WF-100
CompactFlash Wireless LAN Card
User Manual

August 8, 2002 Revision 0.2

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Federal Communications Commission Statement

This device complies with **FCC Rules Part 15**. Operation is subject to the following two conditions:
This device ma y not cause harmful interference.
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 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. If this equipment is not installed and used in accordance with the manufacturer's instructions, it 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 during 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 to 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.

The use of shielded cables for connection of the monitor to the graphics card is required to assure compliance with FCC regulations. Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

Manufacturer's Disclaimer Statement

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Printed in Taiwan

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1. Introduction

1.1 Overview

This user manual describes the detail functions of the CompactFlash Type II wireless LAN card (model name: WF-100) driver and utility, as well as the installation and un-installation deliberately.

WF-100 complies with full IEEE 802.11b standards with bit rate up to 11Mbps and the interface complies with CompactFlash specifications.

The WF-100 software can be installed with the WF-100 CompactFlash wireless LAN card on various Windows platforms include Pocket PC to provide the wireless LAN access functionality; it also contains utility allowing users to configure and monitor the status of the wireless LAN card easily.

1.2 Features

* **Fully IEEE 802.11b and Wi-Fi compatible**
* **Working range up to 300 meters in an open environment**
* **Seamless roaming under 802.11b WLAN infrastructure**
* **Automatically Support basic rate at 11M/5.5M/2M/1M fall back functionality**
* **WEP 64/128 bits encryption provided**
* **Supply User-friendly installation: hardware auto-detection and software easy-setup without manual configuration.**
* **The powerful utility operates and communicates other WLAN devices**
* **Direct Sequence Spread Spectrum (DSSS) technology provides robust, interference-resistant and wireless communication security.**
* **Compatible with any computer under the OS of Microsoft Windows series: Windows 98/ME/2000/XP and Windows CE 3.0 (Pocket PC)**

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2. Wireless LAN Application

Wireless LAN (Local Area Network) systems offer a great number of advantages over the traditional wired system. And these systems support the same network configuration options of the legacy Ethernet LANs as defined by IEEE 802.3 standard committee. In general, wireless LAN products can be configured as "Ad Hoc (Peer-to-Peer)" or "Infrastructure (Access Point)" for the LANs of departmental, SOHO or enterprise.

2.1 Ad-Hoc Topology

"Ad-Hoc" is the peer-to-peer mode of network operation without access point. An Ad-Hoc wireless LAN is a group of computers, which equipped with the wireless adapters and connected each together as an independent wireless LAN. Computers in a specific Ad-Hoc wireless LAN must be configured at the same radio channel and SSID for establishing the wireless connection. Ad-Hoc wireless LAN is ideally applicable at a departmental scale for a branch or SOHO operation.

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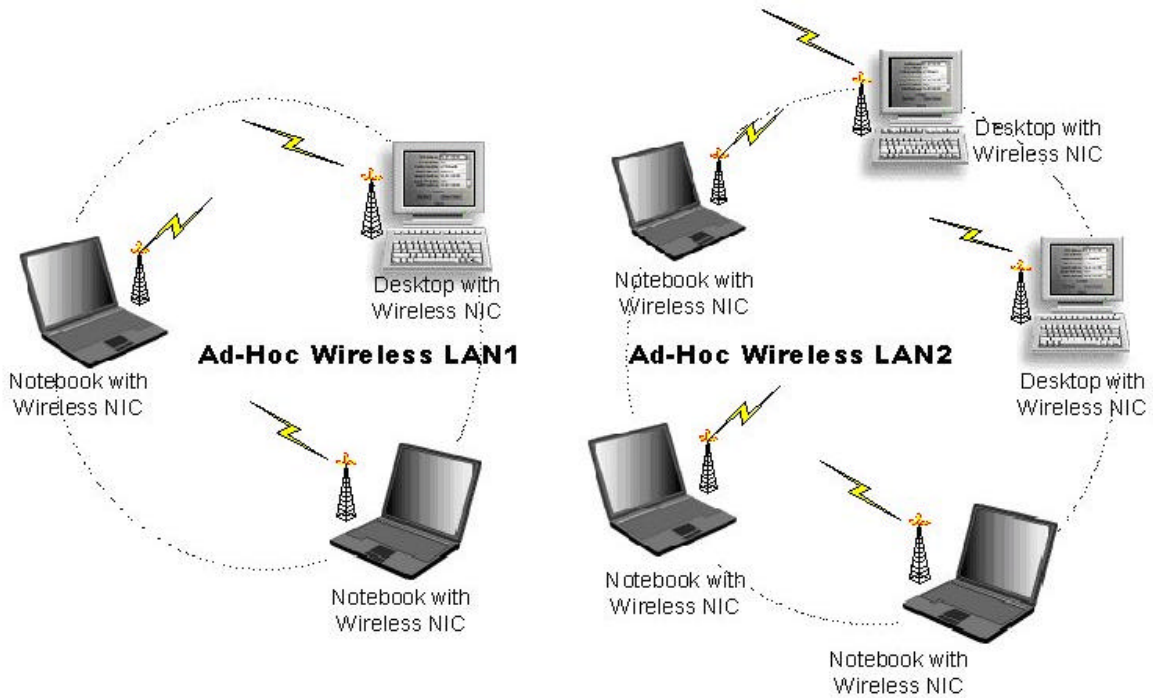
2.2 Infrastructure Topology

Infrastructure mode of network operation requires the presence of an access point at least. In this mode, all wireless LAN client devices need to build the communication with the access point first and then access to a wired LAN such as Ethernet. Therefore, an integrated wireless and wired LAN is called an infrastructure configuration. A group of wireless LAN client users and an access point construct a Basic Service Set (BSS). Each wireless LAN client device in this BSS can talk to any device in the wired LAN infrastructure via the access point. In this infrastructure configuration, wireless LAN systems will extend the accessibility to the wired LAN. On the other hand, infrastructure mode also supports roaming capability for mobile wireless LAN users. More than one BSS can be configured as an Extended Service Set (ESS). The continuous network allows wireless LAN users to roam freely within an ESS. The premise to build an ESS is that all wireless LAN client devices and access points within the ESS must be configured with the same ESS ID.


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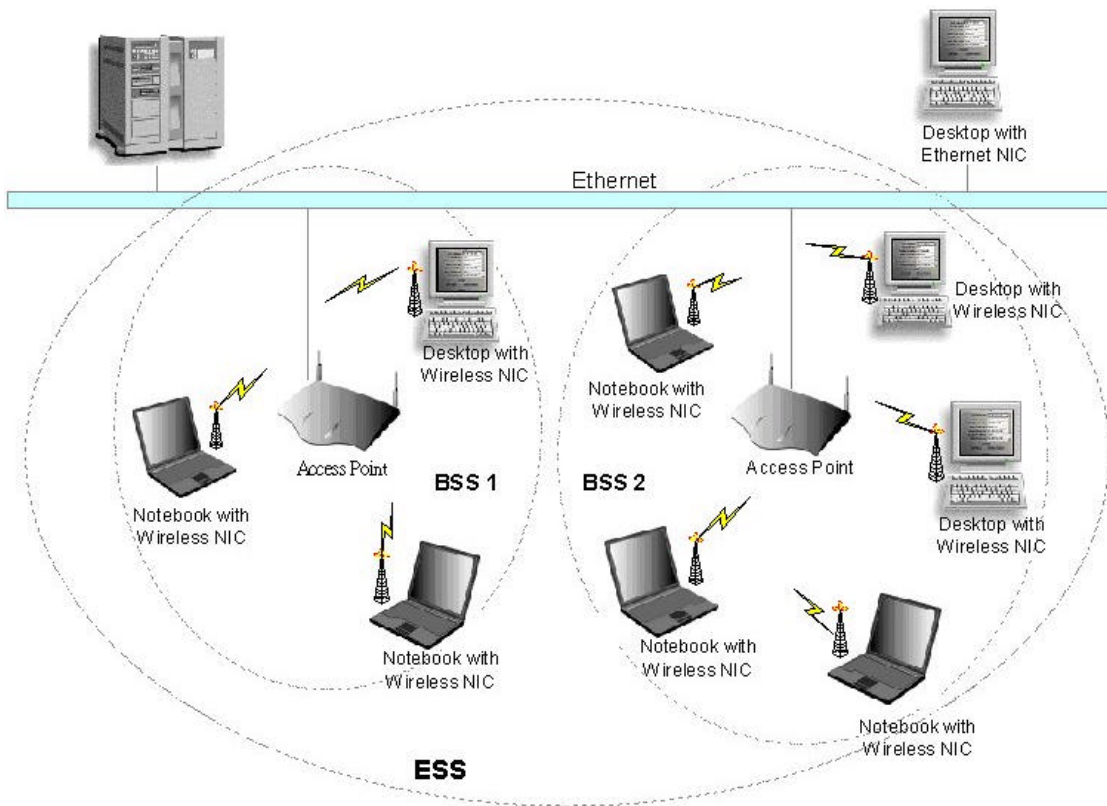
3. Installation Procedure for Windows

3.1 Installation for Windows XP

1. Insert the WF-100 CompactFlash card into a CompactFlash slot of a computer. Then the system will automatically detect the new hardware and prompt you to start the installation of the driver. Please put the device driver CD into the CD-ROM drive, and then click **Next** button to continue.
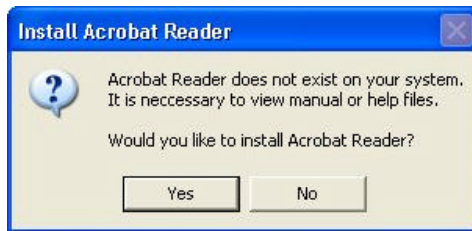

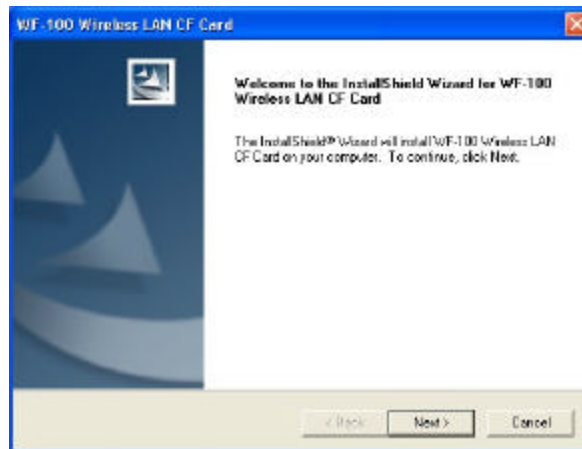2. Select the driver file "wlannic.inf". Click **Next** button to continue.
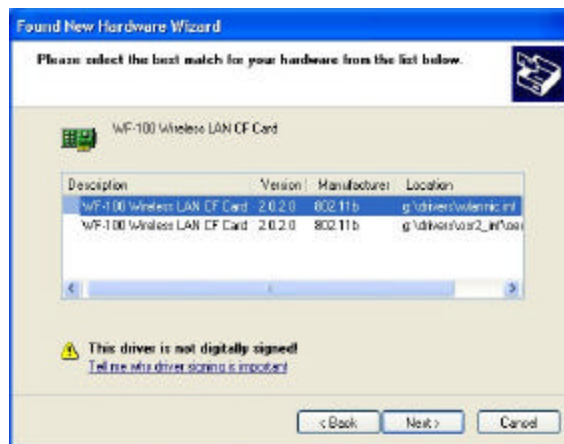
3. Now, it's time to install the software of this card. Please choose the language for the following installation instructions.

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Choose Setup Language

Select the language for this installation from the choices below.

English (United States)

OK   Cancel

4. If there is no Acrobat Reader on the system, you may install it right away. With Acrobat Reader you can read the user manual of the utility in PDF format.

Install Acrobat Reader

Acrobat Reader does not exist on your system. It is neccessary to view manual or help files.

Would you like to install Acrobat Reader?

Yes   No

5. A wizard begins to guide you through all the following installation steps. Click **Next** to continue.

WF-100 Wireless LAN CF Card

Welcome to the InstallShield Wizard for WF-100 Wireless LAN CF Card

The InstallShield® Wizard will install WF-100 Wireless LAN CF Card on your computer. To continue, click Next.

< Back   Next >   Cancel

6. You may specify the destination location of the utility. Click **Next** to continue.

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7. You may specify the program folder name. Click **Next** to continue.

8. Then the wizard starts to perform setup operations including copying files, and this will take a few seconds. When finished, click **Finish** to complete the software installation. Sometimes the system will request you, if necessary, to restart your computer right away to make the installation take . Just follow the on-screen instructions to finalize the installation.
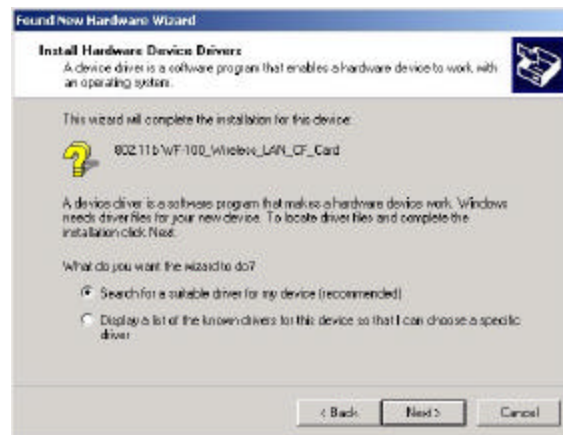
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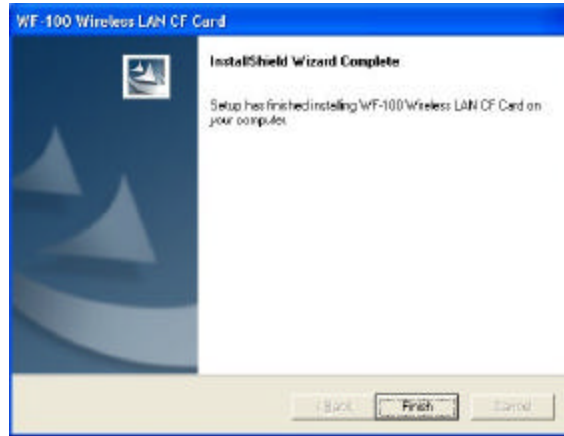
3.2 Installation for Windows 2000

1. Insert the WF-100 CompactFlash card into a CompactFlash slot of a computer. Then the system will automatically detect the new hardware and prompt you to start the installation of the driver. Click **Next** to continue.
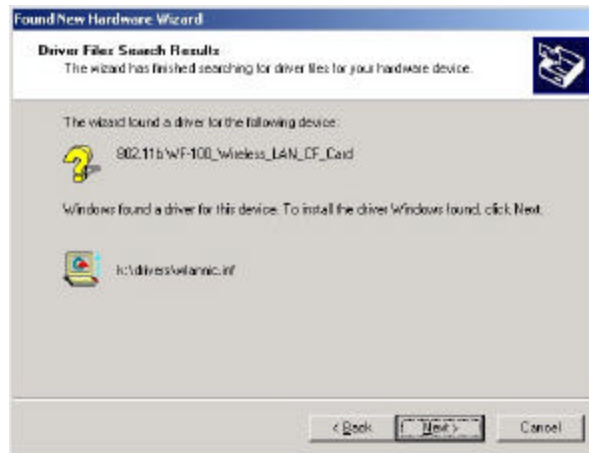
2. Select the option "Search for a suitable driver for my device (recommended)", and click **Next** button.

3. Check the "CD-ROM drives" only, and put the device driver CD into the CD-ROM drive. Then click **Next** button.
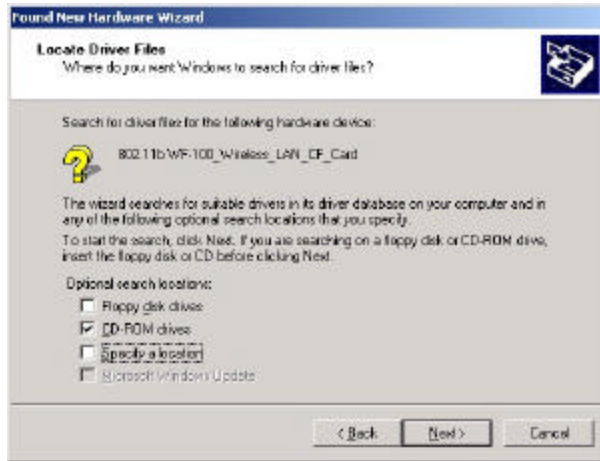
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4. Then the driver file "wlannic.inf" of the device will be found by the system. Click **Next** button to continue.


5. Now, it's time to install the software of this card. Please choose the language for the following installation instructions.
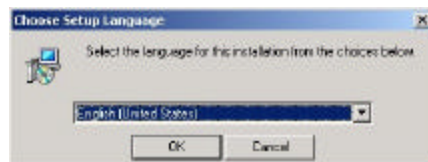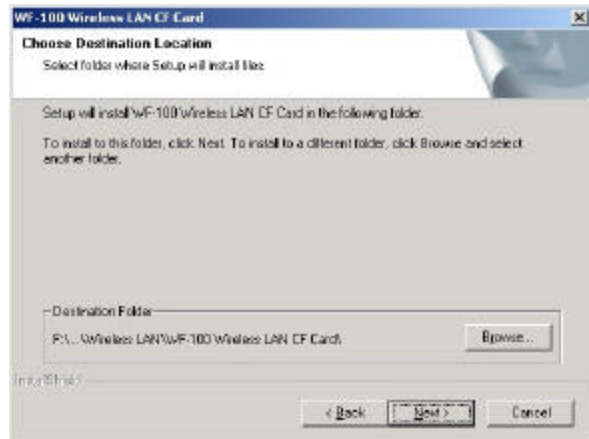

6. If there is no Acrobat Reader on the system, you may install it right away. With Acrobat Reader you can read the user manual of the utility in PDF format.
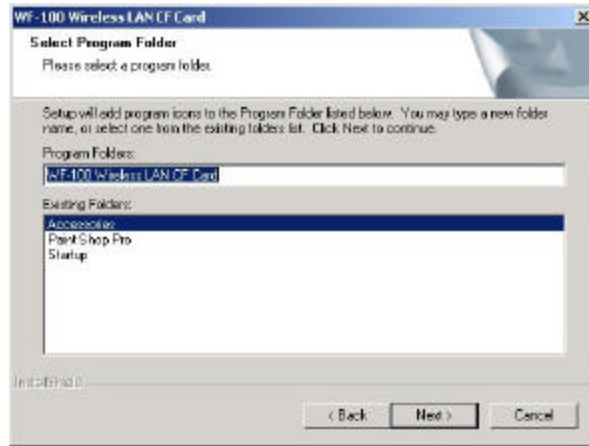
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7. A wizard begins to guide you through all the following installation steps. Click **Next** to continue.
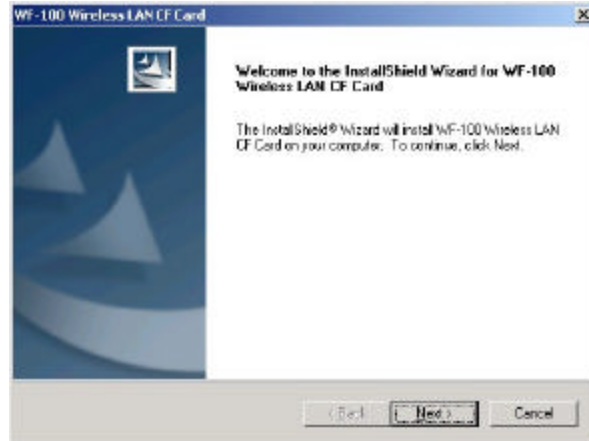
8. You may specify the destination location of the utility. Click **Next** to continue.

9. You may specify the program folder name. Click **Next** to continue.

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10. Then the wizard starts to perform setup operations including copying files, and it takes a few seconds. When finished, click **Finish** to complete the software installation. Sometimes the system will request you, if necessary, to restart your computer right away to make the installation take effect. Just follow the on-screen instructions to finalize the installation.

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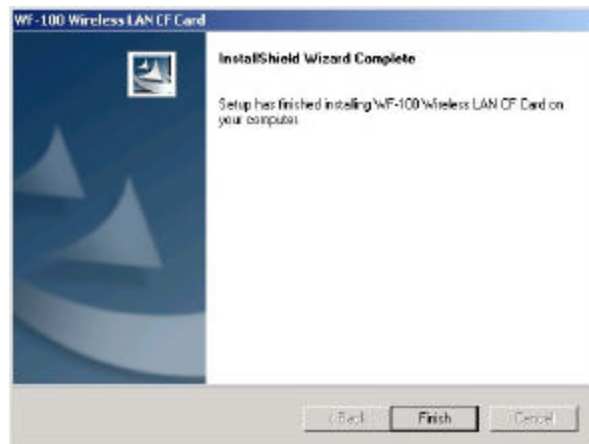
3.3 Installation for Windows Me

1. Insert the WF-100 CompactFlash card into a CompactFlash slot of a computer. And the system will automatically detect the new hardware and prompt you to start the installation of the driver. Then put the device driver CD into the CD-ROM drive. Similarly, the system will automatically detect the driver files on the CD and perform the driver installation.

2. The first phase of driver installation is finished. Please click **Finish** to continue.
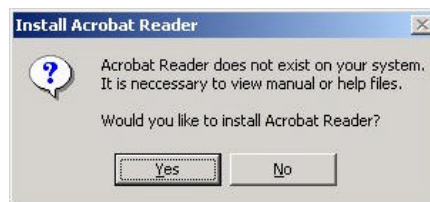

3. Please restart your computer right away to get into the second phase of installation.


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4. After restarting the system, you may choose the language for the following installation instructions.
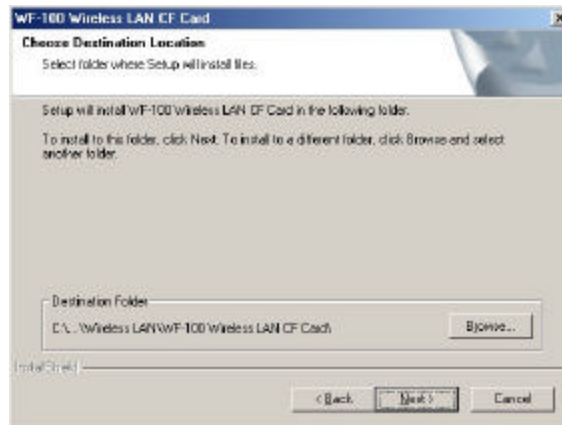

5. If there is no Acrobat Reader on the system, you may install it right away. With Acrobat Reader you can read the user manual of the utility in PDF format.
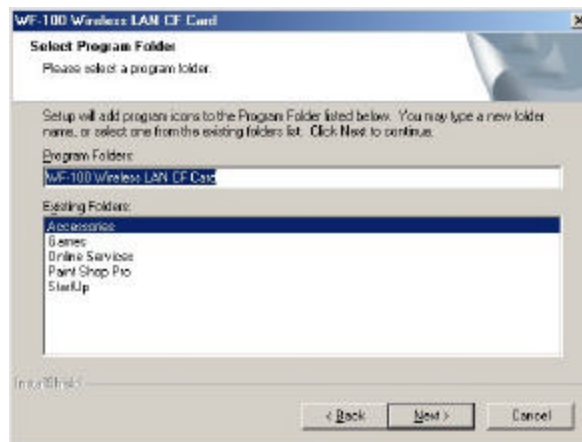

6. A wizard begins to guide you through all the following installation steps. Click **Next** to continue.

7. You may specify the destination location of the utility. Click **Next** to continue.

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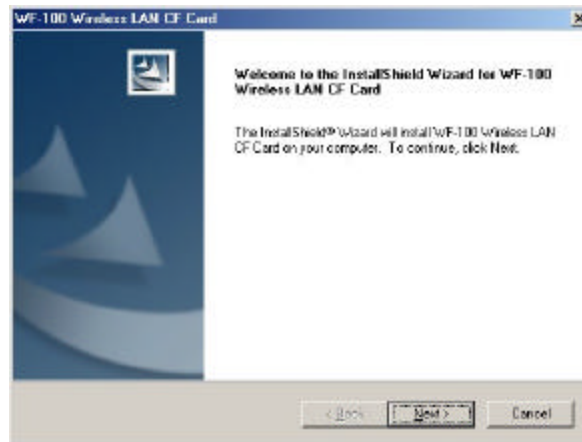
8. You may specify the program folder name. Click **Next** to continue.

9. Then the wizard starts to perform setup operations including copying files, and it takes a few seconds. When finished, click **Finish** to complete the software installation. Sometimes the system will request you, if necessary, to restart your computer right away to make the installation take effect. Just follow the on-screen instructions to finalize the installation.

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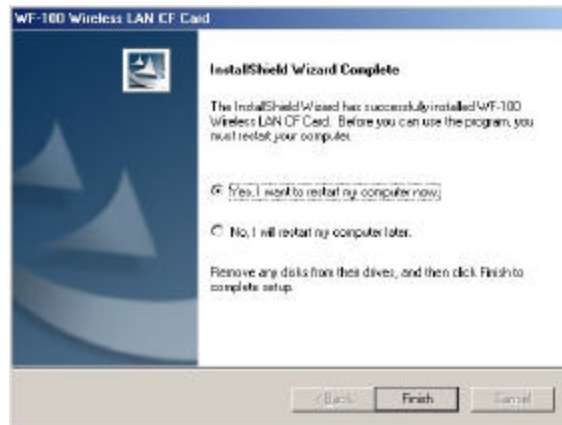
3.4 Installation for Windows 98

1. Insert the WF-100 CompactFlash card into a CompactFlash slot of a computer. Then the system will automatically detect the new hardware and prompt you to start the installation of the driver. Click **Next** to continue.

2. Select the option "Search for a suitable driver for my device (recommended)", and click **Next** button.

3. Put the device driver CD into the CD-ROM and check the "Specify a location". Where choose the folder "Drivers" of the CD-ROM drive as the location.

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4. Then the driver file "wlannic.inf" of the device will be found by the system. Click **Next**
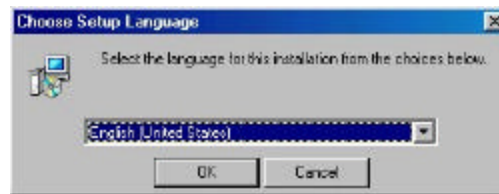   button to continue.

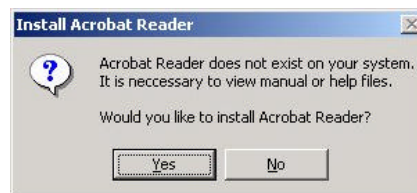5. The first phase of driver installation is finished. Please click **Finish** to continue.

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6. Please restart your computer right away to get into the second phase of installation.

7. After restarting the system, you may choose the language for the following installation instructions.

8. If there is no Acrobat Reader on the system, you may install it right away. With Acrobat Reader you can read the user manual of the utility in PDF format.
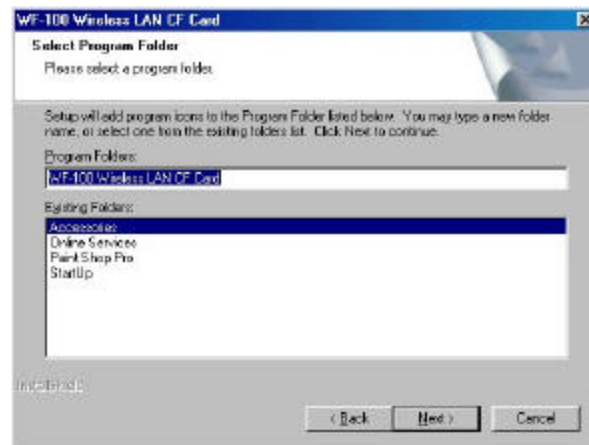
9. A wizard begins to guide you through all the following installation steps. Click **Next** to continue.

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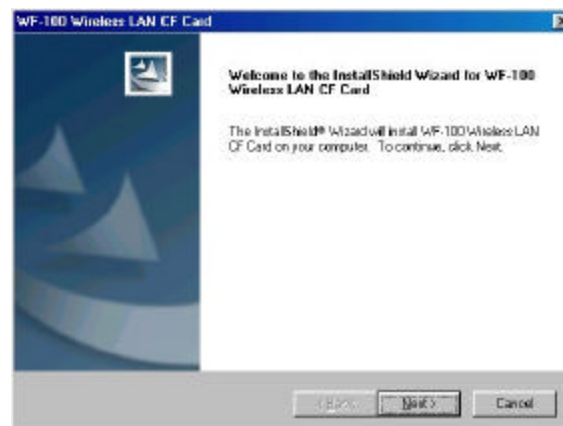
10. You may specify the destination location of the utility. Click **Next** to continue.
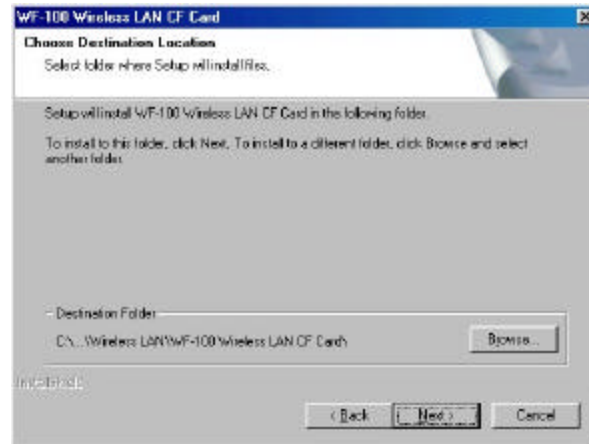
11. You may specify the program folder name. Click **Next** to continue.

12. Then the wizard starts to perform setup operations including copying files, and it takes a few seconds. When finished, click **Finish** to complete the software installation. Sometimes the system will request you, if necessary, to restart your computer right away to make the installation take effect. Just follow the on-screen instructions to finalize the installation.

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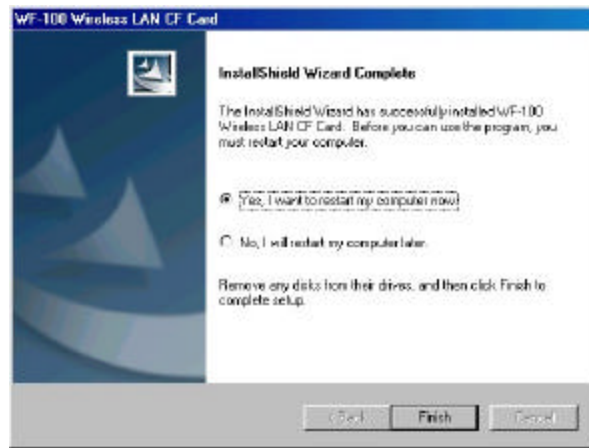
3.4 Uninstallation

WF-100 utility utilizes InstallShield uninstallation mechanism to provide users an uninstallation program. The uninstallation program conforms the standard Windows uninstallation look-and-feel. Users can choose to run **Remove Wireless LAN Driver** from the Windows Start menu to uninstall the software of **WF-100 Wireless LAN PC Card**. The uninstallation program will then remove the driver and utility from the system completely.
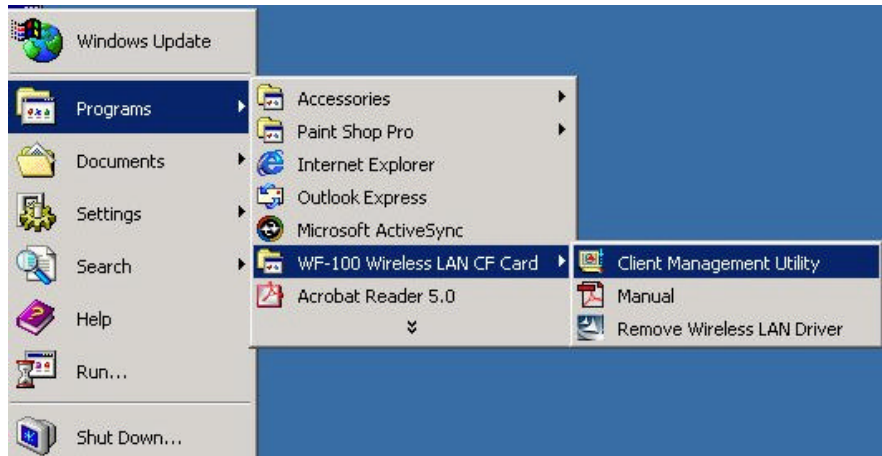
As an alternative, users may also choose to uninstall the WF-100 software by running **Add/Remove Programs** in the **Control Panel**

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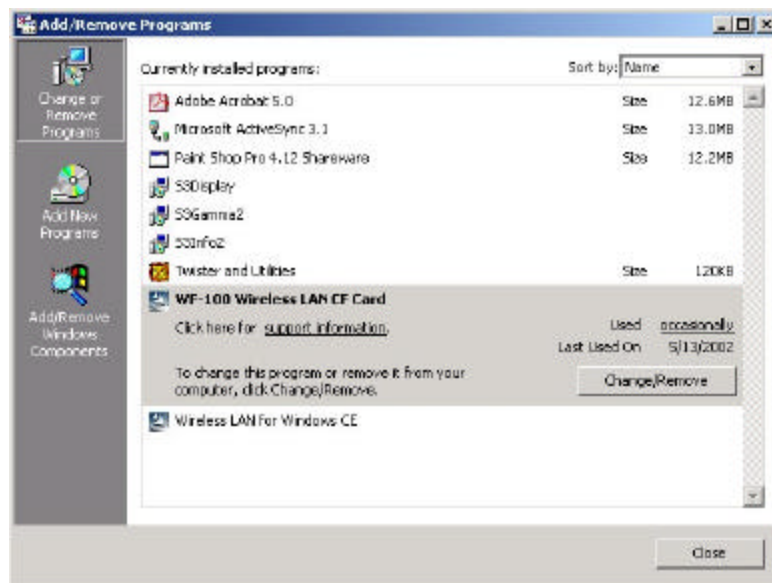
4. Installation Procedure for Pocket PC

4.1 Installation for Pocket PC

1. Insert the WF-100 CompactFlash card into the CompactFlash slot of your Pocket PC.

2. Connect the Pocket PC to your host computer and check that the state of **ActiveSync** has become **Connected**.

3. Put the device driver CD into the CD-ROM drive, and then start to install the software from host computer to Pocket PC via **ActiveSync**. Please choose the language for the following installation instructions.

4. A wizard begins to guide you through all the following installation steps. Click **Next** to continue.

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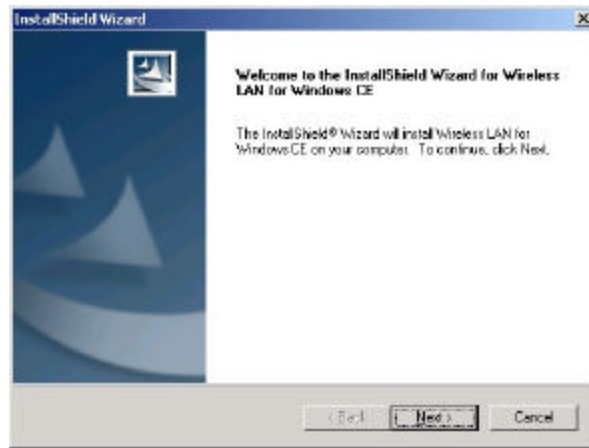
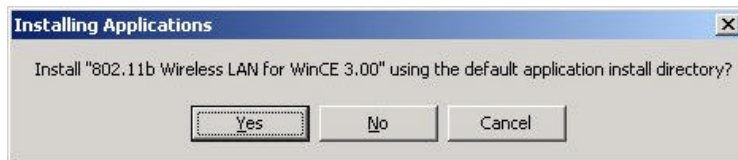5. Click **Yes** to install to the default directory.

6. Then the wizard starts to perform software setup operations including copying files, and it takes a few seconds. When finished, the system will advise you of checking screen message on Pocket PC. Just follow the message to reset your Pocket PC to make the driver installation take effect.
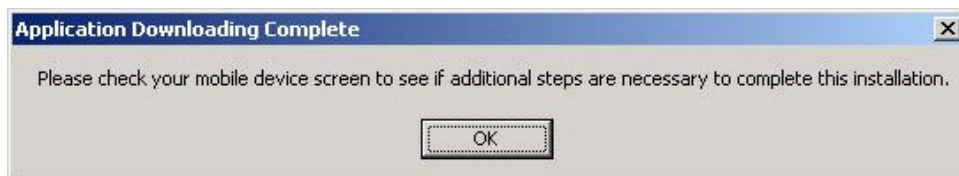
7. Press **Finish** to finalize the installation.

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4.2 Uninstallation

Users may use **Remove Programs** in your Pocket PC to uninstall the driver. To run the **Remove Programs** , you may select the **Settings** i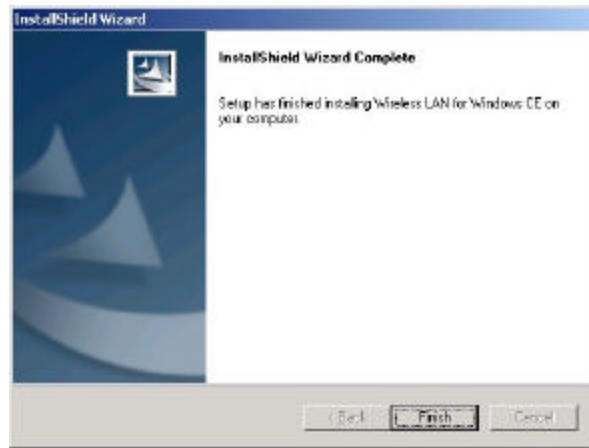tem from **Start** menu, change to **System** tab of **Settings**, then click the **Remove Programs** icon. To uninstall the driver, just choose the item **802.11b Wireless LAN for WinCE** and click **Remove** button on the screen of **Remove Programs.** After that, the driver and utility will be removed from the system completely.

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5. Wireless Client Management Utility For Windows

Wireless Client Management Utility (**WCM**) provides the following window interfaces for users to easily manage the wireless card.

- **Status Icon**   A taskbar icon immediately shows the current connection status.
- **Status Tab**   Show wireless information of the current connection.
- **Profile Tab**   Allow users configure different wireless settings for each profile.
- **Encryption Tab**   provide interface to add WEP keys to prevent unauthorized users from accessing your wireless network.
- **Survey Tab**   Provide a site-survey tool to list all the active access points and ad-hoc stations that are within the range of your computer
- **Statistics Tab**   Display statistical counters of data transmission and reception.
- **About Tab**   Display software/firmware versions and frequency domain of the card.

After installation, **WCM** will automatically run and show **Status Icon** on the taskbar. Users may launch the utility window from **start menu**, **control panel**, or just double-clicking **Status Icon**.

Detailed descriptions of features are provided in the following sections.

5.1 Status Icon

Status Icon indicates the current connection status of the station. It can be one of the following.

Icon	Indication	Description	Color
	Excellent/Good Link Quality	The link quality of the current connection is excellent/good.	Light green
	Fair Link Quality	The link quality of the current connection is fair. Please move the station closer to the Access Point	Yellow
	Poor Link Quality	The link quality of the current connection is poor. Please save your files if you are transferring files and move the station closer to the Access Point.	One level of Yellow
	Not Linked	The signal is lost for the preferred connection.	Empty
	Data Frame Errors – Check WEP Settings	The encryption is enabled but the key of the station doesn't match the key of the sender. Or the encryption is disabled but what in the sender is enabled. Please check WEP key settings.	A key with a red "X"

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|		The wireless LAN card has no RF radio signal. Please enable RF radio using Wireless Client Management Utility.	A red "X"
	Radio Off		

Users may click **Status Icon** to pop up a selection menu, where users can turn on/off the wireless radio , launch the utility window for the wireless settings, or remove this status icon from the taskbar .

If users double -click **Status Icon**, the utility window will be launched.

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5.2 Status Tab

The **Status** tab of the utility window provides information of the wireless connection on the current profile. Figure 1 shows the screen layout of the **Status tab.**
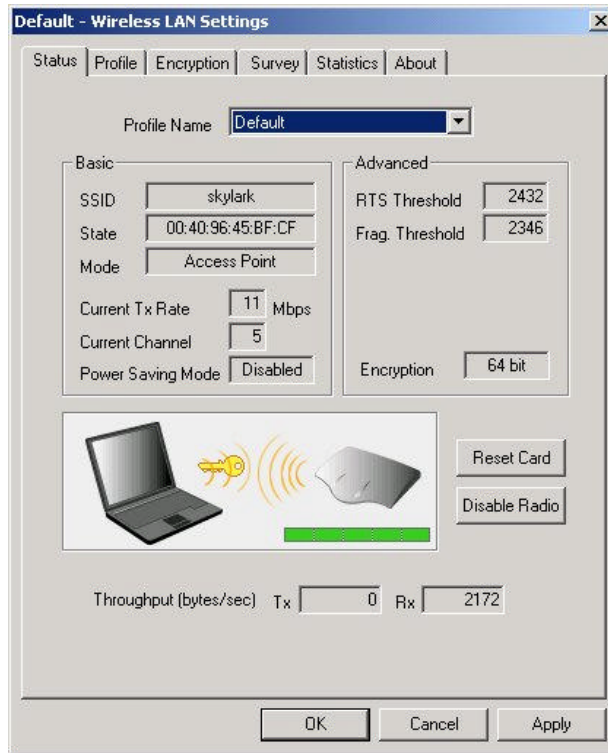
Profile Name

Show the engaged profile name. Users may change the profile for different connection.

SSID

Short for **Service Set Identifier,** a unique identifier referred to as a Network Name of a wireless network.

State

Display the current link state of the station.

- **MAC address of the access point** — if connected, this column displays the MAC address (BSSID) of the access point in **Access Point Mode** .
- **Scanning** -- the station is searching for available access point of specified SSID in **Access Point Mode** . If disconnected, this column is always in this state.
- **Associated** – the station is currently communicating with another station in the **Peer-to-Peer Mode** .
- **Not Associated** – the station cannot detect any available station with the specified SSID in the **Peer-to-Peer Mode** .

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Mode

- **Access point** – This mode of operation requires the presence of an access point. All communication is done via the access point, which relays packets to other wireless clients in the BSS as well as to nodes on a wired network such as Ethernet.
- **Peer-to-Peer** – This is the peer-to-peer mode of operation. All communication is done from client to client without using of an access point.

Current Tx Rate

Display the transmission rate of the current communication.

Current Channel

Display the channel of the current wireless connection. The communication channel ranges from **1 to 11(US/FCC, Canada/RSS)**,

1 to 13(Europe/ETSI) or 1 to 14(Japan/TELEC)

Power Saving Mode

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

RTS Threshold

Indicate RTS threshold status, which is set either **disabled** or as the value ranging from **0 to 3000**.

Frag. Threshold

Indicate fragmentation threshold status, which is either **disabled** or as the value ranging from **256 to 2346**.

Encryption

Indicate the state of WEP. If enabled, it indicates the status of 64 bits or 128 bits.

Throughput

Contain two fields displaying the instantaneous wireless receiving (Rx) and transmitting (Tx) throughput values in bytes per second. These numbers are updated every second.

Link Status indication Figure

A series of figures indicate the current signal level, network mode, and WEP state. All figures are described below.

Access Point / WEP disabled

The station receives **excellent** signals. The WEP is disabled.

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	The station receives **good** signals. The WEP is disabled.
	The station receives **fair** signals. The WEP is disabled..
	The station receives a little bit **weak** signals. The WEP is disabled.
	The station only receives a little **feeble** signal. The WEP is disabled.
	The station **cannot receive** any AP's signal. The WEP is disabled.

Access Point / WEP enabled / WEP matched

	The station receives **excellent** signals. The WEP is enabled and the decryption key matches the key of the AP.
	The station receives **good** signals. The WEP is enabled and the decryption key matches the key of the AP.
	The station receives rather **fair** signals. The WEP is enabled and the decryption key matches the key of the AP.
	The station receives a little bit **weak** signals. The WEP is enabled and the decryption key matches the key of the AP.
	The station only receives a little **feeble** signal. The WEP is enabled and the decryption key matches the key of the AP.

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Access Point / WEP enabled / WEP mismatched

	The station receives **excellent** signals. The WEP is enabled but the decryption key doesn't match the key of the AP. Or the WEP is disabled but what in the AP is enabled.
	The station receives **good** signals. The WEP is enabled but the decryption key doesn't match the key of the AP. Or the WEP is disabled but what in the AP is enabled.
	The station receives **fair** signals. The WEP is enabled but the decryption key doesn't match the key of the AP. Or the WEP is disabled but what in the AP is enabled.
	The station receives a little bit **weak** signals. The WEP is enabled but the decryption key doesn't match the key of the AP. Or the WEP is disabled but what in the AP is enabled.
	The station only receives a little **feeble** signal. The WEP is enabled but the decryption key doesn't match the key of the AP. Or the WEP is disabled but what in the AP is enabled.
	The station **cannot receive** any AP's signal. The WEP is enabled.

Peer-to-Peer / WEP disabled

	The station receives **excellent** signals. The WEP is disabled.
	The station receives **good** signals. The WEP is disabled.
	The station receives **fair** signals. The WEP is disabled.
	The station receives a little bit **weak** signals. The WEP is disabled.

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	The station only receives a little **feeble** signal. The WEP is disabled.
	The station **cannot receive** any signal. The WEP is disabled.

Peer-to-Peer / WEP enabled / WEP matched

	The station receives **excellent** signals. The WEP is enabled and the decryption key matches the key of the sender.
	The station receives **good** signals. The WEP is enabled and the decryption key matches the key of the sender.
	The station receives **fair** signals. The WEP is enabled and the decryption key matches the key of the sender.
	The station receives a little bit **weak** signals. The WEP is enabled and the decryption key matches the key of the sender.
	The station only receives a little **feeble** signal. The WEP is enabled and the decryption key matches the key of the sender.

Peer-to-Peer / WEP enabled / WEP mismatched

	The station receives **excellent** signals. The WEP is enabled but the decryption key doesn't match the key of the sender. Or the WEP is disabled but what in the sender is enabled.
	The station receives **good** signals. The WEP is enabled but the decryption key doesn't match the key of the sender. Or the WEP is disabled but what in the sender is enabled.

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	The station receives **fair** signals. The WEP is enabled but the decryption key doesn't match the key of the sender. Or the WEP is disabled but what in the sender is enabled.
	The station receives a little bit **weak** signals. The WEP is enabled but the decryption key doesn't match the key of the sender. Or the WEP is disabled but what in the sender is enabled.
	The station only receives a little **feeble** signal. The WEP is enabled but the decryption key doesn't match the key of the sender. Or the WEP is disabled but what in the sender is enabled.
	The station **cannot receive** any signal. The WEP is enabled.

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5.3 Profile Tab

The **Profile** tab provides users to configure a profile of wireless connection in preference. Totally up to 9 different profiles can be added in the system. All settings in the **Profile** tab are alterable. After filling the profile name and other settings, users may click **Apply** or **OK** button to save the profile. Figure 2 shows the screen layout of the profile tab.

Profile Name
Give a name to the profile.

SSID
Short for **Service Set Identifier**, a 32-character unique identifier referred to as a Network Name of a wireless network. The default value is "ANY". This allows your wireless client to automatically associate to any access point within the range of the station.

Mode
Select the wireless network mode. It can be **Access Point** or **Peer-to-Peer** Mode. The default setting is **Access Point**.

Transmission Rate
The transmission rate tells the speed of the transmission. It can be **1Mbps, 2Mbps, Auto 1 or 2Mbps, 5.5Mbps, 11Mbps**, **or Fully Automatic**. It is **Fully Automatic** by default.

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Channel
Select the transmission channel in **Peer-to-Peer** mode.

Power Saving Mode
Choice of the power saving. The power saving mode can reduce power usage by temporarily disconnecting wireless connections when the connection is idle. The default setting is disabled.

RTS Threshold
Give the threshold of RTS. The RTS mechanism provides a solution to prevent data collisions. But enabling RTS Threshold may cause redundant network overhead that could negatively affect the throughput performance. When setting **Enable**, users may adjust the value from 0 to 3000.

Frag. Threshold
Give the threshold of Fragmentation. The fragmentation mechanism is for improving the efficiency when high traffic flows along in the wireless network. If the device often transmits large files in wireless network, users can enable the Fragmentation Threshold and the mechanism will split the packet to send. When setting **Enable**, users may adjust the value from 256 to 2346.

Restore Defaults
Press this button to restore all settings by default into the current profile.

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5.4 Encryption Tab

The **Encryption** tab equips an additional measure of security on your wireless network by using **WEP (Wired Equivalent Privacy)** encryption. To prevent unauthorized wireless stations from accessing data transmitted over the network, WEP can support high secure data encryption. WEP encrypts each frame transmitted through the radio by using one of the **Keys** entered from this panel. When an encrypted frame is received, it will only be accepted if it decrypts correctly. This will only happen if the receiver has the same **WEP Key** used by the transmitter. The **Encryption** tab contains some settings as below.
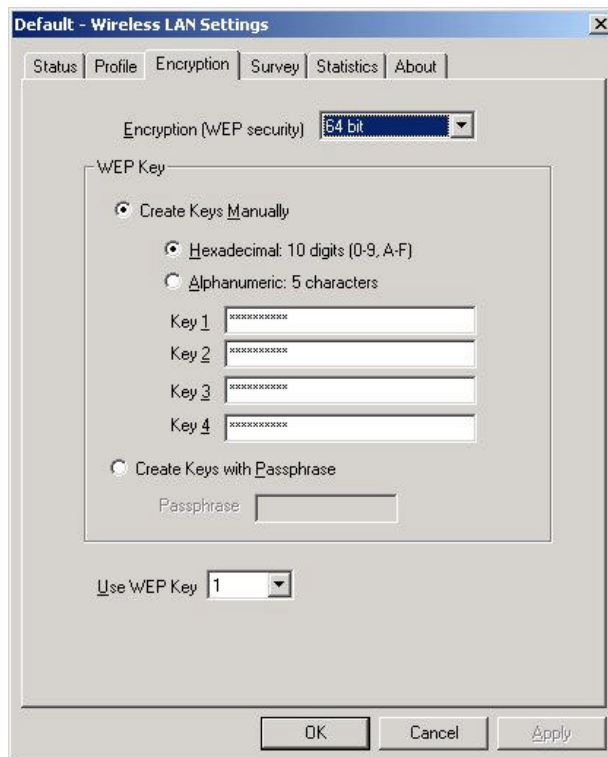
Encryption (WEP security)
It allows you to select **Disabled**, **64 bit** or **128 bit**. When setting **64 bit** or **128 bit**, it means WEP security is in operation.

WEP Key
You can choose **Create Keys Manually** or **Create Keys with Passphrase** to enter encryption keys. It allows **four keys for 64-bit and 128-bit key** according to WEP function select. The detailed descriptions will be shown as below for these two kinds of methods:

Create Key Manually
For 64-bits encryption:
- 5 alphanumeric characters in the range of "a-z", "A-Z" and "0-9". (e.g. MyKey)

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- 10 digit hexadecimal values in the range of "A-F" and "0-9". (e.g. 11AA22BB33).

For 128-bits encryption:
- 13 alphanumeric characters in the range of "a-z", "A-Z" and "0-9". (e.g. WEPencryption).
- 26 digit hexadecimal values in the range of "A-F" and "0-9". (e.g. 11AA22BB33123456789ABCDEFF)

Create Keys with Passphrase
A passphrase is a string of ASCII characters, which will be automatically converted into four different hexadecimal strings for four keys. This saves considerable time since the same keys must be entered into each node on the wireless network.

Key1, Key2, Key3, Key4
These four columns can be used to manually enter the keys. These fields also display the keys when they are generated by a passphrase.

Use WEP key
Indicate the key for encrypting sent packets.

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5.5 Survey Tab

The **Survey** tab supports a Site-Survey tool to discover all active wireless devices within the radio range of the station. For any discovered device, users may press **Connect** button or double click it to make the station immediately connect to. And the system will simultaneously change the profile to "Default" and update the content of the **profile tab** to match such device's settings. Users may also press **Rescan** button to scan again and update the survey result anytime. The **Survey** tab contains some columns as below.
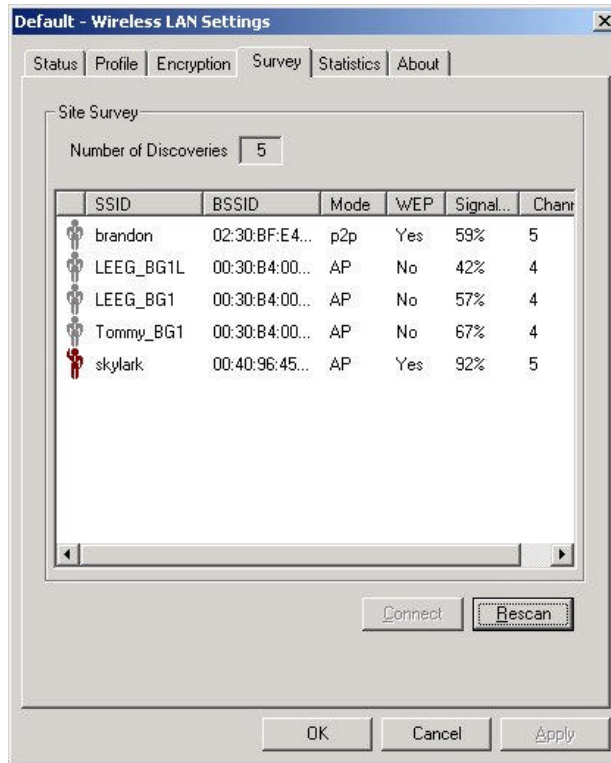
Number of Discoveries
Show the total number of wireless LAN devices discovered by the current scan.

Indicate the discovered device to which the station is currently connecting.

Indicate the discovered devices to which the station is not currently connecting.

SSID
Short for **Service Set Identifier,** a unique identifier referred to as a Network Name of a wireless network.

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BSSID

Short for **Basic Service Set Identifier**, during the infrastructure mode, it represents the MAC address of the access point.

Mode

Show the discovered device is an access point (AP) or a peer-to-peer (p2p) station.

WEP

Show whether the discovered device is WEP enabled.

Signal Level

Display the signal strength level of the discovered device.

Channel

Display the current communication channel used by the discovered device.

Connect

Users may press this button to make the station immediately connect to the selected device. And the system will simultaneously change the profile to "Default" and update the content of the **profile tab** to match such device's settings.

Rescan

Press this button to scan again.

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5.6 Statistics Tab

The **Statistics** tab monitors the successful and failed transmission traffic of the wireless network. Users can press **Reset** button to restart the counter, or just want to temporarily freeze the current showed counters, they can press **Pause** button to do that easily. The detailed **Statistics** information contains some columns as below.

Bytes (Tx Counters)
The number of wireless sent bytes.

Fragments (Tx Counters)
The number of successfully delivered MPDUs of type Data or Management.

Unicast Packets (Tx Counters)
The number of wireless sent unicast packets.

Single Retries
The number of MSDUs successfully transmitted after one (and only one) retransmission.

Multiple Retries
The number of MSDUs successfully transmitted after more than one retransmission.

Retry Limit Exceeded

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The number shows the times of failed transmitted MSDU that caused by reaching the retry limitation (7 for short frame and 4 for long frame) due to no acknowledgement or CTS received.

Deferred Transmissions
The number of MSDUs that one or more transmission attempt(s) was deferred to avoid a collision.

Bytes (Rx Counters)
The number of received bytes of wireless transmission.

Fragments (Rx Counters)
The number of successfully received MPDUs of type Data or Management.

Unicast Packets (Rx Counters)
The number of received unicast packets of wireless transmission.

WEP Undercryptable
The number of received MPDUs, with the WEP subfield in the Frame Control field set to one, that were discarded because either it should not have been encrypted, or due to the receiving station not implementing the privacy option.

No Buffer Discarede
The discarded number of received MPDUs, which is because the lack of buffer space on the NIC.

No Buffer Discarede
The discarded number of received MPDUs, which is because the lack of buffer space on the NIC.

Time Elapse
The timer for the accumulation of these counters

Pause/Continue
Press **Pause** button to freeze the display of these counters' accumulation and timer. Press **Continue** to resume normal display.

Reset
Reset all counters and timer.

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5.7 About Tab

This tab shows the Frequency Domain, Wireless Client Management Utility versions, and serial number and MAC address of the network interface card. Users need to use these version numbers when reporting their problems to technique support.

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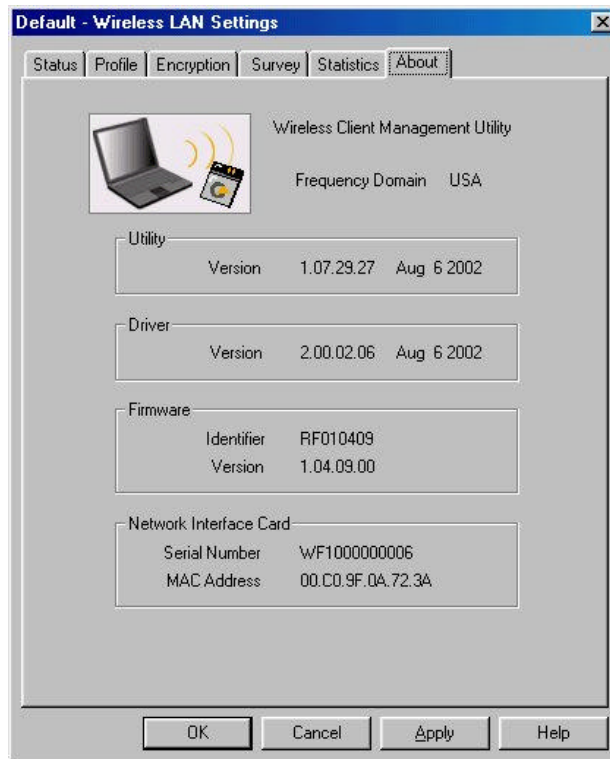
6. Wireless Client Management Utility for Pocket PC

Wireless Client Management Utility (**WCM**) provides the following window interfaces for users to easily manage the wireless card.

- **Status Icon**   A taskbar icon immediately shows the current connection status.
- **Status Tab**   Show wireless information of the current connection.
- **Profile Tab**   Allow users configure different wireless settings for each profile.
- **Encryption Tab**   provide interface to add WEP keys to prevent unauthorized users from accessing your wireless network.
- **Survey Tab**   Provide a site-survey tool to list all the active access points and ad-hoc stations that are within the range of your computer
- **Statistics Tab**   Display statistical counters of data transmission and reception.
- **About Tab**   Display software/firmware versions and frequency domain of the card.

After installation, **WCM** will automatically run and show **Status Icon** on the taskbar. Users may launch the utility window from **start menu**, **System tab in Settings**, or just double-clicking **Status Icon**.

Detailed descriptions of features are provided in the following sections.

6.1 Status Icon

Status Icon indicates the current connection status of the station. It can be one of the following.

Icon	Indication	Description	Color
	Excellent/Good Link Quality	The link quality of the current connection is excellent/good.	Light green
	Fair Link Quality	The link quality of the current connection is fair. Please move the station closer to the Access Point	Yellow
	Poor Link Quality	The link quality of the current connection is poor. Please save your files if you are transferring files and move the station closer to the Access Point.	One level of Yellow
	Not Linked	The signal is lost for the preferred connection.	Empty
	Data Frame Errors – Check WEP Settings	The encryption is enabled but the key of the station doesn't match the key of the sender. Please check WEP key settings. Or the encryption is disabled but what in the sender is enabled. Please check WEP key settings.	A key with a red "X"

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	Radio Off	The wireless LAN card has no RF radio signal. Please enable RF radio using Wireless Client Management Utility. A red "X"

Users may click **Status Icon** to pop up a selection menu, where users can turn on/off the wireless radio, launch the utility window for the wireless settings, or remove this status icon from the taskbar.
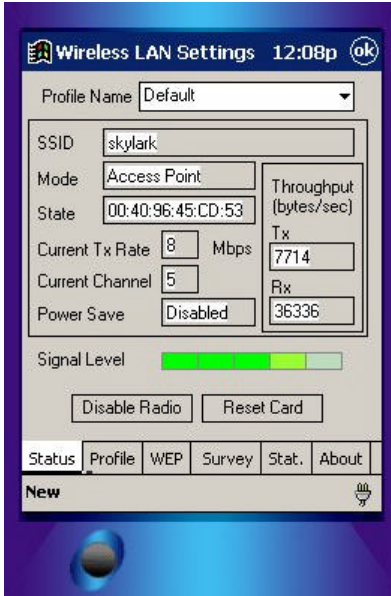

The utility window will also be launched if users double-click the **Status Icon**.

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6.2 Status Tab

The **Status** tab of the utility window provides information of the wireless connection on the current profile. Figure 1 shows the screen layout of the **Status tab.**

Profile Name

Show the engaged profile name. Users may change the profile for different connection.

SSID

Short for **Service Set Identifier,** a unique identifier referred to as a Network Name of a wireless network.

Mode

- **Access point** – This mode of operation requires the presence of an access point. All communication is done via the access point, which relays packets to other wireless clients in the BSS as well as to nodes on a wired network such as Ethernet.
- **Peer-to-Peer** – This is the peer-to-peer mode of operation. All communication is done from client to client without using of an access point.

State

Display the current link state of the station.

- **MAC address of the access point** — if connected, this column displays the MAC address (BSSID) of the access point in **Access Point Mode** .
- **Scanning** -- the station is searching for available access point of specified SSID in **Access Point Mode** . If disconnected, this column is always in this state.
- **Associated** – the station is currently communicating with another station in the **Peer-to-Peer Mode** .

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- **Not Associated** – the station cannot detect any available station with the specified SSID in the **Peer-to-Peer Mode**.

Current Tx Rate

Display the transmission rate of the current communication.

Current Channel

Display the channel of the current wireless connection. The communication channel ranges from **1 to 11(US/FCC, Canada/RSS)**,
1 to 13(Europe/ETSI) or 1 to 14(Japan/TELEC)

Power Save

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

Throughput

Contain two fields displaying the instantaneous wireless receiving (Rx) and transmitting (Tx) throughput values in bytes per second. These numbers are updated every second.

Signal Level

A series of figures indicate the current signal level and WEP state. All figures are described below.

WEP disabled

	The station receives **excellent** signals. The WEP is disabled.
	The station receives **good** signals. The WEP is disabled.
	The station receives **fair** signals. The WEP is disabled.
	The station receives a little bit **weak** signals. The WEP is disabled.
	The station only receives a little **feeble** signal. The WEP is disabled.
	The station **cannot receive** any signal. The WEP is disabled.

WEP enabled / WEP matched

	The station receives **excellent** signals. The WEP is enabled and the decryption key matches the key of the sender.
	The station receives **good** signals. The WEP is enabled and the decryption key matches the key of the sender.

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	The station receives **fair** signals. The WEP is enabled and the decryption key matches the key of the sender.
	The station receives a little bit **weak** signals. The WEP is enabled and the decryption key matches the key of the sender.
	The station only receives a little **feeble** signal. The WEP is enabled and the decryption key matches the key of the sender.

WEP enabled / WEP mismatched

	The station receives **excellent** signals. The WEP is enabled but the decryption key doesn't match the key of the sender. Or the WEP is disabled but what in the sender is enabled.
	The station receives **good** signals. The WEP is enabled but the decryption key doesn't match the key of the sender. Or the WEP is disabled but what in the sender is enabled..
	The station receives **fair** signals. The WEP is enabled but the decryption key doesn't match the key of the sender. Or the WEP is disabled but what in the sender is enabled.
	The station receives a little bit **weak** signals. The WEP is enabled but the decryption key doesn't match the key of the sender. Or the WEP is disabled but what in the sender is enabled.
	The station only receives a little **feeble** signal. The WEP is enabled but the decryption key doesn't match the key of the sender. Or the WEP is disabled but what in the sender is enabled.
	The station **cannot receive** any signal. The WEP is enabled.

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6.3 Profile Tab

The **Profile** tab provides users to configure a profile of wireless connection in preference. Totally up to 9 different profiles can be added in the system. All settings in the **Profile** tab are alterable. After filling the profile name and other settings, users may click **Apply** or **OK** button to save the profile. Figure 2 shows the screen layout of the profile tab.

Profile Name

Give a name to the profile.

SSID

Short for **Service Set Identifier**, a 32-character unique identifier referred to as a Network Name of a wireless network. The default value is "ANY". This allows your wireless client to automatically associate to any access point within the range of the station.

Mode

Select the wireless network mode. It can be **Access Point** or **Peer-to-Peer** Mode. The default setting is **Access Point**.

Tx Rate

The transmission rate tells the speed of the transmission. It can be **1Mbps, 2Mbps, Auto 1 or 2Mbps, 5.5Mbps, 11Mbps**, **or Fully Automatic**. It is **Fully Automatic** by default.

Channel

Select the transmission channel in **Peer-to-Peer** mode.

Power Save

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Choice of the power saving. The power saving mode can reduce power usage by temporarily disconnecting wireless connections when the connection is idle. The default setting is disabled.

Restore Defaults
Press this button to restore all settings by default into the current profile.

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6.4 Encryption Tab

The **Encryption** tab equips an additional measure of security on your wireless network by using **WEP (Wired Equivalent Privacy)** encryption. To prevent unauthorized wireless stations from accessing data transmitted over the network, WEP can support high secure data encryption. WEP encrypts each frame transmitted through the radio by using one of the **Keys** entered from this panel. When an encrypted frame is received, it will only be accepted if it decrypts correctly. This will only happen if the receiver has the same **WEP Key** used by the transmitter. The **Encryption** tab contains some settings as below.
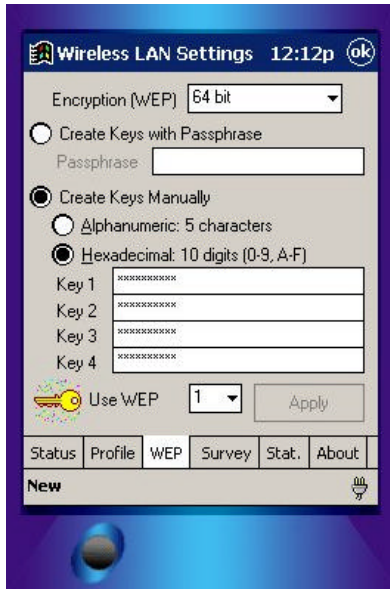
Encryption (WEP)
It allows you to select **Disabled**, **64 bit** or **128 bit**. When setting **64 bit** or **128 bit**, it means WEP security is in operation.

WEP Key
You can choose **Create Keys Manually** or **Create Keys with Passphrase** to enter encryption keys. It allows **four keys for 64-bit and 128-bit key** according to WEP function select. The detailed descriptions will be shown as below for these two kinds of methods:

Create Key Manually
For 64-bits encryption:
- 5 alphanumeric characters in the range of "a-z", "A-Z" and "0-9". (e.g. MyKey)
- 10 digit hexadecimal values in the range of "A-F" and "0-9". (e.g. 11AA22BB33).

For 128-bits encryption:
- 13 alphanumeric characters in the range of "a-z", "A-Z" and "0-9". (e.g.

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WEPencryption).
- 26 digit hexadecimal values in the range of "A-F" and "0-9". (e.g. 11AA22BB33123456789ABCDEFF)

Create Keys with Passphrase
A passphrase is a string of ASCII characters, which will be automatically converted into four different hexadecimal strings for four keys. This saves considerable time since the same keys must be entered into each node on the wireless network.
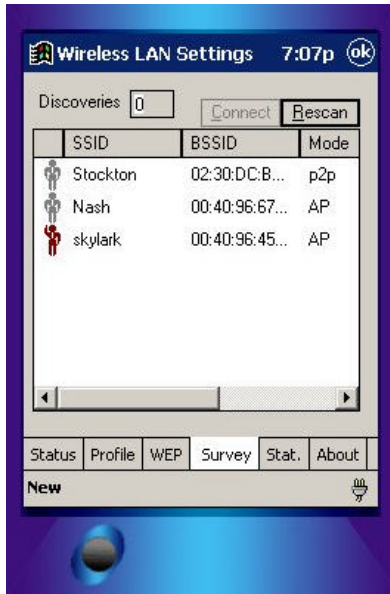
Key1, Key2, Key3, Key4
These four columns can be used to manually enter the keys. These fields also display the keys when they are generated by a passphrase.

Use WEP
Indicate the key for encrypting sent packets.

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6.5 Survey Tab

The **Survey** tab supports a Site-Survey tool to discover all active wireless devices within the radio range of the station. For any discovered device, users may press **Connect** button or double click it to make the station immediately connect to. And the system will simultaneously change the profile to "Default" and update the content of the **profile tab** to match such device's settings. Users may also press **Rescan** button to scan again and update the survey result anytime. The **Survey** tab contains some columns as below.

Discoveries
Show the total number of wireless LAN devices discovered by the current scan.

Indicate the discovered device to which the station is currently connecting.

Indicate the discovered devices to which the station is not currently connecting.

SSID
Short for **Service Set Identifier,** a unique identifier referred to as a Network Name of a wireless network.

BSSID
Short for **Basic Service Set Identifier**, during the infrastructure mode, it represents the MAC address of the access point.

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Mode

Show the discovered device is an access point (AP) or a peer-to-peer (p2p) station.

WEP

Show whether the discovered device is WEP enabled.

Signal Level

Display the signal strength level of the discovered device.

Channel

Display the current communication channel used by the discovered device.

Connect

Users may press this button to make the station immediately connect to the selected device. And the system will simultaneously change the profile to "Default" and update the content of the **profile tab** to match such device's settings.

Rescan

Press this button to scan again.

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6.6 Statistics Tab

The **Statistics** tab monitors the successful and failed transmission traffic of the wireless network. Users can press **Reset** button to restart the counter, or just want to temporarily freeze the current showed counters, they can press **Pause** button to do that easily. The detailed **Statistics** information contains some columns as below.
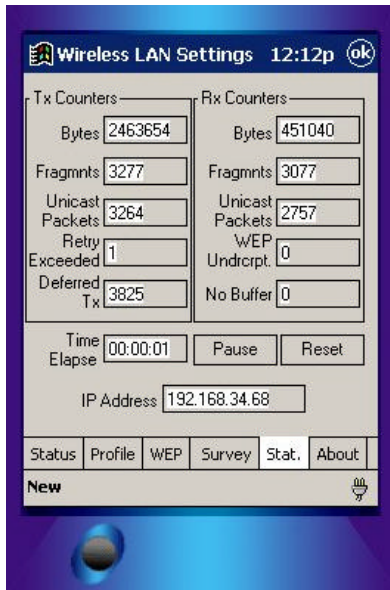
Bytes (Tx Counters)
The number of wireless sent transmission.

Fragments (Tx Counters)
The number of successfully delivered MPDUs of type Data or Management.

Unicast Packets (Tx Counters)
The number of wireless sent unicast packets.

Retry Exceeded
The number shows the times of failed transmitted MSDU that caused by reaching the retry limitation (7 for short frame and 4 for long frame) due to no acknowledgement or CTS received.

Deferred Tx
The number of MSDUs that one or more transmission attempt(s) was deferred to avoid a collision.

Bytes (Rx Counters)
The number of received bytes of wireless transmission.

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Fragments (Rx Counters)
The number of successfully received MPDUs of type Data or Management.

Unicast Packets (Rx Counters)
The number of received unicast packets of wireless transmission.

WEP Undercryptable
The number of received MPDUs, with the WEP subfield in the Frame Control field set to one, that were discarded because either it should not have been encrypted, or due to the receiving station not implementing the privacy option.

No Buffer Discarded
The discarded number of received MPDUs, which is because the lack of buffer space on the NIC.

Time Elapse
The timer for the accumulation of these counters

Pause/Continue
Press **Pause** button to freeze the display of these counters' accumulation and timer. Press **Continue** to resume normal display.
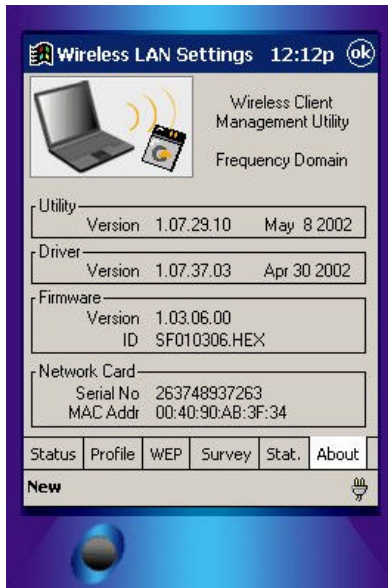
Reset
Reset all counters and timer.

IP Address
Display the current IP Address.

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6.7 About Tab

This tab shows the Frequency Domain, Wireless Client Management Utility versions, and serial number and MAC address of the network interface card. Users need to use these version numbers when reporting their problems to technique support.

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7. Hardware Technical Specification

Standard Compliance

IEEE 802.11b standard and WECA interoperability certified FCC part 15　sec.15. 247/USA
CE/ETSI 300.328　300.826/Eurpoe
TELEC/Japan

Electrical Specification

Parameter name	Value	Remark
Supply voltage range	3.0V~3.6V DC	Bus powered
Average current:	290 mA typical	2% transmit, 98% receive without power saving mode
AVERAGE CURRENT:	75 mA typical	2% transmit, 8% receive 90% standby with power saving mode
Continuous transmit mode	300 mA max	
Continuous receive mode:	290 mA max	
Standby mode:	51 mA max	with power saving mode

Form Factor

Comply with CompactFlash Type II Form Factor.

Connectivity Specification

Comply with the CompactFlash Standard　release 2.0

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Environmental Specification

Parameter name	Value	Remark
Temperature Range	0~55°C	Operation
Temperature Range	-20~65°C	Storage
Relative Humidity	95% max	
Vibration	15G	10 to 2000Hz, non-operating
EMI	FCC class B	
ESD	1500V	Non-operating

Frequency Allocation

Regulatory Domain	Operating frequency range	No. of operating channels
North America	2412~2462MHZ	11channel 3 non-overlapping
Europe	2412~2472MHZ	13channel 3 non-overlapping
Japan	2412~2484MHZ	14channels

Modulation/Data rate

Data Rate	Modulation
1M bps	DBPSK
2M bps	DQPSK
5.5M bps	CCK

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Data Rate	Modulation
11M bps	CCK

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Antenna Specification

Antenna Type: 2 PCB Antenna for Space Diversity

Receive Sensitivity

Modulation/Rate	Sensitivity Spec(dBm, Typ.)	Allowed PER
DBPSK (1M bps)	-87dBm	8% PER or less
DQPSK (2M bps)	-85dBm	8% PER or less
CCK (5.5M bps)	-84dBm	8% PER or less
CCK (11M bps)	-82dBm	8% PER or less

Dynamic Range

Parameter name	Value	Remark
Dynamic Range	82 dB	Maximum Input level is –5dBm

System Linearity Input

Input third order intercept point	Value	Remark
IIP3	-17 dBm Min.	@-28dBm input
IIP3	**13 DBM MIN.**	@-1dBm input

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Adjacent Channel Rejection

Receive Adjacent Channel Rejection shall be tested with a 25MHz Separation and the desired channel input power is –80dBm.

General Specification	Value	Remark
Adjacent channel rejection	35dB.	PER<8% @25MHz jammer offset

Transmitter Power Output

Parameter name	Value	Remark
TXP	13±1dBm	Preliminary measured Measured at antenna port ➢　1st side lobe < -30dBc ➢　2nd side lobe < -50dBc
TXP Range　ALC on	0dB typical	

TX Carrier Suppression

25dB Min.

Preamble Length

Short/Long

Multipath Fading Equalization

- 80 ns rms at 11Mbps
- 160 ns rms at 5.5Mbps
- 280 ns rms at 1M or 2M bps

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