Wireless USB Adapter

WL-U350

User's Manual

Version : 1.0

Copyright

Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of 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:

1. Reorient or relocate the receiving antenna.

2.   Increase the separation between the equipment and receiver.

3.   Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

4.   Consult the dealer or an experienced radio technician for help.

FCC Caution:

To assure continued compliance.(example-use only shielded interface cables when connecting to computer or peripheral devices). Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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

Federal Communication Commission (FCC) Radiation Exposure Statement

This equipment complies with FCC radiation exposure set forth for an uncontrolled environment. In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to the antenna shall not be less than 20 cm(8 inches) during normal operation.

R&TTE Compliance Statement

This equipment complies with all the requirements of DIRECTIVE 1999/5/CE OF THE EUROPEAN PARLIAMENT AND THE COUNCIL OF 9 March 1999 on radio equipment and telecommunication terminal Equipment and the mutual recognition of their conformity (R&TTE)

The R&TTE Directive repeals and replaces in the directive 98/13/EEC (Telecommunications Terminal Equipment and Satellite Earth Station Equipment) As of April 8,2000.

Safety

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

EU Countries Not Intended for Use

The ETSI version of this device is intended for home and office use in Austria Belgium, Denmark, Finland, France (with 4 Frequency channel restrictions). Germany, Greece, Ireland, Italy, Luxembourg, The Netherlands, Portugal, Spain (with 2 Frequency channel restrictions), Sweden and United Kingdom.

The ETSI version of this device is also authorized for use in EFTA member states Iceland, Liechtenstein, Norway and Switzerland.

Revision

User's Manual for PLANET Wireless USB Adapter

Model: WL-U350

Rev: 1.0 (Apr. 2002)

Part No. EM-WL-U350

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Chapter 1 Introduction

Thank you for purchasing WL-U350 USB Wireless LAN Adaptor. This device is an IEEE 802.11b Wireless USB Adapter. It can operate in either Ad-Hoc mode (Point to Point/Point to Multipoint without Access Point) or Infrastructure mode (Point to Point/Point to Multipoint with Access Point). It operates in 2.4GHz unlicensed ISM band in the home or office environment.

WL-U350 provided with a built-in dipole antenna and is connected to computer through 1 meter USB cable. Thus, it is capable of being placed practically anywhere on or around your computer to get better signal quality and longer connection distance.

The WL-U350 is compatible with Windows 98, Me, 2000 and XP. It supports 64-bit and 128-bit WEP (Wired Equivalent Privacy) Encryption for securing wireless network connection. Its data rate support 11, 5.5, 2 and 1 Mbps.   With its auto-fallback function, the data rate can be move to lower speed if signal quality is not good enough.

The WL-U350 provides full mobility and seamless roaming feature for mobile users to keep network connection across access points. Its range of coverage is up to 300 feet indoor and 800 feet outdoors.

Features

- 2.4GHz ISM band, unlicensed operation
- Wireless connection without the hassles and cost of cabling
- Wireless LAN IEEE 802.11b compliant
- Up to 11Mbps data rate with CSMA/CA
- Utilize Direct Sequence Spread Spectrum (DSSS) Technology to provide robust, interference-resistant solution in a multi-user environment
- Working range up to 300 feet indoor and 800 feet outdoor
- Support Ad-Hoc / Infrastructure mode
- Roaming capability to provide mobile computing for mobile worker to access network resources anywhere in the field
- Seamless integration with IEEE 802.3 LAN through WAP-1960 or other IEEE 802.11b compliant Access Point
- Supports most popular operating systems including Windows 98/Me/2000/XP

Application

Infrastructure

The WL-U350 provides access to a wired LAN for wireless workstations. An integrated wireless and wired LAN is called an Infrastructure configuration. A group of WL-U350 PC users and an Access Point compose a Basic Service Set (BSS). Each WL-U350 PC in a BSS can talk to any computer in the wired LAN infrastructure via the Access Point.

An Infrastructure configuration extends the accessibility of a WL-U350 equipped PC to a wired LAN, and doubles the effective wireless transmission range for 2 WL-U350 PCs. Since the Access

Point is able to forward data within its BSS, the effective transmission range in an infrastructure LAN is doubled.

The use of a unique ID in a BSS is essential. All WL-U350 equipped PCs configured without roaming options in an independent BSS must be configured with a BSS ID corresponding to the WL-U350 used in the BSS. Check your WL-U350 for its BSS ID or use the Site Survey function on Configuration Utility program to determine the BSS ID.

The Infrastructure Wireless LAN configuration is appropriate for enterprise-scale wireless access to a central database, or as a wireless application for mobile users.

Infrastructure mode also supports roaming capabilities for mobile users. More than one BSS can be configured as an Extended Service Set (ESS). The continuous network allows users to roam freely within an ESS. All WL-U350 PCs or other IEEE 802.11b compliant wireless adapter within one ESS must be configured with the same ESS ID and use the same radio channel.

Before enabling an ESS with roaming capability, choosing a feasible radio channel and optimum Access Point position is recommended. Proper Access Point positioning combined with a clear radio signal will greatly enhance performance.

Ad-Hoc

An Ad-Hoc wireless LAN is a group of computers, each equipped with one WL-U350 adapter or other wireless adapters, connected as an independent wireless LAN. Computers in a specific Ad-Hoc wireless LAN must be configured to share the same radio channel.

Ad-Hoc wireless LAN configurations are appropriate for branch level departments or SOHO operations.

WL-U350 offers a fast, reliable, cost-effective solution for wireless client access to the network in applications like these:

1. Remote access to corporate network information

E-mail, file transfer and terminal emulation.

2. Difficult-to-wire environments

Historical or old buildings, asbestos installations, and open area where wiring is difficult to employ.

3. Frequently changing environments

Retailers, manufacturers and banks who frequently rearrange the workplace and change location.

4. Temporary LANs for special projects or peak time

Trade shows, exhibitions and construction sites need temporary setup for a short time period.

Retailers, airline and shipping companies need additional workstations for a peak period.

Auditors require workgroups at customer sites.

5. Access to database for mobile workers

Doctors, nurses, retailers, white-collar workers need access to database while being mobile in the hospital, retail store or office campus.

6. SOHO (Small Office and Home Office) users

SOHO users need easy and quick installation of a small computer network.

7. High security connection

The wireless security network installs quickly and provides the flexibility to reconfigure easily.

Specification

Product	Wire Free – Wireless LAN 11Mbps USB Adapter
Models	WL-U350
Attach Interface	USB V1.1 full 12Mbps. Mini-type USB connector
LED Indicators	Power, Link
Operating Frequency / Channel	2.412~2.462GHz (FCC, Canada) / 11 Channels
	2.412~2.4835GHz (Japan, TELEC) / 14 Channels
	2.412~2.472GHz (Euro ETSI) / 13 Channels
	2.457~2.462GHz (Spain) / 2 Channels
	2.457~2.472GHz (France) / 4 Channels
RF Modulation	Direct Sequence Spread Spectrum (DSSS) Technology (CCK, DQPSK, DBPSK)
RF Output Power	14dBm
Sensitivity	-80dBm (@ PER<8%)
Data Rate	11, 5.5, 2, 1 Mbps with auto-rate fall back
Media Access Protocol	CSMA/CA + ACK, IEEE802.11b Compliant
Standard Antenna	One built-in dipole antenna
Range	Up to 800 feet outdoor and 300 feet indoor
Working Mode	Ad-Hoc, Infrastructure

Power Consumption	TX: 5V, 460mA
	RX:5V, 260mA
	Stand by / sleep mode: 5V, 20mA
Dimension (mm)	95 x 65 x 12.5 mm
Humidity	0-90%, non-condensing (Operating and storage)
Temperature	0 – 55 degree C (Operating), -20~70 degree C(Storage)
Compatibility	Windows 98, Me, 2000 and XP
Management	Utility or Windows XP built-in management interface
STANDARDS COMPLIANCE	
Electromagnetic Compatibility	FCC Part 15 class A, CE, ETSI 300, 328

Package Contents

Before installation, please check the items of your package. The package should include the following items:

- One Wireless USB Adapter

- One USB Cable

- One CD-Based software(Including the Wireless LAN Management Utility, Driver and User's Manual)

- One Quick Installation Guide

If any of the above items are missing, contact your supplier as soon as possible.

Minimum System Requirements

Before installation, please check the following requirements with your equipment.

- Pentium Based (above) IBM-compatible PC system with an USB support

- CD-ROM drive

- One Available USB Connector

- Windows 98/2000/ME/XP Operating System

- At least 8 Mbytes of free disk space for utility and driver installation

SAFETY PRECAUTION

Only use the accessories and connection cables attached with the device package. Otherwise, the device may not function. If you miss or damage the accessories or connection cables, please contact your local dealer.

Chapter 2 Installation Procedure

Before you proceed with the installation, it is necessary that you have enough information about the *Wireless USB Adapter.* Note that the provided Configuration utility is for Windows 98/Me/2000 only. The installation of the utility will also install the driver. Thus, it is not necessary to install driver separately on Windows 98/Me/2000. Windows XP already has provided an interface to configure our WL-U350. Thus, you should only install the driver for Windows XP.

2.1 Windows 98/Me/2000 Installation

Please do not insert the WL-U350 to your PC before installing the Configuration utility. The following installation operates under Window 2000. Procedures will be the same for Windows 98/ME.

> *Note:* If you ever install the Wireless USB Adapter before please uninstall the old driver and utility first. If this is the first time to install the Wireless USB Adapter please continue from A step to use the Wizard to continue.

A. Insert Drivers and user's manual CD to your CD drive (Suppose D:\).

B. Run "setup.exe" under "D:\Utility\WL-U350\" directory, or click "Start" button and choose "Run". In the box appears, enter "D:\Utility\WL-U350\setup.exe" (where "D" is the letter of your CD-ROM drive). Execute the **"Setup.exe"** program under the **"Utility"** folder .The following InstallShield Wizard box will show up to guide you how to install properly then click **"Next"**.
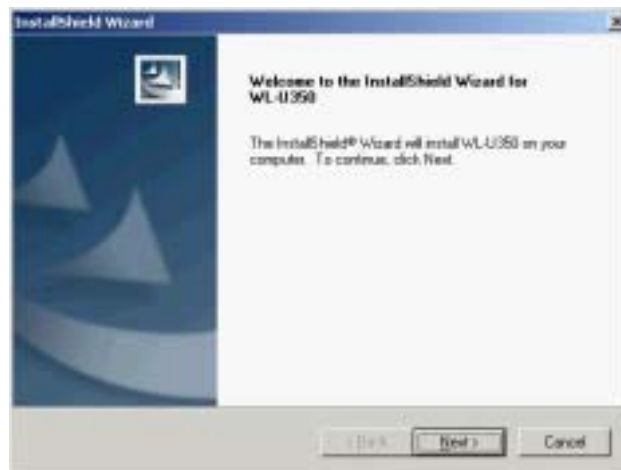

C. Below dialog show the *"License Agreement"* .To install the device you must accept this agreement to continue the process or select no to exit the installation. Select "*Yes*" to continue.

D. Click "Next" to check if any installed utility and proceed to next step. If you have installed the utility, uninstall the utility before click "Next".
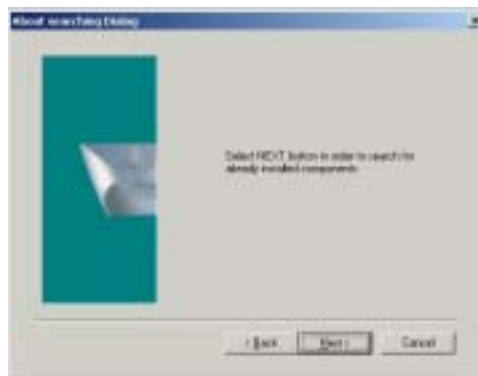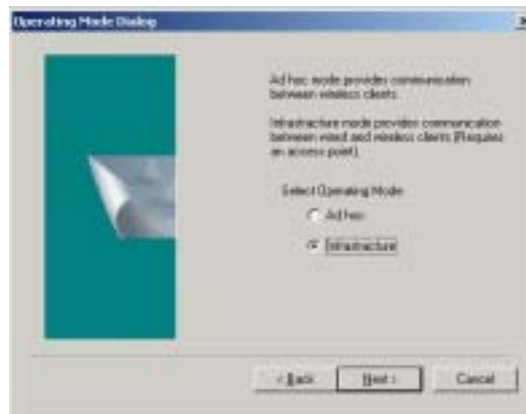

E. To install to this folder in program files, click *"Next"* .To install to a different folder click " *Browse*" and select another folder .Then click **"Next"** .
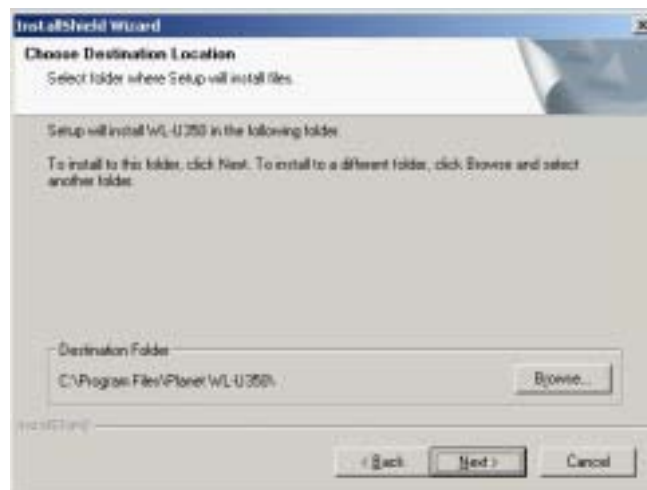
F. You can change the Program Folder name as you wish or use the default name to continue. Click "Next" to continue.
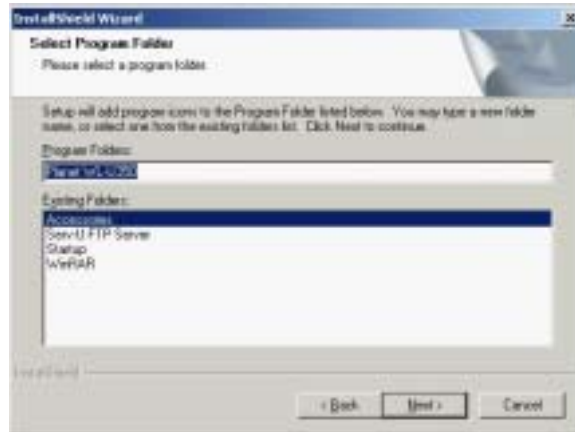
G. In the following Wizard box, You have to select the operating mode to *"Ad-Hoc"* or *"Infrastructure"*, then click *"Next"*.

1. **Ad Hoc mode**: In this mode you will be asked to set ESSID and the Channel as desired. Then click *"Next"* to complete the setting.
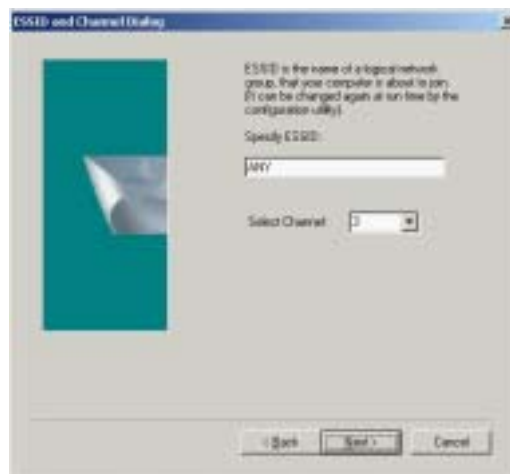
2. **Infrastructure**: In this mode you will be asked to specify the ESSID only and click *"Next"* to complete the setting.

H.   Click **"Next"** to begin copying file to your hard disk or click "Back" to reconfigure.

I.   After Windows 2000 finishes copying the files, Use bundled USB cable to connect

WL-U350 to your PC or Notebook's USB port.

J.   Windows will automatically detect WL-U350.   For a while, this dialog box will appear.

Please click "Yes' to continue the driver installation.

K.   After the driver installation, the completing window appears.   Please click "Finish" and

restart the computer.

L.   After restarting the computer, the Configuration & Monitor Utility icon will be shown on system tray, If not, that mean the installation is fail. Please uninstall the driver from the system then repeat the installation process.

Now, the Wireless LAN USB adaptor is SUCCESSFULLY installed.

2.2 Windows XP Installation

Windows XP have provided a interface to configure our WL-U350.   Thus, you should only install the driver for Windows XP.

A.   Insert the WL-U350 to your computer, Windows XP will automatically detect the adapter and show the following window.   Select "Install from a list or specific location [Advanced]" and click "Next>".

B.   Insert Drivers and User's manual CD to your CD drive (suppose D:\).   Select "Include the location in the search" and click" Browse" button to specify "D:\Drivers\WL-U350\WinXP" directory and then click "Next>".

C. The Hardware Installation box will appear, click "Continue Anyway" to start driver installation.

D. Click "Finish" to complete the driver installation.

E. After complete the driver installation, you can now use Windows XP's built-in utility to configure the WL-U350.   Please click the "Start" button and choose "Connect To".   Select the "Wireless Network Connection" and the "Connect to Wireless Network" dialog box will appear.   Select preferred Wireless Network and click "Connect" or click "Advanced" for further configuration.
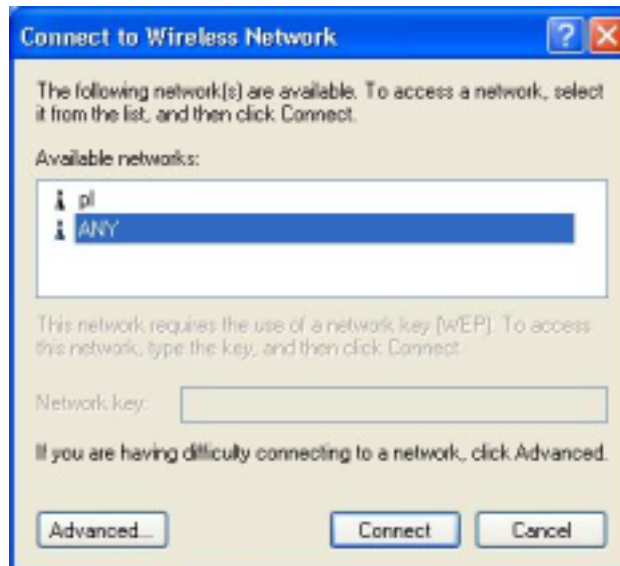
F. For more information on configuring the wireless card.   Please refer to Windows XP's on-line help or next chapter.

Chapter 3 Configuration Utility

The Configuration Utility is a powerful application that helps you to configure the Wireless USB Adapter and monitor the statistics of the communication process. By Double Click the icon on the system tray will brings you to the configuration mode.

This utility can be used to change the following configuration parameters when the device is active.

Note: Click the **"Exit"** button will exit the configuration application.

3.1   "Status"

Click the **"Change"** tab when set up the necessary parameters, and click "**Submit**" after the configuration has been changed.

- ◆ **Operation mode:** Shows the following network modes   :
  - ➢ **Infrastructure--** This operation mode requires the presence of an 802.11 Access Point. All communication is done via the Access Point.
  - ➢ **Ad-Hoc** -- This mode indicates the 802.11 peer-to-peer operation. All

communication is done from client to client without the use of an Access Point.

◆ **Channel:** Shows the number of the radio channel used for the networking. Only Access Points and Ad-Hoc nodes create the BSSID. This parameter is not active in the infrastructure operation mode.

◆ **SSID:** Shows the SSID of the BSS that one willing to join.

◆ **Tx Rate:** Shows the Data Transfer Rate. There are 1 Mbps, 2M bps, 5.5 Mbps, 11 Mbps, and auto mode. If Auto Mode is been selected, the device will select the most suitable rate automatically.

◆ **Power Mgmt Mode:** Shows Power Management modes. There are two optional selections for this mode.

  ➢ **Active--** Adaptor will always set in active mode.

  ➢ **Power Save** -- Adaptor will enter power saving mode when it is idle.

◆ **Signal Strength:** This bar shows the signal strength level. The higher the blue bar, the more radio signal been received by the Wireless USB adaptor. This indicator helps to find the most comfortable antenna/workstation position for quality network operation.

◆ **Link quality:** The measured Signal Strength level gives the overall Link Quality and Connection Status.

◆ **MAC Address:** The MAC Address of the Wireless USB Adaptor. Unique 48-bit, hard-coded Media Access Control address known as the station identifier.

3.2 "Statistics"

Show the total amounts of packets been received or transmitted by the adaptor.

◆ **Data Field:** Shows the total amounts of data packets been successful/unsuccessful transmitted or received by the adaptor..

◆ **Management Field:** Shows the total amounts of management packets been successful / unsuccessful transmitted or received by the adaptor.

◆ **Rejected Packets Field:** Shows the total amounts of rejected packets been transmitted or received by the adaptor.

3.3   "Site Survey"
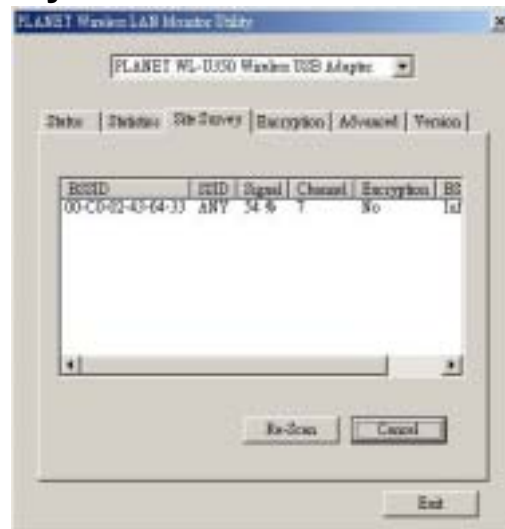
This screen shows all the AP or Adaptor nearby when operating in Ad-Hoc mode.

Click **"Re-Scan"** to collect the BSSID and Channel information of all the wireless devices near by.

If one wishes to connect to any device on the list, double-click the selected list and the adapter will connect to the selected device automatically.

3.4   "Encryption

Additional security can be achieved by using the WEP (Wired Equivalent Privacy) encryption. WEP encrypts each frame transmitted from the radio using one of the keys entered from this panel.

There are four 10 Hex digit encryption keys value available for the WEP. One can define the encryption key values of their own choice.

Enable the WEP (Wired Equivalent Privacy) option in order to activate WEP encryption for transmissions between the stations and the Access Point. WEP is an authentication algorithm which protects authorized Wireless LAN users against eavesdropping.

3.5   "Advanced

There are **Preamble Type**, **Fragmentation Threshold**, and **RTS/CTS Threshold** settings under this mode.

◆   **Preamble Type (Short/Long):** Preamble is the first subfield of PPDU, which is the appropriate frame format for transmission to PHY (Physical layer). There are two options, Short Preamble and Long Preamble. The Short Preamble option improves throughput performance.

◆   **Fragmentation threshold:** The size at which packets will be fragmented. Choose a setting within a range of 256 to 2346 bytes.

◆   **RTS Threshold:** Minimum packet size to require an RTS (Request To Send). For packets smaller than this threshold, an RTS is not sent and the packet is transmitted directly to the WLAN. This is the option for the RTS Threshold activation.

3.6 "Version"

It shows the current **Driver, Firmware,** and **Application Version** of this device.

Chapter 4 Troubleshooting

This section provides solutions to problems usually encountered during the installation and operation of this Wireless USB Adaptor. Read the description below to solve your problems.

What is the IEEE 802.11b standard?
> The IEEE 802.11b Wireless LAN standards subcommittee, which is formulating a standard for the industry. The objective is to enable wireless LAN hardware from different manufactures to communicate.

What IEEE 802.11 feature are supported?
> The product supports the following IEEE 802.11 functions:
> --CSMA/CA plus Acknowledge protocol
> --Multi-Channel Roaming
> --Automatic Rate Selection
> --RTS/CTS feature
> --Fragmentation
> --Power Management

What is Ad-hoc?
> An Ad-hoc integrated wireless LAN is a group of computers, each with a WLAN adapter, connected as an independent wireless LAN. Ad hoc wireless LAN is applicable at a departmental scale for a branch or SOHO operation.

What is Infrastructure?
> An integrated wireless and wireless and wired LAN is called an Infrastructure configuration. Infrastructure is applicable to enterprise scale for wireless access to central database, or wireless application for mobile workers.

What is BSS ID?
> A specific Ad hoc LAN is called a Basic Service Set (BSS). Computers in a BSS must be configured with the same BSS ID.

What is WEP?
> WEP is Wired Equivalent Privacy, a data privacy mechanism based on a 40 or 104 bit shared key algorithm, as described in the IEEE 802 .11 standard.

Can Wireless products support printer sharing?
> Wireless products perform the same function as LAN products. Therefore, Wireless products can work with Netware, Windows NT/2000/XP, or other LAN operating systems to support printer or file sharing.

Would the information be intercepted while transmitting on air?
> WLAN features two-fold protection in security. On the hardware side, as with Direct Sequence Spread Spectrum technology, it has the inherent security feature of scrambling. On the software side, WLAN series offer the encryption function (WEP) to enhance security and Access Control. Users can set it up depending upon their needs.

What is DSSS?   What is FHSS?   And what are their differences?
> Frequency-hopping spread-spectrum (FHSS) uses a narrowband carrier that changes frequency in a pattern that is known to both transmitter and receiver. Properly synchronized, the net effect is to maintain a single logical channel. To an unintended receiver, FHSS appears to be short-duration impulse noise. Direct-sequence spread-spectrum (DSSS) generates a redundant bit pattern for each bit to be transmitted. This bit pattern is called a chip (or chipping code). The longer the chip, the greater the probability that the original data can be recovered. Even if one or more bits in the chip are damaged during transmission, statistical techniques embedded in the radio can recover the original data without-the need for retransmission. To an unintended receiver, DSSS appears as low power wideband noise and is rejected (ignored) by most narrowband receivers.

What is Spread Spectrum?
> Spread Spectrum technology is a wideband radio frequency technique developed by the military for use in reliable, secure, mission-critical communication systems. It is designed to trade off bandwidth efficiency for reliability, integrity, and security. In other words, more bandwidth is consumed than in the case of narrowband transmission, but the trade off

produces a signal that is, in effect, louder and thus easier to detect, provided that the receiver knows the parameters of the spread-spectrum signal being broadcast. If a receiver is not tuned to the right frequency, a spread –spectrum signal looks like background noise. There are two main alternatives, Direct Sequence Spread Spectrum (DSSS) and Frequency Hopping Spread Spectrum (FHSS).