

# **IBM High Rate Wireless LAN (PCI)**

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Quick User' s Guide

**( Draft Version )**

## **About this book**

This manual contains instructions for installing and using the IBM High Rate Wireless LAN (PCI) 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, product use information, and maintenance information.

### **Part 2: Appendices**

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

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

## INDEX

1 INTRODUCTION.....	4
1.1 Features (bullets changed).....	4
1.2 Applications (bullets changed).....	4
Product description.....	6
IBM High Rate WLAN ( PCI ) .....	7
Installing the Card Hardware .....	7
Introducing the Card to your Computer.....	8
2 DRIVER/UTILITY INSTALLATION .....	9
2.1 System Requirements .....	9
2.2 Driver installation.....	9
2.2.1 Windows 95/98/Me/2000/NT .....	9
2.3 IBM Wireless LAN Client Manager Installation .....	11
Appendix A. Product specifications.....	16
Physical specifications .....	16
Power characteristics .....	16
Networking characteristics.....	16
Radio characteristics .....	17
Wireless LAN Range .....	18
Supported frequency sub-bands .....	18
Regulatory Information.....	19
USA-Federal Communications Commission (FCC) .....	19
Information to the user.....	19
Canada-Industry Canada (IC).....	20
Europe-EC Declaration of Conformity .....	20
Technical Specifications.....	20
Appendix B. Troubleshooting .....	21
Troubleshooting the LEDs .....	21
Appendix C. Help and service information.....	22
Appendix D. Product warranties and notices .....	23
Trademarks .....	24
Compliance information .....	24

## **1 INTRODUCTION**

Wireless LAN is local area networking without wires, which uses radio frequencies to transmit and receive data between PC's or other network devices without wires or cables. Wireless LAN configurations include independent networks suitable for small or temporary peer-to-peer configurations and infrastructure networks, offering fully distributed data connectivity via micro cells and roaming. The IBM High Rate Wireless LAN (PCI) card is designed to meet the mobility, performance, security, interoperability, management, and reliability requirements of IEEE 802.11b high data rate standard. It is easy to install on various devices with a standard PC PCI card slot. When installed, IBM High Rate Wireless LAN (PCI) card can communicate with other IEEE 802.11b compliant products to create a wireless network in your office or home.

### **1.1 Features (bullet points changed)**

- Compliant with 11 Mbps 802.11b high-speed specification
- Data rate 11/5.5/2/1 Mbps automatic fallback under noisy environment
- Advanced Power Management for battery saving
- Build-in PCB patch diversity antennas
- Supports a wide range of OS (Win95/98/Me/2000/NT )
- Interoperable with IEEE 802.11b compliant equipment
- Supports full mobility and seamless roaming from cell to cell
- Plug-and-play installation and easy client management with utility software
- Working range up to 115m in semi-open Office environment
- Supports point-to-point and point-to-multipoint access.
- Direct Sequence Spread Spectrum (DSSS) technology provides robust, interference-resistant and secure wireless connection.
- Wireless connection without the hassles and cost of cabling.
- Greater flexibility to locate or move networked PC's

### **1.2 Applications (bullet points changed)**

- Home networking for device sharing - Remote access to corporate network information  
E-mail, file transfer and terminal emulation.
- Frequently changing environments - Retailers, manufacturers and banks who frequently rearrange the workplace and change location.
- SOHO (Small Office and Home Office) users - SOHO users need easy and quick installation of a small computer network.
- Inter-building connection - The wireless building-to-building network installs quickly, requires no monthly lease fees, and provides the flexibility to reconfigure easily.
- Hard-to-wire buildings - Historical or old buildings, asbestos installations, and open area where wiring is difficult to employ.

### IBM High Rate Wireless LAN (PCI)

- Education (ex/ campuses)
- Hospitals/Medical offices - Employees need access to database while being mobile in the hospital.
- Warehouse (inventory)
- Security huts
- Exhibition centers
- Temporary LANs for special projects or peak time - Trade shows, exhibitions, retailers, airline and shipping companies need additional workstations for a peak period. Auditors require workgroups at customer sites.

## **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 IBM High-Rate Wireless LAN (PCI) card is a standard PCI card that fits into any standard PCI slot. It has two light-emitting diode (LED) indicators and one integrated antennas. You can use the IBM High-Rate Wireless LAN (PCI) card in combination with an external antenna. This PCI card is a wireless network that complies with the IEEE 802.11 standard on wireless LANs (Revision B). It supports data-transfer rates up to 11 Mbps. This PCI 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 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
  - WEP data encryption, based on the 128-bit WEP encryption algorithm as defined in the IEEE 802.11 standard on wireless LANs .

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

- IBM High Rate Wireless LAN (PCI) card
  - Transparent protective casing for PCI card storage

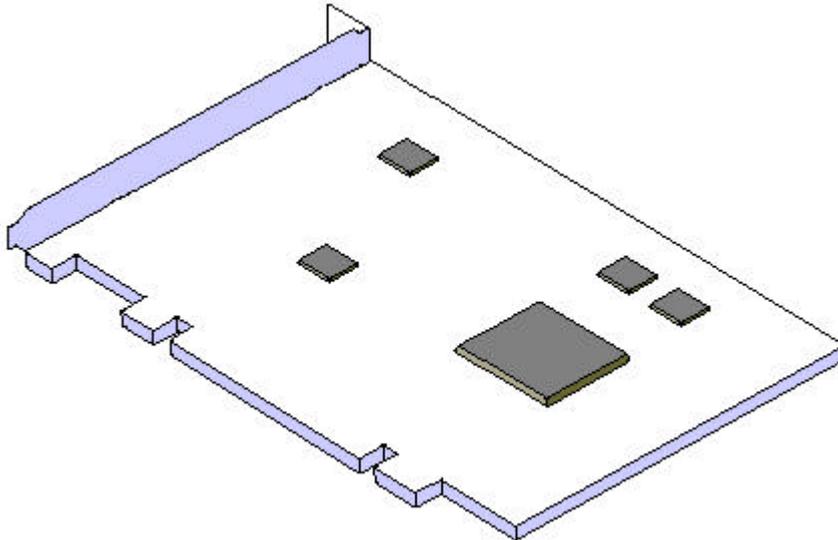
**Note:** To extend the life of the PCI card hardware, store the PCI card in the protective casing whenever carrying the computer on travel without operating the device.

- The IBM Driver and Utility CD

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

## IBM High Rate WLAN ( PCI )

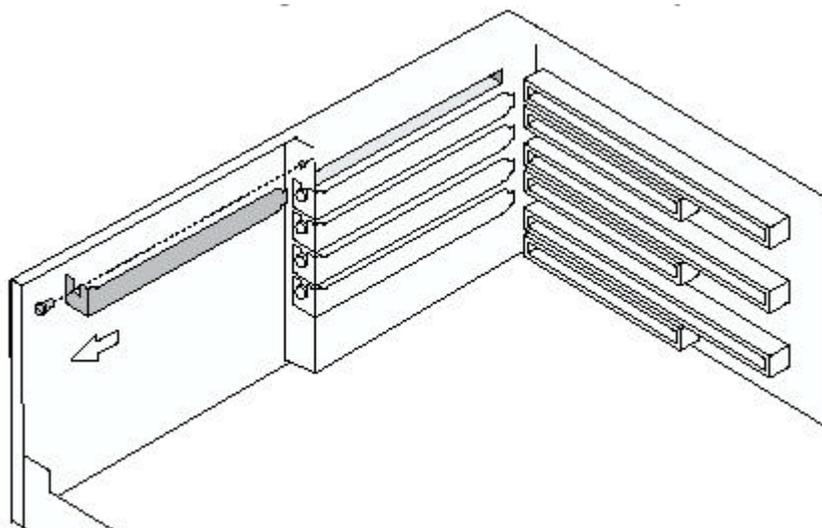
The PCI Card, is a standard “ PCI bus” Card that you can use to install IBM High Rate WLAN ( PCI ) Cards into computer devices .



### Instal l i ng t he Car d Har dware

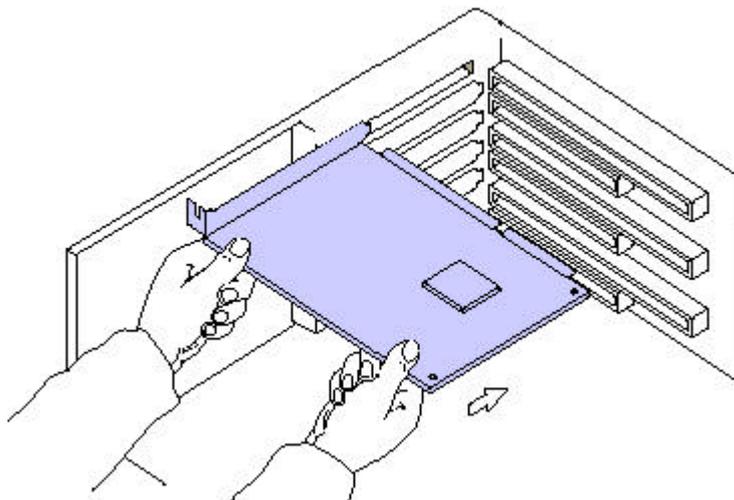
To insert the PCI Card into your computer, carefully follow the steps described in this manual

1. Shut down your computer.
2. Switch off the power of:
  - Your computer,
  - All external devices connected to your computer.
3. Disconnect the power cords from your computer and its external devices from the mains sockets.
4. Remove the top cover of your computer, according to the instructions in the user' s guide that came with your computer.



## IBM High Rate Wireless LAN (PCI)

5. Select an available slot for your Card and remove the metal filler strip (as pictured above). Keep the screw for fixing the Card later.
6. Gently insert the connector of the PCI card into the slot .



7. Secure the card into place with the screw that you removed in step 5.
8. Put the computer cover back into place according to the instructions in the user' s guide that came with your computer.
9. Reconnect all the external devices to your computer.
10. Re- insert the power cords and connect them to the mains sockets.
11. Switch on the power of your computer to complete the hardware installation.

### **Int r oduci ng t he Car d t o your Computer**

Most of today' s Microsoft operating systems will automatically detect and configure the PCI Card hardware. Some of these operating systems . however, may require you to install an additional driver (the PCI Enabler), to allow you to use the PCI Card in combination with IBM High Rate WLAN ( PCI ) Card .

Therefore, prior to inserting a IBM High Rate WLAN ( PCI ) Card into the PCI slot of your computer , follow the installation instructions as described for your operating system to complete the installation of the PCI Card.

## 2 DRIVER/UTILITY INSTALLATION

### 2.1 System Requirements

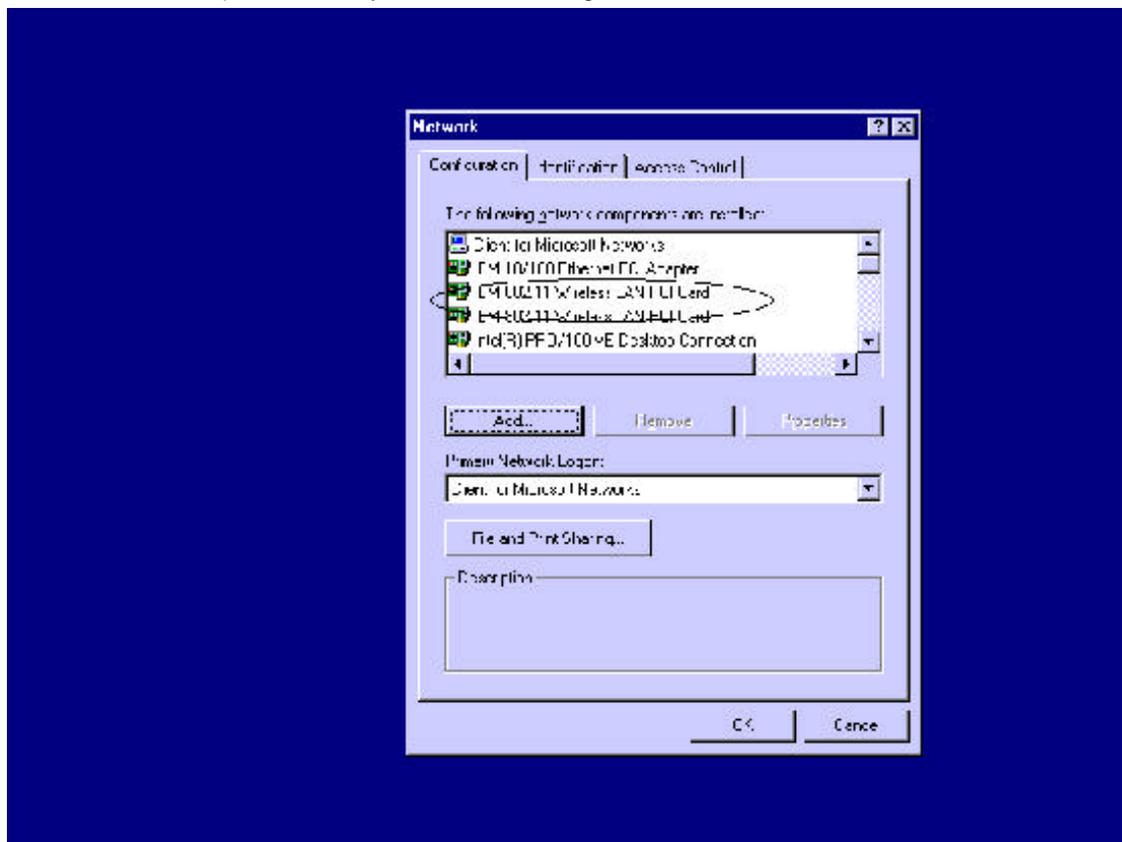
Below lists the minimum requirements to use IBM High Rate Wireless LAN (PCI) card:

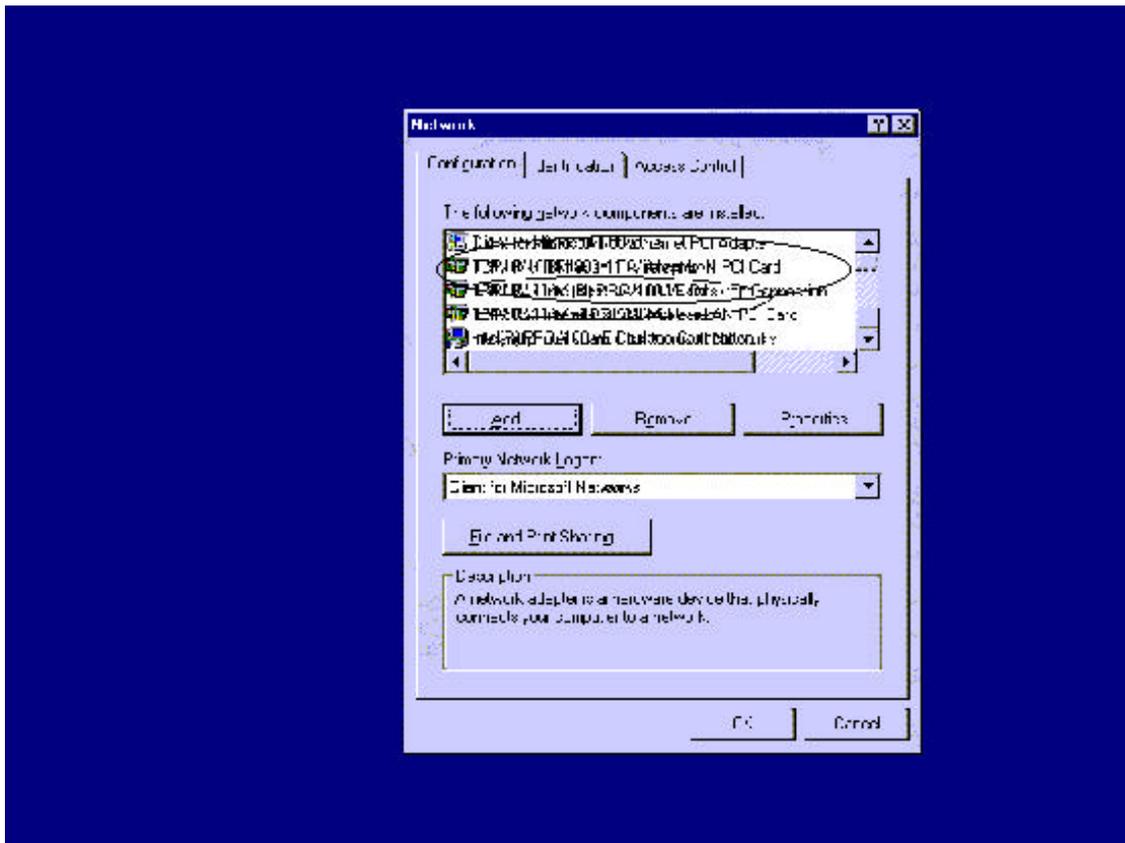
1. A system with a PCI specification compliant PCI slot.
2. Windows 95/98/2000/Me/NT4.0 operating system.
3. A minimum of 5 Mbytes free disk space for driver and utility program.

### 2.2 Driver installation

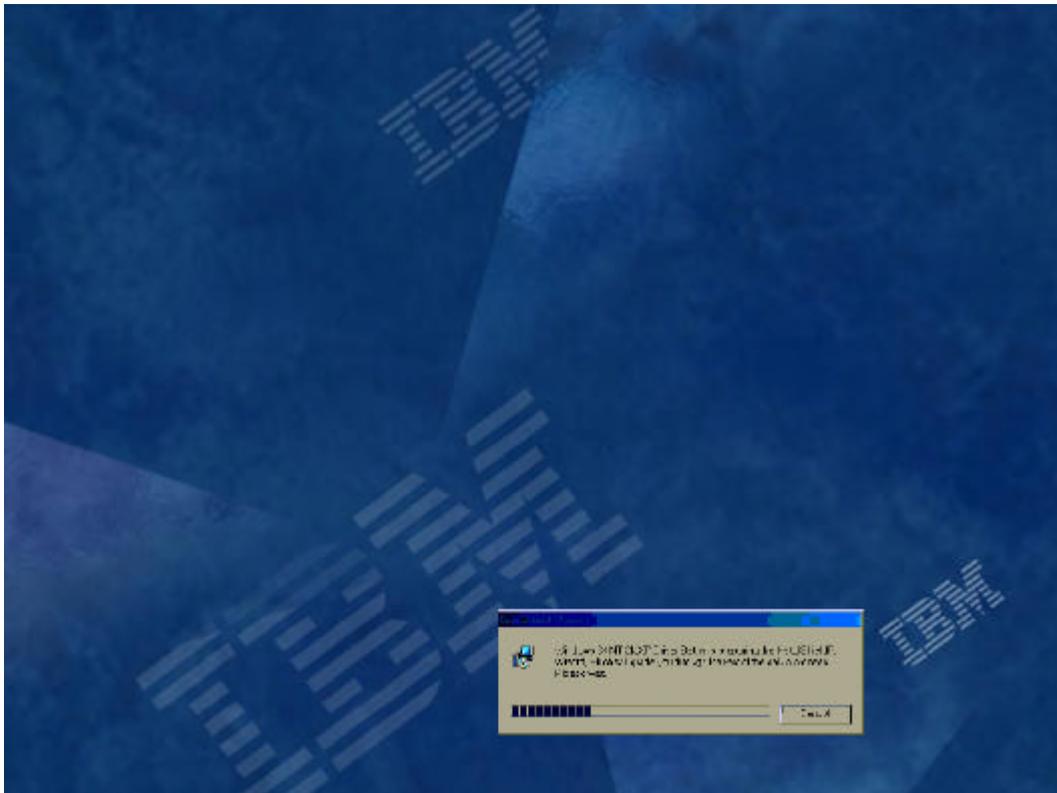
#### 2.2.1 Windows 95/98/Me/2000/NT

1. Before powering on system, please complete hardware installation before continuing.
2. Restart system.
3. Windows should automatically detect the IBM High Rate Wireless LAN (PCI) card and should display a dialog box titled "New Hardware Found".
4. Insert the IBM Driver & Utility CD into the CD-ROM drive. Instruct Windows that the drivers are located on CD-ROM drive. Accept all defaults.
5. After successful installation, you will see two network components. , You' ll see the two network components ( IBM 802.11 wireless LAN PCI Card and TCP/IP -> IBM IBM 802.11 wireless PCI Card ) installed in your network configuration .

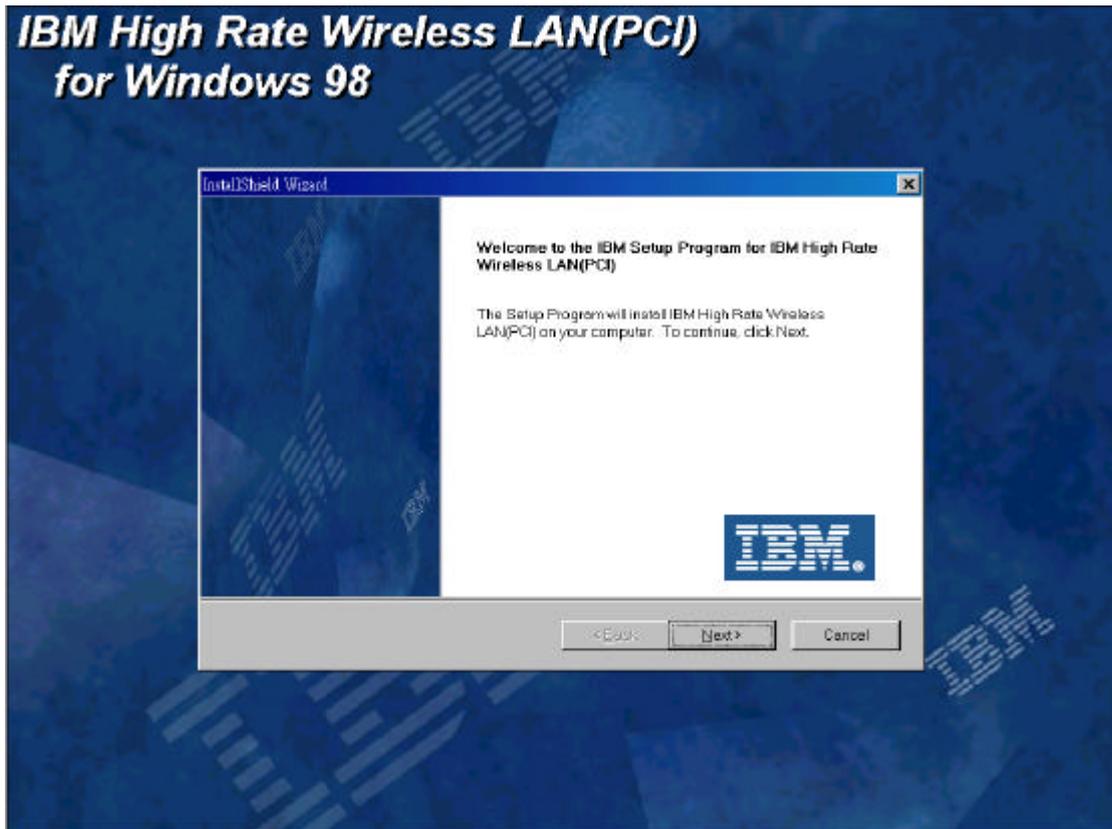




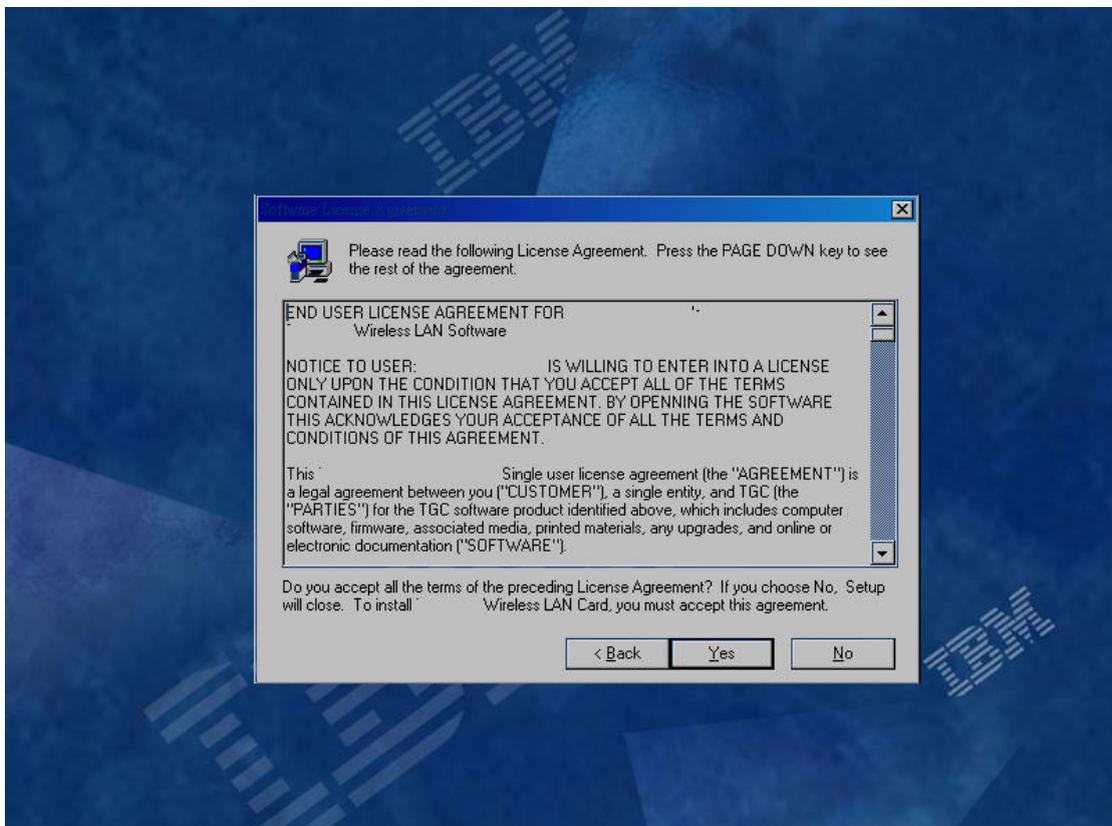
## 23 IBM Wireless LAN Client Manager Installation



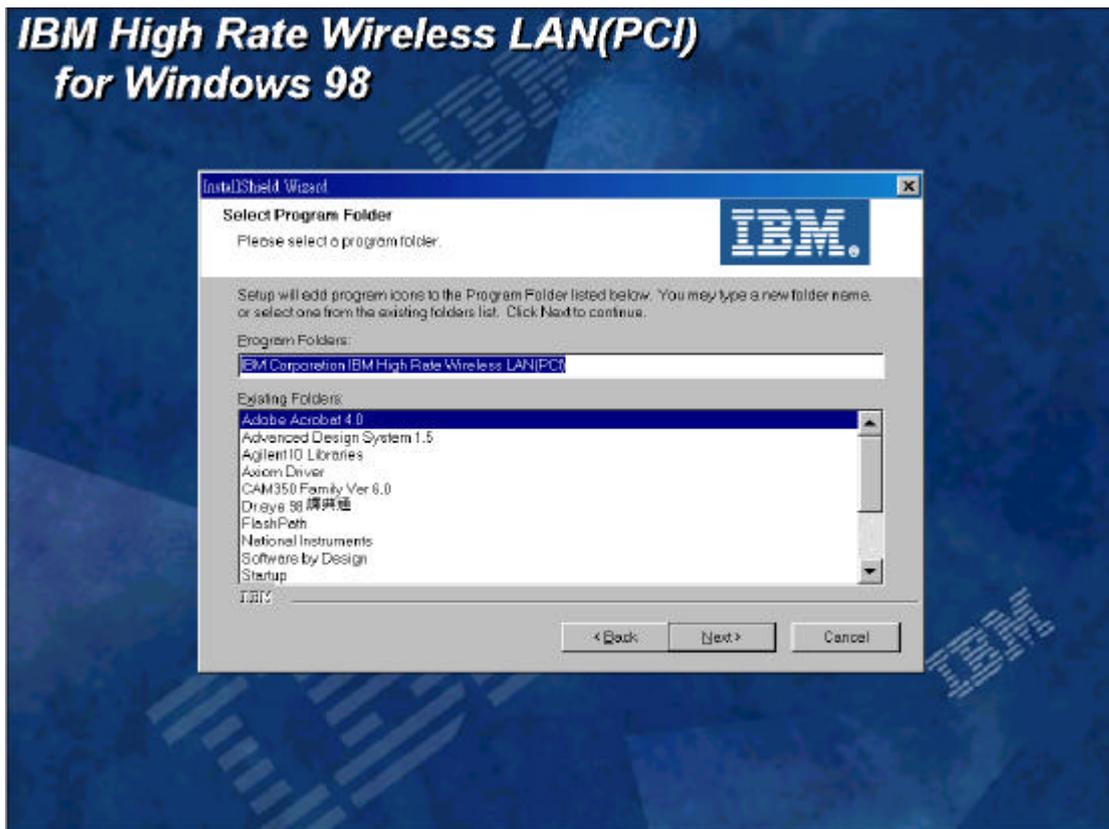
1. Once your system has booted and is idle, insert IBM Driver & Utility CD into the CD-ROM Drive. And the CDROM will automatically start the installation .( If it doesn' t automatically install , Please Run the Autrun.exe on CD-ROM .)



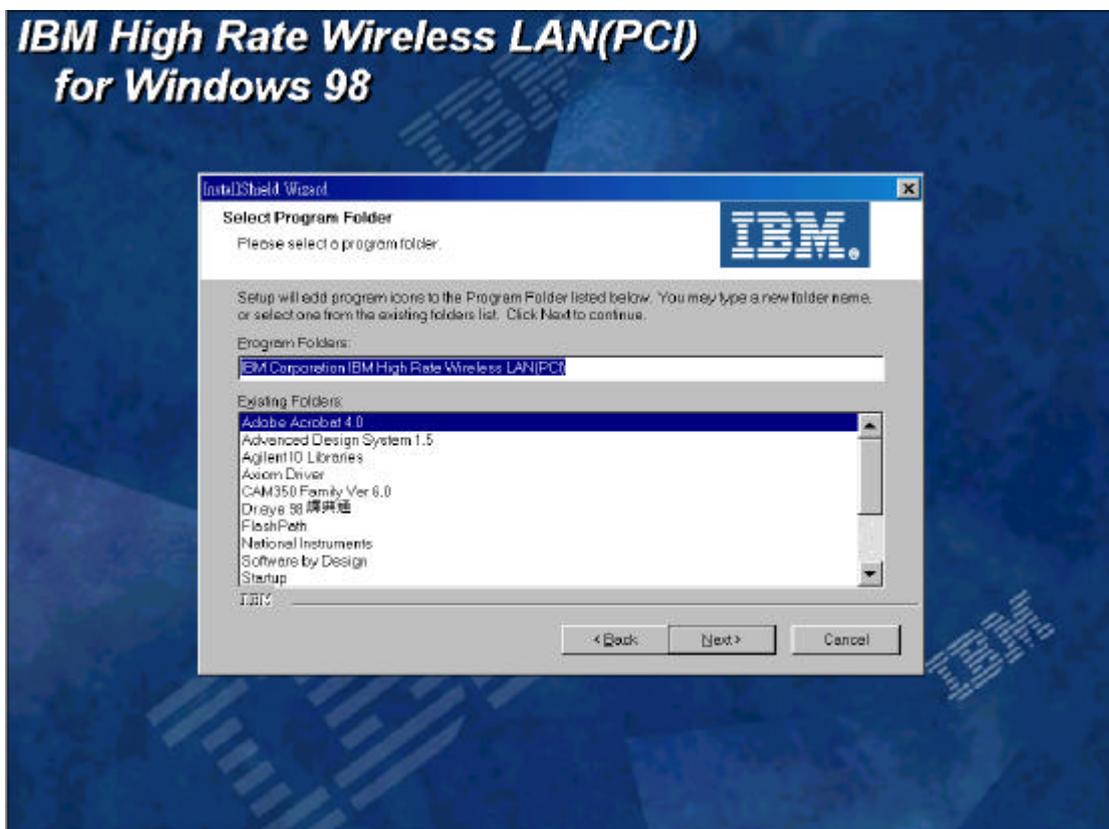
2. Show the information of the Installation of IBM , Please Click Next >.



3. Click Yes if you agree with the statements. ( Please IBM provide the license file )

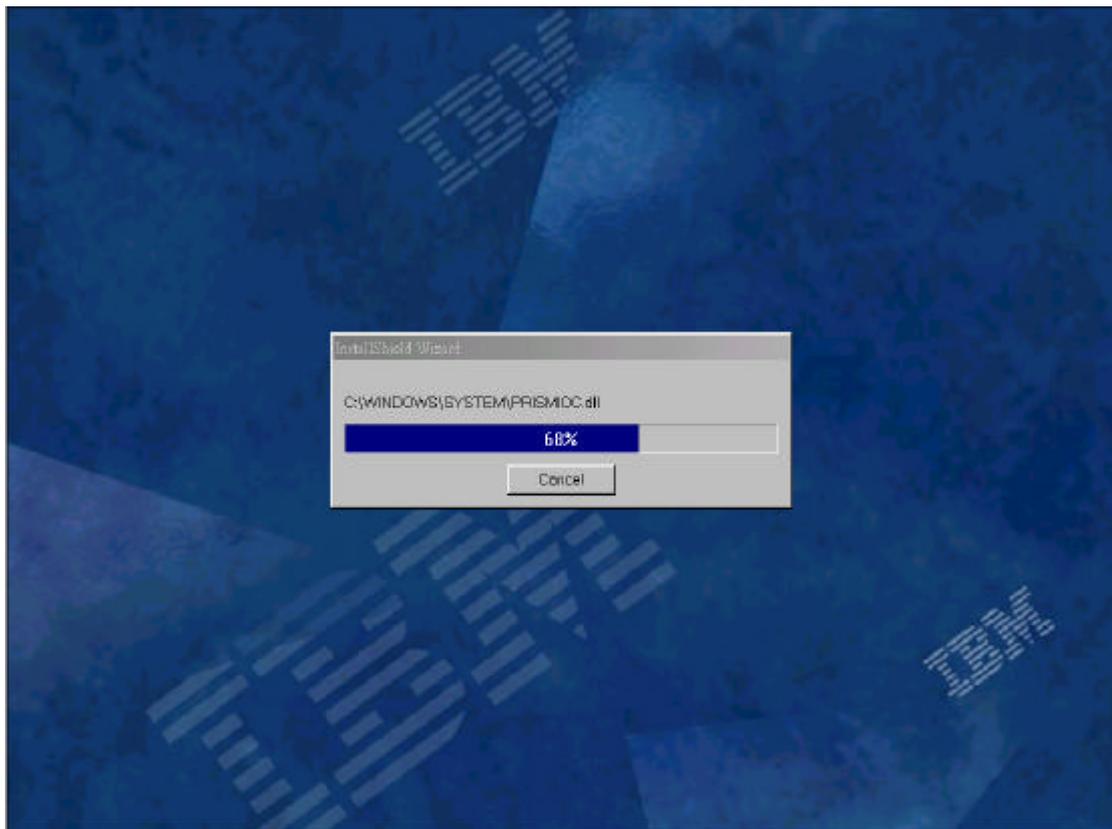


3. Click Next> if you don't want to change the destination folder.

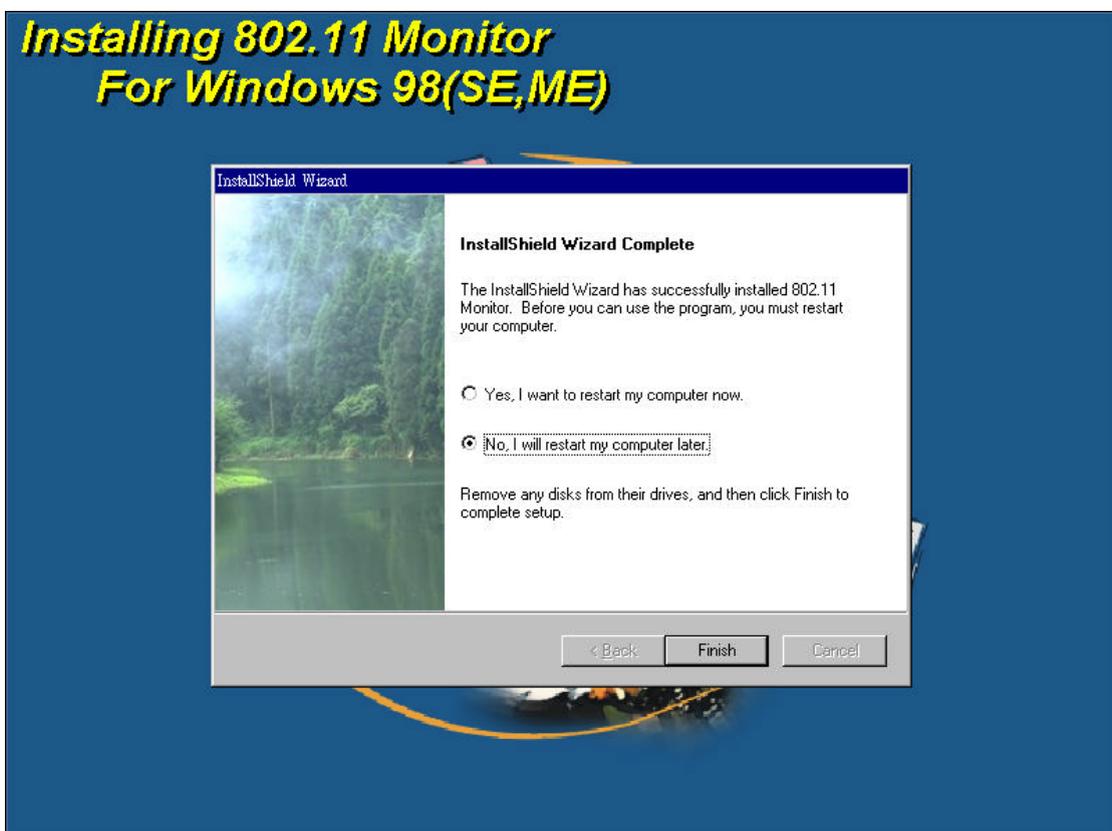


## IBM High Rate Wireless LAN (PCI)

4. Click Next> if you don't want to change the destination folder.

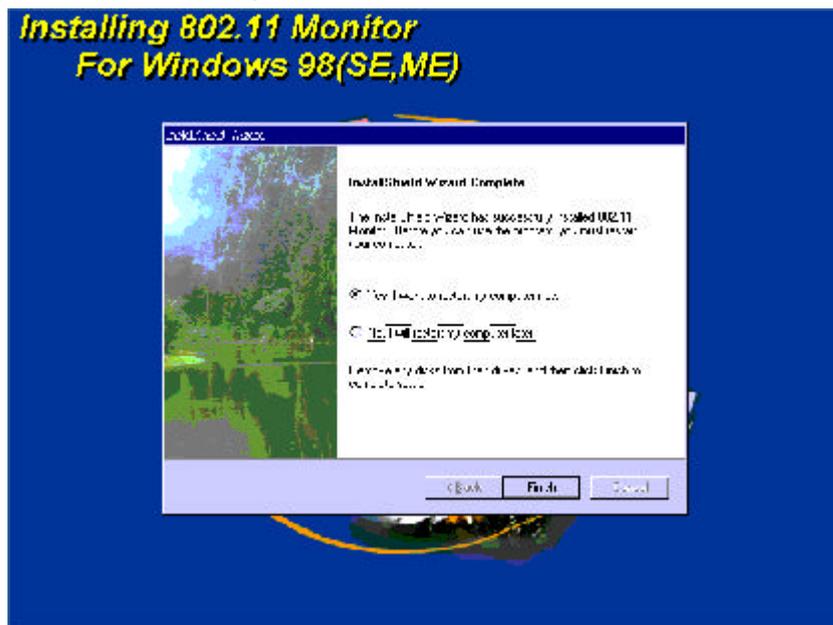


5. And you will see the installation is under processing

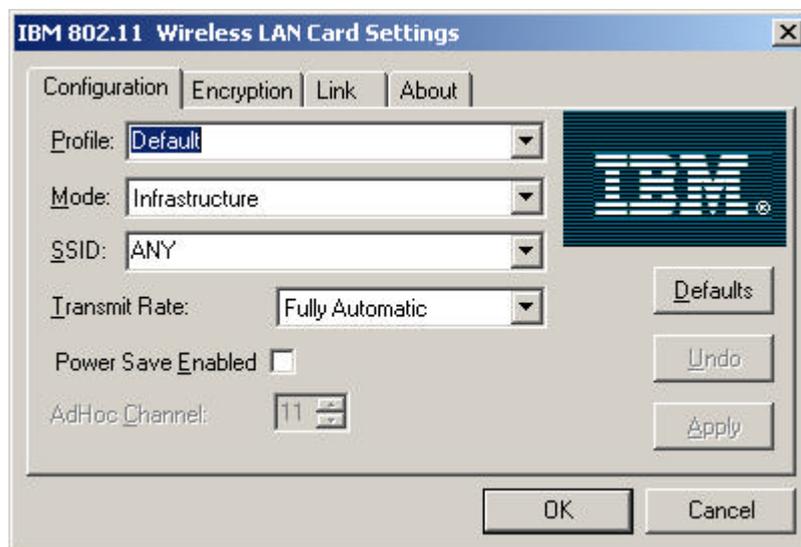


## [IBM High Rate Wireless LAN \(PCI\)](#)

6. Select Yes or No for restart option and click Finish.



7. If the option to restart was selected, click Yes to restart your computer
8. After installation and system has been restarted, it will automatically run the IBM Wireless LAN Client Manager as shown below. If the IBM Wireless LAN Client Manager fails to start, please double click the icon in the system tray to open the IBM Wireless LAN Client Manager main menu, providing quick access to all Card settings.



9. The IBM Wireless LAN Client Manager provides detailed on-line help instructions for each setting. Please refer to them for detail description.

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## Appendix A. Product specifications

This appendix provides the specifications for the IBM High Rate Wireless LAN (PCI) card.

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### Physical specifications

Form factor	PCI
Dimensions (LxW)	119.91*64.41* mm
Weight	grams

Mode	Temperature	Humidity
Operation	0° to 50° C (32° to 122° F)	90% maximum
Storage	-10° to 60° C (14° to 140° F)	10 to 90% (No condensation allowed)

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### Power characteristics

Doze mode	45 mA
Receive mode	225mA
Transit mode	325 mA
Power supply	3 V

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### Networking characteristics

Compatibility	IEEE 802.11 Standard for Wireless LANs (DSSS)
Network operating system	Microsoft Windows 9x/2000/Me/NT4.0
Host operating system	Windows 95: NDIS3 Low profile port driver Windows NT 4.0: NDIS4 Low profile port driver Windows 98, Windows 2000, Windows Me: NDIS5 Low profile port driver
Media access protocol	CSMA/CA (collision avoidance) with acknowledgement (ACK) (i.e. TCP/IP)
Data rate (High-Rate Wireless LAN PC Cards use an automatic Transmit Rate Select mechanism)	High: 11 Mbps Medium: 5.5 Mbps Standard: 2Mbps Low: 1 Mbps

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## Radio characteristics

Radio characteristics may vary according to:

- The country in which the product was purchased
- The type of product that was purchased

Wireless communication is often subject to local radio regulations. Although the IBM High Rate Wireless LAN (PCI) card has 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. To comply with such regulations, the IBM High Rate Wireless LAN (PCI) card is 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 IBM High Rate Wireless LAN (PCI) card.

RF frequency band	2.4 GHz (2400 to 24835 MHz)
Number of selectable sub-channels	North America (FCC): 11 Europe (ETS): 13 France (FR): 4 Japan (JP): 14 Other countries: FCC: 11
Modulation technique	Direct sequence spread spectrum (DSSS) 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 $10^{-5}$
Typical output 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
Semi-open Office Environment	40 m (131 ft.)	70 m (230 ft.)	90 m (295 ft.)	115 m (377 ft.)
Receiver Sensitivity	-84 dBm	-88 dBm	-89 dBm	-91 dBm

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

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 laboratories. These values may vary according to the actual radio conditions at the location where the IBM High Rate Wireless LAN (PCI) 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.

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## Supported frequency sub-bands

Subject to the radio regulations that apply in your country, your IBM High Rate Wireless LAN (PCI) card may support a different set of 2.4 GHz channels.

Consult your Authorized IBM High Rate Wireless LAN (PCI) reseller or IBM Sales office for information about the radio regulations that apply in your country.

The following table lists the IBM High Rate Wireless LAN (PCI) 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
11	2462	2462	2462	2462
12	n/a	2467	2467	2467

## IBM High Rate Wireless LAN (PCI)

13	n/a	2472	2472	2472
14	n/a	n/a	n/a	2484

When installing IBM High Rate Wireless LAN (PCI) cards, the channel configuration is managed as follows:

For wireless clients that operate in a High-Rate Wireless LAN Infrastructure, the IBM High Rate Wireless LAN (PCI) 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 IBM High Rate Wireless LAN (PCI) cards installed into wireless clients that operate in a Peer-to-Peer workgroup mode, the PCI card will use channel 10 by default.

When inserted into an access point, the IBM High Rate Wireless LAN (PCI) card will use the factory-set default channel, unless the LAN AdLow profile strator selected a different channel when configuring the access point device.

## **Regulatory Information**

### **USA-Federal Communications Commission ( FCC)**

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation

FCC RF Radiation Exposure Statement:

This device and its antenna(s) must operate with a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. End-users must be provided with specific operating instructions for satisfying RF exposure compliance.

### **Information to the user**

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. If not installed and used in accordance with the instructions, it 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

IBM High Rate Wireless LAN (PCI)

be determined by tuning the equipment off and on, the user is encouraged to try and correct the interference by one or more of the following measures:

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

**Canada-Industry Canada (IC)**

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations

Cet appareil de la B respecte toutes les exigences du Règlement sur le matériel brouiller du Canada

**Euro-EC Declaration of Conformity**

This device complies with Low Voltage Directive 73/23/EEC and EMC Directive 89/336/EEC

**Technical Specifications**

<b>Mechanical Specification</b>	
Dimensions	Length: app. 119.91mm.
	Width: app. 64.41mm.

<b>Electrical Specifications</b>	
Power density	
PC Card bus	16bit, 5v <sup>a</sup>
PCI bus	PCI Local Bus
Power Supply	3V taken directly from PCI bus. (3 or 3.3V???)
Power Consumption	3V 50mA(excluding ORINOCO PC Card) <a href="#">(Power consumption results show everything larger than 50mA – please adjust to reflect actual measurements)</a>

<b>Temperature &amp; Humidity</b>	
Operation	0° To 50° C
Transit	-20° To 70° C

IBM High Rate Wireless LAN (PCI)

Storage	-10° To 60° C
Humidity	Maximum 95%,no condensation allowed.
<b>Compatibility</b>	
Operating System	Windows 98 SE/ME. Windows 95 Windows NT4.0 Windows XP Windows 2000 Windows CE
RF Compliance	USA FCC CFR47 Part 15-C Canada RSS 210 Europe EN300328-2 EN301489-17 Japan TELEC STD T-66, STD D-33 JATE No.9
EMC Compliance	USA FCC CFR47 Part 15-B Europe EN55022 EN55024
Product Safety	Europe EN60950

- a. Compliant with the PCI Local Bus Specification Revision 2.1
- b. Requires **Windows 2000** Service Pack 1 or higher. (What about SP 2???)

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## Appendix B. Troubleshooting

This section provides information on troubleshooting procedures.

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### Troubleshooting the LEDs

Waiting the Intel to provide the Troubleshooting Document.

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**Appendix C. Help and service information**

IBM marketing team will provide this section .

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## **Appendix D. Product warranties and notices**

The following section provides product warranty information and legal notices.

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### **Warranty Statements**

**IBM marketing team will provide this section .**

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## **Trademarks**

The following terms are trademarks of the IBM Corporation in the United States or other countries or both:

IBM

HelpCenter

Microsoft, Windows and Windows NT are trademarks of the Microsoft Corporation in the United States, other countries or both. Other company, product, and service names may be trademarks or service marks of others.

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## **Compliance information**

For compliance and certification requirements, please see the certification flyer included with the product.