

## *Wireless PCMCIA Card*

**WL-3552**

**User Manual**

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## 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 Intended for Use**

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

**Model: WL-3552**

**Rev: 1.0 (Jul. 2002)**

**Part No. EM-WL3552v1**

**Table of Contents**

**Chapter 1 Introduction ..... 1**

    1.1 *Features* ..... 1

    1.2 *Applications* ..... 1

        1.2.1 *Infrastructure*..... 1

        1.2.2 *Ad-Hoc*..... 2

    1.3 *Specification* ..... 3

    1.4 *Package Contents* ..... 4

    1.5 *Minimum System Requirements*..... 4

    1.6 *Safety Precaution* ..... 5

**Chapter 2 Installation Procedure..... 6**

    2.1 *Windows 98/ME/2000 Installation* ..... 6

    2.2 *Windows XP Installation*..... 10

    2.3 *Windows NT 4.0 Installation* ..... 12

**Chapter 3 Configuration Utility ..... 14**

    3.1 *“Status”*..... 14

    3.2 *“Statistics”*..... 16

    3.3 *“Site Survey”*..... 16

    3.4 *“Encryption”* ..... 17

    3.5 *“Advanced”* ..... 17

    3.6 *“Version”* ..... 18

**Appendix ..... 19**

# Chapter 1 Introduction

Thank you for purchasing WL-3552 PCMCIA Wireless LAN Adaptor. This device is an IEEE 802.11b Wireless PCMCIA 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-3552 provided with a built-in dipole antenna and is connected to PC PCMCIA slot. 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-3552 is compatible with Windows 98, Me, NT, 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-3552 provides full mobility and seamless roaming feature for mobile users to keep network connection across access points. Its range of coverage is up to 350 feet indoor and 1100 feet outdoors.

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## 1.1 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 350 feet indoor and 1100 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/NT/2000/XP

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## 1.2 Applications

### 1.2.1 Infrastructure

The WL-3552 provides access to a wired LAN for wireless workstations. An integrated wireless and wired LAN is called an Infrastructure configuration. A group of WL-3552 PC users and an Access Point compose a Basic Service Set (BSS). Each WL-3552 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-3552 equipped PC to a wired LAN, and doubles the effective wireless transmission range for 2 WL-3552 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-3552 equipped PCs configured without roaming options in an independent BSS must be configured with a BSS ID corresponding to the WL-3552 used in the BSS. Check your WL-3552 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-3552 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.



### 1.2.2 Ad-Hoc

An Ad-Hoc wireless LAN is a group of computers, each equipped with one WL-3552 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-3552 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.

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### 1.3 Specification

<b>Product</b>	<b>Wire Free – Wireless LAN 11Mbps PCMCIA Adapter</b>
Model Name	WL-3552
Attach Interface	PCMCIA Type-II
LED Indicators	Act

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
RF Modulation	Direct Sequence Spread Spectrum (DSSS) Technology (CCK, DQPSK, DBPSK)
RF Output Power	19dBm
Sensitivity	-83dBm (@ 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	Built-in dipole antenna
Range	Up to 1100 feet outdoor and 350 feet indoor
Working Mode	Ad-Hoc, Infrastructure
Power Consumption	TX: 3.3V, 500mA RX: 3.3V, 250mA Stand by / sleep mode: 3.3V, 20mA
Dimension (mm)	115*55*8 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
<b>STANDARDS COMPLIANCE</b>	
Electromagnetic Compatibility	FCC, CE, ETSI 300, 328

## 1.4 Package Contents

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

One WL-3552

One Quick Installation Guide

One Drivers and User's Manual CD

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

## 1.5 Minimum System Requirements

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

- Operating System: MS Windows 98/Me/NT/2000/XP
- Desktop PC or Notebook with CD-ROM driver
- ISA to PCMCIA or PCI to PCMCIA controller in case of desktop PC
- PCMCIA Type Ⅰ or Type Ⅱ slot in case of Notebook.

Note: This PCMCIA card support only +3.3V operating voltage. Before plug WL-3552 into your PCMCIA slot, please ensure it is not work with +5V operation voltage only.

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## **1.6 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 PCMCIA Card*. There are three sections for different OS. Section 2.1 describes how to install the card to Windows 98/ME and Windows 2000. Section 2.2 shows how to install it to Windows XP and section 2.3 for Windows NT. Please refer to the related section according to the OS your PC installed.

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**Note:** *If you ever install the other Wireless PCMCIA Card before, please uninstall the existed driver and utility first. If this is the first time to install this device, please refer to the following steps to complete the installation.*

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### 2.1 Windows 98/ME/2000 Installation

The following installation operates under Window 2000. Procedures, however, will be the same for Window 98/ME.

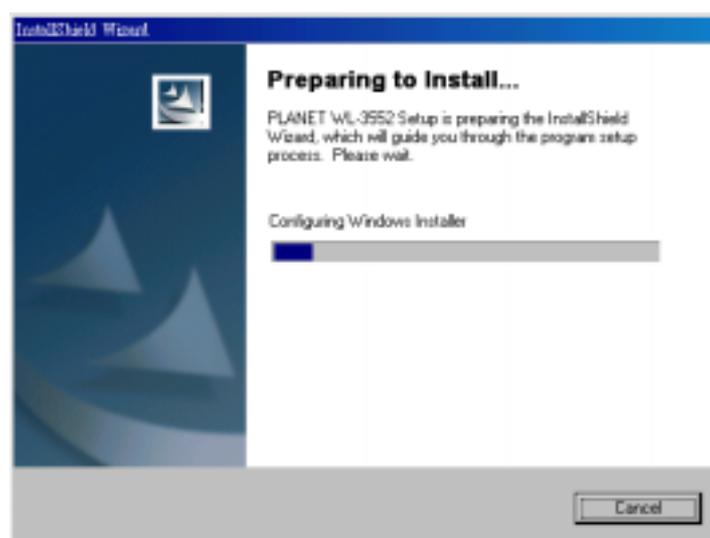
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**Note:** *Do not insert the Wireless PCMCIA Card before completing below process.*

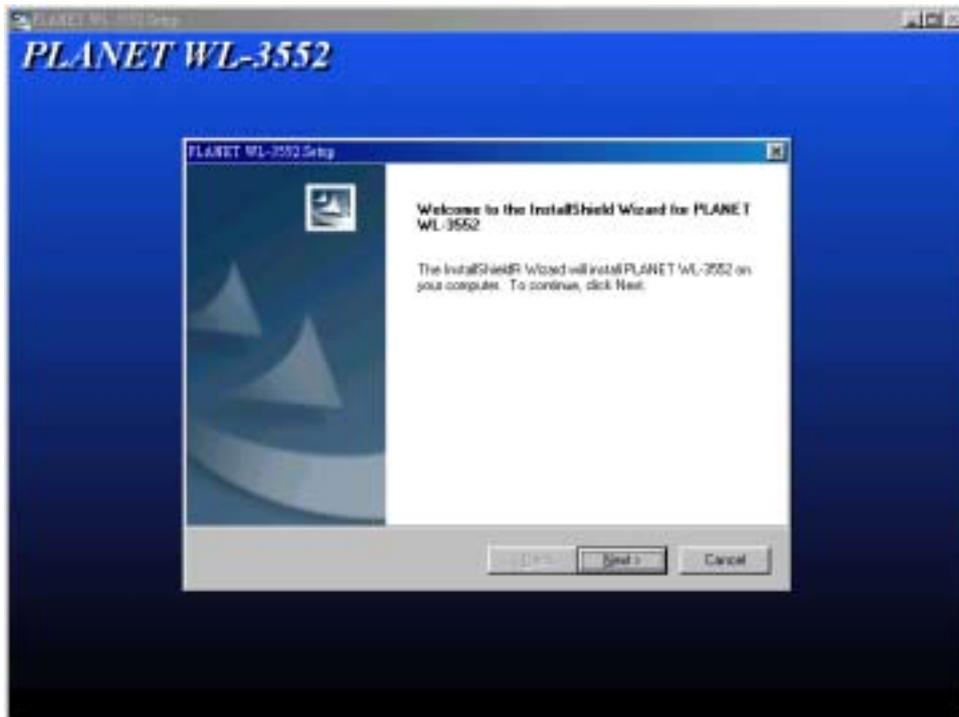
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#### STEP I : Driver and Software Installation

- A. Insert Drivers and User's manual CD to your CD drive (suppose D:\). Run "setup.exe" under "D:\Utility\WL-3552\" directory, or click the "Start" button and choose "Run". In the box appears, enter "D:\Utility\WL-3552\ setup.exe" (where "D" is the letter of your CD-ROM drive). You will see the dialog box as the picture. It will copy some files for installation



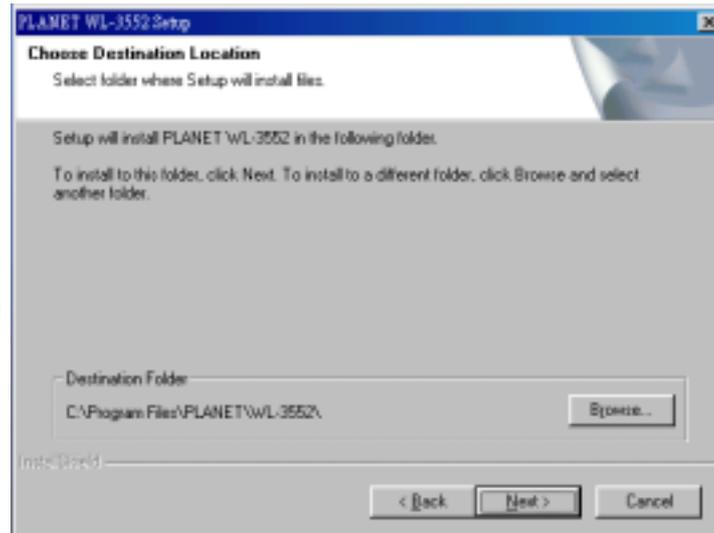
- B. When this screen appears, please press "Next" to continue.



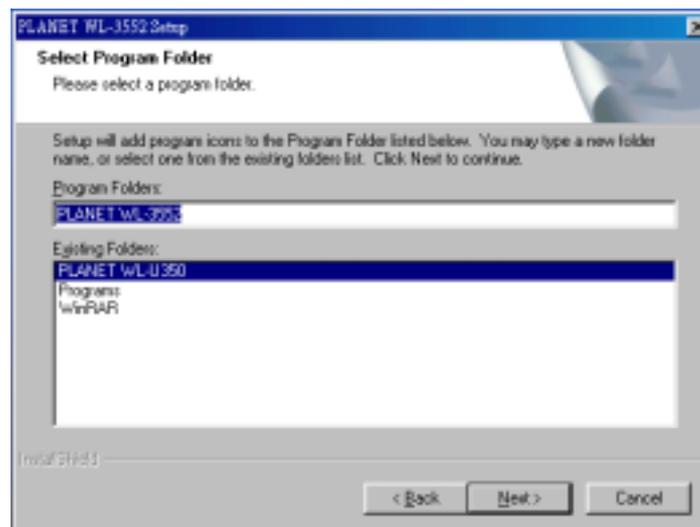
- C. Press "Yes" for agrees the License Agreement.



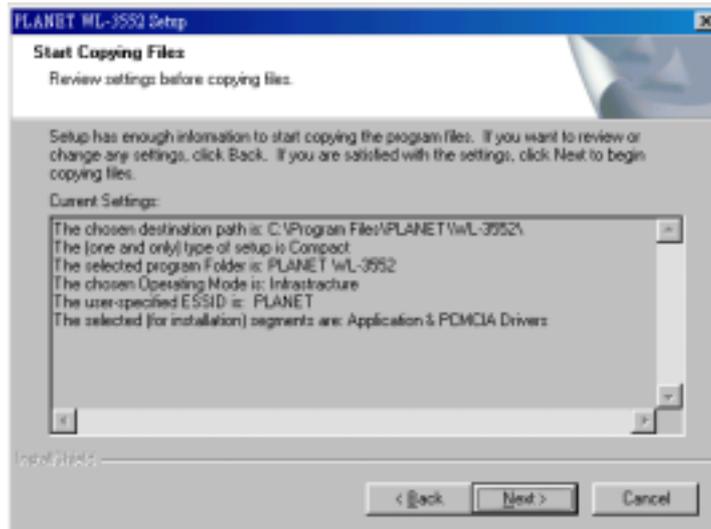
- D. You can click "Browse" to specify the Destination Folder that you want to install the utility. Or you can keep the default setting and click "Next" to continue.



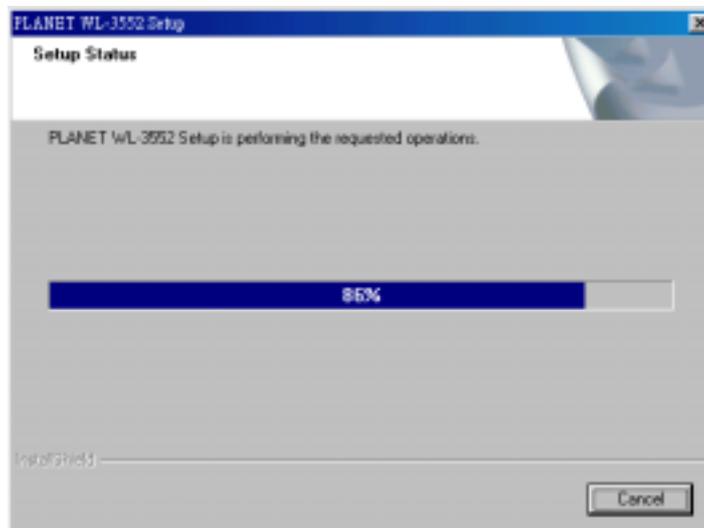
- E.** You can change the Program Folder name as you wish or use the default name to continue. Please click “Next” for next step.



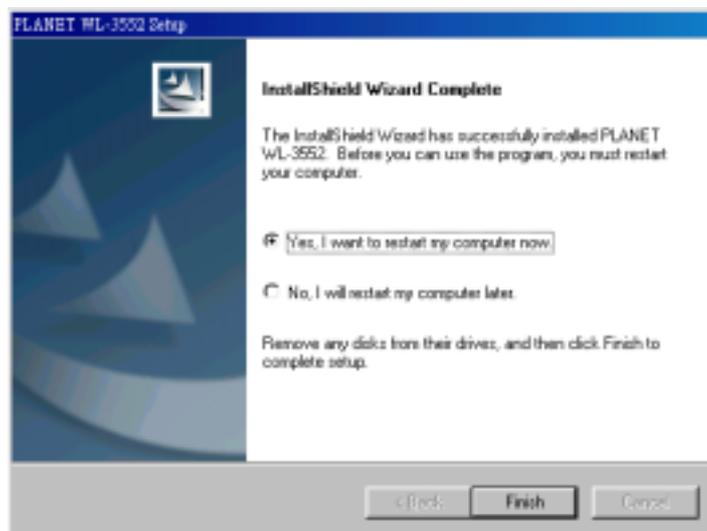
- F.** You can check your install settings in this dialog box. After ensure, please press “Next”.



**G.** Installation will start copy driver and utility to your OS.



**H.** After finish driver and utility installation. Please restart your Notebook.



**STEP II : Hardware Installation**

- A. You can now safely insert your PCMCIA card. The “ Add new hardware Wizard “ automatically loads the Driver for your PCMCIA card. As soon as the procedure has been completed it is recommended to reboot your system.
- B. In the Windows 2000 installation procedure an extra window appears like below to prompt “ Digital Signature Not Found “ and ask you whether you would like to continue the installation. You can safely select “ Yes “.



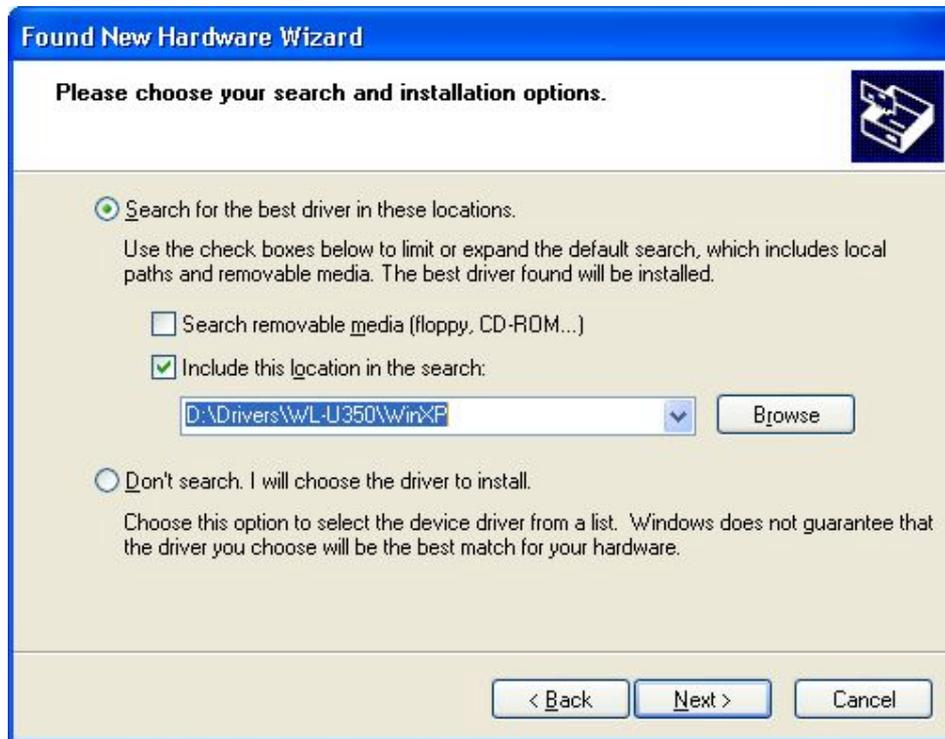
**2.2 Windows XP Installation**

**Note:** *Insert the Wireless PCMCIA Card into the your PC or laptop before the installation.*

- A. Power on the notebook and allow Window XP to load fully. Then insert the WL-3552 to your notebook. The system will automatic detect the new hardware and prompt you to run the installation immediately.



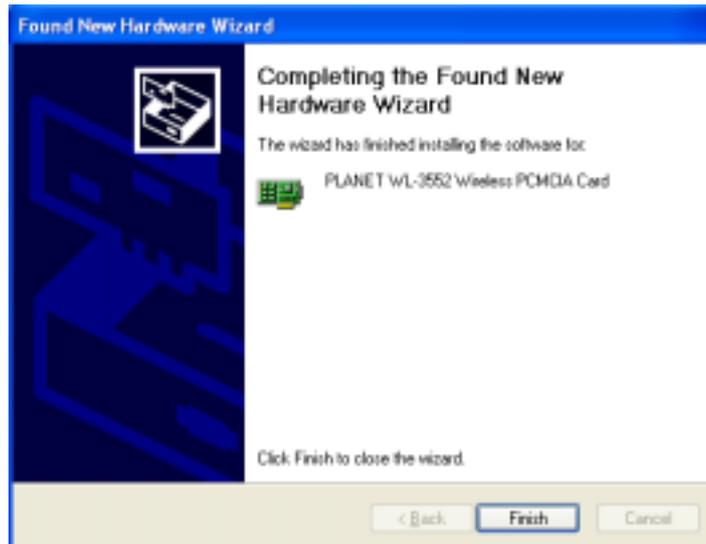
- B. Put Drivers and User's Manual CD into your CD-ROM and give the path to the executable folder "Win XP" under the "Driver -> WL-3552" folder. The following InstallShield Wizard box will show up to guide you how to install properly then click "Next".



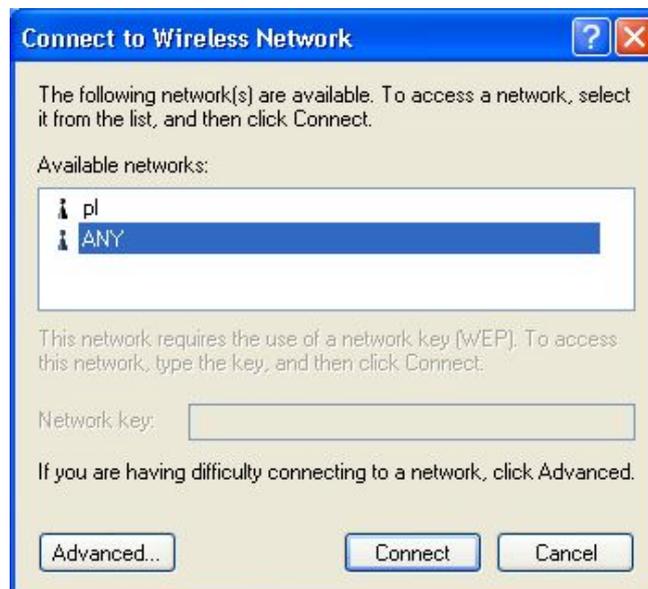
- C. The Hardware Installation box will appear, click "Continue Anyway" to start driver installation.



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



- E. After complete the driver installation. Click the “Start” button and choose “Connect To”. Select the “Wireless Network Connection”, and then the “Connect to Wireless Network” dialog box will appear. Select preferred Wireless Network and click “Connect” or click “Advanced” for further configuration. If you can’t see your APs in this screen, please click “Advanced” to change WL-3552 working rate from “Fix 11Mbps” to “Auto”. That can let you easier to find out all the APs and connect to.



## 2.3 Windows NT 4.0 Installation

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**Note:** Do not insert the Wireless PCMCIA Card before completing below process.

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**Note:** In order to be able to install the WL-3552 on to your PC running under Window NT 4.0, you will need to log on as "Administrator". Also you will need to have NT Service Pack 4 or above installed.

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- A. During the installation, you may be prompted to load operating system files from the Windows installation disk. Please have this disk handy.
- B. Since Windows NT 4.0 does not support "Plug & Play", you must enable the detection of PC Cards by the NT with following the procedures.
  1. Click Start -> Settings -> Control Panel
  2. Double click the "Devices" icon
  3. Select "PCMCIA" from the list and click the "Startup" button
  4. Set the Startup type to "Boot" and Click "OK"
  5. Click "Close" on the "Devices" window
- C. In order to let the NT know about your new card, you must enable the Network support by following the next steps:
  1. Click Start -> Settings -> Control Panel.
  2. Double click the "Network" icon.
  3. In the "Network Settings" dialog box, you will be prompted to install Windows NT Networking in case no network has been installed yet. Click "Yes" and follow the instruction on the screen. If networking had been installed, you will see a dialog with several tabs. In the "Adapters" tab click the "Add". Windows NT Networking Setup will determine the type of network adapter card that you are going to use.
- D. When prompted to select a driver, locate the driver provided with Drivers and User's Manual CD.
- E. During the installation, a dialog box appears asking for the I/O Base and IRQ resource information. In order to find out which values to use, go to Start -> Programs -> Administrative Tools -> Windows NT Diagnostics -> select the "Resources" tab -> press the "IRQ" button. Select one free IRQ from the list. Next, press the button "I/O Port" and choose a 0x20 free I/O space. Add these values into the dialog box. If at any point after the installation you want to change these values, go to the Control Panel -> Network, select the Adapters tab, press the Properties button, and fill in the new values.
- F. Next dialog box will start copying the files. In case there is a version conflict between one or more of the files being copied and the files in your system, you should normally keep the latest version
- G. Finally, when the installation has been completed, you will need to restart your PC.

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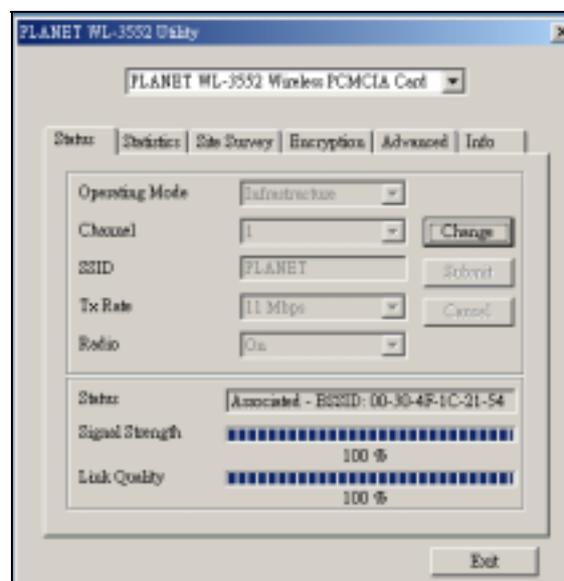
**Note:** If the card is not working properly after the restart procedure you should make sure that your system has free resources since it may show them as being available, although this may not be true.

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## Chapter 3 Configuration Utility

This chapter describe the utility of the WL-3552, be noted, Windows XP are with built-in IEEE802.11b interface utility. If the PC runs Windows XP, please direct run the utility from Windows XP. However, the following information may also help you to know more.

The Configuration Utility is a powerful application that helps you to configure the WL-3552 and monitor the statistics of the communication process. By Double Click the icon on the system tray will show you the dialog box as below.



This utility can be used to modify the configuration parameters when the device is active. Following details the configuration buttons.

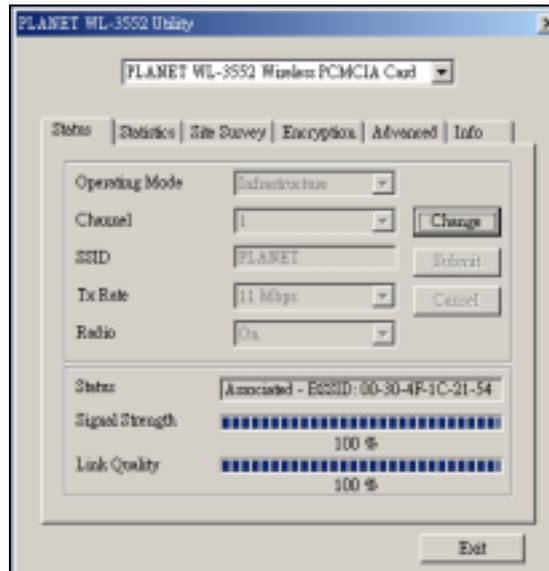
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**NOTE:** Click the **“Exit”** button will exit the configuration application.

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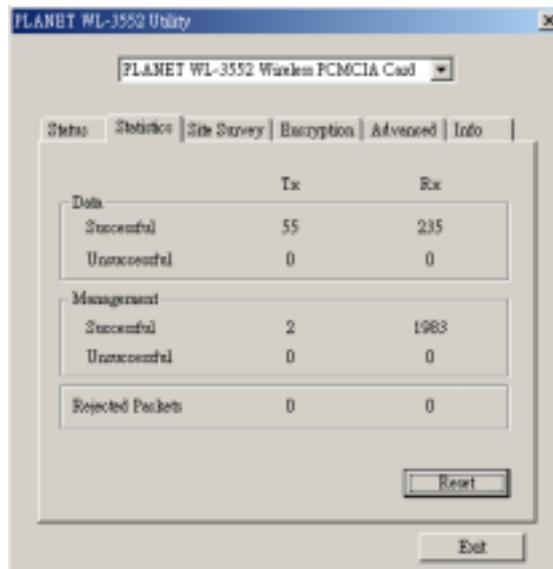
### 3.1 “Status”

Click the **“Change”** button 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 802.11b Access Point. All communication is done via the Access Point.
  - **Ad-Hoc** -- This mode indicates the 802.11b 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, 2 Mbps, 5.5 Mbps, 11 Mbps, and auto mode. If Auto Mode is been selected, the device will select the best transfer rate automatically.
- ◆ **Power Mgmt Mode:** Shows Power Management modes. There are two optional selections for this mode.
  - **Active** -- Adapter will always set in active mode.
  - **Power Save** -- Adapter 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 PCMCIA WLAN adapter. 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. Unique 48-bit, hard-coded Media Access Control address known as the station identifier.

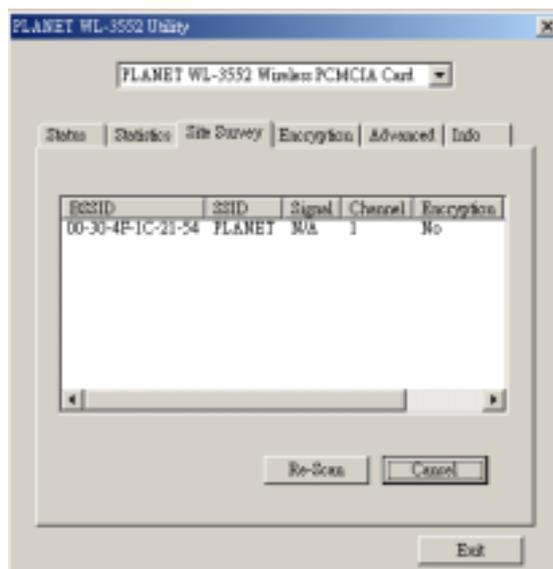
### 3.2 “Statistics”



Shows the total amounts of packets been received or transmitted by the adapter.

- ◆ **Data Field:** Shows the total amounts of data packets had been successful/unsuccessful transmitted or received by the adapter..
- ◆ **Management Field:** Shows the total amounts of management packets had been successful/unsuccessful transmitted or received by the adapter.
- ◆ **Rejected Packets Field:** Shows the total amounts of rejected packets had been transmitted or received by the adapter.

### 3.3 “Site Survey”



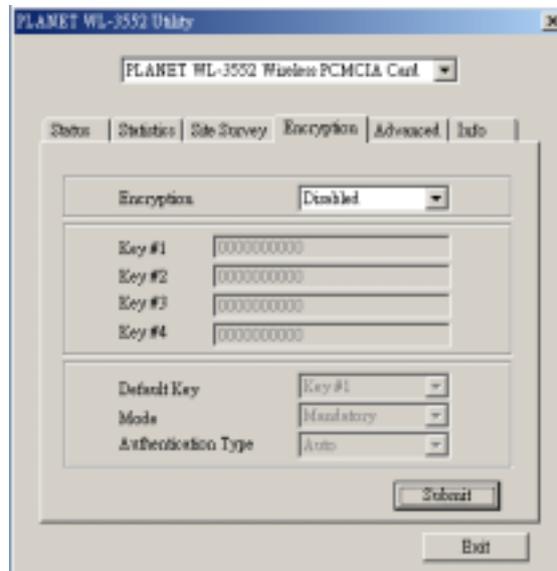
This screen shows all the AP or Adapter nearby when operating in Ad-Hoc mode.

Click “ **Re-Scan** “ to collect the BSSID and Channel information of all the wireless devices around you.

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

WL-3552 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 that protects authorized Wireless LAN users against eavesdropping.

### 3.5 “Advanced”



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

- ◆ **Preamble Type (Short/Long)** : Preamble is the first Suffield 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 from 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.

## Appendix

This section provides some concepts of wireless LAN.

✓ **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 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 64/128 bit shared key algorithm, as described in the IEEE 802.11b 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).