Wireless Local Area Network Card

WL-138g

(For 802.11g and 802.11b Wireless Networks)

User's Manual

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Product Name:	ASUS WLAN Card (WL-138g)
Manual Revision:	1 E1498
Release Date:	December 2003

ASUSTeK COMPUTER INC. (Asia-Pacific)

Address	150 Li-Te Road, Peitou, Taipei, Taiwan 112
Telephone	+886-2-2894-3447
Web site	www.asus.com.tw

Technical Support

Telephone	(MB/Component)	+886-2-2890-7121 (English)
	(Notebook)	+886-2-2890-7122 (English)
	(Server/PC)	+886-2-2890-7123 (English)
	(Networking)	+886-2-2890-7902 (English)
Support fax		+886-2-2890-7698

ASUS COMPUTER INTERNATIONAL (America)

Address	44370 Nobel Drive, Fremont, CA 94538, USA
Fax	+1-510-608-4555
E-mail	tmd1@asus.com
Web site	usa.asus.com

Technical Support

Telephone	(General)	+1-502-995-0883
	(Notebook)	+1-510-739-3777
Support fax		+1-502-933-8713
Support e-mail		tsd@asus.com

ASUS COMPUTER GmbH (Germany and Austria)

Address	Harkort Str. 25, D-40880 Ratingen, Germany
Telephone	+49-2102-95990
Fax	+49-2102-959911
Online contact	www.asuscom.de/sales

Technical Support

Telephone	+49-2102-95990
Fax	+49-2102-959911
Online support	www.asuscom.de/support
Web site	www.asuscom.de/news

ASUS COMPUTER (Middle East and North Africa)

Address	P.O. Box 64133, Dubai, U.A.E.
Telephone	+9714-283-1774
Fax	+9714-283-1775
Web site	www.ASUSarabia.com

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1. Introduction

Overview

Thank you for purchasing the ASUS WLAN Card. The ASUS WLAN Card is a PCI compliant “wireless” network interface card (NIC) for any computer equipped with a PCI slot.

The ASUS WLAN Card is designed to be fully compliant with both the IEEE 802.11g and IEE802.11b wireless local area network (Wireless LAN) standards. As a result of the completion of the standard, the interoperability of Wireless LAN products among multiple manufacturers will be guaranteed. The ASUS WLAN Card product provides high-speed, standards-based Wireless LAN solutions.

The ASUS WLAN Card is designed to be fully compliant with IEEE 802.11g wireless local area networks (WLAN). 802.11g is an extension to 802.11b, used in majority of wireless LANs today. 802.11g will broaden 802.11b's data rates to 54 Mbps within the 2.4 GHz band using OFDM (orthogonal frequency division multiplexing) technology. 802.11g allows backward compatibility with 802.11b devices but only at 11 Mbps or lower depending on the range and presence of obstructions.

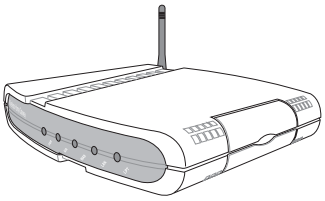
The ASUS WLAN Card supports data rates up to 11 Mbps, with automatic fallback to 5.5, 2, and 1 Mbps in 802.11b networks. It operates in the unlicensed 2.4 GHz frequencies called the Instrumentation, Science, and Medical (ISM) band. Unlicensed means free of charge to users.

The ASUS WLAN Card configuration utility is a user-friendly application that helps you quickly setup multiple roaming nodes using the ASUS WLAN Card. You can even export the configuration settings to a file and import them to other computers for fast multiple installations using ASUS Mobile Manager. Wireless LANs are complementary extensions to existing wired LANs, offering complete mobility while maintaining continuous network connectivity to both corporate and home Intranets. They add a new level of convenience for LAN users. PC users stay connected to the network anywhere throughout a building without being bound by a LAN wires. This is accomplished through the use of ASUS WLAN Access Points or ASUS WLAN Home Gateways. ASUS WLAN Home Gateways with built-in Internet gateway capability, allows your family to share a broadband Modem and one ISP account simultaneously from different rooms without wires! ASUS WLAN products can keep you connected anywhere, any time.

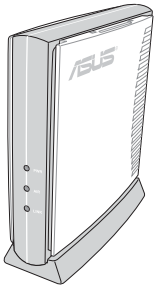
The ASUS Wireless LAN Family

The ASUS Wireless LAN family contains a complete solution for wireless local area networks in the office or at home.

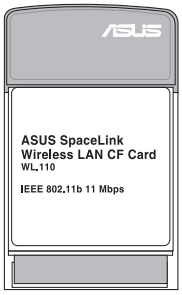
For 802.11b Wireless Networks



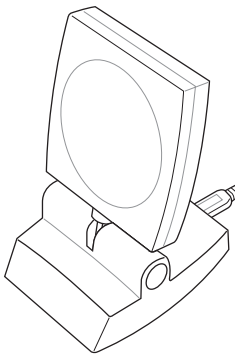
The **ASUS WLAN 802.11b Gateway (WL-500)** creates a wireless network using the IEEE 802.11b wireless standard and allows sharing a single Internet connection.



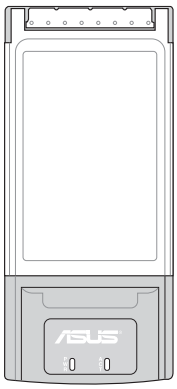
The **ASUS WLAN 802.11b Access Point (WL-300)** creates a wireless network using the IEEE 802.11b wireless standard.



The **ASUS WLAN 802.11b CF Card (WL-110)** is a IEEE 802.11b wireless LAN adapter that fits into a Compact Flash Type II slot in a Portable Digital Assistant (PDA).



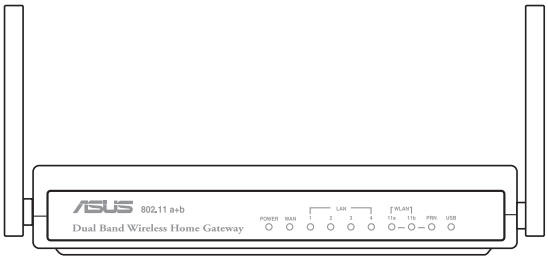
The **ASUS WLAN 802.11b USB Client (WL-140)** is an IEEE 802.11b wireless USB LAN adapter that connects to any computer's USB port with the benefit of being able to place the antenna anywhere in order to maximize signal strength.



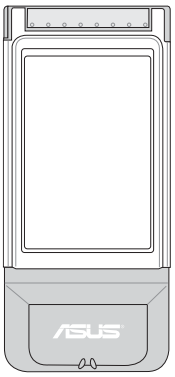
The **ASUS WLAN 802.11b PC Card (WL-103b)** is a IEEE 802.11b wireless LAN adapter that fits into a PCMCIA Type II slot in a Notebook PC. This new version presents a better looking design to replace the WL-100.

The above illustrations are not to scale.

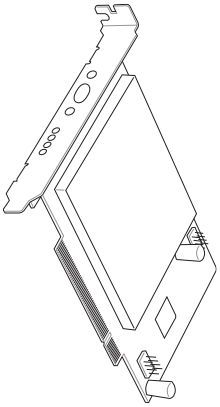
For 802.11b & 802.11a Wireless Networks



The **ASUS WLAN 802.11b/a Router (WL-600)** creates a wireless network using the IEEE 802.11b and 802.11a wireless standards and allows sharing a single Internet connection.

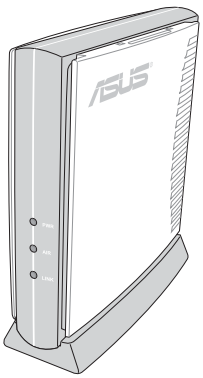


The **ASUS WLAN 802.11b/a Cardbus Card (WL-200)** is a dual band (IEEE 802.11a/b) wireless LAN adapter that fits into a Notebook PC's PCMCIA Type II slot with Cardbus support.

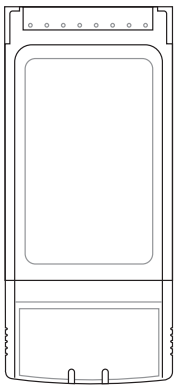


The **ASUS WLAN 802.11b/a PCI Card (WL-230)** is a dual band (IEEE 802.11a/b) wireless PCI card that also supports Bluetooth connections.

For 802.11g & 802.11b Wireless Networks



The **ASUS WLAN 802.11g Access Point (WL-300g)** creates a wireless network using the IEEE 802.11g and 802.11b wireless standards.



The **ASUS WLAN 802.11g PC Card (WL-103g)** is a IEEE 802.11g and 802.11b wireless LAN adapter that fits into a PCMCIA Type II slot in a Notebook PC. This new version presents a better looking design to replace the WL-100g.

The above illustrations are not to scale.

System Requirements

To begin using the ASUS WLAN Card, you must have the following minimum requirements:

- Windows XP/2000/ME/98SE
- Standard 32-bit PCI Slot
- 32MB system memory or larger
- 300MHz processor or higher

The Product Package

When you receive the ASUS WLAN Card package, it should contain the following items:

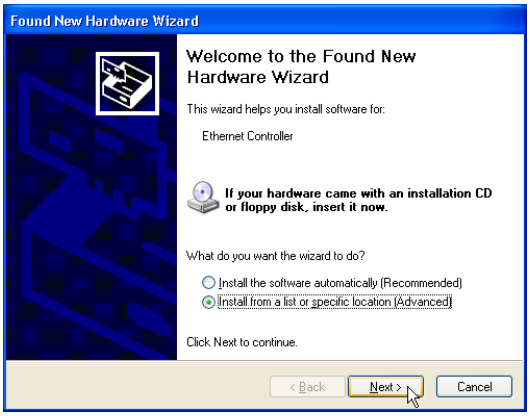
- ASUS WLAN PCI Card
- ASUS WLAN Card Quick Start Guide
- ASUS WLAN Card User's Manual
- CD-ROM Disc (Drivers, Utilities, Documentation)

If any of the above items are not included or damaged, contact your local dealer for instructions.

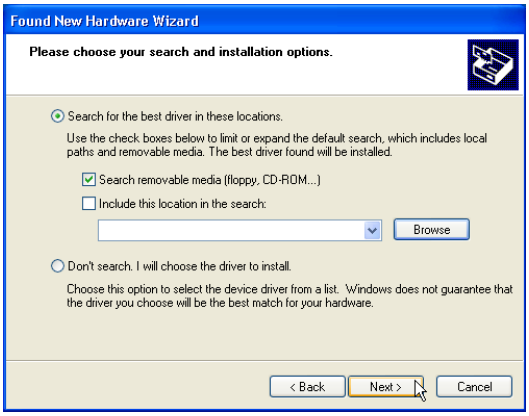
2. Installation

Installing the ASUS WLAN Card Driver

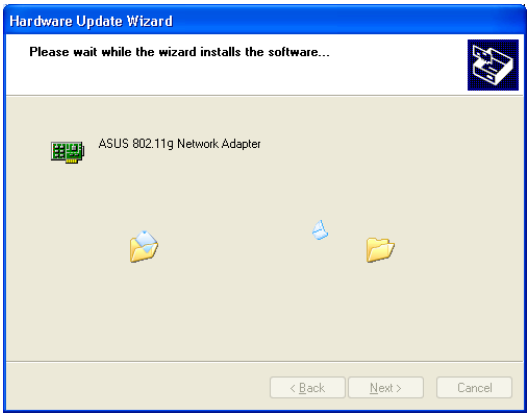
1. Have an experienced person install the ASUS WLAN Card into a free PCI slot. Replace your chassis door, panels, screws, and cables when completed.
2. Turn ON your computer and enter Windows.



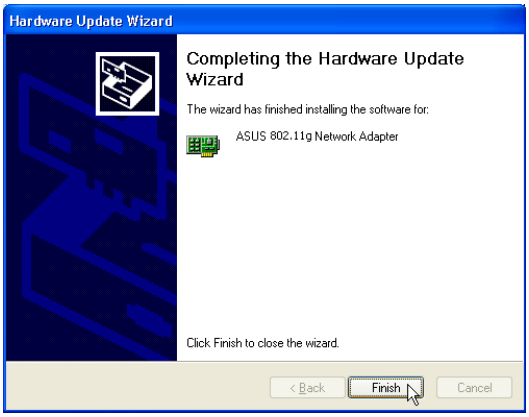
3. Windows will automatically detect the ASUS WLAN Card once it is inserted into the PCI slot, then the “Add New Hardware Wizard” dialog will appear. Click **Next**.



4. Insert the support CD that came with your ASUS WLAN Card.
5. Select “Search for the best driver in”... and “Search removable media...”, then click **Next**.



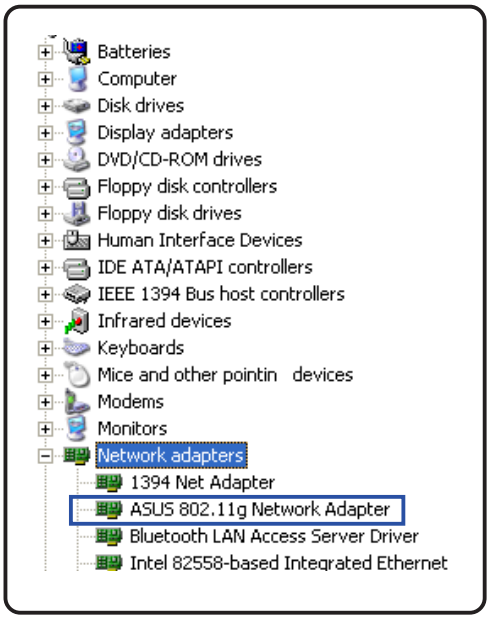
6. Wait while Windows XP creates a restore point for you system files in case you need to restore your current system.



7. Click **Finish** when installation has complete. Restart your computer if prompted.

Verifying Drivers

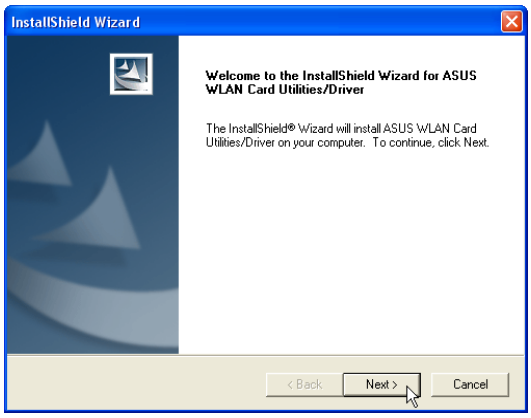
You can verify the ASUS WLAN Card driver in Device Manager. (Access Device Manager from Start | Control Panel | System | Hardware). A question mark means that no driver has been installed. An exclamation mark over a card means that the driver is incorrect. Verify that you are using the correct product and driver CD. Try repeating the installation and contact customer support if necessary.



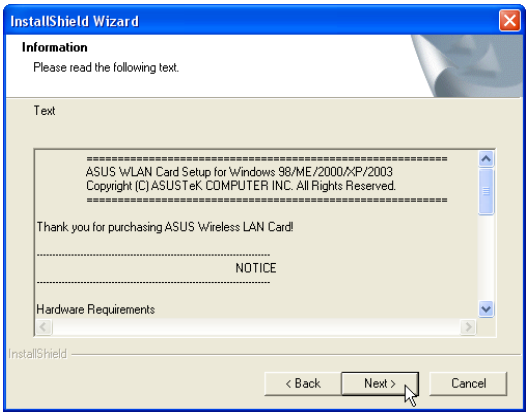
Installing the ASUS WLAN Card Utilities

After you have installed the ASUS WLAN Card driver, you can install the WLAN Adapter utilities as shown below.

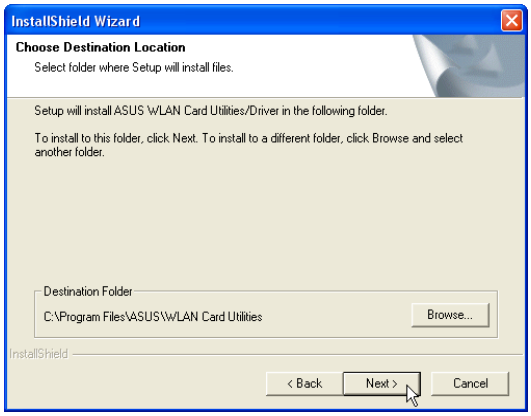
1. Insert the ASUS WLAN Card support CD and an autorun menu will appear. If your autorun is disabled, double click **SETUP.EXE** in the root directory of the support CD.
2. From the autorun menu, select your language and click **Install ASUS WLAN Card Utilities**.



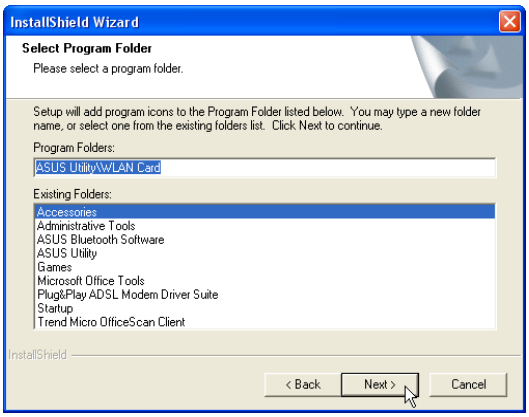
3. Click **Next** on the Welcome screen.



4. Click **Next** after reading the Information.

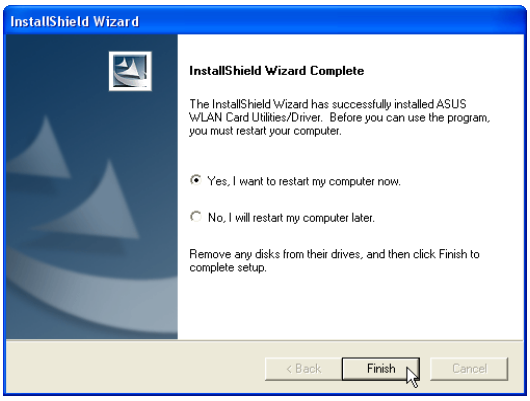


5. Click **Next** to use the default Destination Folder or click Browse to select another folder.

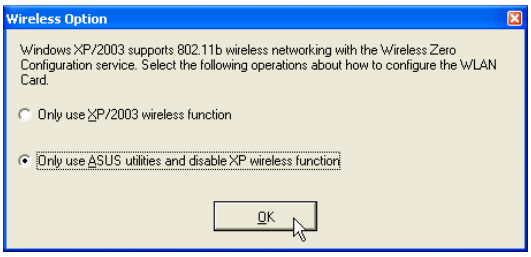


6. Click **Next** to place icons in the default program folder or type another folder name.

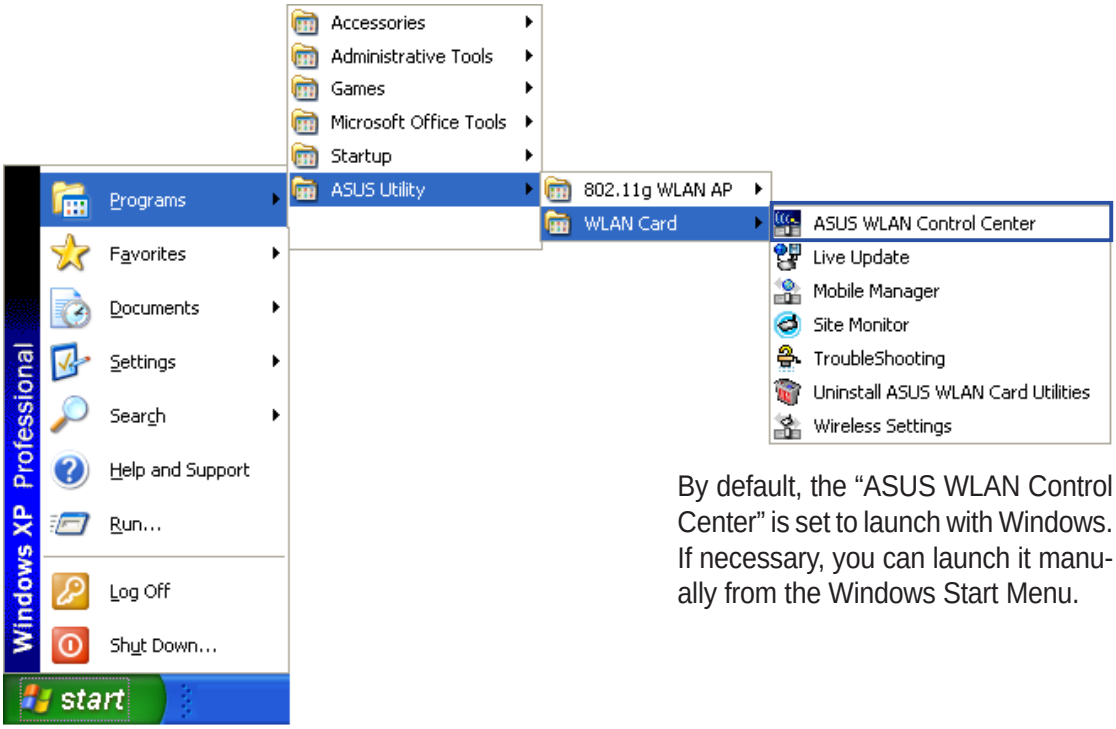
Installing the ASUS WLAN Card Utilities (Cont.)



7. When Setup is complete, click **Finish** to exit the installation wizard.



8. When the program is launched for the first time, you will be asked which function to use. Select to use ASUS utilities for more functions.

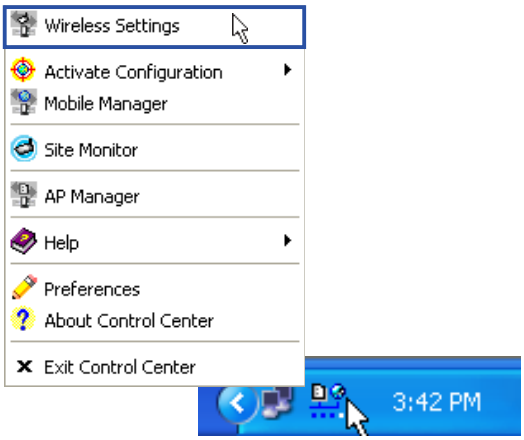


By default, the "ASUS WLAN Control Center" is set to launch with Windows. If necessary, you can launch it manually from the Windows Start Menu.

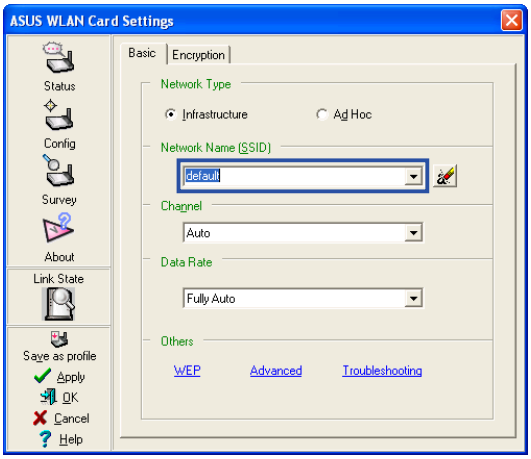
Several shortcuts will be created which can be accessed through Start. ("Classic Start menu" is shown here.)

ASUS WLAN Utility Quick Start

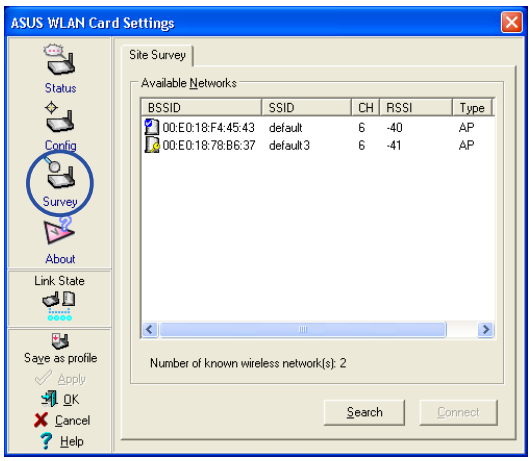
After installing the ASUS WLAN driver and utility, you may need to make some settings before being able to use your wireless connection.



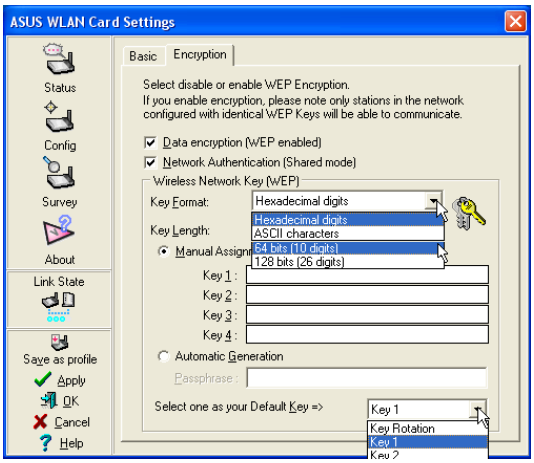
1. Right-click the ASUS WLAN icon and select “Wireless Settings”



2. Set the Network Name (SSID) to the same name as the SSID set in your access point.



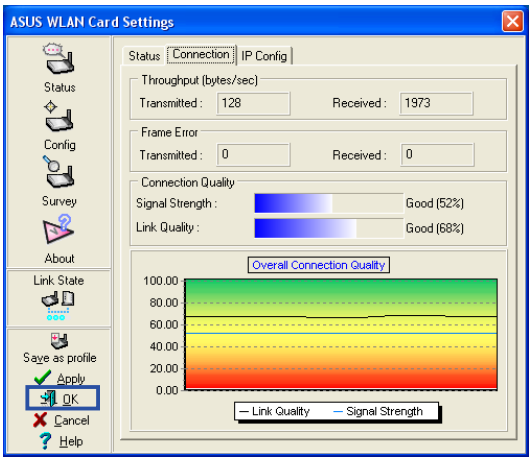
3. Use “Site Survey” if you don’t know the name of your access point(s).



4. Encryption settings must also match those set in the access point. Talk with your network administrator if necessary.

5. You can also see the connection quality on the “Connection” page. Click **OK** to exit the utility.

6. Click **Apply** to save your settings and check the “Status” page to see the “Association State”. It should show “Connected - xx:xx:xx:xx:xx:xx”.



Reading the ASUS WLAN Status Indicators

The ASUS WLAN card consists of one LED that indicates the status of the ASUS WLAN Card.

OFF: No wireless activity.

Blinking: Transmitting or receiving wireless data.

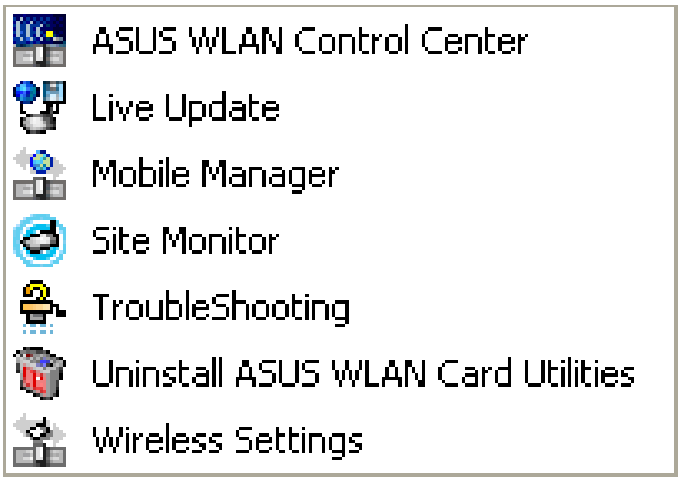
Orientating the Antenna

The ASUS WLAN Card has one external antenna. It is recommended that you adjust the external antenna straight up for maximum range and higher link quality.

3. Software Reference

Chapter Overview

The ASUS WLAN Card software includes six groups of utilities



Windows Start Menu - Programs

- **Control Center** – Makes it easy to launch applications and activate network location settings.
- **Live Update** – Makes it easy to update your ASUS WLAN drivers or utilities automatically through the Internet.
- **Mobile Manager** – A convenient tool to setup and manage network location settings.
- **Site Monitor** – Measures the received signal strength indicator (RSSI) values of all wireless networks. This tool is used for determining the best placement of Access Points to provide the most efficient coverage in a wireless network.
- **Troubleshooting -** Troubleshooting will test your settings and connection to try to pinpoint your problem and give you a solution.
- **Wireless Settings** – Allows users to control the ASUS WLAN Card.

Additional Reference

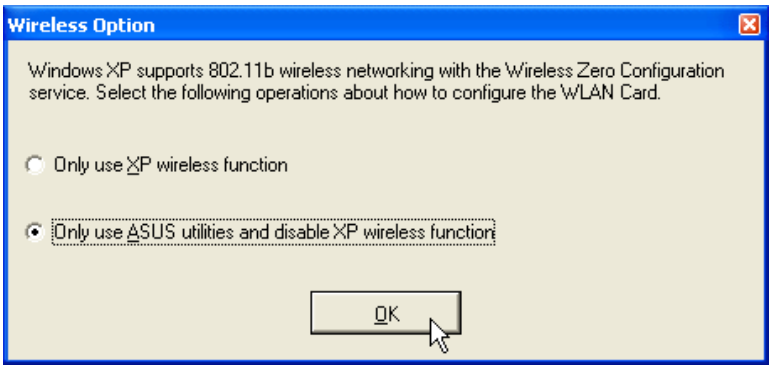
- **Windows XP Wireless Properties** - Brief overview of the wireless settings provided in Windows XP.

Windows XP Wireless Options

The wireless options shown below is only available for Windows XP. The first time you run the Control Center utility, it will automatically show. Select one of the radio buttons to decide which interface to use with your ASUS WLAN Card.

Only use XP wireless function – Only use "Windows XP" wireless network settings to configure the ASUS WLAN Card.

Only use ASUS utilities and disable XP wireless function – Only use "ASUS WLAN Card utilities" to configure the ASUS WLAN Card. (recommended)



You can return to the Wireless Option setting at any time by left clicking the control center icon and choosing "Wireless Option".

Taskbar Left-Click Menu

Control Center Utility

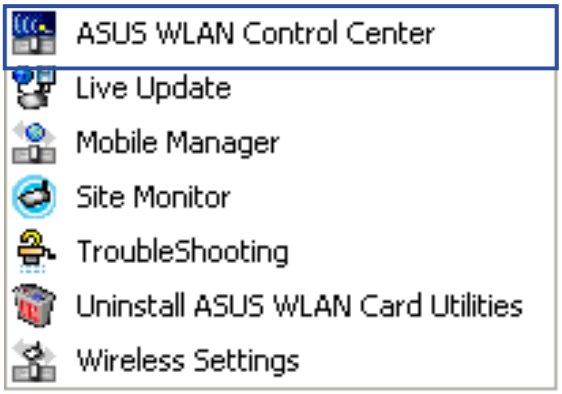
Control Center is an application that makes it easy to launch applications and activate network location settings. Control Center starts automatically when the system boots. Whenever Control Center is running, you will see a Control Center icon displayed on the Windows taskbar.

Starting the Control Center manually

- Select **ASUS WLAN Control Center** in Windows Start menu.

or

- Double click the **ASUS WLAN Control Center** icon on the desktop.

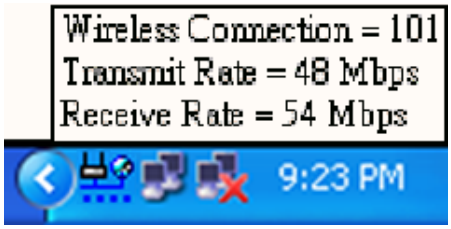


Windows Start Menu

Using the Control Center Taskbar

The Control Center Taskbar menu display the following information:

- The link quality of the ASUS WLAN Card (Excellent, Good, Fair, Poor, Not Linked)
- Whether the ASUS WLAN Card is connected to the Internet (Blue: Connected, Gray: Not Connected)



Taskbar Icon and Status

Wireless Status Icons (on the taskbar)

Excellent link quality and **connected to Internet** (Infrastructure)

Good link quality and **connected to Internet** (Infrastructure)

Fair link quality and **connected to Internet** (Infrastructure)

Poor link quality and **connected to Internet** (Infrastructure)

Not linked but **connected to Internet** (Infrastructure)

Excellent link quality but **not connected to Internet** (Infrastructure)

Good link quality but **not connected to Internet** (Infrastructure)

Fair link quality but **not connected to Internet** (Infrastructure)

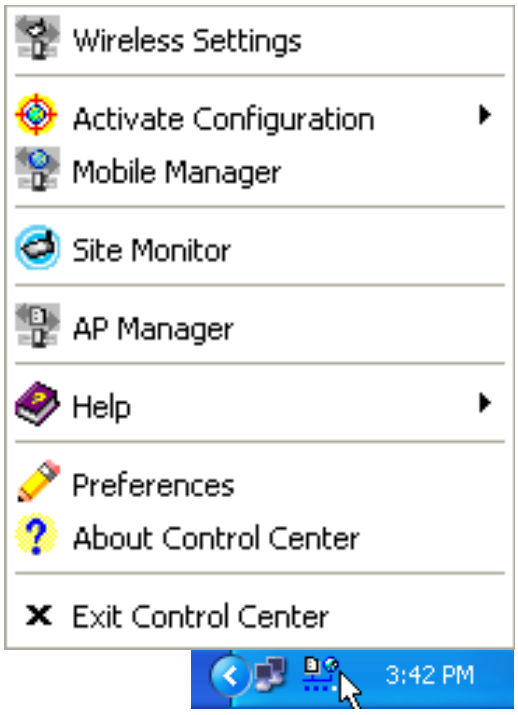
Poor link quality but **not connected to Internet** (Infrastructure)

Not linked and **not connected to Internet** (Infrastructure)

Taskbar Icon - Right Menu

Right-clicking the taskbar icon shows the following menu items:

- **Wireless Settings** – Launches Wireless Settings application.
- **Activate Configuration** – Allows you to set which profile to use.
- **Mobile Manager** – Launches Mobile Manager application.
- **Preferences** – Customizes the way the Control Center program behaves. You can create a Control Center shortcut on the desktop. You can also set whether Control Center starts up with Windows.
- **Exit** – Closes the Control Center program.



Right-Click Menu

Taskbar Icon - Left Menu

Left-clicking the taskbar icon shows the following menu:

- **Wireless Radio On** – Turns the wireless radio ON.
- **Wireless Radio Off** – Turns the wireless radio OFF.
- **Search & Connect** – View the properties of available Access Points within range.
- **Wireless Option** (Windows XP only) – Sets your Windows XP wireless networking environment.

Taskbar Left-Click Menu

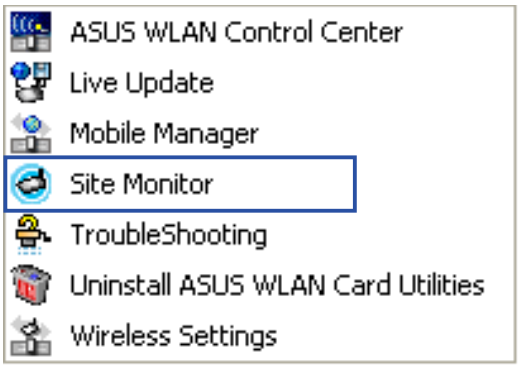
Taskbar Icon - Launch Wireless Setting

Double-clicking the taskbar icon:

- Launches the Wireless Settings application.

Site Monitor Utility

Site Monitor measures the received signal strength indicator (RSSI) values of all available wireless networks. This tool is used for determining the best placement of Access Points to provide the best coverage for a wireless network.



Windows Start Menu

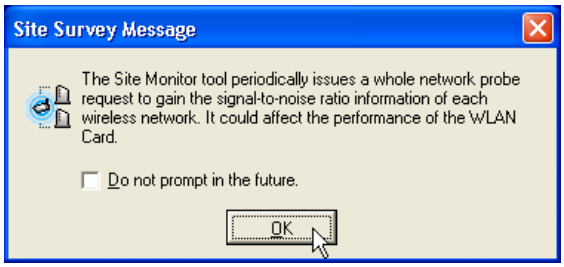
Starting Site Monitor

- Click the Windows **Start** button, select **Programs | ASUS Utility | WLAN Card | Site Monitor**.

or

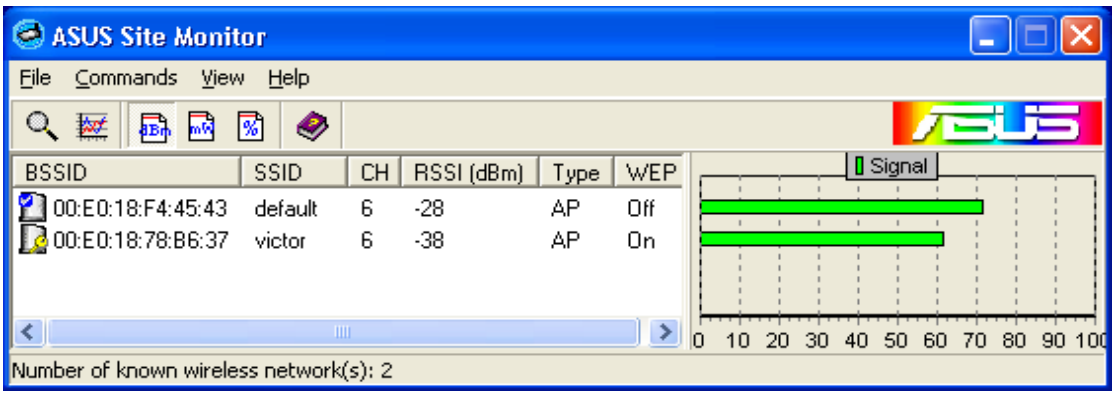
- Right-click the **Control Center** icon on the Windows taskbar and then click **Site Monitor**.

Your wireless LAN performance may be affected when running the site monitor.



Main Screen

Measures the signal values of all available wireless networks.



Some Access Points can disable broadcasting SSID to hide themselves from "Site Survey" or "Site Monitor" for added security but still allow you to join if you know their SSID.

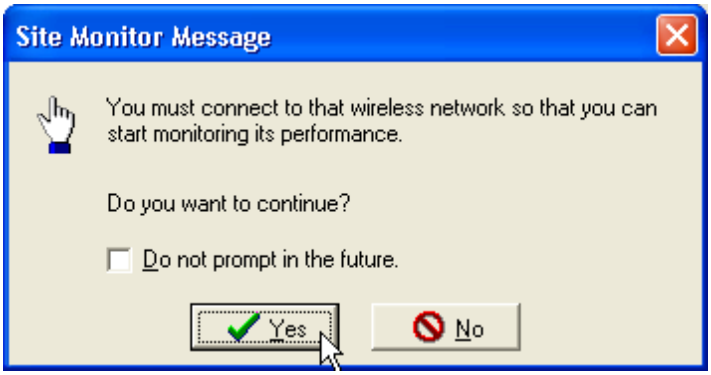
Monitor

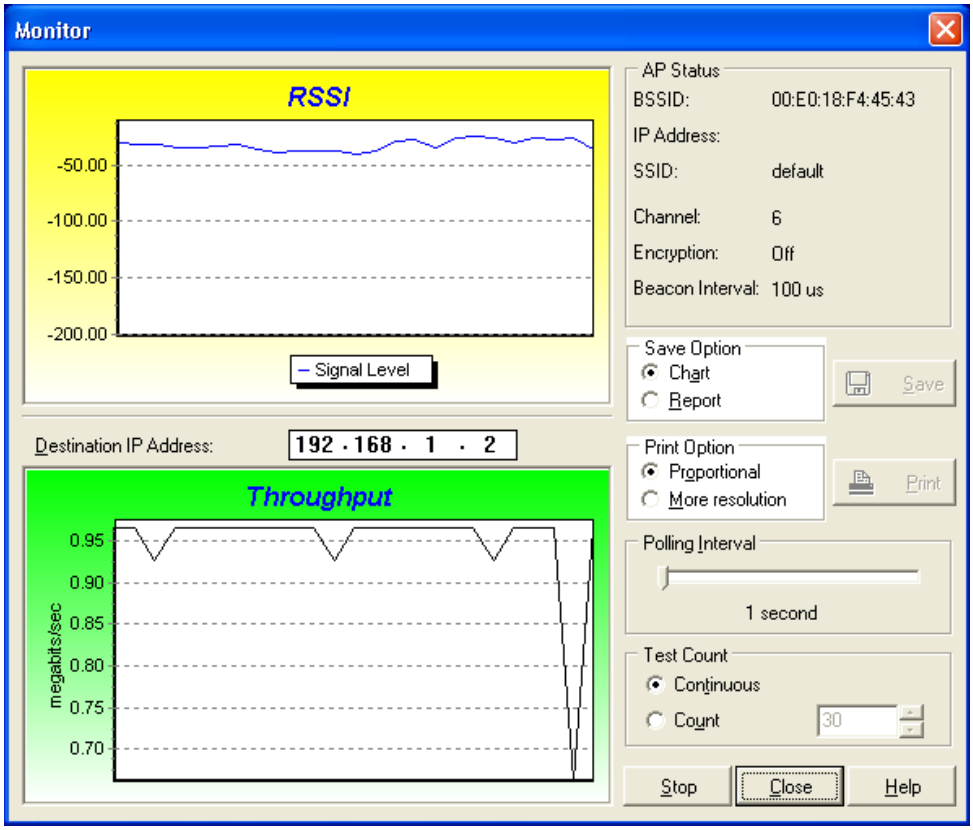
Directed link state test with one particular wireless network, including:

RSSI: This indicates the value of received signal strength of the last received frame. In principle, the higher the RSSI, the better your communications quality.

Throughput: This sends a specified number of data packets to the remote host and calculates the average megabytes per second.

During the test, the Start button toggles to Stop. You can click Start button to begin the link test and click Stop button at any time to terminate the test.





Wireless Settings Utility

Wireless Settings is an application that allows you to control your ASUS WLAN Card. Use Wireless Settings to View or Modify the configuration settings and monitor the operational status of your PC Card. Once Wireless Settings is launched, you can see the tabbed property sheet. This property sheet is composed of tabbed "pages", each with its own group of feature-specific settings.

Starting Wireless Settings

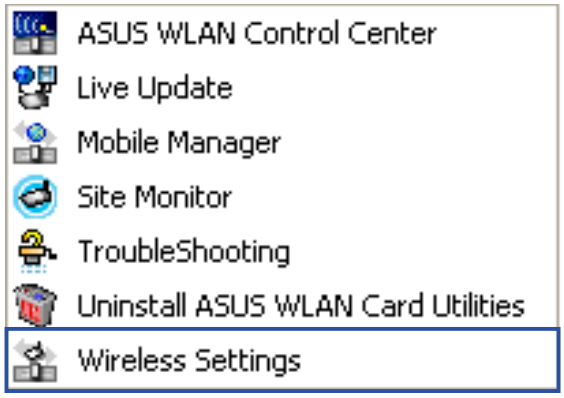
- Open the Windows **Control Panel**, and then double-click the **ASUS WLAN Card Settings** icon.

or

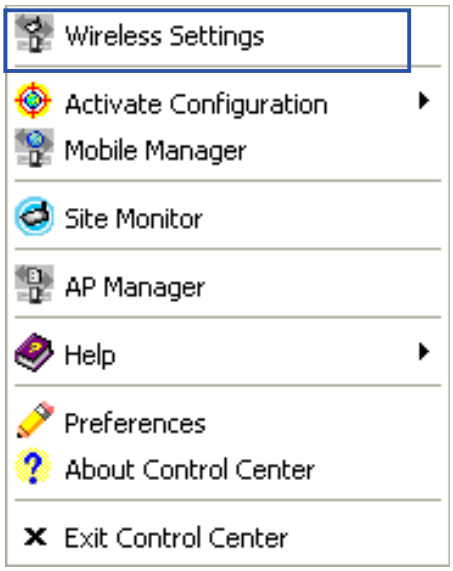
- Click the Windows **Start** button, select **Programs | ASUS Utility | WLAN Card | Wireless Settings**.

or

- Right-click the **Control Center icon** on the Windows taskbar, select **Wireless Settings**.



Windows Start Menu

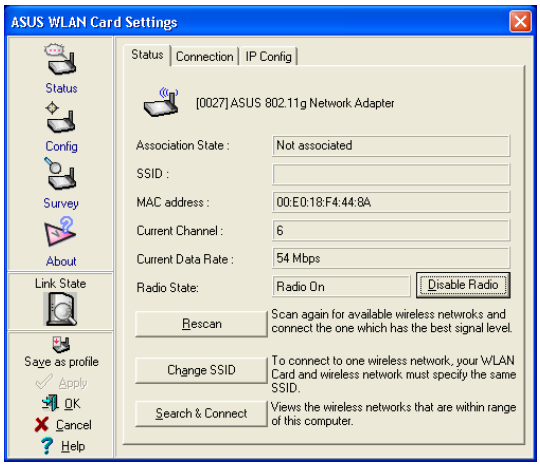


Right-Click Menu

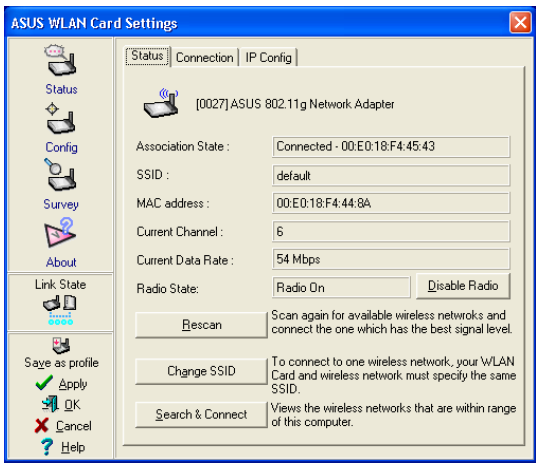
If you have more than one ASUS WLAN device, you will be given a device selection window when you launch the "Wireless Settings" utility. Select the appropriate model if you face this situation.

Status - Status Tab

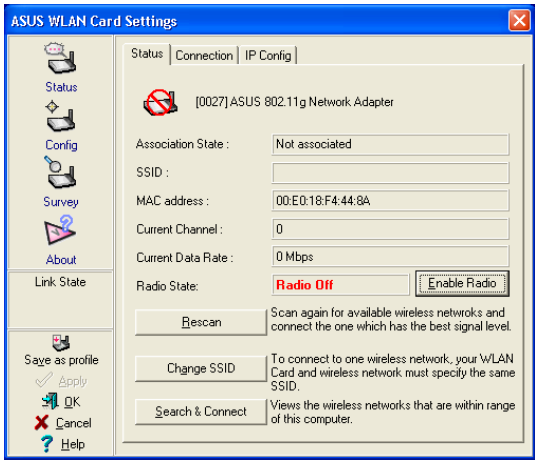
You can view the information about the ASUS WLAN Card from the general menu. These fields are blank if the ASUS WLAN Card does not exist.



Scanning



Connected



Radio Disabled

You can turn OFF the ASUS WLAN Card by clicking the “Disable Radio” button.

Association State

Displays the connection status as follows:

Connected - The station is now associated with one wireless LAN device. When operating in Infrastructure mode, this field shows the MAC address of the Access Point with which you are communicating. When operating in Ad Hoc* mode, this field shows the virtual MAC address used by computers participating in the Ad Hoc* network.

Scanning... - The station is now attempting to authenticate and associate with the desired Access Point or Ad Hoc* node.

Disconnected - The link is connected, but no beacon received.

SSID

Displays the Service Set Identifier (SSID) that the card is either associated or intending to join.

MAC address

Indicates the hardware address of the card. MAC address is a unique identifier for networking devices (typically written as twelve hexadecimal digits 0 through 9 and A through F, six hexadecimal numbers separated by colons, i.e. 00:E0:18:F0:05:C0).

Current Channel

Displays the radio channel that the card is currently tuned. This number changes as the radio scans the available channels.

Current Data Rate

Displays the current transmit data rate in megabits per second (Mbps).

* See Chapter 5 - Glossary

Radio State

Shows the wireless radio on or off.

Radio On - When the wireless radio is turned off, the following icon appears in the upper left of the Settings property page.

Radio Off - When the wireless radio is turned on, the following icon appears in the upper left of the Settings property page.

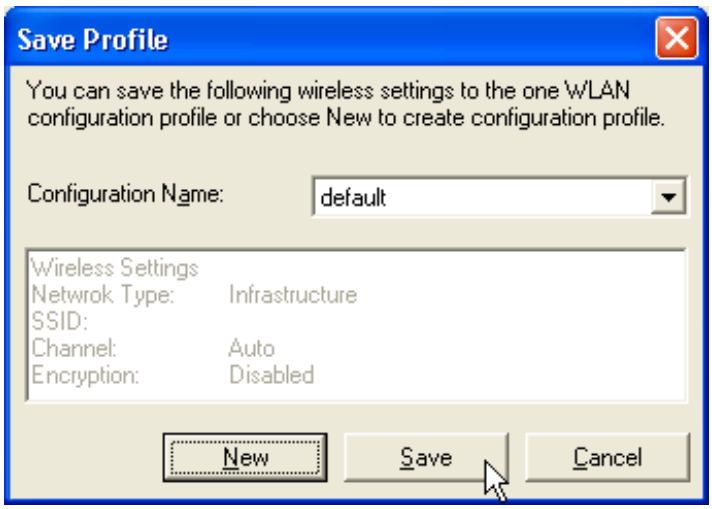
Rescan – Force the radio to rescan all available channels. If your link quality or signal strength is poor, rescanning can be used to push the radio off a weak Access Point and search for a better link with another Access Point. This function will take some time to complete.

Change SSID – Click on this to set the SSID.

Search & Connect – Click on this to connect to an available network.

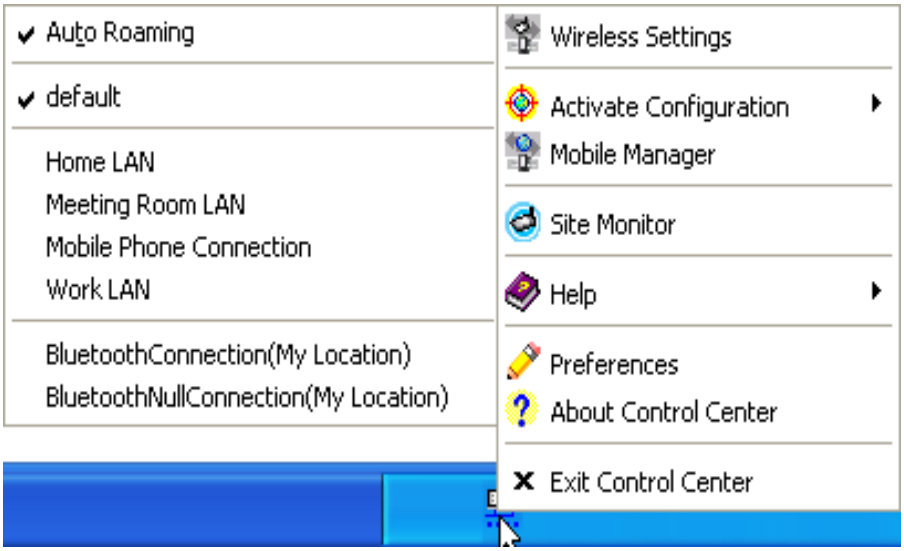
Save as Profile

Later, when you make individual settings, you may want to use profiles to save your settings. Profiles will help you combine all your settings for work, home, roaming, and other locations so that you do not have to repeat individual settings. When you travel from work to home, for example, choose a “home” profile that contains all your settings for home use. When you travel back to work, choose an “office” profile.



Activate Configuration

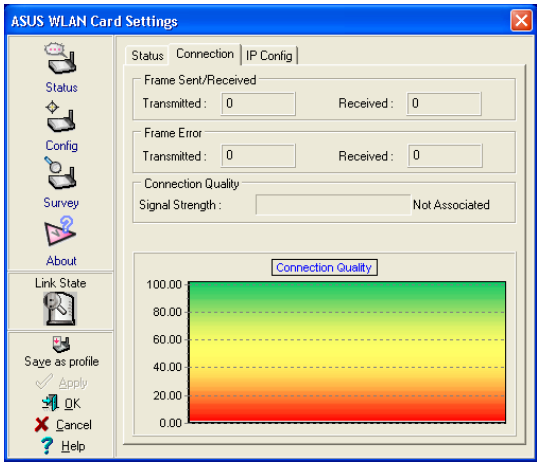
Auto roaming is enabled by default and will automatically switch to stronger access points. You can uncheck it if you have many access points and do not want to constantly switch to different networks. If you want to use a particular profile. You can also check it here.



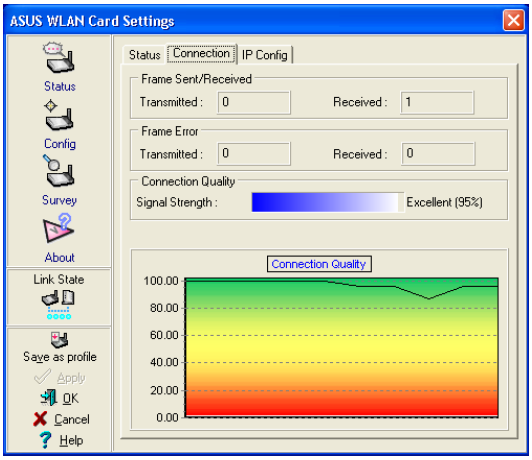
Taskbar Right-Click

Status - Connection Tab

You can view the current link statistics about the ASUS WLAN Card. These statistics are updated once per second and are valid only if the ASUS WLAN Card exists.



Scanning



Connected

Frame Sent/Received

Transmitted - The number of frames that were transmitted.

Received - The number of frames that were received.

Frame Error

Transmitted - The number of frames that were not successfully transmitted.

Received - The number of frames that were not successfully received.

Connection Quality

Signal Strength - Reflects the signal level related to the Access Point or Ad Hoc node the station is currently connected to. Ratings are: Excellent, Good, Fair, and Poor.

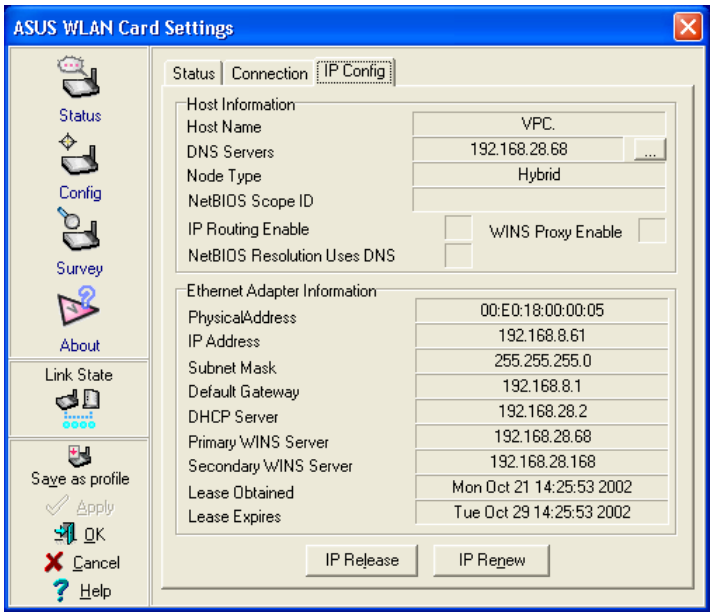
Overall Connection Quality

It is derived from the current "Signal Strength". A graph displays a connection quality range between 0 and 100 percent.

Status - IP Config Tab

IP Config tab shows all the current network configuration information for the ASUS WLAN Card. Use it to verify your network settings.

IP CONFIG will display all the current TCP/IP configuration values including the IP address, subnet mask, default gateway and Windows Internet Naming Service (WINS) and DNS configuration.



Button

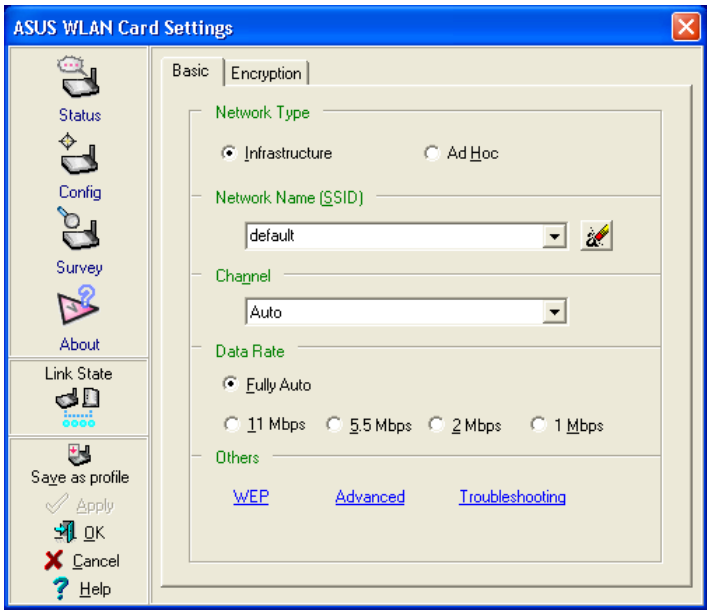
IP Release - Clicking this button will attempt to release the DHCP IP address for the ASUS WLAN Card in case you wish to remove your IP address.

IP Renew - Clicking this button will attempt to renew the DHCP IP address for the ASUS WLAN Card in case you want to obtain a new IP address.

NOTE: The IP Release and IP Renew buttons can only be used on the ASUS WLAN Card that is configured with DHCP.

Config - Basic Tab

Lets you can change the ASUS WLAN Card configurations without rebooting your computer.



Network Type

Infrastructure – Select the Infrastructure mode to establish a connection with an Access Point. Your computer is able to access wireless LAN and wired LAN (Ethernet), via an associated access point. The Channel field turns to "Auto" when "Infrastructure" is selected.

Ad Hoc – Select the "Ad Hoc" mode to communicate directly with each other without using an Access Point. An "Ad Hoc" network is typically formed quickly and easily without pre-planning. For example, share meeting notes between networked computers in a meeting room.

Network Name (SSID)

Use the SSID field to configure the SSID for the ASUS WLAN Card. You can enter a new SSID or select one from the drop-down list box. SSID stands for "Service Set Identifier", which is a string used to identify a wireless LAN. You will only be able to connect Access Points which has the same SSID as the one you set. Use different SSIDs to segment the wireless LAN and increase security. SSIDs must all be printable characters and having a maximum of 32 case sensitive characters, such as " Wireless LAN".

Set the SSID to a null string, if you wish to allow your station to connect to any Access Point it can find. But you cannot use null string in Ad Hoc mode.

Channel

Use the Channel field to select the radio channel for ASUS WLAN Card. In an "infrastructure" network, your ASUS WLAN Card will automatically select the correct frequency channel required to communicate with an Access Point, this parameter will be fixed in "Auto" and cannot be changed. In an "Ad Hoc" network, you can decide the channel number for the ASUS WLAN Card. Any ASUS WLAN Card can communicate in the same network if they have the same frequency channel setting.

The radio channels you may use depend on the regulations in your country. For United States (FCC) and Canada (IC), channels 1 to 11 are supported.

Data Rate

Select the transmit data rate (fix or auto). The data rates supported for the ASUS WLAN Cards are:

Auto – The adapter will adjust to the most suitable transmission rate.

Fix – 11g: Fix data rate to 1, 2, 5.5, 6, 9, 11, 12, 18, 24, 36, 48, or 54 Mbps.

11b: Fix data rate to 1, 2, 5.5, or 11 megabits per second.

Others

WEP – Click on this to show the "Encryption" tab.

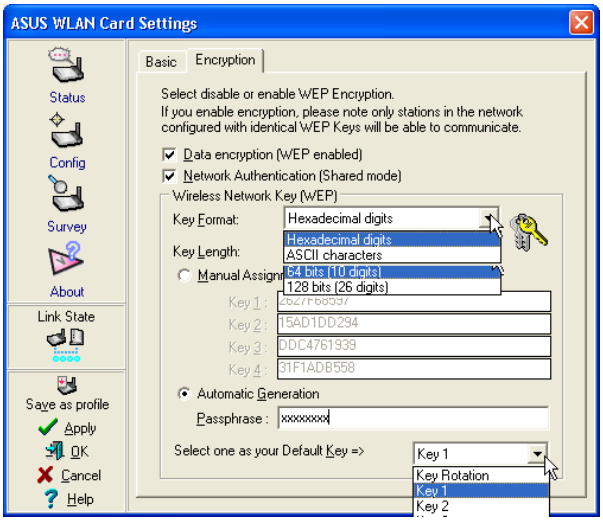
Advanced – Click on this to show the "Advanced" tab. In most cases, the default values do not have to be changed.

Troubleshooting – Click on this to show the Troubleshooting utility.

Click Apply to save and activate the new configurations.

Config - Encryption Tab

Lets you configure the ASUS WLAN Card encryption settings. For data confidentiality in a wireless environment, IEEE 802.11 specifies a Wired Equivalent Privacy (WEP) algorithm to offer transmission privacy similar to wired network. The WEP uses keys to encrypt transmit data packets and decrypt received data packets. The encryption process can scramble frame bits to avoid disclosure to others.



Pull Down Menus

Data encryption (WEP enabled)

This option allows you to enable or disable the Wired Equivalent Privacy (WEP) function. If this check box is selected, a WEP Key is used to encrypt your data before it is transmitted over the air.

If you enable WEP encryption, you will only be able to communicate with wireless devices that have use the same WEP keys.

WEP Key

This option is enable only if you enable WEP Encryption. The WEP Key is a 64 bits (5 byte) or 128 bits (13 byte) Hexadecimal digits that is used to encrypt transmit data packets and decrypt received data packets.

Key Format

You can enter the WEP Key as a Hexadecimal digits (0~9, a~f, and A~F), or as ASCII characters, based on the state of the Key Format.

Key Length

For 64 bits encryption, each Key contains exactly 10 hex digits, or 5 ASCII characters. For 128 bits encryption, each Key contains exactly 26 hex digits, or 13 ASCII characters.

Two ways to assign WEP keys

1. **Manual Assignment -** When you click this button, the cursor appears in the field for Key 1. For 64-bit encryption, you are required to enter four WEP Keys. Each Key contains exactly 10 hex digits (0~9, a~f, and A~F). For 128-bit encryption, you are required to enter four WEP Keys. Each Key contains exactly 26 hex digits (0~9, a~f, and A~F).
2. **Automatic Generation -** Type a combination of up to 64 letters, numbers, or symbols in the Passphrase column, then the Wireless Settings Utility uses an algorithm to generate four WEP Keys for encryption.

NOTE: This function ease users from having to remember their passwords and is compatible to some existing WLAN utilities, but it is not very secure. "Manual Assignment" is more secure.

Default Key

The Default Key field lets you specify which of the four encryption keys you use to transmit data on your wireless LAN. You can change the default key by clicking on the down arrow at the right of this field, selecting the number of the key you want to use and then clicking the Apply button. As long as the Access Point or station with which you are communicating has the same key in the same position, you can use any of the keys as the default.

You then click the Apply button to create your encryption keys. After you click the Apply button, the Wireless Settings Utility uses asterisks to mask your keys.

NOTE: Click the Apply or OK button to save the encryption settings. The keys you entered will be masked by asterisks.

64/128bits versus 40/104bits

You may be confused about configuring WEP encryption, especially when using multiple wireless LAN products from different vendors. There are two levels of WEP Encryption: 64 bits and 128 bits.

First, 64 bit WEP and 40 bit WEP are the same encryption method and can interoperate in the wireless network. This lower level of WEP encryption uses a 40 bit (10 Hex character) as a “secret key” (set by user), and a 24 bit “Initialization Vector” (not under user control). This together makes 64 bits (40 + 24). Some vendors refer to this level of WEP as 40 bits and others refer to this as 64 bits. ASUS WLAN products use the term 64 bits when referring to this *lower* level of encryption.

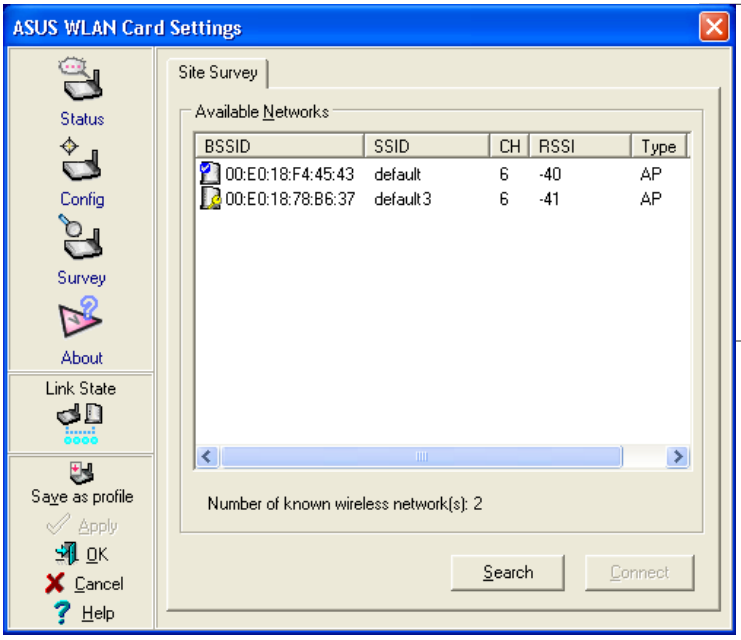
Second, 104 bit WEP and 128 bit WEP are the same encryption method and can interoperate in the wireless network. This higher level of WEP encryption uses a 104 bit (26 Hex character) as a “secret key” (set by user), and a 24 bit “Initialization Vector” (not under user control). This together makes 128 bits (104 + 24). Some vendors refer to this level of WEP as 104 bits and others refer to this as 128 bits. ASUS WLAN products use the term 128 bits when referring to this *higher* level of encryption.

Click Apply to save and activate the new configurations.

Survey - Site Survey Tab

Use the Site Survey tab to view statistics on the wireless networks available to the ASUS WLAN Card. The Site Survey tab is read-only with no user configurable data fields. Use the Site Survey tab to view the following network parameters.

- **BSSID** – View the IEEE MAC addresses of the available networks.
- **SSID** – View the SSID (service set identification) within available networks.
- **CH** – View the direct-sequence channel used by each network.
- **RSSI** – Views the Received Signal Strength Indication (RSSI) in dB.
- **Type** – View wireless network status information, the value is either AP (infrastructure) or STA (Ad Hoc).
- **WEP** – View wireless network WEP encryption information, the value is either OFF (disable encryption) or ON (enable encryption).



Some Access Points can disable broadcasting SSID to hide themselves from "Site Survey" or "Site Monitor" for added security but still allow you to join if you know their SSID.

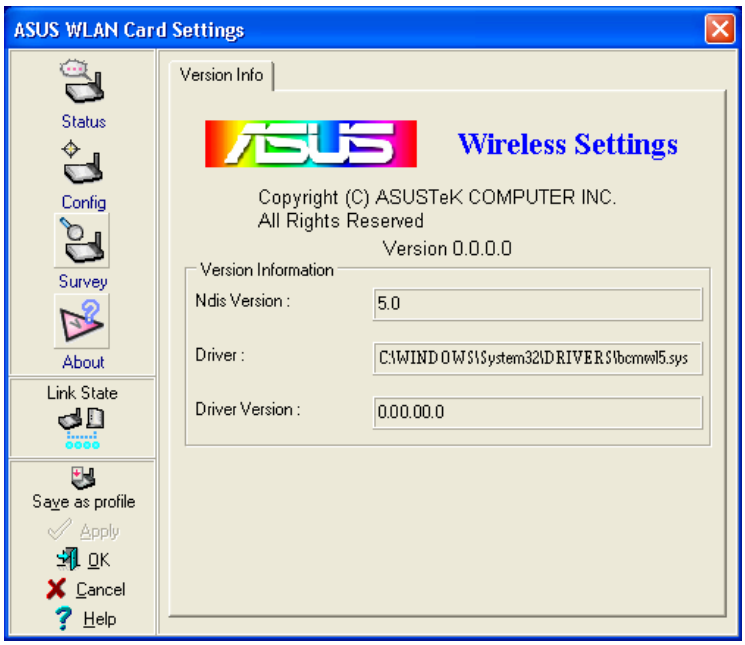
Buttons

Search – Scan all available wireless networks and show the scan result in the "Available Network List".

Connect – To associate a network, select it from the "Available Network List" and click this button.

About - Version Info Tab

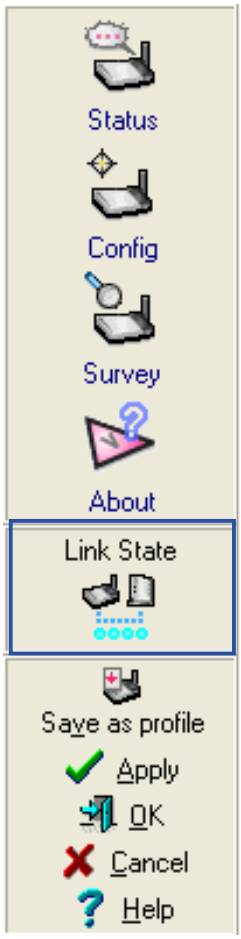
Uses the Version Info tab to view program and ASUS WLAN Card version information. The program version information field includes the Copyright and utility version. The version information includes the ndis version, driver name, and driver version.



This screen is an example only. Your version numbers will be different from what are shown here.

Link State

ASUS WLAN Card “Link State” icon appears on the left side of the ASUS WLAN Card Settings. Use the icon to view the current signal status.



Excellent Link Quality (Infrastructure)

Good Link Quality (Infrastructure)

Fair Link Quality (Infrastructure)

Poor Link Quality (Infrastructure)

Not linked (Infrastructure)

Linked (Ad Hoc)

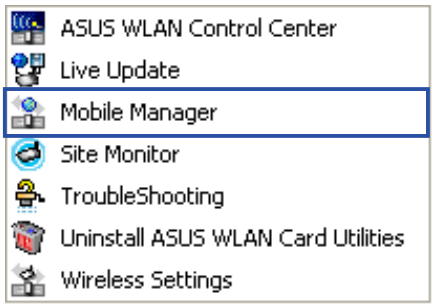
Not Linked (Ad Hoc)

Exit Wireless Settings

To exit Wireless Settings, you can click **OK** or **Cancel**. This utility may be closed at any time and from any tab. If you did not save the configuration settings, you will be prompted to do so.

Mobile Manager Utility

Mobile Manager is a convenient tool to setup and manage network location settings. Mobile Manager lets users configure multiple alternative configurations for different locations. You only need to set this once, and then easily switch configurations when you change your location.



Windows Start Menu

Starting Mobile Manager

- Click the Windows **Start** button, select **Programs | ASUS Utility | WLAN Card | Mobile Manager**.

or

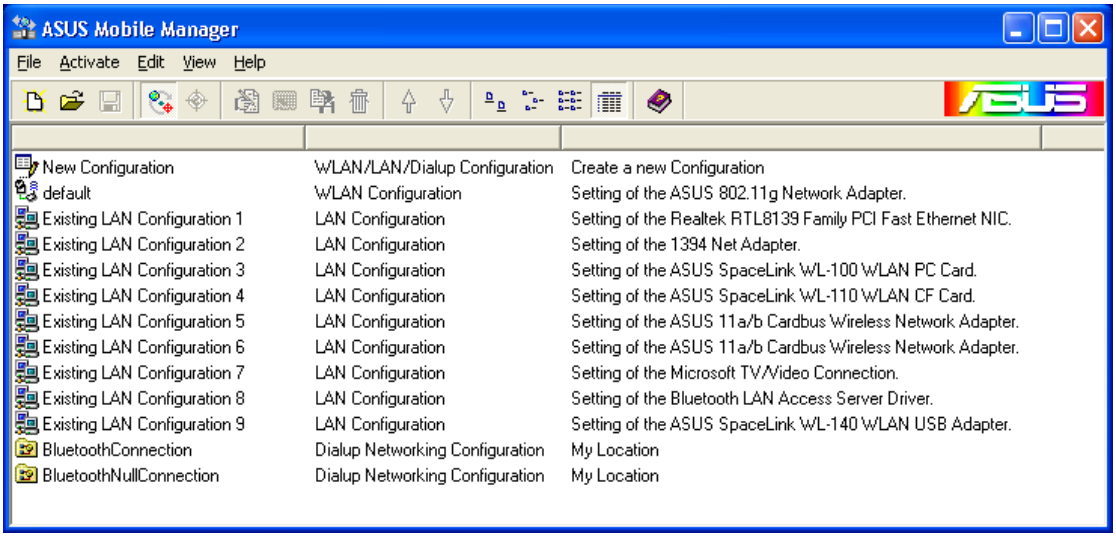
- Right-click the **Control Center** icon on the Windows taskbar and then click **Mobile Manager**.

Using Mobile Manager - Quick Guide

1. The first time you launch the Mobile Manager utility, it will automatically generate configurations that stores the current settings of all installed network devices in your system.
2. Change the name of the configuration to a descriptive name like “Work-Meeting Room” or “Home-ADSL”.
3. On the **File** menu, click **New Configuration**, the New Configuration Wizard dialog appears. Follow the on-screen instructions to create your own location configurations.
4. After you have created your configurations, you can see them in the main window.
5. Select the configuration you want to use and then click **Activate Configuration** from the **Activate** pull-down menu. Your system will then switch to the network settings configured to your chosen selection.

Main Window

You can use the Mobile Manager utility main window to create a new configuration, edit a configuration or activate a configuration. The main window includes a menu bar, tool bar, and a list view for showing existing configurations.



Using the pull-down menu and toolbar

The following topics show the commands available from the Mobile Manager pull-down menu and toolbar. If no configuration is selected, some commands will be grayed out and inaccessible. The toolbar contains buttons for many of the most commonly used commands in Mobile Manager. It allows quick access to some of the most useful features of Mobile Manager. The commands provided by the toolbar buttons are also available from the pull-down menu.

File Menu

New Configuration - Select New Configuration in the File menu to open a New Configuration Wizard dialog. Use the New Configuration Wizard dialog to create a new configuration. See Using New Configuration Wizard for details on this command.

Import Configuration - Load a configuration from an INI File.

Export Configuration - Save the selected configuration (containing Wireless Settings, TCP/IP Settings, Network Settings, ...) to an INI File. The INI file can be placed on a floppy diskette and then imported by other computers using Mobile Manager. This can also be used as a backup feature for yourself.

Exit - Close the Mobile Manager utility.

Mobilize Menu

Auto Roaming – If an association changes, it will automatically switch into a network configuration that you have made. If no associations have been made, it will automatically connect to a wireless network based on configurations that you specify.

Activate Configuration – Applies the configuration that you have selected from the list. You may be prompted to restart Windows depending on the required changes. Follow the instructions on the screen. Windows 2000 and XP usually do not require restarting your computer, but Windows 98 and ME usually will require a restart.

Edit Menu

All these commands are also available from the context menu that appears when you right-click with a configuration in the Mobile Manager window.

Edit Configuration - Select Edit Configuration in the Edit menu to open an Edit Configuration dialog to edit selected configuration items. See “Using Edit Configuration” for details on this command.

Rename - Change the name of the selected configuration.

Copy - Duplicate the selected configuration.

Delete - Discard the selected configuration.

View Menu

Large Icons - Displays large icons for each configuration.

Small Icons - Displays small icons for each configuration.

List - Shows the configuration names in a list.

Details - The Detailed view expands this list to include information about the configurations. The information includes configuration name, type, and description.

Help Menu

Contents - Displays the WinHelp contents window (the one you are reading now) for online Help.

About Mobile Manager - Displays the version number and copyright information for Mobile Manager. Click on the logo to connect to ASUS' website.

New Configuration Wizard

Create a new configuration

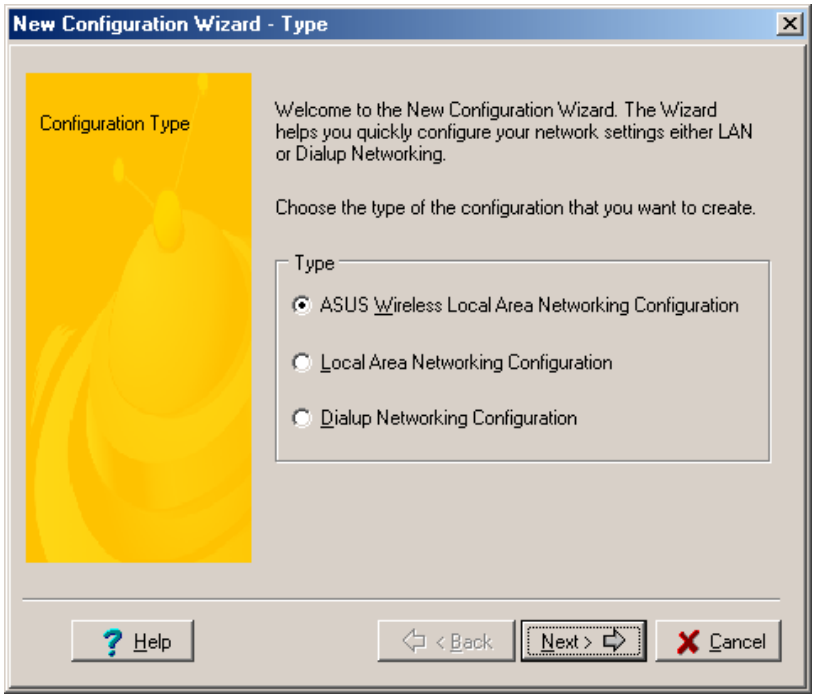
Create a new configuration if you are in a specific location that does not have an existing configuration defined. Use the New Configuration Wizard to create a configuration in a few easy steps.

1. Do one of the following:
   - On the **File menu**, click **New Configuration**.

   or

   - Double-click **New Configuration** on the Main window.

   Then the New Configuration Wizard dialog starts.
2. Choose the type of configuration that you want to create and click **Next**.
   - **Wireless Local Area Network Configuration:** You must have an ASUS WLAN Card installed in your PC.
   - **Wired Local Area Network Configuration:** You must have a NIC (LAN card) (other than ASUS WLAN Card) installed in your PC.
   - **Dialup Networking Configuration:** You must have a modem installed in your PC.



3. Enter the name and description you want to use for this configuration in the Name and description field. And Click **Next**.
4. Follow the on-screen instructions, it will guide you through the process of specifying the settings in your configuration. The Wizard reads the current system settings (TCP/IP, NT Domain, Proxy, File, and Printer Sharing) and displays it. Depending on the configuration that you have created, you can set the following groups of settings:
   - Wireless settings (for Wireless Configuration)
   - Network settings (for Wireless/Wired Configuration)
   - TCP/IP settings (for Wireless/Wired Configuration)
   - Dialing settings (for Dialup Configuration)
   - Dialup Networking settings (for Dialup Configuration)
   - Internet settings (for Wireless/Wired/Dialup Configuration)
   - Sharing settings (for Wireless/Wired/Dialup Configuration)

   See “Using Edit Configuration” for detailed information on each.
5. Enter the appropriate information in the wizard. After specifying the appropriate information on each page, click **Next** to continue.
6. On the final window of the New Configuration Wizard, you will see a **Finish** button.
   - If you do not want to use this new configuration now, click **Finish** to save the new configuration. It will be shown in the Mobile Manager main window.

   or
   - If you want to use this new configuration now, click **Mobilize**.

Edit Configuration

Edit an existing configuration

Edit a configuration if you want to view or change dialup or LAN settings.

- On the **Edit menu**, click **Edit Configuration**.

or

- Double-click one existing configuration on the Main window.

Then the Edit Configuration dialog starts.

The Edit Configuration dialog contains various settings, which you select by clicking the buttons at the left of the window. Each setting is described below.

General settings

Name – This field is mandatory, and used for indicating the location from which you are dialing or connecting to the network. For example, if this is used for a meeting room at work, you can use a name like "Work-Meeting Room". If it is used for home on your ADSL, you can name like "Home-ADSL".

Description – This field is optional, you can use it to provide more details about this configuration.

Network settings

Network settings include: "Identification" and "Microsoft Networking".

Identification

Computer name – Give your computer a unique name of up to 15 characters. Thecomputer name is the name that others on your network will see your computer as. For complete compatibility, do not use spaces or symbols. It's generally the same as the DNS hostname, for example, "JohnDoe".

Workgroup – Type an existing workgroup name or create a new workgroup by typing a new name that contains up to 15 characters. Use it to identify your computer group that you belong to.

Computer Description – This information is displayed as a comment next to the computer name when the computer is seen in "Details" view (select from the Windows pull-down menu). Use it to describe your computer, for example, your name, or location.

Microsoft Networking

Logon validation – Specify how Windows 9x clients connect to a Windows NT Server Domain at this location.Check *Log on to Windows NT domain* box if you are using a Windows NT Server in domain controller mode. And then enter the Window NT server domain name in *Window NT domain* field.

Network logon options – Specify how Windows 9x clients try to logon. Select *Quick logon* to wait until the shared network drives is actually used to attempt the login. Select *Logon and restore network connections* to logon to all shared network drives when the user logs into Windows.

Wireless settings

Network Type

Infrastructure – Select the Infrastructure mode to establish a connection with an Access Point.

Ad Hoc – Select the Ad Hoc mode to communicate directly with each other without using an Access Point.

SSID

Using the SSID filed to configure the SSID setting for the ASUS WLAN Card. SSID stands for Service Set Identifier, which is a string used to identify a wireless LAN. You will only be able to connect with an Access Point, which has the same SSID. Use different SSIDs to segment the wireless LAN and add security.

Note that the SSID must be all printable character string (case sensitivity) and up to 32 characters long, such as " WIRELESS LAN". Set the SSID to a null string, if you wish to allow your station to connect to any Access Point it can find. But you cannot use null string in Ad Hoc mode.

Channel

The radio channel used for transmit/receive data. In infrastructure network, your PC Card will automatically select the correct frequency channel required to communicate with an Access Point, this parameter will be fixed in "Auto" and can't change it. In an Ad Hoc Network, you can decide channel number for the PC Card to operate. PC Cards can communicate in the network if each has the same frequency channel setting.

The radio channels you may use depend on the regulations in your country. For United States (FCC) and Canada (IC), channels 1 to 11 are supported.

WEP

Select enable or disable WEP encryption. Note that if you enable WEP encryption, you will only connect with wireless devices that have the same WEP keys.

WEP Key

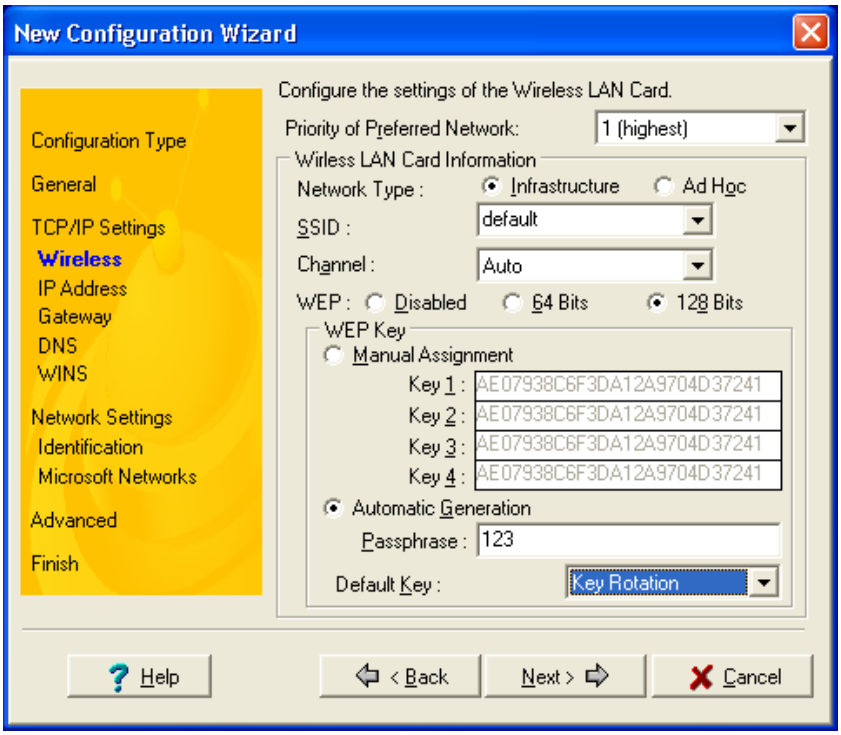
This option is enable only if you enable WEP Encryption. The WEP Key is a 64 bit (5 byte) or 128 bit (13 byte) Hexadecimal digit that is used to encrypt transmit data packets and decrypt received data packets. You have two ways to assign WEP keys:

Automatic Generation - Type a combination of up to 127 letters, numbers, or symbols in the Magic Word column, then it will automatically generate WEP Keys.

Manual Assignment - Manual type WEP keys which valid values include numbers, a~f, and A~F.

Default Key

Determines which entry in the default key table to use for transmitted packets.



Gateway

Specify the gateways. There can be more than one specified.Set up the primary gateway first.

Add a gateway - Type the IP address of the gateway in the **New Gateway** field and then click **Add**. The gateway you specified appears in the **Installed Gateways** list. Repeat to specify another gateways. The value in each field must be a number between 0 and 255. You can have up to eight IP addresses for gateways.

Remove a gateway - Select the gateway from the **Installed Gateways** list and click **Remove**.

DNS

Select Enable or Disable DNS. If you enable DNS, fill the following parameters.

Host – Enter the name of your computer. That is used to identifier the computer on the Internet. The hostname is generally the same as the Microsoft networking computer name, for example, “S82000W”.

Domain – Enter the TCP/IP domain name for your network.The full domain name consists of one or more names that are separated by dots, for example, “asus.com”.

DNS Server Search Order – Specify the DNS Servers in the desired order to search for DNS information.

Domain Suffix Search Order – Add any domain suffixes that may be valid attached to the end of Internet domain name.

WINS

Specify the WINS server. There can be more than one specified.Set up the primary WINS server first.

Disable WINS Resolution – Do not use WINS resolution.

Enable WINS Resolution – Use WINS resolution. Specify the IP addresses of the WINS servers in the desired search order. *Scope ID* is used when NetBIOS over TCP/IP is enabling on the workstations. If this protocol has been enabled, then every workstation group must have the same Scope ID for those computers to communicate within the group. The Scope ID is usually left blank.

Use DHCP for WINS Resolution – If a DHCP server is available that is configured to provide information on available WINS servers.

Dialing settings

Specify how the call will be dialed. This is useful if you want to change the call to a calling card, use your computer from different locations, or add a dial prefix, country code, or area code automatically.

Dialup Networking settings

Dialup Networking settings include four tabs: Device, Phone Number, Server Type, and TCP/IP.

Device

Choose the modem you want to use by Dial-Up Networking to connect to another computer for this connection.

Phone Number

Specify area code, telephone number, and country code for this connection. Clear the **Use area code and Dialing Properties** checkbox, if you want to ignore area code and dialing settings.

Server Type

Type of Dial-Up Server – Select the server type for this connection.

Advanced options

Select **Log on to network** checkbox to specify that Dial-Up Networking will attempt to log on to the network you are connecting to, using the user name and password you typed when you logged on to Windows.

Select **Enable software compression** checkbox to specify whether incoming or outgoing information is compressed before it is sent. This is useful to speed up the transfer of information. Compression occurs only if both computers are using compatible compression.

Select **Require encrypted password** checkbox to specify that only encrypted passwords can be sent to or accepted by your computer. This is useful if you need additional security for this connection. When type your password while dialing out, this setting will encrypt your password but the target computer must support encrypted passwords for your password to be understood.

Allowed network protocols – Specifies the network protocols that your computer can use.

Select **NetBEUI** protocol to connect to Windows NT, Windows for Workgroups, or LAN Manager servers.

Select **IPX/SPX Compatible** protocol to connect to Netware and Windows NT servers and Windows 98 computers.

Select **TCP/IP** protocol to connect to Internet and wide-area networks.

TCP/IP

Server assigned IP address – Specifies whether Dialup Networking accepts an IP address from a ppp server. If the ppp server does not offer an IP address, the IP address specified for TCP/IP Dial-Up Adapter in the Network dialog box is used.

Specify an IP address – Provides a space for you to type the preferred IP address for this connection. Dial-Up Networking tries to use this address first.

Server assigned name server addresses – Specifies whether Dial-Up Networking accepts a DNS and WINS server addresses from a ppp server. If the ppp server does not offer DNS and WINS addresses, DNS and WINS server addresses specified for TCP/IP Dial-Up Adapter in the Network dialog box are used.

Specify name server addresses – Provides a space for you to type one or two DNS and WINS server addresses for this connection only. Dial-Up Networking tries to use these addresses first.

Use IP header compression – Specifies whether Dial-Up Networking uses IP header compression for this connection. IP header compression optimizes data transfer between computers.

Use default gateway on remote network – Specifies whether IP traffic is routed to the WAN connection by default.

Internet settings

A proxy server acts as a security barrier between your internal network (Intranet) and the Internet, keeping other people on the Internet from gaining access to confidential information on your internal network or your computer.

Disable Proxy Server – Do not use proxy server.

Enable Proxy Server – Use the Proxy server to gain access to the Internet.

Use the same proxy server for all protocols – Specifies whether you want to use the same proxy server to gain access to the Internet using all protocols.

Servers – Provides spaces for you to type the address and port number of the proxy server you want to use to gain access to the Internet over HTTP, Secure, FTP, Gopher, and Socks protocol.

Exceptions

Do not use proxy server for address beginning with – Provides a space for you to type the Web addresses that do not need to be accessed through the proxy server. If you want to connect to a computer on your Intranet, make sure you type its address in this box. You can use wild cards to match domain and host names or addresses, for example, "*.company.com", "192.72.111.*".

Bypass proxy server for local addresses – Specifies whether you want to use the proxy server for all local (Intranet) addresses. You might be able to gain access to local addresses easier and faster if you do not use the proxy server.

Sharing settings

I want to be able to give others access to my files – Turn file sharing ON or OFF. File sharing enables people using other computers to read or modify files you share on your computer.

I want to be able to allow others to print to my printer(s) – Turn printer sharing ON or OFF. Printer sharing enables people using other computers to printer their files on your printers.

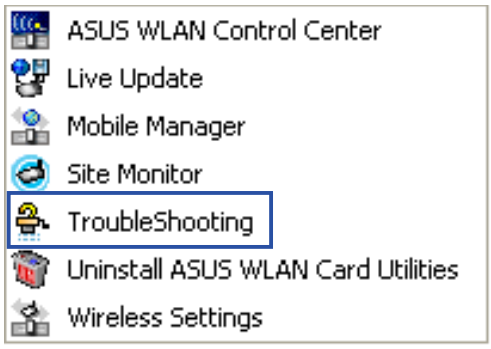
Click **Save** button to save all the changes you have made without closing the Edit Configuration dialog box.

Click **Cancel** button to close the Edit Configuration dialog box without saving any changes you have made.

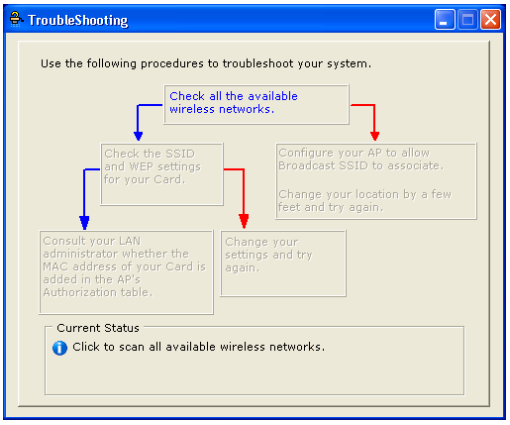
Click **Close** button to close the Edit Configuration dialog box and save any changes that you have made.

Troubleshooting Utility

If you have problems connecting to an access point, try the "TroubleShooting" utility.

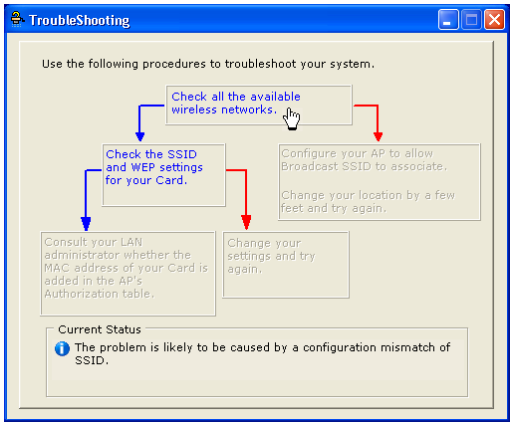


Windows Start Menu



1. The first instruction is to "Check all the available wireless networks". For example you can run "Site Survey", "Site Monitor", or ask your network administrator for correct settings.

   Click the first box to scan all available wireless networks.



2. If you still cannot connect after completing the first instruction, click the first box to reveal a second step.

Depending on the utility's detection of SSID broadcasts, you will have two possible second instruction.

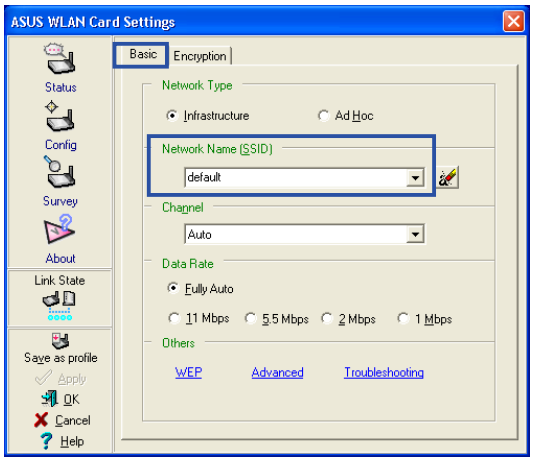
SSID broadcasts detected:
"Check the SSID and WEP settings for your card."

SSID broadcasts not detected:
"Configure your AP to allow Broadcast SSID to associate." or "Change your location by a few feet and try again."

The main point here is that your ASUS WLAN Card's SSID and WEP security settings must match that of a nearby access point. Move closer to the access point if necessary.

ASUS WLAN Card

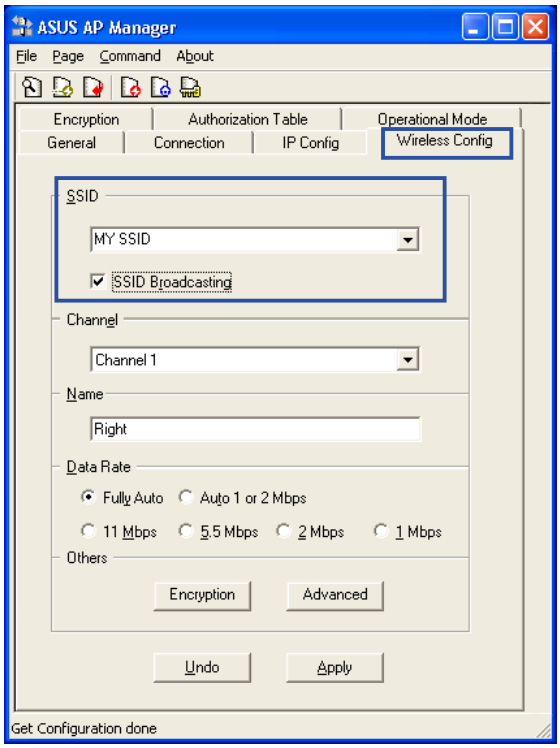
Network Name (SSID) Setting



Make sure that the SSID are the same. SSID Broadcasting on the Access Point is not necessary and may be disabled for increased security. You may enable SSID Broadcasting during troubleshooting if necessary.

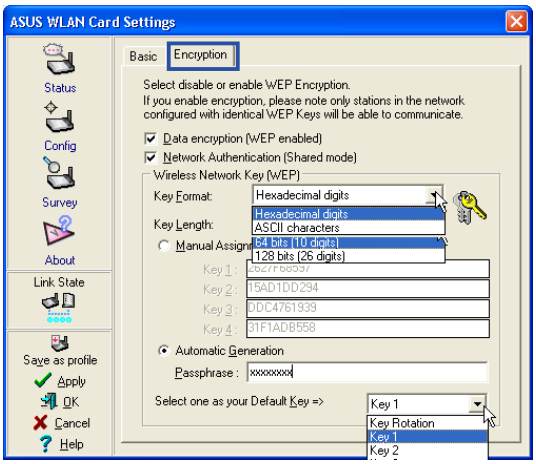
ASUS WLAN Access Point

Network Name (SSID) Setting



ASUS WLAN Card

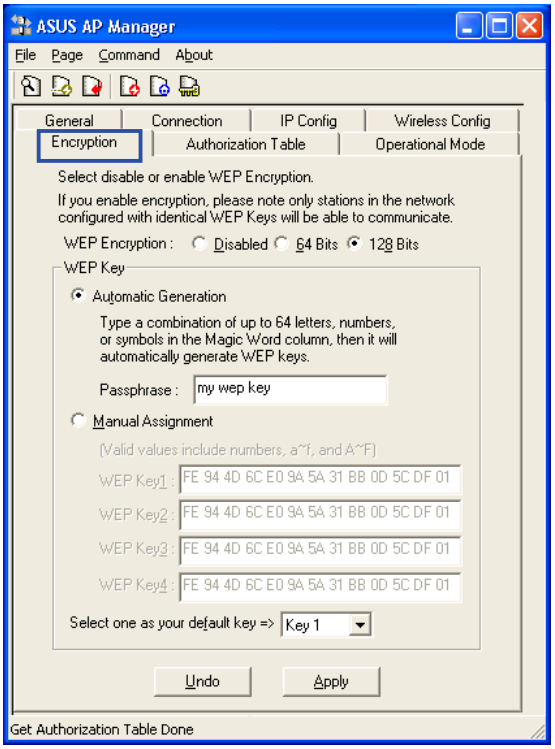
Encryption (security) Settings

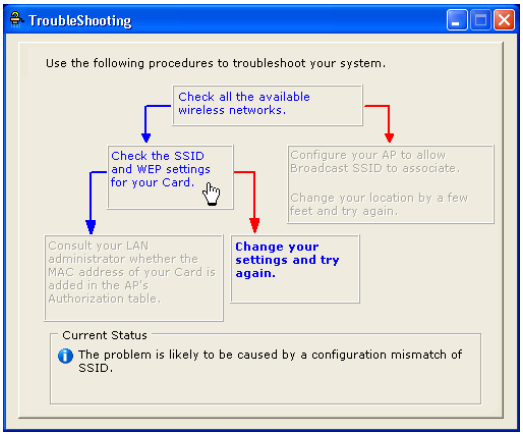


Make sure these are set the same as the access point.

ASUS WLAN Access Point

Encryption (security) Settings





3. If you still cannot connect after completing the second instruction, click the second box to reveal a second step.

Depending on the utility's detection of SSID broadcasts, you will have two possible second instruction.

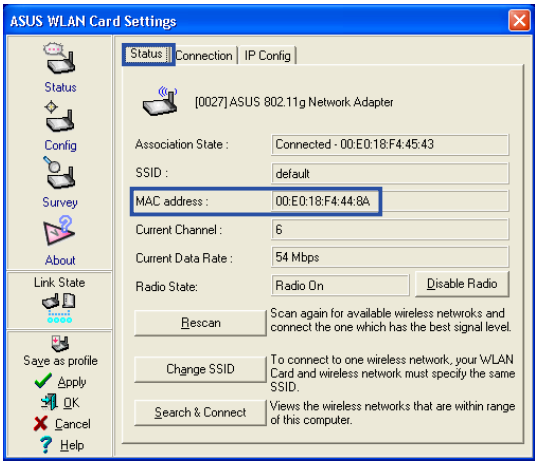
SSID broadcasts detected:
"Consult your LAN administrator whether the MAC address of your Card is added in the APs Authorization table."

SSID broadcasts not detected:
"Change your settings and try again."

The main point here is that your ASUS WLAN Card's MAC address must be allowed and not prohibited from joining the access point. Clicking the last box will send you to the Wireless Settings utility.

ASUS WLAN Card

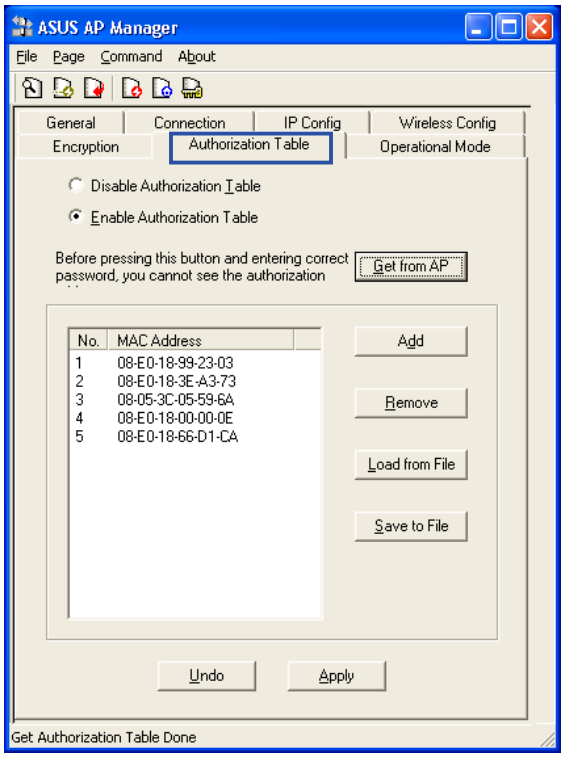
Authorization (MAC Address) Settings

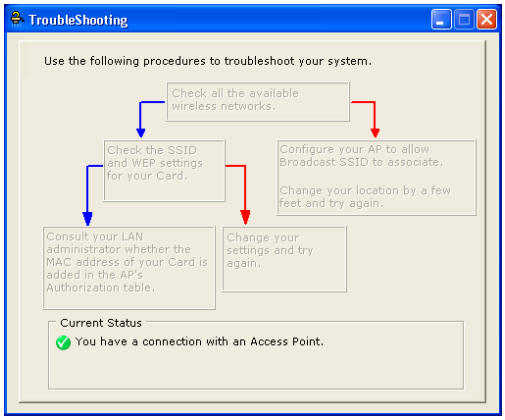


Your MAC address is shown here. Make sure it is included in the access point Authorization Table if it is enabled. Some Authorization Table has an option to "exclude" or "prohibit" certain MAC address from joining. In this case, make sure your MAC address is not among them.

ASUS WLAN Access Point

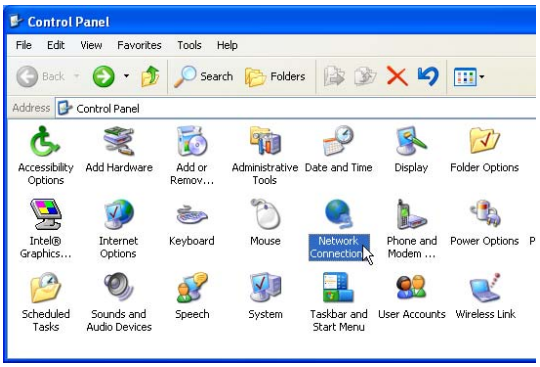
Authorization (MAC Address) Settings



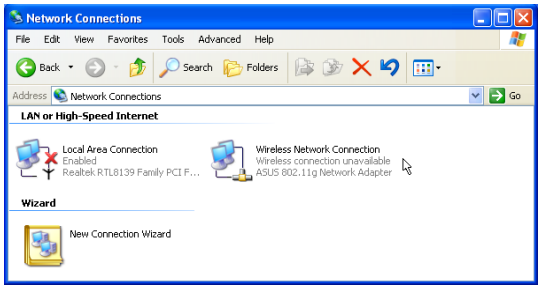


4. After configuration is successful, you will get a current status of: “You have a connection with an Access Point.” You can close the TroubleShooting utility and begin using your wireless network.

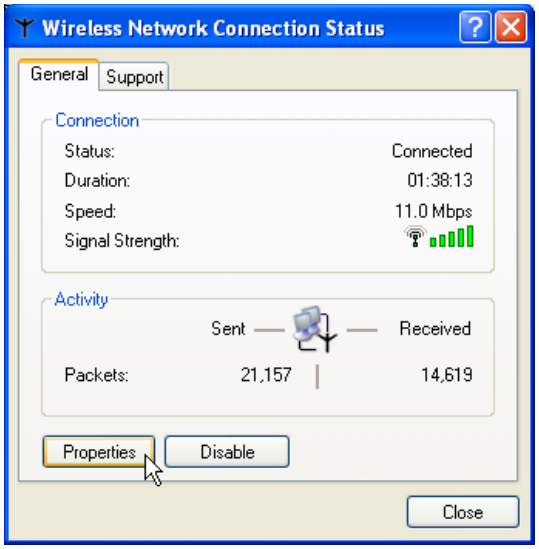
Windows XP Wireless Properties



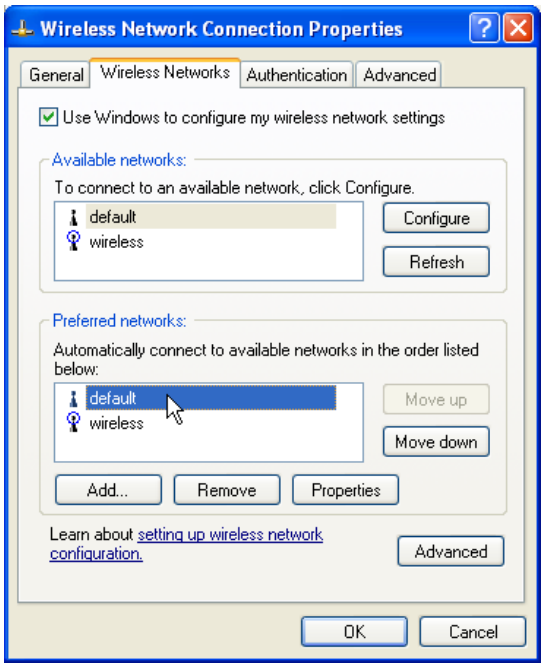
1. Double-click **System** icon in the Control Panel.



2. Double-click **ASUS WLAN ...**

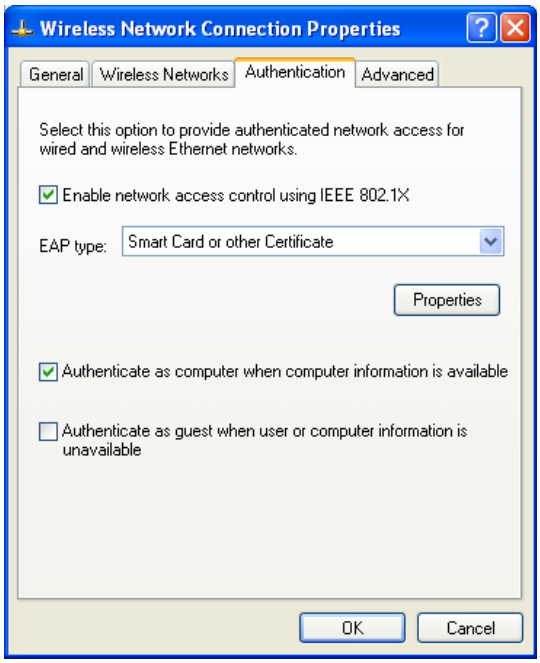


3. The "General" page will show status, duration, speed, and signal strength. Signal strength is represented by green bars with 5 bars meaning excellent signal and 1 bar meaning poor signal.

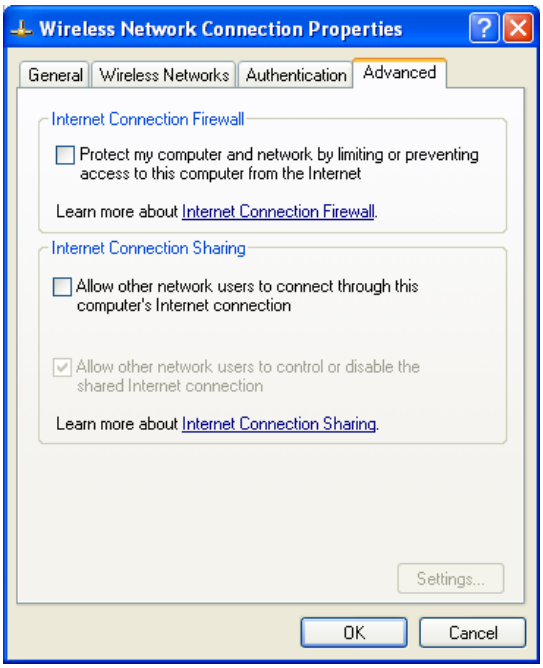


4. The "Wireless Networks" page will show Available networks and Preferred networks. Use the **Add** button to add the "SSID" of available networks and set the connection preference order with the **Move up** and **Move down** buttons. The radio tower with a signal icon identifies the currently connected access point.

Windows XP Wireless Properties (Cont.)



5. The "Authentication" page allows you to add security settings. Read Windows help for more information.



6. The "Advanced" page allows you to set firewall and sharing. Read Windows help for more information.

4. Troubleshooting

The following troubleshooting guides provide answers to some of the more common problems, which you may encounter while installing or using ASUS WLAN Card products. If you encounter difficulties that are not mentioned in this section, please contact ASUS Wireless LAN Technical Support.

Verify if the ASUS WLAN Card is installed correctly.

When the ASUS WLAN Card setup is complete, you can verify if the driver has been setup properly. Right click **My Computer**, select **Properties**, and click the **Device Manager** tab. Then double-click the **Network adapters** icon; you should see "**ASUS 802.11g Network Adapter**" with an icon of an expansion card. There should not be a "!" or "?" (problem) or "x" (disabled) symbol over this icon.

There is a yellow exclamation mark or a yellow question mark in Device Manager in front of my ASUS WLAN Card.

To resolve the problem, you should update/reinstall the ASUS WLAN Card driver. In "Device Manager", right click **ASUS 802.11g Network Adapter**, select **Properties**, and select **Driver** tab. Click on **Update Driver** button, then follow the "Update Device Driver Wizard" to complete the driver installation.

In addition, you may be able to resolve this issue by reinstalling the driver. Choose **ASUS 802.11g Network Adapter**, click **Remove** button in "Device Manager", and then run the **Add New Hardware Wizard** from the **Control Panel**.

Cannot connect to any Access Points

Follow the procedure below to configure your ASUS WLAN Card.

a. Verify that the "Network Type" is in "Infrastructure" mode.

b. Verify that the "SSID" of your ASUS WLAN Card is set to the same "SSID" of an Access Point.

c. Verify that the "Encryption" type is the same as that of an Access Point. If you enabled "WEP" encryption, you must also set the same WEP Keys on both sides.

Cannot connect to a Station (ASUS WLAN Card)

Follow the procedure below to configure your ASUS WLAN Card.

a. Verify that the “Network Type” is in “Ad Hoc” mode.

b. Verify that the “SSID” of your ASUS WLAN Card is set to the same “SSID” of the other station (or another ASUS WLAN Card).

c. Verify that the “channel” of the ASUS WLAN Card is “Auto” or set to the same “channel” of the other station (or another ASUS WLAN Card).

d. Verify that the “Encryption” type is the same as the other station (or another ASUS WLAN Card). If “WEP” encryption is enabled, you must set the same “WEP” Keys on both stations.

Bad link quality or bad signal strength

There are two possible reasons. First is radio interference, keep the environment around the ASUS WLAN Card away from microwave ovens and large metal objects. Then try to reorient the ASUS WLAN Card antenna. Second is the distance, decrease the distance between your ASUS WLAN Card and the Access Point or station (or another ASUS WLAN Card).

The TCP/IP protocol did not bind to the ASUS WLAN PC Card.

This will occur when the computer already has six TCP/IP bindings in Windows 98 or ten bindings in Windows Me. These limits are imposed by the Microsoft operating system.

Solution: If your computer already has the maximum number of TCP/IP bindings, remove one of the network adapters from the Network configuration before installing the ASUS WLAN Card driver.

5. Glossary

Access Point (AP)

An networking device that seamlessly connects wired and wireless networks. Access Points combined with a distributed system support the creation of multiple radio cells that enable roaming throughout a facility.

Ad Hoc

A wireless network composed solely of stations within mutual communication range of each other (no Access Point).

Basic Service Area (BSS)

A set of stations controlled by a single coordination function.

Channel

An instance of medium use for the purpose of passing protocol data units that may be used simultaneously, in the same volume of space, with other instances of medium use (on other channels) by other instances of the same physical layer, with an acceptably low frame error ratio due to mutual interference.

COFDM

See next few pages for detailed explanation.

DNS Server Address (Domain Name System)

DNS allows Internet host computers to have a domain name and one or more IP addresses. A DNS server keeps a database of host computers and their respective domain names and IP addresses, so that when a user enters a domain name into the Internet browser, the user is sent to the proper IP address. The DNS server address used by the computers on your home network is the location of the DNS server your ISP has assigned.

DSL Modem (Digital Subscriber Line)

A DSL modem uses your existing phone lines to transmit data at high speeds.

Direct-Sequence Spread Spectrum

See next few pages for detailed explanation.

Encryption

This provides wireless data transmissions with a level of security.

Direct-Sequence Spread Spectrum

See next few pages for detailed explanation.

Extended Service Set (ESS)

A set of one or more interconnected basic service set (BSSs) and integrated local area networks (LANs) can be configured as an Extended Service Set.

Ethernet

The most widely used LAN access method, which is defined by the IEEE 802.3 standard. Ethernet is normally a shared media LAN meaning all devices on the network segment share total bandwidth. Ethernet networks operate at 10Mbps using CSMA/CD to run over 10-BaseT cables.

Gateway

A network component that acts as an entrance to another network.

IEEE 802.11

IEEE 802.xx is a set of specifications for LANs from the Institute of Electrical and Electronic Engineers (IEEE). Most wired networks conform to 802.3, the specification for CSMA/CD based Ethernet networks or 802.5, the specification for token ring networks. 802.11 defines the standard for wireless LANs encompassing three incompatible (non-interoperable) technologies: Frequency Hopping Spread Spectrum (FHSS), Direct Sequence Spread Spectrum (DSSS), and Infrared. 802.11 specifies a carrier sense media access control and physical layer specifications for 1 and 2 Mbps wireless LANs.

IEEE 802.11b

802.11b specifies a carrier sense media access control and physical layer specifications for 5.5 and 11 Mbps wireless LANs.

IEEE 802.11g

802.11g is an extension to 802.11b, used in majority of wireless LANs today. 802.11g will broaden 802.11b's data rates to 54 Mbps within the 2.4 GHz band using OFDM (orthogonal frequency division multiplexing) technology. 802.11g allows backward compatibility with 802.11b devices but only at 11 Mbps or lower depending on the range and presence of obstructions.

Infrastructure

A wireless network centered about an access point. In this environment, the access point not only provides communication with the wired network but also mediates wireless network traffic in the immediate neighborhood.

IP (Internet Protocol)

The TCP/IP standard protocol that defines the IP datagram as the unit of information passed across an Internet and provides the basis for connectionless packet delivery service. IP includes the ICMP control and error message protocol as an integral part. It provides the functional equivalent of ISO OSI Network Services.

IP Address

An IP address is a 32-bit number that identifies each sender or receiver of information that is sent across the Internet. An IP address has two parts: the identifier of a particular network on the Internet and an identifier of the particular device (which can be a server or a workstation) within that network.

ISM Bands (Industrial, Scientific, and Medicine Bands)

Radio frequency bands that the Federal Communications Commission (FCC) authorized for wireless LANs. The ISM bands are located at 902 MHz, 2.400 GHz, and 5.7 GHz.

ISP (Internet Service Provider)

An organization that provides access to the Internet. Small ISPs provide service via modem and ISDN while the larger ones also offer private line hookups (T1, fractional T1, etc.).

LAN (Local Area Network)

A communications network that serves users within a defined geographical area. The benefits include the sharing of Internet access, files and equipment like printers and storage devices. Special network cabling (10 Base-T) is often used to connect the PCs together.

NIC (Network Interface Card)

A network adapter inserted into a computer so that the computer can be connected to a network. It is responsible for converting data from stored in the computer to the form transmitted or received.

Packet

A basic message unit for communication across a network. A packet usually includes routing information, data, and sometimes error detection information.

PCI (Personal Computer Memory Card International Association)

The Personal Computer Memory Card International Association (PCI), develops

standards for PC cards, formerly known as PCI cards. These cards are available in three types, and are about the same length and width as credit cards. However, the different width of the cards ranges in thickness from 3.3 mm (Type I) to 5.0 mm (Type II) to 10.5 mm (Type III). These cards can be used for various functions, including memory storage, landline modems and wireless modems.

PPP (Point-to-Point Protocol)

PPP is a protocol for communication between computers using a serial interface, typically a personal computer connected by phone line to a server.

PPPoE (Point-to-Point Protocol over Ethernet)

Point-to-Point Protocol is a method of secure data transmission. PPP using Ethernet to connect to an ISP.

Radio Frequency (RF) Terms: GHz, MHz, Hz

The international unit for measuring frequency is Hertz (Hz), equivalent to the older unit of cycles per second. One megahertz (MHz) is one million Hertz. One gigahertz (GHz) is one billion Hertz. The standard US electrical power frequency is 60 Hz, the AM broadcast radio frequency band is 0.55-1.6 MHz, the FM broadcast radio frequency band is 88-108 MHz, and wireless 802.11 LANs operate at 2.4 GHz.

SSID (Service Set ID)

SSID is a group name shared by every member of a wireless network. Only client PCs with the same SSID are allowed to establish a connection.

Station

Any device containing IEEE 802.11 wireless medium access conformity.

Subnet Mask

A subnet mask is a set of four numbers configured like an IP address. It is used to create IP address numbers used only within a particular network.

TCP (Transmission Control Protocol)

The standard transport level protocol that provides the full duplex, stream service on which many application protocols depend. TCP allows a process or one machine to send a stream of data to a process on another. Software implementing TCP usually resides in the operating system and uses the IP to transmit information across the network.

WAN (Wide Area Network)

A system of LANs, connected together. A network that connects computers located in separate areas, (i.e., different buildings, cities, countries). The Internet is a wide area network.

WECA (Wireless Ethernet Compatibility Alliance)

An industry group that certifies cross-vender interoperability and compatibility of IEEE 802.11b wireless networking products and to promote that standard for enterprise, small business, and home environments.

WLAN (Wireless Local Area Network)

This is a group of computers and other devices connected wirelessly in a small area. A wireless network is referred to as LAN or WLAN.

IEEE 802.11b (11Mbits/sec)

In 1997, the Institute of Electrical and Electronics Engineers (IEEE) adopted the 802.11 standard for wireless devices operating in the 2.4 GHz frequency band. This standard includes provisions for three radio technologies: direct sequence spread spectrum, frequency hopping spread spectrum, and infrared. Devices that comply with the 802.11 standard operate at a data rate of either 1 or 2 Mbps.

In 1999, the IEEE created the 802.11b standard. 802.11b is essentially identical to the 802.11 standard except 802.11b provides for data rates of up to 11 Mbps for direct sequence spread spectrum devices. Under 802.11b, direct sequence devices can operate at 11 Mbps, 5.5 Mbps, 2 Mbps, or 1 Mbps. This provides interoperability with existing 802.11 direct sequence devices that operate only at 2 Mbps.

Direct sequence spread spectrum devices spread a radio signal over a range of frequencies. The IEEE 802.11b specification allocates the 2.4 GHz frequency band into 14 overlapping operating Channels. Each Channel corresponds to a different set of frequencies. See the Appendix to determine the center frequency used by each Channel.

If operating multiple 802.11b Wireless ASUS WLAN Cards in the same vicinity, the distance between the center frequencies must be at least 25 MHz to avoid interference. Note that the Channels available to an 802.11b Wireless ASUS WLAN Card will vary from country to country. In the United States, the 802.11b standard allocates 11 operating Channels for direct sequence devices. Channels 1, 6, and 11 are independent and do not overlap with each other. To avoid interference between 802.11b Wireless ASUS WLAN Cards, It is recommended that you configure the Wireless ASUS WLAN Cards using only Channels 1, 6, and 11.

Direct-Sequence Spread Spectrum (for 802.11b)

Spread spectrum (broadband) uses a narrowband signal to spread the transmission over a segment of the radio frequency band or spectrum. Direct-sequence is a spread spectrum technique where the transmitted signal is spread over a particular frequency range. The Space Link Wireless ASUS WLAN Card uses Direct-Sequence Spread Spectrum (DSSS) for radio communication.

Direct-sequence systems communicate by continuously transmitting a redundant pattern of bits called a chipping sequence. Each bit of transmitted data is mapped into chips by the Wireless ASUS WLAN Card and rearranged into a pseudorandom spreading code to form the chipping sequence. The chipping sequence is combined with a transmitted data stream to produce the Wireless ASUS WLAN Card output signal.

Wireless mobile clients receiving a direct-sequence transmission use the spreading code to map the chips within the chipping sequence back into bits to recreate the original data transmitted by the Wireless ASUS WLAN Card. Intercepting and decoding a direct-sequence transmission requires a predefined algorithm to associate the spreading code used by the transmitting Wireless ASUS WLAN Card to the receiving wireless mobile client.

This algorithm is established by IEEE 802.11b specifications. The bit redundancy within the chipping sequence enables the receiving wireless mobile client to recreate the original data pattern, even if bits in the chipping sequence are corrupted by interference. The ratio of chips per bit is called the spreading ratio. A high spreading ratio increases the resistance of the signal to interference. A low spreading ratio increases the bandwidth available to the user. The Wireless ASUS WLAN Card uses a constant chip rate of 11Mchips/s for all data rates, but uses different modulation schemes to encode more bits per chip at the higher data rates. The Wireless ASUS WLAN Card is capable of an 11 Mbps data transmission rate, but the coverage area is less than a 1 or 2 Mbps Wireless ASUS WLAN Card since coverage area decreases as bandwidth increases.

IEEE 802.11a (54Mbits/sec)

The 802.11b standard was designed to operate in the 2.4-GHz ISM (Industrial, Scientific and Medical) band using direct-sequence spread-spectrum technology. The 802.11a standard, on the other hand, was designed to operate in the more recently allocated 5-GHz UNII (Unlicensed National Information Infrastructure) band. And unlike 802.11b, the 802.11a standard departs from the traditional spread-spectrum technology, instead using a frequency division multiplexing scheme that's intended to be friendlier to office environments.

The 802.11a standard, which supports data rates of up to 54 Mbps, is the Fast Ethernet analog to 802.11b, which supports data rates of up to 11 Mbps. Like Ethernet and Fast Ethernet, 802.11b and 802.11a use an identical MAC (Media Access Control). However, while Fast Ethernet uses the same physical-layer encoding scheme as Ethernet (only faster), 802.11a uses an entirely different encoding scheme, called OFDM (orthogonal frequency division multiplexing).

The 802.11b spectrum is plagued by saturation from wireless phones, microwave ovens and other emerging wireless technologies, such as Bluetooth. In contrast, 802.11a spectrum is relatively free of interference.

The 802.11a standard gains some of its performance from the higher frequencies at which it operates. The laws of information theory tie frequency, radiated power and distance together in an inverse relationship. Thus, moving up to the 5-GHz spectrum from 2.4 GHz will lead to shorter distances, given the same radiated power and encoding scheme.

COFDM (for 802.11a/g)

Signal power alone is not enough to maintain 802.11b-like distances in an 802.11a/g environment. To compensate, a new physical-layer encoding technology was designed that departs from the traditional direct-sequence technology being deployed today. This technology is called COFDM (coded OFDM). COFDM was developed specifically for indoor wireless use and offers performance much superior to that of spread-spectrum solutions. COFDM works by breaking one high-speed data carrier into several lower-speed subcarriers, which are then transmitted in parallel. Each high-speed carrier is 20 MHz wide and is broken up into 52 subchannels, each approximately 300 KHz wide. COFDM uses 48 of these subchannels for data, while the remaining four are used for error correction. COFDM delivers higher data rates and a high degree of multipath reflection recovery, thanks to its encoding scheme and error correction.

Each subchannel in the COFDM implementation is about 300 KHz wide. At the low end of the speed gradient, BPSK (binary phase shift keying) is used to encode 125 Kbps of data per channel, resulting in a 6,000-Kbps, or 6 Mbps, data rate. Using quadrature phase shift keying, you can double the amount of data encoded to 250 Kbps per channel, yielding a 12-Mbps data rate. And by using 16-level quadrature amplitude modulation encoding 4 bits per hertz, you can achieve a data rate of 24 Mbps. The 802.11a/g standard specifies that all 802.11a/g-compliant products must support these basic data rates. The standard also lets the vendor extend the modulation scheme beyond 24 Mbps. Remember, the more bits per cycle (hertz) that are encoded, the more susceptible the signal will be to interference and fading, and ultimately, the shorter the range, unless power output is increased.

Note: This ASUS WLAN device only supports 802.11g and 802.11b. 802.11a is supported in other ASUS WLAN products.

6. Safety Information

Federal Communications Commission

This device complies with FCC Rules Part 15. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to Part 15 of the Federal Communications Commission (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.

WARNING! The use of a shielded-type power cord is required in order to meet FCC emission limits and to prevent interference to the nearby radio and television reception. It is essential that only the supplied power cord be used. Use only shielded cables to connect I/O devices to this equipment. You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

Reprinted from the Code of Federal Regulations #47, part 15.193, 1993. Washington DC: Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office.

FCC RF Exposure Guidelines (Access Points)

This Wireless LAN radio device has been evaluated under FCC Bulletin OET 65C and found compliant to the requirements as set forth in CFR 47 Sections 2.1091, 2.1093, and 15.247(b)(4) addressing RF Exposure from radio frequency devices. The radiation output power of this Wireless LAN device is far below the FCC radio frequency exposure limits. Nevertheless, this device shall be used in such a manner that the potential for human contact during normal operation – as a mobile or portable device but use in a body-worn way is strictly prohibit. When using this device, a certain separation distance between antenna and nearby persons has to be kept to ensure RF exposure compliance. In order to comply with the RF exposure limits established in the ANSI C95.1 standards, Access Point equipment should be installed and operated with minimum distance **[20cm]** between the radiator and your body. Use only with supplied antenna. Unauthorized antenna, modification, or attachments could damage the transmitter and may violate FCC regulations.

CAUTION: Any changes or modifications not expressly approved in this manual could void your authorization to use this device.

Canadian Department of Communications

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

This Class B digital apparatus complies with Canadian ICES-003. Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

France Restricted Frequency Band

Some areas of France have a restricted frequency band. The worst case maximum authorized power indoors is:

- 100mW for the entire 2.4 GHz band (2400 MHz–2483.5 MHz)

In the departments listed below, for the entire 2.4 GHz band:

- Maximum authorized power indoors is 100mW

Departments in which the use of the 2400–2483.5 MHz band is permitted with an EIRP of less than 100mW indoors .

01 Ain Orientales	36 Indre	66 Pyrénées
02 Aisne	37 Indre et Loire	67 Bas Rhin
03 Allier	41 Loir et Cher	68 Haut Rhin
05 Hautes Alpes	42 Loire	70 Haute Saône
08 Ardennes	45 Loiret	71 Saône et Loire
09 Ariège	50 Manche	75 Paris
11 Aude	55 Meuse	82 Tarn et Garonne
12 Aveyron	58 Nièvre	84 Vaucluse
16 Charente	59 Nord	88 Vosges
24 Dordogne	60 Oise	89 Yonne
25 Doubs	61 Orne	90 Territoire de Belfort
26 Drôme	63 Puy du Dôme	94 Val de Marne
32 Gers	64 Pyrénées Atlantique	

This requirement is likely to change over time, allowing you to use your wireless LAN card in more areas within France. Please check with ART for the latest information (www.art-telecom.fr)

NOTE: Your ASUS WLAN Card transmits less than 100mW, but more than 10mW.