



# IBM<sup>®</sup> High Rate Wireless LAN Gateway

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*User's Guide*

OPTIONS  
*by IBM*

**Note:** Before using this information and the product it supports, be sure to read the *IBM High Rate Wireless LAN Gateway Safety and Warranty Information* that comes with your option. The *Safety and Warranty Information* contains the following information, which is necessary to review before operating the device:

- Safety information
- Information to the user, including regulatory information and additional installation requirements.
- Federal Communications Commission (FCC) statement
- Product warranty and notices
- Help and service information

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## Preface

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### About this book

This *User's Guide* contains instructions for installing and using the IBM® High Rate Wireless LAN Gateway.

The *User's Guide* contains the product description and usage instructions. For information about the product warranty and help and service information, see the *Safety and Warranty Information* that comes with your option.

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### Registering your option

Thank you for purchasing OPTIONS by IBM. Please take a few moments to register your product and provide us with information that will help IBM to better serve you in the future. Your feedback is valuable to us in developing products and services that are important to you, as well as in developing better ways to communicate with you. Register your option on the IBM Web site at

<http://www.ibm.com/pc/register>

IBM will send you information and updates on your registered product unless you indicate on the Web site questionnaire that you do not want to receive further information.



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## Part 1: Product description

The IBM High Rate Wireless LAN Gateway provides small offices and home offices (SOHO) an economical way to connect an entire local area network (LAN) to the Internet using an external DSL/Cable modem. With its built-in wireless access point, you can connect your IEEE 802.11b-compliant mobile computers or other clients to establish a home network.

The IBM High Rate Wireless LAN Gateway has the following features.

- **High-speed Internet access:** Connect an external DSL/Cable modem to provide Internet access 10-100 times faster than a 56k modem.
- **Wireless access point:** The IBM High Rate Wireless LAN Gateway contains an embedded wireless access point that supports the industry standard (IEEE 802.11b WLAN) protocol with a data rate up to 11 megabits per second (Mbps), can have up to 63 simultaneous users, and is compatible with all WiFi IEEE 802.11b-compliant wireless LAN (WLAN) client cards with seamless roaming between access points.
- **Built-in switch:** With a built-in four-port, dual speed (10/100 Mbps) Ethernet switch, you get complete and fast connectivity for small offices.
- **Single shared ISP account with network address translation (NAT):** NAT works by translating the data packets' IP address from the one provided by the Internet service provider (ISP) to the IP address of the computer attached to the IBM High Rate Wireless LAN Gateway. All computers on the network can share a single ISP account.
- **Dynamic host configuration protocol (DHCP):** The IBM High Rate Wireless LAN Gateway provides IP address acquisition and management.
- **Web-based management:** The IBM High Rate Wireless LAN Gateway simplifies web-based management with a built-in, intuitive web-based configuration and administration graphical user interface (GUI).
- **Built-in firewall:** The IBM High Rate Wireless LAN Gateway has a built-in firewall to protect the computers on the local network from hackers on the Internet.
  - NAT: NAT hides the IP address of the local network from the Internet.
  - Packet filtering: Data packets without a trusted IP address or port are dropped. For DMZ, the exposed computer receives all packets that would otherwise be dropped.
  - Stateful inspection: Data packets are inspected for relevance within a data stream or session. If the data packets are not relevant, they are dropped. For DMZ, the exposed computer receives all packets that would otherwise be dropped.

- **Virtual Server:** With the IBM High Rate Wireless LAN Gateway, you can set up a server on your local network that can be remotely accessed from the Internet (an ftp server, for example).
- **DMZ:** The IBM High Rate Wireless LAN Gateway can support some special applications and Internet games. With DMZ, one designated computer is removed from behind the built-in firewall and exposed to the Internet. This speeds up Internet gaming and might be required from special applications.
- **Access control (Packet filtering):** The IBM High Rate Wireless LAN Gateway can monitor and block specific packets or applications. This function is not the same packet filtering function described for the built-in firewall. The Administrator can set up IP addresses on the Internet that the local computers are blocked from accessing. For example, if the Administrator does not want users to access IP address 255.255.255.255 on the Internet, this function blocks the address.

The Administrator can also set ports to be blocked from local use. For example, if the Administrator does not want users to have ftp access to the Internet, port 21 can be blocked.

- **Wireless security:** As access control mechanisms, the IBM High Rate Wireless LAN Gateway has ESSID for wireless network segmentation, MAC address registration, and wireless equivalency protection (WEP) (64- and 128-bit) encryption.
- **Virtual private networks (VPN):** The IBM High Rate Wireless LAN Gateway supports the following VPNs:
  - IP Security (IPSec) passthrough
  - Point-to-point tunneling protocol (PPTP) passthrough
  - Point-to-point protocol over Ethernet (PPPoE) for DSL

**Note:** Functions listed above that are not viewable in the built-in HTML-configuration utility are active and not adjustable.

- **Status light emitting diodes (LEDs):** These LEDs provide a quick method to check the status of the Gateway.
- **Internet-broadband port:** The IBM High Rate Wireless LAN Gateway has an RJ-45 interface to connect, through an Ethernet cable, to a DSL/Cable modem.
- **10BASE-T/100BASE-Tx ports:** These ports can automatically detect the connection speed of a link and provide a 10 or 100 Mbps connection to Ethernet devices, based on the detected capabilities. All of the 10/100 Mbps Ethernet ports automatically detect whether the attached Ethernet cable is wired in standard or crossover configuration. These ports support a maximum length of 100 m (328.1 ft.) over a Category 5 twisted pair cable.
- **Power jack:** Connect the included external power adapter to the power jack.

The following items are included in your option package:

- One IBM High Rate Wireless LAN Gateway unit



- One ac power supply
- One power cord

**Note:** In the event that your Gateway comes with two power cords, be sure to use the one labeled for your country. One is labeled for use in the United States and Canada, and one is labeled for use in Japan.

- One RJ-45 Ethernet cable
- *IBM High Rate Wireless LAN Gateway Quick Start Guide*
- *IBM High Rate Wireless LAN Gateway Safety and Warranty Information*
- *IBM High Rate Wireless LAN Gateway User's Guide* CD

The included CD contains the following items:

- This *User's Guide* (in PDF format)
- Adobe Acrobat Reader

If any of the above items are missing or damaged, contact the place of purchase.



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## Part 2: Quick setup

This section provides information on setting up your IBM High Rate Wireless LAN Gateway.

To set up your High Rate Wireless LAN Gateway, do the following.

1. Set up your IBM High Rate Wireless LAN hardware by doing the following:
  - a. Attach the included RJ-45 Ethernet cable to the port labeled **Internet** on the back of the Gateway.
  - b. Attach the other end of the RJ-45 Ethernet cable to the output port of your DSL/Cable modem.
  - c. Unclip the antenna.
  - d. Attach the power cord to the ac power supply.
  - e. Attach the ac power supply to the Gateway. The Gateway turns on automatically.

**Note:** In the event that your Gateway comes with two power cords, be sure to use the one labeled for your country. One is labeled for use in the United States and Canada, and one is labeled for use in Japan.
  - f. Turn on your DSL/Cable modem.
  - g. Turn on your computers.
2. Connect your computer to the Gateway.
  - If you are making a wireless connection, your computer's wireless LAN adapter must be configured to find and communicate with the IBM High Rate Wireless LAN Gateway. See the manual or *User's Guide* that comes with your computer's wireless LAN adapter. The default settings of the Gateway are:
    - Network Name (SSID or ESSID): ANY

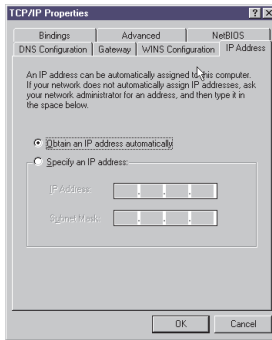
**Note:** This field is case-sensitive. Use all upper-case letters when typing the Network Name.
    - Encryption must be off or disabled.
  - If you are making a wired connection, attach an RJ-45 Category 5 Ethernet cable to one of the four Ethernet ports located on the back of the Gateway, and then connect the other end of the RJ-45 Category 5 Ethernet cable to the Ethernet port of your computer.
3. Configure your computer's TCP/IP properties to communicate with the Gateway.

If you are using Microsoft Windows 95, Windows 98, Windows 98 Second Edition (SE), or Microsoft Windows Millennium Edition (Me), do the following to set up Microsoft Networking properties.

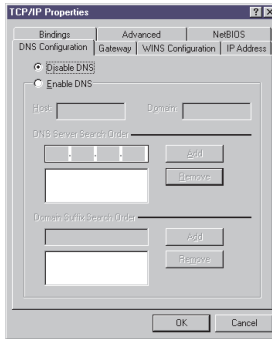
- a. Click **Start** → **Settings** → **Control Panel**.

**Note:** For Windows Me, you might have to select **View all Control Panel Options**.

- b. Double-click the **Network** icon.
- c. Select the TCP/IP setting for the network adapter identified in step 2.
- d. Click **Properties**.
- e. Click the **IP Address** tab.
- f. Click to check the **Obtain an IP address automatically** radio button.



- g. Click the **DNS Configuration** tab.
- h. Click to check the **Disable DNS** radio button.

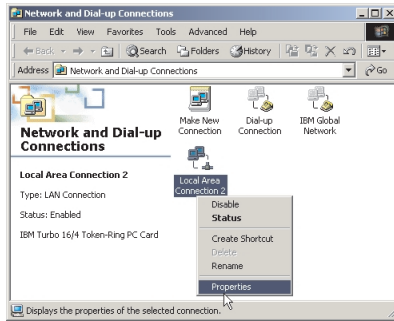


- i. Click **OK**.
- j. Click **OK** again.

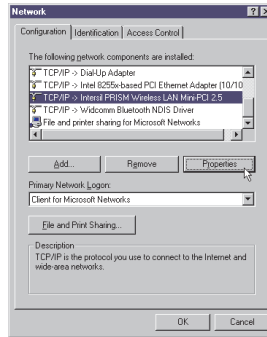
If you are using Microsoft Windows 2000 Professional, do the following to set up Microsoft Networking properties.

- a. Click **Start** → **Settings** → **Control Panel**.
- b. Double-click the **Network and Dial-up Connections** icon.

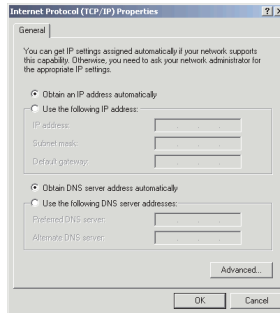
- c. Right-click the icon for the network adapter identified in step 2.
- d. Select **Properties**.



- e. Select **Internet Protocol (TCP/IP)** from the components list.



- f. Click **Properties**.
- g. Click to check the **Obtain an IP address automatically** radio button.



- h. Click to check the **Obtain DNS server address automatically** radio button.
- i. Click **OK**.
- j. Click **OK** again.

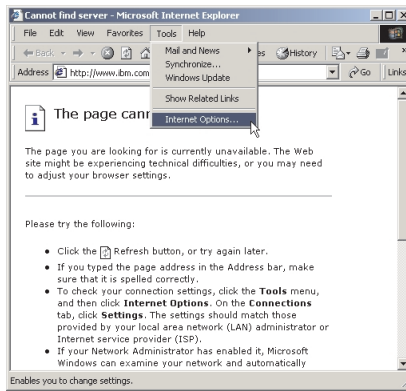
**Note:** Complete the following steps only if your DSL or cable modem provider requires you to specify specific IP or DNS settings. If your DSL or cable modem provider is configured as a DHCP server, no further setup is necessary.

4. Launch your Web browser and disable the proxy settings.

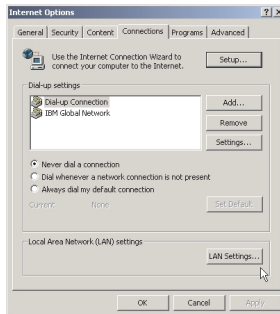
If you are using Microsoft Internet Explorer, do the following to disable proxies.

**Note:** Your version of Internet Explorer must be 5.0 or higher.

- a. Launch Internet Explorer.
- b. Click the **Tools** menu, and then select **Internet Options**.

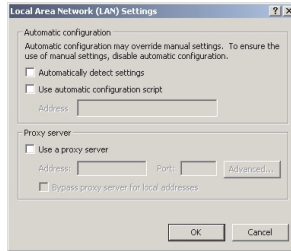


c. Click the **Connections** tab.



d. Click **LAN Settings**.

e. Clear all of the check boxes. See the following illustration to locate the check boxes you must clear.

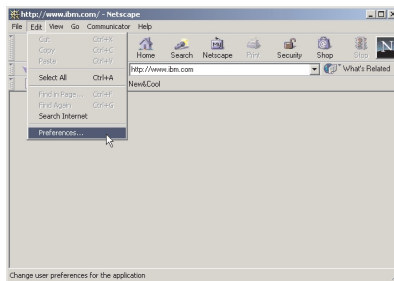


- f. Click **OK**.
- g. Click **OK** again.

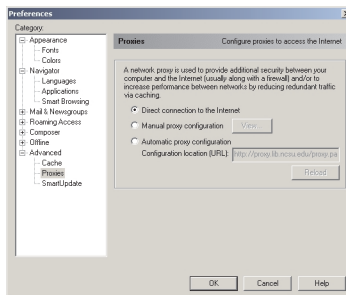
If you are using Netscape Navigator, do the following to disable proxies.

**Note:** Your version of Netscape Navigator must be 4.0 or higher.

- a. Launch Netscape Navigator.
- b. Click the **Edit** menu, and then select **Preferences**.



- c. Click the + sign next to **Advanced**.



- d. Click **Proxies**.
  - e. Click to check the **Direct Connection to the Internet** radio button.
  - f. Click **OK**.
5. In the **Address** field in your Internet Explorer Browser (**Location** field in Navigator), type the address of the Gateway.

**Note:** The default address (URL) of the Gateway is 192.168.1.1.

6. The Enter Network Password dialog box opens.



- Type default in the **User Name** field, and then click **OK**.

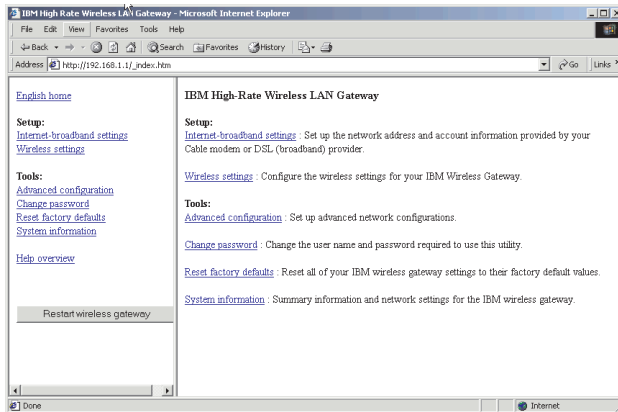
**Note:** "default" is the default user name. There is no default password.

7. A Web page opens asking you to select a language.



- Select your language by clicking the appropriate icon. The language home page opens.





## 8. Configure your Internet-broadband settings.

- a. Obtain the necessary IP and DNS settings from your DSL or cable modem provider.

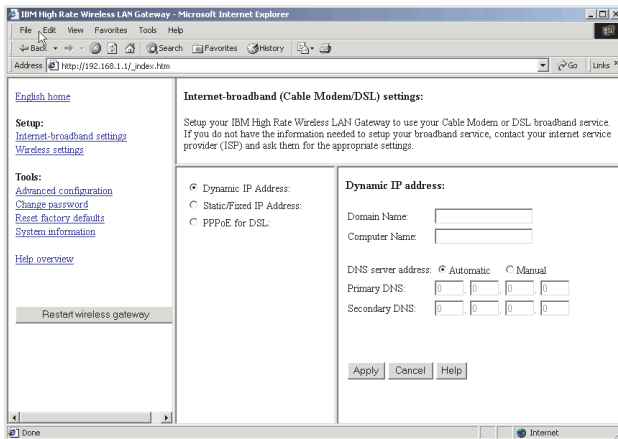
The IBM High Rate Wireless LAN Gateway is configured for Dynamic IP Address and Automatic DNS settings. If your DSL or cable modem provider is configured as a DHCP server, go to step 9.

If your DSL or cable modem provider provides you with information for a Dynamic IP Address, Static/Fixed IP Address, or PPPoE for DSL Address, go to step 8.b.

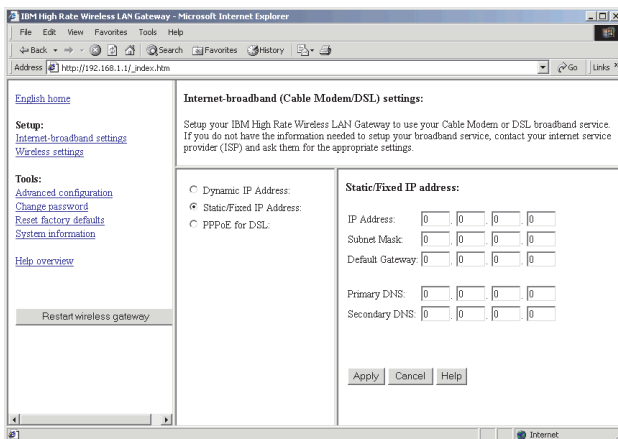
- b. Click **Internet-broadband settings**.
- c. Configure your Internet-broadband settings.

**Note:** Some fields might not be used for all ISP configurations.

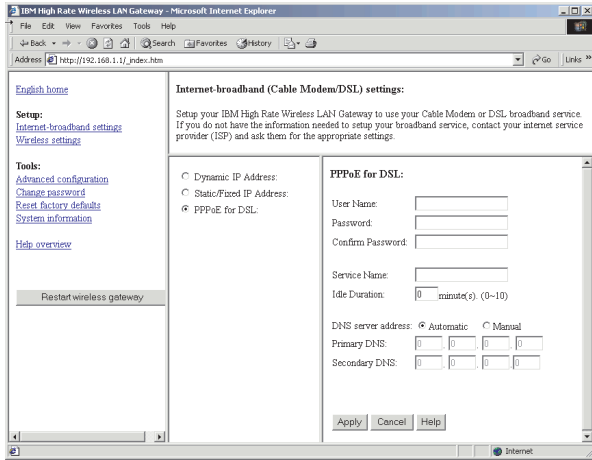
- If your ISP provides you with information for a Dynamic IP address, click the **Dynamic IP Address** radio button, enter the appropriate information in the fields, and then click **Apply**.



- If your ISP provides you with information for a Static/Fixed IP address, click the **Static/Fixed IP Address** radio button, enter the appropriate information in the fields, and then click **Apply**.



- If your ISP provides you with information for a PPPoE for DSL address, click the **PPPoE for DSL** radio button, enter the appropriate information in the fields, and then click **Apply**.



9. Launch a new Web browser and attempt to connect to the Internet through the Gateway.



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## Part 3: Configuration graphical user interface (GUI)

The IBM High Rate Wireless LAN Gateway supports a Web-based management and configuration graphical user interface (GUI).

**Note:** Multiple users can log in through a Web interface at the same time.

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### Web-based interface

The Web-based interface has an easy-to-use GUI.

**Note:** Web browser software can be downloaded from the Web:

- Netscape: <http://www.netscape.com>
- Microsoft: <http://www.microsoft.com>

The Gateway is preconfigured with the default IP address of 192.168.1.1.

1. Launch your Web browser on a computer you have configured for TCP/IP networking.
2. Be sure that the computer and the Gateway have LAN IP addresses on the same subnet.
3. Type `http://192.168.1.1` into the **Location** field (in Netscape Navigator) or the **Address** field (in Internet Explorer) at the top of the browser window, and then press Enter.

**Note:** If the Gateway's IP address has been changed, replace 192.168.1.1 with the current IP address.

The Enter Network Password dialog box opens.



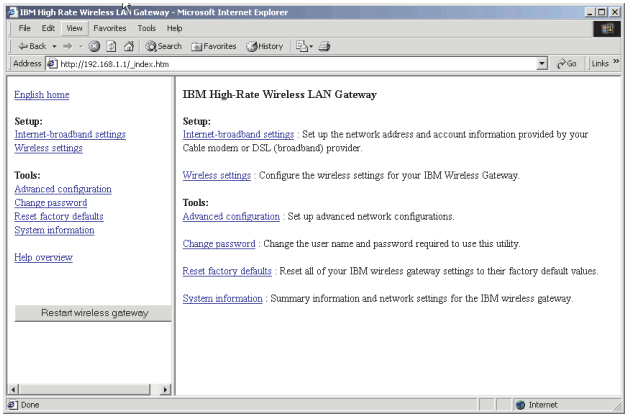
4. Type default in the Login Name field, then press Enter or click **OK**.

**Note:** All IBM High Rate Wireless LAN Gateways are factory-configured with "default" as the default Administrator name. No password is needed.

After login, the Language selection window opens.



- 5. Select your language by clicking the appropriate icon.  
The Language home page opens.



The following is a list of buttons and links displayed on the Web-based interface.

- **Apply:** Stores the new configurations into flash memory after configuration is completed
- **Add:** Adds a new entry into the configuration table
- **Modify:** Modifies an entry in the configuration table
- **Cancel:** Cancels the configurations and restores previous values

- **Back:** Back to the last page viewed
- **Refresh:** Only used on the System Information page to display the system information
- **Help:** Displays related help information
- **Delete:** Deletes an entry in the configuration table

## **Saving configurations**

The configuration changes made through the Web interface are automatically saved into the flash memory within 30 seconds after clicking **Apply**.

For more information, see “Part 6: Using tools for advanced configuration” on page 6-1.



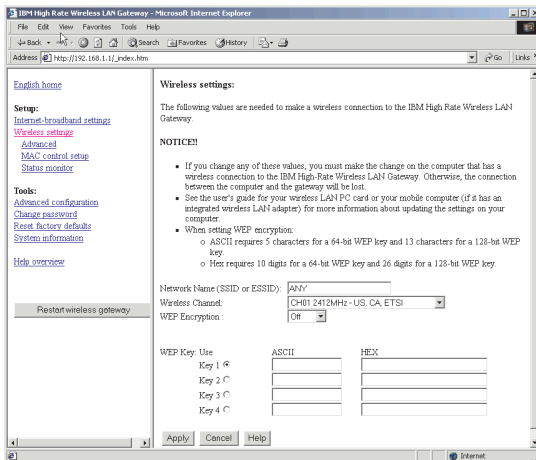


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## Part 4: Setting up the access point in the IBM High Rate Wireless LAN Gateway

The IBM High Rate Wireless LAN Gateway is a multifunctional device with an integrated IEEE 802.11b-compliant access point. You can use it as a base station for your wireless network. Through the following procedure, you can turn on the wireless function of the Gateway and connect your wireless devices with other Ethernet nodes such as a DSL/Cable modem, printer, file server, or other wireless clients.

In the language home page, click **Wireless settings**.



The following three items are displayed in the left frame:

- Advanced
- MAC control setup
- Status monitor

The Network Name or SSID (ESSID) window is displayed in the right frame. Clients must carry the same SSID, or use "ANY", before they can communicate with or through the Gateway. The factory default SSID is "ANY", which means that if the SSID of your client is something other than this (or is blank), you cannot access this Gateway through a wireless connection. The SSID can have up to 13 characters.

Channels are the spectrum range where your wireless signals are transmitted. The clearer the channel, the better your network performance. You can select the desired channel from the pull-down menu.

Wired equivalency privacy (WEP) encrypts the packets sent by the wireless Gateway. The security settings can affect performance, and must be balanced to your needs.

**Note:** A higher encryption setting is more secure but will not perform as well as a less secure setting. A 128-bit WEP encryption setting gives the most security, but also produces the lowest effective data throughput. Disabling encryption gives the highest effective data throughput, but does not offer any additional security.

**WEP Key:** You can create up to four WEP keys. After enabling WEP, you must enter the same WEP key in the client computers, otherwise they will be refused a connection.

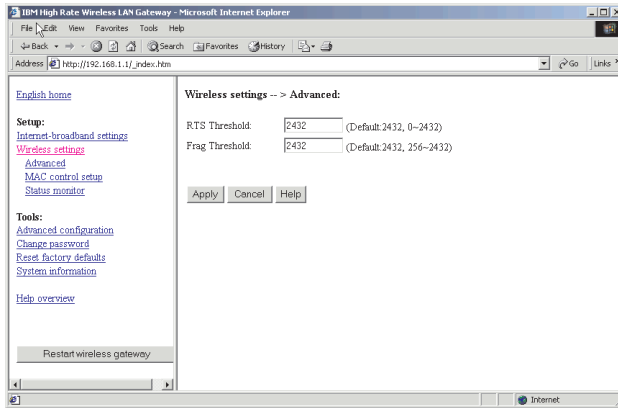
When WEP is enabled, type the WEP key in the **WEP Key 1** field. You can type your WEP key in one of two ways:

- Five alphanumeric characters for 64-bit encryption, or 13 alphanumeric characters for 128-bit encryption. The range of characters is "a-z," "A-Z," or "0-9"
- 10 hexadecimal digits for 64-bit encryption, or 26 digits for 128-bit encryption. The range of digits is "A-F" and "0-9."

You can also type a WEP key in the **Key 2**, **Key 3**, or **Key 4** fields. WEP only uses one key. You must select one WEP key as an active key before enabling encryption.

**Note:** The configuration changes made through the Web interface are automatically saved into the flash memory within 30 seconds after clicking **Apply**.

## Advanced



Request to send (RTS) Threshold: In some situations, not all clients in a WLAN are aware of each other (hidden node problem). That can lead to different WLAN clients transmitting to the Gateway at the same time, therefore jamming each other's transmission. RTS Threshold is a packet size above which the Gateway will expect to use the RTS mechanism. This is negotiated with the client.

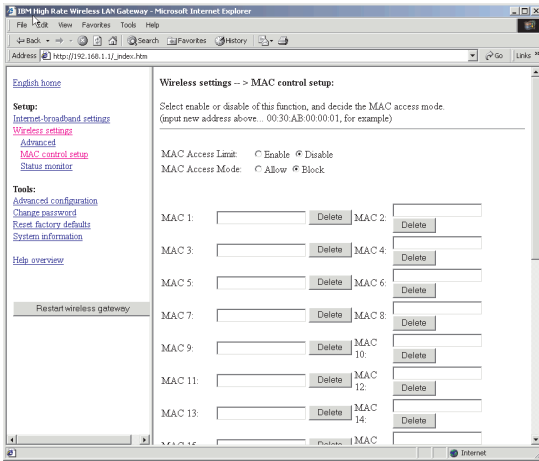
The client issues an RTS signal (before data packets were sent) to advise the Gateway nearby that it has a large packet to send. The Gateway then issues a clear to send (CTS) signal to all clients, which keeps the other clients waiting while the requesting client sends its data.

The default value for the IBM High Rate Wireless LAN Gateway is 2432, which is large so that RTS does not activate in most cases. In most network environments, RTS is not necessary or desired, since it reduces performance.

The Fragmentation Threshold figure determines whether a long packet is split into several shorter packets. This is done for efficiency reasons. Packets longer than the Fragmentation Threshold are split, resulting in better network performance.

---

# MAC Control Setup



You can enable or disable this function, and then determine the MAC access mode.

In IEEE 802.11b-compliant devices, the MAC address is a means of controlling network access. MAC addresses can be found in the package of the network interface card (NIC). The following is an example of a MAC address:

- 00:30:AB:00:00:01

After you have input the MAC address, click **Apply** to save your settings.

If you choose Disable MAC Address Limit, any user with the correct ESSID and within range of your access point can access your Gateway if there are no other means of protection. Enabling this mechanism provides protection to your Gateway.

Enable MAC Address Control: In this field, you can type the MAC address of the wireless clients whose access you want to control.

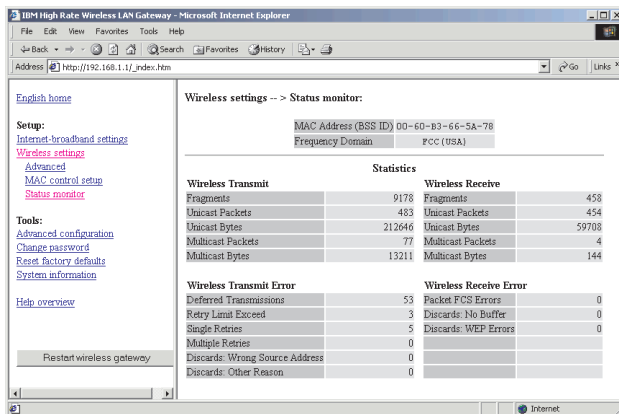
Block or Allow: You can list specific MAC addresses to block or allow in this window.

After you input the MAC addresses, click **Apply** to save your settings.

---

## Status monitor

The Status monitor is an advanced function for experts only. Click **Status monitor** to display the following window.



## IEEE 802.11b Wireless LAN Access Point General Information

- MAC Address (BSS ID): 00-00-00-00-00-00
- Frequency Domain
- Statistics
- Wireless Transmit
- Wireless Receive
- Fragments: 0
- Fragments: 0
- Unicast Packets: 0
- Unicast Packets: 0
- Unicast Bytes: 0
- Unicast Bytes: 0
- Multicast Packets: 0
- Multicast Packets: 0
- Multicast Bytes: 0
- Multicast Bytes: 0
- Wireless Transmit Error
- Wireless Receive Error
- Deferred Transmissions: 0
- Packet FCS Errors: 0
- Retry Limit Exceed: 0
- Discards: No Buffer: 0
- Single Retries: 0
- Discards: WEP Errors: 0
- Multiple Retries: 0
- Discards: Wrong Source Address: 0
- Discards: Other Reason: 0

The following list provides descriptions about the statistics listed above.

- Wireless Transmit
  - Fragments: The number of fragmented packets that are transmitted without errors
  - Unicast Packets: The number of directed packets that are transmitted without errors
  - Unicast Bytes: The number of bytes in directed packets that are transmitted without errors
  - Multicast Packets: The number of multicast packets that are transmitted without errors
  - Multicast Bytes: The number of bytes in multicast packets that are transmitted without errors
- Wireless Receive
  - Fragments: The number of fragmented packets that are received without errors
  - Unicast Packets: The number of directed packets that are received without errors
  - Unicast Bytes: The number of bytes in directed packets that are received without errors
  - Multicast Packets: The number of multicast packets that are received without errors
  - Multicast Bytes: The number of bytes in multicast packets that are received without error
- Wireless Transmit Error
  - Deferred Transmissions: The number of packets successfully transmitted after the wireless MAC defers transmission at least once
  - Retry Limit Exceed: The number of packets not transmitted due to excessive retries
  - Single Retries: The number of packets successfully transmitted after exactly one retry
  - Multiple Retries: The number of packets successfully transmitted after more than one retry
  - Discards: Wrong Source Address: The number of packets discarded due to wrong source address
  - Discards: Other Reason: The number of packets discarded for reasons other than "wrong source address"
- Wireless Receive Error
  - Packet FCS Errors: The number of packets that are received with checksum errors
  - Discards: No Buffer: The number of packets that the wireless MAC cannot receive due to the lack of MAC receive buffer space

- Discards: WEP Errors: The number of packets discarded due to WEP check error





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## Part 5: Setting up client computers for Internet access

This section provides information on setting up client computers for Internet access.

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### Client computer requirements

Client computers can be computers with Microsoft Windows or Novell Netware, or they can be Unix-based.

### System requirements

Your computer must have the following:

- An Ethernet (10/100BASE-T, 10BASE-T, or IEEE 802.11b WLAN) network interface card (NIC)
- A TCP/IP network protocol
- a CD-ROM drive
- A Microsoft Internet Explorer browser (version 5.0 or higher) or Netscape Navigator (version 4.0 or higher)

#### Notes:

1. The Gateway supports auto-crossover in all four LAN port switches.
2. The included software on the CD is compatible with Microsoft Windows 95, Windows 98, Windows 98SE, Microsoft Windows NT<sup>®</sup> 4.0 workstation, Microsoft Windows 2000 Professional, and Microsoft Millennium Edition (Me).
3. The Gateway routes only TCP/IP from the LAN ports to the Internet-broadband port. On the LAN switch hub, it handles any typical Ethernet traffic.

### Setting up Windows 95, Windows 98, and Windows Me clients

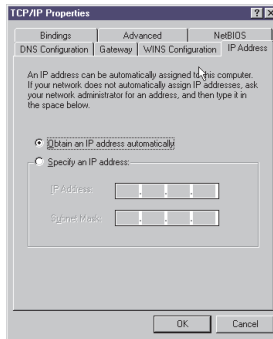
If you use the built-in DHCP server, the server provides the following TCP/IP configuration information to your computer:

- IP address of the computer
- Subnet mask of the computer
- IP address of the default gateway, which is also the IP address of the server
- DNS server

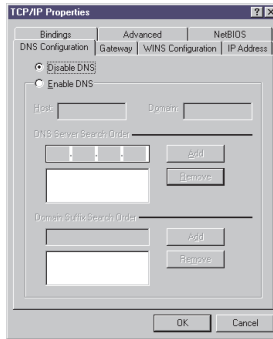
To configure a Windows 95, Windows 98, or Windows Me computer as your client computer, do the following:

1. Click **Start** → **Settings** → **Control Panel**.
2. Double-click **Network**.
3. In the network component list, double-click **TCP/IP** for the Ethernet card.
4. Click the **IP Address** tab.

5. Select **Obtain an IP address automatically**.



6. Click the **DNS** tab.
7. Select **Disable DNS**.



8. Save the changes, and then restart your computer. Your computer will be able to access the Internet through the server.

**Manual configuration:** If you do not want to use DHCP service, you must manually configure the IP address of your computer. To manually configure the IP address of your computer, do the following:

1. Click **Start** → **Settings** → **Control Panel**.
2. Double-click **Network**.
3. Double-click **TCP/IP**.
4. Click the **IP Address** tab.
5. Select **Specifying an IP Address**.
6. Type the IP address for your computer.
7. Type the subnet mask. If you choose to keep the default subnet mask setting on your server, type 255.255.255.0.
8. Click the **Gateway** tab.

9. Type the IP address of the server.
10. Click **Add** to insert the entry as the first item in the Installed Gateway List.
11. Click the **DNS** tab.
12. Select **Enable DNS**.
13. Add the IP address of the server to the DNS Server Search Order list.
14. Save the changes, and then restart your computer. Your computer can access the Internet through the server.

## Setting up Windows 2000 Professional clients

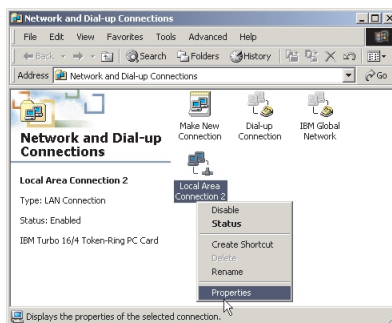
Before setting up a Windows 2000 Professional client, be sure that the TCP/IP protocol is installed with your Ethernet network card. See your Windows 2000 Professional manual for instructions on installing the TCP/IP protocol.

Use the built-in DHCP server to configure the TCP/IP settings of your Windows 2000 Professional computer. The server provides the following TCP/IP configuration information to your computer:

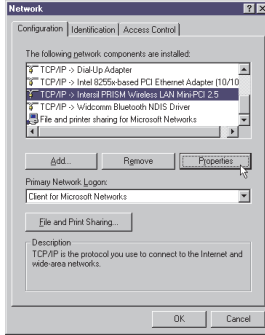
- IP address of the computer
- Subnet mask of the computer
- IP address of the default gateway, which is also the IP address of the server
- DNS server

To configure a Windows 2000 Professional computer as your client computer, do the following:

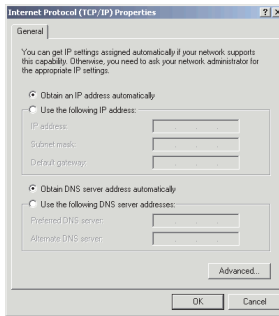
1. Click **Start** → **Settings** → **Control Panel**.
2. Double-click the **Network and Dial-up Connections** icon.
3. Right-click the icon for the network connection.
4. Select **Properties**.



5. Select **Internet Protocol (TCP/IP)** from the components list.



6. Click **Properties**.
7. Click to check the **Obtain an IP address automatically** radio button.



8. Click to check the **Obtain DNS server address automatically** radio button.
9. Click **OK**.
10. Click **OK** again.
11. Restart your computer. Your computer is able to access the Internet through the server.

**Manual configuration:** If you do not want to use DHCP service, you must manually configure the IP address of your computer, To manually configure the IP address f your computer, do the following:

1. Click **Start** → **Settings** → **Control Panel**.
2. Double-click **Network and Dial-up Connections**.
3. Right-click the icon for the network connection.
4. Select **Properties**.
5. In the network protocols list, double-click **TCP/IP**.
6. Click to check the **Specifying an IP address** radio button.
7. Type the IP address for your computer.

8. Type the subnet mask. If you choose to keep the default subnet mask setting on your server, type 255.255.255.0.
9. Type the IP address of the server in the **Default Gateway** field.
10. Click to check the **Use the following DNS servers addresses** radio button.
11. Enter the IP addresses of the DNS servers in the **Preferred DNS server** and the **Alternate DNS server** fields.
12. Save the changes, and then restart your computer. Your computer is able to access the Internet through the server.

### **Setting up Windows NT 4.0 Workstation clients**

Before setting up a Windows NT 4.0 Workstation client, be sure that the TCP/IP protocol is installed with your Ethernet network card. See your Windows NT 4.0 Workstation manual for instructions on installing the TCP/IP protocol.

Use the built-in DHCP server to configure the TCP/IP settings of your Windows NT 4.0 Workstation computer. The server provides the following TCP/IP configuration information to your computer:

- IP address of the computer
- Subnet mask of the computer
- IP address of the default gateway, which is also the IP address of the server
- DNS server

To configure a Windows NT 4.0 Workstation computer as your client computer, do the following:

1. Click **Start** → **Settings** → **Control Panel**.
2. Double-click **Network**.
3. Click the **Protocols** tab.
4. In the network protocols list, double-click **TCP/IP**.
5. Click the **IP Address** tab.
6. Select the **Obtain an IP address from a DHCP server** radio button.
7. Save the changes, and then restart your computer. Your computer can access the Internet through the server.

**Manual configuration:** If you do not want to use DHCP service, you must manually configure the IP address of your computer. To manually configure the IP address of your computer, do the following:

1. Click **Start** → **Settings** → **Control Panel**.
2. In the network component list, double-click **TCP/IP**.
3. Click the **IP Address** tab.
4. Select the **Specifying an IP address** radio button.
5. Type the IP address for your computer.
6. Type the subnet mask. If you choose to keep the default subnet mask setting on your server, type 255.255.255.0.

7. Type the IP address of the server in the Default Gateway field.
8. Click the **DNS** tab.
9. Add the IP address of the server to the DNS Service Order list.
10. Add the name of the computer to the Host Name field.
11. Save the changes, and then restart your computer. Your computer can access the Internet through the server.

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## Part 6: Using tools for advanced configuration

This section provides instructions for advanced configuration in the Web-based interface.

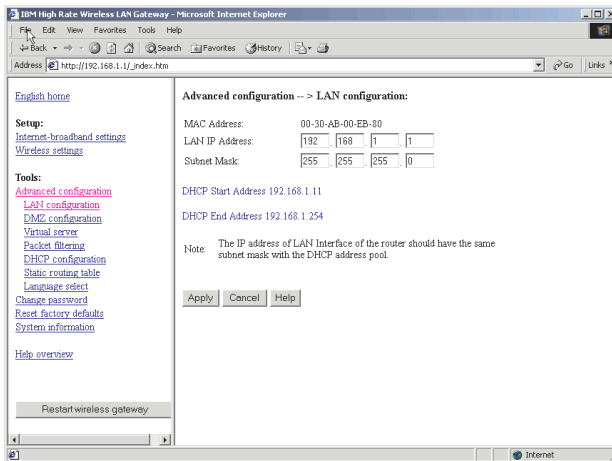
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### Advanced configuration

Click **Advanced Configuration** to display the Advanced Configuration table.

### LAN configuration

To configure your local area network (LAN), click **Advanced Configuration**, and then click **LAN Configuration** to display the Lan Configuration table.



In this table, you can change the TCP/IP settings of the Ethernet LAN interface of the Gateway.

- **MAC Address:** This changes the media access control (MAC) address of the LAN interface. It is displayed in six pairs of hexadecimal numbers.

**Note:** This field is read-only.

- **LAN IP Address:** This is the IP address of the LAN interface of the Gateway. The IP address value uses dotted decimal notation (N.N.N.N, with N being a value from 0 to 255). The default is 192.168.1.1. This is the IP address that client computers on the LAN use as their default gateway, as well as on their DNS server if you want to use the built-in DNS feature of the Gateway.

You can change the IP address if your existing network uses a different subnet or there is another computer with the same IP address.

**Note:** The value of the IP address in this table and the range of the IP address pool in the DHCP server must be in the same subnet and have the same subnet mask. If these values are not the same, the DHCP server disables and will not display the warning message in this window.

- **Subnet Mask:** This is the local subnet mask of the LAN interface of the Gateway. The default is 255.255.255.0.

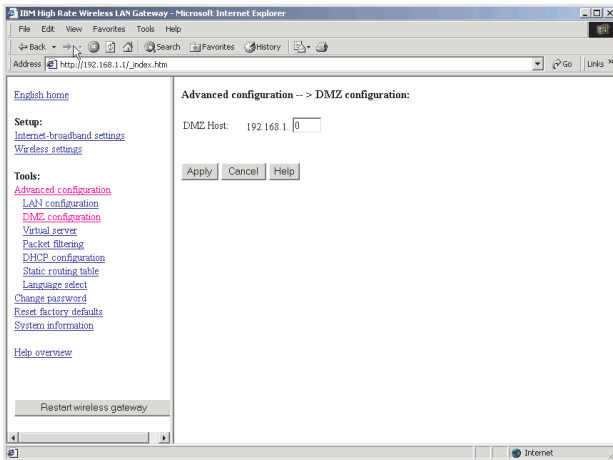
Click **Apply** to complete the LAN configuration.

**Note:** The configuration changes made through the Web-based interface are automatically saved into the flash memory within 30 seconds after clicking **Apply**.

## DMZ configuration

With DMZ, you can expose a specific computer to the Internet for special applications and faster Internet gaming.

Click **Advanced Configuration**, and then click **DMZ Configuration** to display the DMZ Configuration table.



- **DMZ Host:** In the blank field, type the IP address of the computer you want to use for DMZ.



**Note:** Turning on DMZ can cause potential security holes on your local network. The computer specified for DMZ is not protected by the built-in firewall.

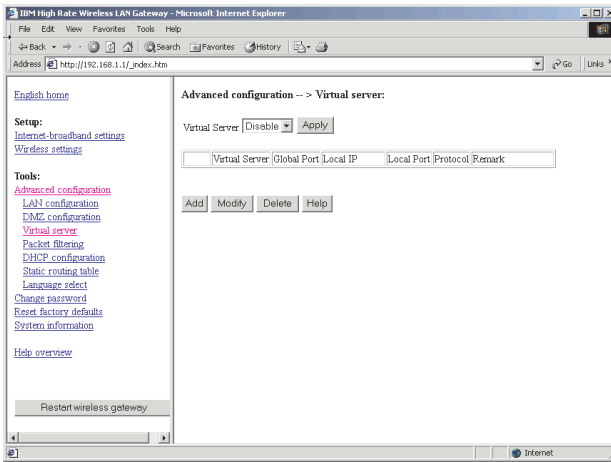
## Virtual server

With the IBM High Rate Wireless LAN Gateway, you can make some servers on the LAN accessible to users through the Internet. These servers are called Virtual Servers.

Only one server for each IP service can be run (for example, http or ftp). Each service is defined by the service type (TCP or UDP) and the TCP or UDP number, respectively.

To add a Virtual Server, do the following:

1. Click **Advanced Configuration**, and then click **Virtual Server Configuration** to display the Virtual Server table.



This table displays the status of the Virtual Servers on the LAN. You can enable or disable virtual server by selecting **Enable** or **Disable** from the pull-down menu at the top of the table.

**Note:** You must click **Apply** for the enabling or disabling to take effect.

2. To add a Virtual Server, click **Add**.
  - **Virtual Server:** Enable or disable the Virtual Server on the LAN. Only an enabled server can be accessed through the Gateway from the Internet.
  - **Global Port:** TCP or UDP port number used by the Gateway on the Internet-broadband port. This is the port number visible to users in the Internet, and is also known as the External Port Number.
  - **Local IP:** IP address of the server computer on the LAN.

- **Local Port:** TCP or UDP port number used by the server computer on the LAN. Designated external port numbers are translated into this internal port number.
- **Protocol:** Specifies the TCP or UDP port number by selecting the appropriate protocol. Most well-known protocols have default port numbers defined by various standards.
- **Remark:** Type any comments about your server.

**Notes:**

- a. The Virtual Server might not work without a fixed IP address from your ISP.
- b. The server computer on the Gateway LAN must have a fixed IP address in the same subnet as the Gateway's LAN IP address. The server's IP address must be typed into the Excluded IP table.

Click **Apply** to complete the configuration of your Virtual Server.

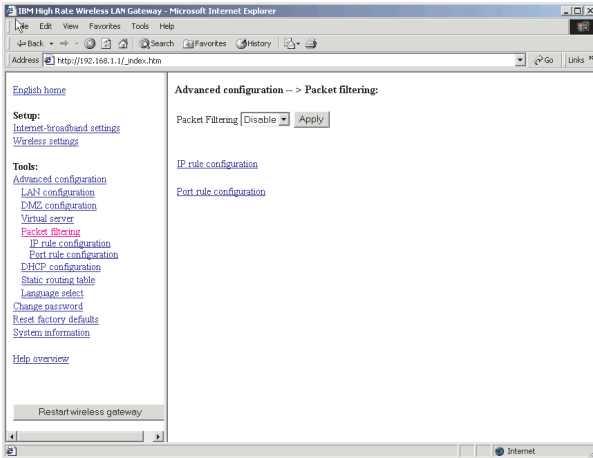
**Note:** The configuration changes made through the Web interface are automatically saved into the flash memory within 30 seconds after clicking **Apply**.

## Packet filtering

By default, all users can access all services on the Internet. With packet filtering, the network Administrator can block users from specific sites or applications on the Internet.

**Note:** This type of packet filtering is not the same as the packet filtering that the built-in firewall does.

To configure packet filtering, click **Advanced Configuration**, and then click **Packet Filtering Configuration** to display the Packet Filtering table.



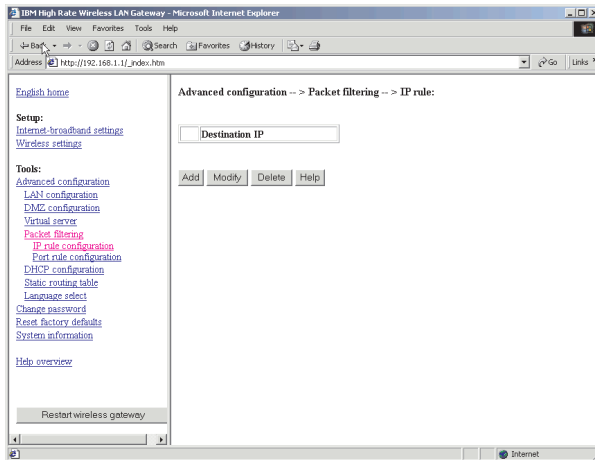
You can enable or disable packet filtering by selecting **Enable** or **Disable** from the pull-down menu at the top of the table.

There are two rules to define packet filtering: IP rule and Port rule.

## IP rule

To filter packets using the IP rule, do the following:

1. Click **IP Rule** to display the IP rule table.



2. Click **Add**.
3. Enter the IP address of the Internet site that the LAN users are prohibited from accessing.

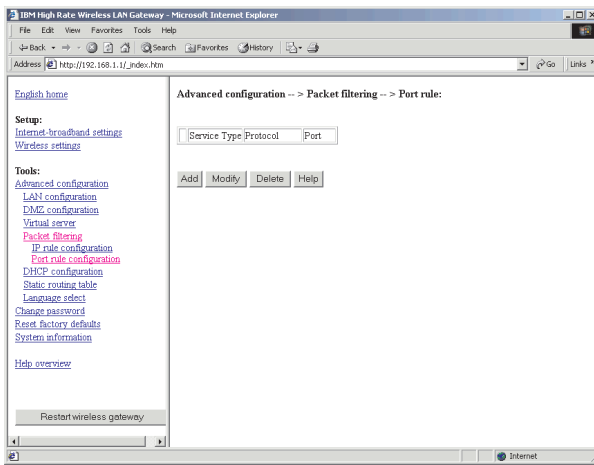
4. Click **Apply**. The IP rule table has a new entry added to it.  
Repeat steps 3 and 4 to block more Web sites using the IP rule.

**Note:** The configuration changes made through the Web interface are automatically saved into the flash memory within 30 seconds after clicking **Apply**.

## Port rule

Different services or applications on the Internet have corresponding port numbers. With the Gateway, you can filter packets based on their port numbers. To filter packets using the Port rule, do the following:

1. Click **Port Rule** to display the Port rule table.



2. Click **Add** to add an entry into the Port rule table.
  - **Service Type:** TCP or UDP service
  - **Protocol:** Select the protocol (or application) such as FTP or HTTP. If a well-known protocol is selected from the list, then the corresponding port number is set according to various Internet standards. The Port Edit box is disabled. Click **User-Defined** to specify a protocol not found in the list.
  - **Port:** Specifies the TCP or UDP port number. Use this field if the protocol (or application) is not found in the list or a non-default port number is used.

**Note:** This blocks all users on the LAN from accessing this port to the Internet.

3. Click **Apply**. The Port rule table has a new entry added to it.  
Repeat steps 2 and 3 to block more Web sites using the port rule.

**Note:** The configuration changes made through the Web interface are automatically saved into the flash memory within 30 seconds after clicking **Apply**.

## DHCP configuration

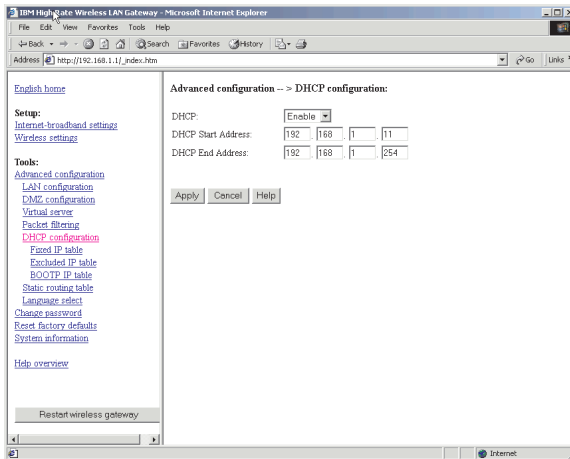
With dynamic host configuration protocol (DHCP), you can automatically configure the TCP/IP settings of the computers on the LAN, including the IP address and subnet mask.

The Gateway integrates a DHCP server to simplify the setup of TCP/IP networks. The server can provide the following settings to the client computers:

- IP Address
- Subnet Mask
- Default Gateway
- DNS Server

To adjust the DHCP configuration on your Gateway, do the following:

1. Click **Advanced Configuration**, and then click **DCHP Configuration** to display the DHCP table.



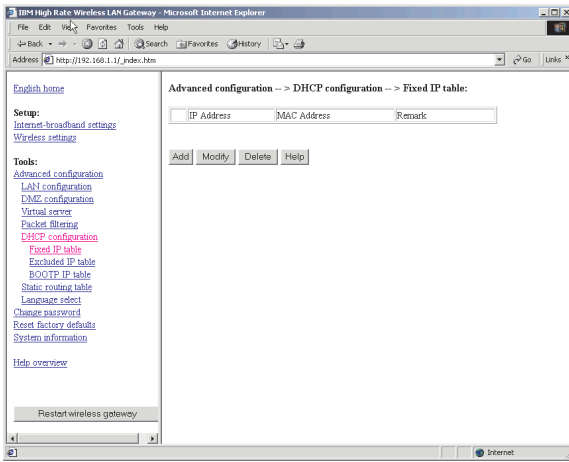
- **DHCP:** The DHCP feature can be enabled or disabled.
  - **DHCP Start Address:** This is the starting IP address of the IP address pool in the DHCP server. The default is 192.168.1.11.
  - **DHCP End Address:** This is the end address of the address pool in the DHCP server. The default is 192.168.1.254.
2. Click **Apply** to complete the configuration of the DHCP server.

**Note:** The configuration changes made through the Web interface are automatically saved into the flash memory within 30 seconds after clicking **Apply**.

### Fixed IP table

This feature is useful for those servers that want permanently assigned IP addresses. These client computers are identified by their MAC addresses. To permanently assign an IP address to a server, do the following:

1. Click **Advanced Configuration** → **DHCP Configuration** → **Fixed IP** to display the Fixed IP table.



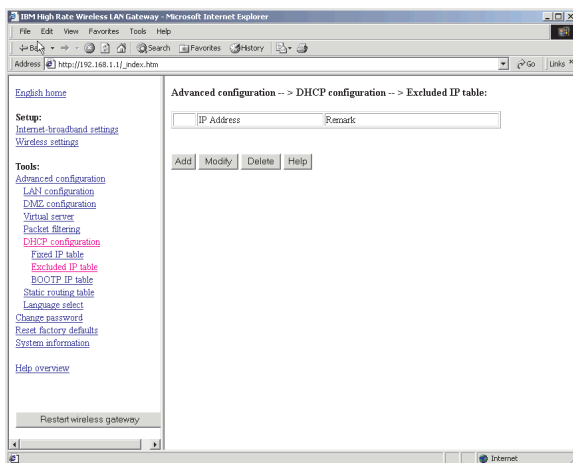
2. Click **Add** to add a new entry in the Fixed IP table.
  - **IP Address:** The specified IP address for the client device. This IP address must be within the address pool in the DHCP server.
  - **MAC Address:** The MAC address of the client device
  - **Remark:** The descriptions of the client device that needs the fixed IP address
3. Click **Apply**. A new entry is added to the Fixed IP table.

**Note:** The configuration changes made through the Web interface are automatically saved into the flash memory within 30 seconds after clicking **Apply**.

### Excluded IP table

The feature is useful when some of the IP addresses in the pool are already manually assigned to client computers on the LAN. To exclude an IP address from the DHCP server, do the following:

1. Click **Advanced Configuration** → **DHCP** → **Excluded IP** to display the Excluded IP table.



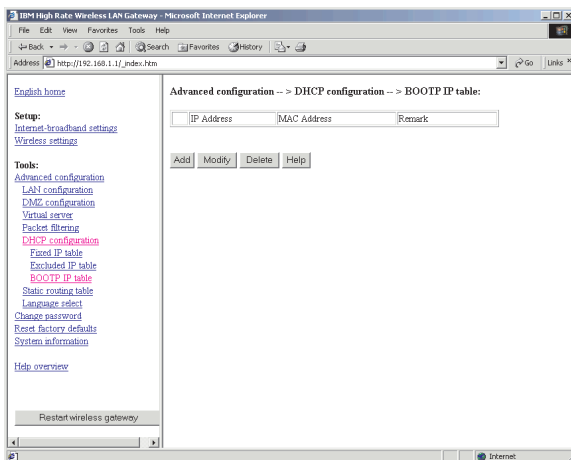
2. Click **Add** to add a new entry in the Excluded IP table.
  - **IP Address:** Enter the specified IP address. The IP address must be within the address pool of the DHCP server.
  - **Remark:** The descriptions of the excluded IP address
3. Click **Apply**. A new entry is added to the Excluded IP table.

**Note:** The configuration changes made through the Web interface are automatically saved into the flash memory within 30 seconds after clicking **Apply**.

## BOOTP IP Table

These are IP addresses reserved for the user using a BOOTP protocol to get an IP address. The IP address must be within the address pool. To specify an IP address to be used by the BOOTP protocol, do the following:

1. Click **Advanced Configuration** → **DHCP Configuration** → **BOOTP IP** to display the BOOTP IP table.



2. Click **Add** to add a new entry in the BOOTP IP table.
  - **IP Address:** The specified address used by the BOOTP protocol. This IP address must be within the address pool in the DHCP server.
  - **MAC Address:** The MAC address of the client device used for that IP address
  - **Remark:** The descriptions of the IP address
3. Click **Apply**. A new entry is added to the BOOTP IP table.

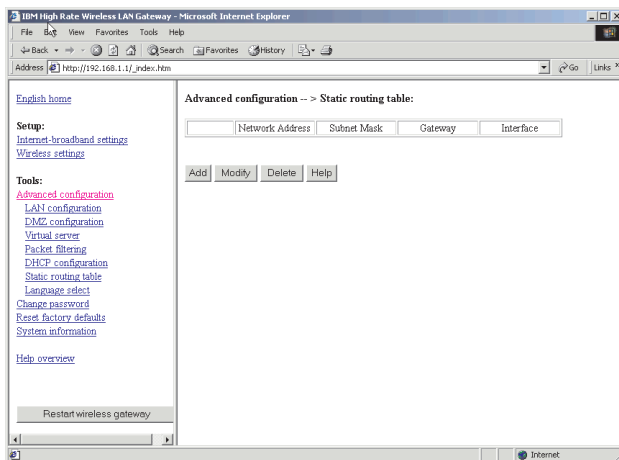
**Note:** The configuration changes made through the Web interface are automatically saved into the flash memory within 30 seconds after clicking **Apply**.

## Static Routing table

The IBM High Rate Wireless LAN Gateway supports static TCP/IP routing. It can serve as a router between two different TCP/IP networks (or subnets). In the static routing table, you can exchange packets with other network segments. The static routing table might be necessary when there are other routers on your network and at least one of the routers is connected to more than one network (or subnet). To route TCP/IP, do the following:

1. Click **Advanced Configuration**, and then click **Static Routing Table** to display the static routing table.



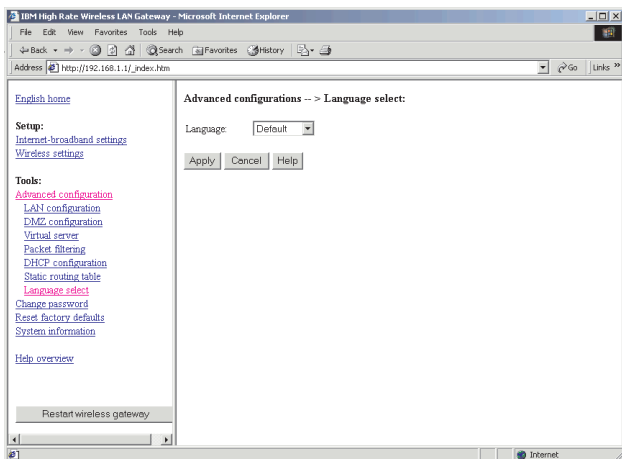


2. Click **Add** to add a new entry into the static routing table.
  - **Network Address:** The IP address of the destination network
  - **Subnet Mask:** The network mask of the destination network address
  - **Gateway:** IP address of the gateway or router to which the packets destined for the destination network will be forwarded
  - **Interface:** Output interface to which packets will be forwarded. It can be the LAN Ethernet or Internet-broadband port.
3. Click **Apply**. A new entry is added to the routing table.

**Note:** The configuration changes made through the Web interface are automatically saved into the flash memory within 30 seconds after clicking **Apply**.

## Language select

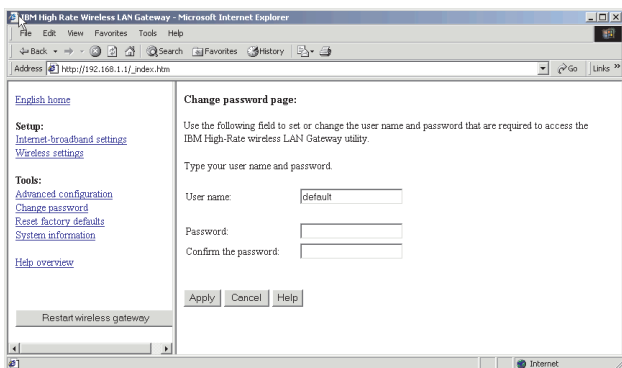
Click **Advanced Configuration**, and then click **Language select** to display the Language select page.



Select English or Japanese in the Language pull-down menu. Select **Default** to set the language you selected as the default language for using the IBM High Rate Wireless Gateway.

## Change password

Click **Change password** to display the Change password table.



The Administrator Login Name and Administrator Login Password can be changed in this table. The default login name is "default." A password is not required. For security reasons, change the Administrator profile settings.

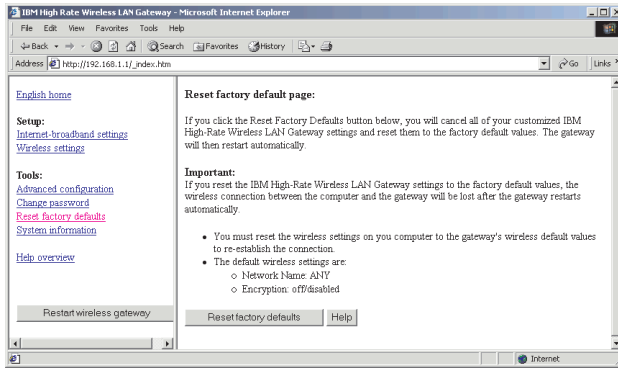
Click **Apply** to complete the configuration.

**Note:** The configuration changes made through the Web interface are automatically saved into the flash memory within 30 seconds after clicking Apply.

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## Reset factory defaults

Click **Reset factory defaults** to display the Reset to factory default page.



Click the **Reset factory defaults** button. The following dialog box is displayed.

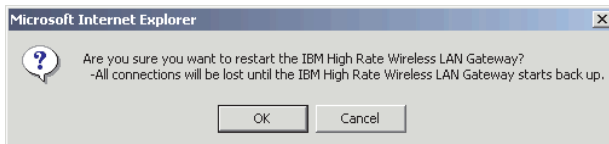


Click **OK** to clear the new settings and restore all of the factory defaults.

---

## Restart Wireless Gateway

To restart your Gateway, click **Restart wireless gateway**. The following dialog box is displayed.



Click **Yes** to restart the IBM High Rate Wireless Gateway.

For information on the System information and the Help functions of the IBM High Rate Wireless LAN Gateway, see “Part 7: System information and help” on page 7-1.

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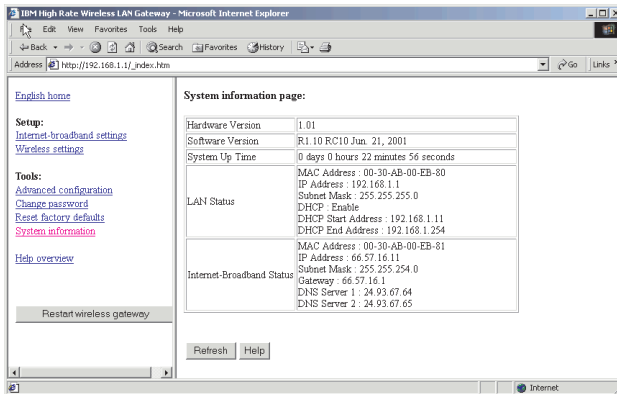
## Part 7: System information and help

This section provides system information and information on the Help feature of the IBM High Rate Wireless LAN Gateway.

---

### System Information

To display the system information table, click **System Information**.



Click **Refresh** to read or refresh the system status. The information—including the current status of the LAN, Internet-broadband connection, and system-up time—is displayed in this window.

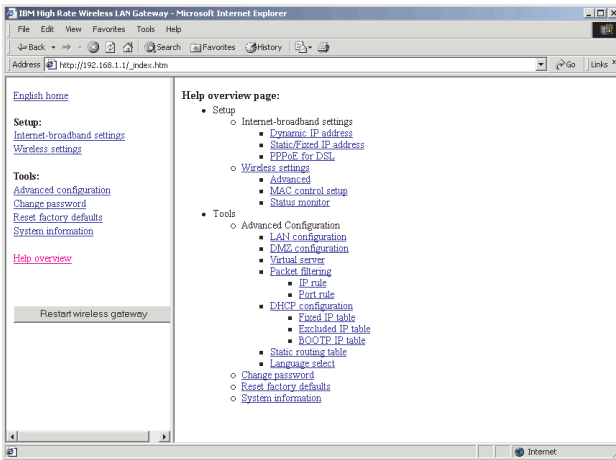
- **Hardware Version:** Displays the version of the Gateway hardware
- **Software Version:** Displays the version of the Gateway software
- **System-up Time:** Displays the elapsed time since you set up the system
- **LAN Status:**
  - **MAC Address:** The Ethernet MAC address of the LAN interface of the Gateway, displayed in six hexadecimal numbers
  - **IP Address:** The IP address of the local LAN interface of the Gateway. The default is 192.168.1.1.
  - **Subnet Mask:** The local subnet mask of the LAN interface of the Gateway. The default is 255.255.255.0.
  - **DHCP:** Displays the status (enabled or disabled) of the DHCP and the range of IP addresses controlled by the DHCP server
- **Internet-Broadband Status:**

- **MAC Address:** The Ethernet MAC address of the Internet-Broadband interface of the Gateway, displayed in six hexadecimal numbers
- **IP Address:** The IP address of the Gateway as seen by external users on the Internet (including your ISP)
- **Subnet Mask:** The local subnet mask of the Internet-Broadband interface of the Gateway
- **Gateway:** The Gateway IP Address provided by your ISP
- **NAT:** Displays the status of the NAT
- **DNS Server:** The IP address of the DNS Server

---

## Help Feature

The GUI Management tool provides an easy help function to help you configure the Gateway. You can click **Help** in each configuration window for help with configuring each parameter, or you can click **Help** on the left-side window to get general help information, or to choose the parameter you need help with from the list.



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## Part 8: Troubleshooting

This section provides information on troubleshooting problems with your IBM High Rate Wireless LAN Gateway.

- Power LED is off

If the power LEDs are off while the Gateway is turned on, be sure that the power adapter is properly connected to your Gateway. Be sure that you are using the 12V dc power adapter included in your option package. If the problem persists, contact the IBM HelpCenter.

- Self-test LED stays on for more than 30 seconds

If you experience problems with the Self-test LED, cycle the power to see if the Gateway recovers and the LED stays on for a short amount of time. If the error persists, contact the IBM HelpCenter.

- Check your LAN connections to the Gateway.

After checking the Ethernet connection between your computer and the server, use the TCP/IP PING command to determine if the TCP/IP settings are correct for the server and the computer:

1. If you are using a Windows-based computer, click **Start** → **Programs** → **Accessories** → **Command Prompt**.
2. Type PING 192.168.1.1.

**Note:** If you have changed the IP address of the Gateway, type the new IP address after PING.

If you receive replies for this command, the IP address of your computer is set up correctly.

If you do not receive replies for this command, check that you typed the correct IP address. If the problem persists, contact the IBM HelpCenter.

- Test the path from your computer to a remote device:

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

1. Connect your Gateway to the Internet with a DSL/Cable modem.
2. If you are using a Windows-based computer, click **Start** → **Programs** → **Accessories** → **Command Prompt**.
3. Type PING 192.168.1.1, followed by the IP address of a remote device such as the DNS server of your ISP.

If the path is functioning properly, replies are displayed. If you do not receive any replies, do the following:

- a. Be sure your computer has the IP address of your Gateway listed as the default gateway. If the IP address configuration of your computer is assigned by DHCP, this information is not visible in the control panel network utility.
- b. Click **Start** → **Run**, and then type `wiipcfg` to verify that the IP address of the Gateway appears as the default gateway.

**Note:** In Microsoft Windows NT 4.0 Workstation and Windows 2000 Professional, run `ipconfig` from a command prompt.

- c. Check to be sure that the network address of your computer (the portion of the IP address specified by the netmask) is different than the network address of the remote device.
- d. Click **System information** to verify the Internet-broadband status. If the Internet-broadband connection is not functioning, check to be sure your DSL/Cable modem is connected and functioning. If you have just turned on your Gateway, it might be necessary to reset your DSL/Cable modem to get an IP address from the DHCP server at your ISP.
- e. If your ISP assigned a host name to your computer, type the host name as the Gateway name in the Internet-broadband Configuration field. Pressing the RESET button on the rear of the Gateway restarts the Gateway. Holding down the RESET button on the rear of the Gateway for more than five seconds restores the Gateway's factory defaults.







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recovered post-consumer fiber.