# WLAN 802.11a/b/g/n MiniPCI module



# **User Manual**

# Version: 1.0

Nov 2009

### **Copyright Statement**

No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, whether electronic, mechanical, photocopying, recording or otherwise without the prior writing of the publisher. Windows<sup>™</sup> XP/Vista are trademarks of Microsoft<sup>®</sup> Corp. Pentium is trademark of Intel.

All copyright reserved.

#### FCC STATEMENT:

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: 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.

For product available in the USA/Canada market, only channel 1~11 can be operated. Selection of other channels is not possible.

This device and its antenna(s) must not be co-located or operation in conjunction with any other antenna or transmitter.

This device is going to be operated in 5.15~5.25GHz frequency range, it is restricted in indoor environment only.

#### IMPORTANT NOTE:

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

#### **IMPORTANT NOTE:**

This module is intended for OEM integrator. The OEM integrator is still responsible for the FCC compliance requirement of the end product, which integrates this module.

20cm minimum distance has to be able to be maintained between the antenna and the users for the host this module is integrated into. Under such configuration, the FCC radiation exposure limits set forth for an population/uncontrolled environment can be satisfied.

Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

#### USERS MANUAL OF THE END PRODUCT:

In the users manual of the end product, the end user has to be informed to keep at least 20cm separation with the antenna while this end product is installed and operated. The end user has to be informed that the FCC radio-frequency exposure guidelines for an uncontrolled environment can be satisfied. The end user has to also be informed that any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment. If the size of the end product is smaller than 8x10cm, then additional FCC part 15.19 statement is required to be available in the users manual: This device complies with Part 15 of 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.

#### LABEL OF THE END PRODUCT:

The final end product must be labeled in a visible area with the following " Contains TX FCC ID: TV7R52HN ". If the size of the end product is larger than 8x10cm, then the following FCC part 15.19 statement has to also be available on the label: This device complies with Part 15 of 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.

**Table of Contents** 

1. Introduction 6	
2. Driver/Utility Installation / Uninstallation7	
2.1 INSTALLATION	3
3. Connecting to an Existing Network 17	
4. Creating an Ad Hoc New Network 23	
5. Modifying a Wireless Network 26	
5.1 INFRASTRUCTURE MODE AND AD HOC MODE25.2 MODIFYING A WIRELESS NETWORK25.3 DEFAULT SETTINGS WINDOWS XP ZERO-CONFIGURATION3	27
Appendix A: FAQ about WLAN 36	

### 1. Introduction

Thank you for purchasing the WLAN a/b/g/n mini-card 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:
  - 50 MB of free hard disk space (minimum)
  - 256 MB of RAM or later (recommended)
  - 900 MHz processor or higher
- Microsoft<sup>®</sup> Win<sup>TM</sup> 2000/XP/Vista

### 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. Install you card in your laptop and insert the **Installation Software CD** into the CD-Rom Drive.
  - Atheros Client Installation Program

     Image: Client Installation Program

     This program installs the driver and client utilities for your<br/>Atheros Wireless LAN Client Adapter.

2. Click "Next".

3. Read the License Agreement and choose "I accept the items of the license agreement", then click "Next".

Ath	eros Client Installation Program	×
Li	icense Agreement Please read the following license agreement carefully.	4
	Atheros Communications, Inc.       Software License Agreement         PLEASE READ THIS SOFTWARE LICENSE AGREEMENT ("LICENSE") CAREFULLY         BEFORE USING THE ATHEROS SOFTWARE. BY USING THE ATHEROS         SOFTWARE, YOU ARE AGREEING TO BE BOUND BY THE TERMS OF THIS         LICENSE.         IF YOU DO NOT AGREE TO THE TERMS OF THIS LICENSE, DO NOT USE THE         SOFTWARE. IF YOU DO NOT AGREE TO THE TERMS OF THE LICENSE, YOU MAY         RETURN THE ATHEROS SOFTWARE TO THE PLACE WHERE YOU OBTAINED IT         FOR A REFUND. IF THE ATHEROS SOFTWARE WAS ACCESSED         ELECTRONICALLY, CLICK "DISAGREE/DECLINE". FOR ATHEROS SOFTWARE	
Insta	O I accept the terms of the license agreement     Print     O I do not accept the terms of the license agreement     Shield <u>Back</u> <u>Next</u> Cance	2

4. Choose this option to install the driver and client utilities, and click "Next".

Atheros Client Installation Program	×
Setup Type Select the setup type that best suits your needs.	
Click the type of setup you prefer. Install Client Utilities and Driver Install Driver Only Make Driver Installation Diskette(s)	Description Choose this option to install the driver and client utilities. This is the recommended option.
InstallShield	k <u>N</u> ext > Cancel

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

Atheros Client Installation Program	×
<b>Choose Destination Location</b> Select the folder where the installation program will install the files.	
The installation program will install the client utilities in the following location:	
Destination Folder C:\Program Files\Atheros	Browse
InstallShield <u>&lt; B</u> ack <u>N</u> ext >	Cancel

6. Click **"Next"** to continue or change the name of the program folder.

Atheros Client Installation Program	$\mathbf{X}$
Select Program Folder Select a program folder.	
The installation program will add program icons to the Program Folder listed below. You may enter a new folder name or select one from the Existing Folders list.	
Program Folder: Atheros	
E <u>x</u> isting Folders:	
3Com TFTP Server ASUS Utility	
InstallShield	
< <u>Back</u> Next > Cancel	

### 7. Click **"Next"**.

Atheros Client Installation Program
Atheros Client Installation Program
IMPORTANT: Please Read!
On Windows XP, you can configure your Atheros Wireless LAN Client Adapter through the Atheros Client Utility (ACU) or a third-party supplicant. Because third-party tools may not provide all of the functionality available in the ACU, Atheros recommends that you use the ACU. (Please note that a patch from Microsoft might be required to use the Microsoft tool with WPA security.)
On the next screen, select whether you want to use the ACU or a third-party tool to configure your client adapter.
NOTE: If you select a third-party tool, some of the ACU features will not be available. To activate those features, you must install the ACU.
InstallShield
< <u>B</u> ack Next > Cancel

8. Choose the configuration tool for your client card and click **"Next"** to continue or.

Atheros Client Installation Program	×
Choose Configuration Tool	
Which tool will you use to configure your client adapter?	
Atheros Client Utility (ACU) and Supplicant.	
O Third-Party Supplicant	
InstallShield < <u>B</u> ack <u>N</u> ext >	Cancel

9. Click "Yes" to continue.



10. Click **"OK"** to continue.

Atheros	: Client Installation Program
⚠	The installation program installs the driver automatically when the client adapter is inserted. Insert the adapter now if it is not yet inserted, cancel the Found New Hardware Wizard if it appears, and proceed with the installation. Click OK to continue.
	確定

11. Installing process.

Atheros Client Installation Program	
Setup Status	15
Atheros Client Installation Program is configuring your new software installation.	
Installing the driver files	
InstallShield	Cancel

12. Reboot your computer.

Atheros Client Installation Program		
	InstallShield Wizard Complete The Installation Program has successfully performed the selected operations, but the system needs to be rebooted before all of the changes will take effect. Click OK/Yes to reboot the system. Yes, I want to restart my computer now.           Yes, I want to restart my computer now.           No, I will restart my computer later.           Remove any disks from their drives, and then click Finish to complete setup.	
	< Back Finish Cancel	

# 2.2 Additional Setup Processes

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

1. **Windows 2000/XP/Vista:** Select "Install the software automatically" when the window with this option appears, and then click "Next" to continue installation.

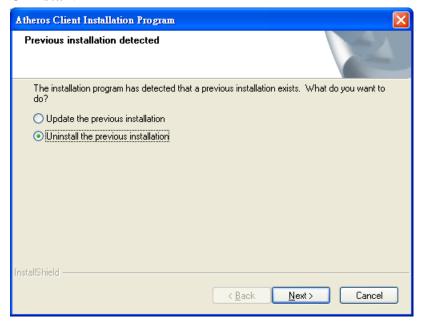
# **2.3 Uninstallation**

Note! Before uninstallation, please close all running programs.

- 1. Click <u>Start>Programs>Control Panel >Install/uninstall program>Atheros client</u> <u>installation program></u>.
- 2. Choose "Remove". Click "Next".

Atheros Client Installation Program - InstallShield Wizard
Preparing Setup Please wait while the InstallShield Wizard prepares the setup.
Atheros Client Installation Program Setup is preparing the InstallShield Wizard, which will guide you through the rest of the setup process. Please wait.
InstallShield ————————————————————————————————————

3. Choose **"Uninstall the previous installation"** and click **"Next"** to start **Uninstall**.



4. Click "OK" or "Yes" to start Uninstall.



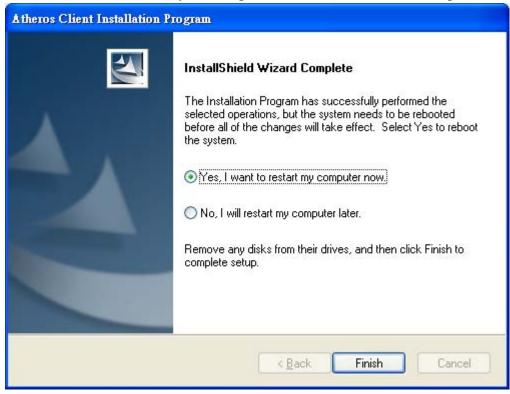


Atheros Client Installation Program	$\times$
Setup Status	
Atheros Client Installation Program is configuring your new software installation.	
InstallShield Cancel	

5. Click "Yes" to remove the profiles and click "No" to remove your profiles.



6. Click "Finish" and reboot your computer. The Uninstall is now completed.



#### **3.** Connecting to an Existing Network

1. Double click the shortcut icon of Atheros Client Utility on the desktop, and the Configuration window appears.



2. Click "Profile Management" tab.

$\Lambda$ Atheros Client Utility - Curren	at Profile: Default	? 🔀
<u>A</u> ction <u>O</u> ptions <u>H</u> elp		
Current Status Profile Management	Diagnostics	
	Associated 5 GHz 300 Mbps	Network Type: Infrastructure Control Channel: 36 Extension Channel: 40
Server Based Authentication:	None	Data Encryption: None
IP Address:	192.168.11.2	
Signal Strength:		Excellent
		Advanced

3. Click "Scan".

\Lambda Atheros Client Utility - 🤉	Current Profile: Default	? 🛛
<u>A</u> ction <u>O</u> ptions <u>H</u> elp		
Current Status Profile Manag	ement Diagnostics	
🗽 Default		<u>N</u> ew
		Modify
		Remo <u>v</u> e
		Activate
- Details		
Network Type:	Infrastructure	Import
Security Mode:	Disabled	
Network Name 1 (SSID1		<u>Export</u>
Network Name 2 (SSID2	••	Scan
Network Name 3 (SSID3	): <empty></empty>	
Auto Select Profiles		Order Profiles
Disable WLAN if LAN is	Connected	

4. Choose which AP you want to link and click "Activate".

Network Name (SSID	)  🟟	11n	Super 🗌	XR   S	ignal Strength	Chan	nel 🛛 🔼
👗 SKYTEST				մ	15 dB	13	
👗 Smith		XS		ألد	15 dB	36	
👗 SYSTEM	-			<u>_l</u> ]	6 dB	11	
💡 test_11n		XS		JI.	35 dB	36	
🗼 TG185n3350	-	XS		JI.	18 dB	48	
👗 ThomsonE000DB	<b>~</b> 3	XS		J.	14 dB	36	
👗 TP-LINK-DQA		XS			4 dB	6	
👗 trytrytry	<b>~</b> 3		X	? <u>il</u>	7 dB	36	6
🗼 WiFi-3G_SGB					33 dB	9	
1 SUMPAR				-1	nu un	C C	>

5. Give a Profile name for the SSID and Click "OK".

Profile Management		? 🗙
General Security Advance	d	
Profile Settings		
Profile Name:	Name	
Client Name:	USER-00DCE7224C	
Network Names		
SSID1:	test_11n	
SSID2:		
SSID3:		
	· · · · · · · · · · · · · · · · · · ·	反消

6. Give a Profile name for the SSID and Click "OK".

A Atheros Client Utility - Cu	urent Profile: Name	? 🛛
<u>A</u> ction <u>O</u> ptions <u>H</u> elp		
Current Status Profile Managen	nent Diagnostics	
Default <sup>7</sup> Name		<u>N</u> ew <u>M</u> odify Remo⊻e Activate
Details Network Type: Security Mode: Network Name 1 (SSID1): Network Name 2 (SSID2): Network Name 3 (SSID3): Auto Select Profiles Disable WLAN if LAN is Co	Infrastructure Disabled test_11n <empty> <empty></empty></empty>	<u>I</u> mport <u>Export</u> <u>Scan</u> Order <u>P</u> rofiles

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

7. 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. About the security setting process, please refer to the chap 5.

Profile Management		? 🗙
General Security Advanced		
_Set Security Options		
O WPA/WPA2	WPA/WPA2 EAP Type: LEAP	
🔘 WPA/WPA2 Passphrase		
○ 802.1x	802.1x EAP Type: LEAP	
OPre-Shared Key (Static WEP)		
None		
Configure	Allow Association to Mixed Cells Profile Locked Limit Time for Finding Domain Controller . 0	
Group Policy Delay:	0 🔅 sec	
	確定	「消」

8. Once connected, you can check the signal strength from the following 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/n mini-card 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".
- 3. Tray icon.

The tray icon appears at the bottom of the screen, and shows the signal strength using colors.



Hold the mouse cursor over the tray icon to display the current configuration profile name and association, as well as transmit and receive speed and the wireless adapter name and IP address.

Right-click on the tray icon to:

Help Open the online help.
 Open Atheros Client Utility Launch the Atheros Client Utility (ACU). Use the ACU to configure the profile or view status and statistics information.
 Client Managed Test Run the Client Managed Test Utility.
 Preferences Set the startup options and menu options for the ACU. Check whether the program should start automatically when Windows starts, and check the menu items that should appear on the popup menu.

Enable/Disable Radio	Enable or disable the RF Signal.		
Manual LEAP Login	Log in to LEAP manually, if LEAP is set to manually prompt for user name and password on each login.		
Reauthenticate	Reauthenticate to the access point.		
Select Profile	Click a configuration profile name to switch to it. If no configuration profile exists for a connection, add a profile first.		
Show Connection Status	Display the Connection Status window. This window		
	Active Profile	on about the connection: Displays the name of the active configuration profile.	
	Auto Profile Selection	Shows whether auto profile selection is enabled.	
	Connection Status	Displays whether the adapter is connected to a wireless network.	
	Link Quality	Lists the quality of the link connection.	
	SSID	Displays the SSID of the associated network.	
	Access Point Name	Shows the name of the access point the wireless adapter is connected to.	
	Access Point IP Address	Shows the IP address of the access point the wireless adapter is connected to.	
	Current Receive Rate	Shows the current receive rate in Mbps.	
	Current Transmit Rate	Shows the current transmit rate in Mbps.	
	Client Adapter IP Address	Displays the IP address of the wireless adapter.	

Exit Exit the Atheros Client Utility application.

The colors are defined as follows:

Color	Quality
Green	Excellent
Green	Good
Yellow	Poor
Red	Poor
Gray	No Connection

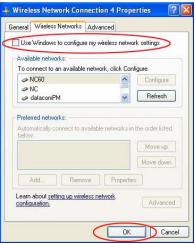
Enable or disable the tray icon in the Action menu.

### **Option 2:**

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

Network Connections			
File Edit New Favorites Tools	Advanced Help		
(3 tat () - () )	iearch 🍋 Folders [		
Address 🔍 Network Connections			💌 🛃 😡
Network Tasks	LAN or High-Speed	Internet	
Create a new connection Set up a home or small office network Classile this network device Market Rename this connection	Network Bridge	elsoul consection 55 Disoble View Available Wireless Networks Statue Repair	
<ul> <li>Change settings of this connection</li> </ul>	Local Are Disabled,	Add to Unidge	
Other Places (3)	Sluetooth Wreless I Disabled,	Create Shortzut Deleta Rename	
Control Panel	-Ψ	Properties	

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



### 4. Creating an Ad Hoc New Network

**NOTE!** Ad-hoc mode is available only for 802.11b/g. It is not available for 802.11a.

This is a client product and do not have radar detection function specified by FCC. The software will not let you to use ad-hoc under 802.11a.

🛆 Atheros Client Utility - Current Profile: Name	? 🛛
<u>A</u> ction <u>O</u> ptions <u>H</u> elp	
Current Status Profile Management Diagnostics	
Default	<u>N</u> ew
Name	<u>M</u> odify
	Remo <u>v</u> e
	Acțivate
Details	
Network Type: Infrastructure	Import
Security Mode: Disabled	
Network Name 1 (SSID1): test_11n	<u>Export</u>
Network Name 2 (SSID2): <empty></empty>	Scan
Network Name 3 (SSID3): <empty></empty>	
Auto Select Profiles	Order Profiles
Disable WLAN if LAN is Connected	

### 1. In the **Profile Management** tab, click **New**.

2. In the **Profile Management** window, click **Advance** tab and choose **"Ad Hoc"** in the Network Type function.

Profile Management	? 🛛
General Security Advanced	
Transmit Power Level 2.4 GHz: 100 mW 5 GHz: 40 mW	Power Save Mode: Normal
Wireless Mode	Ad Hoc Infrastructure Wireless Mode When Starting Ad Hoc Network
<ul> <li>5 GHz 300 Mbps</li> <li>5 GHz 54 Mbps</li> <li>2.4 GHz 300 Mbps</li> <li>2.4 GHz 54 Mbps</li> <li>2.4 GHz 11 Mbps</li> </ul>	<ul> <li>○ 5 GHz 54 Mbps</li> <li>○ 2.4 GHz 11 Mbps</li> <li>○ 2.4 GHz 54 Mbps</li> <li>Channel: Auto </li> </ul>
Roaming: Default	802.11 Authentication Mode Auto Open Shared Preferred APs
	確定 取消

3. Select the "Channel" tab and click "**OK**".

Jeneral Security Advanced	
Transmit Power Level       2.4 GHz:       100 mW       5 GHz:       40 mW	Metwork Type: 11d Use
Wireless Mode	Wireless Mode When Starting Ad Hoc Network
<ul> <li>5 GHz 300 Mbps</li> <li>5 GHz 54 Mbps</li> <li>2.4 GHz 300 Mbps</li> <li>2.4 GHz 54 Mbps</li> <li>2.4 GHz 11 Mbps</li> </ul>	<ul> <li>○ 5 GHz 54 Mbps</li> <li>○ 2.4 GHz 11 Mbps</li> <li>○ 2.4 GHz 54 Mbps</li> <li>Channel: Auto </li> </ul>
	802.11 Authentication Mode
Roaming: Default	P 6 7 8

4. Give a Profile name for the SSID and Click "**OK**" to save the settings.

Profile Management		? 🛛
General Security Advance	a	
-Profile Settings-		
Profile Name:	Name	
Client Name:	USER-00DCE7224C	
_Network Names		
SSID1:		
SSID2:		
SSID3:		
		The Ada
	( <u>確定</u> )	取消

5. Click the **Security** tab. If not using security, select **None**. Please refer to the chap 5 for the security setting.

### 5. Modifying a Wireless Network

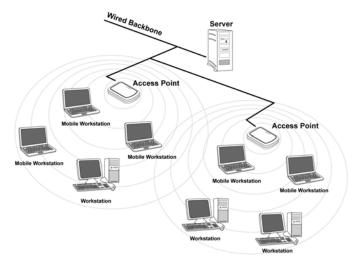
# 5.1 Infrastructure Mode and Ad Hoc Mode

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

**NOTE!** Ad-hoc mode is available only for 802.11b/g. It is not available for 802.11a. This is a client product and do not have radar detection function specified by FCC. The software will not let you to use ad-hoc under 802.11a.

#### 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).

**NOTE!** Ad-hoc mode is available only for 802.11b/g. It is not available for 802.11a. This is a client product and do not have radar detection function specified by FCC. The software will not let you to use ad-hoc under 802.11a.



# **5.2 Modifying a Wireless Network**

- 1. Open "WLAN a/b/g/n mini-cardModule 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.

🛆 Atheros Client Utility - Current Profile: Name	? 🛛
<u>A</u> ction <u>Options</u> <u>H</u> elp	
Current Status Profile Management Diagnostics	
Default	<u>N</u> ew
Name	Modify
	Remo <u>v</u> e
	Activate
Details	
Network Type: Infrastructure	Import
Security Mode: Disabled	
Network Name 1 (SSID1): test_11n	<u>E</u> xport
Network Name 2 (SSID2): <empty></empty>	Scan
Network Name 3 (SSID3): <empty></empty>	
Auto Select Profiles	Order <u>P</u> rofiles
Disable WLAN if LAN is Connected	

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

Profile Management		? 🗙
General Security Advance	1	
- Profile Settings-		
Profile Name:	Name	
Client Name :	USER-00DCE7224C	
_ Network Names		
SSID1:	test_11n	
SSID2:		
SSID3:		
	確定	取消
		1
Profile Name	Identifies the configuration profile. This name	
	must be unique. Profile names are not case	
	sensitive.	
Client Name	Identifies the client machine.	
Network Names	The IEEE 802.11 wireless network name. This	

field has a maximum limit of 32 characters.

Configure up to three SSIDs (SSID1, SSID2, and

SSID3).

(SSIDs)

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

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

Profile Management		?×
General Security Advanced		
Set Security Options		
O WPA/WPA2	WPA/WPA2 EAP Type: LEAP	
O WPA/WPA2 Passphrase		
○ 802.1x	802.1x EAP Type: LEAP	
○ Pre-Shared Key (Static WEP)		
<ul> <li>None</li> </ul>		
Configure	Allow Association to Mixed Cells	
	Profile Locked Limit Time for Finding Domain Controller . 0	
Group Policy Delay:	0 Sec	
		友消

The type of security mode the station is using. The options include
the following:
WPA/WPA2/CCKM
WPA/WPA2 Passphrase
• 802.1x
Pre-Shared Key (Static WEP)
• None
These options define the unique encryption key for network
configuration security.
Enables the use of Wi-Fi Protected Access (WPA).
Choosing WPA/WPA2 opens the WPA/WPA2 EAP drop-down
menu. The options include:
1
• EAP-FAST
• EAP-TLS

WPA/WPA2	<ul> <li>EAP-TTLS</li> <li>EAP-SIM</li> <li>PEAP (EAP-GTC)</li> <li>PEAP (EAP-MSCHAP V2)</li> <li>LEAP</li> </ul> Enables WPA/WPA2 Passphrase security.			
Passphrase	Click on the Configure button and fill in the WPA/WPA2 Passphrase.			
802.1x	802.1x       Enables 802.1x security. This option requires IT administration.         Choosing 802.1x opens the 802.1x EAP type drop-down menu. The options include:       • EAP-FAST         • EAP-FAST       • EAP-TLS         • EAP-TILS       • EAP-SIM         • PEAP (EAP-GTC)       • PEAP (EAP-MSCHAP V2)         • LEAP         If the access point that the wireless adapter is associating to has WEP set to Optional and the client has WEP enabled, make sure that Allow Association to Mixed Cells is checked on the Security Tab to allow association.			
	Enables the use of pre-shared keys that are defined on both the access point and the station. To define pre-shared encryption keys, choose the Pre-Shared Key radio button and click the Configure button to fill in the Define Pre-Shared Keys window. If the access point that the wireless adapter is associating to has WEP set to Optional and the client has WEP enabled, make sure that Allow Association to Mixed Cells is checked on the Security			

	Tab to allow association.	
None	No security (not recommended).	
Association to	Check this check box if the access point with which the client adapter is to associate has WEP set to Optional and WEP is enabled on the client adapter. Otherwise, the client is unable to establish a connection with the access point.	
Finding Domain	<ul> <li>Check this check box and enter the number of seconds (up to 300) after which the authentication process times out when trying to find the domain controller. Entering zero is like unchecking this check box, which means no time limit is imposed for finding the domain controller.</li> <li>Note: The authentication process times out whenever the authentication timer times out or the time for finding the domain controller is reached.</li> </ul>	
Group Policy Delay	Specify how much time elapses before the Windows logon process starts group policy. Group policy is a Windows feature used by administrators to specify configuration options for groups of users. The objective is to delay the start of Group Policy until wireless network authentication occurs. Valid ranges are from 0 to 65535 seconds. The value that you set goes into effect after you reboot your computer with this profile set as the active profile. This drop-down menu is active only if you chose EAP-based authentication.	

#### 6. Select **Advanced** tab.

Profile Management	? 🗙
General Security Advanced	
Transmit Power Level	Power Save Mode: Off
2.4 GHz: 100 mW	
5 GH2: 40 mW 💙	Network Type: Infrastructure 💌
Wireless Mode	Wireless Mode When Starting Ad Hoc Network
☑ 5 GHz 300 Mbps	5 GHz 54 Mbps
<ul> <li>5 GHz 54 Mbps</li> <li>2.4 GHz 300 Mbps</li> </ul>	2.4 GHz 11 Mbps
✓ 2.4 GHz 500 Mbps	2.4 GHz 54 Mbps
🗹 2.4 GHz 11 Mbps	Channel: Auto 💌
	~ 802.11 Authentication Mode
	Auto Open Shared
Roaming: Default 🗸	Preferred APs
	確定 取消

Transmit Power Level	Selects the transmit power level for 80211b/g or 802.11a in mW. Actual transmit power may be limited by regulatory domain or hardware limitations. Also note that administrator has the privilege of locking these power levels, so that these values are pre-selected and not editable.
Power Save Mode	<ul> <li>Specify:</li> <li>Maximum mode causes the access point to buffer incoming messages for the wireless adapter. The adapter periodically polls the access point to see if any messages are waiting.</li> <li>Normal uses maximum when retrieving a large number of packets, then switches back to power save mode after retrieving the packets.</li> <li>Off turns power saving off, thus powering up the wireless adapter continuously for a short message response time.</li> </ul>
Network Type	Specifies the network as either infrastructure (access

	point mode) or ad hoc.	
Wireless Mode	Specifies 5 GHz 54Mbps, 5 GHz 300Mbps, 2.4 GHz 54 Mbps, 2.4 GHz 11Mbps, 2.4 GHz 300Mbps or Quality of Service operation in an access point network. The wireless adapter must match the wireless mode of the access point it associates to.	
Starting an Ad Hoc	<ul> <li>Specifies 5 GHz 54 Mbps, 5 GHz 108 Mbps, or 2.4 GHz 54/11 Mbps to start an <u>ad hoc</u> network if no matching network name is found after scanning all available modes.</li> <li>This mode also allows selection of the channel the wireless adapter uses. The channels available depend on the regulatory domain. If the adapter finds no other ad hoc adapters, this selection specifies the which channel with the adapter starts the ad hoc network with.</li> <li>The wireless adapter must match the wireless mode and channel of the clients it associates to.</li> </ul>	
	<ul> <li>Select what mode the wireless adapter uses to authenticate to an access point:</li> <li>Auto causes the adapter to attempt authentication using shared, but switches it to open authentication if shared fails.</li> <li>Open enables an adapter to attempt authentication regardless of its WEP settings. It will only associate with the access point if the WEP keys on both the adapter and the access point match.</li> <li>Shared only allows the adapter to associate with access points that have the same WEP key.</li> </ul>	
Roaming Strength	Select the roaming level to suit the roaming aggressiveness of the client. Five roaming levels ranging from <b>Very Low</b> to <b>Very High</b> allow for the best	

	performance in different environments such as home or office.
	onnee.

7. Select "TCP/IP Property" tab. Enter the settings and click "OK" to save the settings.

rofile Editor Security Setting TCP/IP Pro	perty				
You can get IP settings assigned auto capability. Otherwise, you need to asl appropriate IP settings					s
C Obtain an IP address automaticall	,				
┌ ⓒ Use the following IP address —					
IP address :		-	- 0	-8	
Subnet mask :		5 <b>.</b>		а.	
Default gateway :		3	-	2	
C Obtain DNS server address autor	natically				
┌	ress				
Preferred DNS server :		94		94	
Alternate DNS server :		3	-	94	

- 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/n mini-card Module", and make sure this connection is **Enabled**.
- 3. Right-click the Wireless Network Connection of "WLAN a/b/g/n mini-card 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.