty input boxes for IP address; 'IP Address Range:' with 'From' and 'To' labels and two sets of four empty input boxes for IP address ranges; and 'Everyone' which is selected. Below this is a horizontal line. The 'Port Number:' is set to '8080' in a text box. At the bottom are 'Apply' and 'Cancel' buttons.

Figure 6-9



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, type 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.

Chapter 7

Troubleshooting

This chapter provides information about troubleshooting your RangeMax Dual Band Wireless-N Router WNDR3300. After each problem description, instructions are provided to help you diagnose and solve the problem. As a first step, 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:

- “Troubleshooting Quick Tips”
- “Troubleshooting Basic Functions” on page 7-2
- “Troubleshooting the Web Configuration Interface” on page 7-4
- “Troubleshooting the Internet Connection” on page 7-5
- “Troubleshooting a Network Using the Ping Utility” on page 7-6
- “Problems with Date and Time” on page 7-8
- “Solving Wireless Connection Problems” on page 7-9
- “Restoring the Default Configuration and Password” on page 7-13

Troubleshooting 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.

- Wired and wirelessly connected computers *must* have network (IP) addresses on the same network as the router. The simplest way to do this is to configure each computer to obtain an IP address automatically using DHCP. Click the link to the online document "[Preparing Your Network](#)" in [Appendix B](#), or see the documentation that came with your computer.
- Some cable modem service providers require you to use the MAC address of the computer initially registered on the account. Your wireless router can capture and use that MAC address, as described in "[Configuring Your Internet Connection Using the Smart Setup Wizard](#)" on [page 1-5](#).

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 "[Problems with Date and Time](#)" on [page 7-8](#).

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. After approximately 10 seconds, verify that:

- a. The Power light is solidly on.
- b. The Internet light is on.
- c. A numbered Ethernet port light is on for any local port that is connected to a computer. This indicates that a link has been established to the connected device.

If any of the above conditions does not occur, see the appropriate following section.

The Power light is not on or is blinking.

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 12V DC 1A power adapter that NETGEAR supplied for this product.
- If the Power light alternately blinks green and amber every second, the router software is corrupted. This can happen if a firmware upgrade is interrupted, or if the router detects a problem with the firmware. For recovery instructions, contact Technical Support at www.netgear.com/support.

If the error persists, you have a hardware problem and should contact Technical Support at www.netgear.com/support.

The lights never turn off.

When the router is turned on, the lights turn on for about 10 seconds and then turn off. If all the lights stay on, there is a fault within the router.

If all lights are still on 1 minute after power up:

- Cycle the power to see if the router recovers.
- Clear the router's configuration to factory defaults as explained in "Restoring the Default Configuration and Password" on page 7-13.

If the error persists, you might have a hardware problem and should contact Technical Support at www.netgear.com/support.

The Internet or Ethernet port lights are not on.

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

- Make sure that the Ethernet cable connections are secure at the router and at the modem or computer.
- Make sure that power is turned on to the connected modem or computer.
- Be sure that you are using the correct cable:

When connecting the router's Internet port to a cable or DSL modem, use the cable that was supplied with the cable or DSL modem. This cable could be a standard straight-through Ethernet cable or an Ethernet crossover cable.

The Wireless light is not on.

If the Wireless light does not come on, verify that the wireless feature is turned on according to the instructions in [“Viewing Advanced Wireless Settings” on page 2-11](#).

Troubleshooting the Web Configuration Interface

If you are unable to access the router's Web Configuration Interface from a computer on your local network, check the following:

- If you are connecting from a wireless computer, try connecting from a wired computer.
- Check the Ethernet connection between the wired computer and the router as described in [“Troubleshooting Basic Functions” on page 7-2](#).
- Make sure that your computer's IP address is on the same subnet as the router. For instructions, click the link to the online document [“Preparing Your Network” in Appendix B](#) to configure your computer.



Note: If your computer's IP address is shown as 169.254.x.x: Windows and Mac OS generate and assign an IP address if the computer cannot reach a DHCP server. These autogenerated addresses are in subnet 169.254.x.x. If your IP address is in this range, check the connection from the computer to the router, and reboot your computer.

- Make sure that your browser has Java, JavaScript, or ActiveX enabled. If you are using Internet Explorer, click **Refresh** to be sure that the Java applet is loaded.
- Try closing the browser and opening it again, or try a different browser.

- Make sure that you are using the correct login information. The factory default login name is **admin**, and the password is **password**. Make sure that Caps Lock is off when entering this information.

If the router does not save changes you have made in the Web Configuration 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 the Internet Connection

If you can access your router but you are unable to access the Internet, you should first determine whether the router is able to obtain an IP address from your Internet Service Provider (ISP). Unless your ISP provides a fixed IP address, your router must request an IP address from the ISP. You can determine whether the request was successful using the Web Configuration Manager.

To check the WAN IP address:

1. Start your browser, and select an external site such as <http://www.netgear.com>.
2. Access the main menu of the router's configuration at <http://www.routerlogin.net>.
3. Under Maintenance, select **Router Status**.
4. Check that an IP address is shown for the Internet port. If 0.0.0.0 is shown, your router has not obtained an IP address from your ISP.

If your router is unable to obtain an IP address from the ISP, you might need to force your cable or DSL modem to recognize your new router by restarting your network, as described in “[Be sure to restart your network in this sequence.](#)” on page 7-1.

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

- Your ISP might require a login program.
Ask your ISP whether they require PPP over Ethernet (PPPoE) or some other type of login.
- If your ISP requires a login, the login name and password might be set incorrectly.
- Your ISP might check for your computer's host name.
Assign the computer host name of your ISP account as the account name in the Basic Settings screen.

- Your ISP allows only one Ethernet MAC address to connect to Internet and might check for your computer's MAC address. In this case, do one of the following:
 - Inform your ISP that you have bought a new network device, and ask them to use the router's MAC address.
 - Configure your router to spoof your computer's MAC address. This procedure is explained in [“Configuring Your Internet Connection Using the Smart Setup Wizard”](#) on page 1-5.

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

- 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 provides the addresses of one or two DNS servers for your use. If you entered a DNS address during the router's configuration, reboot your computer, and verify the DNS address as described in the online document you can access from [“Preparing Your Network”](#) in Appendix B. You can also configure your computer manually with DNS addresses, as explained in your operating system documentation.

- Your computer might not have the router configured as its TCP/IP gateway.

If your computer obtains its information from the router by DHCP, reboot the computer, and verify the gateway address as described in the online document you can access from [“Preparing Your Network”](#) in Appendix B.

- 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**.

Troubleshooting a 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. You can easily troubleshoot a network by using the ping utility in your computer or workstation.

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 the Start button, 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 the numbered Ethernet port light is on for the port to which you are connected. If the light is off, follow the instructions in [“The Internet or Ethernet port lights are not on.”](#) on page 7-3.
 - Check that the corresponding Link lights are on for your network interface card. If your router and computer are connected to a separate Ethernet switch, make sure 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 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 "spoo" the MAC address from the authorized computer. For more information, see "[Configuring Your Internet Connection Using the Smart Setup Wizard](#)" on page 1-5.

Problems with Date and Time

Under Content Filtering in the main menu, select **E-mail** to display a screen that shows the current date and time of day. The WNDR3300 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 is configured correctly. 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 **Adjust for Daylight Savings Time** check box.

Solving Wireless Connection Problems

The first steps in solving wireless connection problems are these:

1. Using your wireless card's setup utility program, make sure that your wireless card can find your wireless router.
2. Configure and test with the simplest wireless connection possible, and then add security.

The topics in this section describe these steps.

Using Your Wireless Card Setup Program

When you install a NETGEAR wireless card 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.

If you have no specific wireless card setup program installed, you can use the basic setup utility in Windows by following these steps:

1. Open the Windows Control Panel, and double-click **Network Connections**.
2. In the LAN section, double-click **Wireless Network Connection**.

Use the setup program to scan for available wireless networks. Look for a network name (SSID) of NETGEAR or your custom SSID if you have changed it. 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 card? Check the Mode setting, as described in [“Viewing and Configuring Basic ISP Settings”](#) on page 1-5.

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

- Is your router too far from your computer, or too close? Place your computer 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 computer? See [“Optimizing Wireless Performance”](#) on page 5-13.

If your wireless network appears and has good signal strength, configure your wireless card and router for the simplest possible connection, as described in the next section.

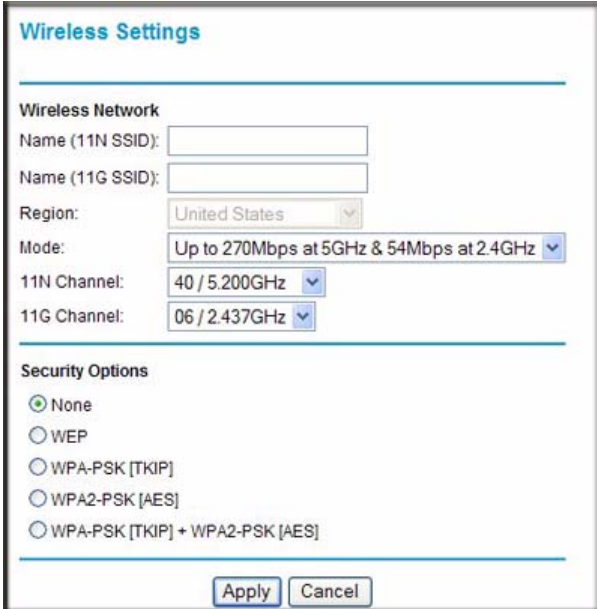
Setting Up and Testing Basic Wireless Connectivity



Note: If you use a wireless computer to change wireless settings, you might be disconnected when you click **Apply**. Reconfigure your wireless adapter to match the new settings, or access the wireless router from a wired computer to make any further changes.

Follow these instructions to set up and test basic wireless connectivity. Once you have established basic wireless connectivity, you can enable security settings appropriate to your needs.

1. Select **Wireless Settings** under Setup in the main menu of the WNDR3300 router.



The screenshot shows the 'Wireless Settings' page. It is divided into two main sections: 'Wireless Network' and 'Security Options'.
Under 'Wireless Network':
- 'Name (11N SSID):' is an empty text box.
- 'Name (11G SSID):' is an empty text box.
- 'Region:' is a dropdown menu set to 'United States'.
- 'Mode:' is a dropdown menu set to 'Up to 270Mbps at 5GHz & 54Mbps at 2.4GHz'.
- '11N Channel:' is a dropdown menu set to '40 / 5.200GHz'.
- '11G Channel:' is a dropdown menu set to '06 / 2.437GHz'.
Under 'Security Options':
- There are five radio button options: 'None' (selected), 'WEP', 'WPA-PSK [TKIP]', 'WPA2-PSK [AES]', and 'WPA-PSK [TKIP] + WPA2-PSK [AES]'.
At the bottom of the form are two buttons: 'Apply' and 'Cancel'.

Figure 7-1

2. For the wireless network name (SSID), use the default name, or choose a suitable descriptive name. In the **Name (SSID)** field, you can enter a value of up to 32 alphanumeric characters. The default SSID is NETGEAR.



Note: The SSID is case-sensitive; NETGEAR is not the same as nETgear. Also, the SSID of any wireless access adapters must match the SSID you configure in the RangeMax Dual Band Wireless-N Router WNDR3300. If they do not match, you will not get a wireless connection to the WNDR3300 router.

3. Select the region in which the wireless interface will operate.
4. Set the channel. The default channel is **Auto**.

This field determines which operating frequency is used. It should not be necessary to change the wireless channel unless you notice interference problems with another nearby wireless router or access point. Select a channel that is not being used by any other wireless networks within several hundred feet of your router. For more information about the wireless channel frequencies, click the link to the online document “[Wireless Networking Basics](#)” in [Appendix B](#).

5. Set the mode to **Up to 270 Mbps at 5 GHz and 54 Mbps at 2.4 GHz**.
6. For Security Options, select **None**.
7. Click **Apply** to save your changes.



Note: If you are configuring the router from a wireless computer and you change the router’s SSID, channel, or security settings, you will lose your wireless connection when you click **Apply**. You must then change the wireless settings of your computer to match the router’s new settings.

8. Select **Wireless Settings** under Advanced in the main menu of the WNDR3300 router.

Advanced Wireless Settings

Wireless Router Settings

Enable Wireless Router Radio

Enable SSID Broadcast

Fragmentation Threshold (256 - 2346):

CTS/RTS Threshold (1 - 2347):

Preamble Mode:

WPS Settings

Router's PIN: **97674955**

Disable Router's PIN

Keep Existing Wireless Settings

Wireless Card Access List

Figure 7-2

9. Make sure the **Enable Wireless Router Radio** and **Enable SSID Broadcast** check boxes are selected.
10. Click **Setup Access List**.
11. Make sure that the **Turn Access Control On** check box is *not* selected.

12. Configure and test your wireless computer for wireless connectivity.

Program the wireless adapter of your computer to have the same SSID and channel that you configured in the router, and disable encryption. Check that your computer has a wireless link and can obtain an IP address by DHCP from the router.

Once your computer has basic wireless connectivity to the router, you can configure the advanced wireless security functions of the computer and router (for more information about security, see [Chapter 2, “Safeguarding Your Network”](#)).

Restoring the Default Configuration and Password

This section explains how to restore the factory default configuration settings, changing the router’s administration password back to **password**. You can erase the current configuration and restore factory defaults in two ways:

- Use the Erase function of the router (see [“Erasing the Configuration”](#) on page 6-9).
- 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 restore the factory default configuration settings when you do not know the administration password or IP address, you must use the restore settings button on the rear panel of the router.

1. Press and hold the restore settings button for 10 seconds.
2. Release the restore settings button, and wait for the router to reboot.

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 RangeMax Dual Band Wireless-N Router WNDR3300.

Table A-1. WNDR3300 Router Default Configuration Settings

Feature		Default Setting
Router Login		
	Router Login URL	http://www.routerlogin.net <i>or</i> http://www.routerlogin.com
	Login Name (case-sensitive) printed on product label	admin
	Login Password (case-sensitive) printed on product label	password
Internet Connection		
	MAC Address	Use default hardware address
	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	Pacific Time
	Time Zone Adjusted for Daylight Saving Time	Disabled
	Allow a Registrar to configure this router	Enabled

Table A-1. WNDR3300 Router Default Configuration Settings (continued)

Feature		Default Setting
Wireless		
	Wireless Communication	Enabled
	SSID Name	<ul style="list-style-type: none"> • 11N SSID: NETGEAR-DualBand-N • 11G SSID: NETGEAR-2.4-G
	Security	Disabled
	Broadcast SSID	Enabled
	Transmission Speed	Auto ^a
	Country/Region	United States in the US, otherwise varies by region
	RF Channel	6 until region selected
	Operating Mode	<ul style="list-style-type: none"> • Mode 1. 802.11n 2.4G mode • Mode 2. 802.11n 5G mode and 802.11g legacy mode at 2.4G
	Data Rate	Best
	Output Power	Full
Firewall		
	Inbound (communications coming in from the Internet)	Disabled (bars all unsolicited requests)
	Outbound (communications going out to the Internet)	Enabled (all)
<p>a. 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.</p>		
Network Protocol and Standards Compatibility		
	Data and Routing Protocols	TCP/IP, RIP-1, RIP-2, DHCP, PPPoE, PPTP, Bigpond, Dynamic DNS, and UPnP

Table A-1. WNDR3300 Router Default Configuration Settings (continued)

Feature		Default Setting
Power Adapter		
	North America	120V, 60 Hz, input
	United Kingdom, Australia	240V, 50 Hz, input
	Europe	230V, 50 Hz, input
	Japan	100V, 50/60 Hz, input
	All regions (output)	12V DC @ 1.5A output, 18W maximum
Physical Specifications		
	Dimensions	1.1" x 6.89" x 4.68" 28 x 175 x 119 mm
	Weight	1.2 lbs. 0.5 kg
Environmental Specifications		
	Operating temperature	0° to 40° C (32° to 104° F)
	Operating humidity	90% maximum relative humidity, noncondensing
Electromagnetic Emissions		
	Meets requirements of	FCC Part 15 Class B
		VCCI Class B
		EN 55 022 (CISPR 22), Class B C-Tick N10947

Table A-1. WNDR3300 Router Default Configuration Settings (continued)

Feature		Default Setting
Interface Specifications		
	LAN	10BASE-T or 100BASE-Tx, RJ-45
	WAN	10BASE-T or 100BASE-Tx, RJ-45
	Wireless	Maximum wireless signal rate complies with the IEEE 802.11 standard. 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.
	Radio Data Rates	Auto Rate Sensing
	Frequency	2.4 GHz and 5 GHz
	Data Encoding	Standards IEEE 802.11n draft version 1.0 IEEE 802.11n, IEEE 802.11g, IEEE 802.11b 2.4 GHz IEEE 802.11n, IEEE 802.11g 5.0 GHz
	Maximum Computers Per Wireless Network	Limited by the amount of wireless network traffic generated by each node. Typically 30–70 nodes.
	Operating Frequency Ranges 2.4G Ghz	2.412–2.462 GHz (US) 2.412–2.472 GHz (Japan) 2.412–2.472 GHz (Europe ETSI)
	Operating Frequency Ranges 5G Ghz	5.18–5.24 + 5.745–5.825 GHz (US) 5.18–5.24 GHz (Europe ETSI)
	802.11 Security	40-bit (also called 64-bit) and 128-bit WEP, WPA-PSK, and WPA2-PSK.

Restoring the Default User Name and Password

You can restore the factory default configuration settings to reset the router's user name to **admin**, the password to **password**, and the IP address to **www.routerlogin.net**. This procedure erases your current configuration, including your wireless security settings, and restores the factory defaults. When you log in after resetting, the Smart Wizard configuration assistant prompts you to configure these settings.

To restore the factory default configuration settings:

1. Use a sharp object such as a pen or a paper clip to press and hold the restore factory settings button, located on the rear panel of the router, for about 20 seconds.
2. Release the restore factory settings button, and wait for the router to reboot.

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

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
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*.

A

- access
 - blocking [3-1](#)
 - remote [6-13](#)
 - restricting by MAC address [2-17](#)
 - viewing logs [3-6](#)
- access control
 - turning off [7-12](#)
 - turning on [2-19](#)
- account name [1-6, 6-2](#)
- adding
 - client devices [2-15](#)
 - priority rules [5-16](#)
 - WPS client [2-13](#)
- administrator password, changing [2-19](#)
- advanced wireless settings [2-11](#)
- advertisement period [5-13](#)
- AES (Advanced Encryption Standard) encryption [2-10](#)
- applications
 - port forwarding example [5-8](#)
 - QoS for [5-16](#)
- attached devices [6-7](#)
- autogenerated IP addresses [7-4](#)
- automatic authentication [2-8](#)
- automatic software upgrade [6-11](#)

B

- backing up configuration file [6-8](#)
- backing up, transfer time [5-24](#)
- bandwidth, optimizing [5-21](#)
- basic settings [1-5, 2-5](#)
- basic wireless connectivity [7-10](#)
- Bigpond [1-8](#)

- blocking
 - access [3-1](#)
 - inbound traffic [5-1](#)
- bold text [xi](#)
- broadband Internet [5-23](#)
- broadcast status [6-4](#)

C

- cables, checking [7-2](#)
- channel, wireless port [6-4](#)
- client devices, adding [2-15](#)
- configuration file [6-7](#)
 - backing up [6-8](#)
 - erasing [6-9](#)
- configuring
 - advanced security [2-11](#)
 - basic security [2-6](#)
 - DMZ server [4-8](#)
 - Dynamic DNS [4-6](#)
 - LAN IP settings [4-1](#)
 - NAT [4-9](#)
 - port forwarding [5-6](#)
 - port triggering [5-9](#)
 - QoS [5-16](#)
 - WEP security [2-8](#)
 - WPA security [2-10](#)
 - WPS [2-14](#)
- connection mode [1-10](#)
- connection range [5-13](#)
- connection status settings [6-5](#)
- connection types [5-23](#)
- content filtering [3-1](#)
- crossover cable [7-4](#)
- custom service, adding to port forwarding [5-7](#)
- customer support [ii](#)

D

data packets, fragmented [5-20](#)
date and time, troubleshooting [7-8](#)
daylight savings time [3-9, 7-9](#)
default DMZ server [4-7, 5-6](#)
default factory settings
 listed [A-1](#)
 restoring [6-9, 7-13, A-4](#)
default gateway [6-5](#)
default LAN IP configuration [4-2](#)
deleting configuration [6-9](#)
destination IP address [5-2](#)
device name [4-2, 6-7](#)
DHCP server [4-3, 6-5](#)
DHCP setting [6-3](#)
disabling
 advanced wireless options [2-12](#)
 firewall [4-7](#)
 router PIN [2-15](#)
DMZ server [4-7, 4-8, 5-6](#)
DNS addresses
 entering [1-7, 1-10](#)
 troubleshooting [7-6](#)
DNS server [5-2](#)
documents, reference [B-1](#)
domain name [1-6](#)
Domain Name Server (DNS) addresses [6-3](#)
Dynamic DNS [4-5](#)
dynamic IP addresses [1-6](#)
DynDNS.org [4-5](#)

E

electromagnetic emissions [A-3](#)
e-mailing logs [3-7](#)
encryption [2-1](#)
encryption keys [2-10](#)
environmental specifications [A-3](#)
erasing configuration [6-9](#)

Ethernet cables, checking [7-2](#)
Ethernet light, troubleshooting and [7-3](#)
Ethernet MAC address. *See* MAC addresses

F

factory default settings
 listed [A-1](#)
 restoring [6-9, 7-13, A-4](#)
filtering content [3-1](#)
firewalls
 default settings [A-2](#)
 disabling [4-7](#)
 overview [2-21](#)
Firmware Upgrade Assistant [1-3, 6-9](#)
firmware version [6-2](#)
fixed font text [xi](#)
fixed IP addresses [1-7](#)
fragmented data packets [5-20](#)
frequency, operating [2-8](#)

G

games, online, QoS for [5-16](#)
generating encryption keys [2-10](#)
Gigabit Ethernet [5-24](#)

H

host name [1-6, 6-2, 6-7](#)

I

idle time-out [1-10](#)
inbound traffic, allowing or blocking [5-1](#)
Interface specifications [A-4](#)
interference, reducing [5-14](#)
Internet connection
 default settings [A-1](#)
 troubleshooting [7-5](#)
Internet IP address [1-6](#)
Internet light, troubleshooting and [7-3](#)

Internet port, status [6-2](#)
Internet services, blocking access [3-3](#)
interval, poll [6-6](#)
IP addresses
 autogenerated [7-4](#)
 blocking access by [3-5](#)
 current [6-3](#)
 dynamic [4-5](#)
 dynamic or static [1-6](#)
 LAN [4-2](#)
 reserved [4-4](#)
IP subnet mask [4-3, 6-3](#)
ISP settings [1-5](#)
italic text [xi](#)

K

keys, encryption [2-10](#)
keywords, blocking by [3-1](#)

L

LAN IP setup [4-1](#)
LAN path, troubleshooting [7-7](#)
LAN port
 QoS for [5-17](#)
 settings [6-3](#)
lease, DHCP [6-5](#)
LEDs. *See* lights, troubleshooting and
lights, troubleshooting and [7-2](#)
local network, default settings [A-1](#)
local servers, forwarding to [5-6](#)
location, router [5-14](#)
logging in [1-2](#)
logging out [1-4](#)
login required [1-7](#)
login settings [A-1](#)
logs
 sending [3-7](#)
 time-stamping entries [3-9](#)
 viewing [3-6](#)

M

MAC addresses
 attached devices [6-7](#)
 current [6-3](#)
 entering [1-7](#)
 QoS for [5-18](#)
 restricting access by [2-17](#)
 troubleshooting [7-8](#)
mail server, outgoing [3-8](#)
managing router remotely [6-13](#)
manual software upgrade [6-12](#)
metric value [4-11](#)
mixed mode encryption [2-3, 2-10](#)
mode, communication [2-7, 6-4](#)
MTU size [4-8, 5-20](#)
multiple input, multiple output (MIMO) [5-23](#)

N

NAT (Network Address Translation) [4-7, 4-9, 5-2](#)
network
 correct settings, checking [7-2](#)
 restarting [7-1](#)
network protocol compatibility [A-2](#)
Network Time Protocol (NTP) [3-9, 7-8](#)

O

obstructions, connecting through [5-23](#)
online gaming, QoS for [5-16](#)
Open System authentication [2-8](#)
operating frequency [2-8](#)
optimizing bandwidth [5-21](#)
outgoing mail server [3-8](#)

P

packets, fragmented [5-20](#)
passphrase [2-8, 2-10, 2-11](#)
password
 changing [2-19](#)
 restoring [7-13](#)

path, testing [7-8](#)
physical specifications [A-3](#)
PIN, router [2-14, 2-15](#)
ping [4-8, 7-6](#)
placing router [5-14](#)
poll interval [6-6](#)
port filtering [3-3](#)
port forwarding [5-5, 5-6](#)
port numbers [3-3](#)
port status [6-6](#)
port triggering
 configuring [5-9](#)
 overview [5-3](#)
 port forwarding, compared to [5-6](#)
power adapter, default settings [A-3](#)
Power light, troubleshooting and [7-2, 7-3](#)
Powerline HD products [5-23](#)
PPPoE (PPP over Ethernet) [1-9, 7-5](#)
PPTP (Point to Point Tunneling Protocol) [1-8](#)
primary DNS server [1-7, 1-10](#)
printing manual [xii](#)
prioritizing traffic [5-14](#)
product and publication details [vi](#)

Q

QoS (Quality of Service) [5-14](#)

R

range, connection [5-13](#)
reducing interference [5-14](#)
reference documents [B-1](#)
releasing connection status [6-5](#)
remote computers, accessing [5-2](#)
remote devices, testing path [7-8](#)
remote management [6-13](#)
renewing connection status [6-5](#)
requirements, speed [5-24](#)
reserved IP addresses [4-4](#)

Resource CD [1-1](#)
restarting network [7-1](#)
restoring
 configuration [6-8](#)
 default factory settings [6-9, 7-13, A-4](#)
restricting access by MAC address [2-17](#)
RIP (Router Information Protocol) direction [4-3](#)
router PIN [2-15](#)
router status, viewing [6-1](#)

S

sample network, figure [5-22](#)
scheduling blocking [3-5](#)
secondary DNS server [1-7, 1-10](#)
security
 options, compared [2-2](#)
 setting up [2-1](#)
service blocking [3-3](#)
service name [1-9](#)
service port numbers [3-4](#)
setting time [3-9](#)
settings, default. *See* default factory settings
setup information, gathering [2-4](#)
Setup Manual [1-1](#)
Setup Wizard [1-5](#)
Shared Key authentication [2-8](#)
SMTP server [3-8](#)
software, upgrading [6-9](#)
source computer [5-2](#)
specifications, technical [A-1](#)
speed requirements [5-24](#)
SPI (Stateful Packet Inspection) firewall [4-7](#)
spoofing MAC addresses [1-7](#)
SSID [2-6, 6-4, 7-11](#)
SSID broadcast [2-12, 7-12](#)
static IP addresses [1-7](#)
static routes [4-9](#)
status lights, troubleshooting and [7-2](#)

status, router, viewing [6-1](#)

streaming video and audio [5-24](#)

subnet mask [4-3](#), [6-3](#)

system up time [6-6](#)

T

TCP/IP network, troubleshooting [7-6](#)

technical specifications [A-1](#)

Telstra Bigpond [1-8](#)

Test light, troubleshooting and [7-2](#)

testing wireless connections [7-10](#)

time of day, troubleshooting [7-8](#)

time to live, advertisement [5-13](#)

time, setting [3-9](#)

time-out

idle [1-10](#)

port triggering [5-11](#)

TKIP (Temporal Key Integrity Protocol) encryption [2-10](#)

trademarks [ii](#)

troubleshooting [7-1](#)

trusted user [3-3](#)

typographical conventions [xi](#)

U

Universal Plug and Play (UPnP) [5-12](#)

up time, system [6-6](#)

updating firmware [1-3](#)

upgrading router software [6-9](#)

URLs, typography for [xi](#)

user-defined services [3-4](#)

V

version, RIP (Router Information Protocol) [4-3](#)

viewing

advanced wireless settings [2-11](#)

attached devices [6-7](#)

basic security settings [2-6](#)

logs [3-6](#)

router status [6-1](#)

W

WAN IP address, troubleshooting [7-5](#)

WAN setup [4-7](#)

Web Configuration Interface, troubleshooting [7-4](#)

Web Configuration Manager [1-2](#)

WEP encryption [2-3](#), [2-8](#)

Wireless Card Access List [2-17](#)

wireless card, setting up [7-9](#)

wireless connection type [5-23](#)

wireless connection, troubleshooting [7-9](#)

Wireless light, troubleshooting and [7-4](#)

wireless network name [2-6](#), [6-4](#), [7-11](#)

Wireless port settings [6-4](#)

wireless radio [2-12](#), [6-4](#), [7-12](#)

wireless security, setting up [2-1](#)

wireless settings

advanced [2-11](#)

basic [2-5](#)

checking for correct [7-2](#)

default, listed [A-2](#)

gathering information [2-4](#)

testing [7-10](#)

WMM (Wi-Fi Multimedia) [5-15](#)

WPA2-PSK encryption [2-3](#), [2-10](#)

WPA-PSK + WPA2-PSK encryption [2-3](#)

WPA-PSK encryption [2-3](#), [2-10](#)

WPA-PSK+WPA2-PSK encryption [2-10](#)

WPS (Wi-Fi Protected Setup) security [2-12](#)

