ZyAIR G-1000

Wireless LAN 54 Mbps Access Point

Quick Installation Guide

Version 3.50
July 2003

ZyXEL
Unleash Networking Power

Table of Contents

1 Introducing the ZyAIR

The ZyAIR G-1000 is an IEEE802.11g-compliant, 54 Mbps wireless LAN access point. It is suited for a wireless connection to the wired network in a home and small office environment. The key features of the ZyAIR G-1000 are IEEE 802.1x, WEP data encryption and MAC address filtering. See your *User's Guide* for more details on all ZyAIR features.

2 Hardware

This section provides details on hardware specifications.

2.1 Top Panel and Connections

LABEL	DESCRIPTION
ETHERNET	Use an Ethernet cable to connect to a computer (with an Ethernet card) for initial configuration to this port. The port is auto-negotiating (can connect at 10 or 100 Mbps) and auto-crossover (automatically adjusts to the type of Ethernet cable you use (straight-through or crossover)).
RESET	You only need to use this button if you've forgotten the ZyAIR's password or the IP address is not known. It returns the ZyAIR to the factory defaults (password is 1234 and LAN IP address 192.168.1.2). Refer to the *User's Guide*.
POWER 12VDC	Connect the end of the included power adaptor to this power socket. **Use only the included power adaptor.**

2.2 The LED Display

The **PWR** LED turns on when the power is connected. The Link LED blinks and turns off. The ZyAIR LED turns on after the system test. The **ETHN** LED turns on, if the **ETHERNET** port is properly connected.

Figure 1 Front Panel LEDs

Table 1 Front Panel LED Description

LED	COLOR	STATUS	DESCRIPTION
Link	Red	Blinking	The ZyAIR is not ready or rebooting.
		Off	The ZyAIR is working properly.
ZyAIR (WLAN ACK)	Blue	Breathing	The ZyAIR is sending/receiving data.
		On	The ZyAIR is ready, but is not sending/receiving data.
ETHN	Green	On	The ZyAIR has a successful 10Mb Ethernet connection.
		Blinking	The ZyAIR is sending/receiving data.
		Off	The ZyAIR does not have 10Mb Ethernet connection.
	Orange	On	The ZyAIR has a successful 100Mb Ethernet connection.
		Blinking	The ZyAIR is sending/receiving data.
		Off	The ZyAIR does not have 100Mb Ethernet connection.
PWR	Green	On	The ZyAIR is receiving power.
		Off	The ZyAIR is not receiving power.

3 Setting Up Your Computer's IP Address

Skip this section if your computer's IP address is already in the range of 192.168.1.3 ~ 192.168.1.254 with subnet mask 255.255.255.0.

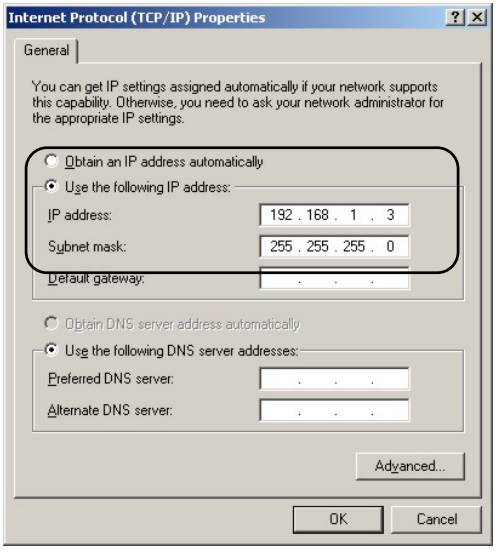
Your computer must have a network card and TCP/IP installed. TCP/IP should already be installed on computers using Windows NT/2000/XP, Macintosh OS 7 and later operating systems.

3.1 Windows 2000/NT/XP

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

   In Windows 2000/NT, click **Network and Dial-up Connections**.
3. Right-click **Local Area Connection** and then click **Properties**.
4. Select **Internet Protocol (TCP/IP)** (under the **General** tab in Win XP) and click **Properties**.
5. The **Internet Protocol TCP/IP Properties** screen opens (the **General** tab in Windows XP).

   Configure your computer to use a static IP address, select **Use the following IP Address** and fill in the **IP address** (192.168.1.3 to 192.168.1.254) and **Subnet mask** (255.255.255.0) fields.



6. Leave the **Preferred DNS sever** and **Alternate DNS server** fields blank if you do not know the IP address(es) of the DNS server.
7. Click **OK** to close the **Internet Protocol (TCP/IP) Properties** window.
8. Click **OK** to close the **Local Area Connection Properties** window.

3.2 Testing the Connection to the ZyAIR

1. Click **Start**, (**All**) **Programs**, **Accessories** and then **Command Prompt**.
2. In the **Command Prompt** window, type "ping 192.168.1.2" followed by a space and the IP address of the ZyAIR (192.168.1.2 is the default).
3. Press **ENTER**. The following screen displays.

```
C:\>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

Reply from 192.168.1.2: bytes=32 time=10ms TTL=254
Reply from 192.168.1.2: bytes=32 time<10ms TTL=254
Reply from 192.168.1.2: bytes=32 time<10ms TTL=254
Reply from 192.168.1.2: bytes=32 time<10ms TTL=254

Ping statistics for 192.168.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum =  10ms, Average =  2ms

C:\>
```

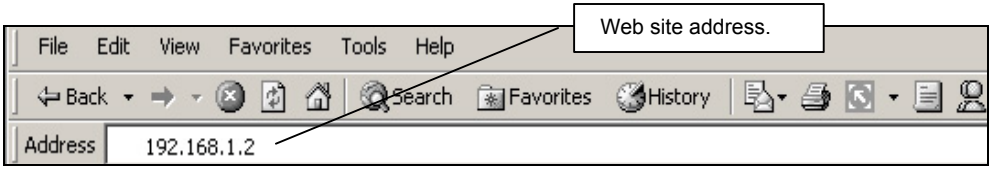
Your computer can now communicate with the ZyAIR.

4 Configuring the ZyAIR

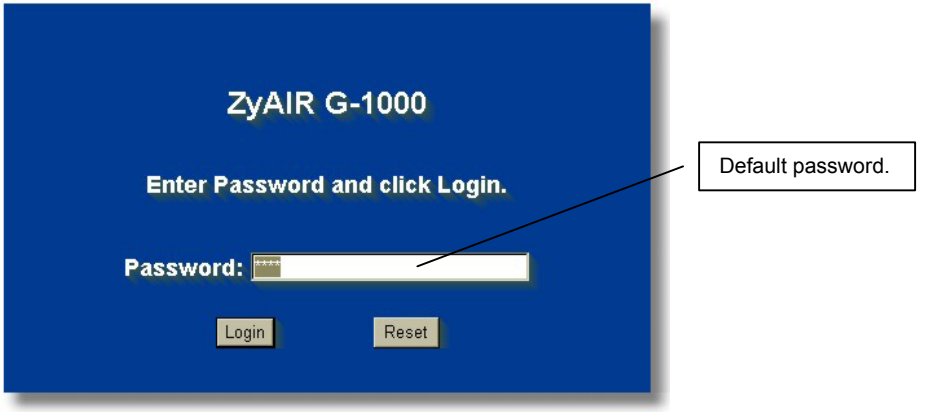
The *Quick Installation Guide* shows you how to use the web configurator only. See your *User's Guide* for background information on all ZyAIR features and SMT (System Management Terminal) configuration.

4.1 Accessing the ZyAIR via the Web Configurator

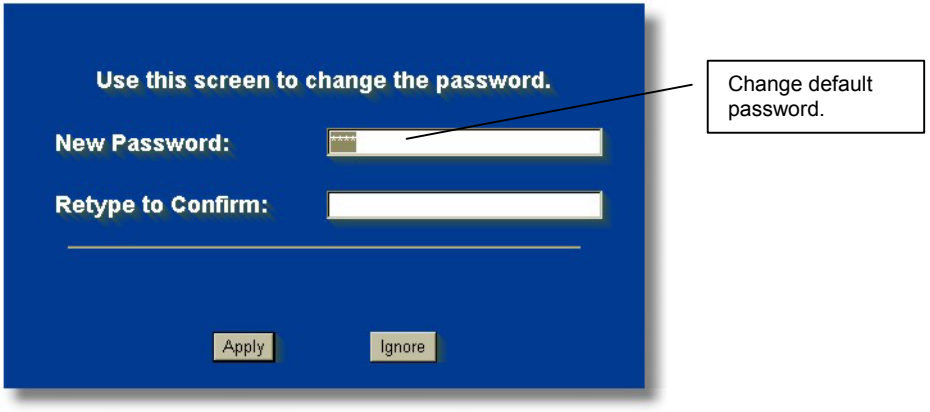
1. Launch your web browser. Enter "192.168.1.2" as the web site address.



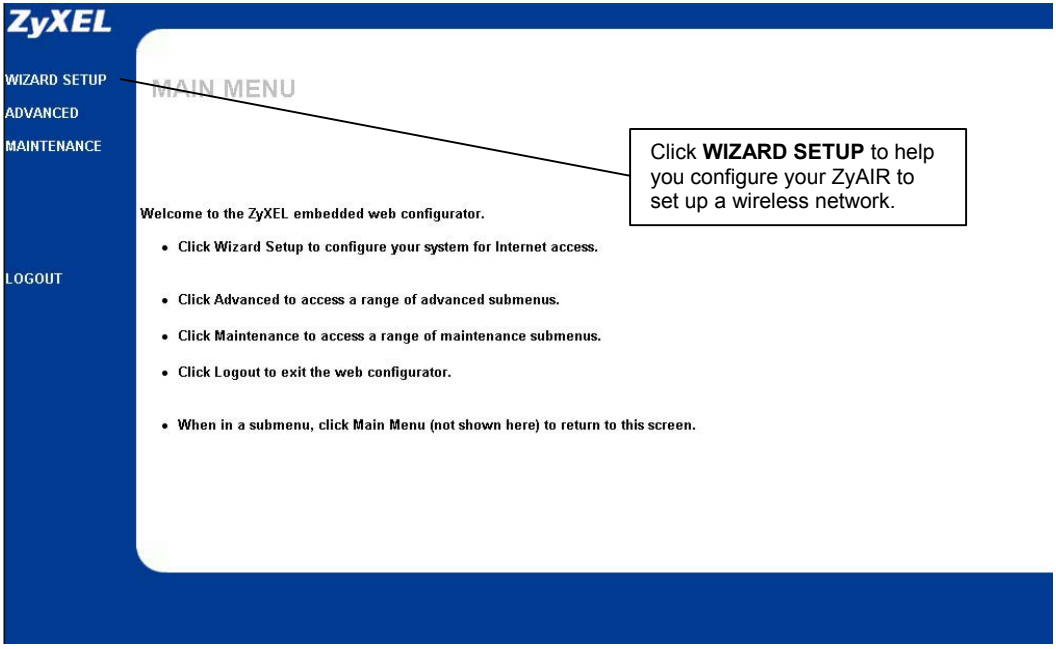
2. The default password ("1234") is already in the password field (in non-readable format). Click **Login** to proceed to a screen asking you to change your password. Click **Reset** to revert to the default password in the password field.



3. It is highly recommended you change the default password. Enter a new password, retype it to confirm and click **Apply**; alternatively click **Ignore** to proceed to the **MAIN MENU** screen if you do not want to change the password now.



4. You should now see the web configurator **MAIN MENU** screen.

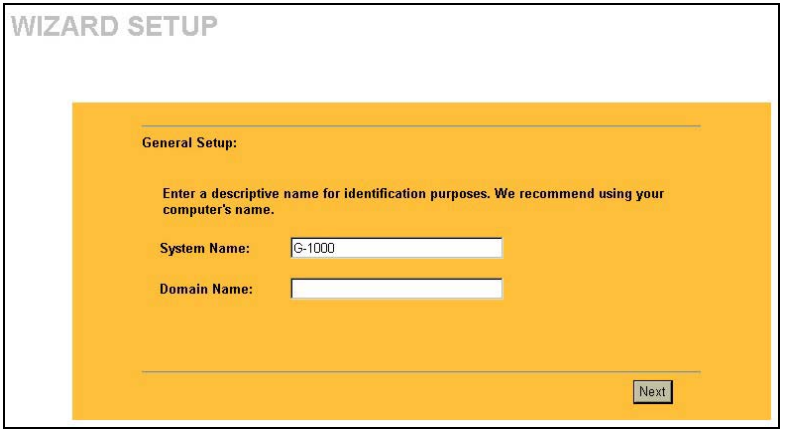


The ZyAIR automatically times out after five minutes (default) of inactivity. Simply log back into the ZyAIR if this happens.

4.2 Configuring the ZyAIR Using the Wizard

The wizard consists of a series of screens to help you configure your ZyAIR for wireless stations to access your wired LAN. Refer to your *User's Guide* for more background information.

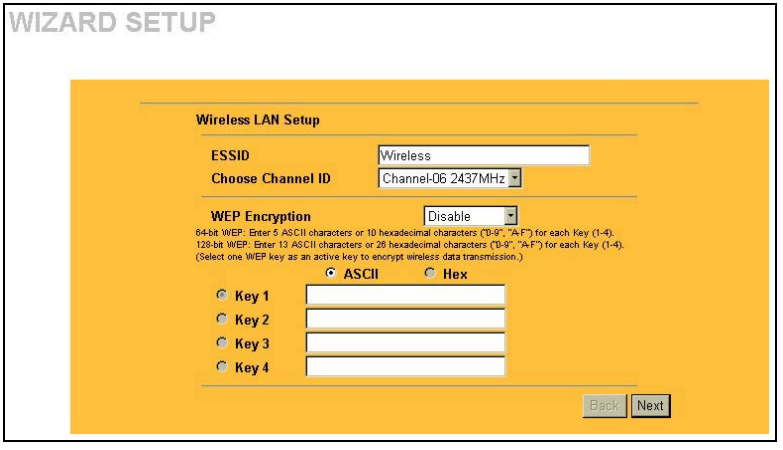
5. Click **WIZARD SETUP** in the main menu to display the first wizard screen shown next.



System Name is a unique name to identify the ZyAIR in the Ethernet network. Enter a descriptive name.

Leave the **Domain Name** entry blank and click **Next** to continue.

6. Use the second wizard screen to set up the wireless LAN.



ESSID is a unique name to identify the ZyAIR in the wireless LAN. Enter a descriptive name.

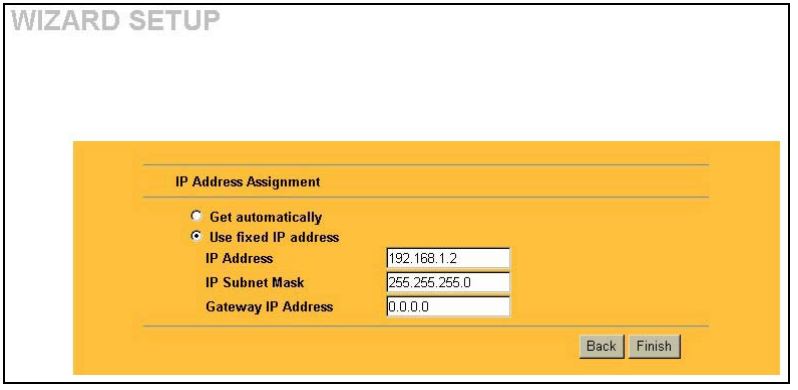
A channel is the range of radio frequencies used by IEEE 802.11g wireless devices.

Choose a radio channel to use in the **Choose Channel ID** field.

WEP (Wired Equivalent Privacy) encrypts data frames before transmitting them over the wireless network. Select either **64-bit** or **128-bit** from the **WEP Encryption** drop-down list box to activate WEP encryption. Select **Disable** to turn off WEP data encryption.
Select **ASCII** or **HEX** WEP key input method and then follow the on-screen instructions to set up the WEP keys.
Click **Next** to continue.

The wireless stations and ZyAIR must use the same ESSID, channel ID and WEP encryption key (if WEP is enabled) for wireless communication.

7. Fill in the fields in the last wizard configuration screen.



Select **Get automatically** to have the ZyAIR obtain an IP address from a DHCP server.
You must know the IP address assigned to the ZyAIR (by the DHCP server) to access the ZyAIR again.

Select **Use fixed IP address** to give the ZyAIR a fixed, unique IP address. Enter a subnet mask appropriate to your network and the gateway IP address if applicable.
Click **Finish**.

If you change the ZyAIR's IP address, you must use the *new* IP address if you want to access the web configurator again.

8. Change the wireless parameter settings in the wireless stations to match those of the ZyAIR. Refer to the user's guide for your wireless adapter.

5 Advanced Configuration

5.1 Wireless LAN Overview

This section introduces the wireless LAN and some basic configurations. Wireless LANs can be as simple as two computers with wireless adapters communicating in a peer-to-peer network or as complex as a number of computers with wireless adapters communicating through access points (APs) which bridge network traffic to the wired LAN.

5.2 Configuring Wireless LAN

Click **ADVANCED** and **WIRELESS** to open the screen as shown next.

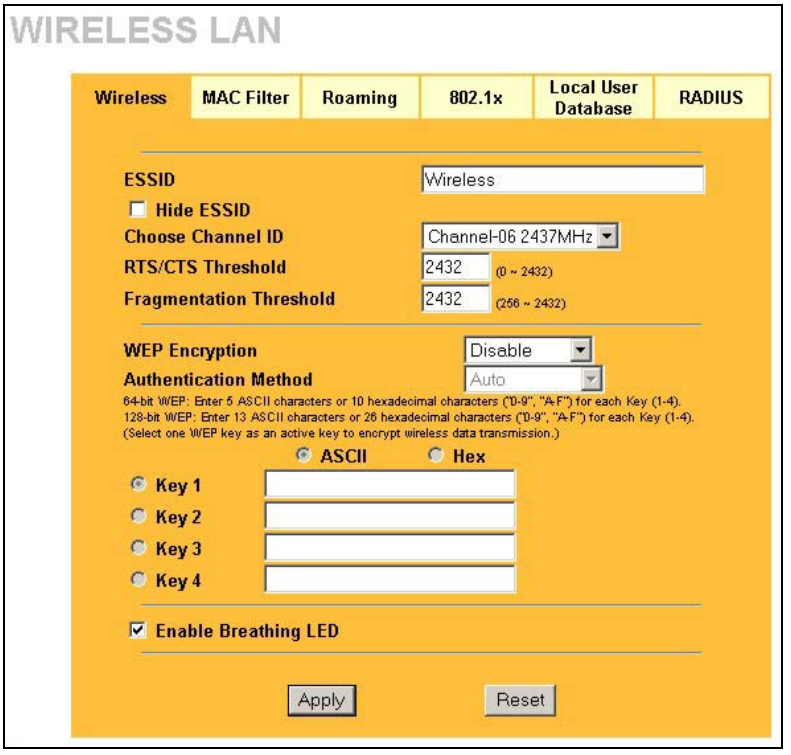


Figure 2 Wireless LAN

The following table describes the fields in this screen.

Table 2 Wireless LAN

LABEL	DESCRIPTION
ESSID	(Extended Service Set ID) The ESSID identifies the service set the wireless station is to connect to. Wireless stations associating to the access point must have the same ESSID. Enter a descriptive name (up to 32 characters) for the wireless LAN.
Hide ESSID	Select this box to hide the ESSID in the outgoing beacon frame so a station cannot obtain the ESSID through passive scanning.
Choose Channel ID	Adjacent access points (APs) should use a channel different from what you selected to reduce interference. The wireless stations connected to the ZyAIR must use the same channel you selected.

Table 2 Wireless LAN

LABEL	DESCRIPTION
RTS /CTS Threshold	(Request To Send) The threshold (number of bytes) for enabling RTS/CTS handshake. 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. Enter a value between **0** and **2432**.
Fragmentation Threshold	The threshold (number of bytes) for the fragmentation boundary for directed messages. It is the maximum data fragment size that can be sent. Enter a value between **256** and **2432**.
WEP Encryption	WEP (Wired Equivalent Privacy) encrypts data frames before transmitting them over the wireless network. Select **Disable** to allow wireless stations to communicate with the access points without any data encryption. Select **64-bit WEP** or **128-bit WEP** to enable data encryption.
Authentication Method	Select **Auto**, **Open System** or **Shared Key** from the drop-down list box.
Key 1 to Key 4	If you chose **64-bit WEP** in the **WEP Encryption** field, then enter any 5 characters (ASCII string) or 10 hexadecimal characters ("0-9", "A-F") preceded by 0x for each key. If you chose **128-bit WEP** in the **WEP Encryption** field, then enter 13 characters (ASCII string) or 26 hexadecimal characters ("0-9", "A-F") preceded by 0x for each key. There are four data encryption keys to secure your data from eavesdropping by unauthorized wireless users. The values for the keys must be set up exactly the same on the access points as they are on the wireless stations.
Enable Breathing LED	Select this check box to enable the Breathing LED, also known as the ZyAIR LED. The blue ZyAIR LED is on (dimmed) when the ZyAIR is on and blinks brightly (or breaths) when data is being transmitted to/from its wireless stations. Clear the check box to turn this LED off even when the ZyAIR is on and data is being transmitted/received.
Apply	Click **Apply** to save your changes back to the ZyAIR.
Reset	Click **Reset** to begin configuring this screen afresh.

5.3 Configuring Roaming

A wireless station is a computer with an IEEE 802.11g-compliant wireless adapter. An Access Point (AP) acts as a bridge between the wireless and wired networks. An AP creates its own wireless coverage area. A wireless station can associate with a particular access point only if it is within the access point's coverage area.

In a network environment with multiple access points, wireless stations are able to switch from one access point to another as they move between the coverage areas. This is roaming. As the wireless station moves from place to place, it is responsible for choosing the most appropriate access point depending on the signal strength, network utilization or other factors.

The roaming feature on the access points allows the access points to relay information about the wireless stations to each other. When a wireless station moves from a coverage area to another, it scans and uses the channel of a new access point, which then informs the access points on the LAN about the change. The new information is then propagated to the other access points on the LAN. An example is shown in *Figure 3*.

If the roaming feature is not enabled on the access points, information is not communicated between the access points when a wireless station moves between coverage areas. The wireless station may not be able to communicate with other wireless stations on the network and vice versa.

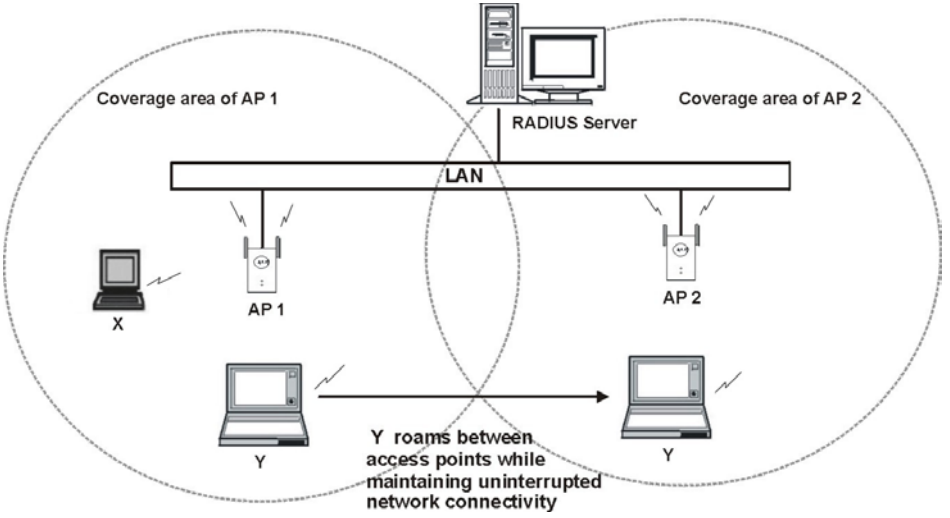


Figure 3 Roaming Example

To enable roaming on your ZyAIR, click **WIRELESS**, then the **Roaming** tab. The screen appears as shown.

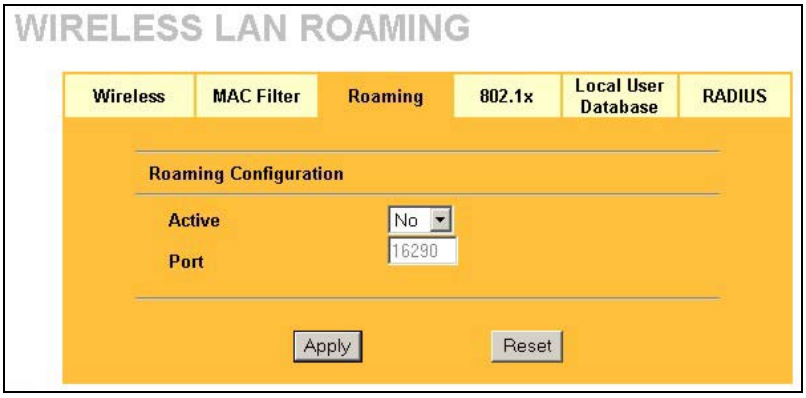


Figure 4 Roaming

The following table describes the fields in this screen.

Table 3 Roaming

LABEL	DESCRIPTION
Active	Select **Yes** from the drop-down list box to enable roaming on the ZyAIR if you have two or more ZyAIRs on the same subnet. **All APs on the same subnet and the wireless stations must have the same ESSID to allow roaming.**
Port	Enter the port number to communicate roaming information between APs. The port number must be the same on all APs. The default is 16290. Make sure this port is not used by other services.
Apply	Click **Apply** to save your changes back to the ZyAIR.
Reset	Click **Reset** to begin configuring this screen afresh.

5.4 Configuring IEEE 802.1x Authentication

You can set the ZyAIR and your network to authenticate a wireless station before the wireless station can communicate with the ZyAIR and the wired network to which the ZyAIR is connected. Your ZyAIR supports the Institute of Electrical and Electronics Engineers (IEEE) 802.1x standard that works with IEEE 802.11 to enhance user authentication.

To change your ZyAIR's authentication settings, click **WIRELESS**, then the **802.1x** tab. The screen appears as shown.

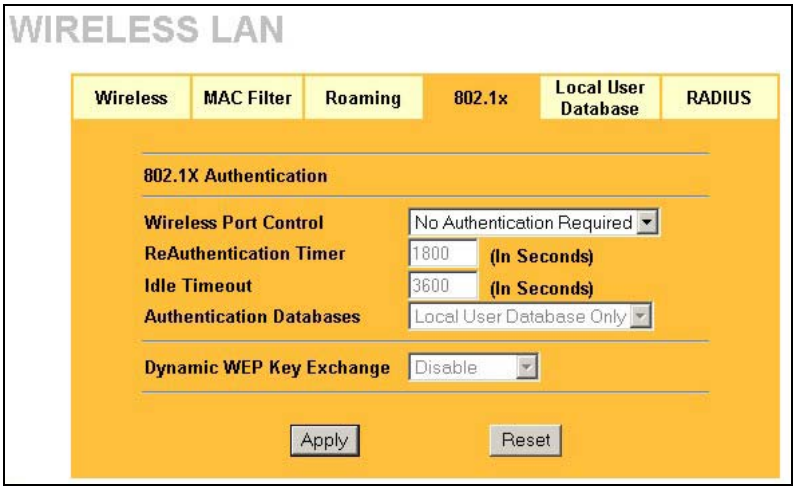


Figure 5 Wireless 802.1x Authentication

The following table describes the fields in this screen.

Table 4 Wireless 802.1x Authentication

LABEL	DESCRIPTION
Wireless Port Control	To control wireless stations access to the wired network, select a control method from the drop-down list box. Choose from **No Authentication Required**, **Authentication Required** and **No Access Allowed**. **No Authentication Required** allows all wireless stations access to the wired network without entering usernames and passwords. This is the default setting. **Authentication Required** means that all wireless stations have to enter usernames and passwords before access to the wired network is allowed. **No Access Allowed** blocks all wireless stations access to the wired network.
ReAuthentication Timer	Specify how often wireless stations have to reenter usernames and passwords in order to stay connected. This field is activated only when you select **Authentication Required** in the **Wireless Port Control** field. Enter a time interval between 10 and 9999 seconds. The default time interval is **1800** seconds (30 minutes). **If wireless authentication is done using a RADIUS server, the reauthentication timer on the RADIUS server has priority.**

Table 4 Wireless 802.1x Authentication

LABEL	DESCRIPTION
Idle Timeout	The ZyAIR automatically disconnects a wireless station from the wired network after a period of inactivity. The wireless station needs to enter the username and password again before access to the wired network is allowed. This field is activated only when you select **Authentication Required** in the **Wireless Port Control** field. The default time interval is **3600** seconds (or 1 hour).
Authentication Databases	This field is activated only when you select **Authentication Required** in the **Wireless Port Control** field. The authentication database contains wireless station login information. The local user database is the built-in database on the ZyAIR. The RADIUS is an external server. Use this drop-down list box to select which database the ZyAIR should use (first) to authenticate a wireless station. Before you specify the priority, make sure you have set up the corresponding database correctly first. Select **Local User Database Only** to have the ZyAIR just check the built-in user database on the ZyAIR for a wireless station's username and password. Select **RADIUS Only** to have the ZyAIR just check the user database on the specified RADIUS server for a wireless station's username and password. Select **Local first, then RADIUS** to have the ZyAIR first check the user database on the ZyAIR for a wireless station's username and password. If no match is found, the user database on the specified RADIUS server is then checked. Select **RADIUS first, then Local** to have the ZyAIR first check the user database on the specified RADIUS server for a wireless station's username and password. If no match is found, the user database on the ZyAIR is then checked.
Dynamic WEP Key Exchange	This field is activated only when you select **Authentication Required** in the **Wireless Port Control** field. Also set the **Authentication Databases** field to **RADIUS Only**. Local user database may not be used. Select **Disable** to allow wireless stations to communicate with the access points without using dynamic WEP key exchange. Select **64-bit WEP** or **128-bit WEP** to enable data encryption. Up to 32 stations can access the ZyAIR when you configure dynamic WEP key exchange.
Apply	Click **Apply** to save your changes back to the ZyAIR.
Reset	Click **Reset** to begin configuring this screen afresh.

5.5 Local User Database and RADIUS Overview

EAP is an authentication protocol designed originally to run over PPP (Point-to-Point Protocol) frame in order to support multiple types of user authentication. RADIUS is based on a client-sever model that

supports authentication, authorization and accounting. The access point (ZyAIR) is the client and the server is the RADIUS server. RADIUS is a simple package exchange in which your ZyAIR acts as a message relay between the wireless station and the network RADIUS server. In order to ensure network security, the access point and the RADIUS server use a shared secret key, which is a password, they both know. The key is not sent over the network. In addition to the shared key, password information exchanged is also encrypted to protect the network from unauthorized access. By using EAP to interact with an EAP-compatible RADIUS server, the access point helps a wireless station and a RADIUS server to perform mutual authentication.

To authenticate wireless users without interacting with a network RADIUS server, you can store user profiles locally. The ZyAIR first checks the local user database, then use the user database on the RADIUS server to authenticate wireless stations. To change your ZyAIR's local user list, click **WIRELESS**, then the **Local User Database** tab.

If you do enable the EAP authentication, you need to specify the local user database or the external sever for remote user authentication. To set up your ZyAIR's local user database, click **WIRELESS**, then the **Local User Database** tab. To set up your ZyAIR's RADIUS server settings, click **WIRELESS**, then the **RADIUS** tab.

6 Hardware Installation

This section provides step-by-step instructions on attaching the antennas and mounting your ZyAIR.

6.1 Attaching Antennas

Follow the steps below to connect the supplied antennas.

1. Locate the antenna connectors on the sides of your ZyAIR.
2. Screw the antennas clockwise onto the antenna connectors. The antennas should be perpendicular to the ground and parallel to each other.

Make sure the antennas are securely screwed onto the antenna connectors.

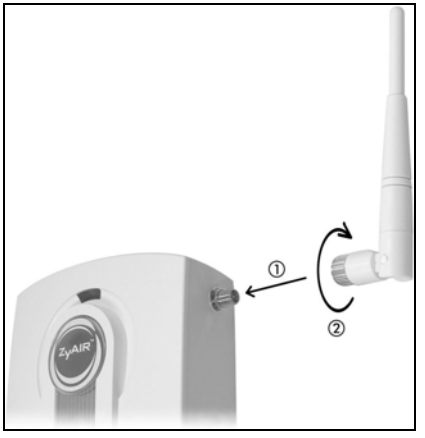


Figure 6 Attaching Antennas

6.2 Hardware Mounting Installation

In general, the best location for the access point is at the center of your intended wireless coverage area. For better performance, mount the ZyAIR high up free of obstructions.

6.3 Free-standing

Place your ZyAIR on a flat, level surface (on a desk or shelf) that is strong enough to support the weight of the ZyAIR with the connection cables.

6.4 Wall-mounted

Follow the steps to attach your ZyAIR to a wall.

1. Locate a high position on the wall that is free of obstructions.

2. Connect two screws (not included) in the wall 60mm apart. You can use the diagram at the end of this guide to help you mark the screw holes correctly. Use screws with 6mm ~ 8mm (0.24" ~ 0.31") wide heads. Do not screw the screws all the way in to the wall. Leave a small gap between the head of the screw and the wall. The gap must be big enough for the screw heads to slide into the screw slots and the connection cables to run down the back of the ZyAIR.

Make sure the screws are securely fixed to the wall and strong enough to hold the weight of the ZyAIR with the connection cables.

3. Adjust the cables.

    1. Run the connection cables down the back of the ZyAIR as shown in the following figure.

OR:

    2. Run the connection cables upward and along the edge of the ceiling.

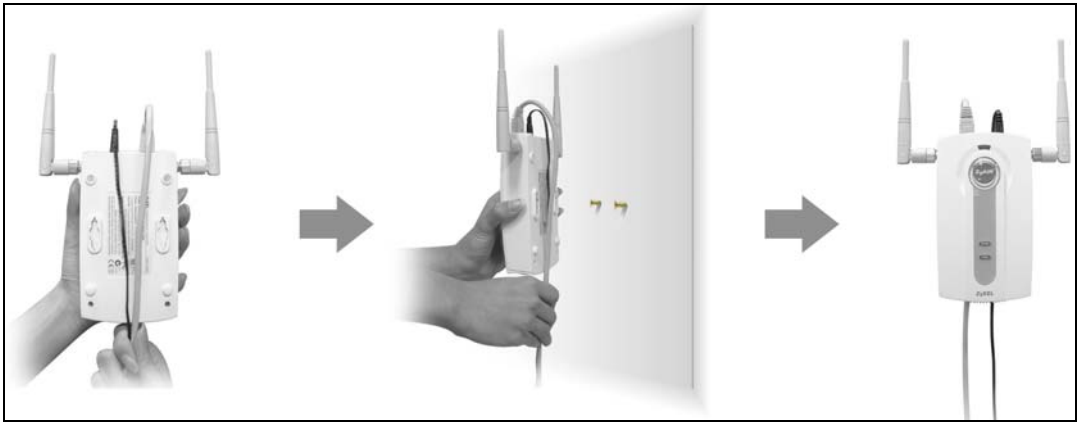


Figure 7 Run the Cables Down the Back of the ZyAIR

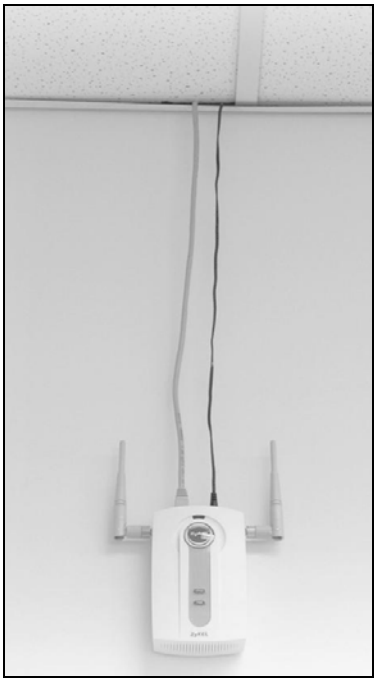


Figure 8 Run the Cables Upward

4. Align the holes on the back of the ZyAIR with the screws on the wall. Hang the ZyAIR on the screws.

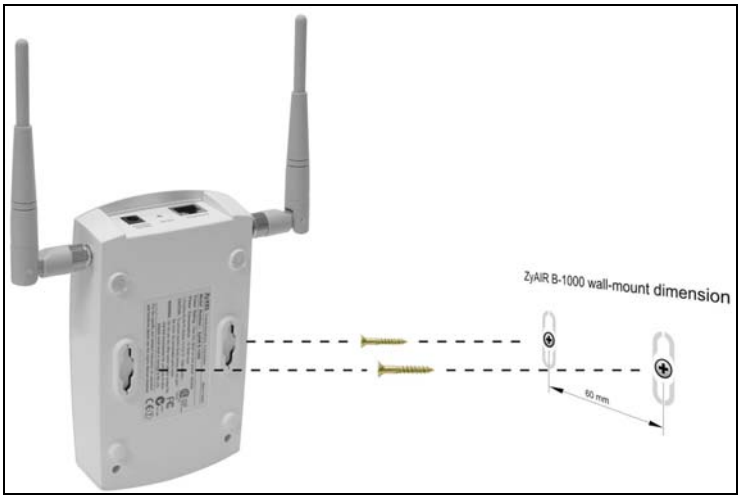


Figure 9 Hanging the ZyAIR

7 Troubleshooting

PROBLEM	CORRECTIVE ACTION
The **PWR** LED is off.	Make sure you are using only the supplied power adaptor and the power adaptor is plugged into an appropriate power supply. Unplug the power adaptor and plug it in again. If the error persists, you may have a hardware problem. In this case, you should contact your vendor.
The **ETHN** LED is off.	Check the cable connection to the ZyAIR's **ETHERNET** port. Make sure your computer's network card is working properly.
I cannot access the web configurator.	Make sure the IP addresses and subnet masks of the ZyAIR and the computer are in the same IP address range. (For example, if the ZyAIR is using the default IP address and subnet mask, check that the IP address of the computer is in the range 192.168.1.3 ~192.168.1.254 and the subnet mask is 255.255.255.0). Refer to the *Setting Up Your Computer's IP Address* section. If you change the ZyAIR default IP address, then enter the new IP address as the web site address. The default password is "1234". If you have changed the password and have now forgotten it or that the IP address is not known, you will need to reset the ZyAIR. Refer to the *User's Guide* for how to use the **RESET** button.
I cannot ping any computer on the network.	Make sure the ZyAIR is turned on and the Link LED is off. If the **ETHN** LED is off, check the cables between the ZyAIR and your computer or hub. Make sure the Ethernet cable length does not exceed 100 meters. Verify that the IP address and the subnet mask of the ZyAIR and the computers are in the same range.

Cut out this page to mark the points on the wall for the screws.