# IEEE 802.11n Wireless PCI Adapter

**User's Manual** 

March 2008

#### FCC Warning

This equipment has been tested and found to comply with the limits for a Class C 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 communication. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which

- Consult the dealer or an experienced radio/TV technician for help. the receiver is connected.

**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.

#### **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 a minimum distance of about eight inches (20cm) between the radiator and your body.

This transmitter must not be co-located or operated in conjunction with any other antenna or transmitter.

## **Revision History**

Revision V2.0 History Second release

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#### 1. Introduction

This is a wireless client device that delivers unrivaled wireless performance for your Desktop PC. It complies with IEEE 802.11n draft standard and backward compatible with IEEE 802.11b/g. With this adapter, you can easily upgrade your Desktop PC wireless connectivity. Once the wireless PCI adapter is connected, access the network with high-speed Internet connection while sharing photos, files, music, video, printers, and storage. Get a better Internet experience with a faster wireless connection so you can enjoy smooth digital phone calls, gaming, downloading, and video streaming. It also provides peer-to-peer communication among any compatible wireless users and no Access Point required.

This Wireless PCI Adapter provides maximum transfer rate up to 300Mbps and supports WEP, WPA, WPA2 and WPS high-level WLAN security features that guarantee the best security for users.

This product is made in ISO9001 approved factory and complies with FCC part 15 regulations and CE approval.

#### 1.1 Features

- Complies with draft IEEE 802.11n standard
- Up to 150Mbps data transfer rates in 802.11n mode
- · Backward compatible with IEEE 802.11b/g
- · Legacy and High Throughput Modes
- Supports 64/128-bit WEP Data Encryption
- Supports WPA, WPA2 (802.11i), WPS, 802.11x advanced security
- Supports both Infrastructure and Ad-Hoc Networking Modes
- Supports Quality of Service (QoS) WMM, WMM-PS
- Supports Multiple BSSID
- Supports Windows 2000/XP/Vista
- Simple user setup and diagnostics utilities
- 20MHz/40MHz Bandwidth

#### 1.2 LED Indicator

LED	Light Status	Description
ACT	Blinking	Data is being transmitted or received.
LINK	On	Wireless link is established.

#### **1.3 Package Contents**

- One Wireless PCI Adapter
- 2 External Antennas (depends on the model)
- One CD-ROM (Drivers / Utility, User's Manual)

If any of the above items is missing, contact your dealer immediately.

#### 1.4 Before you start

You must have the requirements as follow,

- A computer with an available PCI slot
- At least a 300MHz processor and 32MB memory
- Windows 2000/XP/Vista support
- A CD-ROM drive
- · Wireless PCI Adapter properly installed

#### **1.5 Hardware Installation**

**STEP1:** Turn off your computer and remove its cover

STEP2: Insert the PCI card to an available PCI slot firmly. Please refer to the illustration below:



STEP3: Secure this card to the rear of the computer chassis and put back the cover.

**STEP4:** Secure the antenna to antenna connector of the card. Please refer to the illustration below:



**STEP5:** Turn on the computer.

#### [Guidelines for the Hardware Installation]

Please observe the following guidelines when you are installing the PCI card to the Desktop PC:

Avoid placing the PC close to obstacles

Obstructions such as concrete and thick walls limit radio signal penetration and reduce the throughput and the coverage range of the PCI card.

Place the PC as high as possible

The higher the PC is placed, the better the performance.

Adjust the antenna position

The WLAN PCI card has one antenna for signal reception and another one antenna for high power signal transmission. The antenna on the right side is for signal reception and should be set perpendicular (90 degrees). The left side is for signal transmission and should be set about 90 degree.

### 2. Installation Procedure

*Note:* If you have installed the Wireless Adapter driver & utility before, please uninstall the old version first.

#### 2.1 For Windows XP and 2000

**STEP1: Found New Hardware Wizard** is displayed after the adapter is installed and the computer is restarted. Please click **Cancel** to continue.

Found New Hardware Wizard
The wizard could not find the software on your computer for
It is recommended that you connect to the Internet so that the wizard can search online and look for the appropriate software.
Yes, connect and search for the software on the Internet
No, do not connect to the Internet now
If you know another place where the software might be located, click Back and select the Advanced option.
< <u>B</u> ack <u>N</u> ext > Cancel

(For Windows XP)

(For Windows 2000)

**STEP2:** Insert Installation CD into CD-ROM drive then windows below will appear. Click **Install Driver & Utility** to begin device driver installation.



**STEP3:** Please read the following license agreement. Use the scroll bar to view the rest of this agreement. Select **I accept the terms of the license agreement** and click **Next** to continue.



**STEP4:** In Windows XP, there is a **Windows Zero Configuration Tool** for you to setup wireless adapter. You can choose to configure the adapter through the **Microsoft Zero Configuration Tool** or the **Ralink Configuration Tool**. It is recommended to choose the **Ralink Configuration Tool** for the adapter. Click **Next** to continue.

Ralink Wireless LAN - Install	Shield Wizard		
Setup Type Select the setup type that best s	uits your needs.		
Ralink	Select Configuration Tool          Ralink Configuration Tool         Microsoft Zero Configuration Tool	bol	
InstallShield	< <u>B</u> ack	Next >	Cancel

**STEP5:** If you need the adapter to operate with better performance, please choose **Optimize for performance mode** to enable the **Tx Burst mode**. Or you can choose **Optimize for WiFi mode** to run in standard wireless network.

Ralink Wireless LAN - Insta	IIShield Wizard	
Setup Type Select the setup type that best	t suits your needs.	
	Choose Configuration TxBurst or WiFi.	
Ralink		
InstallShield	<back next=""></back>	Cancel

**STEP6:** Click **Install** to begin the installation.

Ralink Wireless LAN - InstallSI	nield Wizard		
Ready to Install the Program The wizard is ready to begin install	ation.		
Ralink	Click Install to begin the installation. If you want to review or change any wizard.	v of your installation	settings, click Back. Click Cancel to exit the
InstallShield	< <u>B</u> ack	[Install]	Cancel

**STEP7:** Please wait for a while during the adapter is configuring your new software installation.

Ralink Wireless LAN - InstallS	hield Wizard	×
Setup Status		
	The InstallShield Wizard is installing Ralink Wireless LAN	
Ralink	Installing C:\Program Files\RALINK\Common\RaUI.exe	]
InstallShield	Cancel	]

10

**STEP8:** After the setup wizard has successfully installed wireless LAN, click **Finish** to exit the wizard.

Ralink Wireless LAN - InstallS	hield Wizard
	InstallShield Wizard Complete
	The InstallShield Wizard has successfully installed Ralink Wireless LAN. Click Finish to exit the wizard.
-	
Ralink	
InstallShield	Cancel

To check if the adapter is properly installed, you can right-click **My Computer**  $\rightarrow$  choose **Properties**  $\rightarrow$  click **Device Manager**.



(For Widows XP)

(For Widows 2000)

The Configuration Utility appears as an icon on the system tray of Windows while the

adapter is running. You can open the utility by double-click on the icon.

Right-click the icon, there are some items for you to operate the configuration utility,

- Launch Config Utilities  $\rightarrow$  Select this option to open the Configuration Utility tool.
- Use Zero Configuration as Configuration utility → Select this option to use Windows XP built-in wireless configuration utility (Windows Zero Configuration) to configure to card.
- Switch to AP Mode  $\rightarrow$  Select this option to change to AP mode.
- **Exit**  $\rightarrow$  Select **Exit** to close the Configuration Utility tool.



#### 2.2 For Vista

**STEP1: Found New Hardware Wizard** is displayed after the adapter is installed and the computer is restarted. Please click **Cancel** to continue.



**STEP2:** Insert Installation CD into CD-ROM drive then windows below will appear. Click **Install Driver & Utility** to begin device driver installation.



**STEP3:** Please read the following license agreement. Use the scroll bar to view the rest of this agreement. Select **I accept the terms of the license agreement** and click **Next** to continue.

Ralink Wireless LAN - InstallShie	ld Wizard	×
Ralink Wireless LAN - InstallShie	Id Wizard Se agreement carefully.  RALINK Wireless Utility for Windows 98/ME/2000/XP/Vista Copyright (C) RALINK TECHNOLOGY, CORP. All Rights Reserved.  Thank you for purchasing RALINK Wireless product!  SOFTWARE PRODUCT LICENSE The SOFTWARE PRODUCT is protected by copyright laws and international copyright treaties, as well as other intellectual property laws and treaties. The SOFTWARE PRODUCT is licensed, not sold.  I. GRANT OF LICENSE. This End-User License Agreement grants you the following rights Installation and Use. You may install and use an unlimited number of copies of the SOFTWARE PRODUCT.  Reproduction and Distribution. You may reproduce and distribute an unlimited number of copies of the SOFTWARE PRODUCT; provided that each copy shall be a true and complet copy, including all copyright and trademark notices, and shall be accompanied by a copy of this EULA. Copies of the SOFTWARE PRODUCT may be distributed as a standalone produc or included with your own product.	E ct
	I gccept the terms of the license agreement     I go not accept the terms of the license agreement	it
InstallShield	< <u>B</u> ack (Next>)	ncel

**STEP4:** Click **Install** to begin the installation.

Ralink Wireless LAN - InstallShield Wizard				
Ready to Install the Program The wizard is ready to begin installation.				
Ralink	Click Install to begin the installation. If you want to review or change any wizard.	of your installation settings, click l	Back. Click Cancel to exit the	
InstallShield	< <u>B</u> ack	Install	Cancel	

**STEP5**: Please wait for a while during the adapter is configuring your new software installation.

Ralink Wireless LAN - InstallShield Wizard		
Setup Status		
Ralink	The InstallShield Wizard is installing Ralink Wireless LAN Installing C:\Program Files\RALINK\RT2860 Wireless LAN Card\Driver\netr28.cat	
InstallShield	Cancel	

**STEP8:** After the setup wizard has successfully installed wireless LAN, click **Finish** to exit the wizard.

Ralink Wireless LAN - InstallShield	Wizard
	InstallShield Wizard Complete
_	The InstallShield Wizard has successfully installed Ralink Wireless LAN. Click Finish to exit the wizard.
Ralink	
InstallShield	K Back Finish Cancel

To check if the adapter is properly installed, you can right-click **My Computer**  $\rightarrow$  choose **Properties**  $\rightarrow$  click **Device Manager**.



The Configuration Utility appears as an icon on the system tray of Windows while the

adapter is running. You can open the utility by double-click on the icon.

le   Link Status	Site Survey   Statistic	s   WF	'S Configu	iration   Qo	S About		
SSID	BSSID	Phy	Signal	▲ C	Encryption	Authentic	Network Ty
Default_11N	00-06-4F-33-44-66	N	29%	6	None	Unknown	Infrastructure
UNI	00-06-4F-50-1E-B6	G	44%	6	None	Unknown	Infrastructure
SMC	00-13-F7-19-26-D2	G	86%	6	None	Unknown	Infrastructure
RT2561_1	00-AA-BB-01-23-45	G	10%	6	None	Unknown	Infrastructure
WLAN_SW	00-07-40-F1-99-42	G	100%	9	TKIP	WPA-PSK	Infrastructure
Belkin_N1	00-17-3F-5A-8E-AD	N	86%	11	AES	WPA-PS	Infrastructure
WR514VN	00-06-4F-46-73-6D	N	100%	11	TKIP	WPA-PSK	Infrastructure
mySSID	00-03-7F-FE-00-02	G	76%	11	None	Unknown	Infrastructure
					1		
Connected <> \	VLAN_SW			Rescar	1	Add to I	Profile

Ralink wireless utility needs to cooperate with Microsoft AutoConfig service in order to perform scanning and connecting actions, so the AutoConfig service should be enable beforehand.



**Control Menu**  $\rightarrow$  Once Ralink wireless utility is minimized, the user can click the Ralink icon on the taskbar to bring up the control menu.

- Launch Config Utilities  $\rightarrow$  Restore Ralink wireless utility window.
- Switch to AP Mode  $\rightarrow$  Select this option to change to AP mode.
- **Exit**  $\rightarrow$  Select **Exit** to close the Configuration Utility tool.

#### 3. Wireless Network Configuration Utility

#### 3.1 For Windows XP & 2000

The Configuration Utility is a powerful application that helps you to configure the Wireless LAN adapter and monitor the link status and statistics during the communication process.

When the adapter is installed, the configuration utility will be displayed automatically. This adapter will auto connect to wireless device which has better signal strength and no wireless security setting.

In Windows XP, it provides wireless configuration utility named "Windows Zero configuration" which provides basic configuration function for Ralink Wireless NIC, Ralink's Utility (RaUI) provides WPA supplicant functionality. To make it easier for user to select the correct utility, RaUI will let user make the selection when it first runs after windows XP boots.

RaUI can co-exist with **WZC** (**Windows Zero Configuration**). When coexisting with WZC, RaUI only provides monitoring function, such as link status, network status, statistic counters, advance feature status, WMM status and WPS status. It won't interfere with WZC's configuration or profile functions. Please see below picture: To select WZC or RaUI



If "Use Zero Configurations as Configuration utility" is selected, please continue on the section. Below picture shows that the RaUI status when WZC is active as main control utility.

🗟 RaUI						×
Profile Netwo	work Advanced	Statistics WWW	WPS	Radio On/Off	R	•
Sorted by >> 🔵 SSID	🙆 Channe	el 🕜 Signal		Show dBm		
_Shiang_2860AP	<b>1</b> /211	<b>BGn</b> 81%			-	^
aaa	<b>A</b> 3	<b>1 9</b> 55%				
AlbertY-200	106	<b>Bq P</b> 76%	-			
AP	101	<b>1 9</b> 55%				
▶ AP1	106	<b>bq</b> 100%				
APPA	126		_	_		
21126	11	<b>BQ</b> 81%	_			
Broadcom	11	80 81%	_			
Buffalo 54	11					
Cobra	106	<b>1 9 9</b> 34%	_			
Rescan Conne	Add to Profile					
Status >> AP1 <> 0	0-03-7F-00-D7-A4		Link Qu	ality >> 100%		
Extra Info >> Link is Up	[TxPower:100%]					
Channel >> 6 <> 243	7000 MHz		Signal Str	angth 2 >> 100%		
Authentication >> Unknown			Signal Stri	angth 3 >> 100%		
Encryption >> None			Noise St	rength >> 26%		
Network Type >> Infrastruc	cture	Transmit —				-
IP Address >> 192.168.5	4U IEE O	Link Spe	ed >> 54.0 Mbps	Max		
Default Gateway >> 192.168.5	.254	Throughp	out >> 0.000 Mbps	0.104		
	нт	Beesive		Mbps		3Y5
BW(>> p/a	SND0 >> p.(>	Link Sne	ed >> 54.0 Mbps	Max		
Gl>>n/a MCS>>	n/a SNR1 >> n/a	Throughp	out >> 0.098 Mbps			
				35.746 Mbps		

When activating WZC, there are couple different on RaUI status compare to the without WZC running:

- (1) **Profile** button will be gray, profile function is removed since the NIC is controlled by WZC.
- (2) The **connect** and **add profile** function will be gray. The reason is same as the first difference.

#### [Use WZC to configure wireless NIC]

STEP1: If connection is lost or not connected, the status prompt as below will pop up.



STEP2: Right-click the network connection icon in the task bar.



STEP3: Select "View Available Wireless Networks" will pop up the dialog shown as below.



**STEP4:** Select intended AP and click "**Connect**" shown as below, then click "**Connect** Anyway".



#### STEP5: AP1 is successful connected.

Network Tasks	Choose a wireless	network	
💋 Refresh network list	Click an item in the list below to information.	) connect to a wireless network in range	or to get more
Set up a wireless network for a home or small office	((p)) AP1	s petwork	Connected ☆ 🛆
Related Tasks	((p)) <sup>242</sup>		
Learn about wireless networking	Contraction 202	ed wireless network (WPA)	8000
Change the order of preferred networks	Unsecured wireless	s network	
Change advanced settings	((p)) AP	ed wireless network (WPA)	
	((Q)) <sup>219</sup>		
	((@)) Baron_PC_AP4	ed wireless network (WPA)	00068
	Becurity-enable	ed wireless network	••000 🚽



STEP6: If you want to modify information about AP, click "Change advanced settings"

#### STEP7: Choose "Wireless Networks" tab.

General	Wireless Networks	Advance	d
🔽 Use	Windows to configur	e my wirele	ess network settings
- Avail	able networks:	- 1991,025,000	
Toc	onnect to, disconnect	from, or fir	d out more information
abou	t wireless networks in	range, clic	k the button below.
			View Wireless Networks
Prefe Autor belov	rred networks: matically connect to a w: AP1 (Automatic)	vailable ne	tworks in the order listed
Prefe Autor belov	rred networks: matically connect to a v: AP1 (Automatic)	vailable ne	tworks in the order listed Move up Move down
Prefe Autor belov	rred networks: matically connect to a v: AP1 (Automatic) Add	vailable ne	tworks in the order listed Move up Move down Properties