

ZyAIR G-300

Wireless LAN PCI Adapter

User's Guide

Version 1.0

October 2003



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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.

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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.

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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

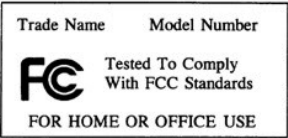
Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Caution

1. To comply with FCC RF exposure compliance requirements, a separation distance of at least 20 cm must be maintained between the antenna of this device and all persons.
2. This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

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Refer to the product page at www.zyxel.com.



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.
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LOCATION				
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 300, Taiwan
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Preface

Congratulations on the purchase of your new ZyAIR G-300 Wireless LAN PCI Adapter!

About This User's Guide

A practical and comprehensive tool, this guide provides information about the ZyAIR Wireless LAN Utility that you use to configure your ZyAIR.

Familiarize yourself with the *Syntax Conventions* listed below for better and faster understanding.

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 for an online glossary of networking terms and additional support documentation.

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.
- Window and command choices are in **Bold Times New Roman** font. Predefined field choices are in **Bold Arial** font.
- The ZyXEL ZyAIR G-300 Wireless LAN PCI Adapter is referred to as the ZyAIR in this guide.
- The ZyAIR G-300 PCI Adapter Utility may be referred to as the ZyAIR Utility in this guide.

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 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!

Chapter 1

Getting to Know Your ZyAIR

This chapter describes the key features and applications of your ZyAIR and introduces the basics of wireless LAN technology.

1.1 About Your ZyAIR

The ZyAIR is an IEEE 802.11g compliant wireless LAN PCI adapter that fits into any standard 32-bit PCI slot. With the ZyAIR, you can enjoy the wireless mobility within the coverage area. The IEEE 802.11g technology provides greater range and offers higher transmission rate at up to 54 Mbps.

The following lists the main features of your ZyAIR.

- Your ZyAIR can communicate with other IEEE 802.11b/g compliant wireless adapters.
- Automatic rate selection.
- Data transmission rates up to 54 Mbps.
- Offers 64-bit and 128-bit WEP (Wired Equivalent Privacy) data encryption for network security.
- Low CPU utilization allowing more computer system resources for other programs.
- An external antenna.
- Driver support for Windows 2000/XP.

1.2 Applications

Unlike wired networks, you can set up wireless networks in two different modes: infrastructure and ad-hoc. Set up your wireless network depending on your network needs. The following sections describe each network mode.

1.2.1 Ad-hoc

An ad-hoc network consists of two or more computers communicating with one another through the wireless network. No access points (APs) or existing wired networks are needed. An access point acts as a bridge between the wireless and wired networks

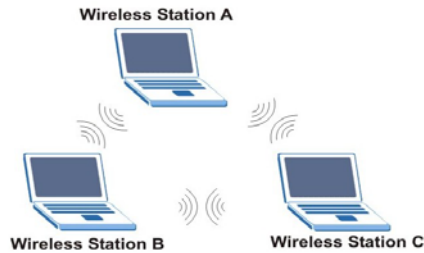


Figure 1-1 Ad-hoc Application

1.2.2 Infrastructure

When wireless stations wish to access and share resources on the wired network, they should use infrastructure mode. Wireless stations may move from one coverage area to another seamlessly without network interruption. This is called roaming.

The figure below depicts an infrastructure network example

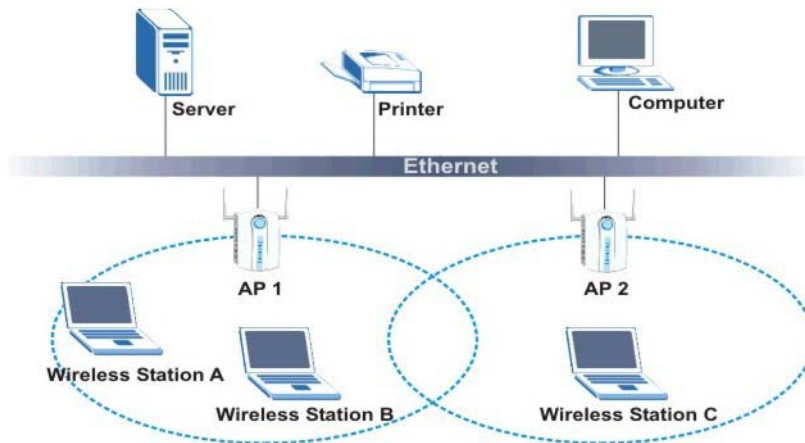


Figure 1-2 Infrastructure Application Example

An Infrastructure network has the following advantages over an ad-hoc network:

- Extended range: each wireless station within the range of an access point can communicate with other wireless station within range of the access point.
- Roaming: the access point enables a wireless station to move through a building and still be connected to the LAN.

- Wired to wireless LAN connectivity: the access point bridges the gap between wireless LANs and their wired counterparts.

1.3 Benefits of a Wireless LAN

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

- Access to network services in areas otherwise hard or expensive to wire, such as historical buildings, buildings with asbestos materials and classrooms.
- Doctors and nurses can access a complete patient's profile on a handheld or notebook computer upon entering a patient's room.
- It allows flexible workgroups a lower total cost of ownership for networks that are frequently reconfigured.
- Conference room users can access the network as they move from meeting to meeting- accessing up-to-date information that facilitates the ability to communicate decisions "on the fly".
- It provides campus-wide networking coverage, allowing enterprises the roaming capability to set up easy-to-use wireless networks that transparently covers an entire campus.

1.4 Notes on Wireless LAN Setup

When setting up a wireless LAN, be sure to note the following points:

- Optimize the performance of the WLAN by ensuring that the distance between access points is not too far. In most buildings, most WLAN adapters operate within a range of 100 ~ 300 feet, depending on the thickness and structure of the walls.
- Radio waves can pass through walls and glass but not metal. If there is interference in transmitting through a wall, it may be that the wall has reinforcing metal in its structure. Install another access point to circumvent this problem.
- Floors usually have metal girders and metal reinforcing struts that interfere with WLAN transmission.

1.5 ZyAIR Driver and Utility Installation

Refer to the *Quick Installation Guide* to install the ZyAIR hardware and the ZyAIR Utility.

Chapter 2

Disable Windows XP Wireless LAN Configuration Tool

Windows XP provides a configuration tool to set up wireless networks for IEEE802.11b and 802.11g wireless LAN devices. However, you should use the ZyAIR Utility in order to take full advantages of the ZyAIR features and functions.

DO NOT use the Windows XP configuration tool and the ZyAIR Utility at the same time. It is recommended 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.

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



Figure 2-1 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.

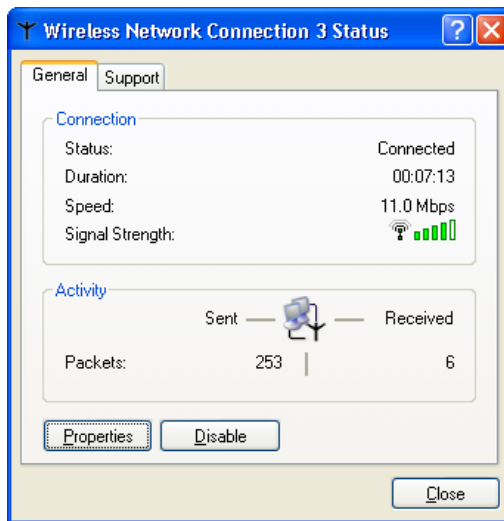


Figure 2-2 Windows XP: Wireless Network Connection Status

- 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 2-3 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**.

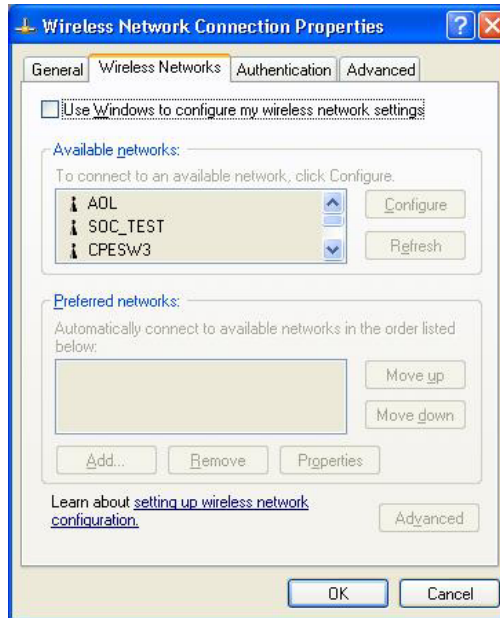


Figure 2-4 Windows XP: Wireless Network Connection Properties

Chapter 3

Using the ZyAIR Wireless LAN Utility

This chapter shows you basic ZyAIR configuration using the ZyAIR Utility.

Install the ZyAIR before you proceed. Refer to the *Quick Installation Guide*.

For Windows XP users: disable the Windows XP wireless configuration tool first before you proceed. Refer to *Chapter 2*.

Screen shots for Windows XP are shown unless otherwise specified.

3.1 Accessing the ZyAIR Utility

Follow the steps below to access the ZyAIR Utility

After you install 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 3-1 ZyAIR Utility: System Tray Icon

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

Table 3-1 ZyAIR Utility: System Tray Icon

COLOR	DESCRIPTION
Blue	The ZyAIR has a good or excellent connection to a wireless network.
Yellow	The ZyAIR has a usable but weak connection to a wireless network.
Red	The ZyAIR has no or a poor connection to a wireless network.

Double-click on the icon in the system tray to open the ZyAIR Utility.

3.2 Viewing Current Configuration

When the ZyAIR Utility starts, the **Configuration** screen displays first, showing the current configuration of your ZyAIR. If this is the first time you use the ZyAIR Utility, you must first connect to a wireless network. Refer to *Section 3.7*.

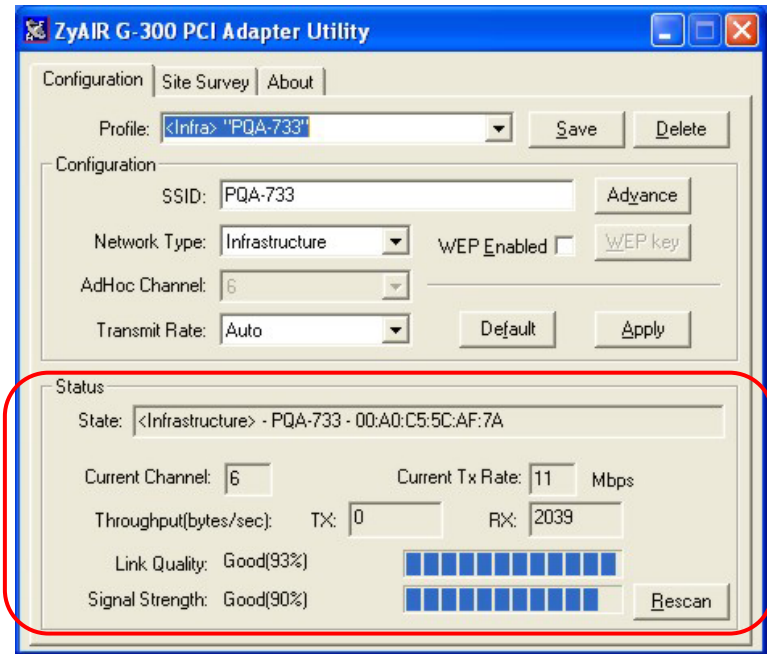


Figure 3-2 ZyAIR Utility: Configuration: Status

The following table describes the labels under **Status** in this screen.

Table 3-2 ZyAIR Utility: Configuration: Status

LABEL	DESCRIPTION
State	This field displays the type of wireless network and the name and MAC address of the wireless device to which the ZyAIR is connected.
Current Channel	This field displays the radio channel the ZyAIR is currently using.
Current Tx Rate	This field displays the current transmission rate of the ZyAIR in megabits per second.
Throughput (byte/sec)	
TX	This field displays the number of data frames transmitted.

Table 3-2 ZyAIR Utility: Configuration: Status

LABEL	DESCRIPTION
RX	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 show the strength of the signal.
Rescan	Click Rescan to re-establish connection to the wireless device whose SSID is shown in the State field.

3.3 Wireless LAN Parameters

This section describes each wireless LAN parameter.

3.3.1 Channel

The range of radio frequencies used by IEEE 802.11 wireless devices is called a “channel”. The number of available channels depends on your geographical area. You may have a choice of channels (for your region) so adjacent APs (access points) should use different channels to reduce crosstalk. Crosstalk occurs when radio signals from different access points overlap causing interference and degrading performance.

Adjacent channels partially overlap however. To avoid interference due to overlap, the AP should be on a channel at least five channels away from a channel that an adjacent AP is using. For example, if your region has 11 channels and an adjacent AP is using channel 1, then you need to select a channel between 6 or 11.

3.3.2 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.

3.3.3 Transmission Rate

ZyAIR provides various transmission (data) rate options for you to select. Options include **Auto** (default), **1Mbps**, **2Mbps**, **5.5Mbps**, **6Mbps**, **9Mbps**, **11Mbps**, **12Mbps**, **18Mbps**, **24Mbps**, **36Mbps**, **48Mbps** and **54Mbps**. In most networking scenarios, the factory default **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.

3.3.4 Wireless LAN Network Types

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**. 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** mode.

Ad-Hoc Mode

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

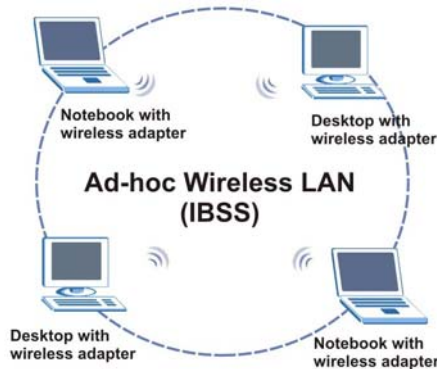


Figure 3-3 Ad-hoc Network Example

To set up an ad-hoc network, configure all wireless stations in ad-hoc network type and use the same SSID and channel.

Infrastructure Mode

When a number of wireless stations are connected using a single AP, you have a Basic Service Set (BSS).

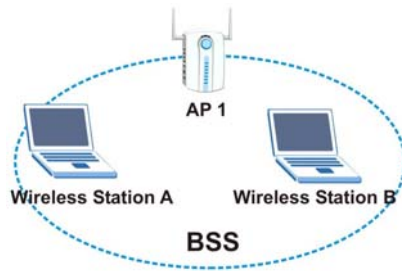


Figure 3-4 BSS Example

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 stations or devices connected to the wired network. Wireless stations can then access resource, such as the printer, on the wired network.

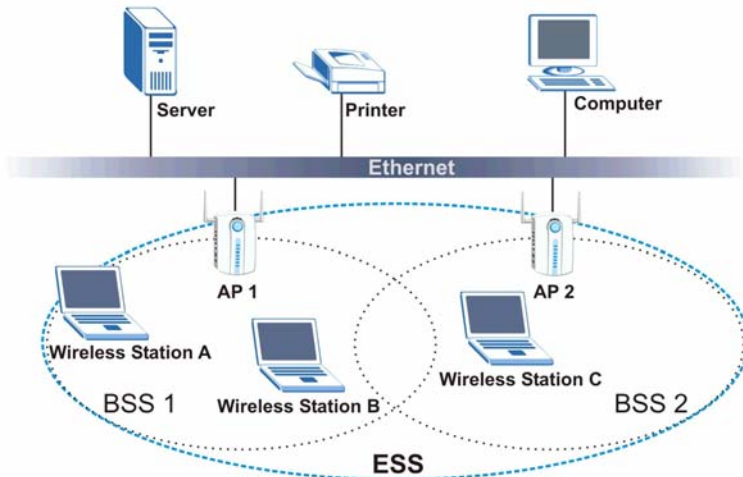


Figure 3-5 Infrastructure Network Example

3.4 Roaming

In an infrastructure network, wireless stations are able to switch from one AP 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 simple roaming example. When **Wireless Station B** moves to position **X**, the ZyAIR in **Wireless Station B** automatically switches the channel to the one used by **AP 2** in order to stay connected to the network.

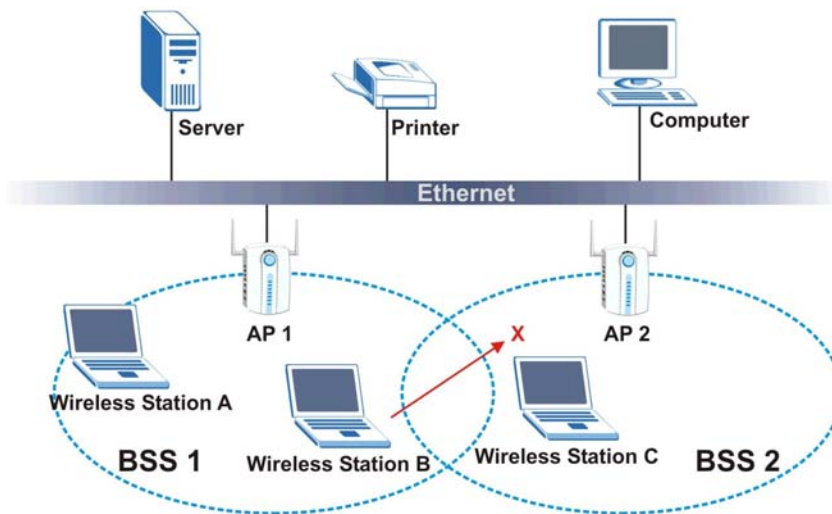


Figure 3-6 Roaming Example

3.5 Configuring the ZyAIR Wireless Parameters

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

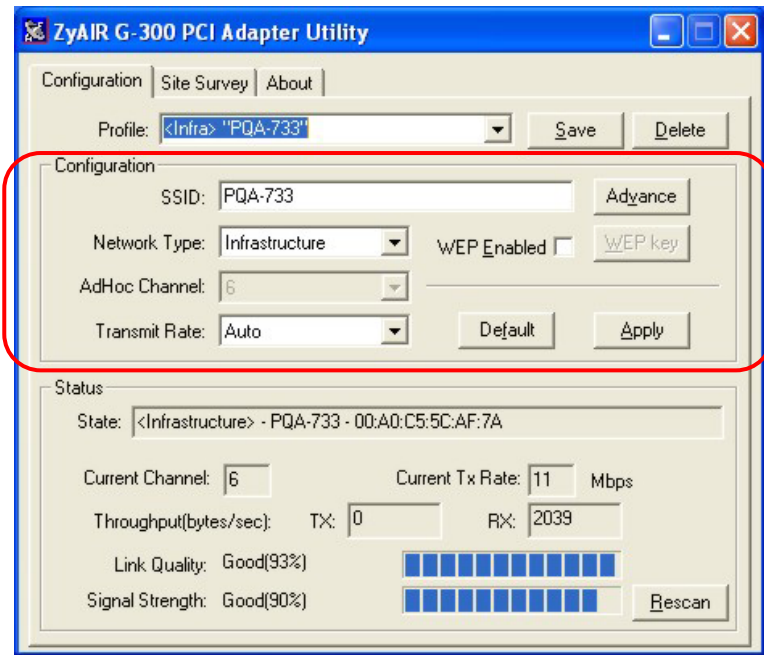


Figure 3-7 ZyAIR Utility: Configuration: Configuration

Follow the instructions in the table below to configure the wireless LAN related fields. Refer to the next section for **Profile** field descriptions.

Table 3-3 ZyAIR Utility: Configuration: Configuration

FIELD	DESCRIPTION
Configuration	
SSID	Enter the SSID (Service Set Identifier) of the AP or the peer ad-hoc computer to which you want to associate in this field. To associate to an ad-hoc network, you must enter the same SSID as the peer ad-hoc computer. Enter any to associate to or roam between any infrastructure wireless networks.
Advanced	Click Advanced to display the Advanced Configuration screen. Refer to the <i>Advanced Configuration</i> chapter.

Table 3-3 ZyAIR Utility: Configuration: Configuration

FIELD	DESCRIPTION
Network Type	Select Infrastructure or Ad-Hoc from the drop-down list box. Select Infrastructure to associate to an AP. Select Ad-Hoc to associate to a peer ad-hoc computer. Refer to <i>Section 3.3.4</i> for more information.
WEP Enabled	The WEP keys are used to encrypt data before transmitting. Select this check box to activate WEP encryption. Refer to <i>Chapter 4</i> for more information.
AdHoc Channel	This field is activated if you select Ad-Hoc in the Network Type field. Select the channel number from the drop-down list box. To associate to a peer ad-hoc computer, you must use the same channel as the peer ad-hoc computer.
Transmit Rate	Select a transmission rate from the drop-down list box. Choose from Auto (default), 1Mbps , 2Mbps , 5.5Mbps , 6Mbps , 9Mbps , 11Mbps , 12Mbps , 18Mbps , 24Mbps , 36Mbps , 48Mbps and 54Mbps .
Default	Click Default to return the field settings under Configuration back to the factory defaults.
Apply	Click Apply to save and activate the field settings under Configuration .

3.6 Network Configuration Profile Setting

The **Profile** function in the **Configuration** screen allows you to save the wireless network settings in the **Configuration** screen, use one of the pre-configured network profiles a profile.

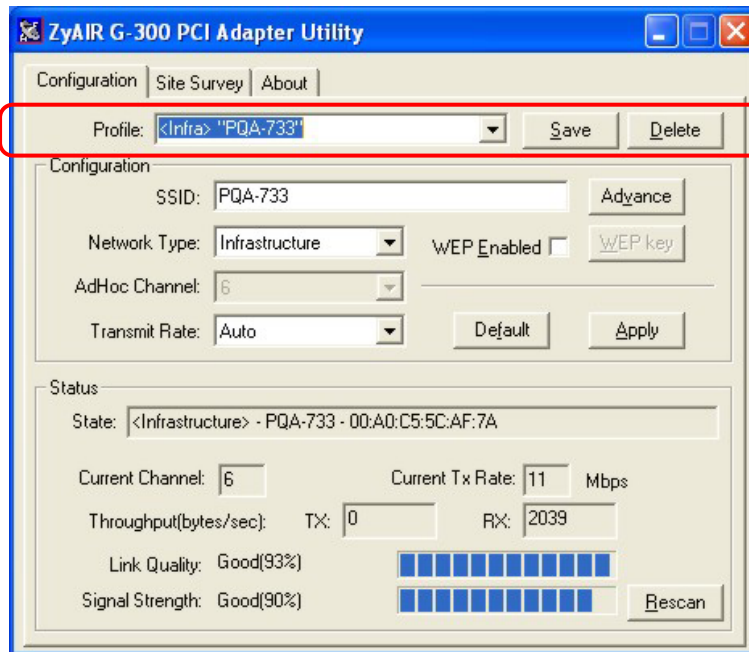


Figure 3-8 ZyAIR Utility: Configuration: Profile

3.6.1 Saving the Current Setting to a Profile

To save the current settings in the **Configuration** screen to a new profile, enter a descriptive name in the **Profile** field and click **Save**.

3.6.2 Using a Pre-configured Profile

To use a previously saved network profile, select the profile file name from the drop-down list box.

Once you activate a profile, the ZyAIR Utility will use that profile the next time it is started. If you do not activate a profile, the ZyAIR Utility reverts to use the default profile.

3.6.3 Deleting a Profile

To delete an existing wireless network configuration, select a profile from the drop-down list box and click **Delete**.

3.7 Site Survey

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

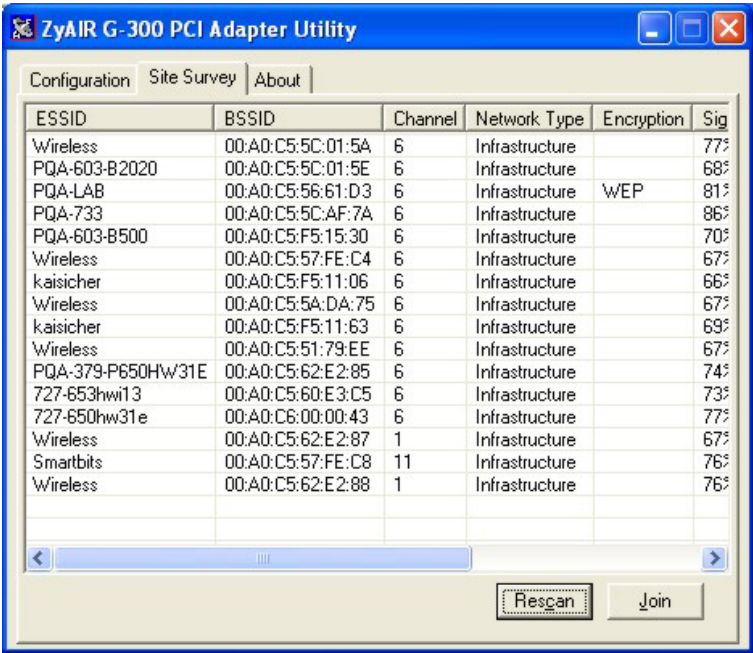


Figure 3-9 ZyAIR Utility: Site Survey

The following table describes the fields in this screen.

Table 3-4 ZyAIR Utility: Site Survey

FIELD	DESCRIPTION
ESSID	This field displays the ESSID (or name) 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.
Network Type	This field displays the wireless network type (Infrastructure or Ad Hoc) of the wireless device.
Encryption	This field shows whether the WEP data encryption is activated (WEP) or inactive.
Signal	This field displays the signal strength of each wireless device in percentage.

Table 3-4 ZyAIR Utility: Site Survey

FIELD	DESCRIPTION
Rates	This field displays the transmission rates the wireless device supports.
Rescan	Click Rescan to scan for available wireless device(s) within transmission range.
Join	Click Join to associate to the selected wireless device.

3.7.1 Connecting to a Network

Follow the steps below to connect to a network using the **Site Survey** screen.

- Step 7.** Click **Rescan** to scan for all available wireless devices within range.
- Step 8.** To join a network, click an entry in the table to select a wireless device and click **Join**.
- Step 9.** If the **Encryption** field is **WEP** for the selected wireless network, you must then configure the WEP keys on the ZyAIR. Refer to *Chapter 4*.
- Step 10.** Verify that you have successfully connected to the selected network and check the network information in the **Configuration** screen.

3.8 The About Screen

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

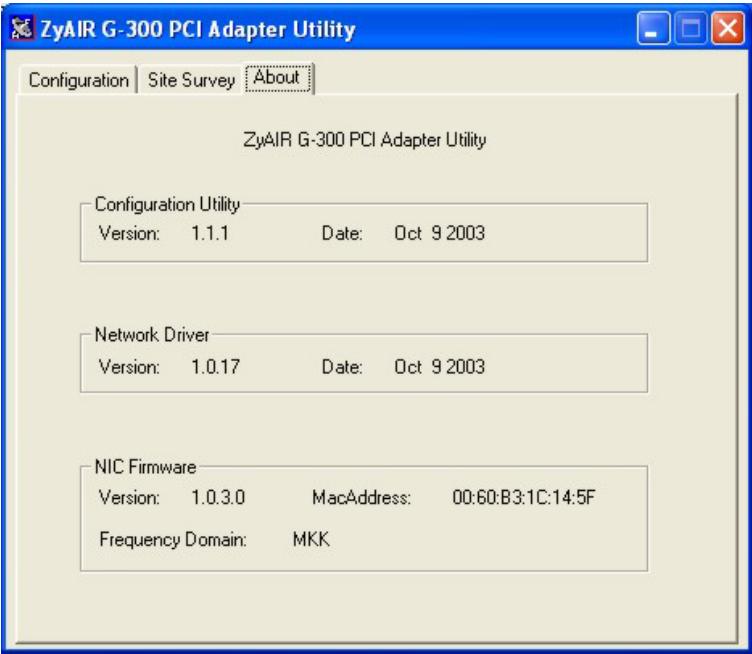


Figure 3-10 ZyAIR Utility: About

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

Table 3-5 ZyAIR Utility: About

FIELD	DESCRIPTION
Configuration Utility Version	This field displays the version number of the ZyAIR Utility.
Network Driver Version	This field displays the version number of the Windows driver for the ZyAIR.
NIC Firmware Version	This field displays the firmware version and the MAC address of the ZyAIR.
Frequency Domain	This field displays the regional code. This field displays MKK (Japan), ETSI (Europe) or FCC (North America). If you set your ZyAIR in Ad-Hoc mode, this field displays FCC .

Chapter 4

Wireless LAN Security

This chapter shows you how to set up the wireless LAN security available in the ZyAIR.

4.1 Introduction

Wireless LAN security is vital to your network to protect wireless communication between wireless stations and the wired network.

Configure the wireless LAN security using the **Encryption** screen. If you do not enable any wireless security on your ZyAIR, data transferred between the ZyAIR and the wired network is accessible to any network device.

4.1.1 Data Encryption with WEP

WEP (Wired Equivalent Privacy) encryption scrambles the data transmitted between the ZyAIR and the AP or other wireless stations to keep network communications private. It encrypts unicast and multicast communications in a network. 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 automatically generated WEP keys from the **Encryption** 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.

4.1.2 Authentication Mode

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.

4.2 Configuring Encryption on the ZyAIR

In the **Configuration** screen, select **WEP Enable** and click **Edit** to display the **Encryption** screen as shown next.

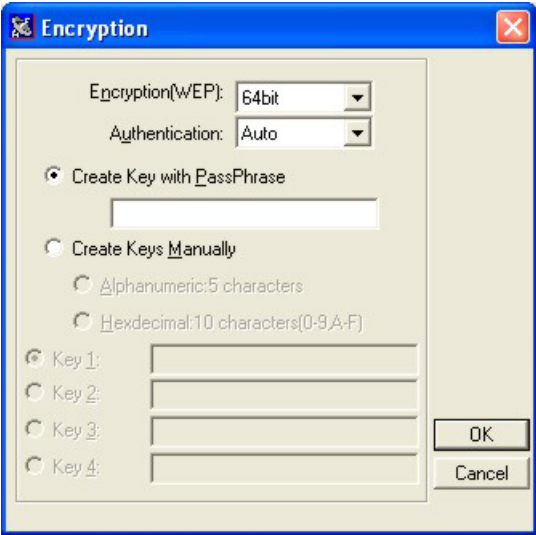


Figure 4-1 ZyAIR Utility: Encryption

The following table describes the fields in this screen.

Table 4-1 ZyAIR Utility: Encryption

FIELD	DESCRIPTION
Encryption (WEP)	<p>The WEP keys are used to encrypt data before it is transmitted. The values for the keys must be set up exactly the same on the APs or other peer ad-hoc wireless computers as they are on the ZyAIR.</p> <p>Select either 64bit or 128bit from the drop-down list box to activate WEP encryption and then fill in the related fields.</p>
Authentication	<p>Select an option from the drop-down list box to authenticate the access point.</p> <p>Refer to <i>Section 4.1.2</i> for more information.</p>
Create Key with PassPhrase	<p>Select this option and enter the passphrase in the field provided. As you enter the passphrase, the ZyAIR automatically generates the WEP keys and displays them in the key fields below. Write down the automatically generated WEP keys in and use them to manually set the WEP keys in other WLAN adapters.</p> <p>The passphrase is case-sensitive. You must use the same passphrase for all wireless LAN adapters with this feature in the same WLAN.</p>
Create Key Manually	Select this option if you want to manually enter the WEP keys.
Alphanumeric	Select this option to enter WEP keys as ASCII characters.
Hexadecimal	Select this option to enter the WEP keys as hexadecimal characters.

Table 4-1 ZyAIR Utility: Encryption

FIELD	DESCRIPTION
Key 1 ... 4	<p>Enter the WEP keys in the fields provided.</p> <p>If you select 64bit in the Encryption(WEP) field.</p> <ul style="list-style-type: none">♦ Enter either 10 hexadecimal digits in the range of “A-F”, “a-f” and “0-9” (e.g. 11AA22BB33) for HEX key type <p>or</p> <ul style="list-style-type: none">♦ Enter 5 printable ASCII characters (case sensitive) ranging from “a-z”, “A-Z” and “0-9” (e.g. MyKey) for ASCII key type. <p>If you select 128bit in the Encryption(WEP) field,</p> <ul style="list-style-type: none">♦ Enter either 26 hexadecimal digits in the range of “A-F”, “a-f” and “0-9” (for example, 00112233445566778899AABBCC) for HEX key type <p>or</p> <ul style="list-style-type: none">♦ Enter 13 printable ASCII characters (case sensitive) ranging from “a-z”, “A-Z” and “0-9” (for example, MyKey12345678) for ASCII key type. <div><p>ASCII WEP key is case sensitive.</p><p>Select a WEP key to use for data encryption.</p></div>
OK	Click OK to save the changes.
Cancel	Click Cancel to discard all changes and close the screen.

Chapter 5

Advanced Configuration

This chapter shows you how to configure advanced features of the ZyAIR.

5.1 Overview

The following sections introduce the advanced features you can configure.

5.1.1 Threshold Controls

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 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 Threshold** size.

RTS 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.

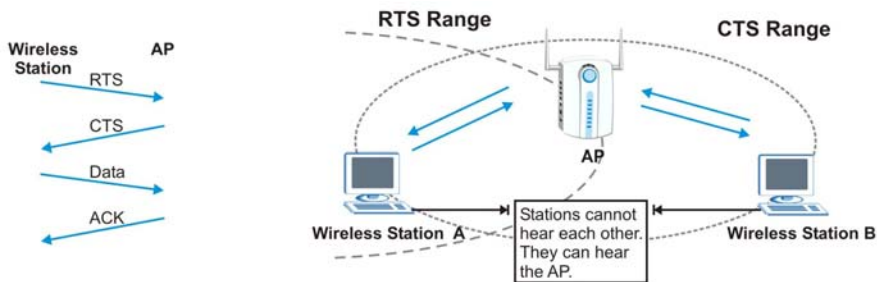


Figure 5-1 RTS Threshold

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 Threshold is designed to prevent collisions due to hidden nodes. An **RTS 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 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 Threshold** directly to the AP without the RTS (Request To Send)/CTS (Clear to Send) handshake.

You should only configure **RTS 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 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 Threshold** size.

Enabling the RTS threshold causes redundant network overhead that may affect throughput performance.

5.2 The Advanced Configuration Screen

In the **Configuration** screen, click **Advanced** to display the pop-up screen as shown.

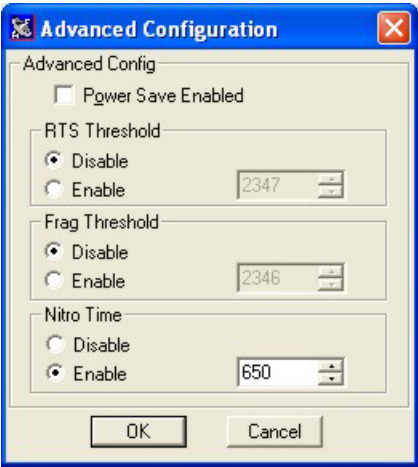


Figure 5-2 Configuration: Advanced

The following table describes the labels in this screen.

Power Save Enable	Select this check box to reduce power consumption (especially for laptop computers). This forces the ZyAIR to go to sleep mode when it is not transmitting data. <div>This only works if the wireless device to which the ZyAIR is connected also supports this feature.</div>
RTS 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.
Frag Threshold	The threshold (number of bytes) for the fragmentation boundary for directed messages. It is the maximum data fragment size that can be sent.
Nitro Time	This is the time interval (in usec) between packet bursts. This allows your ZyAIR to operate in a network with IEEE802.11b wireless LAN devices and still take advantage of higher transmission rates with IEEE802.11g standard.
OK	Click OK to save the settings.
Cancel	Click Cancel to discard all changes and close this screen.

Chapter 6

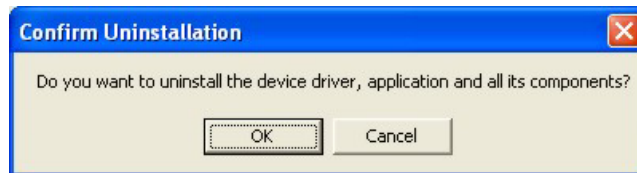
Removing and Upgrading the ZyAIR Utility

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

6.1 Removing the ZyAIR Utility

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

- Step 1.** Close and exit the ZyAIR Utility.
- Step 2.** Click **Start**, (all)Programs, ZyAIR G-300 PCI Adapter Utility, Uninstall ZyAIR G-300 Adapter Utility.
- Step 3.** When prompted, click **Yes** to remove the driver and the utility software.



- Step 4.** Click **Finish** and restart the computer when prompted.

6.2 Upgrading the ZyAIR Utility

To perform the upgrade, follow the steps below.

- Step 5.** Download the latest version of the utility from the ZyXEL web site and save the file on your computer.
- Step 6.** Follow the steps in the *Removing the ZyAIR Utility* section to remove the current ZyAIR Utility from your computer.
- Step 7.** Restart the computer when prompted.
- Step 8.** After restarting, refer to the procedure in the *Quick Installation Guide* to install the new utility software.
- Step 9.** Check the version numbers in the **About** screen to make sure the new utility is installed properly.

Chapter 7

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.

7.1 Problems Starting the ZyAIR Utility Program

Table 7-1 Troubleshooting Starting ZyAIR Utility Program

Cannot start the ZyAIR Wireless LAN Utility	Make sure the ZyAIR is properly inserted and the LED is on. Refer to the <i>Quick Installation Guide</i> for the LED descriptions.
	Use the Device Manager to check for possible hardware conflicts. Click Start, Settings, Control Panel, System, Hardware and Device Manager . Verify the status of the ZyAIR under Network Adapter . (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.

7.2 Problems Communicating With Other Computers

Table 7-2 Troubleshooting Communication Problems

PROBLEM	CORRECTIVE ACTION
The ZyAIR computer cannot communicate with the other computer.	Make sure you are connected to the network.

Table 7-2 Troubleshooting Communication Problems

PROBLEM	CORRECTIVE ACTION
A. Infrastructure	<p>Make sure that the AP and the associated computers are turned on and working properly.</p> <p>Make sure the ZyAIR and the associated AP use the same SSID.</p> <p>Configure the AP to use another radio channel if interference is high.</p> <p>Make sure that the computer and the AP share the same WEP key and authentication mode. Verify the settings in the Encryption and Advanced screens.</p>
B. Ad-Hoc	<p>Verify that the peer computer(s) is turned on.</p> <p>Make sure the ZyAIR and the peer computer(s) are using the same SSID and channel.</p> <p>Use another radio channel if interference is high.</p> <p>Make sure that the ZyAIR and the AP share the same WEP key and authentication mode. Verify the settings in the Encryption and Advanced screens.</p>

7.3 Problem with the Link Status

Table 7-3 Troubleshooting Link Status

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

Appendix A

Product Specifications

Product Specifications

Product Name	ZyAIR G-300 Wireless LAN PCI Adapter
Type	3.3V 32-bit PCI adapter
Standards	IEEE 802.11b IEEE 802.11g
Network Architectures	Infrastructure Ad-Hoc
Operating Frequencies	2.412-2.483GHz
Operating Channels	IEEE 802.11b: 11 Channels (North America) IEEE 802.11g: 11 Channels (North America) IEEE 802.11b: 13 Channels (Europe) IEEE 802.11g: 13 Channels (Europe)
Data Rate	IEEE 802.11b: 11, 5.5, 2, 1Mbps IEEE 802.11g: 54, 48, 36, 24, 18, 12, 9, 6 Mbps
Modulation	IEEE 802.11g: Orthogonal Frequency Division Multiplexing (64QAM, 16QAM, QPSK and BPSK) IEEE 802311b: Direct Spread Spectrum (CCK, DQPSK, DBOSK).
Security	64/128-bit WEP
Operating Temperature	0 ~ 55 degrees Centigrade
Storage Temperature	-10 ~ 65 degrees Centigrade
Operating Humidity	90% (non-condensing)
Storage Humidity	20 ~ 80% (non-condensing)
Power Consumption	TX: 460mA RX: 310mA
Voltage	3.3V±5%
Weight	<80g
Dimension	134mm(L)*121mm(W)*22mm(H)

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