

# **Broadcom4323 Wi-Fi card**

**M/N:95. 0209T02**

**Wireless 802.11N dual-band USB module**

## **User Manual**

**Rev 1.0**

## **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.

### **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.

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

Operations in the 5.15-5.25GHz band are restricted to indoor usage only  
IEEE 802.11b or 802.11g operation of this product in the U.S.A. is firmware-limited to channels 1 through 11.

**This device is intended only for OEM integrators under the following conditions:**

- 1) The antenna must be installed such that 20 cm is maintained between the antenna and users, and
- 2) The transmitter module may not be co-located with any other transmitter or antenna,
- 3) For all products market in US, OEM has to limit the operation channels in CH1 to CH11 for 2.4G band

by supplied firmware programming tool. OEM shall not supply any tool or info to the end-user regarding to Regulatory Domain change.

As long as 3 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, LVD TV... etc.).

**IMPORTANT NOTE:**

In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

***End Product Labeling***

This transmitter module is authorized only for use in device where the antenna may be installed such that 20 cm may be maintained between the antenna and users. The final end product must be labeled in a visible area.

***Manual Information To the End User***

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's manual of the end product which integrates this module.

The end user manual shall include all required regulatory information/warning as show in this manual.

**Canadian Regulatory Notice**

This device complies with RSS-210 of the Industry Canada Rules. Operation is subject to the following two conditions:

- 1) this device may not cause interference and

2) this device must accept any interference, including interference that may cause undesired operation of the device.

Caution:

The device for the band 5150-5250 MHz is only for indoor usage to reduce potential for harmful interference to co-channel mobile satellite systems.

**IMPORTANT NOTE:**

**IC Radiation Exposure Statement:**

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

## Table of contents

<b>Introduction</b>	<b>6</b>
<b>Hardware installation</b>	<b>8</b>
<b>Using the Wireless Utility</b>	<b>9</b>

## Introduction

The BroadCom4323 is a dual-band, quad-mode wireless network adapter that works on all the frequencies allocated for WLAN operation everywhere in the world. It is in compliance with the Draft IEEE802.11n standard in a 2x2 MIMO configuration. It also complies with the IEEE 802.11a, 802.11g, and 802.11b standards.

BroadCom4323 features the compactness and support USB2.0 specifications which gives users of laptops, notebooks, tablet PCs, and other mobile computing devices transparent Internet access anywhere in the world through any Wi-Fi network without software changes or additional hardware.

Able to provide greater than 100Mbps real world throughput using high-speed spatial multiplexing modes, the BroadCom4323 provides the freedom to work as you wish, wherever you wish, using whatever kind of application you wish to use. The adapter installs directly in any host device with a USB interface: just plug it in and you're ready to access local resources and/or the Internet at the highest speed the WLAN, the location, and the host computer can provide. It is ready to work "out of the box" in any embedded device or in any computer running Microsoft® Windows 2000, or XP. The BroadCom4323 Wi-Fi Card is truly a "must-have" for every productivity-sensitive laptop, notebook, or tablet PC user and any bandwidth-sensitive embedded design..

## Features

- IEEE 802.11n Draft-compliant.
- 2-stream spatial multiplexing up to 300 Mbps.
- Supports 2x2 and optional diversity with 3 or 4 antennas.
- Supports MCS 0–15 and MCS 32 modulation and coding rates in Draft-802.11n.
- Supports 20-MHz and 40-MHz channelization.
- Greenfield, mixed mode, and legacy modes supported.
- Full IEEE 802.11a/b/g legacy compatibility with enhanced performance.
- USB 2.0 device support.
- UART and JTAG interfaces, up to 16 GPIOs.
- ARM® Cortex-M3™ CPU core plus 80-KB ROM/384-KB RAM.
- Supports Broadcom's OneDriver™ software. Supports WHQL certified drivers for Windows® XP, Windows 2000 operating systems for client applications. Supports Linux® and VxWorks® for access point and router applications.
- Comprehensive wireless network security support that includes WPA, WPA2, and

- AES encryption/decryption coupled with TKIP and IEEE 802.1X support.
- BCM4323 packages: 13-mm x 13-mm 262-pin TFBGA.

### **WiFi-Protected Setup(WPS)-supportedWhat is Wireless LAN?**

Wireless Local Area Network (WLAN) systems offer a great number of advantages over traditional wired systems. WLANs are flexible and easy to setup and manage. They are also more economical than wired LAN systems.

Using radio frequency (RF) technology, WLANs transmit and receive data through the air. WLANs combine data connectivity with user mobility. For example, users can roam from a conference room to their office without being disconnected from the LAN.

Using WLANs, users can conveniently access shared information, and network administrators can configure and augment networks without installing or moving network cables.

WLAN technology provides users with many convenient and cost saving features:

- **Mobility:**

WLANs provide LAN users with access to real-time information anywhere in their organization, providing service opportunities that are impossible with wired networks.

- **Ease of Installation:**

Installing is easy for novice and expert users alike, eliminating the need to install network cables in walls and ceilings.

- **Scalability:**

WLANs can be configured in a variety of topologies to adapt to specific applications and installations. Configurations are easily changed and range from peer-to-peer networks suitable for a small number of users to full infrastructure networks of thousands of users roaming over a broad area.

### **Notes:**

The UUT is a Client Device that does not have radar detection capability and ad-hoc function

### Hardware installation

This chapter covers how to installing the Wireless Module in your embedded system.

### Hardware description

The BroadCom4323 is a dual-band, quad-mode wireless network adapter that works on all the frequencies allocated for WLAN operation everywhere in the world. It is in compliance with the Draft IEEE802.11n standard in a 2x2 MIMO configuration. It also complies with the IEEE 802.11a, 802.11g, and 802.11b standards.

### Outlook

Following is the module outlook.

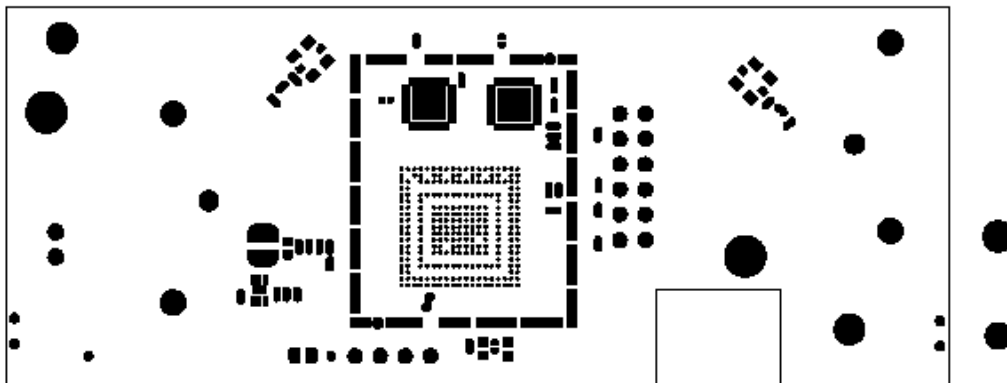


Figure 1: module outlook



## Chapter 3

### Windows set up for BCM4323 client card

The BCM4323 client card can only work correctly if the OS is set up correctly.

Following describe how to set up windows environment.

#### IMPORTANT NOTES:

- i) The following instructions must be performed in order 1) to 6) to ensure that the batch files will work with the Cards provided.
- ii) Every new WLAN radio card to be tested must be set up as per these instructions (i.e. Every card must have a unique IP address and have the Legacy mode and auto-networking parameters set during install to allow for correct batch file operation.

#### 1) Enable Windows Zero Configuration

Go to: Start > Control Panel > Administrative Tools > Services

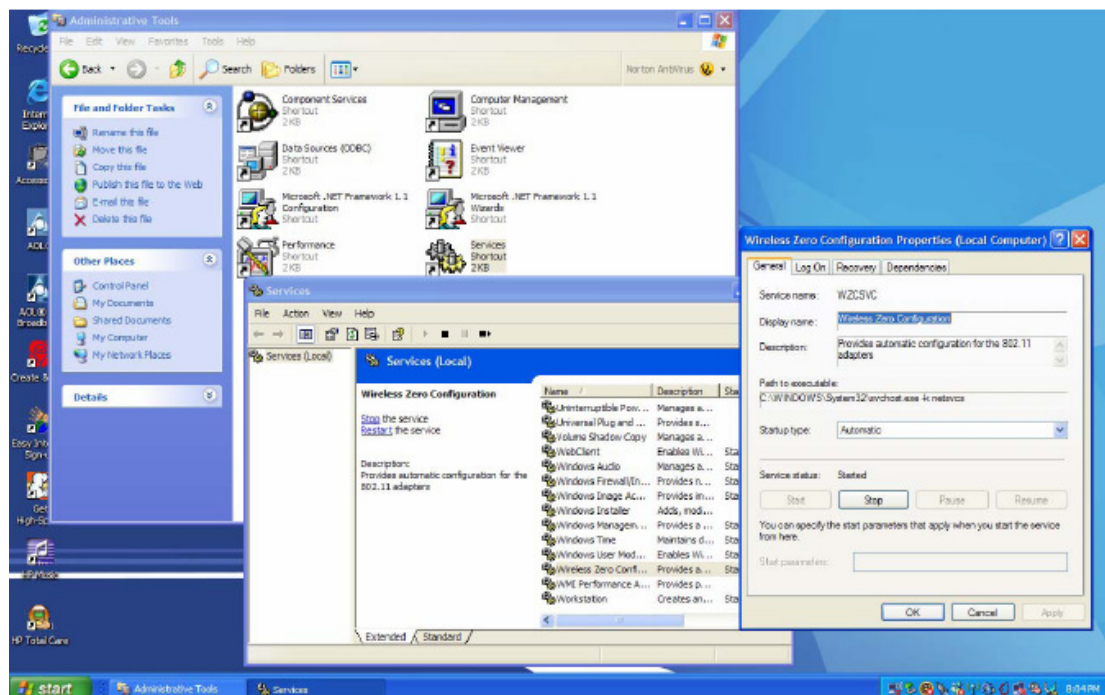
Scroll to the bottom and select “Wireless Zero Configuration”,

Select Start up Type: Automatic,

Click Apply

Click Start

Click OK

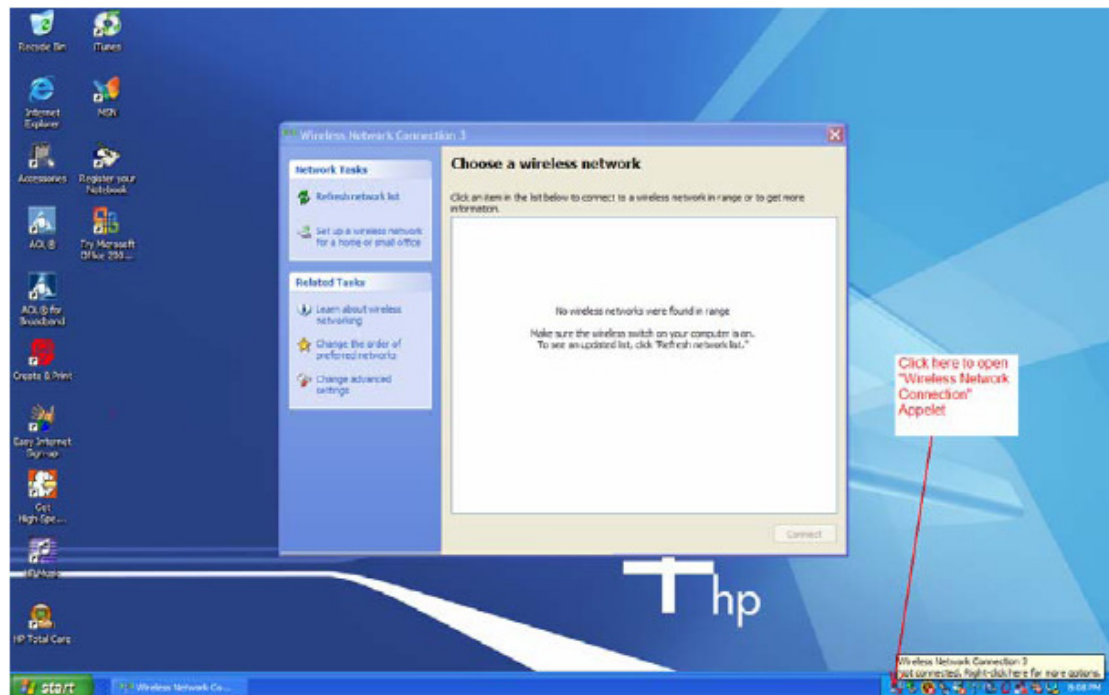


#### 2) Disable Auto Networking

Click the “Wireless Network Connection.....” applet in the bottom right hand tray of the

PC screen.

Click “Change Advanced Settings”



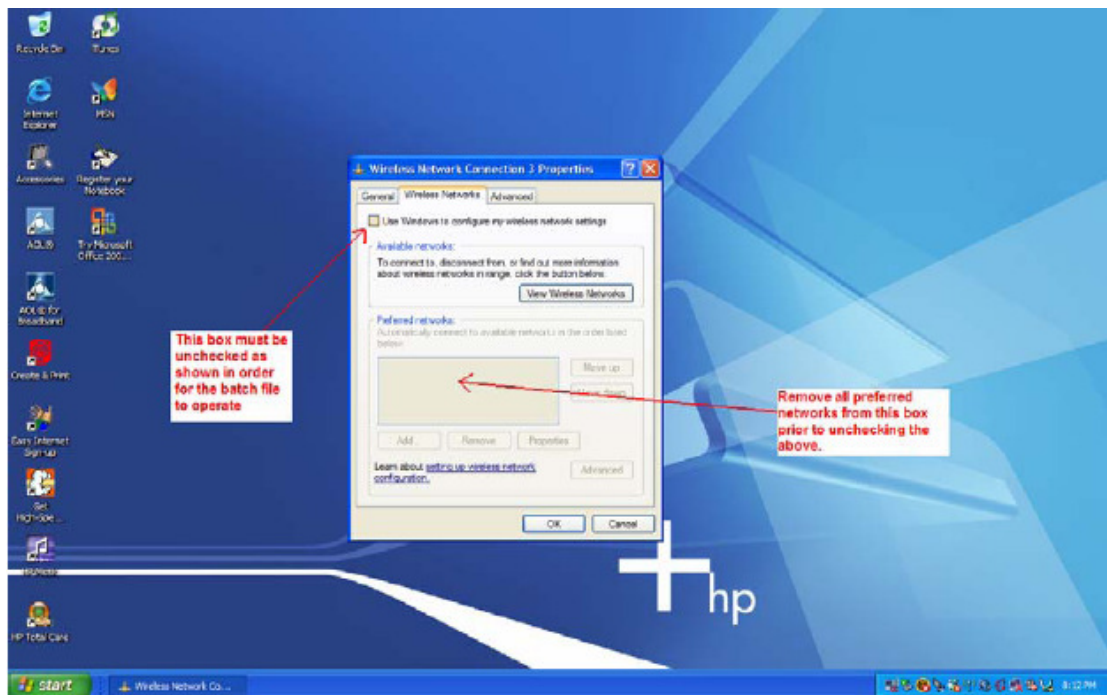
{If the “Wireless Network” Tab is not highlighted then you will need to enable “Wireless Zero Configuration” as 1) above}.

Select the “Wireless Network Tab”

Ensure the check box at the top of this dialog box “Use Windows to Configure my wireless network settings” is selected/checked.

Ensure that the “Preferred Networks” section of this screen is empty. Select and remove all entries that may already exist.

Remove check from the box at the top of this dialog box “Use Windows to Configure my wireless network settings”.



Click OK.

### 3) Setting IP Address

Click the “Wireless Network Connection.....” applet in the bottom right hand tray of the PC screen.

Click “Change Advanced Settings”

Select “General Tab”

Double Click on “Internet Protocol (TCP/IP)”

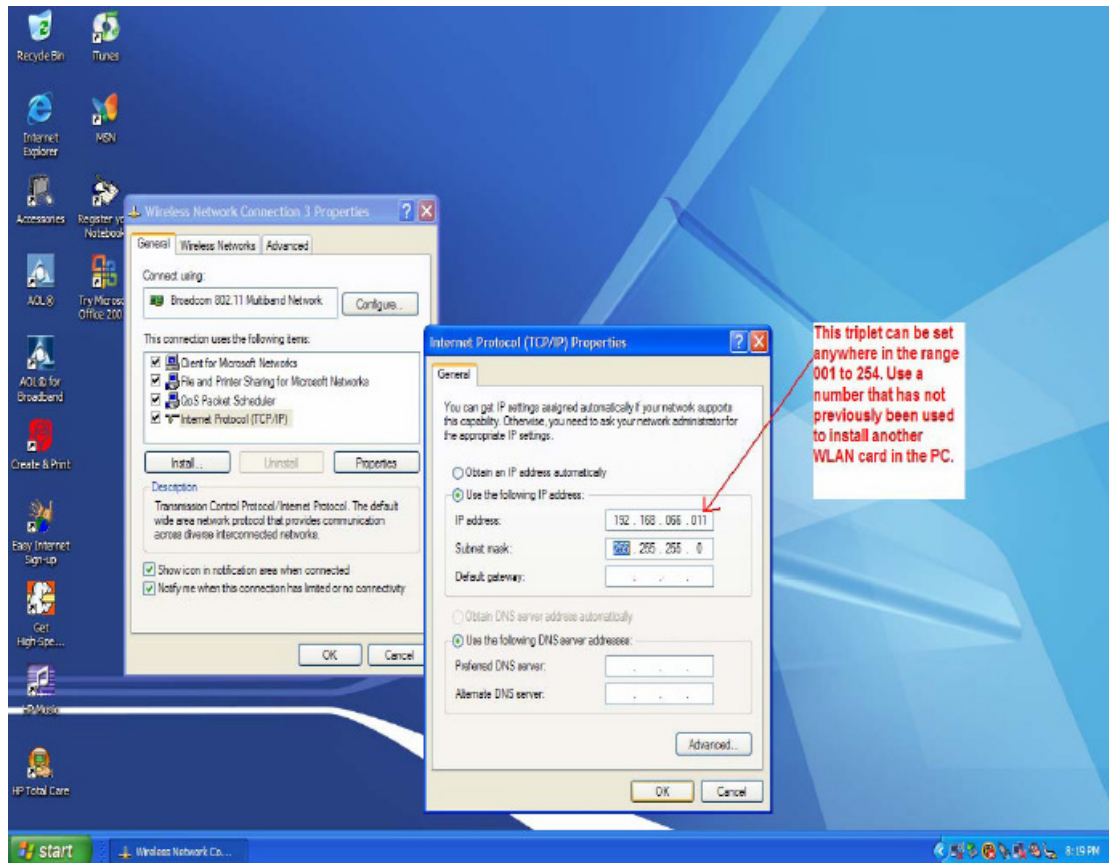
Select • Use the following IP ADDRESS

Set IP Address to 192.168.066.011

Click OK to get default subnet mask of 255.255.255.0

Click OK

Click OK



#### 4) Set “IBSS Link Indication” to Legacy mode

Click the “Wireless Network Connection.....” applet in the bottom right hand tray of the PC screen.

Click “Change Advanced Settings”

Select “General Tab”

Click “Configure” Tab

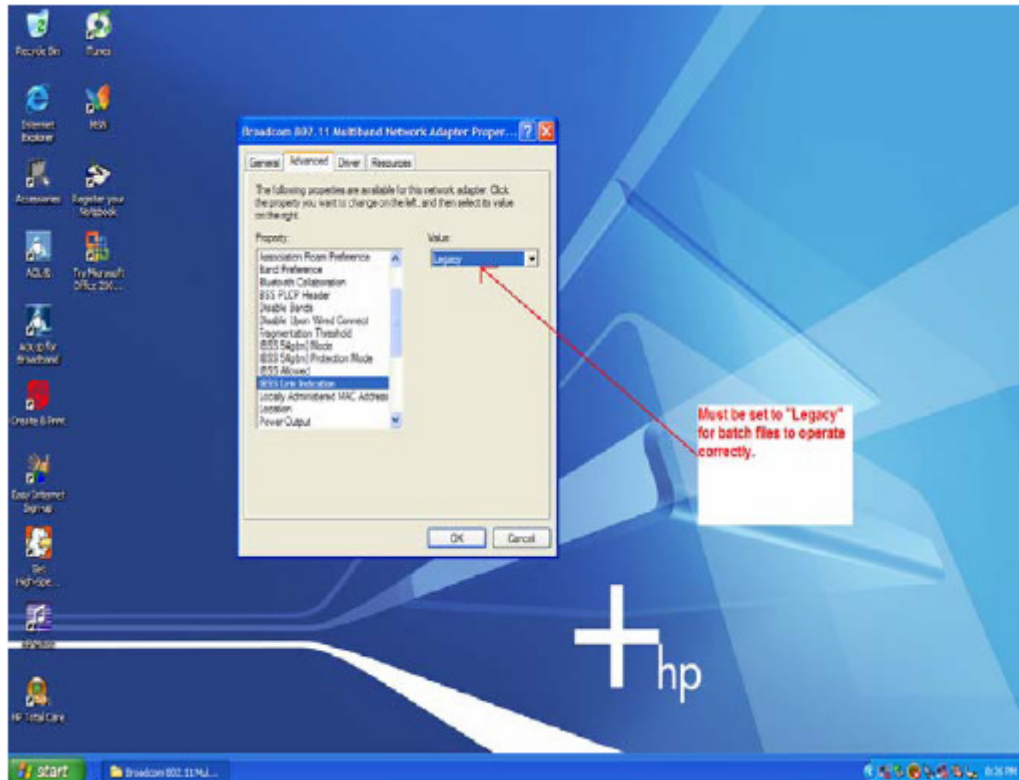
Click “Advanced” Tab

Highlight property “IBSS Link Indication”

Click on value and set to “Legacy”

Click OK

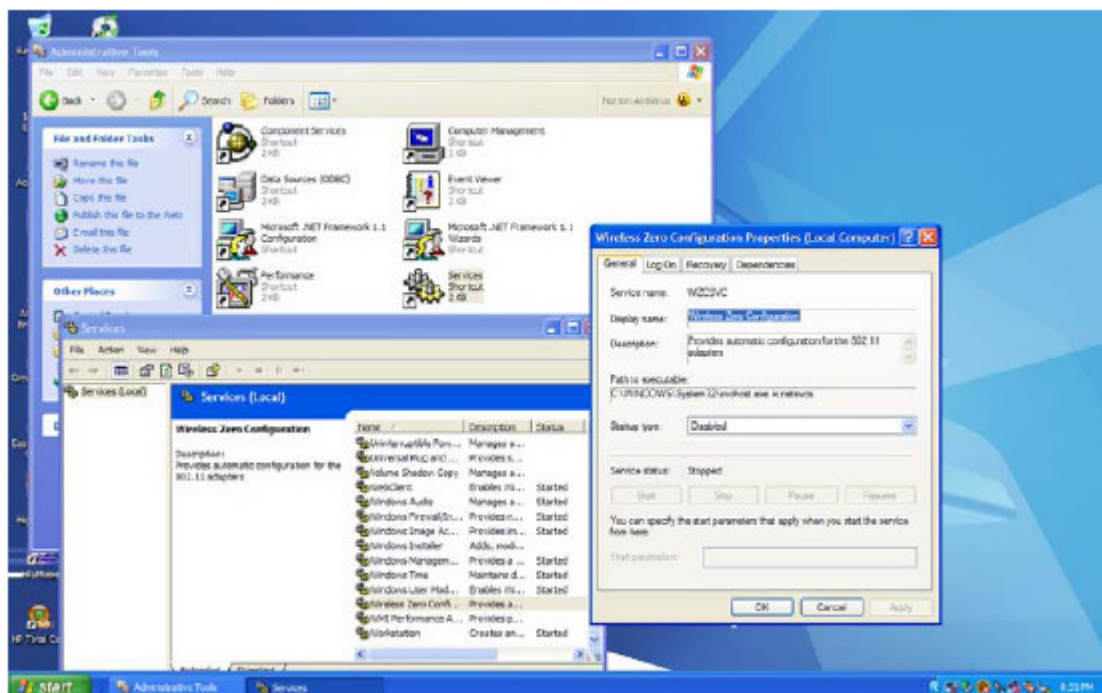
Click OK



## 5) Disabling Windows Zero Configuration

Go to: Start > Control Panel > Administrative Tools > Services

- > Scroll to the bottom and select “Wireless Zero Configuration”
- > Click “Stop”
- > Select Start up Type: Disabled
- > Click Apply
- > Click “OK”



## 5) Other PC Set up requirements

- Disable Firewall on the host PC
- You will need to have **a driver build** to ensure that all the commands detailed in the test batch files work correctly.
- On some more recent drivers you may need to set the 40MHz transmit mode in the windows "Advanced" tab to ensure correct operation.

## Appendix A

### Specifications

Specifications	
Product Name	Draft 802.11n-compatible Dual Band Wireless Card
Interface	Support usb 2.0
Network Standards	IEEE802.11 a/g/b Draft n-compliant
Data Rate	54, 48, 36, 24, 18, 12, 9, 6, 11, 5.5, 2,1Mbps 20MHz BW: 130, 117, 104, 78, 52, 39, 26 and 13Mbps 40MHz BW: 300, 270, 243, 216, 162, 108, 81, 54 and 27Mbps
Modulation	802.11a/g/n---- 54, 48, 36,24,18,12,9,6Mbps (OFDM) 802.11b ---- CCK (11Mbps, 5.5Mbps), QPSK (2Mbps), BPSK (1Mbps)
Operating Frequency	2.412 ~ 2.462 GHz: North America 2.412 ~ 2.472 GHz: Europe ETSI 2.412 ~ 2.472 GHz: Japan (ARIB STD-T66) 5.15 ~ 5.35GHz/ 5.47~ 5.825 GHz: North America UNII 5.15 ~ 5.35GHz/ 5.47 ~ 5.725GHz: Europe ETSI Note: 5.25-5.35GHz and 5.47-5.725GHz bands are excluded for 11n mode 4.9 ~ 5.0GHz/ 5.15 ~ 5.35GHz: Japan
Operating Channels	11b: 1~11 for America,1~13 for Europe (ETSI),1~14 for Japan 11g: 1~11 for America,1~13 for Europe (ETSI) and Japan (ARIB STD-66) 11a: 36-64, 100-165 North America; 36-64 for Japan and other ch definitions
RF Output Power	15 dBm (2.4GHz, 11Mbps, CCK, typical for CH 1,11) 17 dBm (2.4GHz, 11Mbps, CCK, typical except CH 1,11) 13dBm (2.4GHz) (54Mbps, OFDM, typical for CH 1,11) 15dBm (2.4GHz) (54Mbps, OFDM, typical except CH 1,11) 13dBm (2.4 or 5GHz, 40MHz BW, all channels) 12 dBm (5GHz, 54Mbps, OFDM typical)
Antenna	2 PIFA antenna

<b>Coverage Area</b>	Indoor: 20M@54Mbps, 35M@24Mbps, 60M@6Mbps, 100M@11Mbps Outdoor: 50M@54Mbps, 65M@48Mbps, 90M@36Mbps, 120M@24,18, 12,9,6Mbps, 80M@11Mbps, 120M@5.5Mbps, 200M@2Mbps, 300M@1Mbps
<b>Receiver Sensitivity</b>	-86 dBm @ 11M (CCK, 8% PER) -70 dBm @ 54M (11g,OFDM, 10% PER) -65 dBm @ 54M (11n,OFDM, 10% PER)
<b>Power Consumption</b>	TX power consumption @3.3V: 600-850mA RX power consumption @3.3V: 500-700mA
<b>Support OS</b>	Linux, Microsoft Windows Windows 2000, Windows XP
<b>Operating Temperature</b>	0 to 55 °C
<b>Humidity</b>	20% to 95% Non-condensing
<b>Dimensions (mm)</b>	(W) 95mm × (D) 38mm × (H) 1mm
<b>Voltage</b>	3.3V