Overview

This chapter describes the Cisco Aironet Wireless LAN Adapters, also referred to as *client adapters*, and illustrates their role in a wireless network.

The following topics are covered in this section:

- Introduction to the Client Adapters, page 1-2
- Parts of the Client Adapter, page 1-3
- Network Configurations Using the Client Adapter, page 1-4
- Introduction to the Client Utility, page 1-7
- Opening the Client Utility for Mac OS 9.x, page 1-7
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- Client Utility Basics, page 1-8

Introduction to the Client Adapters

The Cisco Aironet Wireless LAN Adapters, also referred to as *client adapters*, are radio modules that provide transparent wireless data communications between fixed, portable, or mobile devices and other wireless devices or a wired network infrastructure. The client adapters are fully compatible when used in devices supporting Plug-and-Play (PnP) technology.

The primary function of the client adapters is to transfer data packets transparently through the wireless infrastructure. The adapters operate similarly to a standard network product except that the cable is replaced with a radio connection. No special wireless networking functions are required, and all existing applications that operate over a network will operate using the adapters.

This document covers three types of client adapters:

- **PC card client adapter** (also referred to as a *PC card*) – A PCMCIA card radio module that can be inserted into any device equipped with an *external* Type II or Type III PC card slot. Host devices can include laptops, notebook computers, personal digital assistants, and hand-held or portable devices.
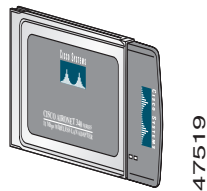

- **LM card client adapter** (also referred to as an *LM card*) – A PCMCIA card radio module that can be inserted into any device equipped with an *internal* Type II or Type III PC card slot. Host devices usually include hand-held or portable devices.

- **PCI client adapter** – A client adapter card radio module that can be inserted into any device equipped with an empty PCI expansion slot, such as a desktop computer.
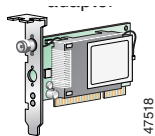
Refer to the "Radio Antenna" section on page 1-3 for antenna differences between these adapters.

Introduction to the Client Adapter Software Components

The software components of the client adapter consists of a driver, firmware, and a client utility. These components work together to allow the client adapter to work properly in your workstation. Typically, the driver and client utility are designed for use with a specific operating system or a group of similar operating systems, while the firmware is designed specifically for the client adapter's hardware and radio. The firmware controls the radio operations.

The client adapter firmware provides the interface between the radio and the driver. The driver provides the interface between the client adapter firmware and the workstation's operating system. The client adapter is installed as a network communications adapter on the workstation's operating system.

The client utility interfaces to the operating system to allow you to configure, test, and monitor the operations of the client adapter on the wireless LAN. The client utility also allows you to load new firmware into the client adapter.

Terminology

Throughout this document, the following terms are used:

- **client adapter** – Refers to all three types of adapters
- **PC card**, **LM card**, or **PCI client adapter** – Refers to only a specific adapter
- **workstation** (or **station**) – Refers to a computing device with an installed client adapter

Parts of the Client Adapter

The client adapter is composed of three major parts: a radio, a radio antenna, and two LEDs.

Radio

The client adapter contains a direct-sequence spread spectrum (DSSS) radio that operates in the 2.4-GHz license-free Industrial Scientific Medical (ISM) band. The radio transmits data over a half-duplex radio channel operating at up to 11 Mbps.

DSSS technology causes radio signals to be transmitted over a wide frequency range, using multiple frequencies simultaneously. The benefit of this technology is its ability to protect the data transmission from interference. For example, if a particular frequency encounters noise or interference or both, enough redundancy is built into the signal on other frequencies that the client adapter is usually still successful in its transmission.

Radio Antenna

The type of antenna used depends on your client adapter:

- PC cards have an integrated, permanently attached diversity antenna. The benefit of the diversity antenna system is improved coverage. The system works by allowing the card to switch and sample between its two antenna ports in order to select the optimum port for receiving data packets. As a result, the card has a better chance of maintaining the radio frequency (RF) connection in areas of interference. The antenna is housed within the section of the card that hangs out of the PC card slot when the card is installed.

- LM cards are shipped without an antenna; however, an antenna can be connected through the card's external connector. If a snap-on antenna is used, it should be operated in diversity mode. Otherwise, the antenna mode used should correspond to the antenna port to which the antenna is connected.

- PCI client adapters are shipped with a 2-dBi dipole antenna that attaches to the adapter's antenna connector. However, other types of antennas may be used. PCI client adapters can be operated through the right antenna port only.

Note   For information on setting the client adapter's antenna mode, refer to Chapter 5, "Advanced Configuration on Mac OS 9.x" or to Chapter 6, "Advanced Configuration on Mac OS X."

Note   External antennas used in combination with a power setting resulting in a radiated power level above 100 mW equivalent isotropic radiated power (EIRP) are not allowed for use within the European community and other countries that have adopted the European R&TTE directive or the CEPT recommendation Rec 70.03 or both. For more details on legal combinations of power levels and antennas in those countries, contact Cisco Corporate Compliance. See also the "Declarations of Conformity and Regulatory Information" section on page C-1.

LEDs

The client adapter has two LEDs that glow or blink to indicate the status of the adapter or to convey error messages. Refer to Chapter 9 for an interpretation of the LED codes.

Network Configurations Using the Client Adapter

The client adapter can be used in a variety of network configurations. In some configurations, access points provide connections to your network or act as repeaters to increase wireless communication range. The maximum communication range is based on how you configure your wireless network.

This section describes and illustrates the following common network configurations:

- Ad hoc wireless local area network (LAN)
- Wireless infrastructure with workstations accessing a wired LAN

Note   For examples of more complex network configurations involving client adapters and access points, refer to the *Cisco Aironet Access Point Hardware Installation Guide*.

Note   For information on setting the client adapter's network mode, refer to Chapter 5 for the Mac OS 9.x operating system or to Chapter 6 for the Mac OS X operating system.

Ad Hoc Wireless LAN

An ad hoc (or peer-to-peer) wireless LAN (see Figure 1-1) is the simplest wireless LAN configuration. In a wireless LAN using an ad hoc network configuration, all devices equipped with a client adapter can be linked together and communicate directly with each other.

Figure 1-1   Ad Hoc Wireless LAN
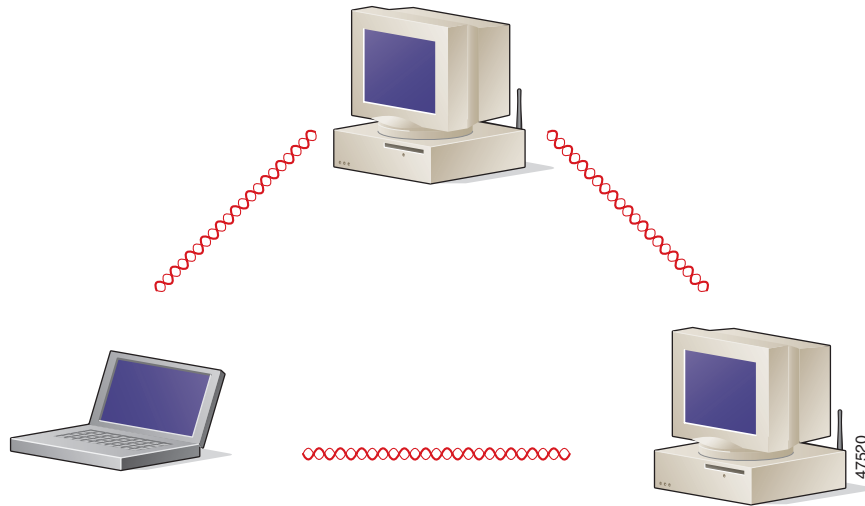
Wireless Infrastructure with Workstations Accessing a Wired LAN

A microcellular network can be created by placing two or more access points on a LAN. Figure 1-2 shows a microcellular network with workstations accessing a wired LAN through several access points.

This configuration is useful with portable or mobile stations because it allows them to be directly connected to the wired network even while moving from one microcell domain to another. This process is transparent, and the connection to the file server or host is maintained without disruption. The mobile station stays connected to an access point as long as it can. However, once the transfer of data packets needs to be retried or beacons are missed, the station automatically searches for and associates to another access point. This process is referred to as *seamless roaming*.

Figure 1-2   Wireless Infrastructure with Workstations Accessing a Wired LAN
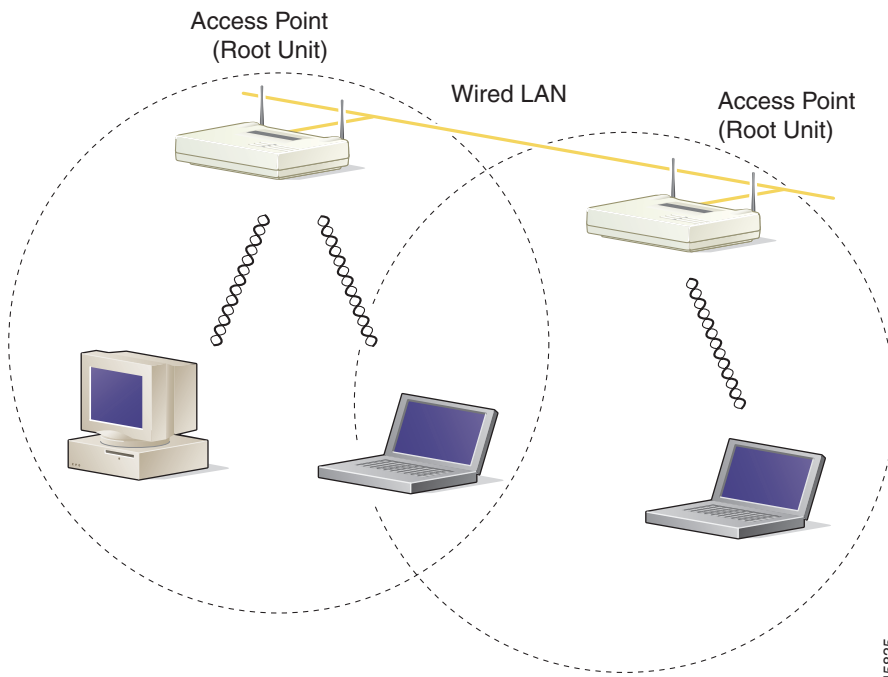
Introduction to the Client Utility

The client utility allows you to load new firmware, enable security features, configure your client adapter, and perform user-level diagnostics. The latest client utility software package for both the Mac OS 9.x and the Mac OS X operating systems is available from Cisco's web site.

Note   The latest Macintosh software package on CCO contains the driver and client utility for both the Mac OS 9.x and the Mac OS X operating systems.

To obtain the latest driver and client utility from the Cisco Web site, follow these steps:

Step 1   Use your web browser to access the following URL:

http://www.cisco.com/pcgi-bin/tablebuild.pl/aironet-utils-mac.

Step 2   Click on the latest software file (MACOSInstallv*2x.sit*) for both the Mac OS 9x and Mac OS X operating systems. The 2*x* identifies the software package version number.

Step 3   Read and accept the terms and conditions of the Software License Agreement.

Step 4   Select the Cisco server from which you wish to download the file.

Step 5   Save the file to your hard drive then exit the web browser.

For installation instructions, refer to Chapter 3, "Installing the Driver, Client Utility, and Client Adapter."

Opening the Client Utility for Mac OS 9.x

To open the client utility on a Mac OS 9.x operating system, follow the steps below:

Step 1   Double-click the Macintosh hard disk icon on the desktop.

Step 2   Double-click the **Cisco pcm3x0 Folder** icon. If you selected a location other than the default (the Cisco pcm3x0 Folder) during the installation process, select the folder in which the utility was installed.

Step 3   Double-click the **pcm3x0PPC** icon. The computer searches for the client adapter. After the adapter is found, the Basic Properties screen appears.

Opening the Client Utility for Mac OS X

To open the client utility on a Mac OS X operating system, follow the steps below:

Step 1   On the Finder menu bar, click **Go** and select **Applications** from the pull-down menu.

Step 2   Double-click the **Aironet Client Utility** icon in the Applications folder. The computer searches for the radio on the client adapter. After the adapter and radio are found, the client utility basic properties screen appears.

Client Utility Basics

This section explains the basic features of the client utility for Mac OS 9.x and Mac OS X.

Mac OS 9.x

The client utility on Mac OS 9.x supports several screens used for specific functions.

Switching between Screens

The client utility allows more than one screen (or window) to be open at a time. The Windows menu (see Figure 1-3) displays a list of the open screens.

Figure 1-3   Windows Menu

The screen marked with a diamond indicates the active screen. You can change which screen is active by clicking on another screen in the Windows menu.

Note   The Basic Properties screen and the Edit Properties screen cannot be open at the same time.

Buttons on the Client Utility Screens

The buttons on the bottom of the client utility screens are used to perform specific functions. Table 1-1 describes the most common buttons.

Table 1-1   Client Utility Buttons on Mac OS 9.x

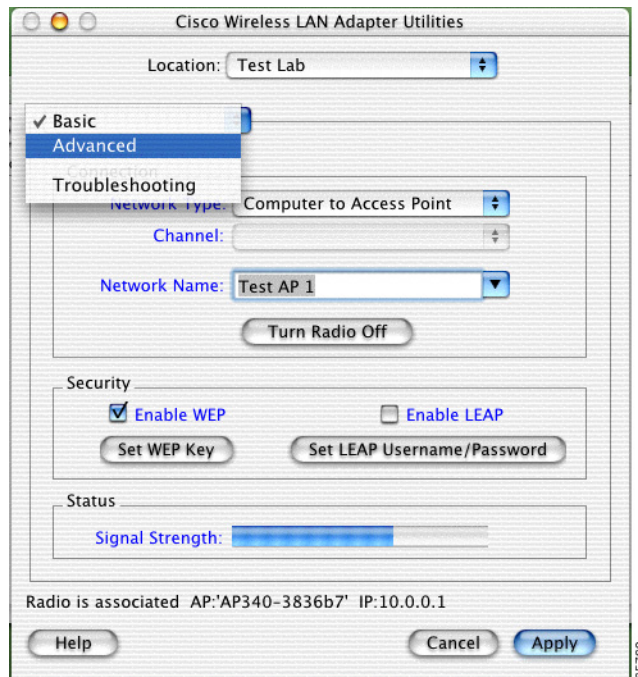| Button	Description
Cancel	Exits the application without saving any changes
OK	Saves any changes and exits the application
Apply	Saves any changes but does not exit the application
Pause	Freezes the information on the Statistics screens and prevents it from being updated
Continue	Allows the information on the Statistics screens to be updated after the Pause button is selected
Clear Stats	Temporarily clears any values on the Statistics screens and resets them to 0
Start	Initiates a RF Link test
Stop	Stops an RF Link test that is running
Defaults	Sets the parameters for a screen to their default values
Help	Provides information on the screen and its parameters

Mac OS X

The client utility on Mac OS X supports three main screens, the basic and advanced parameter screens and the troubleshooting screen.

Switching between Screens

You can change the client utility's active screen by clicking the parameter option field's up or down arrows. Figure 1-4 shows the screen pull-down parameter options.

Figure 1-4   Client Utility Screen Pull-Down Parameter Options

Note   You can click the highlighted blue text on the client utility screens to obtain additional descriptive information on the highlighted words. You can also click the Help button to obtain detailed information on the client utility parameters and fields.

Buttons on the Client Utility Screens and Dialog Boxes

The buttons supported by the client utility are used to perform specific functions. Table 1-2 describes the most common buttons.

Table 1-2   Client Utility Buttons for Mac OS X

Button	Description
Apply	Saves any changes but does not exit the application.
Cancel	Exits the application or screen without saving any changes. If changes have been made, a message appears asking if you want to save the changes.
Turn Radio Off Turn Radio On	Turns the radio off or on.
Set WEP Key	Sets the WEP keys.
Set LEAP Username/Password	Sets the LEAP username and password.
Help	Provides information on the screen and its parameters.