Cisco Aironet Wireless LAN Adapters Hardware Installation Guide

340 and 350 Series

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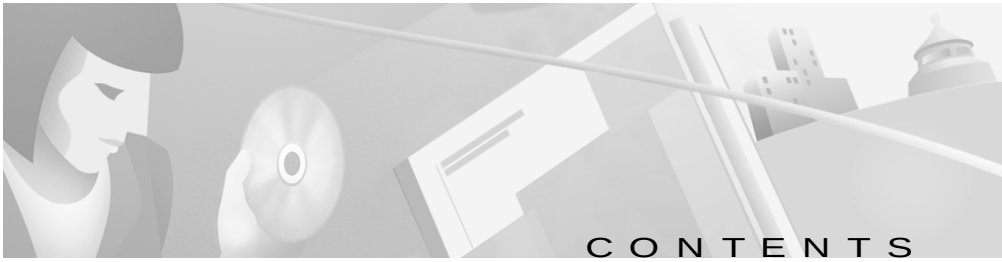

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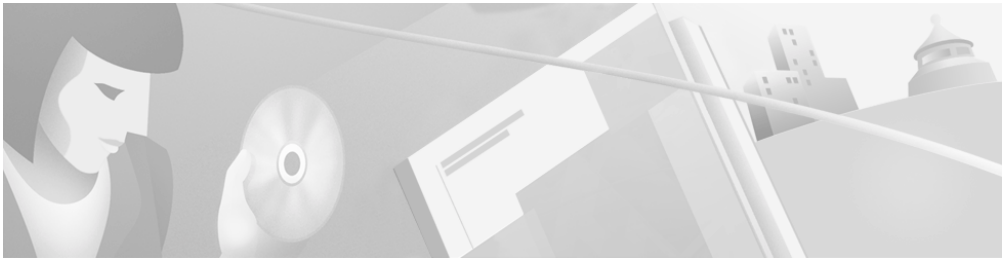

Preface

The preface provides an overview of the *Cisco Aironet Wireless LAN Adapters Hardware Installation Guide*, references related publications, and explains how to obtain other documentation and technical assistance, if necessary.

The following topics are covered in this section:

Audience

This publication is for the person responsible for installing and maintaining a Cisco Aironet Wireless LAN Adapter, also referred to as a *client adapter*. The installer should be familiar with computing devices and with network terms and concepts.

Purpose

This publication describes the client adapters, explains how to install the adapters and the client utilities (which enable you to configure and view the status of the adapter), and offers troubleshooting information.

Organization

This publication is organized into the following chapters:

- Chapter 1, “Product Overview,” provides an introduction to the client adapters, describes network configurations, and offers guidelines for positioning equipment in a wireless network.
- Chapter 2, “Preparing for Installation,” provides information that you need to know before installing a client adapter, such as safety information and system requirements.
- Chapter 3, “Installing the Client Adapter,” provides instructions for inserting a client adapter as well as installing the driver and the client utilities.
- Chapter 4, “Troubleshooting and Routine Procedures,” provides information for diagnosing and correcting common problems as well as procedures for updating or removing the driver and uninstalling the client utilities.
- Appendix A, “Technical Specifications,” lists the physical, radio, power, and regulatory specifications for the client adapters.
- Appendix B, “Translated Safety Warnings,” provides translations of the client adapters’ safety warnings in nine languages.
- Appendix C, “Declarations of Conformity and Regulatory Information,” provides conformity and regulatory information for the client adapters.

Conventions

This publication uses the following conventions to convey instructions and information:

- Commands and keywords are in **boldface**.
- Variables are in *italics*.
- Notes, cautions, and warnings use the following conventions and symbols:

Note Means *reader take note*. Notes contain helpful suggestions or references to materials not contained in this manual.

Caution Means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.

Warning **This warning symbol means *danger*. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. To see translations of the warnings that appear in this publication, refer to Appendix B, "Translated Safety Warnings."**

Waarschuwing **Dit waarschuwingssymbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij elektrische schakelingen betrokken risico's en dient u op de hoogte te zijn van standaard maatregelen om ongelukken te voorkomen. Voor vertalingen van de waarschuwingen die in deze publicatie verschijnen, kunt u het document *Regulatory Compliance and Safety Information* (Informatie over naleving van veiligheids- en andere voorschriften) raadplegen dat bij dit toestel is ingesloten.**

Varoitus **Tämä varoitusmerkki merkitsee vaaraa. Olet tilanteessa, joka voi johtaa ruumiinvammaan. Ennen kuin työskentelet minkään laitteiston parissa, ota selvää sähkökytkentöihin liittyvistä vaaroista ja tavanomaisista onnettomuuksien ehkäisykeinoista. Tässä julkaisussa esiintyvien varoitusten käännökset löydät laitteen mukana olevasta *Regulatory Compliance and Safety Information* -kirjasesta (määräysten noudattaminen ja tietoa turvallisuudesta).**

Attention **Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant causer des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers posés par les circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents. Pour prendre connaissance des traductions d'avertissements figurant dans cette publication, consultez le document *Regulatory Compliance and Safety Information* (Conformité aux règlements et consignes de sécurité) qui accompagne cet appareil.**

Warnung **Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu einer Körperverletzung führen könnte. Bevor Sie mit der Arbeit an irgendeinem Gerät beginnen, seien Sie sich der mit elektrischen Stromkreisen verbundenen Gefahren und der Standardpraktiken zur Vermeidung von Unfällen bewußt. Übersetzungen der in dieser Veröffentlichung enthaltenen Warnhinweise finden Sie im Dokument *Regulatory Compliance and Safety Information* (Informationen zu behördlichen Vorschriften und Sicherheit), das zusammen mit diesem Gerät geliefert wurde.**

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Advarsel **Dette varselsymbolet betyr fare. Du befinner deg i en situasjon som kan føre til personskade. Før du utfører arbeid på utstyr, må du vare oppmerksom på de faremomentene som elektriske kretser innebærer, samt gjøre deg kjent med vanlig praksis når det gjelder å unngå ulykker. Hvis du vil se oversettelser av de advarslene som finnes i denne publikasjonen, kan du se i dokumentet *Regulatory Compliance and Safety Information* (Overholdelse av forskrifter og sikkerhetsinformasjon) som ble levert med denne enheten.**

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Varning! **Denna varningssymbol signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utför arbete på någon utrustning måste du vara medveten om farorna med elkretsar och känna till vanligt förfarande för att förebygga skador. Se förklaringar av de varningar som förkommer i denna publikation i dokumentet *Regulatory Compliance and Safety Information* (Efterrättelse av föreskrifter och säkerhetsinformation), vilket medföljer denna anordning.**

Related Publications

For more information about Cisco Aironet Wireless LAN Adapters and related products, refer to the following publications:

- *Quick Start Guide: Cisco Aironet Wireless LAN Adapters*
- *Cisco Aironet Wireless LAN Adapters Software Configuration Guide*
- *Release Notes for Cisco Aironet Wireless LAN Adapters*
- *Quick Start Guide: Cisco Aironet Access Points*
- *Cisco Aironet Access Point Hardware Installation Guide*
- *Cisco Aironet Access Point Software Configuration Guide*

Obtaining Documentation

World Wide Web

You can access the most current Cisco documentation on the World Wide Web at http://www.cisco.com, http://www-china.cisco.com, or http://www-europe.cisco.com.

Documentation CD-ROM

Other Cisco documentation and additional literature are available in a CD-ROM package shipped separately from the Cisco Aironet Series Wireless LAN Adapters CD that shipped with your product. The Documentation CD-ROM, a member of the Cisco Connection Family, is updated monthly. To order copies of the Documentation CD-ROM, contact your local sales representative or call customer service. The CD-ROM package is available as a single package or as an annual subscription.

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- Telnet: cco.cisco.com
- Modem using standard connection rates and the following terminal settings: VT100 emulation; 8 data bits; no parity; and 1 stop bit
  - From North America, call 408 526-8070
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English	tac@cisco.com
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Kanji (Japanese)	japan-tac@cisco.com
Hangul (Korean)	korea-tac@cisco.com
Spanish	tac@cisco.com
Thai	thai-tac@cisco.com

In North America, TAC can be reached at 800 553-2447 or 408 526-7209. For other telephone numbers and TAC e-mail addresses worldwide, consult the following web site: http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml.

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We appreciate and value your comments.

Product 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:

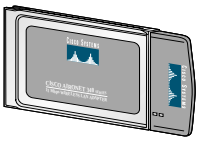
Introduction to the Client Adapters

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.

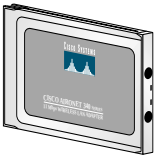
The primary function of the client adapters is to transfer data packets transparently through the wireless infrastructure. The adapters operate similarly to a standard network product except that the cable is replaced with a radio connection. No special wireless networking functions are required, and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

This document covers three types of client adapters:

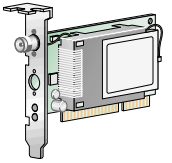
- **PC card client adapter** (also referred to as a *PC card*) – A PCMCIA card radio module that can be inserted into any device equipped with an *external* Type II or Type III PC card slot. Host devices can include laptops, notebook computers, personal digital assistants, and hand-held or portable devices.



- **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 1-4 for antenna differences between these adapters.

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 usually will still be 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 Refer to the *Cisco Aironet Wireless LAN Adapters Software Configuration Guide* for information on 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, contact Cisco Corporate Compliance. See also the "Declaration of Conformity with Regard to the R&TTE Directive 1999/5/EC" section on page C-4.

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 4 for an interpretation of the LED codes.

Security Features of the Client Adapter

The client adapter supports two principal security features to protect your data as it is transmitted through your wireless network: Wired Equivalent Privacy (WEP) keys and Extensible Authentication Protocol (EAP) or LEAP (also referred to as *EAP - Cisco Wireless*).

WEP Keys

WEP is an optional IEEE 802.11 feature that provides your client adapter and other devices on your wireless network with data confidentiality equivalent to that of a wired LAN. It involves packet-by-packet data encryption by the transmitting device and decryption by the receiving device.

Each device within your wireless network is assigned up to four encryption keys, called *WEP key*s, that encrypt data before it is transmitted. If a device receives a packet that is not encrypted with the appropriate key (as the WEP keys of all devices must match), the device discards the packet and never delivers it to the intended receiver.

For the client adapter, WEP is implemented through the client utilities. In Windows and Linux operating systems, the Client Encryption Manager (CEM) utility allows you to set WEP keys, and the Aironet Client Utility (ACU) is used to enable WEP. In the MacOS 9.x operating system, WEP keys are set and enabled in one utility.

Note Refer to the *Cisco Aironet Wireless LAN Adapters Software Configuration Guide* for instructions on setting WEP keys and enabling WEP for your specific operating system.

EAP and LEAP

EAP is an optional IEEE 802.1x security feature that is ideal for organizations with a large user base and access to an EAP-enabled Remote Authentication Dial-In User Service (RADIUS) server, such as Cisco Secure ACS 2.6. The RADIUS server uses EAP to provide server-based authentication for clients.

Server-based authentication can be enabled for your client adapter in one of two ways:

- Through a host device and code built into its operating system (referred to as *EAP*)
- Through your client adapter's firmware and Cisco software (referred to as *LEAP*)

  This method provides authentication service to client adapters whose host devices are not running an operating system with built-in EAP support. The term *LEAP* is used to distinguish authentication provided by the client firmware from authentication provided by a host and its operating system.

For Windows 95, 98, NT, 2000, or Me or future Windows operating systems, the Aironet Client Utility setup program, which installs the client utilities, is used to enable LEAP or EAP. After LEAP or EAP is enabled and the computer is rebooted, the client adapter authenticates to the RADIUS server using the username and password entered by the user at the network logon. See the "Installing the Client Utilities and Enabling LEAP or EAP" section on page 3-30 for instructions on using the Aironet Client Utility setup program to enable LEAP or EAP.

For Windows CE, Linux, and MacOS 9.x, LEAP is enabled through a particular screen in the client utilities. The username and password entered in this screen are used by the client adapter to authenticate to the RADIUS server. In Windows CE, you do not need to re-enter your username and password after your device is rebooted or your client adapter is ejected. In Linux and MacOS 9.x, the username and password need to be re-entered at the start of each new session. See the *Cisco Aironet Wireless LAN Adapters Software Configuration Guide* for instructions on enabling LEAP through the client utilities.

When you enable EAP on your Access Points and LEAP or EAP on your client adapter, authentication to the network occurs in the following sequence:

1. The client adapter uses the username and password to start the authentication process.
2. The Access Point communicates with the EAP-compliant RADIUS server to authenticate the username and password.
3. If the username and password are valid, the RADIUS server and the client adapter negotiate a dynamic, session-based WEP key. The key, which is unique for the authenticated client, provides the client with secure network access.
4. The client and Access Point use the WEP key for all data transmissions during the session.

Note Refer to the IEEE 802.11 Standard for more information on EAP and to the following URL for additional information on RADIUS servers: http://www.cisco.com/univercd/cc/td/doc/product/software/ios120/12cgcr/secur_c/scprt2/scrad.htm.

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

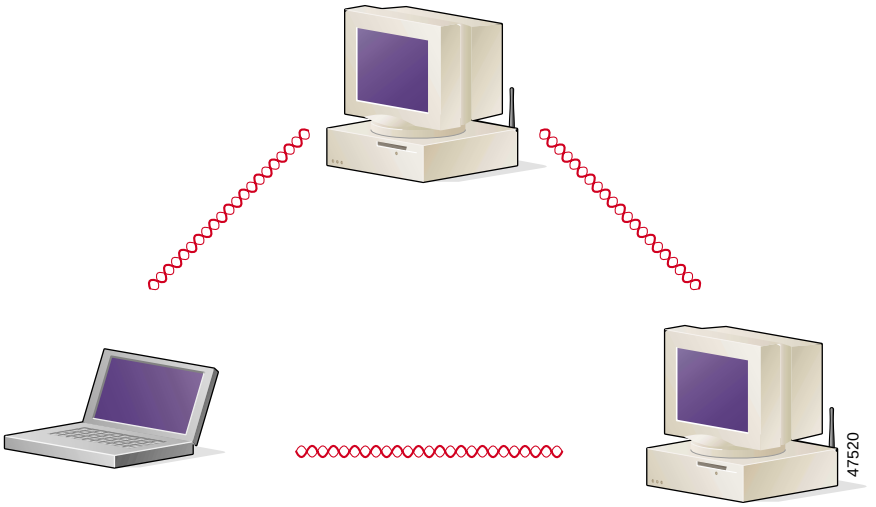
Note For examples of more complex network configurations involving client adapters and Access Points, refer to the *Cisco Aironet Access Point Hardware Installation Guide*.

Note Refer to the *Cisco Aironet Wireless LAN Adapters Software Configuration Guide* for information on setting the client adapter's network mode.

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

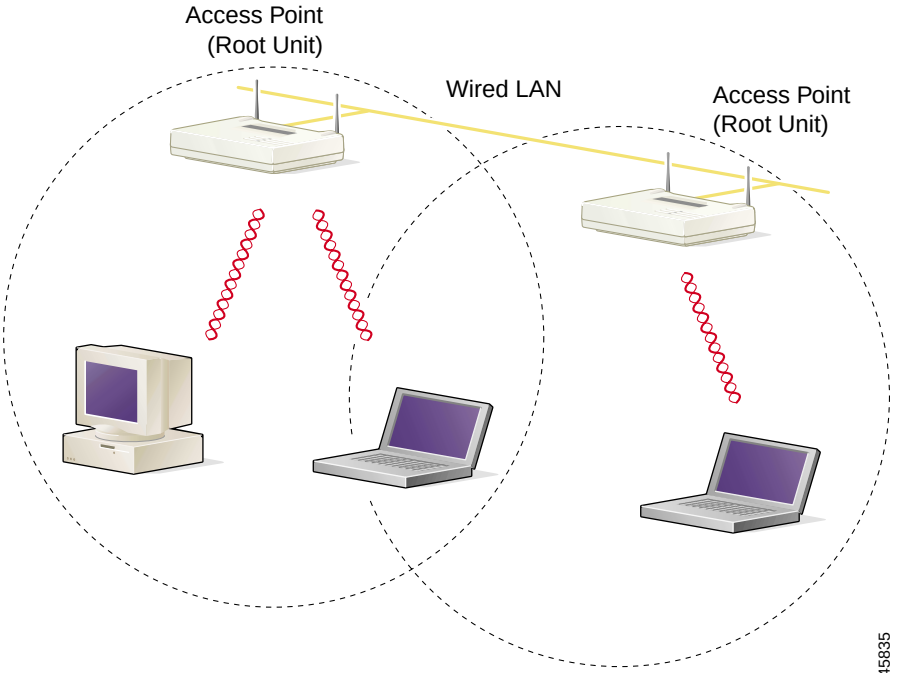


Wireless Infrastructure with Workstations Accessing a Wired LAN

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



Positioning Your Wireless Products

Determining the network location of your wireless products can be influenced by a number of factors. This section discusses those factors and provides guidelines and tools for achieving optimum placement.

The site survey and link test tools provided with the client utilities can help you to determine the best placement for Access Points and workstations within your wireless network. Refer to the *Cisco Aironet Wireless LAN Adapters Software Configuration Guide* for information on using these tools and to the *Cisco Aironet Access Point Hardware Installation Guide* for additional information on the placement of Access Points.

Note The site survey and link test tools are not supported in the Linux operating system.

Site Survey

Because of differences in component configuration, placement, and physical environment, every network application is a unique installation. Before installing the system, you should perform a site survey to determine the optimum utilization of networking components and to maximize range, coverage, and network performance.

Consider the following operating and environmental conditions when performing a site survey:

- **Data rates** – Sensitivity and range are inversely proportional to data bit rates. The maximum radio range is achieved at the lowest workable data rate. A decrease in receiver threshold sensitivity occurs as the radio data increases.
- **Antenna type and placement** – Proper antenna configuration is a critical factor in maximizing radio range. As a general rule, range increases in proportion to antenna height.
- **Physical environment** – Clear or open areas provide better radio range than closed or filled areas. Also, the less cluttered the work environment, the greater the range.

- **Obstructions** – A physical obstruction such as metal shelving or a steel pillar can hinder performance of the client adapter. Avoid locating the workstation in a location where there is a metal barrier between the sending and receiving antennas.
- **Building materials** – Radio penetration is greatly influenced by the building material used in construction. For example, drywall construction allows greater range than concrete blocks. Metal or steel construction is a barrier to radio signals.

Link Test

The link test tool is used to determine RF coverage. The test results can help the installer to eliminate areas of low RF signal levels that can result in a loss of connection between the client adapter and the Access Point.

CHAPTER 2

Preparing for Installation

This chapter provides information that you need to know before installing a client adapter.

The following topics are covered in this section:

Safety information

Follow the guidelines in this section to ensure proper operation and safe use of the client adapter.

FCC Safety Compliance Statement

The FCC, with its action in ET Docket 96-8, has adopted a safety standard for human exposure to RF electromagnetic energy emitted by FCC-certified equipment. Cisco Aironet products meet the uncontrolled environmental limits found in OET-65 and ANSI C95.1, 1991. Proper operation of this radio device according to the instructions in this publication will result in user exposure substantially below the FCC recommended limits.

Safety Guidelines

- Do not touch or move the antenna while the unit is transmitting or receiving.
- Do not hold any component containing a radio such that the antenna is very close to or touching any exposed parts of the body, especially the face or eyes, while transmitting.
- Do not operate the radio or attempt to transmit data unless the antenna is connected; otherwise, the radio may be damaged.
- Use in specific environments:
  - The use of wireless devices in hazardous locations is limited to the constraints posed by the safety directors of such environments.
  - The use of wireless devices on airplanes is governed by the Federal Aviation Administration (FAA).
  - The use of wireless devices in hospitals is restricted to the limits set forth by each hospital.

- Antenna use:
  - In order to comply with FCC RF exposure limits, dipole antennas should be located at a minimum distance of 7.9 inches (20 cm) or more from the body of all persons.
  - High-gain, wall-mount, or mast-mount antennas are designed to be professionally installed and should be located at a minimum distance of 12 inches (30 cm) or more from the body of all persons. Please contact your professional installer, VAR, or antenna manufacturer for proper installation requirements.

Warnings

Observe the following warnings when operating the client adapter:

Warning **Do not operate your wireless network device near unshielded blasting caps or in an explosive environment unless the device has been modified to be especially qualified for such use.**

Warning **In order to comply with RF exposure limits established in the ANSI C95.1 standards, it is recommended when using a laptop with a PC card client adapter that the adapter's integrated antenna is positioned more than 2 inches (5 cm) from your body or nearby persons during extended periods of transmitting or operating time. If the antenna is positioned less than 2 inches (5 cm) from the user, it is recommended that the user limit exposure time.**

Translated versions of these safety warnings are provided in Appendix B.

Unpacking the Client Adapter

Follow these steps to unpack the client adapter:

Step 1 Open the shipping container and carefully remove the contents.

Step 2 Return all packing materials to the shipping container and save it.

Step 3 Ensure that all items listed in the "Package Contents" section below are included in the shipment. Check each item for damage.

Note If any item is damaged or missing, notify your authorized Cisco sales representative. Any remote antenna and its associated wiring are shipped separately.

Package Contents

Each client adapter is shipped with the following items:

- Cisco Aironet PC Card Client Adapter, Cisco Aironet LM Card Client Adapter, or Cisco Aironet PCI Client Adapter
- Standard 2-dBi dipole antenna (for PCI client adapter)
- *Quick Start Guide: Cisco Aironet Wireless LAN Adapters*
- Cisco Aironet Series Wireless LAN Adapters CD
- Cisco Information Packet, which contains warranty, safety, and support information
- Cisco product registration card

System Requirements

In addition to the items shipped with the client adapter, you will also need the following in order to install the adapter:

- A computing device (laptop, notebook, portable or hand-held device) equipped with a Type II or Type III PC card slot or a desktop personal computer equipped with an empty PCI expansion slot

Note All drivers and supporting software (Card and Socket Services) for the PC card slot must be loaded and configured. However, if you are using the Linux operating system, a current version of Card and Socket Services is provided on the Cisco Aironet Series Wireless LAN Adapters CD and can be installed and configured during the driver installation process. See the "Installing the Driver for Linux" section on page 3-24.

- A Phillips screwdriver (for PCI client adapter)
- Windows NT Service Pack 3 or greater if your computer uses the Windows NT operating system
- The following information from your system administrator:
  - Your wireless client name
  - The protocols necessary to bind to the client adapter
  - The case-sensitive service set identifier (SSID) for your RF network
  - For Windows CE systems, the primary and secondary Domain Name System (DNS) and Windows Internet Name Service (WINS) for your computer
  - If you are not connected to a DHCP server, the IP address, broadcast address (if you are using the Linux operating system), subnet mask, and default gateway address of your computer
  - The username and password for your network account

Site Requirements

Because the client adapter is a radio device, it is susceptible to RF obstructions and common sources of interference that can reduce throughput and range. Follow these guidelines to ensure the best possible performance:

- Install the client adapter in an area where large steel structures such as shelving units, bookcases, and filing cabinets will not obstruct radio signals to and from the client adapter.
- Install the client adapter away from microwave ovens. Microwave ovens operate on the same frequency as the client adapter and can cause signal interference.

Note Refer to the "Positioning Your Wireless Products" section on page 1-10 for additional guidelines on achieving optimum placement of your workstation.

CHAPTER 3

Installing the Client Adapter

This chapter provides instructions for installing a client adapter and the client utilities.

The following topics are covered in this section:

Inserting the Client Adapter into a Computing Device

Note If you are running Windows 95, 98, NT, or 2000 and a Cisco Aironet client adapter was previously installed on your computer with the 6.10 driver, you must remove this driver before you can insert your new client adapter and install its more recent driver. Refer to the "Removing the 6.10 Driver" section on page 4-10 for instructions.

This section provides instructions for inserting a PC card or a PCI client adapter into a computing device.

Caution These procedures and the physical connections they describe apply generally to conventional PC card slots and PCI expansion slots. In cases of custom or nonconventional equipment, be alert to possible differences in PC card slot and PCI expansion slot configurations.

Inserting a PC Card

Step 1 Before you begin, examine the PC card. One end has a dual-row, 68-pin PC card connector. The card is keyed so it can be inserted only one way into the PC card slot.

Note The PC card slot is on the left or right side of the computer, depending on the model.

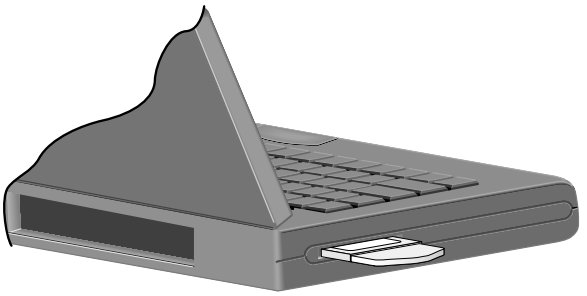
Step 2 Follow the instructions below for your specific operating system:

- **Windows 95** – The Windows 95 driver files are contained in a self-extracting executable file on the Cisco Aironet Series Wireless LAN Adapters CD. *Before* you insert the client adapter, you must copy this file to a floppy disk or to a directory on your hard drive. Go to the "Installing the Driver for Windows 95" section on page 3-7.
- **Windows 98, Windows 2000, Windows Me, or Linux** – Turn on your computer, let the operating system boot up completely, and follow the remaining steps in this section to insert the PC card.
- **Windows NT** – Turn off your computer, follow the remaining steps in this section to insert the PC card, and reboot your computer.
- **Windows CE and MacOS 9.x** – The driver and client utilities must be installed before you insert the PC card. Go to the "Installing the Correct Driver" section on page 3-6.

Caution Do not force the PC card into your computer's PC card slot. Forcing it will damage both the card and the slot. If the PC card does not insert easily, remove the card and reinsert it.

Step 3 Hold the PC card with the Cisco logo facing up and insert it into the PC card slot, applying just enough pressure to make sure it is fully seated (see Figure 3-1).

Figure 3-1 Inserting a PC Card into a Computing Device



Step 4 Go to the "Installing the Correct Driver" section on page 3-6 to install the driver for your computer's operating system.

Note You can remove and reinsert your PC card when necessary. Refer to the "Removing a PC Card" section on page 4-24 for instructions.

Inserting a PCI Client Adapter

Step 1 Turn off the PC and all its components.

Step 2 Remove the computer cover.

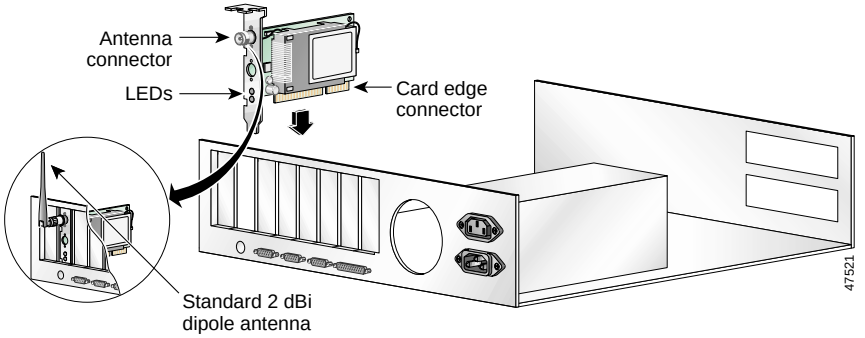
Note On most Pentium PCs, PCI expansion slots are white. Refer to your PC documentation for slot identification.

Step 3 Remove the screw from the top of the CPU back panel above an empty PCI expansion slot. This screw holds the metal bracket on the back panel.

Caution Static electricity can damage your client adapter. Before removing the adapter from the anti-static packaging, discharge static by touching a metal part of a grounded PC.

Step 4 Examine the client adapter. The antenna connector and the LEDs face out of your computer and are visible when you put the cover back on. The bottom edge of the adapter is the connector you will insert into an empty expansion slot in your computer. See Figure 3-2.

Figure 3-2 Inserting a PCI Client Adapter into a PC



Step 5 Tilt the adapter to allow the antenna connector and LEDs to slip through the opening in the CPU back panel.

Step 6 Press the client adapter into the empty slot until the connector is firmly seated.

Caution Do not force the adapter into the expansion slot as this could damage both the adapter and the slot. If the adapter does not insert easily, remove the adapter and reinsert it.

Step 7 Reinstall the screw on the CPU back panel and replace the computer cover.

Step 8 Attach the 2-dBi antenna to the adapter's antenna connector until it is finger-tight. Do *not* overtighten.

Step 9 For optimal reception, position the antenna so it is straight up.

Step 10 Boot up your computer.

Note Because PCI client adapters are installed inside desktop computers, you should have little reason to remove the adapter. However, instructions are provided in the "Removing a PCI Client Adapter" section on page 4-24 in case you ever need to remove your PCI client adapter.

Installing the Correct Driver

Note Before you begin the driver installation process, make sure you have the installation disks for your computer's operating system nearby. Some operating system files may be needed to complete the driver installation.

The driver you use for your client adapter depends on which operating system your computer is running. This section provides instructions for installing the correct driver for your operating system. Use Table 3-1 to quickly locate the installation instructions for your specific operating system.

Table 3-1 Locating Driver Installation Instructions

Operating System	Page Number
Windows 95	3-7
Windows 98	3-11
Windows NT	3-13
Windows 2000	3-14
Windows Millennium Edition (Me)	3-16
Windows CE	3-18
Linux	3-24
MacOS 9.x	3-27

The procedures in this section assume you are installing the driver from the CD provided. If your computer does not have a CD-ROM drive, download the driver from Cisco's web site at http://www.cisco.com/public/sw-center/sw-wireless.shtml. Under "Wireless Software Products - Cisco Aironet Drivers and Utilities," select your computer's operating system and the appropriate driver.

Installing the Driver for Windows 95

Note Windows 95 limits your computer's network connections to four. If you try to install a client adapter when four network devices (such as a PCMCIA Ethernet card, dial-up adapter, VPN adapter, docking station Ethernet card, etc.) are already connected to your computer, the new adapter cannot establish a network connection.

The driver installation instructions vary for Windows 95 Version A and Version B. You can determine which version your computer is running by selecting **My Computer**, **Control Panel**, **System**, and **General**. The version of your computer's operating system is located under the System heading. If you have Windows 95 Version B, the version number ends with the letter *B*.

- For Windows 95 Version A driver installation instructions, go to the "Windows 95 Version A" section below.
- For Windows 95 Version B driver installation instructions, go to the "Windows 95 Version B" section on page 3-9.

Windows 95 Version A

If your computer's operating system is Windows 95 Version A, follow these steps.

Step 1 Insert the Cisco Aironet Series Wireless LAN Adapters CD into your computer's CD-ROM drive.

Step 2 Copy the Win95Driver.exe file from the Win95 directory on the CD to a floppy disk or to a directory (other than the root directory) on your computer's hard drive.

Step 3 Remove the CD from your computer's CD-ROM drive.

Step 4 Locate the Win95Driver.exe file on your floppy disk or in a directory on your hard drive and double-click it to extract the driver files. Unless you specify a different location, the files are placed on the floppy disk.

Note Do not extract the files to the root directory of your hard drive. Windows 95 is unable to read them from this location.

Step 5 Follow the instructions in the "Inserting the Client Adapter into a Computing Device" section on page 3-2 to insert the client adapter.

Step 6 After you insert the client adapter into your computing device, Windows automatically detects it and opens the New Hardware Found window.

Step 7 Select **Driver from disk provided by hardware manufacturer** and click **OK**.

Step 8 In the Install From Disk window, enter the path to the location where you extracted the Windows 95 driver files. The default is A:\, so if you extracted the files to the root directory on a floppy disk, you do not have to enter a path. If, however, you extracted the files to a directory on your hard drive, you must enter the entire path (for example, C:\Win95).

Step 9 Click **OK**.

Step 10 If you are prompted to insert the Windows 95 operating system disk, click **OK** and do one of the following:

- If the Windows 95 operating system files are installed on your computer, they are usually located in the C:\Windows\Options\Cabs folder. Type **C:\Windows\Options\Cabs** in the Copy files from dialog box. Click **OK** to copy the required files.
- If Windows 95 prompts for the Windows 95 operating system CD, insert this CD into your CD-ROM drive. If your CD-ROM drive is drive D, the path in the dialog box should be D:\Win95. Click **OK** to copy the required files.

Step 11 After the files are copied, remove any disks from your computer.

Step 12 Double-click **My Computer**, **Control Panel**, and **Network**.

Step 13 Select the Cisco Systems wireless LAN adapter and click **Properties**.

Step 14 In the client adapter Properties window, click the **Advanced** tab.

Step 15 Select **Client Name**. Type your computer's unique client name in the Value dialog box.

Step 16 Select **SSID**. Type your RF network's (case-sensitive) SSID in the Value dialog box. Click **OK**.

Step 17 If you are prompted to restart your computer, click **Yes**.

Step 18 If you are not connected to a DHCP server, double-click **My Computer**, **Control Panel**, and **Network**. Select **TCP/IP -> Cisco Systems Wireless LAN Adapter**. Click the **Properties** button, select **Specify an IP address**, and enter the IP address, subnet mask, and default gateway address of your computer (which can be obtained from your system administrator). Click **OK** twice. When prompted to restart your computer, click **Yes**.

The driver installation is complete.

Windows 95 Version B

If your computer's operating system is Windows 95 Version B, follow these steps.

Step 1 Insert the Cisco Aironet Series Wireless LAN Adapters CD into your computer's CD-ROM drive.

Step 2 Copy the Win95Driver.exe file from the Win95 directory on the CD to a floppy disk or to a directory (other than the root directory) on your computer's hard drive.

Step 3 Remove the CD from your computer's CD-ROM drive.

Step 4 Locate the Win95Driver.exe file on your floppy disk or in a directory on your hard drive and double-click it to extract the driver files. Unless you specify a different location, the files are be placed on the floppy disk.

Note Do not extract the files to the root directory of your hard drive. Windows 95 is unable to read them from this location.

Step 5 Follow the instructions in the "Inserting the Client Adapter into a Computing Device" section on page 3-2 to insert the client adapter.

Step 6 After you insert the client adapter into your computing device, Windows automatically detects it and briefly opens the New Hardware Found window.

Step 7 The Update Device Driver Wizard dialog box opens and indicates that Windows will complete the installation of the client adapter. Click **Next**.

Step 8 If the Update Device Driver Wizard indicates that Windows was unable to locate a driver for the client adapter, click **Other Locations**.

Step 9 In the Select Other Location window, enter the path to the location where you extracted the Windows 95 driver files. The default is A:\, so if you extracted the files to the root directory on a floppy disk, you do not have to enter a path. If, however, you extracted the files to a directory on your hard drive, you must enter the entire path (for example, C:\Win95).

Step 10 Click **OK**.

Step 11 When the Update Device Driver Wizard indicates that it has found the driver, click **Finish**.

Step 12 When the Insert Disk window appears prompting you to insert the Aironet Wireless LAN Adapter Installation Disk, click **OK**.

Step 13 If a windows appears indicating that the pcx500.sys file could not be found, enter the same path that you entered in Step 9 and click **OK**.

Step 14 If you are prompted to insert the Windows 95 operating system disk, click **OK** and do one of the following:

- If the Windows 95 operating system files are installed on your computer, they are usually located in the C:\Windows\Options\Cabs folder. Type **C:\Windows\Options\Cabs** in the Copy files from dialog box. Click **OK** to copy the required files.
- If Windows 95 prompts for the Windows 95 operating system CD, insert this CD into your CD-ROM drive. If your CD-ROM drive is drive D, the path in the dialog box should be D:\Win95. Click **OK** to copy the required files.

Step 15 When prompted to restart your computer, remove any disks and click **Yes**.

Step 16 When the computer restarts, double-click **My Computer**, **Control Panel**, and **Network**.

Step 17 Select the Cisco Systems wireless LAN adapter and click **Properties**.

Step 18 In the client adapter Properties window, click the **Advanced** tab.

Step 19 Select **Client Name**. Type your computer's unique client name in the Value dialog box.

Step 20 Select **SSID**. Type your RF network's (case-sensitive) SSID in the Value dialog box. Click **OK**.

Step 21 If you are not connected to a DHCP server, double-click **My Computer**, **Control Panel**, and **Network**. Select **TCP/IP -> Cisco Systems Wireless LAN Adapter**. Click the **Properties** button, select **Specify an IP address**, and enter the IP address, subnet mask, and default gateway address of your computer (which can be obtained from your system administrator). Click **OK**.

Step 22 In the Network window, click **OK**.

Step 23 When prompted to restart your computer, click **Yes**.

The driver installation is complete.

Installing the Driver for Windows 98

Note Windows 98 limits your computer's network connections to eight. If you try to install a client adapter when eight network devices (such as a PCMCIA Ethernet card, dial-up adapter, VPN adapter, docking station Ethernet card, etc.) are already connected to your computer, the new adapter cannot establish a network connection.

If your computer's operating system is Windows 98, follow these steps.

Step 1 After you insert the client adapter into your computing device, Windows automatically detects it, briefly opens the New Hardware Found window, and starts collecting information for a driver information database.

The Add New Hardware Wizard dialog box opens and indicates that Windows is searching for new drivers.

Step 2 Click **Next**. Another dialog box opens and asks what you want Windows to do.

Step 3 Select **Search for the best driver for your device (Recommended)** and click **Next**.

Step 4 Select **CD-ROM drive**, deselect all other options, insert the Cisco Aironet Series Wireless LAN Adapters CD into your computer's CD-ROM drive, and click **Next**.

The hardware wizard finds the installation files on the CD and displays the search results.

Step 5 When the client adapter driver is displayed, click **Next** to copy the required files.

Step 6 During driver installation, you may be prompted to enter a path to the Windows 98 operating system files. If so, do one of the following:

- If the Windows 98 operating system files are installed on your computer, they are usually located in the C:\Windows\Options\Cabs folder. Type **C:\Windows\Options\Cabs** in the Copy files from dialog box. Click **OK** to copy the required files.
- If Windows 98 prompts for the Windows 98 operating system CD, insert this CD into your CD-ROM drive. If your CD-ROM drive is drive D, the path in the dialog box should be D:\WIN98. Click **OK** to copy the required files.

Step 7 The Add New Hardware Wizard window opens and indicates that the installation is complete. Click **Finish**.

Step 8 When prompted to restart your computer, remove the CD and click **Yes**.

Step 9 When the computer restarts, double-click **My Computer**, **Control Panel**, and **Network**.

Step 10 Select the Cisco Systems wireless LAN adapter and click **Properties**.

Step 11 In the client adapter Properties window, click the **Advanced** tab.

Step 12 Select **Client Name**. Type your computer's unique client name in the Value dialog box.

Step 13 Select **SSID**. Type your RF network's (case-sensitive) SSID in the Value dialog box. Click **OK**.

Step 14 If you are not connected to a DHCP server, double-click **My Computer**, **Control Panel**, and **Network**. Select **TCP/IP -> Cisco Systems Wireless LAN Adapter**. Click the **Properties** button, select **Specify an IP address**, and enter the IP address, subnet mask, and default gateway address of your computer (which can be obtained from your system administrator). Click **OK**.

Step 15 In the Network window, click **OK**.

Step 16 When prompted to restart your computer, click **Yes**.

The driver installation is complete.

Installing the Driver for Windows NT

Note This procedure requires that your computer has Windows NT Service Pack 3 or greater.

If your computer's operating system is Windows NT, follow these steps.

Step 1 If an error message appears indicating that at least one service or driver failed during system setup, click **OK**.

Step 2 Follow the steps below to obtain an available interrupt request (IRQ):

a. Select **Start** > **Programs** > **Administrative Tools** > **Windows NT Diagnostics**.

b. Click the **Resources** tab.

c. The used IRQs are listed in numerical order along the left side of the Resources window. Write down the number of an IRQ that is not being used. You will need this IRQ for Step 12.

Step 3 On your computer desktop, double-click **My Computer**, **Control Panel**, and **Devices**. Scroll down and select **Pcmcia**. Click **Startup**, select **Automatic**, and click **OK**.

Note For PC cards, also ensure that the Cardbus service is deselected.

Step 4 Insert the Cisco Aironet Series Wireless LAN Adapters CD into your computer's CD-ROM drive.

Step 5 Double-click **My Computer**, **Control Panel**, and **Network**.

Step 6 Click the **Adapters** tab and select **Add**.

Step 7 In the Select Network Adapter window, click **Have Disk**.

Step 8 In the Insert Disk window, enter the letter of your CD-ROM drive (such as **D:**\) and click **OK**.

Step 9 In the Select OEM Option box, select the Cisco Systems wireless LAN adapter and click **OK**.

Step 10 In the Adapter Setup window, select **Client Name**. Type your computer's unique client name in the Value dialog box.

Step 11 Select **SSID**. Type your RF network's (case-sensitive) SSID in the Value dialog box.

Step 12 Enter an available IRQ number, which you obtained in Step 2.

Step 13 Click **OK** and **Close**.

Step 14 The Microsoft TCP/IP Properties window should open. If it does not open, double-click **My Computer**, **Control Panel**, and **Network**. Select **Protocols**, **TCP/IP**, and **Properties**.

Step 15 Perform one of the following:

- If you are connected to a DHCP server, select **Obtain an IP address from a DHCP server**. When asked if you want to enable DHCP, click **Yes** and **OK**.
- If you are not connected to a DHCP server, select **Specify an IP address** and enter the IP address, subnet mask, and default gateway address of your computer (which can be obtained from your system administrator). Click **OK**.

Step 16 When prompted to restart your computer, remove the CD and click **Yes**.

The driver installation is complete.

Installing the Driver for Windows 2000

If your computer's operating system is Windows 2000, follow these steps.

Step 1 After you insert the client adapter into your computing device, Windows 2000 automatically detects it and briefly opens the Found New Hardware window.

The Found New Hardware Wizard window opens and indicates that the wizard will help you to install the driver.

Step 2 Click **Next**. Another window opens and asks what you want the wizard to do.

Step 3 Select **Search for a suitable driver for my device (recommended)** and click **Next**.

Step 4 Select **CD-ROM drives**, deselect all other options, insert the Cisco Aironet Series Wireless LAN Adapters CD into your computer's CD-ROM drive, and click **Next**. The wizard finds the installation files on the CD and displays the search results.

Step 5 When the client adapter driver is displayed, click **Next** to copy the required files.

Step 6 When you receive a message indicating that Windows has finished the installation, click **Finish**.

Step 7 Remove the CD from your computer's CD-ROM drive.

Step 8 Double-click **My Computer**, **Control Panel**, and **System**.

Step 9 In the System Properties window, click the **Hardware** tab.

Step 10 Click **Device Manager**.

Step 11 In the Device Manager window, double-click **Network Adapters**.

Step 12 Right-click the Cisco Systems wireless LAN adapter.

Step 13 Click **Properties**.

Step 14 In the client adapter Properties window, click the **Advanced** tab.

Step 15 In the Advanced window, select **Client Name**. Type your computer's unique client name in the Value dialog box.

Step 16 Select **SSID**. Type your RF network's (case-sensitive) SSID in the Value dialog box. Click **OK**.

Step 17 If you are not connected to a DHCP server, follow these steps:

a. Double-click **My Computer**, **Control Panel**, and **Network and Dial-up Connections**.

b. Right-click **Local Area Connection**.

c. Click **Properties**, **Internet Protocol (TCP/IP)**, and **Properties**.

d. Click **Use the following IP address** and enter the IP address, subnet mask, and default gateway address of your computer (which can be obtained from your system administrator). Click **OK**.

e. In the Local Area Connection Properties window, click **OK**.

Step 18 If you are prompted to restart your computer, click **Yes**.

The driver installation is complete.

Installing the Driver for Windows Millennium Edition (Me)

The first release of Windows Me comes with driver version 6.15, which is installed automatically the first time you insert a client adapter. To upgrade to the driver provided with your new client adapter, follow these steps.

Step 1 Make sure the client adapter is in your computer and the computer is booted up.

Note If this is the first time you are inserting a client adapter into your computing device, Windows Me automatically detects it, updates the hardware information database, and installs driver version 6.15.

Step 2 Insert the Cisco Aironet Series Wireless LAN Adapters CD into your computer's CD-ROM drive.

Step 3 Double-click **My Computer**, **Control Panel**, **System**, the **Device Manager** tab, and **Network Adapters**.

Step 4 Select the Cisco Aironet wireless LAN adapter. Click **Properties**.

Step 5 In the client adapter Properties window, click the **Driver** tab.

Step 6 Click the **Update Driver** button. The Update Device Driver Wizard window appears.

Step 7 Select **Specify the location of the driver (Advanced)** and click **Next**.

Step 8 Select **Search for a better driver than the one your device is using now (Recommended)**.

Step 9 Make sure the **Removable Media** checkbox is deselected.

Step 10 Select the **Specify a location** checkbox and click the **Browse** button.

Step 11 Locate your computer's CD-ROM drive and click **Next**.

Step 12 When asked what you would like to install, select **The updated driver (recommended)** and click **Next**.

Step 13 When a screen appears indicating the driver that will be installed and its location, click **Next**.

Step 14 If Windows cannot find the pcx500.sys file and requests that you insert the CD (even though the CD is already in your computer's CD-ROM drive), enter the letter of your CD-ROM drive (such as **D:**) in the Copy files from dialog box and click **OK**.

Step 15 When you are notified that the installation is complete, click the **Finish** button.

Step 16 When you are prompted to restart your computer, remove the CD and click **No**.

Step 17 Double-click **My Computer**, **Control Panel**, and **Network**.

Step 18 Select the Cisco Systems wireless LAN adapter. Click **Properties**.

Step 19 In the client adapter Properties window, click the **Advanced** tab.

Step 20 In the Advanced window, select **Client Name**. Type your computer's unique client name in the Value dialog box.

Step 21 Select **SSID**. Type your RF network's (case-sensitive) SSID in the Value dialog box. Click **OK**.

Step 22 If you are not connected to a DHCP server, double-click **My Computer**, **Control Panel**, and **Network**. Select **TCP/IP -> Cisco Systems Wireless LAN Adapter**. Click the **Properties** button, select **Specify an IP address**, and enter the IP address, subnet mask, and default gateway address of your computer (which can be obtained from your system administrator). Click **OK**.

Step 23 In the Network window, click **OK**.

Step 24 When prompted to restart your computer, click **Yes**.

The driver installation is complete.

Installing the Driver for Windows CE

Note Windows CE devices do not support PCI client adapters.

The driver installation instructions vary depending on which version of Windows CE you are running, and the files you install vary depending on your device's processor. To determine the Windows CE version and the processor type, follow the instructions in the "Determining Windows CE Version and Processor Type" section below.

Determining Windows CE Version and Processor Type

Step 1 Perform one of the following:

- If your Windows CE device is a pocket PC (ppc) device, select **Start** > **Settings** > the **System** tab > **About**. The Windows CE version and the processor type are displayed. Go to Step 4.
- If your Windows CE device is a hand-held (hpc) device, select **Start** > **Settings** > **Control Panel** > **System**. Go to Step 2.

Step 2 In the System Properties window, select the **Device** tab. The processor type is displayed (such as MIPS 4000 Family).

Step 3 Select the **System** tab. The core system version indicates the version of Windows CE that the device is running (such as 2.11).

Step 4 For Windows CE 2.11, go to the "Windows CE 2.11" section on page 3-19.

For Windows CE 3.00, go to the "Windows CE 3.00" section on page 3-21.

Windows CE 2.11

If your computer is running Windows CE 2.11, follow these steps.

Step 1 Use a serial or USB cable to connect your Windows CE device to a laptop or PC running Active Sync. A message appears on the Windows CE device indicating that it is connecting to the host.

After the Windows CE device is connected, the New Partnership window appears on the laptop or PC. This window asks if you want to set up a partnership.

Step 2 Perform one of the following:

- If you want to establish a partnership that allows you to synchronize files between the laptop or PC and the Windows CE device, select **Yes**, click **Next**, and follow the instructions on the screen to specify the files to be synchronized and to finish setting up the partnership.
- If you do not want to synchronize files and want to connect as a "guest," select **No** and click **Next**. The screen indicates that you are connected as a guest.

Step 3 Insert the Cisco Aironet Series Wireless LAN Adapters CD into the laptop or PC's CD-ROM drive.

Step 4 Use Windows Explorer to browse the CD and locate the aironet.dll file and the *.htm (help) files in the directory structure that corresponds to the device and processor type of your Windows CE device.

Example: If you are running Windows CE 2.11 on a MIPS processor, the appropriate aironet.dll file and the help files would be located in the following directory structure: WinCE\Ce2.11\Mips.

Step 5 Drag and drop the appropriate aironet.dll file and the help files from the CD to the \Windows directory on the Windows CE device.

Step 6 On the Windows CE device, create a folder entitled *Cisco* in the \Windows\Programs directory. Creating this folder will enable you to access the client utilities from Start > Programs > Cisco after the utilities are installed.

Step 7 Drag and drop the client utility files, which have an .exe extension, from the CD to the \Windows\Programs\Cisco directory of the Windows CE device. The client utility files are located in a directory specific to the Windows CE version and processor type.

Example: The client utility files for Windows CE 2.11 on a MIPS processor would be located in the following directory structure: WinCE\Ce2.11\Mips.

Step 8 After the files are copied, remove the CD.

Step 9 Disconnect the Windows CE device and reboot it.

Step 10 Follow the instructions in the "Inserting the Client Adapter into a Computing Device" section on page 3-2 to insert the client adapter into the PC card slot of the Windows CE device.

The Unidentified PCCard Adapter dialog box appears with the driver name set to Network card in Socket X. If the driver name is set to anything other than a network card, remove the client adapter, reset the Windows CE device, and reinsert the client adapter.

Step 11 Type **aironet** for the driver name and click **OK**.

The Windows CE device should configure the client adapter, and the green LED on the adapter should blink. If this does not happen, remove the client adapter, reset the Windows CE device, and go back to Step 10.

Step 12 The Aironet Wireless LAN Adapter Settings dialog box appears. Perform one of the following:

- If you are connected to a DHCP server, select **Obtain an IP address via DHCP** or **Use server-assigned IP address** and click **OK**.
- If you are not connected to a DHCP server, select **Specify an IP address** or **Use specific IP address** and follow the steps below:
  - **a.** Enter the IP address, subnet mask, and default gateway address of your computer (which can be obtained from your system administrator).
  - **b.** Select the **Name Servers** tab and enter the primary and secondary DNS and WINS for your computer (which can be obtained from your system administrator).
  - **c.** Click **OK**.

Step 13 Select **Start** > **Programs** > **Cisco** > **Aironet Client Utility** to open the Aironet Client Utility (ACU).

Step 14 Select **Client Name** under Property. Type your Windows CE device's unique client name in the Value dialog box.

Step 15 Select **SSID** under Property. Type your RF network's case-sensitive SSID in the Value dialog box.

Step 16 Select **Data Rates** under Property. Make sure Auto is selected in the list of options in the Value dialog box.

Step 17 Click **OK**.

Step 18 If prompted, eject the client adapter and reinsert it for the changed settings to take effect.

Step 19 The driver and client utility installation is complete. Refer to the *Cisco Aironet Wireless LAN Adapters Software Configuration Guide* for instructions on how to use each utility.

Windows CE 3.00

If your computer is running Windows CE 3.00, follow these steps.

Step 1 Use a serial or USB cable to connect your Windows CE device to a laptop or PC running Active Sync. A message appears on the Windows CE device indicating that it is connecting to the host.

After the Windows CE device is connected, the New Partnership window appears on the laptop or PC. This window asks if you want to set up a partnership.

Step 2 Choose one of the following options:

- If you want to establish a partnership that allows you to synchronize files between the laptop or PC and the Windows CE device, select **Yes**, click **Next**, and follow the instructions on the screen to specify the files to be synchronized and to finish setting up the partnership.
- If you do not want to synchronize files and want to connect as a "guest," select **No** and click **Next**. The screen indicates that you are connected as a guest.

Step 3 Insert the Cisco Aironet Series Wireless LAN Adapters CD into the laptop or PC's CD-ROM drive.

Step 4 Use Windows Explorer to browse the CD and locate the *.cab file in the directory structure that corresponds to the device and processor type of your Windows CE device.

Example: If you are running Windows CE 3.00 on a pocket PC device with a StrongARM processor, the appropriate *.cab file would be located in the following directory structure: WinCE\Ce3.00\SA11xx and would look something like *SA11xxPPC30v131.cab*, where SA11xx indicates the processor type, *PPC30* represents Windows CE version 3.00 on a pocket PC device, and *v131* indicates the driver version.

Step 5 Drag and drop the appropriate *.cab file from the CD to the root directory (called *My Pocket PC* or *My Handheld PC*) on the Windows CE device.

Step 6 The File Conversion window appears indicating that some files may need to be converted. Click **OK**.

Step 7 After the *.cab file is copied to the Windows CE device, remove the CD from the laptop or PC and disconnect the Windows CE device.

Step 8 On your Windows CE device, open **File Explorer** or **Windows Explorer** and locate the *.cab file in the root directory.

Step 9 Click the ***.cab** file to execute it. The cisco.dll driver is installed in the \Windows directory, the client utilities are extracted to the Windows\Start Menu\Programs\Cisco directory, and the *.cab file is removed.

Step 10 Follow the instructions in the "Inserting the Client Adapter into a Computing Device" section on page 3-2 to insert the client adapter into the PC card slot of the Windows CE device.

The Windows CE device should configure the client adapter, and the green LED on the adapter should blink. If this does not happen, remove the client adapter, reset the Windows CE device, and reinsert the client adapter.

Step 11 The Cisco Wireless LAN Adapter Settings dialog box appears.

- If you are connected to a DHCP server, select **Obtain an IP address via DHCP** or **Use server-assigned IP address** and click **OK**.
- If you are not connected to a DHCP server, select **Specify an IP address** or **Use specific IP address** and follow the steps below:
  - **a.** Enter the IP address, subnet mask, and default gateway address of your computer (which can be obtained from your system administrator).
  - **b.** Select the **Name Servers** tab and enter the primary and secondary DNS and WINS for your computer (which can be obtained from your system administrator).
  - **c.** Click **OK**.

Step 12 Select **Start** > **Programs** > **Cisco** > **Aironet Client Utility** to open the Aironet Client Utility (ACU).

Step 13 Select **Client Name** under Property. Type your Windows CE device's unique client name in the Value dialog box.

Step 14 Select **SSID** under Property. Type your RF network's case-sensitive SSID in the Value dialog box.

Step 15 Select **Data Rates** under Property. Make sure Auto is selected in the list of options in the Value dialog box.

Step 16 Click **OK**.

Step 17 The driver and client utility installation is complete. Refer to the *Cisco Aironet Wireless LAN Adapters Software Configuration Guide* for instructions on how to use each utility.

Installing the Driver for Linux

Note This procedure can be performed only by root users (those with administrative rights).

Note Cisco's Linux driver currently supports version 2.2.xx of the Linux kernel. To determine your kernel version, type **uname -a** and press **Enter**. The name of your computer and the Linux kernel version are displayed. For example, in *drake.cisco.com 2.2.15-4mak*, *drake.cisco.com* represents your computer's name, and *2.2.15* is the kernel version.

If your computer's operating system is Linux, follow these steps.

Step 1 After you insert the client adapter into your computing device, insert the Cisco Aironet Series Wireless LAN Adapters CD into your computer's CD-ROM drive.

Step 2 Go to the Linux directory on the CD.

Step 3 Type **sh ./cwinstall** and press **Enter**.

Step 4 When you are asked to select where you want the client utilities to be installed, perform one of the following:

- If you want the files to be installed in the specified default location, press **Enter**.
- If you want to specify a different location, enter the desired path and press **Enter**.

Step 5 When you are asked if you already have the source for Card and Socket Services unpacked, perform one of the following:

- If you do not already have Card and Socket Services unpacked, type **n**, press **Enter**, and go to Step 6.
- If you already have Card and Socket Services unpacked, type **y**, press **Enter**, and go to Step 7.

Step 6 Version 3.1.21 of Card and Socket Services is provided on the Cisco Aironet Series Wireless LAN Adapters CD. If you want this version to be unpacked into the current directory (or into the /tmp directory if the current directory is read only), type **y** and press **Enter**, and go to Step 8.

Note If you want to use a different version of Card and Socket Services, you can break away from this installation to obtain a different version from the Internet (at the address specified) and then continue the installation.

Step 7 When you are asked if you have already installed Card and Socket Services, perform one of the following:

- If you have not installed Card and Socket Services, type **n**, press **Enter**, and go to Step 8.
- If you have already installed Card and Socket Services, type **y**, press **Enter**, go to the directory where the file is installed, and type **make -f airo_cs.mk install**. Go to Step 12.

Step 8 Type **make config** and press **Enter**.

Step 9 When you are prompted to respond to a series of questions, press **Enter** to accept the default value for each question.

Note The default responses for each question are correct for most users. Consult the *PCMCIA-HOWTO* for additional information about each option.

Step 10 After you have responded to each question, type **make all** and press **Enter**.

Step 11 After the make all command is finished executing, type **make install** and press **Enter**.

Step 12 Perform one of the following:

- If you do not want to limit access to the client utilities to root users (those with administrative rights), no action is required. Proceed to Step 13.
- If you want only root users to be able to run the client utilities and configure the client adapter, type **chmod 500 /***path***/acu** (where *path* is the exact path to where the utilities were installed in Step 4), press **Enter**, type **chmod 500 /***path***/cem**, and press **Enter**.

Step 13 Perform one of the following:

- If you want your computer's IP address to be assigned by DHCP and your network has a DHCP server, you must run a DHCP client utility. The two most popular client utilities are DHCP CD and Pump. Most Linux distributions should have one of them. If you have neither, you must install it from your distribution CD-ROM or download one from the Internet. Refer to your distribution's home page for more information.
- If your computer is not connected to a DHCP server, follow the steps below to enter the IP address, subnet mask, and default gateway address of your computer.

  a. Perform one of the following:

  - If you want to set the IP address and have the system determine the broadcast address and subnet mask, type **ifconfig eth***x IP address* (where *x* is the number of your client adapter and *IP address* is your computer's IP address) and press **Enter**.
  - If you want to set the IP address and manually set the broadcast address and subnet mask, type **ifconfig eth***x IP address* **broadcast** *broadcast address* **netmask** *netmask* (where *x* is the number of your client adapter, *IP address* is your computer's IP address, *broadcast address* is the corresponding broadcast address, and *netmask* is your subnet mask) and press **Enter**.

  Note Your client adapter's number is zero (0) if it is the only Ethernet adapter card installed. The Device field of the Status screen in the Aironet Client Utility (ACU) indicates the number of the adapter being used.

  b. To enter the default gateway address, type **route add default gw** *IP address of gateway* **netmask 0.0.0.0 metric 1** (where *IP address of gateway* is your default gateway address) and press **Enter**.

Step 14 Remove the CD and reboot your computer.

Step 15 The driver and client utility installation is complete. Refer to the *Cisco Aironet Wireless LAN Adapters Software Configuration Guide* for instructions on how to use each utility.

Note Linux allows you to install the drivers for more than one client adapter and to then select between the adapters. (Up to two PC cards and up to five PCI client adapters can be supported.) To install the driver for another client adapter, you can follow the previous instructions; however, the process will be abbreviated now that some files are already installed. After the drivers and the client utilities are installed, you can switch back and forth between the client adapters using the Select Radio parameter in ACU. See the *Cisco Aironet Wireless LAN Adapters Software Configuration Guide* for information on using this parameter.

Installing the Driver for MacOS 9.x

Note Cisco Aironet PCI client adapters are not supported for use with Apple computers.

If you are using an Apple PowerBook G3 running MacOS 9.x, follow these steps.

Step 1 Boot up your PowerBook.

Step 2 Insert the Cisco Aironet Series Wireless LAN Adapters CD into your computer's CD-ROM drive. The Cisco pc3x0 icon appears on the desktop.

Step 3 Double-click the **Cisco pc3x0** icon. The Cisco pc3x0 window appears.

Step 4 Double-click the **Installer** icon. If a window appears indicating that the installation cannot occur with other applications running, click the **Continue** button.

Step 5 When the Cisco Wireless LAN Adapter Software screen appears, click **Continue**. The Install window appears.

The application and driver for the Power Macintosh is shown in the middle of the window, and the proposed destination of the files to be copied is shown in the Destination Folder in the bottom left corner of the window. If you want to specify a different folder, click the **Select Folder** button and choose a different location.

Step 6 Click the **Install** button in the bottom right corner of the window.

Step 7 When a window appears informing you that the installation requires a restart of your computer, click the **Continue** button.

Step 8 After the files are copied to the designated folder in Macintosh HD, a window appears indicating that the installation was successful. Click the **Restart** button.

Step 9 After your computer reboots, follow the instructions in the "Inserting the Client Adapter into a Computing Device" section on page 3-2 to insert the client adapter into your PowerBook's PC card slot. The Cisco Wireless LAN Adapter icon appears on the desktop.

Step 10 Click the apple-shaped icon in the top left corner of the desktop.

Step 11 Select **Control Panels** > **AppleTalk**. The AppleTalk window appears.

Step 12 Make sure the name of the correct wireless LAN adapter appears in the Connect via dialog box. If it does not, click the up or down arrow on the right side of the Connect via dialog box and select the correct adapter.

Step 13 Close the AppleTalk window.

Step 14 Click the apple-shaped icon in the top left corner of the desktop.

Step 15 Select **Control Panels** > **TCP/IP**. The TCP/IP window appears.

Step 16 Select **Cisco Wireless LAN Adapter** in the Connect via drop-down box.

Step 17 Perform one of the following:

- If you are connected to a DHCP server, select **Using DHCP Server** in the Configure drop-down box and type your computer's unique client name in the DHCP Client ID field.
- If you are not connected to a DHCP server, select **Manually** in the Configure drop-down box and enter the IP address, subnet mask, router address, name server address, and search domains of your computer (which can be obtained from your system administrator). Only the IP address and subnet mask are required.

Step 18 Close the TCP/IP window.

Step 19 When a window appears asking if you want to save changes to the current configuration, click the **Save** button.

Step 20 Double-click the **Macintosh HD** icon on the desktop. The Macintosh HD window appears.

Step 21 Double-click the **Cisco pcm3x0 Folder** icon. The Cisco pcm3x0 Folder window appears.

Step 22 Double-click the **pcm3x0PPC** icon. The Cisco pcm3x0 window appears, and the computer searches for the client adapter. After the adapter is found, the Cisco pcm3x0 - Basic Properties window appears.

Step 23 Under Radio, make sure that radio status is on. If it is off, click the **Turn radio on** button.

Step 24 Perform one of the following:

- If your computer is in an infrastructure network, select **Computer to base station** in the Network subwindow.
- If your computer is in a peer-to-peer (ad hoc) network, select **Computer to computer** in the Network subwindow.

Step 25 Type your RF network's (case-sensitive) SSID in the SSID dialog box.

Step 26 Click **OK**.

Step 27 Eject the CD by clicking the CD icon on the desktop and dragging it to the trash can.

Step 28 The driver and client utility installation is complete. Refer to the *Cisco Aironet Wireless LAN Adapters Software Configuration Guide* for instructions on how to use the client utility.

Installing the Client Utilities and Enabling LEAP or EAP

Note This section provides instructions for installing the client utilities and enabling LEAP or EAP for Windows 95, 98, NT, 2000, and Me. If your computer is using a Windows CE, Linux, or Macintosh operating system, the client utilities are installed with the driver (see the "Installing the Correct Driver" section on page 3-6), and LEAP is enabled through the client utilities (refer to the *Cisco Aironet Wireless LAN Adapters Software Configuration Guide* for instructions).

After you have installed the appropriate driver for your computer's operating system, you can install the Aironet Client Utility (ACU), Link Status Meter (LSM), and Client Encryption Manager (CEM) utilities. ACU allows you to configure the client adapter, enable server-based authentication, and enable the Wired Encryption Privacy (WEP) feature; LSM provides troubleshooting and status information; and CEM enables you to set one or more WEP keys for your client adapter.

Note The following procedure assumes you are installing the client utilities from the CD provided. If your computer does not have a CD-ROM drive, download the utilities from Cisco's web site at http://www.cisco.com/public/sw-center/sw-wireless.shtml. Under "Wireless Software Products - Cisco Aironet Drivers and Utilities," select your computer's operating system and the appropriate utility.

Follow the steps below to install the client utilities for Windows 95, 98, NT, 2000 or Me.

Step 1 Close any Windows programs that are running.

Step 2 Insert the Cisco Aironet Series Wireless LAN Adapters CD into your computer's CD-ROM drive.

Step 3 Select **Start** > **Run** and enter the following path (where *D* is the letter of your CD-ROM drive): **D:\Utilities\ACU\setup.exe**.

Step 4 When the Welcome screen appears, click **Next**.

Step 5 In the Authentication Method screen, select the server-based authentication method preferred for wireless network access in your location and click **Next**:

- If you select **None** (the default value), server-based authentication is not enabled for your client adapter. After the client utilities are installed, you can elect not to implement any security features, or you can activate some level of security by using WEP keys. Refer to the *Cisco Aironet Wireless LAN Adapters Software Configuration Guide* for instructions on setting WEP keys using CEM and enabling WEP through ACU.
- If you select **LEAP**, LEAP is enabled on your client adapter, provided an EAP-enabled RADIUS server is running on your network. After LEAP is enabled and your computer is rebooted, your client adapter authenticates to the RADIUS server using your network logon and receives a session-based WEP key.
- If you select **EAP**, EAP is enabled on your client adapter, provided an EAP-enabled RADIUS server is running on your network. If your computer is not using an operating system with built-in EAP support, this option is not available. After EAP is enabled and your computer is rebooted, your client adapter authenticates to the RADIUS server using your network logon and receives a session-based WEP key.

Step 6 In the Select Components screen, make sure the client utilities that you want to install are selected and any that you do not want to install are deselected. Click **Next**.

Step 7 In the Select Program Folder screen, click **Next** to allow icons for the client utilities to be placed in the Cisco Systems, Inc. folder.

Step 8 In the Setup Complete screen, perform one of the following:

- If you selected no server-based authentication in Step 5, select **Launch the Aironet Client Utility** and click **Finish**. ACU opens so you can configure your client adapter.
- If you selected LEAP or EAP server-based authentication in Step 5, select **Yes, I want to restart my computer now**, remove the CD from your computer's CD-ROM drive, and click **Finish**. When the computer reboots, enter your username and password at the network logon screen. Following the sequence of events described in the "EAP and LEAP" section on page 1-6, the client adapter is authenticated and assigned a session-based WEP key, provided your client adapter is configured to associate to an EAP-enabled Access Point.

Step 9 Refer to the *Cisco Aironet Wireless LAN Adapters Software Configuration Guide* for instructions on how to use each utility.

Note Icons are automatically added to the desktop when you install the client utilities. If you wish to remove these icons from your desktop, right-click the icon, click **Delete**, and click **Yes** to confirm your decision.

Note To install or use the client utilities on Windows NT or Windows 2000 systems, you must log onto the system as a user with administrative privileges. The utilities do not install or operate correctly for users not logged in with administrative rights.

Note If you ever need to uninstall the client utilities and the Aironet Client Utility setup program, follow the instructions in the "Uninstalling the Client Utilities and the Aironet Client Utility Setup Program" section on page 4-25.

Note After LEAP or EAP is enabled on your client adapter, you can enable or disable it at any time using ACU. Refer to the *Cisco Aironet Wireless LAN Adapters Software Configuration Guide* for more information.

Verifying Installation

To verify that you have properly installed the appropriate driver and client utilities, perform one of the following:

- If your computer's operating system is Windows 95, 98, NT, 2000, or Me, open ACU by double-clicking the **ACU** icon on your desktop. If the installation was successful, the bottom left corner of the Aironet Client Utility screen indicates that your client adapter is associated to its Access Point.
- If your computer's operating system is Windows CE 2.11 or 3.0, open ACU by selecting **Start** > **Programs** > **Cisco** > **Aironet Client Utility**. If the installation was successful, the bottom of the ACU screen indicates that your client adapter is associated to its Access Point.
- If your computer's operating system is Linux, go to the directory where the utilities were installed and type **acu** to open ACU. If the installation was successful, the bottom left corner of the Aironet Client Utility screen indicates that your client adapter is associated to its Access Point.
- If your computer's operating system is MacOS 9.x, double-click the **pcm3x0PPC** icon in the Cisco pcm3x0 folder to open the pcm3x0PPC client utility. If the installation was successful, the top of the Basic Properties screen indicates that your client adapter is associated to its Access Point.

To verify that your client adapter is authenticated and has received a session-based WEP key (if you are running Windows 95, 98, NT, 2000, or Me and you enabled LEAP or EAP on your client adapter), check the system tray on your desktop. The WepStat icon, which looks like two connected computers, should appear in the system tray and indicate that LEAP or EAP is authenticated and WEP is enabled. In addition, LEAP or EAP and Enable WEP should be selected in the Network Security screen in ACU.

Note If your computer's operating system is Windows CE, Linux, or MacOS 9.x, LEAP is enabled through the client utilities, not during the installation of the utilities. For information on enabling LEAP and verifying authentication for client adapters that are used with these operating systems, refer to the *Cisco Aironet Wireless LAN Adapters Software Configuration Guide*.

Note If your installation was unsuccessful or you experienced problems during or after driver installation, refer to Chapter 4 for troubleshooting tips.

CHAPTER 4

Troubleshooting and Routine Procedures

This chapter provides general information for diagnosing and correcting common problems encountered when installing or operating a Cisco Aironet Wireless LAN Adapter as well as procedures for performing routine operations.

The following topics are covered in this section:

Accessing the Latest Troubleshooting Information

This chapter provides basic troubleshooting tips for your client adapter. For more up-to-date and complex troubleshooting information, refer to the TAC web site at http://www.cisco.com/tac. Select **Wireless LAN** under "Top Issues."

Using the Indicator LEDs

The client adapter shows messages and error conditions through its two LEDs:

- **Link Integrity/Power LED (green**) – This LED lights when the client adapter is receiving power and blinks slowly when the adapter is linked with the network.
- **Link Activity LED (amber)** – This LED blinks quickly when the client adapter is receiving or transmitting data and blinks in a repeating pattern to indicate an error condition.

Table 4-1 interprets the LED operating messages.

Table 4-1 LED Operating Messages

Green LED	Amber LED	Condition
Off	Off	Client adapter is not receiving power or an error has occurred.
Blinking quickly	Blinking quickly	Power is on, self-test is OK, and client adapter is scanning for a network.
Blinking slowly	Blinking quickly	Client adapter is associated to an Access Point.
Continuously on or blinking slowly	Blinking	Client adapter is transmitting or receiving data while associated to an Access Point.

Table 4-1 LED Operating Messages (continued)

Green LED	Amber LED	Condition
Off	Blinking quickly	Client adapter is in power save mode.
On	Blinking quickly	Client adapter is in ad hoc mode.
Off	On	Driver installed incorrectly.
Off	Blinking in a pattern	Indicates an error condition.

Problems after Installing the Driver

Note If you experience problems during driver installation, you may want to restart the installation process. Go to the "Removing the Driver" section on page 4-9 to start with a clean install.

Follow the instructions in this section if you experience difficulty with your client adapter after installing the driver (for instance, your computer repeatedly freezes at the network login screen, the green LED does not blink to indicate that the adapter is active, etc.).

Client Adapter Recognition Problems

If your client adapter is not being recognized by your computer's PCMCIA adapter, check your computer's BIOS and make sure that the PC card controller mode is set to PCIC compatible.

Note A computer's BIOS varies depending on the manufacturer. For support on BIOS-related issues, consult your computer's manufacturer.

If your computer's operating system is MacOS 9.x, verify that the driver (pcm3x0) and enablers (pcm3x0Enabler) are installed. They should be in the Extensions folder of the System folder.

- If you cannot find the driver, reinstall it and restart the computer.
- If the driver is properly installed, eject the client adapter and reinsert it.

Missing Files in Windows CE

If you experience a problem after attempting to install the driver for Windows CE, some necessary files may be missing.

- If you are using Windows CE 2.11, locate the mfcce211.dll, arp.dll, dhcp.dll, ndis.dll, and network.cpl files on the Windows CE Services CD that was shipped with your Windows CE device or obtain them from the device manufacturer. Then use Windows Explorer to copy these files into the \Windows directory of the Windows CE device and reinstall the driver following the instructions in the "Installing the Driver for Windows CE" section on page 3-18.
- If you are using Windows CE 3.00, obtain the mfcce300.dll file from the device manufacturer, use Windows Explorer to copy it into the \Windows directory of the Windows CE device, and reinstall the driver following the instructions in the "Installing the Driver for Windows CE" section on page 3-18.

Resolving Resource Conflicts

If you encounter problems while installing your client adapter on a computer running a Windows operating system, you may need to specify a different interrupt request (IRQ) or I/O range for the adapter.

The default IRQ for the client adapter is IRQ 10, which may not work for all systems. Follow the steps for your specific operating system to obtain an available IRQ.

During installation the adapter's driver installation script scans for an unused I/O range. The installation can fail if the I/O range found by the driver installation script is occupied by another device but not reported by Windows. An I/O range might not be reported if a device is physically present in the system but not enabled under Windows. Follow the steps for your specific operating system to obtain an available I/O range.

Resolving Resource Conflicts in Windows 95, 98, and Me

Step 1 Double-click **My Computer**, **Control Panel**, **System**, the **Device Manager** tab, and **Network Adapters**.

Step 2 Select the Cisco Systems wireless LAN adapter.

Step 3 Click the **Properties** button.

Step 4 In the General screen, the Device Status field indicates if a resource problem exists. If a problem is indicated, click the **Resources** tab.

Step 5 Deselect the **Use automatic settings** checkbox.

Step 6 Under Resource Settings or Resource Type, click **Input/Output Range**.

Step 7 Look in the Conflicting Device list at the bottom of the screen. If it indicates that the range is being used by another device, click the **Change Setting** button.

Step 8 Scroll through the ranges in the Value dialog box and select one that does not conflict with another device. The Conflict Information window at the bottom of the screen indicates if the range is already being used.

Step 9 Click **OK**.

Step 10 Under Resource Settings or Resource Type, click **Interrupt Request**.

Step 11 Look in the Conflicting Device list at the bottom of the screen. If it indicates that the IRQ is being used by another device, click the **Change Setting** button.

Step 12 Scroll through the IRQs in the Value dialog box and select one that does not conflict with another device. The Conflict Information window at the bottom of the screen indicates if the IRQ is already being used.

Step 13 Click **OK**.

Step 14 Reboot your computer.

Resolving Resource Conflicts in Windows 2000

Step 1 Double-click **My Computer**, **Control Panel**, **System**, the **Hardware** tab, **Device Manager**, and **Network Adapters**.

Step 2 Select the Cisco Systems wireless LAN adapter.

Step 3 In the General screen, the Device Status field indicates if a resource problem exists. If a problem is indicated, click the **Resources** tab.

Step 4 Deselect the **Use automatic settings** checkbox.

Step 5 Under Resource Settings or Resource Type, click **Input/Output Range**.

Step 6 Look in the Conflicting Device list at the bottom of the screen. If it indicates that the range is being used by another device, click the **Change Setting** button.

Step 7 Scroll through the ranges in the Value dialog box and select one that does not conflict with another device. The Conflict Information window at the bottom of the screen indicates if the range is already being used.

Step 8 Click **OK**.

Step 9 Under Resource Settings or Resource Type, click **Interrupt Request**.

Step 10 Look in the Conflicting Device list at the bottom of the screen. If it indicates that the IRQ is being used by another device, click the **Change Setting** button.

Step 11 Scroll through the IRQs in the Value dialog box and select one that does not conflict with another device. The Conflict Information window at the bottom of the screen indicates if the IRQ is already being used.

Step 12 Click **OK**.

Step 13 Reboot your computer.

Resolving Resource Conflicts in Windows NT

Step 1 Select **Start** > **Programs** > **Administrative Tools** > **Windows NT Diagnostics**.

Step 2 Click the **Resources** tab.

Step 3 Click the **IRQ** button.

Step 4 The used IRQs are listed in numerical order along the left side of the Resources window. Write down the number of an IRQ that is not being used; you will need it for Step 11.

Step 5 Click the **I/O Port** button.

Step 6 The used I/O ranges are listed in numerical order along the left side of the Resources window under Address. Write down an I/O range that is not being used (for example, if range 0100-013F is followed by 0170-0177 in the list, then 0140-0169 is an available range); you will need it for Step 13.

Step 7 Double-click **My Computer**, **Control Panel**, and **Network**.

Step 8 Click the **Adapters** tab and select the Cisco Aironet wireless LAN adapter.

Step 9 Click **Properties**.

Step 10 Select **Interrupt** under Property.

Step 11 Select the number of the unused interrupt from Step 4 in the Value drop-down box.

Step 12 Select **IO Base Addres**s under Property.

Step 13 Select a value that is within the unused range you determined in Step 6. For example, if your unused range is 0140-0169, you could select 150.

Step 14 Click **OK**.

Problems Obtaining an IP Address in Windows CE

If your computer's operating system is Windows CE 2.11 or 3.00 and your network is set up to use DHCP to acquire an IP address, the DHCP lease renewal may fail, especially in suspend/resume situations. To obtain an IP address, soft reset your Windows CE device.

Problems Associating to the Access Point

Follow the instructions below if your client adapter fails to associate to the Access Point.

- If possible, move your workstation a few feet closer to the Access Point and try again.
- Make sure the client adapter is securely inserted in your computer's PC card slot or PCI expansion slot.
- If you are using a PCI client adapter, make sure the antenna is securely attached.
- Make sure the Access Point is turned on and operating.
- Check that all parameters are set properly for both the client adapter and the Access Point. These include the SSID, LEAP or EAP activation, WEP activation, network type, and channel.
- If the client adapter still fails to establish contact, refer to the "Obtaining Technical Assistance" section on page xvii for technical support information.

Problems Authenticating to the Access Point

If your client adapter is a 40-bit card and LEAP is enabled, the adapter can associate to but not authenticate to Access Points using 128-bit encryption. To authenticate to an Access Point using 128-bit encryption, you have two options:

- Purchase a 128-bit client adapter. This is the most secure option.
- Disable WEP for the client adapter and configure the adapter and the Access Point to associate to mixed cells. This option presents a security risk because your data is not encrypted as it is sent over the RF network.

Problems Connecting to the Network

After you have installed the appropriate driver and client utilities, contact your IS department if you have a problem connecting to the network. Proxy server, network protocols, and further authentication information might be needed to connect to the network.

Removing the Driver

This section provides instructions for removing a client adapter driver from your computer. Two examples of when you may need to remove a driver are listed below:

- If you are running Windows 95, 98, NT, or 2000 and a Cisco Aironet client adapter was previously installed on your computer with the 6.10 driver, you must remove this driver before you can install a more recent driver, such as the one provided on the Cisco Aironet Series Wireless LAN Adapters CD.
- If you experience difficulty while installing the driver for your computer's operating system, you may want to abort the installation procedure and start over. However, before you attempt to install the driver again, you must first remove any part of the driver that you may have already installed.

Table 4-2 enables you to quickly locate the instructions for removing a driver for your specific operating system.

Table 4-2 Locating Driver Removal Instructions

Operating System	6.10 Driver	Driver Other Than 6.10
Windows 95	page 4-10	page 4-13
Windows 98	page 4-10	page 4-13
Windows NT	page 4-11	page 4-14
Windows 2000	page 4-12	page 4-15
Windows Millennium (Me)	Not applicable	page 4-13
Windows CE 2.11	Not applicable	page 4-16
Windows CE 3.0	Not applicable	page 4-16
Linux	Not applicable	page 4-17
MacOS 9.x	Not applicable	page 4-17

Removing the 6.10 Driver

To determine if the 6.10 driver is installed on your computer, open the Aironet Client Utility (ACU) by clicking on the **ACU** icon on the desktop and select **Status** from the Commands pull-down menu. The driver version is indicated in the NDIS Driver Version field.

To uninstall the 6.10 driver, follow the instructions that apply to your computer's operating system.

Removing the 6.10 Driver for Windows 95 and 98

Step 1 Make sure the previous client adapter is in your computer and the computer is booted up.

Step 2 Right-click the **WepStat** icon in the system tray on your desktop. This icon looks like two connected computers.

Step 3 Click **Terminate**.

Step 4 Insert the Cisco Aironet Series Wireless LAN Adapters CD into your computer's CD-ROM drive.

Step 5 Open **Windows Explorer** and find the \Utilities\RmWep directory on your computer's CD-ROM drive.

Step 6 Double-click the **RmWep.exe** file.

Step 7 Minimize **Windows Explorer**.

Step 8 Double-click **My Computer**, **Control Panel**, and **Network**.

Step 9 In the Network window, select the Cisco Systems wireless LAN adapter.

Step 10 Click **Remove** and **OK**.

Step 11 When prompted to restart your computer, click **No**.

Step 12 Maximize **Windows Explorer**.

Step 13 Click **View**, **Options** or **Folder Options**, and **View**. Under Hidden files, make sure **Show all files** is selected, make sure the **Hide file extensions for known file types** checkbox is deselected, and click **OK**.

Step 14 Find your computer's operating system in the following table, go to the path listed, and delete the file indicated.

Operating System	Location of File	File to be Deleted
Windows 95	C:\Windows\Inf	pc4800.inf
Windows 98	C:\Windows\Inf or C:\Windows\Inf\Other	pc4800.inf or aironetnetx500.inf

Step 15 Remove the CD from your computer's CD-ROM drive.

Step 16 Shut down your computer.

Step 17 Remove the client adapter.

Step 18 Go to the "Inserting the Client Adapter into a Computing Device" section on page 3-2 for instructions on inserting your new client adapter and installing the latest driver.

Removing the 6.10 Driver for Windows NT

Step 1 Make sure the previous client adapter is in your computer and the computer is booted up.

Step 2 Right-click the **WepStat** icon in the system tray on your desktop. This icon looks like two connected computers.

Step 3 Click **Terminate**.

Step 4 Insert the Cisco Aironet Series Wireless LAN Adapters CD into your computer's CD-ROM drive.

Step 5 Open **Windows Explorer** and find the \Utilities\RmWep directory on your computer's CD-ROM drive.

Step 6 Double-click the **RmWep.exe** file.

Step 7 Close **Windows Explorer**.

Step 8 Double-click **My Computer**, **Control Panel**, and **Network**.

Step 9 In the Network window, click the **Adapters** tab.

Step 10 Select the Cisco Systems wireless LAN adapter.

Step 11 Click **Remove**.

Step 12 When asked if you wish to continue, click **Yes** and **Close**.

Step 13 When prompted to restart your computer, click **No**.

Step 14 Remove the CD from your computer's CD-ROM drive.

Step 15 Shut down your computer.

Step 16 Remove the client adapter.

Step 17 Go to the "Inserting the Client Adapter into a Computing Device" section on page 3-2 for instructions on inserting your new client adapter and installing the latest driver.

Removing the 6.10 Driver for Windows 2000

Step 1 Make sure the previous client adapter is in your computer and the computer is booted up.

Step 2 Right-click the **WepStat** icon in the system tray on your desktop. This icon looks like two connected computers.

Step 3 Click **Terminate**.

Step 4 Insert the Cisco Aironet Series Wireless LAN Adapters CD into your computer's CD-ROM drive.

Step 5 Open **Windows Explorer**.

Step 6 Click **Tools**, **Folder Options**, and **View**.

Step 7 Under Hidden files and folders, make sure **Show hidden files and folders** is selected, make sure the **Hide file extensions for known file types** checkbox is deselected, and click **OK**.

Step 8 Find the \Utilities\RmWep directory on your computer's CD-ROM drive.

Step 9 Double-click the **RmWep.exe** file.

Step 10 Go to C:\Windows\Inf and double-click the oem*x*.inf and oem*x*.pnf files, where *x* equals a numeral, to open them.

Step 11 Delete the oem*x*.inf and oem*x*.pnf files that are labeled *Aironet*.

Step 12 Remove the CD from your computer's CD-ROM drive.

Step 13 If you are prompted to restart your computer, click **Yes**.

Step 14 When the computer restarts, double-click **My Computer**, **Control Panel**, and **Add/Remove Hardware**.

Step 15 In the Add/Remove Hardware Wizard window, click **Next**.

Step 16 Click **Uninstall/Unplug a device**. Click **Next**.

Step 17 Click **Uninstall a device**. Click **Next**.

Step 18 From the Devices list, select the Cisco Systems wireless LAN adapter. Click **Next**.

Step 19 Click **Yes, I want to uninstall this device**. Click **Next**.

Step 20 Click **Finish**.

Step 21 Shut down your computer.

Step 22 Remove the client adapter.

Step 23 Go to the "Inserting the Client Adapter into a Computing Device" section on page 3-2 for instructions on inserting your new client adapter and installing the latest driver.

Removing a Driver Other Than the 6.10 Driver

To uninstall a driver other than the 6.10 driver, follow the instructions that apply to your computer's operating system.

Removing the Driver for Windows 95, 98, and Me

Step 1 Double-click **My Computer**, **Control Panel**, and **Network**.

Step 2 In the Network window, select the Cisco Systems wireless LAN adapter.

Step 3 Click **Remove** and **OK**.

Step 4 When prompted to restart your computer, click **No**.

Step 5 Open **Windows Explorer**.

Step 6 If your computer's operating system is Windows 95 or 98, click **View**, **Options** or **Folder Options**, and **View**. Under Hidden files, make sure **Show all files** is selected and click **OK**.

Step 7 Find your computer's operating system in the following table, go to the path listed, and delete the file indicated.

Operating System	Location of File	File to be Deleted
Windows 98	C:\Windows\Inf or C:\Windows\Inf\Other	pc4800.inf or aironetnetx500.inf
Windows Me	C:\Windows\Inf\Other	aironetnetx500.inf

Step 8 Find your computer's operating system in the following table and delete the pcx500.sys file from the path indicated.

Operating System	Location of pcx500.sys File
Windows 95	C:\Windows\System\pcx500.sys
Windows 98	C:\Windows\System\pcx500.sys
Windows Me	C:\Windows\System32\Drivers\pcx500.sys

Step 9 Restart your computer.

Removing the Driver for Windows NT

Step 1 Double-click **My Computer**, **Control Panel**, and **Network**.

Step 2 In the Network window, click the **Adapters** tab.

Step 3 Select the Cisco Systems wireless LAN adapter.

Step 4 Click **Remove**.

Step 5 When asked if you wish to continue, click **Yes** and **Close**.

Step 6 When prompted to restart your computer, click **Yes**.

Removing the Driver for Windows 2000

Step 1 Make sure the client adapter is installed in your computer. Otherwise, Windows cannot find the adapter to remove it.

Step 2 Double-click **My Computer**, **Control Panel**, and **Add/Remove Hardware**.

Step 3 In the Add/Remove Hardware Wizard window, click **Next**.

Step 4 Click **Uninstall/Unplug a device**. Click **Next**.

Step 5 Click **Uninstall a device**. Click **Next**.

Step 6 From the Devices list, select the Cisco Systems wireless LAN adapter. Click **Next**.

Step 7 Click **Yes, I want to uninstall this device**. Click **Next**.

Step 8 Click **Finish**.

Step 9 Open **Windows Explorer**.

Step 10 Click **Tools**, **Folder Options**, and **View**.

Step 11 Under Hidden files and folders, make sure **Show hidden files and folders** is selected. Click **OK**.

Step 12 Go to C:\Windows\Inf and double-click the oem*x*.inf and oem*x*.pnf files, where *x* equals a numeral, to open them.

Step 13 Delete the oem*x*.inf and oem*x*.pnf files that are labeled *Cisco*.

Step 14 Go to C:\Windows\System32\Drivers and delete the pcx500.sys file.

Step 15 Shut down your computer.

Step 16 Remove the client adapter.

Step 17 Turn your computer back on.

Removing the Driver for Windows CE 2.11

Step 1 Eject the client adapter and remove it from the Windows CE device.

Step 2 Select **Start** > **Programs** > **Cisco** > **Cisco Aironet Uninstall**. The Cisco Aironet Uninstall screen appears.

Step 3 Select the **Uninstall Cisco Aironet Wireless LAN Adapter** checkbox.

Step 4 Click **OK**. The utility informs you that the adapter has been uninstalled.

The registry entries (but no files) are removed, and the system returns to the point at which the files have just been copied to the Windows CE device.

Removing the Driver for Windows CE 3.00

Step 1 Eject the client adapter and remove it from the Windows CE device.

Step 2 Select **Start** > **Settings** > **Control Panel** > **Remove Programs** (on a hand-held device) or **Start** > **Settings** > **System** tab > **Remove Programs** (on a pocket PC device).

Step 3 Select the Cisco Systems wireless LAN adapter.

Step 4 Click the **Remove** button.

Step 5 When asked to verify your decision to remove the adapter, click **Yes**.

Step 6 Click **OK**. The driver, client utilities, registry entries, and Cisco directory are removed.

Removing the Driver for Linux

Step 1 Insert the Cisco Aironet Series Wireless LAN Adapters CD into your computer's CD-ROM drive.

Step 2 Go to the Linux directory on the CD.

Step 3 Type **sh ./cwuninstall** and press **Enter**. If the uninstall is successful, the driver and the client utilities are removed. If the uninstall process fails, an error message appears.

Removing the Driver for MacOS 9.x

Step 1 Double-click the **Cisco pc3x0** icon on the desktop. The Cisco pc3x0 window appears.

Step 2 Double-click the **Installer** icon.

Step 3 When the Cisco Wireless LAN Adapter Software screen appears, click **Continue**. The Install window appears.

Step 4 In the top left corner of the Install window, click on the **Easy Install** pull-down menu and select **Custom Remove**.

Step 5 Select the **Application, driver and help files for Power Macintosh** checkbox.

Step 6 Click the **Remove** button.

Step 7 When a window appears indicating that the removal cannot occur with other applications running, click the **Continue** button.

Step 8 After you receive a message indicating that the removal was successful, click the **Restart** button.

Step 9 Remove the client adapter from the desktop by clicking on the **Cisco Wireless LAN Adapter** icon and dragging it to the trash can or by clicking on the **Cisco Wireless LAN Adapter** icon and selecting the **Eject** command in the Special menu.

Step 10 Remove the client adapter from your PowerBook's PC card slot.

Note If the uninstall process is not successful, refer to the Read Me file on the Cisco Aironet Series Wireless LAN Adapters CD for information on manually removing the necessary files.

Updating the Driver

You can obtain the latest drivers at http://www.cisco.com/public/sw-center/sw-wireless.shtml. Under "Wireless Software Products - Cisco Aironet Drivers and Utilities," select your computer's operating system and copy the appropriate driver to your hard drive or to a floppy disk.

Use Table 4-3 to quickly locate the instructions to upgrade the driver for your specific operating system.

Table 4-3 Updating the Driver Instructions

Operating System	Page Number
Windows 95	4-19
Windows 98	4-19
Windows NT	4-19
Windows 2000	4-20
Windows Millennium Edition (Me)	4-21
Windows CE	4-22
Linux	4-23
MacOS 9.x	4-23

Upgrading the Driver for Windows 95 and 98

Step 1 Make sure your client adapter is installed in your computer.

Step 2 Double-click **My Computer**, **Control Panel**, **System**, the **Device Manager** tab, and **Network Adapters**.

Step 3 Select the Cisco Systems wireless LAN adapter.

Step 4 Click **Properties**.

Step 5 Select the **Driver** tab.

Step 6 Click the **Change Driver** or **Update Driver** button.

Step 7 The Update Device Driver Wizard window appears. Click **Next**.

Step 8 Select **Search for a better driver than the one your device is using now (Recommended)** and click **Next**.

Step 9 Select the location of the new driver (floppy disk drive or specify a location), deselect the other options, enter the full path to the new driver (if you selected to specify a location), and click **Next**.

Step 10 A message appears indicating that the system is ready to install the new driver. Click **Next** and **Finish**.

The driver upgrade is complete, and the old driver is overwritten by the new one.

Upgrading the Driver for Windows NT

Step 1 Make sure your client adapter is installed in your computer.

Step 2 Double-click **My Computer**, **Control Panel**, **Network**, and **Adapters**.

Step 3 Select the Cisco Systems wireless LAN adapter.

Step 4 Click the **Update** button.

Step 5 In the Windows NT Setup window, enter the full path to the new driver (for example, you would enter A:\ if you copied the file to the root of a floppy disk) and click **Continue**.

Step 6 Follow the instructions on the screen to complete the upgrade process.

Upgrading the Driver for Windows 2000

Step 1 Make sure your client adapter is installed in your computer.

Step 2 Double-click **My Computer**, **Control Panel**, **System**, the **Hardware** tab, **Device Manager**, and **Network Adapters**.

Step 3 Select the Cisco Systems wireless LAN adapter.

Step 4 Select the **Driver** tab.

Step 5 Click the **Update Driver** button.

Step 6 The Update Device Driver Wizard window appears. Click **Next**.

Step 7 Select **Search for a suitable driver for my device (Recommended)** and click **Next**.

Step 8 Select the location of the new driver (floppy disk drive or specify a location), deselect the other options, and click **Next**.

Step 9 Enter the full path to the new driver (if you selected to specify a location) and click **OK**.

Step 10 A message appears indicating that the system is ready to install the new driver. Click **Next** and **Finish**.

The driver upgrade is complete, and the old driver is overwritten by the new one.

Upgrading the Driver for Windows Me

Step 1 Make sure your client adapter is installed in your computer.

Step 2 Double-click **My Computer**, **Control Panel**, **System**, the **Device Manager** tab, and **Network Adapters**.

Step 3 Select the Cisco Systems wireless LAN adapter.

Step 4 Click **Properties**.

Step 5 Select the **Driver** tab.

Step 6 Click the **Update Driver** button. The Update Device Driver Wizard window appears.

Step 7 Select **Specify the location of the driver (Advanced)** and click **Next**.

Step 8 Select **Search for a better driver than the one your device is using now (Recommended)** and click **Next**.

Step 9 Select the **Specify a location** checkbox, deselect the other options, enter the full path to the new driver, and click **Next**.

Step 10 A message appears indicating that the system is ready to install the new driver. Click **Next** and **Finish**.

The driver upgrade is complete, and the old driver is overwritten by the new one.

Upgrading the Driver for Windows CE

The instructions for upgrading the driver vary depending on the format of the new driver (*.dll versus *.cab files). Follow the instructions for the format of your new driver.

*.dll Files

If your new driver has a .dll extension, follow these steps.

Step 1 Eject the client adapter and remove it from the Windows CE device. This causes the existing driver to unload from memory.

Step 2 Copy the new *.dll file to the \Windows directory.

Step 3 Insert the client adapter. The new *.dll file is used.

*.cab Files

If your new driver has a .cab extension, follow these steps.

Step 1 Copy the new *.cab file to your Windows CE device.

Step 2 Eject the client adapter and remove it from the Windows CE device. This causes the existing driver to unload from memory.

Step 3 Execute the new *.cab file. A message appears indicating that the Cisco Systems wireless LAN adapter is already installed.

Step 4 Click the **OK** button to reinstall it.

Step 5 Insert the client adapter. The new driver *.dll file is used.

Upgrading the Driver for Linux

Step 1 Make sure your client adapter is installed in your computer.

Step 2 Copy the new driver from your hard drive or floppy disk to the pcmcia_cs_3.1.21 directory.

Step 3 Go to the pcmcia_cs_3.1.21 directory and uncompress the new driver file by typing **tar zxvf** *filename***.tar.gz** (for example, tar zxvf airo_cs.tar.gz) and pressing **Enter**.

Step 4 Type **make -f** *filename***.mk install** (for example, make -f airo_cs.mk install) and press **Enter**.

The driver upgrade is complete, and the old driver is overwritten by the new one.

Upgrading the Driver for MacOS 9.x

Step 1 Make sure your client adapter is installed in your computer.

Step 2 Drag and drop the new driver and enablers into the System folder.

Step 3 When a dialog box appears indicating that the items need to be put into the Extensions folder, click **Yes**.

Step 4 When a dialog box appears indicating that an older version exists, click **Yes** to replace it.

Step 5 Restart your PowerBook.

The driver upgrade is complete, and the old driver is overwritten by the new one.

Removing the Client Adapter

Follow the instructions below whenever you need to remove the client adapter from your computer.

Removing a PC Card

To remove a PC card after it is successfully installed and configured (such as when your laptop is to be transported), completely shut down your computer and pull the card directly out of the PC card slot. When the PC card is reinserted and the computer is rebooted, your connection to the network should be re-established.

On Macintosh computers running MacOS 9.x, you can remove the PC card while the system is running, provided the card is not being used (that is, the client utility is not running and the card is not selected in the AppleTalk and TCP/IP control panels).

Removing a PCI Client Adapter

Because PCI client adapters are installed inside desktop computers, which are not designed for portable use, you should have little reason to remove the adapter. However, instructions are provided below in case you ever need to remove your PCI client adapter.

Step 1 Completely shut down your computer.

Step 2 Disconnect the client adapter's antenna.

Step 3 Remove the computer cover.

Step 4 Remove the screw from the top of the CPU back panel above the PCI expansion slot that holds your client adapter.

Step 5 Pull up firmly on the client adapter to release it from the slot and carefully tilt the adapter to allow it to clear the opening in the CPU back panel.

Step 6 Reinstall the screw on the CPU back panel and replace the computer cover.

Uninstalling the Client Utilities and the Aironet Client Utility Setup Program

Follow the instructions below if you need to uninstall the client utilities and the Aironet Client Utility setup program on computers running Windows 95, 98, NT, 2000, or Me.

Step 1 Close any Windows programs that are running.

Step 2 Insert the Cisco Aironet Series Wireless LAN Adapters CD into your computer's CD-ROM drive.

Step 3 Select **Start** > **Run** and enter the following path (where *D* is the letter of your CD-ROM drive): **D:\Utilities\ACU\setup.exe**.

Step 4 When the Welcome screen appears, select **Remove** and click **Next**.

Step 5 When asked if you want to completely remove the selected application, click **Yes**.

Step 6 If you receive a message indicating that a file was detected that may no longer be needed by any application but deleting the file may prevent other applications from running, click **Yes**.

Step 7 If you receive a message indicating that locked files were detected, click **Reboot**.

Step 8 In the Maintenance Complete screen, click **Finish**.

Step 9 If you are prompted to restart your computer, remove the CD from the computer's CD-ROM drive and click **Yes**.

Technical Specifications

This appendix provides technical specifications for the Cisco Aironet Wireless LAN Adapters.

The following topics are covered in this section:

Table A-1 lists the technical specifications for the Cisco Aironet Wireless LAN Adapters.

Note If a distinction is not made between series or client adapter type, the specification applies to all Cisco Aironet Wireless LAN Adapters in the 340 and 350 series.

Table A-1 Technical Specifications for the Cisco Aironet Wireless LAN Adapters

Physical Specifications	
Size	
PC card	4.5 in. L x 2.1 in. W x 0.2 in. H (11.3 cm L x 5.4 cm W x 0.5 cm H)
LM card	3.4 in. L x 2.1 in. W x 0.2 in. H (8.6 cm L x 5.4 cm W x 0.5 cm H)
PCI client adapter	5.8 in. L x 3.2 in. W x 0.5 in. H (14.7 cm L x 8.1 cm W x 1.3 cm H)
Weight	
PC card and LM card	1.3 oz (0.037 kg)
PCI client adapter	4.6 oz (0.13 kg)
Enclosure	
PC card	Extended Type II PC card
LM card	Standard Type II PC card with RF connectors
Connector	
PC card and LM card	68-pin PCMCIA
PCI client adapter	PCI card edge
Status indicators	Green and amber LEDs; see Chapter 4
Operating temperature	
350 series client adapters	–22°F to 158°F (–30°C to 70°C)
340 series client adapters	32°F to 158°F (0°C to 70°C)

Table A-1 Technical Specifications for the Cisco Aironet Wireless LAN Adapters (continued)

Storage temperature	–40°F to 185°F (–40°C to 85°C)
Humidity (non-operational)	95% relative humidity
Altitude	**Operational** 9843 ft (3000 m) @ room temperature for 2 hours **Non-operational** 5,000 ft (4572 m) @ room temperature for 20 hours
ESD	15 kV (human body model)
Radio Specifications	
Type	Direct Sequence Spread Spectrum IEEE 802.11b compliant
Power output	100 mW (20 dBm) 50 mW (17 dBm) 30 mW (15 dBm) 20 mW (13 dBm) - 350 series client adapters only 15 mW (12 dBm) - 340 series client adapters only 5 mW (7 dBm) 1 mW (0 dBm) **Note** 30 mW is the maximum power level supported by 340 series client adapters. **Note** Check page C-4 for limitations on radiated power (EIRP) levels in the European community and other countries.

Table A-1 Technical Specifications for the Cisco Aironet Wireless LAN Adapters (continued)

Operating frequency	2.400 to 2.497 GHz (depending on the regulatory domain in which the client adapter is used)
Usable channels	2412 to 2484 MHz in 5-MHz increments
Interference rejection	–35 dBc adjacent channel rejection
Data rates	1, 2, 5.5, and 11 Mbps
Modulation	Binary Phase Shift Keying (BPSK) - 1 Mbps Quaternary Phase Shift Keying (QPSK) - 2 Mbps Complementary Code Keying (CCK) - 5.5 and 11 Mbps
Receiver sensitivity	
350 series client adapters	–94 dBm @ 1 Mbps –91 dBm @ 2 Mbps –89 dBm @ 5.5 Mbps –85 dBm @ 11 Mbps
340 series client adapters	–90 dBm @ 1 Mbps –88 dBm @ 2 Mbps –87 dBm @ 5.5 Mbps –83 dBm @ 11 Mbps
Receiver delay spread (multipath)	500 ns @ 1 Mbps 400 ns @ 2 Mbps 300 ns @ 5.5 Mbps 140 ns @ 11 Mbps (350 series client adapters) 70 ns @ 11 Mbps (340 series client adapters)

Table A-1 Technical Specifications for the Cisco Aironet Wireless LAN Adapters (continued)

Range	
350 series client adapters	**Outdoor** 2000 ft (609.6 m) @ 1 Mbps 1500 ft (457.2 m) @ 2 Mbps 1000 ft (304.8 m) @ 5.5 Mbps 800 ft (243.8 m) @ 11 Mbps **Indoor** 350 ft (106.7 m) @ 1 Mbps 250 ft (76.2 m) @ 2 Mbps 200 ft (61 m) @ 5.5 Mbps 150 ft (45.7 m) @ 11 Mbps **Note** The above range numbers assume the use of a snap-on antenna with the LM card.
340 series client adapters	**Outdoor** 1500 ft (457.2 m) @ 1 Mbps 1200 ft (365.8 m) @ 2 Mbps 800 ft (243.8 m) @ 5.5 Mbps 400 ft (121.9 m) @ 11 Mbps **Indoor** 300 ft (91.4 m) @ 1 Mbps 225 ft (68.6 m) @ 2 Mbps 150 ft (45.7 m) @ 5.5 Mbps 100 ft (30.5 m) @ 11 Mbps **Note** The above range numbers assume the use of a snap-on antenna with the LM card.
Antenna	
PC card	Integrated diversity antenna
LM card	Two MMCX antenna connectors
PCI client adapter	RP-TNC connector

Table A-1 Technical Specifications for the Cisco Aironet Wireless LAN Adapters (continued)

Power Specifications	
Operational voltage	5.0 V ± 0.25 V
Receive current steady state	
PC card and LM card	Typically 250 mA
PCI client adapter	Typically 350 mA
Transmit current steady state	
350 series PC card and LM card	Typically 450 mA @ 20 dBm
350 series PCI client adapter	Typically 550 mA @ 20 dBm
340 series PC card and LM card	Typically 350 mA @ 15 dBm
340 series PCI client adapter	Typically 450 mA @ 15 dBm
Sleep mode steady state	
350 series PC card and LM card	Typically 15 mA
350 series PCI client adapter	Typically 115 mA
340 series PC card and LM card	Typically 15 mA
340 series PCI client adapter	Typically 110 mA

Table A-1 Technical Specifications for the Cisco Aironet Wireless LAN Adapters (continued)

Safety and Regulatory Compliance	
Safety	Designed to meet: UL 1950 Third Ed. CSA 22.2 No. 950-95 IEC 60950 Second Ed., including Amendments 1-4 with all deviations EN 60950 Second Ed., including Amendments 1-4
EMI and susceptibility	FCC Part 15.107 & 15.109 Class B ICES-003 Class B (Canada) CISPR 22 Class B AS/NZS 3548 Class B VCCI Class B EN 50082-1
Radio approvals	FCC Part 15.247 Canada RSS-139-1, RSS-210 Japan Telec 33A
RF exposure	Europe ETS-300-328 OET-65C RSS-102 ANSI C95.1

Translated Safety Warnings

This appendix provides translations of the safety warnings that appear in this publication.

The following topics are covered in this section:

Explosive Device Proximity Warning

Warning	**Do not operate your wireless network device near unshielded blasting caps or in an explosive environment unless the device has been modified to be especially qualified for such use.**
Waarschuwing	**Gebruik dit draadloos netwerkapparaat alleen in de buurt van onbeschermde ontstekers of in een omgeving met explosieven indien het apparaat speciaal is aangepast om aan de eisen voor een dergelijk gebruik te voldoen.**
Varoitus	**Älä käytä johdotonta verkkolaitetta suojaamattomien räjäytysnallien läheisyydessä tai räjäytysalueella, jos laitetta ei ole erityisesti muunnettu sopivaksi sellaiseen käyttöön.oen.**
Attention	**Ne jamais utiliser un équipement de réseau sans fil à proximité d'un détonateur non blindé ou dans un lieu présentant des risques d'explosion, sauf si l'équipement a été modifié à cet effet.**
Warnung	**Benutzen Sie Ihr drahtloses Netzwerkgerät nicht in der Nähe ungeschützter Sprengkapseln oder anderer explosiver Stoffe, es sei denn, Ihr Gerät wurde eigens für diesen Gebrauch modifiziert und bestimmt.**
Avvertenza	**Non utilizzare la periferica di rete senza fili in prossimità di un detonatore non protetto o di esplosivi a meno che la periferica non sia stata modificata a tale proposito.**
Advarsel	**Ikke bruk den trådløse nettverksenheten nært inntil uisolerte fenghetter eller i et eksplosivt miljø med mindre enheten er modifisert slik at den tåler slik bruk.**
Aviso	**Não opere o dispositivo de rede sem fios perto de cápsulas explosivas não protegidas ou num ambiente explosivo, a não ser que o dispositivo tenha sido modificado para se qualificar especialmente para essa utilização.**

¡Advertencia! **No utilizar un aparato de la red sin cable cerca de un detonador que no esté protegido ni tampoco en un entorno explosivo a menos que el aparato haya sido modificado con ese fin.**

Varning! **Använd inte den trådlösa nätverksenheten i närheten av oskyddade tändhattar eller i en explosiv miljö om inte enheten modifierats för att kunna användas i sådana sammanhang.**

Warning for Laptop Users

Warning **In order to comply with RF exposure limits established in the ANSI C95.1 standards, it is recommended when using a laptop with a PC card client adapter that the adapter's integrated antenna is positioned more than 2 inches (5 cm) from your body or nearby persons during extended periods of transmitting or operating time. If the antenna is positioned less than 2 inches (5 cm) from the user, it is recommended that the user limit exposure time.**

Waarschuwing **In het kader van een in de ANSI C95.1 norm vastgelegde limiet voor blootstelling aan straling veroorzaakt door radiofrequenties, dient u bij langdurig gebruik van een laptop met client adapter pc-kaart een afstand van meer dan 5 centimeter aan te houden tussen de geïntegreerde antenne van de adapter en uzelf en enige andere personen. Als deze afstand niet kan worden aangehouden, dient u de tijd dat het apparaat gebruikt wordt te beperken.**

Varoitus **ANSI C95.1 -standardin radiotaajuuksille asettamien altistumisrajojen mukaisesti on suositeltavaa, että käytettäessä kannettavaa tietokonetta, jossa on PC-kortti-asiakas-adapteri, adapterin integroitu antenni on käännetty yli viisi cm pois vartalosta tai lähellä olevista henkilöistä pitkäaikaistenlähetys- tai käyttöjaksojen aikana. Jos antenni on käännetty alle viisi 5 cm käyttäjästä, on suositeltavaa, että käyttäjä rajoittaa altistumisaikaa.**

Attention **Afin de respecter les limitations en matière d'exposition aux fréquences radioélectriques définies par les normes ANSI C95.1, il est recommandé aux utilisateurs d'ordinateurs portables dotés d'adaptateurs client pour carte PC ou aux personnes se trouvant à proximité de se placer à plus de 5 cm de l'antenne de l'adaptateur lors de longues périodes de transmission ou de fonctionnement. Si l'utilisateur se trouve à moins de 5 cm de l'antenne, il est préférable de limiter le temps d'exposition.**

Warnung **In Übereinstimmung mit den in den Sicherheitsstandards ANSI C95.1 verzeichneten Höchstwerten für den Kontakt mit Radiofrequenz (RF) wird für die Benutzung eines Laptops mit PC-Adapterkarten für Clients empfohlen, bei längerer Inbetriebnahme oder Datenübertragung die integrierte Antenne des Adapters mindestens 5 cm vom Benutzer und anderen sich in der Nähe aufhaltenden Personen entfernt aufzustellen. Befindet sich die Antenne weniger als 5 cm vom Benutzer entfernt, sollte die Benutzungsdauer des Geräts eingeschränkt werden.**

Avvertenza **In conformità con i limiti sull'esposizione a frequenze radio stabiliti nelle direttive ANSI C95.1, quando si utilizza un computer portatile con una scheda PC dotata di adattatore client è consigliabile mantenere l'antenna integrata dell'adattatore a più di 5 cm di distanza durante periodi di esposizione prolungati. Se l'antenna è posizionata a meno di 5 cm di distanza dall'utente, è consigliabile limitare i tempi di esposizione alle frequenze.**

Advarsel **Du må overholde begrensningene for RF-eksponering som er fastsatt i ANSI C95.1-standardene. Derfor anbefaler vi, når du bruker en bærbar PC med et klientkort i PC-format, at kortets innebygde antenne plasseres mer enn 5 cm fra deg eller personer i nærheten under lengre perioder med overføring eller bruk. Hvis antennen er plassert mindre enn 5 cm fra brukeren, anbefaler vi at brukeren begrenser eksponeringstiden.**

Aviso **Para estar em conformidade com os limites de exposição RF estabelecidos nas normas ANSI C95.1 recomenda-se que, aquando da utilização de um laptop com um adaptador de cliente PC card, a antena integrada do adaptador esteja posicionada a mais de 5 cm do seu corpo ou de pessoas na vizinhança durante longos períodos de tempo de transmissão ou operação. Se a antena estiver posicionada a menos de 5 cm do utilizador, recomenda-se que o utilizador limite o tempo de exposição.**

¡Advertencia! **Para cumplir los límites de exposición a radiofrecuencia (RF) que se establecen en la norma ANSI C95.1, al utilizar un equipo portátil con un adaptador cliente de tarjeta PC, sitúe la antena del adaptador al menos a 2 pulgadas(5 cm) del usuario o de las personas adyacentes durante periodos largos de transmisión o funcionamiento. Si la distancia es inferior a 2 pulgadas (5 cm), se recomienda limitar el tiempo de exposición.**

Varning! **För att följa de regler för radiosändare som utfärdats enligt ANSI-standarden C95.1, rekommenderar vi att PC Card-adapterns inbyggda antenn befinner sig minst 5 cm från dig själv och andra personer när du använder en bärbar dator med PC Card-adapter under en längre tid. Om antennen befinner sig mindre än 5 cm från användaren, rekommenderar vi inte användning under längre tid.**

Declarations of Conformity and Regulatory Information

This appendix provides declarations of conformity and regulatory information for the Cisco Aironet Wireless LAN Adapters.

The following topics are covered in this section:

Manufacturers Federal Communication Commission Declaration of Conformity Statement

Models: AIR-PCM341, AIR-PCM342, AIR-LMC341, AIR-LMC342, AIR-PCI341, AIR-PCI342, AIR-PCM351, AIR-PCM352, AIR-LMC351, AIR-LMC352, AIR-PCI351, AIR-PCI352

Tested To Comply With FCC Standards

FOR HOME OR OFFICE USE

FCC Certification Number: LDK102038 (AIR-PCM34x), LDK102035 (AIR-LMC34x and AIR-PCI34x) LDK102040 (AIR-xxx35x)

Manufacturer: Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA

This device complies with Part 15 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.

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

- Reorient or relocate the receiving antenna.
- Increase separation between the equipment and receiver.

- Connect the equipment to an outlet on a circuit different from which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician.

Caution The Part 15 radio device operates on a non-interference basis with other devices operating at this frequency. Any changes or modification to said product not expressly approved by Cisco could void the user's authority to operate this device.

Department of Communications – Canada

Canadian Compliance Statement

This Class B Digital apparatus meets all the requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numerique de la classe B respecte les exigences du Reglement sur le material broilleur du Canada.

This device complies with Class B Limits of Industry Canada. 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.

The device is certified to the requirements of RSS-139-1 and RSS-210 for 2.4-GHz spread spectrum devices. The use of this device in a system operating either partially or completely outdoors may require the user to obtain a license for the system according to the Canadian regulations. For further information, contact your local Industry Canada office.

European Community, Switzerland, Norway, Iceland, and Liechtenstein

Declaration of Conformity with Regard to the R&TTE Directive 1999/5/EC

Deutsch:	Dieses Great entspricht den grundlegenden Anforderingen und den weiteren entsprechenden Vorgaben der Richtlinie 1999/5/EU.
Dansk:	Dette udstyr er i overensstemmelse med de væsentlige krav og andre relevante bestemmelser i Direktiv 1999/5/EF.
English:	This equipment is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.
Español:	Este equipo cumple con los requisitos esenciales asi como con otras disposiciones de la Directiva 1999/5/CE.
Ελληνας:	Αυτός ο εξοπλισμός είναι σε συμμόρφωση με τις ουσιώδεις απαιτήσεις και άλλες σχετικές διατάξεις της Οδηγίας 1999/5/EC.
Français:	Cet equipment est conforme aux exigencies essentielles et aux autres dispositions pertinantes de la Directive 1999/5/EC.
Íslenska:	Þetta tæki er samkvæmt grunnkröfum og öðrum viðeigandi ákvæðum Tilskipunar 1999/5/EC.
Italiano:	Questo apparato é conforme ai requisiti essenziali ed agli altri principi sanciti dalla Direttiva 1999/5/CE.

50341

Nederlands:	Dit apparaat voldoet aan de essentiele eisen en andere van toepassing zijnde bepalingen van de Richtlijn 1999/5/EC.
Norsk:	Dette utstyret er i samsvar med de grunnleggende krav og andre relevante bestemmelser i EU-direktiv 1999/5/EF.
Português:	Este equipamento está em conformidade com os requisitos essenciais e outras provisões relevantes da Directiva 1999/5/EC.
Suomi:	Tämä laite täyttää direktiivin 1999/5/EY oleelliset vaatimukset ja on siinä asetettujen muiden laitetta koskevien määräysten mukainen.
Svenska:	Denna utrustning är i överensstämmelse med de väsentliga kraven och andra relevanta bestämmelser i Direktiv 1999/5/EC.

50342

The Declaration of Conformity related to this product can be found at the following URL: http://www.ciscofax.com.

For the 340 series, the following standards were applied:

- Radio: ETS 300.328
- EMC: ETS 300.826
- Safety: EN 60950

The following CE mark is affixed to the 340 series equipment:

CE 0682 !

49325

For the 350 series, the following standards were applied:

- Radio: EN 300.328-1, EN 300.328-2
- EMC: EN 301 489-1, EN 301 489-17
- Safety: EN 60950

The following CE mark is affixed to the 350 series equipment:

The above CE mark is required as of April 8, 2000 but might change in the future.

Note This equipment is intended to be used in all EU and EFTA countries. Outdoor use may be restricted to certain frequencies and/or may require a license for operation. For more details, contact Cisco Corporate Compliance.

Note Combinations of power levels and antennas resulting in a radiated power level of above 100 mW equivalent isotropic radiated power (EIRP) are considered as not compliant with the above mentioned directive and are not allowed for use within the European community and countries that have adopted the European R&TTE directive 1999/5/EC and/or the CEPT recommendation Rec 70.03. For more details on legal combinations of power levels and antennas, contact Cisco Corporate Compliance.

Declaration of Conformity for RF Exposure

The radio module has been evaluated under FCC Bulletin OET 65C and found compliant to the requirements as set forth in CFR 47 Sections 2.1091, 2.1093, and 15.247 (b) (4) addressing RF Exposure from radio frequency devices.

Guidelines for Operating Cisco Aironet Wireless LAN Adapters in Japan

This section provides guidelines for avoiding interference when operating Cisco Aironet Wireless LAN Adapters in Japan. These guidelines are provided in both Japanese and English.

Japanese Translation

この機器の使用周波数帯では、電子レンジ等の産業・科学・医療用機器のほか工場の製造ライン等で使用されている移動体識別用の構内無線局（免許を要する無線局）及び特定小電力無線局（免許を要しない無線局）が運用されています。

1　この機器を使用する前に、近くで移動体識別用の構内無線局及び特定小電力無線局が運用されていないことを確認して下さい。

2　万一、この機器から移動体識別用の構内無線局に対して電波干渉の事例が発生した場合には、速やかに使用周波数を変更するか又は電波の発射を停止した上、下記連絡先にご連絡頂き、混信回避のための処置等(例えば、パーティションの設置など)についてご相談して下さい。

3　その他、この機器から移動体識別用の特定小電力無線局に対して電波干渉の事例が発生した場合など何かお困りのことが起きたときは、次の連絡先へお問い合わせ下さい。

連絡先：03-5219-6000

43768

English Translation

This equipment operates in the same frequency bandwidth as industrial, scientific, and medical devices such as microwave ovens and mobile object identification (RF-ID) systems (licensed premises radio stations and unlicensed specified low-power radio stations) used in factory production lines.

1. Before using this equipment, make sure that no premises radio stations or specified low-power radio stations of RF-ID are used in the vicinity.
2. If this equipment causes RF interference to a premises radio station of RF-ID, promptly change the frequency or stop using the device; contact the number below and ask for recommendations on avoiding radio interference, such as setting partitions.
3. If this equipment causes RF interference to a specified low-power radio station of RF-ID, contact the number below.

Contact Number: 03-5219-6000

802.11 The IEEE standard that specifies carrier sense media access control and physical layer specifications for 1- and 2-megabit-per-second (Mbps) wireless LANs.

802.11b The IEEE standard that specifies carrier sense media access control and physical layer specifications for 5.5- and 11-Mbps wireless LANs.

A

Access Point A wireless LAN data transceiver that uses radio waves to connect a wired network with wireless stations.

Ad Hoc Network A wireless network composed of stations without Access Points.

Associated A station is configured properly to allow it to wirelessly communicate with an Access Point.

B

BOOTP Boot Protocol. A protocol used for the static assignment of IP addresses to devices on the network.

BPSK A modulation technique used by IEEE 802.11-compliant wireless LANs for transmission at 1 Mbps.

C

CCK Complementary code keying. A modulation technique used by IEEE 802.11-compliant wireless LANs for transmission at 5.5 and 11 Mbps.

Client A radio device that uses the services of an Access Point to communicate wirelessly with other devices on a local area network.

CSMA Carrier sense multiple access. A wireless LAN media access method specified by the IEEE 802.11 specification.

D

Data Rates The range of data transmission rates supported by a device. Data rates are measured in megabits per second (Mbps).

dBi A ratio of decibels to an isotropic antenna that is commonly used to measure antenna gain. The greater the dBi value, the higher the gain, and the more acute the angle of coverage.

DHCP Dynamic host configuration protocol. A protocol available with many operating systems that automatically issues IP addresses within a specified range to devices on the network. The device retains the assigned address for a specific administrator-defined period.

Dipole A type of low-gain (2.2-dBi) antenna consisting of two (often internal) elements.

DSSS Direct sequence spread spectrum. A type of spread spectrum radio transmission that spreads its signal continuously over a wide frequency band.

E

EAP Extensible Authentication Protocol. An optional IEEE 802.1x security feature ideal for organizations with a large user base and access to an EAP-enabled Remote Authentication Dial-In User Service (RADIUS) server.

Ethernet The most widely used wired local area network. Ethernet uses carrier sense multiple access (CSMA) to allow computers to share a network and operates at 10, 100, or 1000 Mbps, depending on the physical layer used.

F

File Server A repository for files so that a local area network can share files, mail, and programs.

G

Gateway A device that connects two otherwise incompatible networks together.

GHz Gigahertz. One billion cycles per second. A unit of measure for frequency.

I

IEEE Institute of Electrical and Electronic Engineers. A professional society serving electrical engineers through its publications, conferences, and standards development activities. The body responsible for the Ethernet 802.3 and wireless LAN 802.11 specifications.

Infrastructure The wired Ethernet network.

IP Address The Internet Protocol (IP) address of a station.

IP Subnet Mask The number used to identify the IP subnetwork, indicating whether the IP address can be recognized on the LAN or if it must be reached through a gateway.

Isotropic An antenna that radiates its signal 360 degrees both vertically and horizontally in a perfect sphere.

M

Modulation Any of several techniques for combining user information with a transmitter's carrier signal.

Multipath The echoes created as a radio signal bounces off of physical objects.

P

Packet A basic message unit for communication across a network. A packet usually includes routing information, data, and sometimes error detection information.

Q

Quadruple Phase Shift Keying A modulation technique used by IEEE 802.11-compliant wireless LANs for transmission at 2 Mbps.

R

Range A linear measure of the distance that a transmitter can send a signal.

Receiver Sensitivity A measurement of the weakest signal a receiver can receive and still correctly translate it into data.

RF Radio frequency. A generic term for radio-based technology.

Roaming A feature of some Access Points that allows users to move through a facility while maintaining an unbroken connection to the LAN.

RP-TNC A connector type unique to Cisco Aironet radios and antennas. Part 15.203 of the FCC rules covering spread spectrum devices limits the types of antennas that may be used with transmission equipment. In compliance with this rule, Cisco Aironet, like all other wireless LAN providers, equips its radios and antennas with a unique connector to prevent attachment of non-approved antennas to radios.

S

Spread Spectrum A radio transmission technology that spreads the user information over a much wider bandwidth than otherwise required in order to gain benefits such as improved interference tolerance and unlicensed operation.

SSID Service Set Identifier. A unique identifier that stations must use to be able to communicate with an Access Point. The SSID can be any alphanumeric entry up to a maximum of 32 characters.

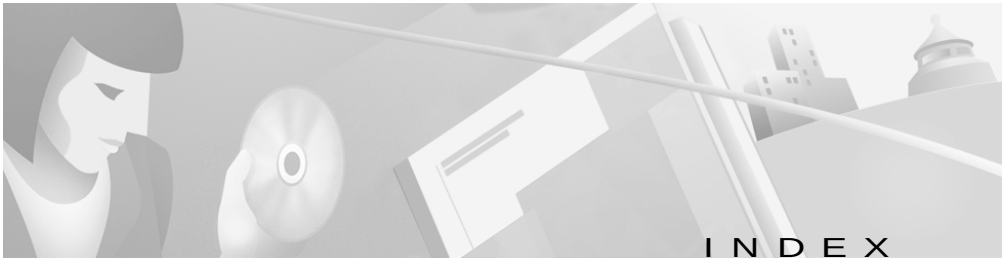
T

Transmit Power The power level of radio transmission.

W

WEP Wired Equivalent Privacy. An optional security mechanism defined within the 802.11 standard designed to make the link integrity of wireless devices equal to that of a cable.

Workstation A computing device with an installed client adapter.



Numerics

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