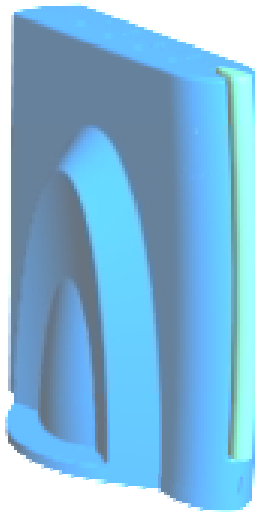


**Enhanced Wireless LAN**

# ***Access Point***

**User's Guide**

Version A1  
February 2003



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## FCC WARNING

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 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 to 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.

You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

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.

# Table Of Contents

<b>Introduction</b> .....	<b>1</b>
SYSTEM REQUIREMENTS .....	1
CABLING .....	1
<b>Glossary</b> .....	<b>2</b>
<b>How to Use this Guide</b> .....	<b>3</b>
<b>Planning Your Network</b> .....	<b>4</b>
INFRASTRUCTURE NETWORK TYPES.....	4
PLANNING AN INFRASTRUCTURE NETWORK.....	6
Single AP Installation .....	6
Multiple AP Installation .....	6
ROAMING.....	7
ACCESS POINT PLACEMENT GUIDELINES.....	8
Placing For Performance.....	8
<b>Getting Started</b> .....	<b>9</b>
ACCESS POINT HARDWARE INSTALLATION .....	9
LED INDICATORS AND RESET BUTTON .....	9
AP UTILITY SOFTWARE INSTALLATION AND UNINSTALLATION.....	10
Installation.....	10
Uninstallation.....	11
<b>The AP Utility</b> .....	<b>12</b>
USING THE AP UTILITY'S CONFIGURATION PANELS .....	14
The IP Panel.....	14
The Filter Panel.....	15
The Wireless Panel.....	16
The Encryption Panel.....	18
The Advanced Panel .....	19
USING THE AP UTILITY'S MENUS.....	20
The Select Menu .....	20

The Manage Menu .....20  
The Info Command .....23  
**Technical Support ..... 24**  
**Limited Warranty ..... 25**  
**Index..... 28**

# List of Figures

FIGURE 1. SIMPLE WIRELESS INFRASTRUCTURE NETWORK .....	4
FIGURE 2. WIRELESS-TO-WIRED-ETHERNET BRIDGE.....	5
FIGURE 3. MULTIPLE-AP NETWORK .....	5
FIGURE 4. ACCESS POINT: FRONT, SIDE, AND REAR VIEWS .....	9
FIGURE 5. LED FUNCTIONS .....	10
FIGURE 6. TYPICAL AP UTILITY DISPLAY ON FIRST STARTUP .....	13
FIGURE 7. TYPICAL AP UTILITY DISPLAY ON LATER STARTUPS.....	13
FIGURE 8. APPLY SETTINGS COMMAND AND BUTTON .....	14
FIGURE 9. THE FILTER PANEL .....	15
FIGURE 10. THE WIRELESS PANEL .....	16
FIGURE 11. CHANNELS AVAILABLE IN MAJOR REGULATORY DOMAINS.....	17
FIGURE 12. THE ENCRYPTION PANEL .....	18
FIGURE 13. THE ADVANCED PANEL .....	20
FIGURE 14. THE MANAGE MENU AND EQUIVALENT BUTTONS.....	21
FIGURE 15. THE MONITORING WINDOW'S IDENTITY PANEL.....	21
FIGURE 16. THE MONITORING WINDOW'S STATISTICS PANEL.....	22
FIGURE 17. THE MONITORING WINDOW'S STATIONS PANEL .....	23

# Packing List

Your product package should contain the following items:

- One enhanced wireless LAN access point (AP)
- Two AP Utility setup diskettes
- One diskette containing this user's guide in Portable Document Format (PDF)
- One AC power adapter

# Introduction

Congratulations on choosing an outstanding wireless networking product. Your enhanced wireless LAN access point conforms to the IEEE 802.11b standard and is exceptionally easy to set up and use. In addition, it offers special features that allow greater network security and far higher wireless communication speeds than the IEEE 802.11b standard.

**Note:** Special security and speed features (WEP keys longer than 128 bits, and data rates greater than 11 Mbps) can be used only on wireless links to devices from the same product family as your access point. Contact your networking equipment dealer for details.

This user's guide describes your enhanced wireless LAN access point's installation and operation in detail. Follow the instructions in this guide carefully to be assured of many years of superb performance.

The access point, referred to throughout this guide as the "AP," provides a transparent bridged connection between wireless stations and a wired network. Managing the flow of data packets between the wired and wireless portions of your LAN, it allows your wireless stations to communicate seamlessly with devices attached to your wired network.

Included in the AP package is the AP Utility, a program for configuring and monitoring the AP from a computer running Microsoft® Windows 98, ME, NT 4.0, 2000, or XP.

## System Requirements

System requirements for installing and operating the AP are:

- A 10-Mbps wired (IEEE 802.3 10BASE-T) Ethernet connection
- An IBM-type microcomputer running Microsoft® Windows 98, NT 4.0, ME, 2000, or XP (required only when the configuration of the AP must be changed)

## Cabling

Connecting the AP to an Ethernet network requires a Category 3 or higher unshielded or shielded twisted-pair (UTP or STP) cable. The AP connects to the network the same way as any network end node. The cable length should conform to Ethernet standards.

# Glossary

## ***Group ID, BSSID***

A Group ID (the 802.11 standard uses the term BSSID) is the ID of a wireless cell. It is ordinarily the Medium Access Control (MAC) address (the Ethernet hardware address) of the AP serving the cell. A wireless cell is usually made up of stations in an area that the radio signal can comfortably cover. In other words, any wireless station in the cell can communicate with any other within reach of the radio signal.

## ***Domain Name, ESSID, SSID***

In wireless networking, “domain” most often refers to a group of wireless devices that share a common identifier called an Extended Service Set ID, or ESSID. This is often abbreviated to SSID. The domain is usually defined by the network administrator as a segment or subnet of a large network and may be made up of overlapping wireless cells. Wireless nodes can roam freely within the same domain without disconnecting from the network.

## ***Roaming***

The convenience of a mobile PC is the ability to move freely. The concept is similar to that of a cellular phone moving from one base station to another.

## ***Regulatory Domain***

IEEE 802.11b-compliant devices use the license-free ISM (Industrial, Scientific, and Medical) band to communicate through radio waves. Different countries offer different radio frequencies to be used as the ISM band. There are four frequency bands defined by 802.11: Japan (2.471 to 2.497 GHz), USA, Extended Japan, Canada, and Europe (2.4 to 2.4835 GHz), Spain (2.445 to 2.475 GHz), and France (2.4465 to 2.4835 GHz). To use the AP in a country not listed here, check with your government’s regulatory body to find the correct frequency band to use. The AP is supplied preset to the country of sale’s frequency band.

# How to Use this Guide

The AP and the AP Utility are extremely versatile in providing varying levels of network management. For small-office and home-office users, setup and configuration is a quick, four-step process. The Access Point Hardware Installation section, on page 9, provides simple instructions to get your network up and running within minutes. Go to the Access Point Hardware Installation section if your network will meet the following criteria:

- You will accept all default values.
- Your network will have only one access point.

The AP Utility permits AP configuration from a PC via an Ethernet connection. The program enables the user to change the AP's settings before or after putting the AP into operation on an existing network.

Note that before any other settings can be changed, the AP must be assigned an IP address that puts it on the same TCP/IP subnet as the computer running the AP Utility. The AP can get suitable IP settings from a Dynamic Host Configuration Protocol (DHCP) server on the network; if this fails, suitable IP settings can be sent to the AP using the AP Utility.

Before using the AP Utility, you should read through the next section, "Planning Your Network," to learn how to get the best possible performance from your wireless network.

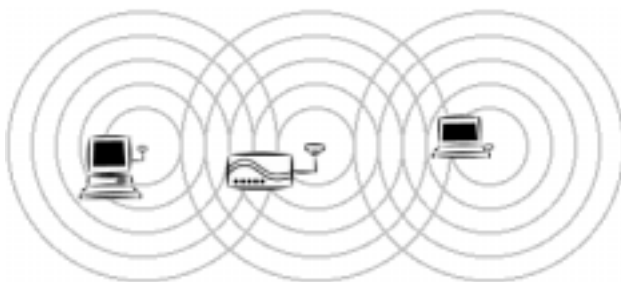
# Planning Your Network

## Infrastructure Network Types

An “infrastructure” network is formed by several stations and one or more access points (APs), with the stations located no more than a given distance from the AP. **Figure 1** shows a typical infrastructure network topology.

There are three infrastructure network setups that are commonly used. It is a good idea to understand the possible network setups and configuration requirements before planning your wireless network.

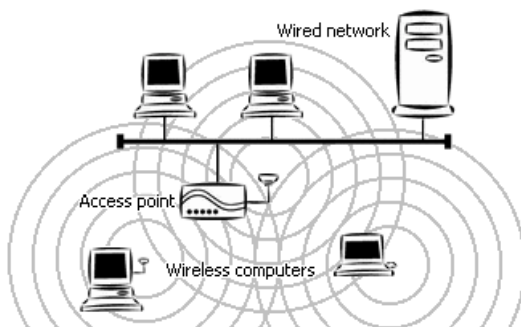
- Type 1. The simplest wireless infrastructure network is composed of one AP and a few wireless stations communicating via radio waves (**Figure 1**). This setup enables mobile stations to communicate with each other. The main benefit of this type of network is to extend the range of the network. If an AP is placed between Station 1 and Station 2, the radio transmission distance is effectively doubled, since Station 1 can talk to Station 2 through the AP. The drawback of this configuration is that the effective bandwidth is halved since all communication is relayed by the AP.



**Figure 1. Simple wireless infrastructure network**

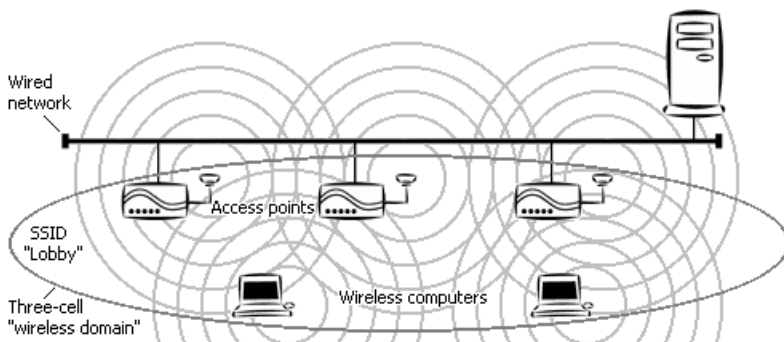
- Type 2. The next simplest wireless network is very similar to the Type 1 network. This time the AP is connected to a wired Ethernet network as a node. In this configuration the AP is effectively performing as a bridge between the wired and wireless networks (**Figure 2**).

Wireless users have the same access to network resources as they would have if they were wired. This type of network is usually used to extend an existing network into a hard-to-wire environment or to allow roaming.



**Figure 2. Wireless-to-wired-Ethernet bridge**

Type 3. The third type of network is composed of multiple APs and multiple stations (**Figure 3**). The APs can be connected to a wired network with servers and other resources. Each AP's coverage area is referred to as a *cell*. Adjacent APs with the same SSID form a *domain*. Signal overlap between cells allows uninterrupted roaming in the domain.



**Figure 3. Multiple-AP network**

The reasons for having multiple APs installed are:

1. To increase bandwidth in order to boost overall network performance
2. To extend the coverage range

Any other type of configuration is usually a mix of these commonly used types.

# Planning an Infrastructure Network

This section explains some of the factors you need to consider when planning an infrastructure network. Setting up is a two-step process:

1. Install and configure the wireless devices.
2. Decide the best physical location of the wireless devices so as to optimize performance.

The following sections give quick guidelines for these two steps. Before we go into detail, the network planner should first decide whether to have a single-AP or multiple-AP wireless network.

## *Single AP Installation*

If you are setting up a simple network with only one AP and a few stations (a Type 1 or Type 2 network configuration as described in Infrastructure Network, page 4), the installation can be performed painlessly. All you need to do is make sure the AP and all the wireless stations have the same domain name (SSID) in their configuration.

Adding a new station to an existing infrastructure network is easy. Again, all you need to do is set the newly added station to use the same domain name (SSID) as the APs.

## *Multiple AP Installation*

***Install multiple APs in the same network (or domain) with an overlapping signal (Figure 3)***

- Use the same domain name (SSID).
- Enable the roaming function on any stations that require manual activation of this function.

*Note: Roaming is automatic on stations equipped with wireless LAN adapters from the same product family as your AP. Such stations will automatically connect to whichever AP in the same domain offers the best signal.*

## Roaming

Your AP can provide seamless roaming capabilities. The roaming function allows mobile stations to remain connected to the network as they move around.

Your AP is designed to allow wireless stations to roam freely within an infrastructure domain composed of multiple APs with overlapping signal coverage (as in the Type 3 network configuration described in the previous section). For example, roaming enables Station 1 to move from the AP 1 signal coverage area to the AP 2 signal coverage area without disconnecting from the network. The handover is achieved transparently; the Station 1 user would not realize he had moved from AP 1 to AP 2.

The requirements for a roaming environment are:

- a) Multiple APs with overlapping signal coverage. See “Multiple AP Installation,” page 6.
- b) The APs must be configured to have the same domain name (SSID). See “The Wireless Panel” in the chapter on using the AP Utility.
- c) The mobile stations must have the same domain name (SSID) as the APs.
- d) It is advisable that APs on different TCP/IP subnets be given different domain names (SSIDs) to avoid roaming confusion (see note below).

*Note: If you want a mobile PC to be able to move between different APs without terminating its existing network link, you may need to enable the roaming function on the mobile station. The APs that a mobile station will roam to must also be configured with the same domain name (SSID). If a station detects that signal quality on the link to the current AP is weak, it will search for an AP in the same domain with better signal quality and automatically establish a new connection with it. When a station is roaming, however, it always uses the same IP address. A TCP/IP router will not route information packets to a mobile station if it re-associates with a AP that is on a different TCP/IP subnet. In other words, if your network consists of two subnets connected by a router, a mobile station may roam to a different subnet with the same domain name (SSID) and then fail to communicate with other network devices via TCP/IP. To avoid this problem, you should assign different domain names (SSIDs) to different TCP/IP subnets.*

## Access Point Placement Guidelines

A characteristic of radio communication is the interference problem. Radio is susceptible to interference. Therefore, the more interference you can avoid, the better performance you will get from wireless products. The following section describes how the AP should be placed to reduce possible interference.

A few tips to mention that are particularly significant in a radio wave communications system:

1. Radio waves reflect or refract from buildings, walls, metal furniture, or other objects. This can result in performance degradation due to the fluctuation of the received signal.
2. Microwave ovens use the 2.45-GHz frequency band. Wireless networking products function in the 2.4–2.5-GHz band, and therefore share some of the band with microwave ovens. This means that when a nearby microwave oven is in use, it may interfere with wireless devices, resulting in performance degradation on the wireless network.

### *Placing For Performance*

For the best performance, it is advisable that users follow the guidelines below in placing the product:

- Place the AP as high as possible, in as open an area as possible.
- Avoid placing the AP close to metal objects (e.g., file cabinets, metal partitions, etc.).
- Keep APs and stations as far as possible from microwave ovens (a minimum distance of 10 meters is advisable).

# Getting Started

## Access Point Hardware Installation

This section explains how to quickly set up the access point for use via a wired Ethernet connection, and using the factory default settings. For installation on a network using other than the default settings, i.e., on an existing network, complete the hardware setup and refer to “The AP Utility,” page 12. To set up a wireless station, refer to the wireless network adapter user’s guide.

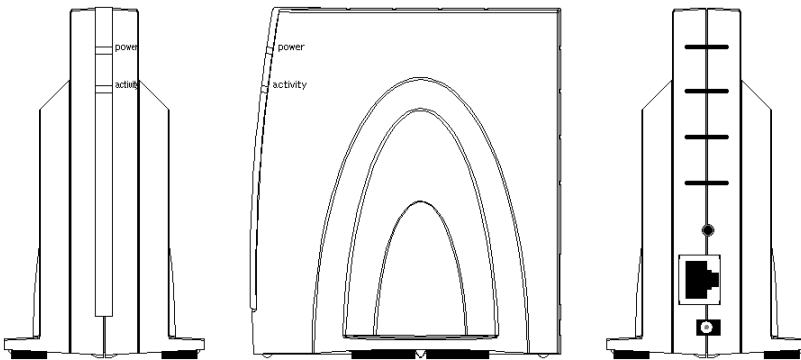


Figure 4. Access point: front, side, and rear views

- step 1** Plug one end of an Ethernet cable into the Ethernet jack on the back of the access point, and the other end into a hub or switch on your LAN.
- step 2** Plug the power adapter into an AC outlet, and then connect it to the power jack on the back of the access point.

The AP is now ready to communicate with wireless stations using its factory default settings (the SSID is set to *Wireless* and encryption is disabled). For station setup instructions, refer to the user’s guide for the station’s wireless network adapter.

## LED Indicators and Reset Button

The access point has two green light-emitting diode (LED) indicators that show the status of the unit. They are labeled **power** and **activity**. On the back of the unit, just above the RJ-45 Ethernet jack, is a reset button.

The **power** LED shines steadily whenever the AP has power. The only exception is when the AP’s reset button is pressed. A quick press of the reset button makes the **power** LED blink and restarts the AP. If the reset button is held down, the **power** LED will flash continuously for several seconds and then go out to show that the unit’s factory settings have been restored.

The **activity** LED shines steadily when an idle wireless link is detected. When data packets are received from a wireless station, this LED flashes on and off.

The following table summarizes the LEDs' functions:

<i>Label</i>	<i>Color</i>	<i>Function</i>
<b>power</b>	Green	Unlit: Power off or reset finished On: Device ready Blinking: Reset under way
<b>activity</b>	Green	Unlit: No wireless link On: Idle wireless link detected Blinking: Receiving packets from wireless station

**Figure 5. LED functions**

## AP Utility Software Installation and Uninstallation

### *Installation*

- step 1** Insert AP Utility setup disk 1 in drive A.
- step 2** Open the **Start** menu, choose **Run**, type **a:\setup**, and press Enter.
- step 3** A Welcome screen will appear. Click **Next** to start the setup program.
- step 4** A notice for users of Microsoft® Windows 98 and Windows NT 4.0 will appear. Read this notice carefully. You might need to install DCOM98 or NT Service Pack 4 before going on. These can be obtained from Microsoft's Web site.
- step 5** You will be given a chance to choose where the AP Utility will be installed. Accept the default location (C:\Program Files\AP Utility\AP Utility) or click **Browse** to choose another location, and then click **Next**.
- step 6** You will be given a chance to choose the desktop folder in which the AP Utility will appear. Accept the default folder or select a different one, and then click **Next**.
- step 7** The setup process will begin. Progress will be displayed in the setup screen. You can stop the process at any time by clicking **Cancel**.
- step 8** When prompted to insert AP Utility setup disk 2, remove disk 1 from drive A, insert disk 2, and click OK.
- step 9** After the AP Utility has been installed, click **Start / Programs / AP Utility / AP Utility**. The AP Utility will start up.

The AP Utility works through an Ethernet connection to the AP and is intended for basic first-time setup of AP parameters, as well as for more sophisticated configuration (see “The AP Utility,” page 12).

### *Uninstallation*

Should you wish to uninstall the AP Utility, click **Start / Programs / AP Utility / Uninstall the AP Utility**.

A confirmation box will ask if you are sure you wish to remove the program. Click **Yes**.

# The AP Utility

The AP Utility is a Windows 98/ME/NT4/2000/XP-based utility that is used via an Ethernet connection between the AP and a PC. It lets you —

- set necessary AP parameters (e.g., IP address, domain name/SSID, etc.)
- upgrade the AP's firmware
- reset the AP

Click **Start ► Programs ► AP Utility ► AP Utility** to start the program. The utility will automatically search the network for compatible APs and display the results in five seconds. This is usually enough to find all compatible APs on a LAN. The search can work through both wired and wireless Ethernet links, but not through routers or non-Ethernet connections.

For all configuration functions to work, the AP must have IP settings that put it on the same TCP/IP subnet as the computer running the AP Utility. The AP is set at the factory to request IP settings from a Dynamic Host Configuration Protocol (DHCP) server when powered up. If the AP cannot get suitable IP settings from a DHCP server, you will have to send it such settings using the AP Utility.

The first time the AP Utility starts up, it displays a dialog box titled **Find AP**. This dialog box lets you —

- select an AP from a drop-down list box (if multiple APs were found)
- search for APs that may have become accessible since the utility started up
- go to the main window for further configuration of the selected AP (if that AP's current IP settings allow this)
- go to the **Set IP** dialog box to give the selected AP IP settings that will allow further configuration
- go to the **Password** dialog box to change the AP's password

**Note:** The AP's default password is *admin*. You should change the password to protect the AP's settings. Remember this password; it is never displayed.

On subsequent startups, if the utility finds a “known” and suitably configured AP, the main window will appear directly. You can display the **Find AP** dialog box by clicking the Find AP button or opening the **Select** menu and choosing **Find AP**.

If the AP does not receive IP settings from a DHCP server or the AP Utility within a minute and twenty seconds of being powered up or reset, it will automatically assign itself an IP address in the 169.254.x.x range. Microsoft® Windows systems that are set to use DHCP also auto-assign themselves IP addresses in this range if the DHCP server fails and their DHCP leases run out.

Typical first-time and later AP Utility startup displays are shown below. If the selected AP already has suitable IP settings, you can click **OK** to go directly to the

AP Utility's main window. If the selected AP's IP settings will not allow further configuration, clicking either **OK** or **Change IP Settings** will display a dialog box titled **Set IP**.

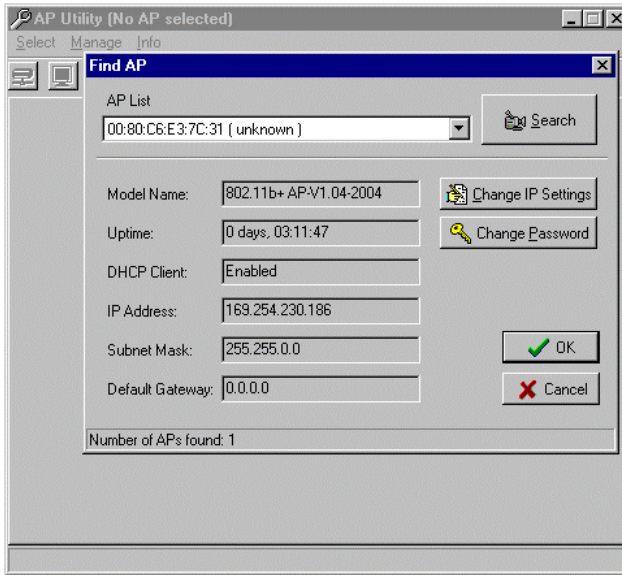


Figure 6. Typical AP Utility display on first startup

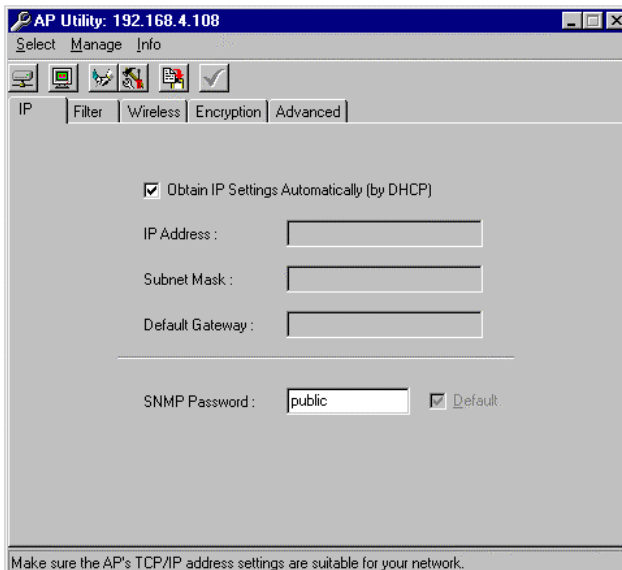


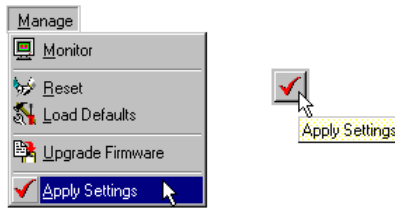
Figure 7. Typical AP Utility display on later startups

# Using the AP Utility's Configuration Panels

AP configuration is carried out mainly through the five panels whose tabs appear in the AP Utility's main window: the **IP**, **Filter**, **Wireless**, **Encryption**, and **Advanced** panels. This section explains how to use these panels.

Above the panel tabs are six buttons corresponding to commands in the utility's menus. Of these, the most frequently used is the Apply Settings button on the right. This button corresponds to the **Manage** menu's **Apply Settings** command.

The Apply Settings button and command are disabled when the settings in the AP Utility's panels completely match the AP's current configuration. When you change a setting in any panel, the button and the command become enabled and can be clicked to send all changes to the AP.



**Figure 8. Apply Settings command and button**

When you apply new settings from a configuration panel, there is a short delay as the AP is restarted and communication with it is re-established. You are then returned to the **IP** panel.

The AP Utility's menus and other buttons are discussed in a later section. They have important functions, but often are not used at all in basic AP configuration.

## *The IP Panel*

The **IP** panel is visible in the second startup display shown above. This panel shows the IP settings that allow full communication between the AP and the AP utility. Use the controls in this panel as follows:

- To turn the AP's DHCP Client function on or off, check or uncheck the control labeled **Obtain an IP address automatically**.
- To specify new, non-DHCP IP settings for the AP, click and type in the **IP Address**, **Subnet Mask**, and **Default Gateway** boxes.
- To change the SNMP password for managing the AP, click and type in the **SNMP Password** box (or click **Default** to restore the default SNMP password). The utility will "remember" this password and automatically use it for this AP.

To send the new settings to the AP, click the Apply Settings button, or open the **Manage** menu and choose **Apply Settings**.

## The Filter Panel

The **Filter** panel lets you prevent certain kinds of packets from passing from the wired portion of your network to the wireless portion. When the AP, through its wired interface, receives a packet of a type to be filtered, it will drop the packet instead of transmitting it to wireless stations. This can greatly increase the efficiency of the wireless network.

By default, no packets are filtered. The **Filter** panel lets you set the AP to filter packets containing the following networking protocols:

- **IP.** This is an abbreviation for TCP/IP, the main protocol suite of the Internet.
- **IPX.** This is the main protocol used by Novell's NetWare products.
- **NetBEUI.** This is a protocol used mainly by very old versions of Windows.
- **AppleTalk.** Macintosh systems use this protocol for local network functions.
- **Other Protocols.** If this option is checked, *only* protocols that are *not* checked in the Filter panel will be allowed through. Everything else will be blocked.
- **Internet Multicast Frames.** These are IP packets that usually contain streaming audio or video data.

The Filter function affects only packets appearing on the wired portion of the network, and it only prevents them from reaching wireless stations. Wireless stations can still send such packets, and packets filtered by the AP can still reach wired stations.

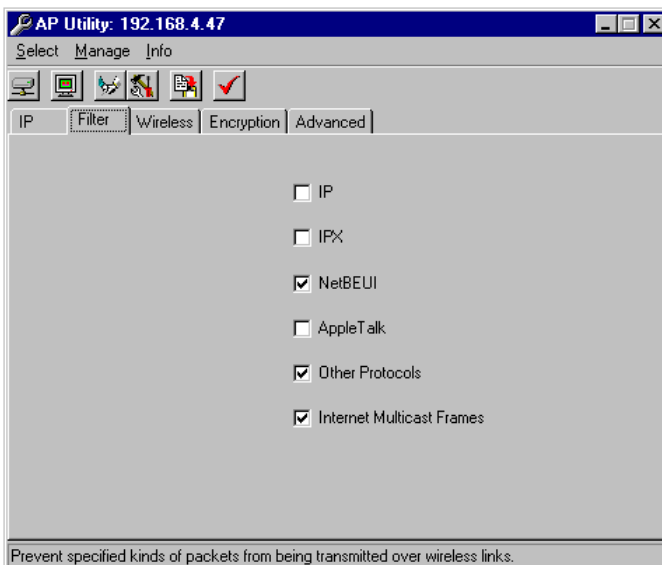
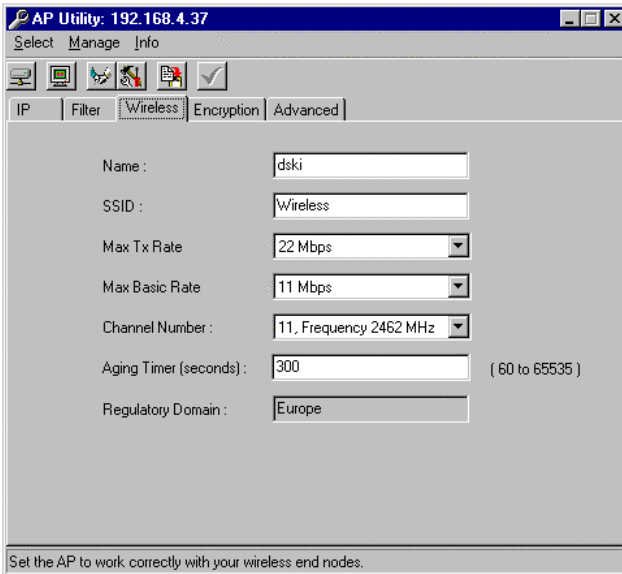


Figure 9. The Filter panel

To send any changed settings to the AP, click the Apply Settings button or choose **Apply Settings** from the **Manage** menu.

### The Wireless Panel

The **Wireless** panel lets you view and adjust settings that are unique to, and in many cases necessary for, wireless communication. These settings are explained below.



**Figure 10. The Wireless panel**

**Name.** Sometimes referred to as the AP’s “alias,” this is a string up to 20 characters long that helps you identify the AP. It does not affect operation in any way. This setting is initially blank, and “unknown” appears here and next to the AP’s MAC address in the **Find AP** window’s AP list.

**SSID.** Also known as the AP’s “domain name” or ESSID (Extended Service Set Identifier), this is a string by which wireless stations and an AP or APs determine that they belong to the same group. The AP’s default SSID is the word *Wireless*.

**Max Tx Rate.** This is the highest data transmission speed that can be used between the AP and any wireless station. The AP and stations automatically adjust their transmission speed according to signal quality. They may sometimes use lower speeds than that set here, but they will not use speeds higher than the **Max Tx Rate** setting. The default setting is the highest speed the AP is capable of.

Lower speeds can increase the wireless range; higher speeds can reduce the AP’s range for better security.

**Max Basic Rate.** This is the highest permissible transmission rate for broadcast, multicast, and management packets. Lower rates help ensure that these packets get through without retries that could reduce network performance. The default setting is 11 Mbps. This setting cannot be higher than the **Max Tx Rate** setting.

**Channel Number.** A channel is a small group of adjacent frequencies. If the coverage areas of two APs overlap, the APs must use channels with center frequencies at least 30 MHz apart to avoid interfering with each other. The table below shows the channels available in different regulatory domains. APs with overlapping coverage areas should be set at least four channels apart. In most regulatory domains, your AP's default setting is channel 11.

Channel Number	Center Frequency (MHz)	FCC/ Canada	ETSI	Spain	France	Japan
1	2412	O	O			O
2	2417	O	O			O
3	2422	O	O			O
4	2427	O	O			O
5	2432	O	O			O
6	2437	O	O			O
7	2442	O	O			O
8	2447	O	O			O
9	2452	O	O			O
10	2457	O	O	O	O	O
11	2462	O	O	O	O	O
12	2467		O		O	O
13	2472		O		O	O
14	2484					O

**Figure 11. Channels Available in Major Regulatory Domains**

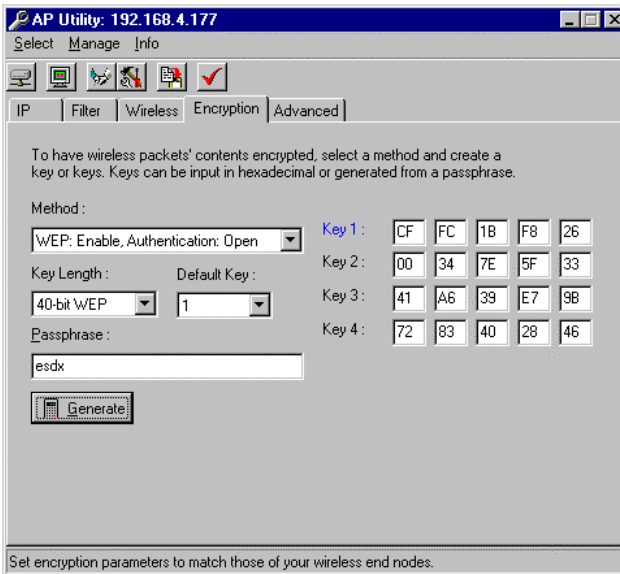
**Aging Timer:** For a wireless station to establish a connection to an AP takes up bandwidth. The AP maintains a table of currently connected stations so these stations do not have to go through the process of establishing a connection each time they wish to transmit. The Aging Timer is the number of seconds a station will be kept in the table if no communication with the station takes place. The default value is 300.

**Regulatory Domain:** This is the region whose regulations the AP has been set at the factory to comply with. This setting cannot be changed.

## The Encryption Panel

Information passing over wireless links can be encrypted to prevent snooping. Only stations that encrypt their transmissions with the correct key will then be able to connect to the AP and communicate with the rest of the network.

Encryption is disabled by default. The following figure shows the **Encryption** panel after the process of enabling encryption has been started.



**Figure 12. The Encryption panel**

If you wish to use encryption, enable the function as follows:

**step 1** Open the **Method** list and select a suitable method.

The method determines (1) whether Wired Equivalent Privacy (WEP) encryption will be used at all, and (2) whether stations must use WEP encryption when authenticating themselves (that is, when requesting permission to join the wireless network).

“Open authentication” means that requests to join the network must not be encrypted. “Shared authentication” means that stations must encrypt all requests to join the network. “Authentication: Both” means that stations’ requests to join may be either encrypted or unencrypted.

After you choose a setting that enables WEP, key input boxes appear and the other controls in this panel are enabled.

**step 2** Open the **Key Length** list and select a key length.

40-bit WEP encryption (sometimes called 64-bit WEP) lets you create four keys, which you can switch among for better security. 128-bit WEP lets you create a single, longer, more secure key. 256-bit WEP encryption, the most secure of all, can be used only if all wireless stations are equipped with wireless network adapters from the same product family as your AP.

Remember that the AP and all wireless stations must use the same encryption settings at any given time.

**step 3** There are two ways to create the actual key or keys:

*Using a passphrase:* Click in the **Passphrase** box, type any text, and then click **Generate**. The numeric values of the key or keys will appear in the key input boxes in hexadecimal (base 16) notation.

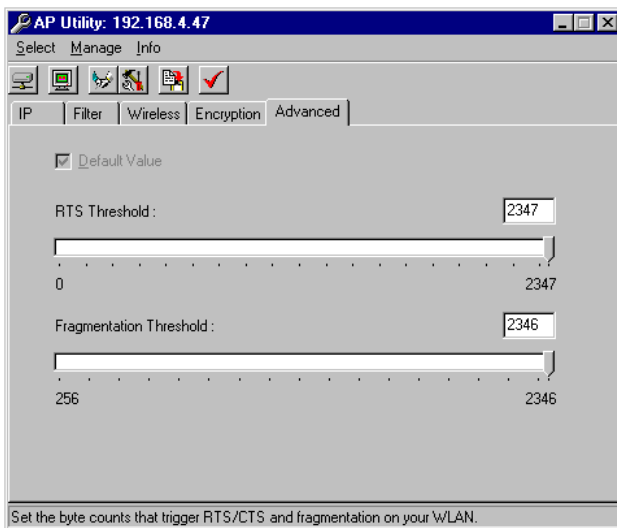
*Typing hexadecimal values:* You can click in the key input boxes and type the values of the key or keys using two-digit hexadecimal notation (00, 01, 02 . . . 0A, 0B, 0C, and so forth, up to FF).

Note that the hexadecimal key values (and the passphrase, if you use one) will be removed from the screen after you apply the settings. Be sure to memorize or record them for use in configuring stations.

**step 4** If using 40-bit WEP and switching keys, open the **Default Key** list and select the key currently in use on the wireless network.

### *The Advanced Panel*

The **Advanced** panel lets you set the number of bytes a packet must contain to trigger RTS/CTS (Request to Send/Clear to Send) handshaking and/or “fragmentation” (intentional splitting up) into multiple packets before wireless transmission. These values need to be changed only in unusual situations.



**Figure 13. The Advanced panel**

## Using the AP Utility's Menus

### *The Select Menu*

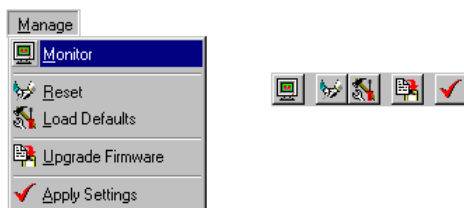
The **Select** menu contains two commands, **Find AP** and **Exit**.

Use the **Find AP** command to locate compatible access points on your network. The AP Utility will list the APs found and let you choose one to configure, exactly as it does when first started up. See “The AP Utility,” page 12, for details.

The **Exit** command ends an AP Utility session. If you have changed settings in any configuration panel without applying them (that is, without sending them to the AP), you will be asked if you wish to apply them before exiting.

### *The Manage Menu*

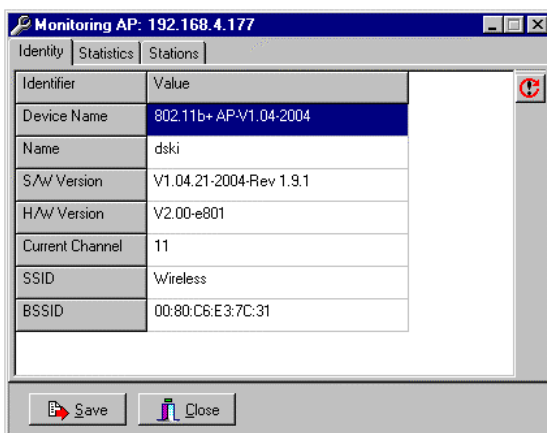
Managing the AP consists of monitoring its operation, resetting (restarting) it, loading the default (factory) settings, upgrading the unit's firmware, and applying settings from the AP Utility's configuration panels. The **Manage** menu and the main-window buttons that correspond to its commands are shown below.



**Figure 14. The Manage menu and equivalent buttons**

The **Monitor** command (or the Monitor button) opens a window that provides information about the AP and the network. This window has three tabbed panels, labeled **Identity**, **Statistics**, and **Stations**. A **Save** button at the bottom of the window lets you save the displayed information to a disk file.

The **Identity** panel shows the AP’s current name, channel, and SSID settings, as well as fixed information such as the unit’s BSSID and the version numbers of its software (firmware) and hardware. A Refresh button at the top right lets you re-fetch the information from the AP if a network problem temporarily interrupts communication.

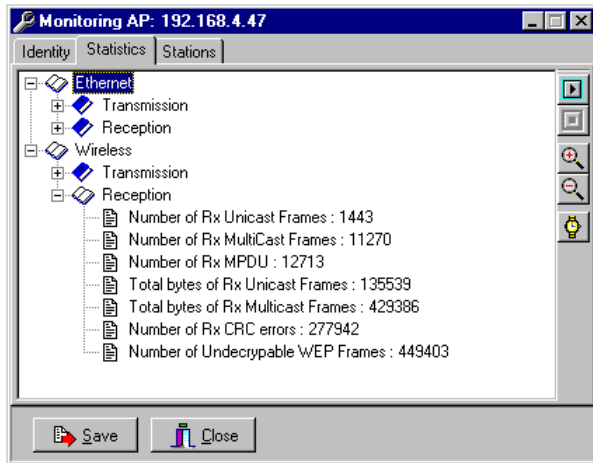


**Figure 15. The Monitoring window’s Identity panel**

The **Statistics** panel is important for assessing the health of the network. The AP keeps counts of “frames” (packets) sent, received, and dropped on each of its interfaces. These counts can be retrieved using the **Statistics** panel.

This panel contains an expandable list. To expand an item, click the plus sign next to it. An expanded item has a minus sign next to it, which you can click to collapse the item. Buttons at the right, each marked with a magnifying glass and a plus or minus sign, can be clicked to expand or collapse the whole list at once.

Operational statistics are retrieved from the AP by “polling” it, that is, by requesting the latest counts at regular intervals. To start this process, click the top button on the right side of the panel, which looks like a tape or disc player’s Play button. The next button down discontinues statistics retrieval.



**Figure 16. The Monitoring window’s Statistics panel**

By default, when retrieving statistics from the AP, the AP Utility polls the AP every three seconds. This is the shortest interval allowed. A button marked with a wristwatch lets you adjust the polling interval within a range of 3 to 60 seconds.

The **Stations** panel lists devices that are currently associated with the AP (that is, communicating through it in one way or another). Three kinds of devices can appear here:

**STA.** A wireless station communicating directly through the AP.

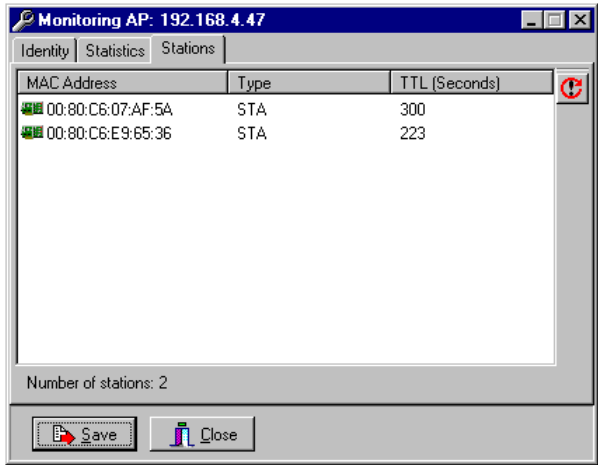
**WEB.** A wireless Ethernet bridge. A WEB can take the place of wireless network adapters for one to sixteen Ethernet-capable devices.

**Client.** A computer or other device connected to a WEB and using the WEB to communicate through the AP.

For each device currently associated with the AP, the **Stations** panel shows the MAC address, type of device (STA, WEB, or Client) and “time to live” (TTL). TTL is related to the **Aging Timer** setting in the main window’s **Wireless** panel. It is the number of seconds remaining before the device will be dropped from the AP’s association table if the device becomes idle.

Whenever the Monitoring window is on the screen, the AP Utility polls the AP for updated information on associated devices every 30 seconds, whether the **Stations**

panel is displayed or not. A Refresh button in the top right corner of the **Stations** panel lets you retrieve updated information from the AP at any time.



**Figure 17. The Monitoring window's Stations panel**

The next command in the Manage menu is **Reset**. Choosing this command starts the AP up again without changing the unit's configuration. Because the AP will go off line for a short while (normally no more than 15 seconds), you will be asked to confirm the command before it is carried out.

The **Load Defaults** command has the same effect as a prolonged press of the reset button on the back of the AP: it erases all user settings and restores the default (factory) configuration. A warning will appear and you will be asked to confirm the command.

The **Upgrade Firmware** command lets you update the built-in program code that controls the AP's operation. New versions of this code may be released to add new functions or to make the AP work more smoothly. Choose this command if you have obtained a file containing such code and you wish to download the file to the AP. The AP Utility will display a dialog box that lets you specify the file to be downloaded, initiate the download, and monitor the progress of the upgrade.

### *The Info Command*

The **Info** command displays a dialog box titled About and providing information about the AP Utility and the environment it is running in.

# Technical Support

If you are having a problem using this product and cannot resolve it, please note the following information and contact your dealer for technical support:

- What you were doing when the error occurred
- What error messages you saw
- Whether the problem can be reproduced
- The serial number of your product
- The firmware version number
- A copy of the AP configuration file

# Limited Warranty

## **Hardware**

The manufacturer warrants its products to be free of defects in workmanship and materials, under normal use and service, for a period of 12 months from the date of purchase from an authorized reseller and for the period of time specified in the documentation supplied with each product.

Should a product fail to be in good working order during the applicable warranty period, the manufacturer will, at its option and expense, repair or replace it, or deliver to the purchaser an equivalent product or part at no additional charge except as set forth below. Repair parts and replacement products are furnished on an exchange basis and will be either reconditioned or new. All replaced products and parts will become the property of the manufacturer. Any replaced or repaired product or part has a ninety (90) day warranty or the remainder of the initial warranty period, whichever is longer.

The manufacturer shall not be liable under this warranty if its testing and examination disclose that the alleged defect in the product does not exist or was caused by the purchaser's, or any third party's misuse, neglect, improper installation or testing, unauthorized attempt to repair or modify, or any other cause beyond the range of the intended use, or by accident, fire, lightning, or other hazard.

## **Software**

Software and documentation materials are supplied "as is" without warranty as to their performance, merchantability, or fitness for any particular purpose. However, the diskette media containing the software are covered by a 90-day warranty which protects the purchaser against failure within that period.

## ***Limited Warranty Service Procedures***

Any product (1) received in error, (2) in a defective or non-functioning condition, or (3) exhibiting a defect under normal working conditions, can be returned to the manufacturer by following these steps:

1. Prepare the following materials:
  - dated proof of purchase
  - product model number and quantity
  - product serial number
  - precise reason for return
  - your name/address/email address/telephone/fax
2. Inform the distributor or retailer
3. Ship the product back to the distributor/retailer with prepaid freight. The purchaser must pay the shipping freight from the distributor/retailer to the manufacturer. Any package sent C.O.D. (Cash On Delivery) will be refused.

Charges: Usually RMA (Returned Material Authorization) items will be returned to the purchaser via air mail, prepaid by the manufacturer. If returned by another carrier, the purchaser will pay the difference. A return freight and handling fee will be charged to the purchaser if the manufacturer determines that the product was not faulty or that the damage was caused by the user.

## ***Warning***

The manufacturer is not responsible for the integrity of any data on storage equipment (hard drives, tape drives, floppy diskettes, etc.). We recommend that our customers back their data up before sending such equipment in for diagnosis or repair.

## ***Service after Warranty Period***

After the warranty period expires, all products can be repaired for a reasonable service charge. The shipping charges to and from the repair facility will be borne by the purchaser.

## ***Return for Credit***

In the case of a “DOA” (and item found “dead on arrival”) or a shipping error, a return for credit will automatically be applied to the purchaser’s account, unless otherwise requested.

## ***Limitation of Liability***

All expressed and implied warranties of a product's merchantability, or of its fitness for a particular purpose, are limited in duration to the applicable period as set forth in this limited warranty, and no warranty will be considered valid after its expiration date.

If this product does not function as warranted, your sole remedy shall be repair or replacement as provided for above. In no case shall the manufacturer be liable for any incidental, consequential, special, or indirect damages resulting from loss of data, loss of profits, or loss of use, even if the manufacturer or its authorized distributor/dealer has been advised of the possibility of such damages, or for any claim by any other party.

# Index

## *I*

10BASE-T ..... 1

## *A*

AppleTalk ..... 15

Apply Settings command and button  
..... 14, 16

## *B*

BSSID ..... 2, 21

## *C*

cabling ..... 1

cell ..... 2, 5

coverage ..... 5, 7, 17

## *D*

DHCP ..... 3, 12, 14

domain name ..... 6, 7, 12, 16, 21

domain, regulatory ..... 2, 17

domain, wireless ..... 2, 5, 7

## *E*

encryption ..... 9, 18, 19

ESSID ..... 2, 16

Exit command ..... 20

## *F*

Find AP command ..... 20

fragmentation ..... 19

frequency, radio ..... 2, 8, 17

## *G*

Group ID ..... 2

## *H*

hexadecimal ..... 19

## *I*

Identity panel ..... 21

IEEE 802.11b ..... 1, 2

infrastructure ..... 4

interference ..... 8, 17

IP address ..... 3, 7, 12, 14

IPX ..... 15

ISM band ..... 2

## *L*

LEDs ..... 9

Load Defaults command ..... 23

## *M*

MAC address ..... 2, 16, 22

Macintosh ..... 15

Medium Access Control ..... 2

Monitor command ..... 21

multicast ..... 15, 17

## *N*

NetBEUI ..... 15

## *O*

overlap, signal ..... 2, 5, 6, 7, 17

## *P*

passphrase ..... 19

password ..... 12

password, SNMP ..... 14

performance ..... 3, 5, 6, 8, 17

polling ..... 22

## *R*

radio frequency ..... 2, 8, 17

Refresh button ..... 21, 23

regulatory domain ..... 2, 17

reset button

    in AP Utility ..... 20, 23

    on AP ..... 9, 23

roaming ..... 2, 4, 5, 6, 7

RTS/CTS ..... 19

## **S**

signal overlap .....	2, 5, 6, 7, 17
signal quality .....	6, 7, 8, 16
SNMP password .....	14
SSID .....	2, 5, 6, 7, 9, 12, 16, 21
STA (wireless station) .....	22
Stations panel .....	22
Statistics panel .....	21
STP .....	1
subnet .....	2, 3, 7, 12, 14

## **T**

TCP/IP .....	3, 7, 12, 15
--------------	--------------

twisted-pair .....	1
--------------------	---

## **U**

Upgrade Firmware command .....	23
UTP .....	1

## **W**

WEB (Wireless Ethernet Bridge) ..	22
WEP .....	1, 18, 19
Windows .....	1, 10, 12, 15
wireless cell .....	2, 5
wireless domain .....	2, 5, 7