

WM1-Mini-PCI Wireless LAN Card

USER MANUAL

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Checked By:

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- Quanta Confidential -

Revision	Date	Remark
1A	12/07/2001	First draft

Federal Communications Commission Statement

This device complies with FCC Rules Part 15. Operation is subject to the following two conditions:
This device may 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 turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and receiver.

- Connect the equipment 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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1 Introduction

1-1 Overview

The user manual of the model named WM1 will be based on this documentation. The product complies with full IEEE 802.11b standard with bit rate up to 11Mbps and interface complies with Mini-PCI specifications. This manual will assist you with the installation procedure and the operation of Wireless Client Manager utility which is used for managing the wireless LAN card and establishing the wireless connection with your Local Area Network.

1-2 Features

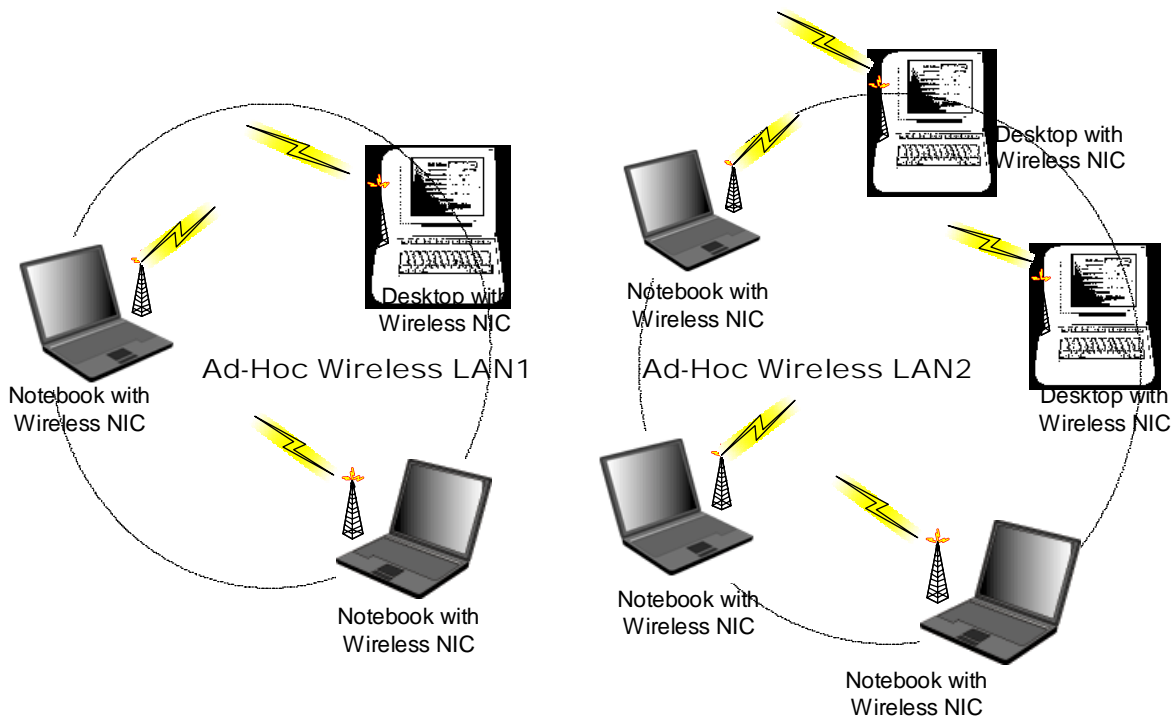
- * **Fully IEEE 802.11b and Wi-Fi compatible**
- * **Seamless roaming under 802.11b WLAN infrastructure**
- * **Support 11M/5.5M/2M/1M automatically fall back functionality**
- * **WEP 40/128 bits encryption provided**
- * **User-friendly installation, Auto-detect and easy setup**
- * **Provide Web-based configuration utilities and window-based diagnostics tools**
- * **Good receiving sensitivity and block free design**
- * **Compatible with any computer running Microsoft Windows 98/2000/ME/NT/XP**

2 Wireless LAN Application

Wireless LAN (Local Area Network) systems offer a great number of advantages over a traditional, wired system. And these systems support the same network configuration options of the legacy Ethernet LANs as defined by IEEE 802 standard committee. Besides, they are more flexibles, easier to setup and manage and often more cost effective than wired equivalence. In general, wireless LAN products can be configured as “Ad-Hoc (Peer-to-Peer)” for departmental or SOHO LANs or “Infrastructure (Access Point)” for enterprise LANs.

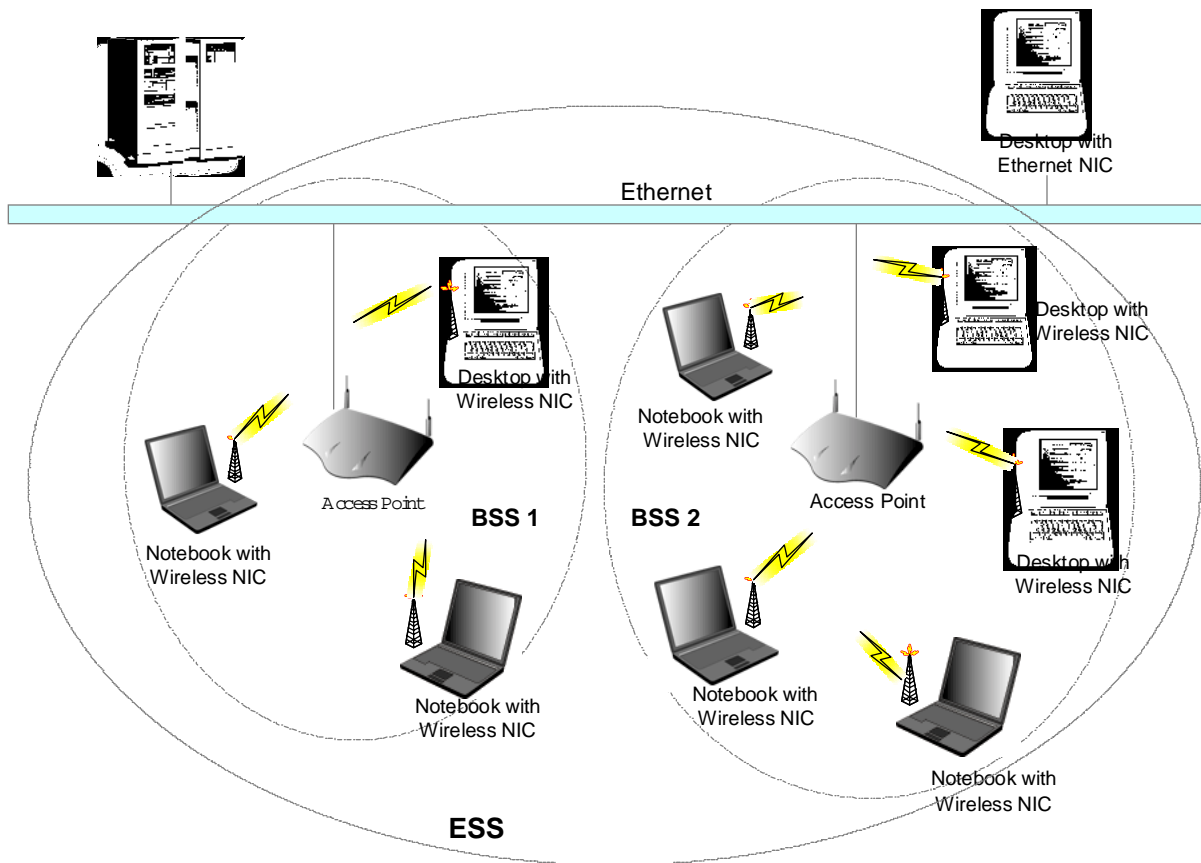
2-1 Ad-Hoc Topology

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



2-2 Infrastructure Topology

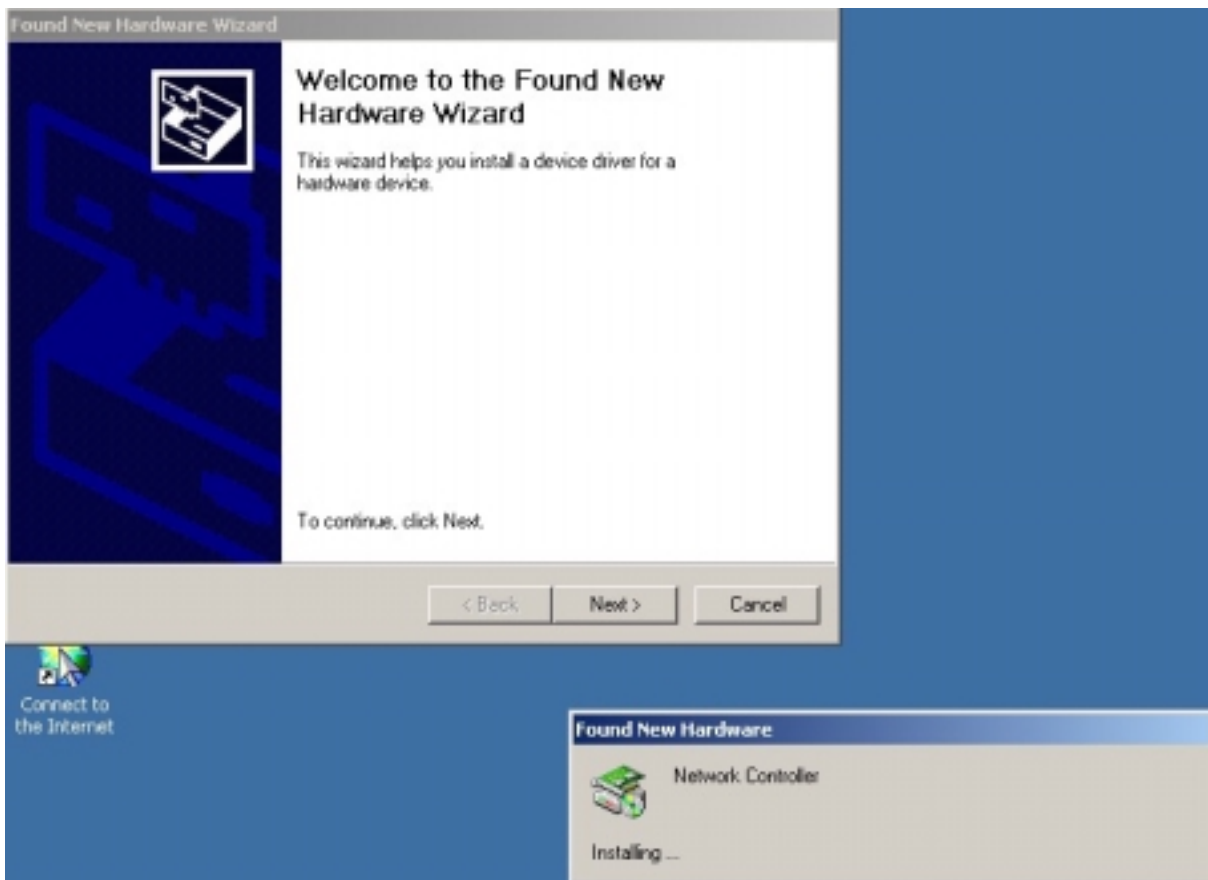
This mode of operation requires the presence of an access point at least. In this mode, all wireless LAN client devices need to communicate with the access point and then access to a wired LAN such as Ethernet via the access point. Therefore, an integrated wireless and wired LAN is called an infrastructure configuration. A group of wireless LAN client users and an access point construct a Basic Service Set (BSS). Each wireless LAN client devices in this BSS can talk to any devices 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 capabilities for mobile wireless LAN users. More than one BSS can be configured as an Extended Service Set (ESS). The continuous network allow wireless LAN users to roam freely within an ESS. All wireless LAN client devices and access points within the ESS must be configured with the same ESS ID and use the same radio channel.



3 Installation Procedure

3-1 For Windows 2000 installation

1. Windows 2000 will automatically detect the new hardware and prompt you to install the driver needed. Click “**Next**” button to begin the installation.



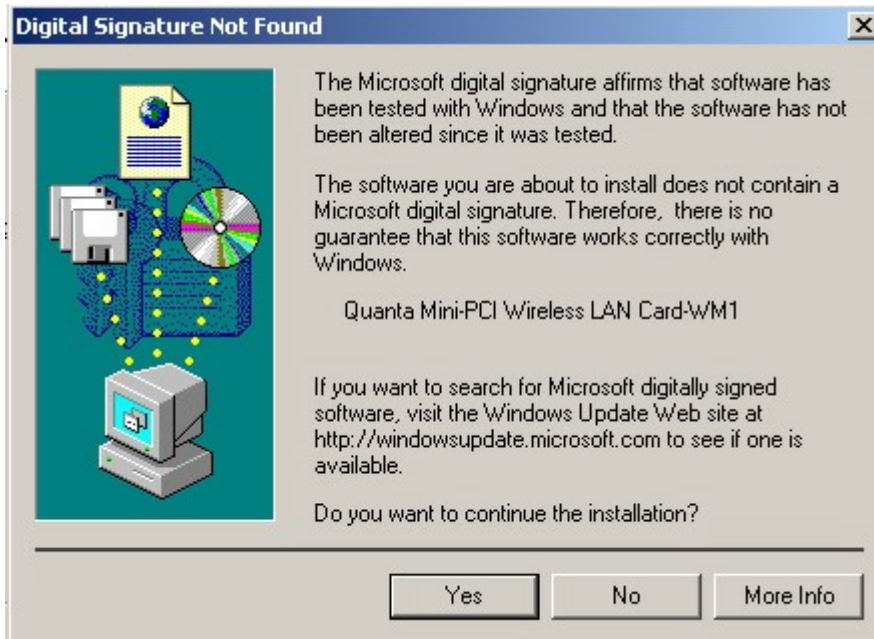
2. Select “**Search for a suitable driver for my device [recommended]**”, and click “**Next**” button.



1. Select the location where the corresponding driver is placed, “**CD-ROM drivers**” is the default location we support, and click “**Next**” button.



- Windows 2000 will show a windows information dialog. Click “Yes” button.



- Windows 2000 will install the driver. As the driver files are being copied to the appropriate location, windows 2000 will show a windows information dialog. Users click “Finish” button to complete the software installation.



4 Wireless Client Manager Utility

The WM1 Wireless Client Manager (WCM) screen is divided into four tabs :

- Status : provides current information on your wireless connection setting.
- Profile : easily allows users to configure those different setting for each profile.
- Encryption : prevent unauthorized users from accessing your wireless network.
- About : provides valuable information on the version and build numbers of WCM.

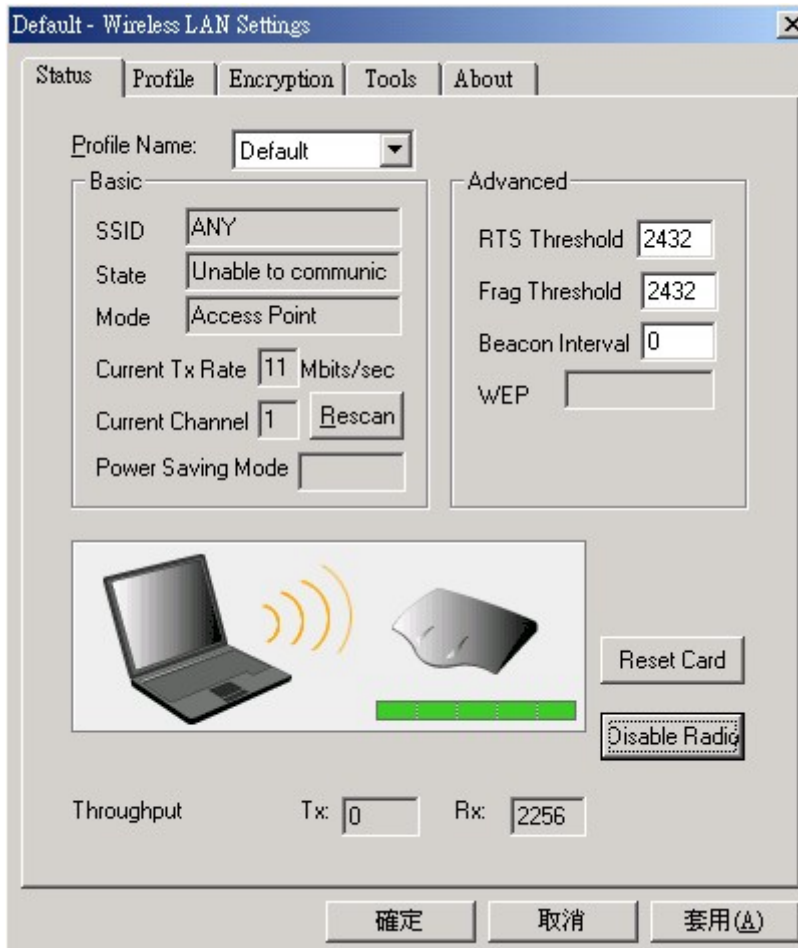
Status Tab

The **Status** tab provides information on the current profile, if any, being used in your wireless connection. The information listed on the **Status** tab is indicated below.

Profile Name

Basic – SSID, State, Mode, Current Tx Rate, Current Channel, Power Saving Mode

Advanced – RTS Threshold, Frag Threshold, Beacon Interval, WEP



Profile Name

The name of the profile currently in use.

Basic**SSID**

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

State

This field is used to display the current state of the driver. When the state “associated” means normal flow of operation in access point or peer-to-peer devices. During access point connection, it will represent the MAC address of the access point. And during an Ad-Hoc connection, it will read the MAC address of the peer-to-peer devices. A state of “scanning” means that the node is searching for available access point and can not detect any wireless device within range.

Mode

It will be shown the access point or peer-to-peer in this field.

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 the use of an access point.

Current Tx Rate

It will shown the transmit rate is being currently used for an active connection. This value has no meaning when state is “scanning”

Current Channel

Channel being used, if any, for this wireless connection. It will shown the communication channel ranging from 1 to 11.

Power Saving Mode

Indicates of power saving mode is enable or disable. Power saving mode reduced energy usage by temporarily disconnecting wireless connections when the connection is idle.

Rescan

Pressing the rescan button causes the driver to restart and begin its connection procedure. The connection procedure differs depending on the mode of the driver.

Advance**RTS Threshold**

Indicated of RTS threshold is disable or the value ranging from 0 to 2432.

Frag Threshold

Indicated of frag threshold is disable or the value ranging from 256 to 2432.

Beacon Interval

Indicated of beacon interval is disable or the ranging from 20 to 1000.

WEP

Indicated of WEP is disable, 64 bit or 128 bit.

Throughput

These two fields display the instantaneous wireless receive and transmit throughput displayed in bytes per second. These values are updated every two seconds.

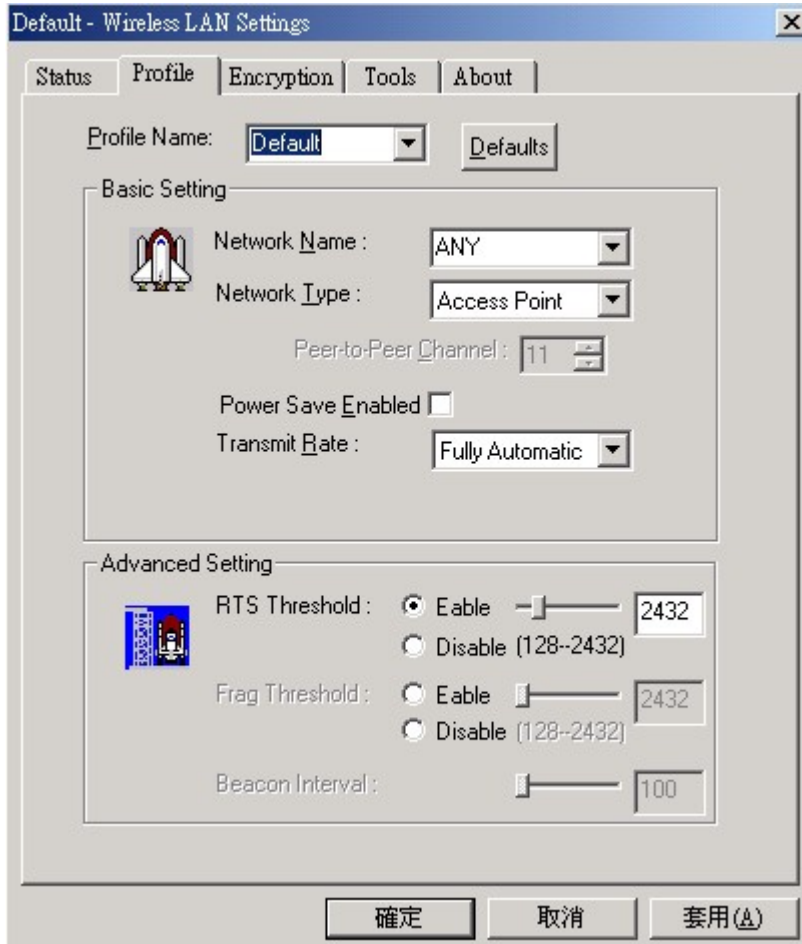
Profile Tab

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

Profile Name, Defaults

Basic – SSID, State, Mode, Current Tx Rate, Current Channel, Power Saving Mode

Advanced – RTS Threshold, Frag Threshold, Beacon Interval, WEP



Profile Name

Name given to the profile. Any user can add 10 maximum different profiles if he wish.

Defaults

Pressing this button restores each field in the panel to its default value. The default value for each field as below.

Basic

SSID

The name of the SSID (Service Set Identification) associated with the profile. The default value is “ANY”, This allows your wireless client to automatically associate to any access point in the vicinity of your wireless client.

Mode

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

Current Tx Rate

The transmission rate at which the data packets are transmitted by client of access point. You can set this to 1Mbps, 2Mbps, Auto 1 or 2Mbps, 5.5Mbps, 11Mbps, Fully Automatic. The default value is “Fully Automatic”.

Peer-to-Peer Channel

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

Power Saving Mode

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

Advance

RTS Threshold

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

Frag Threshold

The field allows you to set enable or disable. When the field is enable, you can set the value ranging from 256 to 2432. Fragmentation mechanism is used for improving the efficiency when high traffic flows along in the wireless network. If your wireless devices often transmit large files in wireless network, you can enable the Fragmentation Threshold and the mechanism will split the packet.

Beacon Interval

Changing the Beacon Interval is only effective in peer-to-peer mode. You can set the value ranging from 20 to 1000.

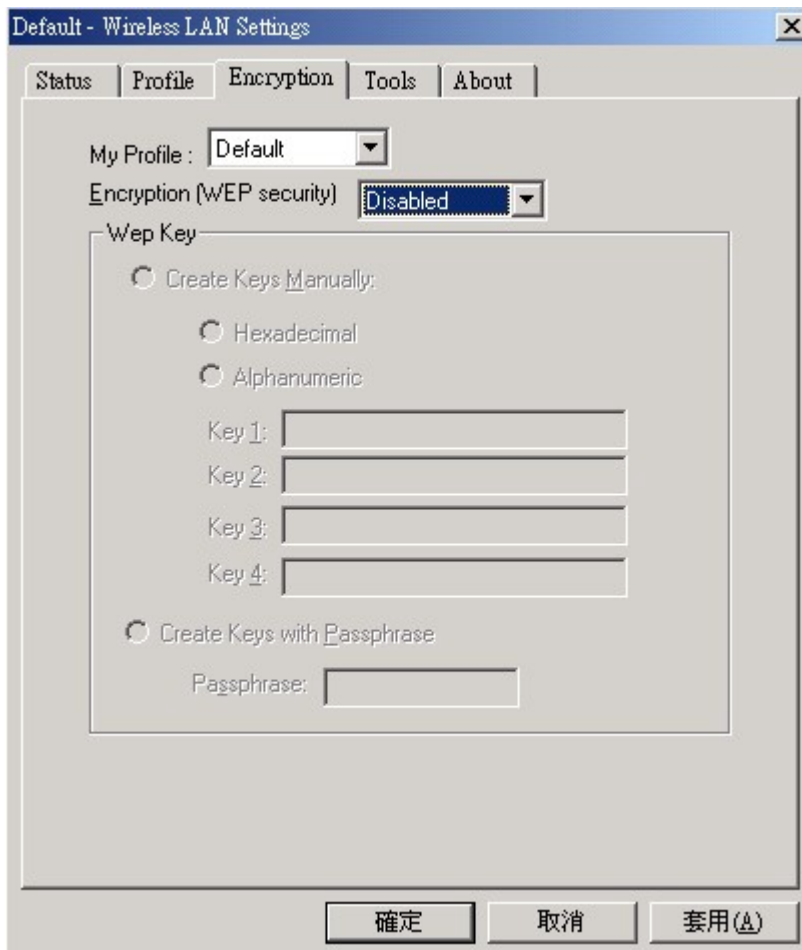
Encryption Tab

The **Encryption** tab is used to desire an additional measure of security on your wireless network, which can be achieved by using WEP (Wired Equivalent Privacy) encryption. To prevent unauthorized wireless stations from accessing data transmitted over the network, WEP can support high secure data encryption. WEP encrypts each frame transmitted from the radio 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 WEP Key used by the transmitter. The **Encryption** tab contains some fields as below.

Encryption [WEP security]

WEP Key – Create Key Manually, Create Keys with Pass-phrase Key1, Key2, Key3, Key4

Use WEP key



Encryption [WEP security]

The field allows you to set Disabled, 64-bit, 128-bit. When setting 64bit, or 128 bits, it means

WEP security is used.

WEP Key

You can use “Create Key Manually” or “Create Keys with Pass-phrase” method to enter encryption keys. It allows the entry of four keys for 64-bit encryption and one set of 128-bit key according to WEP function select. To be written to the driver and registry, each key must consist of correct digits and letters. The detailed descriptions will be shown as below for these two kinds of methods:

Create Key Manually

For 40-bits encryption:

- Five 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. WEPencryption).
- 26 digit hexadecimal values in the range of “A-F” and “0-9”. (e.g. 11AA22BB33123456789ABCDEF)

Create Keys with Pass-phrase

A Pass-phrase can be entered which is used as a “seed” to randomly generate the four keys. This saves considerable time since the same keys must be entered into each node on the wireless network.

Key1, Key2, Key3, Key4

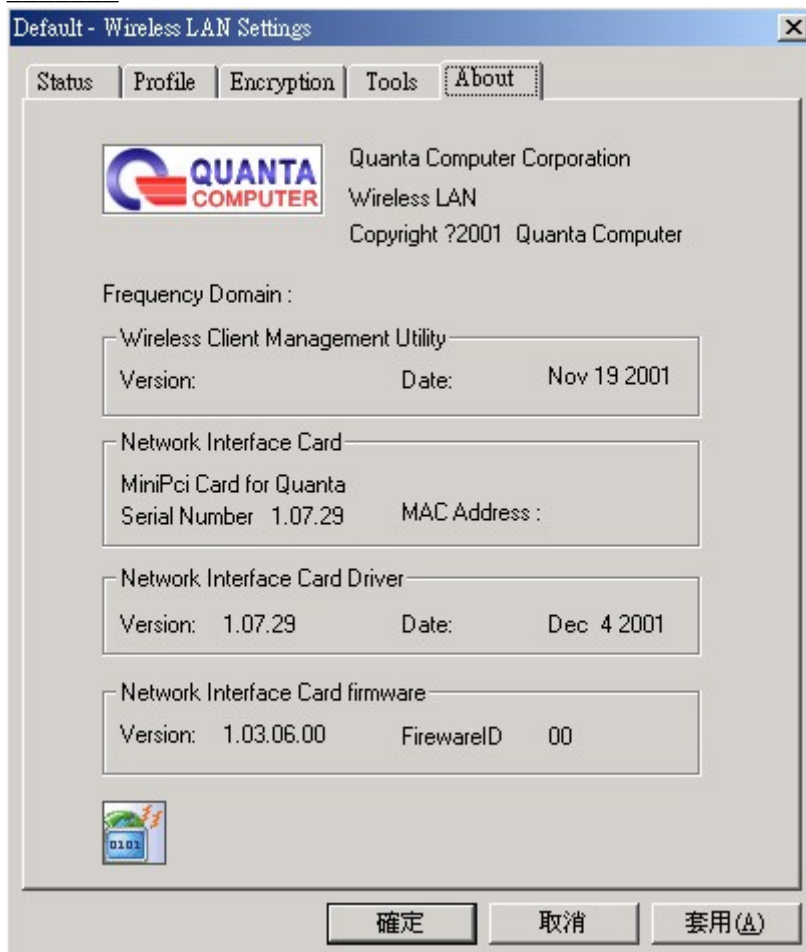
These four fields can be used to manually enter the keys. This may be necessary if you wish this node to match keys in a different vendor product. These fields also display the keys when they are generated using a Pass-phrase.

Use WEP key

This field updates the driver with the four keys displayed in Key1 through Key4. These keys are also written to the registry for permanent storage. For 128 bit encryption, this field will be invisible.

About Tab

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



5. Technical Specification of Wireless LAN

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

Supply voltage range:	3.0V~3.6V DC	ripple 1% less
Average current t:	218 mA typical	2% transmit • 98% receive without power saving mode
Average current:	40 mA typical	2% transmit • 8% receive 90% standby with power saving mode
Continuous transmit mode:	380 mA max	
Continuous receive mode:	215 mA max	
Standby mode:	17 mA max	with power saving mode

Form Factor

Comply with Mini-PCI type • B Form Factor.

Connectivity Specification

Mini-PCI Interface • release 1.0 •

Environmental Specification

Temperature Range:	0~55°C • Operation - 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

North America:	2412~2462MHZ	11channels • 3 non-overlapping •
Europe:	2412~2472MHZ	13channels • 3 non-overlapping •
Japan:	2412~2484MHZ	14channels

Modulation/Data rate

Direct sequence spread spectrum • DSSS •
 1M bps DBPSK 5.5M bps CCK
 2M bps DQPSK 11M bps CCK

Antenna Specification

Two Antenna ports provided for Space Diversity
 Port Impedance 50 ohms

Receive Sensitivity

1M bps	-87dBm Max	8% PER or less
2M bps	-85dBm Max	8% PER or less
5.5M bps	-84dBm Max	8% PER or less
11M bps	-82dBm Max	8% PER or less

Dynamic Range

85dB typical Max. input level -5dBm

System Linearity • Input •

Input third order intercept point		
IIP3_90	-15 dBm Min.	-90dBm input
IIP_25	10 dBm Min.	-25dBm input

Image Rejection

Image rejection: 60dB Min. PER<8%

System Linearity • Output •

Adjacent channel rejection 40 Min. PER<8% @25MHz jammer offset

Transmitter Power Output

TXP:	14±1dBm	measured at antenna port
		1st side lobe < -30dBc
		2nd side lobe < -50dBc
TXP Range • ALC on •	0dB typical	

Carrier Suppression

15dB Min.

Preamble Length

Short/Long

Multipath Fading Equalization

RAKE receiver incorporated • targeted for multipath delay spread •
125 ns rms at 11Mbps • 200 ns rms at 5.5 Mbps and 500 ns rms at 1 or 2M bps