The 802.11g Wireless LAN Card
User’s Manual

User Instruction Manual for Windows 98 SE / ME / 2000 / XP

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Chapter 1 Introduction

Congratulations on your decision to use wireless networking. The 802.11g Wireless LAN Card is a high performance, IEEE Standard 802.11g compatible, wireless networking card that installs into your PC's slot to support wireless LAN communications at speeds up to 54Mbps with other PC's located hundreds of feet apart.

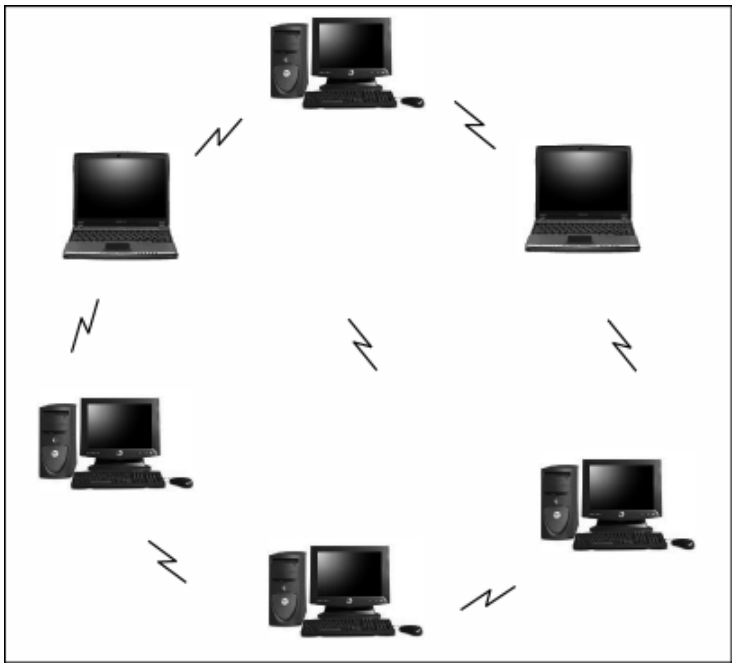


Figure 1 Typical Wireless LAN Network

The 802.11g Wireless LAN Card allows reliable, secure and untethered access to your data providing you with exciting new ways to adapt to your lifestyle and needs. Without the limitations of wires, true mobility and data access is seamless in your office or home office.

Data access from work, streaming audio MP3's from a notebook to a stereo, downloading Internet content wirelessly from a broadband connection, watching TV on a notebook, are all possibilities with the 802.11g Wireless LAN Card.

About This Manual

This manual provides you with all the information necessary to successfully install and use your new 802.11g Wireless LAN Card. The manual is divided into six chapters and two appendices as follows:

- Chapter 1- Introduction. This chapter provides a brief overview of the 802.11g Wireless LAN Card and the installation process.
- Chapter 2-Wireless Networking Concepts. This chapter introduces the major terms and explains the various concepts associated with configuring wireless LANs.
- Chapter 3-Installation. Provides hardware installation and software setup procedures to prepare your PC for Wireless LAN Card operation. You will also need to perform the LAN configuration procedures described in Chapter 4.
- Chapter 4-Configuration & Operation. This chapter provides operating instructions for the Wireless LAN Card and provides procedures for configuring your wireless LAN after completion of installation and initial setup.
- Chapter 5-Uninstalltion. This chapter details how to uninstall the WLAN Management Utility.
- Chapter 6-Troubleshooting. This chapter provides some good tips to follow in case you are having difficulties with the Wireless LAN Card after completing the installation procedure.

- Appendix A- Hardware Specifications. This appendix provides hardware specifications for the Wireless LAN Card.
- Appendix B-Glossary. Defines various terminology associated with Wireless LANs.

Product Overview

The 802.11g Wireless LAN Card gives you the freedom of secure high-speed communications with other PCs without the need for interconnecting wires. You can even connect in to other LAN infrastructures such as your company's internal Ethernet LAN or your own home network. The antenna and design of the Wireless LAN Card gives you unmatched sensitivity which means your system will remain connected to other wireless PCs at high speeds for longer distances.

The Wireless LAN Card operates according to the IEEE 802.11g Wireless LAN specification, for wireless data communications at speeds up to 54Mbps (Megabits per second). IEEE 802.11g operates on frequencies in the 2.4GHz range using OFDM (Orthogonal Frequency Division Multiplexing) technology.

Backed by international standards and the IEEE organization, IT departments and end-users alike benefit from the reliability and interoperability of products based on these standards. From an investment point of view, it makes good business sense investing in technology that will be support worldwide for many years to come (unlike technologies not backed by international communications standards). Whether you are running a company or a home office, the Wireless LAN Card reduces, or eliminates in some cases, the need to setup wired LAN networks in the office or home office, eliminating costs associated with wiring rooms and buildings.

802.11g Wireless LAN Card Features

- Up to 54Mbps data transfer rates for high-speed access to data
- Compatible with 802.11g Wi-Fi CERTIFIED equipment (2.4GHz operating range)
- Plug-and-play with Microsoft Windows operating systems
- Secure data access, up to 128-bit WEP encryption protection
- Driver requires minimal memory footprint and CPU support
- Easy upgrades via software driver, no firmware to upgrade
- Provides seamless connectivity to Wireless and hardwired LANs

System Requirements

- PC with Windows 98 SE, Windows 2000, Windows ME, or Windows XP Operating Systems
- One (1) available Slot
- CD-ROM drive (for the drivers and configuration software)

Installation Overview

The installation process is relatively fast and simple.

1. Place the CD-ROM supplied with your 802.11g Wireless LAN Card (containing the drivers and configuration software) in your CD-ROM drive and the configuration software auto starts. Simply go through a series of self-prompting screens and select from the options to configure your

Wireless LAN Card for your particular operating system (these procedures are detailed in Chapter 3-Installation).

2. Plug the Wireless LAN Card into your PC's Slot.

3. Set up your wireless LAN using the instructions in Chapter 4. Record your security codes (WEP keys), etc. for later reference. Repeat steps 1 through 3 for each PC that will be connected to your wireless LAN. Your wireless LAN should now be fully functional.

4. If you are experiencing problems after completion of the installation procedures, refer to Chapter 6, *Troubleshooting*.

Chapter 2 Wireless Network Concepts

For the past few decades, wired Local Area Networks (LAN) or more commonly know as Ethernet, have provided a seamless way of connecting and communicating with multiple PCs, desktops, laptop/notebooks, servers as well as a host of other peripherals, including printers, scanners, etc. LANs have served us well in environments where users were not mobile or had little need to access data other than in their office.

With the advent of notebook computers and an increasingly mobile computing society, the need for wireless networking finds more applications with each passing day. Wireless LANs have evolved to meet the needs of mobile computing and are becoming very popular as compatibility, reliability and familiarity increases and equipment costs decrease.

Wireless LANs (WLAN) allow users to roam freely about a network taking their computers with them while still maintaining a networking connection. In essence, WLANs are an extension of wired LAN networks, where the critical need is data access and mobility. The tradeoffs are slower speeds (although quite satisfactory for Internet and email access) and limited roaming distance, as dictated by the environment.

A basic WLAN network requires client nodes and access points, similar to a LAN with its clients and infrastructure (switches, repeaters, etc.). The access point is the connection to the wired LAN network or a designated computer device performing the supervisory function, while client nodes are typically WLAN adapters installed in peripheral computing devices, such as notebooks, desktops, personal digital assistants (PDAs) and others. Once a WLAN is setup, it acts like a wired LAN, using the same protocols designated for communicating via the IEEE Ethernet standard.

Wireless LAN Network Modes

WLANs basically have two modes of operation:

- Ad-Hoc mode
- Infrastructure mode

What is Ad-Hoc mode?

An Ad-Hoc WLAN is created when two or more PCs equipped with Wireless LAN Cards (WLAN clients) are configured to use the same radio channel and Network Name in the same area and can communicate freely with each other, without the

need for an Access Point to a hard-wired LAN network. Only PCs that use the same radio channel and network name can communicate over the Ad-Hoc network. This type of a network is a peer-to-peer relationship where each computer talks directly to one another with no one PC being dominant.

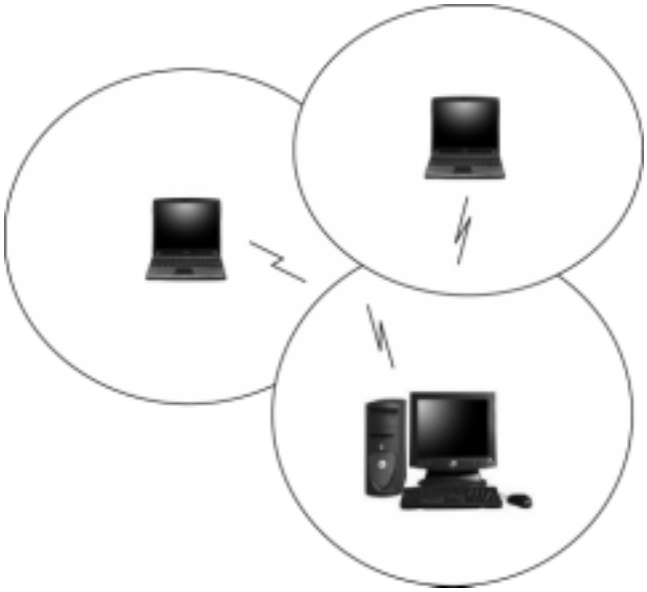


Figure 2 Ad-Hoc Mode: Two or More PCs with 802.11g Wireless LAN Cards Configured to Same Radio Channel and Network Name

Infrastructure Mode

When a WLAN access point is introduced into the WLAN, the access point and its clients (each PC) comprise a Basic Service Set (BSS), whereby the *access point* serves as the connection to the wired LAN for each client. Clients within the same BSS do not directly communicate between each other; rather they communicate to the AP that routes the data to the appropriate destination.

The access point bridges both wired and wireless networks, allowing wired and wireless client communication. This arrangement of WLAN access points and clients is commonly referred to as *Infrastructure mode*. An access point also

extends the range of the WLAN, double over that of client only networks because the access point is able to forward data within its BSS.

Infrastructure mode enables the network clients to freely roam, once an ESS (Extended Service Set) is established.

With all clients using the same radio channel and ESS ID (sometimes referred to as SSID which is a given name to the network), users are fully mobile within the range of the access point signal. Access points should be situated in location to deliver the largest range of signals, with minimal interference. Best performance and signal quality is often affected by building structures, walls, etc., and may require some trial-and-error to identify the best location for access points.

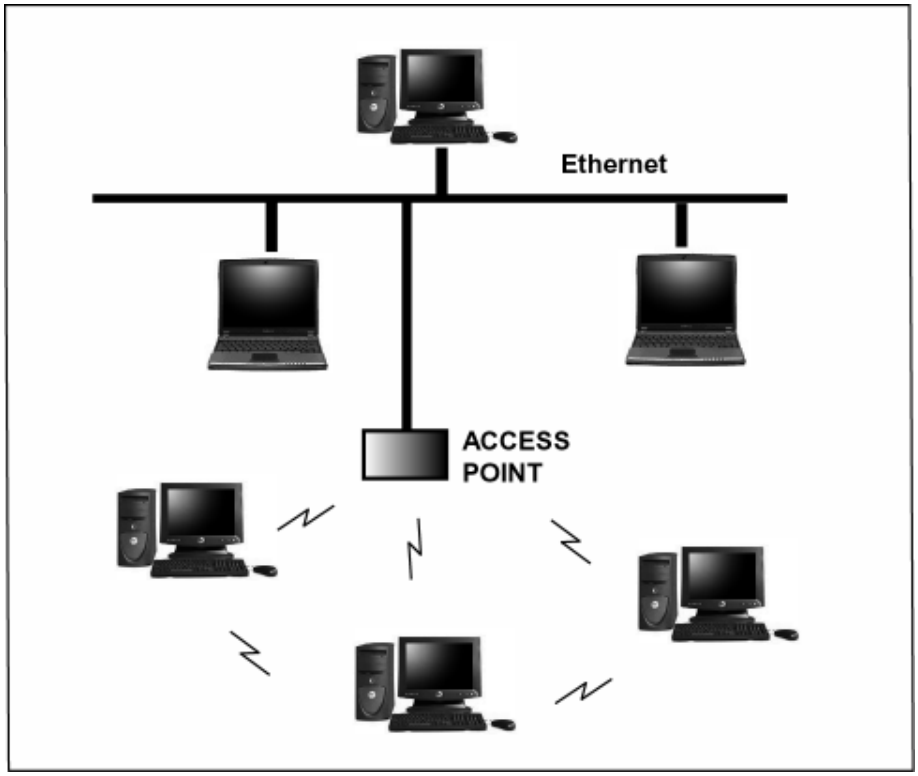


Figure 3 Infrastructure Mode-Combination Wireless and Hardwired LANs

Planning Your New Wireless Network

First, determine what components (WLAN cards, access points) and what kind of network will be created (Ad-Hoc, Infrastructure mode). Then select your network name (SSID), WEP key (security password) and channel number (1 through 11 in US, 1 through 13 in Europe and 1 through 14 in Japan). All members of the wireless LAN will have to configure their PCs to the same SSID, WEP and Channel number to talk to each other. SSID, WEP key and channel number are essential to understanding and creating a successful wireless network.

These concepts are explained in the following paragraphs.

What is SSID?

A wireless network requires a BSS or ESS to operate and a name associated with it. SSID literally stands for a network name for use with that Service Set of clients and access points if so set up. All computers must have the same SSID as the network in order to communicate over the new network. The SSID name can be any name such as “wireless_lan”, “Bob’s domain”, or “AbCdE123”, and can include numbers as well as be case-sensitive. If the exact SSID name is not used, then that wireless client cannot logon into that network.

What Channel Do I Use?

IEEE 802.11g wireless LAN networks communicate using one of several available channels (each with a different operating frequency) to reduce the interference from other potential sources or users of that channel. Depending on

the country where the network is being set up, you may have a choice of up to 14 channels available. In the US, channels 1 through 11 are defined for use in the 2.4GHz spectrum used by 802.11g. In Europe, channels 12 and 13 are added, while Japan can have up to 14 channels. Channels 1, 6 and 11 are the most commonly used channels in the US.

For your network, choose a channel that offers little interference and configure all users of this network to the same channel.

What is a WEP key?

WEP provides for two levels of security encryption based on the length of bits in a key called a Shared Key. A 40-bit key (which is 5 characters) provides some security; this can be a key like “12345” or “MyLAN”. A 104-bit key is also available and provides more robust security. A 13-character key is required for 104-bit security. Keys can be in ASCII characters or Hexadecimal. ASCII characters are those used in computers and include all typewritten characters including the alphabet and numbers, as well as */”()[] characters. Hexadecimal characters are limited to the numbers 0-9 and the first 6 letters of the alphabet a-f.

Table 1 WEP Key Examples

WEP Key size	Number of Digits	Example
40-bit (also called 64-bit)	5 (ASCII)	12345, MyLAN, 78E*5
	10 (Hexadecimal)	1A37FB458C
104-bit (also called 128-bit)	13 (ASCII)	1234567890123,This_is_MyLAN
	26 (Hexadecimal)	1A37FB458C12E34F8523E9FF76

Note: *Every key has an added 24-bit provided by the card, which are set by the manufacturer and not user modifiable. This manual uses the terms 40-bit and 104-bit to represent 64-bit and 128-bit keys respectively. This is the most commonly used terminology in the industry.*

The WEP key for your wireless LAN network is another form of password. Like passwords, certain combinations of passwords are not recommended for use (such as 01234, abcde, or publicly known information like your office phone number, dog's name, etc.). Protect your WEP key as you would a password.

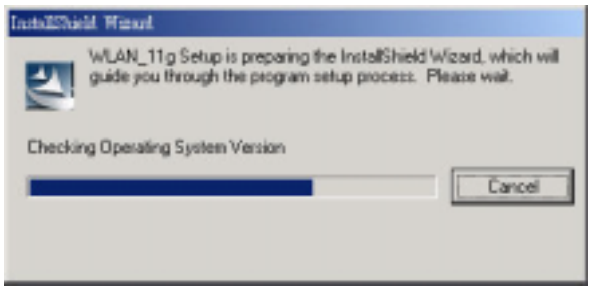
Note: *If you access other networks with already predefined keys, always enter them exactly as they appear taking note of lower and upper case letters.*

Any computer accessing a wireless network with WEP enabled not only requires the same SSID but also the same WEP key in order to have access.

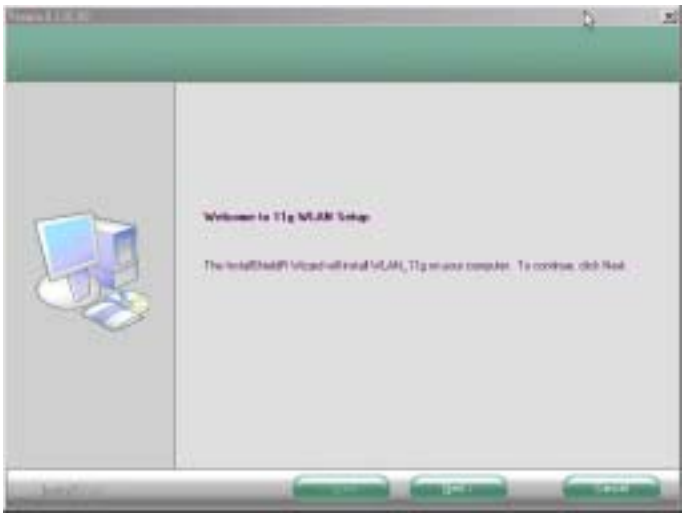
With the above factors decided, physical placement of the components will be critical. The maximum range of the wireless LAN will often be decided by the type of environment it is located in and, if in different rooms, by how many obstacles are in the way which reduces the range of the wireless adapters. Often, Ad-Hoc mode will require the wireless clients to be in closer range of each other than Infrastructure type networks. The Wireless LAN Card can operate at up to 100m indoors and up to 300m outdoors, although the physical environment (walls, floors, ceilings, etc.) will limit the range of wireless signals.

Chapter 3 Installation

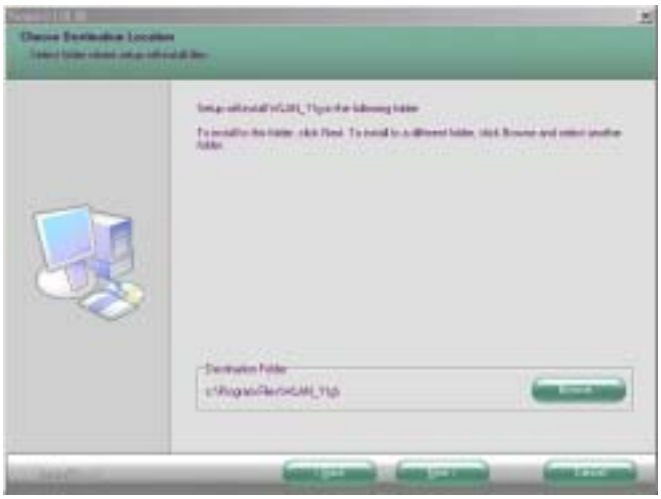
1. Insert the installation CD into your CD-ROM drive. The setup program will start automatically.



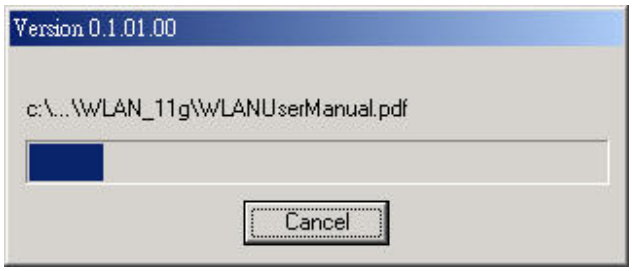
2. Click **Next** to begin the setup.



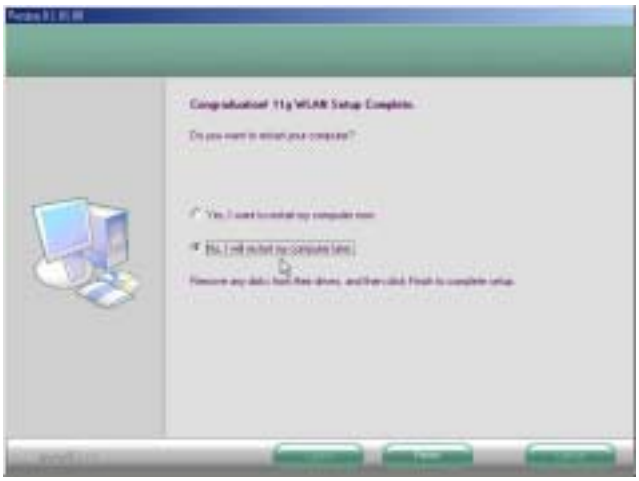
3. Select the destination folder. To install to the default folder as shown below, click **Next** to continue.



4. The necessary Driver and Utility files will be copied to your system directory.



5. Select **No** and then click **Finish** to complete the installation (Windows 98 SE and ME users must select **Yes**).



6. The shortcut

will appear on your desktop. By click this icon, you can run the Utility program.

Note: *After installing a new network adapter, Windows automatically configures the TCP/IP protocol to automatically obtain an IP address from a DHCP server. Depending on your setup, you may want to consider specifying a fixed IP address for your new wireless adapter.*

Chapter 4 Configuration & Operation

Once the driver is installed, the 802.11g Wireless LAN Card will be up and running. If you encounter any difficulties, consult *Chapter 6, Troubleshooting*. This chapter provides general operation and configuration information for use after initial installation is completed.

Configuration of the Wireless LAN Card is dependent on the operating system. Please follow the instructions carefully to make sure you are taking the appropriate steps for your operating system.

Wireless LAN Configuration for Windows 98 SE / ME / 2000

If your PC uses Windows 98 SE, Windows ME, or Windows 2000, use the following configuration procedure.

***NOTE**: If your PC uses Windows XP, skip this procedure and refer to the paragraph titled, "Wireless LAN Configuration for Windows XP" located further in this chapter.*

Utility Startup Configuration Details

The Wireless LAN Card has its own management software. Users can control all functions provided by the application named WLAN Utility. You may run the utility by double clicking the WLAN Utility shortcut on your desktop.

Three colors are used to describe the status of the connection icon shown in the System Tray. Green indicates excellent connection. Yellow indicates the connection has poor quality, and Red means no connection. Double click the icon and the WLAN utility will be opened.

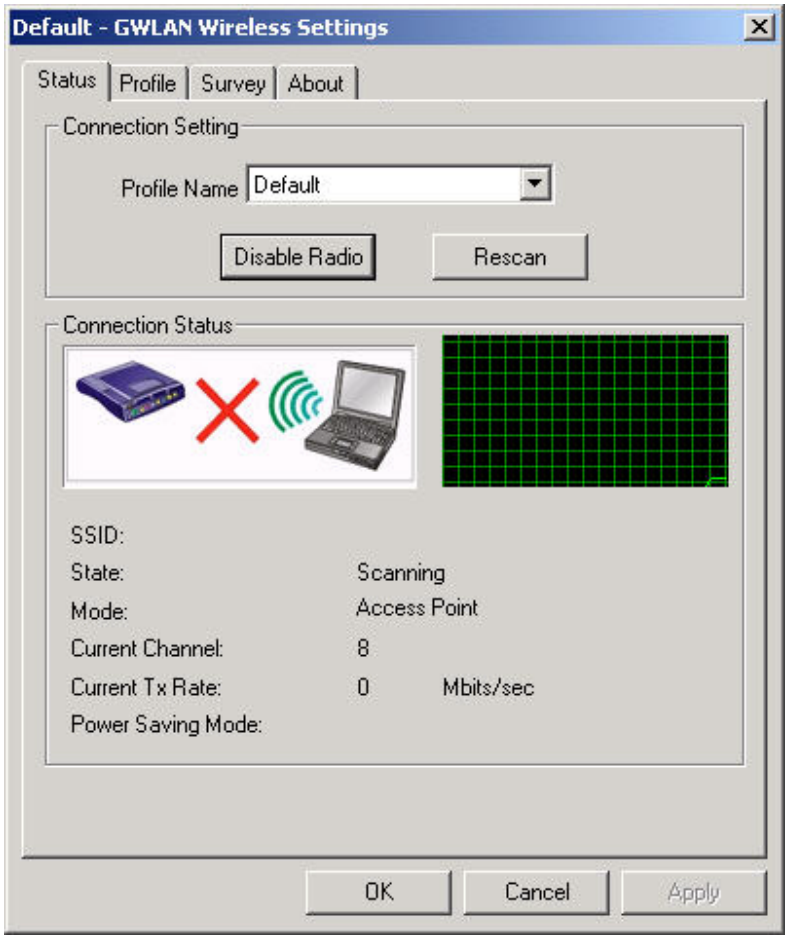
The WLAN Management Utility (Windows 98 SE / ME / 2000)

The WLAN Utility contains the following four major functions. Each function is described in detail below:

- Status: provide the information of the current wireless connection.
- Profile: allow users easily configure different settings for each profile.
- Survey: support site-survey tool to list the active access points that are within the range of your computer.
- About: provide valuable information about the firmware and software version, MAC address, and so on.

Status Tab

The Status tab provides information on the current profile, if any, being used in the wireless connection. The information listed on the Status tab is indicated below. Figure 1 shows the screen layout of the Status tab:



Profile Name

The name of profile currently in use.

Connection Status

SSID

The name of the **SSID** (Service Set Identification) associated with the profile.

State

This field is used to display the current state of the driver. The **State** field can be the following: Check this box to have networks automatically connection when available

Associated - Normal flow of operation between stations in Ad-Hoc mode and Infrastructure mode.

Not Associated - means the node cannot detect any Ad-Hoc station or access point within the range.

Scanning - Searching for available access point or active node.

Mode

The mode can be either **access point** or **peer-to-peer**.

Access Point (Infrastructure Mode) – This mode of operation requires the presence of an access point. All communication is done via the access point, which relays packets to other wireless clients in the BSS as well as to nodes on a wired network such as Ethernet.

Peer-to-Peer (Ad-Hoc Mode) – This is the peer-to-peer mode of operation. All communication is done from client to client without the use of an access point.

Current Channel

It shows what channel is used now.

Current Tx Rate

It shows the transmit rate being currently used for an active connection. The value is masked when the state shows the “scanning” message.

Power Saving Mode

Indicate the power saving mode is being enabled or disabled. Power saving mode can reduce the power usage by temporarily disconnecting wireless connections when the connection is idle.

Figure Status Indication Area

There are two modes in the status indication area. One is Access Point and the other is Peer-to-Peer. At the same time, each mode allows users to enable or disable WEP. When encryption is enabling, wireless clients will offer the matched WEP key for verification to connect to the access point; otherwise, the connecting will fail. The following figures summarize the possible WEP key verification outcomes:

Access Point / WEP enabled

The receiver is receiving **excellent** signals. Encryption is enabled and matched.

The receiver can **not receive** the AP's signal or user authentication failed.

Access Point / WEP disabled

The receiver is receiving **excellent** signals. Encryption is disabled.

The receiver can **not receive** the AP's signal. Encryption is disabled.

Peer-to-Peer / WEP enabled

The receiver is receiving **excellent** signals. Encryption is enabled and matched.

The receiver can **not receive** the PC's signal or user authentication failed.

Peer-to-Peer / WEP disabled

The receiver is receiving **excellent** signals. Encryption is disabled.

The receiver can **not receive** the PC's signal. Encryption is disabled.

Profile Tab

The Profile tab is used to configure the various profiles available to you for wireless connections. The Profile tab contains some of the same fields as the Status tab, but unlike the Status tab, all of the fields in the Profile tab are alterable. Figure 2 shows the screen layout of the profile tab.

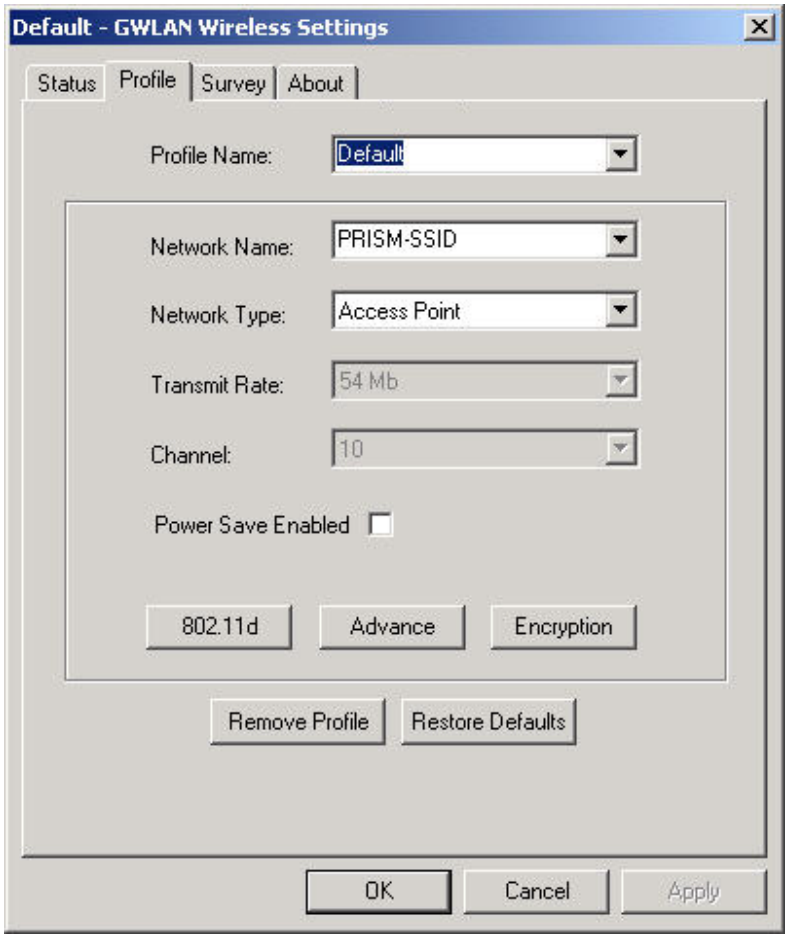


Figure 2 Profile Tab

Profile Name

Allow to give a name to the profile. Any user can add 9 different profiles at most if he wishes. After assigning a new profile name and complete related fields shown

below it, you then can press Apply to save the profile. Click “Apply” or “OK” to activate the options that you have set.

Network Name

The identification of BSS (Basic Service Set) is associated with the current profile. The default value is “ANY”. This allows your wireless client to automatically associate to any access point in the vicinity of your wireless client.

TIP: SSID is the name of the Wireless LAN network to connect to. If some are detected, these will be displayed on screen. Otherwise, enter a name to use. SSID is case-sensitive. Always use the same spelling and case when adding computers to the network.

NOTE: *Record your SSID below and refer to it when necessary.*

SSID name: _____

Network Type

This field allows you to select from a list of supported network mode. The modes displayed will have “Access Point” and “Peer-to-Peer”. The default value is “Access Point”.

Transmission Rate

The transmission rate is the rate at which the data packets are transmitted by the client. The default value is “54Mb” and cannot change.

Channel

Changing the channel is only effective in Ad-Hoc networks. Networking operating infrastructure mode can automatically scans for a channel. Be aware that when the peer-to-peer mode is selected, be sure to set your wireless stations with the same channel.

Power Save Enable

The field allows you to set enable or disable the power saving mode. Power saving mode can reduce power usage by temporarily disconnecting wireless connections when the connection is idle. The default value is “Disabled”.

Advanced Button

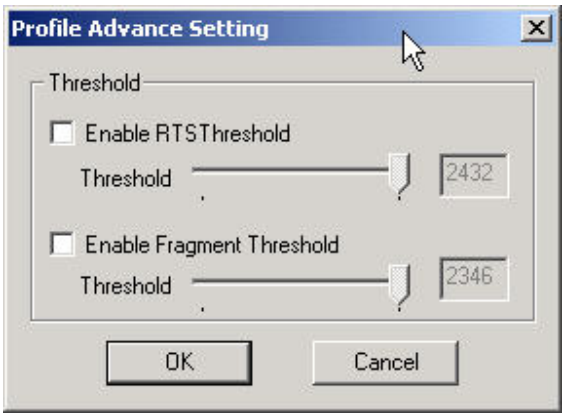


Figure 3 Profile Advance Settings

RTS Threshold

The field allows you to set enable or disable. When the field is set to Enabled, you can adjust the value between 0 to 2432. RTS threshold is a mechanism implemented to prevent the “Hidden Node” problem. “Hidden Node” is a situation in which two stations are within range of the same access point, but are not within range of each other. Thus, it provides a solution to prevent data collisions. Enabling RTS Threshold may cause redundant network overhead that could negatively affect the throughput performance.

Fragment Threshold

The field allows you to set enable or disable. When the field is set to Enabled, you can adjust the value from 256 to 2346. Fragmentation mechanism is used for improving the efficiency when high traffic flows along in the wireless network. If your wireless devices often transmit large files in wireless network, you can enable the Fragmentation Threshold and the mechanism will split the packet to send.

Encryption Button

The Encryption button is used to equip an additional measure of security on your wireless network, which can be achieved by using WEP (Wired Equivalent Privacy) encryption. To prevent unauthorized wireless stations from accessing data transmitted over the network, WEP can support high secure data encryption. WEP encrypts each frame transmitted through the radio by using one of the Keys entered from this panel. When an encrypted frame is received, it will only be accepted if it decrypts correctly. This will only happen if the receiver has the same WEP Key used by the transmitter. The Encryption tab contains some fields as below.

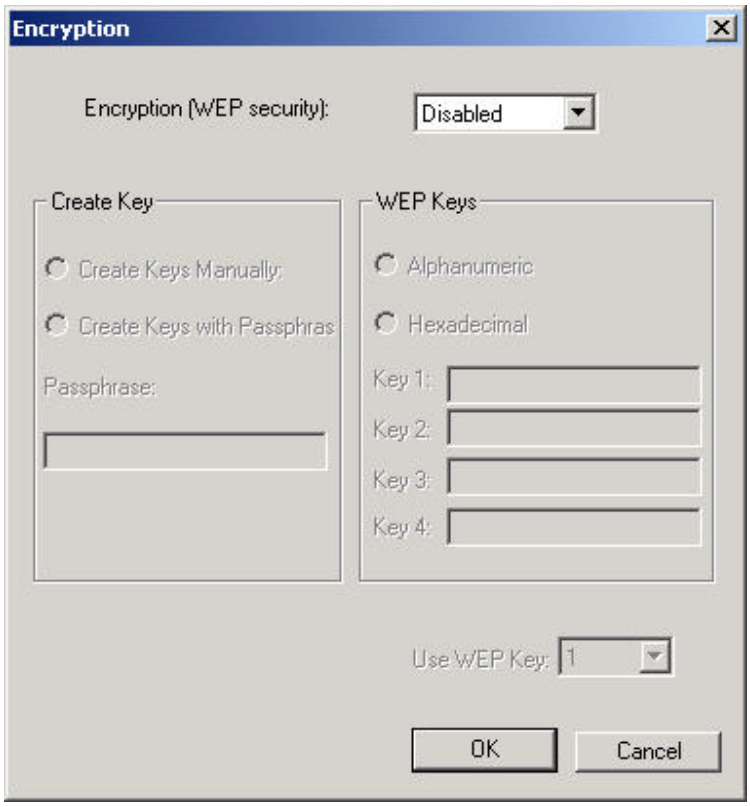


Figure 4 Encryption Tab

Encryption [WEP security]

The field allows you to select Disabling, 64-bit and 128-bit. When setting 64bit, or 128 bits, it means WEP security is used.

WEP Key

For 64-bit encryption:

- Alphanumeric: 5 characters (case sensitive) ranging from “a-z”, ”A-Z” and “0-9”. (e.g. My*#Key)
- Hexadecimal: 10 hexadecimal digits in the range of “a-f”, "A-F" and "0-9". (e.g. 11AA22BB33).

For 128-bit encryption:

- Alphanumeric: 13 characters (case sensitive) ranging from “a-z”, ”A-Z” and “0-9”. (e.g.MyKey12345678).
- Hexadecimal: 26 hexadecimal digits in the range of “a-f”, "A-F" and "0-9". (e.g.00112233445566778899AABBCC)

TIP: WEP is a protocol defined in 802.11i to provide encryption capabilities for wireless LAN communications. Because data travels through air, there is a likelihood of unintended receivers listening in on your data conversation. WEP encryption keys can be 64-bit (minimal security) or 128-bit (more secure). Additionally a WEP key is needed to

encrypt and decrypt data packets, and any computer on a WEP network must have the same key, otherwise it will not be allowed on that network. It is recommended that you select WEP encryption to reduce security risks and unauthorized users from using the wireless LAN network and access to important data.

Create Keys with Pass-phrase

WEP keys may be created using a Pass-phrase to randomly generate the four keys. This saves considerable time when entering all four keys into each node on the wireless network.

Key1, Key2, Key3, Key4

These four fields hold the manually entered keys. They will also display the generated keys using a Pass-phrase.

Ensure that the WEP key entered here matches all other applications and clients using the same network. WEP keys can be case-sensitive, and incorrect keys will not allow clients access to this network.

Note: *Record your WEP key size and WEP key in the spaces below for later reference.*

WEP key size: _____

WEP key: _____

Use WEP key

This field updates the driver with the four keys displayed in Key1 through Key4. These keys are also written to the registry for permanent storage.

802.11d Button

The 802.11d tab supports Wireless Local Area Networks providing specifications for conformant operation beyond the original six regulatory domains of that standard. These extensions provide a mechanism for an IEEE Std 802.11 access point to deliver the required radio transmitter parameters to an IEEE Std 802.11 mobile station, which allows that station to configure its radio to operate within the applicable regulations of a geographic or political subdivision. This tab lets you specify one of three levels of 802.11d support **None**, **Strict** and **Flexible**.

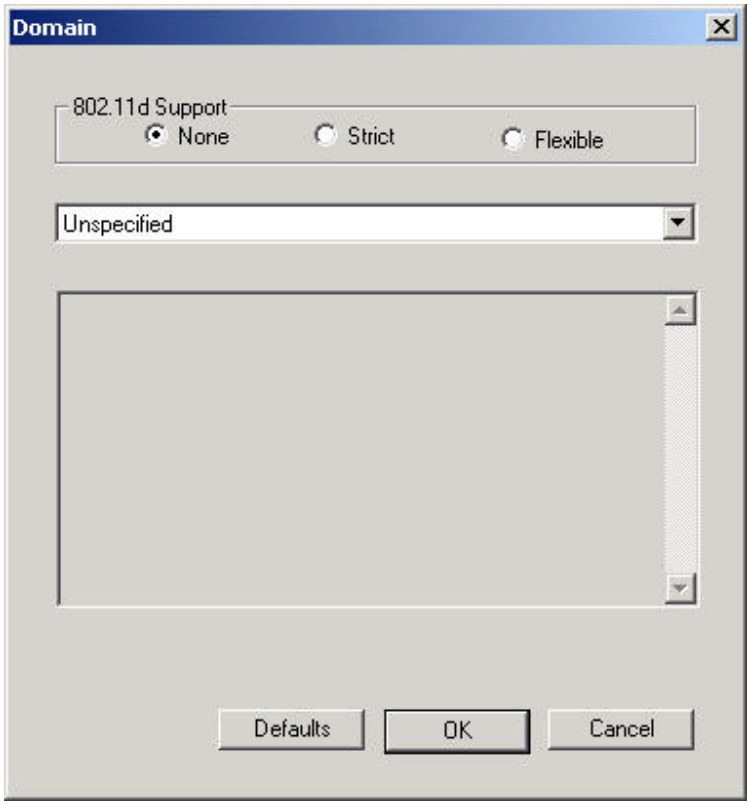


Figure 5 802.11d Button Window

None

You can choose the county in the Countries/Domains field which corresponds to your location.

Strict

Your adapter will only communicate with AP which provides 802.11d support.

Flexible

Your adapter can communicate with any AP it find.

Restore Defaults Button

Pressing this button restores each field in the panel to its default value.

Remove Profile Button

Pressing this button move the setting value of each field in the panel.

Survey Tab

The Survey tab supports powerful Site-Survey tool to discovery all active wireless devices in the radio range. While selecting this wireless device displayed on the screen, users can press **Connect** button to quick connect the wireless device

chosen by users and simultaneously modify the **Default** profile automatically. If users want to update the survey result, they can press **Rescan** button again. Each row of the information contains the following columns:

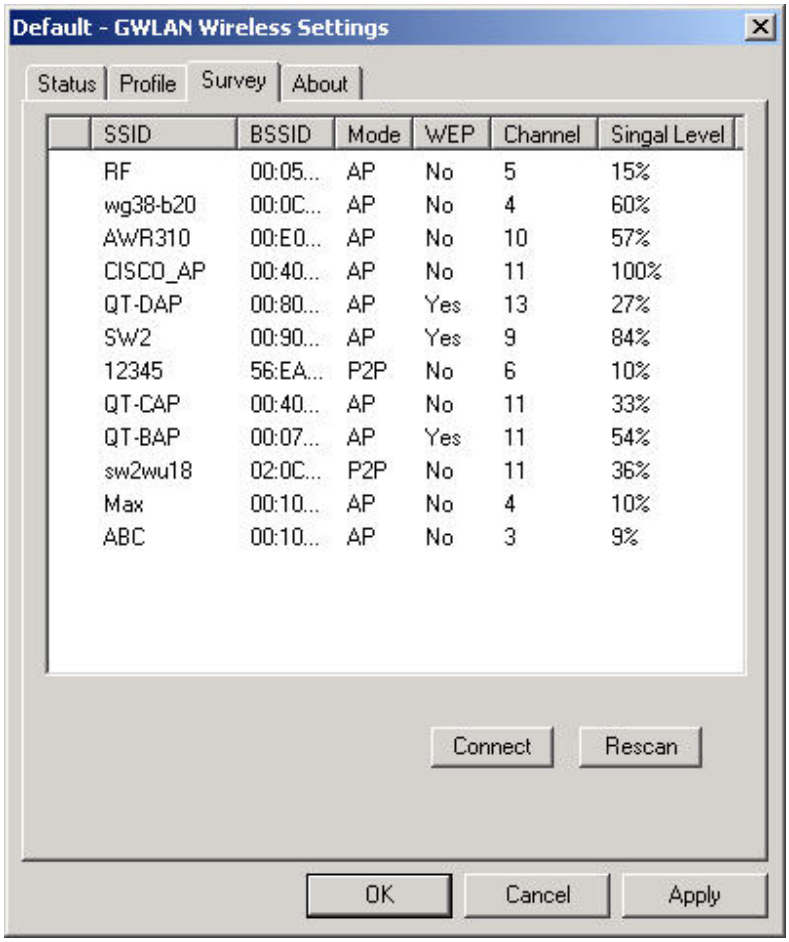


Figure 6 Survey Tab

Number of Discoveries

The total number of wireless LAN devices discovered by this Site-Survey.

SSID

The ESS ID stands for Extended Service Set Identification, and it presents the SSID of the access point. In the peer-to-peer device discovered, all clients should share the same SSID for communication.

BSSID

The BSSID stands for Basic Service Set Identification. During infrastructure mode, it represents the MAC address of the access point.

Mode

The discovered device is an access point (AP) or a peer-to-peer (P2P) device.

WEP

The discoverable device is encryption enable or disable in this column.

Signal Level

The signal measurement for each discovered device within the radio range. A higher percentage means that this discovered device has stronger signal strength. If the device you want to connect to has lower signal level, you can move it closer to this device or vice versa.

Channel

This field shows the current channel used by the discovered device.

About Tab

The About tab is used to show Wireless Client Management Utility version, Serial Number and MAC Address of this Network Interface Card, Network Interface Card Driver version and Network Interface Card firmware version. Users need to use these version numbers when reporting their problems to technique support.

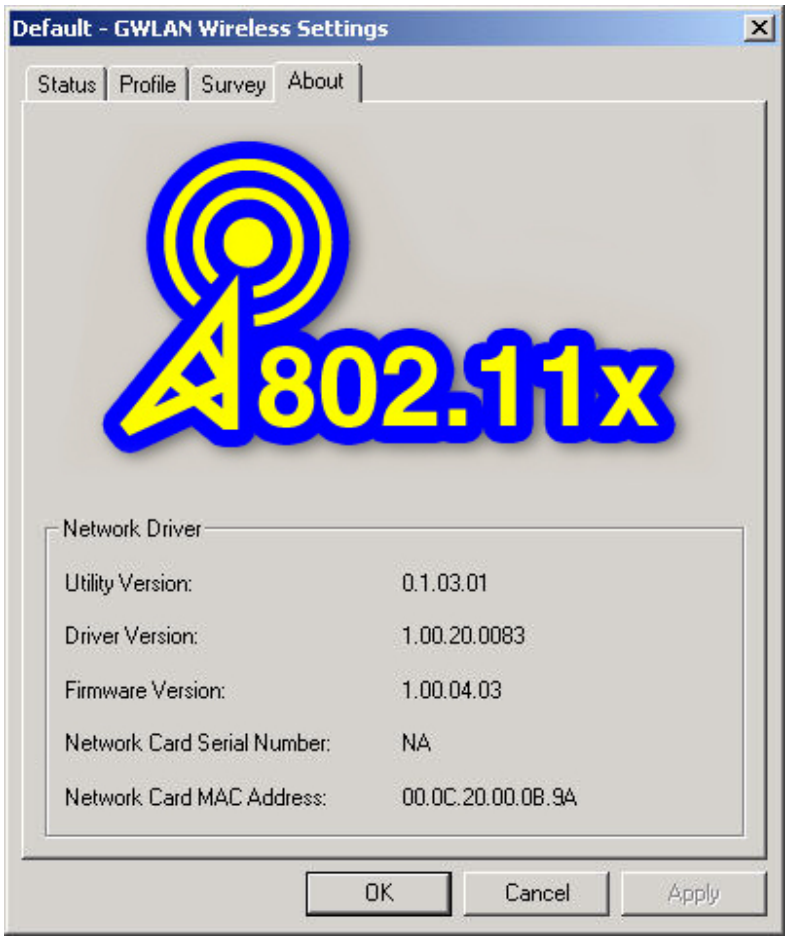


Figure 8 About Tab

Utility Version
WLAN Management Utility version

Driver Version
Device Driver version and date

Firmware Version
Firmware version

Network Card Serial Number
NIC serial number

Network Card MAC Address
NIC MAC address

Wireless LAN Configuration for Windows XP

Use the following procedure if you are configuring a Wireless LAN Card Wireless LAN Card using a PC running the Windows XP operating system.

To configure your card for use with a network:

1. Left-click on the **Wireless Network Connection** indicator icon in the System tray (lower right hand area) to launch the **Connect to Wireless Network** window.

2. A list of available network SSIDs will be provided, if any are detected or available. If a network is chosen and requires a WEP key, the key should be entered in the *Network Key* field.

TIP: SSID is the name of the Wireless LAN network to connect to. If some are detected, these will be displayed on screen. Otherwise, enter a name to use. The SSID is case-sensitive. Always use the same spelling and case when adding computers to the network.

NOTE: *Record your SSID below and refer to it when necessary.*

SSID name: _____

What is WEP? WEP is a security protocol defined in 802.11i to provide encryption capabilities for wireless LAN communications. WEP encryption keys can be 40-bit

(minimal security) or 104-bit (more secure). Additionally a WEP key is needed to encrypt and decrypt data packets, and any computer on a WEP network must have the same key, otherwise it will not be allowed on that network. It is recommended that you select WEP encryption to reduce security risks and unauthorized users from using the wireless LAN network and access to important data. A 40-bit key is 5 characters (such as "AbCdE") while a 104-bit key is 13 characters in length. Keys can be entered in ASCII or Hexadecimal (see above "What is WEP" for explanation).

Note: *Record your WEP key size and WEP key in the spaces below for later reference.*

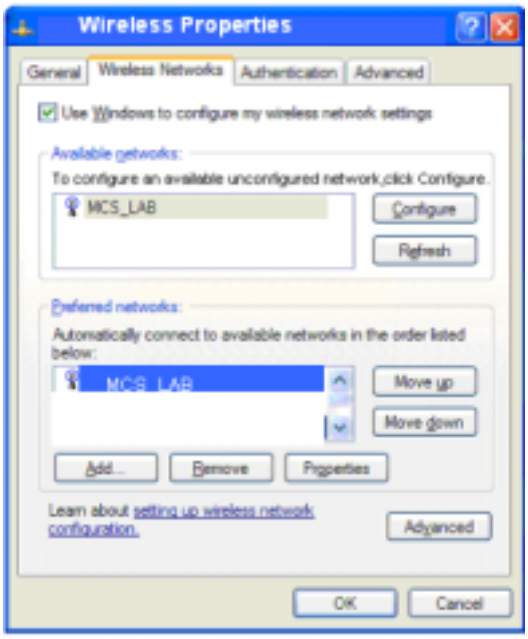
WEP key size: _____

WEP key: _____

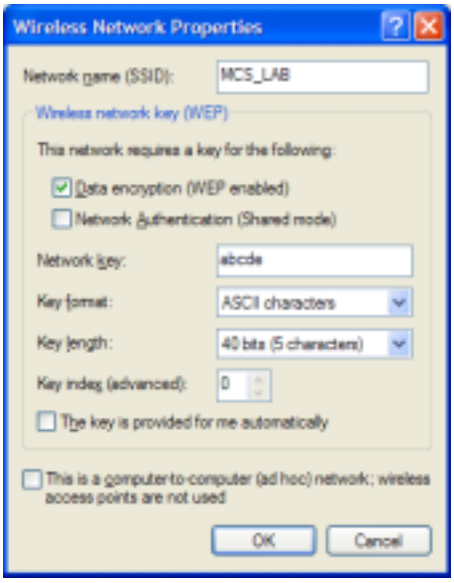
3. Click **Connect** – This will attempt to connect the Wireless LAN Card Wireless LAN Card to the selected network.

Difficulties Connecting to the Network

1. If you are having difficulty connecting, click **Advanced** to open the Wireless LAN Card Wireless LAN Card Properties.



2. Select the SSID of the network to log on, and click **Configure**. This will open up the **Wireless Networks Properties** window.



3. Ensure the WEP key is correct. If the Wireless LAN Card is used with an access point, the checkbox **This is a computer-to-computer (ad hoc) network…** should **not** be checked.

What is Ad-Hoc? A network mode that selects communications & data access between wireless computers only. The alternative is Infrastructure mode (data access between wireless computers, access points and/or a wired LAN network).

---

4. Select **OK**. If you have **Preferred Networks** listed, consult the *Wireless Network section in Chapter 4* for information about automatically connecting to those networks, depending on network mode selected.

5. Select **OK** again at the **Wireless Properties** window.

6. Finally, click **Connect** to connect the Wireless LAN Card to the selected network. If there are still difficulties, consult *Chapter 6, Troubleshooting*.

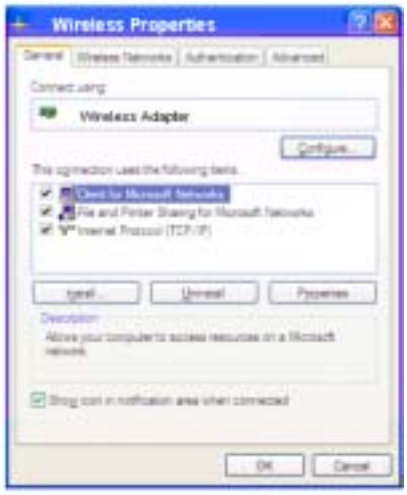
Advanced Windows XP Configuration

When selecting the **Advanced** button of the **connect to wireless network window**, a window of four tabs appears. However, only the **Wireless Networks** tab is required for network configuration of the Wireless LAN Card.

- General
- Wireless Networks – configuration of the Wireless LAN Card, scans for available and preferred access points and networks

- Authentication
- Advanced

General Tab



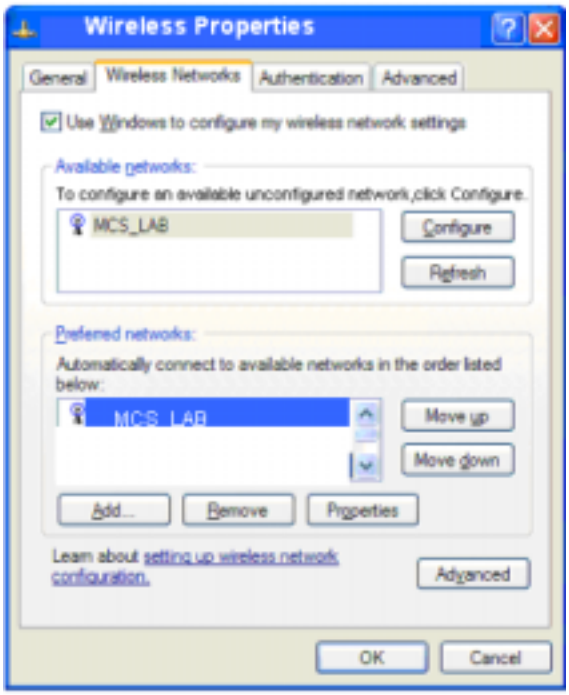
The General Tab is provided by Windows XP.

Screen options include

- **Connect Using** – shows the Wireless LAN Card
- **Configure** – (new window) shows typical connection protocols used (e.g. Client for Microsoft Networks, Internet Protocol (TCP/IP) settings)
- **Install-** installs a new service.
- **Uninstall-**uninstalls a selected service.
- **Properties** – for each protocol

Show icon in notification area when connected - A check here will display the connection status of the Wireless LAN Card in the System Tray area of the Windows desktop.

Wireless Networks window



The **Wireless Networks** tab displays a list of detected Access Points by name (SSID) as well as the user's preferred networks to connect to, using the Wireless LAN Card.

If **Use Windows to configure my Wireless Network settings** check box is checked, this allows Windows to configure wireless network settings for the Wireless LAN Card.

The **Available Networks** box displays detected, available networks in the area of the Wireless LAN Card. The SSID of the access points in those networks are displayed.

TIP: SSID is the name of the Wireless LAN network to connect to. If some are detected, these will be displayed on screen. Otherwise, enter a name to use. SSID is case-sensitive. Always use the same spelling and case when adding computers to the network.

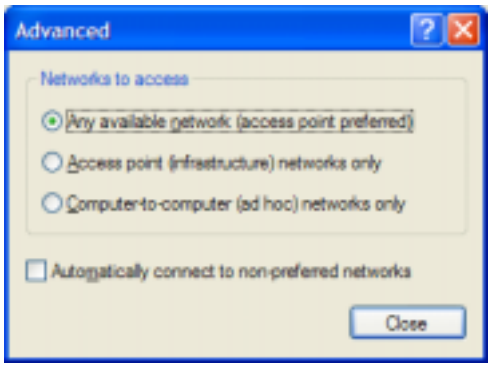
Configure allows the user to add a network not configured yet (for use with the Wireless LAN Card) and opens up the **Wireless Network Properties** window (see below). After this card is configured for that network, it is added to the **Preferred Networks** list.

Refresh will rescan the area for any networks and display the available networks.

The **Preferred Networks** box displays the user's network choices.

- **Add** – Adds a new network to this list, even those not in the **Available Network** list. This option will open up the **Wireless Network Properties** window (see below).
- **Remove** – Removes a selected network from the list.
- **Properties** – Opens up the **Wireless Network Properties** window (see below), but does not allow changing the network name or type of network (Access Point or Ad-Hoc).
- **Move Up/Move Down** – Changes the order of selected networks in the **Preferred Networks** list. If this list has any Access Point networks, Ad-Hoc networks cannot be placed ahead of them.

- Advanced – Allows selection of all or a subset of all the networks in the Preferred Network list. No entries are removed from the list, but some networks may not be displayed if they are not selected. Clicking **Advanced** displays a new window with three choices.



- **Any available network (access point preferred)** - The Wireless LAN Card will connect with networks using access points first, but all networks including Ad-Hoc will be displayed.
- **Access point (Infrastructure) networks only** - The Wireless LAN Card shall only connect with networks using access points.
- **Computer-to-computer (Ad-Hoc) networks only** - The Wireless LAN Card connects only with Ad-Hoc networks.

TIP: The network mode selects Ad-Hoc communications (data access between wireless computers) or Infrastructure (data access between wireless computers, access points and/or a wired LAN network).

Based on the selection, all or a subset of all the networks in the **Preferred Network** list are enabled and displayed. The remainders of the networks in the list are disabled. This selection also decides which type of networks to configure or add.

If the **Automatically connect to non-preferred networks** check box is selected, then the Wireless LAN Card will try to connect any non-preferred networks after it has tried all the networks in Preferred Network list without any success.

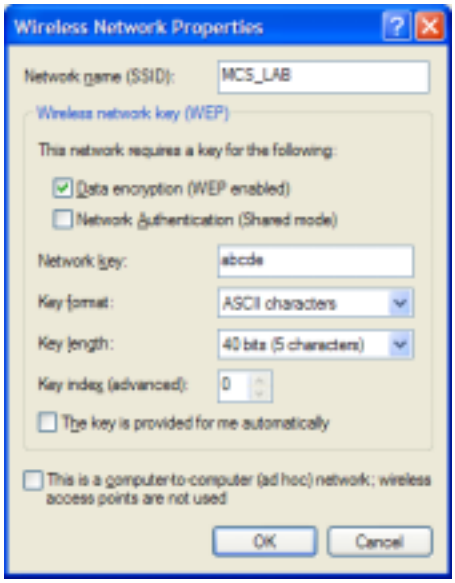
After selection, **Close** will close this window.

Select **OK** to store these network settings and to attempt to connect the Wireless LAN Card to the networks in the **Preferred Network** list. If successful, the Wireless LAN Card will be connected to the chosen network. Otherwise, the Wireless LAN Card will attempt to connect to the next network in the **Preferred Network** list, until connected or until all choices have been tried.

NOTE: *If all the networks have been tried unsuccessfully, and the check box* ***Automatically connect to non-preferred networks*** *is selected, then the Wireless LAN Card will attempt to associate with any available SSID.*

Wireless Network Properties Window

The **Wireless Network Properties** window allows the user to set properties of the Wireless LAN Card for a particular network.



Network name (SSID) - The current network access point or the name of the network being configured.

Data Encryption (WEP enabled) – A check here enables data encryption via WEP. A WEP key is required beforehand.

TIP: WEP is a protocol defined in 802.11i to provide encryption capabilities for wireless LAN communications. Because data travels through air, there is a likelihood of unintended receivers listening in on your data conversation. WEP encryption keys can be 40-bit (minimal security) or 104-bit (more secure). Additionally a WEP key is needed to encrypt and decrypt data packets, and any computer on a

WEP network must have the same key, otherwise it will not be allowed on that network. It is recommended that you select WEP encryption to reduce security risks and unauthorized users from using the wireless LAN network and access to important data.

Network Authentication (Shared mode) – This check box should be set if you want to use WEP encryption for Network Authentication.

NOTE: *If either of the above check boxes are checked, a new check box opens up requesting the application providing the WEP key.*

Network Key – The WEP key required for encryption.

Ensure that the WEP key entered here matches all other applications and clients using the same network. WEP keys can be case-sensitive, and incorrect keys will not allow clients access to this network.

Key Format – Choose Hexadecimal or ASCII characters.

Key Length – ASCII: Choose 40-bit (5 characters) or 104-bit (13 characters).

Hexadecimal: Choose 40-bit (10 digits) or 104-bit (26 digits).

Key Index – (0,1,2,3), reserved for use by vendor.

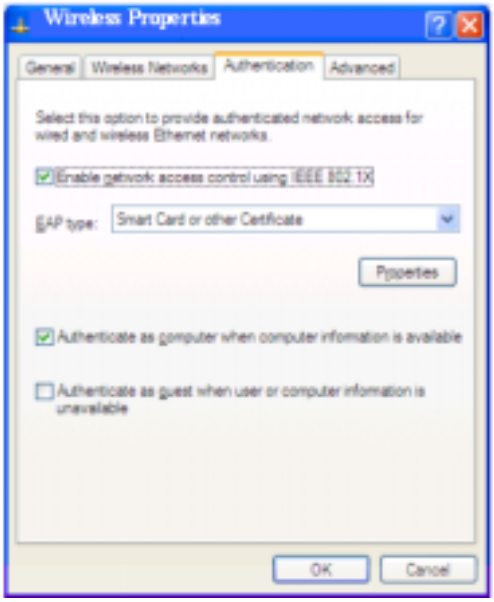
The key is provided for me automatically. This feature is only available for devices that support 802.1x authentication. The Wireless LAN Card does not support this form of authentication.

This is a computer-to-computer (Ad-Hoc) network; wireless access points are not used – Selects Infrastructure or Ad-Hoc mode for this network.

Select **OK** to store these network settings in the **Preferred Network** list database. Clicking **OK** will not connect the Wireless LAN Card to the network yet.

***NOTE**: If **OK** is selected and the application finds that a network with the same name and type already exists in **Preferred Network** list, an error message will appear and changes to this network will be lost.*

Authentication



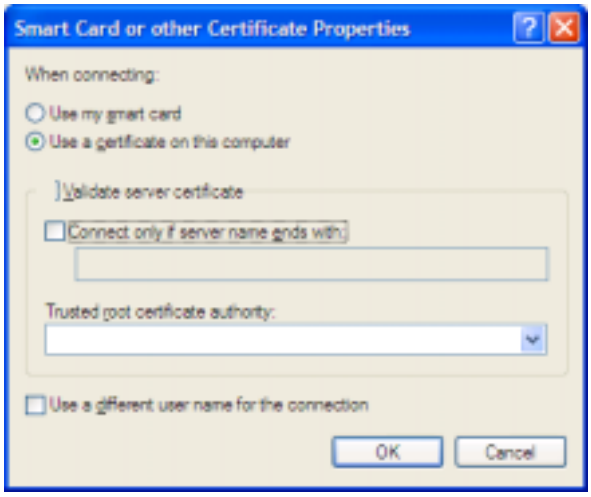
The Authentication tab screen is provided by Windows XP.

Enable network access control using IEEE 802.1X – A check box here will enable 802.1X advanced authentication and will request the user to choose the EAP type from the selected list.

Authenticate as computer when computer information is available – This checkbox will automatically login as a computer if the information is available.

If no information is available, checking the box **Authenticate as guest when user of computer information is unavailable** will accomplish login.

Properties – Brings up the **Smart Card or Other Certificate properties** screen to set the options for the EAP type, as follows:



Choices include:

- **Use my smart card-** Select this option if a smart card is used for network authentication and login.
- **Use a certificate on this computer**-If **Validate server certificate** box is checked, two option boxes become available:

– Connect only if server name ends with appears if a specific server is requested

– Trusted root certificate authority list of options appears to choose a specific host certificate.

- **Use a different user name for the connection** – check this box to specify a user name for this connection.

Advanced tab

The advanced tab is provided by Windows XP.

Choices include

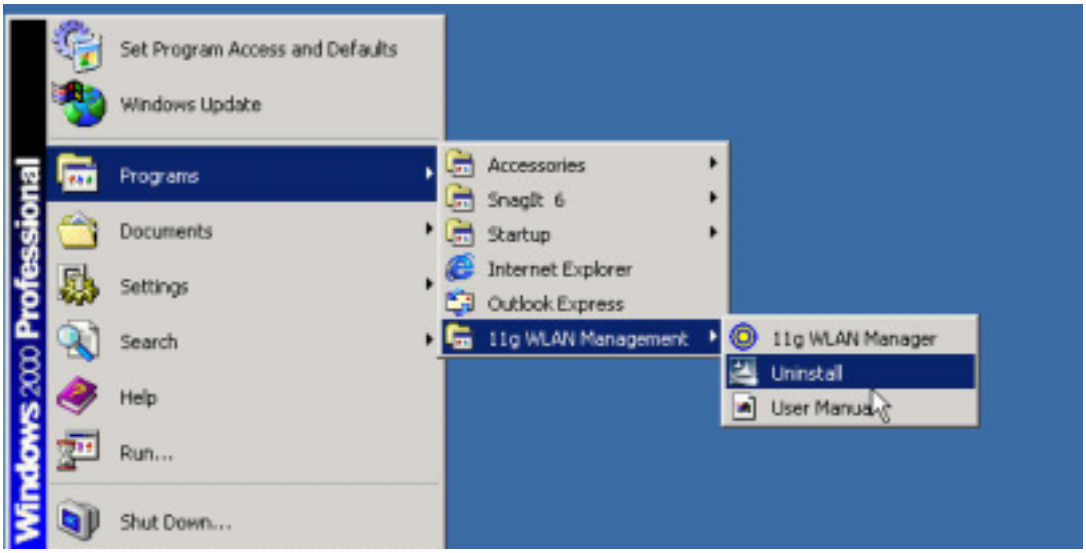
- **Internet Connection Firewall** – This checkbox will request Windows XP to enable its firewall function for access to the Internet.
- **Internet Connection Sharing** – This checkbox will allow other computers and user to use this computer's connection for Internet access. If checked, a second option will allow or restrict access to control or disable the shared connection.

Chapter 5 Uninstall

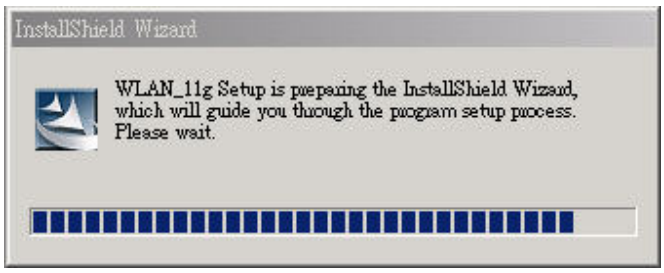
Uninstall the WLAN Utility

1. To uninstall the 11g WLAN management Utility and Driver, choose

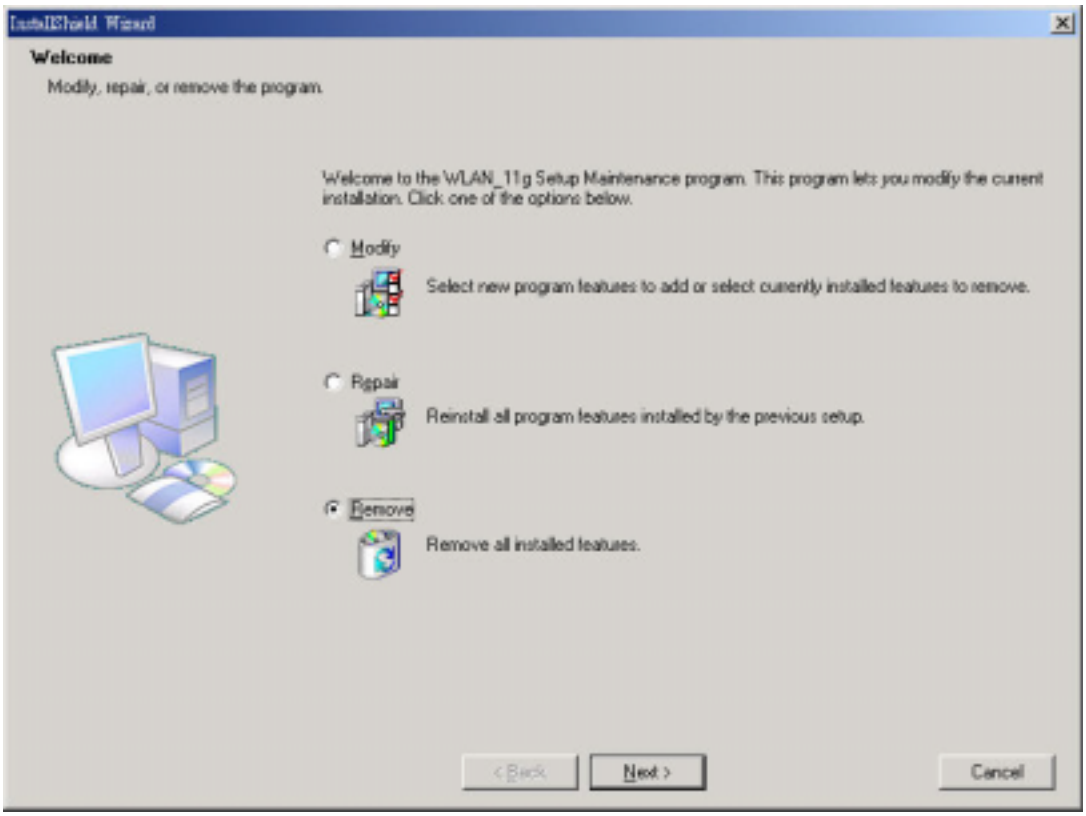
Start then **Programs** then **11g WLAN Management Utility**, and click **Uninstall**.



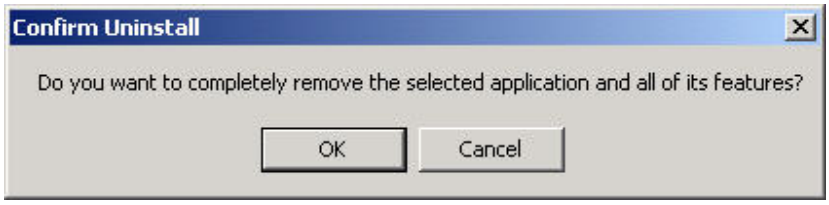
2. You will be asked if you want to uninstall the WLAN Utility and all of its components.



3. Click **Remove** option and **Next** button.



4. Click **OK** to remove or click **Cancel** to exit.



Chapter 6 Troubleshooting

Common Installation Problems

The 802.11g Wireless LAN Card does not work

1. Ensure you are connected to a Wireless network. You may have wandered out of range.

2. Your Wireless LAN Card is a basically a radio transmitter. Ensure that you aren't blocking transmissions by placing the card next to a metal shield or other material that could interfere with communications.

3. Ensure the Wireless LAN Card is inserted correctly into the slot of your computer and move to the next step below.

The 802.11g Wireless LAN Card is not recognized by my computer

1. Remove and reinsert the Wireless LAN Card.

2. Restart your computer to ensure the Wireless LAN Card drivers are properly loaded, after completing Software installation.

3. Double-click the **Settings/Control Panel** tab and the **System** icon. Open the **Device Manager** tab (under **Hardware** in some versions of Windows) and click on **Network Adapters**. The Wireless LAN Card icon should have no yellow exclamation or red cross marks. If either is present, the most likely problem is conflicting resources.

4. Make sure that your system has at least one IRQ available.

5. Make sure the Wireless LAN Card is inserted and installed with the proper driver.

6. If the Wireless LAN Card does not function after attempting the above steps, uninstall the driver software, remove the card, reboot your system, and repeat the hardware and software installation as described in Chapters 3 and 4 of this manual.

The 802.11g Wireless LAN Card does not communicate with other wireless devices.

1. Ensure the SSID and WEP key parameters match those of the devices you are communicating with. These parameters are case-sensitive and should be entered exactly as noted on the other devices.

2. Ensure the Wireless LAN Card is configured on the same channel as the Access Point or other Wireless LAN devices on the same network.

Frequently Asked Questions

How do I setup my wireless network for the best range?

Physical placement of the wireless network is key and will vary according to the type of network used and how many clients and other equipment will use it. Generally, the following recommendations apply to all wireless LAN equipment.

Ad-Hoc configurations (PCs with Wireless LAN Cards only) simplify placement. The PC's just need to be in close proximity to each other in order to exchange data. See below for further recommendations.

For an infrastructure configuration (with an Access Point and several wireless clients), physical placement of the Access Point will be key as it determines the range of the wireless LAN network and it's connection to the wired LAN network (if present).

Wireless LAN networks have the best range in open areas or environments with few obstacles. For every wall, door, ceiling the signals have to travel through, the range is reduced. Thicker obstacles or metal environments reduce the range even further. When placing Access Points, try to decrease the number of obstacles in the area so that mobile wireless clients have the best access and range. Access Points (like radio towers on top of hills) have the best range when they are raised above obstacles such as furniture. When ever possible, mount your Access point high up a wall. This could also help your range if your Access Point is downstairs and you are try to provide WLAN coverage to a floor above you.

Wireless signals also degrade if they pass through object at an angle. Again, direct line of contact and minimal obstacles will increase the range. Also, note that high RF noise objects such as antennas, microwaves, monitors can affect signal sensitivity and range. Positioning wireless equipment a few feet away from them will minimize their effect.

How Do I Check the Status of the 802.11g Wireless LAN Card?

Here are a few ways to do this.

- Check the **System Tray** bar (lower right hand corner of Windows desktop) and verify that the Wireless LAN Card is connected (no Red X through it)
- Check to ensure that at least one green **Signal Strength** Indicator bar is colored or

- Click on the **Wireless LAN Card Connections** icon in the **Status Tray** bar to view connection status and details, or
- From the **Start** menu, select **System Settings / Config** and choose **Network Connections** to view the Wireless PC Card connection status.

If the Wireless LAN Card is not connected, clicking on the **Status Tray** icon will bring up the **Connect to Wireless Network** window (See Chapter 4*, Configuration & Operation*).

How do I Access a Different Wireless Network?

1. Click the **Wireless LAN Card Connection** in the **Status Tray** bar. The **Connect to Wireless Network** window will appear, with a choice of networks available (or detected).
2. Select a network and enter a WEP key (if needed).
3. Click **Connect** to attempt to connect to that network.
4. If the Wireless LAN Card cannot connect to it, click **Advanced** and verify the properties of that network to ensure the SSID, Channel, WEP key are all entered correctly.
5. If the **network to connect to** is not available (or detected), a new network name can be added by selecting the **Advanced** tab, choosing the **Wireless Networks** tab and configuring a new network (See Wireless Networks tab section in Chapter 4, *Configuration & Operation*).
6. Once configured, and the new network is selected, the system will scan for the network and ensure it is in the area to attempt to connect to it.

How Do I Change the SSID Name, WEP Key, and Channel of the Wireless PC Card?

Consult the *Configuration section* for your operating system in Chapter 4, Installation. Also, follow the steps above in **How do I access a different wireless network**.

Appendix A

Hardware Specifications

Product Model	
Description	IEEE802.11g 2.4 GHz 54Mbps Mini-PCI Wireless Network Interface Card, backward compatible with IEEE802.11b.
Standard Compliance	IEEE802.11b, IEEE802.11g, IEEE802.11d
Chip	Intersil PRISM® GT Frisbee chipset
Transmission Rate	OFDM: 6, 9, 12, 18, 24, 36, 48, 54 Mbps CCK: 5.5, 11 Mbps DSSS: 1, 2 Mbps
Security	64/128-bit WEP Encryption
Voltage	3.3 VDC +/- 5%
LED	Link status
Power	TX power consumption: <450mA RX power consumption < 390mA Sleep Mode power consumption <45mA
Software Support	Windows 98/ME/2000/XP
Network Architecture	Supports ad-hoc (peer-to-peer) and infrastructure (communications through Access Point)
RF Output Power	17dBm typical @ 54M
Antenna	Two Ceramic antennas
Operating Channels	CH1~CH11 (2.412GH~2.462GHz) FCC CH1~CH13 (2.412GHz~2.472GHz) ETSI CH1~CH14 (2.412GHz~2.483GHz) TELEC

Modulation	OFDM with BPSK, QPSK, 16QAM, 64QAM (11g) DBPSK, DQPSK, CCK (11b)	
Sensitivity	**11g; PER < 10%**	**11b; PER < 8%**
	54 Mbps -69 dBm	11 Mbps -84 dBm
	48 Mbps -68 dBm	5.5 Mbps -88 dBm
	36 Mbps -74 dBm	2 Mbps -89 dBm
	24 Mbps -79 dBm	1 Mbps -93 dBm
	18 Mbps -82 dBm	
	12 Mbps -84 dBm	
	9 Mbps -87 dBm	
	6 Mbps -88 dBm	
Temperature	0 ~ 60℃(Operating), -20 ~ 65℃(Storing)	
Humidity	20 - 80% (non-condensing)	
Warranty	1 year	
Size and Weight	118.0mmL*54.1mmW*5.0mmH, <50g	

Appendix B

Glossary

Access Point

A wireless LAN adapter, which connects to a wired LAN network (acting as a bridge) and serves as the base for a wireless LAN network, directing communication between clients. An access point is only used in Infrastructure mode. Access Points in a business environment are typically connected to the wired LAN network. In the home, an Access Point would be connected to a broadband Internet device such as a Cable or ADSL modem.

Ad-Hoc

This is a wireless LAN network comprised solely of clients (no access points), which can communicate with each other only when they are in range of each other's Signal and configured to the same channel and SSID.

BSS – Basic Service Set

This denotes the availability of access points and clients, all in communication with each other. An Ad-Hoc LAN (clients only) may also have a BSS ID; all machines must use the same BSS ID.

Client

A PC, peripheral or other electronics with a connection to the network, with the sole purpose of using the network for data access and transfer. For example, a notebook PC with the Wireless LAN Card is considered a client.

ESS – Extended Service Set

The availability of access points and clients (BSS) and connections to wired networks, as well as the ability for a client to roam. ESS is available in Infrastructure mode, and all components must have the same ESS ID. Clients within an ESS may roam freely through many BSSs, if they are within range of the wireless LAN networks.

Infrastructure

As opposed to Ad-Hoc, this network mode allows connection to access points and to wired LAN networks or Internet access device such as a cable or ADSL modem.

LAN – Local Area Network

A network of clients/users typically based on the IEEE Ethernet protocol and using TCP/IP (Internet Protocol).

Roaming

Clients can freely move about the wireless LAN network (ESS).

WEP – Wired Equivalent Privacy

A shared-key encryption protocol used to provide security for wireless data. At least two implementations of WEP exist, with keys based on the number of bits (64 or 128-bit). The more bits in the key, the harder it is to decipher and therefore, the more secure the connection is.

Appendix C

FCC Class B Radio Frequency Interference Statement

Note:

This device is intended only for OEM integrators under the following conditions:

1) The antenna must be installed such that 20 cm is maintained between the antenna and users, and
2) The transmitter module may not be co-located with any other transmitter or antenna.

As long as 2 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.).

IMPORTANT NOTE: In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter)

and obtaining a separate FCC authorization.

End Product Labeling

This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users (for example access points, routers, wireless ADSL modems, and similar equipment). The final end product must be labeled in a

visible area with the following: "Contains TX FCC ID: Q5SWM68-1 ".

Manual Information for End Users

The end user must not have manual instructions to remove or install the device. The user manual for end users must include the following information in a prominent location:

"IMPORTANT NOTE: To comply with FCC RF exposure compliance requirements, the antenna used for this transmitter must be installed to provide 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."