WIRELESS LAN PCI ADAPTER

802.11b Wireless LAN PCI Adapter

PCI511WB

Instruction Guide

* Actual product may vary from photo

StarTech.com

The Professionals' Source For Hard-to-Find Computer Parts

FCC COMPLIANCE STATEMENT

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy 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 the dealer or an experienced radio/TV technician for help.

FCC Caution
This equipment must be installed and operated in accordance with provided instructions and a minimum 20cm (8 inches) spacing must be provided between computer mounted antenna and a person's body (including extremities of hands, wrists, and feet) during wireless modes of operation.

R&TTE Compliance Statement
This equipment complies with all the requirements of DIRECTIVE 1999/5/CE OF THE EUROPEAN PARLIAMENT AND THE COUNCIL of March 9, 1999 on radio equipment and telecommunication terminal Equipment and the mutual recognition of their conformity (R&TTE).
The R&TTE Directive repeals and replaces in the directive 98/13/EEC (Telecommunications Terminal Equipment and Satellite Earth Station Equipment) as of April 8, 2000.

Safety
This equipment is designed with the utmost care for the safety of those who install and use it. However, special attention must be paid to the dangers of electric shock and static electricity when working with electrical equipment. All guidelines of this and of the computer manufacturer must therefore be allowed at all times to ensure the safe use of the equipment.

EU Countries Intended for Use
The ETSI version of this device is intended for home and office use in Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, and the United Kingdom. The ETSI version of this device is also authorized for use in EFTA member states: Iceland, Liechtenstein, Norway, and Switzerland.

Table of Contents

Introduction

Thank you for purchasing a StarTech.com wireless LAN PCI adapter. Based on the IEEE 802.11b 2.4 GHz wireless standard, the PCI511WB instantly provides your desktop computer with wireless LAN (WLAN) access. The card features advanced wireless security technology like Temporal Key Integrity Protocol (TKIP) and Advanced Encryption Standard (AES) and up to 11 Mbits/sec of fast data transfer.

Whether you are setting up a peer-to-peer Ad Hoc network with other computers using 802.11b devices (like the StarTech.com USB511WB or CB511WB) or setting up an Infrastructure network with a wireless access point (like the StarTech.com WAP1011BB), this cardbus adapter is the perfect way to add your computer to your wireless network.

Features

- Complies with IEEE 802.11b (DSSS) 2.4 GHz standard
- Uses high-speed data transfer rate up to 11 Mbits/sec
- Supports 64/128-bit AES/TKIP/WEP Data Encryption for advanced LAN security
- Supports peer-to-peer communication between wireless users with no Access Point required
- Automatic rate fallback enables data reliability
- Supports power save mode
- Use detachable antenna with long cable for easy antenna positioning
- Backed by StarTech.com's lifetime year warranty

Before You Begin

To ensure a quick and easy card installation, please read through this section carefully before attempting to install the card.

WARNING! PCI cards, like all computer equipment, can be severely damaged by static electricity. Be sure that you are properly grounded before opening your computer case or touching your PCI card. StarTech.com recommends that you wear an anti-static strap when installing any computer component. If an anti-static strap is unavailable, discharge yourself of any static electricity build-up by touching a large grounded metal surface (such as the computer case) for several seconds. Also be careful to handle the PCI card by its edges and not the gold connectors.

System Requirements

- A desktop computer running Windows XP, 2000, Me, 98SE, WinCE.Net or Linux
- An open PCI slot

Package Contents

- 1 x PCI511WB wireless PCI adapter
- 1 x removable antenna (with cable)
- 1 x driver / utility CD

Installation

This section will guide you through the installation of your PCI card and the related software. Please read through the instructions carefully and complete each step in the order listed.

NOTE: The following instructions are for Windows users only. Linux users should consult their Linux vendor for installation details.

Installing the Card and Drivers

1. Make sure that your system is unplugged and you are grounded.
2. Remove the cover of your system (see your computer's user manual for details, if necessary) and gently turn your computer onto its side.
3. Locate an empty PCI slot (usually white in colour) and remove the metal plate that covers the rear bracket. You may need a Phillips screwdriver to perform this step. **Hang on to the screw!** You will need it to secure the card later.
4. Gently insert the card into the empty slot, making sure it is firmly seated.
5. Secure the card in place using the screw you removed in Step 3.
6. Put the computer case back on and turn your computer on.
7. Windows will automatically detect the new device. Insert your driver / utility disk into the disk drive and direct the system to the appropriate location in the “Driver” folder on the CD. For example, Windows 2000 users should select the “Driver \ Win2000” folder. The system will now install the necessary drivers.

Removing the Windows XP Wireless Utility

Windows XP has contains a default built-in wireless network utility. **It is recommended that you use the utility provided with the PCI511WB.** To remove the default Windows utility, perform the following steps:

1. Click on **Start, Control Panel,** and select **Network Connections**.
2. Right click **Wireless Network Connection,** and click **Properties**.
3. Click the **Wireless Networks** tab.
4. Clear the “Use Windows to configure my wireless network settings” checkbox and click **OK**.

Installing the Utility

1. With your driver / utility in your disk drive, open the Utility folder and click on the Setup.exe file.
2. Click **Next** to begin the installation.
3. Click **Yes** to accept the license agreement. The utility will now be installed on your system.
4. Click **Finish** to complete the installation.
5. When the utility is completely installed, a shortcut named **Rtl8180** will appear on your desktop. There will also be a new icon in your taskbar. To use your wireless PCI adapter, double-click on the shortcut or click on the icon.

Monitoring Your Card

The two LEDs on the card are good indications of the card's activity and status.

Link: This green LED indicates a proper connection to the network.

Tx/Rx: This orange LED indicates when there is activity on the network.

Using the Configuration Utility

The Configuration Utility helps you configure your PCI511WB and monitor your link status and network statistics. You can change the following parameters while the device is active.

To bring up the configuration utility, double-click on the **Rtl8180** shortcut or click on the icon in your taskbar. There are four tabs available on the configuration utility:

- **Configuration** (p. 5): From the Configuration tab, you can configure different aspects of your adapter, including your network type, power setting modes, radio channel, and data rate.
- **Link State** (p. 7): The Link State screen gives you information about your wireless connection, including signal strength, signal quality, and transmission statistics.
- **Security** (p. 9): The Security tab allows you to customize your security settings, including WEP, TKIP, and AES WLAN technologies.
- **Statistics** (p. 11): From the Statistics tab, you can get real time information about packet transmission and receiving status.

Configuration

Parameter	*Description*
Network Type	**Infrastructure**: Select this mode if you are using an 802.11 wireless access point like the StarTech.com WAP1011BB. All communication is done via the WAP. **Ad Hoc**: Use this wireless mode if you are connecting to another wireless base station like the StarTech.com CB511WB without using an access point.
SSID	The SSID is the unique name that identifies a WLAN. The ID can be up to 32 printable ASCII characters and prevents the unintentional merging of two co-located WLANs. Only adapters with identical SSIDs can communicate with each other.
Fragment Threshold	This value defines the maximum size of a packet. Any packet larger than this value will be fragmented. The range for this threshold is 256 to 2432 bytes. When altering this value, minor changes are recommended.
RTS Threshold	This value defines the minimum packet size for a Request to Send (RTS). For packets smaller than this threshold, an RTS is not sent and the packet is transmitted directly to the WLAN. The range for this threshold is 0 to 2432 bytes. When altering this value, minor changes are recommended.
Beacon Interval	This field specifies the duration between beacon packets (fixed at 100 milliseconds). Beacon packets include information about the adapter and are broadcasted to the WLAN at set intervals.

(Configuration, continued)

Power Save	**CAM** (Continous Access Mode): Adapter will always be in Active Mode. **Max**: Puts the adapter in power saving mode when idle. **Fast**: Puts the adapter in power saving mode when idle, but allows some components of the adapter to remain alive. This mode consumes more power than **Max** mode.
Use Short Preamble	Check this box if you want to use the short preamble type. The preamble defines the length of the CRC block for communication between the access point and the adapter. High network traffic areas should use a short preamble.
Turn Off Radio	Check this box to disable the adapter's wireless connection.
Show Icon in System Tray	Check this box to show the adapter's icon in your system tray.
Channel	Select the radio channel you want to use for networking. This field is not active in Infrastructure mode.
Auto Select Rate	Check this box if you want the adapter to automatically choose the most suitable transmission rate.
1MBps, 2MBps, 5.5MBps, 11MBps	If you do not have Auto Select Rate enabled, choose one of the following for each field: **Not Used**: Prohibits the adapter from operating at this rate. **Used**: Allows the adapter to operate at this rate. **Basic**: Restricts the adapter to operate at at least this data rate. At least one of the fields must be set to Basic. In case of obstacles or interference where the Basic rate(s) is unattainable, the adapter will try to use the data rates listed as Used.

Click **Apply** to save your configuration settings. Click **Undo** to cancel the settings.

Link State

Parameter	*Description*
Current Channel	Shows the current channel used for your wireless connection.
Data Rate	Shows the data rate of your wireless connection.
Link State	**Checking Status**: The adapter is checking the status of the connection. **Not Associated**: The connection has been interrupted. Press the **Rescan** button to reconnect the wireless device. **Associated**: The adapter is successfully linked to a wireless device. Pressing the **Detail** button shows you the parameters and link status of the adapter.
Signal Strength	This bar indicates the signal strength. A higher percentage indicates that more radio signal has been received. You can use this indicator to help find a suitable location for the adapter. See also Appendix A: Installation Considerations on page 13.
Signal Quality	This bar indicates the quality of the link. The higher the percentage, the better the quality of the link.
MAC Address	Shows the MAC address of the adapter.
Statistics	Shows the amount of data packets that have been successfully / unsuccessfully transmitted or received by the adapter.

Site Survey

The Site Survey button shows all nearby access points or adapters. Click the **Refresh** button to collect the SSID and Channel information of all the wireless devices near your adapter. Double-click on a device in the list to automatically connect to it.

Security

Parameter	*Description*
Data Encryption	**None**: Disables WEP Data Encryption. **WEP**: Enables WEP Data Encryption. If you enable WEP, you need to continue by setting the WEP key length and encryption keys. **TKIP**: Enables TKIP Data Encryption. If you enable TKIP you need to continue by setting the TKIP key length and encryption keys. **AES**: Enables AES Data Encryption. If you enable AES, you need to continue by setting the AES key length and encryption keys. For a further description of the different types of encryption, see the following page.
Auth Alogorithm	This setting must be consistent with the wireless device you want the adapter to connect to. **Open System**: No authentication is needed. **Shared Key**: Only wireless devices using a shared key (WEP, TKIP, or AES) are allowed to connect. You must make sure that the same key has been set up on both devices. **Auto Switch**: Auto switch the authentication algorithm depending on the wireless device the adapter is connecting to.

(Security, continued)

Default Key ID	Select one of the keys (1~4) as the encryption key.
Key Length	Select either 64 or 128-bits. Larger key lengths provide more security but reduce throughput.
Key 1 ~ Key 4	Fill in the text box by following the rules below: **64-bit**: Enter 10 Hexidecimal digits (0, 1, 2 ~ 9, a, b, c, etc) as the encryption key. For example: 012345abcd **128-bit**: Enter 26 Hexidecimal digits (0, 1, 2 ~ 9, a, b, c, etc) as the encryption key. For example: 0123456789abcdef0123456789. **NOTE:** Once you have entered the key, the digits will dissappear and be replaced by * symbols. Make sure that you write down the key you entered.

Data Encryption

WEP is an authentication alogorithm that protects authorized WLAN users against eavesdropping. WEP has been found to have some security problems. TKIP is a temporary quick-fix method defined in the IEEE 802.11i standard to quickly overcome the weaknesses in WEP security. AES has been developed to ensure the highest degree of security and authenticity for digital information and is the most advanced solution defined by IEEE 802.11i for security in the wireless network.

The security setting must be the same on the wireless network. The adapter supports 64/128-bit WEP, TKIP, and AES encryption functions.

Statistics

The transmission page gives you real time information about packet transmission and receiving status. The Value represents the number of times the Counter Name has occurred. In the example above, there have been 6607 packets received (Rx Packet Count).

Troubleshooting

If you are experiencing trouble with your PCI511WB, first make sure that the card is firmly seated in the PCI slot.

- Make sure that the IP address, subnet mask, gateway, and DNS settings are correctly entered for the network. Check with your operating system vendor if you are having difficulty with these network settings. Remember that each computer must be configured for networking and file sharing before the wireless network is in place.
- Make sure that you have selected the proper network connection mode. Use **Ad Hoc** mode if you are connecting two wireless devices without an access point. Use **Infrastructure** mode when you are using an access point.
- If you are in **Infrastructure** mode, make sure that the same **SSID** is specified for each wireless client and access point. In **Ad-Hoc** mode, make sure both wireless clients have the same **SSID**.
- If you have enabled encryption options, make sure that the correct encryption key has been entered on each device. Make sure that the key selected on your PCI511WB is the same key entered on the other wireless device you want to connect to.
- If your wireless card appears as an “Unknown device” in the Device Manager, remove the device from Device Manager and repeat the installation procedure.
- Make sure that there are no resource conflicts that may exist. Check your Device Manager to make sure that device has installed properly.
- If you are experiencing intermittent network connections, try re-orienting the adapter. See Appendix A: Installation Considerations on page 13 for more details.
- If there is no network association after your adapter wakes up from sleep mode, try restarting your computer.

Appendix A: Installation Considerations

The PCI511WB lets you use your desktop computer to access your WLAN, but there are some things to keep in mind when attempting to set up a wireless connection. The wireless signal range can be limited by the number, location, thickness, and material of ceilings, walls or similar that the signal must pass through. To maximize your wireless range, keep the following considerations in mind when positioning your antenna:

- Try to minimize the number of walls, ceilings, and similar between your wireless devices. Each wall or ceiling the signal must cross can reduce the signal range by up to 90 feet (30 m). Position your receiving devices so that the path between them is as unobstructed as possible.

- The type of material the wireless signal must cross through also affects its range. A solid metal door or concrete wall can decrease the signal's range. Whenever possible, position the adapters so that the signal can pass between drywall or open doors.

- Make sure that you are aware of the line the signal must take to travel between devices. The angle that the signal is on as it travels through a door, wall, or ceiling affects how thick the obstruction is. For example, if a wall is 1.5 feet thick and the signal passes through it at a 45-degree angle, the signal must pass through 3 feet (1m) of wall. At a 2-degree angle, the wall appears to be 42 feet (14m) thick. Always try to position your devices so that the signal can travel at 90-degree angles.

- Electrical devices or appliances that generate RF noise (such as microwaves, electric motors or computer monitors) can interfere with the wireless signal. Try to keep your adapter at least 3-6 feet (1-2 m) away from these types of devices.

Appendix B: Setting Up A Wireless Ad Hoc Network

To install an Ad Hoc network, you need two computers and two wireless adapters. Follow the instructions below to set up an Ad Hoc network between your two adapters, using the product Quick Install or Instruction Guides for details when necessary.

PCI511WB
11 Mbits/sec PCI 802.11B
Wireless Adapter Card

CB511WB
11 Mbits/sec Cardbus 802.11B
Wireless Notebook Card

1. Install your PCI511WB network adapter, drivers, and utility program to your computer using the instructions provided in the Quick Install guide.

2. Install your second 802.11b wireless adapter, drivers, and utility program to your other computer using the instructions provided in the Quick Install guide.

3. Using your configuration utility, set each adapter to **Ad Hoc** mode and make sure that both adapters are on the same **Channel** and have the same **SSID** (see Configuration on page 5 and 6 for details).

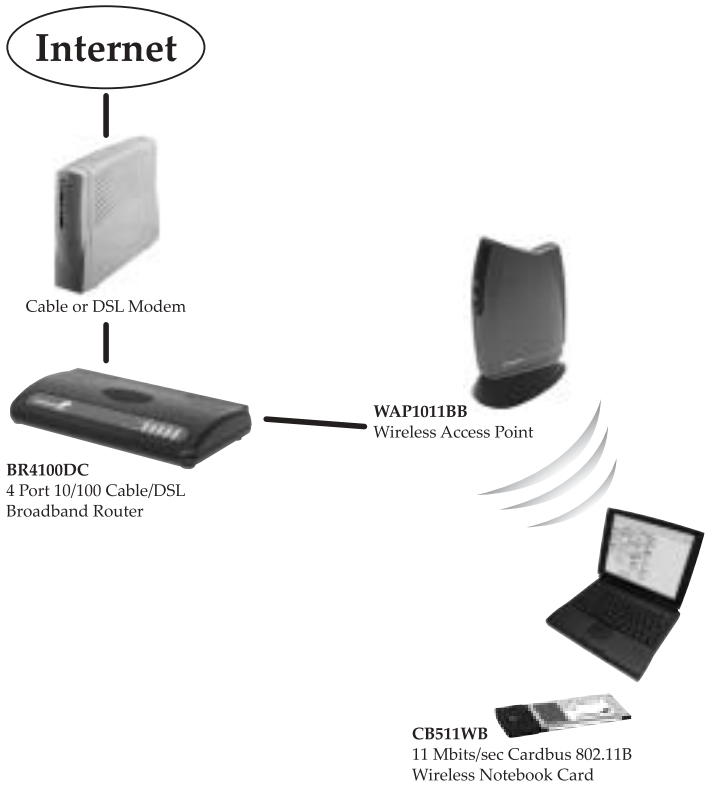
4. From your operating system software, make sure that the IP addresses assigned to each computer are in the same range as (but not identical to) each other and that the computers use the same subnet mask. Check with your operating system vendor for information on setting up networking and file sharing.

   For example, if your first computer has an IP address of 192.168.0.2 and a subnet mask of 255.255.255.0, your second computer could be assigned an IP address of 192.168.0.3 with a subnet mask of 255.255.255.0.

5. When you have installed all the proper components, use the instructions on your Quick Install or Instruction guide to connect your two devices.

Appendix C: Setting Up an Infrastructure Network

An Infrastructure network consists of both Wired and Wireless elements joined by a Wireless Access Point. Follow the instructions below to set up an Infrastructure network between your two adapters, using the product Quick Install or Instruction Guides for details when necessary.



The example above assumes a previously established wired network with Internet sharing supplied via a router.

1. Connect your wireless access point to one of your router's LAN ports using an Ethernet cable. Use the access point's instruction guide for installation details.

2. Install your wireless adapters, including their drivers and utility programs using the instructions provided by the vendor.

3. From your configuration utility, make sure that your **Network Type**, **SSID**, **Channel**, and **Security Settings** are all set to the same values for each device on your wireless network. Also make sure that the IP addresses for each device are in the same range as (but not identical to) each other and that the computers use the same subnet mask.

   Note: You may be able to use your Wireless Access Point to configure these settings on your wireless adapters. Check with your WAP's documentation for details.

Glossary

802.11b: A family of IEEE-defined specifications for wireless networks. The 802.11b standard supports data transfer rates up to 11 Mbits/sec in the 2.4 GHz band using DSSS technology. Also known as WiFi.

Access Point: See wireless access point.

Ad Hoc: A wireless computer-to-computer LAN. An Ad Hoc network can consist of two devices with wireless adapters, and does not require a WAP, router, or gateway. Also known as peer-to-peer mode.

BSS (Basic Service Set): In Infrastructure mode, a BSS consists of a Wireless Access Point and the adapters associated with it.

DSSS (Direct Sequence Spread Spectrum): A transmission technology used as the basis for 802.11b wireless transmissions. DSSS helps increase a signal's resistance to interference and allows for some data bit recovery.

Encryption: The transformation of data into encoded ciphertext to ensure data transmission can not be accessed by users outside the network. Encryption uses an encryption algorithm and encryption keys to encode and decode the information. See also WEP.

Encryption Algorithm: A formula used to convert data from understandable "plaintext" into encoded "ciphertext." Each algorithm uses a key (a string of bits) to perform the calculations. The larger the key (most are 64 or 128-bits in length), the more difficult to break the code.

ESS (Extended Service Set): In Infrastructure mode, the ESS consists of two or more BSSes in the same subnet.

IBSS (Independent Basic Service Set): In Ad Hoc mode, an IBSS consists of two or more wireless devices that communicate directly and do not use a wireless access point.

Infrastructure: A network configuration that typically combines both wired and wireless elements. Wireless devices communicate with a WAP in order to communicate with each other and with the wired elements of the network.

IP Address (Internet Protocol Address): An assigned number used to identify a computer on a network. An IP address consists of four numbers less than 255 separated by periods (for example, 192.168.2.1).

LAN (Local Area Network): A group of computers and devices connected together in a relatively small area (such as a house or an office).

MAC Address (Media Access Control Address): A unique serial number that identifies a piece of hardware connected to a network.

Plug and Play: A set of specifications that allows a computer to automatically detect and configure hardware devices. With Plug and Play computers, any new hardware device that is connected to a computer will automatically be recognised without the user having to tell the computer the device has been added.

SSID (Service Set Identifier): A name that uniquely identifies a WLAN. In order for wireless devices to communicate with each other, they must have the same SSID.

Subnet: An identifiably separate part of a network that is interconnected with, but still independent from, the rest of the network. Subnets can help improve network security and performance and typically use a router.

Subnet Mask: A technique used by the IP protocol to filter messages into a particular network segment or subnet. Subnet masks are expressed as four decimal numbers between 0 and 255 separated by periods. (Example: 255.255.255.1) It is used to create private IP addresses for use within a particular network. Also known as a network mask.

WAN (Wide Area Network): A network that connects computers in geographically separated areas. The Internet is an example of a WAN.

WAP (Wireless Access Point): A networking device that seamlessly connects wired and wireless networks. Used in Infrastructure networks, a wireless access point is capable of connecting to an Ethernet network as well as an 802.11 network.

WEP (Wired Equivalent Protocol): A security protocol designed to provide a wireless network with the same level of security as a wired LAN. WEP offers protection primarily by encrypting the information that flows between adapters.

Wi-Fi: See 802.11b.

Technical Specifications

Standard	IEEE 802.11b
Interface	PCI V2.2 / 2.1
Frequency Band	2.400~2.4835 GHz (Industrial Scientific Medical Band)
Modulation	CCK@11.5 / 5.5 Mbits / sec, DQPSK@2 Mbits / sec DBPSK@1 Mbit / sec
Radio Technology	Direct Sequence Spread Spectrum (DSSS)
Data Rate	11 / 5 / 5 / 2 / 1 Mbits / sec
Security	61 / 128-bit WEP encryption
Antenna	External detachable dipole antenna with RP-SMA
Drivers	Windows 98SE, Me, 2000, XP, WinCE.net, Linux
LEDs	Tx / Rx, Link
Transmit Power	16 dBm ~ 18 dBm
Channels	1~11: North America
Operating Temperature	32~131ºF (0~55ºC)
Humidity	5-95% (non-condensing)
Certification	FCC, CE

Technical Support

The following technical resources are available for this StarTech.com product:

On-line help:

We are constantly adding new information to the *Tech Support* section of our web site. To access this page, click the *Tech Support* link on our homepage, **www.startech.com**. In the tech support section there are a number of options that can provide assistance with this card.

Knowledge Base - This tool allows you to search for answers to common issues using key words that describe the product and your issue.

FAQ - This tool provides quick answers to the top questions asked by our customers.

Downloads - This selection takes you to our driver download page where you can find the latest drivers for this product.

Call StarTech.com tech support for help: **1-519-455-4931**
Support hours: Monday to Friday 9:00AM to 5:00PM EST (except holidays)

Warranty Information

This product is backed by a lifetime warranty. In addition StarTech.com warrants its products against defects in materials and workmanship for the periods noted below, following the initial date of purchase. During this period, the products may be returned for repair, or replacement with equivalent products at our discretion. The warranty covers parts and labor costs only. StarTech.com does not warrant its products from defects or damages arising from misuse, abuse, alteration, or normal wear and tear.

Limitation of Liability

In no event shall the liability to StarTech.com Ltd. (or its officers, directors, employees or agents) for any damages (whether direct or indirect, special, punitive incidental, consequential, or otherwise), loss of profits, loss of business, or any pecuniary loss, arising out of related to the use of the product exceed the actual price paid for the product.

Some states do not allow the exclusion or limitation of incidental or consequential damages. If such laws apply, the limitations or exclusions contained in this statement may not apply to you.

Revised: May 28, 2004