WLAN a+b+g mini-PCI Module

RZ2009

User Manual

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Copyright Statement

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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 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 and, if not installed and used in accordance with he 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 of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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 this 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.

IMPORTANT NOTE:

The device shall not be used in such a manner that the potential for human contact during normal operation is minimized. It is the responsibility of the installer and users of the device to guarantee that the antenna operates at least 20 centimeters (8 inches) from any person. The antenna should not be co-located with any other antenna or transmitter. This is necessary to insure that the product operates in accordance with the FCC RF Guidelines for Human Exposure

Labeling Considerations

The OEM product that employs FCC ID: NN4RZ2009 RF module shall label as below:

"Contains transmitter module FCC ID: NN4RZ2009" or "Contains FCC ID: NN4RZ2009"

Professional Installment

The device must be installed by professionals in accordance with responsible party's instruction manual.

Modification

Modifications to the device, unless expressly approved by the responsible party, could void the user's authority to operate the device.

Antenna Type

The device uses a 26dBi Parabolic grid antenna with a specified length of coax cable.

The device uses a 15 dBi WNA-202F Patch antenna with 3 dB cable loss.

The device uses 6 dBi KA-00 Cardioid antenna with 6 dB cable loss.

The device uses a 6 dBi CA-01 Omni antenna with 3 dB cable loss

The device uses 18 dBi YA2418RD Yagi antenna with 10 dB cable loss.

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1. Introduction

Thank you for purchasing the WLAN a+b+g mini-PCI Module that provides the easiest way to wireless networking. This User Manual contains detailed instructions in the operation of this product. Please keep this manual for future reference.

System Requirements

- A laptop PC contains:
 - 32 MB memory or greater
 - 300 MHz processor or higher
- Microsoft[®] Win[™]2000/ME/98 Second Edition/XP

2. Driver/Utility Installation / Uninstallation

2.1 Installation

Note! The Installation Section in this User Manual describes the first-time installation for Windows. To re-install the driver, please first uninstall the previously installed driver. See Chapter 2.3 "Uninstallation" in this User Manual.

Follow the steps below to complete the driver/utility installation:

- 1. Insert the Installation Software CD into the CD-Rom Drive.
- 2. Click "Next".

WLAN a+b+g mini-PCI Module	Setup	×
E	Welcome to the InstallShield Wizard for WLAN a+b+g mini-PCI Module The InstallShieldR Wizard will install WLAN a+b+g mini-PCI Module on your computer. To continue, click Next.	
	< Back Cancel Cancel	

3. Read the License Agreement and click "Yes".



4. Click "Next" to continue or click "Browse" to choose a destination folder.



5. Click "Next".

Select Program Folder Please select a program folder. Setup will add program icons to the Program Folder listed below. You may type a new folder name, or select one from the existing folders list. Click Next to continue. Brogram Folders: WLAN a+b+g mini-PCI Module Existing Folders: ACD Systems Lotus Applications	WLAN a+b+g mini-PCI Module Setup		×
Please select a program folder. Setup will add program icons to the Program Folder listed below. You may type a new folder name, or select one from the existing folders list. Click Next to continue. Program Folders: WLAN a+b+g mini-PCI Module Existing Folders: ACD Systems Lotus Applications	Select Program Folder		and the second second
Setup will add program icons to the Program Folder listed below. You may type a new folder name, or select one from the existing folders list. Click Next to continue. Program Folders: <u>VVIAN a+b+g mini-PCI Module</u> Existing Folders: <u>ACD Systems</u> Lotus Applications	Please select a program folder.		1000
Program Folders: WLAN a+b+g mini-PCI Module Egisting Folders: ACD Systems Lotus Applications	Setup will add program icons to the Program name, or select one from the existing folders	Folder listed below. You may list. Click Next to continue.	y type a new folder
WLAN a+b+g mini-PCI Module Egisting Folders: ACD Systems Lotus Applications	Program Folders:		
Egisting Folders: ACD Systems Lotus Applications	WLAN a+b+g mini-PCI Module		
Egeting Folders: ACD Systems Lotus Applications	, Fuisiine Felders		
Lotus Applications	ACD Sustema		
	Lotus Applications		
	2		
InstallShield	InstallShield		
< <u>B</u> ack <u>Next</u> > Cancel		< Back Next	Cancel

6. Click "Yes" to create a shortcut icon on your desktop.

Question	×
?	Do you want to add a WLAN a+b+g mini-PCI Module shortcut to your desktop $?$
	Yes No

7. Click "Finish".

WLAN a+b+g mini-PCI Modu	Ic Setup InstallShield Wizard Complete Setup has finished installing WLAN a+b+g mini-PCI Module on your computer.
	< Back Finish Cancel

8. You should now see a shortcut icon on your desktop.

2.2 Additional Setup Processes

During software installation procedure, each operating system may prompt different specific options:

- 1. **Windows 98SE:** The system will request the original Windows CD during the installation process. When the installation is finished, you'll have to restart your computer.
- 2. Windows Me: Please restart your computer when the installation is finished.
- 3. **Windows 2000/XP:** Select "Install the software automatically" when the window with this option appears, and then click "Next" to continue installation.

2.3 Uninstallation

Note! Before uninstallation, please close all running programs.

- 1. Click <u>Start>Programs>WLAN a+b+g mini-PCI Module >UnInstall WLAN a+b+g mini-PCI Module</u>.
- 2. Choose "Remove". Click "Next".



3. Click "OK" to start Uninstall.

Confirm Uninstall			×
Do you want to co	ompletely remove the se	elected application an	d all of its features?
	OK	Cancel	

4. Click "Finish". Uninstall is now completed.

WLAN a+b+g mini-PCI Module	Setup
	Maintenance Complete InstallShield Wizard has finished performing maintenance operations on WLAN a+b+g mini-PCI Module .
	< Back Finish Cancel

3. Connecting to an Existing Network

1. Double click the shortcut icon of WLAN a+b+g mini-PCI Module on the desktop, and the Configuration window appears.

		2411 ·	_	Information List	Detail List	
Profile List			E ID	Selected Profile Information		
Default		Nous	- 9	 Configuration Name 	Default	
and the second second		NEW		 Network Name 		
				 Network Connection 	AP(Infrastructure)	
	82	Modify	1.1.1.1	= WEP	Disabled	
			E 😪	Link Information		
	_	Doloto	- 25	 Network Name 		
	Ш.	Delete		 Network Connection 	AP(Infrastructure)	
				 Security 	None	
	\checkmark	Apply		- Channel	3	
Enable Smar	t Selection			 Transmission Rate 	1 Mbps	
				 Signal Strength 	24%	
vailable Networks						
Network Name	Connection Mode	Channel	WEP	Signal Strength	Network Connection	
	Pre	ss Refresh bu	utton to initia	ite site survey process		

2. Click on the **Refresh** button Petresh to list all available networks.

					0 ¹⁰ 1	Aore
Profile Lict				Information List	Detail List	
FIOINE LIST			E ()	Selected Profile Information	1	
Default		New		 Configuration Name 	Default	
		INC W		Network Name		
				Network Connection	AP(Infrastructure)	
		Modify	1.000	 WEP 	Disabled	
			E 🔛	Link Information		
	10.000					
		Delete		 Network Name 	WN	
		Delete		 Network Name Network Connection 	WN AP(Infrastructure)	
		Delete		 Network Name Network Connection Security 	WN AP(infrastructure) None	
		Delete Apply		 Network Name Network Connection Security Channel 	WN AP(Infrastructure) None 5	
Enable Smart	t Selection	Delete Apply		Network Name Network Connection Security Channel Transmission Rate	VVN AP(infrastructure) None 5 1 Mbps	
Enable Smart	t Selection	Delete Apply		Network Name Network Connection Security Channel Transmission Rate Signal Strength	WN AP(Infrastructure) None 5 1 Mbps 36%	
Enable Smart	t Selection	Delete Apply		Network Name Network Connection Cecurity Channel Transmission Rate Signal Strength	WN AP(Infrastructure) None 5 1 Mbps 36%	
Enable Smart	t Selection	Delete Apply Channel		Network Name Network Connection Security Channel Transmission Rate Signal Strength	VVN AP(Infrastructure) None 5 1 Mbps 36%.	
Enable Smart	t Selection	Delete Apply Channel 6	WEP Enable	Network Name Network Connection Security Channel Transmission Rate Signal Strength Signal Strength Signal Strength	VVN AP(Infrastructure) None 5 1 Mbps 36% Network Connection Infrastucture	
T Enable Smart	t Selection Connection Mode B B	Delete Apply Channel 6 5	VVEP Enable Disable	Network Name Network Connection Security Channel Transmission Rate Signal Strength Signal Strengt	VVN AP(Infrastructure) None 5 1 Mbps 36% Network Connection Infrastucture Infrastucture	
Enable Smart	t Selection Connection Mode B B B	Delete Apply Channel 6 5 2	VVEP Enable Disable Enable	Network Name Network Connection Security Channel Transmission Rate Signal Strength Signal Strength G2% 36% 31%	VVN AP(Infrastructure) None 5 1 Mbps 36% Network Connection Infrastucture Infrastucture Infrastucture	
Enable Smart	t Selection	Delete Apply Channel 6 5 2 4	VVEP Enable Disable Enable Enable	Network Name Network Connection Security Channel Transmission Rate Signal Strength Signal Strength 36% 31% 30%	VVN AP(Infrastructure) None 5 1 Mbps 36% (Network Connection Infrastucture Infrastucture Infrastucture Infrastucture	

Note! To automatically connect to the network with the strongest signal, select **Enable Smart Selection**. **Any** displays in Profile List.

 From the list of "Available Networks", choose one network by double clicking the Network Name. One of the following dialog boxes appears. Click "Yes" to continue.

Connection wizard	Connection wizard
Network name (SSID) : WN This is a wireless access point. To access this network, click Yes.	Network name (SSID) :NC60 This is a wireless access point. This network requires the use of a network key (WEP). To access this network, click Yes.
Cancel Cancel Concel	Yes Cancel

4. If the chosen network has security enabled, the **Security** tab displays. Select the security option used by the network. Contact the network administrator for the correct settings.

onfiguration Setting			
Profile Editor Security	TCP/IP Property		
Set Security Option	าร		
C WPA	WPA EAP Type	TLS	*
C WPA-PSK			
C 802.1x	802.1× EAP Type	TLS	*
C Pre-Shared	Кеу		
Configu			
	<u></u>	_	1
	ок	Cancel	Apply

5. If selecting **WPA** or **802.1X**, select the EAP type, then click on the **Configure** button to select the certificate.

select a Certificate	
lames [Issued: 2002/10/24]	
Use Any Certificate Authority	C Choose a Certificate Authority
CW HKT SecureNet CA SGC Root	Y
ames	

6. If selecting **WPA-PSK**, click on the **Configure** button to enter the PassPhrase.

Enter your VADA Describuses. The printing on length is 0 shousedown	
Enter your MDA Decembrace. The minimum length is 9 showed as	
Enter your wea Passprirase. The minimum length is o character	rs.
J	

- If selecting Pre-Shared Key, click on the Configure button to enter the correct Encryption Keys. Key entry method:
 - a.10hex digits: User must enter 10 hexadecimal digits.

The hexadecimal define is "0-9" and "A-F".

ex: 123456abc

- b.5 chars: User must enter 5 characters. ex: ab3#@
- c.13 chars: User must enter 13 characters.

ex: ab3#@kf08&kdk

d.16 chars: User must enter 16 characters.

ex: ab3#@kf08&kdk456

For WEP key, please contact with MIS administrator.

		8			
Encryption Keys (H	lex 0-9 A-F)		Keyle		
Jnique Key:		64	(40+24)	ngth 10 hex digits	-
Shared					
First:		64	(40+24)	10 hex digits	-
Second:		64	(40+24)	10 hex digits	-
Third:		64	(40+24)	10 hex digits	-
Fourth:		64	(40+24)	10 hex digits	•
First Key: Column	1, Length 0				

- 8. Click on **OK** (or **Apply** if using the other tabs) when done to save the settings.
- 9. Once connected (the icon 😵 or 😵 in front of the name of the Connected Network), you can check the signal strength from the icon 🗟 in the Windows System Tray.

Additional Note for Windows XP

In Windows XP, it is recommended that you use the WLAN a+b+g mini-PCI Module Configuration Utility. Before using the Utility, please follow the steps below to disable the Windows XP Zero Configuration:

Option 1:

- 1. Double click the shortcut icon to open the Utility.
- 2. From the Windows System Tray, you should see the signal icon. Right-click it and select "Disable Zero-Configuration".

Open Utility	
Disable Adapter	
Turn radio on	😲 Notification 🛛 🗶
Disable Zero-Configuration	WinXP Zero Configuration is disabled
Eixt	EN 🔇 🖉 🖉 🙀 11:37 AM

Option 2:

- 1. Go to "Control Panel" and double click "Network Connections".
- 2. Right-click "Wireless Network Connection" of "WLAN a+b+g mini-PCI Module", and select "Properties".



3. Select "Wireless Networks" tab, and uncheck the check box of "Use Windows to configure my wireless network settings", and then click "OK".

A	and the second se	e my wireless	network	settings
To connec	etworks. st to an available	network, clic	sk Confi	oure:
A NC60	1		~	Configure
I NC				Befrech
Preferred r	networks:			
Preferred r Automatica below:	networks: ally connect to av	vailable netw	orks in t	he order listed Move up
Preferred n Automatica below:	networks: ally connect to ar	vailable netw	orks in t	he order listed Move up Move down
Automatica below.	networks: ally connect to a 	vailable netw	orks in t	he order listed Move up Move down

WLAN 80	N Configuration 2.11a/b/g	ation	1010101010		0101010100000	Mc
- Profile Lict				Information List	Detail List	
FIDILE LIST			E D	Selected Profile Information		_
Default		New		 Configuration Name 	Default	
		INC.		Network Name		
				 Network Connection 	AP(Infrastructure)	
		Modify	1.00	= WEP	Disabled	
		Modify	□ %	 WEP Link Information 	Disabled	
		Modify Delete	□ 🐕	 WEP Link Information Network Name 	Disabled	
		Modify Delete	□ %	WEP Link Information Network Name Network Connection	Disabled WN AP(Infrastructure)	
		Modify Delete	□ 32	 WEP Link Information Network Name Network Connection Security 	Disabled VVN AP(Infrastructure) None	
E Enchla Smoot		Modify Delete Apply	- 32	WEP Link Information Network Name Network Connection Security Channel	Disabled WN AP(Infrastructure) None 5	
Enable Smart	Selection	Modify Delete Apply	- 32	WEP Link Information Network Name Network Connection Security Channel Transmission Rate	Disabled WN AP(Infrastructure) None 5 1 Möps	
Enable Smart	Selection	Modify Delete Apply	□ %	VVEP Link Information Network Name Network Connection Security Channel Transmission Rate Signal Strength	Disabled WN AP(Infrastructure) None 5 1 Mbps 36%	
Enable Smart	Selection	Modify Delete Apply	- 3	WEP Link Information Network Name Network Connection Security Channel Transmission Rate Signal Strength	Disabled VM AP(infrastructure) None 5 1 Mbps 36%	
Available Networks	Selection Mode	Modify Delete Apply Channel		WEP Link Information Network Name Network Connection Security Channel Transmission Rate Signal Strength Signal Strength	Disabled VN AP(Infrastructure) None 5 1 Mbps 36% Network Connection	
Available Networks Network Name NC50	Selection Mode	Modify Delete Apply Channel 6	VVEP Enable	WEP Link Information Network Name Network Connection Security Channel Transmission Rate Signal Strength Signal Strength	Disabled VNN AP(Infrastructure) None 5 1 Mbps 36% Network Connection Infrastructure	
Available Networks Network Name Network Name Network Name	Selection Mode B B	Modify Delete Apply Channel 6 5	VVEP Enable [VKEP Link Information Network Name Network Connection Security Channel Transmission Rate Signal Strength Signal Strength 622 36%	Disabled V/N AP(Infrastructure) None 5 1 Mbps 36% Network Connection Infrastructure Infrastructure	
Available Networks Network Name NCS0 NCS0 NCS0	Selection Mode Connection Mode B B B	Modify Delete Apply Channel 6 5 2	VVEP Enable Enable Enable	WEP Link Information Network Name Network Connection Security Channel Transmission Rate Signal Strength Signa	Disabled VN AP(Infrastructure) None 5 1 Mbps 36% Network Connection Infrastucture Infrastucture Infrastucture	
Available Networks Network Name NC50 NC50 NC50 NC50	Selection Mode	Modify Delete Apply Channel 6 5 2 4	VVEP Stable [Disable [Enable Enable Enable [VVEP Link Information Network Name Network Name Security Channel Transmission Rate Signal Strength Signal Strength 38% 38% 31% 30%	Disabled VNN AP(Infrastructure) None 5 1 Mbps 36% Network Connection Infrastucture Inf	

2. Select the "Profile Editor" tab.

Profile Items	Content
Configuration Name	Default
Network Name(SSID1)	
Network Name(SSID2)	
Network Name(SSID3)	
Network Connection	Ad Hoc 💌
Power Saving	AP(Infrastructure)
Wireless Mode	Ad Hoc
Ad Hoc Net Start	802.11a
802.11b Range	Normal Range
Scan Mode	Auto
Transmit Power	Full Power
QoS	Disabled
Country	UNITED_STATES
2.4 GHz Preamble	Long only
Country 2.4 GHz Preamble	UNITED_STATES Long only

- 3. Choose the check box of **Enable Advanced Setting** to edit all settings.
- 4. If joining or creating an Ad-Hoc network, choose Ad Hoc.
- 5. If the correct country is not selected, select the country where the computer is located. ALERT! Different countries have different regulations that affect which channels can be used. You should always choose the country where you are physically located to avoid using an illegal channel.
- Click OK (or Apply if using the other tabs) to save the settings.
 For details of each setting, refer to Modifying a Wireless Network on page 20.
- 7. Click the Security tab. If not using security, select None.

0	WPA WPA-PSK	WPA EAP Type	TLS	<u>~</u>
c	802.1x	802.1× EAP Type	TLS	7
0 @	Pre-Shared K	ey		
	Configur	e		

8. If security is used, select **Pre-Shared Key** and click on the **Configure** button.

9. Enter an encryption key in the **Shared: First** field.

	Default Encryption Key:				-
		1			
Encryption Keys (H	lex 0-9 A-F)				
			Key Le	ngth	
Jnique Key:		64	(40+24)	10 hex digits	•
Shared					
First		64	(40+24)	10 hex digits	-
Second:		64	(40+24)	10 hex digits	-
Third:		64	(40+24)	10 hex digits	-
Fourth:		64	(40+24)	10 hex digits	-
First Key: Column	1, Length 0				
					_

10. Click **OK** (or **Apply** if using the other tabs) to save the settings. The new **Network Name** is listed in the **Profile List**.

The driver does not allow channel selection in Ad-Hoc mode. Instead, the driver starts with an initial channel then checks channel status. If the channel is busy, the driver automatically uses a different channel.

For details of each setting, please see chapter 5.

5. Modifying a Wireless Network

5.1 Infrastructure Mode and Ad Hoc Mode

You can set the Wireless Network Adapter to work in either **Infrastructure mode** or **Ad Hoc mode**.

Infrastructure Mode

In infrastructure mode, devices communicate with each other by first going through an Access Point (AP). Wireless devices can communicate with each other or can communicate with a wired network. When one AP is connected to wired network and a set of wireless stations, it is referred to as a BSS (Basic Service Set).



Ad Hoc Mode

Ad-hoc mode is also called "peer-to-peer mode" or "Independent Basic Service Set (IBSS)". In ad hoc mode, devices communicate directly with each other without using an Access Point (AP).



5.2 Modifying a Wireless Network

- 1. Open "WLAN a+b+g mini-PCI Module Configuration" by double clicking the shortcut icon on the desktop.
 - **Note!** If there's no network name listed in the "Profile List", click **Refresh** button and double click a Network Name from **Available Networks**. The chosen Network Name is listed in the Profile List.
- 2. From the Profile List, select one Profile and click **Modify** button

			_	CONTRACTOR OF CONTRACTOR		1
Profile List				Information List	Detail List	
1234 Default NC		New Modify Delete	- 3	VALP Voile information Configuration Name Network Name Vetwork Connection VVEP Link Information Network Name	NC NC AP(Infrastructure) Disabled 1234	
Enable Smart	t Selection	Apply		Network Connection Security Channel Transmission Rate Signal Strength	AP(Infrastructure) None 1 1 Mbps 20%	
Enable Smart	t Selection	Apply	WEP	Network Connection Security Channel Transmission Rate Signal Strength	AP(Infrastructure) None 1 1 Mbps 20%	
Enable Smart	t Selection	Apply Channel 5	WEP Disable	Network Connection Security Channel Transmission Rate Signal Strength Signal Strength 37%	AP(Infrastructure) None 1 1 Mbps 20%	_
Enable Smart	t Selection	Apply Channel 5 2	WEP Disable [Enable]	Network Connection Security Channel Transmission Rate Signal Strength Signal Strength 37% 38%	AP(Infrastructure) None 1 1 Mops 20% Network Connection	
Enable Smart	L Selection Mode	Apply Channel 5 2	WEP Disable Enable Disable	Network Connection Scurity Channel Transmission Rate Signal Strength Signal Strength 37% 36% 26%	AP(Infrastructure) None 1 1 Mbps 20% Network Connection Infrastucture Infrastucture Infrastucture	
T Enable Smart Available Networks Network Name NC NC50 21234 NC50 NC50 NC50	t Selection Mode Connection Mode B B B B B	Apply Channel 5 2 1 4	WEP Disable [Enable] Disable] Enable]	Network Connection Security Channel Transmission Rate Signal Strength 37% 36% 26% 24%	AP(Infrastructure) None 1 1 Mbps 20% Network Connection Infrastucture Infrastucture Infrastucture Infrastucture	

3. Select **Profile Editor** tab and edit the settings. Click **OK** to save the modifications.

e)
e)
e)
e)
e)
;

- Configuration Name: This name identifies the configuration. This name should be unique.
- Network Name (SSID1) (SSID2) (SSID3): The name of the wireless network. This name cannot be longer than 32 characters. If the field is set to be "ANY" or is left blank, your computer will connect to an AP with the best signal strength.
- Network Connection: Specifies the mode of the network. Two options are "Infrastructure" and "Ad Hoc".
- Power Saving: Minimizes power consumption while maintaining network connectivity and high data transfer performance. In Ad Hoc mode, Power Savings function cannot be enabled. The power management options are:
 - Off: PC Card is powered up at all times.
 - Normal: PC Card sleeps less often and stays asleep for a shorter period.
 - **Maximum**: PC Card sleeps more frequently and stays asleep as much as possible.
- Wireless Mode: Three options are "802.11b", "802.11a", "802.11g",
- Super A", "Super G" or "Auto". "Auto" allows the use of either 802.11a,

802.11g or 802.11b mode.

- Ad Hoc Net Start: Specifies a band to establish an Ad Hoc network if no matching SSID is found. Four options are available: 802.11b, 802.11a, 802.11aTurbo and 802.11g.
- 802.11b Range: Options are Normal Range and Extended Range. This function can let user to determine the transfer range in 802.11b mode. Extended Range can prolong the transfer range with a lower data transmitting rate.
- Scan Mode: Options are Active Scan, Passive Scan and Auto. In Active Scan, the driver sends out the probe request frames from each channel and collects the response frames from the responding. In Passive Scan, the driver scan each requested channel, listening the beacons on each channel.
- Transmit Power: This setting allows you to change the output power of the PC Card to increase or decrease the coverage area.
- QoS: Disables or enables the PC Card to cooperate in a network using QoS (Quality of Service).
- Country: Select the country where this PC Card will operate.
 ALERT! Different countries have different regulations that affect which channels can be used. You should always choose the country where you are physically located to avoid using an illegal channel.
- 2.4 GHz Preamble: Allows Ad-Hoc compatibility with other 2.4 GHz devices. Two options are Short and Long and Long only. Use Long Only when configuring the client for an 802.11b RoamAbout AP wireless network.

4. Select **Security** tab and choose the security mode.

Note! *Check with your Network Administrator for the security features supported by your AP.*

onfiguration Setting		
Profile Editor Security	TCP/IP Property	
Set Security Optio	ns	
C WPA	WPA EAP Type TLS	v
C WPA-PSK	and a second	_
C 802.1x	802.1x EAP Type TLS	<u>_</u>
C Pre-Shared	Key	
None		
Config	ure	
	OK Cancel	Apply

- WPA: Enables the use of WiFi protected Access (WPA). This option requires IT administration.
 - **a)** Select **WPA** to open the WPA EAP drop-down menu. The options includes TLS and PEAP.
 - **b)** Click on the **Configure** button and complete the configuration information in the Define Certificate dialog.
- WPA-PSK: Enables the WPA-Pre Shared Key (PSK). Click on the Configure button and complete the configuration information in the WPA Passphrase dialog.
- 802.1x: Enables 802.1x security. This option requires IT administration.
 a) Select 802.1x to open the 802.1x EAP drop-down menu. The options include TLS and PEAP.
 - **b)** Click on the **Configure** button and complete the configuration information in the Define Certificate dialog.

- Pre-Shared Key: Enables the use of pre-shared keys that are defined on the AP and the station.
 - a) Select the Pre-Shared Key radio button.
 - **b)** Click on the **Configure** button and complete the configuration information in the Define Certificate dialog.
- **None:** No security.
- 5. Define the Certificate.

Select a Certificate	
lames [Issued: 2002/10/24]	
Use Any Certificate Authority	C Choose a Certificate Authority
CW HKT SecureNet CA SGC Root	Y
Corporate.com ogin Name	
Corporate.com ogin Name lames	
Corporate.com ogin Name ames	
Corporate.com ogin Name Iames	
Corporate.com .ogin Name James	
ogin Name lames	
Corporate.com .ogin Name James	
.ogin Name James	

- Select a Certificate: Select the Certificate to Authenticate to the RADIUS server from the drop-down menu.
- Use any Certificate Authority: The Default Setting. Select this radio button to use any Certificate Authority (CA) for authentication.
- Choose a Certificate Authority: Select this radio button to choose the desired Certificate Authority for authentication from the drop-down menu.
- Server/Domain Name: The the RADIUS server name or the domain name used for the network access.
- **Login Name:** The username used to log into the server or domain.
- Define User Information (PEAP): Click on the Define User Information button and complete the configuration information in the Define User Information dialog.

- 6. If selecting **WPA-PSK**, click on the **Configure** button to enter the PassPhrase. The PassPhrase must be a minimum of 8 printable ASCII characters. The PassPhrase should be at least 20 characters to make it more difficult for an attacker to decipher the key.
- 7. If selecting **Pre-Shared Key**, click on the **Configure** button to enter the Encryption Keys.When finished, click **OK**. For WEP key, please contact with MIS administrator.

Ency which Kourd		
Encryption Keys (r	1ex U-9 A-F)	Key Length
Unique Key:		64 (40+24) 10 hex digits
Shared		
First:		64 (40+24) 10 hex digits
Second:		64 (40+24) 10 hex digits
Third:		64 (40+24) 10 hex digits
Fourth:		64 (40+24) 10 hex digits
First Key: Column	1, Length 0	

- **Key Entry Method:** Determines the entry method for the key. Hexadecimal (0-9, A-F) or ASCII text (all keyboard characters).
- Default Encryption Key: Allows you to choose one encryption key (First, Second, Third, or Fourth) as the transmit key, which encrypts transmissions from the PC Card.
- Unique Key: Defines the per-session encryption key for the current network configuration. Not used in Ad-Hoc mode.
- Shared Keys: Use these fields to enter the wireless network's encryption keys. The keys must be in the correct position (First, Second, Third, or Fourth).
- Key Length: Defines the length of each encryption key.
 o For 40/64 bit (enter 10 digits for hexadecimal or 5 characters for ASCII)
 o For 104/128 bit (Enter 26 digits for hexadecimal or 13 characters for ASCII)

When the length is changed, the number of available characters in the field automatically changes. If a previously entered key is too long, the key is automatically truncated to fit. If the key length is increased again, the key does not update to the previous value.

- 8. Click **OK** to save the settings.
- 9. Select "TCP/IP Property" tab. Enter the settings and click "OK" to save the settings.

Profile Editor	Security Setting	TCP/IP Proper	ty				
You car capabilit appropri	get IP settings as: y. Otherwise, you ate IP settings	signed automat need to ask yo	ically if y iur netwo	our ne ork adri	twork s ninistrat	upports thi or for the	is
C Obt	ain an IP address a	automatically					
Use Use	the following IP ad	dress —					
IF	address:			8	- 20	- 22	
s	ubnet mask :			3		3	
D	efault gateway :			5		-8	
C Obt	ain DNS server ad the following DNS referred DNS serv	dress automati server addres er :	s	94		9	
5.22	Iternate DNS serve			502	20	- 13	

- If the network uses DHCP server, choose **Obtain an IP address automatically**.
- If the network does not use DHCP server, choose Use the following IP address to set the relative settings. For the IP configuration information, please contact the network administrator.

5.3 Default Settings Windows XP Zero-Configuration

You may also choose the default parameters and directly proceed to Windows XP zero-configuration through the steps below:

- 1. Go to "Control Panel" and open "Network Connections".
- 2. Right-click the Wireless Network Connection of "WLAN a+b+g mini-PCI Module", and make sure this connection is **Enabled**.
- 3. Right-click the Wireless Network Connection of "WLAN a+b+g mini-PCI Module", and then click "Properties".
- 4. Select "Wireless Networks" tab and select "Use Windows to configure my wireless network settings" check box.
- **Note!** Clear the check box of "Use Windows to configure my wireless network settings" will disable automatic wireless network configuration.

5.4 Super A/G Setting

The Super A/G features do not require station configuration as the command are handled during auto-negotiation.

- 1. User can double click the AP that set in Super A/G mode in the site survey list, the configuration tool would auto connect to that AP.
- 2. User can manually create a new profile, and then modify the profile setting by changing the "wireless Mode" to "Super A" or "Super G".

Appendix A: FAQ about WLAN

1. Can I run an application from a remote computer over the wireless network? This will depend on whether or not the application is designed to be used over a network. Consult the application's user guide to determine whether it supports operation over a network.

2. Can I play computer games with other members of the wireless network? Yes, as long as the game supports multiple players over a LAN (local area network). Refer to the game's user guide for more information.

3. What is Spread Spectrum?

Spread Spectrum technology is a wideband radio frequency technique developed by the military for use in reliable, secure, mission-critical communications 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).

4. 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.

5. 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 offers the encryption function (WEP) to enhance security and access control.

6. What is WEP?

WEP is Wired Equivalent Privacy, a data privacy mechanism based on a 64-bit or 128-bit shared key algorithm, as described in the IEEE 802.11 standard.

7. What is infrastructure mode?

When a wireless network is set to infrastructure mode, the wireless network is configured to communicate with a wired network through a wireless access point.

8. What is roaming?

Roaming is the ability of a portable computer user to communicate continuously while moving freely throughout an area greater than that covered by a single access point. Before using the roaming function, the workstation must make sure that it is the same channel number with the access point of dedicated coverage area.

To achieve true seamless connectivity, the wireless LAN must incorporate a number of different functions. Each node and access point, for example, must always acknowledge receipt of each message. Each node must maintain contact with the wireless network even when not actually transmitting data. Achieving these functions simultaneously requires a dynamic RF networking technology that links access points and nodes. In such a system, the user's end node undertakes a search for the best possible access to the system. First, it evaluates such factors as signal strength and quality, as well as the message load currently being carried by each access point and the distance of each access point to the wired backbone. Based on that information, the node next selects the right access point and registers its address. Communications between end node and host computer can then be transmitted up and down the backbone. As the user moves on, the end node's RF transmitter regularly checks the system to determine whether it is in touch with the original access point or whether it should seek a new one. When a node no longer receives acknowledgment from its original access point, it undertakes a new search. Upon finding a new access point, it then re-registers, and the communication process continues.

Appendix B: Specification

Item		Kev	specifications		
Frequency	► U-NII: 2.4	12 ~ 2.462Ghz	specifications		
range	2.4	00 - 2.483 GHz			
Tunge	\succ Europe: 2.4	12 ~2.472Ghz. 5.15~	5.35Ghz, 5.47 ~ 5.725Gh	7	
	2.4	00 - 2.483 GHz		_	
	► Japan [·] 2.4	$12 \sim 2.484$ Ghz 5.15 -	- 5 25Ghz		
	2.4	00 = 2.483 GHz + 4.90	-5.091 GHz $5.15 - 5.250$	Hz	
	\triangleright China: 2.4	$12 \sim 2.403 \text{ GHz}, 4.90$	~5 85Ghz	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
	2.4	12 2.472GHz, 5.725 00 – 2.483GHz	5.05 GHZ		
Modulation	> 802.11b/g	00 1 100 0111			
technique	DSSS (DBPSK, DOPSK, CCK)				
tooninque	OFDM for data rate > 20 Mbps				
	> 802.11a				
	OFDM(BPSK.OPSK. 16-OAM, 64-OAM)				
Channels	> 802.11h/g				
support	US/Canada: 11 (1	~ 11)			
	Major European c	ountry: 13 (1 ~ 13)			
	France: 4 (10 ~ 13	3)			
	Japan: 14 (1~13 o	r 14 th)			
	China: 13 (1 ~ 13)			
	> 802.11a				
	1). US/Canada:12	non-overlapping cha	nnels (5.15 ~ 5.35GHz, 5.'	725 ~ 5.825GHz)	
	2). Europe: 19 no	n-overlapping channe	l (5.15 ~ 5.35GHz, 5.47 ~	5.725GHz)	
	3). Japan: 4 non-c	verlapping channels (5.15 ~ 5.25GHz)		
	4). China : 5 non-	overlapping channels	(5.15 ~ 5.85GHz)		
Operation	➤ 3.3V +/- 5%				
voltage		002 11	003 111	000 11	
Power	C	802.11a	802.11D	802.11g	
consumption	Continuous IX 4	240, 250m A	3/0~390IIIA @180BIII	420 440mA@18dBm	
	ETD T _y	340~330IIIA 420_440mA	510 520m A	420~440IIIA	
		$420 \sim 440 \text{mA}$	470, 485m A	400. 510m A	
	Standby mode	400~420IIIA 260, 280mA	470~4851IIA	450~510IIIA	
	Stalludy mode	50m A	440~430IIIA 50m A	430~470IIIA	
	DE Kill	40m A	10m A	40m A	
Output	> 802 11b/g	40111A	40IIIA	40IIIA	
nower	18 dBm neak	nower			
power	\geq 802 11a	power			
	$\begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 $				
	5,150 - 5,250)· 15 dBm			
	5.150 - 5.250 5.250 - 5.350	13 dBm			
	5.470 - 5.725	i: not allowed			
	5.725 - 5.825	5: 17 dBm			
	2). Europe				
	5.150 - 5.250) and 5.250 – 5.350:	18 dBm		
	5.470 - 5.725	5: 17 dBm			
	5.725 - 5.825	5: Not allowed.			
	3). Japan				
	5.150 - 5.250): 18 dBm			
	5.250 - 5.350	: not allowed			
	5.470 - 5.725	i: not allowed			
	<u>5.725 - 5</u> .825	: not allowed			

Item	Key specifications
Operation	> 802.11a
distance	Outdoor: 40m@72Mbps,85m@54Mbps,250m@48Mbps,310m@36Mbps
	Indoor:20m@72Mbps,25m@54Mbps,35m@48Mbps,40m@36Mbps
	➢ 802.11b
	Outdoor:300m@11Mbps,465m@5.5Mbps,500m@2Mbps,515m@1Mbps
	Indoor: 60m@11Mbps,70m@5.5Mbps,83m@2Mbps,85m@1Mbps
	▶ 802.11g
	Outdoor: 82m@54Mbps,100m@48Mbps,300m@36Mbps
	Indoor:20m@54Mbps,25m@48Mbps,35m@36Mbps
Operation	\blacktriangleright Windows [®] 98SE, ME, 2K, XP
System	
supported	
Security	➢ 64-bit,128-bit, 152-bit WEP Encryption
	► 802.1x Authentication
	AES-CCM & TKIP Encryption
Operation mode	Infrastructure & Ad-hoc mode
Transfer data rate	➢ 802.11b/g
	11, 5.5, 2, 1 Mbps, auto-fallback, up to 54 Mbps
	➢ 802.11g (Super mode)
	up to 108 Mbps
	➢ 802.11a (Normal mode) 54.40.25 24.10.12 0.€ (11.10.10.10.10.10.10.10.10.10.10.10.10.1
	54, 48, 36, 24, 18, 12, 9, 6Mbps, auto-fallback
	➢ 802.11a (Turbo mode) 100.0672.40.2624.10.10 MI
	108,96,72,48,36,24,18,12 Mbps, auto-fallback
Operation	\succ 0° ~ /0° C
temperature	> 200 000 C
Storage	\sim -20° ~ 80° C
temperature	
W1-F1° Alliance	WECA Compliant
WHQL	Microsoft [®] 2K, XP Complaint
FAA	S/W audio On/Off support
EMC certificate	FCC part 15 (USA)
	► IC RSS210 (Canada)
	➢ Telec (Japan)
	ETSI, EN301893, EN60950 (Europe)
Media access	CSMA/CA with ACK architecture 32-bit MAC
protocol	
Type of Used	150mm Shielded Coaxial Cable. Insertion Loss 0.7dB
Cables	