



# Overview

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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](#)
- [Hardware Components, page 1-3](#)
- [Software and Firmware Components, page 1-5](#)
- [Network Configurations Using the Client Adapter, page 1-6](#)



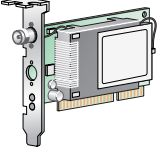
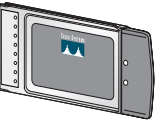
# Introduction to the Client Adapters

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 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 the following types of client adapters:

**Table 1-1 Client Adapter Types**

Client Adapter	Model Number	Description	Illustration
PC card	AIR-PCM3xx	An IEEE 802.11b-compliant 11-Mbps 2.4-GHz PCMCIA card radio module that can be inserted into any device equipped with an <i>external</i> Type II or Type III PC card slot. Host devices can include laptops, notebook computers, personal digital assistants, and handheld or portable devices. The PC card is available in the 340 and 350 series.	 47519
LM card	AIR-LMC3xx	An IEEE 802.11b-compliant 11-Mbps 2.4-GHz PCMCIA card radio module that is usually preinstalled in a device equipped with an <i>internal</i> Type II or Type III PC card slot. Host devices usually include handheld or portable devices. The LM card is available in the 340 and 350 series.	 47893
PCI card	AIR-PCI3xx	An IEEE 802.11b-compliant 11-Mbps 2.4-GHz client adapter card radio module that can be inserted into any device equipped with an empty PCI expansion slot, such as a desktop personal computer. The PCI card is available in the 340 and 350 series.	 65189
PC-Cardbus card	AIR-CB20A	An IEEE 802.11a-compliant 54-Mbps 5-GHz client adapter card radio module with a Cardbus interface that can be inserted into any device equipped with an <i>external</i> Type II or Type III Cardbus slot. Host devices can include laptops, notebook computers, personal digital assistants, and handheld or portable devices.	 74795



**Note**

In the first three product model numbers, the first *x* represents the client adapter series (340 or 350), and the second *x* indicates the wired equivalent privacy (WEP) level of the card, where 0 = no WEP capability, 1 = 40-bit WEP, and 2 = 128-bit WEP. If the last two product model numbers contain K9, the card is 128-bit WEP capable.

Refer to the [“Radio Antenna” section on page 1-4](#) for antenna differences between these adapters.

## Terminology

Throughout this document, the following terms are used:

- **client adapter**—Refers to all four types of adapters
- **PC card, LM card, PCI card, or PC-Cardbus client adapter**—Refer to a specific adapter type
- **workstation (or station)**—Refers to a computing device with an installed client adapter

## Hardware Components

The client adapter has three major hardware components: a radio, a radio antenna, and two LEDs.

### Radio

Different radios are used for the 2.4-GHz and 5-GHz client adapters:

- The Cisco Aironet 340 and 350 series PC, LM, and PCI cards are IEEE 802.11b-compliant client adapters. They contain a direct-sequence spread spectrum (DSSS) radio that operates in the 2.4-GHz Industrial Scientific Medical (ISM) license-free band. The 340 series 30-milliwatt (mW) radio and the 350 series 100-mW radio transmit data over a half-duplex radio channel operating at up to 11 Mbps. These cards interoperate with other IEEE 802.11b-compliant client devices in ad hoc (or *peer-to-peer*) mode or with Cisco Aironet 340, 350, and 1200 Series Access Points (with a 2.4-GHz radio) and other IEEE 802.11b-compliant infrastructure devices in infrastructure mode. They are approved for indoor and outdoor use.

DSSS technology distributes a radio signal over a wide range of frequencies and then returns the signal to the original frequency range at the receiver. 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 usually will still be successful in its transmission.

- The Cisco Aironet AIR-CB20A PC-Cardbus card is an IEEE 802.11a-compliant client adapter. It contains an orthogonal frequency division multiplexing (OFDM) radio that operates in the Unlicensed National Information Infrastructure (UNII) 1 and UNII 2 license-free bands located in the lower 5-GHz portion of the radio frequency spectrum. The 20-mW radio transmits data over a half-duplex radio channel operating at up to 54 Mbps. This card interoperates with other IEEE 802.11a-compliant client devices in ad hoc mode or with Cisco Aironet 1200 Series Access Points (with a 5-GHz radio) and other IEEE 802.11a-compliant infrastructure devices in infrastructure mode. It is approved for indoor use only except in the United States, which allows for outdoor use on channels 52 through 64.

## 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.
- PCI cards are shipped with a 2-dBi dipole antenna that attaches to the card's antenna connector. However, other types of antennas may be used. PCI cards can be operated through the primary (or right) antenna port only.
- PC-Cardbus cards have an integrated, permanently attached non-diversity antenna that contains two antenna ports, one for transmitting and one for receiving. The card cannot switch and sample between the ports. The antenna is housed within the section of the card that hangs out of the Cardbus slot when the card is installed.

**Note**

Refer to the Antenna Mode (Transmit and Receive) parameters in [Table 6-6](#) for information about setting the client adapter's antenna mode.

**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, refer to the [“Declaration of Conformity with Regard to the R&TTE Directive 1999/5/EC”](#) section on [page C-4](#) and the [“Maximum Power Levels and Antenna Gains”](#) section on [page D-4](#).

## LEDs

The client adapters have two LEDs that glow or blink to indicate the status of the adapter or to convey error messages. Refer to the [“Interpreting the Indicator LEDs”](#) section on [page 9-2](#) for an interpretation of all LED codes.

# Software and Firmware Components

The software and firmware components of the client adapter consist of radio firmware, drivers, client utilities, and desktop controls. These components work together to allow the client adapter to work properly in your workstation. The CD that ships with the client adapter includes an installer utility that contains the drivers, client utilities, and desktop controls; the client adapter firmware is already installed. However, a more recent version of the software or firmware may be available from Cisco.com.

**Note**

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Cisco recommends using current software and firmware versions, which are available for download from the Cisco Software Center at Cisco.com. This website identifies the recommended software and firmware versions for your specific client adapter and operating system.

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## Radio Firmware

The radio firmware, which is stored in the client adapter's Flash memory, controls the adapter's radio. The firmware is preinstalled on the client adapter hardware. [Chapter 8, "Routine Procedures,"](#) provides instructions for upgrading radio firmware.

## Driver

The driver provides an interface between a computer and the client adapter, thereby enabling the operating system and applications to communicate with the adapter. The CD that ships with the client adapter contains drivers for each operating system and client adapter type. The installer automatically determines the correct driver for your operating system and card type before installing the driver. [Chapter 3, "Installing the Client Adapter,"](#) provides instructions for installing the ACU and drivers.

## Client Utility

The client utility, which is entitled Aironet Client Utility (ACU), is an optional application that interacts with the radio firmware to adjust client adapter settings and display information about the adapter. The CD that ships with the client adapter contains the ACU for each operating system. If you plan to use ACU, install it before using the client adapter. [Chapter 3, "Installing the Client Adapter,"](#) provides instructions for installing the ACU and drivers.

## Desktop Controls

The Aironet desktop controls provide a convenient way to view client adapter status and initiate common client adapter tasks. For the Mac OS X operating system, the desktop control is an icon in the main menu bar. For the Mac OS 9 operating system, the desktop control is a control strip module. The desktop controls are automatically installed with the client utility. If you don't want to use these controls, you can hide them.

# 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*.

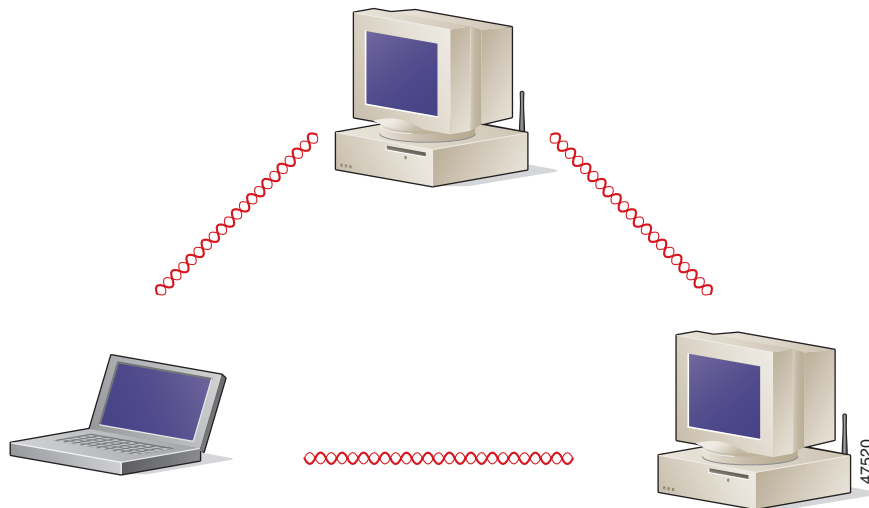

**Note**

For information about setting the client adapter's network mode, refer to [Chapter 6, "Advanced Configuration."](#)

## 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*

