

SENAO

**High-Speed Wireless
Cardbus Adapter**

User's Manual

Version: 1.1

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Revision History

| Version | Date | Notes |
|----------------|-------------------|-----------------|
| 1.0 | September 8, 2003 | Initial Version |
| 1.1 | October 2, 2003 | Updated Screens |

1 Introduction

This chapter describes the features & benefits, package contents, PC card description, system requirements, applications, and network configuration.

1.1 Features & Benefits

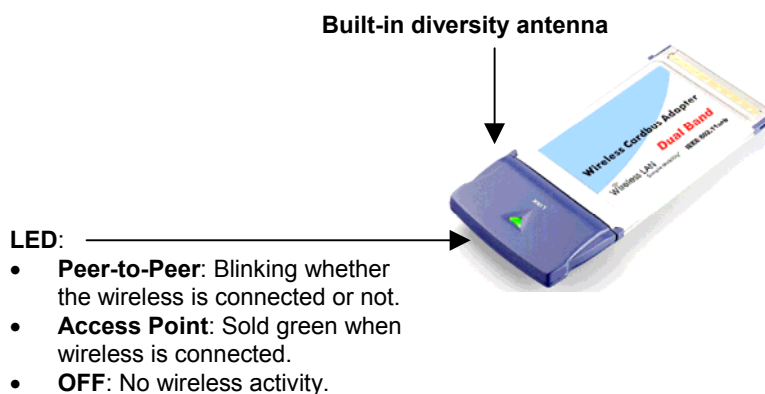
| Features | Benefits |
|--|--|
| High-speed data rate up to 54 Mbps | Capable of handling heavy data payloads such as MPEG video streaming. |
| WEP Data Encryption and TKIP | Powerful data security. |
| IEEE 802.1x client support (optional) | Enhances authentication and security. |
| Multi-country roaming (802.11d) support | Automatically adjusts regulatory domain to operate in different countries. |
| Advanced power management | Low power consumption in power saving mode. |
| TPC (Transmission Power Control) and DFS (Dynamic Frequency Selection) support | TPC offers flexibility to adjust RF output power. |

1.2 Package Contents

- One PC Card
- One Installation CD
- One Quick Installation Guide

1.3 PC Card Description

The PC card is a standard PC card that fits into any PCMCIA card Type II slot. The PC card has a LED indicator and an integrated built-in diversity antenna.



1.4 System Requirements

The following are the minimum system requirements in order to use the PC card.

- PC/AT compatible computer with a PCMCIA Type II slot.
- Windows 98/ME/ /2000/XP operating system.
- 1.3 MB of free disk space for installing the PC Card driver and utility program.

1.5 Applications

The wireless LAN products are easy to install and highly efficient. The following list describes some of the many applications made possible through the power and flexibility of wireless LANs:

a) Difficult-to-wire environments

There are many situations where wires cannot be laid easily. Historic buildings, older buildings, open areas and across busy streets make the installation of LANs either impossible or very expensive.

b) Temporary workgroups

Consider situations in parks, athletic arenas, exhibition centers, disaster-recovery, temporary offices and construction sites where one wants a temporary WLAN established and removed.

c) The ability to access real-time information

Doctors/nurses, point-of-sale employees, and warehouse workers can access real-time information while dealing with patients, serving customers and processing information.

d) Frequently changed environments

Show rooms, meeting rooms, retail stores, and manufacturing sites where frequently rearrange the workplace.

e) Small Office and Home Office (SOHO) networks

SOHO users need a cost-effective, easy and quick installation of a small network.

f) Wireless extensions to Ethernet networks

Network managers in dynamic environments can minimize the overhead caused by moves, extensions to networks, and other changes with wireless LANs.

g) Wired LAN backup

Network managers implement wireless LANs to provide backup for mission-critical applications running on wired networks.

h) Training/Educational facilities

Training sites at corporations and students at universities use wireless connectivity to ease access to information, information exchanges, and learning.

1.6 Network Configuration

To better understand how the wireless LAN products work together to create a wireless network, it might be helpful to depict a few of the possible wireless LAN PC card network configurations. The wireless LAN products can be configured as:

- a) Ad-hoc (or peer-to-peer) for departmental or SOHO LANs.
- b) Infrastructure for enterprise LANs.
- c) Wireless routing and IP sharing.

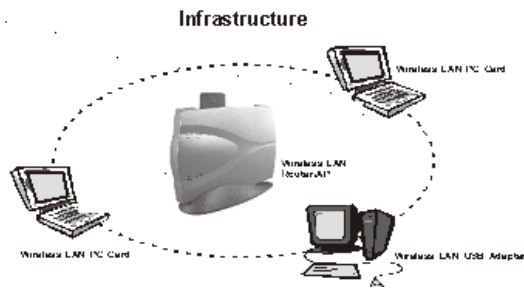
a) Ad-Hoc (peer-to-peer) Mode

This is the simplest network configuration with several computers equipped with the PC Cards that form a wireless network whenever they are within range of one another. In ad-hoc mode, each client is peer-to-peer, would only have access to the resources of the other client and does not require an access point. This is the easiest and least expensive way for the SOHO to set up a wireless network. The image below depicts a network in ad-hoc mode.

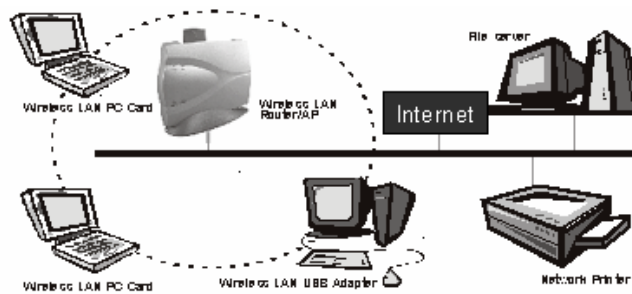


b) Infrastructure Mode

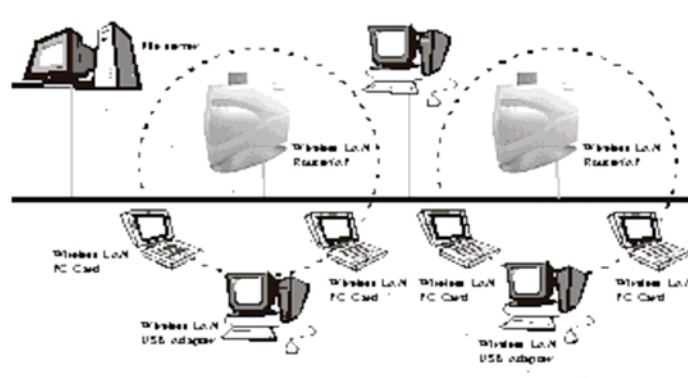
The infrastructure mode requires the use of an access point (AP). In this mode, all wireless communication between two computers has to be via the AP. It doesn't matter if the AP is stand-alone or wired to an Ethernet network. If used in stand-alone, the AP can extend the range of independent wireless LANs by acting as a repeater, which effectively doubles the distance between wireless stations. The image below depicts a network in infrastructure mode.



Extended-range independent WLAN using an AP as a repeater; if wired to an Ethernet network as shown below, the AP serves as a bridge and provides the link between the server and the wireless clients. The wireless clients can move freely throughout the coverage area of the AP while remaining connected to the server. Since the AP is connected to the wired network, each client would have access to the server's resources as well other clients.

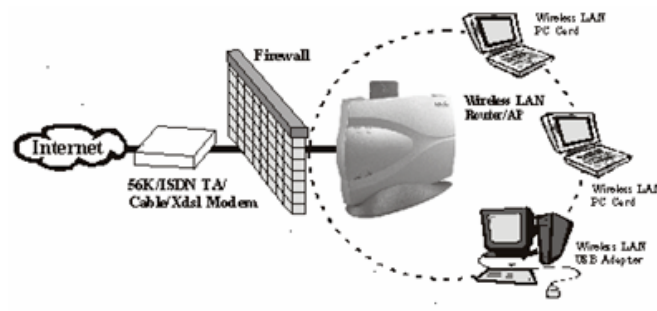


Access points have a finite range, on the order of 50 meters indoor and 100 meters outdoors. In a very large facility such as an enterprise, a warehouse, or on a college campus, it will probably be necessary to install more than one access point to cover an entire building or campus, as shown in the image below. In this scenario, access points hand the client off from one to another in a way that is invisible to the client, ensuring their connectivity. Wireless clients can roam seamlessly between different coverage areas and remain connected to the network.



c) Wireless routing and IP sharing

In infrastructure mode, in addition to acting as a bridge between an Ethernet and wireless network, the AP can be configured as a wireless router and IP sharing device for Internet access as shown below. You don't need to buy an expensive router. Nor do you need to buy several modems and set up phone lines. Just share one AP, one modem, a single dial-up account, and one phone line; dozens of network users can surf the Internet simultaneously.



2 Drivers & Client Utility

This chapter describes how to install the drivers and client utility in Windows 98/ME/2000/XP.

2.1 Before You Begin

Before installing the new drivers into your PC, you need to remove all of the Wireless LAN PC card drivers that you have installed.

During the installation, Windows 98/ME/2000/XP may need to copy systems files from its installation CD. Therefore, you may need a copy of the Windows installation CD at hand before installing the drivers. On many systems, instead of a CD, the necessary installation files are archived on the hard disk in C:\WINDOWS\OPTIONS\CABS directory.

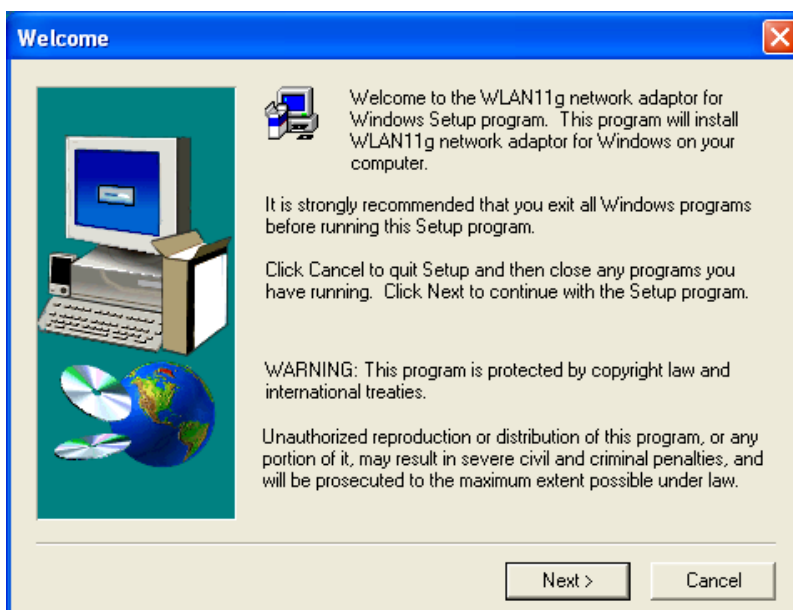
2.2 Installing the PC Card Drivers

Follow the steps below in order to install the PC card drivers:

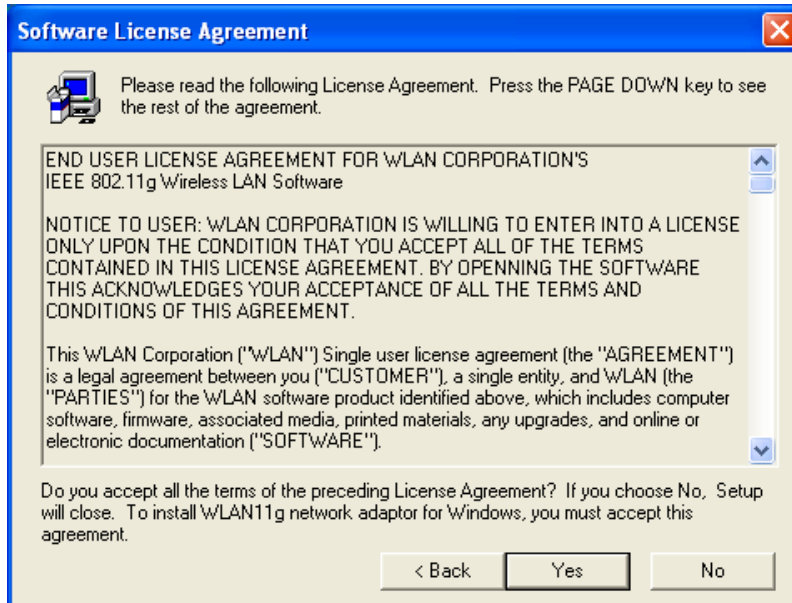
1. Insert the CD-ROM that was provided to you in this package. The setup should run automatically. If the setup does not run automatically, then you must manually select the **setup.exe** file from the CD-ROM drive.
2. Once the setup begins you will see the **Install Shield Wizard**, as the image depicts below.



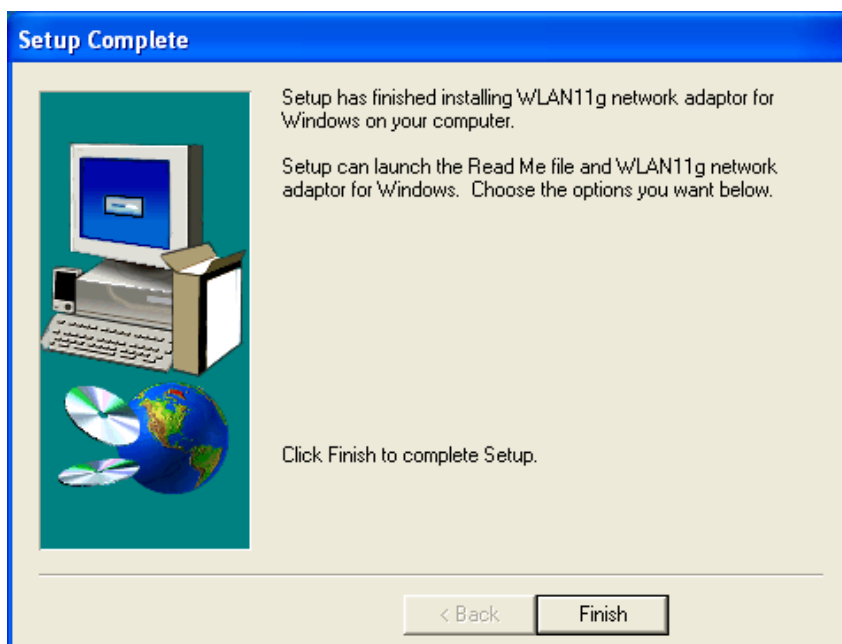
3. Click on the **Next** button to continue. The Install Wizard will then copy a few files that are necessary to install the PC card. You will then see the **Welcome** screen, as the image depicts below.



4. Click on the **Next** button to continue. The setup will then bring you to the **Software License Agreement** screen, as the image depicts below.

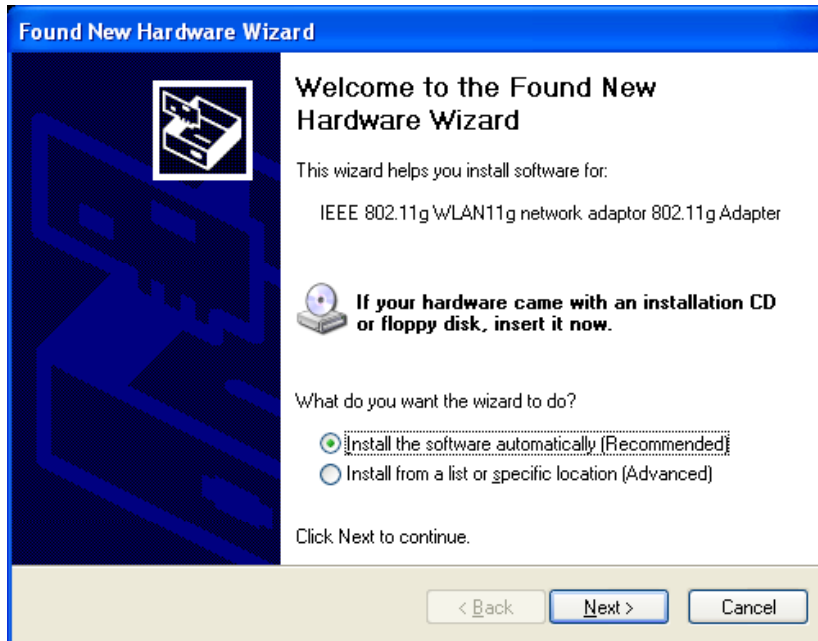


5. After reading the license agreement click on the **Yes** button to continue. The setup will then copy the drivers into your PC. You will then see the **Setup Complete** screen, as the image depicts below.

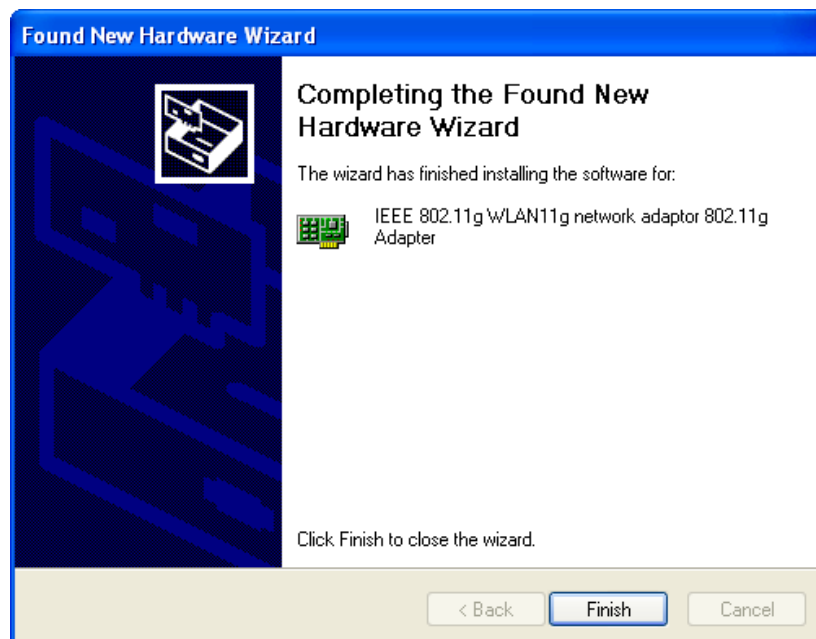


6. Click on the **Finish** button. The first part of the installation is complete.

7. Gently insert the PC card into the PCMCIA Type II slot of your PC. Windows will automatically detect the PC card and display the **Found New Hardware Wizard**, as the image depicts below.



8. Select the **Install the software automatically (Recommended)** radio button, and then click on the **Next** button to continue. The setup will then begin to copy the necessary files. After the copying is completed you will see the final screen of the installation procedure, as the image depicts below.

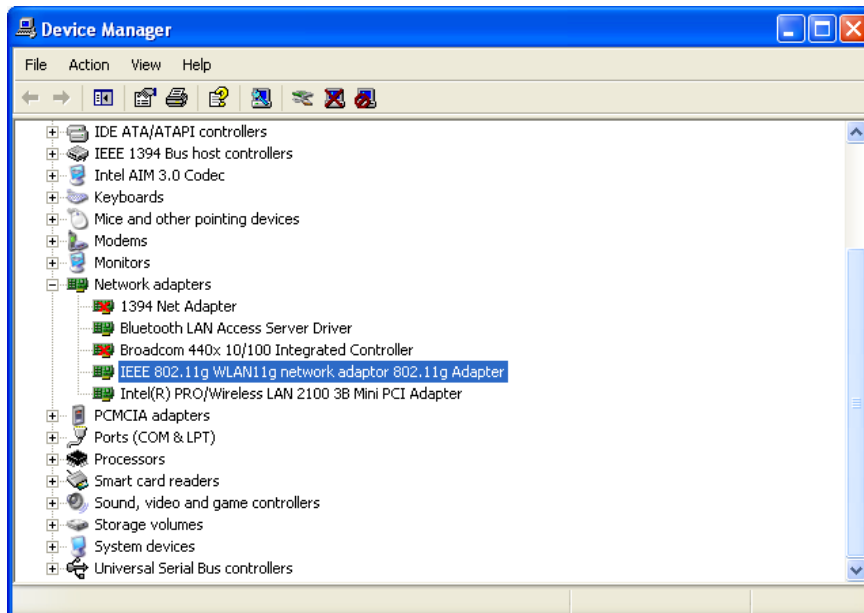


9. The installation of the PC card is now complete. Click on the **Finish** button.

2.3 Verify the installation

Follow the steps below in order to verify that the PC card has been installed and is functioning properly:

1. Click on **Start > Settings > Control Panel**.
2. Double click on the **System** icon.
3. Click on the **Hardware** tab, and then click on the **Device Manger** button.
4. Select **Network adapters** to view a list of network adapters on your PC. You will then see a window similar to the image below.



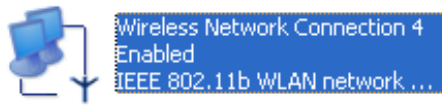
5. Make sure that you do not see a yellow (?) or a red (X) next to the PC card (*IEEE 802.1g WLAN 11g network adaptor 802.11g Adapter*). If you do see a (?) or (X) you would need to uninstall the drivers, and reinstall them again. In order to uninstall the drivers refer to section **2.6 Uninstall Client Utility**.

2.4 Disable Windows SSID/WEP Configuration

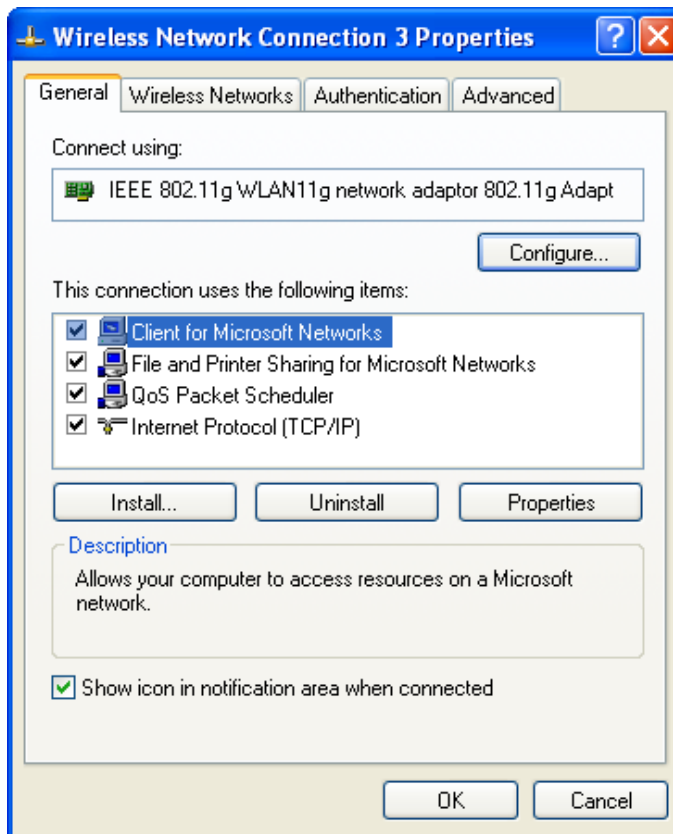
In order to configure **SSID** and **WEP** settings from the Client Utility, you must first disable the Windows based SSID and WEP configuration from the Network

Configuration in the Control Panel. Follow the steps below in order to disable the SSID and WEP on Windows.

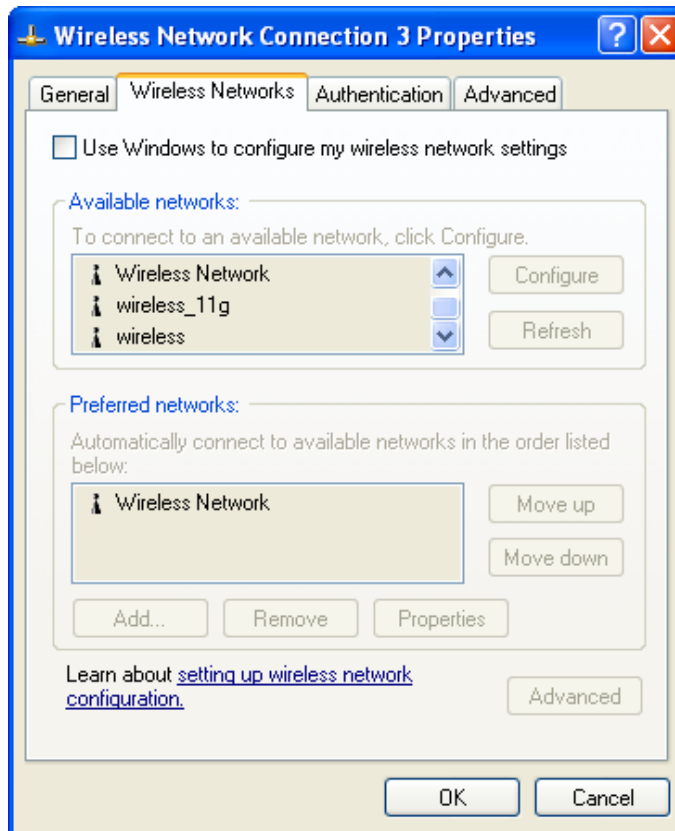
1. Click on **Start > Settings > Control Panel**.
2. Double click on the **Network Connections** icon.
3. Right-click on the wireless network connection for the PC card, and then select **Properties**. The icon may look similar to the image below.



After you click on **Properties**, the **Wireless Network Connection Properties** window will appear, as the image depicts below:



4. Click on the **Wireless Networks** tab, you will then see the following screen.



5. Make sure that there isn't any check placed in the **Use Windows to configure my wireless network settings** check box.
6. Click on the **OK** button.

2.5 Using the Client Utility

After a successful installation you will see the PC card **Client Utility radio** icon in the system tray.



PC Card Client Utility radio



Green indicates good or excellent link status.

Yellow indicates fair link status.

Red indicates poor or no link status.

The client utility will automatically be executed and show a small green **radio** icon at the bottom right corner of your screen in the system tray whenever the PC card is inserted into the PC card slot of your computer. Right-click the radio icon to view the list of options available. Each item is described below.

2.5.1 Wireless Radio On/Off

The first two items in the icon menu are used to turn on/off the wireless radio (image right). When the wireless radio is turned off, a red cross is placed over the radio icon in the system tray as shown below. When the wireless radio is turned on, the icon will vary in colors depending on the link quality.



Wireless Radio Off

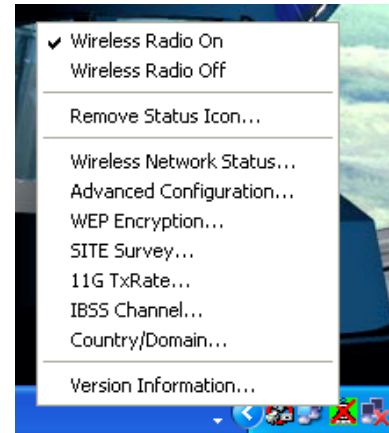


Link Quality

Green indicates good or excellent link status.

Yellow indicates fair link status.

Red indicates poor or no link status.



2.5.2 Remove Status Icon

This item allows you to set the system tray radio icon to appear or disappear. Once you choose this item, the system will display the dialog box to confirm if you want to remove the system tray icon as shown below.



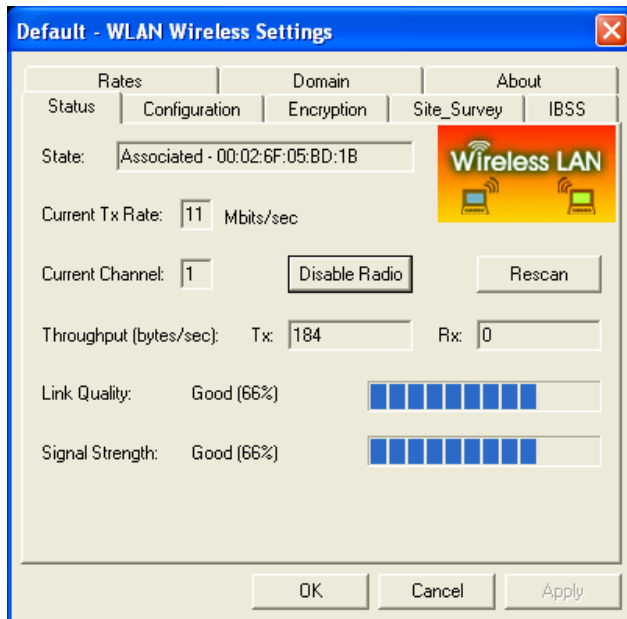
You can also set the system tray radio icon to disappear permanently by placing a check in the box **Remove Status Icon Permanently** as shown above. When the computer is restarted, the system tray radio icon will reappear unless the **Remove Status Icon Permanently** box was checked.

2.5.3 Wireless Network Status

This item allows you to view the status, configure IBSS, Rates, Domain, and view information about the client utility.

2.5.3.1 Status

The **Status** tab displays the current status of the wireless radio. The following information is included in this tab, as the image depicts below.



- **State:** this displays the MAC address of the AP that the radio is associated with.
- **Current Tx Rate:** this displays the current transfer rate.
- **Disable Radio:** click on this button to turn the radio off.
- **Rescan:** click on this button if you would like the radio to scan for a different channel.
- **Current Channel:** this displays the current channel that the radio is using.
- **Throughput (bytes/sec):** this displays the transmitting (Tx) and receiving (Rx) bytes per second.
- **Link Quality:** this displays the quality of the link from the radio to the AP.
- **Signal Strength:** this displays the strength of the signal from the radio to the AP.
- Click on the **Apply** or **OK** button if you have made any changes.

2.5.3.2 Configuration

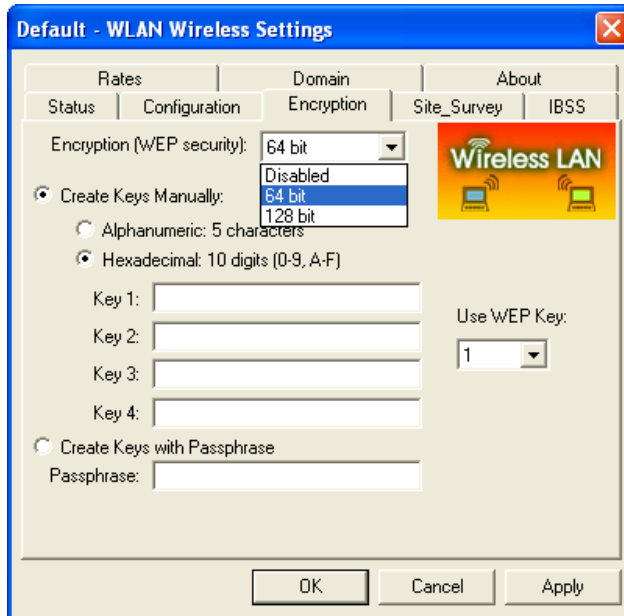
The **Configuration** tab allows you to configure the SSID and type of network. The following information is included in this tab, as the image depicts below.



- **Profile Name:** enter a name for this profile; this can be any name that you may associate with your network.
- **Network Name:** enter the SSID of the network. The SSID is a unique name shared among all points in your wireless network. The SSID must be identical for all points in the network, and is case-sensitive.
- **Network Type:** select Peer-to-Peer or Access Point from the drop-down list.
- Click on the **Apply** or **OK** button if you have made any changes.

2.5.3.3 Encryption

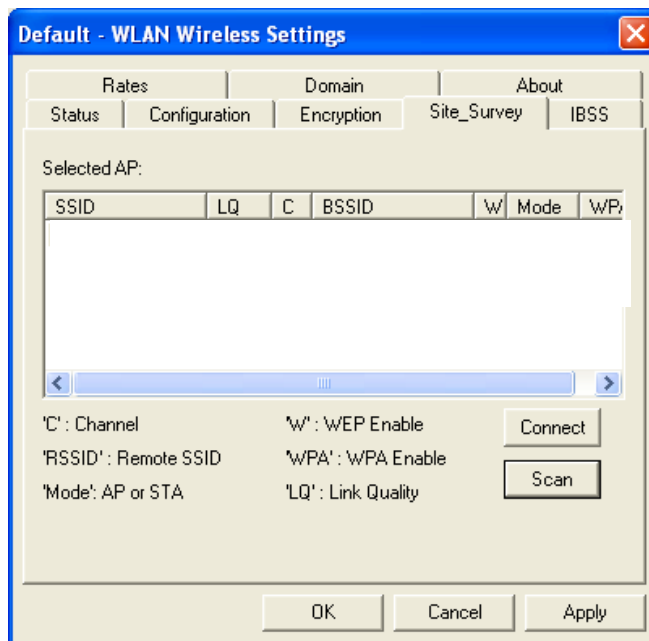
The **Encryption** tab allows you to configure WEP security. The following information is included in this tab, as the image depicts below.



- **Encryption (WEP security):** WEP is an acronym for Wired Equivalent Privacy, which is a security protocol for Wireless Local Area Networks (WLANs) defined in the 802.11 standard. WEP is designed to provide the same level of security as a wired LAN. Select **disabled**, **64-bit**, or **128-bit** from the drop-down list.
- **Alphanumeric characters:** select this radio button if you would like to use characters/numbers for the WEP key.
- **Hexadecimal digits (0-9, A-F):** select this radio button if you would like to use hexadecimal digits for the WEP key.
- **Key 1 – Key 4:** enter the WEP key here.
- **Create Keys with Pass phrase:** enter a string of characters to be used as a WEP key.
- **Use WEP key:** select a key number from the drop down list.
- Click on the **Apply** or **OK** button if you have made any changes.

2.5.3.4 Site Survey

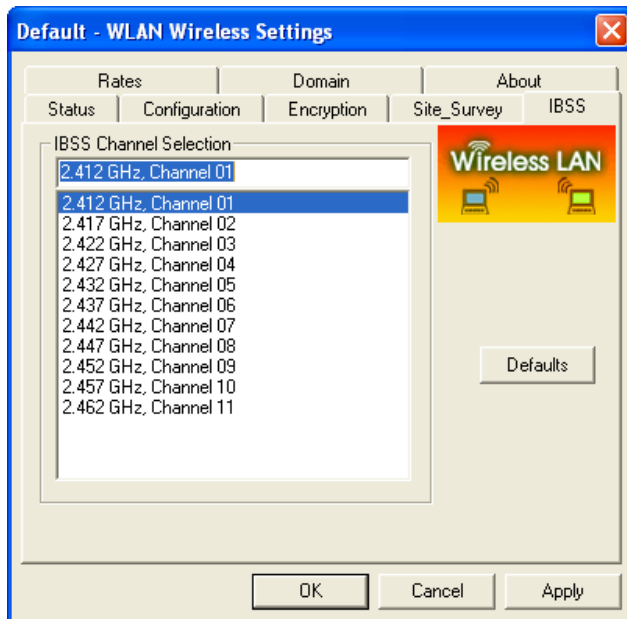
The **Site Survey** tab displays a list of Access Points in the area, and allows you to connect to a specific Access Point. The following information is included in this tab, as the image depicts below.



- **SSID:** displays the SSID of the Access Point.
- **LQ:** displays the link quality of the Access Point.
- **C:** displays the channel number of the Access Point.
- **BSSID:** displays the MAC address of the Access Point.
- **W:** indicates whether WEP is enabled.
- **Mode:** indicates whether the SSID is a Station (STA) or Access Point (AP).
- **WPA:** indicates whether WPA (Wi-Fi Protected Access) is enabled.
- **Connect:** to connect with a specific Access Point, select the Access Point from the drop-down list, and then click on the **Connect** button.
- **Scan:** to view a list of Access Points in the area click on the **Scan** button.
- Click on the **Apply** or **OK** button if you have made any changes.

2.5.3.5 IBSS

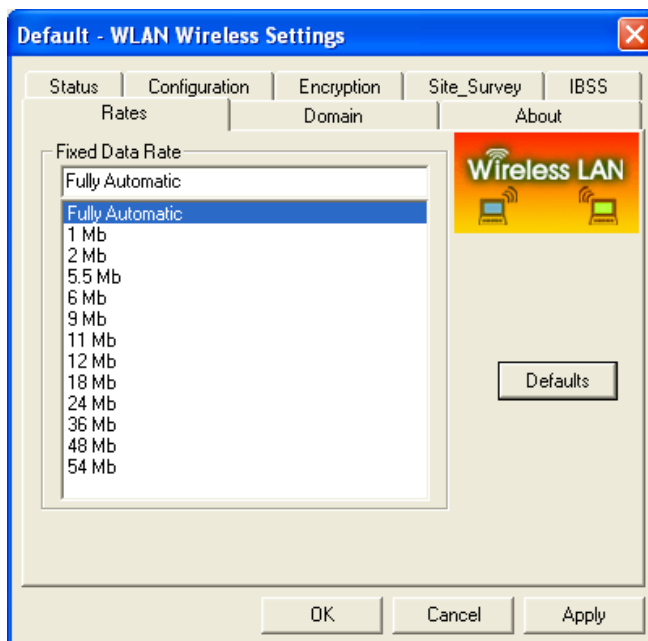
The **IBSS** tab displays IBSS Channel Selection. You may select a channel from the list, or click on the **Default** button, for a default channel. The image below depicts the **IBSS** tab.



- Click on the **Apply** or **OK** button if you have made any changes.

2.5.3.6 Rates

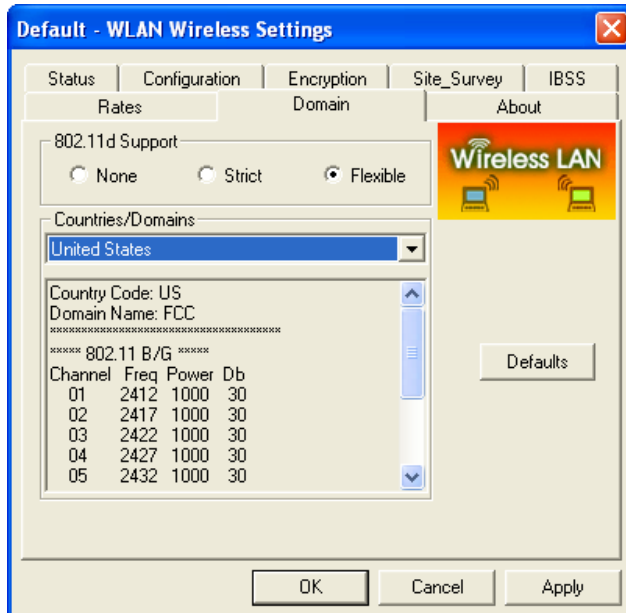
The **Rates** tab displays the data rate. You may select a data rate from the list, or click on the **Default** button, for a default data rate (Fully Automatic). The image below depicts the **Rates** tab.



- Click on the **Apply** or **OK** button if you have made any changes.

2.5.3.7 Domain

The **Domain** tab displays the 802.11d support and current countries/domains, as the image depicts below.



- **802.11d Support:** by default 802.11d support is set to flexible. You may change this by selecting **None** or **Strict**.
- **Countries/Domains:** you may select your country from the drop-down list. You will then see country specific information in the text box.
- Click on the **Apply** or **OK** button if you have made any changes.

2.5.3.8 About

The **About** tab displays information about the PC card. This includes the network driver version and date, configuration utility version and date, and the NIC (Network Interface Card) firmware version and date.



2.6 Uninstall the Client Utility

If the PC card installation is unsuccessful for any reason, the best way to solve the problem may be to completely uninstall the PC card and its software and repeat the installation procedure again.

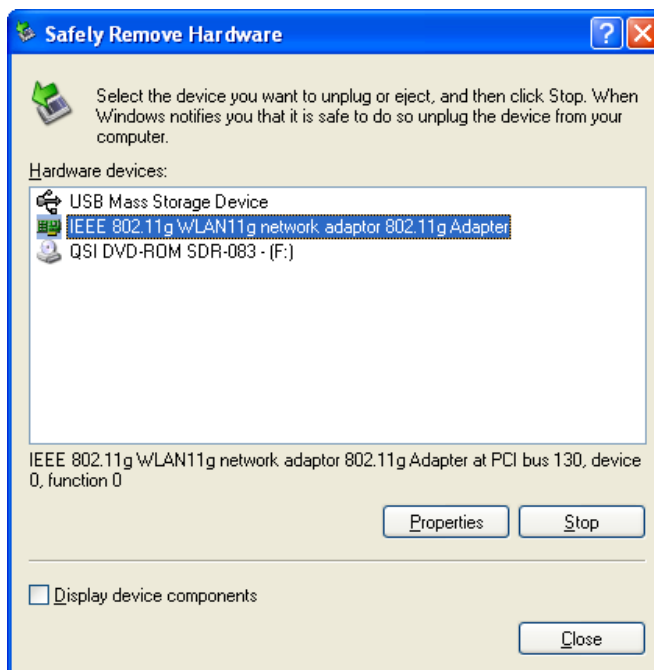
Follow the steps below in order to uninstall the Client Utility:

1. Double click on the **Safely Remove Hardware** icon in the system tray.



Safely Remove Hardware icon

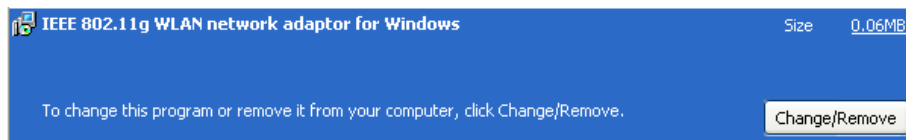
After clicking on the icon the following window will appear.



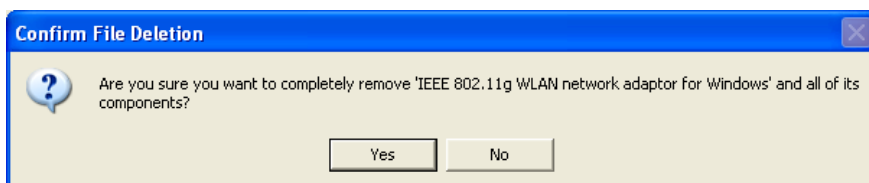
2. Select **IEEE 802.11g WLAN11g network adaptor 802.11g Adapter** and then click on the **Stop** button. You will then see a window asking you to confirm the stop.



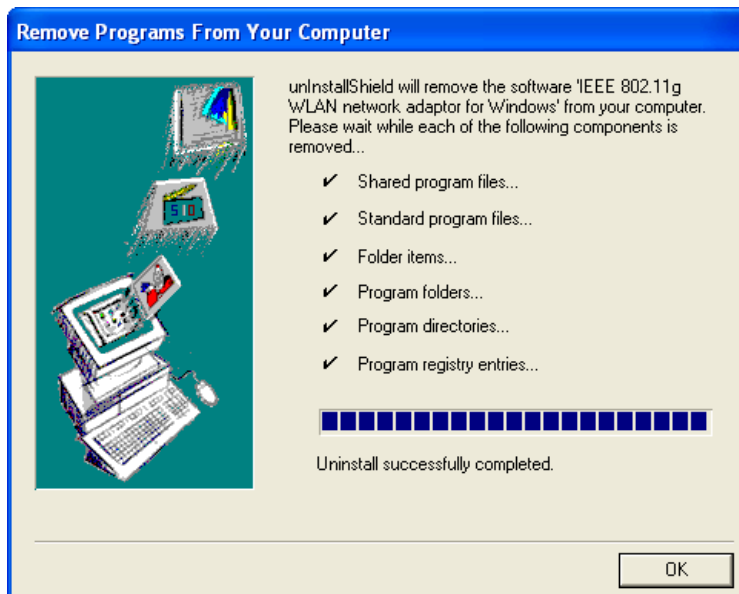
3. Click on the **OK** button.
4. At this point, gently remove the PC card from the PCMCIA Type II slot.
5. Click on **Start > Settings > Control Panel**, and then click on the **Add or Remove Programs** icon. A window will then appear listing all the programs on your PC. From the list click on the PC card item, as the image depicts below.



6. Click on the **Change/Remove** button. You will then be asked to confirm the file deletion, as the image depicts below.



7. Click on the **Yes** button. The uninstall shield will then begin to uninstall the files from you computer, as the image depicts below.



8. Click on the **OK** button, the uninstallation is successful.

Appendix A – Troubleshooting

The following table describes the solutions for the problems that may occur when installing the PC card.

| Problem | Solution |
|--|---|
| Windows does not detect the PC card when installed | <p>Verify that the PC card is properly inserted into the PC card slot.</p> <p>Check whether the computer has a Plug and Play BIOS.</p> <p>Windows 98/ME/2000/XP might not detect the PC card if a previous installation of the PC card was cancelled before it was completed. Remove the driver and reinstall it again.</p> |
| Driver fails to load | A resource conflict could exist. Use the Device Manger to resolve the resource conflict. |
| Device conflict on Windows system | A device conflict may be related to PC card. Use the computer properties to identify the Port Address and IRQ values. If there is a device conflict, select alternative settings for I/O Base Address or IRQ values. If you know which device is conflicting with the PC card, you have the option of changing the device's I/O address or IRQ instead of the PC card. |
| No resource conflicts were detected, but the wireless station does not attach to the network | Verify that the SSID of the PC card matches that of the Access Point. Use the Network Configuration properties in the control panel to modify the SSID. |
| Non functioning card LED | <p>The PC card is not powered on: The cause may be:</p> <ul style="list-style-type: none"> • No driver loaded or installed. • Card – Driver mismatch, which prevented the driver from loading. • Device conflict, which prevented the driver from loading. <p>Actions:</p> <ul style="list-style-type: none"> • Verify that the driver has been installed. • Determine if there is a conflict with another device. |

Appendix B – Specifications

Wireless PC Card

| General | |
|---------------------|--|
| Data Rates | 1,2,5.5,6,9,11,12,18,24,36,48,54 Mbps |
| Network Standards | IEEE 802.11, IEEE 802.11b, 802.11g draft |
| Compliance | FCC Part 15/UL, ETSI 300/328/CE |
| Drivers | Windows 98/ME/2000/XP |
| Operational Voltage | 3.3 ± 0.15V |
| Current Consumption | Continue Tx: < 850mA Continue Rx: < 550mA |
| Security | IEEE802.1x Client Support WPA -- Wi-Fi Protected Access (64,128-bit WEP with TKIP, Pre-Share Key) |

| RF Information | |
|--|--|
| Frequency Band | 2412 – 2483.5 MHz |
| Channels | 11 for North America, 14 for Japan, 13 for Europe, 2 for Spain, 4 for France |
| Media Access Protocol | Carrier sense multiple access with collision avoidance (CSMA/CA) |
| Modulation Technology | Orthogonal Frequency Division Multiplexing (OFDM) DBPSK @ 1Mbps DQPSK @2Mbps CCK @ 5.5 & 11Mbps BPSK @ 6 and 9 Mbps QPSK @ 12 and 18 Mbps 16-QAM @ 24 and 36 Mbps 64-QAM @ 48 and 54 Mbps |
| Receive Sensitivity (Typical) | -92dBm @ 1Mbps -91dBm @ 6Mbps -82dBm @ 24Mbps -89dBm @ 2Mbps -90dBm @ 9Mbps -78dBm @ 36Mbps -88dBm @ 5.5Mbps -87dBm @ 12Mbps -71dBm @ 48Mbps -85dBm @ 11Mbps -85dBm @ 18Mbps -71dBm @ 54Mbps |
| Available transmit power (Depend on Different Countries' Regulation) | 21 ± 2dBm @1, 2, 5.5 and 11Mbps 20 ± 2dBm @6, 9, 12, 18Mbps 17 ± 2dBm @24, 36Mbps 16 ± 2dBm @48, 54Mbps |

| Physical | |
|------------|--|
| LED | RF link activity |
| Interface | 32-bit CardBus PC Card Standard V. 7.1 Type II |
| Antenna | Integrated built-in diversity antenna |
| Dimensions | 118 (L)mm x 54(W)mm x 6.3(H)mm |

| Environmental | |
|---------------------------|--|
| Temperature Range | 0°C to 55°C - Operating -40°C to 70°C - Storage |
| Humidity (non-condensing) | 5%~95% Typical |

Appendix C – Regulatory Compliance Information

Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy 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 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: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

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.

IMPORTANT NOTE:

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

This device complies with FCC RF Exposure limits set forth for an uncontrolled environment, under 47 CFR 2.1093 paragraph (d)(2).

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
equipment.