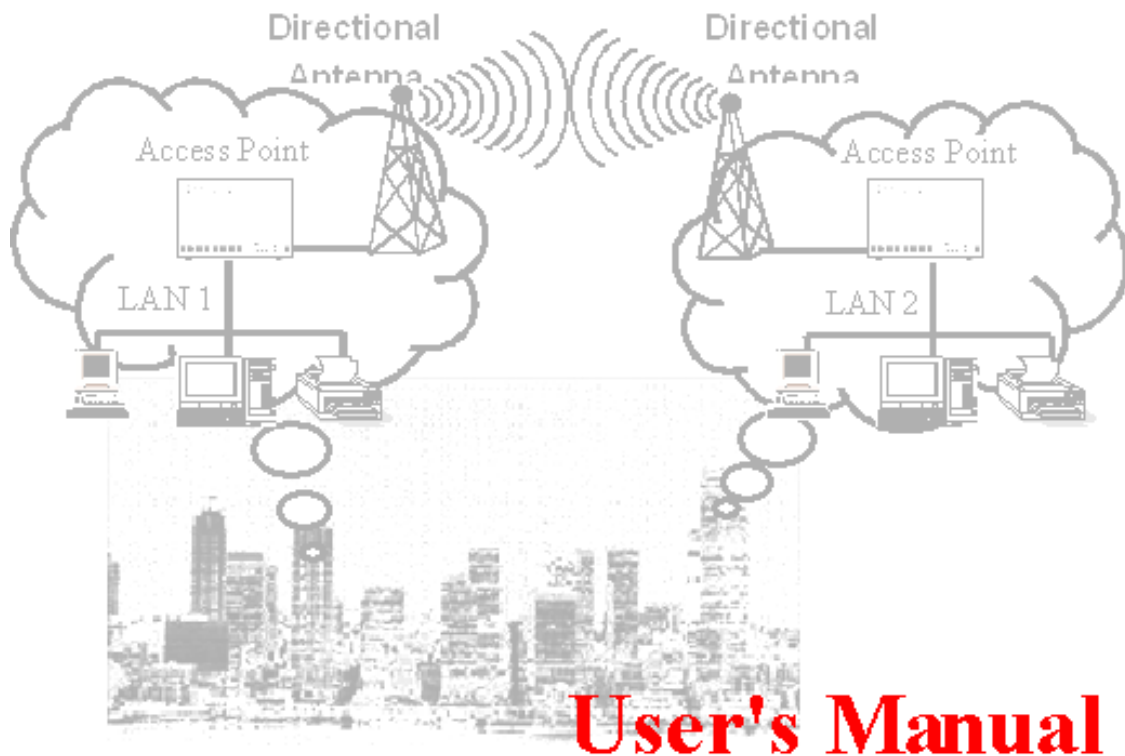


**MILAN**<sup>®</sup>

TECHNOLOGY

**IEEE 802.11g**

# Wireless LAN Access Point



**User's Manual**

---

**MIL-W2331G**

**USER GUIDE**

#### Regulatory Approval

- FCC Class A
- UL 1950
- CSA C22.2 No. 950
- EN60950
- CE
- EN55022 Class A
- EN55024

#### Canadian EMI Notice

This Class A digital apparatus meets all the requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

#### European Notice

Products with the CE Marking comply with both the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Community. Compliance with these directives imply conformity to the following European Norms:

- EN55022 (CISPR 22) - Radio Frequency Interference
- EN61000-X - Electromagnetic Immunity
- EN60950 (IEC950) - Product Safety

#### **Five-Year Limited Warranty**

MiLAN Technology warrants to the original consumer or purchaser that each of its products, and

all components thereof, will be free from defects in material and/or workmanship for a period of five years from the original factory shipment date. Any warranty hereunder is extended to the original consumer or purchaser and is not assignable.

MiLAN Technology makes no express or implied warranties including, but not limited to, any implied warranty of merchantability or fitness for a particular purpose, except as expressly set forth in this warranty. In no event shall MiLAN Technology be liable for incidental or consequential damages, costs, or expenses arising out of or in connection with the performance of the product delivered hereunder. MiLAN Technology will in no case cover damages arising out of the product being used in a negligent fashion or manner.

#### **Trademarks**

The MiLAN logo and MiLAN Technology trademarks are registered trademarks of MiLAN Technology in the United States and/or other countries.

#### **To Contact MiLAN Technology**

For prompt response when calling for service information, have the following information ready:

- Product serial number and revision
- Date of purchase
- Vendor or place of purchase

You can reach MiLAN Technology technical support at:

E-mail: [support@milan.com](mailto:support@milan.com)  
Telephone: +1.408.744.2751  
Fax: +1.408.744.2771  
MiLAN Technology  
1329 Moffett Park Drive  
Sunnyvale, CA 94089  
United States of America

Telephone: +1.408.744.2775  
Fax: +1.408.744.2793

<http://www.milan.com>  
[info@milan.com](mailto:info@milan.com)

# Table of Contents

## 1. Introduction

Package Contents

## 2. Hardware Installation

Desktop Installation

Power On

Side Panel

## 3. Web-based Configuration

Accessing the Web-based Configuration Utility

System configuration

3.1 Local Area Network (LAN) Settings

3.2 Wireless Settings

3.3 Wireless Distribution System (WDS) Links

3.4 Wireless Security

3.4.1 ACL

3.4.2 WEP

3.4.3 RADIUS

3.4.4 802.1x Security

3.4.5 WPA

3.5 Install Wizard

3.6 Status

## Appendix A: FCC Information

# 1.

## Introduction

---

The next-generation wireless LAN device – 54Mbps 802.11g Wireless Access Point, brings an extremely high performance to the wireless realm. Fully compliant with IEEE802.11g standard, the 54Mbps 802.11g Wireless Access Point also provides powerful features such as the WDS, WPA security, SNMP and more. Maximize network efficiency while minimizing your network investment and maintenance costs.

## Package Contents

Unpack the contents of the package and verify them against the checklist below.

- MIL-W2331G Wireless LAN Access Point
- DC Power Adapter
- Users Guide

If any item is missing or damaged, please contact your local dealer for service.

## 2.

# Hardware Installation

---

## Desktop Installation

Connect the 54Mbps 802.11g Wireless Access Point to a hub (in Bridge mode) or a PC with a UTP Ethernet cable. The cross-over cable must be used when connecting the Access Point directly to a PC.

## Power On

Connect the power adapter to the power socket on the 54Mbps 802.11g Wireless Access Point. Connect the other end of the power pack into an appropriate electrical outlet.

**Note 1:** Use of a power adapter other than the one supplied with the 54Mbps 802.11g Wireless Access Point may result in damage to the product.

## Side Panel

The button on the Access Point side panel labeled “**DEFAULT**” enables the user to restore the 54Mbps Wireless LAN Access Point to its default setting. This may be used to reset the password to the default, as well as all other settings.

To restore the Access Point default settings, press the “**DEFAULT**” button on the side panel of the Wireless Access Point for 10 seconds, then release the button and wait for the system to reboot. The rebooting process will last approximately 30 seconds. Upon completion, the 54Mbps 802.11g Wireless Access Point default settings will be restored and the Access Point can be configured again with the Web-based Configuration Utility.

# 3.

## Web-based Configuration

---

The 54Mbps 802.11g Wireless Access Point allows configuration through a Web-based Configuration Utility. The following instructions will complete the installation of the Wireless Access Point.

### Accessing the Web-based Configuration Utility

1. Connect a computer to the Access Point either through wireless or wired connection. **Set** a fixed IP address, within the range of 192.168.1.X to the computer, where X cannot be 254. When attempting to use a wireless connection, configure the computer advanced options as:
  - SSID: default
  - WEP: disable
2. Activate the web browser and enter in the IP address of the AP in the Address or location field and press **Enter**. The default value of the Access Point is 192.168.1.254.
3. Follow the on-screen instructions to enter the system password then press **Enter**. The default password is “private”.

# System Configuration

The Web-based Configuration Utility provides 3 items to monitor and configure the Wireless Access Point: **Configuration**, **Install Wizard** and **Status**. These core options are essential to enable the Access Point to work properly.

The screenshot displays the configuration utility for a 54Mbps 802.11g Wireless Router. The page is titled "54Mbps 802.11g Wireless Router" and has a navigation bar with "Configuration" and "Status" tabs, and "Home", "Help", and "Contact" links. A blue sidebar on the left contains a menu with the following items: Configuration (with sub-items: Settings summary, Identity), Local Area Network (with sub-items: Network setup, DHCP Server), Wireless (with sub-items: Wireless settings, WDS Links, WiFi Test Page), and Security (with sub-items: Wireless security, Unauthorized configuration). The main content area is titled "Settings Summary" and lists the following settings:

<b>Access Point properties</b>	
SSID (internal radio):	default
SSID (expansion card radio):	not present
<b>Wide Area Network (WAN):</b>	
Connection type:	Disabled
<b>Local Area Network (LAN):</b>	
IP Address:	192.168.1.254
DHCP Server:	Disabled
Firewall:	Disabled
<b>Wireless settings</b>	
Wireless security	None
Access Control	Any client

The footer of the page contains the text "© 2003 ZyDOR Inc."

## 3.1 Local Area Network (LAN) Settings:

The screenshot shows the configuration page for a 54Mbps 802.11g Wireless Router. The page title is "54Mbps 802.11g Wireless Router" and it includes navigation links for "Configuration", "Status", "Home", "Help", and "Contact". The main content area is titled "Local Area Network (LAN)" and features a "Primary Address Selection" section. This section has two radio button options: "Dynamic" and "Static IP". The "Static IP" option is selected. Below these options are three input fields: "IP Address" with the value "192.168.1.254", "Subnet mask" with the value "255.255.255.0", and "Gateway" with the value "0.0.0.0". At the bottom right of the form, there are "Cancel" and "Apply" buttons. A left-hand navigation menu is visible, listing categories like Configuration, Local Area Network, Wireless, and Security with their respective sub-items. The footer of the page contains the copyright notice "© 2003 ZCOM, Inc."

Three options are provided for the Local Area Network setup:

- Local Area Network
- External DHCP
- Internal DHCP

If an external DHCP server will be used, select **Dynamic** for the Primary Address Selection. Otherwise, set the Primary Address Selection to **Static IP**.

The third choice, internal DHCP server, is available under the **Static IP** option. Enter the setting on the DHCP server page and enable the default DHCP server. Once DHCP is enabled, set the IP address for **Static IP** in the range of the DHCP server where the default DHCP server is usually enabled. Click the **Apply** button to save the new configuration.

## 3.2 Wireless Settings

The screenshot shows the configuration interface for a 54Mbps 802.11g Wireless Router. The page is titled "54Mbps 802.11g Wireless Router" and has navigation links for "Configuration", "Status", "Home", "Help", and "Contact". A left sidebar contains a menu with categories: "Configuration" (Settings summary, Identity), "Local Area Network" (Network setup, DHCP Server), "Wireless" (Wireless settings, WDS Links, WiFi Test Page), and "Security" (Wireless security, Unauthorized configuration). The main content area is titled "Wireless Settings" and is divided into "Radio settings" and "Internal radio" sections. The "Radio settings" section includes fields for "Regulatory Domain" (ETSI (Europe)), "IAPP" (checkbox), and "Internal radio" settings: "Wireless network name (SSID)" (default), "Band" (2.4 GHz (Mixed) with a "change policy..." link), "Radio Channel" (11), "PRISM Nitro™" (Maximum), and "Broadcast SSID" (checked). The "Internal radio" section is labeled "(not present)" and includes similar settings for a 5 GHz band.

The wireless settings will impact the coverage and the performance of the Wireless Access Point. The Access Point can be operated in three different bandwidth scenarios:

- G-only (High rate 54Mbps)
- B-only (Low rate 11Mbps )
- Mixed (both below 54M and 11Mbps).

To change the bandwidth setting, click on the **change policy...** link and select the appropriate radio policy. Click the **OK** button to save the new configuration.

The screenshot shows a dialog box titled "Change radio policy - Microsoft Internet Explo...". The dialog has a blue header and contains the following text: "Change radio policy", "Select the policy for the internal radio", and three radio button options: "Mixed (Allow both 802.11b and 802.11g)", "G-only", and "B-only". Below the options is a warning message: "Changing the radio policy could result in a loss of your connection when you are using a wireless connection." At the bottom are "OK" and "Cancel" buttons.

**Note:** Changing the radio policy could result in a loss of connection when using a wireless connection to the Web-based Configuration Utility.

To deliver the throughput enhancement in both mixed and g-only networks, Prism Nitro™ mode can be enabled by using Intersil's packet bursting technology. The burst size is adjustable and typically the bigger burst packet, the more 11g transmission sharing will occur while a mixed network is in effect.

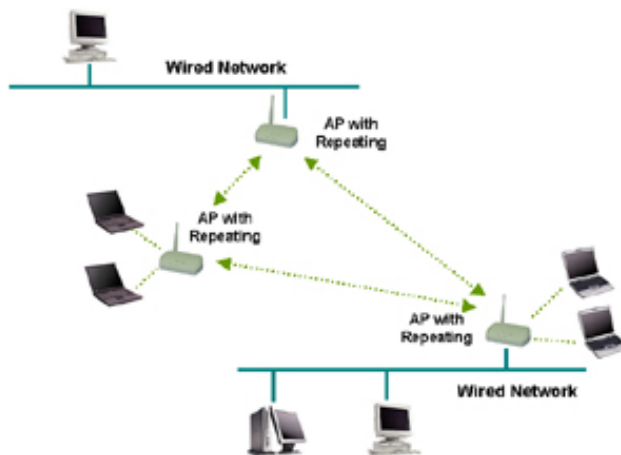
Deselect the **Broadcast SSID** option to logically hide the Access Point. The Access Point will refuse any connection request from an unrecognized Network ID.

### 3.3 Wireless Distribution System (WDS) Links

Use the Wireless Distribution System (WDS) option to extend the range of the network without having to use cables to link the Access Points wirelessly. Under WDS, the Access Points are still functioning as regular Access Points, which can provide the link services to wireless clients.

The screenshot shows the configuration page for a 54Mbps 802.11g Wireless Router. The page title is "54Mbps 802.11g Wireless Router" and it includes navigation links for "Configuration", "Status", "Home", "Help", and "Contact". The main heading is "Wireless Distribution System Links". Below this, there is a text instruction: "Select the following Access Points that will be used for the wireless distribution system of your wireless network." There are two sections: "WDS Links for internal radio:" and "WDS Links for expansion card radio:". The internal radio section contains a table with columns: "Enable", "Peer address", "Name", "SSID", "Data Rates", "Channel", "Age", and "RSSI". One entry is visible with "Peer address" 00:60:B3:00:E5:11, "Name" blank, "SSID" default, "Data Rates" 802.11g, "Channel" 11, "Age" 0, and "RSSI" 212. The expansion card radio section shows "- No expansion card radio present". At the bottom, there is a note: "To manually add Access Points to your WDS Links click the button Add WDS Link." and a button labeled "Add WDS Link". There are also "Cancel" and "Apply" buttons at the bottom right.

Enter the MAC address of the Access Point to connect to wirelessly in the appropriate field by selecting the peer address that the Access Point has located or by clicking the **Add WDS Link** button to add a new address. Click the **Apply** button to save the new configuration.



## 3.4 Wireless Security

To protect wireless intellectual property, it is important to secure the wireless connection. This Access Point is equipped a sophisticated security algorithm to protect against intruders entering your system or listening to conversations over the network.

### 3.4.1 ACL

Different access rules may be assigned for each user by adding the MAC address and the access rights.

#### Access Control List

Enable access control list

##### Default Access

Accept  Reject

##### Specific Clients

MAC Address	Access
00:60:B3:00:01:55	accept
00:60:B3:00:13:67	accept
	<input type="button" value="Add..."/> <input type="button" value="Delete..."/>

Select **Enable Access Control List** to enable ACL. Enter Specific Clients by clicking the **Add** button and entering the MAC address. Highlight each MAC address and click the appropriate setting to either accept or reject the connection. Click the **Apply** button to save the new configuration.

### 3.4.2 WEP

The basic security setting is to enable WEP algorithm by assigning 64 or 128 bits encryption key.

64 bits:	ABCDEA01234567899876543210	26 digits
128 bits:	ABCDA012345	10 digits

#### Wired Equivalent Privacy (WEP)

Use WEP security

Pre-shared Key:

64-bits

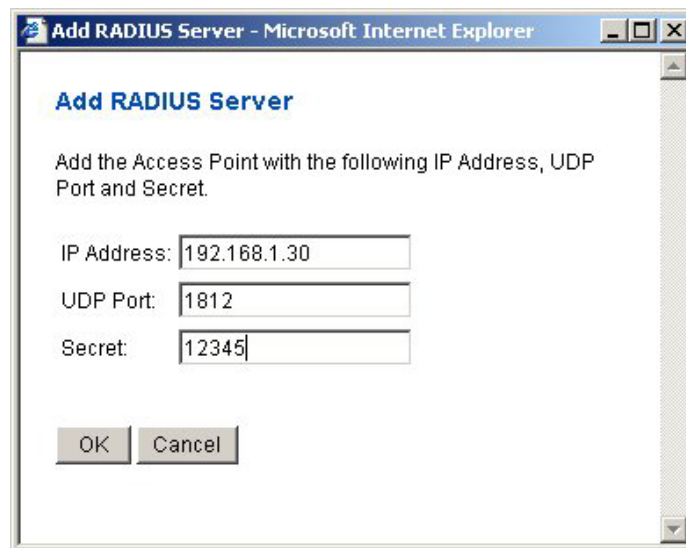
128-bits

Select **Use WEP Security** to enable Wired Equivalent Privacy (WEP).  
Select a specific length of hexadecimal key and enter the encryption key in the appropriate field. Click the **Apply** button to save the new configuration.

### 3.4.3 RADIUS

RADIUS performs the authentication function required to check the credentials of users and intermediate Access Points and indicates whether the users are authorized to connect to the network through the Access Points.

Enabling RADIUS is the first step toward building up an 802.1x-capable environment. It is also a requirement to accommodate the recently introduced Wi-Fi protected access (WPA-EAP) to wireless networks.



The screenshot shows a web browser window titled "Add RADIUS Server - Microsoft Internet Explorer". The main content area has a heading "Add RADIUS Server" and a sub-heading "Add the Access Point with the following IP Address, UDP Port and Secret." Below this, there are three text input fields: "IP Address:" containing "192.168.1.30", "UDP Port:" containing "1812", and "Secret:" containing "12345". At the bottom of the form are two buttons: "OK" and "Cancel".

Enter the **IP address** of RADIUS and the specific **UDP Port** number, UDP 1812, as well as a **Secret** key, which is identical to the given key in RADIUS. Click the **OK** button to save the new configuration.

### 3.4.4 802.1x Security

IEEE 802.1x will perform a standardized network access control to keep out unauthorized users, verify the credentials of users with RADIUS and distribute the encryption key.

It is required to provide RADIUS information in prior to setup 802.1x. Two lengths of encryption key are provided, 64 or 128 bits.

#### 802.1X Security

Use 802.1X security

Key Size

64-bits

128-bits

Group Key Rekey Settings

No rekeying

Rekey every  minutes

Rekey every  x 1000 packets

---

Select **Use 802.1x Security** and choose the appropriate **Key Size**. Set the Group Key Rekey Settings to **No rekeying** or enter the frequency to rekey for the number of **minutes** or the volume of **packets** (x 1000). Click the **Apply** button to save the new configuration.

### 3.4.5 WPA

The Wi-Fi Protected Access (WPA) is currently the highest level of security a wireless network can achieve. It is a subset of the security specification and has been introduced as an interim solution for most known security weaknesses in comparison to the plain WEP.

**TKIP**, the successor to WEP, enhances the ability to eliminate the known vulnerabilities of WEP. Enterprises that already have RADIUS in place can use WPA with 802.1x or RADIUS (WPA-EAP).

A WLAN client with WPA capabilities is needed to acquire a digital certificate to be successfully authenticated by RADIUS via a specific EAP channel, TLS. It is typically called supplicant, or it is associated with a software application.

Software vendors, including Microsoft, offer upgrades for their cards. The most popular software application that runs on WLAN clients in the market is the Windows XP SP2. (SP1 with WPA hotfix) provided by Microsoft.

#### Wi-Fi Protected Access (WPA)

- Disable WPA security
- Use WPA with pre-shared key
  - Password Phrase  (8-63 characters)
- Use WPA with RADIUS server
  - Update if station leaves BSS
  - Group Key Rekey settings:
    - No rekeying
    - Rekey every  minutes
    - Rekey every  x 1000 packets

Back Cancel Apply

Select **Use WPA with RADIUS Server** and set the Group Key Rekey Settings to **No rekeying** or enter the frequency to rekey for the number of **minutes** or the volume of **packets** (x 1000). Small business and home wireless LANs can use WPA without 802.1x by selecting **Use WPA with pre-shared key** and entering a **password phrase**. Click the **Apply** button to save the new configuration.

## 3.5 Install Wizard

The install wizard provides guided prompts through the main settings for the Access Point.

Begin by selecting the country in which the product will be used. This is the organization that certifies the Access Point for use in each country. Choose the country cautiously in order to comply with the regulation.

Then select a specific SSID as your network identification. Client stations can roam freely using this product and other Access Point that have the same SSID.

Next, select a number for the radio channel, which determines the channel to be used to transmit and receive signals.

Finally, set up your security policy by enabling the legacy WEP, WPA, or use the default setting that will allow any client to associate with the Access Point.

## 3.6 Status

The status screen shows current information on the 54Mbps Wireless LAN Access Point as Interface Statistics, Wireless Statistics (including Association and WDS statistics), Client Statistics (including DHCP, Wireless, Access Point and WDS Links), and Event Reporting.

The screenshot displays the status page for a 54Mbps 802.11g Wireless Router. The page title is "54Mbps 802.11g Wireless Router" and it includes navigation links for "Configuration", "Status", "Home", "Help", and "Contact". A left-hand navigation menu is visible, listing "Statistics/ Usage" (with sub-items: Settings summary, Interface statistics, Wireless statistics, Event reporting) and "Clients" (with sub-items: DHCP Clients, Wireless clients, Access Points, WDS links). The main content area is titled "WDS Links" and is divided into two sections: "WDS Links using internal radio" and "WDS Links using expansion card radio". Each section contains a table with columns for Peer address, Name, SSID, Data Rates, Channel, Age, and RSSI. The "internal radio" section shows a message: "- There are currently no WDS links using the internal radio". The "expansion card radio" section shows a message: "- No expansion card radio present". The footer of the page indicates "© 2003 ZyXEL Inc."

54Mbps 802.11g Wireless Router

Configuration | Status Home | Help | Contact

**Statistics/ Usage**

- Settings summary
- Interface statistics
- Wireless statistics
- Event reporting

**Clients**

- DHCP Clients
- Wireless clients
- Access Points
- WDS links

**WDS Links**

**WDS Links using internal radio**

Peer address	Name	SSID	Data Rates	Channel	Age	RSSI
- There are currently no WDS links using the internal radio						

**WDS Links using expansion card radio**

Peer address	Name	SSID	Data Rates	Channel	Age	RSSI
- No expansion card radio present						

© 2003 ZyXEL Inc.

# Appendix A:

## FCC Information

---

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received; including interference that may cause undesired operation.

### Federal Communications Commission (FCC) Statement

This Equipment has been tested and found to comply with the limits for a Class B and C digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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



### FCC RF Radiation Exposure Statement:

1. This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
2. This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.



90000422 Rev 1P