ZyAIR 100

Wireless PC Card

User's Guide

Version 1.0.3

October 2002

ZyXEL

TOTAL INTERNET ACCESS SOLUTION

Copyright

Copyright © 2002 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, user's guide, 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 patent 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.

Federal Communications Commission(FCC) Interference Statement

This 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:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and the 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.

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 the 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 A limits for radio noise emissions from digital apparatus set out in the radio interference regulations of Industry Canada.

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 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; refer to the separate Warranty Card for your Return Material Authorization number (RMA). 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 (USA and territories only). If the customer desires some other return destination beyond the U.S. borders, the customer shall bear the cost of the return shipment. This warranty gives you specific legal rights and you may also have other rights that vary from state to state.

Online Registration

Do not forget to register your Prestige (fast, easy online registration at www.zyxel.com for free future product updates and information.

Customer Support

Please have the following information ready when you contact customer support.

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

METHOD LOCATION	E-MAIL SUPPORT/ SALES	TELEPHONE/ FAX	WEB SITE / FTP SITE	REGULAR MAIL
WORLDWIDE	support@zyxel.com.tw sales@zyxel.com.tw	+886-3-578-3942 +886-3-578-2439	www.zyxel.com www.europe.zyxel.com ftp.europe.zyxel.com	ZyXEL Communications Corp., 6 Innovation Road II, Science-Based Industrial Park, HsinChu, Taiwan 300, R.O.C.
NORTH AMERICA	support@zyxel.com sales@zyxel.com	+1-714-632-0882 800-255-4101 +1-714-632-0858	www.zyxel.com ftp.zyxel.com	ZyXEL Communications Inc., 1650 Miraloma Avenue, Placentia, CA 92870, U.S.A.
SCANDINAVIA	support@zyxel.dk sales@zyxel.dk	+45-3955-0700 +45-3955-0707	www.zyxel.dk ftp.zyxel.dk	ZyXEL Communications A/S, Columbusvej 5, 2860 Soeborg, Denmark.
GERMANY	support@zyxel.de sales@zyxel.de	+49-2405-6909-0 +49-2405-6909-99	www.zyxel.de	ZyXEL Deutschland GmbH. Adenauerstr. 20/A4 D-52146 Wuerselen, Germany

Table of Contents

Copyright ..... **ii**
Federal Communications Commission(FCC) Interference Statement ..... **iii**
Information for Canadian Users ..... **iv**
ZyXEL Limited Warranty ..... **v**
Customer Support ..... **vi**
List of Figures ..... **ix**
List of Tables ..... **ix**
Preface ..... **x**
GETTING STARTED ..... **I**
Chapter 1 Getting to Know Your ZyAIR **1-1**
1.1 Introduction 1-1
1.2 Features of the ZyAIR 1-1
1.3 Applications 1-2
Chapter 2 Hardware Installation **2-1**
2.1 System Requirements 2-1
2.2 Installing the ZyAIR 2-1
Chapter 3 ZyAIR Driver Installation **3-1**
3.1 Windows 95 (OSR2)/98/ME Setup 3-1
3.2 Windows NT 4.0 Setup 3-5
3.3 Windows 2000 Setup 3-9
3.4 Windows XP Setup 3-10
3.5 Software Installation Complete 3-12
ADVANCED MANAGEMENT ..... **II**
Chapter 3 ZyAIR Utility Installation and Configuration **3-1**
3.1 Installing the Utility 3-1
3.2 Accessing the Utility 3-2
3.3 Utility Screens 3-3
3.4 Configuration 3-3
3.4.1 WEP (Wired Equivalent Privacy) 3-4
3.4.2 Create Encryption Keys by Using a Passphrase 3-5

3.4.3 Create Encryption Keys Manually 3-5
3.4.4 Advanced Configuration 3-6
3.4.5 Loop Back 3-8
3.4.6 AP Browser 3-9
3.4.7 Site Survey 3-10
Chapter 4 Advanced Configuration 4-1
4.1 Introduction 4-1
4.2 Advanced Property Parameters 4-1
4.2.1 Authentication Algorithm 4-1
4.2.2 Preamble Mode 4-1
4.3 Advanced Configuration in Windows 95(OSR2)/98/ME 4-2
4.4 Advanced Configuration in Windows 2000/XP 4-3
4.5 Advanced Configuration in Windows NT 4-4
ADDITIONAL INFORMATION III
Chapter 5 Troubleshooting 5-1
5.1 Problems During Driver Installation 5-1
5.2 Problems With the Utility Configuration 5-2
5.3 Problems With Access Point Settings 5-2
5.4 Problems Communicating With the Computer 5-3
Appendix A Network Configuration ..... B
Appendix B Hardware Specifications ..... E
Appendix C Important Safety Instructions ..... F
Index ..... G

List of Figures

Figure 2-1 Inserting the ZyAIR into your Notebook Computer 2-2
Figure 3-1 Utility – Configuration 3-3
Figure 3-2 Utility – WEP Encryption 3-5
Figure 3-3 Utility – Advanced Configuration 3-6
Figure 3-4 RTS Threshold 3-7
Figure 3-5 Utility – Loop Back 3-8
Figure 3-6 Utility – Access Point Browser 3-9
Figure 3-7 Utility – Site Survey 3-10

List of Tables

Table 2-1 LED Descriptions 2-2
Table 3-1 Utility – Access Point Browser Screen Menu Fields 3-9
Table 4-1 Two Advanced Property Field Descriptions 4-3
Table 5-1 Troubleshooting the Installation of Your ZyAIR 100 5-1
Table 5-2 Troubleshooting the Configuration 5-2
Table 5-3 Troubleshooting the Settings for the Access Point 5-2
Table 5-4 Troubleshooting Communication Problems 5-3

Preface

About Your ZyAIR 100

Congratulations on your purchase of the ZyAIR 100 Wireless PC Card.

Online Registration

Do not forget to register your ZyAIR 100 (fast, easy online registration at www.zyxel.com) for free future product updates and information.

With a built-in Access Point and powerful routing features of the Prestige series models, you can place a wireless Prestige anywhere on a local network and create a wireless infrastructure for real-time database access, file sharing, email, printer sharing, and fast Internet access. A mobile investment saves your office construction costs, maintenance, and scalability because it's easy to add nodes. A mobile office can dramatically increase the office efficiency. The ZyAIR 100 is designed for:

- Home offices and small businesses with cable, DSL and wireless modem.
- Wireless LAN connectivity: allows you to work anywhere in the coverage area.
- Multiple office/department connections via access devices.
- E-commerce/EDI applications.

Your ZyAIR 100 is easy to install and to configure.

About This User's Guide

This user's guide is designed to guide you through the hardware and software installation of your ZyAIR 100 for its various applications.

Regardless of your particular application, it is important that you follow the steps outlined in **Chapters 2** and **Chapter 3**. You can then refer to the appropriate chapters of the user's guide, depending on your application.

Related Documentation

- Supporting Disk

  More detailed information and examples can be found in our included disk (as well as on the zyxel.com web site). This disk contains information on configuring your ZyAIR 100, Application Notes and Troubleshooting.

- Quick Start Guide

Our Quick Start Guide is designed to help you get up and running right away. It contains a detailed easy-to-follow setup steps, default settings, handy checklists and information on setting up your network using the ZyAIR 100 utility.

- ZyXEL Web Site

  The ZyXEL download library at www.zyxel.com contains additional support documentation. Please also refer to www.zyxel.com for an online glossary of networking terms.

Syntax Conventions

- The window screen titles and labels are in **Bold Times New Roman** font. Predefined field choices are in **Bold Arial** font.
- "Type" means for you to type one or more characters and press the carriage return. "Select" or "Choose" means for you to use one of the predefined choices.
- For brevity's sake, we will use "e.g.," as shorthand for "for instance", and "i.e.," for "that is" or "in other words" throughout this manual.
- The ZyAIR 100 Wireless PC Card may be referred to as the ZyAIR 100 or the ZyAIR in this user's guide.

Part I:

GETTING STARTED

Chapters 1 to 3 are structured as a step-by-step guide to help you connect, install and setup your ZyAIR to operate on your notebook computer.

Chapter 1
Getting to Know Your ZyAIR

This chapter introduces the main features and applications of the ZyAIR.

1.1 Introduction

The ZyAIR is an 11 Mbps IEEE 802.11(b) wireless PCMCIA card and that has a standard PCMCIA adapter which fits into any standard PCMCIA Type II notebook computer slot. Its maximum 11 Mbps data rate gives equivalent Ethernet speed to access corporate networks or the Internet in a wireless environment. The ZyAIR gives you the wireless communication with any 802.11b-compliant product, allowing you to stay connected anywhere within a coverage area.

1.2 Features of the ZyAIR

The following are the essential features of the ZyAIR.

- Supports data rate of 1, 2, 5.5 and 11 Mbps
- Ranges up to 800 feet in an open environment
- Supports Point-to-Point and Point-to-Multi-point access
- Seamless connectivity to wired Ethernet and computer Network LAN
- Helps to augment existing networks quickly and easily
- Direct Sequence Spread Spectrum (DSSS) technology provides robust, interference-resistant and secure wireless connections
- Wireless connectivity minus the cost of cabling
- Supports, Windows 95 (OSR2)/98/NT4.0/2000/XP
- Supports Plug and Play
- Ease of installation

- Flexibility and mobility to locate or move networked computers

1.3 Applications

The ZyAIR offers fast, reliable and cost-effective solutions for wireless networks. They include:

- Remote Access to Corporate Network Information

  For email, file transfer and terminal emulation access.

- Difficult to Wire Environments

  For use in historical or old buildings, asbestos installations and open areas where wiring is impossible to deploy.

- Frequently Changing Environments

  For retailers, manufacturers and those who frequently rearrange the workplace or change location.

- Temporary LANs for Special Projects or During Peak Time

  For trade shows, exhibitions and construction sites where a temporary network is required. For retailers, airline and shipping companies who need additional workstations during peak periods. For auditors requiring workgroups at customer sites.

- Access to Database for Mobile Users

  Doctors, nurses, retailers who need to access their databases on the move in a hospital, retail store, office or campus.

- SOHO (Small Office and Home Office) Users

  SOHO users who need easy and quick installation of a small computer network.

- High Security Connection

  Flexible, secure and quick installations.

Chapter 2
Hardware Installation

This chapter shows you how to install the hardware.

2.1 System Requirements

- PCMCIA Type II slot
- PCMCIA card and socket service that is Revision 2.1-compliant to PCMCIA specification (or higher)
- Windows 95 (OSR2)/98/NT 4.0/2000/ME/XP Operating System.
- 500 Kbytes free hard disk space (minimum) for driver and utility program installation.

2.2 Installing the ZyAIR

Follow the procedure shown next to install the ZyAIR. Refer to the appendix for important safety instructions.

Step 1. Locate available Type II or Type III PCMCIA slot in your notebook computer.

Step 2. With the ZyAIR adapter's 68-pin connector facing the PCMCIA slot and its label side and LEDs facing up, slide the ZyAIR completely into the PCMCIA slot as shown next.

Never force, bend or twist the ZyAIR into the slot.

Step 3. Go to the next chapter for more instructions on installing the driver.

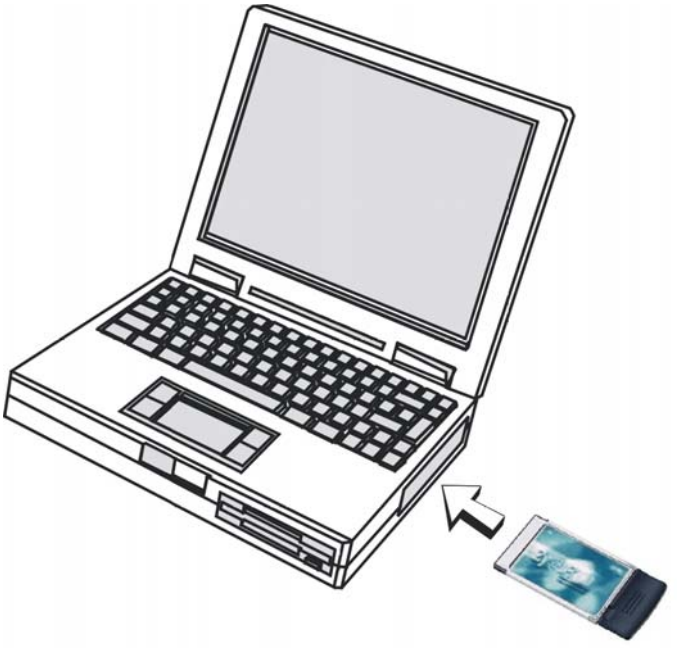


Figure 2-1 Inserting the ZyAIR into your Notebook Computer

The PCMCIA slot supports "hot swapping" of PCMCIA adapter, allowing you to insert or remove the ZyAIR from the slot whenever you like even when power to your computer is on. However, you should always disable the ZyAIR prior to card removal to allow Windows to log off from the network server. Disable the ZyAIR properly and disconnect power to the PC Card slot.

The following table describes the LEDs.

Table 2-1 LED Descriptions

LED	COLOR	STATUS	DESCRIPTION
POWER	Green	On	The ZyAIR is receiving power.
LINK	Orange	On	The ZyAIR has a successful wireless connection.
		Blinking	The ZyAIR is sending/receiving data through the wireless connection.

Chapter 3
ZyAIR Driver Installation

This chapter shows you how to install the ZyAIR driver for Windows 95 (OSR2)/98/NT 4.0/2000/XP Operating Systems.

3.1 Windows 95 (OSR2)/98/ME Setup

Before starting driver installation, make sure that the ZyAIR has been inserted into a standard type II PCMCIA slot on your notebook computer.

Step 1. Insert the ZyAIR into an avialable PCMCIA slot in your notebook computer. Windows will auto-detect the ZyAIR and displays **Add New Hardware Wizard** dialog box. Click **Next**.

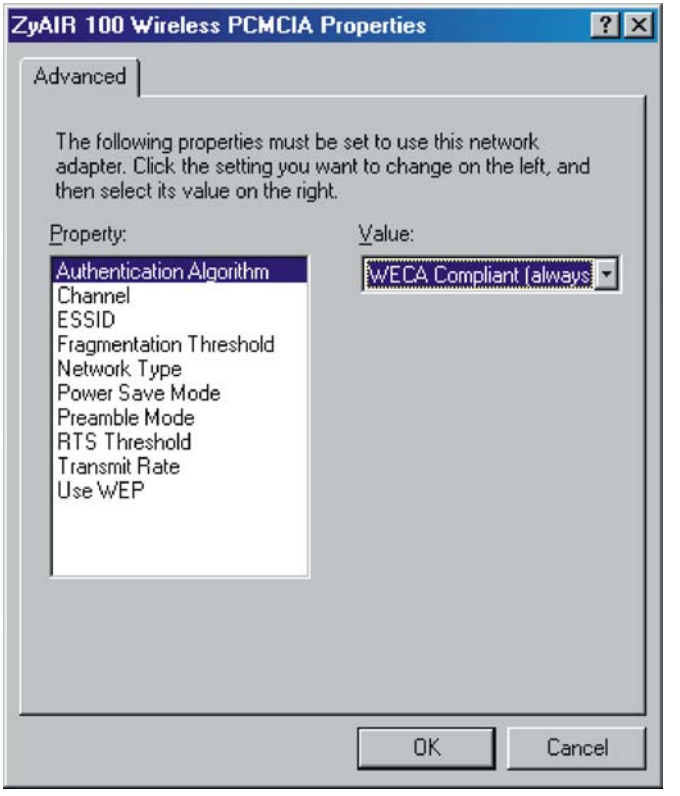
Step 2. Select **Search for the best driver for your device (Recommended)** and then click **Next**.

Step 3. Insert the support CD-ROM into the CD-ROM drive and specify the location of the driver, then click **Next**.

Step 4. Click **Next** to continue.

Step 5. Click **Next** to install the necessary driver.

Step 6. Once the driver is installed, the **Properties** window displays as shown below.Accept the default settings. If you need to make changes, use the utility software (descussed later*)*. Click **OK** to continue.



Step 7. Click **Finish**.

Step 8. Click **Yes** to restart your computer.

Step 9. Click **Start**, then **Control Panel, System** and then the **Device Manager** tab. Double-click **Network Adapters.** Locate the ZyAIR icon. If no error icon appears, then your ZyAIR has been successfully installed. If you see an error message, then refer to the *Troubleshooting* section.

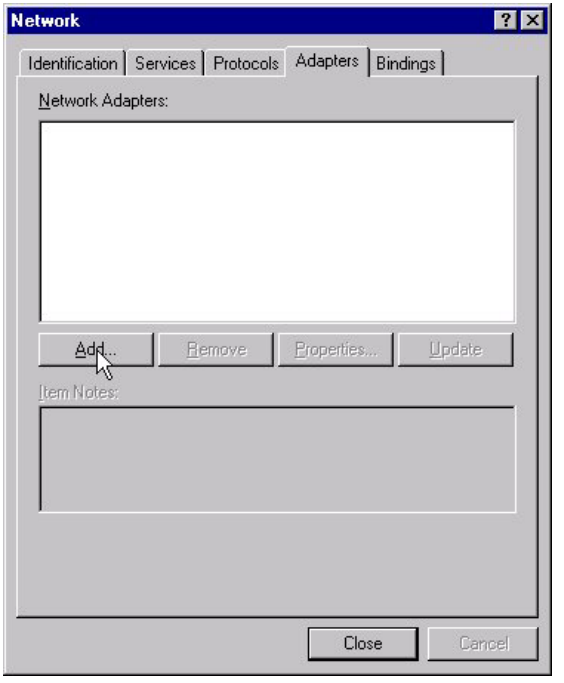
Step 10. Click **OK**.

3.2 Windows NT 4.0 Setup

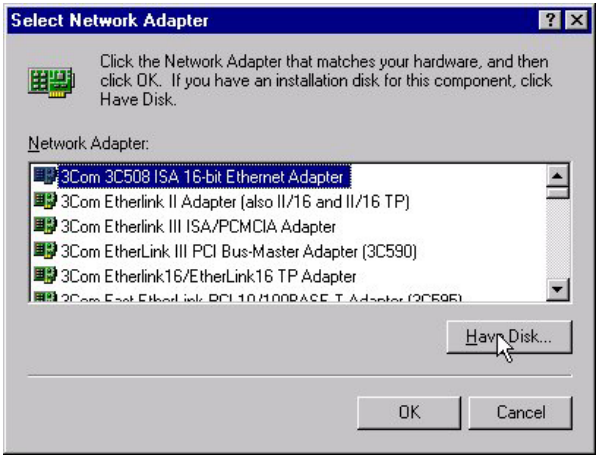
Before starting driver installation, make sure that the ZyAIR has been inserted into a standard type II PCMCIA slot on your notebook computer.

Step 1. Login as **Administrator**.

Step 2. Click **Start**, then **Control Panel**. Double-click **Network** click on the **Adapters** tab and then click **Add**.

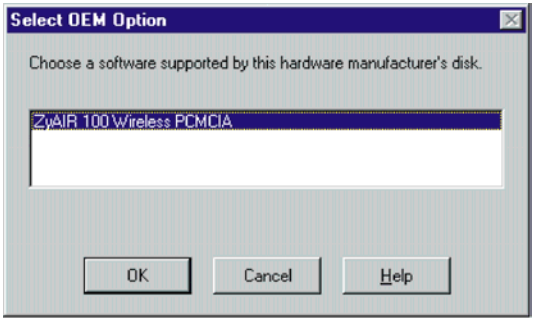


Step 3. Click **Have Disk**.

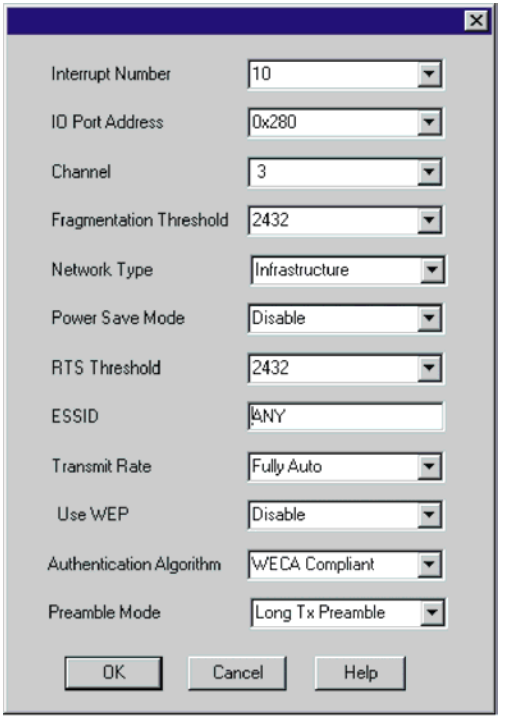


Step 4. Insert the support CD-ROM into the CD-ROM drive and specify the location of the driver.

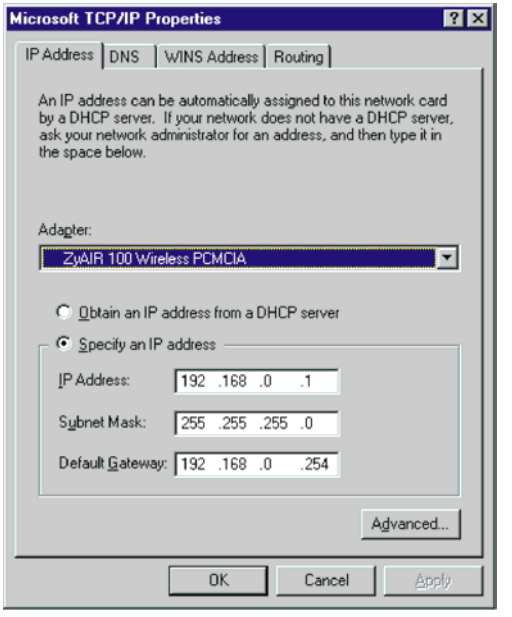
Step 5. Click **OK.** Windows will attempt to locate the **INF** file in the path specified. If you have entered the path correctly, Windows will copy and install the appropriate drivers onto your computer.



Step 6. Once the driver is installed, a **Properties** window displays as shown below.Accept the default settings. If you need to make changes, use the utility software (descussed later*)*. Click **OK** to continue.

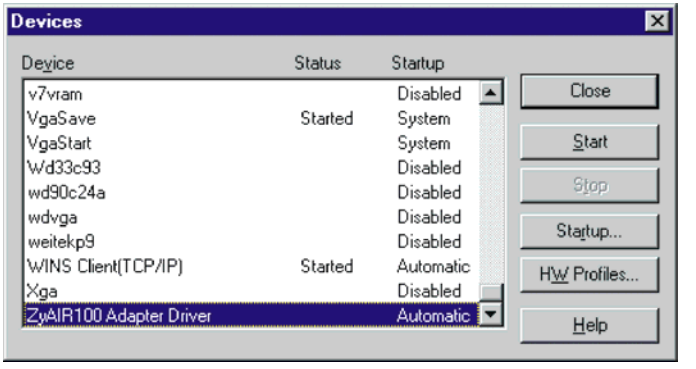


Step 7. Click **Start**, then **Control Panel**. Double-click **Network,** click on the **Adapters** tab, then click **Properties**. If you are assigned a static (fixed) IP address, select **Specify an IP address** and specify the **IP Address** , **Subnet Mask** and **Default Gateway** fields. If you are using a dynamic IP address, select **Obtain an IP address from a DHCP server**.



Step 8. Click **Yes** to restart your computer.

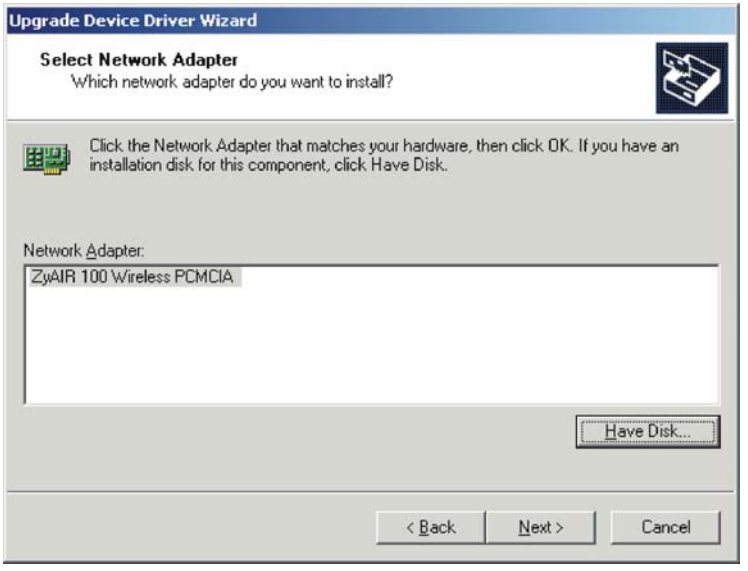
Step 9. To find out if the ZyAIR is functioning properly, click **Start**, then **Control Panel**. Double-click **Devices.** Your ZyAIR is working if **Automatic** is shown in the **Startup** column. Click **Close** to exit.



3.3 Windows 2000 Setup

Step 1. Insert the ZyAIR into the PCMCIA slot of your computer. Windows will auto-detect the new hardware and displays **Found New Hardware** dialog box and then the **Upgrade Device Driver Wizard**.

Step 2. Insert the support CD-ROM into the CD-ROM drive and click **Have Disk.** Specify the location of the driver.



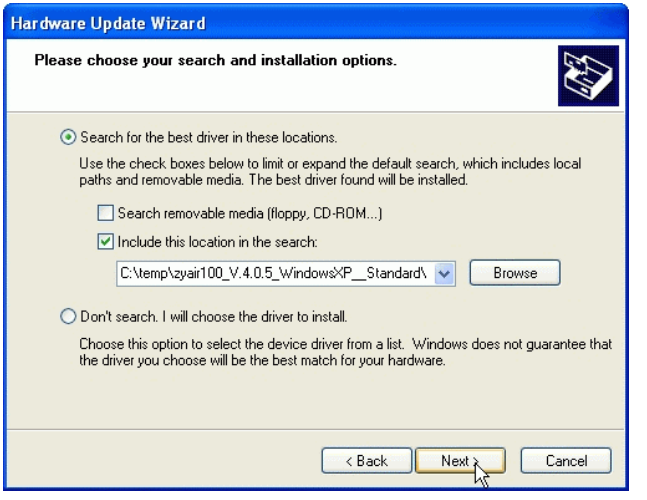
Step 3. Follow the on screen instructions to complete driver installation.

Restart your computer when you are prompted to do so.

3.4 Windows XP Setup

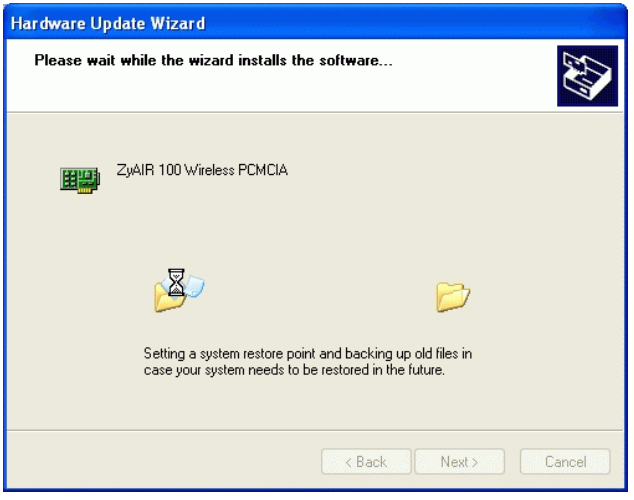
Step 1. Insert the ZyAIR100 into the PCMCIA slot on your notebook. Windows XP will auto-detect the ZyAIR and displays the **Found New Hardware Wizard** dialogue. Select **Install from a list or specific (Advanced)** and click **Next**.

Step 2. Insert the support CD-ROM into CD-ROM drive. Specify the location of the driver. Click **Next.**



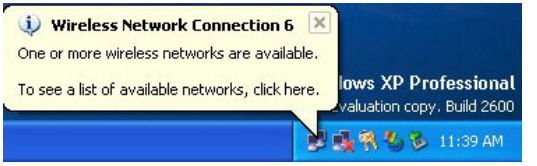
Step 3. If you encounter the following warning screen, click **Continue Anyway** .

Step 4. Windows will detect the ZyAIR and copy corresponding files onto your computer. Click **Next**.

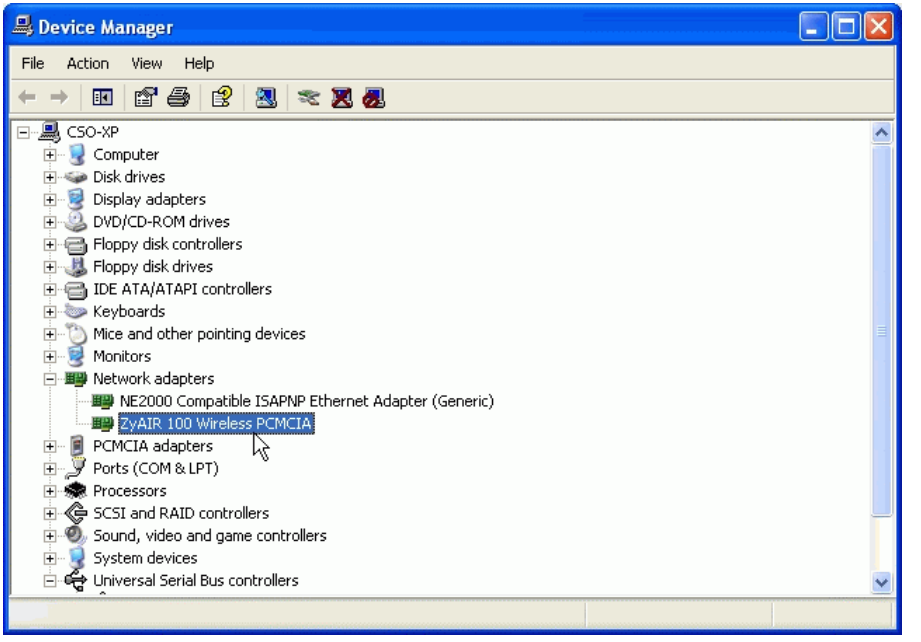


Step 5. Click **Finish**.

Step 6. After installing the ZyAIR, Windows XP displays a **Wireless Network Connection #** message.



Step 7. Click **Start, Control Panel, Performance and Maintenance** (in category view), **System, Hardware, Device Manager**. Cick **Network Adapters.** Locate the ZyAIR icon. If no error icon appears, your ZyAIR is working.



3.5 Software Installation Complete

Well Done! You have successfully installed and set up your ZyAIR to operate on your computer.

Part II:

ADVANCED MANAGEMENT

This part provides information on configuring parameters

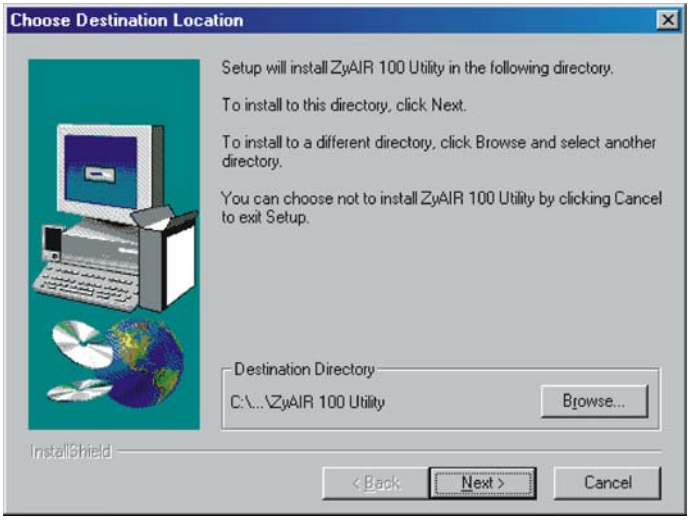
Chapter 3
ZyAIR Utility Installation and Configuration

This chapter shows you how to install the utility software and configure the ZyAIR.

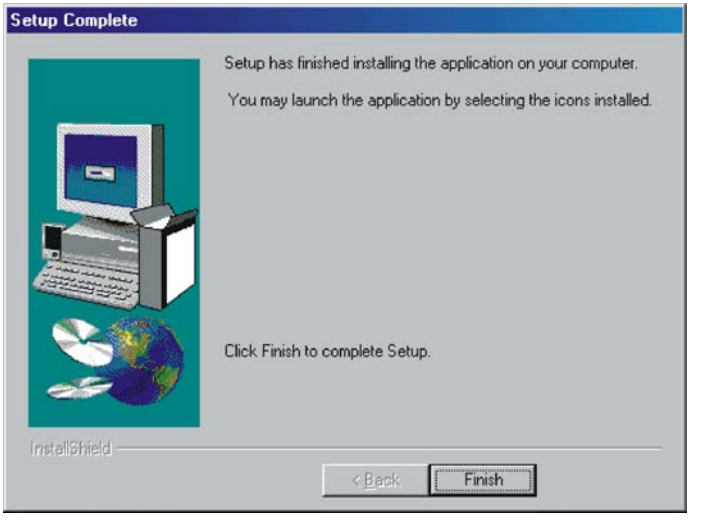
3.1 Installing the Utility

Screen shots may vary depending on your version of Windows.

Step 1. Insert the support CD-ROM into your CD-ROM drive and run the **setup.exe** file found in the **Utility** folder. Follow the on-screen instructions.



Step 2. Click **Finish** to complete the utility installation.

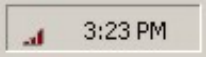


Step 3. Proceed to the following sections to configure your ZyAIR.

3.2 Accessing the Utility

Your ZyAIR is Plug-and-Play and its default settings can be set for a typical infrastructure wireless LAN. Simply install the ZyAIR onto your computer and it is ready for use. In special circumstances however, you may need to change configuration settings depending on how you want to manage your wireless network. Use the **ZyAIR 100 Utility** program to configure your ZyAIR and perform user-level diagnosis.

Step 1. To run the utility for the first time, click **Start** and then **Programs**. Click **ZyAIR 100 Utility**. The icon for the ZyAIR appears in the system tray.



Step 2. Double click on the **ZyAIR 100 Utility** icon in the system tray to display the utility window as shown next.

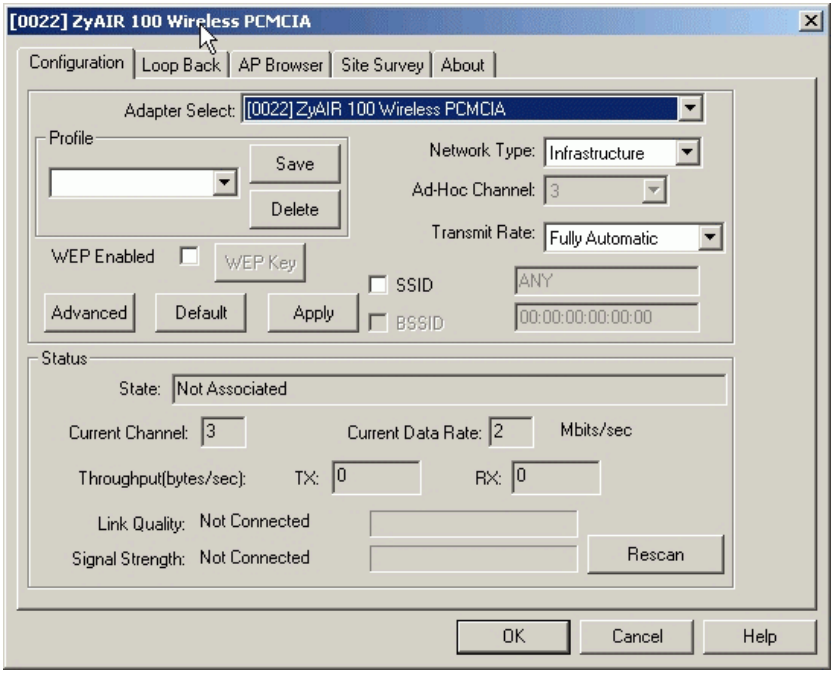


Figure 3-1 Utility – Configuration

3.3 Utility Screens

Configure and monitor your ZyAIR using the following screens: **Configuration**, **Loop Back**, **AP Browser**, **Site Survey** and **About**.

3.4 Configuration

The **Configuration** screen allows you to view and modify the current configurations of your ZyAIR easily and quickly. The configuration settings include: **ESS ID, SS ID**, **Network Type**, **Use WEP** and **Transmission Rate**. Within the **Advanced** setting, you can set **Power Save, RTS** or **Frag Threshold, IRQ** and **I/O address**.

SS ID

The SSID is a unique ID given to the access point (AP). An AP acts as a bridge between the wireless stations and the wired network. Select **SSID** and enter a specific SSID you desire to connect with. You can leave **SSID** field blank, or enter **ANY** (all characters in uppercase). This allows your wireless adapter to automatically associate to any AP in the vicinity of your wireless adapters. It is recommended that you

select the **SSID** option. This will prevent your computer from accidentally connecting to a different wireless network.

Wireless clients associating to any AP must have the same SSID

When moving your computer to another location within the network environment and it becomes out-of-range of the current AP, the roaming function will automatically connect your computer to another AP.

Network Type

To connect your wireless station to a local network infrastructure, set the station operation mode to **Infrastructure** (with AP as default setting). In case you do not wish to connect to a network infrastructure, but prefer to set up a small independent wireless workgroup, you can enable the **Ad-hoc** (without AP).

When the Ad-hoc **mode is selected, be sure to set your wireless stations with the same channel.**

ZyAIR works with any IEEE 802.11 and IEEE 802.11(b)-compliant APs.

Transmission Rate

ZyAIR provides various transmission (data) rate options for you to select. **Transmission Rate** options include **Fully Auto**, **Fixed 1 Mb/s**, **Fixed 2 Mb/s**, **Auto Select 1M** or **2M**, **Fixed 5.5Mb/s** and **Fixed 11Mb/s**. In most networking scenarios, you will see that the factory default **Fully Auto** will prove 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, ZyAIR will automatically switch to a lower transmission (data) rate. Transmission at lower data speeds is usually more reliable. However, when the communication quality improves again, ZyAIR will gradually increase the transmission (data) rate again until it reaches the highest available transmission rate.

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

3.4.1 WEP (Wired Equivalent Privacy)

To prevent unauthorized wireless stations from accessing data transmitted over the network, ZyAIR offers highly secure data encryption known as WEP. If you require high security in transmission, please select **Enable** and click the **WEP Key** button.

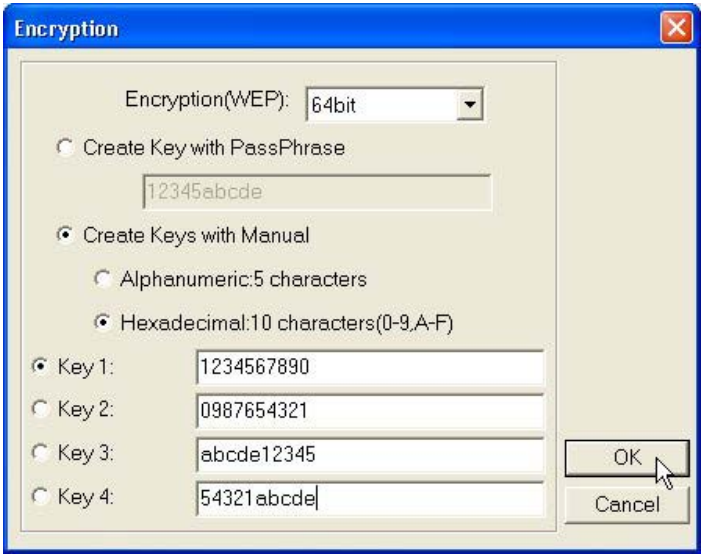


Figure 3-2 Utility – WEP Encryption

The **Encryption** dialog box enables you to identify four different encryption keys and select one of them to encrypt your transmission data. There are two methods to set the WEP keys as described:

3.4.2 Create Encryption Keys by Using a Passphrase

To create encryption keys by using a passphrase, select either the **64bit** or **128bit** encryption first and then select **Create Key with Passphrase** and type a character string in the **Create Key with Passphrase** field. As you type, the utility uses an algorithm to generate four keys automatically. Select one of the four WEP keys and click **OK**. Then click the **Apply** button on the **Configuration** tab to make the setting take effect.

3.4.3 Create Encryption Keys Manually

You can also create up to four encryption keys manually by selecting **Create Keys Manually**.

For 64bit encryption you may choose:

- **Alphanumeric*:* 5 characters** (case sensitive) ranging from "a-z", "A-Z" and "0-9" (e.g. MyKey)
- **Hexadecimal**: **10 hexadecimal digits** in the range of "A-F", "a-f" and "0-9" (e.g. 11AA22BB33)

For 128bit encryption you may choose:

- **Alphanumeric*:* 13 characters** (case sensitive) ranging from "a-z", "A-Z" and "0-9" (e.g. MyKey12345678)

- **Hexadecimal: 26 hexadecimal digits** in the range of "A-F", "a-f" and "0-9" (e.g. 00112233445566778899AABBCC)**.**

After entering the WEP keys in the key field, select one key as an active key, click **OK** and then click **Apply** to make the setting take effect.

To allow encrypted data communications, you must set the same encryption key values on all wireless stations and/or Access Points. For example, if you use Key 1 on your ZyAIR and the value is (e.g., MyCar), the same value must be assigned to Key 1 for all other client stations. The values you enter on the Encryption dialog box will only be visible the first time you enter the keys. After closing this dialog box, all Key values will be displayed as "xxxxxxxxxxxx" every time the tab is displayed again.

3.4.4 Advanced Configuration

Click **Advanced** in the **Configuration** screen to display the **Advanced Configuration** window.

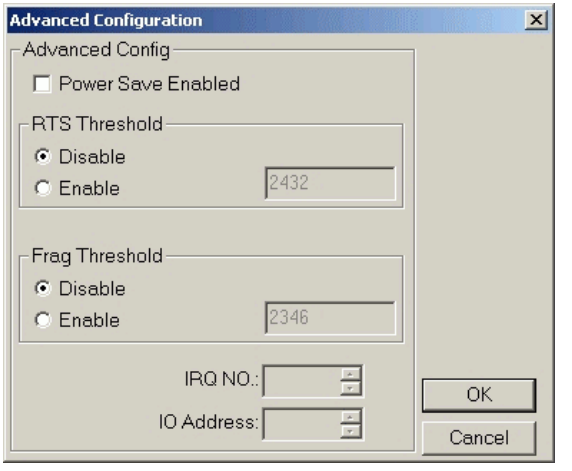


Figure 3-3 Utility – Advanced Configuration

Power Save

Check the **Power Save Enabled** checkbox to conserve the battery life of your computer. When Power Save is enabled, your ZyAIR will go into sleep mode to minimize power consumption.

The Power Save function is only supported in the Ad-hoc **network type. The** Infrastructure **network type is supported in upcoming firmware upgrades. Please contact your reseller for the most recent firmware.**

RTS Threshold

The **RTS Threshold** prevents the hidden node problem. Hidden node is a situation in which two stations are within range of the same AP, but are not within range of each other. The following figure illustrates an example of the hidden node problem. Both stations (STA) are within range of the AP, however, they cannot hear each other. Therefore, they are considered hidden nodes from each other. When a station starts data transmission with the AP, it might not notice that the other station is already using the wireless medium. When these two stations send data at the same time, they might collide when arriving simultaneously at the AP. The collision will most certainly result in a loss of messages for both stations.

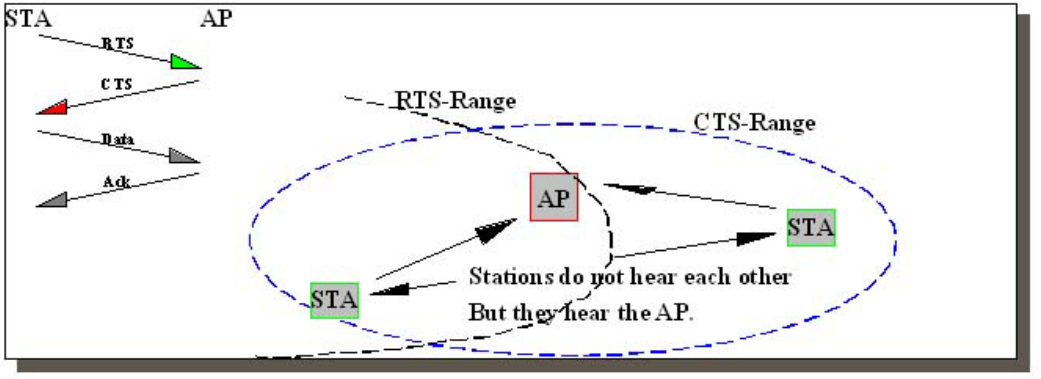


Figure 3-4 RTS Threshold

The **RTS Threshold** mechanism provides a solution to prevent data collisions. When you enable **RTS Threshold** on a possible hidden station, this station and its A Pt will use a Request to Send/Clear to Send protocol (RTS/CTS). The station will send an RTS to the AP, informing that it is going to transmit the data. Upon receipt, the AP responds with a CTS message to all stations within its range to notify all other stations to defer transmission. It will also confirm with the requesting station that the AP has reserved it for the time frame of the requested transmission.

Select **Disable** when you are not concerned with the hidden node problem. When the hidden node problem becomes an issue, select **Enable** and specify the packet size. The RTS function will be activated if the packet size exceeds the value you set. It is highly recommended that you set the value ranging from **0** to **2432**.

Enabling the RTS Threshold may cause redundant network overhead that could negatively affect the throughput performance instead of providing a remedy.

Frag Threshold

Fragmentation improves the efficiency when high traffic flows along in the wireless network. If your ZyAIR often transmits large files in the wireless network, you can enable the **Fragmentation Threshold** by clicking **Enable** in the **Advanced Configuration** window and the function will split the packet. Set the value between **256** and **2432**. **Frag Threshold** is set to **Disable** by default.

3.4.5 Loop Back

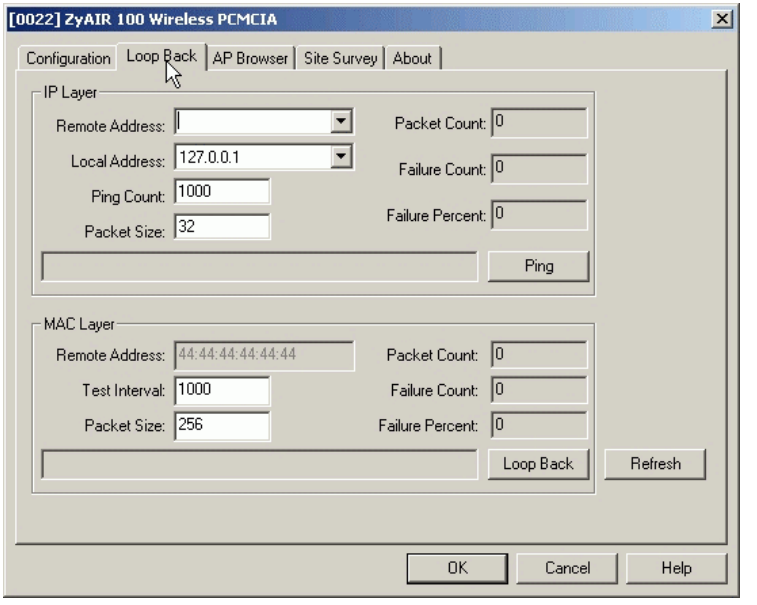


Figure 3-5 Utility – Loop Back

Use the **Loop Back** window to test data transmission quality between your ZyAIR and any computer on the network. The Ping function test whether communication has been made successfully or not between the local station and the remote station. Enter the IP address of a remote station, set the ping interval and packet size and the click **Ping** to start the test. Run the loop back test by clicking the **Loop Back** button to verify the communication quality between your wireless station and AP. The **Refresh** button sets the counters back to zero.

3.4.6 AP Browser

Click **AP Browser** to display the status of all the active AP.

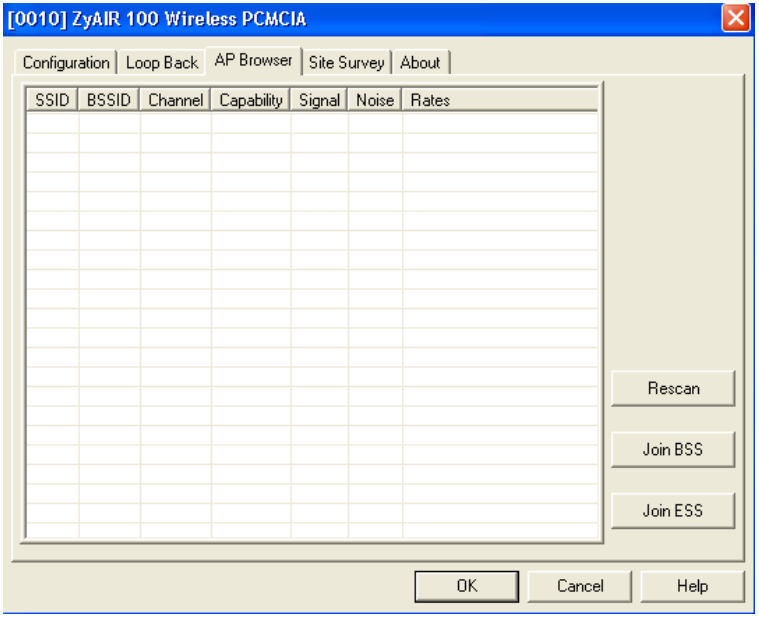


Figure 3-6 Utility – Access Point Browser

The following table shows the field descriptions.

Table 3-1 Utility – Access Point Browser Screen Menu Fields

FIELD	DESCRIPTION
SSID	The SS ID (Service Set ID or MAC address) of the AP.
BSSID	The BSS ID (Basic Service Set ID) of the AP.
Channel	The operating channel of the respective AP.
Capability	When communicating with any AP, it will display **BSS**. This means that the AP is in the **Infrastructure** mode. When the device is in **Ad-hoc** mode, no information appears in this column.
Signal	The signal level is in the range of **27** to **154**. A high number indicates a strong signal. This information is for technician's use only.

Table 3-1 Utility – Access Point Browser Screen Menu Fields

FIELD	DESCRIPTION
Noise	This measures the actual amount of noise within your area. There may be situations where you are close to your AP but your signal is low. This may indicate a high noise level. This information is for technician's use only.
Rates	The data rates that ZyAIR supports.

3.4.7 Site Survey

Use **Site Survey** to view the channel quality of all 14 radio channels. The blue bar indicates good channel quality. The higher the blue bar, the better the quality is (for instance, less interference). The yellow indicates fair channel quality. The red bar indicates the channel is busy or having severe interference.

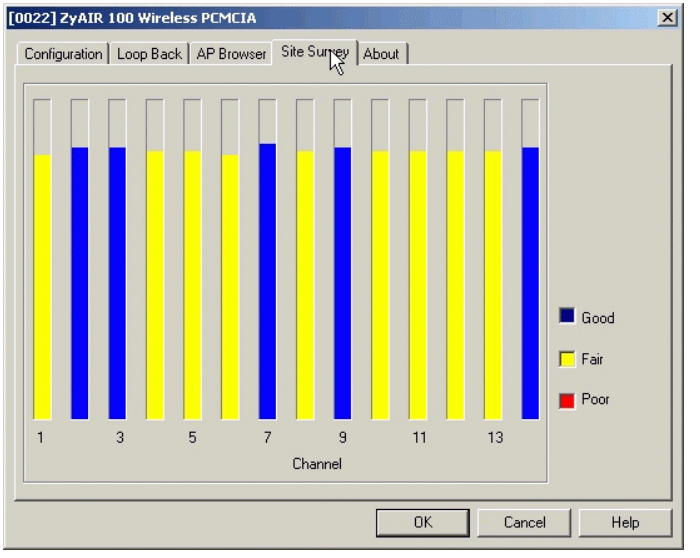


Figure 3-7 Utility – Site Survey

Chapter 4
Advanced Configuration

This chapter shows you advanced configuration for your ZyAIR.

It is recommended to configure your ZyAIR using the utility program. Configuration using the Advanced Property **window will** NOT **be reflected in the** ZyAIR 100 Utility **program.**

4.1 Introduction

The default settings should be sufficient for ZyAIR to operate unless network specification requires you to change them. You may use the **Advanced Properties** window to fine-tune your ZyAIR configuration. You should be completely familiar with the operating system and the setting of the network before making changes using the **Advanced Properties** window.

4.2 Advanced Property Parameters

4.2.1 Authentication Algorithm

Your ZyAIR supports two authentication algorithms: Open (or WECA compliant) and Shared.

Open authentication algorithm 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 no authentication is provided. A key is generated and accepted by each other. Thus the wireless stations can associate with any AP and listen to any data transmitted plaintext. Open authentication algorithm should always be used.

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

4.2.2 Preamble Mode

A preamble is a signal used to synchronize the transmission timing in your wireless network. Two preamble modes are supported: Long, Short and Auto

Long preamble mode allows more processing time for each transmitted data packet. This is the default setting. Short preamble mode allows less processing time for the transmitted data packets.

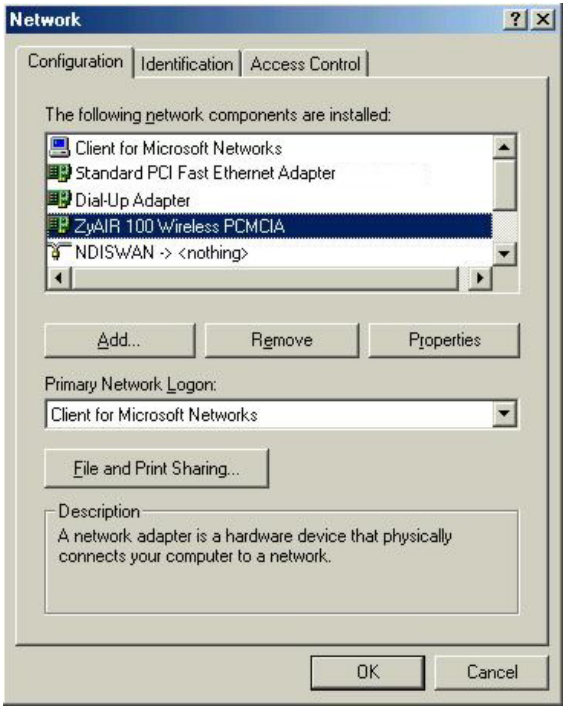
Using short preamble mode may minimize overhead and maximize network throughput. However, short preamble mode is supported by IEEE 802.11b compliant wireless devices, thus wireless stations using short preamble mode cannot communicate with wireless stations using the original IEEE 802.11 standard.

4.3 Advanced Configuration in Windows 95(OSR2)/98/ME

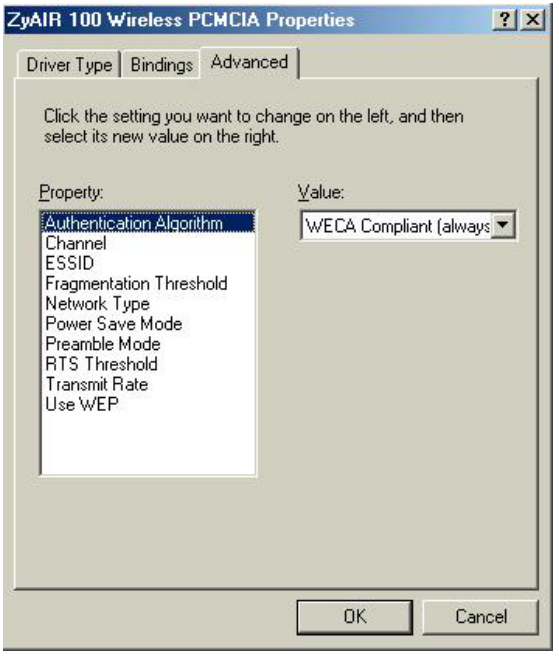
Follow the steps below to access and configure the **Advanced Properties** window for your ZyAIR.

Step 1. Click Start, Settings, and click Control Panel.

Step 2. Double-click the **Network** icon and select the **ZyAIR 100 Wireless PCMCIA** icon.



Step 3. Click **Properties** and then **Advanced** to display the window shown below.



The following table describes the two fields not configurable using the **ZyAIR 100 Utility**. It is recommended you use the default settings for these two fields.

Table 4-1 Two Advanced Property Field Descriptions

FIELD	DESCRIPTION
Authentication Algorithm	Select **WECA Compliant (always use)** (default) or **Must use Shared with WEP** from the drop-down list box. Refer to *Section 4.2.1* for background information.
Preamble Mode	Select from **Auto**, **Short Tx Preamble** or **Long Tx Preamble** (default). Refer to *Section 4.2.2* for background information.

For descriptions of other fields, refer to *Section 3.4*

4.4 Advanced Configuration in Windows 2000/XP

Follow the steps below to access and configure the **Advanced Property** window for your ZyAIR.

Step 1. Click **Start**, (**Settings** in Windows 2000), and click **Control Panel**.

Step 2. Click **System**, select the **Hardware** tab and click **Device Manager**.

Step 3. In the **Device Manager** window, under **Network Adapter**, right-click **ZyAIR 100 Wireless PCMCIA** and select **Property**.

Step 4. Refer to *Table 4-1* and *Section 3.4* for field descriptions.

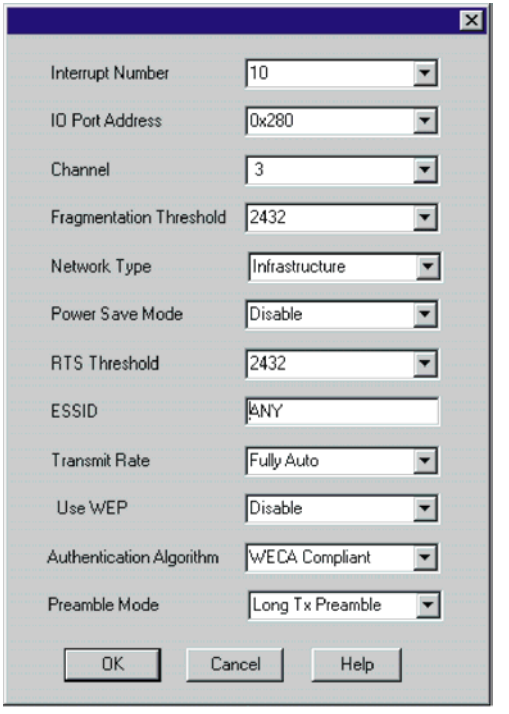
4.5 Advanced Configuration in Windows NT

Follow the steps below to access and configure the **Advanced Properties** window for your ZyAIR.

Step 1. Right-click **Network Neighborhood** on the desktop and select **Properties**.

Step 2. Click **Adapter** and select **ZyAIR 100 Wireless PCMCIA**.

Step 3. Click **Properties** to display the window shown next.



Change the Interrupt Number **or the** IO Port Address **only if there is a hardware conflict between your ZyAIR and other devices.**

Refer to *Table 4-1* and *Section 3.4* for field descriptions.

Part III:

ADDITIONAL INFORMATION

This part contains Troubleshooting, Appendices, and the Index.

Chapter 5
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.

5.1 Problems During Driver Installation

Table 5-1 Troubleshooting the Installation of Your ZyAIR

PROBLEM	CORRECTIVE ACTION
The ZyAIR is not working after the driver installation	Insert the PCMCIA adapter into your notebook computer's slot again. The Power and Link LED should be on if the adapter is properly inserted. Make sure there is no hardware conflict between your ZyAIR and other hardware in your computer. If there is a conflict, you need to set your I/O and IRQ manually. For Windows 95 (OSR2)/98/NT/2000 operating system, make sure that the PCMCIA adaptor driver is installed on your computer.
Windows does not auto-detect the ZyAIR	Restart your computer. Do a manual scan of your computer hardware. In Windows 2000, click **Start**, **Settings, Control Panel**, **System**, **Hardware, Hardware Wizard**. In Windows XP, click **Start**, **Control Panel, Performance and Maintenance, System, Hardware, Device Manager**. Then Right-click on your computer name and select **Scan for Hardware Changes**. Check your PCMCIA adapter and make sure there is no hardware conflict. Return your card to vendor for maintenance.

5.2 Problems With the Utility Configuration

Table 5-2 Troubleshooting the Configuration

PROBLEM	CORRECTIVE ACTION
Problems encountered with the utility configuration.	Click **Loopback** in the **Loop Back** window to check the link status with the AP it is associated with (in **Infrastructure** mode). Click on the **Site Survey** tab to check whether there is high interference around the environment. Make sure that you have set the correct IP address for the ZyAIR. Use the Ping command to ping the unit itself. **Netbeui** must be installed and relevant parameters properly set. Double-click **Network Neighborhood** on your Windows desktop. You should see your computer name.

5.3 Problems With Access Point Settings

Table 5-3 Troubleshooting the Settings for the Access Point

PROBLEM	CORRECTIVE ACTION
Problems with AP settings.	Make sure that the AP is on and that all the LEDs are working properly. Click **Ping** in **Loop Back** window to ping any other host. If the host does not respond, your Access Point might not be connected to the network.

5.4 Problems Communicating With the Computer

Table 5-4 Troubleshooting Communication Problems

PROBLEM	CORRECTIVE ACTION
The ZyAIR client cannot communicate with the other computer in the Ethernet when the Infrastructure mode is configured.	Make sure that the AP and the associated computer are on. Use the **Site Survey** utility to verify operating radio channel has low interference. Change the AP and all the stations within the BSS to another radio channel if interference is high. Make sure that the computer and the AP share the same security option and key. Make sure your computer and the AP use the same BSS ID for a roaming-disabled station. Make sure your computer and the AP use the same SS ID for a roaming-enabled station.
Site Survey utility displays red bars for all channels (high interference)	Move your computer closer to the AP within the transmission range. There is too much radio interference (for example microwave) around your wireless network. Relocate or reduce the radio interference.

Appendix A
Network Configuration

The ZyAIR 100 supports the same network configuration options of Legacy Ethernet LANs as defined by the IEEE 802 standard. The ZyAIR 100 can be configured as:

Ad-hoc for departmental or SOHO LANs.

Infrastructure for enterprise LANs.

LAN-interconnection for point-to-point link as a campus backbone.

Ad-hoc Wireless LAN Topology

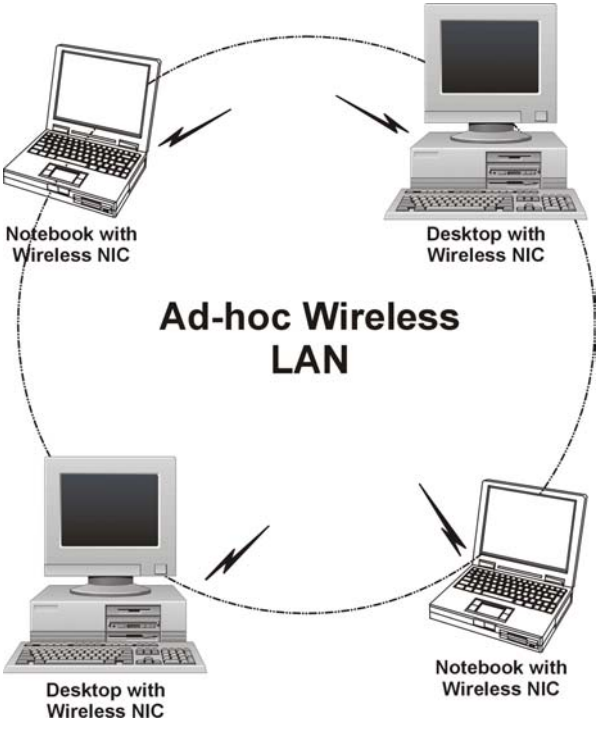


Diagram 1 Ad-hoc Wireless LAN Example

An Ad-hoc wireless LAN is a group of computers, each equipped with one wireless adapter, and connected as an independent wireless LAN. Computers in a specific Ad-hoc wireless LAN must be configured on the same radio channel. An Ad-hoc wireless LAN is available at a departmental scale for a branch or SOHO operation.

Wireless LAN Topology Infrastructure

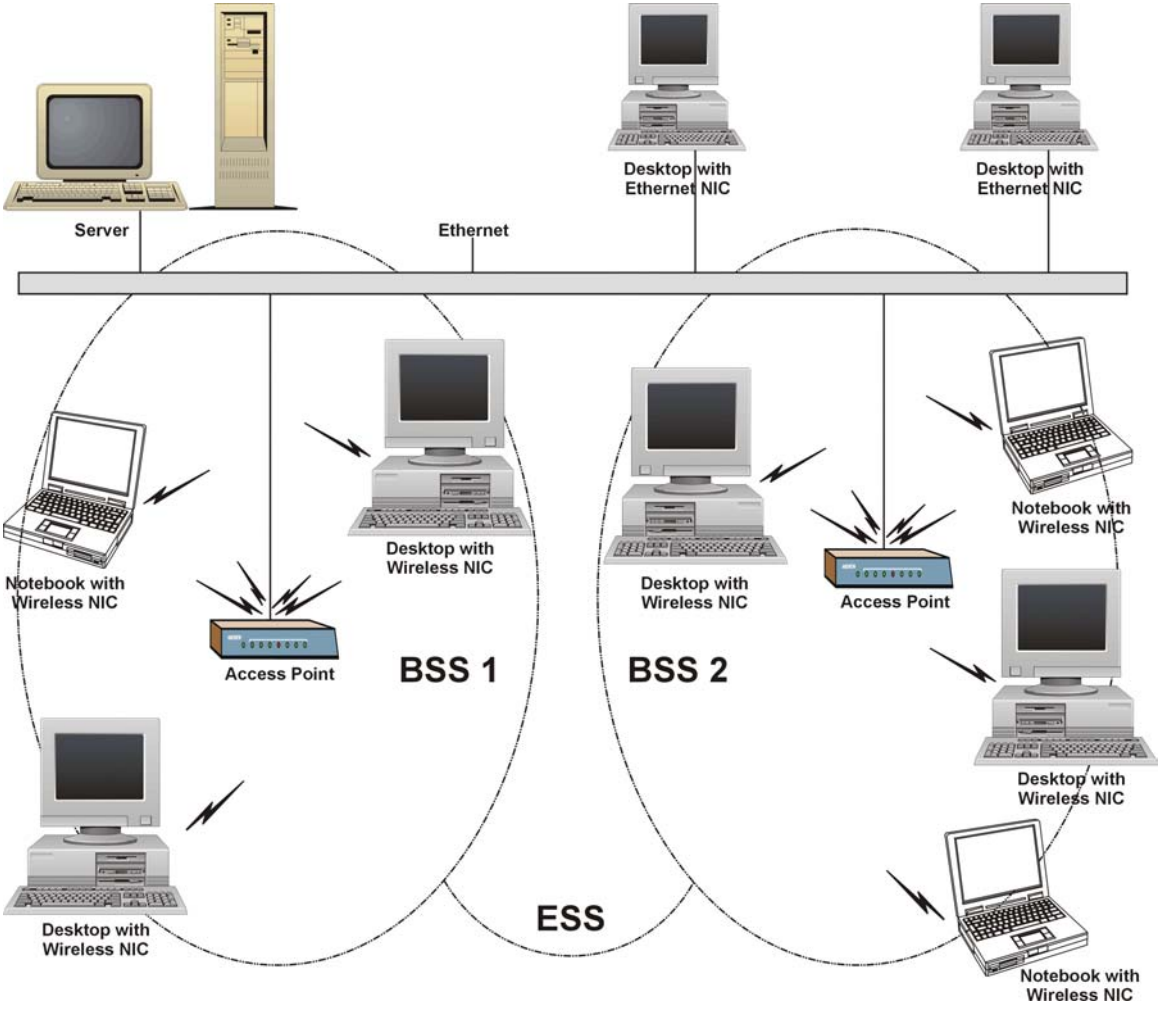


Diagram 2 Wireless LAN Infrastructure Example

The ZyAIR 100 provides access to a wired LAN for wireless computers. An integrated wireless and wired LAN is called an Infrastructure configuration. A group of wireless LAN computer users and an Access Point constitute a Basic Service Set (BSS). Each wireless-equipped computer in this BSS can talk to any computer in the wired LAN infrastructure via the Access Point.

Infrastructure configuration will extend the accessibility of a wireless station to the wired LAN. Multiple Access Points will allow roaming and it will increase the transmission range. The Access Point is also able to forward data within its BSS. The effective transmission range in an Infrastructure LAN is doubled.

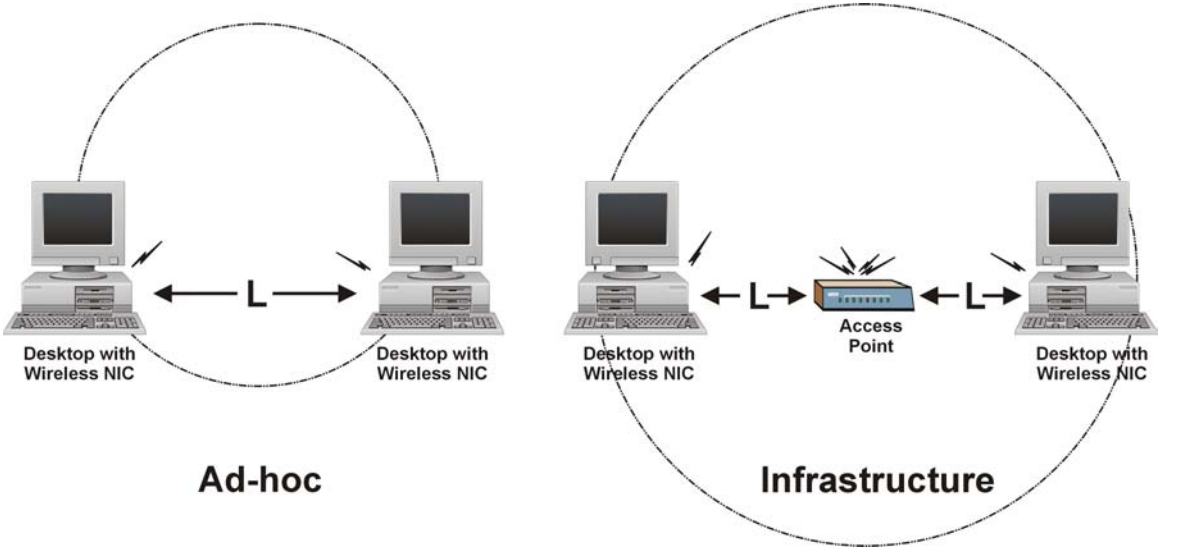


Diagram 3 Effective Transmission Range Example

Appendix B
Hardware Specifications

Diagram 4 ZyAIR 100 Specifications

Number of Operating Channels	11 for North America, 14 for Japan, 13 for Europe (ETSI), 2 for Spain, 4 for France
Operating Frequency	2.412 ~ 2.462 GHz (North America) 2.412 ~ 2.484 GHz (Japan) 2.412 ~ 2.472 GHz (Europe ETSI) 2.457 ~ 2.462 GHz (Spain) 2.457 ~ 2.472 GHz (France)
Range (in an open environment)	11 Mbps: 460 feet = 140m 5.5 Mbps: 656 feet = 200m 2 Mbps: 885 feet = 270m 1 Mbps: 1311 feet = 400m
RF Technology	Direct Sequence Spread Spectrum
Modulation	CCK (11 Mbps, 5.5 Mbps), DQPSK (2 Mbps), DBPSK (1 Mbps)
Voltage	3.3V and 5V DC
Power Consumption	Tx power consumption: < 350mA Rx power consumption: < 250mA Sleep Mode: 17mA
Output Power	13 dBm
Sensitivity	@PER < 0.08 11 Mbps < –83 dBm 5.5 Mbps < –86 dBm 2 Mbps < –89 dBm 1 Mbps < –91 dBm
Data Rate	1, 2, 5.5, 11 Mbps
Media Access Protocol	CSMA/CA, 802.11b compliant
Supported O/S	Windows 95 (OSR2)/98/ME/2000/NT4.0/XP

Appendix C
Important Safety Instructions

The following safety instructions apply to the ZyAIR 100 Wireless PCMCIA Card:

1. Be sure to read and follow all warning notices and instructions.
2. Do not service the product by yourself. Refer all servicing to qualified service personnel.
3. Generally, when installed after the final configuration, the product must comply with the applicable safety standards and regulatory requirements of the country in which it is installed. If necessary, consult the appropriate regulatory agencies and inspection authorities to ensure compliance.
4. A rare condition can create a voltage potential between the earth grounds of two or more buildings. If products installed in separate building are interconnected, the voltage potential can cause a hazardous condition. Consult a qualified electrical consultant to determine whether or not this phenomenon exists and if necessary, implement corrective action before interconnecting the products. If the equipment is to be used with telecommunications circuit, take the following precautions:
   - Never install telephone wiring during a lightning storm.
   - Never install telephone jacks in wet location unless the jack is specially designed for wet location.
   - Never touch non-insulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
   - Use caution when installing or modifying telephone lines (other than a cordless telephone) during an electrical storm. There is a remote risk of electric shock from lightning
5. In order to limit Radio Frequency (RF) exposure, the following rules should be applied:
   - Install the antenna in a location where a distance of 20 cm from the antenna may be maintained.
   - While installing the antenna in the location, please do not turn on the power of wireless card.
   - While the device is working (transmitting or receiving), please do not touch or move the antenna.
   - Do not operate a portable transmitter near unshielded blasting caps or in an explosive environment unless it is a type especially qualified for such use.
6. For Laptop (notebook) computer users, in order to comply with the FCC RF exposure limits, it is recommended when using a laptop with a wireless LAN adapter card that the card's integrated antenna should not be positioned closer than 5 cm (2 inches) from your body or nearby persons for extended periods of time while it is transmitting (or operating). If the antenna is positioned less than 5 cm (2 inches) from the user, it is recommended that the user limit exposure time.

Index

A

Access Point Setting Problem 5-2
Access Points Browser 3-9
Ad-hoc Topology ..... B
Advanced Concifugration
  Windows 2000/XP 4-3
  Windows 95 (OSR2)/98/ME 4-2
  Windows NT 4-4
Authentication Algorithm.....4-1
  Open 4-1
  Shared.....4-1
  WECA-compliant.....4-1

B

Basic Service Set..... D
BSS.....See Basic Service Set
BSS ID 3-9

C

Capacity.....3-9
Channel 3-9
  Operating.....E
Clear to Send protocol.....3-7
Communication Problem.....5-3
Configuration Problem.....5-2
Connectivity
  Seamless.....1-1
  Wireless.....1-1
CTS .....See Clear to Send
Customer Support..... vi

D

data collision 3-7
data encryption.....3-4
data rate 1-1
Direct Sequence Spread Spectrum (DSSS) Technology..... See Direct Sequence Spread Spectrum Technology
Direct Sequence Spread Spectrum Technology 1-1
disk space (minimum) free.....2-1

E

ESS ID 3-3, 3-9

F

Features 1-1
Frag Threshold 3-8
Fragmentation function 3-8
Frequency
  Operating.....E

H

Hardware Specifications .....E
Hidden Node problem.....3-7
hot swapping 2-2

I

Infrastructure Topology C
Inserting the ZyAIR 100 2-2

Installation
Hardware 2-1
Software 3-1
Installation Problem 5-1
Interrupt Number 4-4
IO Port Address 4-4

L

LED Descriptions 2-2

M

MAC address 3-9
Main Menu 3-3
Media Access Protocol ..... E
Modulation ..... E

N

Netbeui 5-2
Network Configuration ..... B
Network Type 3-4
Noise Level 3-10

O

O/S Supported ..... E

P

Parameter Configuration 3-1
PCMCIA adapter 2-2
PCMCIA slot 2-2
Power
Ouput ..... E
Power Consumption ..... E
Power Save 3-6
Preamble Mode 4-1
Long 4-2
Short 4-2
problem description 5-1

R

radio channel 3-10
Radio Frequency (RF) exposure ..... F
Range ..... E
Working 1-1
Rate
Data ..... E
Transmission 3-4
Related Documentation x
Request to Send protocol 3-7
RF Technology ..... E
roaming function 3-4
RTS ..... See Request to Send
RTS Threshold 3-7

S

Safety Instructions ..... F
security in transmission 3-4
Sensitivity ..... E
Signal Level 3-9
Site Survey 3-10
Support Disk x
Supporting Disk x
Syntax Conventions of this Manual xi
System Requirements 2-1

T

Transmission Range
Effective ..... D
Troubleshooting 5-1

V

Voltage ..... E

W

WEP ..... See Wired Equivalent Privacy
WEP Encryption Screen 3-5
Wired Equivalent Privacy 3-4

Z

ZyAIR 100
Advantage x
Applications 1-2
Features 1-1
ZyAIR 100 Utility
Setting Up 3-1
Using 3-2