



High-Rate Wireless LAN PC Card

User's Guide

OPTIONS
by IBM



High-Rate Wireless LAN PC Card

User's Guide

Note: Before using this information and the product it supports, be sure to read the information under Appendix D, “Product warranties and notices” on page D-1.

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Contents

Safety Information	v
About this book	ix
Part 1: Installation and user's guide	1-1
Appendix A. Product specifications	A-1
Appendix B. Troubleshooting	B-1
Appendix C. Help and service information	C-1
Appendix D. Product warranties and notices	D-1

Safety Information



Before installing this product, read the Safety Information book.

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Antes de instalar este produto, leia o Manual de Informações sobre Segurança.

安装本产品前请先阅读《安全信息》手册。

Prije instalacije ovog proizvoda pročitajte priručnik sa sigurnosnim uputama.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs hæftet med sikkerhedsforskrifter, før du installerer dette produkt.

Lue Safety Information -kirjanen, ennen kuin asennat tämän tuotteen.

Avant de procéder à l'installation de ce produit, lisez le manuel Safety Information.

Vor Beginn der Installation die Broschüre mit Sicherheitshinweisen lesen.

Πριν εγκαταστήσετε αυτό το προϊόν, διαβάστε το εγχειρίδιο Safety Information.

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

Installálás el tt olvassa el a Biztonsági el írások kézikönyvét !

Prima di installare questo prodotto, leggere l'opuscolo contenente le informazioni sulla sicurezza.

本製品を導入する前に、安全情報資料を御読みください。

이 제품을 설치하기 전에, 안전 정보 책자를 읽어보십시오.

Пред да го инсталирате овој производ прочитајте ја книгата со безбедносни информации.

Lees voordat u dit product installeert eerst het boekje met veiligheidsvoorschriften.

Les heftet om sikkerhetsinformasjon (Safety Information) før du installerer dette produktet.

Przed zainstalowaniem tego produktu należy przeczytać broszurę Informacje Dotyczące Bezpieczeństwa.

Antes de instalar este produto, leia o folheto Informações sobre Segurança.

Перед установкой продукта прочтите брошюру по технике безопасности (Safety Information).

Pred inštaláciou tohto produktu si pre ítajte Informa nú brožúrku o bezpe nosti.

Preden namestite ta izdelek, preberite knjižico Varnostne informacije.

Antes de instalar este producto, lea la Información de Seguridad.

Läs säkerhetsinformationen innan du installerar den här produkten.

在安裝本產品之前，也請先閱讀「安全性資訊」小冊子。

About this book

This manual contains instructions for installing and using the IBM High-Rate Wireless LAN PC Card. The manual is divided into two parts:

Part 1: Installation and user's guide

This guide contains the product description, hardware and software installation instructions, and product use and maintenance information.

Part 2: Appendixes

The appendixes contain help and service information, the product warranties, and notices.

Note: The illustrations in this manual might be slightly different from your hardware.

Part 1: Installation and user's guide

This section provides the product and software descriptions, and the installation and user's guide.

Product description

The High-Rate Wireless LAN PC Card is a standard PC Card that fits into any PC Card Type II slot.

The High-Rate Wireless LAN PC Card has two light-emitting diode (LED) indicators and two integrated antennas. You can use the High-Rate Wireless LAN PC Card in combination with an external antenna.

The High-Rate Wireless LAN PC Card is a wireless network PC Card that complies with the IEEE 802.11 standard on wireless LANs (Revision B) and supports data transfer rates up to 11 MBps.

The High-Rate Wireless LAN PC Card is fully compatible with any other wireless LAN system based on direct sequence spread spectrum (DSSS) radio technology that complies with the IEEE 802.11 standard on wireless LANs (Revision B).

The High-Rate Wireless LAN PC Card supports the following wireless LAN features:

- Automatic Transmit Rate Select mechanism in the range of “High, Medium, Standard and Low”
- Frequency Channel Selection (2.4 GHz)
- Roaming over multiple channels
- Card Power Management
- Wired Equivalent Privacy (WEP) data encryption, based on the 64 bit RC4 encryption algorithm as defined in the IEEE 802.11 standard on wireless LANs

In addition to this manual, your package contains the following:

- High-Rate Wireless LAN PC Card
 - Transparent protective casing for PC Card storage
- Note:** To extend the life of the PC Card hardware, store the PC Card in the protective casing whenever carrying the computer on travel without operating the device.
- The High-Rate Wireless LAN software CD

If any of these items are missing or damaged, contact your reseller.

Software description

The High-Rate Wireless LAN software CD contains software and documentation for all High-Rate Wireless LAN products that support roaming functionality in indoor environments.

The High-Rate Wireless LAN software CD is divided into two sections:

- *X:\Manuals*: User's guides and reference documents, where *X* is the drive letter of your CD-ROM drive
- *X:\Software*: Software for High-Rate Wireless LAN client stations and infrastructure products, such as the High-Rate Wireless LAN Access Point

Before installing the software, read the software license agreement (LICENSE.TXT) located in the root folder of the CD.

You can visit the IBM Web site to:

- Verify if newer versions of the software that was shipped with your product are available
- Download and install the latest software with your purchased product

You can download the latest software and documentation from the High-Rate Wireless LAN Web site at

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

The High-Rate Wireless LAN software CD also contains a folder named Xtras. This folder contains additional tools that might be helpful for installing and managing your High-Rate Wireless LAN Network.

The Acrobat folder includes a copy of the Adobe Acrobat Reader, which is required to view or print the High-Rate Wireless LAN user documentation included on this CD.

The Adobe Acrobat Reader is owned by and licensed from Adobe Systems Incorporated. This software is provided "as is."

Note: IBM makes no warranty or representation, express or implied, relating to the completeness, reliability, effectiveness, accuracy, performance, or operation of the Adobe software, or as to its suitability, merchantability or fitness for a particular purpose or against infringement of intellectual property rights of any party.

For more information about Adobe Acrobat software, see the Adobe Web site at

<http://www.adobe.com/acrobat>

Configuring the High-Rate Wireless LAN network

You can use the High-Rate Wireless LAN PC Card Kit to:

- Connect your computer to a Peer-to-Peer workgroup of wireless computing devices
- Connect your computer to a local area network (LAN) infrastructure that includes IBM High-Rate Wireless LAN Access Points (Access Points), or other IEEE 802.11-compliant LAN systems
- Expand the capabilities of your Access Points, to support wireless devices that have been equipped with High-Rate Wireless LAN PC Cards

Peer-to-Peer workgroups

With the Peer-to-Peer workgroup configuration, you can quickly set up a small wireless workgroup, where the workgroup participants can exchange files using features like “Files and Printer Sharing” as supported by the Microsoft® Network Neighborhood. You can use this type of wireless Peer-to-Peer networks while mobile, or in Small Office/Home Office (SOHO) environments. As long as the stations are within range of one another, this is the easiest and least expensive way to set up a wireless network.

Infrastructure network

With the High-Rate Wireless LAN Access Point, you can connect to a corporate LAN infrastructure to have wireless access to all network facilities.

LAN infrastructures can be stand-alone wireless LANs or wireless network infrastructures connected to an existing Ethernet network

Installing the High-Rate Wireless LAN PC Card

Note: If you intend to use the High-Rate Wireless LAN PC Card in a High-Rate Wireless LAN Access Point, see the *User's Guide* that was shipped with the access point, or download it from the IBM High-Rate Wireless LAN Web site at

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

Perform the installation in two steps:

1. Install the Client Manager software
2. Install the device drivers

Installing the Client Manager software

The High-Rate Wireless LAN Client Manager can be used to monitor the quality of your network connection.

To install the Client Manager software, do the following:

1. Insert the High-Rate Wireless LAN software CD into the CD-ROM drive of your computer. If Autorun is enabled on your computer, the Wireless Networking Client Software window opens.

Note: If you downloaded the software from the web, please refer to the installation instructions found on the Web site.

2. Click **Install Client Manager**; then follow the on-screen instructions.

Note: If Autorun is not enabled on your computer, you can start Client Manager by running the .EXE file located in the root directory of the High-Rate Wireless LAN software CD; then following the on-screen instructions.

For instructions on how to use Client Manager, see "Using Client Manager" on page 1-12.

Installing the device drivers

This section provides instructions on installing the device drivers for your High-Rate Wireless LAN PC Card in Windows® 95, Windows 98, Windows NT® 4.0, and Windows 2000.

Note: Keep the Microsoft Windows installation CDs or software diskettes close at hand. If your computer came with a factory-installed Windows operating system, these files will be stored as .CAB files on the hard disk drive of your computer.

Installing a High-Rate Wireless LAN PC Card requires the same level of expertise that you need to install any other type of standard Ethernet network adapter card. This manual assumes that you have a working knowledge of standard Microsoft Windows operating systems and of installing network adapter cards.

Note: If your computer uses the CardWizard program for PC Card configuration, you must install the latest version of CardWizard on your computer. The latest version can be downloaded from the IBM Web site at

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

Depending on your operating system and the configuration of your computer, the installation of the device drivers will consist of:

1. Installing the device drivers
2. Selecting the Miniport device driver

Note: You will need to perform this procedure only if Windows did not automatically detect the right High-Rate Wireless LAN Miniport device drivers.

3. Network installation

Note: You will need to perform this procedure only if this is the very first time that networking support is installed on your computer.

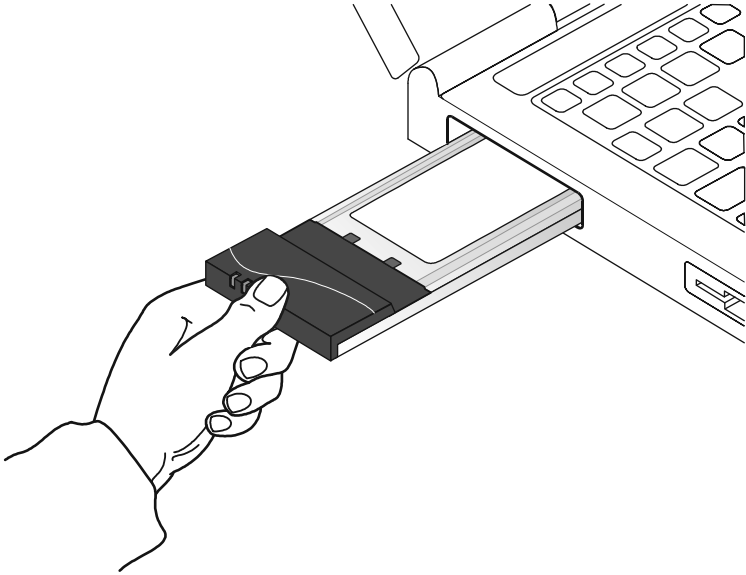
Installing the device drivers in Windows 95 and Windows 98

The Windows 95 and Windows 98 operating systems support Plug and Play operation for PC Cards. When you insert the High-Rate Wireless LAN PC Card into your computer, these operating systems automatically detect the card and enable the High-Rate Wireless LAN Miniport device driver, or prompt you to install the device driver, when the operating system cannot find the required device driver. This typically occurs the first time you insert the High-Rate Wireless LAN PC Card into your computer.

When the High-Rate Wireless LAN Miniport device driver is installed, you can remove and reinsert the card whenever you want, that is, you can "Hot Swap" the card.

To install the High-Rate Wireless LAN PC Card in Windows 95 or Windows 98, do the following:

1. Insert the High-Rate Wireless LAN PC Card into your computer.



2. Turn on your computer.
3. Insert the High-Rate Wireless LAN software CD into the CD-ROM drive of your computer. Windows automatically detects your PC Card, and the New Hardware Found Wizard window opens.
4. Follow the on-screen instructions.
5. When you are prompted to locate the device driver installation files, select the High-Rate Wireless LAN CD that comes with your PC Card kit, or select another source if you downloaded the most recent device drivers from the IBM High-Rate Wireless LAN Web site. Windows installs the device drivers.

Note: When Windows completes the installation of the device drivers, the Add/Edit Configuration Profile window opens. In most cases, the Windows 95 or Windows 98 operating system automatically finds the correct device drivers. If you are prompted to select the device drivers from a list of device drivers, continue with “Selecting the Miniport device driver” on page 1-6.

6. Continue with “Setting basic parameters” on page 1-8 to complete the installation of your High-Rate Wireless LAN PC Card.

Note: In some occasions, your operating system might not detect the new hardware. This might happen when:

- The notebook computer into which you want to install the High-Rate Wireless LAN PC Card is a brand-new “out-of-the-box” computer, where the Windows 95 or Windows 98 operating system was factory-installed.
- A previous installation of the High-Rate Wireless LAN PC Card was aborted before it was finished.

Installing the device drivers in Windows NT

Note: If networking is not installed, you are prompted whether you want it installed.

Click **Yes**; then follow the on-screen instructions. Continue with the installation of the device drivers.

To install the device drivers in Window NT, do the following:

1. Install Client Manager using the instructions in “Installing the Client Manager software” on page 1-3.
2. Insert the High-Rate Wireless LAN PC Card into your computer. The CardWizard window opens.
3. Follow the on-screen instructions. When prompted for the location of the device drivers, select X:\Drivers\Win_NT, where X is the drive letter of your CD-ROM drive.
4. When Windows completes the device driver installation, continue with “Setting basic parameters” on page 1-8.

Installing the device drivers in Windows 2000

To install the device drivers in Windows 2000, do the following:

1. Install Client Manager using the instructions in “Installing the Client Manager software” on page 1-3.
2. Insert the High-Rate Wireless LAN PC Card into your computer; then follow the on-screen instructions. The New Hardware Found Wizard window opens.
3. The Digital Signature Not Found window might open, depending on your version of Windows 2000. Click **Yes** to continue.
4. Windows 2000 completes the installation of the device drivers. Continue with “Setting basic parameters” on page 1-8.

Selecting the Miniport device driver

If your Windows operating system automatically detected your hardware, you are prompted to select a device driver from a list or to install the device driver from a diskette provided by the hardware manufacturer. If the correct device drivers are automatically found, go to “Setting basic parameters” on page 1-8.

To select the miniport device driver, do the following:

1. In the Select Network Adapter window, click **Have Disk**.
2. Be sure that the High-Rate Wireless LAN Software CD is inserted into your computer; then click **OK**.

Note: If you are prompted to identify the location of files, type the correct drive letter and directory; then click **OK**.

Windows starts to copy files from your installation disks or CD and the High-Rate Wireless LAN software CD.

- Windows system files are usually on the Windows installation CD.
- If your computer comes with the Windows operating system factory-installed, choose the directory that contains the Windows setup files (.CAB files).
- When you are prompted to identify the High-Rate Wireless LAN device driver files (typically file names starting with the characters `wv*.*`), specify the drive and directory that contains your High-Rate Wireless LAN software:
 - If you are installing from the High-Rate Wireless LAN CD, the directory is `X:\Drivers` (where *X* is the drive letter of your CD-ROM drive).

Note: There is a separate directory for Windows 95, Windows 98, Windows NT, and Windows 2000.
 - If you are installing files that you downloaded from the Internet, select the disk drive or directory where you saved the downloaded files.

Note: If you previously installed a PC Card on your computer, most of these files are already available on your hard disk drive. If you do not have the Windows installation CD available, try replacing the proposed path in the Copy Files From window with: `C:\WINDOWS\SYSTEM` or `C:\WINDOWS`.

Network installation

If this is the first time that networking support is installed onto your computer, you will be prompted to enter a computer and workgroup name. These names will be used to identify your computer on the Microsoft Network Neighborhood. After you enter a computer and workgroup name, do the following:

1. Click **OK**.
2. In the Computer Name field, type a unique name for your computer. You can type any name you like.
3. In the Workgroup field, type a unique name for your workgroup. You can type any name you like.
4. (Optional) Provide a description of the computer in the Computer Description field.

For more information about setting your Microsoft Network Neighborhood properties, consult your Windows documentation or the Windows online help information.

Setting basic parameters

After installing the device drivers, the Add/Edit Configuration Profile window opens. In the Add/Edit Configuration Profile window, you can specify one or more network connection profiles to enable you to dynamically switch your preferred network connection.

Note: If you are using Windows 2000, the Add/Edit Configuration Profile window might not open automatically. If it does not, do the following:

1. Click **Start** → **Settings** → **Control Panel**.
2. Double-click **Wireless Networking**. The Add/Edit Configuration Profile window opens.

For example, you can set up different profiles for:

- **Office:** To connect to a company network through an Access Point. see “Basic settings for existing networks” on page 1-8.
- **Workgroup Computing:** To share files in small Peer-to-Peer workgroups without an Access Point. see “Basic settings for Peer-to-Peer workgroups” on page 1-9.

For more information about the different types of networks, see “Configuring the High-Rate Wireless LAN network” on page 1-3.

To connect to a High-Rate Wireless LAN network, do the following:

1. Assign a name to the network connection profile.
2. From the menu, select how you want to connect to the wireless network.
3. Click **Edit Profile** to view or modify the parameters that apply to your network.

For first-time installations, set up the default profile using only basic settings. See “Basic settings for existing networks” on page 1-8.

When you have completed and validated the installation of your PC Card, you can add additional profiles or edit the existing ones.

For help, press F1 or click **Help**.

Basic settings for existing networks: If you selected Connect to an Access Point in the Add/Edit Configuration Profile window, you only need to set the Network Name parameters. To set the Network Name parameters, do the following:

1. In the Network Name field, define the name of the wireless network that you want to connect to. You can name the network anything you like.
 - To connect to any High-Rate Wireless LAN network near your computer, you can leave the Network Name field blank, or enter ANY in the Network Name field.
- Note:** When your Network Name field is set to ANY, your computer attempts to establish a radio connection with any High-Rate Wireless LAN network that provides good communications quality.
- To connect to only one specific wireless network, type the network name that applies to your network. Consult your LAN administrator for the the name that applies to your network.

Note: The Network Name can be any alphanumeric string up to 32 characters, and in the range of a to z, A to Z, and 0 to 9. The network name is case-sensitive. For more information on network names, press F1 or click **Help**.

2. Click **OK** to confirm the network name and return to the Add/Edit Configuration Profile window.
3. Click **OK** again to continue the installation. Go to “Completing the installation” on page 1-9.

In the High-Rate Wireless LAN Edit Configuration window, you can also change other parameters (Encryption, Advanced, Admin, and Adapter parameters). These parameters are described in the online help file of the device drivers. Consult your LAN Administrator for the parameter settings that apply to your network environment.

Basic settings for Peer-to-Peer workgroups: If you selected to connect to a Peer-to-Peer workgroup in the Add/Edit Configuration Profile window, you only need to set the Network Name parameters. To set the Network Name parameters, do the following:

1. In the Network Name field, define the name of the wireless network that you want to connect to. You can name the network anything you like.
 - The Network Name can be any alphanumeric string up to 32 characters, and in the range of a to z, A to Z, and 0 to 9. The network name is case-sensitive. For more information on network names, press F1 or click **Help**.
 - If there is already a Peer-to-Peer group with this name available your computer automatically connects to this workgroup.
 - If there is not a Peer-to-Peer workgroup with this name, your computer automatically starts one with this name.
2. Click **OK** to confirm the network name and return to the Add/Edit Configuration Profile window.
3. Click **OK** again to continue the installation. Go to the next section.

Completing the installation

To complete the installation of the network, do the following:

1. When you have finished setting the basic parameters, click **OK** to close the Add/Edit Configuration window. Windows completes building the device driver configuration database, and copies files from your CD-ROM or diskette to the hard disk drive of your computer.
2. If the Windows operating system prompts you to identify the location of the Windows files, specify the drive and directory of the Windows Installation CD or diskettes.
3. When Windows completes the copying of files, click **OK** to restart your computer.

After you have restarted your computer, the Windows operating system detects the High-Rate Wireless LAN PC Card.

Windows loads the High-Rate Wireless LAN Miniport device driver; then opens a window prompting you to enter a user name and password. The password you enter here will be the one used to log into the Microsoft Network Neighborhood.

Verifying installation: You can use one of the following methods to verify whether the installation of the device drivers was successful:

- Verify that the **PC Card icon** is in the taskbar.
- Check the LEDs on your PC Card.
 - If the green power LED is a steady green, the PC Card is active
 - If the green Transmit/Receive LED is flickering green, data is being transferred by the PC Card.

To check the quality of the network connection, you can install the High-Rate Wireless LAN Client Manager using instructions in “Installing the Client Manager software” on page 1-3.

Note: Some older Windows 95 versions do not automatically install the necessary TCP/IP protocol, and you cannot connect to the network. If this is the case, see you Windows documentation to install the correct TCP/IP protocols.

Setting advanced parameters

Although your High-Rate Wireless LAN PC Card works fine in most network environment with the basic parameters, you might want to investigate the advanced parameters options as displayed on the Edit Configuration window for the High-Rate Wireless LAN PC Card.

Note: Consult your LAN Administrator for information about whether these parameters are appropriate for your setting.

Using and maintaining the High-Rate Wireless LAN PC Card

This section provides instructions on using and maintaining your High-Rate Wireless LAN PC Card.

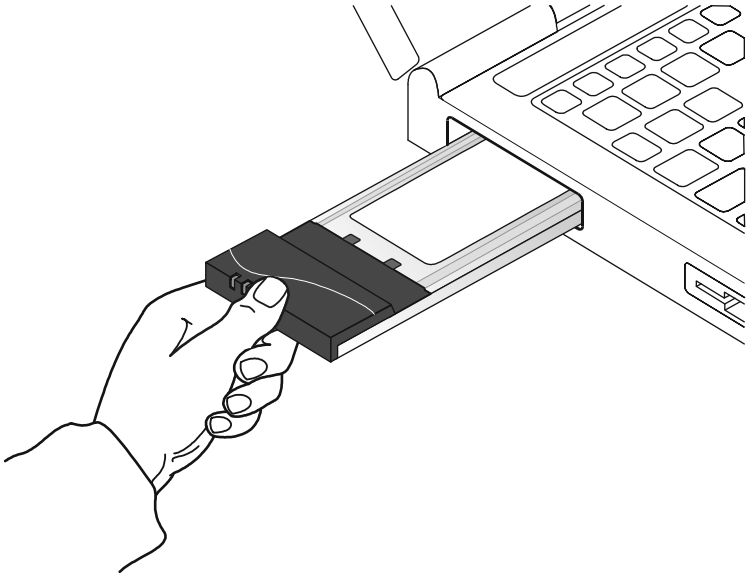
Radio antennas

The built-in radio and antennas of your High-Rate Wireless LAN PC Card perform best in an open environment with as few obstacles as possible. To achieve the maximum range for wireless communications do not cover the card with objects such as books or thick stacks of paper.

If you are using the card inside a desktop computer, you might need to purchase the optional Range Extender Antenna.

Removing the PC Card

If you do not need the wireless connectivity of your High-Rate Wireless LAN PC Card, you can remove the PC Card from its slot.



Attention: If you remove the High-Rate Wireless LAN PC Card from your computer, you will lose your connection to the network. Before removing the PC Card, be sure that you have closed all files and network applications.

Always disable the PC Card before removing the PC Card from the slot, so that the Windows operating system:

- Logs off from the network server
- Disables the High-Rate Wireless LAN PC Card device driver
- Disconnects power to the PC Card slot, which will extend battery life for notebook computers

To stop using the High-Rate Wireless LAN PC Card, do the following:

1. Click the **PC Card** icon on the Windows taskbar.
2. Select **Stop High-Rate Wireless LAN PC Card**.
3. Remove the PC Card when prompted.

Maintaining your PC Card

If you are not using the High-Rate Wireless LAN PC Card for wireless communications, store it inside the transparent plastic casing that comes with your option package.

To clean the PC Card, gently wipe it with a soft (damp) cloth.

Attention: To avoid damage to the PC Card, do not clean it with abrasive materials or rinse it with liquids.

Viewing other computers in the network

To display the other High-Rate Wireless LAN stations in the network, do the following:

1. Double-click **My Computer**.
2. Double-click **Network Neighborhood**. This displays all of the stations in your Microsoft Networking Group.
3. To display other workgroups in the network environment, double-click **Entire Network**.

If you cannot find other High-Rate Wireless LAN-networked computers, you can verify whether the other High-Rate Wireless LAN computers are:

- Turned on and logged on to the network
- Configured to operate with identical Microsoft Network Neighborhood settings concerning:
 - Networking Protocol
 - Wireless Network Name
 - Workgroup Name

To view or modify the Station Name or Workgroup of your computer, Do the following

1. Click **Start** → **Settings** → **Control Panel**.
2. Double-click **Network**.
3. Click the **Identification** tab. In the identification window, you can verify or change the Station Name or Workgroup parameters.

Note: You must restart your computer so that changes to the network settings take effect.

To verify the radio connection with other stations refer to “Viewing and modifying PC Card settings” on page 1-13.

Using Client Manager

If you installed the High-Rate Wireless LAN Client Manager as described in “Installing the Client Manager software” on page 1-3, you can use the Client Manager to:







- Verify the quality of your wireless connection to the network
- View or modify the configuration settings of your wireless PC Card

The Client Manager starts automatically every time you turn on your computer. The **Client Manager** icon is displayed in the Windows taskbar, and indicates that the Client Manager program is running. To view a detailed status overview of your network, click the **Client Manager** icon once with your left mouse button. For more options, use the right mouse button to click the **Client Manager** icon.

Viewing wireless link quality

You can use the **Client Manager** icon on the Windows taskbar to verify the link quality of your network connection.

An overview of all possible icons is provided in the following table.

Icon	Description	Color
	Excellent radio connection	Green
	Good radio connection	Green
	Marginal radio connection: Move closer to the High-Rate Wireless LAN Access Point or to the base station.	Yellow
	Poor radio connection: Save your files and move closer to the access point or the base station.	Red
	No radio connection: You have moved out of range of the network or the Client Manager is looking for an initial connection.	Red
	Peer-to-Peer network connection	Blank

Viewing and modifying PC Card settings

If you want to view or modify High-Rate Wireless LAN parameters, do the following:

1. Use the right mouse button to click the **Client Manager** icon on the Windows taskbar.
2. Select **Configuration Profile**.
3. Select **Add/Edit Profile** to add a new profile or to modify an existing profile, or select **One of the existing profiles** (if available) to select a profile without viewing or modifying the settings.

After selecting another profile, or modifying the existing one, the PC Card uses the selected profile to connect to the wireless network.

If your **Client Manager** icon is not visible, start the Client Manager program again by doing the following:

1. Click **Start** → **Programs** → **High-Rate Wireless LAN workgroup**
2. Select **Client Manager**.

Appendix A. Product specifications

This appendix provides the specifications for the High-Rate Wireless LAN PC Card.

Physical specifications

Form factor	PC Card Type-II Extended
Dimensions (LxWxH)	117.8 x 53.95 x 8.7 mm (4.6 x 2.1 x .34 in.)
Weight	45 grams

Mode	Temperature	Humidity
Operation	0° to 50° C (32° to 50° F)	95% maximum
Transit	-20° to 70° C (-4° to 158° F)	15 to 95% (No condensation allowed)
Storage	-10° to 60° C (14° to 140° F)	10 to 90% (No condensation allowed)

Power characteristics

Doze mode	10 mA
Receive mode	180 mA
Transit mode	280 mA
Power supply	5 V

Networking characteristics

Compatibility	IEEE 802.11 Standard for Wireless LANs (DSSS)
Network operating system	Microsoft Windows
Host operating system	Windows 95: NDIS3 Miniport driver Windows NT 4.0: NDIS4 Miniport driver Windows 98 and Windows 2000: NDIS5 Miniport driver
Media access protocol	CSMA/CA (collision avoidance) with acknowledgement (ACK)
Data rate (High-Rate Wireless LAN PC Cards use an automatic Transmit Rate Select mechanism)	High: 11 MBps Medium: 5.5 MBps Low: 1 MBps

Radio characteristics

Radio characteristics may vary according to:

- The country where the product was purchased
- The type of product that was purchased

Wireless communication is often subject to local radio regulations. Although High-Rate Wireless LAN wireless networking products have been designed for operation in the license-free 2.4 GHz band, local radio regulations might impose a number of limitations to the use of wireless communication equipment.

Note: Refer to the flyer included in your option package for country-specific regulatory information.

To comply with such regulations, High-Rate Wireless LAN PC Cards are marketed with dedicated channel-sets, with a number of factory-programmed channels identified by the following acronyms:

- ETS: For countries that adhere to the regulations as defined by the European Telecommunications Standards Institute (ETSI).
- FCC: For countries that adhere to the regulations as defined by the US Federal Communications Commission (FCC).
- FR: For France
- JP: For Japan

The acronym of the channel-set supported by your card is printed on a label on the back-side of your High-Rate Wireless LAN PC Card.

RF frequency band	2.4 GHz (2400 to 2500 MHz)
Number of selectable sub-channels	North America (FCC): 11 Europe (ETS): 13 France (FR): 4 Japan (JP): 1 Other countries: FCC: 11 ETS: 13
Modulation technique	Direct sequence spread spectrum (DSSS) <ul style="list-style-type: none"> • CCK for high and medium transmit rates • DQPSK for standard transmit rate • DBPSK for low transmit rate
Spreading	11-chip Barker Sequence
Bit error rate (BER)	Better than 10^{-5}
Nominal outout power	15 dBm

Wireless LAN Range

Range (100 bytes user data) / transmit rate	High speed 11 MBps	Medium speed 5.5 MBps	Standard speed 2 MBps	Low speed 1 MBps
Open office environment ¹	160 m (525 ft.)	270 m (886 ft.)	400 m (1312 ft.)	550 m (1805 ft.)
Semi-open office environment ²	50 m (164 ft.)	70 m (230 ft.)	90 m (295 ft.)	115 m (377 ft.)
Closed office ³	25 m (82 ft.)	35 m (115 ft.)	40 m (131 ft.)	50 m (165 ft.)
Receiver sensitivity	-83 dBm	-87 dBm	-91 dBm	-94 dBm
Delay spread (at FER of <1%)	65 ns	225 ns	400 ns	500 ns

¹In an open office environment, antennas can "see" each other. There are no physical obstructions between them.

²In a semi-open office environment, work space is divided by shoulder-height, hollow wall elements. Antennas are at desktop level.

³In a closed office environment, work space is separated by floor-to-ceiling brick walls.

The range of the wireless signal is related to the transmit rate of the wireless communication. Communications at lower transmit rate may travel larger distances.

Note: The range values listed in the table are typical distances as measured at the IBM High-Rate Wireless LAN laboratories. These values may vary according to the actual radio conditions at the location where the High-Rate Wireless LAN product will be installed.

- The range of your wireless devices can be affected when the antennas are placed near metal surfaces and solid high-density materials.
- Range is also impacted due to obstacles in the signal path of the radio that may either absorb or reflect the radio signal.

Supported frequency sub-bands

Subject to the radio regulations that apply in your country, your High-Rate Wireless LAN PC Card may support a different set of 2.4 GHz channels. Consult your Authorized High-Rate Wireless LAN reseller or IBM Sales office for information about the radio regulations that apply in your country.

The following table lists the High-Rate Wireless LAN IEEE 802.11 channel sets in the 2400 to 2500 MHz range.

Channel ID	FCC	ETSI	FR	JP
1	2412	2112	n/a	2412
2	2417	2417	n/a	2417
3	2422	2422	n/a	2422
4	2427	2427	n/a	2427
5	2432	2432	n/a	2432
6	2437	2437	n/a	2437
7	2442	2442	n/a	2442
8	2447	2447	n/a	2447
9	2452	2452	n/a	2452
10	2457	2457	2457	2457

Channel ID	FCC	ETSI	FR	JP
11	2462	2462	2462	2462
12	n/a	2467	2467	2467
13	n/a	2472	2472	2472
14	n/a	n/a	n/a	2484

When installing High-Rate Wireless LAN PC Cards, the channel configuration is managed as follows:

- For wireless clients that operate in a High-Rate Wireless LAN Infrastructure, the High-Rate Wireless LAN PC Card automatically starts operation at the channel identified by the access points. When roaming between different access points, the station can dynamically switch to another channel if required.
- For High-Rate Wireless LAN PC Cards installed into wireless clients that operate in an Peer-to-Peer workgroup mode, the PC Card will use channel 10 by default.
- When inserted into a access point, the High-Rate Wireless LAN PC Card will use the factory-set default channel, unless the LAN Administrator selected a different channel when configuring the access point device.

Appendix B. Troubleshooting

This section provides information on troubleshooting procedures.

Troubleshooting the LEDs

If you have difficulty using or installing your High-Rate Wireless LAN product, the error may be due to various causes:

- A component of the High-Rate Wireless LAN system is out of range, which prevents the PC Card from establishing a wireless connection with the network.
- There is a configuration mismatch, which prevents the PC Card from establishing a wireless connection with the (correct) network.
- Absence of or conflict with the High-Rate Wireless LAN device driver.
- there is a problem or conflict with the PC Card slot, which prevents the PC Card from receiving power.
- There is a conflict with the High-Rate Wireless LAN hardware and another device.

The starting point to troubleshooting problems with your High-Rate Wireless LAN PC Card is to look at the LED activity of the High-Rate Wireless LAN PC Card. The following table provides an overview of the various modes of operation and the associated LED activity. The table also includes a number of troubleshooting hints, if required, that may help you solve the problem.

Power LED	Transmit Receive LED	Description/action
Continuous green	Blinking	The PC Card is turned on, and is sensing and transmitting data.
Continuous green	Off	The PC Card is turned on; there is no wireless activity.
Flicker	Flicker	Power management mode: The PC Card is turned on, but set to power-saving mode to conserve battery life. The card activates at regular intervals to check for wireless data.

Power LED	Transmit Receive LED	Description/action
Blink at 10-second intervals	Blink at 10-second intervals	<p>The PC Card is working fine, but did not establish a wireless connection with the wireless infrastructure.</p> <ul style="list-style-type: none"> • Contact the LAN administrator to verify the Network Name assigned to the wireless infrastructure. • Contact the LAN administrator to verify the correct values of the encryption keys. • Contact the LAN administrator to verify whether the network infrastructure has been closed. • Change the configuration of your PC Card to enter the correct Network Name. • If there are no access points available, change the configuration of your PC Card to run in Peer-to-Peer mode.

If both LEDs are off, then the PC Card is not turned on and it cannot receive or transmit data. This can be because:

- There is no device driver installed
- The card and device drivers are mismatched, preventing the device driver from loading
- There is a device conflict, preventing the device drivers from loading

If both LEDs are off, take the following actions:

- Verify if a device driver has been installed. If not, install the device driver.
- Verify the device settings of the PC Card to determine the occurrence of a conflict with another device. If there is a conflict, change the settings of the PC Card or the conflicting device.
- Verify the versions of the device driver and the PC Card software.
- Consult the IBM High-Rate Wireless LAN Web site at
<http://www.ibm.com/pc>
to see if software upgrades are available.

Troubleshooting the network connection

If you cannot connect to the network, verify that your network name is correct. The High-Rate Wireless LAN Network Name is case-sensitive. When you enter this name, type the name between quotation marks, for example, “My Wireless Network”. If you omit the quotation marks, the driver will interpret the value as all upper-case, for example, MY WIRELESS NETWORK. If your access points are configured with both lower- and upper-case characters, the driver cannot establish a radio connection.

LEDs work but you can’t connect to the network

If you can not connect to the network while the LEDs indicate that the network is working properly (Power LED is on, Transmit Receive LED blinks) the TCP/IP settings of your network might not be properly set.

Changing the TCP/IP settings

To change the TCP/IP connections, consult your LAN administrator for the values of your TCP/IP settings; then do the following:

1. Click **Start** → **Settings** → **Control Panel**
2. Double-click **Network**.
3. From the list of installed components, check if the TCP/IP -> High-Rate Wireless LAN PC Card protocol is installed.
 - If the protocol is not yet installed, click **Add**; then select the TCP/IP protocol from the list. Refer to your Windows documentation for more information.
 - If the protocol is installed, select the protocol and click **Properties**. Check if the parameters match the settings provided by your LAN Administrator. Make changes if necessary; then click **OK**.
4. When prompted, restart your computer.

Appendix C. Help and service information

This section contains information on how to obtain online and telephone technical support.

Technical support

Technical support is available during the life of your product. Assistance can be obtained through the Personal Computing Support Web site and the IBM Automated Fax System. During the warranty period, assistance for replacement or exchange of defective components is available. In addition, if your IBM option is installed in an IBM computer, you might be entitled to service at your location. Your technical support representative can help you determine the best alternative.

Technical support	
IBM Personal Computing Support Web Site	http://www.ibm.com/pc/support
IBM Automated Fax System	1-800-426-3395 1-800-465-3299 (in Canada)

Marketing, installation, and configuration support through the HelpCenter will be withdrawn or made available for a fee, at IBM's discretion, 90 days after the option has been withdrawn from marketing. Additional support offerings, including step-by-step installation assistance, are available for a nominal fee.

Telephone technical support

To assist the technical support representative, have available as much of the following information as possible:

1. Option name
2. Option number
3. Proof of purchase
4. Computer manufacturer, model, serial number (if IBM), and manual
5. Exact wording of the error message (if any)
6. Description of the problem
7. Hardware and software configuration information for your system

If possible, be at your computer. Your technical support representative might want to walk you through the problem during the call.

For the support telephone number and support hours by country, refer to the following table or to the enclosed technical support insert. If the number is not provided, contact your IBM reseller or IBM marketing representative. Response time may vary depending on the number and nature of the calls received.

Support 24 hours a day, 7 days a week	
Canada (Toronto only)	1-416-333-3344

Canada (all others)	1-800-565-3344
U.S.A. / Puerto Rico	1-800-772-2227

Appendix D. Product warranties and notices

The following section provides product warranty information and legal notices.

Warranty Statements

The warranty statements consist of two parts: Part 1 and Part 2. Part 1 varies by country. Part 2 is the same for both statements. Be sure to read both the Part 1 that applies to your country and Part 2.

- **United States, Puerto Rico, and Canada (Z125-4753-05 11/97)** “IBM Statement of Limited Warranty for United States, Puerto Rico, and Canada (Part 1 - General Terms)”
- **Worldwide except Canada, Puerto Rico, Turkey, and United States (Z125-5697-01 11/97)** “IBM Statement of Warranty Worldwide except Canada, Puerto Rico, Turkey, United States (Part 1 - General Terms)” on page D-4
- **Worldwide Country-Unique Terms** “Part 2 - Worldwide Country-Unique Terms” on page D-7

IBM Statement of Limited Warranty for United States, Puerto Rico, and Canada (Part 1 - General Terms)

This Statement of Warranty includes Part 1 - General Terms and Part 2 - Country-unique Terms. The terms of Part 2 may replace or modify those of Part 1. The warranties provided by IBM in this Statement of Warranty apply only to Machines you purchase for your use, and not for resale, from IBM or your reseller. The term "Machine" means an IBM machine, its features, conversions, upgrades, elements, or accessories, or any combination of them. The term "Machine" does not include any software programs, whether pre-loaded with the Machine, installed subsequently or otherwise. Unless IBM specifies otherwise, the following warranties apply only in the country where you acquire the Machine. Nothing in this Statement of Warranty affects any statutory rights of consumers that cannot be waived or limited by contract. If you have any questions, contact IBM or your reseller.

The IBM Warranty for Machines

Machine - IBM High-Rate Wireless LAN PC Card

Warranty period* - 3 Years

** Contact your place of purchase for warranty service information. Some IBM Machines are eligible for on-site warranty service depending on the country where service is performed.*

IBM warrants that each Machine 1) is free from defects in materials and workmanship and 2) conforms to IBM's Official Published Specifications. The warranty period for a Machine is a specified, fixed period commencing on its Date of Installation. The date on your sales receipt is the Date of Installation, unless IBM or your reseller informs you otherwise.

During the warranty period IBM or your reseller, if approved by IBM to provide warranty service, will provide repair and exchange service for the Machine, without charge, under

the type of service designated for the Machine and will manage and install engineering changes that apply to the Machine.

If a Machine does not function as warranted during the warranty period, and IBM or your reseller are unable to either 1) make it do so or 2) replace it with one that is at least functionally equivalent, you may return it to your place of purchase and your money will be refunded. The replacement may not be new, but will be in good working order.

Extent of Warranty

The warranty does not cover the repair or exchange of a Machine resulting from misuse, accident, modification, unsuitable physical or operating environment, improper maintenance by you, or failure caused by a product for which IBM is not responsible. The warranty is voided by removal or alteration of Machine or parts identification labels.

THESE WARRANTIES ARE YOUR EXCLUSIVE WARRANTIES AND REPLACE ALL OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THESE WARRANTIES GIVE YOU SPECIFIC LEGAL RIGHTS AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM JURISDICTION TO JURISDICTION. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF EXPRESS OR IMPLIED WARRANTIES, SO THE ABOVE EXCLUSION OR LIMITATION MAY NOT APPLY TO YOU. IN THAT EVENT, SUCH WARRANTIES ARE LIMITED IN DURATION TO THE WARRANTY PERIOD. NO WARRANTIES APPLY AFTER THAT PERIOD.

Items Not Covered by Warranty

IBM does not warrant uninterrupted or error-free operation of a Machine.

Unless specified otherwise, IBM provides non-IBM machines **WITHOUT WARRANTIES OF ANY KIND.**

Any technical or other support provided for a Machine under warranty, such as assistance via telephone with "how-to" questions and those regarding Machine set-up and installation, will be provided **WITHOUT WARRANTIES OF ANY KIND.**

Warranty Service

To obtain warranty service for the Machine, contact your reseller or IBM. In the United States, call IBM at 1-800-565-3344. In Canada, call IBM at 1-800-565-3344. You may be required to present proof of purchase.

IBM or your reseller provides certain types of repair and exchange service, either at your location or at a service center, to keep Machines in, or restore them to, conformance with their Specifications. IBM or your reseller will inform you of the available types of service for a Machine based on its country of installation. IBM may repair the failing Machine or exchange it at its discretion.

When warranty service involves the exchange of a Machine or part, the item IBM or your reseller replaces becomes its property and the replacement becomes yours. You represent that all removed items are genuine and unaltered. The replacement may not be new, but will be in good working order and at least functionally equivalent to the item replaced. The replacement assumes the warranty service status of the replaced item.

Any feature, conversion, or upgrade IBM or your reseller services must be installed on a Machine which is 1) for certain Machines, the designated, serial-numbered Machine and 2) at an engineering-change level compatible with the feature, conversion, or upgrade. Many features, conversions, or upgrades involve the removal of parts and their return to IBM. A part that replaces a removed part will assume the warranty service status of the removed part.

Before IBM or your reseller exchanges a Machine or part, you agree to remove all features, parts, options, alterations, and attachments not under warranty service.

You also agree to

1. ensure that the Machine is free of any legal obligations or restrictions that prevent its exchange;
2. obtain authorization from the owner to have IBM or your reseller service a Machine that you do not own; and
3. where applicable, before service is provided
 - a. follow the problem determination, problem analysis, and service request procedures that IBM or your reseller provides,
 - b. secure all programs, data, and funds contained in a Machine,
 - c. provide IBM or your reseller with sufficient, free, and safe access to your facilities to permit them to fulfill their obligations, and
 - d. inform IBM or your reseller of changes in a Machine's location.

IBM is responsible for loss of, or damage to, your Machine while it is 1) in IBM's possession or 2) in transit in those cases where IBM is responsible for the transportation charges.

Neither IBM nor your reseller is responsible for any of your confidential, proprietary or personal information contained in a Machine which you return to IBM or your reseller for any reason. You should remove all such information from the Machine prior to its return.

Production Status

Each IBM Machine is manufactured from new parts, or new and used parts. In some cases, the Machine may not be new and may have been previously installed. Regardless of the Machine's production status, IBM's appropriate warranty terms apply.

Limitation of Liability

Circumstances may arise where, because of a default on IBM's part or other liability, you are entitled to recover damages from IBM. In each such instance, regardless of the basis on which you are entitled to claim damages from IBM (including fundamental breach, negligence, misrepresentation, or other contract or tort claim), IBM is liable for no more than

1. damages for bodily injury (including death) and damage to real property and tangible personal property; and
2. the amount of any other actual direct damages, up to the greater of U.S. \$100,000 (or equivalent in local currency) or the charges (if recurring, 12 months' charges apply) for the Machine that is the subject of the claim.

This limit also applies to IBM's suppliers and your reseller. It is the maximum for which IBM, its suppliers, and your reseller are collectively responsible.

UNDER NO CIRCUMSTANCES IS IBM LIABLE FOR ANY OF THE FOLLOWING: 1) THIRD-PARTY CLAIMS AGAINST YOU FOR DAMAGES (OTHER THAN THOSE UNDER THE FIRST ITEM LISTED ABOVE); 2) LOSS OF, OR DAMAGE TO, YOUR RECORDS OR DATA; OR 3) SPECIAL, INCIDENTAL, OR INDIRECT DAMAGES OR FOR ANY ECONOMIC CONSEQUENTIAL DAMAGES (INCLUDING LOST PROFITS OR SAVINGS), EVEN IF IBM, ITS SUPPLIERS OR YOUR RESELLER IS INFORMED OF THEIR POSSIBILITY. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.

IBM Statement of Warranty Worldwide except Canada, Puerto Rico, Turkey, United States (Part 1 - General Terms)

This Statement of Warranty includes Part 1 - General Terms and Part 2 - Country-unique Terms. The terms of Part 2 may replace or modify those of Part 1. The warranties provided by IBM in this Statement of Warranty apply only to Machines you purchase for your use, and not for resale, from IBM or your reseller. The term "Machine" means an IBM machine, its features, conversions, upgrades, elements, or accessories, or any combination of them. The term "Machine" does not include any software programs, whether pre-loaded with the Machine, installed subsequently or otherwise. Unless IBM specifies otherwise, the following warranties apply only in the country where you acquire the Machine. Nothing in this Statement of Warranty affects any statutory rights of consumers that cannot be waived or limited by contract. If you have any questions, contact IBM or your reseller.

Machine - IBM High-Rate Wireless LAN PC Card

Warranty period* - Three Years

** Contact your place of purchase for warranty service information. Some IBM Machines are eligible for on-site warranty service depending on the country where service is performed.*

The IBM Warranty for Machines

IBM warrants that each Machine 1) is free from defects in materials and workmanship and 2) conforms to IBM's Official Published Specifications. The warranty period for a Machine is a specified, fixed period commencing on its Date of Installation. The date on your sales receipt is the Date of Installation, unless IBM or your reseller informs you otherwise.

During the warranty period IBM or your reseller, if approved by IBM to provide warranty service, will provide repair and exchange service for the Machine, without charge, under the type of service designated for the Machine and will manage and install engineering changes that apply to the Machine.

If a Machine does not function as warranted during the warranty period, and IBM or your reseller are unable to either 1) make it do so or 2) replace it with one that is at least functionally equivalent, you may return it to your place of purchase and your money will be refunded. The replacement may not be new, but will be in good working order.

Extent of Warranty

The warranty does not cover the repair or exchange of a Machine resulting from misuse, accident, modification, unsuitable physical or operating environment, improper maintenance by you, or failure caused by a product for which IBM is not responsible. The warranty is voided by removal or alteration of Machine or parts identification labels.

THESE WARRANTIES ARE YOUR EXCLUSIVE WARRANTIES AND REPLACE ALL OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THESE WARRANTIES GIVE YOU SPECIFIC LEGAL RIGHTS AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM JURISDICTION TO JURISDICTION. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF EXPRESS OR IMPLIED WARRANTIES, SO THE ABOVE EXCLUSION OR LIMITATION MAY NOT APPLY TO YOU. IN THAT EVENT, SUCH WARRANTIES ARE LIMITED IN DURATION TO THE WARRANTY PERIOD. NO WARRANTIES APPLY AFTER THAT PERIOD.

Items Not Covered by Warranty

IBM does not warrant uninterrupted or error-free operation of a Machine.

Unless specified otherwise, IBM provides non-IBM machines **WITHOUT WARRANTIES OF ANY KIND.**

Any technical or other support provided for a Machine under warranty, such as assistance via telephone with "how-to" questions and those regarding Machine set-up and installation, will be provided **WITHOUT WARRANTIES OF ANY KIND.**

Warranty Service

To obtain warranty service for the Machine, contact your reseller or IBM. You may be required to present proof of purchase.

IBM or your reseller provides certain types of repair and exchange service, either at your location or at a service center, to keep Machines in, or restore them to, conformance with their Specifications. IBM or your reseller will inform you of the available types of service for a Machine based on its country of installation. IBM may repair the failing Machine or exchange it at its discretion.

When warranty service involves the exchange of a Machine or part, the item IBM or your reseller replaces becomes its property and the replacement becomes yours. You represent that all removed items are genuine and unaltered. The replacement may not be new, but will be in good working order and at least functionally equivalent to the item replaced. The replacement assumes the warranty service status of the replaced item.

Any feature, conversion, or upgrade IBM or your reseller services must be installed on a Machine which is 1) for certain Machines, the designated, serial-numbered Machine and 2) at an engineering-change level compatible with the feature, conversion, or upgrade. Many features, conversions, or upgrades involve the removal of parts and their return to IBM. A part that replaces a removed part will assume the warranty service status of the removed part.

Before IBM or your reseller exchanges a Machine or part, you agree to remove all features, parts, options, alterations, and attachments not under warranty service.

You also agree to

1. ensure that the Machine is free of any legal obligations or restrictions that prevent its exchange;
2. obtain authorization from the owner to have IBM or your reseller service a Machine that you do not own; and
3. where applicable, before service is provided
 - a. follow the problem determination, problem analysis, and service request procedures that IBM or your reseller provides,
 - b. secure all programs, data, and funds contained in a Machine,
 - c. provide IBM or your reseller with sufficient, free, and safe access to your facilities to permit them to fulfill their obligations, and
 - d. inform IBM or your reseller of changes in a Machine's location.

IBM is responsible for loss of, or damage to, your Machine while it is 1) in IBM's possession or 2) in transit in those cases where IBM is responsible for the transportation charges.

Neither IBM nor your reseller is responsible for any of your confidential, proprietary or personal information contained in a Machine which you return to IBM or your reseller for any reason. You should remove all such information from the Machine prior to its return.

Production Status

Each IBM Machine is manufactured from new parts, or new and used parts. In some cases, the Machine may not be new and may have been previously installed. Regardless of the Machine's production status, IBM's appropriate warranty terms apply.

Limitation of Liability

Circumstances may arise where, because of a default on IBM's part or other liability, you are entitled to recover damages from IBM. In each such instance, regardless of the basis on which you are entitled to claim damages from IBM (including fundamental breach, negligence, misrepresentation, or other contract or tort claim), IBM is liable for no more than

1. damages for bodily injury (including death) and damage to real property and tangible personal property; and
2. the amount of any other actual direct damages, up to the greater of U.S. \$100,000 (or equivalent in local currency) or the charges (if recurring, 12 months' charges apply) for the Machine that is the subject of the claim.

This limit also applies to IBM's suppliers and your reseller. It is the maximum for which IBM, its suppliers, and your reseller are collectively responsible.

UNDER NO CIRCUMSTANCES IS IBM LIABLE FOR ANY OF THE FOLLOWING: 1) THIRD-PARTY CLAIMS AGAINST YOU FOR DAMAGES (OTHER THAN THOSE UNDER THE FIRST ITEM LISTED ABOVE); 2) LOSS OF, OR DAMAGE TO, YOUR RECORDS OR DATA; OR 3) SPECIAL, INCIDENTAL, OR INDIRECT DAMAGES OR FOR ANY ECONOMIC CONSEQUENTIAL DAMAGES (INCLUDING LOST PROFITS OR SAVINGS), EVEN IF IBM, ITS SUPPLIERS OR YOUR RESELLER IS INFORMED OF THEIR POSSIBILITY. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL

DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.

Part 2 - Worldwide Country-Unique Terms

ASIA PACIFIC

AUSTRALIA: The IBM Warranty for Machines: The following paragraph is added to this Section:

The warranties specified in this Section are in addition to any rights you may have under the Trade Practices Act 1974 or other legislation and are only limited to the extent permitted by the applicable legislation.

Extent of Warranty: The following replaces the first and second sentences of this Section:

The warranty does not cover the repair or exchange of a Machine resulting from misuse, accident, modification, unsuitable physical or operating environment, operation in other than the Specified Operating Environment, improper maintenance by you, or failure caused by a product for which IBM is not responsible.

Limitation of Liability: The following is added to this Section:

Where IBM is in breach of a condition or warranty implied by the Trade Practices Act 1974, IBM's liability is limited to the repair or replacement of the goods or the supply of equivalent goods. Where that condition or warranty relates to right to sell, quiet possession or clear title, or the goods are of a kind ordinarily acquired for personal, domestic or household use or consumption, then none of the limitations in this paragraph apply.

PEOPLE'S REPUBLIC OF CHINA: Governing Law: The following is added to this Statement:

The laws of the State of New York govern this Statement.

INDIA: Limitation of Liability: The following replaces items 1 and 2 of this Section:

1. liability for bodily injury (including death) or damage to real property and tangible personal property will be limited to that caused by IBM's negligence;
2. as to any other actual damage arising in any situation involving nonperformance by IBM pursuant to, or in any way related to the subject of this Statement of Warranty, IBM's liability will be limited to the charge paid by you for the individual Machine that is the subject of the claim.

NEW ZEALAND: The IBM Warranty for Machines: The following paragraph is added to this Section:

The warranties specified in this Section are in addition to any rights you may have under the Consumer Guarantees Act 1993 or other legislation which cannot be excluded or limited. The Consumer Guarantees Act 1993 will not apply in respect of any goods which IBM provides, if you require the goods for the purposes of a business as defined in that Act.

Limitation of Liability: The following is added to this Section:

Where Machines are not acquired for the purposes of a business as defined in the Consumer Guarantees Act 1993, the limitations in this Section are subject to the limitations in that Act.

EUROPE, MIDDLE EAST, AFRICA (EMEA)

The following terms apply to all EMEA countries.

The terms of this Statement of Warranty apply to Machines purchased from an IBM reseller. If you purchased this Machine from IBM, the terms and conditions of the applicable IBM agreement prevail over this warranty statement.

Warranty Service

If you purchased an IBM Machine in Austria, Belgium, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland or United Kingdom, you may obtain warranty service for that Machine in any of those countries from either (1) an IBM reseller approved to perform warranty service or (2) from IBM.

If you purchased an IBM Personal Computer Machine in Albania, Armenia, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Georgia, Hungary, Kazakhstan, Kirghizia, Federal Republic of Yugoslavia, Former Yugoslav Republic of Macedonia (FYROM), Moldova, Poland, Romania, Russia, Slovak Republic, Slovenia, or Ukraine, you may obtain warranty service for that Machine in any of those countries from either (1) an IBM reseller approved to perform warranty service or (2) from IBM.

The applicable laws, Country-unique terms and competent court for this Statement are those of the country in which the warranty service is being provided. However, the laws of Austria govern this Statement if the warranty service is provided in Albania, Armenia, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Federal Republic of Yugoslavia, Georgia, Hungary, Kazakhstan, Kirghizia, Former Yugoslav Republic of Macedonia (FYROM), Moldova, Poland, Romania, Russia, Slovak Republic, Slovenia, and Ukraine.

The following terms apply to the country specified:

EGYPT: Limitation of Liability: The following replaces item 2 in this Section: 2. as to any other actual direct damages, IBM's liability will be limited to the total amount you paid for the Machine that is the subject of the claim.

Applicability of suppliers and resellers (unchanged).

FRANCE: Limitation of Liability: The following replaces the second sentence of the first paragraph of this Section:

In such instances, regardless of the basis on which you are entitled to claim damages from IBM, IBM is liable for no more than: (items 1 and 2 unchanged).

GERMANY: The IBM Warranty for Machines: The following replaces the first sentence of the first paragraph of this Section:

The warranty for an IBM Machine covers the functionality of the Machine for its normal use and the Machine's conformity to its Specifications.

The following paragraphs are added to this Section:

The minimum warranty period for Machines is six months.

In case IBM or your reseller are unable to repair an IBM Machine, you can alternatively ask for a partial refund as far as justified by the reduced value of the unrepaired Machine or ask for a cancellation of the respective agreement for such Machine and get your money refunded.

Extent of Warranty: The second paragraph does not apply.

Warranty Service: The following is added to this Section:

During the warranty period, transportation for delivery of the failing Machine to IBM will be at IBM's expense.

Production Status: The following paragraph replaces this Section:

Each Machine is newly manufactured. It may incorporate in addition to new parts, re-used parts as well.

Limitation of Liability: The following is added to this Section:

The limitations and exclusions specified in the Statement of Warranty will not apply to damages caused by IBM with fraud or gross negligence and for express warranty.

In item 2, replace "U.S. \$100,000" with "1.000.000 DEM."

The following sentence is added to the end of the first paragraph of item 2:

IBM's liability under this item is limited to the violation of essential contractual terms in cases of ordinary negligence.

IRELAND: Extent of Warranty: The following is added to this Section:

Except as expressly provided in these terms and conditions, all statutory conditions, including all warranties implied, but without prejudice to the generality of the foregoing all warranties implied by the Sale of Goods Act 1893 or the Sale of Goods and Supply of Services Act 1980 are hereby excluded.

Limitation of Liability: The following replaces items one and two of the first paragraph of this Section:

1. death or personal injury or physical damage to your real property solely caused by IBM's negligence; and 2. the amount of any other actual direct damages, up to the greater of Irish Pounds 75,000 or 125 percent of the charges (if recurring, the 12 months' charges apply) for the Machine that is the subject of the claim or which otherwise gives rise to the claim.

Applicability of suppliers and resellers (unchanged).

The following paragraph is added at the end of this Section:

IBM's entire liability and your sole remedy, whether in contract or in tort, in respect of any default shall be limited to damages.

ITALY: Limitation of Liability: The following replaces the second sentence in the first paragraph:

In each such instance unless otherwise provided by mandatory law, IBM is liable for no more than: (item 1 unchanged) 2) as to any other actual damage arising in all situations involving non-performance by IBM pursuant to, or in any way related to the subject matter of this Statement of Warranty, IBM's liability, will be limited to the total amount you paid for the Machine that is the subject of the claim.

Applicability of suppliers and resellers (unchanged).

The following replaces the second paragraph of this Section:

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Applicability of suppliers and resellers (unchanged).

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High-Rate Wireless LAN PC Card.

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Note: 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 and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.


- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult an IBM authorized dealer or service representative for help.

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Responsible party:

International Business Machines Corporation
New Orchard Road
Armonk, NY 10504
Telephone: 1-919-543-2193

 Tested To Comply
With FCC Standards
FOR HOME OR OFFICE USE

Industry Canada Class B emission compliance statement

This Class B digital apparatus complies with Canadian ICES-003.

Avis de conformité à la réglementation d'Industrie Canada

Cet appareil numérique de classe B est conforme à la norme NMB-003 du Canada.

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Dieses Gerät ist berechtigt in Übereinstimmung mit dem deutschen EMVG vom 9.Nov.92 das EG-Konformitätszeichen zu führen.

Der Aussteller der Konformitätserklärung ist die IBM UK, Greenock.

Dieses Gerät erfüllt die Bedingungen der EN 55022 Klasse B.

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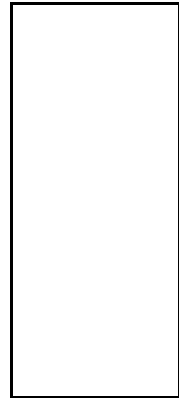
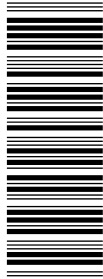


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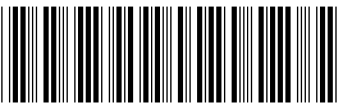


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