# WLAN a+b+g mini-PCI Module

# CM9

# **OEM Installation Manual**

(The module is sold only to the OEM integrators & the

manual is valid only for the OEM manufactures)

Version: 1.0

March 2004

#### **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 the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one 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:**

This module is restricted to mobile configuration. To comply with FCC RF exposure compliance requirements, the antenna used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. This transmitter module must not be co-located or operating in conjunction with any other antenna in conjunction with any other antenna or transmitter.

### 1. Introduction

### 1.1 The WLAN 802.11a+b+g mini-PCI Module

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<sup>®</sup> Win<sup>™</sup>2000/ME/98 Second Edition/XP

\*Caution !!

(1). This module cannot be bound in a tablet computer for RF exposure issues. (See label 1)
(2). Due to the RF exposure issues, this module can be used in a laptop computer in normal operation, but cannot be used when it is put above the lap and the LCD screen is in the closed position. (See label 2)



Label 1





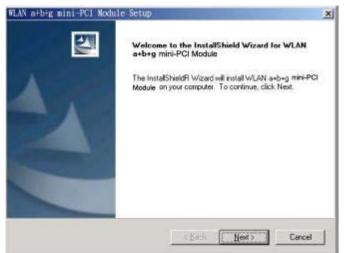
### **Driver/Utility Installation / Uninstallation**

### 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:

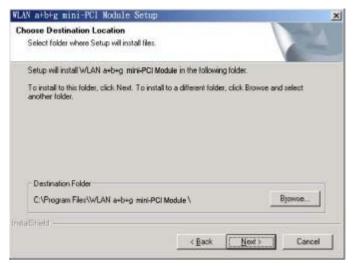
- 1. Insert the Installation Software CD into the CD-Rom Drive.
- 2. Click "Next".



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

icense Agreement		Sec. 7
Please read the following license as	greement carefully.	
Press the PAGE DOWN key to see	the rest of the agreement.	
	ublication may be reproduced. Iransmitte lated into any language or computer lan	guage, in any
otherwise, without the prior written		manuaror
		manual or
		manual or

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



#### 5. Click "Next".

i atbtg mini-PCI Module Set slect Program Folder	up	1	
Please select a program folder.			
Setup will add program icons to the Pri name, or select one from the existing fi			w folder
Program Folders:			
WLAN a+b+g mini-PCI Module			
Existing Folders:			
ACD Systems			
Lotus Applications			
IShield -			
	< Back	Next >	Cancel

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

Question	X
?	Do you want to add a WLAN a+b+g mini-PCI Module shortcut to your desktop ?
	<u>Yes</u> <u>N</u> o

7. Click "Finish".

WLAN a+b+g mini-PCI Node	Ite: Setup: InstallShield Wizard Complete Setup has finished installing WLAN a+b+g mini-PCI Module on your computer.
	<book cancel<="" th=""></book>

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</u> mini-PCI Module.
- 2. Choose "Remove". Click "Next".



3. Click "OK" to start Uninstall.



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

MLAN atbig mini PCI Modu	Maintenance Complete InstallShield Wizard has finished performing maintenance operations on WLAN a+b+g mini-PCI Module .

### **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.

11 Balandar	7	antific terr	_	New York Contraction of the Party Contraction		lore
Profile List				Information List	Detail List	-
Default		- 10			Default	
Derault		New		<ul> <li>Configuration Name</li> <li>Network Name</li> </ul>	Detault	
				<ul> <li>Network Name</li> <li>Network Connection</li> </ul>	AP(Infrastructure)	
	JE3	Modify		<ul> <li>WEP</li> </ul>	Disabled	
			E 💱		Disabled	
	<u> </u>		- 32	<ul> <li>Network Name</li> </ul>		
		Delete		<ul> <li>Network Connection</li> </ul>	AP(Infrastructure)	
				<ul> <li>Security</li> </ul>	None	
		Apply		<ul> <li>Channel</li> </ul>	3	
🔽 Enable Smar	t Selection	1005520		<ul> <li>Transmission Rate</li> </ul>	1 Mbps	
				<ul> <li>Signal Strength</li> </ul>	24%	
vailable Networks						
Network Name	Connection Mode	Channel	WEP	Signal Strength	Network Connection	
	Pre	ss Refresh bi	utton to initi	ate site survey process		

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

Contract of the second s						More
Profile List				Information List	Detail List	
Default		New Modify		Configuration Name     Network Name     Network Connection     WEP Link Information	Default AP(Infrastructure) Disabled	
Enable Smar	t Selection	Delete Apply		Network Name     Network Connection     Security     Channel     Transmission Rate     signal Strength	WN AP(Infrastructure) None 5 1 Mbps 36%	
vailable Networks		Apply		Network Connection     Security     Channel     Transmission Rate     Signal Strength	AP(infrastructure) None 5 1 Mbps 36%	
wailable Networks	Connection Mode	Apply		Network Connection     Security     Channel     Transmission Rate     Signal Strength     Signal Strength	AP(infrastructure) None 5 1 Mbps 36% Network Connection	A
vailable Networks Network Name	Connection Mode	Apply Channel 6	Enable [	Network Connection     Security     Channel     Transmission Rate     Signal Strength     Signal Strength     G205	AP(infrastructure) None 5 1 Mbps 36% Network Connection Infrastucture	A
vailable Networks Network Name NC50	Connection Mode B B	Apply.	Enable [ Disable [	Network Connection     Security     Channel     Transmission Rate     Signal Strength     Signal Strength     G2%     36%	AP(infrastructure) None 5 1 Mbps 36% Network Connection Infrastucture Infrastucture	<u></u>
vailable Networks Network Name	Connection Mode	Apply Channel 6	Enable [	Network Connection     Security     Channel     Transmission Rate     Signal Strength     Signal Strength     G205	AP(infrastructure) None 5 1 Mbps 36% Network Connection Infrastucture	

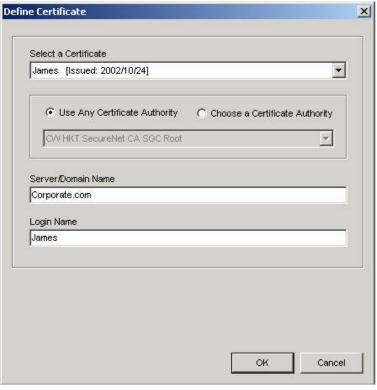
- **Note**! To automatically connect to the network with the strongest signal, select **Enable Smart Selection**. **Any** displays in Profile List.
- From the list of "Available Networks", choose one network by double clicking the Network Name. One of the following dialog boxes appears. Click "Yes" to continue.

Connection wizard	X Connection wizard	X
Network name (SEID) : VMV This is a volveless access point. To access this network, click Yes.	Network name (SSD) : NOSO This is a wireless access point This network requires the use of a network key (MEP). To access this network, click Yes. Yes Cancel	
C Don't show this wizard next line.	Duri show this wizerd next time.	

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 Settin	9		
Profile Editor Secur	ity TCP/IP Property		
Set Security Op	ntions		
C WPA	WPA EAP Type	.S _	]
C WPA-PSI	<		
O 802.1×	802.1× EAP Type T	.s 💆	]
C Pre-Shar	ed Key		
None			
Cor	figure		
		-	
	ок	Cancel A	Apply

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



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

VPA-PSK	
Enter your WPA Passphrase. Th	ne minimum length is 8 characters.

7. 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.

		19
	Default Encryption Key:	
Encryption Keys (H	lex 0-9 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	

- 8. Click on **OK** (or **Apply** if using the other tabs) when done to save the settings.
- 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".



#### **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".

	1		
S Network Connections			000
File Edit View Favoriton Isala	Advanced Help		2
0 0 0 0	learch 💽 Politices	<b>1</b> .	
letter 🌒 Microsoft Competitioned			💌 🚺 Go
Network Tanks	LAH or High-Speed	l let erest	
Croate a taxe competition Croate a taxe competition office network Costle the setues desire Paramethic competition	And same and a subge	Dodin Dodin Wee Analishik Window Networks Solar Food	
Carge attraction of the concention	Local Are Discolori	Add to Bridge	
Other Places 8	Wirdcool Obtailed	Greate Stotzat Soars Relate	
Growtwitterel	<b>⊏</b> 4	Popeos.	

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

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Une	Windows to cr	onligure ine w	arelets netwo	ak setings
Avai	ble networks:			
Too	innect to an av	valiable netwo	ok, olick Cor	figure.
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	PCI Module Configu V Configuration 2 <b>2.11a/b/g</b>	1	<			Mo
- Profile List				Information List	Detail List	
Detaurt		New	ВÛР	Selected Profile Informatio Configuration Name Network Name	n Detaut	
	. 🛃	Modify	- 85	Network Connection	AP(Infrastructure) Disabled	
			8 <b>92</b>	VUEP Link Information	Disabled	
		Modify Delete	a <b>92</b>	WEP	Disabled WN	
		Delete	a <b>%</b>	WEP Link Internation Network Name	Disabled	
			= <b>%</b>	WEP Init Internation Network Name Network Connection	Disebled VAN AF(Infrastructure)	
T Enable Smart	I Selection	Delete	3 <b>8</b>	WEP Ink Internation Network Name Network Connection Security	Disabled VMN AP(Inhastructure) None	
F Enable Smart	I Selection	Delete	8 <b>92</b>	WEP Initia Information Network Name Network Connection Security Channel	Disabled VMN AP(Inhastructure) None S	
Enable Smart	I Selection	Delete	8 <b>92</b>	WEP Init Information Network Name Network Connection Security Channel Transmission Rate	Disabled VM AP(Inhastructure) Hone S 1 Maps	
	I Selection	Delete	e 🕸	WEP Init Information Network Name Network Connection Security Channel Transmission Rate	Disabled VM AP(Inhastructure) Hone S 1 Maps	
Available Nativaria	Connection Mode D	Delete Prov		WEP Internation Network Name Network Connection Security Charnel Transmission Rate Skynel Strength	Disabled VM AF(Mhadhucbure) Hone 5 1 Mope 36%	
Available Notworks	Connection Wode	Delete Arrphy Chennel	WEP	WEP Internation Network Name Network Connection Security Charnel Transmission Rate Skynel Strength	Disabled VM AF(Mhashusbure) None 6 1 Mapa 38%	
Available Notworks	Connection Mode D	Delete Arrphy Chennel	UNEP Drable [	WEP Ink Internation Network Name Network Connectory Security Channel Transmission Rate Signal Strength	Disabiled VAI AP(Inhradinucture) None 6 1 Maps 38% Network Connection	
Available Notivorka Network Name A NCSD	Connection Wode	Detete Arrony Chennel 5	WEP Drable	SVEP Init Information Network Name Network Connectany Security Channel Transvission Rate Signal Strength Signal Strength Signal Strength Signal Strength Signal Strength	Disabled VA AP(Inhastructure) None 5 1 Maps 36% Vetwork Connection Inhastructure antrostructure	

### 4. Creating an Ad Hoc New Network

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

- 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**.

VVPA	WPA EAP Type	TLS	<u>×</u>
` WPA-PSK ` 802.1×	802.1x EAP Type	TLS	<u>×</u>
Pre-Shared Ke	Ŷ		
Configure			,

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.

Encryption Keys (H	lex 0-9 A-F)		
12		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		

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.

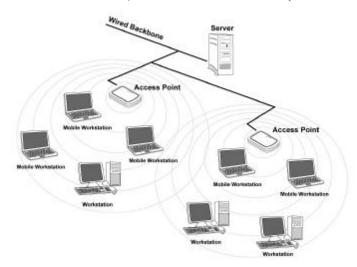
### 5. Modifying a Wireless Network

### 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

						More.
Profile List		-		Information List	DetaiLet	-
1234 Detsult		New Modify	- 0	Configuration Name     Network Name     Network Connection     WEP     Link Information	ISC NC AP(intrastructure) Disabled	
F Enable Smar		Delete Apply		<ul> <li>Network Name</li> <li>Network Connection</li> <li>Security</li> <li>Channel</li> <li>Transmission Rate</li> <li>Speed Strength</li> </ul>	1234 AF(Infrastructure) Nons 1 1 Mbps 2015	
Available Networks	1 Betestion	Apply		<ul> <li>Network Connection</li> <li>Security</li> <li>Channel</li> <li>Transmission Rate</li> <li>Signal Strength</li> </ul>	AP(Intrestructure) Nons 1 1 Mose 20%	
Available Networks Network Name	t Selection	Accoly		Network Connection     Society     Channel     Transmission Rate     Signal Strength     Signal Strength	AP(Intrestructure) None 1 1 Mbps 2015	-
Available Networks Network Name	1 Belestion	ADD/y Channel 5	Disebie	Network Connection     Socurf+     Orwinel     Orwinel     Transmission Rate     Signal Strength     Signal Strength     37%	AP(Intracture) None 1 More 2015 Network Connection	
ivalible Networks Network Name	1 Selection	Accoly	Diseble Brabia	Network Connection     Socurfr     Orannal     Transmission Rate     Signal Strength     Signal Strength     27%     36%	AP(Intrestructure) Nores 1 1 Migres 2016 Network Connection Network Connection	
Available Networks Network Name	1 Belestion	ADD/y Channel 5	Disebie	Network Connection     Socurf+     Orwinel     Orwinel     Transmission Rate     Signal Strength     Signal Strength     37%	AP(Intracture) None 1 More 2015 Network Connection	-

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

Profile Items	Content
Configuration Name	Default
Network Name(SSID1)	
Network Name(SSID2)	
Network Name(SSID3)	
Network Connection	AP(Infrastructure)
Power Saving	Normal
Mireless Mode	Auto
Ad Hoc Net Start	802.11a
302.11b Range	Normal Range
Scan Mode	Auto
Transmit Power	Full Power
2oS	Disabled
Country	UNITED_STATES
2.4 GHz Preamble	Short and Long

- **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"

- Ad Hoc Net Start: Specifies a band to establish an Ad Hoc network if no matching SSID is found. three options are available: 802.11b, 802.11a, 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, but can not exceed the authorized max. power output.
- 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.(When this product sells to US, client will disable the other frequency of outside USA)
- 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.* 

Profile Editor Secu	ng rity TCP/IP Property		
Set Security O	ptions		
C WPA	WPA EAP Type	TLS	-
C WPA-PS	к		
C 802.1×	802.1x EAP Type	TLS	<b>*</b>
C Pre-Sha	red Key		
None			
Co	nfigure		
	2	-	

- 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	
James [Issued: 2002/10/24]	2
Use Any Certificate Authority	C Choose a Certificate Authority
CW HKT SecureNet CA SGC Root	<u>_</u>
.ogin Name James	
James	OK Canc

- 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.

- 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.
- 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.

Encryption Keys (H	lex 0-9 A-F)		
_		Key Le	
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			
capabilit	iget IP settings ass y. Otherwise, you ate IP settings					nis
	ain an IP address a					
- 🖲 Use	the following IP ad	ldress ——				
IF	address :				<u>.</u> ::	
s	ubnet mask :					
D	efault gateway :		Г		÷	
C Obt	ain DNS server add	íress automatic	cally			
– 🕶 Use	the following DNS	server addres:	s			 
	- referred DNS serve					 -
Д	lternate DNS serve	er:	, T	•	•	

- 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.

### 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	Key specifications
Frequency range	➢ U-NII: 5.745 ~ 5.825Ghz 2.400 − 2.4835GHz,
Modulation technique	<ul> <li>&gt; 802.11b/g DSSS (DBPSK, DQPSK, CCK) OFDM for data rate &gt; 20 Mbps</li> <li>&gt; 802.11a OFDM(BPSK,QPSK, 16-QAM, 64-QAM)</li> </ul>
Channels support Operation	<ul> <li>802.11b/g US/Canada: 11 (1 ~ 11)</li> <li>802.11a 1). US/Canada: 5 non-overlapping channels ( 5.725 ~ 5.825GHz)</li> <li>3.3V +/- 5%</li> </ul>
voltage Outpower	802.11a         802.11b         802.11g           19.67dBm         21.41dBm         20.25dBm

Item	Key specifications
Operation	> 802.11a
distance	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	Windows <sup>®</sup> 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
	802.11a (Normal mode)
	54, 48, 36, 24, 18, 12, 9, 6Mbps, auto-fallback
Operation >	$0^{\circ} \sim 70^{\circ} \mathrm{C}$
temperature	
Storage >	$-20^{\circ} \sim 80^{\circ} \text{ C}$
temperature	
Wi-Fi <sup>®</sup> Alliance	WECA Compliant
WHQL	Microsoft <sup>®</sup> 2K, XP Complaint
FAA	S/W audio On/Off support
Media access	CSMA/CA with ACK architecture 32-bit MAC
protocol	
Embedded	Embedded Dual Band Antenna
Antenna	

Information for OEM integrator

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user manual of the end product.

The user manual which is provided by OEM integrators for end users must include the following information in a prominent location.

"To comply with FCC RF exposure compliance requirements, the antenna used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

Label for end product must include " Contains FCC ID: M82-EKI6323AG