Dell™ Wireless 2350 Broadband Router User's Guide

Technical Specifications and Regulatory Information:

Wireless Interoperability

The Dell Wireless 2350 products are designed to be interoperable with any wireless LAN product that is based on direct sequence spread spectrum (DSSS) and orthogonal frequency division multiplexing (OFDM) radio technology and to comply with the following standards:

- IEEE 802.11b Standard on Wireless LAN
- IEEE 802.11g Standard on Wireless LAN
- Wireless Fidelity (WiFi) certification, as defined by the WECA (Wireless Ethernet Compatibility Alliance)

Wireless 802.11 and Your Health

The Dell Wireless 2350 Broadband Router, like other radio devices, emits radio frequency electromagnetic energy. The level of energy emitted by this device, however, is less than the electromagnetic energy emitted by other wireless devices such as mobile phones. The Dell Wireless 2350 device operates within the guidelines found in radio frequency safety standards and recommendations. These standards and recommendations reflect the consensus of the scientific community and result from deliberations of panels and committees of scientists who continually review and interpret the extensive research literature. In some situations or environments, the use of the Dell Wireless 2350 devices may be restricted by the proprietor of the building or responsible representatives of the applicable organization. Examples of such situations include the following:

- Using the Dell Wireless equipment on board airplanes, or
- Using the Dell Wireless equipment in any other environment where the risk of interference with other devices or services is perceived or identified as being harmful.

If you are uncertain of the policy that applies to the use of wireless devices in a specific organization or environment (an airport, for example), you are encouraged to ask for authorization to use the Dell Wireless 2350 device before you turn it on.

Technical Specifications

Standards supported

- IEEE 802.3, IEEE 802.3u, IEEE 802.11b, 802.11g

Protocols

- TCP/ IP, IPX, UDP, DHCP Client, DHCP Server

Environment

- Operating Humidity 10% to 85% (Non-Condensing)
- Storage Humidity 5% to 90% (Non-Condensing)
- Operating Temperature 0° to 40° C (32° F to 104° F)
- Storage Temperature 0° to 70° C (32° F to 158° F)

Power specification

Receive Sensitivity

- 11Mbps: 10-5 BER @ -80 dBm, typical
- 54Mbps: 10-5 BER @ -65 dBm, typical

Transmit Power

- Normal Temp Range: ±12 dBm

DC power supply

- Input: AC 100-250 50-60 Hz 1A
- Output: 5V DC 2A

Radio specification

Range: "Up to 100m" indoors and "Up to 450m" outdoors (open range)

Frequency range: 2.4 - 2.4835 GHz, direct sequence spread spectrum

Number of Channels:

- Europe: 11 (1-13)
- US: 11 (1-11)
- France: 2 (10-11)
- Japan: 11 (1-13)
- Taiwan: 11 (1-11)

Mobility: Seamless roaming across cell boundaries with handover

Specific features

Supported bit rates:

For 802.11g:

- 54 Mbps
- 48 Mbps
- 36 Mbps
- 24 Mbps
- 18 Mbps
- 12 Mbps
- 9 Mbps
- 6 Mbps

For 802.11b:

- 11 Mbps
- 5.5 Mbps
- 2 Mbps
- 1 Mbps

Data Encryption: WEP (64/128 bit) and WPA

Utility Software

- Setup Wizard software
- Control Utility software

Regulatory Information

The Dell Wireless 2350 wireless network device must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product. For country-specific approvals, see Radio approvals. Dell Inc is not responsible for any radio or television interference caused by unauthorized modification of the devices included with this Dell Wireless 2350 kit, or the substitution or attachment of connecting cables and equipment other than that specified by Dell Inc. The correction of interference caused by such unauthorized modification, substitution or attachment is the responsibility of the user. Dell Inc and its authorized resellers or distributors are not liable for any damage or violation of government regulations that may arise from the user failing to comply with these guidelines.

For the latest regulatory information, documentation, and other updates, please visit the Dell website at support.dell.com.

Canada -- Industry Canada (IC)

This device complies with RSS210 of Industry Canada.

Europe -- EU Declaration of Conformity

This equipment complies with the essential requirements of the European Union directive 1999/5/EC.

Cet équipement est conforme aux principales caractéristiques définies dans la Directive européenne RTTE 1999/5/CE.
Die Geräte erfüllen die grundlegenden Anforderungen der RTTE-Richtlinie 1999/5/EG.
Questa apparecchiatura è conforme ai requisiti essenziali della Direttiva Europea R&TTE 1999/5/CE.
Este equipo cumple los requisitos principales de la Directiva 1999/5/CE de la UE, "Equipos de Terminales de Radio y Telecomunicaciones".
Este equipamento cumpre os requisitos essenciais da Directiva 1999/5/CE do Parlamento

Europeu e do Conselho (Directiva RTT).
Deze apparatuur voldoet aan de noodzakelijke vereisten van EU-richtlijn betreffende radioapparatuur en telecommunicatie-eindapparatuur 1999/5/EG.
Dette udstyr opfylder de Væsentlige krav i EU's direktiv 1999/5/EC om Radio- og teleterminaludstyr.
Dette utstyret er i overensstemmelse med hovedkravene i R&TTE-direktivet (1999/5/EC) fra EU.
Utrustningen uppfyller kraven för EU-direktivet 1999/5/EC om ansluten teleutrustning och ömsesidigt erkännande av utrustningens överensstämmelse (R&TTE).
Tämä laite vastaa EU:n radio- ja telepäätelaitedirektiivin (EU R&TTE Directive 1999/5/EC) vaatimuksia.

France

Some areas of France have a restricted frequency band. The worst-case maximum authorized power indoors is:

10 mW for the entire 2.4 GHz band (2400 MHz - 2483.5 MHz)

100 mW for frequencies between 2446.5 MHz and 2483.5 MHz (NOTE - Channels 10 through 13 inclusive operate in the band 2446.6 MHz - 2483.5 MHz)

There are few possibilities for outdoor use: On private property or on the private property of public persons, use is subject to a preliminary authorization procedure by the Ministry of Defence, with maximum authorized power of 100 mW in the 2446.5 - 2483.5 MHz band. Use outdoors on public property is not permitted.

In the departments listed below, for the entire 2.4 GHz band:

Maximum authorized power indoors is 100 mW

Maximum authorized power outdoors is 10 mW

Departements in which the use of the 2400 - 2483.5 MHz band is permitted with an EIRP of less than 100 mW indoors and less than 10 mW outdoors:

01	Ain Orientales	36	Indre	66	Pyrénées
02	Aisne	37	Indre et Loire	67	Bas Rhin
03	Allier	41	Loir et Cher	68	Haut Rhin
05	Hautes Alpes	42	Loire	70	Haute Saône
08	Ardennes	45	Loiret	71	Saône et Loire
09	Ariège	50	Manche	75	Paris
11	Aude	55	Meuse	82	Tarn et Garonne
12	Aveyron	58	Nièvre	84	Vaucluse
16	Charente	59	Nord	88	Vosges
24	Dordogne	60	Oise	89	Yonne
25	Doubs	61	Orne	90	Territoire de Belfort
26	Drôme	63	Puy du Dôme	94	Val de Marne
32	Gers	64	Pyrénées Atlantique		

This requirement is likely to change over time, allowing you to use your wireless LAN card in more areas within France. Please check with ART for the latest information (www.art-telecom.fr)

> *NOTE: Your Dell Wireless 2350 Broadband Router transmits less than 100 mW, but more than 10 mW.*

Italia

A license is required for indoor use. Outdoor use is prohibited.
E' necessaria la concessione ministeriale anche per l'uso interno. Verificare con i rivenditori la procedura da seguire. L'uso per installazione in esterni non e' permessa.

USA -- Federal Communications Commission (FCC)

This device complies with Part 15 of the FCC Rules. Operation of the device is subject to the following two conditions:

This device may not cause harmful interference.

This device must accept any interference that may cause undesired operation.

Dell declares that WRTA-108GD (FCC ID: MXF-R930720G) is limited in CH1~CH11 for 2.4GHz by specified firmware controlled in U.S.A.

Interference statement

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 generates, uses, and can radiate radio frequency energy. If the equipment is not installed and used in accordance with the instructions, the equipment may cause harmful interference to radio communications. There is no guarantee, however, that such 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 taking one or more of the following measures:

Reorient or relocate the receiving antenna.

Increase the distance between the equipment and the receiver.

Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.

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

FCC Caution:

To assure continued compliance, any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

NOTE: This Dell Wireless 2350 wireless network device must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product. Any other installation or use will violate

	FCC Part 15 regulations.

IMPORTANT NOTE

FCC RF Radiation Exposure Statement

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Radio approvals

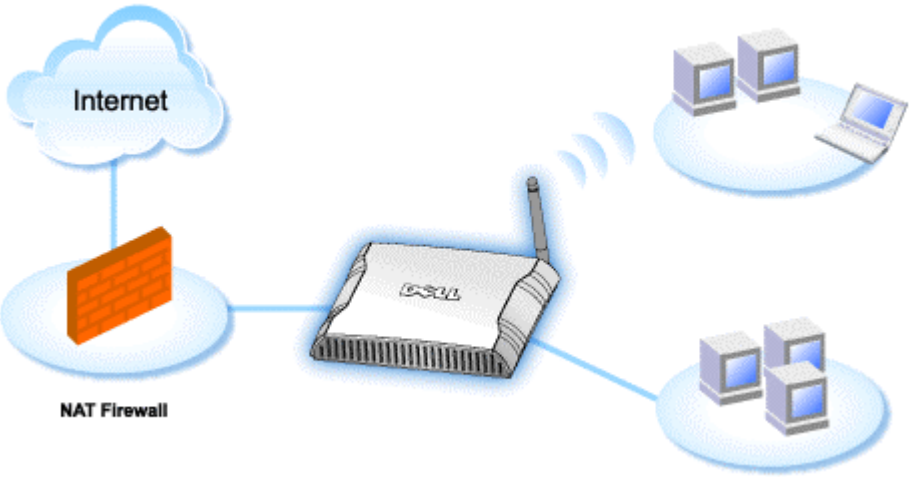
To determine whether you are allowed to use your wireless network device in a specific country, please check to see if the radio type number that is printed on the identification label of your device is listed on the radio approval list posted on the general Dell support site at support.dell.com.

Introduction:

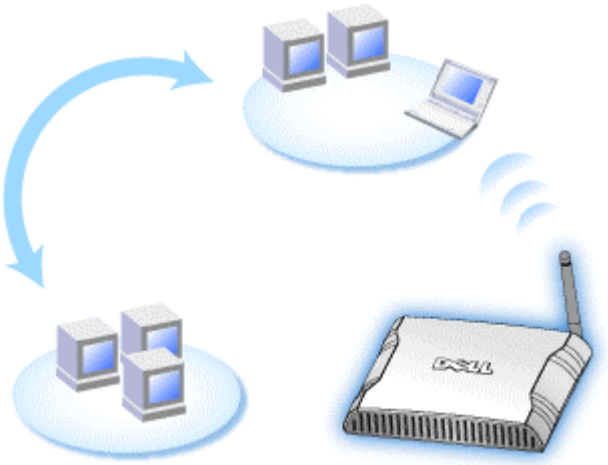
Overview

The Dell Wireless 2350 Broadband Router is an 802.11b/g wireless access point with a built-in Internet router. Connecting to a DSL or cable modem, the Wireless 2350 can offer both wired and wireless computers simultaneous access to the Internet. The Wireless 2350 can be configured the following ways:

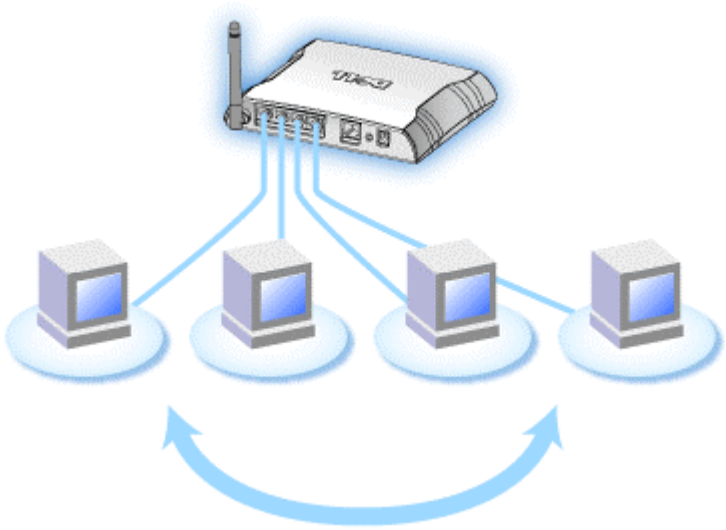
- **Internet router:** Connects to a cable or DSL modem providing Internet connectivity to both wired and wireless computers. The firewall features included in the router control Internet access and protect your network.



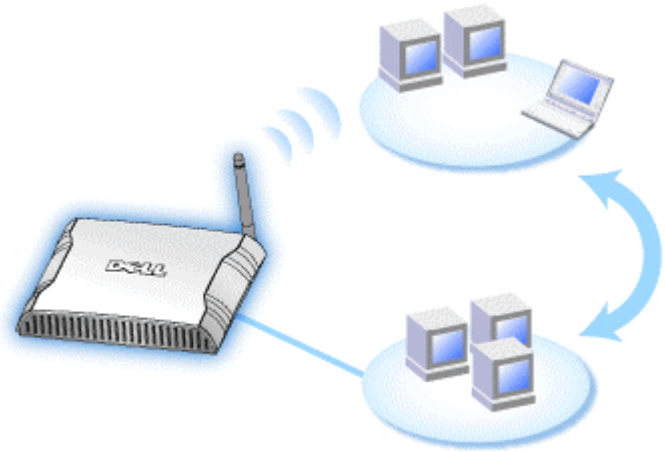
- **Wireless hub (Access Point):** Connects wireless computers for file and print sharing.



- **4-port Ethernet switch:** Connects four wired computers for file and print sharing.



- **Ethernet bridge:** Enables file and print sharing between wired and wireless computers. In addition, connects to an Ethernet hub, extending Internet connectivity and sharing to more wired computers.



The Wireless 2350 supports up to 252 clients. Up to 16 of the 252 clients can be wireless. The **Network Address Translation** (NAT) feature allows 32 clients to simultaneously communicate out to the Internet. It runs at speeds up to 54 **Megabits per second** (Mbps), and the LAN (wired) port runs at 10/100 Mbps. The maximum distance between the Wireless 2350 and each Wireless computer is 300 feet. This distance may be less depending on your environment.

By default, you can use the Wireless 2350 in the following ways:

- a wireless access point using **wireless** as the wireless network name.
- a DHCP server that provides IP addresses to wireless and wired clients.
- a bridge to an Ethernet hub.

Wireless Networking Overview:

Wireless Local Area Network (WLAN)

A **Local Area Network** (LAN) is a network in one location. Users at that location can share files, printers, and other services. In a LAN, a networked computer that requests services is called a client. A **Wireless Local Area Network** (WLAN) is a type of LAN that uses high frequency radio waves rather than wires to communicate and transmit data among the network clients and devices. It is a flexible data communication system implemented as an extension to, or as an alternative for, a wired LAN.

In a WLAN, wireless adapters are installed in clients, also called wireless clients. The adapter allows the wireless client to communicate with the WLAN without cables. Instead, wireless clients send and receive information through a path in the air called a channel.

The standards for a WLAN are based on the IEEE 802.11b standard and IEEE 802.11g standard. All Dell 802.11b/g-compliant devices interoperate with other 802.11b/g -compliant wireless devices from other vendors. The WiFi certification logo indicates that the wireless device has been tested by an independent organization.

A wireless client operates in either infrastructure mode or peer-to-peer mode.

Identifying a WLAN

An ESSID and BSSID are both **Service Set Identifiers** (SSID) that identify and control the wireless client's access to a given WLAN. The SSID is sometimes referred to as the network name. The SSID indicates what WLAN you are referring to. In most cases, the user interface displays the SSID.

When installing an access point or wireless adapter in a wireless client, the installation program asks you to enter the SSID. Dell cannot provide you with this information, as it is specific to your network; but you may choose to use the default SSID, **wireless**, for your Wireless 2350. All wireless clients and access points in a WLAN must use the same network name.

Encryption

In a WLAN, wireless clients and access points send and receive information through the air. Without implementing security, it is possible for an unauthorized person to intercept the information.

A common way of implementing security and protecting information is encryption. Encryption applies a set of instructions, called an algorithm, to information. The instructions combine the plain or clear text of information with a sequence of hexadecimal numbers, called an encryption key.

Before transmitting information over the airwaves, the wireless client or access point encrypts or scrambles the information. The access point or wireless client receiving the information uses the same key to decrypt or unscramble the information. The information is only readable to WLAN devices that have the correct encryption key. The longer the key is, the stronger the encryption.

The Wireless 2350 supports both **Wired Equivalent Privacy** (WEP) and **Wi-Fi Protected Access** (WPA).

WEP

WEP (Wired Equivalent Privacy) provides a way of creating an encrypted key that is shared between a wireless client (such as a notebook with a wireless PC card) and the router. In the Wireless 2350, WEP is an optional feature that can be enabled or disabled. When WEP encryption is enabled, you must set the WEP key in the client to match the WEP key used by

the access point because you can ONLY connect to access points that have a matching WEP Key.

NOTE: It is better to change keys frequently. The same algorithm is used for all the communications that should be protected. If the same key is used, the same message will give exactly the same cipher text. Then, it will be possible for an eavesdropper to break the encrypted data. For this reason, it is strongly recommended to change keys often.

There are two WEP encryption methods:

- 40(64)-bit Encryption
- 104(128)-bit Encryption

40-bit and 64-bit encryption are identical. Some vendors use the term 40-bit; others use 64-bit. A wireless device that claims to have 40-bit encryption interoperates with a device that claims to have 64-bit encryption; the same is true for the reverse. A 40(64)-bit key consists of 10 hexadecimal numbers, arrayed as follows:

Key #1: 1011121314

Key #2: 2021222324

Key #3: 3031323334

Key #4: 4041424344

A 104(128)-bit key has several trillion times as many possible combinations than a 40(64)-bit key. It consists of 26 hexadecimal numbers, arrayed as follows:

Key (#1): 10111213141516171819 1A1B1C

All wireless clients and access points in a WLAN must use the same encryption method and key. The following two examples stress how important this point is.

Example 1

The encryption method for an access point is 40(64)-bit. The method for a wireless client is 104(128)-bit encryption. The client and access point cannot communicate with each other, even though the selected key is the same. To resolve this problem, set the access point to use 104(128)-bit encryption.

Example 2

The encryption method is the same for the access point and wireless client. You select key 1 for the access point and key 2 for the wireless client. The wireless client cannot communicate with the WLAN. To resolve this problem, select key 1 for the wireless client.

NOTE: Use the same key and encryption method for the wireless devices in the WLAN. Otherwise, they cannot communicate with each other.

The Wireless 2350 uses either hexadecimal digits or ASCII characters to create encryption keys. Hexadecimal digits include the numbers 0 to 9 and the letters A to F. For example, the decimal number 15 is represented as F in the hexadecimal numbering system.

ASCII is the acronym for the American Standard Code for Information Interchange. Pronounced *ask-ee*, ASCII is a code for representing English characters as numbers, with each letter assigned a number from 0 to 127. For example, the ASCII code for uppercase M is 77. Most computers use ASCII codes to represent text, which makes it possible to transfer data from one computer to another.

WPA

WPA (Wi-Fi Protected Access) is an upgrade to the WEP standard for securing your wireless network. WPA is derived from and will be forward-compatible with the future IEEE 802.11i standard. It provides improved data encryption and user authentication.

To enhance the level of security, WPA uses **Temporal Key Integrity Protocol** (TKIP) encryption to address the vulnerabilities of the static keys used in WEP. TKIP includes four algorithms: **message integrity check** (MIC), to protect packets from tampering; **Per-Packet Key** (PPK) hashing, to prevent weak key attacks; extended **initialization vector** (IV), to reduce IV reuse and the possibility that a hacker will collect sufficient packets to crack the encryption; and a re-keying mechanism, to change the temporal key dynamically. TKIP is the most commonly used encryption method; however, if your wireless clients do not support TKIP, the Wireless 2350 also supports **Advanced Encryption Security** (AES) encryption. AES will replace 802.11's RC4-based encryption under the 802.11i specification. AES, the gold-standard encryption algorithm, provides maximum security for wireless network.

For user authentication, WPA adopts an authentication scheme through 802.1x. 802.1x provides a framework for user authentication and a key distribution management method. 802.1x consists of three main elements: an Authentication Server (typically a RADIUS server),

WPA-enabled router or AP (called Authenticator), and a WPA-enabled client (called Supplicant). 802.1x ensures only authorized users can access the network.

In enterprises, WPA will be used in conjunction with both a wireless router and authentication server. In a **Small Office/Home Office** (SOHO) environment, where there is no authentication server, users can use **pre-shared key** (PSK) mode in place of the authentication server. The Wireless 2350 offers you WPA running in PSK mode. The mutual authentication and improved encryption technology of WPA allows wireless communication to achieve greater security.

Automatic Rate Selection and Rate Scaling

In 802.11g, wireless network adapters and access points can transmit data at one of the following rates: 54, 48, 36, 24, 18, 12, 9, or 6 Mbps. In 802.11b, the data can be transmitted at a rate of 11, 5.5, 2, or 1 Mbps. As the distance between an adapter and access point increases or decreases, the data rate automatically changes. Other factors, like interference, also affect the data rate. The Wireless 2350 uses automatic rate selection and rate scaling to determine the most efficient rate of communication. Rate scaling maintains optimal communication between wireless clients and the WLAN.

A Look at the Hardware:

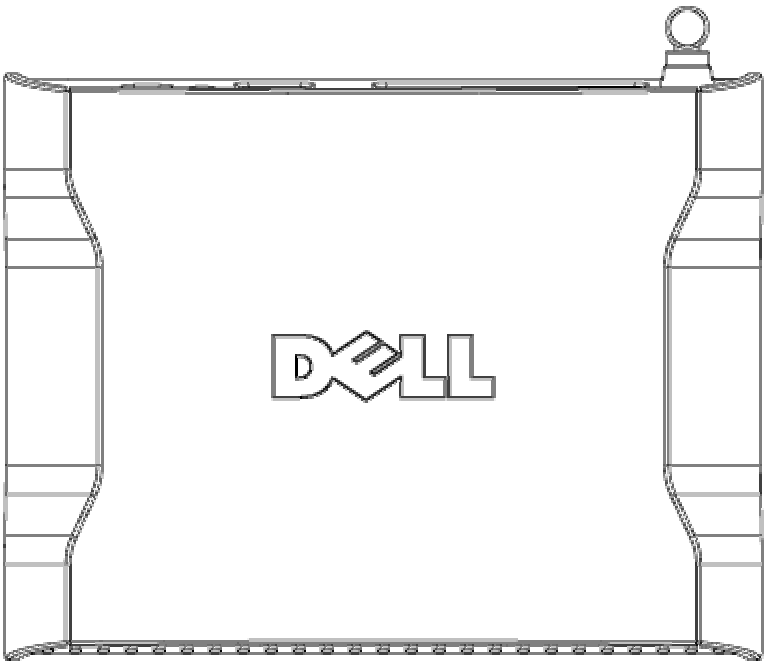
Front Panel

Back Panel

Front Panel

The Dell Wireless 2350 Broadband Router has seven **Light Emitting Diodes** (LEDs), or link lights, on its front side. The following table defines the behavior for each LED:

Front Panel



LED	Represents	Activity
Power	Power	The Power LED will light up green when the device is powered on. It will blink when the device is reset.
Wireless	Wireless LAN	The LED is steady on green when there is at least one wireless link connecting to the Wireless 2350.
Internet	DSL or cable modem	A steady green light indicates the connection is active, and blinks with data activity. A steady amber light indicates data collision.
LAN 1 LAN 2 LAN 3 LAN 4	Local Area Network	A steady green light indicates the connection is active and transfer rate is at 100Mbps. A steady greenish amber light indicates the connection is active and transfer rate is at 10Mbps.

Back Panel

Back Panel

Connector	Description
Lock	This accepts locking devices for protecting the Wireless 2350 from theft.
Reset	Use an object, such as a paper clip, to press the button for at least 5 seconds. The Power LED will be off for a short time and then light up again. You can then release the button to reset the device to its factory-default settings.
Internet	This accepts an RJ-45 connector for network cabling.
LAN 1 LAN 2 LAN 3 LAN 4	This accepts RJ-45 connectors for connecting up to 4 computers to the Wireless 2350's 4-port switch.
Power	Connect the power adapter to this Power port, and then plug the other end of the power cable into a power outlet.

Using Your Router:

Overview

Factory Default Settings: Your Wireless 2350 Broadband Router came with factory default settings that should work for the majority of the network usage scenarios. However, there are cases where your network environment may require a different router configuration.

Setup Wizard: Setup Wizard is a Windows-based software program included on your Wireless 2350 CD. You can use this program to 1) install the router on your network and create an environment for multiple computers to share Internet access, 2) add additional computers to the network, 3) install the Control Utility on your computer and 4) provide links to the user's guide and the Dell support website.

Control Utility: Control Utility is a Windows-based software program included on your Wireless 2350 CD. This utility can be installed on your computer by choosing the Install Control Utility option in the Setup Wizard. It provides you with a useful configuration tool to manage your Wireless 2350. Refer to the section Control Utility for detailed information.

Web-Based Configuration Tool: The web-based configuration tool is for advanced configuration of the Wireless Broadband Router. It is a tool provided inside the router which can be accessed via the web browser on your computer. This tool includes every basic and advanced configuration option for the Wireless 2350. For instance, you can allow other Internet users to access a Web server hosted on your local private network, or disable your wireless network.

NOTE: **Setup Wizard** or **Control Utility** must be run on Windows 2000 and Windows XP

computers. Microsoft Internet Explorer 4.0 or higher or Netscape 4.0 or higher must be used for the web-based configuration tool.

Factory Default Settings:

Dell pre-configures the Wireless 2350 with the following settings:

NOTE: If you lose track of the device settings, you can reset the router by pushing the reset button to restore these settings back to your router.

Setting	Default
User Name	admin
Password	admin
Device Name	Wireless 2350
IP Address	192.168.2.1
Subnet Mask	255.255.255.0
10 Mbps Ethernet WAN IP	<obtain from ISP via DHCP>
WAN DHCP Client	Enabled
ESSID (wireless network name)	wireless
Channel	6
Encryption	No Encryption
DHCP Server	Enabled
NAT Routing	Enabled

NOTE: Your Wireless 2350 Broadband Router came with factory default settings that should work for the majority of the network usage scenarios. However, there are cases where your network environment may require a different router configuration.

Setup Wizard

Introduction

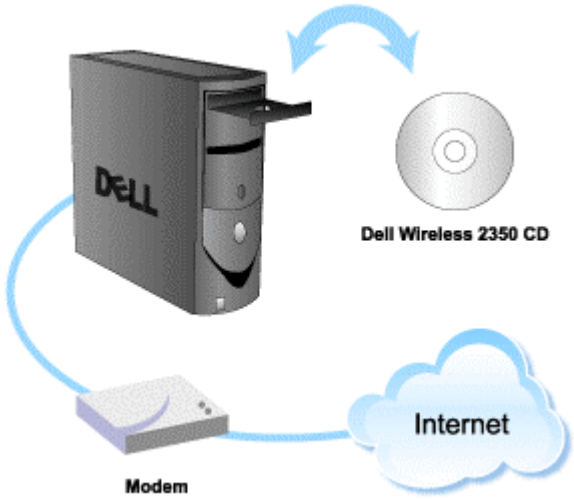
Setup Wizard is an easy-to-use program included on your Wireless 2350 CD. It provides simplified configuration procedures for establishing Internet connectivity on the Wireless 2350. The Setup Wizard first extracts the connection settings from your active ISP connection on your computer with a cable/DSL modem. It then displays a series of graphical illustrations on how to connect the router to the network. Finally it applies the extracted settings on your router and validates its installation. If the installation cannot be completed successfully, the Setup Wizard will display troubleshooting instructions to guide you through the installation process.

In addition, the Setup Wizard also supports the installation of the Control Utility and provides links to the user's guide on the Wireless 2350 CD and the Dell support website.

Launch the Setup Wizard

To run the Setup Wizard, perform the following steps:

Insert the CD



1. Insert the **Wireless 2350 Broadband Router Setup CD** into the CD drive on a computer that is connected directly to the Internet.
   Your CD should automatically launch the Setup Wizard. If it does not, complete the following steps to start the Wizard.
   a. Click the **Start** button, and then click **Run**.
   b. Type the following text in the **Open:** field:
      ***X*:\setup.exe**
      where ***X*** is the drive letter of your CD drive.

Once the Setup Wizard has been launched, you will be guided through a series of windows. These windows are illustrated below along with an explanation on their functionalities.

Setup Wizard Screens

Welcome Menu

This menu offers several options to select from.

- **Router Installation**
  Begin installing your router and configure a computer for Internet connectivity
- **Connect Additional Computer**
  Configure additional computers for Internet connectivity
- **Install Control Utility**
  Install the Control Utility on a computer

- **User's Guide**
  View the user's guide (this document)
- **Exit**
  End the Setup Wizard

Welcome

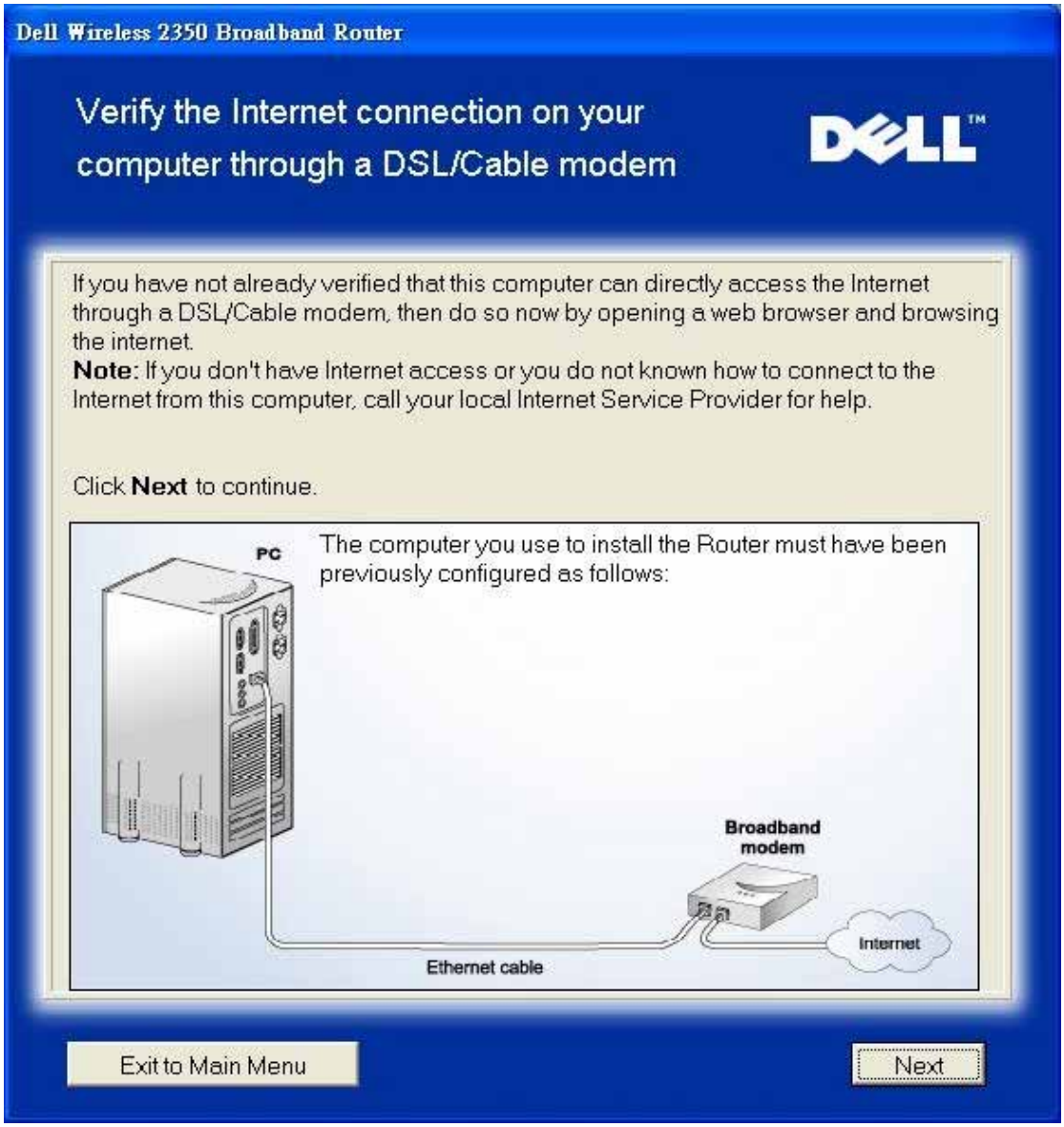
Router Installation

- Click **Router Installation** if you want to install the router on the computer that is used to connect to the Internet with a cable or DSL modem.
- To connect additional computers to your network after you have successfully installed the router using the **Router Installation** option, place the Wireless 2350 CD in each additional computer and run the Setup Wizard. Click **Connect Additional Computers** to add each additional computer to your network.

Verify Internet Connection on Your Computer with a Cable or DSL Modem

To install your Dell Wireless 2350 Broadband Router, please verify that this computer can directly access the Internet.

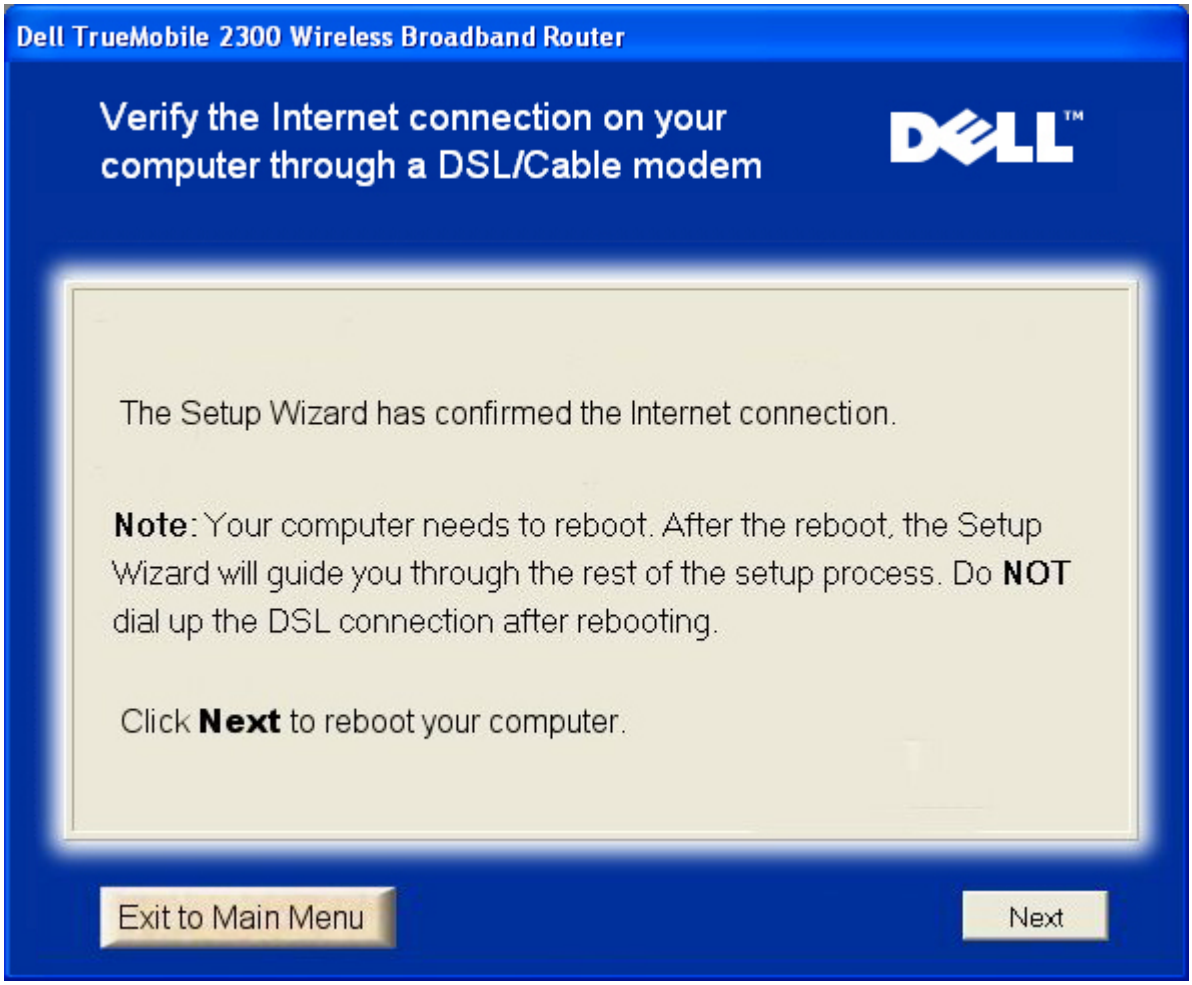
Verify Internet Connection



Confirmed Internet Connection

If you are using a PPPoE (Point to Point Protocol over Ethernet) connection, your computer will then need to reboot.

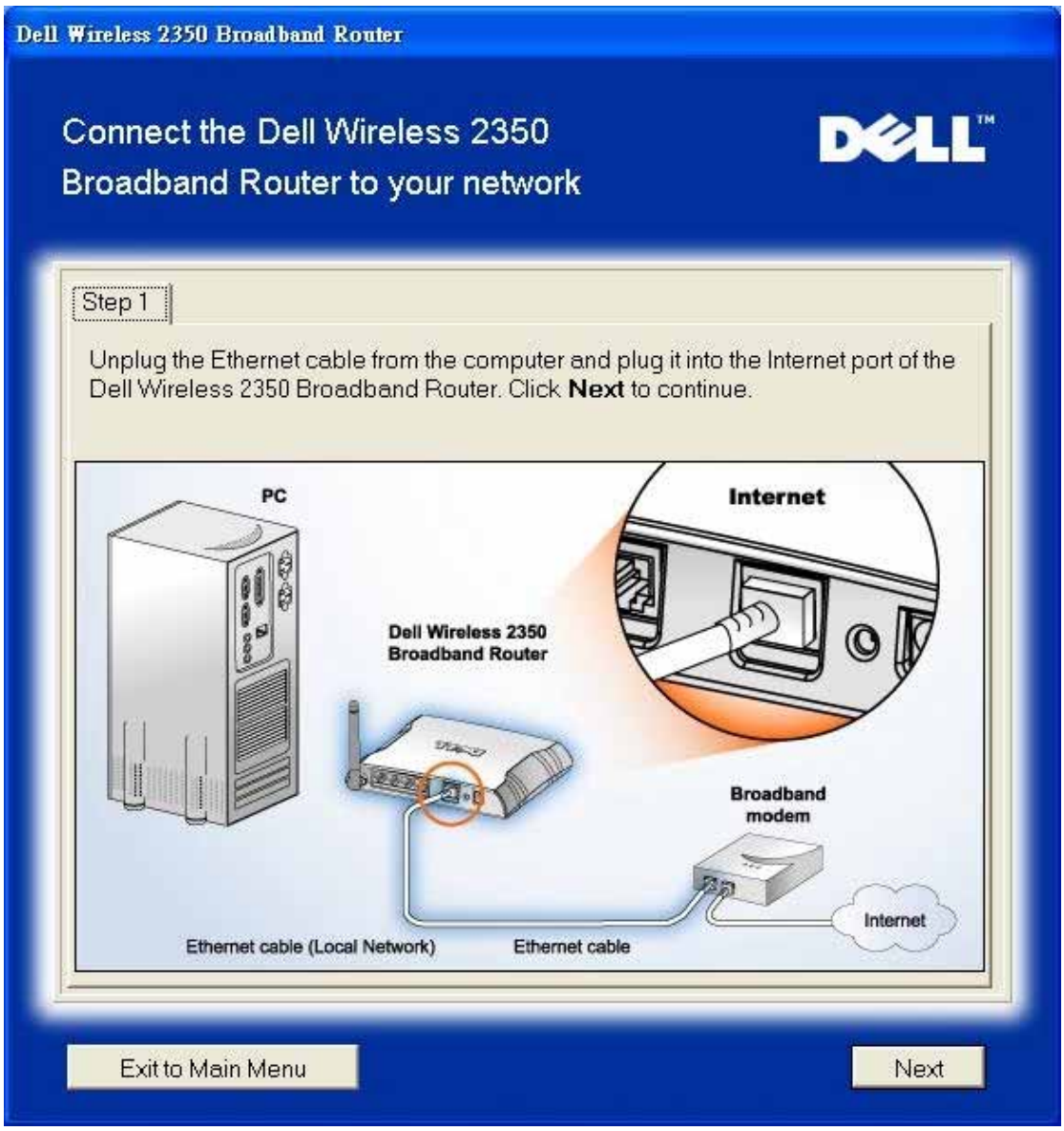
Confirmed Internet Connection (PPPoE)



Connect the Dell Wireless 2350 Broadband Router to Your Network

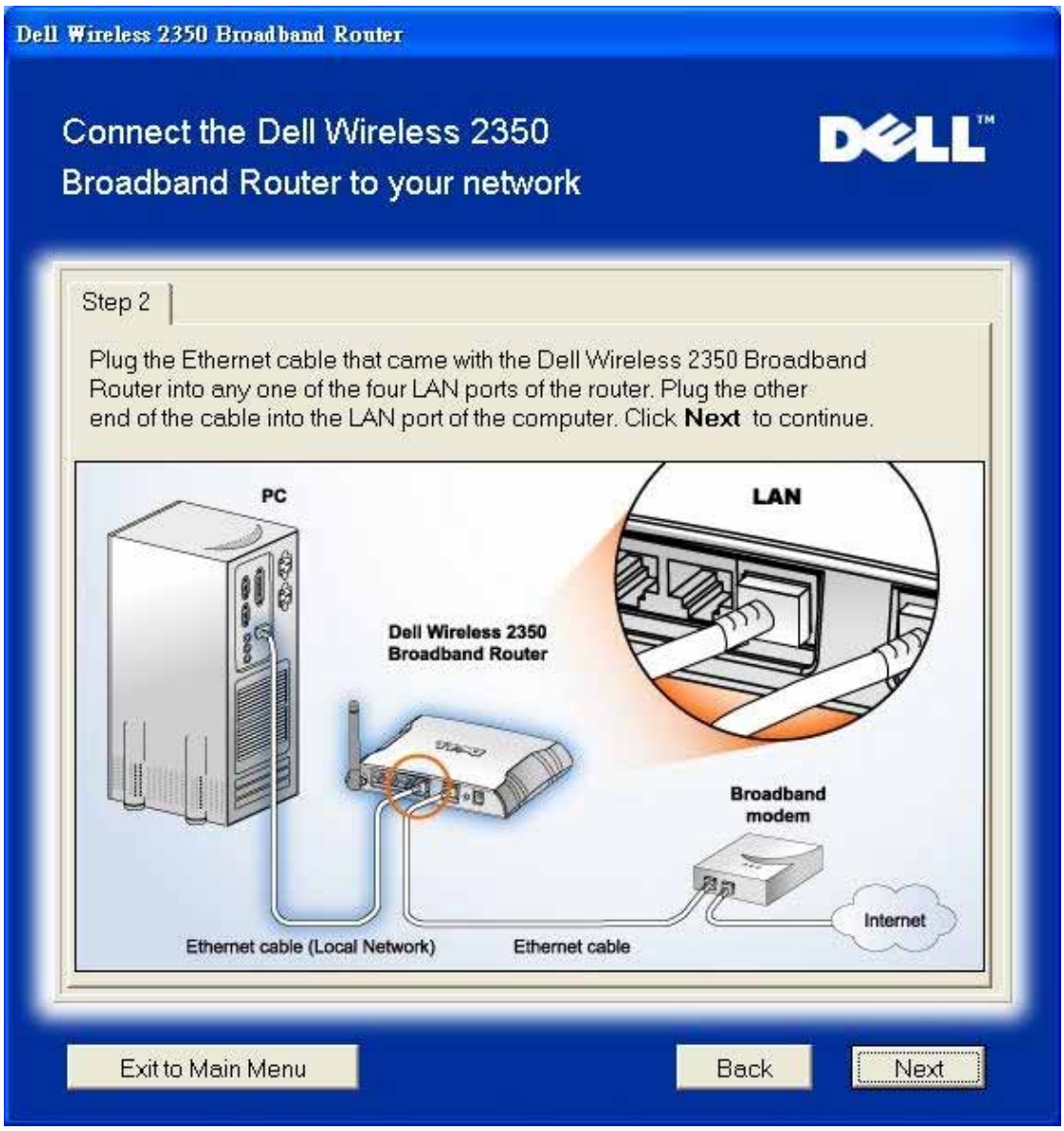
Step 1 illustrates how the modem is connected to the Wireless 2350.

Connect Router to Network: Step 1



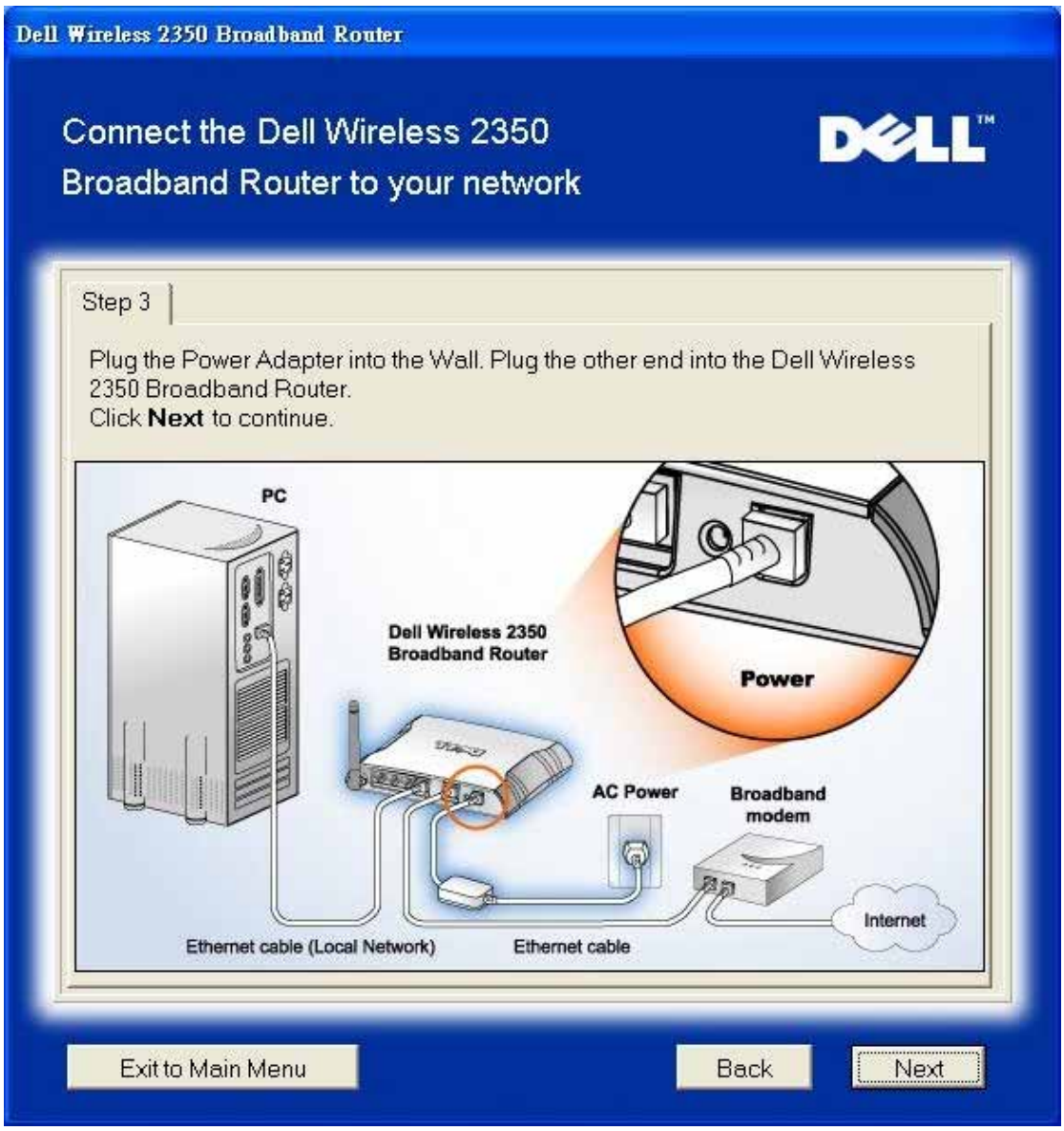
Step 2 illustrates how the router is connected to the computer.

Connect Router to Network: Step 2



Step 3 illustrates how the Wireless 2350 is connected to the power supply.

Connect Router to Network: Step 3



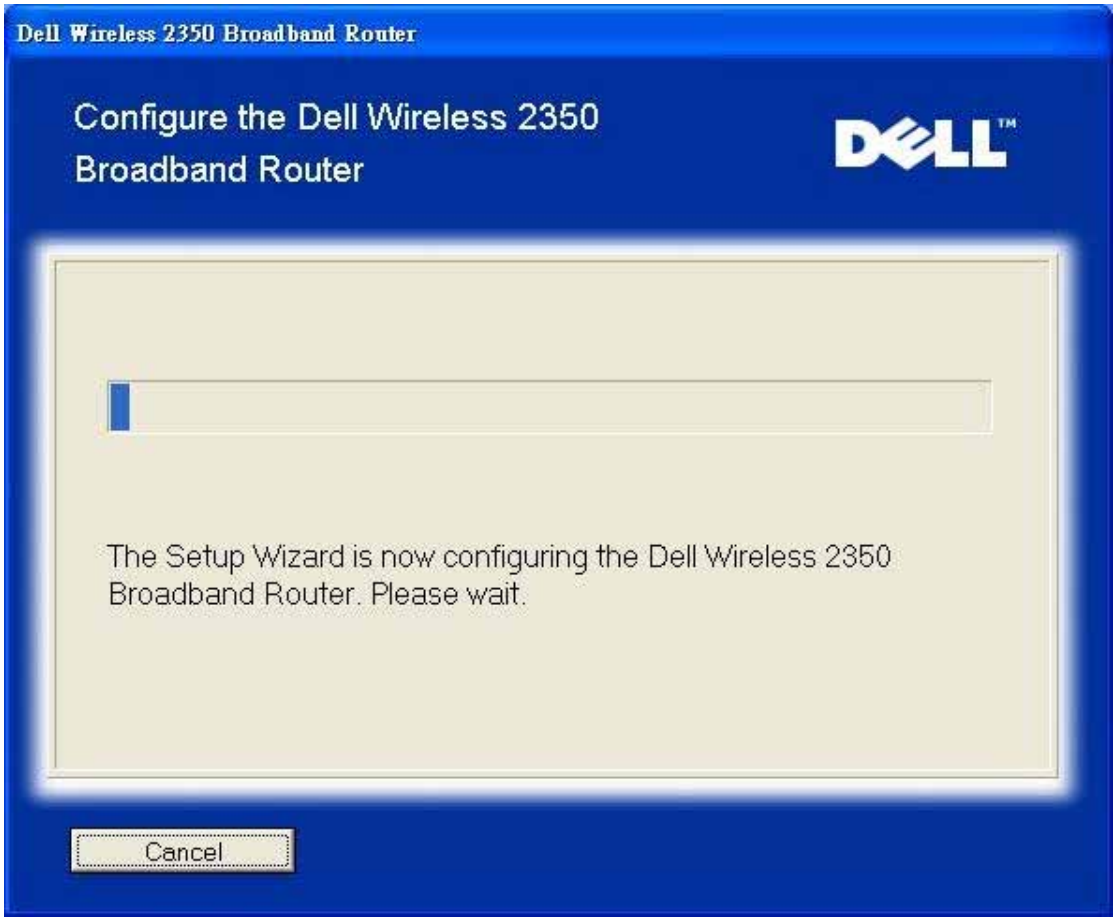
Configure the Dell Wireless 2350 Broadband Router

If you are using a PPPoE connection, type your PPPoE username and password in the box.

PPPoE

The Setup Wizard will apply the Internet connection settings to your Wireless 2350 when you click the **Next** button.

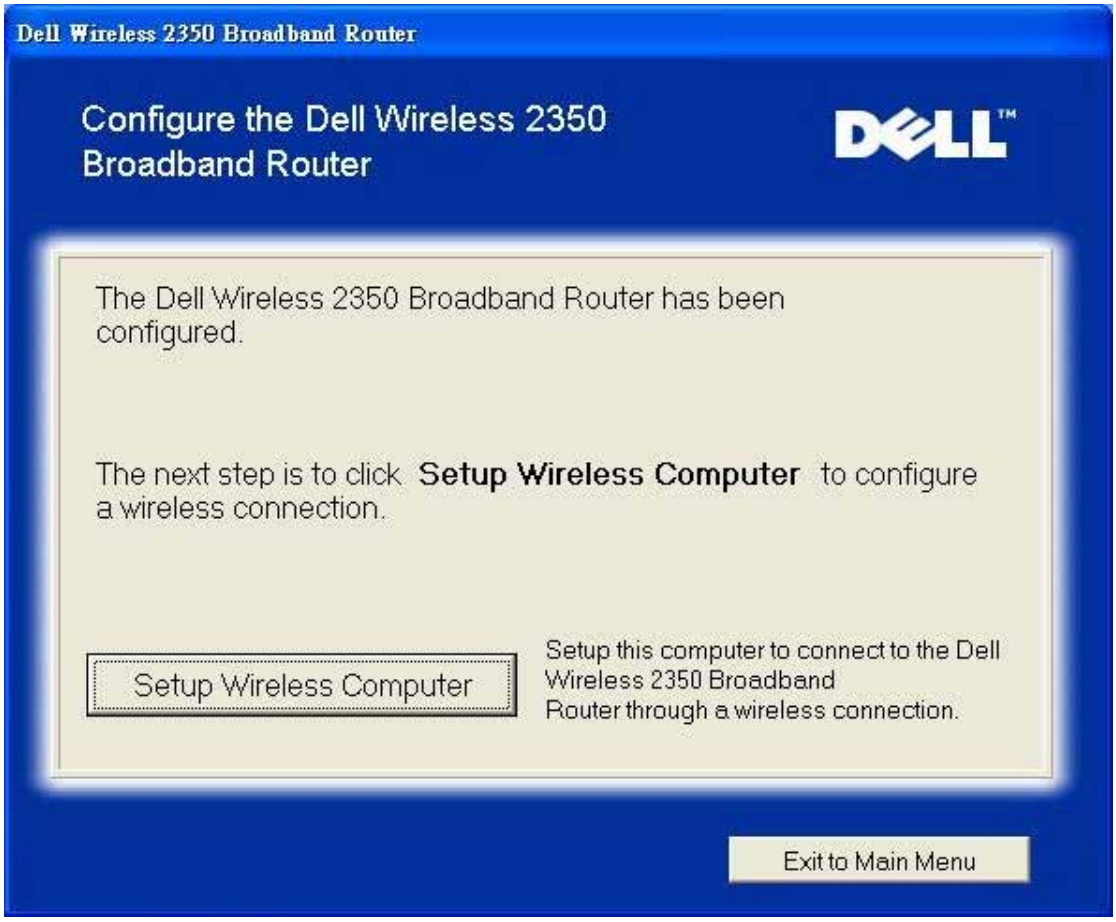
Configure Router



Congratulations

You have successfully installed the Wireless 2350 and configured the first computer for Internet access.

Congratulations



Connect Additional Computers

To set-up each computer that is to be connected to the router, the Wireless 2350 CD needs to be inserted into each one.

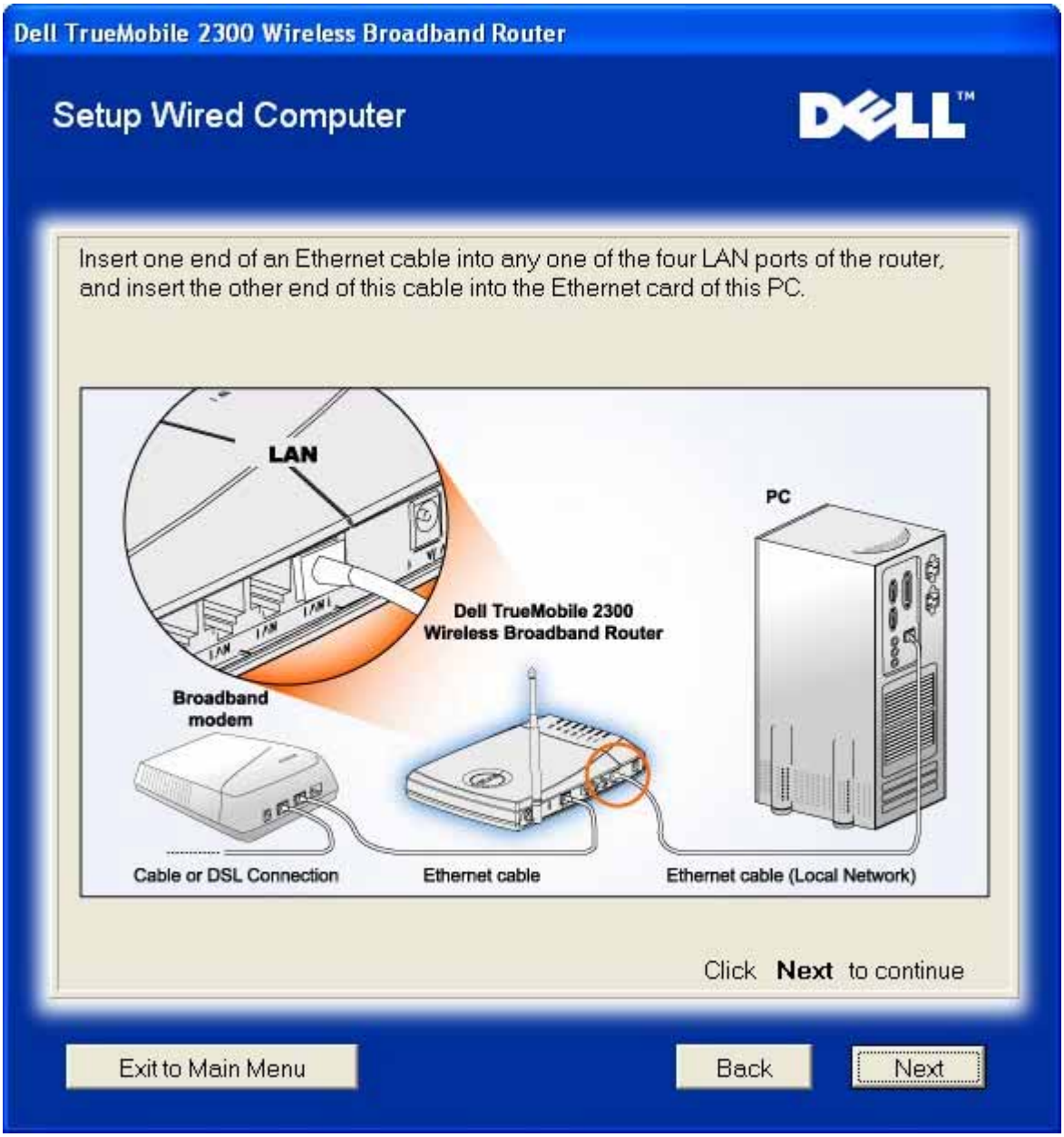
- Click to select your connection type.

Connection Type

Setup Wired Computer

Pressing the **Setup Wired Computer** button displays instructions to connect computers to the network through an Ethernet cable.

Setup Wired Computer



Congratulations

You have successfully connected a wired computer to the network.

Congratulations

Setup Wireless Computer

Pressing the **Setup Wireless Computer** button displays instructions to connect computers to the network through a wireless channel.

Setup Wireless Computer

Follow the remaining on-screen instructions to configure the wireless network card on this computer.

Congratulations

You have successfully connected a wireless computer to the network.

Congratulations

Control Utility:

The Control Utility is Windows-based software that allows you to configure your router and monitor the status of the connection from your computer to the Wireless 2350 and to Internet.

- Install the Control Utility
- Uninstall the Control Utility
- Start the Control Utility
- Exit the Control Utility
- How to Configure the Router by the Control Utility?

Install the Control Utility

You can install the Control Utility on your computer when you step through the setup process using the Setup Wizard.

1. Insert the *Wireless 2350 Broadband Router Setup Wizard and User Guide CD* into the CD drive. Your CD should automatically launch the **Setup Wizard** program. If it does not, complete the following steps to start the Wizard.

    a. Click the **Start** button, and then click **Run**.
    b. Type the following text in the **Open:** field:
    ***X*:\setup.exe**
    where ***X*** is the drive letter of your CD drive.
    c. Click the **OK** button.
2. From the main menu, click the **Install Control Utility** button.
3. Follow the on-screen instructions.

Uninstall the Control Utility

1. If the Wireless 2350 icon is displayed in the system tray in the lower right corner of the screen, right-click the Wireless 2350 icon and click **Exit**.
2. Click the **Start** button.
3. Click **Control Panel**.
   The **Control Panel** window appears.
4. Click the **Add/Remove Programs** icon.
5. Click to select the **Control Utility** from the program list and remove it as instructed.

Start the Control Utility

The control utility program will run automatically upon each computer startup by default. If the utility does not start automatically, run the **Dell Wireless 2350 Broadband Router Dell Control Utility** from the **Start** menu.

Once running, a router icon is created in the system tray in the lower right corner of your screen. If you have a good connection to the Internet, the system tray icon looks gray and white  . You can double-click the router icon to open the utility panel.

NOTE: If the icon is yellow  , it indicates that the Internet connection is not active. If the icon is red  , it indicates that the connection to the router failed.

Exit the Control Utility

When you start the control utility program, it will place a small gray and white icon  in the system tray in the lower right corner of your screen. If you want to exit the program, right-click the icon, and then left-click **Exit** to quit the program.

How to Configure the Router by the Control Utility:

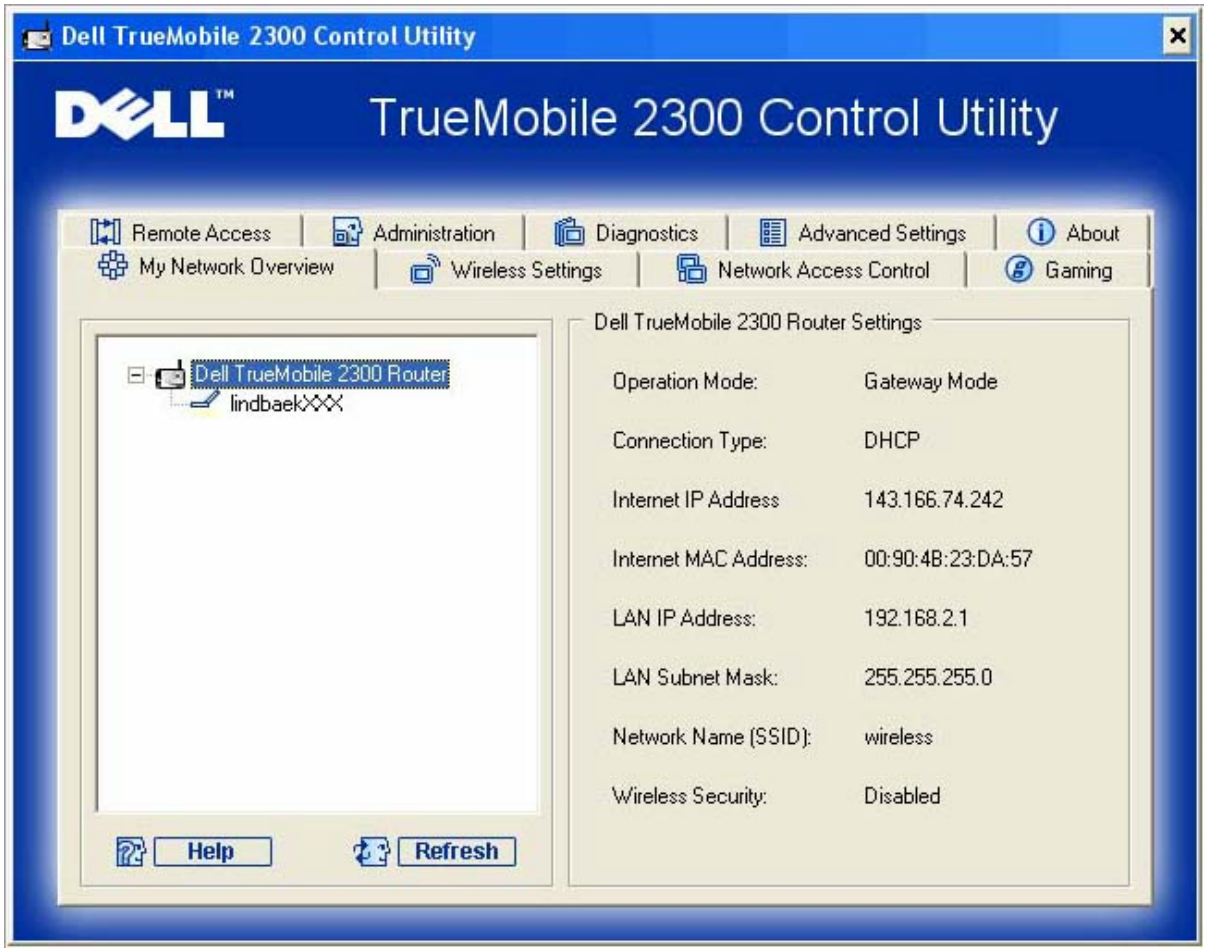
My Network Overview

This screen provides information about your network connection and settings. The left pane displays your connection status. The right pane displays the following network settings:

- Operation Mode

- Connection Type
- Internet IP Address
- Internet MAC Address
- LAN IP Address
- LAN Subnet Mask
- Network Name (SSID)
- Wireless Security

My Network Overview



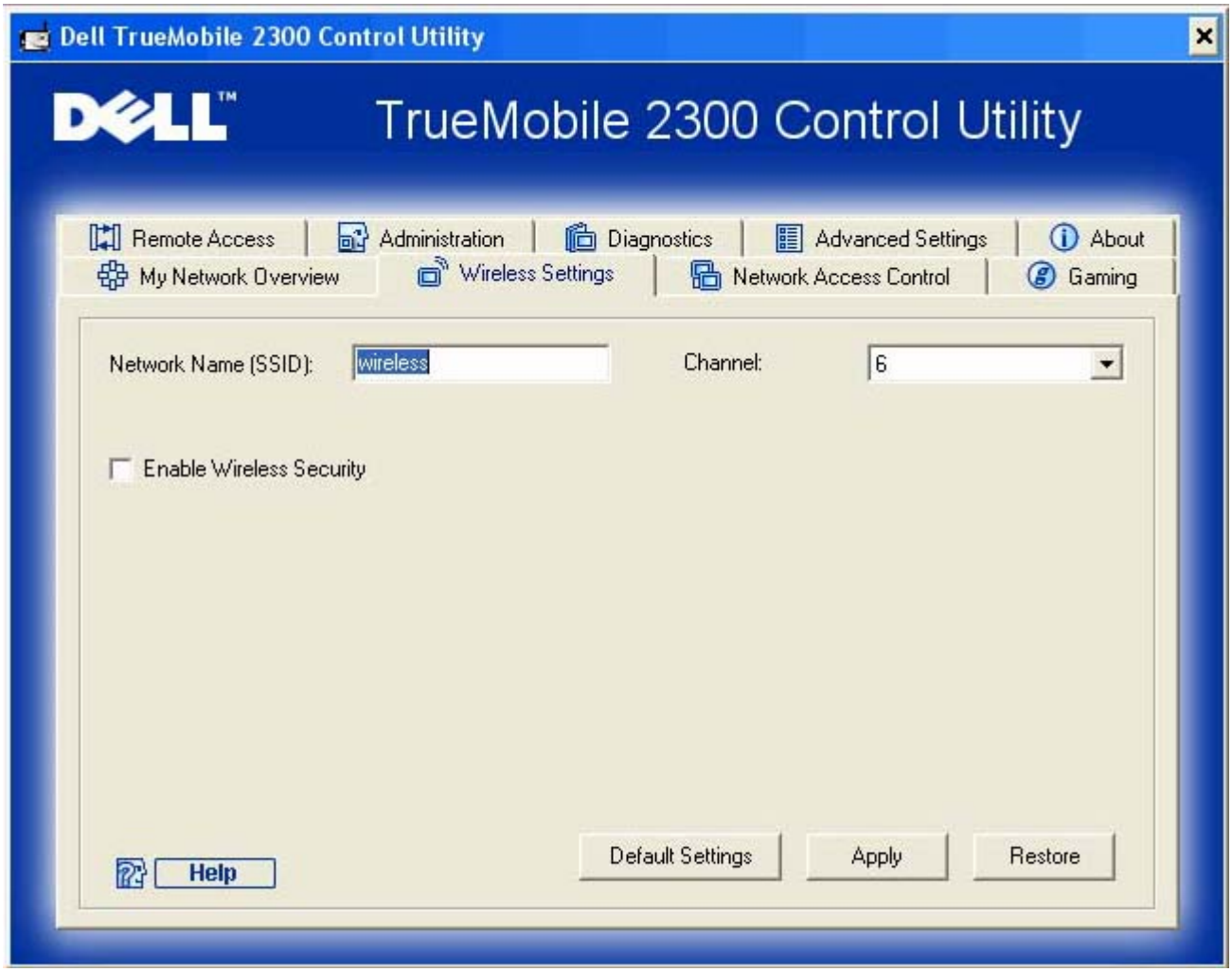
Wireless Settings

- **Network Name (SSID)**
  The SSID is a unique network name. It is used to identify the WLAN. This name is used when connecting additional computers to your wireless router.

- **Channel**
  This is the radio channel over which a communication transmission occurs.
- **Default Settings**
  Resets the wireless settings to its factory defaults.
- **Apply**
  Saves current settings.
- **Restore**
  Restores previous settings.

Your router has an advanced security mechanism. It ensures the confidentiality of data, and also guards data against being modified. If you want to enable the security mechanism, click to select **Enable Wireless Security**.

Wireless Settings



WEP Settings

Wired Equivalent Privacy (WEP) encryption used in the 802.11 standard is to protect wireless communication from eavesdropping. WEP provides a way of creating an encrypted key that is shared between a wireless client (such as a notebook with a wireless PC card) and the router. This key encrypts data before it is transmitted. WEP can be implemented with a 40(64)-bit or 104(128)-bit key. For added security, change your key often. When you change the key on one wireless device, it must be changed for all wireless devices and Access Points in the network.

- **Key Format**
  Can be ASCII or hexadecimal format. Hexadecimal format includes the numbers 0 through 9 and the letters A through F. ASCII format includes all alphanumeric charcters.
- **Key Length**
  Can be either 40(64)-bit or 104(128)-bit key length. Some wireless network cards are only able to use 40(64)-bit encryption. If all your clients are able to communicate at 104(128)-bit, then choose 104(128)-bit. If any client is only able to communicate at 40(64)-bit, choose 40(64)-bit.
- **Key1**, **Key2**, **Key3**, and **Key4**
  Type four different keys in the **Key** fields provided to store on the Wireless 2350. If you choose 40(64)-bit encryption, enter a 5-character (or 10 hexadecimal digits). For 104(128)-bit encryption, enter a 13-character (or 26 hexadecimal digits) WEP key.
- **Default Key**
  Select only one key out of the four provided in the **Default Key** field.

WPA Settings

Wi-Fi Protected Access (WPA) is an upgrade to the WEP standard for securing your wireless network.

If you would like to secure your wireless network using WPA, you must have WPA support for your wireless clients. If you are using a Dell wireless client, you can check for the availability of WPA-enabled software updates for your wireless client at http://support.dell.com.

- **WPA Pre-shared Key**
  All wireless clients must use this key to gain access to the network. Note that the Key format must also match the setting for the wireless clients.
- **Key Format**
  Can be ASCII or hexadecimal format. Hexadecimal format includes the numbers 0

through 9 and the letters A through F. ASCII format includes all alphanumeric charcters.

- **WPA Group Rekey Interval**
  WPA Group Rekey Interval is used to specify the frequency of encryption key rotations. The lower the number, the faster your encryption key will rotate; however, setting this number too low may cause your wireless network to slow down.
- **WPA Encryption**
  TKIP (Temporal Key Integrity Protocol) is the most commonly used encryption method. **AES** (Advanced Encryption Standard) can be used if your wireless clients do not support TKIP.

Network Access Control

- **Add**
  Adds a new entry to the list.
- **Edit**
  Allows you to edit entries.
- **Delete**
  Deletes a record from the list.
- **Delete All**
  Deletes all records from the list.
- **Restore**
  Restores previous settings.

Network Access Control

Parental Control

Parental Control allows you to determine what type of websites are accessible through your wireless network. It also allows you to specify what time of day the Internet can be accessed.

To enable parental control, perform the following steps:

1. Click to select **Enable Parental Control**.
2. Click the **Add** button.
   The **Parental Control** window appears.
3. Enter the IP address of the computer you want to control (for example, your child's computer) in the **Host IP** field.
4. Select **Allowed** or **Denied** from the **Internet Access** list.
5. Enter a time **Interval**, during which users will be allowed to access the Internet.
6. Select **allow** or **deny** for web access.

7. Specify which websites may be accessed or may not be accessed by entering their URLs in the **Website URL** field.
8. Click the **OK** button to apply, or click the **Cancel** button to exit without making any changes.
9. Click the **Apply Parental Control Settings** button on the bottom of the screen to activate the new settings.

MAC (Media Access Control)

This feature prevents specific computers within the wireless local area network (WLAN) from accessing the Internet.

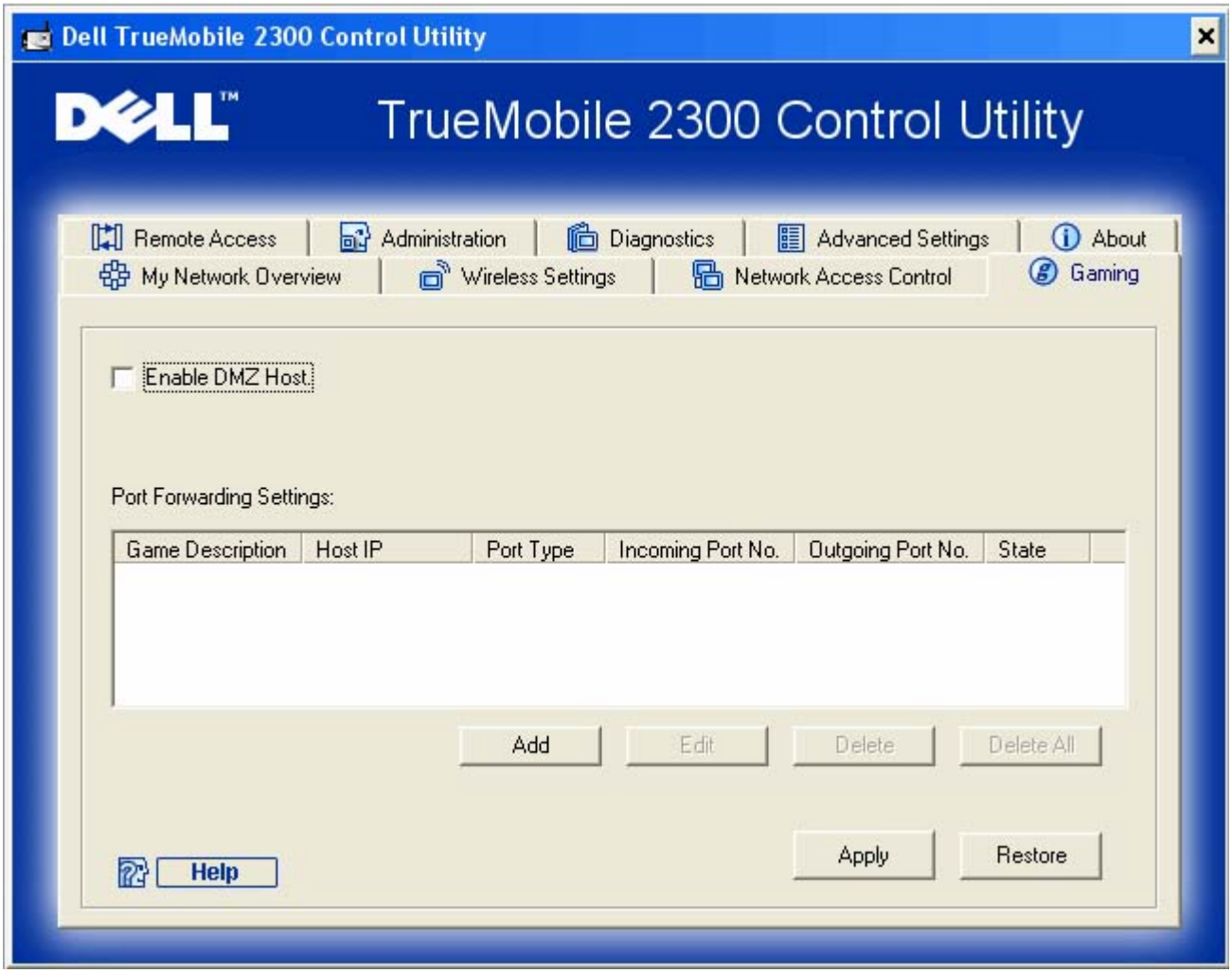
To enable MAC, perform the following steps:

1. Click to select **Enable MAC Access Control**.
2. Click the **Add** button.
   The **MAC Access Control: Add a Record** window appears.
3. Enter the hexadecimal MAC address (for example, 00:11:22:33:44:55) that you want to grant or deny access in the **Host MAC** box.
4. Click the **OK** button to apply, or click the **Cancel** button to exit without making any changes.
5. You can click on the selected record and click again on its **Host Name** to enter the desired name for this record.
6. Click the **Apply MAC Control Settings** button on the bottom of the screen to activate the new settings.

Gaming

In some cases, the firewall feature of the router will cause a game not to function as intended. The settings listed on the **Gaming** menu can solve these problems.

Your Wireless 2350 Router has an integrated **Network Address Translation** (NAT) firewall that rejects any unsolicited data from the Internet to access the computer on your LAN. Applications like e-mail and web browsing are unaffected by NAT. However, some applications (such as Internet messaging and gaming applications) will not function correctly.



Port Forwarding Settings

Port forwarding allows you to configure your router to accept unsolicited data through a specfic port. The ports and protocol type (TCP, UDP, or both) will depend on what gaming service you are using.

To enable Port Forwarding, perform the following steps:

1. Click the **Add** button.
   The **Gaming: Add a Record** window appears.
2. Type the desired name or description in the **Game Description** field.
3. Type the IP address of the device (for example, desktop computer) for gaming in the **Computer IP for gaming** field.
4. Select a transport layer protocol from the **Protocol Type** list. The options listed here are TCP (Transmission Control Protocol), UDP (User Datagram Protocol), and both.

5. Enter the incoming port number in the **Incoming Port No.** field and the outgoing port number in the **Outgoing Port No.** (also called **Destination Port**) field.

NOTE: This information should be available from your gaming service.

6. Select **Enable** or **Disable** the gaming from the **State** list.
7. Click the **OK** button to apply, or click the **Cancel** button to exit without making any changes.

DMZ

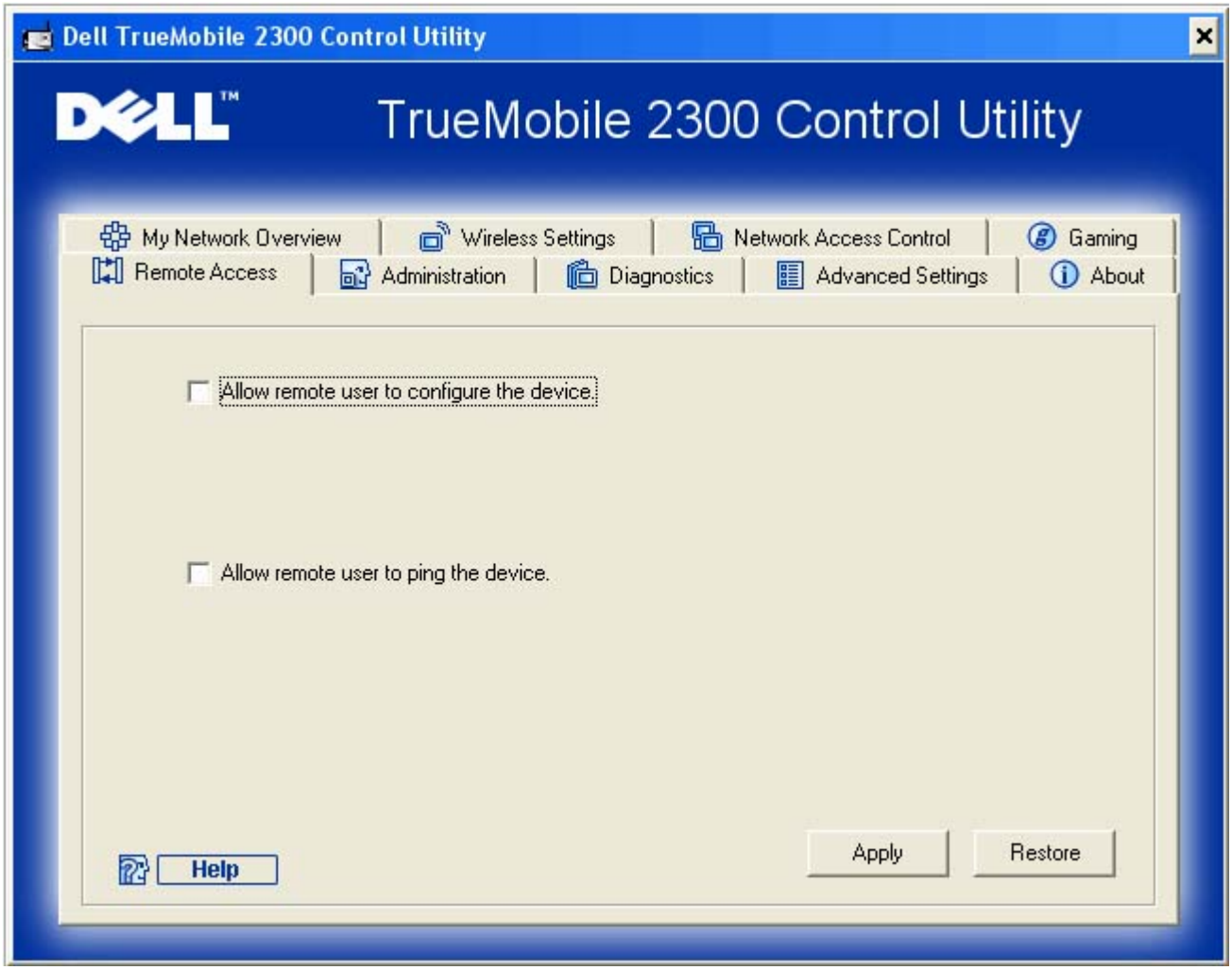
Some applications experience problems when working behind a firewall. To solve this problem you can put computers outside of the firewall via the router's **DMZ** (demilitarized zone) feature. The DMZ feature disables the NAT firewall and allows all data to pass through all ports to this computer.

Follow the instructions below to enable the DMZ feature.

1. Click to select **Enable DMZ Host**.
2. Type the IP address of the computer that will run the gaming application in the **DMZ IP Address** field.
3. Click the **Apply** button to apply the new settings.

Remote Access

Remote Access



Allow Remote User to Configure the Device

This option allows you to configure the device from a remote location via the network.

1. Click to select **Allow remote user to configure the device**.
2. Enter the IP address of the remote administration host in the required field.
3. Enter the HTTP port number that will be used on the router in the **HTTP port number** field.
4. Click the **Apply** button to save the settings, or click the **Restore** button to restore to its previous settings.

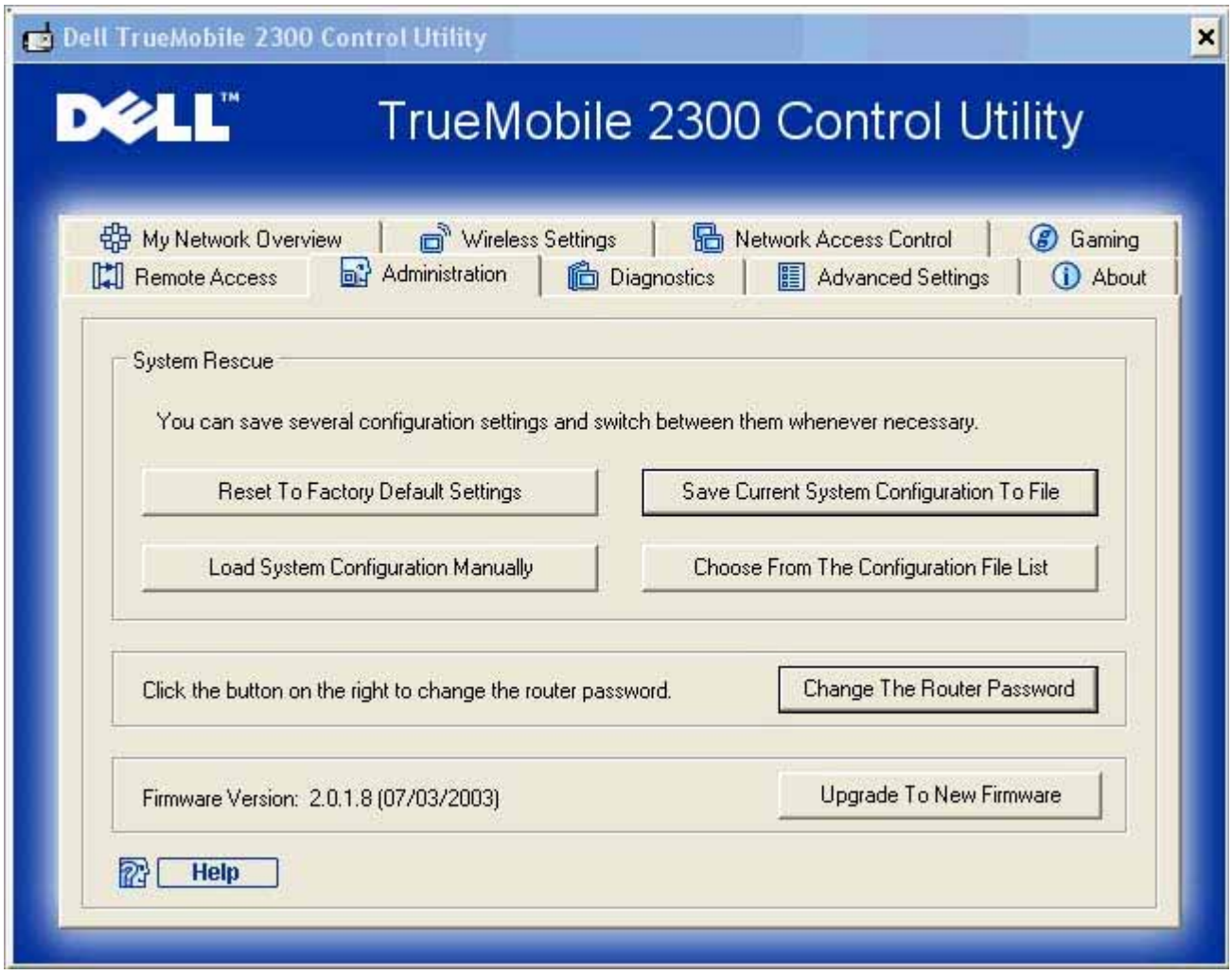
Allow Remote User to Ping the Device

This option allows you to configure the WAN ping capability. The default setting is **disabled**. The router will not answer ping requests, so your WAN port is invisible to port scanners, which can make your network safer.

1. If you want your WAN port to be visible on the Internet, click to select **Allow remote user to ping the device**.
2. Click the **Apply** button to save the settings, or click the **Restore** button to restore to its previous settings.

Administration

Administration



System Rescue

System Rescue allows you to save a backup of your configuration settings.

- **Save Current System Configuration To File**
  Saves the current settings as a **.pro** file.
- **Load System Configuration Manually**
  Loads the backup file to restore previously saved settings.
- **Choose From The Configuration File List**
  The router will automatically save a copy of backup configuration files in the file list. You can select a file to load from the list, instead of searching for the correct file.
- **Reset to Factory Default Settings**
  Resets the router to its default configuration.

Change Password

To prevent unauthorized changes to the router settings, the router is password protected. It is strongly recommended that you change the factory default password.

1. Click the **Change the Router Password** button.
   The **Password Settings** window appears.
2. Type the original password in the **Original Password** field.
3. Type the new password in the **New Password** field, and then retype it in the **Confirm Password** field to verify.
4. Type the password hint message in the **Password Hint Message** field.
5. Click the **Submit** button when you finish the setting. If you want to clear any values you have entered in any field, click the **Cancel** button.

Upgrade to New Firmware

If you are instructed to upgrade the firmware, click the **Upgrade to New Firmware** button. It will connect to the Dell website to upgrade to the latest firmware release. It is unnecessary to upgrade the firmware if your router is working properly.

Diagnostics

Diagnostics

You can monitor the current status of your network connection in the **Diagnostics** menu. The network detection can be activated by clicking the **Start Diagnostics** button on the bottom of the screen.

When the detection is done, the screen will display a summary of your Internet connectivity.

Advanced Settings

To configure the advanced settings of the router, click the **Login** button to log in to the web-based configuration tool. The web-based configuration tool allows you to set up advanced network configurations for your Dell Wireless 2350 Broadband Router.

Web-based Configuration Tool:

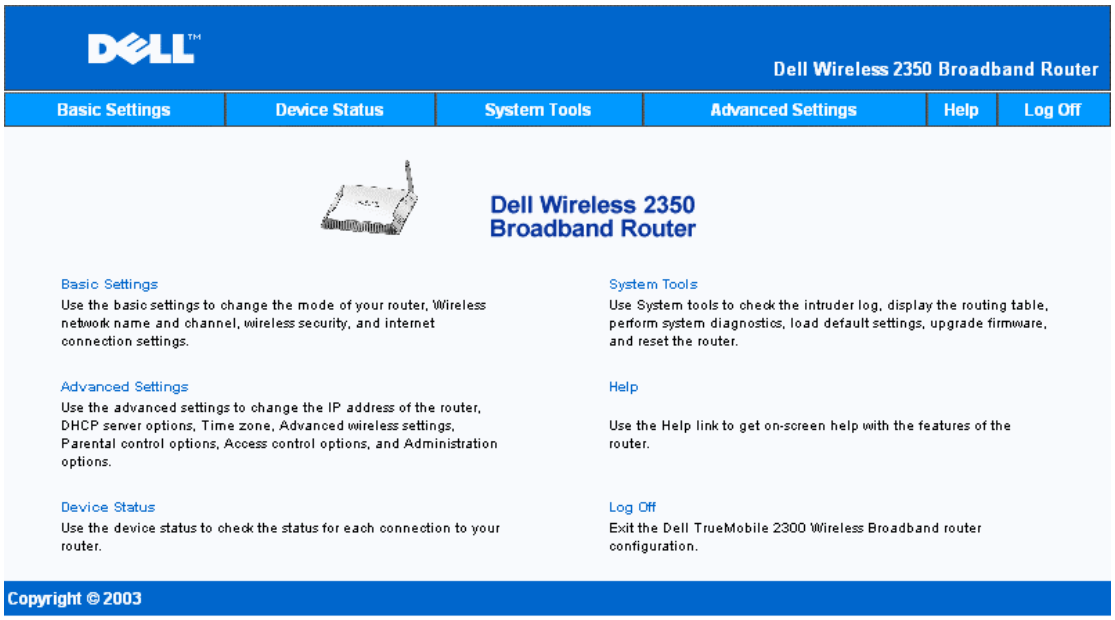
Overview

The web-based configuration tool enables you to set up advanced network configuration for your Dell Wireless 2350 Broadband Router. Follow the instructions below to gain access to the web tool.

NOTE: Microsoft Internet Explorer 4.0 or higher or Netscape 4.0 or higher must be used for the web-based configuration tool.

1. Click the **Start** button, and then click **Run**.
2. Type the following text in the **Open** box:
   http://my.router
3. If this is the first time configuring your Wireless 2350, or if the user name and password have not been changed, type **admin** in the **User Name** and **Password** fields.
4. Click the **OK** button.
   The **Configuration** screen appears.

NOTE: Dell technical support representatives do not support the configuration options in the **Advanced Settings** portion of the configuration program. These options are provided for your convenience only. However, the advanced settings are fully documented and explained in this guide.



Log Off

The web-based configuration tool only allows access to one user at a time.

Basic Settings:

The following configuration options are included in Basic Settings:

Router Mode

Wireless Settings

Wireless Security

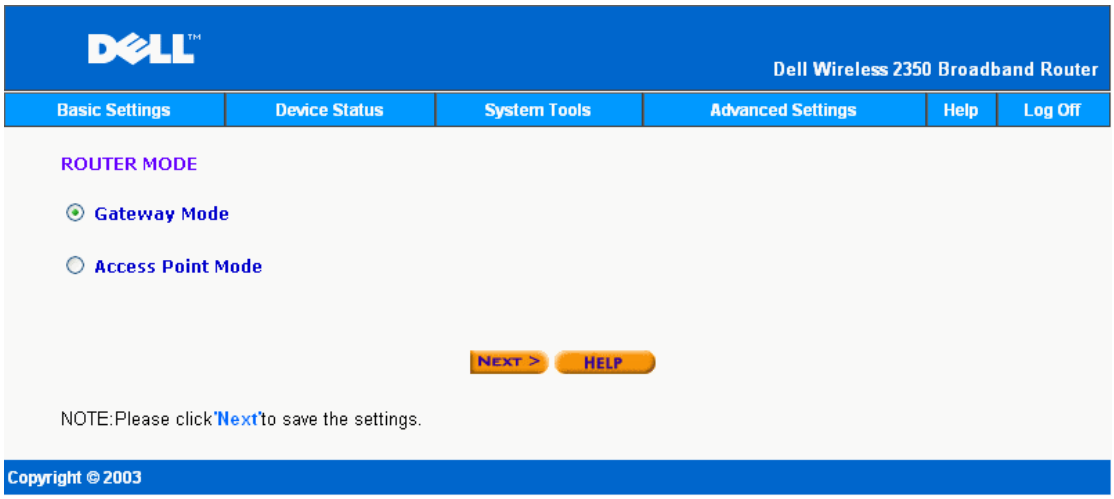
Internet Connection Settings

NOTE: To implement the changes you make to the settings, you must save your settings and restart the router. Otherwise, the router uses the previous settings. If you are using the **BACK/NEXT** links to step through each screen in the **Basic Settings** portion of the web-configuration tool, you ultimately reach the **Save & Apply** page. Click **Save & Restart** button to commit the changes, and the router will reboot automatically with the new settings in effect.

Router Mode

The Dell Wireless 2350 has two operating modes: **Gateway** mode and **Access Point** mode.

Router Mode



Gateway mode allows your router to create a wireless network to access the broadband router. Wired and wireless network devices share the same Internet connection through the **Internet** port in the Gateway mode. However, some ISPs may request you to do the additional setup, such as PPPoE, before using your router to access the Internet.

Access Point (AP) mode allows your router to act as a bridge between wireless devices and Ethernet devices in the existing network. All wired and wireless devices are located in the same class C subnet. Internet port is useless here. Thus, Access Point mode is here to help you set up a single isolated network.

NOTE: If the device is put in AP mode, the **Internet Connection Settings** will not be available.

The **Gateway** mode is the default setting in Wireless 2350.

Wireless Settings

Wireless Settings

NOTE: You must change each client's wireless adapter settings to match the Wireless 2350 settings. Use the factory defaults for the Wireless 2350, unless the default settings have been changed. In this case, note the changes and use the new settings for each wireless network card. For assistance configuring a wireless network card, see the card's documentation.

Setting	Possible Values
Network Name (SSID)	(**wireless** by default)
Channel	(**6** by default)

Network Name (SSID)

The network name is a value that identifies a collection of **wireless** devices found in a particular network. The default value for the Wireless 2350 is **wireless**. All workstations and access points must use the same SSID to be able to communicate with one another.

The SSID is a 32-character field, and the value is case sensitive.

Channel

The Wireless 2350 can operate on a variety of channels. Routers within close proximity to one another must be on different channels. If you have just one router, then the default, channel 6, is probably adequate. If you have multiple access points in your network, it is suggested to stagger the channels for each router. It is advisable to use the default unless there is a specific reason for changing the channel, such as interference from microwaves, cellular phone towers, or other access points in the area.

Wireless Security

Data encryption provides added security by encoding network communications using an encryption key. Your Wireless 2350, in conjunction with wireless network adapters that support encryption, can scramble your transmitted data to make it difficult for someone to eavesdrop or intercept your information. Two methods of data encryption are available: **Wired Equivalent Privacy** (WEP) and **Wi-Fi Protected Access** (WPA). If you wish to enable wireless security, click to select **Enable Wireless Security**.

Wireless Security

WEP

If you wish to enable WEP encryption, click to select **WEP** in the **Network Authentication** list.

Setting	Possible Values
Key Format	Hexadecimal Digits / ASCII Characters
Key Length	40 bits (5 characters) / 104 bits (13 characters)
Key1, Key2, Key3, Key4	*<user-defined>*

There are two levels of WEP encryption: 40(64)-bit and 104(128)-bit, with 104(128)-bit being the more secure of the two. The WEP encryption keys are simply a set of hexadecimal numbers or ASCII characters that you choose. Each Wireless 2350 and every wireless workstation must use the same WEP encryption key to communicate. For more information on encryption, see the Wireless Networking Overview - Encryption section of this user's guide.

- **Key Format**
  Key format can be in ASCII or hexadecimal format. Hexadecimal digits include the numbers 0 through 9 and the letters A through F. If you select ASCII format, you can enter any character.
- **Key Length**
  Key length can be either **40(64)-bit** or **104(128)-bit**. Larger key lengths are more secure. Some wireless network cards are only able to use 40(64)-bit encryption. If all your clients are able to communicate at 104(128)-bit, choose 104(128)-bit.
- **Key**
  If you choose 40(64)-bit encryption, enter a 5-character (or 10 hexadecimal digits) WEP encryption **Key** in the fields provided. For 104(128)-bit encryption, enter a 13-character (or 26 hexadecimal digits) WEP key in the fields provided. You have the option of entering four different keys to store on the Wireless 2350. Select only one key out of the four provided in the **Default Key** drop-down list. For added security, change your key often. When you change the key on one wireless device, remember that it must be changed for all wireless devices and access points in the network.

NOTE: If you are adding the Wireless 2350 to an existing network and will be using an existing encryption key for the wireless clients, contact the person in charge of the network. The same key must be used when configuring the encryption for the Wireless 2350. The administrator must make any changes to all access points and wireless clients on a network. Changing the key on just one access point or wireless client disconnects it from the rest of the network.

WPA

If you wish to enable WPA encryption, select **WPA** from the **Network Authentication** list.

WPA is an upgrade to the WEP standard for securing your wireless network.

If you would like to secure your wireless network using WPA, you must have WPA support for your wireless clients. If you are using a Dell Wireless wireless client, you can check for the availability of WPA-enabled software update for your wireless client at http://support.dell.com.

- **WPA Pre-shared Key**
  WPA Pre-Shared Key (PSK) is a field where the password is entered. All wireless clients must also use this password to gain access to the network. Note that the Key format must also match the setting for the wireless clients.
- **Key Format**
  Key Format is a box that lists 2 items: **Hexadecimal** Digits (numbers 0 through 9 and letters A through F) and **ASCII** Characters (any letter, number, or symbol). Select the proper format for your key. If your wireless client(s) only support one of the two formats, be sure to specify the correct one.
- **WPA Group Rekey Interval**
  WPA Group Rekey Interval is used to specify the frequency of encryption key rotations. The lower the number, the faster your encryption key will rotate, however, setting this number too low may cause your wireless network to slow down.
- **WPA Encryption**
  WPA Encryption has 2 choices: **TKIP** (Temporal Key Integrity Protocol) is the most commonly used encryption method. **AES** (Advanced Encryption Standard) can be used if your wireless clients do not support TKIP.

Internet Connection Settings

NOTE: The Setup Wizard enters the required cable/DSL ISP settings into the router after you complete the installation successfully. These settings should only be changed manually if the Setup Wizard is unsuccesful.

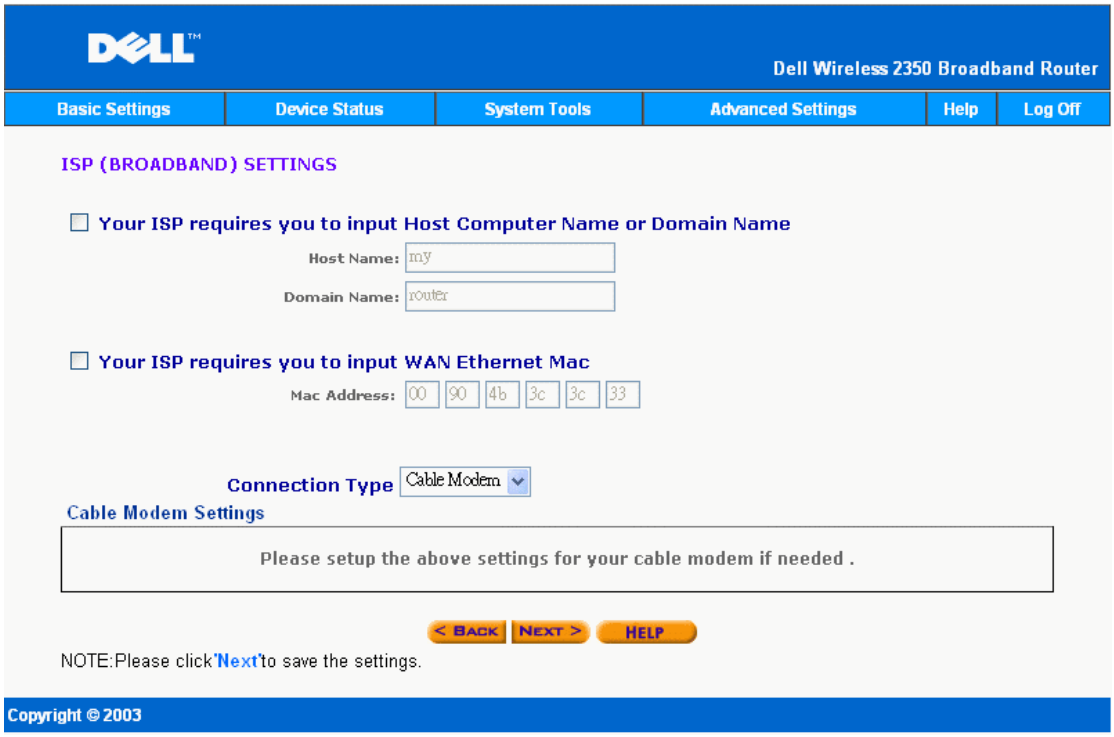
NOTE: If the device is put in AP mode, the **Internet Connection Settings** will not be available.

Your ISP Requires You to Input Host Computer Name or Domain Name

If your ISP requires that you input a host computer name or domain name, click to select **Your ISP requires you to input Host Computer Name or Domain Name**. Type the appropriate values in the fields provided.

NOTE: Host computer names and domain names are only used by cable modem ISPs.

Internet Connection Settings



Your ISP Requires You to Input WAN Ethernet MAC

If your ISP requires that you input a WAN Ethernet MAC address, click to select **Your ISP requires you to input WAN Ethernet MAC**. In the field provided, type the public WAN (cable/DSL) MAC address assigned to your Wireless 2350. You can find the WAN MAC address on the back panel of the Wireless 2350 or on the Device Information page in the web-based configuration tool.

Connection Type

Select the connection type from the list. Four options are available.

- Cable Modem
- DSL (Static)
- DSL (PPPoE)

- PPTP

Cable Modem Settings

No additional settings are required. Make sure that the settings listed are correct.

DSL Static IP Settings

In the fields provided, type the IP address, IP subnet mask, ISP gateway address, and *Domain Name Server* (DNS) IP address provided by your ISP.

DSL PPPoE Settings

Point to Point Protocol over Ethernet (PPPoE) is a proposal specifying how a host computer interacts with a broadband modem (for example, DSL, cable, or wireless) to access the network. In many respects PPPoE is similar to the **Dialup Networking** approach. If you have a DSL (PPPoE) Internet connection, enter the PPPoE user name and password provided by your ISP.

PPTP Settings

The following settings should be provided to you by your ISP.

- IP Address
- Subnet Mask
- Server IP Address
- User Name
- Password

If your ISP specifies that you use PPTP (Point-to-Point Tunneling Protocol) as your connection to the Internet, you cannot use the provided Setup Wizard to automatically set up your router. Follow the instructions below to set up your connection manually:

1. Remove the Ethernet cable from the back of the computer you currently connect with, and connect it to the Internet port of your Wireless 2350.
2. Connect the Ethernet cable provided to any of the four LAN ports, and the other end to your computer.
3. Configure your computer's Ethernet adapter to obtain an address automatically.
4. See Windows Help for information on how to configure your computers network adapter.

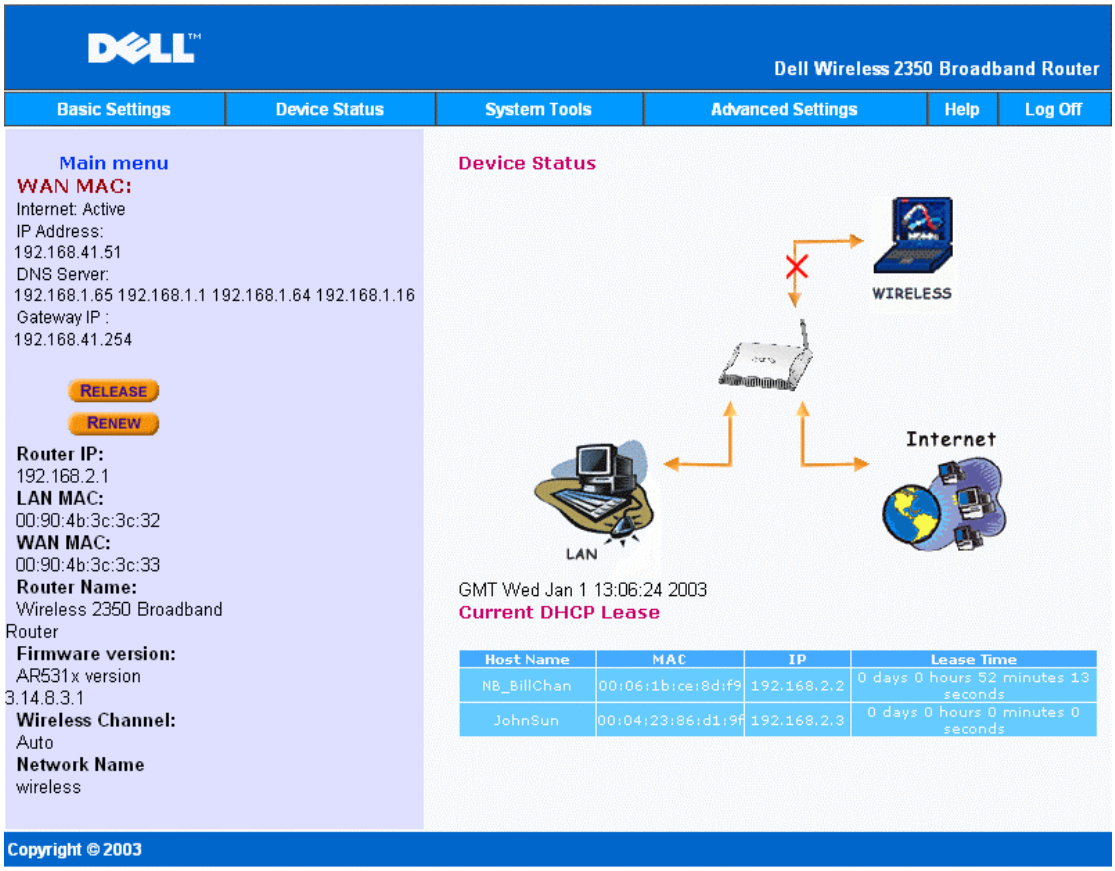
NOTICE: If you are charged for your Internet Connection by the minute, unplug the network cable from the Internet port on the Wireless 2350 when Internet access is no longer desired.

Device Status:

The Device Status screen displays the basic network settings for your Dell Wireless 2350 Wireless Broadband Router. When changes are made to the network settings, those changes are updated on this screen. In addition, it graphically displays the current connection status for the Wireless 2350 and other devices in your network. Connections between network devices are shown with a yellow arrow. Inoperative connections are represented by one red X through the yellow connection line.

NOTE: The Wireless 2350 router offers two ways to check the status of your network. One is the **Device Status** feature in the web configuration tool mentioned here. The other is through the Windows-based Control Utility.

Status



Device Status

The following connections are displayed on the Device Status page:

Device	Indication
Internet	An inactive cable/DSL connection indicates that either the cable is unplugged or the Wireless 2350 has not received an IP address. An active connection indicates the WAN interface of the router has a valid IP address and your computers can connect to the Internet via the router.
Wired Client (LAN)	Shown as an active connection when a wired client is configured and physically connected to your network, and inactive when the Ethernet cable is disconnected from the computer.
Wireless Client	Shown as an active connection when a wireless client is configured for your network, and inactive when there is no wireless client connected to your router.

When the Wireless 2350 acts as a DHCP server, it assigns IP addresses to the clients on the network. These IP addresses are displayed in the **DHCP Log** below the Device Status figure.

WAN Ethernet Settings

Refer to the left side of the screen for the following WAN Ethernet settings and the Internet protocol (IP) settings for the Wireless 2350:

Setting/Device	Information Displayed
Internet	The connection to the Internet is Active/Not Active
Router IP	IP address assigned to the Wireless 2350
LAN MAC	MAC address for the LAN and Wireless interfaces
WAN MAC	MAC address for the WAN interface
Router Name	The name for the Wireless 2350 (the default is Wireless 2350)
Firmware Version	Version number of the firmware currently installed on the

	Wireless 2350 and the release date of the firmware
Wireless Channel	Radio channel on which the Wireless 2350 is communicating on the air
Network Name	A unique network name that identifies the network. It is also known as SSID (Service Set Identifer). When a client station tries to connect to the router, the user must know the router's SSID first.

The following buttons appear on the left navigation bar:

Button	Action
RELEASE	Releases the IP address that the Wireless 2350 has been assigned from your ISP. If the Wireless 2350 has been configured to receive a static IP address, clicking **Release** does not release this IP address.
RENEW	Renews the IP address with a DHCP server provided by your ISP. If the Wireless 2350 has been configured to receive a static IP address, clicking **Renew** does not renew the IP address.

System Tools:

Use the System Tools section to view the intruder detection log, routing tables, and system diagnostics regarding the device settings and status. The System Tools section also includes features to restore the default settings, upgrade the firmware for the Wireless 2350, and reset the unit.

Use the following pages in the web-based configuration tool to access the System Tools:

Intruder Detection Log

Display Routing Table

System Diagnostic

Load Default Settings

Upgrade Firmware

Reset Device

Intruder Detection Log

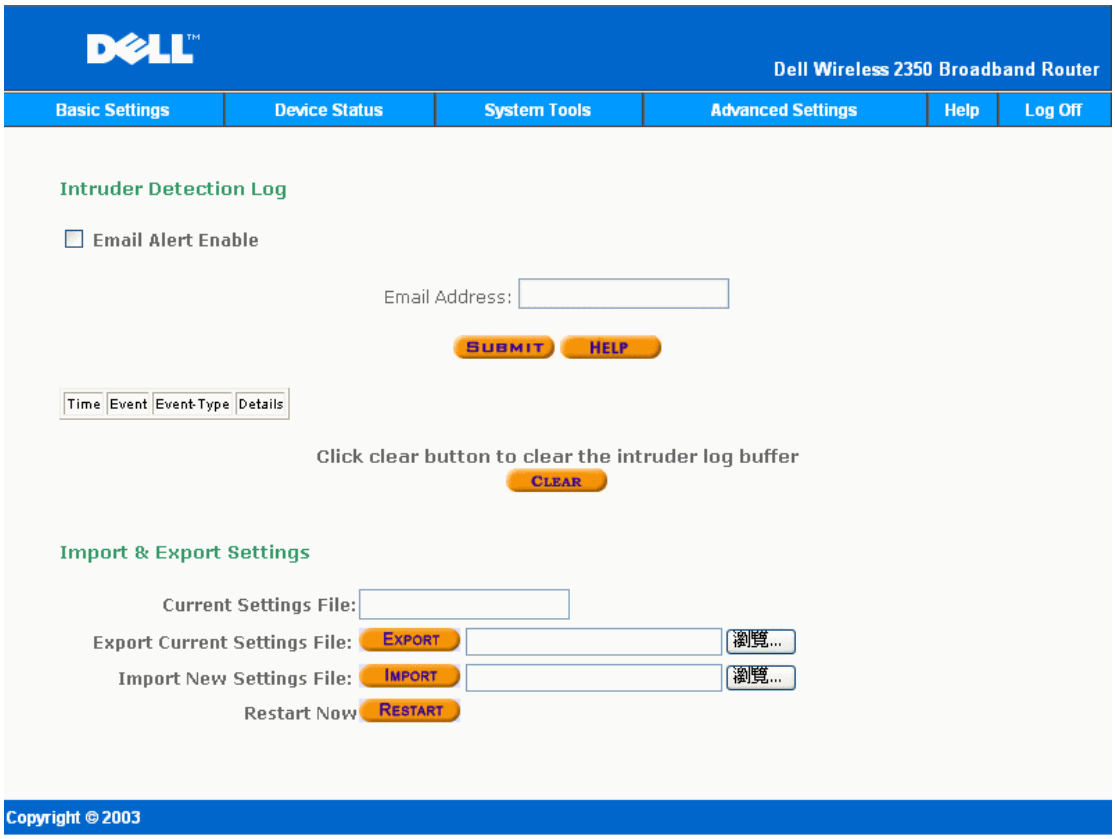
Indicator	Description
Event	Type of attack that the router detects
Time	Based on the timestamp of the IP packet, plus or minus the time offset
Source	IP address that the packet came from
Dest (=Destination)	Usually the IP address for the Wireless 2350
Port	Port number
Remark	show additional information about the event

The system can alert you via e-mail to any attempted intrusion.

1. Click to select **Email Alert Enable**.
2. Type the e-mail address that you want the alert sent to in the **Email Address** field.
3. Click the **Submit** button.

The figure below shows an example of an entry of an intrusion attempt event from a computer with IP address 192.168.2.60 (Source) targeted at the router's port number 80 at time 12 AM:1 Min: 5 Sec.

Intrusion



The figure above shows system statistics for all wired and wireless stations.

Dell Wireless 2350 Router allows user to save current settings into storage devices and to load previous saved settings into the router. Click “Restart” button to export or import configuration files.

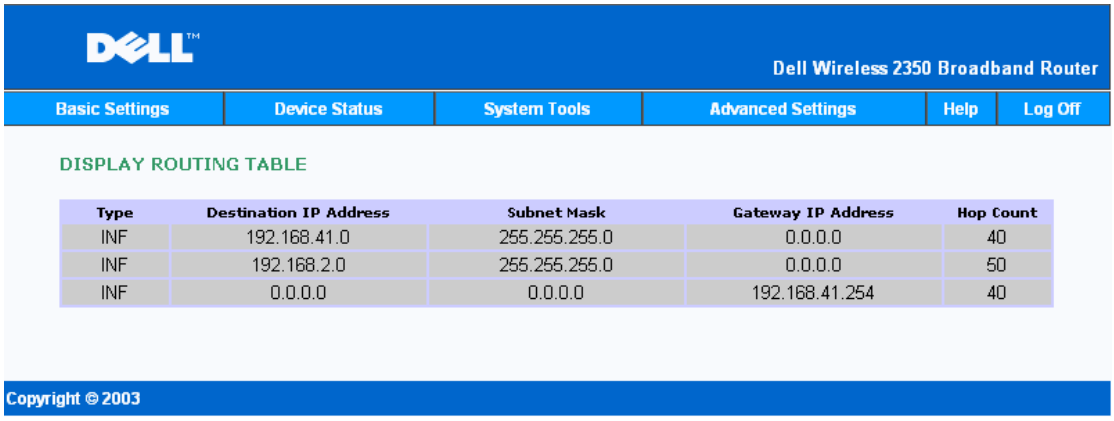
Display Routing Table

Indicator	Description
Type	The type of routing. This can be either of the following: LAN or WAN interface (INTF) Static routing
Destination LAN IP Address	Either an entire network or a specific IP address. An IP address ending in .0 refers to a network.

Subnet Mask	Must follow the subnet mask rules
Gateway IP Address	To communicate with an IP address matching the destination IP Address, the Wireless 2350 sends all traffic through the gateway IP address listed here.
Hop Count	The number of routers the packet has passed through to its destination. Hop count is used to measure the distance between a source and a destination. If there are 3 routers between the source and the destination nodes, the hop count for the packet will be 3 when it arrives at its destination node.

The figure below shows three network routes that your router currently possesses. 192.168.2.0 is the destination network connected to one of your router's interface ports (LAN or WAN) and the IP address and Subnet Mask for this interface is 192.168.2.1 and 255.255.255.0, respectively. The number of routers (Hop Count) the packet passed through is 1. Also in the same example, the destination with 0.0.0.0 network and 0.0.0.0 Subnet Mask is the default route for your router, where every packet that left unmapped to any other route will be mapped to this route. The outgoing default gateway IP address is 192.168.1.254.

Routing Table

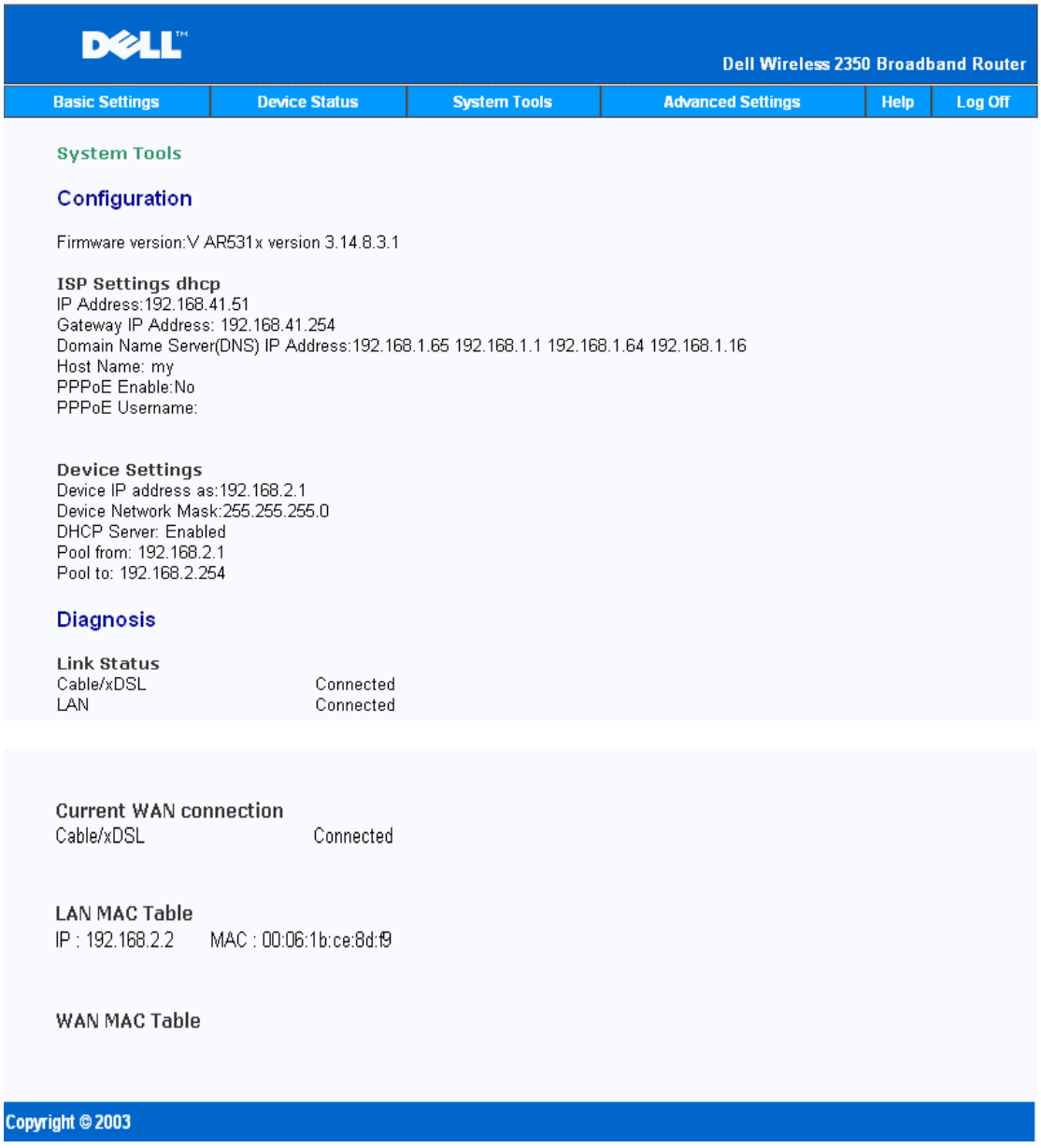


System Diagnostic

The Systems Diagnostic page is for your information only. This page displays both the configuration settings and diagnostics for the Wireless 2350. Configuration settings include firmware version, the ISP and device settings that have been configured for your network.

The Diagnostic section shows the current connections for your network. Diagnostic settings include the ISP status, link status, current WAN connection, LAN MAC table, and WAN MAC table.

System Diagnostic



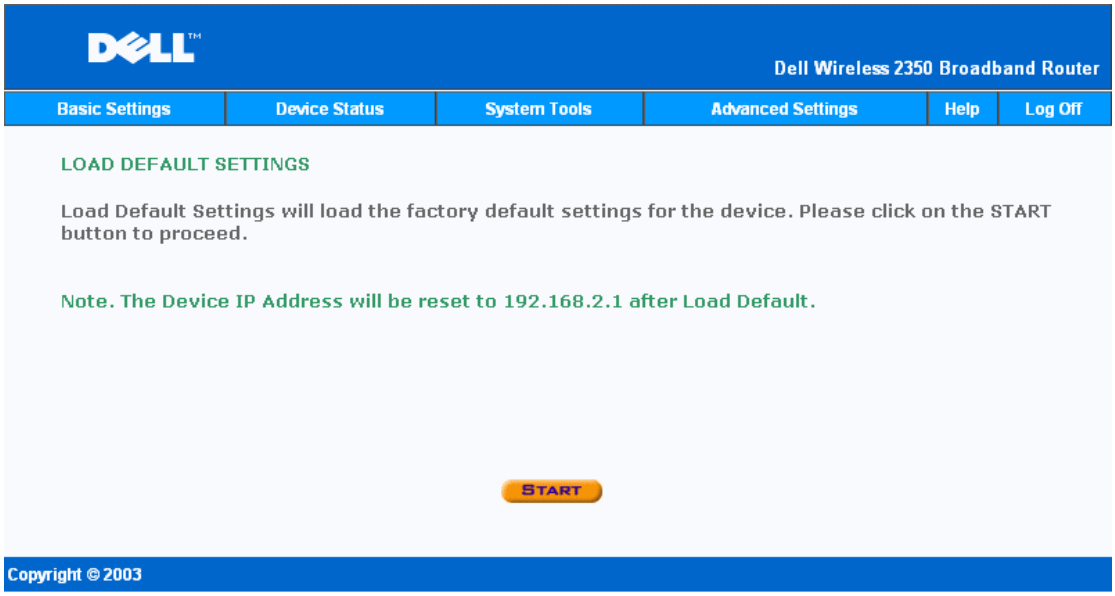
Load Default Settings

The Load Default Settings page allows you to reload the factory default configurations that came with the device. When this option is used, the default IP address is reset to the factory default value (192.168.2.1). This is equivalent to pressing and holding the **Reset** button on the

back panel of the device for more than 5 seconds (for more details, refer to A Look at the Hardware).

NOTICE: Loading the default settings option will cause the current settings for your Wireless 2350 to be lost.

Load Default Settings



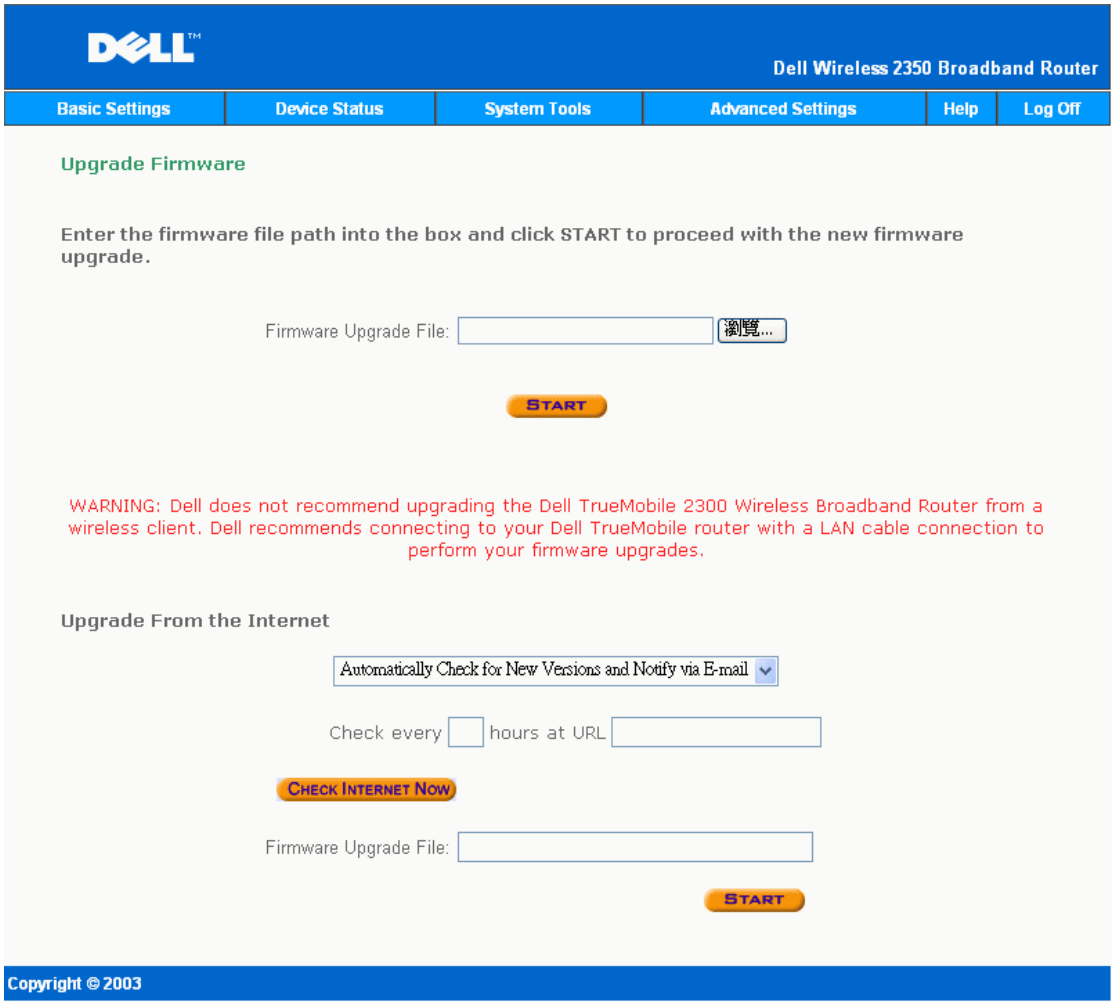
Click the **Start** button to reload the default settings.

Upgrade Firmware

Dell periodically releases firmware updates to provide improved performance or capabilities. Use the firmware upgrade feature to easily upgrade the firmware on your Wireless 2350. You can check the Dell support website, support.dell.com, to see if there are any new upgrades. Download the new firmware first before upgrading and save it to one of the clients in your network. To upgrade the firmware, type the firmware file path into the box, or click the **Browse** button to choose a firmware file to upgrade to.

NOTE: Make sure the file you choose is an actual Dell Wireless 2350 Wireless Broadband Router firmware file.

Upgrade the Firmware



Click the **Start** button when you have chosen a file. After the firmware is written to the Wireless 2350, the home page will be loaded automatically. While the Wireless 2350 resets, the **Power** light on the front panel of the router blinks.

The other option to upgrade firmware is through the internet. Enter e-mail address and check every number of hours. Or user can click “check internet now” to see if there is new firmware available for upgrading. Click the **Start** button when you have chosen a file. After the firmware is written to the Wireless 2350, the home page will be loaded automatically. While the Wireless 2350 resets, the **Power** light on the front panel of the router blinks.

NOTE:	Make sure the file you choose is an actual Dell Wireless 2350 Broadband Router firmware file.
NOTE:	Dell does not recommend upgrading the Dell Wireless 2350 Broadband Router from a wireless client. Dell recommends connecting to your Dell Wireless Router with a LAN cable connection to peform

	your firmware upgrades.

Reset Device

Use the Reset Device function if a system failure occurs. This feature does **not** reload the factory default settings. It simply resets the device to the network settings that existed on the device before the system failure occurred. This is equivalent to unplugging the device and plugging it back in or pressing the reset button for less than 3 seconds until the **Power** light starts to blink. No settings are lost.

NOTICE:	If you were in the process of updating the network settings, those changes are lost when the device is reset.

Click the **Start** button to reset the Wireless 2350 to its **current firmware settings**. While the Wireless 2350 is reset, the **Power** light on the front of the router blinks.

Advanced Settings:

NOTE: Dell technical support representatives do not support the configuration options in the Advanced Settings portion of the configuration program. These options are provided for your convenience only. However, the advanced settings are fully documented and explained in this guide.

The options **Port Forwarding Settings** and **Static Routing** are invisible if you are in Access Point Mode.

Advanced IP Settings

The Dell Wireless 2350 Broadband Router comes with an assigned IP address and IP subnet mask. These settings apply only to the local network portion of the router. If you are installing the unit on an existing network or simply want to change these values, make sure the IP subnet mask is the same for all devices on your network. The network portion of the IP address must also be the same for all devices on your network.

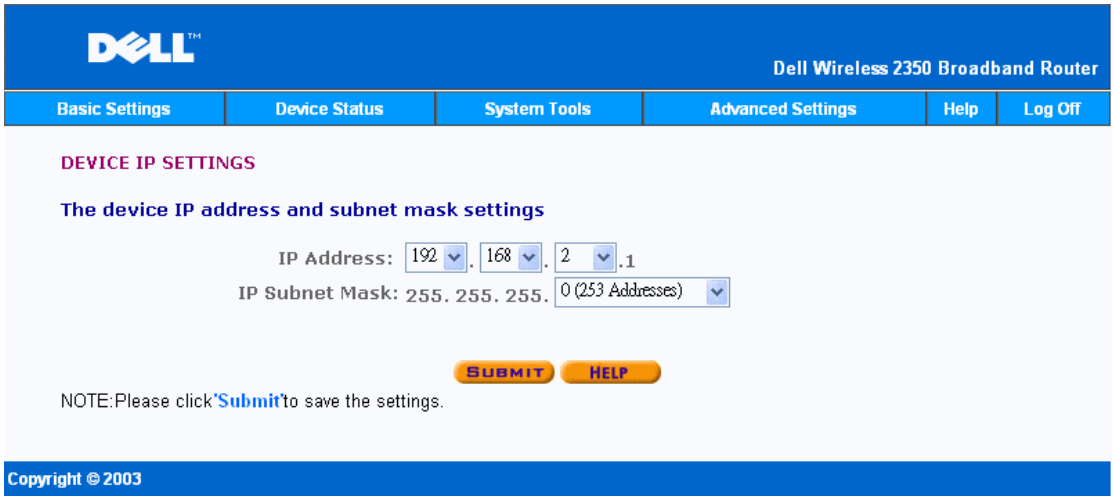
NOTE: Dell strongly suggests you do not change the IP address unless there is a specific reason for doing so.

While you are changing the IP address, be aware of the following:

- Changing the IP address of the Wireless 2350 also changes the IP address pool if the DHCP server is enabled.
- If you are using the Wireless 2350 with a cable modem or DSL line, you should assign a **private** IP address. Private IP addresses are in one of three ranges:
    - 10.0.0.1-10.254.254.254
    - 172.16.0.1-172.31.254.254
    - 192.168.0.1-192.168.254.254
- You must use the new IP address to access the web-based configuration tool.

NOTE: You should only change the IP address or IP subnet mask if you are installing the Wireless 2350 on an existing wired network and the DHCP server function for your Wireless 2350 is disabled in the **Advanced Settings**. For more information, contact your network administrator.

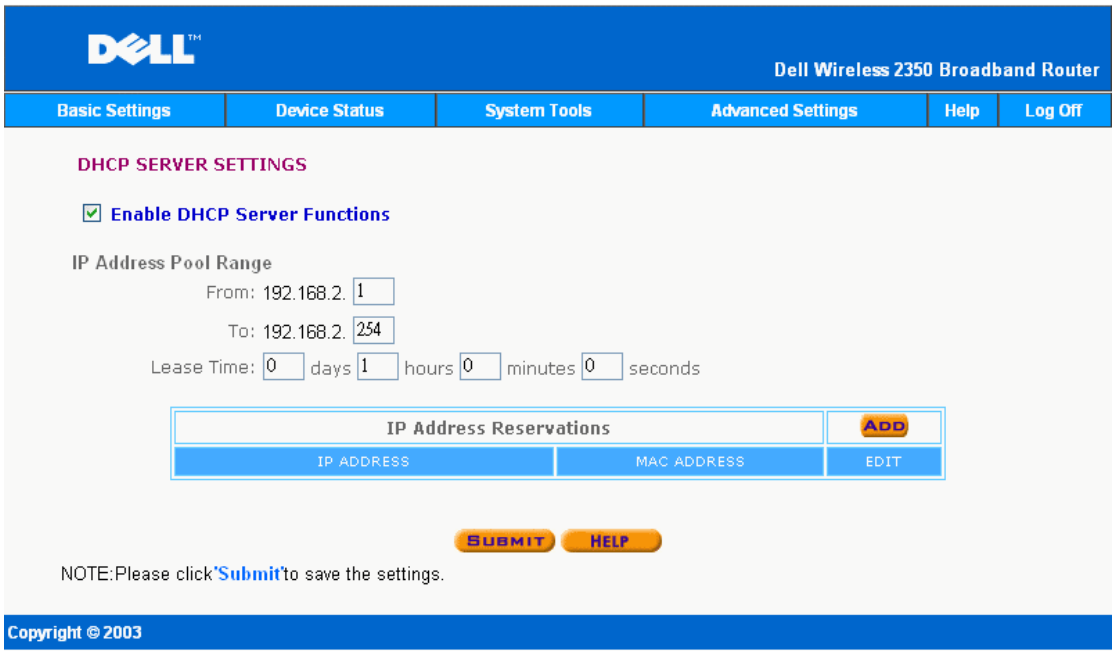
Advanced IP Settings



DHCP Server Settings

Dynamic Host Configuration Protocol (DHCP), defines a way to automatically assign IP addresses to computers on a network. IP addresses are managed by a DHCP server. If a Windows computer is configured to obtain an IP address automatically, it automatically gets an address from the DHCP server.

DHCP Server Settings



Enable DHCP Server Functions

By default, the Wireless 2350 is set to function as a DHCP server. If you are installing the unit on an existing network that already has a DHCP server or simply do not want the Wireless 2350 to function as the network's DHCP server, click to deselect **Enable DHCP Server Functions** to disable the DHCP server function.

IP Address Pool Range

The IP Address Pool Range section provides a means of controlling a low and high value for the IP addresses on a network. Use the indicated fields to define the range of IP addresses you would like the Wireless 2350 to provide to DHCP clients. The valid range of numbers you should enter is between 1 and 254.

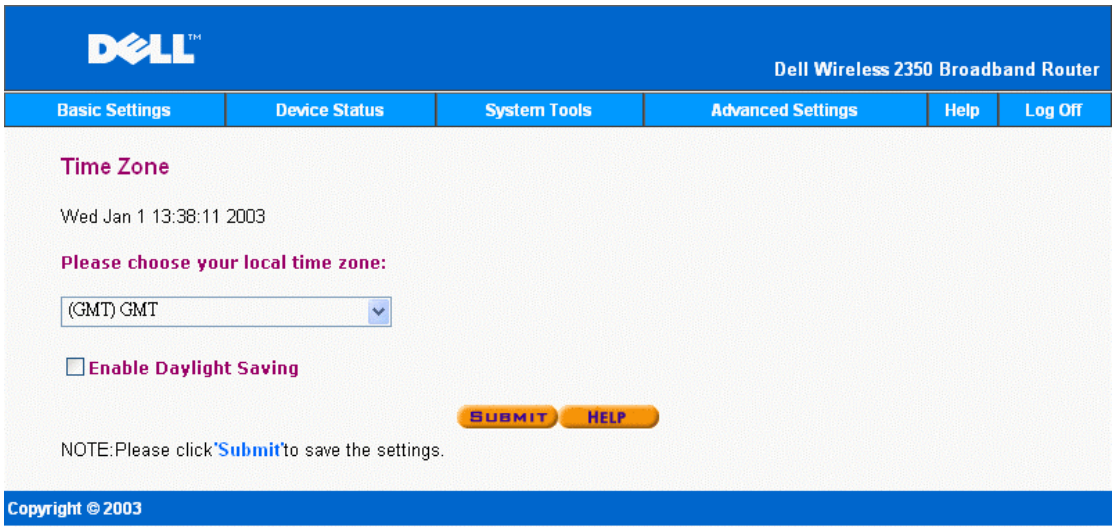
The lease time is the amount of time a user will be allowed to use the IP address assigned by the DHCP server. You may specify the lease time that DHCP server offers for the client to use the IP address. This setting is especially useful on campuses or other environments where users change frequently.

IP Address Reservation

Specific IP addresses may also be reserved for particular devices in a network. The **IP Address Reservation** fields allow you to reserve up to 20 IP addresses for a specific system. The **MAC Address** field is the physical address of the network card on the client computer. Use the input fields under **IP Address** to indicate the IP address for those devices that should use a manually defined IP address.

Time Zone

Time Zone

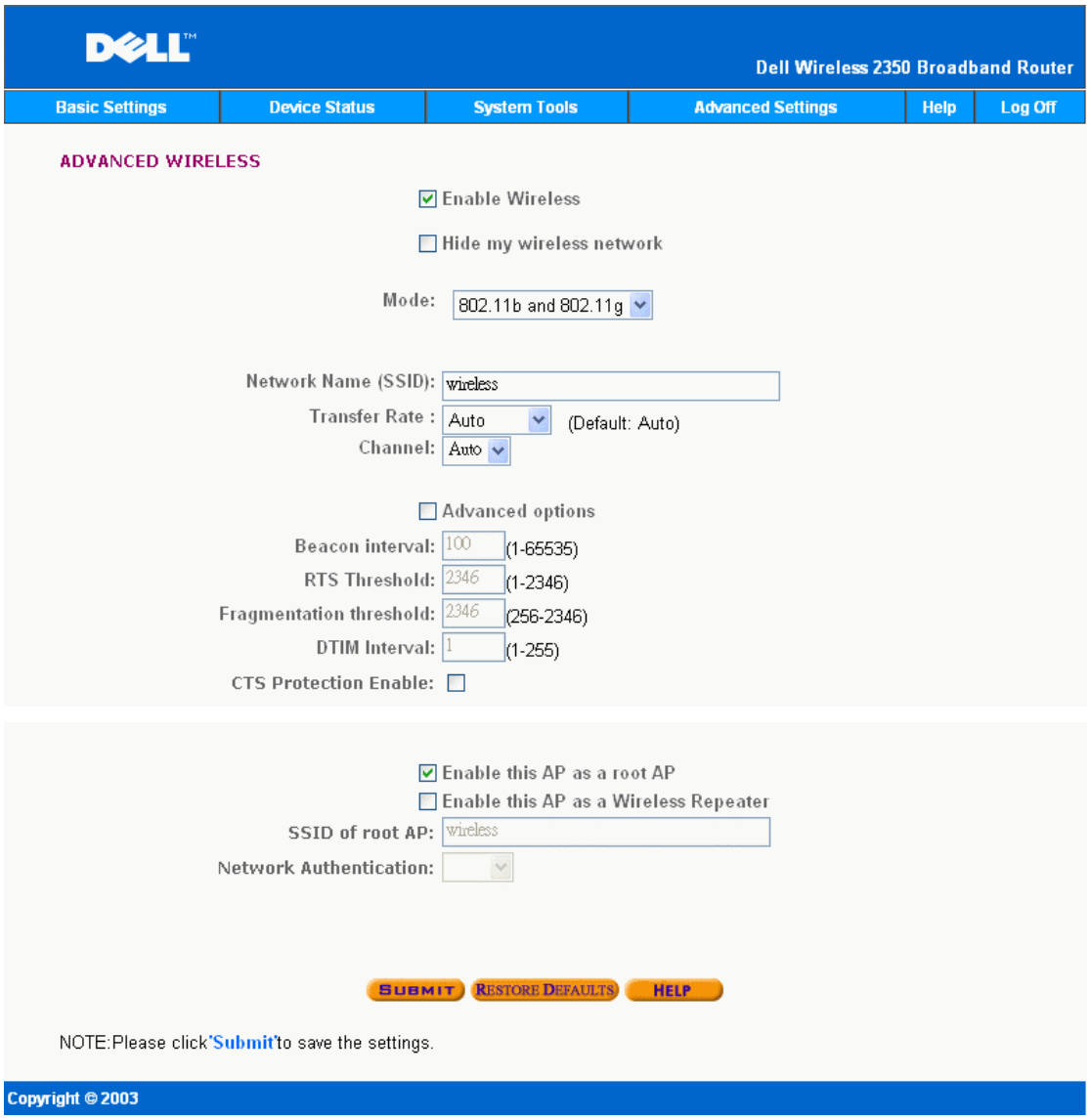


Use the **Time** Zone page to select your local time zone from the pull-down list. The Time Zone Settings affect the Intruder Detection Log. This setting overrides the time stamp on IP packets that are in Greenwich Mean Time (GMT).

During the summer months, the clock will move one or several hours ahead. Countries have different change dates. In most of the U.S and Canada, daylight saving time begins on the first Sunday of April. Time reverts to standard time on the last Sunday of October. To enable daylight saving click the box **Enable Daylight Saving**.

Advanced Wireless

Advanced Wireless



Enable Wireless

This setting enables radio transmission and reception on the Wireless 2350.

Hide my wireless network

Checking this disables the Wireless Broadband Router to send out beacon packets to the wireless network. It is deselected by default and other users can easily find and make association to your Wireless Broadband Router with the use of a site survey tool.
If you want to increase wireless network security, you can enable this feature.

Mode

Wireless 2350 Router is 802.11g-compatible. You can select **both b & g** (dual mode), or **802.11b**, or **802.11g** from the **Mode** list.

SSID

Service Set Identifier (SSID) is a 32-character name that uniquely identifies all the computers and equipment that make up the wireless network.

Transfer Rate

Transfer rate can be set to automatic or some other fixed value. It is recommended that you set the transfer rate to automatic (Auto) to allow the wireless network devices to transmit at a rate they deem optimum at any given point of time.

Channel

The channel settings let you set the channel for this router. The radio channel is the place over which a communication transmission occurs. The operating channel number depends on the regulatory domain.

NOTE: If you want to configure the settings of Beacon Interval, RTS Threshold, Fragmentation Threshold, and DTIM Interval, ensure that **Advanced Options** is selected first.

Beacon Interval

The amount of time in Kusecs (one Kusec equals 1,024 microseconds) between radio beacons from the Wireless 2350 to its client stations. The value range is from 1 to 65535.

RTS Threshold

The packet size above which the Wireless 2350 will issue a Request to Send before sending the packet.

RTS (Request to Send) mechanism prevents the **Hidden Node** problem. When two stations are within range of the same Access Point (AP) but are not within range of each other, they are hidden nodes for each other. The packets from these two stations may collide if they arrive at the AP at the same time. To prevent data collision with the hidden node, you can activate RTS mechanism. If RTS mechanism is activated, the station will send a RTS first to inform the AP that it is going to transmit the data. Then, the AP will reply with the CTS (Clear to Send) to all

stations within its range to notify all other stations and reserve the bandwidth for your data.

The RTS threshold controls what size data packet would issue a RTS. Only when the packet exceeds the RTS threshold, the device will send a RTS before sending the packet. There is trade-off to consider what value you should set for the RTS threshold. Small values cause RTS to be sent more often, and it would waste the bandwidth. However, the more often RTS packets are sent, the sooner the system can recover from collisions. It is recommended to use the default value or only minor reductions of this default value. The value range is from 1 to 2347.

Fragmentation Threshold

The fragmentation threshold, specified in bytes, determines whether data packets will be fragmented and at what size. Packets that are smaller than the specified fragmentation threshold value will not be fragmented. Packets that are larger than the fragmentation threshold will be fragmented into smaller packets and transmitted a piece at a time instead of all at once. Thus, it will reduce the need for retransmission and improve overall network performance. Fragmentation is activated usually when the system is in heavy traffic and interference environment. The setting must be within the range of 256 to 2346 bytes. It is recommended to use the default value or only minor reductions of this default value.

DTIM Interval

DTIM (Delivery Traffic Indication Message) Interval, always a multiple of the beacon period, determines how often the beacon contains a traffic indicator map (TIM). The TIM alerts stations in sleep state to stay awake long enough to receive their data frames. The value range is from 1 to 255.

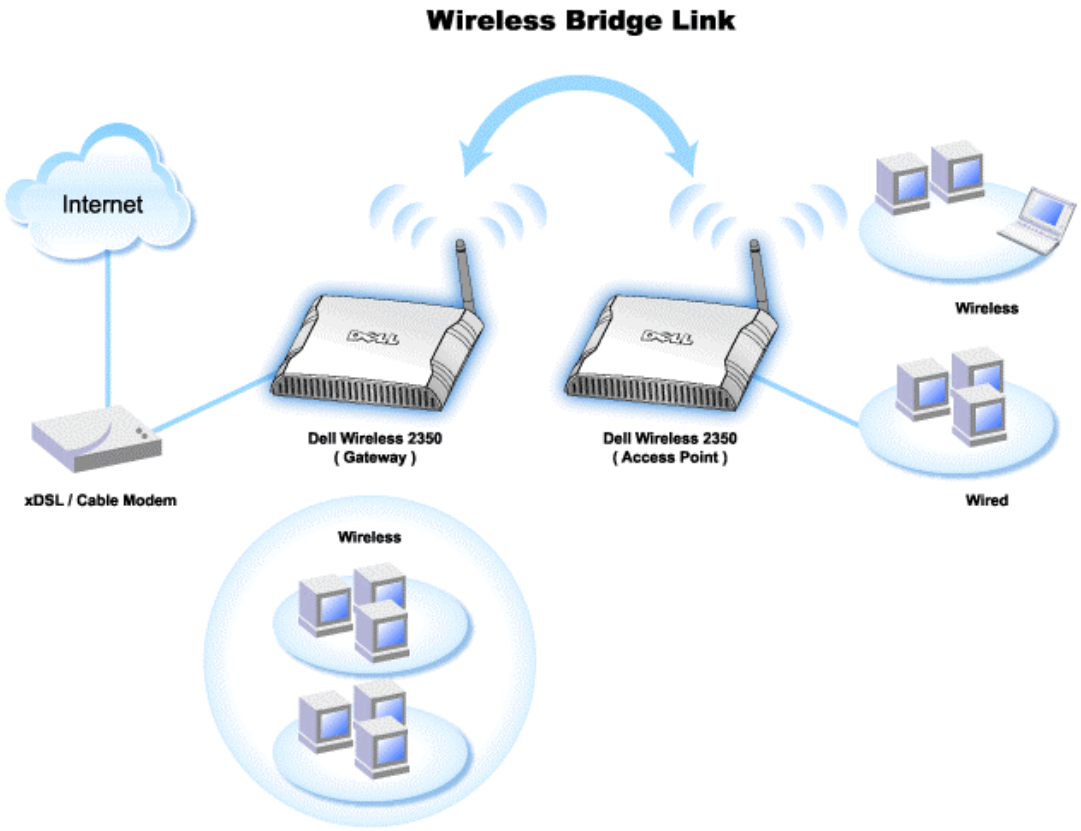
CTS Protection mode

Allows user to enable or disable this feature which allows operation of 'g' clients in an environment with 'b' AP. Enabling this allows 'b' clients to perform better in this environment. Disabling allows maximum throughput for 'g' clients.

Wireless Bridge

Wireless bridging can be used to increase the coverage of your wireless network and/or to provide wired access to remote computers. You need two or more Dell Wireless 2350 Broadband Routers to set up wireless bridging.

To set up wireless bridging, configure the wireless settings for all of your Dell Wireless 2350 Broadband Routers to the same settings.



Configuring your router for Wireless Bridging:

1. Ensure **Enable Wireless** is checked.
2. Type your wireless network name in the **Network name (SSID)** field if you want to change it from the default setting.
3. Ensure **Advanced Options** is deselected.
4. Enable **Wireless Bridge**.
5. Type the Wireless MAC address (fields) of the other Dell Wireless 2350 Broadband Router(s) that you want to bridge.

NOTE: To connect two bridges together, enter the MAC address of the bridge at the other end. To connect three bridges together, enter the MAC addresses of the other two bridges in the bridge acted as the multipoint center. The MAC address of the center bridge is the only address that needs to be entered into the other bridges.

6. Click the **Submit** button.

7. Repeat the steps above for each Dell Wireless 2350 Broadband router you want to bridge.

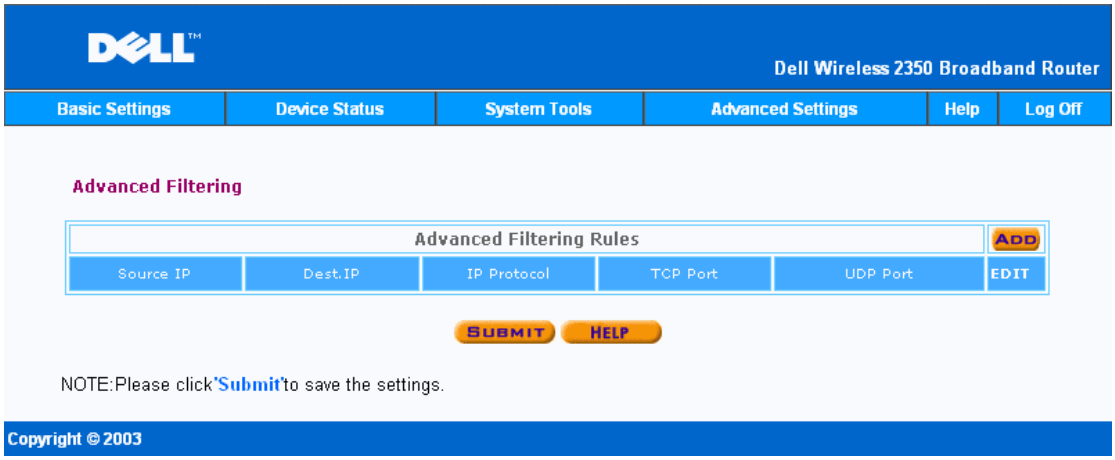
NOTE: Ensure all Wireless 2350 routers are set to same wireless settings. Also, all router(s) not directly connected to Internet should be configured to Access Point mode.

Restore Defaults

If you have customized your wireless system configuration, you can restore the wireless settings to factory defaults by clicking the RESTORE DEFAULTS button.

Parental Control

Parental Control



IP filtering is a mechanism enabling a networking node to accept or deny certain types of IP datagrams based on the IP address, port number, protocol type, and other criteria.

1. Click the **Add** button. A pop-up **Parental Control Rule** window will appear.
2. Click to select the IP address of the particular computer you want to control (for example, your child's computer) in the **IP Address** list.
3. To block or grant access to the Internet during a period of time, specify the start and end time from the **Time Restriction** list.
4. Click to select **Allow** or **Deny** from the **Internet Access** list.

5. Enter the URL that you want to allow or deny the access in the **Web Site Restrictions** field.
6. Click to select **Allow** or **Deny** access to these web sites.
7. Enter the **web keywords** to deny traffic with the same keywords
8. Click the **Submit** button to store the changes.

Advanced Filtering allows user to setup a more complicated rule to filter out unwanted traffic. Click **ADD** button to setup source IP, Destination IP, IP protocol, TCP port, and UDP port.

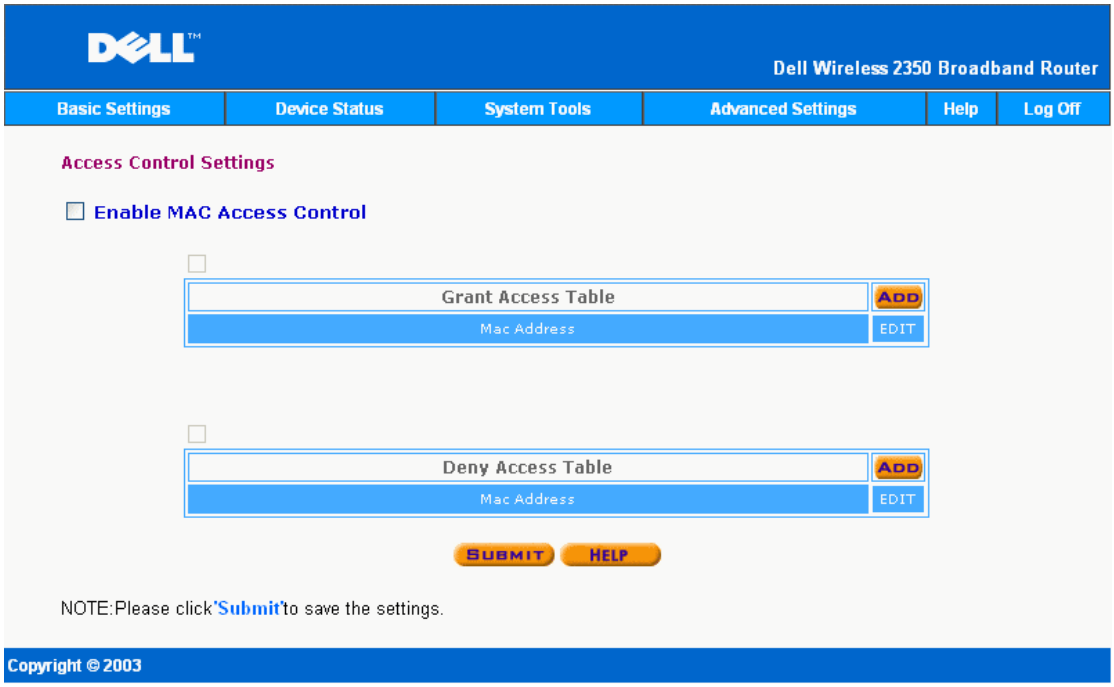
The figure above shows DNS server status. User is able to see host name, IP address, and Source.

For user hosting service with a dynamic IP from ISP's DHCP server, Dynamic DNS allows server to match ever changing IP to work station which the service is provided. Check "Enable Dynamic DNS" box and enter User Name, Password, and Host Name to register with Server.

Access Control Settings

The Access Control Settings feature allows you to control which local client computer can or can not access the network through the router. The Wireless 2350 by default allows any local client computer to access the network. There are two tables for Access Control Settings, Grant Access Table and Deny Access Table. Each table is able to support up to 32 entries. Only one table can be active at a time. Selecting the checkbox for Grant Access Table will disable the Deny Access Table and vice versa. This MAC Access control settings apply to wireless clients only and not to wired clients.

Access Control Settings



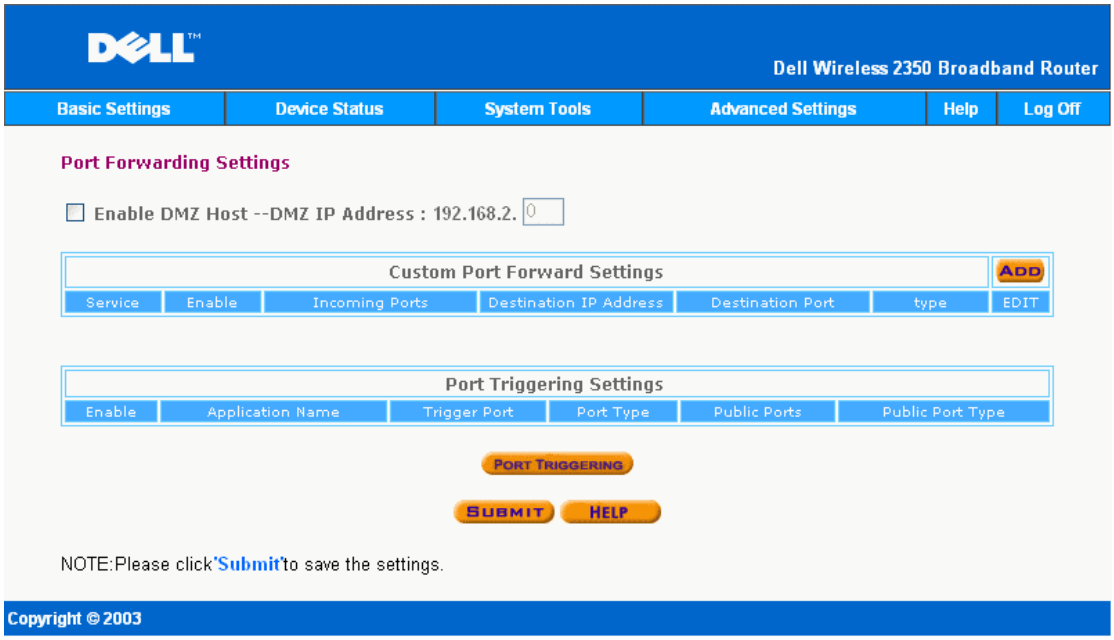
To enable access control in the router, perform the following steps:

1. Click to select **Enable MAC Access Control**.
2. Click the **Add** button, a pop-up window will open and then enter the MAC address of the network card on the computer on which you allow the access to the router.
3. Click **Submit** to enter the rule to the router.
4. To remove an existing rule, click to select **edit** beside **MAC address**.
5. A pop-up window will open and click the **DEL** button to remove it.

NOTE: The Access Control Settings apply to wireless client computers and not to wired client computers.

Port Forwarding Settings

Port Forwarding Settings



DMZ

The DMZ (demilitarized zone) feature allows access to all ports. (For example, if you have problems hosting a game server, you can choose this option. This will open all ports to your game server.)

1. Click to select **Enable DMZ Host** .
2. Type the IP address of the computer that you want to run the gaming application in the **DMZ IP Address** field.
3. Click the **Submit** button to activate the setting.

NOTE: Configuring the Wireless 2350 in DMZ mode is useful if you want to play certain games through the Wireless 2350, but the ports cannot be opened with all other existing configuration tools.

NOTICE: Opening a service to the Internet causes security concerns. Pay careful attention to security alerts, and make sure that strong access controls and authentication are in place before allowing access to any services.

Custom Port Forwarding Settings

Port Forwarding may be more difficult than DMZ to configure. However, it provides a relatively safe way of running an Internet application or providing an Internet service from behind a

firewall since only a single port (or a range of ports) is exposed to the Internet. You can configure this port forwarding setting to create a custom rule that defines a specific port and protocol for data traffic to pass through to the specific computer on your LAN.

An example is an HTTP server running on your LAN, which you want to be available to the Internet. Your public IP address (that your ISP gives you) is X.X.X.X (The X is a number), and you have a computer hosting the HTTP server at LAN address 192.168.2.2 on your Wireless 2350 (192.168.2.1) controlled LAN. You can configure 192.168.2.2 to have port forwarding for port 80 (HTTP), then users on the Internet can go to http://X.X.X.X and get the HTTP server (192.168.2.2). The data traffic entering service port 80 will be directed to the computer (192.168.2.2), and other computers on your LAN will not see this data traffic.

For some Internet applications (such as Internet messaging and gaming applications), you can configure this port forwarding setting so that these applications can function correctly behind the firewall. These applications are required to have specific TCP/UDP ports. The ports for these applications and the protocol type will depend on what Internet services you are using. Check with your service provider or application's user manual to have the information first.

Make sure you have the following ports set up as described below.

1. Click the **ADD** button first to add entries.
2. Enter the desired name or description in the **Service Name** field.
3. In the **Incoming Ports** field, enter a range of ports. If you want to specify only a single port number, enter the same number in both fields.
4. In the **Destination IP Address** field, enter the IP address of the computer you want to receive the connection request.
5. In the **Destination MAC Address** field, enter the MAC address of the computer you want to receive the connection request.
6. In the **Destination Port** field, enter a port number or a range of ports of the machine to which you are mapping.
7. In the **Port type** field, select TCP, UDP, or both protocols. The protocol could be specified in your application's documentation.
8. Click the **Submit** button to activate the setting.

For example, if you want to play the game Fighter Ace II on a computer with an IP address of 192.168.2.3, enter **3** for the **Destination IP Address**. Find the MAC address of this computer and enter it for the **Destination MAC Address**. Select **TCP** as the **Port type**. Enter **50000** and **51000** for two fields of **Incoming Ports** and also for the **Destination Port**. Click **Submit** button to activate the setting. For other games or services, consult the application's user manual.

The steps below show how to find the MAC address of the computer in Windows 2000 and XP.

1. Click the **Start** button, and then click **Run**.
2. In the **Open:** field, type the following text: **cmd**
3. Click the **OK** button.
4. At the command prompt, type the following text to obtain the **Physical Address** (MAC address): **ipconfig/all**

Commonly Used Ports

Services	Protocol Type	Ports
HTTP (WEB Server)	TCP	80
FTP	TCP	20, 21
TELNET	TCP	23
SMTP (Mail Server)	TCP	25
POP3 (Mail Server)	TCP	110
IRC	TCP	6667
NNTP (News Server)	TCP	119

Port Triggering

Port triggering allows the router to watch outgoing data for a specific port number. The IP address of the computer that sends the data is remembered by the router, so that when the requested data returns through the router, the data will be passed to the specific computer by way of IP address and port mapping rules. The router opens the port when the Port Triggering happens. When the computer running the application stops sending the data through this port, the router will close the port.

1. Click the **PORT TRIGGERING** button first.
2. Enter the desired name or description in the **Application Name** field.
3. In the **Trigger Port** field, enter a port number. Check with your Internet application provider for more information on what Trigger Port it is using.

4. Select TCP (Transmission Control Protocol), or UDP (User Datagram Protocol), or both protocols as the **Trigger Port Type**.
5. Specify the range of the **Public Ports** by typing the start and end port numbers in the required fields.
6. Select TCP (Transmission Control Protocol), or UDP (User Datagram Protocol), or both (TCP and UDP) as the **Public Port Type**.
7. Click the **Submit** button to activate the setting.

Click the **Submit** button to store the changes.

Static Routing

Static Routing

Static routes are manually configured routes to remote networks. That is, the route is predefined and is not discovered by the **Routing Information Protocol** (RIP), as in dynamic routing. Static routing allows you to assign a gateway to an IP address or network. If there are routers on your internal network that do not function with RIP 1 or 2, you can set up a static route to those routers.

The advantage to using static routing is that network traffic is reduced; thus, static routing is beneficial for slow Internet connections. Routing using static routes is practical for small networks. For larger networks, the router needs to dynamically keep track of changes in the physical wiring of the network, and the use of dynamic routing (RIP) is recommended.

NOTICE: The Static Routing settings are intended for advanced network administrators only. Do not change these settings unless you are certain of the correct values. You may not be able to access the configuration tool if invalid information is entered.

To use static routing, manually add the Destination IP Address, Subnet Mask, and Gateway IP Address for each route you are adding to the Static Routing Table, and click **Add**. Then click **Submit**. If you are routing to an entire network, the last number in the destination IP address should be a zero (0); for example, 192.168.0.0.

NOTE: In static routing, the Wireless 2350 does **NOT** dynamically discover routing information and does **NOT** use RIP. The Wireless 2350 currently does **NOT** support RIP.

Use the fields beside each route and the **Delete** button to remove static routes from the Static Routing Table.

Administration Settings

Password Settings

The Wireless 2350 uses a password to authenticate the user before allowing changes to be made to any network settings. If you would like to change the current password, click to select **Change Your Password** and enter the new password in both **New Password** and **Retype Password** fields. Write down the password and keep it in a secure location for future reference.

System Administration

- **HTTP Port No.**
  Do not change the **HTTP Port** value unless you have reason to do so. Typically, web servers listen for incoming web requests on port 80.

- **Allow remote user to configure the device**
  If you would like a remote user to be able to administer your Wireless 2350 over the Internet, click to select titled **Allow remote user to configure the device**. Enter the IP address for the remote administration host computer.
- **Allow remote user to ping the device**
  Click to select **Allow remote user to ping the device** to enable your Wireless 2350 to be pinged by any user on the Internet. This feature is helpful if you want to allow other Internet users to check the status of your Wireless 2350.
- **Enable UPnP function** UPnP stands for Universal Plug and Play, a protocol which allows UPnP-enabled client computers, such as Windows XP, to discover and configure the Wireless 2350. One of most common use of UPnP on the router is to open ports to allow application-specific data to be forwarded through the router for various Internet services or gaming applications. The router detection and the router configuration process can be carried out automatically by the UPnP-enabled client applications such as **MSN Messenger** so you won't have to do it manually. Click to select **Enable UPnP function** to enable this service.

  If you have an Windows XP system, you can use it to access and control the router while the router's UPnP function is enabled. Here are some examples of what you can do with UPnP from your Windows XP system.

  Example 1: Access the router's web configuration tool without knowing its IP address.

  1. Double-click the **My Network Neighborhood** icon from the desktop.
  2. Double-click the **Broadband Router** icon that is created for your router. This will bring up the authentication screen of the router's Web configuration tool.
  3. Type the correct password and click the **OK** button to access the web configuration tool.

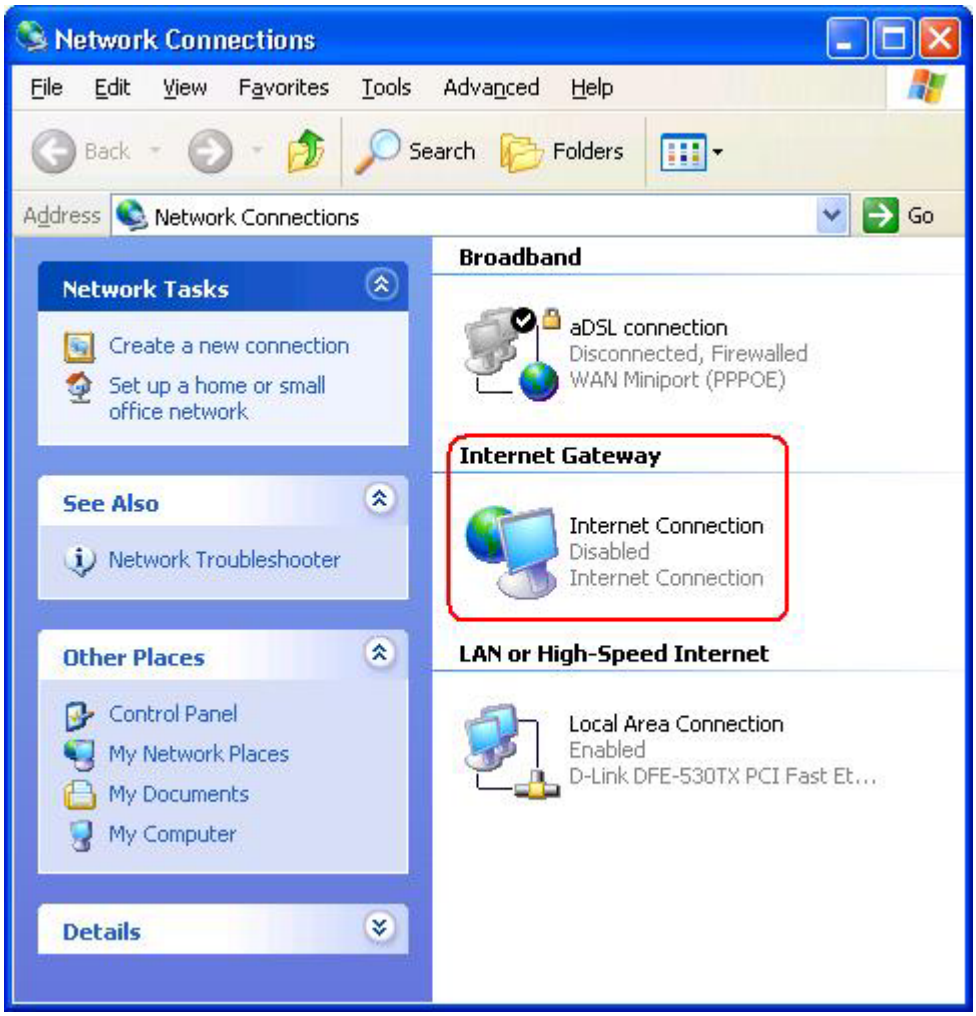
  Authentication Screen

Example 2: Manage the router's port forwarding rules from the Windows XP interface.

NOTE: If you have already configured a port forwarding rule for the service through the web configuration tool, you don't need to perform the following steps for the same service again.

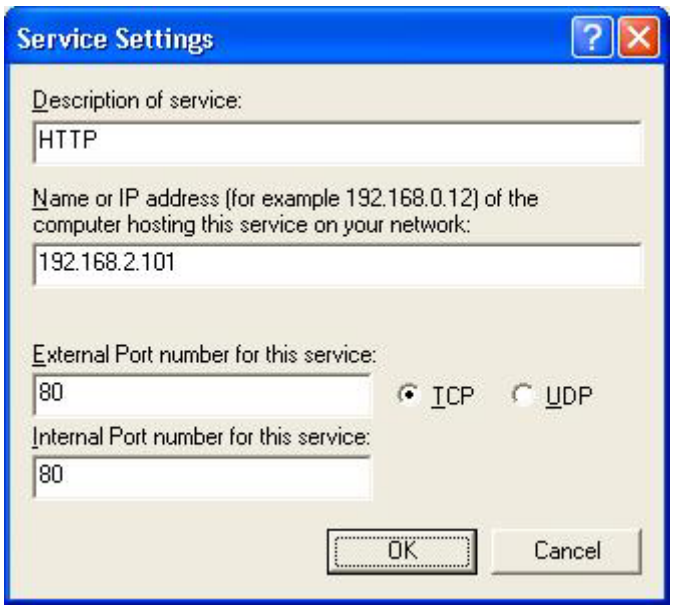
4. Right-click the **My Network Neighborhood** icon on the desktop.
5. Right-click the **Internet Connection** icon created for the router.

Network Connections



6. Right-click the icon and left-click **Properties**.
7. Click **Settings**.
8. Click **Add**.
9. Type Description of service, IP address of the service host, External Port number for this service, Internal Port number for this service, and click to select either TCP or UDP. For example, the graph below shows an example of how to enable a computer with an IP address 192.168.2.101 to host a public HTTP server.

Service Settings



10. Click the **OK** button to save the changes.