RangeMax WiFi Range Extender WPN824EXT User Manual

NETGEAR

Technical Support and Documentation

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

NETGEAR, INC. Support Information

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

E-mail: support@netgear.com

North American NETGEAR website: *http://www.netgear.com*

Setup documentation is available on the *Resource CD*, on the support website, and on the documentation website. When the RangeMax WiFi Range Extender WPN824EXT is connected to the Internet, click the KnowledgeBase or the Documentation link under the Web Support menu to view support information.

Trademarks

NETGEAR, the NETGEAR logo, ProSafe, RangeMax and Auto Uplink are trademarks or registered trademarks of NETGEAR, Inc. Microsoft, Windows, Windows NT and Vista are registered trademarks 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 WiFi Range Extender WPN824EXT 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.

The 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 WiFi Range Extender WPN824EXT 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.

Voluntary Control Council for Interference (VCCI) Statement

This equipment is in the Class B category (information equipment to be used in a residential area or an adjacent area thereto) and conforms to the standards set by the Voluntary Control Council for Interference by Data Processing Equipment and Electronic Office Machines aimed at preventing radio interference in such residential areas. When used near a radio or TV receiver, it may become the cause of radio interference. Read instructions for correct handling.

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 489-17, EN60950

Europe – Declaration of Conformity in Languages of the European Community

Cesky [Czech]	*NETGEAR* Inc. tímto prohlašuje, že tento Radiolan je ve shode se základními požadavky a dalšími príslušnými ustanoveními smernice 1999/5/ES..
Dansk [Danish]	Undertegnede *NETGEAR Inc.* erklærer herved, at følgende udstyr Radiolan overholder de væsentlige krav og øvrige relevante krav i direktiv 1999/5/EF.
Deutsch [German]	Hiermit erklärt *NETGEAR Inc.*, 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 *NETGEAR Inc.* seadme Radiolan vastavust direktiivi 1999/5/EÜ põhinõuetele ja nimetatud direktiivist tulenevatele teistele asjakohastele sätetele.
English	Hereby, *NETGEAR Inc.*, 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 *NETGEAR Inc.* 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 *NETGEAR Inc.* ΔΗΛΩΝΕΙ ΟΤΙ Radiolan ΣΥΜΜΟΡΦΩΝΕΤΑΙ ΠΡΟΣ ΤΙΣ ΟΥΣΙΩΔΕΙΣ ΑΠΑΙΤΗΣΕΙΣ ΚΑΙ ΤΙΣ ΛΟΙΠΕΣ ΣΧΕΤΙΚΕΣ ΔΙΑΤΑΞΕΙΣ ΤΗΣ ΟΔΗΓΙΑΣ 1999/5/ΕΚ.
Français [French]	Par la présente *NETGEAR Inc.* déclare que l'appareil Radiolan est conforme aux exigences essentielles et aux autres dispositions pertinentes de la directive 1999/5/CE.

Italiano [Italian]	Con la presente *NETGEAR Inc.* dichiara che questo Radiolan è conforme ai requisiti essenziali ed alle altre disposizioni pertinenti stabilite dalla direttiva 1999/5/CE.
Latviski [Latvian]	Ar šo *NETGEAR Inc.* deklarē, ka Radiolan atbilst Direktīvas 1999/5/EK būtiskajām prasībām un citiem ar to saistītajiem noteikumiem.
Lietuvių [Lithuanian]	Šiuo *NETGEAR Inc.* deklaruoja, kad šis Radiolan atitinka esminius reikalavimus ir kitas 1999/5/EB Direktyvos nuostatas.
Nederlands [Dutch]	Hierbij verklaart *NETGEAR Inc.* dat het toestel Radiolan in overeenstemming is met de essentiële eisen en de andere relevante bepalingen van richtlijn 1999/5/EG.
Malti [Maltese]	Hawnhekk, *NETGEAR Inc.*, jiddikjara li dan Radiolan jikkonforma mal-htigijiet essenzjali u ma provvedimenti ohrajn relevanti li hemm fid-Dirrettiva 1999/5/EC.
Magyar [Hungarian]	Alulírott, *NETGEAR Inc.* nyilatkozom, hogy a Radiolan megfelel a vonatkozó alapvetõ követelményeknek és az 1999/5/EC irányelv egyéb elõírásainak.
Polski [Polish]	Niniejszym NETGEAR Inc. oświadcza, że Radiolan jest zgodny z zasadniczymi wymogami oraz pozostałymi stosownymi postanowieniami Dyrektywy 1999/5/EC.
Português [Portuguese]	*NETGEAR Inc.* declara que este Radiolan está conforme com os requisitos essenciais e outras disposições da Directiva 1999/5/CE.
Slovensko [Slovenian]	NETGEAR Inc. izjavlja, da je ta Radiolan v skladu z bistvenimi zahtevami in ostalimi relevantnimi določili direktive 1999/5/ES.
Slovensky [Slovak]	*NETGEAR Inc.* týmto vyhlasuje, _e Radiolan spĺňa základné po_iadavky a všetky príslušné ustanovenia Smernice 1999/5/ES.
Suomi [Finnish]	*NETGEAR Inc.* vakuuttaa täten että Radiolan tyyppinen laite on direktiivin 1999/5/EY oleellisten vaatimusten ja sitä koskevien direktiivin muiden ehtojen mukainen.
Svenska [Swedish]	Härmed intygar *NETGEAR Inc.* 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 *NETGEAR Inc.* yfir því að Radiolan er í samræmi við grunnkröfur og aðrar kröfur, sem gerðar eru í tilskipun 1999/5/EC.
Norsk [Norwegian]	*NETGEAR Inc.* erklærer herved at utstyret *Radiolan* 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 approva.ls

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 WPN824EXT Wireless Range Extender 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 into which the radio receiver is connected.

- Consult the dealer or an experienced radio/TV technician for help.

RangeMax WiFi Range Extender WPN824EXT
FC Tested to Comply with FCC Standards FOR HOME OR OFFICE USE PY307300071

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

Canadian Department of Communications Radio Interference Regulations

This digital apparatus (RangeMax WiFi Range Extender WPN824EXT) does not exceed the Class B limits for radio-noise emissions from digital apparatus as set out in the Radio Interference Regulations of the Canadian Department of Communications.

Canada ID: 4054A-07300071

Product and Publication Details

Model Number:	WPN824EXT
Publication Date:	April 2008
Product Family:	Wireless Range Extender
Product Name:	RangeMax WiFi Range Extender WPN824EXT
Home or Business Product:	Home
Language:	English
Publication Part Number:	202-10310-02
Publication Version Number:	1.0

Contents

v1.0, April 2008

About This Manual

The *NETGEAR® RangeMax WiFi Range Extender WPN824EXT User Manual* provides information for configuring the features of the RangeMax WiFi Range Extender WPN824EXT beyond initial configuration settings. Initial configuration instructions can be found in the setup manual, the *Wireless Range Extender 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::

Italic	Emphasis, books, CDs
Bold	User input, IP addresses, GUI screen text
Fixed	Command prompt, CLI text, code
italic	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.

> ⚠️ **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 WiFi Range Extender according to these specifications:

Product Version	RangeMax WiFi Range Extender WPN824EXT
Manual Publication Date	April 2008

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

> → 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 forwards or backwards through the manual one page at a time.

- A ⎡☰⎤ button that displays the table of contents and a ⎡☷⎤ 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

Part Number	Version Number	Date	Description
202-10310-02	1.0	April 2008	First publication

Chapter 1
Introduction

Congratulations on your purchase of the NETGEAR® RangeMax WiFi Range Extender WPN824EXT. The WiFi range extender provides connection for multiple computers to the Internet through an external broadband access device (such as a gateway/router).

Key Features

> **Note:** For first-time installation and basic troubleshooting of your WiFi range extender, refer to the *NETGEAR RangeMax WiFi Range Extender Setup Manual*.

The RangeMax WiFi Range Extender WPN824EXT is easy to use and provides features that are described in the following sections:

- "RangeMax™ Multi-In, Multi-Out (MIMO) Technology"
- "802.11g Wireless Networking"
- "Autosensing Ethernet Connections with Auto Uplink"
- "Wireless Repeater Capability"
- "Quality of Service (QoS)"
- "Automatic Firmware Updates"

RangeMax™ Multi-In, Multi-Out (MIMO) Technology

NETGEAR's RangeMax Multi-In, Multi-Out (MIMO) technology provides 10 times more coverage than standard 802.11g alone by eliminating "dead spots" in the area of coverage where you use your wireless computers. Your whole house or office suite now becomes a "hot spot" without requiring any range extenders, repeaters, or external antennas. RangeMax maintains a high speed throughout your home, not just when you are close to your WiFi range extender.

RangeMax is an advanced Smart MIMO (Multi-In, Multi-Out) technology that uses seven internal antennas. RangeMax constantly surveys your home environment for physical barriers and interference and adjusts the wireless signal to compensate for these performance blockers.

For example, if you carry your laptop from the family room to the bedroom, RangeMax automatically senses the change and selects from multiple possible antenna configurations to deliver you the fastest, clearest connection so that everyone can enjoy consistently high-speed connections, everywhere in your house, with no drop-outs and no dead spots.

RangeMax is also 100 percent compatible with your existing 802.11b/g products (for example, 802.11b, 802.11g, Centrino, and SuperG™ wireless clients) and boosts their range and speed by up to 50 percent.

802.11g Wireless Networking

The WiFi range extender acts as an 802.11g wireless access point, providing continuous, high-speed 108 Mbps access between your wireless and Ethernet devices. The extender provides the folowing functions:

- 802.11g wireless networking at up to 108 Mbps.

- 802.11g wireless networking, with the ability to operate in 802.11g-only, 802.11b-only, or 802.11g and b modes, providing backwards compatibility with 802.11b devices or dedicating the wireless network to the higher-bandwidth 802.11g devices.

- 64-bit and 128-bit WEP encryption security.

- WEP keys that can be generated manually or by passphrase.

- WPA-PSK support. Support for Wi-Fi Protected Access (WPA) data encryption, which provides strong data encryption and authentication based on a pre-shared key.

- Wireless access that can be restricted by MAC address.

- Wireless network name broadcast that can be turned off so that only devices that have the network name (SSID) can connect.

Autosensing Ethernet Connections with Auto Uplink

The WiFi range extender can connect to a standard Ethernet network. The LAN interface is autosensing and capable of full-duplex or half-duplex operation.

The WiFi range extender incorporates Auto Uplink™ technology. The Ethernet port automatically senses whether the Ethernet cable plugged into the port should have a normal connection, such as to a computer, or an uplink connection, such as to a switch or hub. That port then configures itself to the correct configuration. This feature also eliminates the need to worry about crossover cables, as Auto Uplink accommodates either type of cable to make the right connection.

Wireless Repeater Capability

The WiFi range extender is configurable as a base or repeater station in order to extend range. This allows you to use it with wireless access points (APs) to build large bridged wireless networks. For more information, see "Wireless Repeating Function" on page 4-1.

Quality of Service (QoS)

Built-in Quality of Service (QoS) ensures prioritization of Voice over Internet Protocol (VoIP) and gaming traffic. For more information, see "QoS Setup" on page 4-6.

Automatic Firmware Updates

The WiFi range extender is automatically updated with the latest router firmware during installation and at login. For more information, see "Using Automatic Firmware Update upon Login" on page 1-6 and "Firmware Update" on page 3-11.

Compatible and Related NETGEAR Products

NETGEAR products related to the RangeMax WiFi Range Extender WPN824EXT are as follows:

*   RangeMax Wireless USB 2.0 Adapter (WPN111)
*   RangeMax Wireless PCI Adapter (WPN311)
*   RangeMax Wireless PC Card (WPN511)

Performance, Placement, and Range Guidelines

You should select the physical placement of your WiFi range extender to maximize the network speed. The operating distance or range of your wireless connection can vary significantly based on the physical placement of the WiFi range extender. The latency, data throughput performance, and notebook power consumption of wireless adapters also vary depending on your configuration choices.

> → **Note:** Failure to follow these guidelines can result in significant performance degradation or inability to wirelessly connect to the WiFi range extender. For complete range and performance specifications, see Appendix A, "Technical Specifications."

For best results, place your WiFi range extender:

- 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).

- Away from sources of interference, such as computers, microwaves, and 2.4 GHz cordless phones.

- Away from large metal surfaces.

The time it takes to establish a wireless connection can vary depending on both your security settings and placement. WEP connections can take slightly longer to establish. Also, WEP and WPA-PSK \encryption can consume more battery power on a notebook computer.

When used on a metallic surface, MIMO units must be oriented vertically to ensure proper operation:
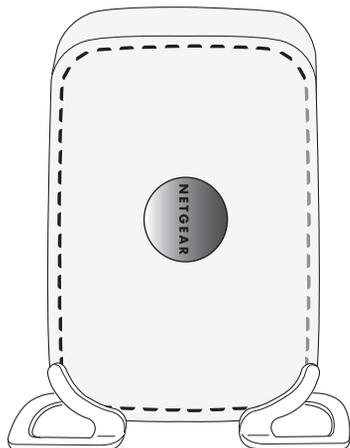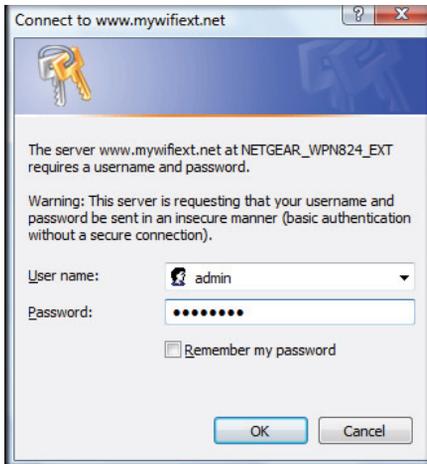

Figure 1-1

Logging In

> → **Note:** For first-time installation and basic troubleshooting of your WiFi range extender, refer to the setup manual, the *NETGEAR RangeMax WiFi Range Extender Setup Manual*.

To access the extender using its login name and password:

1. Type **http://www.mywifiext.net** or **http://www.mywifiext.com** in the address field of your browser, and then press Enter.

   A login window similar to the one shown in Figure 1-2 displays.

Figure 1-2

2. When prompted, enter **admin** for the extender user name and **password** for the extender password, both in lowercase letters. (For security reasons, the extender has its own user name and password.) If you later change the user name and password from the defaults, use what you have set up.

> → **Note:** The extender 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.

Using Automatic Firmware Update upon Login

The Checking for Firmware Updates screen appears when you log in in unless you previously cleared the Check for Updated Firmware Upon Log-in check box. For information about checking for new firmware through the main menu, see "Firmware Update" on page 3-11.
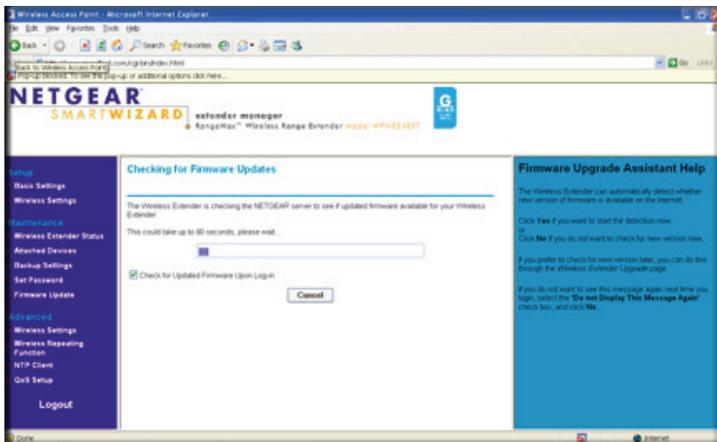

Figure 1-3

1. Allow the update feature to check for firmware updates more recent than the firmware currently installed in your WiFi range extender.

   If the update feature discovers a newer version of software, you are asked if you want to upgrade to the new software.
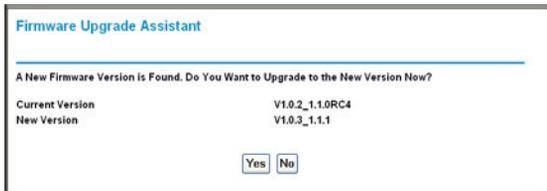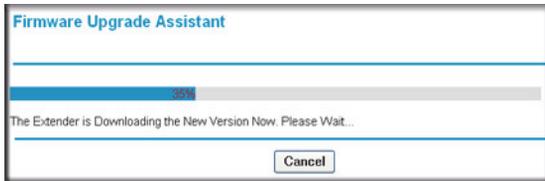

Figure 1-4

2. To download and install a newer version, click **Yes**.

The update feature automatically installs the most recent firmware.

> ⚠️ **Warning:** Do not try to go online, turn off the extender, shut down the computer, or do anything else to the extender until the extender finishes downloading!
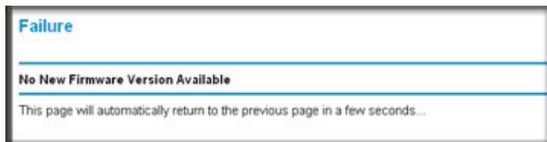

Figure 1-5
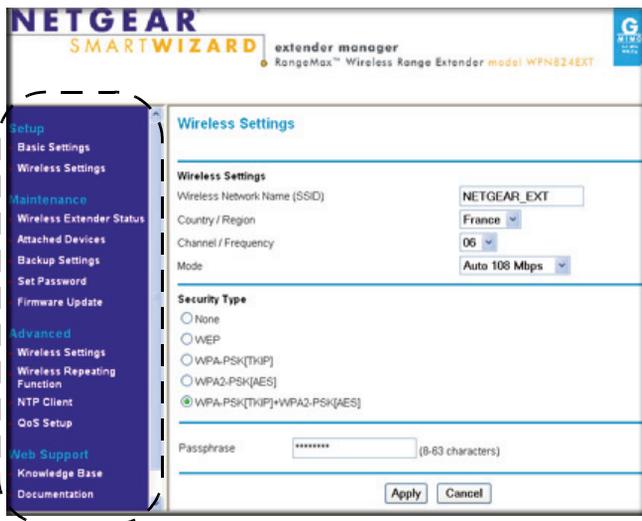
The thank you window also displays.

Figure 1-6

If no new firmware is available, the following message appears.

Figure 1-7

About the WiFi Range Extender Main Menu

When you log in to the WiFi range extender, the main menu displays.

Figure 1-8

To find information about the selections on the main menu, see the following topics in this manual:

Table 1-1. WiFi Range Extender Main Menu

WiFi Range Extender Main Menu		Topic in Manual
Setup	Basic Settings	"Basic Settings" on page 3-1
	Wireless Settings	Chapter 2, "Implementing Appropriate Wireless Security
Maintenance	Wireless Extender Status	"Wireless Extender Status" on page 3-3
	Attached Devices	"Attached Devices" on page 3-7
	Backup Settings	"Backup Settings" on page 3-8
	Set Password	"Set Password" on page 3-9
	Firmware Update	"Firmware Update" on page 3-11

Table 1-1. WiFi Range Extender Main Menu (continued)

WiFi Range Extender Main Menu		Topic in Manual
Advanced	Wireless Settings	Chapter 2, "Implementing Appropriate Wireless Security
	Wireless Repeating Function	"Wireless Repeating Function" on page 4-1
	NTP Client	"NTP Client" on page 4-5
	QoS Setup	"QoS Setup" on page 4-6
Web Support	KnowledgeBase	"Technical Support and Documentation" on page ii
	Documentation	"Technical Support and Documentation" on page ii

Introduction

Chapter 2
Implementing Appropriate Wireless Security

Unlike wired network data, your wireless data transmissions can be received well beyond your walls by anyone with a compatible adapter. For this reason, use the security features of your wireless equipment. The WiFi range extender provides highly effective security features, which are covered in detail in this chapter.

Enhancing the Security of Your Network
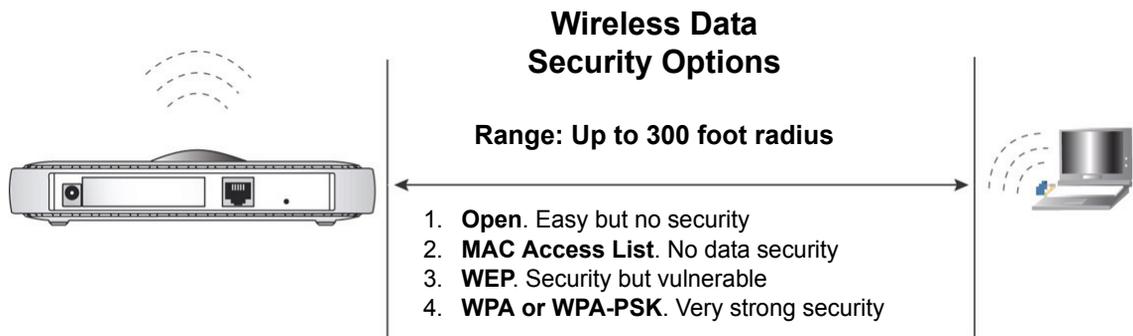
Deploy the security features appropriate to your needs.

**Wireless Data
Security Options**

Range: Up to 300 foot radius

1. **Open**. Easy but no security
2. **MAC Access List**. No data security
3. **WEP**. Security but vulnerable
4. **WPA or WPA-PSK**. Very strong security

Figure 2-1

> **Note:** Indoors, computers can connect over 802.11b/g wireless networks at ranges of up to 300 feet. Such distances can allow for others outside of your immediate area to access your network.

There are several ways you can enhance the secur ity of your wireless network.

- **Restrict access based on MAC address**. You can restrict access to only trusted computers so that unknown computers cannot wirelessly connect to the WPN824EXT. MAC address filtering adds an obstacle against unwanted access to your network, but the data broadcast over the wireless link is fully exposed.

- **Turn off the broadcast of the wireless network name (SSID)**. If you disable broadcast of the SSID, only devices that have the correct SSID can connect. This nullifies the wireless network "discovery" feature of some products such as Windows XP, but the data is still fully exposed to a determined snoop using specialized test equipment like wireless sniffers.

- **WEP**. Wired Equivalent Privacy (WEP) data encryption provides data security. WEP Shared Key authentication and WEP data encryption block all but the most determined eavesdropper.

- **WPA-PSK**. Wi-Fi Protected Access–Pre-Shared Key (WPA-PSK) data encryption provides strong data security. WPA-PSK blocks eavesdropping. Because this is a new standard, wireless device driver and software availability might be limited.

Wireless Settings Record

Before customizing your wireless settings, NETGEAR recommends that you 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 will choose the settings for your wireless network. Either way, record the settings for your wireless network in the spaces below.

- **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 WiFi range extender. In some configuration utilities (such as in Windows XP), the term "wireless network name" is used instead of 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 set to Shared Key as well 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 WiFi range extender.

  – **Data encryption (WEP) keys**. There are two methods for creating WEP data encryption keys. Whichever method you use, record the key values in the spaces below.

    - **Passphrase method**. _____ These characters *are* case-sensitive. Enter a word or group of printable characters, and click the Generate Keys button. Not all wireless devices support the passphrase method.

- • **Manual method**. These values *are not* case-sensitive. For 64-bit WEP, enter 10 hex digits (any combination of 0–9 or a–f). For 128-bit WEP, enter 26 hex digits.

  Key 1: _____

  Key 2: _____

  Key 3: _____

  Key 4: _____

- • **If WPA-PSK authentication is used**.

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

Use the procedures described in this chapter to configure the WiFi range extender. Store this information in a safe place.

# Setting Up and Testing Basic Wireless Connectivity

→ **Note:** If you use a wireless computer to configure WPA settings, you will be disconnected when you click Apply. Reconfigure your wireless adapter to match the new settings or access the WiFi range extender 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. Log in to the WiFi range extender (see "Logging In" on page 1-5).

2. Select **Wireless Settings** in the main menu of the WiFi range extender. The Wireless Settings screen displays.
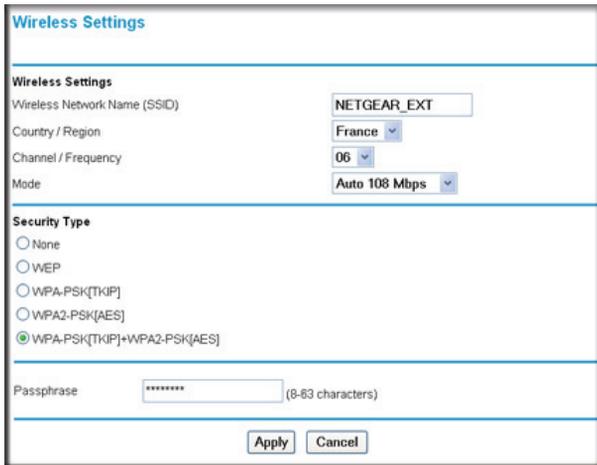
Figure 2-2

3. Choose a suitable descriptive name for the wireless network name (SSID). In the **Wireless Network Name (SSID)** field, enter a value of up to 32 alphanumeric characters. The default SSID is **NETGEAR_EXT**.

> **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 WiFi Range Extender WPN824EXT. If they do not match, you will not get a wireless connection to the WPN824EXT.

4. Set the country/region. Select the region in which the wireless interface will operate. It might not be legal to operate the WiFi range extender in a country or region other than the one shown here. See online help for more details. To change the country/region, select from the drop-down list. The region selection feature might not be available in the localized version of the firmware that you have.

5. Set the channel/frequency. 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 network. For more information about the wireless channel frequencies, click the link to the online document "Wireless Networking Basics" in Appendix B.

6. Set the operating mode. Select the wireless operating mode you want. The default is **Auto 108 Mbps**. You can change this to **b only**, **g only**, or **802.11b/g mixed**.

7. For initial configuration and test, leave the security setting as set when you installed the WiFi range extender. Once your computers have basic wireless connectivity, you can configure the advanced wireless security functions, as described in "Configuring Advanced Wireless Settings" on page 2-7.

8. Click **Apply** to save your changes.

> → **Note:** If you are configuring the WPN824EXT from a wireless computer and you change the WPN824EXT's SSID, channel, or security settings, you will lose your wireless connection when you click on Apply. You must then change the wireless settings of your computer to match the WPN824EXT's new settings.

9. Configure and test your computers for wireless connectivity.

   Program the wireless adapter of your computers to have the same SSID and channel that you configured in the WPN824EXT. Check that they have a wireless link and are able to obtain an IP address by DHCP from the WPN824EXT.

Selecting a Wireless Security Option

To select a wireless security option:

1. Log in to the WiFi range extender (see "Logging In" on page 1-5).

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

3. Select a security type. If the information is required, **Passphrase**, **Authentication Type**, **Encryption Strength,** or **Security Encryption (WEP) Key** fields appear after you select a security type, as described in Table 2-1 on page 2-6.

> → **Note:** For more information on wireless security, click the link to the online document "Wireless Networking Basics" in Appendix B, or the WiFi range extender help screens.
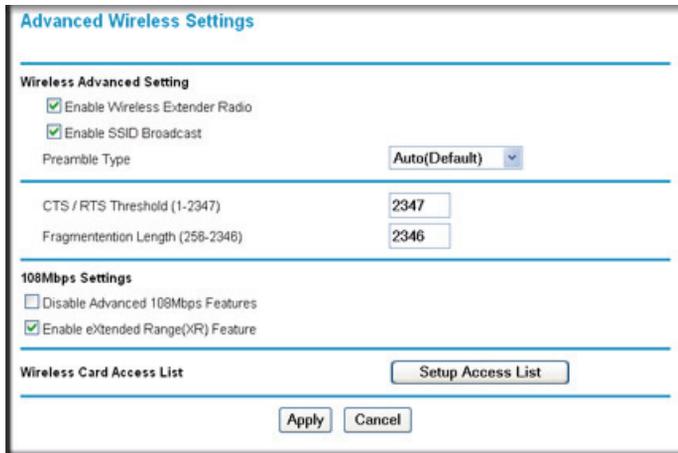
Table 2-1. Wireless Security Options

Security Type	Description
None	No wireless security. Recommended only for troubleshooting wireless connectivity.

WEP. WEP (Wired Equivalent Privacy)	.WEP offers the following options:
	• Open System
	  With Open Network authentication and 64 or 128 bit WEP data encryption, the WPN824EXT *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 in order 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.
	  Note: Not all wireless adapter configuration utilities support passphrase key generation.
	• Automatic
	  The WiFi range extender automatically detects whether Open System or Shared Key is used.

WPA-PSK (TKIP). Wi-Fi Protected Access with Pre-Shared Key, use WPA-PSK standard encryption with TKIP encryption type. **WPA2-PSK (AES)**. Wi-Fi Protected Access version 2 with Pre-Shared Key, use WPA2-PSK standard encryption with the AES encryption type.	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. Enter a word or group of printable characters in the Password Phrase field. These characters *are* case-sensitive. **Note**: Not all wireless adapter configuration utilities support WPA-PSK and WPA2-PSK. Furthermore, client software is required on the client. Windows XP Service Pack 2 and Windows XP Service Pack 1 with WPA patch do include the client software that supports WPA. However, the wireless adapter hardware and driver must also support WPA.
WPA-PSK (TKIP) + WPA2-PSK (AES). 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).

4. Click **Apply**, or click **Cancel** to return to the original settings.

Configuring Advanced Wireless Settings

To configure the advanced wireless settings of your WiFi range extender:

1. Select **Wireless Settings** under Advanced on the main menu. The Advanced Wireless Settings screen displays.
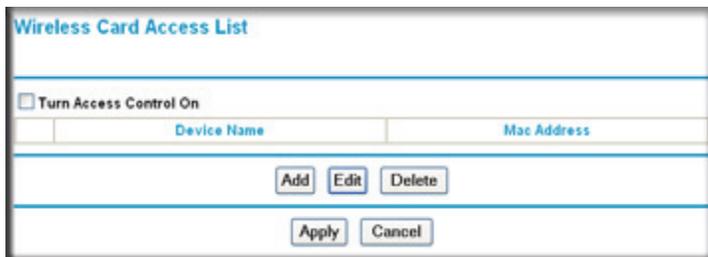

Figure 2-3

2. Enable or fill in the following fields, as appropriate:

- **Enable Wireless Extender Radio**. If selected, attached wireless clients will be able to access the Internet. If not selected, attached wireless clients will not be able to access the Internet. The Wireless status light on the front of the wireless extender will also display the current status of the WiFi range extender (on, off) to let you know if it is disabled or enabled.

- **Enable SSID Broadcast**. If selected, the WiFi range extender's SSID will broadcast its name (SSID) to all attached wireless clients. Attached wireless clients that have no SSID (or a null value) can then adopt the correct SSID for connections to the extender. If you disable broadcast of the SSID, only devices that have the correct SSID can connect. Disabling SSID broadcast nullifies the wireless network discovery feature of some products such as Windows XP.

- **CTS/RTS Threshold (1–2347)**. This setting is reserved for wireless testing and advanced configuration only. For best performance, leave this at the default setting (2347).

- **Fragmentation Length (256–2346)**. The maximum packet size used for fragmentation. Packets larger than the size entered in this field will be fragmented. The Fragment Threshold value must be larger than the RTS Threshold value. For best performance, leave this at the default setting (2346).

- **Disable Advanced 108Mbps Features**. If this checkbox is selected, the WiFi range extender will not perform data compression, packet bursting, and large frame support. For the best performance, leave this at the default setting.

- **Enable eXtended Range(XR) Feature**. This technology, eXtended Range(XR), requires no additional configuration and provides significantly longer range over 802.11 by maintaining connectivity when signals encounter barriers. For the best performance, leave this check box selected, the default setting.

- **Wireless Card Access List**. By default, any wireless computer that is configured with the correct SSID will be allowed access to your wireless network. For increased security, you can restrict access to the wireless network to allow only specific computers based on their MAC addresses. The Wireless Card Access Setup screen displays a list of wireless computers that are allowed to connect to the WiFi range extender based on their MAC addresses. These wireless computers must also have the correct SSID and WEP settings configured on the Wireless Settings screen to access the wireless network.

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

To turn access control on:

1. Click **Setup Access List**. The Wireless Card Access List screen displays.

Figure 2-4

2. Select the **Turn Access Control On** check box to restrict wireless computers by their MAC addresses.

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

4. Use the **Add**, **Edit**, and **Delete** buttons to add wireless computers to the list. The Wireless Card Entry screen displays.
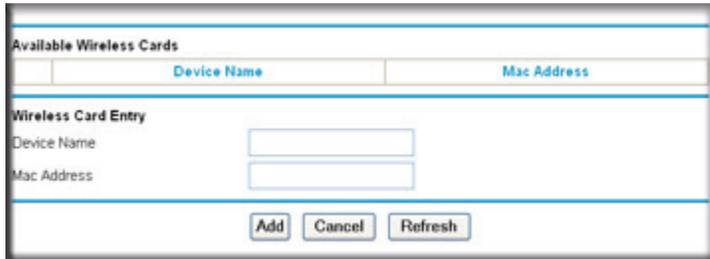
Figure 2-5

→ **Note:** If Turn Access Control On is enabled and the Access Control List is blank, then no wireless computers can connect to your wireless network.

Do one of the following:

- If a wireless computer appears in the Available Wireless Cards list, you can capture its MAC address and add it to your list.

- You can manually enter the information for the PC.

→ **Note:** Refer to the online help for more information.

5. Click **Add** to save changes and return to the Wireless Settings screen.

Chapter 3
Setup and Maintenance

This chapter describes the features you can configure or view under Setup and Maintenance in the main menu of your WiFi range extender.

Basic Settings

> ⚠ **Warning:** The WiFi range extender is already configured with the optimum settings. Incorrect settings might unexpectedly disable the WiFi range extender.

Select **Basic Settings** under Setup in the main menu. The Basic Settings screen displays.

Figure 3-1

- **Internet IP Address**. The WiFi range extender is shipped preconfigured to automatically request an IP address through a DHCP server from your service provider. For more help, see "Preparing Your Network" in Appendix B, "Related Documents."

- To configure the Internet IP address, do one of the following:

- To allow your ISP to assign an IP address for the WiFi range extender, select **Get Dynamically From ISP Gateway**.

- To enter a permanent, fixed (static) IP address for the WiFi range extender, select **Use Static IP Address**, and enter the IP address, subnet mask, and default gateway.

• **Domain Name Server (DNS) Address**. If you know that your ISP does not automatically transmit DNS addresses to the WiFi range extender during login, you should contact your ISP to get DNS server addresses.

To configure the Domain Name Server (DNS) address, do one of the following:

- To allow your WiFi range extender to get ISP to assign an IP address for the WiFi range extender, select **Get Automatically From ISP Gateway**.

- 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.

• **Test**. To test for a successful Internet connection, click **Test**.

If you do not connect:

- Review the settings and make sure that you have selected the correct options and typed everything correctly.

- Check that your ISP is working correctly.

- Contact your ISP to verify the configuration information.

- Review troubleshooting in the setup manual, the *NETGEAR RangeMax WiFi Range Extender Setup Manual*, available on the *Resource CD*.

- Contact NETGEAR Technical Support.

To save your settings, click **Apply**, or click **Cancel** to return to the original settings.

Wireless Settings

→ **Note:** The Wireless Settings options are described in the context of configuring wireless security. See Chapter 2, "Implementing Appropriate Wireless Security" .

Wireless Extender Status

The Wireless Extender Status screen provides status and usage information. Select **Wireless Extender Status** under Maintenance in the main menu. The Wireless Extender Status screen displays.

Wireless Extender Status

Firmware Version	V1.0.3_1.1.1RC4
Hardware Version	0.5

IP Settings

MAC Address	00:1B:2F:AF:EC:11
IP Address	10.1.32.39
IP Subnet Mask	255.255.255.0
Default Gateway	10.1.32.13
Domain Name Server	10.1.1.6 10.1.1.7
DHCP Client	Enable

Wireless Settings

Wireless Network Name (SSID)	NETGEAR_EXT
Country / Region	France
Channel	6
Operation Mode	Auto 108 Mbps
Security Options	WPA-PSK/WPA2-PSK
Wireless AP	ON
Broadcast Name	ON

[Show Statistics] [Connection Status]

Figure 3-2

This screen shows the following settings:

Table 3-1. Wireless Range Extender Status Fields

Field		Description
Firmware Version		This is the version of the current software the extender is using. This will change if you upgrade your extender.
Hardware Version		This is the version of the physical device.
IP Settings		These are the current settings that you configured in the Basic Settings screen.
	MAC Address	The Media Access Control address, the physical address, being used by the Internet (WAN) port of the extender.
	IP Address	The IP address being used by the Internet port of the extender. The default IP address of the extender is **192.168.1.250**. If no address is shown, or is 0.0.0.0, the extender cannot connect to the Internet.
	IP Subnet Mask	The IP subnet mask being used by the Internet (WAN) port of the extender. For an explanation of subnet masks and subnet addressing, click the link to the online document "TCP/IP Networking Basics" in Appendix B.
	Default Gateway	The assigned default gateway address (the local network address) that the extender is connected to. If it is assigned dynamically, and no Internet connection exists, this is blank or 0.0.0.0.
	Domain Name Server	The Domain Name Server addresses being used by the extender. A Domain Name Server translates human language URLs, such as http://www.netgear.com, into IP addresses.
	DHCP Client	If disabled, the extender is configured to use a fixed IP address. If enabled, the extender is configured to obtain an IP address dynamically.
Wireless Settings		These are the current settings that you configured in the Wireless Settings screen.
	Wireless Network Name (SSID)	The wireless network name (SSID) being used by the wireless port of the extender. The default is NETGEAR_EXT.
	Country/Region	The geographic region where the extender being used. It might be illegal to use the wireless features of the extender in some parts of the world.
	Channel	Identifies the channel of the wireless port being used. Click the link to the online document "Wireless Networking Basics" in Appendix B for the frequencies used on each channel.
	Operation Mode	Indicates the extender communication mode: 802.11g and 802.11b, 802.11g only, 802.11b only, 108 Mbps only, or Auto 108 Mbps.
	Security Options	This is the security type you configured.

Table 3-1.   Wireless Range Extender Status Fields (continued)

Field		Description
	Wireless AP	Indicates whether the wireless interface is enabled. If not enabled, the Wireless status light on the front panel is off.
	Broadcast Name	Indicates if the extender is broadcasting its SSID.

Click **Show Statistics** to display performance statistics such as the number of packets sent and number of packets received for each port. The Statistics screen displays.
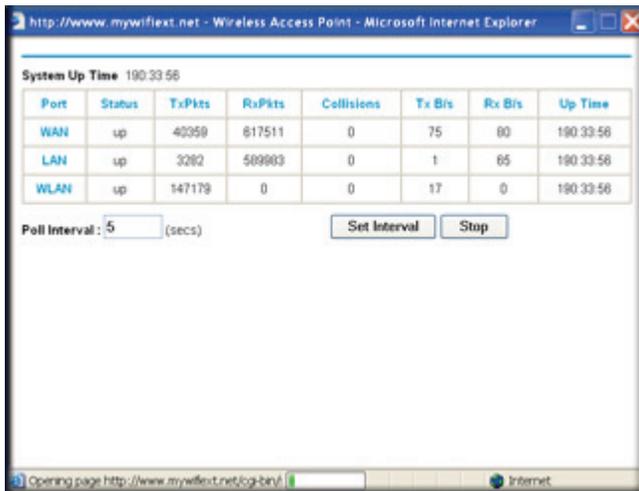
Figure 3-3

This screen shows the following settings:

Table 3-2.   Wireless Range Extender Statistics Fields

Field	Description
System Up Time	The amount of time since the extender was last restarted.
Port	The statistics for the Internet and local ports. For each port, the screen displays the following information:
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.

Table 3-2. Wireless Range Extender Statistics Fields (continued)

Field	Description
Tx B/s	The current transmission (outbound) bandwidth used on the Internet and local ports.
Rx B/s	The current reception (inbound) bandwidth used on the Internet and local ports.
Up Time	The amount of time since the extender was last restarted.
Poll Interval	Specifies the intervals at which the statistics are updated in this window. (Click **Stop** to freeze the display.)
Set Interval	Enter a time, and then click **Set Interval** to set the polling frequency.
Stop	Click **Stop** to freeze the polling information.

Click **Connection Status** to display status. The Connection Status screen displays.
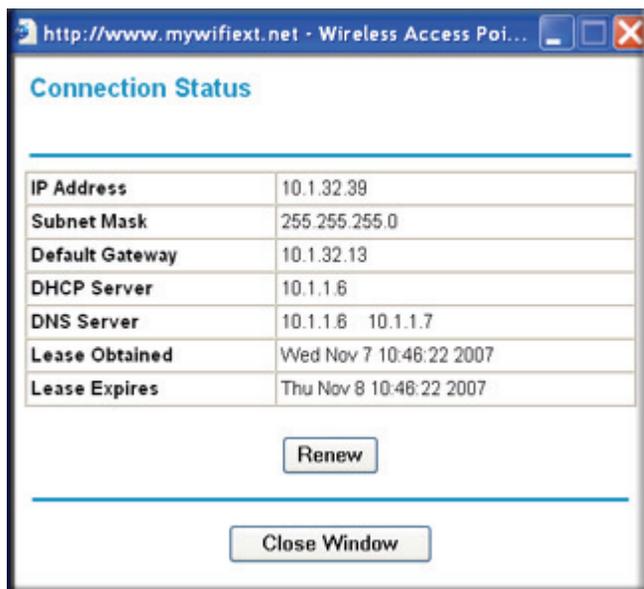
Figure 3-4

This screen shows the following settings:

Table 3-3. Wireless Range Extender Connection Status Fields

Field	Description
IP Address	The Internet IP address assigned to the extender.
Subnet Mask	The Internet Subnet Mask assigned to the extender.
Default Gateway	The Internet default gateway the extender communicates with.
DHCP Server	The IP address of the DHCP server that provided the IP configuration addresses.
DNS Server	The IP address of the DNS server that provided the network name to IP address translation.
Lease Obtained	When the DHCP lease was obtained.
Lease Expires	When the DHCP lease expires.
Renew	Click **Renew** to renew the DHCP lease.

Attached Devices

The Attached Devices screen contains a table of all IP devices that the WiFi range extender has discovered on the local network. Select **Attached Devices** under Maintenance in the main menu. The Attached Devices screen screen displays.

Figure 3-5

For each device, the table shows the IP address, Ethernet MAC address, and device name (if available). To force the WiFi range extender to look for attached devices and update the table, click **Refresh**.

Note: If the WiFi range extender is restarted, the table data is lost until the extender rediscovers the devices.

Backup Settings

The configuration settings of the RangeMax WiFi Range Extender WPN824EXT are stored within the extender in a configuration file. The Backup Settings screen allows you to back up (save) this file to your computer, restore it, or reset it to the factory default settings.

Select **Backup Settings** under Maintenance in the main menu. The Backup Settings screen displays.

Figure 3-6

The following options are available:

* **Restore**, **Backup**. The Restore and Backup options in the Backup Settings screen allow you to save and retrieve a file containing your router's configuration settings, by doing one of the following:

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

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

> ⚠️ **Warning:** Do not interrupt the reboot process.

- **Erase**. Sometimes you might want to restore the extender to original default settings. You can do so by using the Erase function, which restores all factory settings. After an erase, the extender's user name is **admin**, the password is **password**, the LAN IP address is 192.168.1.250, and the extender's DHCP server is enabled.

  To erase the configuration, click the **Erase** button.

> → **Note:** 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 extender. See "Restoring the Default User Name and Password" on page A-4

Set Password

The Set Password screen allows you to change the default password for the WiFi range extender, **password**, to a more secure password. (For more information about logging in and the default settings, see "Logging In" on page 1-5 and "Restoring the Default User Name and Password" on page A-4.)

Select **Set Password** under Maintenance in the main menu. The Set Password screen displays.

Figure 3-7

> **Tips:**
>
> - An ideal, very secure password should contain no dictionary words from any language, and should be a mixture of letters (both upper- and lower-case), numbers, and symbols. Your password can be up to 30 characters.
>
> - Before changing the router password, use the router backup utility (see "Backup Settings" on page 3-8) to save your configuration settings. If, after changing the password, you forget the new password you assigned, you have to reset the router back to the factory defaults to be able to log in using the default password of password. This means you have to restore all the router configuration settings. If you ever have to reset the router back to the factory defaults, you can restore your settings from the backup.

To change the password, first enter the current password, then enter the new password twice. Click **Apply**.

Firmware Update

The Firmware Update screen allows you to manage firmware updates after you have installed your WiFi range extender. Select **Firmware Update** under Maintenance in the main menu. The Firmware Update screen displays.

Figure 3-8

The following options are available:

- **Check for New Version from the Internet**. The WiFi range extender checks the NETGEAR database for a newer firmware image file and compares it to your currently installed version. To force the extender to check for a newer version, click **Check**.

– If a new version is found, you are asked about upgrading. Click **Yes** to update your firmware.

> ⚠ **Warning:** Do not turn off the extender, shut down the computer, or do anything else to the extender while the update is in progress, as indicated by the messages that display.

– If no new firmware version is available, the message **No New Firmware Version Available** displays.

• **Check for New Version Upon Login**. If this option is selected (the default), the extender checks the NETGEAR database for a newer firmware image file every time you log in. To disable this feature, clear the check box.

• **Locate and select the Update file from your hard disk**. Use this field, and the **Browse** and **Update** buttons, to manually check for new firmware.

To manually check and upload new firmware, use the following steps.

> → **Note:** You cannot perform the following steps from a computer connected to the extender through a wireless link. You must use a computer connected to the extender through an Ethernet cable, and your Web browser must support HTTP uploads, such as Microsoft Internet Explorer 6.0 or later, or Netscape Navigator 4.78 or later.

    a. Log in to the WiFi range extender.

    b. Select **Wireless Extender Status** under Management in the main menu. When the Wireless Extender Status screen displays, note the version number of your extender firmware.

    c. Go to *http://www.NETGEAR.com/support*, and select **Downloads** from the menu bar.

    d. From the **Product Selection** drop-down list, select **WPN824EXT**. The Product Support page for your extender displays.

    e. Under Downloads**,** check the most recent firmware version offered against the firmware version shown on your Wireless Extender Status screen.

    f. If the version on the NETGEAR website is more recent, click the version number. Then, click **Right-click and Save to Download**, and save the file to a location on your hard disk.

    g. Log in again to the WiFi range extender, then select **Firmware Update** under Maintenance in the main menu.

h. Click **Browse** and locate the unzipped firmware image that you downloaded to your PC (the file ends in .img or .chk).

i. Once you have selected the file, click **Upload** to send the software to the extender. The upload process takes several minutes. When the software upload process is complete, the extender restarts.

> ⚠ **Warning:** Do not try to go online, turn off the extender, shut down the computer, or do anything else to the extender until the extender finishes restarting! When the Test light stops blinking, wait a few seconds more before using the extender.

j. After the extender has restarted, select **Wireless** Extender **Status** under Management in the main menu. Check the firmware version to verify that your extender now has the new software installed.

Chapter 4
Advanced Settings and Features

This chapter describes the features you can configure or view under Advanced in the main menu of your WiFi range extender.

Advanced Wireless Settings

→ **Note:** The Advanced Wireless Settings options are described in the context of configuring wireless security. See Chapter 2, "Implementing Appropriate Wireless Security."

Wireless Repeating Function

The WiFi range extender can be used with wireless access points (APs) to build large bridged wireless networks, using the Wireless Repeating Function screen.

⚠ **Warning:** If you use the Wireless Repeating function, be aware that this limits your options for wireless security to none or WEP. For more information about wireless security, see Chapter 2, "Implementing Appropriate Wireless Security."

Select **Wireless Repeating Function** under Advanced in the main menu. The Wireless Repeating Function screen displays.

Wireless Repeating Function

☐ **Enable Wireless Repeating Function**

Wireless MAC of this Extender : 00:1B:2F:AF:EC:11

○ **Wireless Repeater**

| Repeater IP Address | 0 | 0 | 0 | 0 |

☐ Disable Wireless Client Association

| Base Station MAC Address | |

○ **Wireless Base Station**

☐ Disable Wireless Client Association

Repeater MAC Address 1	
Repeater MAC Address 2	
Repeater MAC Address 3	
Repeater MAC Address 4	

[Apply] [Cancel]

Figure 4-1

The RangeMax WiFi Range Extender WPN824EXT supports two modes of the Wireless Repeating function:

- **Both "Enable Wireless Repeating Function" and "Wireless Repeater" are selected.** In Wireless Repeater mode, the WiFi range extender sends all traffic from its local wireless or wired computers to a remote AP. To configure this mode, you must know the MAC address of the remote parent AP.

- **Both "Enable Wireless Repeating Function" and "Wireless Base Station" are selected.** In Wireless Base Station mode, the WiFi range extender acts as the parent AP, bridging traffic to and from the child repeater APs, as well as handling wireless and wired local computers. To configure this mode, you must know the MAC addresses of the child repeater APs.

In either of these modes, you can configure whether the extender (or AP) will communicate with local wireless computers by selecting or clearing the Disable Wireless Client Association check box:

- **"Disable Wireless Client Association" not selected.** In addition to performing wireless repeating with remote APs, the extender will act as an AP to connect local wireless computers.

- **"Disable Wireless Client Association" selected**. The extender will communicate wirelessly only with other APs whose MAC addresses are listed in this screen. The extender will not accept local wireless connections. (Communication with wire-connected LAN devices is not disabled.)

The following figure shows a wireless repeating scenario with the WiFi range extender in Wireless Base Station mode, and with all APs supporting local wireless clients:
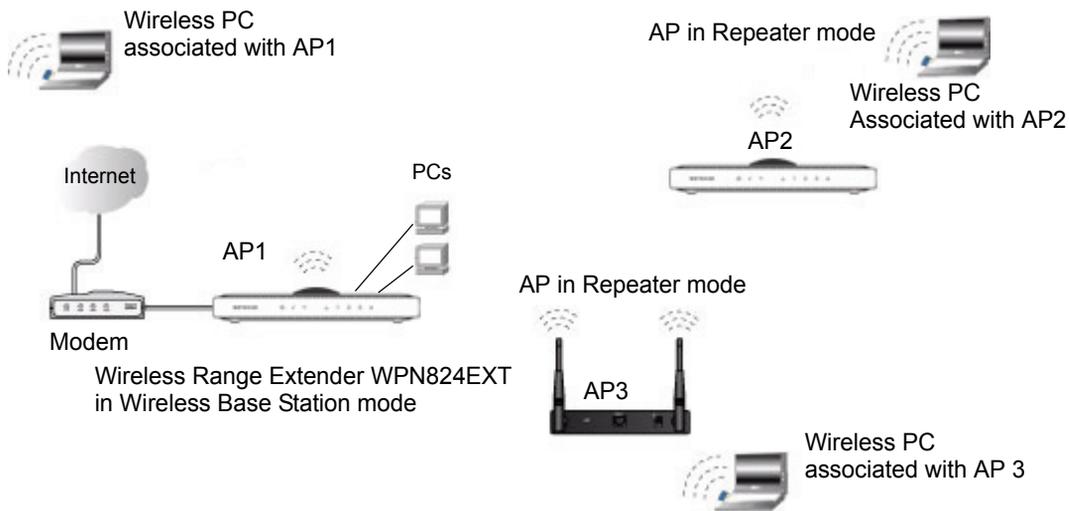
Figure 4-2

In the scenario shown, the following conditions must be met for all access points including the WiFi range extender:

- All AP devices must use the same SSID, wireless channel, authentication mode (if any), and encryption mode (see information about WEP in Chapter 2, "Implementing Appropriate Wireless Security").

- All APs must be on the same LAN IP subnet. That is, all the AP LAN IP addresses are in the same network.

- All LAN devices (wired and wireless PCs in Figure 4-2) must be configured to operate in the same LAN network address range as the APs.

• If you are using DHCP, the **Get Dynamically From ISP Gateway** radio button in the Internet IP Address section of the Basic Settings screen should be selected for all AP devices in the IP Address Source portion.

To set up the repeater configuration shown in Figure 4-2:

1. Configure the operating mode of AP1 (the WiFi range extender in Figure 4-2) as a wireless base station with the MAC addresses of AP2 and AP3 in the first two **Repeater MAC Address** fields.

2. Configure the operating mode of AP2 and AP3 as wireless repeater with the MAC address of AP1, the WiFi range extender, in the **Base Station MAC Address** field.

3. Configure AP2 and AP3 to have a static IP address in their **Repeater IP Address** fields.

4. Verify connectivity across the LANs.

   A computer on any wireless or wired LAN segment of the WiFi range extender should be able to connect to the Internet or share files and printers with any other wireless or wired PC or server connected to any of the other APs.

In the scenario shown, a WiFi range extender can also be used as one of the "child" APs. Configure the WiFi range extender's Wireless Repeating Function settings as described for AP2 or AP3.

→	**Note:** If a WiFi range extender is used as a wireless repeater AP as shown in Figure 4-2 on page 4-3, you might need to change other configuration settings. In particular, you should disable the DHCP server function on the wireless repeater APs.

NTP Client

The WiFi range extender uses the Network Time Protocol (NTP) to obtain the current time and date from one of several Network Time Servers on the Internet, using the NTP Client screen. Select **NTP Client** under Advanced in the main menu. The NTP Client screen displays.
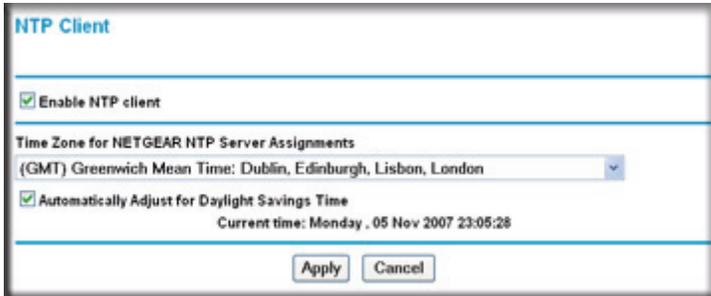
Figure 4-3

To localize the time for your log entries, you must specify your time zone:

* **Enable NTP client**. The NTP client is enabled by default. If you do not want the WiFi range extender to obtain the current time and date from an NTP server on the Internet, clear the **Enable NTP client** check box and click **Apply**.

* **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 WiFi range extender automatically adjusts the time at the start and end of the daylight savings time period.

QoS Setup

QoS is an advanced feature that you can use to prioritize some types of traffic ahead of others. The WiFi range extender can provide QoS prioritization over the wireless link and on the Internet connection. To configure QoS, use the QoS Setup screen. Select **QoS Setup** under Advanced in the main menu. 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

QoS Setup

☑ Enable WMM (Wi-Fi multi-media) Settings

☐ Turn Internet Access QoS On

Edit   Delete

Add Priority Rule

Apply   Cancel

Figure 4-4

Using WMM QoS for Wireless Multimedia Applications

The WiFi range extender supports Wi-Fi Multimedia Quality of Service (WMM QoS) to prioritize wireless voice and video traffic over the wireless link. WMM QoS is a feature that 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, WMM must be enabled for both the WiFi range extender and the client running the application. 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 4-4 on page 4-6, by clearing the **Enable WMM** checkbox and clicking **Apply**.

Configuring QoS for Internet Access

You can give prioritized Internet access to:
- Traffic for specific applications
- Traffic for specific online games
- Traffic on individual Ethernet LAN ports of the router
- Traffic 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. Select **QoS Setup** under Advanced in the main menu. The QoS Setup screen displays, shown in Figure 4-4 on page 4-6.

2. Click **Add Priority Rule**. The QoS Priority Rules screen displays.
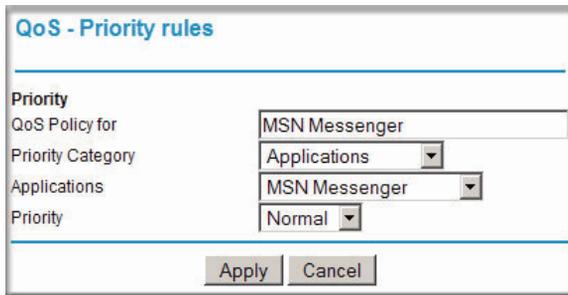
Figure 4-5

3. In the **Priority Category** list, select either **Applications** or **Online Gaming**. In either case, a list of predefined applications or games appears in the **Applications** drop-down list.

4. From the **Applications** drop-down 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 chose to add a new entry, the screen expands as shown:
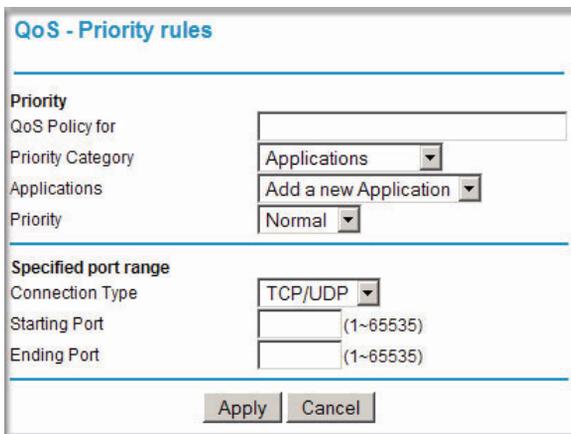
Figure 4-6

   b. In the **QoS Policy for** field, enter a descriptive name for the new application or game.

   c. Select the packet type, either **TCP** or **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. Open the QoS Setup screen, shown in .

2. Click **Add Priority Rule**.

3. From the **Priority Category** list, select **Ethernet LAN Port**. The QoS Priority Rules screen changes:
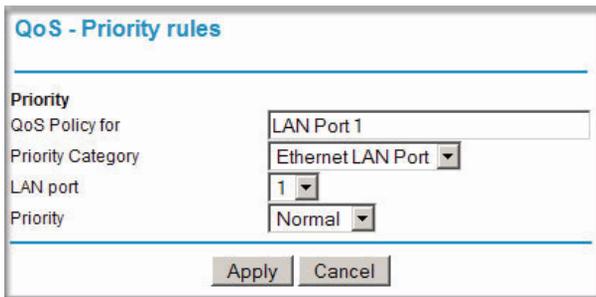
Figure 4-7

4. From the **LAN port** list, select the LAN port that will have a QoS policy.

5. 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**.

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 MAC Address

To create a QoS policy for traffic from a specific MAC address:

1. Open the QoS Setup screen, shown in .

2. Click **Add Priority Rule**.

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

Figure 4-8

4. 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.

5. 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**.

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**.

Editing or Deleting an Existing QoS Policy

To edit or delete an existing QoS policy:

1. Open the QoS Setup screen, shown in Figure 4-4 on page 4-6.

2. Select the radio button next to the QoS policy to be edited or deleted.

3. Do either 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.

4. Click **Apply** in the QoS Setup screen to save your changes.

Advanced Settings and Features

Appendix A
Technical Specifications

Default Configuration Settings

This appendix provides factory default settings and technical specifications for the RangeMax WiFi Range Extender WPN824EXT.

Table A-1. WiFi Range Extender Default Configuration Settings

Feature		Default Setting
Smart Wizard		Enabled
Extender Login		
	Extender Login URL	http://www. mywifiext.net *or* http://www.mywifiext.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
Local Network		
	Extender LAN IP address printed on product label (also known as modem-router IP address)	192.168.1.250
	Extender Subnet	255.255.255.0
	DHCP Server	Enabled
	Time Zone	(GMT) Greenwich Mean Time
	Time Zone Adjusted for Daylight Saving Time	Enabled

Table A-1. WiFi Range Extender Default Configuration Settings (continued)

Feature	Default Setting
Wireless	
Wireless Communication	Enabled
SSID Name	NETGEAR_EXT
Security	Disabled
Broadcast SSID	Enabled
Transmission Speed	Auto[a]
Country/Region	United States in the U.S., otherwise varies by region
RF Channel	Auto
Operating Mode	802.11 g/b
Data Rate	Best
Output Power	Full
Network Protocol and Standards Compatibility	
Data and Routing Protocols	TCP/IP, DHCP
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)	12 V DC @ 1A output, 22W maximum
Physical Specifications	
Dimensions	28 x 175 x 119 mm (1.1 x 6.89 x 4.68 in.)
Weight	0.3 kg (0.66 lb)
Environmental Specifications	
Operating temperature	0° to 40° C (32° to 104° F)
Operating humidity	90% maximum relative humidity, noncondensing

Table A-1. WiFi Range Extender Default Configuration Settings (continued)

Feature		Default Setting
Electromagnetic Emissions		
	Meets requirements of	FCC Part 15 Class B
		VCCI Class B
		EN 55 022 (CISPR 22), Class B
		C-Tick N10947
Interface Specifications		
	LAN	10BASE-T or 100BASE-Tx, RJ-45
	Internet	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	1, 2, 5.5, 6, 9, 12, 18, 24, 36, 48, 54, and 108 Mbps Auto Rate Sensing
	Frequency	2.4–2.5 Ghz
	Data Encoding	802.11b: Direct Sequence Spread Spectrum (DSSS) 802.11g: Orthogonal Frequency Division Multiplexing (OFDM)
	Maximum Computers Per Wireless Network	Limited by the amount of wireless network traffic generated by each node. Typically 30–70 nodes.
	Operating Frequency Ranges	2.412–2.462 GHz (US) 2.457–2.462 GHz (Spain) 2.412–2.484 GHz (Japan) 2.457–2.472 GHz (France) 2.412–2.472 GHz (Europe ETSI)
	802.11 Security	40 bit (also called 64 bit) and 128 bit WEP, WPA-PSK and WPA2-PSK.

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.

Restoring the Default User Name and Password

You can restore the factory default configuration settings to reset the extender's user name to **admin,** the password to **password,** and the IP address to **192.168.1.250**. 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 extender, for about 20 seconds.

2. Release the restore factory settings button, and wait for the extender to reboot.

    The factory default settings are restored so that you can access the extender 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
Windows XP and Vista Wireless Configuration Utilities	*http://documentation.netgear.com/reference/enu/winzerocfg/index.htm*
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*

v1.0, April 2008

Index

v1.0, April 2008