

# *ZyAIR*

*Wireless LAN Utility*

## *User's Guide*

Version 4.0

February 2004



# Copyright

## **Copyright ©2004 by ZyXEL Communications Corporation**

The contents of this publication may not be reproduced in any part or as a whole, transcribed, stored in a retrieval system, translated into any language, or transmitted in any form or by any means, electronic, mechanical, magnetic, optical, chemical, photocopying, manual, or otherwise, without the prior written permission of ZyXEL Communications Corporation.

Published by ZyXEL Communications Corporation. All rights reserved.

### **Disclaimer**

ZyXEL does not assume any liability arising out of the application or use of any products, or software described herein. Neither does it convey any license under its patent rights nor the patents' rights of others. ZyXEL further reserves the right to make changes in any products described herein without notice. This publication is subject to change without notice.

### **Trademarks**

Trademarks mentioned in this publication are used for identification purposes only and may be properties of their respective owners.

# ZyXEL Limited Warranty

ZyXEL warrants to the original end user (purchaser) that this product is free from any defects in materials or workmanship for a period of up to two (2) years from the date of purchase. During the warranty period and upon proof of purchase, should the product have indications of failure due to faulty workmanship and/or materials, ZyXEL will, at its discretion, repair or replace the defective products or components without charge for either parts or labor and to whatever extent it shall deem necessary to restore the product or components to proper operating condition. Any replacement will consist of a new or re-manufactured functionally equivalent product of equal value, and will be solely at the discretion of ZyXEL. This warranty shall not apply if the product is modified, misused, tampered with, damaged by an act of God, or subjected to abnormal working conditions.

## **NOTE**

Repair or replacement, as provided under this warranty, is the exclusive remedy of the purchaser. This warranty is in lieu of all other warranties, express or implied, including any implied warranty of merchantability or fitness for a particular use or purpose. ZyXEL shall in no event be held liable for indirect or consequential damages of any kind of character to the purchaser.

To obtain the services of this warranty, contact ZyXEL's Service Center for your Return Material Authorization (RMA) number. Products must be returned Postage Prepaid. It is recommended that the unit be insured when shipped. Any returned products without proof of purchase or those with an out-dated warranty will be repaired or replaced (at the discretion of ZyXEL) and the customer will be billed for parts and labor. All repaired or replaced products will be shipped by ZyXEL to the corresponding return address, Postage Paid. This warranty gives you specific legal rights, and you may also have other rights that vary from country to country.

## **Online Registration**

Register online at [www.zyxel.com](http://www.zyxel.com) for free future product updates and information.

## Information for Canadian Users

The Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective operation and safety requirements. The Industry Canada does not guarantee that the equipment will operate to a user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

For their own protection, users should ensure that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

### **Caution**

Users should not attempt to make such connections themselves, but should contact the appropriate electrical inspection authority, or electrician, as appropriate.

### **Note**

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the radio interference regulations of Industry.

# Federal Communications Commission (FCC) Interference Statement<sup>1</sup>

The device complies with Part 15 of FCC rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operations.

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 commercial environment. 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.

If this equipment does cause harmful interference to radio/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:

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

## Notice 1

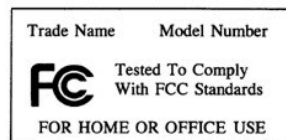
Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

## Caution

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

## Certifications

Refer to the product page at [www.zyxel.com](http://www.zyxel.com).



---

<sup>1</sup> Refer to the *Quick Installation Guide* for model specific FCC statement(s) and the procedure to view the product's certification(s).



# Customer Support

When contacting your Customer Support Representative, please have the following information ready:

- Product model and serial number.
- Warranty Information.
- Date you received your product.
- Brief description of the problem and the steps you took to solve it.

METHOD LOCATION	SUPPORT E-MAIL	TELEPHONE <sup>2</sup>	WEB SITE	REGULAR MAIL
	SALES E-MAIL	FAX <sup>2</sup>	FTP SITE	
WORLDWIDE	<a href="mailto:support@zyxel.com.tw">support@zyxel.com.tw</a>  <a href="mailto:sales@zyxel.com.tw">sales@zyxel.com.tw</a>	+886-3-578-3942  +886-3-578-2439	<a href="http://www.zyxel.com">www.zyxel.com</a> <a href="http://www.europe.zyxel.com">www.europe.zyxel.com</a> <a href="ftp://ftp.zyxel.com">ftp.zyxel.com</a>  <a href="http://ftp.europe.zyxel.com">ftp.europe.zyxel.com</a>	ZyXEL Communications Corp. 6 Innovation Road II Science Park Hsinchu 300 Taiwan
NORTH AMERICA	<a href="mailto:support@zyxel.com">support@zyxel.com</a>  <a href="mailto:sales@zyxel.com">sales@zyxel.com</a>	+1-800-255-4101 +1-714-632-0882  +1-714-632-0858	<a href="http://www.us.zyxel.com">www.us.zyxel.com</a>  <a href="ftp://ftp.us.zyxel.com">ftp.us.zyxel.com</a>	ZyXEL Communications Inc. 1130 N. Miller St. Anaheim CA 92806-2001 U.S.A.
GERMANY	<a href="mailto:support@zyxel.de">support@zyxel.de</a>  <a href="mailto:sales@zyxel.de">sales@zyxel.de</a>	+49-2405-6909-0  +49-2405-6909-99	<a href="http://www.zyxel.de">www.zyxel.de</a>	ZyXEL Deutschland GmbH. Adenauerstr. 20/A2 D-52146 Wuerselen Germany
FRANCE	<a href="mailto:info@zyxel.fr">info@zyxel.fr</a>	+33 (0)4 72 52 97 97  +33 (0)4 72 52 19 20	<a href="http://www.zyxel.fr">www.zyxel.fr</a>	ZyXEL France 1 rue des Vergers Bat. 1 / C 69760 Limonest France
SPAIN	<a href="mailto:support@zyxel.es">support@zyxel.es</a>  <a href="mailto:sales@zyxel.es">sales@zyxel.es</a>	+34 902 195 420  +34 913 005 345	<a href="http://www.zyxel.es">www.zyxel.es</a>	ZyXEL Communications Alejandro Villegas 33 1º, 28043 Madrid Spain
DENMARK	<a href="mailto:support@zyxel.dk">support@zyxel.dk</a>  <a href="mailto:sales@zyxel.dk">sales@zyxel.dk</a>	+45 39 55 07 00  +45 39 55 07 07	<a href="http://www.zyxel.dk">www.zyxel.dk</a>	ZyXEL Communications A/S Columbusvej 5 2860 Soeborg Denmark
NORWAY	<a href="mailto:support@zyxel.no">support@zyxel.no</a>  <a href="mailto:sales@zyxel.no">sales@zyxel.no</a>	+47 22 80 61 80  +47 22 80 61 81	<a href="http://www.zyxel.no">www.zyxel.no</a>	ZyXEL Communications A/S Niils Hansens vei 13 0667 Oslo Norway

<sup>2</sup> “+” is the (prefix) number you enter to make an international telephone call.

## ZyAIR Wireless LAN Utility

---

METHOD LOCATION	SUPPORT E-MAIL SALES E-MAIL	TELEPHONE <sup>2</sup> FAX <sup>2</sup>	WEB SITE FTP SITE	REGULAR MAIL
SWEDEN	<a href="mailto:support@zyxel.se">support@zyxel.se</a> <a href="mailto:sales@zyxel.se">sales@zyxel.se</a>	+46 31 744 7700 +46 31 744 7701	<a href="http://www.zyxel.se">www.zyxel.se</a>	ZyXEL Communications A/S Sjöporten 4, 41764 Göteborg Sweden
FINLAND	<a href="mailto:support@zyxel.fi">support@zyxel.fi</a>	+358-9-4780-8411	<a href="http://www.zyxel.fi">www.zyxel.fi</a>	ZyXEL Communications Oy Malminkaari 10 00700 Helsinki Finland



# Table of Contents

Copyright.....	ii
ZyXEL Limited Warranty .....	iii
Information for Canadian Users.....	iv
Federal Communications Commission (FCC) Interference Statement.....	v
Customer Support.....	vii
List of Figures.....	xi
List of Tables .....	xii
Preface.....	xiii
<b>Chapter 1 Getting Started.....</b>	<b>1-1</b>
1.1 About Your ZyAIR .....	1-1
1.2 ZyAIR Hardware and Utility Installation.....	1-1
1.3 Disable Windows XP Wireless LAN Configuration Tool .....	1-1
1.4 Accessing the ZyAIR Utility.....	1-4
1.5 ZyAIR Modes .....	1-5
1.5.1 Change ZyAIR Modes .....	1-5
<b>Chapter 2 Wireless LAN Network.....</b>	<b>2-1</b>
2.1 Overview.....	2-1
2.1.1 SSID.....	2-1
2.1.2 Channel .....	2-1
2.1.3 Transmission Rate (Tx Rate).....	2-1
2.1.4 Wireless Network Application .....	2-2
2.1.5 Roaming.....	2-4
2.2 Wireless LAN Security .....	2-5
2.2.1 Data Encryption with WEP.....	2-5
2.3 Fragmentation Threshold .....	2-5
2.4 RTS/CTS Threshold.....	2-5
2.5 Authentication Type.....	2-6
2.6 Preamble Type .....	2-7
<b>Chapter 3 Wireless Station Mode Configuration.....</b>	<b>3-1</b>
3.1 Introduction.....	3-1
3.2 The Link Info Screen .....	3-1
3.3 The Configuration Screen .....	3-2
3.4 The Site Survey Screen .....	3-5
3.4.1 Connecting to a Network.....	3-6
3.5 The Security Screen .....	3-7
3.6 The Advanced Screen .....	3-9

<b>Chapter 4 Access Point Mode Configuration .....</b>	<b>4-1</b>
4.1 Introduction.....	4-1
4.1.1 Additional Setup Requirements .....	4-1
4.2 The Link Info Screen .....	4-1
4.3 The Configuration Screen .....	4-3
4.4 The Link Status Screen .....	4-6
4.5 The Security Screen .....	4-7
4.6 The MAC Filter Screen.....	4-8
<b>Chapter 5 Maintenance.....</b>	<b>5-1</b>
5.1 The About Screen .....	5-1
5.2 Removing the ZyAIR Utility .....	5-2
5.3 Upgrading the ZyAIR Utility.....	5-2
<b>Chapter 6 Troubleshooting.....</b>	<b>6-1</b>
6.1 Problems Starting the ZyAIR Utility Program.....	6-1
6.2 Problem Connecting to an Access Point.....	6-2
6.3 Problems Communicating With Other Computers .....	6-2
6.4 Problem with the Link Status.....	6-3
<b>Appendix A Setting up Your Computer’s IP Address .....</b>	<b>A</b>
<b>Appendix B Access Point Mode Setup Example .....</b>	<b>M</b>
<b>Index .....</b>	<b>Q</b>

# List of Figures

Figure 1-1 Windows XP: System Tray Icon.....	1-2
Figure 1-2 Windows XP: Wireless Network Connection Status .....	1-2
Figure 1-3 Windows XP: Connect to Wireless Network.....	1-3
Figure 1-4 Windows XP: Wireless Network Connection Properties.....	1-4
Figure 1-5 ZyAIR Utility: System Tray Icon .....	1-4
Figure 1-6 ZyAIR Utility: Switch Modes .....	1-5
Figure 2-1 IBSS Example .....	2-2
Figure 2-2 BSS Example.....	2-3
Figure 2-3 Infrastructure Network Example .....	2-3
Figure 2-4 ZyAIR as an Access Point Example.....	2-4
Figure 2-5 Roaming Example .....	2-4
Figure 2-6 RTS Threshold.....	2-6
Figure 3-1 Station Mode: Link Info .....	3-1
Figure 3-2 Station Mode: Configuration.....	3-3
Figure 3-3 Station Mode: Site Survey.....	3-5
Figure 3-4 Station Mode: Site Survey Warning .....	3-6
Figure 3-5 Station Mode: Security .....	3-7
Figure 3-6 Station Mode: Advanced .....	3-9
Figure 4-1 Access Point Mode: Link Info.....	4-2
Figure 4-2 Access Point Mode: Configuration.....	4-4
Figure 4-3 Access Point Mode: Link Status.....	4-6
Figure 4-4 Access Point Mode: Security.....	4-7
Figure 4-5 Access Point Mode: MAC Filter .....	4-8
Figure 5-1 About .....	5-1
Figure 5-2 Confirm File Deletion .....	5-2

## List of Tables

Table 1-1 ZyAIR Utility: System Tray Icon .....	1-5
Table 3-1 Station Mode: Link Info .....	3-2
Table 3-2 Station Mode: Configuration .....	3-3
Table 3-3 Station Mode: Site Survey .....	3-5
Table 3-4 Color Indicator for Link Quality/Link Strength.....	3-6
Table 3-5 Station Mode: Security .....	3-7
Table 3-6 Station Mode: Advanced.....	3-10
Table 4-1 Access Point Mode: Link Info .....	4-2
Table 4-2 Access Point Mode: Configuration .....	4-4
Table 4-3 Access Point Mode: Link Status .....	4-6
Table 4-4 Access Point Mode: MAC Filter.....	4-9
Table 5-1 About .....	5-2
Table 6-1 Troubleshooting Starting ZyAIR Utility Program .....	6-1
Table 6-2 Troubleshooting Access Point Connection Problem.....	6-2
Table 6-3 Troubleshooting Communication Problems .....	6-2
Table 6-4 Troubleshooting Link Quality.....	6-3

# Preface

Congratulations on the purchase of your new ZyAIR!

## About This User's Guide

This manual provides information about the ZyAIR Wireless LAN Utility.

This guide is for ZyAIR wireless LAN adapters that use the ZyAIR Wireless LAN Utility for configuration, thus the model name shown in the screens may vary from what you actually purchased.

## Syntax Conventions

- “Type” or “Enter” means for you to type one or more characters. “Select” or “Choose” means for you to use one of the predefined choices.
- Mouse action sequences are denoted using a comma. For example, “click the Apple icon, **Control Panels** and then **Modem**” means first click the Apple icon, then point your mouse pointer to **Control Panels** and then click **Modem**.
- Window and command choices are in **Bold Times New Roman** font. Predefined field choices are in **Bold Arial** font.
- The ZyXEL ZyAIR wireless LAN adapter is referred to as the ZyAIR in this guide.
- The ZyAIR Wireless LAN Utility may be referred to as the ZyAIR WLAN Utility or, simply, as the ZyAIR Utility in this guide.













## Related Documentation

- Support Disk  
Refer to the included CD for support documents and device drivers.
- Quick Installation Guide  
Our Quick Installation Guide is designed to help you get your ZyAIR up and running right away. It contains a detailed easy-to-follow connection diagram and information on installing your ZyAIR.
- ZyXEL Glossary and Web Site  
Please refer to [www.zyxel.com](http://www.zyxel.com) for an online glossary of networking terms and additional support documentation.

## User Guide Feedback

Help us help you. E-mail all User's Guide-related comments, questions or suggestions for improvement to [techwriters@zyxel.com.tw](mailto:techwriters@zyxel.com.tw) or send regular mail to The Technical Writing Team, ZyXEL Communications Corp., 6 Innovation Road II, Science-Based Industrial Park, Hsinchu, 300, Taiwan. Thank you.

### Graphics Icons Key

 ZyWALL	 Computer	 Notebook computer
 Server	 Modem	 Firewall
 Telephone	 Switch	 Router
 DSLAM	 Wireless Access Point	 Wireless Signal

# Chapter 1

## Getting Started

*This chapter introduces the ZyAIR and prepares you to use the ZyAIR Utility.*

### 1.1 About Your ZyAIR

The ZyAIR is an IEEE 802.11b compliant wireless LAN adapter. With the ZyAIR, you can enjoy the wireless mobility within the coverage area.

The following lists the main features of your ZyAIR.

- Your ZyAIR can communicate with other IEEE 802.11b/Wi-Fi compliant wireless devices.
- Automatic rate selection.
- Offers 64-bit and 128-bit WEP (Wired Equivalent Privacy) data encryption for network security.
- Proprietary SoftAP feature turns your ZyAIR into an access point (AP).
- Low CPU utilization allowing more computer system resources for other programs.
- A built-in antenna
- Driver support for Windows XP/2000/Me/98 SE

### 1.2 ZyAIR Hardware and Utility Installation

Follow the instructions in the *Quick Installation Guide* to install the ZyAIR driver and utility and make hardware connections.

### 1.3 Disable Windows XP Wireless LAN Configuration Tool

Windows XP includes a configuration tool for wireless devices.

**DO NOT use the Windows XP configuration tool and the ZyAIR Utility at the same time. It is recommended that you use the ZyAIR Utility to configure the ZyAIR.**

Follow the steps below to disable the configuration tool in Windows XP after you install the ZyAIR Utility. Refer to the *Quick Installation Guide* for more information.

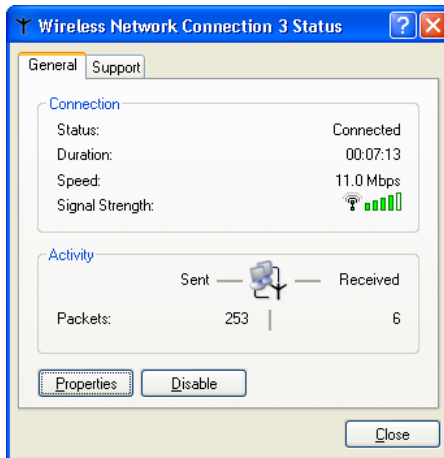
**Step 1.** Double-click the network icon for wireless connections in the system tray. If the icon is not present, proceed to *Step 2*. Otherwise skip to *Step 5*.



**Figure 1-1 Windows XP: System Tray Icon**

**Step 2.** If the icon for the wireless network connection is not in the system tray, click **Start, Control Panel** and double-click **Network Connections**.

**Step 3.** Double-click on the icon for wireless network connection to display a status window as shown next.



**Figure 1-2 Windows XP: Wireless Network Connection Status**

**Step 4.** Click **Properties** and click the **Wireless Networks** tab. Then skip to *Step 6*.

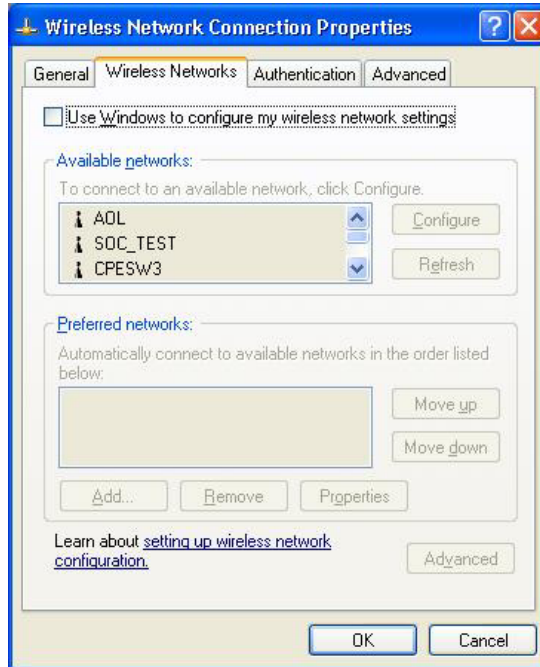


**Step 5.** When a **Connect to Wireless Network** window displays, click **Advanced...**



**Figure 1-3 Windows XP: Connect to Wireless Network**

**Step 6.** In the **Wireless Network Connection Properties** window, make sure the **Use Windows to configure my wireless network settings** check box is *not* selected. Click **OK**.



**Figure 1-4 Windows XP: Wireless Network Connection Properties**

## 1.4 Accessing the ZyAIR Utility

After you install and start the ZyAIR Utility, an icon for the ZyAIR Utility appears in the system tray.

**When the ZyAIR Utility system tray icon displays, the ZyAIR is installed properly.**



**Figure 1-5 ZyAIR Utility: System Tray Icon**

The color of the ZyAIR Utility system tray icon indicates the status of the ZyAIR. Refer to the following table for details.

**Table 1-1 ZyAIR Utility: System Tray Icon**

COLOR	DESCRIPTION
Red	The ZyAIR is working properly but is not connected to any AP or wireless station.
Blue	The ZyAIR is connected to a wireless network.

Double click on the ZyAIR Wireless LAN Utility icon in the system tray to open the ZyAIR Utility. The ZyAIR Utility screens are similar in all Microsoft Windows versions. Screens for Windows 2000 are shown.

## 1.5 ZyAIR Modes

You can set your ZyAIR to operate in either wireless station or access point (AP) modes.

In wireless station mode, your ZyAIR must connect to a peer wireless station or an AP to take part in your wireless network.

In access point mode, your ZyAIR functions as an access point. This allows you to set up your wireless network without using a dedicated AP device. Up to 16 wireless stations can associate to the ZyAIR to form a wireless network. Refer to *Section 4.1* for more information.

### 1.5.1 Change ZyAIR Modes

To change between the modes, select either the **Station** or **Access Point** option in the **Link Info** screen.

**Figure 1-6 ZyAIR Utility: Switch Modes**

**Wait for about five seconds for the ZyAIR Utility to complete the mode change. The current mode is indicated on the title bar of the ZyAIR Utility.**

**When you use the Windows XP configuration tool and the ZyAIR Utility to configure the ZyAIR at the same time, the ZyAIR automatically operates in station mode.**



# Chapter 2

## Wireless LAN Network

*This chapter provides background information on wireless LAN network.*

### 2.1 Overview

This section describes the wireless LAN network terms and applications.

#### 2.1.1 SSID

The SSID (Service Set Identity) is a unique name shared among all wireless devices in a wireless network. Wireless devices must have the same SSID to communicate with each other.

#### 2.1.2 Channel

A radio frequency used by a wireless device is called a channel.

#### 2.1.3 Transmission Rate (Tx Rate)

The ZyAIR provides various transmission (data) rate options for you to select. Options include **Fully Auto**, **1 M bit/sec**, **2 M bit/sec**, **5.5M bit/sec**, **11M bit/sec**, **16.5M bit/sec** and **27.5M bit/sec**<sup>3</sup>. In most networking scenarios, the factory default **Fully Auto** setting proves the most efficient. This setting allows your ZyAIR to operate at the maximum transmission (data) rate. When the communication quality drops below a certain level, the ZyAIR automatically switches to a lower transmission (data) rate. Transmission at lower data speeds is usually more reliable. However, when the communication quality improves again, the ZyAIR gradually increases the transmission (data) rate again until it reaches the highest available transmission rate.

You can select any of the above options. If you wish to balance speed versus reliability, select **11M bit/sec** or **5.5M bit/sec** in a networking environment where you are certain that all wireless devices can communicate at the highest transmission (data) rate. **1M bit/sec** or **2M bit/sec** are used often in networking environments where the range of the wireless connection is more important than speed.

---

<sup>3</sup> The transmission rate of 27.5M bit/sec is not available at the time of writing.

**For ZyAIR B122 and ZyAIR B-320, you may select the proprietary transmission rates of 16.5M bit/sec or 27.5M bit/sec if you are connecting to another ZyAIR B-320, ZyAIR B-122 client or ZyAIR B-500 AP and vice versa.<sup>4</sup>**

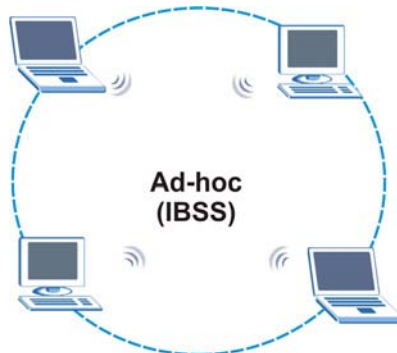
## 2.1.4 Wireless Network Application

Wireless LAN works in either of the two modes: ad-hoc and infrastructure.

To connect to a wired network within a coverage area using Access Points (APs), set the ZyAIR operation mode to **Infrastructure(BSS)**. An AP acts as a bridge between the wireless stations and the wired network. In case you do not wish to connect to a wired network, but prefer to set up a small independent wireless workgroup without an AP, use the **Ad-hoc (IBSS)** (Independent Basic Service Set) mode.

### Ad-Hoc (IBSS)

Ad-hoc mode does not require an AP or a wired network. Two or more wireless clients communicate directly to each other. An ad-hoc network may sometimes be referred to as an Independent Basic Service Set (IBSS).



**Figure 2-1 IBSS Example**

---

<sup>4</sup> At the time of writing, the proprietary transmission rates are only available for ZyAIR B-122, ZyAIR B-320 and ZyAIR B-500.

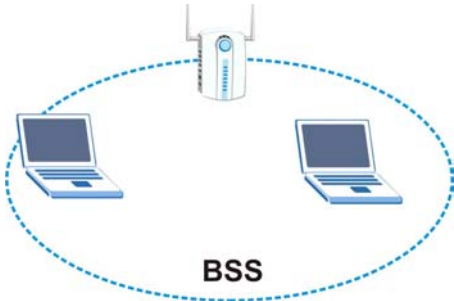


Figure 2-2 BSS Example

A series of overlapping BSS and a network medium, such as an Ethernet forms an Extended Service Set (ESS) or infrastructure network. All communication is done through the AP, which relays data packets to other wireless clients or devices connected to the wired network. Wireless clients can then access resource, such as the printer, on the wired network.

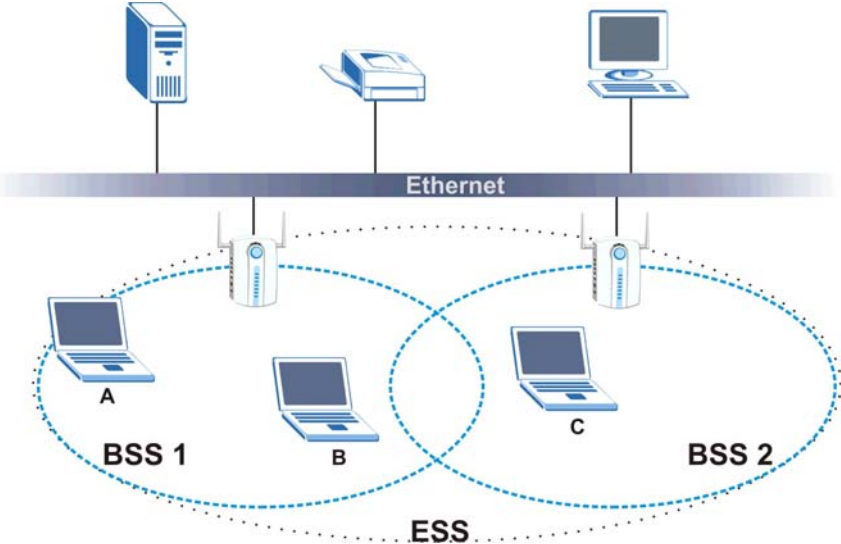
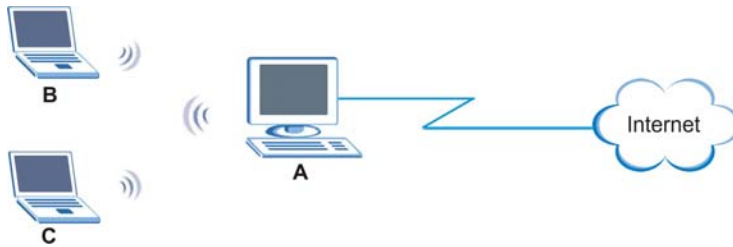


Figure 2-3 Infrastructure Network Example

**Access Point Mode**

The following figure depicts a network example in which you set the ZyAIR in access point mode.



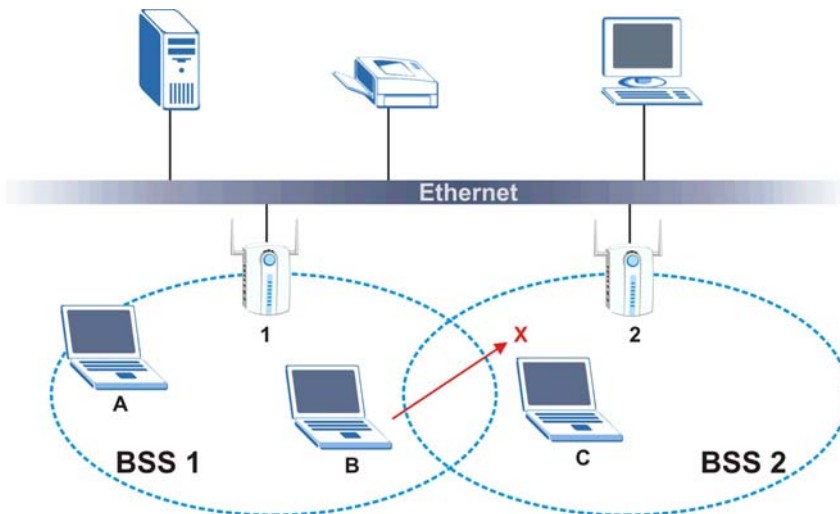
**Figure 2-4 ZyAIR as an Access Point Example**

In the example, the ZyAIR is installed on computer A and set to operate in access point mode. Computer A shares Internet connection to the wireless LAN, so wireless stations B and C can access the Internet.

### 2.1.5 Roaming

In an infrastructure network, wireless stations are able to switch from one BSS to another as they move between the coverage areas. During this period, the wireless stations maintain uninterrupted connection to the network. This is roaming. As the wireless station moves from place to place, it is responsible for choosing the most appropriate AP depending on the signal strength, network utilization or other factors.

The following figure depicts a roaming example. When wireless client B moves to position X, the ZyAIR in wireless client B automatically switches the channel to the one used by access point 2 in order to stay connected to the network.



**Figure 2-5 Roaming Example**



## 2.2 Wireless LAN Security

Wireless LAN security is vital to your network to protect wireless communications.

Configure the wireless LAN security using the **Security** screen. If you do not enable any wireless security on your ZyAIR, the ZyAIR's wireless communications are accessible to any wireless networking device that is in the coverage area.

### 2.2.1 Data Encryption with WEP

WEP (Wired Equivalent Privacy) encryption scrambles all data packets transmitted between the ZyAIR and the AP or other wireless stations to keep network communications private. Both the wireless clients and the access points must use the same WEP key for data encryption and decryption.

There are two ways to create WEP keys in your ZyAIR.

- Automatic WEP key generation based on a “password phrase” called a passphrase. The passphrase is case sensitive. You must use the same passphrase for all WLAN adapters with this feature in the same WLAN.  
For WLAN adapters without the passphrase feature, you can still take advantage of this feature by writing down the four automatically generated WEP keys from the **Security** screen of the ZyAIR Utility and entering them manually as the WEP keys in the other WLAN adapter(s).
- Enter the WEP keys manually.

Your ZyAIR allows you to configure up to four 64-bit or 128-bit WEP keys but only one key can be enabled at any one time.

## 2.3 Fragmentation Threshold

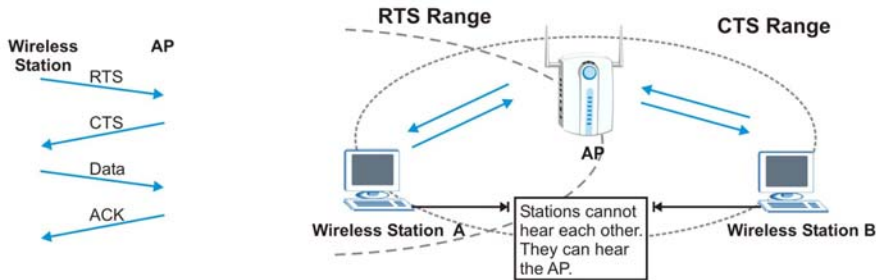
A **Fragmentation Threshold** is the maximum data fragment size (between 256 and 2432 bytes) that can be sent in the wireless network before the ZyAIR will fragment the packet into smaller data frames.

A large **Fragmentation Threshold** is recommended for networks not prone to interference while you should set a smaller threshold for busy networks or networks that are prone to interference.

If the **Fragmentation Threshold** value is smaller than the **RTS/CTS Threshold** value (see previously) you set then the RTS (Request To Send)/CTS (Clear to Send) handshake will never occur as data frames will be fragmented before they reach **RTS/CTS Threshold** size.

## 2.4 RTS/CTS Threshold

A hidden node occurs when two stations are within range of the same access point, but are not within range of each other. The following figure illustrates a hidden node. Both stations are within range of the access point (AP) or wireless gateway, but out-of-range of each other, so they cannot “hear” each other, that is they do not know if the channel is currently being used. Therefore, they are considered hidden from each other.



**Figure 2-6 RTS Threshold**

When station A sends data to the AP, it might not know that the station B is already using the channel. If these two stations send data at the same time, collisions may occur when both sets of data arrive at the AP at the same time, resulting in a loss of messages for both stations.

**RTS/CTS Threshold** is designed to prevent collisions due to hidden nodes. An **RTS/CTS Threshold** defines the biggest size data frame you can send before an RTS (Request To Send)/CTS (Clear to Send) handshake is invoked.

When a data frame exceeds the **RTS/CTS Threshold** value you set (between 0 to 2432 bytes), the station that wants to transmit this frame must first send an RTS (Request To Send) message to the AP for permission to send it. The AP then responds with a CTS (Clear to Send) message to all other stations within its range to notify them to defer their transmission. It also reserves and confirms with the requesting station the time frame for the requested transmission.

Stations can send frames smaller than the specified **RTS/CTS Threshold** directly to the AP without the RTS (Request To Send)/CTS (Clear to Send) handshake.

You should only configure **RTS/CTS Threshold** if the possibility of hidden nodes exists on your network and the “cost” of resending large frames is more than the extra network overhead involved in the RTS (Request To Send)/CTS (Clear to Send) handshake.

If the **RTS/CTS Threshold** value is greater than the **Fragmentation Threshold** value (see next), then the RTS (Request To Send)/CTS (Clear to Send) handshake will never occur as data frames will be fragmented before they reach **RTS/CTS Threshold** size.

**Enabling the RTS Threshold causes redundant network overhead that could negatively affect the throughput performance.**

## 2.5 Authentication Type

The IEEE 802.11b standard describes a simple authentication method between the wireless clients and AP. Three authentication modes are defined: Auto, Open and Shared.

Open authentication mode is implemented for ease-of-use and when security is not an issue. The wireless station and the AP do *not* share a secret key. Thus the wireless stations can associate with any AP and listen to any data transmitted plaintext.

Shared authentication mode involves a shared secret key to authenticate the wireless station to the AP. This requires you to enable a security feature and specify a shared secret key (usually the WEP encryption and WEP key) on both the wireless station and the AP.

Auto authentication mode allows the ZyAIR to switch between the open and shared key authentication modes automatically. Use the auto mode if you do not know the authentication mode of the other wireless clients.

## 2.6 Preamble Type

A preamble is used to synchronize the transmission timing in your wireless network. There are two preamble modes: **Long Preamble** and **Short Preamble**.

Short preamble takes less time to process and minimizes overhead, so it should be used in a good wireless network environment when all wireless clients support it.

Select **Long Preamble** if you have a ‘noisy’ network or are unsure of what preamble mode the access point or the other wireless clients support as all IEEE 802.11b compliant wireless adapters must support long preamble. However, not all wireless adapters support short preamble. Use long preamble if you are unsure what preamble mode the wireless adapters support, to ensure interpretability between the ZyAIR and the access point/wireless stations and to provide more reliable communication in ‘noisy’ networks.

Select **Auto** to have the ZyAIR automatically use short preamble when all access point/wireless stations support it, otherwise the ZyAIR uses long preamble.

The ZyAIR and the access point/wireless stations **MUST** use the same preamble mode in order to communicate.



# Chapter 3

## Wireless Station Mode Configuration

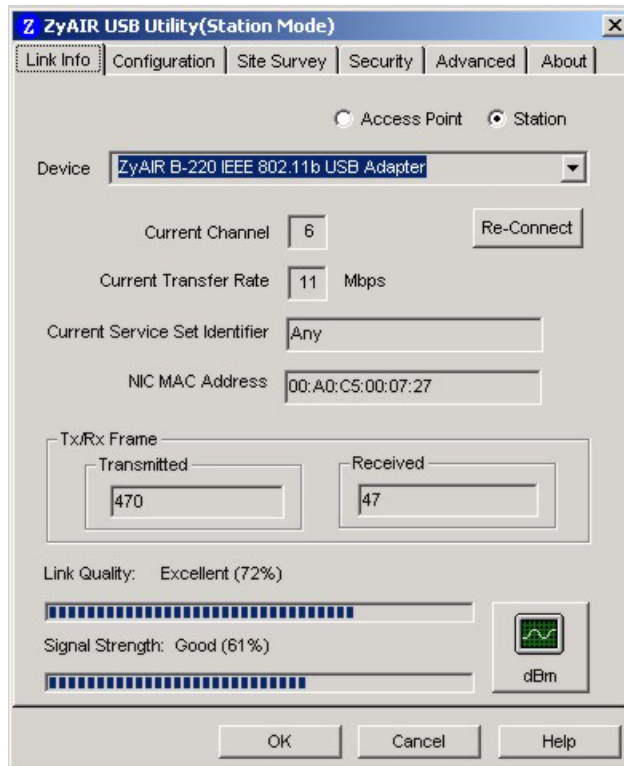
*This chapter shows you how to configure your ZyAIR in wireless station mode.*

### 3.1 Introduction

To set your ZyAIR as a wireless station, refer to *Section 1.5.1*.

### 3.2 The Link Info Screen

When the ZyAIR Utility starts, the **Link Info** screen displays, showing the current configuration of your ZyAIR. The model name shown in the screens may vary depending on the model you are using.



**Figure 3-1 Station Mode: Link Info**

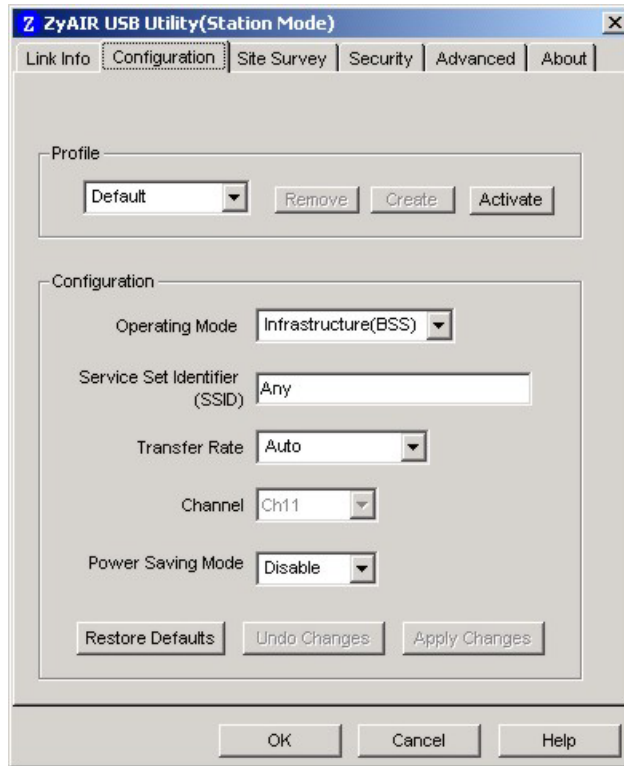
The following table describes the labels in this screen.

**Table 3-1 Station Mode: Link Info**

LABEL	DESCRIPTION
Access Point	Select <b>Access Point</b> to set the ZyAIR to operate in access point mode. Refer to <i>Section 1.5</i> for more information.
Station	Select <b>Station</b> to set the ZyAIR to operate in wireless station mode. Refer to <i>Section 1.5</i> for more information.
Device	This field displays the model name of your ZyAIR. Select from the drop-down list menu if you have more than one wireless LAN adapter in your computer.
Re-Connect	Click <b>Re-Connect</b> to re-establish the connection to the wireless network whose SSID is shown in the <b>Current Service Set Identifier</b> field.
Current Channel	This field displays the radio channel the ZyAIR is currently using.
Current Transfer Rate	This field displays the current transmission rate of the ZyAIR in megabits per second (Mbps).
Current Service Set Identifier	This field displays the name of the wireless device to which the ZyAIR is associated.
NIC MAC Address	This field displays the MAC address of the ZyAIR.
Tx/Rx Frame	
Transmitted	This field displays the number of data frames transmitted.
Received	This field displays the number of data frames received.
Link Quality	The status bar and the percentage number show the quality of the signal.
Link Strength	The status bar and the percentage number or a number in dBm (decibel relative units compared to milliwatts) show the strength of the signal.
Percent/dBm	Click this button to display either percentages in the <b>Link Quality</b> and <b>Link Strength</b> fields or a number of dBm in the <b>Link Strength</b> field.
OK	Click <b>OK</b> to save all changes and close the ZyAIR Utility.
Cancel	Click <b>Cancel</b> to discard changes and close the ZyAIR Utility.
Help	Click <b>Help</b> to display on-line help window.

### 3.3 The Configuration Screen

Click **Configuration** in the ZyAIR Utility program to display the **Configuration** screen as shown next.



**Figure 3-2 Station Mode: Configuration**

The following table describes the labels in this screen.

**Table 3-2 Station Mode: Configuration**

LABEL	DESCRIPTION
Profile	The Profile function allows you to save the wireless network settings in this screen, use one of the pre-configured network profiles or reset the settings in this screen to the factory default values.
Remove	To delete an existing wireless network configuration, select a profile from the drop-down list box and click <b>Remove</b> .
Create	Enter a descriptive name in the drop-down list box and click <b>Create</b> to save the current settings in the <b>Configuration</b> screen to a new profile,

**Table 3-2 Station Mode: Configuration**

LABEL	DESCRIPTION
Activate	To use a previously saved network profile, select the profile file name from the drop-down list box and click <b>Activate</b> .
Configuration	
Operating Mode	Select <b>Infrastructure(BSS)</b> or <b>Ad-Hoc(IBSS)</b> from the drop-down list box. Select <b>Infrastructure(BSS)</b> to associate to an AP. Select <b>Ad-Hoc(IBSS)</b> to associate to a peer computer.
Service Set Identifier (SSID)	Enter the SSID of the wireless network to which you want to associate. To associate to an ad-hoc network, you must enter the same SSID as the peer computer. Enter <b>Any</b> to associate to or roam between any infrastructure wireless networks. This is the default setting.
Transfer Rate	Select a transmission speed from the drop-down list box. Choose from <b>Fully Auto</b> (default), <b>1M bit/sec</b> , <b>2M bit/sec</b> , <b>5.5M bit/sec</b> , <b>11M bit/sec</b> , <b>16.5M bit/sec</b> and <b>27.5M bit/sec</b> <sup>5</sup> . For ZyAIR B-122 and ZyAIR B-320, the proprietary transmission rates of <b>16.5M bit/sec</b> and <b>27.5M bit/sec</b> are available. Select one of the options only if you are connecting to another ZyAIR B-122, ZyAIR B-320 clients or ZyAIR B-500 and vice versa <sup>6</sup> .
Channel	Select the channel number from the drop-down list box. To associate to an ad-hoc network, you must use the same channel as the peer computer.
Power Saving Mode	Select <b>Enable</b> to save power (especially for notebook computers). This forces the ZyAIR to go to sleep mode when it is not transmitting data. When you select <b>Disable</b> , the ZyAIR will never go to sleep mode.
Restore Default	Click <b>Restore Default</b> to reset all fields back to factory default values.
Undo Changes	Click <b>Undo Changes</b> to start configuring the fields again.
Apply Changes	Click <b>Apply Changes</b> to save the changes back to the ZyAIR.
OK	Click <b>OK</b> to save all changes and close the ZyAIR Utility.
Cancel	Click <b>Cancel</b> to discard changes and close the ZyAIR Utility.
Help	Click <b>Help</b> to display the on-line help window.

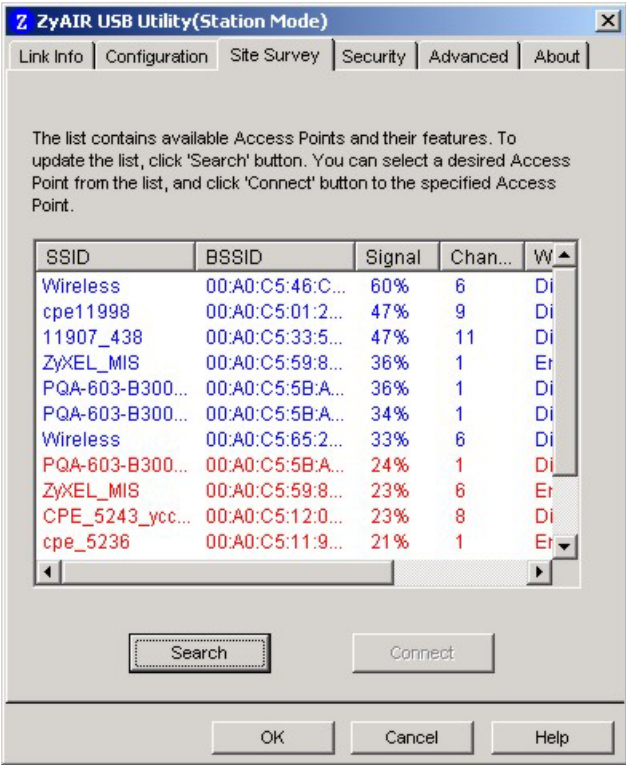
<sup>5</sup> The transmission rate of 27.5M bit/sec is not available at the time of writing.

<sup>6</sup> At the time of writing, the proprietary transmission rates are only available for connection with another ZyAIR B-122, ZyAIR B-320 or ZyAIR B-500.



### 3.4 The Site Survey Screen

Use the **Site Survey** screen to scan for and connect to a wireless network automatically.



**Figure 3-3 Station Mode: Site Survey**

The following table describes the labels in this screen.

**Table 3-3 Station Mode: Site Survey**

LABEL	DESCRIPTION
SSID	This field displays the SSID (Service Set Identifier) of each wireless device.
BSSID	This field displays the MAC address of the wireless device.
Channel	This field displays the channel number used by each wireless device.
Signal	This field displays the signal strength of each wireless device.

**Table 3-3 Station Mode: Site Survey**

LABEL	DESCRIPTION
WEP	This field shows whether WEP data encryption is activated ( <b>Enable</b> ) or inactive ( <b>Disable</b> ).
Search	Click <b>Search</b> to scan for available wireless device within transmission range.
Connect	Click <b>Connect</b> to associate to the selected wireless device.
OK	Click <b>OK</b> to save all changes and closes the ZyAIR Utility.
Cancel	Click <b>Cancel</b> to discard changes and close the ZyAIR Utility.
Help	Click <b>Help</b> to display the on-line help window.

The following table describes the colors used for the entries in the **Site Survey** screen.

**Table 3-4 Color Indicator for Link Quality/Link Strength**

COLOR	DESCRIPTION
Green	Excellent link quality or link strength.
Blue	Good link quality or link strength.
Red	Poor link quality or link strength.

### 3.4.1 Connecting to a Network

Follow the steps below to connect to a network.

- Step 1.** Click **Search** to scan for all available wireless networks within range.
- Step 2.** To join a network, either click an entry in the table to select a wireless network and then click **Connect** or double-click an entry.
- Step 3.** If the **WEP** field displays **Enable** for the selected wireless network, the following screen displays.



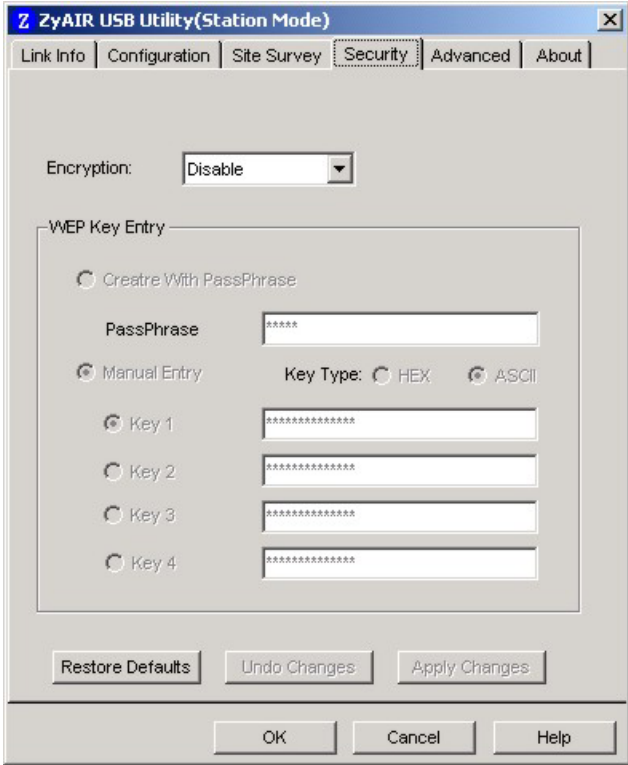
**Figure 3-4 Station Mode: Site Survey Warning**

- Step 4.** Click **OK** to display the **Security** screen and refer to *Section 3.5* to set up WEP keys. Otherwise click **Cancel** and connect to another wireless network without WEP encryption.

**Step 5.** To verify that you have successfully connected to the selected network, check the network information in the **Link Info** screen.

### 3.5 The Security Screen

Click the **Security** tab to display the **Security** screen as shown next.



**Figure 3-5 Station Mode: Security**

The following table describes the labels in this screen.

**Table 3-5 Station Mode: Security**

LABEL	DESCRIPTION
Encryption	Select either <b>64 Bits</b> or <b>128 Bits</b> to activate WEP encryption and then fill in the related fields. Select <b>Disable</b> to deactivate the WEP encryption.

**Table 3-5 Station Mode: Security**

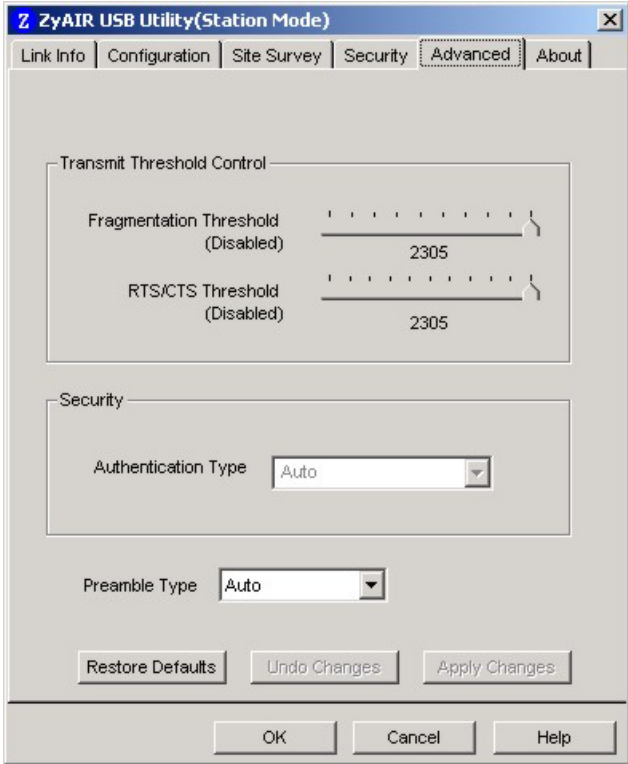
LABEL	DESCRIPTION
<b>WEP Key Entry</b>	The WEP keys are used to encrypt data before transmitting. The values for the keys must be set up exactly the same on the APs or other peer wireless computers as they are on the ZyAIR.
Create with PassPhrase	Select this option if you want the ZyAIR to automatically generate a WEP key based on the passphrase specified in the <b>PassPhrase</b> field.
PassPhrase	When you select <b>Create with PassPhrase</b> , enter the passphrase. As you enter the passphrase, the ZyAIR automatically generates four different WEP keys and displays them in the key fields below. Refer to <i>Section 2.2.1</i> for more information.
Manual Entry	Select this option if you want to manually enter the WEP keys.
Key Type	Select either the <b>HEX</b> or <b>ASCII</b> WEP key type.
Key 1 ... 4	<p>Enter the WEP keys in the fields provided.</p> <p>If you select <b>64 Bits</b> in the <b>Encryption</b> field.</p> <ul style="list-style-type: none"> <li>♦ Enter either 10 hexadecimal digits in the range of “A-F”, “a-f” and “0-9” (for example, 11AA22BB33) for HEX key type</li> </ul> <p>or</p> <ul style="list-style-type: none"> <li>♦ Enter 5 ASCII characters (case sensitive) ranging from “a-z”, “A-Z” and “0-9” (for example, MyKey) for ASCII key type.</li> </ul> <p>If you select <b>128 Bits</b> in the <b>Encryption</b> field,</p> <ul style="list-style-type: none"> <li>♦ Enter either 26 hexadecimal digits in the range of “A-F”, “a-f” and “0-9” (for example, 00112233445566778899AABBCC) for HEX key type</li> </ul> <p>or</p> <ul style="list-style-type: none"> <li>♦ Enter 13 ASCII characters (case sensitive) ranging from “a-z”, “A-Z” and “0-9” (for example, MyKey12345678) for ASCII key type.</li> </ul> <div style="border: 1px solid black; padding: 5px; text-align: center; margin-top: 10px;"> <p><b>You <i>must</i> configure all four WEP keys the first time you use the ZyAIR.</b></p> <p><b>ASCII WEP keys are case sensitive.</b></p> <p><b>Select a default WEP key to use for data encryption.</b></p> </div>
Restore Default	Click <b>Restore Default</b> to reset all fields back to factory default values.
Undo Changes	Click <b>Undo Changes</b> to start configuring the fields again.

**Table 3-5 Station Mode: Security**

LABEL	DESCRIPTION
Apply Changes	Click <b>Apply Changes</b> to save the changes back to ZyAIR.
OK	Click <b>OK</b> to save all changes and close the ZyAIR Utility.
Cancel	Click <b>Cancel</b> to discard changes and close the ZyAIR Utility.
Help	Click <b>Help</b> to display the on-line help window.

### 3.6 The Advanced Screen

To set the advanced features on the ZyAIR, click the **Advanced** tab.



**Figure 3-6 Station Mode: Advanced**

The following table describes the labels in this screen

**Table 3-6 Station Mode: Advanced**

LABEL	DESCRIPTION
Transmit Threshold Control	
Fragmentation Threshold	The threshold (number of bytes) for the fragmentation boundary for directed messages. It is the maximum data fragment size that can be sent. Move the slider to set the fragmentation threshold.
RTS/CTS Threshold	Data with its frame size larger than this value will perform the RTS/CTS handshake. Setting this attribute to be larger than the maximum MSDU (MAC service data unit) size turns off the RTS/CTS handshake. Setting this attribute to zero turns on the RTS/CTS handshake.
Security	
Authentication Type	Select an authentication method. Choices are <b>Auto</b> , <b>Shared</b> and <b>Open</b> . Refer to <i>Section 2.5</i> for more information.
Preamble Type	Select a preamble type. Choices are <b>Long Preamble</b> , <b>Short Preamble</b> and <b>Auto</b> . The default setting is <b>Auto</b> . Refer to <i>Section 2.6</i> for more information.
Restore Default	Click <b>Restore Default</b> to reset all fields back to factory default values.
Undo Changes	Click <b>Undo Changes</b> to start configuring the fields again.
Apply Changes	Click <b>Apply Changes</b> to save the changes back to ZyAIR.
OK	Click <b>OK</b> to save all changes and close the ZyAIR Utility.
Cancel	Click <b>Cancel</b> to discard changes and close the ZyAIR Utility.
Help	Click <b>Help</b> to display the on-line help window.

# Chapter 4

## Access Point Mode Configuration

*This chapter shows you how to configure your ZyAIR in access point mode.*

### 4.1 Introduction

To set your ZyAIR as an Access Point (AP), refer to *Section 1.5.1*.

In access point mode, your ZyAIR functions as an access point. This allows you to set up your wireless networks without using a dedicated AP device. Up to 16 wireless stations can associate to the ZyAIR.

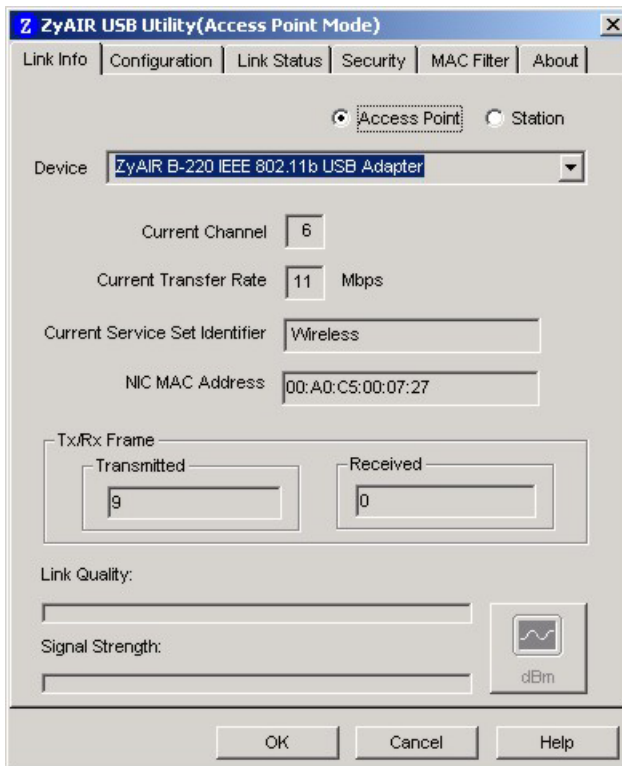
#### 4.1.1 Additional Setup Requirements

To bridge your wired and wireless network using the ZyAIR, the following requirements must be met:

1. The ZyAIR must be installed on a computer connected to the wired network.
2. Either configure network sharing (refer to the appendix for an example) or bridge the two interfaces (wireless and wired) on the computer.
3. Set the wireless station's IP address to be in the same subnet as the computer in which the ZyAIR is installed. Refer to the *Setting Up Your Computer's IP Address* appendix.

### 4.2 The Link Info Screen

Click **Link Info** to display the screen as shown.



**Figure 4-1 Access Point Mode: Link Info**

The following table describes the labels in this screen.

**Table 4-1 Access Point Mode: Link Info**

LABEL	DESCRIPTION
Access Point	Select <b>Access Point</b> to set the ZyAIR to operate in access point mode. Refer to <i>Section 1.5</i> for more information.
Station	Select <b>Station</b> to set the ZyAIR to operate in wireless station mode. Refer to <i>Section 1.5</i> for more information.
Device	This field displays the model name of your ZyAIR. Select from the drop-down list menu if you have more than one wireless LAN adapter in your computer.
Current Channel	This field displays the radio channel the ZyAIR is currently using.

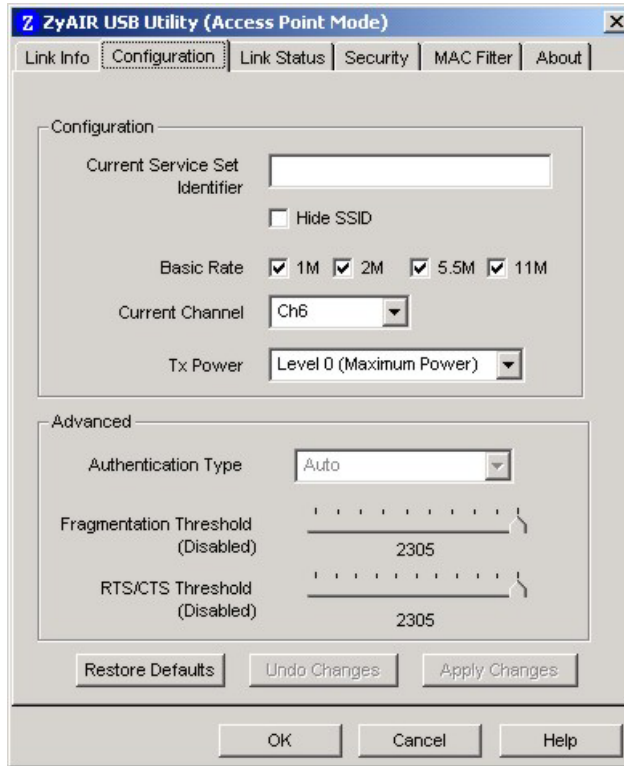


**Table 4-1 Access Point Mode: Link Info**

LABEL	DESCRIPTION
Current Transfer Rate	This field displays the current transmission rate of the ZyAIR in megabits per second.
Current Service Set Identifier	This field displays the name that identifies your ZyAIR in the wireless LAN network.
NIC MAC Address	This field displays the MAC address of the ZyAIR.
Tx/Rx Frame	
Transmitted	This field displays the number of data frames transmitted.
Received	This field displays the number of data frames received.
Link Quality	This is applicable when the ZyAIR is in wireless station mode. The status bar and the percentage number show the quality of the signal.
Link Strength	This is applicable when the ZyAIR is in wireless station mode. The status bar and the percentage number or a number in dBm (decibel relative units compared to milliwatts) show the strength of the signal.
Percent/dBm	This is applicable when the ZyAIR is in wireless station mode. Click this button to display either percentages in the <b>Link Quality</b> and <b>Link Strength</b> fields or a number of dBm in the <b>Link Strength</b> field.
OK	Click <b>OK</b> to save all changes and close the ZyAIR Utility.
Cancel	Click <b>Cancel</b> to discard changes and close the ZyAIR Utility.
Help	Click <b>Help</b> to display on-line help window.

### 4.3 The Configuration Screen

Click **Configuration** to display the screen as shown.



**Figure 4-2 Access Point Mode: Configuration**

The following table describes the labels in this screen.

**Table 4-2 Access Point Mode: Configuration**

LABEL	DESCRIPTION
Configuration	
Current Service Set Identifier (SSID)	The SSID identifies the Service Set to which a wireless station is associated. Wireless stations associating to the access point (the ZyAIR) must have the same SSID. Enter a descriptive name (up to 32 printable 7-bit ASCII characters) for the wireless LAN.
Hide ESSID	Select this check box to hide the ESSID in the outgoing beacon frame so a station cannot obtain the ESSID through passive scanning using a site survey tool.

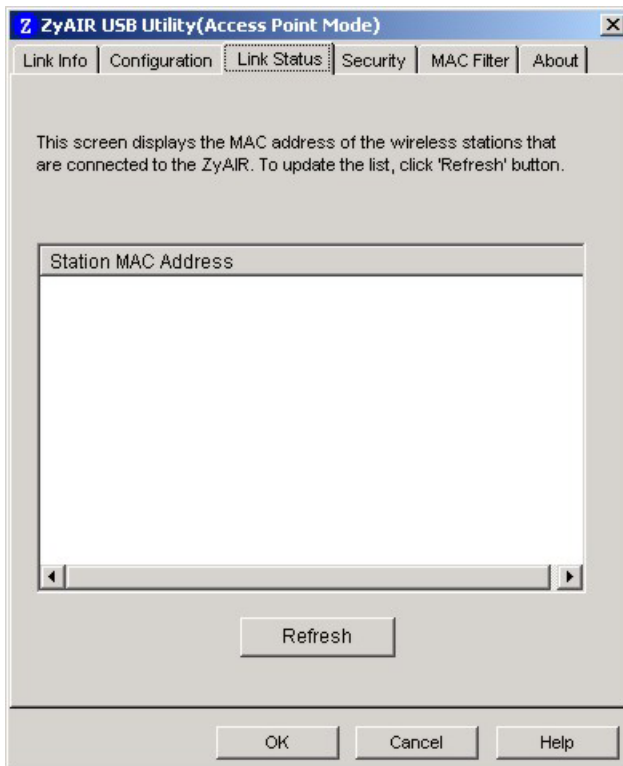
**Table 4-2 Access Point Mode: Configuration**

LABEL	DESCRIPTION
Basic Rate	Select the rate(s) at which the ZyAIR can transmit data in the wireless LAN network. Make sure the wireless stations in the same wireless network are set to use the rate(s) for data transmission.
Current Channel	Set the operating frequency/channel depending on your particular region.
Tx Power	<p>Set this field if you need to conserve power consumption (especially for notebook computers). This control changes the strength of the ZyAIR's antenna gain or transmission power. Antenna gain, measured in dBm (decibel relative units compared to milliwatts), is the increase in coverage. Higher antenna gain improves the range of the signal for better communications.</p> <p>Select <b>Level 0 (Maximum Power)</b> to set the ZyAIR's antenna to transmit at 17-dBm.</p> <p>Select <b>Level 1</b> to set the ZyAIR's antenna to transmit at 15-dBm.</p> <p>Select <b>Level 2</b> to set the ZyAIR's antenna to transmit at 13-dBm.</p> <p>Select <b>Level 3 (Minimum Power)</b> to set the ZyAIR's antenna to transmit at 11-dBm. This allows for the least power consumption.</p>
Advanced	
Authentication Type	<p>Select this checkbox to select an authentication method. Choices are <b>Auto</b>, <b>Shared</b> and <b>Open</b>.</p> <p>Refer to <i>Section 2.5</i> for more information.</p>
Fragmentation Threshold	<p>The threshold (number of bytes) for the fragmentation boundary for directed messages. It is the maximum data fragment size that can be sent. Refer to <i>Section 2.3</i> for more information.</p>
RTS/CTS Threshold	<p>Data with its frame size larger than this value will perform the RTS/CTS handshake. Setting this attribute to be larger than the maximum MSDU (MAC service data unit) size turns off the RTS/CTS handshake. Refer to <i>Section 2.4</i> for more information.</p> <p>Setting this attribute to zero turns on the RTS/CTS handshake.</p>
Restore Default	Click <b>Restore Default</b> to reset all fields back to factory default values.
Undo Changes	Click <b>Undo Changes</b> to start configuring the fields again.
Apply Changes	Click <b>Apply Changes</b> to save the changes back to the ZyAIR.
OK	Click <b>OK</b> to save all changes and close the ZyAIR Utility.
Cancel	Click <b>Cancel</b> to discard changes and close the ZyAIR Utility.
Help	Click <b>Help</b> to display the on-line help window.

## 4.4 The Link Status Screen

View the wireless stations that are currently associated to the ZyAIR in the **Link Status** screen.

**If the ZyAIR cannot communicate to a wireless station for up to ten minutes, the MAC address of that wireless station is automatically deleted from the Link Status screen.**



**Figure 4-3 Access Point Mode: Link Status**

The following table describes the labels in this screen.

**Table 4-3 Access Point Mode: Link Status**

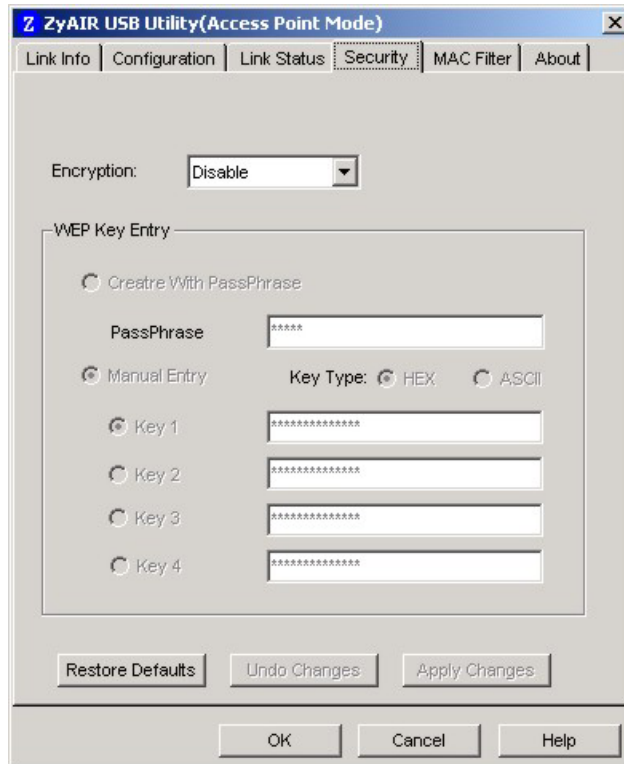
LABEL	DESCRIPTION
Station MAC Address	This field displays the MAC addresses of up to 16 wireless stations that are connected to the ZyAIR.

**Table 4-3 Access Point Mode: Link Status**

LABEL	DESCRIPTION
Refresh	Click <b>Refresh</b> to update this screen.
OK	Click <b>OK</b> to save all changes and close the ZyAIR Utility.
Cancel	Click <b>Cancel</b> to discard changes and close the ZyAIR Utility.
Help	Click <b>Help</b> to display the on-line help window.

## 4.5 The Security Screen

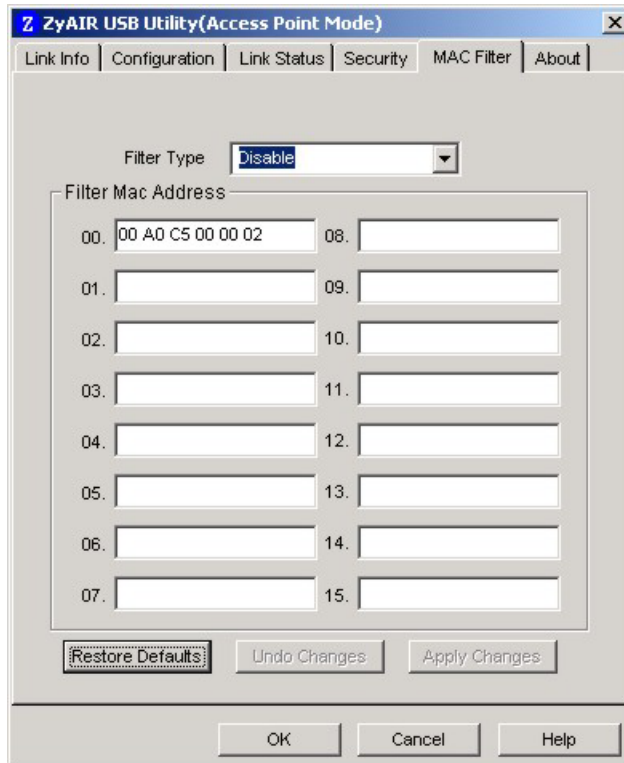
To set up wireless LAN security, click **Security** to display the screen as shown.

**Figure 4-4 Access Point Mode: Security**

Refer to *Table 3-5* for field descriptions.

## 4.6 The MAC Filter Screen

The **MAC Filter** screen allows you to configure the ZyAIR to give exclusive access to (Accept) devices or exclude devices from (Reject) connecting to the ZyAIR. Every Ethernet device has a unique MAC (Media Access Control) address. The MAC address is assigned at the factory and consists of six pairs of hexadecimal characters, for example, 00:A0:C5:00:00:02. You need to know the MAC address of the device(s) to configure this screen.



**Figure 4-5 Access Point Mode: MAC Filter**

The following table describes the labels in this screen.

**Table 4-4 Access Point Mode: MAC Filter**

LABEL	DESCRIPTION
Filter Type	<p>Define the filter action for the list of MAC addresses in the MAC address filter table.</p> <p>Select <b>Disable</b> to deactivate the MAC filter feature.</p> <p>Select <b>Reject</b> to block access to the ZyAIR, MAC addresses not listed will be allowed to access the router.</p> <p>Select <b>Accept</b> to permit access to the ZyAIR, MAC addresses not listed will be denied access to the router.</p>
Filter MAC Address	
00 .. 15	<p>Specify the MAC address(es) of the wireless station(s) that is allowed or denied association to the ZyAIR.</p> <p>Enter six pairs of hexadecimal digits in the range of “A-F”, “a-f” and “0-9” (for example, 00A0C5000002).</p> <p>Once you click <b>Apply Changes</b> to save the values, this field displays the MAC address with spaces separating the six pairs of hexadecimal digits (for example 00 A0 C5 00 00 02). If you enter an invalid MAC address, it will not be displayed.</p>
Restore Default	Click <b>Restore Default</b> to reset all fields back to factory default values.
Undo Changes	Click <b>Undo Changes</b> to start configuring the fields again.
Apply Changes	Click <b>Apply Changes</b> to save the changes back to the ZyAIR.
OK	Click <b>OK</b> to save all changes and close the ZyAIR Utility.
Cancel	Click <b>Cancel</b> to discard changes and close the ZyAIR Utility.
Help	Click <b>Help</b> to display the on-line help window.





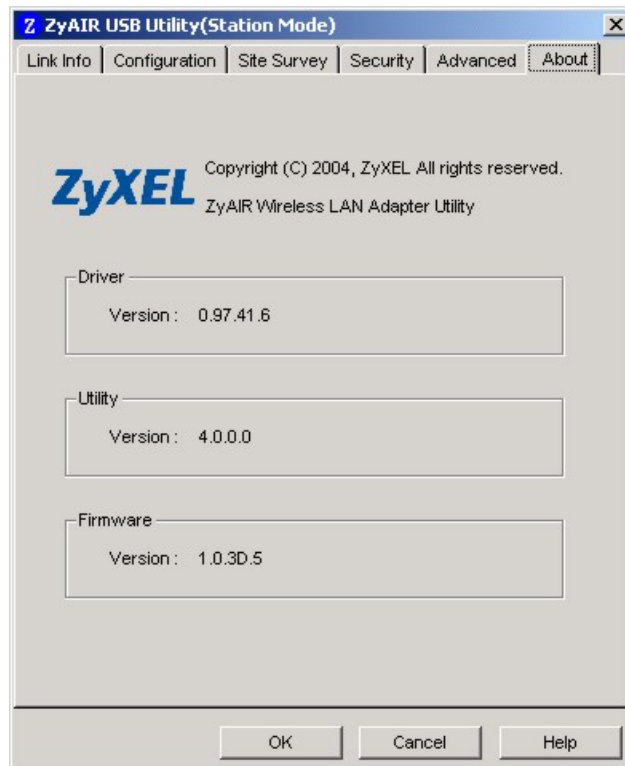
# Chapter 5

## Maintenance

*This chapter describes how to uninstall or upgrade the ZyAIR Utility.*

### 5.1 The About Screen

The **About** screen displays related version numbers of the ZyAIR.



**Figure 5-1 About**

The following table describes the read-only fields in this screen.

Table 5-1 About

LABEL	DESCRIPTION
Driver Version	This field displays the version number of the ZyAIR driver.
Utility Version	This field displays the version number of the ZyAIR Utility.
Firmware Version	This field displays the version of the firmware on which the driver and the utility are based.
OK	Click <b>OK</b> to save all changes and close the ZyAIR Utility.
Cancel	Click <b>Cancel</b> to discard changes and close the ZyAIR Utility.
Help	Click <b>Help</b> to display the on-line help window.

## 5.2 Removing the ZyAIR Utility

Follow the steps below to remove (or uninstall) the ZyAIR Utility from your computer.

- Step 1.** Click **Start, Programs, ZyAIR Utility, Uninstall ZyAIR Package**.
- Step 2.** When prompted, click **OK** to remove the driver and the utility software.

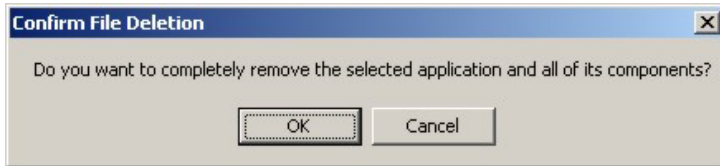


Figure 5-2 Confirm File Deletion

- Step 3.** Restart your computer when prompted.

## 5.3 Upgrading the ZyAIR Utility

**Before you uninstall the ZyAIR Utility, take note of the current network configuration.**

To perform the upgrade, follow the steps below.

- Step 1.** Download the latest version of the utility from the ZyXEL web site and save the file on your computer.
- Step 2.** Follow the steps in the *Section 5.2* to remove the current ZyAIR Utility from your computer.
- Step 3.** Restart your computer when prompted.
- Step 4.** After restarting, refer to the procedure in the *Quick Installation Guide* to install the new utility.

**Step 5.** Check the version numbers in the **About** screen to make sure the new utility is installed properly.



# Chapter 6

## Troubleshooting

*This chapter covers potential problems and the possible remedies. After each problem description, some instructions are provided to help you to diagnose and to solve the problem.*

### 6.1 Problems Starting the ZyAIR Utility Program

**Table 6-1 Troubleshooting Starting ZyAIR Utility Program**

Cannot start the ZyAIR Wireless LAN Utility	Make sure the ZyAIR is properly inserted and the LED(s) is on. Refer to the <i>Quick Installation Guide</i> for the LED descriptions.
	Use the <b>Device Manager</b> to check for possible hardware conflicts. Click <b>Start, Settings, Control Panel, System, Hardware</b> and <b>Device Manager</b> . Verify the status of the ZyAIR under <b>Network Adapter</b> . (Steps may vary depending on the version of Windows).
	Install the ZyAIR in another computer.
	If the error persists, you may have a hardware problem. In this case, you should contact your local vendor.
The ZyAIR Wireless LAN Utility displays only three tabs.	When the ZyAIR Wireless LAN Utility displays only three tabs, you are using the Windows XP wireless configuration tool at the same time. Refer to the <i>Section 1.3</i> to disable the Windows XP wireless configuration tool.
Cannot change to Access Point mode	If you use the Windows XP configuration tool and the ZyAIR Utility to configure the ZyAIR at the same time, the ZyAIR automatically operates in wireless station mode. You need to disable the Windows XP configuration tool to change between the modes using the ZyAIR Utility (refer to the <i>Section 1.3</i> for more information).

## 6.2 Problem Connecting to an Access Point

**Table 6-2 Troubleshooting Access Point Connection Problem**

PROBLEM	CORRECTIVE ACTION
When using the Windows XP configuration tool, cannot scan for or connect to any access points.	<p>The ZyAIR might still be operating in access point mode. This results when you set the ZyAIR to operate in access point mode using the ZyAIR Utility, close the ZyAIR Utility and then use the Windows XP configuration tool.</p> <p>Before you use the Windows XP configuration tool, make sure you set the ZyAIR to operate in station mode before you close and exit the ZyAIR Utility.</p>

## 6.3 Problems Communicating With Other Computers

**Table 6-3 Troubleshooting Communication Problems**

PROBLEM	CORRECTIVE ACTION
In wireless station mode, the computer with the ZyAIR installed cannot communicate with the other computer(s).	
A. <b>Infrastructure</b>	<p>Make sure that the AP and the associated computers are turned on and working properly.</p> <p>Make sure the ZyAIR computer and the associated AP use the same SSID.</p> <p>Change the AP and the associated wireless clients to use another radio channel if interference is high.</p> <p>Make sure that the computer and the AP share the same security option and key. Verify the settings in the <b>Security</b> screen.</p>
B. <b>Ad-Hoc (IBSS)</b>	<p>Verify that the peer computer(s) is turned on.</p> <p>Make sure the ZyAIR computer and the peer computer(s) are using the same SS ID and channel.</p> <p>Make sure that the computer and the peer computer(s) share the same security option and key.</p> <p>Change the wireless clients to use another radio channel if interference is high.</p>

**Table 6-3 Troubleshooting Communication Problems**

PROBLEM	CORRECTIVE ACTION
In access point mode, the wireless station(s) cannot associate to the ZyAIR.	<p>Verify that the computer with the ZyAIR installed is turned on.</p> <p>Make sure the wireless station(s) uses the same SSID as the ZyAIR.</p> <p>Make sure the wireless station(s) uses the same security option and/or WEP keys.</p> <p>Verify that the wireless station(s) is not blocked in the <b>MAC Filter</b> screen.</p>

## 6.4 Problem with the Link Status

**Table 6-4 Troubleshooting Link Quality**

PROBLEM	CORRECTIVE ACTION
The link quality and/or signal strength is poor all the time.	<p>Search and connect to another AP with a better link quality using the <b>Site Survey</b> screen.</p> <p>Move your computer closer to the AP or the peer computer(s) within the transmission range.</p> <p>There may be too much radio interference (for example microwave or another AP using the same channel) around your wireless network.</p> <p>Relocate or reduce the radio interference.</p>





# Appendix A

## Setting up Your Computer's IP Address

All computers must have a 10M or 100M Ethernet adapter card and TCP/IP installed.

Windows 95/98/Me/NT/2000/XP, Macintosh OS 7 and later operating systems and all versions of UNIX/LINUX include the software components you need to install and use TCP/IP on your computer. Windows 3.1 requires the purchase of a third-party TCP/IP application package.

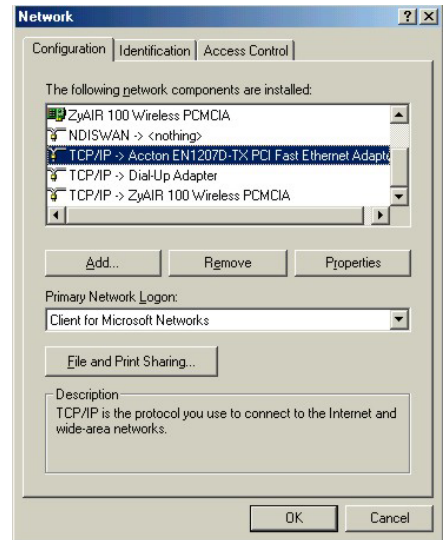
TCP/IP should already be installed on computers using Windows NT/2000/XP, Macintosh OS 7 and later operating systems.

After the appropriate TCP/IP components are installed, configure the TCP/IP settings in order to "communicate" with your network.

If you manually assign IP information instead of using dynamic assignment, make sure that your computers have IP addresses that place them in the same subnet as the ZyAIR.

### Windows 95/98/Me

Click **Start**, **Settings**, **Control Panel** and double-click the **Network** icon to open the **Network** window.



The **Network** window **Configuration** tab displays a list of installed components. You need a network adapter, the TCP/IP protocol and Client for Microsoft Networks.

If you need the adapter:

- a. In the **Network** window, click **Add**.

- b. Select **Adapter** and then click **Add**.
- c. Select the manufacturer and model of your network adapter and then click **OK**.

If you need TCP/IP:

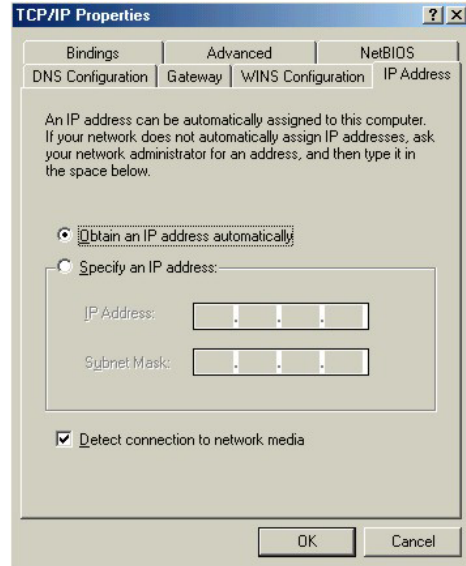
- a. In the **Network** window, click **Add**.
- b. Select **Protocol** and then click **Add**.
- c. Select **Microsoft** from the list of **manufacturers**.
- d. Select **TCP/IP** from the list of network protocols and then click **OK**.

If you need Client for Microsoft Networks:

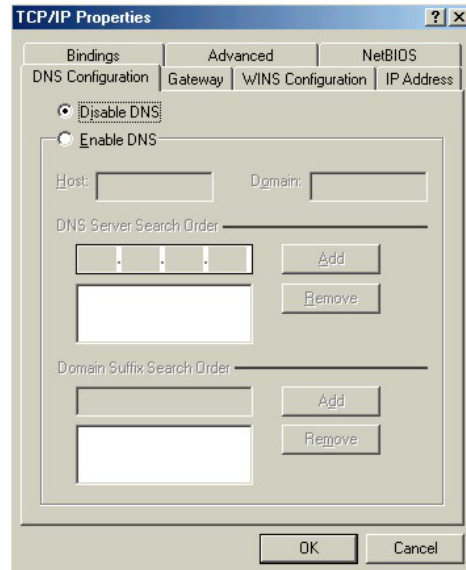
- a. Click **Add**.
- b. Select **Client** and then click **Add**.
- c. Select **Microsoft** from the list of manufacturers.
- d. Select **Client for Microsoft Networks** from the list of network clients and then click **OK**.
- e. Restart your computer so the changes you made take effect.

In the **Network** window **Configuration** tab, select your network adapter's TCP/IP entry and click **Properties**.

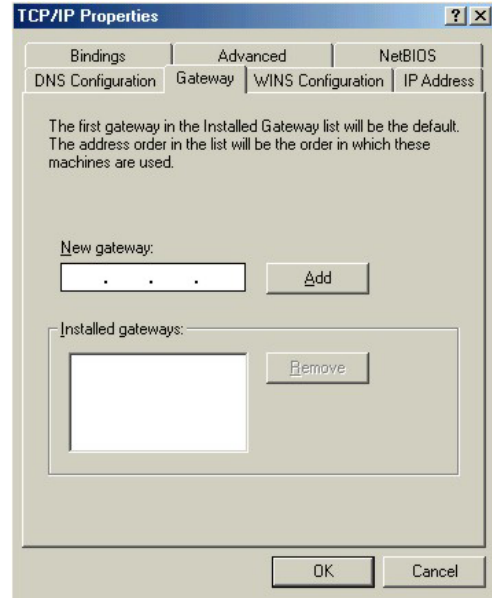
1. Click the **IP Address** tab.
  - If your IP address is dynamic, select **Obtain an IP address automatically**.
  - If you have a static IP address, select **Specify an IP address** and type your information into the **IP Address** and **Subnet Mask** fields.



2. Click the **DNS Configuration** tab.
  - If you do not know your DNS information, select **Disable DNS**.
  - If you know your DNS information, select **Enable DNS** and type the information in the fields below (you may not need to fill them all in).



3. Click the **Gateway** tab.
  - If you do not know your gateway's IP address, remove previously installed gateways.
  - If you have a gateway IP address, type it in the **New gateway field** and click **Add**.



4. Click **OK** to save and close the **TCP/IP Properties** window.
5. Click **OK** to close the **Network** window. Insert the Windows CD if prompted.
6. Restart your computer when prompted.

### *Verifying Your Computer's IP Address*

1. Click **Start** and then **Run**.
2. In the **Run** window, type "winipcfg" and then click **OK** to open the **IP Configuration** window.
3. Select your network adapter. You should see your computer's IP address, subnet mask and default gateway.

## **Windows 2000/NT/XP**

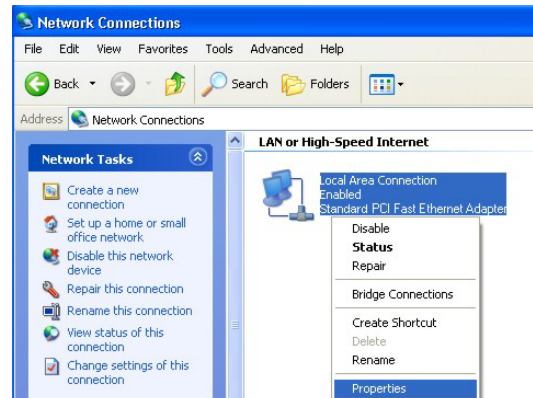
1. For Windows XP, click **start, Control Panel**. In Windows 2000/NT, click **Start, Settings, Control Panel**.



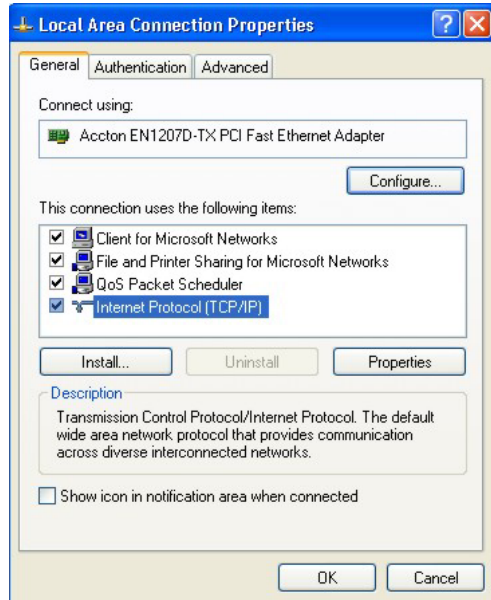
2. For Windows XP, click **Network Connections**. For Windows 2000/NT, click **Network and Dial-up Connections**.



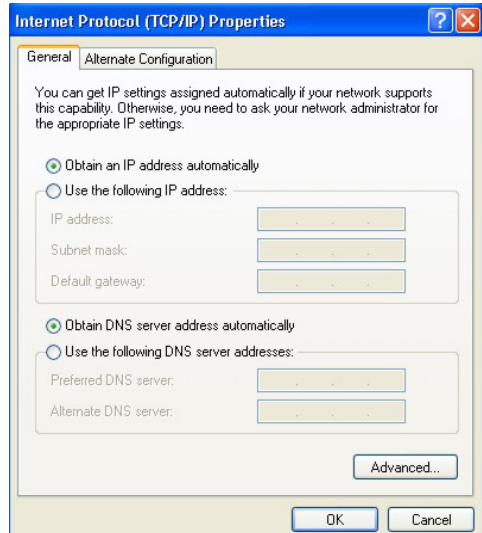
3. Right-click **Local Area Connection** and then click **Properties**.



4. Select **Internet Protocol (TCP/IP)** (under the **General** tab in Win XP) and click **Properties**.



5. The **Internet Protocol TCP/IP Properties** window opens (the **General** tab in Windows XP).
  - If you have a dynamic IP address click **Obtain an IP address automatically**.
  - If you have a static IP address click **Use the following IP Address** and fill in the **IP address**, **Subnet mask**, and **Default gateway** fields.Click **Advanced**.



6. -If you do not know your gateway's IP address, remove any previously installed gateways in the **IP Settings** tab and click **OK**.

Do one or more of the following if you want to configure additional IP addresses:

-In the **IP Settings** tab, in IP addresses, click **Add**.

-In **TCP/IP Address**, type an IP address in **IP address** and a subnet mask in **Subnet mask**, and then click **Add**.

-Repeat the above two steps for each IP address you want to add.

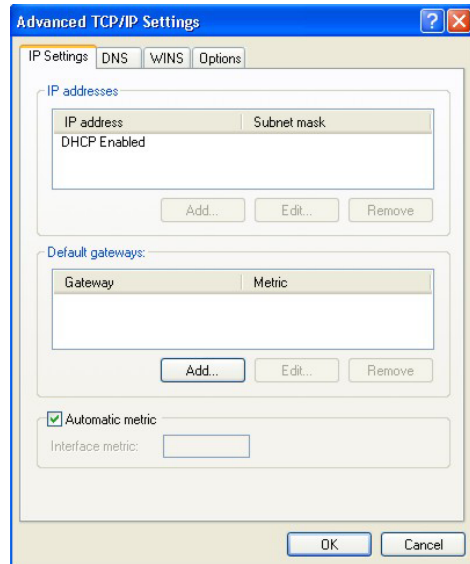
-Configure additional default gateways in the **IP Settings** tab by clicking **Add** in **Default gateways**.

-In **TCP/IP Gateway Address**, type the IP address of the default gateway in **Gateway**. To manually configure a default metric (the number of transmission hops), clear the **Automatic metric** check box and type a metric in **Metric**.

-Click **Add**.

-Repeat the previous three steps for each default gateway you want to add.

-Click **OK** when finished.

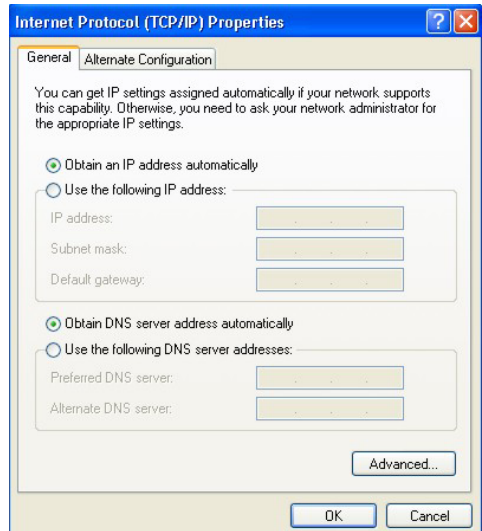


7. In the **Internet Protocol TCP/IP Properties** window (the **General tab** in Windows XP):

-Click **Obtain DNS server address automatically** if you do not know your DNS server IP address(es).

-If you know your DNS server IP address(es), click **Use the following DNS server addresses**, and type them in the **Preferred DNS server** and **Alternate DNS server** fields.

If you have previously configured DNS servers, click **Advanced** and then the **DNS** tab to order them.



8. Click **OK** to close the **Internet Protocol (TCP/IP) Properties** window.
9. Click **OK** to close the **Local Area Connection Properties** window.
10. Restart your computer (if prompted).

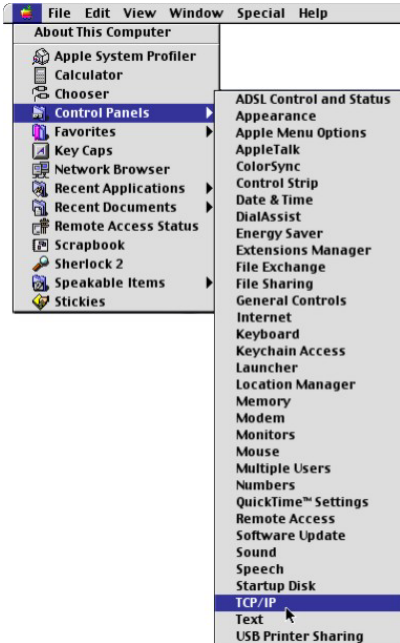
### *Verifying Your Computer's IP Address*

1. Click **Start, All Programs, Accessories** and then **Command Prompt**.
2. In the **Command Prompt** window, type "ipconfig" and then press [ENTER]. You can also open **Network Connections**, right-click a network connection, click **Status** and then click the **Support** tab.

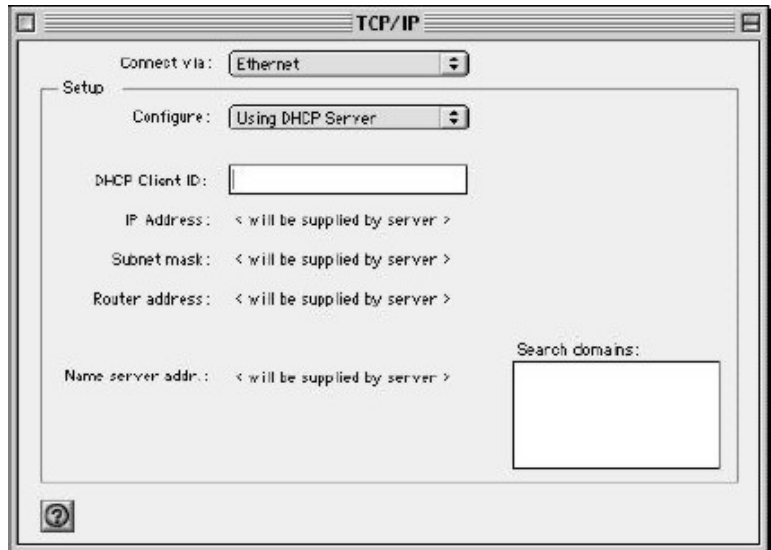
## Macintosh OS 8/9



1. Click the **Apple** menu, **Control Panel** and double-click **TCP/IP** to open the **TCP/IP Control Panel**.



2. Select **Ethernet** from the **Connect via** list.



3. For dynamically assigned settings, select **Using DHCP Server** from the **Configure:** list.

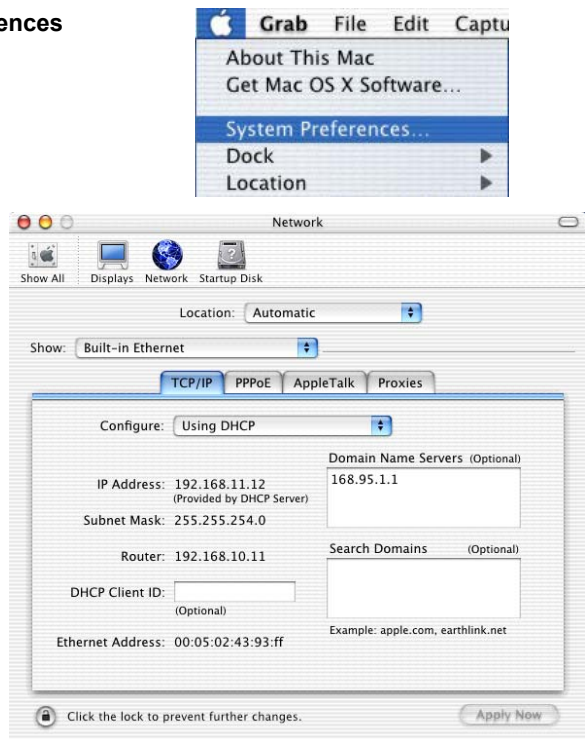
4. For statically assigned settings, do the following:
  - From the **Configure** box, select **Manually**.
  - Type your IP address in the **IP Address** box.
  - Type your subnet mask in the **Subnet mask** box.
  - Type the IP address of your ZyAIR in the **Router address** box.
5. Close the **TCP/IP Control Panel**.
6. Click **Save** if prompted, to save changes to your configuration.
7. Restart your computer (if prompted).

### Verifying Your Computer's IP Address

Check your TCP/IP properties in the **TCP/IP Control Panel** window.

## Macintosh OS X

1. Click the **Apple** menu, and click **System Preferences** to open the **System Preferences** window.
2. Click **Network** in the icon bar.
  - Select **Automatic** from the **Location** list.
  - Select **Built-in Ethernet** from the **Show** list.
  - Click the **TCP/IP** tab.



3. For dynamically assigned settings, select **Using DHCP** from the **Configure** list.
4. For statically assigned settings, do the following:
  - From the **Configure** box, select **Manually**.
  - Type your IP address in the **IP Address** box.
  - Type your subnet mask in the **Subnet mask** box.
  - Type the IP address of your ZyAIR in the **Router address** box.
5. Click **Apply Now** and close the window.
6. Restart your computer (if prompted).

#### *Verifying Your Computer's IP Address*

Check your TCP/IP properties in the **Network** window.



# Appendix B

## Access Point Mode Setup Example

This example uses the network sharing feature in Windows 2000 to bridge the wired and wireless network when you set the ZyAIR in access point (AP) mode.

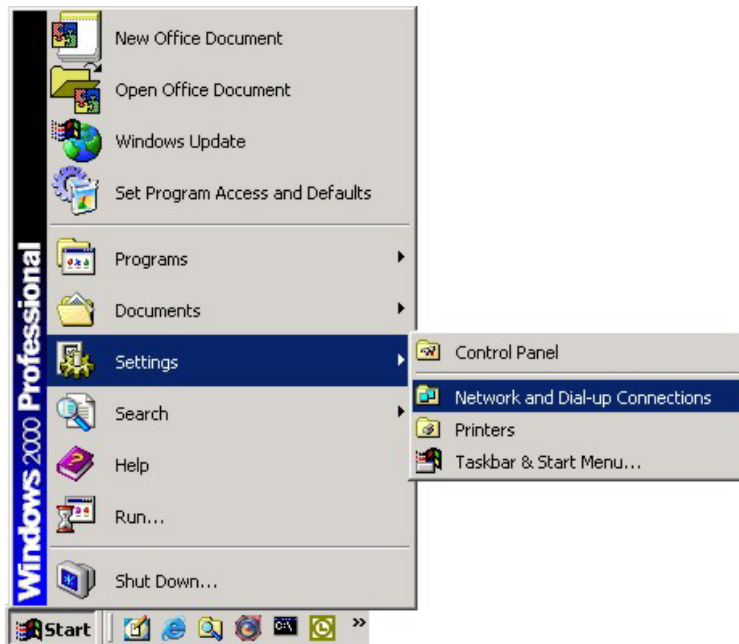
Refer to *Section 4.1.1* for setup methods and requirements.

Steps may vary depending on your Windows version. You may need to install additional software in Windows 98/Me.

### Configuring the Computer on Which You Install the ZyAIR

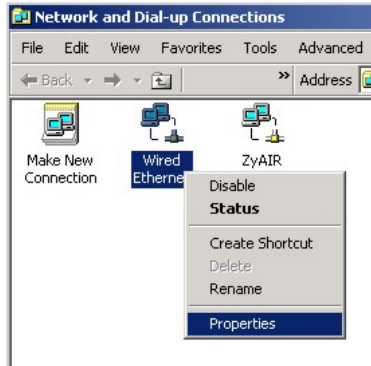
**Step 1.** Refer to *Section 1.5.1* to set the ZyAIR to operate in AP mode.

**Step 2.** Click **Start, Settings, Network and Dial-up Connections** (or click **Start, Settings, Control Panel** and double-click **Network and Dial-up Connections**).



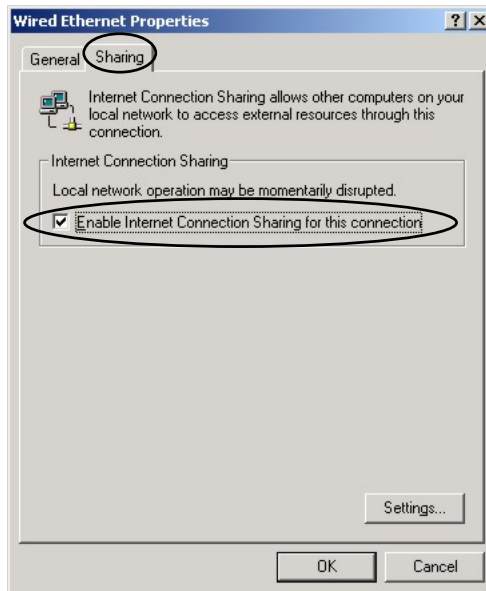
**Diagram 1 Windows 2000: Start**

**Step 3.** Right-click on the icon for your wired Ethernet adapter and click **Properties**.



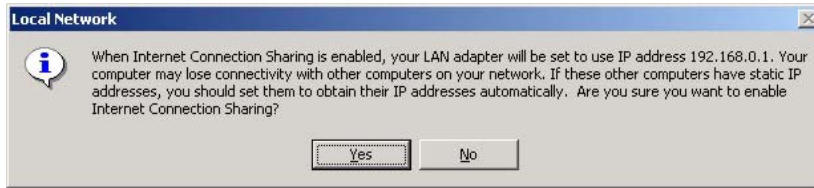
**Diagram 2 Windows 2000: Network and Dial-up Connections**

- Step 4.** A Properties screen displays. Click the **Sharing** tab and select **Enable Internet Connection Sharing for this connection**. Click **OK**.



**Diagram 3 Windows 2000: Network Properties**

- Step 5.** A notice screen displays. Click **Yes**.



**Diagram 4 Windows 2000: Local Network**

### **Configuring the Wireless Station Computer**

Refer to the *Setting Up Your Computer's IP Address* appendix to set up the wireless station computer(s) IP address.





# Index

## A

About .....	5-1
About the ZyAIR Utility .....	5-1
Access point mode .....	1-5
Access Point Mode .....	4-1
Additional setup requirements .....	4-1
Configuration .....	4-4
Link Info .....	4-2
Link Status .....	4-6
MAC Filter .....	4-8
Power saving mode .....	4-5
Security .....	4-7
Setup example .....	M
Accessing the ZyAIR Utility .....	1-4
Advanced .....	3-9
Antenna gain .....	4-5
Authentication Mode .....	2-6
Auto .....	2-7
Open .....	2-7
Shared .....	2-7
Authentication Type .....	3-10
Auto authentication mode .....	2-7
Automatic WEP key generation .....	2-5

## C

Communication Problem	
Ad-hoc (IBSS) .....	6-2
Infrastructure .....	6-2
Computer's IP Address .....	A
Configuration .....	3-2, 4-3
Connecting to a Network .....	3-6
Copyright .....	ii
Disclaimer .....	ii
Trademarks .....	ii
Create with Passphrase .....	3-8
CTS (Clear to Send) .....	2-6
Customer Support .....	vii

## D

Data encryption .....	2-5
-----------------------	-----

## E

ESS .....	2-3
Extended Service Set .....	<i>See</i> ESS

## F

Federal Communications Commission (FCC)	
Interference Statement .....	v
Model Specific .....	v
Filter MAC address .....	4-9
Fragmentation Threshold .....	2-5, 3-10

## G

Graphics Icons Key .....	xiv
--------------------------	-----

## H

Hidden node .....	2-5
-------------------	-----

## I

IBSS .....	2-2
Independent Basic Service Set .....	<i>See</i> IBSS
Information for Canadian Users .....	iv
Caution .....	iv
Note .....	iv

## L

Link Info .....	3-1, 4-1
Link Status .....	4-6

**M**

MAC (Media Access Control) ..... 4-8  
 MAC Filter ..... 4-8  
 MAC filter type..... 4-9  
 Manual Entry ..... 3-8

**N**

Network Type ..... 2-2  
 Ad-Hoc(IBSS) ..... 2-2

**O**

Online Registration ..... iii  
 Open authentication mode ..... 2-7  
 Operating Mode ..... *See* Network Type

**P**

passphrase ..... 2-5  
 Passphrase ..... 3-8  
 Preamble Mode ..... 2-7  
 Preamble Type ..... 3-10  
 Preface ..... xiii  
 problem description ..... 6-1  
 Proprietary transmission rates ..... 2-2, 3-4

**R**

Related Documentation ..... xiii  
 Roaming ..... 2-4  
 Example ..... 2-4  
 RTS (Request To Send) ..... 2-6  
 RTS/CTS handshake ..... 2-6  
 RTS/CTS Threshold ..... 2-5, 3-10

**S**

Security ..... 3-7, 4-7  
 Service Set ..... 4-4  
 Service Set Identity ..... *See* SSID  
 Shared authentication mode ..... 2-7

Site Survey ..... 3-5  
 SSID ..... 2-1  
 Station Mode  
     Advanced ..... 3-9  
     Configuration ..... 3-3  
     Power saving mode ..... 3-4  
     Security ..... 3-7  
     Site Survey ..... 3-5  
     Site Survey Warning ..... 3-6  
 Syntax Conventions ..... xiii

**T**

Transfer Rate ..... 3-4  
 Transmission Speed ..... 3-4  
 Transmission Speeds ..... 2-1  
 Troubleshooting  
     Communication problem with other computers  
         ..... 6-2  
 Troubleshooting ..... 6-1  
     Checking Hardware Conflict ..... 6-1  
     Communication problems ..... 6-2  
     Problem with link status ..... 6-3  
     Radio interference ..... 6-3  
     Starting ZyAIR Utility ..... 6-1

**U**

Using the ZyAIR Utility ..... 2-1

**W**

Warranty ..... iii  
     Note ..... iii  
 WEP ..... 2-5  
 WEP Data Encryption with ..... 2-5  
 WEP Key ..... 2-5, 3-8  
     Type ..... 3-8  
 Windows XP Requirement ..... 1-1  
 Wired Equivalent Privacy ..... *See* WEP  
 Wireless LAN Parameters  
     Channel ..... 2-1

Network Type ..... 2-2  
SSID ..... 2-1  
Transmission Rate ..... 2-1  
Wireless LAN Security ..... 2-5  
    Data Encryption with WEP ..... 2-5  
Wireless Network Basics ..... 1-1  
Wireless station mode ..... 1-5  
Wireless Station Mode ..... 3-1

**Z**

ZyAIR Modes ..... 1-5

Access point ..... 4-1  
Station ..... 3-1  
Switch between modes ..... 1-5  
ZyAIR Utility  
    Before you upgrade ..... 5-2  
    Link Info ..... 3-1  
    Removing ..... 5-2  
    Upgrading ..... 5-2  
ZyAIR Utility Maintenance ..... 5-1