CHAPTER 8

Routine Procedures

This chapter provides procedures for common tasks related to the client adapter.

The following topics are covered in this chapter:

Inserting and Removing a Client Adapter

This section provides instructions for inserting and removing PC cards, PC-Cardbus cards, and PCI cards. Instructions are not provided for LM cards and mini PCI cards because they are pre-installed inside computing devices and are not meant to be installed or removed by the user.

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

Inserting a Client Adapter

Follow the instructions in one of the sections below to insert a PC card, PC-Cardbus card, or PCI card into a computing device.

Inserting a PC Card or PC-Cardbus Card

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

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

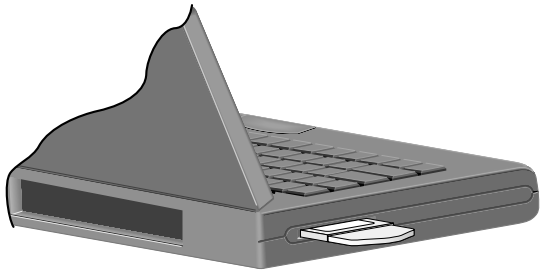
Step 2 Follow the instructions below for your specific operating system:

- **Windows 95, Windows 98, Windows 2000, Windows Me, or Windows XP**– Turn on your computer, let the operating system boot up completely, and follow the remaining steps in this section to insert the card.
- **Windows NT** – Turn off your computer, follow the remaining steps in this section to insert the card, and reboot your computer.

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

Step 3 Hold the card with the Cisco logo facing up and insert it into the PC card slot or Cardbus slot, applying just enough pressure to make sure it is fully seated (see Figure 8-1).

Figure 8-1 Inserting a PC Card or PC-Cardbus Card into a Computing Device



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

Inserting a PCI Card

Step 1 Turn off the PC and all its components.

Step 2 Remove the computer cover.

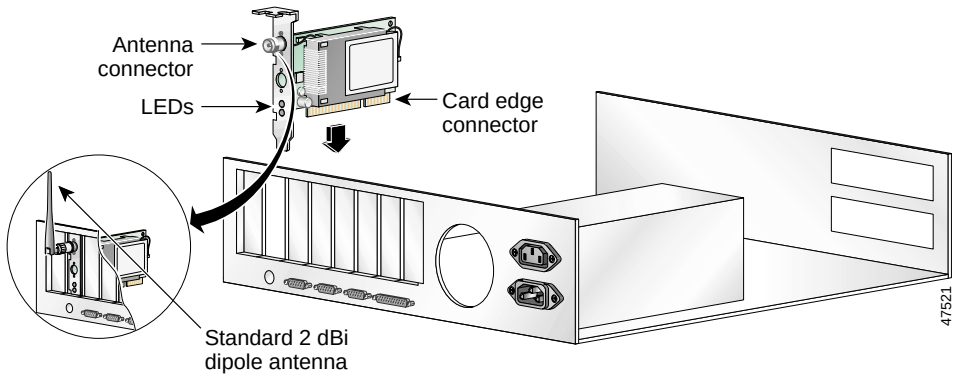
Note On most Pentium PCs, PCI expansion slots are white. Refer to your PC documentation for slot identification.

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 PCI card. Before removing the adapter from the anti-static packaging, discharge static by touching a metal part of a grounded PC.

Step 4 Examine the PCI card. 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 card is the connector you will insert into an empty expansion slot in your computer. See Figure 8-2.

Figure 8-2 Inserting a PCI Card into a PC



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

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

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

Removing a Client Adapter

Follow the instructions in one of the sections below to remove a PC card, PC-Cardbus card, or PCI card from a computing device, when necessary.

Removing a PC Card or PC-Cardbus Card

To remove a PC card or PC-Cardbus 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 or Cardbus slot. When the card is reinserted and the computer is rebooted, your connection to the network should be re-established.

Removing a PCI Card

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 card.

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.

Upgrading the Firmware

The client adapter is shipped with the firmware installed in its Flash memory; however, a more recent version of the firmware may be available from Cisco.com. Cisco recommends using the most current version of radio firmware. Follow the instructions in this section to determine the version of your client adapter's firmware and to upgrade it if a more recent version is available from Cisco.com.

Determining the Firmware Version

Follow the instructions in this section to determine if you need to upgrade the client adapter's firmware.

Step 1 To determine the version of firmware that your client adapter is currently using, open ACU; then click the **Status** icon or select **Status** from the Commands drop-down menu. The Status screen displays the current version of your adapter's firmware in the Firmware Version field.

Step 2 To determine the latest firmware version available on Cisco.com, follow the steps below:

a. Use your computer's web browser to access the following URL: http://www.cisco.com/public/sw-center/sw-wireless.shtml

b. Locate the section for client adapter firmware.

c. Click the link for your client adapter's series (for example, 350 Series).

d. Locate the firmware for your client adapter type and find the one with the greatest release number. This is the latest available version on Cisco.com.

Note The firmware for PC, LM, and PCI cards is labeled *PCM-LMC-PCI*, the firmware for mini PCI cards is labeled *mini PCI* or *MPI*, and the firmware for PC-Cardbus cards is labeled *CB*.

Note In order to use LEAP authentication, your client adapter and access point firmware must have matching 802.1X draft standards. That is, if the access point uses draft 8 firmware (prior to 11.06) or has draft 8 selected, the client adapter must use draft 8 firmware (prior to 4.25.x). Similarly, if the access point uses draft 10 firmware (11.06 or later) and has draft 10 selected, the client adapter must use draft 10 firmware (4.25.x or later). Mini PCI card firmware and PC-Cardbus card firmware were first released at draft 10.

Note In order to use EAP-TLS or EAP-MD5 authentication with Windows XP, your client adapter and access point must use 802.1X draft standard 10 firmware.

Step 3 If the firmware available from Cisco.com has a higher number than the firmware currently installed in your client adapter, follow the instructions in the "Loading New Firmware" section below to upgrade the firmware.

Loading New Firmware

Caution If a power failure occurs while you are loading new firmware, your client adapter may become inoperable. If this occurs, follow the instructions in the "Technical Assistance Center" section of the Preface to contact TAC for assistance.

Follow the instructions below to load new firmware into your client adapter.

Step 1 Use your computer's web browser to access the following URL: http://www.cisco.com/public/sw-center/sw-wireless.shtml

Step 2 Locate the section for client adapter firmware.

Step 3 Click the link for your client adapter's series (for example, 350 Series).

Step 4 Click the latest radio firmware file for your client adapter type.

Note The firmware for PC, LM, and PCI cards is labeled *PCM-LMC-PCI*, the firmware for mini PCI cards is labeled *mini PCI* or *MPI*, and the firmware for PC-Cardbus cards is labeled *CB*.

Note If your wireless network uses LEAP authentication, remember to select radio firmware of the same draft standard as the access points to which your client adapter will be authenticating. Mini PCI card firmware and PC-Cardbus card firmware were first released at draft 10.

Note If your wireless network uses EAP-TLS or EAP-MD5 authentication, remember to select draft 10 of the radio firmware.

Step 5 Read and accept the terms and conditions of the Software License Agreement.

Step 6 Select the firmware file to download it.

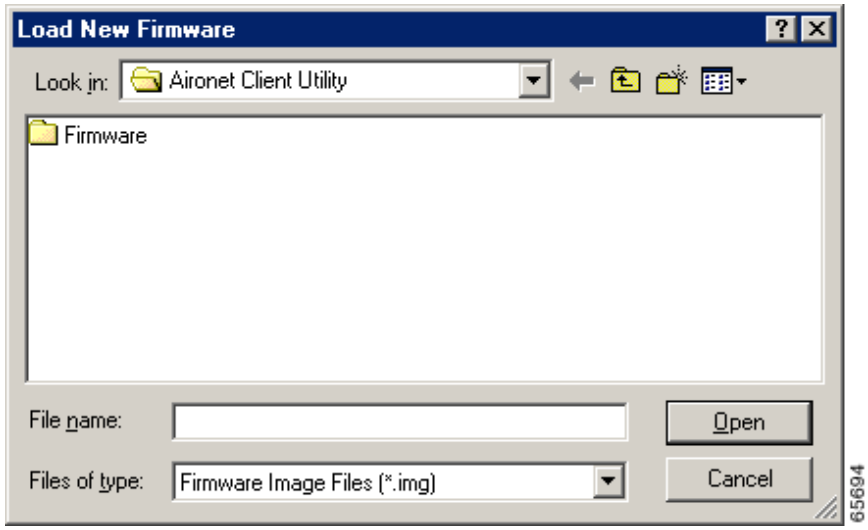
Step 7 Save the file to a floppy disk or to your computer's hard drive.

Step 8 Locate the file using Windows Explorer, double-click it, and extract the image file to a folder.

Step 9 Make sure the client adapter is installed in your computer and is operational.

Step 10 Open ACU; then click the **Load Firmware** icon or select **Load New Firmware** from the Commands drop-down menu. The Open window appears (see Figure 8-3).

Figure 8-3 Open Window



Step 11 Find the location of the new firmware in the Look in box. The default location is *InstallPath*\Firmware, where *InstallPath* is the directory that ACU was installed in.

Step 12 Click the firmware image file (*.img) so that it appears in the File name box at the bottom of the Open window.

Step 13 Click the **Open** button. A progress bar displays while the selected image is loaded into the client adapter's Flash memory.

Step 14 Click **OK** when the "Firmware Upgrade Complete!" message appears. The OK button cannot be selected until the process is complete or an error occurs. If an error occurs, refer to the "Error Messages" section in Chapter 9.

Driver Procedures

This section includes the following procedures:

- Determining the driver version, see below
- Upgrading the driver, see 8-8
- Uninstalling the driver, see 8-13

Determining the Driver Version

Follow the instructions in this section to determine if you need to upgrade the client adapter's driver.

Step 1 To determine the version of the driver that your client adapter is currently using, open ACU; then click the **Status** icon or select **Status** from the Commands drop-down menu. The Status screen displays the current version of your adapter's driver in the NDIS Driver Version field.

Step 2 To determine the latest driver version available on Cisco.com, follow the steps below:

a. Use your computer's web browser to access the following URL: http://www.cisco.com/public/sw-center/sw-wireless.shtml

b. Locate the section for client adapter drivers and utilities.

c. Click the link for individual Windows files.

d. Locate the drivers for your specific operating system and client adapter type and find the one with the greatest release number. This is the latest available version on Cisco.com.

Note The drivers for PC, LM, and PCI cards are labeled *PCM-LMC-PCI*; the drivers for mini PCI cards and PC-Cardbus cards are labeled *MPI-CB*.

Step 3 If the driver available from Cisco.com has a higher number than the driver currently being used by your client adapter, follow the instructions in the "Upgrading the Driver" section on page 8-8 to upgrade the driver.

Note If the 6.10 driver is installed on your Windows 95, 98, NT, or 2000 computer, you must remove this driver before you can install a more recent driver. Refer to the "Uninstalling the 6.10 Driver" section on page 8-13 for instructions.

Upgrading the Driver

Follow the instructions in this section to upgrade your client adapter's driver to a more recent version.

Use Table 8-1 to quickly locate the instructions to upgrade the driver for your specific operating system.

Table 8-1 Updating the Driver Instructions

Operating System	Page Number
Windows 95	8-8
Windows 98	8-8
Windows NT	8-9
Windows 2000	8-10
Windows Millennium Edition (Me)	8-11
Windows XP	8-12

Upgrading the Driver for Windows 95 and 98

Step 1 Use your computer's web browser to access the following URL: http://www.cisco.com/public/sw-center/sw-wireless.shtml

Step 2 Locate the section for client adapter drivers and utilities.

Step 3 Click the link for individual Windows files.

Step 4 Select the latest driver file for Windows 95 or Windows 98 and your client adapter type.

Note The drivers for PC, LM, and PCI cards are labeled *PCM-LMC-PCI*; the drivers for mini PCI cards and PC-Cardbus cards are labeled *MPI-CB*.

Step 5 Read and accept the terms and conditions of the Software License Agreement.

Step 6 Select the driver file to download it.

Step 7 Save the file to a floppy disk or to your computer's hard drive.

Step 8 Locate the file using Windows Explorer, double-click it, and extract its files to a folder.

Step 9 Make sure your client adapter is installed in your computer.

Step 10 Double-click **My Computer**, **Control Panel**, and **System**.

Step 11 Click the **Device Manager** tab.

Step 12 Double-click **Network Adapters**.

Step 13 Select the Cisco Systems wireless LAN adapter.

Step 14 Click **Properties**, the **Driver** tab, and the **Change Driver** or **Update Driver** button.

Step 15 The Update Device Driver Wizard window appears. Click **Next**.

Step 16 Select **Search for a better driver than the one your device is using now (Recommended)** and click **Next**.

Step 17 Select the location of the new driver (floppy disk drive or specify a location), deselect the other options, enter the full path to where you extracted the files, and click **Next**.

Step 18 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 Use your computer's web browser to access the following URL: http://www.cisco.com/public/sw-center/sw-wireless.shtml

Step 2 Locate the section for client adapter drivers and utilities.

Step 3 Click the link for individual Windows files.

Step 4 Select the latest driver file for Windows NT and your client adapter type.

Note The drivers for PC, LM, and PCI cards are labeled *PCM-LMC-PCI*; the drivers for mini PCI cards and PC-Cardbus cards are labeled *MPI-CB*.

Step 5 Read and accept the terms and conditions of the Software License Agreement.

Step 6 Select the driver file to download it.

Step 7 Save the file to a floppy disk or to your computer's hard drive.

Step 8 Locate the file using Windows Explorer, double-click it, and extract its files to a folder.

Step 9 Make sure your client adapter is installed in your computer.

Step 10 Double-click **My Computer**, **Control Panel**, **Network**, and **Adapters**.

Step 11 Select the Cisco Systems wireless LAN adapter.

Step 12 Click the **Update** button.

Step 13 In the Windows NT Setup window, enter the path to where you extracted the files and click **Continue**.

Step 14 Follow the instructions on the screen to complete the upgrade process.

Upgrading the Driver for Windows 2000

Step 1 Use your computer's web browser to access the following URL:
http://www.cisco.com/public/sw-center/sw-wireless.shtml

Step 2 Locate the section for client adapter drivers and utilities.

Step 3 Click the link for individual Windows files.

Step 4 Select the latest driver file for Windows 2000 and your client adapter type.

Note The drivers for PC, LM, and PCI cards are labeled *PCM-LMC-PCI*; the drivers for mini PCI cards and PC-Cardbus cards are labeled *MPI-CB*.

Step 5 Read and accept the terms and conditions of the Software License Agreement.

Step 6 Select the driver file to download it.

Step 7 Save the file to a floppy disk or to your computer's hard drive.

Step 8 Locate the file using Windows Explorer, double-click it, and extract its files to a folder.

Step 9 Make sure your client adapter is installed in your computer.

Step 10 Double-click **My Computer**, **Control Panel**, and **System**.

Step 11 Click the **Hardware** tab and **Device Manager**.

Step 12 Double-click **Network Adapters** and the Cisco Systems wireless LAN adapter.

Step 13 Click the **Driver** tab.

Step 14 Click the **Update Driver** button.

Step 15 The Update Device Driver Wizard window appears. Click **Next**.

Step 16 Select **Display a list of the known drivers for this device so that I can choose a specific driver** and click **Next**.

Step 17 Click **Have Disk**.

Step 18 Enter or browse to the path where you extracted the files and click **OK**.

Step 19 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 Use your computer's web browser to access the following URL: http://www.cisco.com/public/sw-center/sw-wireless.shtml

Step 2 Locate the section for client adapter drivers and utilities.

Step 3 Click the link for individual Windows files.

Step 4 Select the latest driver file for Windows Me and your client adapter type.

Note The drivers for PC, LM, and PCI cards are labeled *PCM-LMC-PCI*; the drivers for mini PCI cards and PC-Cardbus cards are labeled *MPI-CB*.

Step 5 Read and accept the terms and conditions of the Software License Agreement.

Step 6 Select the driver file to download it.

Step 7 Save the file to a floppy disk or to your computer's hard drive.

Step 8 Locate the file using Windows Explorer, double-click it, and extract its files to a folder.

Step 9 Make sure your client adapter is installed in your computer.

Step 10 Double-click **My Computer**, **Control Panel**, and **System**.

Step 11 Click the **Device Manager** tab.

Step 12 Double-click **Network Adapters**.

Step 13 Select the Cisco Systems wireless LAN adapter.

Step 14 Click **Properties**, the **Driver** tab, and the **Update Driver** button. The Update Device Driver Wizard window appears.

Step 15 Select **Specify the location of the driver (Advanced)** and click **Next**.

Step 16 Select **Search for a better driver than the one your device is using now (Recommended)**.

Step 17 Select the **Specify a location** checkbox, deselect the other options, enter the path to where you extracted the files, and click **Next**.

Step 18 A message appears indicating that Windows has found an updated driver. Select **The updated driver (Recommended)** and click **Next**.

Step 19 A message appears indicating that the system is ready to install the new driver. Click **Next** and **Finish**.

Step 20 If you are prompted to restart your computer, click **Yes**.

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

Upgrading the Driver for Windows XP

Note These instructions assume you are using Windows XP's classic view rather than its category view.

Step 1 Use your computer's web browser to access the following URL: http://www.cisco.com/public/sw-center/sw-wireless.shtml

Step 2 Locate the section for client adapter drivers and utilities.

Step 3 Click the link for individual Windows files.

Step 4 Select the latest driver file for Windows XP and your client adapter type.

Note The drivers for PC, LM, and PCI cards are labeled *PCM-LMC-PCI*; the drivers for mini PCI cards and PC-Cardbus cards are labeled *MPI-CB*.

Step 5 Read and accept the terms and conditions of the Software License Agreement.

Step 6 Select the driver file to download it.

Step 7 Save the file to a floppy disk or to your computer's hard drive.

Step 8 Locate the file using Windows Explorer, double-click it, and extract its files to a folder.

Step 9 Make sure your client adapter is installed in your computer.

Step 10 Double-click **My Computer**, **Control Panel**, and **System**.

Step 11 Click the **Hardware** tab and **Device Manager**.

Step 12 Double-click **Network Adapters** and **Cisco Systems 3x0 Series Wireless LAN Adapter**.

Step 13 Click the **Driver** tab and the **Update Driver** button. The Welcome to the Hardware Update Wizard screen appears.

Step 14 Select the **Install from a list or specific location (Advanced)** option and click **Next**.

Step 15 When prompted to choose your search and installation options, select **Don't search. I will choose the driver to install** and click **Next**.

Step 16 When prompted to select a network adapter to install, click the **Have Disk** button. The Install From Disk screen appears.

Step 17 Click the **Browse** button, browse to the location where you extracted the files, and click **Open**. The installation wizard finds the driver file (netx500.inf). Click **OK** on the Install From Disk screen.

Step 18 The Select Network Adapter screen reappears. Select the Cisco Systems wireless LAN adapter and click **Next**.

Step 19 The installation wizard copies the driver files from the floppy disk or computer's hard drive. When the installation is complete, click **Finish**.

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

Uninstalling the Driver

This section provides instructions for uninstalling a client adapter driver from your computer. Two examples of when you may need to uninstall 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 uninstall this driver before you can install a more recent driver, such as the one provided on the CD that shipped with your client adapter.
- 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 uninstall any part of the driver that you may have already installed.

Table 8-2 enables you to quickly locate the instructions for uninstalling a driver for your specific operating system.

Table 8-2 Locating Driver Uninstall Instructions

Operating System	6.10 Driver	Driver Other Than 6.10
Windows 95	page 8-13	page 8-16
Windows 98	page 8-13	page 8-16
Windows NT	page 8-14	page 8-17
Windows 2000	page 8-15	page 8-17
Windows Millennium (Me)	Not applicable	page 8-16
Windows XP	Not applicable	page 8-18

Uninstalling the 6.10 Driver

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

Uninstalling 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 CD that contains the 6.10 driver 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.

Uninstalling 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 CD that contains the 6.10 driver 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.

Uninstalling 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 CD that contains the 6.10 driver 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* and are for a wireless LAN adapter.

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.

Uninstalling 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.

Note When you uninstall the driver, any saved profiles are lost.

Uninstalling the Driver for Windows 95, 98, and Me

Note This procedure does not uninstall the driver that was bundled with Windows Me. It uninstalls only drivers to which you have upgraded. When you follow the steps below to uninstall an upgraded driver and then eject and reinsert the card, Windows Me finds the original driver and reinstalls it automatically.

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, aironetnetx500.inf, or cisconetx500.inf
Windows Me	C:\Windows\Inf\Other	aironetnetx500.inf or cisconetx500.inf

Step 8 Find your computer's operating system in the following table and delete any pcx50*.sys files from the path indicated.

Operating System	Location of pcx50*.sys Files
Windows 95	C:\Windows\System\pcx50*.sys
Windows 98	C:\Windows\System\pcx50*.sys
Windows Me	C:\Windows\System32\Drivers\pcx50*.sys

Step 9 Restart your computer.

Uninstalling 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**.

Uninstalling 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* and are for a wireless LAN adapter.

Step 14 Go to C:\Windows\System32\Drivers and delete any pcx500*.sys files.

Step 15 Shut down your computer.

Step 16 Remove the client adapter.

Step 17 Turn your computer back on.

Uninstalling the Driver for Windows XP

Note This procedure will not uninstall the driver that was bundled with Windows XP. It will uninstall only drivers to which you have upgraded. When you follow the steps below to uninstall an upgraded driver and then eject and reinsert the card, Windows finds the original driver and reinstalls it automatically.

Note These instructions assume you are using Windows XP's classic view rather than its category view.

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

Step 2 Click the **Hardware** tab and **Device Manager**.

Step 3 Double-click **Network Adapters** and **Cisco Systems 3x0 Series Wireless LAN Adapter**.

Step 4 Click the **Driver** tab and the **Uninstall** button.

Step 5 A warning appears indicating that you are about to uninstall the client adapter from your system. Click **OK**.

ACU Procedures

This section provides instructions for the following procedures:

- Opening ACU, see below
- Exiting ACU, see 8-19
- Modifying ACU installation settings, see 8-19
- Determining the version of ACU, see 8-21
- Upgrading ACU, see 8-22
- Uninstalling ACU, see 8-24
- Deleting the ACU icon from the desktop, see 8-25

Opening ACU

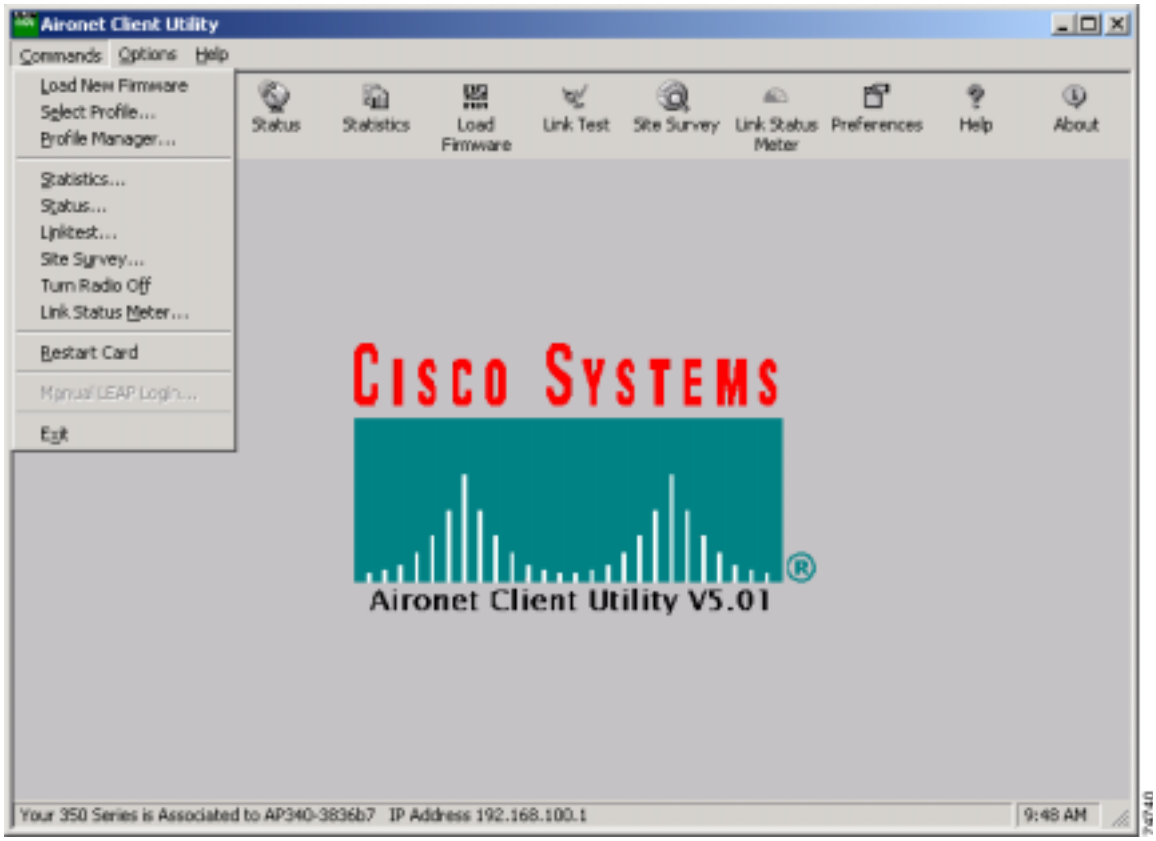
To open ACU, perform one of the following:

- Double-click the **Aironet Client Utility (ACU)** icon on your desktop.
- Select **Aironet Client Utility (ACU)** from the folder in the Windows Start Menu that you chose during installation [the default location is **Start** > **Program Files** > **Cisco Aironet** > **Aironet Client Utility (ACU)**].
- Double-click **My Computer** > **Control Panel** > **Aironet Client Utility**.

Exiting ACU

To exit ACU, select **Exit** from the Commands drop-down menu (see Figure 8-4).

Figure 8-4 Commands Drop-Down Menu



Modifying ACU Installation Settings

Follow the steps below if you need to change any of the settings selected during ACU installation (for example, selecting LEAP or the location of the ACU program files).

Step 1 Close any Windows programs that are running.

Step 2 Select **Start** > **Run**, browse or enter the path to the installed ACU files (the default location is C:\Program Files\Cisco Aironet\setup.exe), and click **OK**. The Welcome screen for the Aironet Client Utility setup maintenance program appears.

Step 3 Select **Modify** and click **Next**. The installation goes through the same sequence of screens that appeared during the initial installation to allow you to select or deselect various options. The following steps walk you through the remaining screens.

Step 4 In the Select Options screen, select as many of the following options as desired and click **Next**:

Option	Description
LEAP	Enables you to create a profile in ACU that uses LEAP authentication. If this option is not selected now and you later want to use LEAP, you must run this installation program again, select **Modify**, and select this option. **Note** Refer to Chapter 5 for information on using LEAP. **Note** If you select LEAP on a Windows 95, 98, or 98 SE device, Microsoft hot fixes are installed during ACU installation to fix two problems related to the use of LEAP. Refer to Chapter 9 for more information on the hot fixes. **Note** If you select LEAP on a Windows XP device, you cannot use Windows XP's fast user switching feature.
Allow Saved LEAP User Name and Password	Enables you to create a profile in ACU that uses a saved (rather than temporary) username and password for LEAP authentication. When such a profile is used, the saved username and password are used to start the LEAP authentication process, and you are not prompted to enter them. **Note** This option is available only if the LEAP option is selected.
Create ACU Icon on your Desktop	Causes the installation program to add an ACU icon to your computer's desktop to provide quick access to the utility.
Allow Non-Administrator Users to use ACU to modify profiles	Enables users without administrative rights to modify profiles in ACU on computers running Windows NT, 2000, or XP. **Note** This option is not available for Windows 95, 98, and Me because these versions of Windows do not support different classes of users.

Step 5 In the Choose Destination Location screen, perform one of the following:

- If you want the ACU program files to be installed in the default location (C:\Program Files, if C:\Program Files is the default Windows program file folder), click **Next**.
- If you want to specify a different destination location for the ACU program files, click **Browse**, select a location, and click **Next**.

Step 6 In the Select Program Folder screen, specify a program folder name for ACU by selecting from the list of existing folders (the default name is Cisco Aironet) or typing in a new folder name; then click **Next**.

A status screen displays the progress of the installation. Then the Setup Complete screen appears.

Step 7 If your computer needs to be rebooted, select **Yes, I want to restart my computer now** or **No, I will restart my computer later** and click **Finish**.

Note If you are prompted to reboot your computer, Cisco recommends that you select the **Yes, I want to restart my computer now** option.

The client utility installation has been modified.

Determining the Version of ACU

Follow the instructions in this section to determine if you need to upgrade ACU.

Step 1 To determine the version of ACU that your client adapter is currently using, open ACU; then click the **About** icon or select the **About Aironet Client Utility** option from the Help drop-down menu. The About Aironet Client Utility screen appears (see Figure 8-5).

Figure 8-5 About Aironet Client Utility Screen

Step 2 To determine the latest version of ACU available on Cisco.com, follow the steps below:

a. Use your computer's web browser to access the following URL: http://www.cisco.com/public/sw-center/sw-wireless.shtml

b. Locate the section for client adapter drivers and utilities.

c. Click the link for individual Windows files.

d. Locate the ACU files and find the one with the greatest release number. This is the latest available version on Cisco.com.

Step 3 If the version of ACU available from Cisco.com has a higher number than the version currently being used by your client adapter, follow the instructions in the "Upgrading ACU" section on page 8-22 to upgrade ACU.

Note If a version of ACU prior to 4.13 is installed on your computer, you must uninstall it before you can upgrade to a more recent version. Refer to the "Uninstalling ACU Versions Prior to 4.13" section on page 8-24 for instructions.

Upgrading ACU

Follow the instructions in this section to upgrade ACU to a more recent version.

Note If you create profiles using ACU version 5.0 (or greater), these profiles are saved if you upgrade to a more recent version of ACU.

Step 1 Close any Windows programs that are running.

Step 2 Use the computer's web browser to access the following URL: http://www.cisco.com/public/sw-center/sw-wireless.shtml

Step 3 Locate the section for client adapter drivers and utilities.

Step 4 Click the link for individual Windows files.

Step 5 Select the latest ACU file.

Step 6 Read and accept the terms and conditions of the Software License Agreement.

Step 7 Select the ACU file to download it.

Step 8 Save the file to your computer's hard drive.

Step 9 Locate the file using Windows Explorer, double-click it, and extract its files to a folder.

Step 10 Select **Start** > **Run**, enter or browse to the path where you extracted the files (for example, C:\temp\setup.exe), and click **OK**. The Aironet Client Utility Setup screen and the InstallShield Wizard appear.

Step 11 When the Welcome screen appears, click **Next**.

Step 12 In the Select Options screen, select as many of the following options as desired and click **Next**:

Option	Description
LEAP	Enables you to create a profile in ACU that uses LEAP authentication. If this option is not selected now and you later want to use LEAP, you must run this installation program again, select **Modify**, and select this option. **Note** Refer to Chapter 5 for information on using LEAP. **Note** If you select LEAP on a Windows 95, 98, or 98 SE device, Microsoft hot fixes are installed during ACU installation to fix two problems related to the use of LEAP. Refer to Chapter 9 for more information on the hot fixes. **Note** If you select LEAP on a Windows XP device, you cannot use Windows XP's fast user switching feature.
Allow Saved LEAP User Name and Password	Enables you to create a profile in ACU that uses a saved (rather than temporary) username and password for LEAP authentication. When such a profile is used, the saved username and password are used to start the LEAP authentication process, and you are not prompted to enter them. **Note** This option is available only if the LEAP option is selected.

Create ACU Icon on your Desktop	Causes the installation program to add an ACU icon to your computer's desktop to provide quick access to the utility.
Allow Non-Administrator Users to use ACU to modify profiles	Enables users without administrative rights to modify profiles in ACU on computers running Windows NT, 2000, or XP. **Note** This option is not available for Windows 95, 98, and Me because these versions of Windows do not support different classes of users.

Step 13 In the Choose Destination Location screen, perform one of the following:

- If you want the ACU program files to be installed in the default location (C:\Program Files, if C:\Program Files is the default Windows program file folder), click **Next**.
- If you want to specify a different destination location for the ACU program files, click **Browse**, select a location, and click **Next**.

Step 14 In the Select Program Folder screen, specify a program folder name for ACU by selecting from the list of existing folders (the default name is Cisco Aironet) or typing in a new folder name; then click **Next**.

A status screen displays the progress of the installation. Then one of two Setup Complete screens displays, depending on whether Windows needs to be restarted to complete the installation.

Step 15 Perform one of the following:

- If your computer does not need to be rebooted, select either of the following options and click **Finish**:

Option	Description
View the README.TXT file	Opens a read-me file containing information about ACU.
Launch the Aironet Client Utility	Opens ACU so you can configure your client adapter.

- If your computer needs to be rebooted, select **Yes, I want to restart my computer now** or **No, I will restart my computer later** and click **Finish**.

Note If you are prompted to reboot your computer, Cisco recommends that you select the **Yes, I want to restart my computer now** option.

The ACU upgrade is complete.

Uninstalling ACU

The procedure for uninstalling ACU varies based on the software's version number. Follow the instructions in one of the sections below to uninstall ACU.

Uninstalling ACU Versions Prior to 4.13

If a version of ACU earlier than 4.13 is installed on your computer, Cisco recommends that you uninstall it before installing ACU version 5.0 or greater. Follow the steps below to uninstall a version of ACU prior to 4.13.

Step 1 Double-click **My Computer**, **Control Panel**, and **Add/Remove Programs**.

Step 2 Select the **Aironet Client Utility (ACU)**.

Step 3 Click **Add/Remove** or **Change/Remove**.

Step 4 When prompted to confirm your decision, click **Yes**. ACU is uninstalled.

Uninstalling ACU Version 4.13 or Greater

Follow the steps below if you ever need to uninstall ACU version 4.13 or greater and its setup program.

Note Cisco does not recommend uninstalling ACU version 4.13 or greater before installing the latest version of ACU.

Step 1 Close any Windows programs that are running.

Step 2 Select **Start** > **Run**, enter the path to the installed ACU files (the default location is C:\Program Files\Cisco Aironet\setup.exe), and click **OK**. The Welcome screen for the Aironet Client Utility setup maintenance program appears.

Step 3 Select **Remove** and click **Next**.

Step 4 When asked if you want to completely remove the selected application and all of its components, click **OK**. The Setup Complete screen appears.

Step 5 If your computer needs to be rebooted, select **Yes, I want to restart my computer now** or **No, I will restart my computer later**.

Note If you are prompted to reboot your computer, Cisco recommends that you select the **Yes, I want to restart my computer now** option. If you choose to restart your computer later, a warning appears indicating that the installed software might not work properly if you do not restart Windows, especially before installing ACU again.

Step 6 Click **Finish**. ACU is uninstalled.

Deleting the ACU Icon from the Desktop

An ACU icon is automatically added to the desktop when you install ACU, provided you selected this option during installation. If you wish to remove this icon from your desktop, right-click the icon, click **Delete**, and click **Yes** to confirm your decision.

Restarting the Client Adapter

ACU enables you to re-initialize (or restart) the client adapter without having to reboot your computer or eject and reinsert the adapter. For instance, if your client adapter is experiencing poor throughput, you might want to restart the client adapter to try to force it to disassociate from the access point to which it is currently associated in the hope that it will reassociate to an access point with a stronger signal.

Note Restarting the client adapter may cause you to lose your wireless network connection.

Follow the steps below to restart the client adapter.

Step 1 Open ACU.

Step 2 Select the **Restart Card** option from the Commands drop-down menu (see Figure 8-4).

Step 3 When prompted to confirm your decision, click **Yes**. The driver stops the client adapter's radio, writes the configuration (although no parameter settings have been changed), and restarts the radio. The status bar at the bottom of the ACU screen shows the client adapter losing association and then reassociating.

Turning Your Client Adapter's Radio On or Off

Your client adapter's radio can be turned on or off. Turning the radio off prevents the adapter from transmitting RF energy. You might want to turn off the client adapter's radio when you are not transmitting data and want to conserve battery power or when you are using a laptop on an airplane and want to prevent the adapter's transmissions from potentially interfering with the operation of certain devices.

When the radio is on, it periodically sends out beacons even if it is not associated to an access point, as required by the 802.11 specification. Therefore, it is important to turn it off around devices that are susceptible to RF interference.

Note Your client adapter is not associated while the radio is off.

Follow the instructions below to turn the client adapter's radio on or off.

- If your client adapter's radio is on, opening ACU and selecting **Radio Off** from the Commands drop-down menu (see Figure 8-4) turns the radio off. The status bar at the bottom of the ACU screen indicates that the radio is turned off.
- If your client adapter's radio is off, opening ACU and selecting **Radio On** from the Commands drop-down menu (see Figure 8-4) turns the radio on.

Uninstalling Microsoft Hot Fixes

When LEAP is selected during ACU installation on a Windows 95, 98, or 98 SE device, Microsoft hot fixes are also installed to fix two problems related to the use of LEAP. If you ever need to uninstall the hot fixes, select **Start** > **Run**, enter C:\Windows\Inf\Qfe\W98.se\241052un.inf, and click **OK**.

Troubleshooting

This chapter provides information for diagnosing and correcting common problems encountered when installing or operating the client adapter.

The following topics are covered in this chapter:

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/public/support/tac/home.shtml. Select **Wireless Technologies** under Top Issues.

Interpreting the Indicator LEDs

Note Mini PCI cards do not have 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 9-1 interprets the LED messages during normal operation. Table 9-2 interprets the LED error condition messages.

Table 9-1 LED Normal Operating Messages

Green LED	Amber LED	Condition
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.
Off	Blinking quickly	Client adapter is in power save mode.
On continuously	Blinking quickly	Client adapter is in ad hoc mode.

Table 9-2 LED Error Condition Messages

Green LED	Amber LED	Condition
Off	Off	Client adapter is not receiving power or an error has occurred.
Off	1 blink at 2-second rate	RAM failure. Refer to the "Obtaining Technical Assistance" section in the Preface for technical support information.
Off	2-second pause, 2 fast blinks, 1-second pause, 1 blink	A configuration error has occurred (for example, WEP is enabled in ACU but the client adapter has not been programmed with a valid WEP key). Recheck your client adapter's configuration settings in ACU.

Table 9-2 LED Error Condition Messages (continued)

Green LED	Amber LED	Condition
Off	2 fast blinks, 2-second pause	Flash boot block checksum failure. Refer to the "Obtaining Technical Assistance" section in the Preface for technical support information.
Off	3 fast blinks, 2-second pause	Firmware checksum failure. Reload the firmware.
Off	4 fast blinks, 2-second pause	MAC address error (error reading MAC chip). Reload the firmware.
Off	5 fast blinks, 2-second pause	Physical layer (PHY) access error. Refer to the "Obtaining Technical Assistance" section in the Preface for technical support information.
Off	6 fast blinks, 2-second pause	Incompatible firmware. Load the correct firmware version.

Troubleshooting the Client Adapter

This section provides troubleshooting tips if you encounter problems with your client adapter.

Problems Installing the Driver

If you experience problems during driver installation, you may want to restart the installation process. Go to the "Uninstalling the Driver" section on page 8-13 to start with a clean install.

Problems Installing ACU

If your attempt to install ACU failed, follow the steps below to repair the installation.

Step 1 Close any Windows programs that are running.

Step 2 Select **Start** > **Run**, enter the path to the installed ACU files (the default location is C:\Program Files\Cisco Aironet\setup.exe), and click **OK**. The Welcome screen for the Aironet Client Utility setup maintenance program appears.

Step 3 Select **Repair** and click **Next**. The Setup Complete screen appears.

Step 4 If your computer needs to be rebooted, select **Yes, I want to restart my computer now** or **No, I will restart my computer later**.

Note If you are prompted to reboot your computer, Cisco recommends that you select the **Yes, I want to restart my computer now** option.

Step 5 Click **Finish**. The repair is complete. All of the selections you made during the previous installation are maintained.

Client Adapter Recognition Problems

Note This section does not apply to mini PCI cards.

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.

Resolving Resource Conflicts

Note This section does not apply to the mini PCI cards.

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**, and **System**.

Step 2 Click the **Device Manager** tab.

Step 3 Double-click **Network Adapters**.

Step 4 Select the Cisco Systems wireless LAN adapter.

Step 5 Click the **Properties** button.

Step 6 In the General screen, the Device Status field indicates if a resource problem exists. If a problem is indicated, click the **Resources** tab.

Step 7 Deselect the **Use automatic settings** checkbox.

Step 8 Under Resource Settings or Resource Type, click **Input/Output Range**.

Step 9 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 10 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 11 Click **OK**.

Step 12 Under Resource Settings or Resource Type, click **Interrupt Request**.

Step 13 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 14 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 15 Click **OK**.

Step 16 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**.

Resolving Resource Conflicts in Windows 2000

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

Step 2 Click the **Hardware** tab and **Device Manager**.

Step 3 Double-click **Network Adapters** and the Cisco Systems wireless LAN adapter.

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 XP

Note These instructions assume you are using Windows XP's classic view, not its category view.

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

Step 2 Click the **Hardware** tab and **Device Manager**.

Step 3 Under Network Adapters, double-click **Cisco Systems 3x0 Series Wireless LAN Adapter**.

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, click **I/O 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, click **IRQ**.

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.

Problems Associating to an Access Point

Follow the instructions below if your client adapter fails to associate to an access point.

- If possible, move your workstation a few feet closer to an access point and try again.
- Make sure the client adapter is securely inserted in your computer's client adapter 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, EAP authentication, WEP activation, network type, channel, etc.

- Follow the instructions in the previous section to resolve any resource conflicts. If you are using Windows NT, you may also want to try disabling the Ethernet port.
- If the client adapter still fails to establish contact, refer to the "Obtaining Technical Assistance" section in the Preface for technical support information.

Problems Authenticating to an Access Point

If your client adapter is a 40-bit card and LEAP or EAP 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 static 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.

Losing Association Upon Resuming from Suspend Mode (Windows NT and Mini PCI Card Only)

Because Windows NT does not support resuming of mini PCI cards, your client adapter loses its association to an access point upon resuming from suspend mode. If this occurs, restart your client adapter to reassociate.

Parameters Missing from ACU Properties Screens

If some parameters are grayed out on the ACU Properties screens, your system administrator may have used an auto installer to deactivate these parameters. In this case, these parameters are not available for you to set.

LEAP Login Screen Appears Before Windows Login Screen

If you are using Windows 95, 98, or Me and your client adapter is configured to use LEAP authentication with an automatically prompted login, the LEAP login screen should appear before the Windows screen after you reboot. If the Windows screen appears first, follow the steps below.

Step 1 On the Windows desktop, right-click the **My Network Places** icon.

Step 2 Click **Properties**.

Step 3 On the Network - Configuration screen, click the arrow on the right side of the Primary Network Logon box.

Step 4 Select **Cisco Aironet Wireless Logon** and click **OK**.

Step 5 When prompted to restart your computer, click **Yes**.

Microsoft Hot Fixes

When LEAP is selected during ACU installation on a Windows 95, 98, or 98 SE device, Microsoft hot fixes are also installed to fix two problems related to the use of LEAP. You can obtain descriptions of these hot fixes and the problems they resolve at the following Microsoft URLs:

- http://support.microsoft.com/support/kb/articles/Q247/8/05.asp (for Windows 95, 98, and 98 SE)
- http://support.microsoft.com/support/kb/articles/Q165/4/02.asp (for Windows 95 only)

Note Only the English version of the hot fixes are installed. Foreign language versions of these operating systems require hot fixes specific to those languages. Contact Microsoft Product Support Services to obtain the hot fixes for languages other than English. Without the hot fixes installed, you may be prompted to enter your credentials at the Windows login prompt twice. To work around this problem, enter your login credentials again.

Error Messages

This section provides a list of error messages that may appear during the installation, configuration, or use of your client adapter. The error messages are listed in alphabetical order, and an explanation as well as a recommended user action are provided for each message.

Error Message `Bad Firmware Image File (`*`filename`*`)`

Explanation The selected firmware file is corrupt and will not be sent to the client adapter.

Recommended Action Select a different firmware file and try to load it.

Error Message `Cannot find a wireless adapter that supports LEAP. Please make sure that you have installed the correct client adapter and updated your firmware.`

Explanation LEAP authentication failed because the client adapter's firmware does not support LEAP.

Recommended Action Follow the instructions in the "Upgrading the Firmware" section on page 8-5 to install the latest client adapter firmware.

Error Message `Cannot find a wireless adapter that supports WEP. Please make sure that you have installed the correct client adapter and purchased WEP support.`

Explanation LEAP authentication failed because the client adapter does not support WEP.

Recommended Action Make sure that you have installed the correct client adapter or upgrade the adapter for WEP support.

Error Message `Card Removed at` *`xx:xx`*

Explanation The client adapter was ejected from the computer.

Recommended Action Reinsert the client adapter if you wish to resume wireless communications.

Error Message `The combination of domain name and user name exceeds maximum number of characters (32) that LEAP supports. Please uncheck Include Windows Logon Domain with User Name in ACU or log on to a local computer, or use shorter names.`

Explanation The combination of characters entered for the username and domain name in the Windows login screen or the LEAP login screen exceed the maximum number supported by LEAP, which is 32.

Recommended Action Perform one of the following:

- Deselect the **Include Windows Logon Domain With User Name** checkbox in the LEAP Settings screen of ACU.
- Log on to a local computer, which does not use a domain name, and try to authenticate again.
- Enter a set of credentials (username, password, and domain name) with fewer characters.

Error Message `The current active profile is not configured for LEAP.`

Explanation The Manual LEAP Login option was selected in ACU, but the active profile is not configured for LEAP. The LEAP authentication process aborts.

Recommended Action If you want the client adapter to LEAP authenticate, select a profile that is configured for LEAP.

Error Message `Error Reading filename`

Explanation A problem occurred while the computer was reading the firmware file from the disk.

Recommended Action Re-copy the firmware file to a floppy disk or to your computer's hard drive and try to load it again or select a different firmware file and try to load it.

Error Message `Error Writing to Flash Memory`

Explanation A problem occurred while the firmware was being flashed.

Recommended Action Eject the client adapter and reinsert it. If the client adapter functions properly, the firmware was flashed successfully. If the client adapter does not function or functions improperly, your client adapter may need to be returned for service. Refer to the "Technical Assistance Center" section in the Preface for information on contacting TAC.

Error Message `Firmware Incompatible with Hardware`

Explanation The selected firmware file does not work with the client adapter.

Recommended Action Select a different firmware file and try to load it.

Error Message `Firmware Upgrade Failed`

Explanation A problem occurred while the firmware was being flashed.

Recommended Action Eject the client adapter and reinsert it. If the client adapter functions properly, the firmware was flashed successfully. If the client adapter does not function or functions improperly, your client adapter may need to be returned for service. Refer to the "Technical Assistance Center" section in the Preface for information on contacting TAC.

Error Message `Maximum Power Save Mode Will Be Temporarily Disabled While You Are Running This Application!`

Explanation The client adapter cannot be run in Max PSP mode while ACU is running.

Recommended Action No user action is required. The client adapter automatically runs in Fast PSP mode while ACU is running.

Error Message `No Wireless LAN Adapters Found`

Explanation A client adapter is not inserted in the computer.

Recommended Action Insert a client adapter if you wish to start wireless communications.

Error Message `No Wireless LAN Adapters Installed!`

Explanation An attempt was made to start ACU without a client adapter being inserted in the computer. ACU cannot execute if a client adapter is not inserted because it needs to be able to read from and write to the adapter.

Recommended Action Insert a client adapter and start ACU.

Error Message `The profile will be disabled until Windows restarts or the card is ejected and reinserted. Are you sure?`

Explanation The username and password for your current profile have expired or are no longer valid. When the LEAP login screen appeared, prompting you to enter your new username and password, you selected Cancel.

Recommended Action Click **No**, enter your new username and password when the LEAP login screen reappears, and click **OK**. The client adapter should authenticate using your new credentials. If the profile uses saved credentials, edit the profile in ACU by changing the username and password on the LEAP Settings screen and save your changes. (If you select **Yes**, the profile will be disabled until you reboot your system or eject and reinsert the card.)

Error Message `A recently installed program has disabled the Welcome screen and Fast User Switching. To restore these features, you must uninstall the program. The following file name might help you identify the program that made the change: cswGina.dll. (Windows XP only)`

Explanation LEAP was selected during ACU installation on a Windows XP computer; then the Change the way users log on or off option was selected under Windows XP's User Accounts.

Recommended Action If LEAP is selected during ACU installation, you cannot use Windows XP's fast user switching feature. If you want to use fast user switching and do not want to use LEAP, you must run the ACU installation program again, select **Modify**, and deselect **LEAP**.

Error Message `Software installed might not work properly if you choose not to restart Windows. Please make sure to restart Windows before installing Aironet Client Utility again.`

Explanation The No, I will restart my computer later option was selected on the Setup Complete screen during an uninstall of ACU.

Recommended Action Restart your computer before installing ACU again.

Error Message `To run LEAP successfully, you will have to apply Microsoft Q241052 Update for the language version of your operating system as documented on http://support.microsoft.com/support/kb/articles/Q247/8/05.asp. Please contact Microsoft Product Support Services to obtain the fix.`

Explanation When LEAP is selected during ACU installation on a Windows 95, 98, or 98 SE device, Microsoft hot fixes are also installed to fix two problems related to the use of LEAP. However, only the English version of the hot fixes are installed. Foreign language versions of these operating systems require hot fixes specific to those languages.

Recommended Action Contact Microsoft Product Support Services to obtain the hot fixes for languages other than English. Without the hot fixes installed, you may be prompted to enter your credentials at the Windows login prompt twice. To work around this problem, enter your login credentials again.

Error Message `Unable to authenticate wireless user. Please make sure you have entered the right user name and password and try again.`

Explanation LEAP authentication failed.

Recommended Action Re-enter the LEAP user name and password or cancel the LEAP authentication. To start another LEAP authentication process, log off and log in again or select **Manual LEAP Login** from the Commands drop-down menu.

Error Message `Unable to Open filename`

Explanation The selected firmware file cannot be found.

Recommended Action Re-copy the firmware file to a floppy disk or to your computer's hard drive and try to load it again or select a different firmware file and try to load it.

Error Message `The user name and password entered for profile 'xxx' are no longer valid and have failed the LEAP authentication. Please enter a new user name and password.`

Explanation The username and password for your current profile have expired or are no longer valid; therefore, your client adapter is unable to LEAP authenticate.

Recommended Action When the LEAP login screen appears, enter your new username and password and click **OK**. The client adapter should authenticate using your new credentials.

Error Message `The user name and password entered for saved profile 'xxx' are no longer valid and have failed the LEAP authentication. Please enter a new user name and password. Please also remember to change them permanently in the saved profile using the ACU Profile Manager.`

Explanation The username and password for your current profile, which uses saved credentials, have expired or are no longer valid; therefore, your client adapter is unable to LEAP authenticate.

Recommended Action When the LEAP login screen appears, enter your new username and password and click **OK**. The client adapter should authenticate using your new credentials. Then edit the profile in ACU by changing the username and password on the LEAP Settings screen and save your changes.

Error Message `You cannot run a linktest because the radio in your Wireless LAN Adapter is not on!`

Explanation An attempt was made to run a link test while the client adapter's radio was off.

Recommended Action Turn on the client adapter's radio by selecting **Radio On** from the Commands drop-down menu; then run the link test.

Error Message `You cannot run a linktest because your Cisco Wireless LAN Adapter is not associated!`

Explanation An attempt was made to run a link test while the client adapter was not associated to an access point or other wireless device.

Recommended Action Run the link test after the client adapter is associated to an access point or another wireless device.

Error Message `You must specify an IP address before running a linktest!`

Explanation An attempt was made to run a link test although the IP address of the access point or other wireless device with which to test the RF link was not specified.

Recommended Action In the Linktest screen's IP Address of Access Point field, enter the IP address of the access point or other wireless device with which you want to test the RF link.

Error Message `You need to be an administrator or a user with administrative rights to install Aironet Client Utility. Please log on as a different user and try again.`

Explanation A non-administrative user attempted to install ACU. The ACU installation process terminates.

Recommended Action Logon as a different user and attempt the installation process again.

Error Message `Wireless Connection Unavailable. (Windows XP only)`

Explanation ACU was used to configure the client adapter on Windows XP, but the Use Windows to configure my wireless network settings checkbox in Windows XP is selected. This message appears even if the client adapter is associated to an access point.

Recommended Action Deselect the **Use Windows to configure my wireless network settings** checkbox in Windows XP to force Windows to display the correct status.

Getting Help

To access information about ACU, open ACU; then click the **Help** icon or select **Contents** from the Help drop-down menu. An overview of ACU is displayed.

From the Overview of the Aironet Client Utility screen, you can access additional information.

- To access information on specific menu options, click **Contents**; double-click **Aironet Client Utility Commands**, the desired menu (such as Options Menu), and the desired topic (such as Preferences).
- To access information on specific parameters, click **Contents**; double-click **Configurable Parameters**, the client adapter, a parameter category (such as System Parameters), and the desired parameter (such as SSID).
- To access information on specific diagnostic topics, click **Contents**; double-click **Run Time Diagnostic Information**, a diagnostic category (such as Running a Linktest), and the desired topic (such as Packet Size).
- To search for a specific topic, click **Index**, select an index entry, and click **Display**.
- To search for a specific word or phrase, click **Contents** or **Index**, click the **Find** tab, and follow the instructions in the Find Setup Wizard window.

Technical Specifications

This appendix provides technical specifications for the Cisco Aironet 11-Mbps 2.4-GHz and 54-Mbps 5-GHz client adapters.

The following topics are covered in this appendix:

Table A-1 lists the technical specifications for the Cisco Aironet 11-Mbps 2.4-GHz and 54-Mbps 5-GHz client adapters.

Note If a distinction is not made between radio or client adapter type, the specification applies to all Cisco Aironet client adapters.

Table A-1 Technical Specifications for Cisco Aironet Client Adapters

Physical Specifications	
Size	
PC card and PC-Cardbus 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 card	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)
Mini PCI card	2.3 in. L x 2.0 in. W x 0.2 in. H (6.0 cm L x 5.1 cm W x 0.5 cm H)
Weight	
PC card and LM card	1.3 oz (0.037 kg)
PCI card	4.6 oz (0.13 kg)
Mini PCI card	0.5 oz (0.014 kg)
PC-Cardbus card	2.0 oz (0.06 kg)
Enclosure	
PC card and PC-Cardbus 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 card	PCI card edge
PC-Cardbus card	68-pin Cardbus
Status indicators	Green and amber LEDs (except mini PCI card); see Chapter 9
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)
5-GHz client adapters	–22°F to 158°F (–30°C to 70°C)
Storage temperature	–40°F to 185°F (–40°C to 85°C)
Humidity (non-operational)	95% relative humidity

Table A-1 Technical Specifications for Cisco Aironet Client Adapters (continued)

Altitude	**Operational** 9843 ft (3000 m) @ room temperature for 2 hours **Non-operational** 15,000 ft (4572 m) @ room temperature for 20 hours
ESD	15 kV (human body model)
Radio Specifications	
Type	
2.4-GHz client adapters	Direct-sequence spread spectrum (DSSS) IEEE 802.11b compliant
5-GHz client adapters	Orthogonal frequency division multiplexing (OFDM) IEEE 802.11a compliant
Power output **Note** Refer to Appendix D for limitations on radiated power (EIRP) levels in the European community and other countries. **Note** If you are using an older version of a 340 or 350 series client adapter, your power level options may be different than those listed here.	
350 series client adapters	100 mW (20 dBm) 50 mW (17 dBm) 30 mW (15 dBm) 20 mW (13 dBm) 5 mW (7 dBm) 1 mW (0 dBm)
340 series PC card	30 mW (15 dBm) 1 mW (0 dBm)
340 series LM card and PCI card	30 mW (15 dBm) 15 mW (12 dBm) 5 mW (7 dBm) 1 mW (0 dBm)
PC-Cardbus card	20 mW (13 dBm) 10 mW (10 dBm) 5 mW (7 dBm) **Note** These values are based on the FCC peak measurement method as defined in FCC 15.407(a)(4).
Operating frequency	
2.4-GHz client adapters	2.400 to 2.497 GHz (depending on the regulatory domain in which the client adapter is used)
5-GHz client adapters	5.15 to 5.25 GHz in the UNII 1 band* 5.25 to 5.35 GHz in the UNII 2 band* *Depending on the regulatory domain in which the client adapter is used

Table A-1 Technical Specifications for Cisco Aironet Client Adapters (continued)

Usable channels	
2.4-GHz client adapters	2412 to 2484 MHz in 5-MHz increments
5-GHz client adapters	5180 to 5320 MHz in 20-MHz increments
Interference rejection	
2.4-GHz client adapters	–35 dBc adjacent channel rejection
5-GHz client adapters	16 dBc @ 6 Mbps 15 dBc @ 9 Mbps 13 dBc @ 12 Mbps 11 dBc @ 18 Mbps 8 dBc @ 24 Mbps 4 dBc @ 36 Mbps 0 dBc @ 48 Mbps –1 dBc @ 54 Mbps
Data rates	
2.4-GHz client adapters	1, 2, 5.5, and 11 Mbps
5-GHz client adapters	6, 9, 12, 18, 24, 36, 48, and 54 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 Orthogonal frequency division multiplexing (OFDM) - 6 to 54 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
5-GHz client adapters	–85 dBm @ 6 Mbps –84 dBm @ 9 Mbps –82 dBm @ 12 Mbps –80 dBm @ 18 Mbps –77 dBm @ 24 Mbps –73 dBm @ 36 Mbps –69 dBm @ 48 Mbps –68 dBm @ 54 Mbps
Receiver delay spread (multipath)	
2.4-GHz client adapters	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)
5-GHz client adapters	TBD

Table A-1 Technical Specifications for Cisco Aironet Client 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.
5-GHz client adapters	**Indoor** TBD
Antenna	
PC card	Integrated diversity antenna
LM card	Two MMCX antenna connectors
PCI card	RP-TNC connector
Mini PCI card	Ultra-miniature SMT U.FL antenna connectors
PC-Cardbus card	Integrated aperture coupled patch antenna

Table A-1 Technical Specifications for Cisco Aironet Client Adapters (continued)

Power Specifications	
Operational voltage	
PC, LM, and PCI card	5.0 V (+ or – 0.25 V)
Mini PCI card	3.0 to 3.6 V
PC-Cardbus card	3.3 V (+ or – 0.33 V)
Receive current steady state	
PC card and LM card	Typically 250 mA
PCI card	Typically 350 mA
Mini PCI card	Typically 330 mA
PC-Cardbus card	TBD
Transmit current steady state	
350 series PC card and LM card	Typically 450 mA @ 20 dBm
350 series PCI card	Typically 550 mA @ 20 dBm
350 series mini PCI card	Typically 570 mA @ 20 dBm
340 series PC card and LM card	Typically 350 mA @ 15 dBm
340 series PCI card	Typically 450 mA @ 15 dBm
PC-Cardbus card	TBD
Sleep mode steady state	
350 series PC card, LM card, and mini PCI card	Typically 15 mA
350 series PCI card	Typically 115 mA
340 series PC card and LM card	Typically 15 mA
340 series PCI card	Typically 110 mA
PC-Cardbus card	TBD

Table A-1 Technical Specifications for Cisco Aironet Client Adapters (continued)

Safety and Regulatory Compliance Specifications	
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) EN 55022 B AS/NZS 3548 Class B VCCI Class B EN 55024 EN 301.489-1 and EN-301.489-17
Radio approvals	FCC Part 15.247 Canada RSS-139-1 (2.4-GHz client adapters), RSS-210 Japan Telec 33B (2.4-GHz client adapters) Japan ARIB STD-T71 (5-GHz client adapters) EN 300.328 (2.4-GHz client adapters) EN 301.893 (5-GHz client adapters)
RF exposure	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 appendix:

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.**

Dipole Antenna Installation Warning

Warning **In order to comply with FCC radio frequency (RF) exposure limits, dipole antennas should be located at a minimum of 7.9 inches (20 cm) or more from the body of all persons.**

Waarschuwing **Om te voldoen aan de FCC radiofrequentie (RF) blootstellingslimieten dienen dipoolantennes zich minstens 20 cm of meer van de lichamen van alle personen bevinden.**

Varoitus **FCC:n antamien radiotaajuuksille altistumista koskevien rajoitusten mukaan dipoliantennien on sijaittava vähintään 20 cm:n päässä kaikista henkilöistä.**

Attention **Pour se conformer aux limites d'exposition à la fréquence radio préconisées par la FCC (Federal Communications Commission), les antennes dipôles doivent se situer à un minimum de 20 cm de toute personne.**

Warnung **Um die in den FCC-Richtlinien festgelegten Expositionshöchstgrenzen für Radiofrequenzen (RF) nicht zu überschreiten, sollten Dipolantennen mindestens 20 cm (7,9 Zoll) vom Körper aller Person entfernt aufgestellt werden.**

Avvertenza **Per conformarsi ai limiti FCC di esposizione a radiofrequenza (RF), le antenne a dipolo devono stare ad una distanza minima di 20 cm dal corpo di ogni persona.**

Advarsel **I henhold til eksponeringsgrensene for radiofrekvenser (RF), skal dipole antenner befinne seg på en avstand av minst 20 cm eller mer fra mennesker.**

Aviso **Para estar de acordo com as normas FCC de limites de exposição para freqüência de rádio (RF), as antenas dipolo devem estar distantes no mínimo 20 cm (7,9 pol) do corpo de qualquer pessoa.**

¡Advertencia! **Para cumplir con los límites de exposición de radio frecuencia (RF) de la Comisión Federal de Comunicaciones (FCC) es preciso ubicar las antenas dipolo a un mínimo de 20 cm (7,9 pulgadas) o más del cuerpo de las personas.**

Varning! **För att följa FCC-exponeringsgränserna för radiofrekvens (RF), bör dipolsantenner placeras på minst 20 cm avstånd från alla människor.**

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 client adapters.

The following topics are covered in this appendix:

Manufacturer's 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, AIR-PCM350-A-K9, AIR-PCM350-40-A-K9, AIR-LMC350-A-K9, AIR-LMC350-40-A-K9, AIR-PCI350-A-K9, AIR-PCI350-10-A-K9, AIR-MPI350-*xx*-A-K9 (where *xx* is the OEM code), AIR-CB20A-A-K9, AIR-CB20A-A-K9-40

FCC Certification Number: LDK102038 (AIR-PCM34x),
LDK102035 (AIR-LMC34x and AIR-PCI34x),
LDK102040 (AIR-xxx35x),
LDK102042 (AIR-MPI350),
LDK102044 (AIR-CB20A)

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, including the use of non-Cisco antennas, could void the user's authority to operate this device.

Caution Within the 5.15-to-5.25-GHz band, UNII devices are restricted to indoor operations to reduce any potential for harmful interference to co-channel Mobile Satellite Systems (MSS) operations.

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.

Cisco Aironet 11-Mbps 2.4-GHz client adapters are certified to the requirements of RSS-139-1 and RSS-210 for 2.4-GHz spread spectrum devices, and Cisco Aironet 54-Mbps 5-GHz client adapters are certified to the requirements of RSS-210 for 5-GHz devices. The use of these devices 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

English:	This equipment is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.
Deutsch:	Dieses Gerät entspricht den grundlegenden Anforderungen und den weiteren entsprecheneden Vorgaben der Richtlinie 1999/5/EU.
Dansk:	Dette udstyr er i overensstemmelse med de væsentlige krav og andre relevante bestemmelser i Directiv 1999/5/EF.
Español:	Este equipo cumple con los requisitos esenciales asi como con otras disposiciones de la Directive 1999/5/EC.
Έλληνας:	Αυτός ο εξοπλισμός συμμορφώνεται με τις ουσιώδεις απαιτήσεις και τις λοιπές διατάξεις της Οδηγίας 1999/5/ΕΚ.
Français:	Cet appareil est conforme aux exigencies essentialles et aux autres dispositions pertinantes de la Directive 1999/5/EC.
Íslenska:	Þessi búnaður samrýmist lögboðnum kröfum og öðrum ákvæðum tilskipunar 1999/5/ESB.
Italiano:	Questo apparato é conforme ai requisiti essenziali ed agli altri principi sanciti dalla Direttiva 1999/5/EC.
Nederlands:	Deze apparatuur voldoet aan de belangrijkste eisen en andere voorzieningen van richtlijn 1999/5/EC.
Norsk:	Dette utstyret er i samsvar med de grunnleggende krav og andre relevante bestemmelser i EU-directiv 1999/5/EC.
Português:	Este equipamento satisfaz os requisitos essenciais e outras provisões da Directiva 1999/5/EC.
Suomalainen:	Tämä laite täyttää direktiivin 1999/5/EY oleelliset vaatimukset ja on siinä asetettujen muidenkin ehtojen mukainen.
Svenska:	Denna utrustning är i överensstämmelse med de väsentliga kraven och andra relevanta bestämmelser i Direktiv 1999/5/EC.

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

2.4-GHz Client Adapters

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 (except for the mini PCI card, or AIR-MPI350):

CE 0650 ! 53091

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

The following CE mark is affixed to 350 series mini PCI card (AIR-MPI350):

CE !

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 your customer service representative.

Note Combinations of power levels and antennas resulting in a radiated power level 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 other countries that have adopted the European R&TTE directive 1999/5/EC or the CEPT recommendation Rec 70.03 or both. For more details on legal combinations of power levels and antennas, refer to the "Maximum Power Levels and Antenna Gains" section on page D-4.

5-GHz Client Adapters

For the 5-GHz client adapters, the following standards were applied:

- Radio: EN 301.893
- EMC: EN 301.489-1, EN 301.489-17
- Safety: EN 60950

The following CE mark is affixed to the 5-GHz equipment:

CE 0682 !

49325

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 Client Adapters in Japan

This section provides guidelines for avoiding interference when operating Cisco Aironet client 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：03-5549-6500

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: 03-5549-6500

Channels, Power Levels, and Antenna Gains

This appendix lists the IEEE 802.11a and IEEE 802.11b channels supported by the world's regulatory domains as well as the maximum power levels and antenna gains allowed per domain.

The following topics are covered in this appendix:

Channels

For IEEE 802.11a

The channel identifiers, channel center frequencies, and regulatory domains of each IEEE 802.11a 20-MHz-wide channel are shown in Table D-1.

Table D-1 Channels for IEEE 802.11a

Channel Identifier	Frequency	Regulatory Domains			
		Americas (-A)	Japan (-J)	Singapore (-S)	Taiwan (-T)
34	5170 MHz	-	X	-	-
36	5180 MHz	X	-	X	-
38	5190 MHz	-	X	-	-
40	5200 MHz	X	-	X	-
42	5210 MHz	-	X	-	-
44	5220 MHz	X	-	X	-
46	5230 MHz	-	X	-	-
48	5240 MHz	X	-	X	-
52	5260 MHz	X	-	-	X
56	5280 MHz	X	-	-	X
60	5300 MHz	X	-	-	X
64	5320 MHz	X	-	-	X
149	5745 MHz	-	-	-	-
153	5765 MHz	-	-	-	-
157	5785 MHz	-	-	-	-
161	5805 MHz	-	-	-	-

Note All channel sets are restricted to indoor usage except the Americas (-A), which allows for indoor and outdoor use on channels 52 through 64 in the United States.

For IEEE 802.11b

The channel identifiers, channel center frequencies, and regulatory domains of each IEEE 802.11b 22-MHz-wide channel are shown in Table D-2.

Table D-2 Channels for IEEE 802.11b

Channel Identifier	Frequency	Regulatory Domains				
		Americas (-A)	EMEA (-E)	Israel (-I)	China (-C)	Japan (-J)
1	2412 MHz	X	X	-	X	X
2	2417 MHz	X	X	-	X	X
3	2422 MHz	X	X	X	X	X
4	2427 MHz	X	X	X	X	X
5	2432 MHz	X	X	X	X	X
6	2437 MHz	X	X	X	X	X
7	2442 MHz	X	X	X	X	X
8	2447 MHz	X	X	X	X	X
9	2452 MHz	X	X	X	X	X
10	2457 MHz	X	X	-	X	X
11	2462 MHz	X	X	-	X	X
12	2467 MHz	-	X	-	-	X
13	2472 MHz	-	X	-	-	X
14	2484 MHz	-	-	-	-	X

Note Mexico is included in the Americas regulatory domain; however, channels 1 through 8 are for indoor use only while channels 9 through 11 can be used indoors and outdoors. Users are responsible for ensuring that the channel set configuration is in compliance with the regulatory standards of Mexico.

Note France is included in the EMEA regulatory domain; however, only channels 10 through 13 can be used in France. Users are responsible for ensuring that the channel set configuration is in compliance with the regulatory standards of France.

Maximum Power Levels and Antenna Gains

For IEEE 802.11a

An improper combination of power level and antenna gain can result in equivalent isotropic radiated power (EIRP) above the amount allowed per regulatory domain. Table D-3 indicates the maximum power levels and antenna gains allowed for each IEEE 802.11a regulatory domain.

Table D-3 Maximum Power Levels Per Antenna Gain for IEEE 802.11a

Regulatory Domain	Maximum Power Level (mW) with 6-dBi Antenna Gain
Americas (-A) (160 mW EIRP maximum on channels 34-48, 800 mW EIRP maximum on channels 52-64)	20
Japan (-J) (10 mW/MHz EIRP maximum)	20
Singapore (-S) (100 mW EIRP maximum)	20
Taiwan (-T) (800 mW EIRP maximum)	20

For IEEE 802.11b

An improper combination of power level and antenna gain can result in equivalent isotropic radiated power (EIRP) above the amount allowed per regulatory domain. Table D-4 indicates the maximum power levels and antenna gains allowed for each IEEE 802.11b regulatory domain.

Table D-4 Maximum Power Levels Per Antenna Gain for IEEE 802.11b

Regulatory Domain	Antenna Gain (dBi)	Maximum Power Level (mW)
Americas (-A) (4 watts EIRP maximum)	0	100
	2.2	100
	5.2	100
	6	100
	8.5	100
	12	100
	13.5	100
	21	20

Table D-4 Maximum Power Levels Per Antenna Gain for IEEE 802.11b (continued)

Regulatory Domain	Antenna Gain (dBi)	Maximum Power Level (mW)
EMEA (-E) (100 mW EIRP maximum)	0	100
	2.2	50
	5.2	30
	6	30
	8.5	5
	12	5
	13.5	5
	21	1
Israel (-I) (100 mW EIRP maximum)	0	100
	2.2	50
	5.2	30
	6	30
	8.5	5
	12	5
	13.5	5
	21	1
China (-C) (10 mW EIRP maximum)	0	5
	2.2	5
	5.2	n/a
	6	n/a
	8.5	n/a
	12	n/a
	13.5	n/a
	21	n/a
Japan (-J) (10 mW/MHz EIRP maximum)	0	50
	2.2	30
	5.2	30
	6	30
	8.5	n/a
	12	n/a
	13.5	5
	21	n/a

Configuring the Client Adapter through Windows XP

This appendix explains how to configure and use the client adapter with Windows XP.

The following topics are covered in this appendix:

Overview

This chapter provides instructions for minimally configuring the client adapter through Windows XP (instead of through ACU) as well as for enabling one of the three security options that are available for use with this operating system. The "Overview of Security Features" section below describes each of these options so that you can make an informed decision before you begin the configuration process.

In addition, the chapter also provides basic information on using Windows XP to specify the networks to which the client adapter associates and to view the current status of your client adapter.

Note If you require more information about configuring or using your client adapter with Windows XP, refer to Microsoft's documentation for Windows XP.

Overview of Security Features

When you use your client adapter with Windows XP, you can protect your data as it is transmitted through your wireless network by encrypting it through the use of Wired Equivalent Privacy (WEP) encryption keys. With WEP encryption, the transmitting device encrypts each packet with a WEP key, and the receiving device uses that same key to decrypt each packet.

The WEP keys used to encrypt and decrypt transmitted data can be statically associated with your adapter or dynamically created as part of the EAP authentication process. The information in the "Static WEP Keys" and "EAP (with Static or Dynamic WEP Keys)" sections below can help you to decide which type of WEP keys you want to use. Dynamic WEP keys with EAP offer a higher degree of security than static WEP keys.

WEP keys, whether static or dynamic, are either 40 or 128 bits in length. 128-bit WEP keys offer a greater level of security than 40-bit WEP keys.

Static WEP Keys

Each device within your wireless network can be assigned up to four static WEP keys. If a device receives a packet that is not encrypted with the appropriate key (as the WEP keys of all devices that are to communicate with each other must match), the device discards the packet and never delivers it to the intended receiver.

Static WEP keys are write-only and temporary; therefore, they cannot be read back from the client adapter and they are lost when power to the adapter is removed or the Windows device is rebooted. Although the keys are temporary, you do not need to re-enter them each time the client adapter is inserted or the Windows device is rebooted. This is because the keys are stored (in an encrypted format for security reasons) in the registry of the Windows device. When the driver loads and reads the client adapter's registry parameters, it also finds the static WEP keys, unencrypts them, and stores them in volatile memory on the adapter.

EAP (with Static or Dynamic WEP Keys)

The new standard for wireless LAN security, as defined by the Institute of Electrical and Electronics Engineers (IEEE), is called *802.1X for 802.11*, or simply *802.1X*. An access point that supports 802.1X and its protocol, Extensible Authentication Protocol (EAP), acts as the interface between a wireless client and an authentication server, such as a Remote Authentication Dial-In User Service (RADIUS) server, to which the access point communicates over the wired network.

Two 802.1X authentication types are available when configuring your client adapter through Windows XP:

- **EAP-TLS** – This authentication type is enabled through the operating system and uses a dynamic, session-based WEP key, which is derived from the client adapter and RADIUS server, to encrypt data.

  RADIUS servers that support EAP-TLS include Cisco Secure ACS version 3.0 and greater and Cisco Access Registrar version 1.8 and greater.

  Note EAP-TLS requires the use of a certificate. Refer to Microsoft's documentation for information on downloading and installing the certificate.

- **EAP-MD5** – This authentication type is enabled through the operating system and uses static WEP to encrypt data. EAP-MD5 requires you to enter a separate EAP username and password (in addition to your standard Windows network login) in order to start the EAP authentication process and gain access to the network.

  Note If you want to authenticate without encrypting the data that is transmitted over your network, you can use EAP-MD5 without static WEP.

  RADIUS servers that support EAP-MD5 include Cisco Secure ACS version 3.0 and greater and Cisco Access Registrar version 1.8 and greater.

When you enable Require EAP on your access point and configure your client adapter for EAP-TLS or EAP-MD5 using Windows XP, authentication to the network occurs in the following sequence:

1. The client adapter associates to an access point and begins the authentication process.

   Note The client does not gain access to the network until mutual authentication between the client and the RADIUS server is successful.

2. Communicating through the access point, the client and RADIUS server complete a mutual authentication process, with the password (for EAP-MD5) or certificate (for EAP-TLS) being the shared secret for authentication. The password or certificate is never transmitted during the process.

   Note The authentication process is now complete for EAP-MD5. For EAP-TLS, the process continues.

3. If mutual authentication is successful, the client and RADIUS server derive a dynamic, session-based WEP key that is unique to the client.
4. The RADIUS server transmits the key to the access point using a secure channel on the wired LAN.
5. For the length of a session, or time period, the access point and the client use this key to encrypt or decrypt all unicast packets that travel between them.

Note Refer to the IEEE 802.11 Standard for more information on 802.1X authentication 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

Configuring the Client Adapter

Follow the steps below to configure your client adapter using Windows XP.

Note If you installed ACU but intend to use Windows XP to configure the client adapter, open ACU and make sure the **Allow Windows To Configure My Wireless Network Settings** option is selected on the Profile Manager screen.

Note These instructions assume you are using Windows XP's classic view rather than its category view.

Step 1 Make sure the client adapter's driver has been installed and the client adapter is inserted into the Windows XP device.

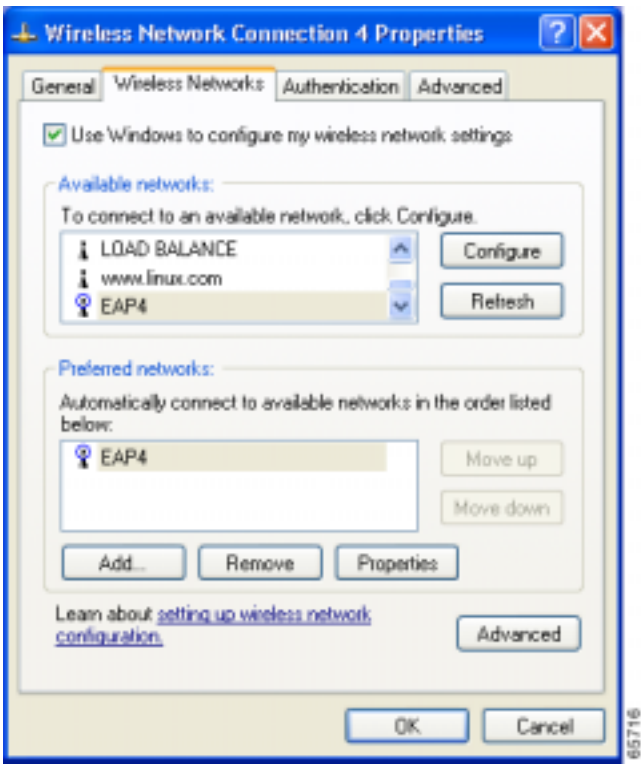
Step 2 Double-click **My Computer**, **Control Panel**, and **Network Connections**.

Step 3 Right-click **Wireless Network Connection**.

Step 4 Click **Properties**. The Wireless Network Connection Properties screen appears.

Step 5 Select the **Wireless Networks** tab. The following screen appears (see Figure E-1).

Figure E-1 Wireless Network Connection Properties Screen (Wireless Networks Tab)



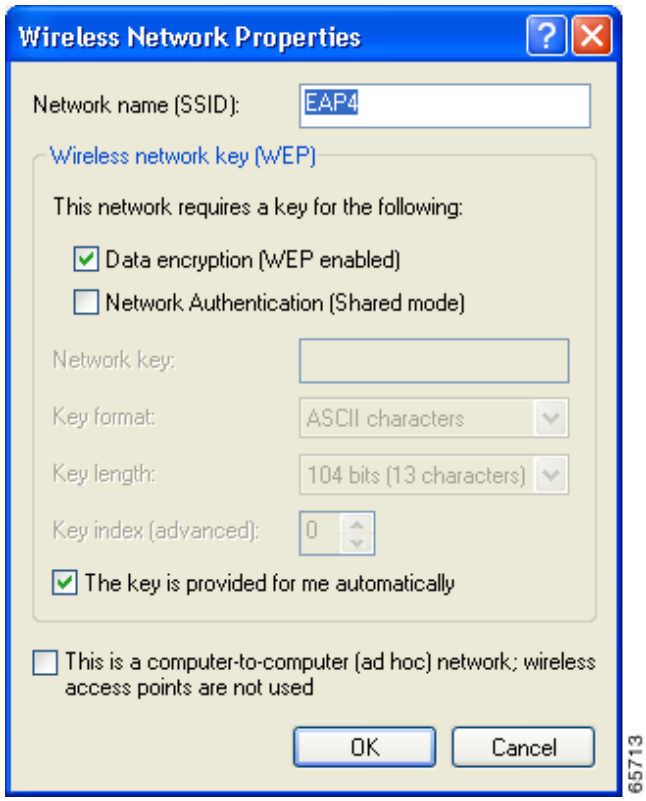
Step 6 Make sure that the **Use Windows to configure my wireless network settings** checkbox is selected.

Step 7 Select the SSID of the access point to which you want the client adapter to associate from the list of available networks and click **Configure**. If the SSID of the access point you want to use is not listed or you are planning to operate the client adapter in an *ad hoc network* (a computer-to-computer network without access points), click **Add**.

Note The Allow Broadcast SSID to Associate option on the access point must be enabled for the SSID to appear in the list of available networks.

The Wireless Network Properties screen appears (see Figure E-2).

Figure E-2 Wireless Network Properties Screen



Step 8 Perform one of the following:

- If you selected an SSID from the list of available networks, make sure the SSID appears in the Network name (SSID) field.
- If you clicked Add, enter the case-sensitive SSID of the access point to which you want the client adapter to associate or the name of the ad hoc network in the Network name (SSID) field.

Step 9 Select the **Data encryption (WEP enabled)** checkbox if you are planning to use static or dynamic WEP.

Step 10 Select the **Network Authentication (Shared mode)** checkbox if you want to use shared key, rather than open, authentication with the access point.

Open authentication allows your client adapter, regardless of its WEP settings, to authenticate and attempt to communicate with an access point.

Shared key authentication allows your client adapter to communicate only with access points that have the same WEP key. Cisco recommends that shared key authentication not be used because it presents a security risk.

Note If you are planning to use EAP-TLS authentication, do not select this checkbox. EAP-TLS does not work with shared key authentication because shared key authentication requires the use of a WEP key, and a WEP key is not set for EAP-TLS until after the completion of EAP authentication.

Step 11 Follow the steps below to enter up to four WEP keys, if you are planning to use static WEP.

Note If you are planning to use EAP-TLS authentication, which uses dynamic WEP, go to Step 12.

a. Obtain the WEP key for the access point (in an infrastructure network) or other clients (in an ad hoc network) from your system administrator and enter it in the Network key field. In order to communicate, the client adapter must use the same WEP key as the access point or other clients.

b. Select one of the following WEP key formats:

- **ASCII characters** – Specifies that the WEP key will be entered in ASCII text, which includes alpha characters, numbers, and punctuation marks.
- **Hexadecimal digits** – Specifies that the WEP key will be entered in hexadecimal characters, which include 0-9, A-F, and a-f.

c. Select one of the following WEP key lengths:

- **104 bits (13 characters/26 digits)** – You can select this option (or the 40 bits option) if your client adapter supports 128-bit WEP.
- **40 bits (5 characters/10 digits)** – You must select this option if your client adapter supports only 40-bit WEP.

d. In the Key index (advanced) field, select the number of the WEP key you are creating (**0**, **1**, **2**, or **3**).

Note The WEP key must be assigned to the same number on both the client adapter and the access point (in an infrastructure network) or other clients (in an ad hoc network).

e. Repeat the previous steps if you want to enter another WEP key.

Step 12 Select the **The key is provided for me automatically** checkbox if you are planning to use EAP-TLS, which uses dynamic WEP keys.

Step 13 Select the **This is a computer-to-computer (ad hoc mode) network; wireless access points are not used** checkbox if you are planning to operate the client adapter in an ad hoc network.

Step 14 Click **OK** to save your settings and to add this SSID to the list of preferred networks (see Figure E-1). The client adapter automatically attempts to associate to the network(s) in the order in which they are listed.

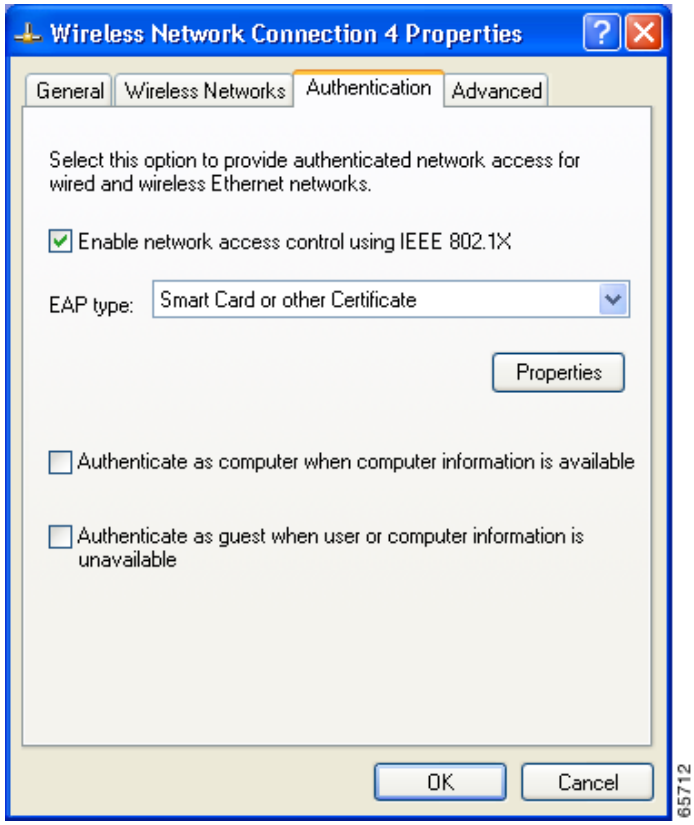
Step 15 If you are planning to use EAP-TLS or EAP-MD5, follow the instructions in either the "Enabling EAP-TLS Authentication" section on page E-7 or the "Enabling EAP-MD5 Authentication" section on page E-9.

Enabling EAP-TLS Authentication

Follow the steps below to prepare the client adapter to use EAP-TLS authentication, provided you have completed the initial configuration.

Step 1 Click the **Authentication** tab on the Wireless Network Connection Properties screen. The following screen appears (see Figure E-3).

Figure E-3 Wireless Network Connection Properties Screen (Authentication Tab)

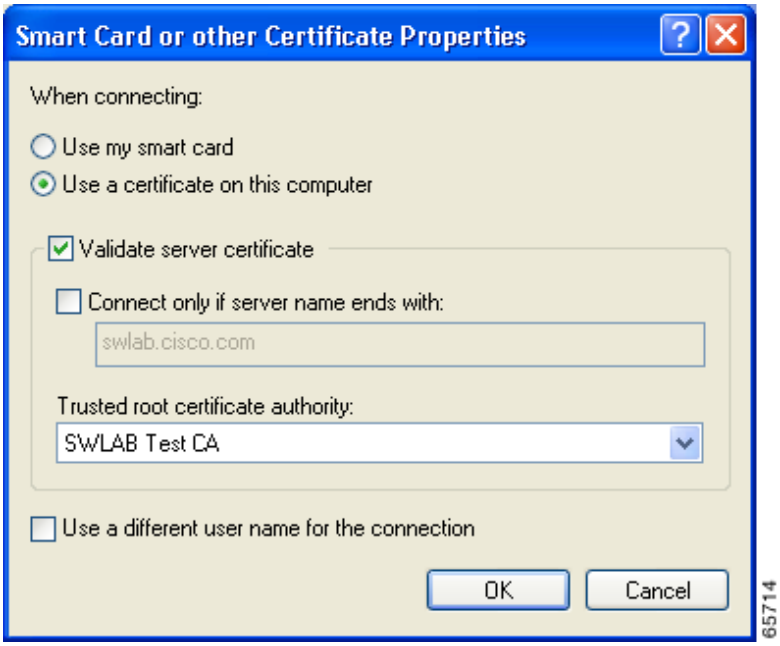


Step 2 Select the **Enable network access control using IEEE 802.1X** checkbox.

Step 3 For EAP type, select **Smart Card or other Certificate**.

Step 4 Click **Properties**. The Smart Card or other Certificate Properties screen appears (see Figure E-4).

Figure E-4 Smart Card or other Certificate Properties Screen



Step 5 Select the **Use a certificate on this computer** option.

Step 6 Select the **Validate server certificate** checkbox.

Step 7 Make sure that the name of the certificate authority from which the EAP-TLS certificate was downloaded appears in the Trusted root certificate authority field.

Step 8 Click **OK** to save your settings. The configuration is complete.

Step 9 If a pop-up message appears above the system tray informing you that you need to accept a certificate to begin the EAP authentication process, click the message and follow the instructions provided to accept the certificate.

Note You should not have to accept a certificate for future authentication attempts. The same certificate, which is tied to your login, will be used.

The client adapter should now EAP authenticate.

Note Whenever the computer reboots and you enter your Windows username and password, the EAP authentication process begins automatically and the client adapter should EAP authenticate.

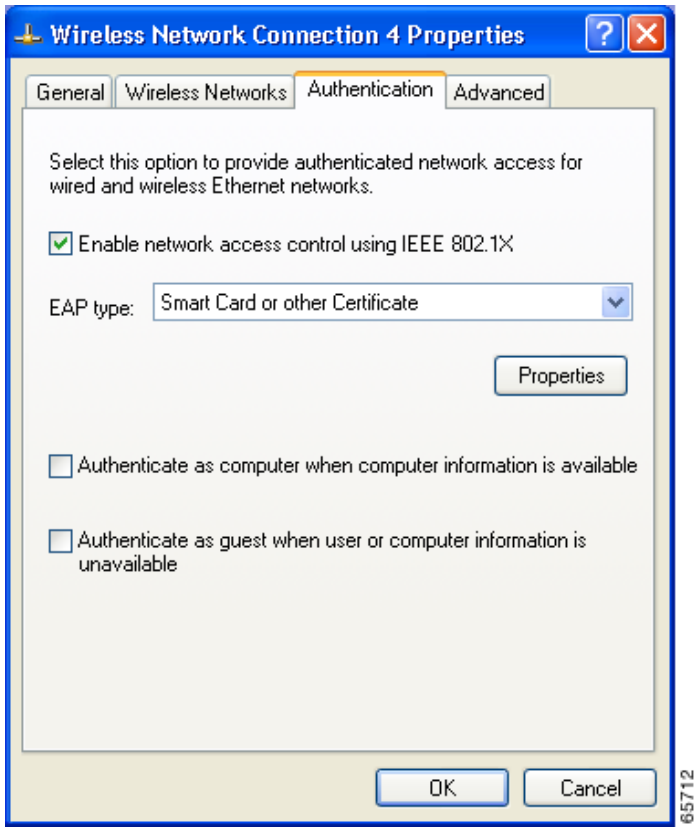
Step 10 To verify authentication, double-click **My Computer**, **Control Panel**, and **Network Connections**. The status appears to the right of your Wireless Network Connection. If the client adapter is authenticated, the status reads, “Authentication succeeded.” The status line also indicates if the authentication attempt fails.

Enabling EAP-MD5 Authentication

Follow the steps below to prepare the client adapter to use EAP-MD5 authentication, provided you have completed the initial configuration.

Step 1 Click the **Authentication** tab on the Wireless Network Connection Properties screen. The following screen appears (see Figure E-5).

Figure E-5 Wireless Network Connection Properties Screen (Authentication Tab)



Step 2 Select the **Enable network access control using IEEE 802.1X** checkbox.

Step 3 For EAP type, select **MD5-Challenge**.

Step 4 Click **OK** to save your settings. The configuration is complete, and the client adapter should attempt to associate and EAP authenticate using MD5.

Step 5 When a pop-up message appears above the system tray informing you that you need to enter your credentials to access the network, click the message. The Wireless Network Connection screen appears.

Step 6 Enter your EAP-MD5 authentication username, password, and optional domain name (which are registered with the RADIUS server) and click **OK**. The client adapter should now EAP authenticate.

Note Whenever the computer reboots and you enter your Windows username and password, the pop-up message appears, and you must re-enter your EAP-MD5 credentials in order to EAP authenticate.

Step 7 To verify authentication, double-click **My Computer**, **Control Panel**, and **Network Connections**. The status appears to the right of your Wireless Network Connection. If the client adapter is authenticated, the status reads, "Authentication succeeded." The status line also indicates if the authentication attempt fails.

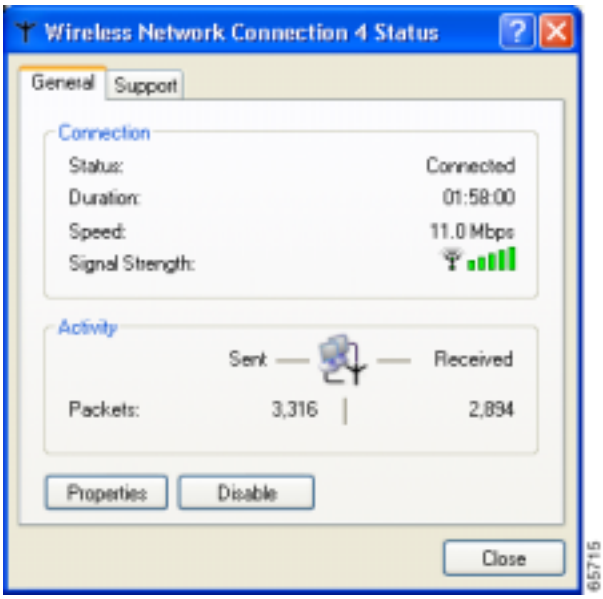
Using Windows XP to Associate to an Access Point

Windows XP causes the client adapter's driver to automatically attempt to associate to the first network in the list of preferred networks (see Figure E-1). If the adapter fails to associate or loses association, it automatically switches to the next network in the list of preferred networks.The adapter does not switch networks as long as it remains associated to the access point. To force the client adapter to associate to a different access point, you must select a different network from the list of available networks (and click **Configure** and **OK)**.

Viewing the Current Status of Your Client Adapter

To view the status of your client adapter, click the icon of the two connected computers in the Windows system tray. The Wireless Network Connection Status screen appears (see Figure E-6).

Figure E-6 Wireless Network Connection Status Screen



Performing a Site Survey

This appendix explains how ACU's site survey tool can be used when conducting a site survey. The following topics are covered in this appendix:

Overview

Note This appendix applies only to people who are responsible for conducting a site survey to determine the best placement of infrastructure devices within a wireless network.

ACU's site survey tool can assist you in conducting a site survey. The tool operates at the RF level and is used to determine the best placement and coverage (overlap) for your network's infrastructure devices. During a site survey, the current status of the network is read from the client adapter and displayed four times per second so you can accurately gauge network performance. The feedback that you receive can help you to eliminate areas of low RF signal levels that can result in a loss of connection between the client adapter and its associated access point (or other infrastructure device).

The site survey tool can be operated in two modes:

- **Passive Mode** – This is the default site survey mode. It does not initiate any RF network traffic; it simply listens to the traffic that the client adapter hears and displays the results. Follow the instructions in the "Using Passive Mode" section on page F-3 to activate the passive mode.
- **Active Mode** – This mode causes the client adapter to actively send or receive low-level RF packets to or from its associated access point and provides information on the success rate. It also enables you to set parameters governing how the site survey is performed (such as the data rate). Follow the instructions in the "Using Active Mode" section on page F-7 to activate the active mode.

Guidelines

Keep the following guidelines in mind when preparing to perform a site survey:

- Perform the site survey when the RF link is functioning with all other systems and noise sources operational.
- Execute the site survey entirely from the mobile station.
- When using the active mode, conduct the site survey with all variables set to operational values.

Additional Information

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

- **Data rates** – Sensitivity and range are inversely proportional to data bit rates. Therefore, the maximum radio range is achieved at the lowest workable data rate, and 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 the performance of wireless devices. Avoid placing these devices in a location where a metal barrier is 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, and metal or steel construction is a barrier to radio signals.

Note Refer to the Hardware Installation Guide for your infrastructure device for additional information on factors affecting placement.

Specifying Signal Strength Units

Follow the steps below to specify how signal strength units are displayed on the site survey screens.

Step 1 Double-click the **Aironet Client Utility** (**ACU)** icon on your desktop to open ACU.

Step 2 Click the **Preferences** icon or select **Preferences** from the Options drop-down menu. The Aironet Client Utility Preferences screen appears.

Step 3 Under Signal Strength Display Units, select one of the following options:

- **Percent** – Displays the signal strength as a percentage.
- **dBm** – Displays the signal strength in decibels with respect to milliwatts.

Note dBm can be selected only if your client adapter is using PCM/LMC/PCI card firmware version 3.92 or greater, mini PCI card firmware version 5.0 or greater, or PC-Cardbus firmware version 4.99 or greater.

Step 4 Click **OK** to save your changes.

Using Passive Mode

Step 1 Open ACU; then click the **Site Survey** icon or select **Site Survey** from the Commands drop-down menu. The Site Survey - Passive Mode screen appears, provided a client adapter is installed in the Windows device and is running.

Figure F-1 shows the Site Survey - Passive Mode screen with the signal strength values displayed as percentages, and Figure F-2 shows the top of the same screen with the signal strength values displayed in dBm.

Note The name of the current profile appears in parentheses at the top of the screen.

Figure F-1 Site Survey - Passive Mode Screen (with Signal Strength as a Percentage)

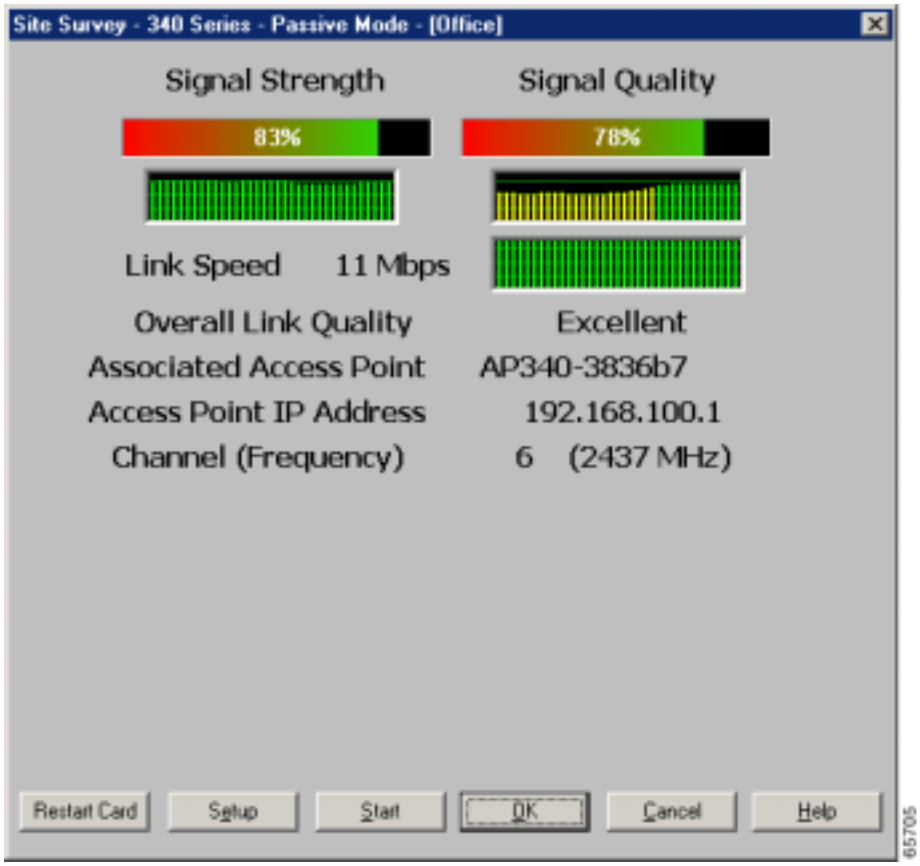


Figure F-2 Top of Site Survey - Passive Mode Screen (with Signal Strength in dBm)

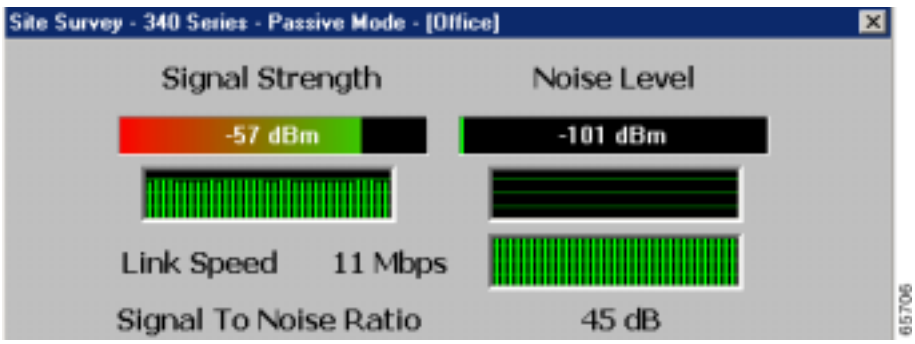


Table F-1 interprets the information that is displayed on the Site Survey - Passive Mode screen.

Table F-1 Site Survey Passive Mode Statistics

Statistic	Description
Signal Strength	The signal strength for all received packets. The higher the value and the more green the bar graph is, the stronger the signal. The histogram below the bar graph provides a visual interpretation of the current signal strength. Differences in signal strength are indicated by the following colors: green (strongest), yellow (middle of the range), and red (weakest). **Range:** 0 to 100% or –95 to –45 dBm
Signal Quality (2.4-GHz client adapters)	The signal quality for all received packets. The higher the value and the more green the bar graph is, the better the quality of the signal. The histogram below the bar graph provides a visual interpretation of the current signal quality. Differences in signal quality are indicated by the following colors: green (highest quality), yellow (average), and red (lowest quality). **Range:** 0 to 100% **Note** This setting appears only for 2.4-GHz client adapters and only if you selected signal strength to be displayed as a percentage. See the "Specifying Signal Strength Units" section on page F-3 for information.
Current Beacons Received (5-GHz client adapters)	The percentage of beacon packets received versus those expected to be received. The higher the value and the more green the bar graph is, the clearer the signal. **Example:** The access point sends out 10 beacons per second, so you would expect the client adapter to receive 50 beacon packets in 5 seconds. If it receives only 40 packets, the percentage of beacons received would be 80%. **Range:** 0 to 100% **Note** This setting appears only for 5-GHz client adapters (or for 2.4-GHz client adapters using firmware version less than 4.05) and only if you selected signal strength to be displayed as a percentage. See the "Specifying Signal Strength Units" section on page F-3 for information.

Table F-1 Site Survey Passive Mode Statistics (continued)

Statistic	Description
Noise Level	The level of background radio frequency energy in the 2.4-GHz or 5-GHz band. The lower the value and the more green the bar graph is, the less background noise present. The histogram below the bar graph provides a visual interpretation of the current level of background noise. Differences in background noise level are indicated by the following colors: green (low noise), yellow (middle of the range), and red (high noise). **Range:** –100 to –45 dBm **Note** This setting appears only if you selected signal strength to be displayed in dBm. See the "Specifying Signal Strength Units" section on page F-3 for information.
Link Speed	In passive mode, the site survey tool monitors transmitted network traffic, and the data rate reflects the rate at which the packets are being transmitted. The Link Speed histogram provides a visual interpretation of the current rate at which your client adapter is transmitting packets. Differences in link speed are indicated by the following colors: green (fastest), yellow (middle of the range), and red (slowest). **Value:** 1, 2, 5.5, or 11 Mbps (2.4-GHz client adapters); 6, 9, 12, 18, 24, 36, 48, or 54 Mbps (5-GHz client adapters)
Overall Link Quality	The client adapter's ability to communicate with the access point. **Value:** Not Associated, Poor, Fair, Good, Excellent **Note** This setting appears only if you selected signal strength to be displayed as a percentage. See the "Specifying Signal Strength Units" section on page F-3 for information.
Signal To Noise Ratio	The difference between the signal strength and the noise level. The higher the value, the better the client adapter's ability to communicate with the access point. **Range:** 0 to 90 dB **Note** This setting appears only if you selected signal strength to be displayed in dBm. See the "Specifying Signal Strength Units" section on page F-3 for information.
Associated Access Point	The access point to which your client adapter is associated. It is shown only if the access point was configured with a name and your client adapter is in infrastructure mode.

Table F-1 Site Survey Passive Mode Statistics (continued)

Statistic	Description
Access Point IP Address	The IP address of the access point to which your client adapter is associated. It is shown only if the access point was configured with an IP address and your client adapter is in infrastructure mode.
Channel (Frequency)	The frequency that your client adapter is currently using as the channel for communications. **Value:** Dependent on client adapter radio and regulatory domain

Step 2 If you want to activate the site survey active mode, go to the "Using Active Mode" section below. Otherwise, click **OK** or **Cancel** to exit the site survey application.

Using Active Mode

Follow the steps below to activate the site survey active mode and obtain current information about your client adapter's ability to transmit and receive RF packets.

Step 1 From the Site Survey - Passive Mode screen (see Figure F-1), click the **Setup** button. The Site Survey Active Mode Setup screen appears (see Figure F-3).

Figure F-3 Site Survey Active Mode Setup Screen

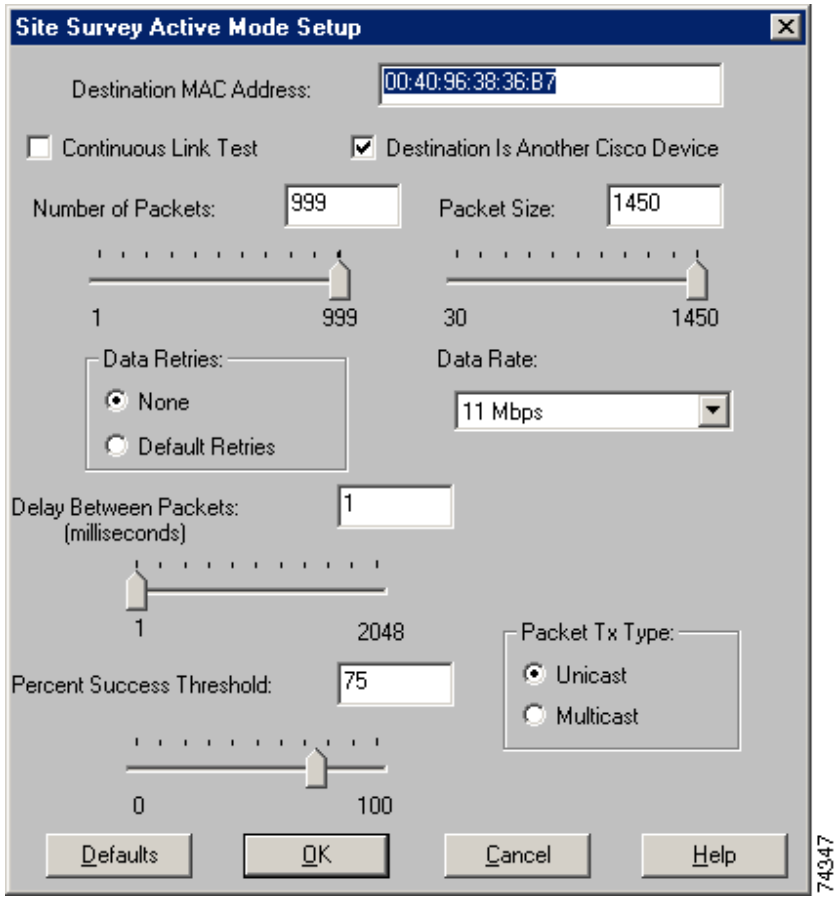


Table F-2 lists and describes the parameters that affect how the site survey is performed. Follow the instructions in the table to set any parameters.

Table F-2 Site Survey Active Mode Parameters

Parameter	Description
Destination MAC Address	The MAC address of the access point (in infrastructure mode) or other clients (in ad hoc mode) that will be used in the test. **Default:** The MAC address of the access point (in infrastructure mode) to which your client adapter is associated **Note** During the test, the client adapter will not roam to other access points so that the size of a single cell can be determined.
Continuous Link Test	Selecting this checkbox causes the test to run until you click **OK** or **Stop**. The test loops repeatedly for the number of packets specified in the Number of Packets field. **Default:** Deselected

Table F-2 Site Survey Active Mode Parameters (continued)

Parameter	Description
Destination Is Another Cisco/Aironet Device	Selecting this checkbox indicates that the device you named in the Destination MAC Address field is a Cisco Aironet access point (in infrastructure mode) or client (in ad hoc mode). In this case, packets sent to the client from the Cisco Aironet device contain additional information, such as lost to source, lost to target, and percent retries, and this information is displayed in the Site Survey - Active screen. If the device specified in the Destination MAC Address field is not a Cisco Aironet device, do not select this checkbox. In this case, the test sends out loopback packets, which originate from and return to the client adapter. **Default:** Selected
Number of Packets	The number of packets that will be sent during the test. **Range:** 1 to 999 **Default:** 100
Packet Size	The size of the packets that will be sent during the test. Select a size that will be typical during normal system use. **Range:** 30 to 1450 **Default:** 512
Data Retries	The number of times a transmission will be retried if an acknowledgment (Ack) is not returned by the destination device. **Default:** None
Data Rate	The bit rate at which packets will be transmitted. Rate shifting will not occur during the test because the echo test built into the radio firmware does not support it. **Value:** 1, 2, 5.5, or 11 Mbps (2.4-GHz client adapters); 6, 9, 12, 18, 24, 36, 48, or 54 Mbps (5-GHz client adapters) **Default:** 11 Mbps (2.4-GHz client adapters); 54 Mbps (5-GHz client adapters)

Retry Value	Description
None	No retries will occur.
Default Retries	The firmware's default value for retries (16) will be used.

Table F-2 Site Survey Active Mode Parameters (continued)

Parameter	Description	
Delay Between Packets	The delay (in milliseconds) between successive transmissions. **Range:** 1 to 2048 ms **Default:** 50 ms	
Percent Success Threshold	The percentage of packets that are not lost. This parameter controls the red line on the Percent Successful histogram. Percentages greater than or equal to this value are displayed as green bars; percentages below this value are displayed as yellow bars. **Range:** 0 to 100% **Default:** 75	
Packet Tx Type	The packet type that will be transmitted during the test. **Default:** Unicast	
	Packet Type	**Description**
	Unicast	When unicast packets are used, the system expects to receive an acknowledgment from the destination, and retries can occur.
	Multicast	When multicast packets are used, no packet retries occur during the test.

Step 2 After setting any parameters, click **OK** to save the settings. The Site Survey - Passive Mode screen appears (see Figure F-1).

Step 3 Click the **Start** button to run the site survey test. The Site Survey - Active Mode screen appears.

Figure F-4 shows the Site Survey - Active Mode screen with the signal strength values displayed as percentages, and Figure F-5 shows the top of the same screen with the signal strength values displayed in dBm.

Figure F-4 Site Survey - Active Mode Screen (with Signal Strength as a Percentage)

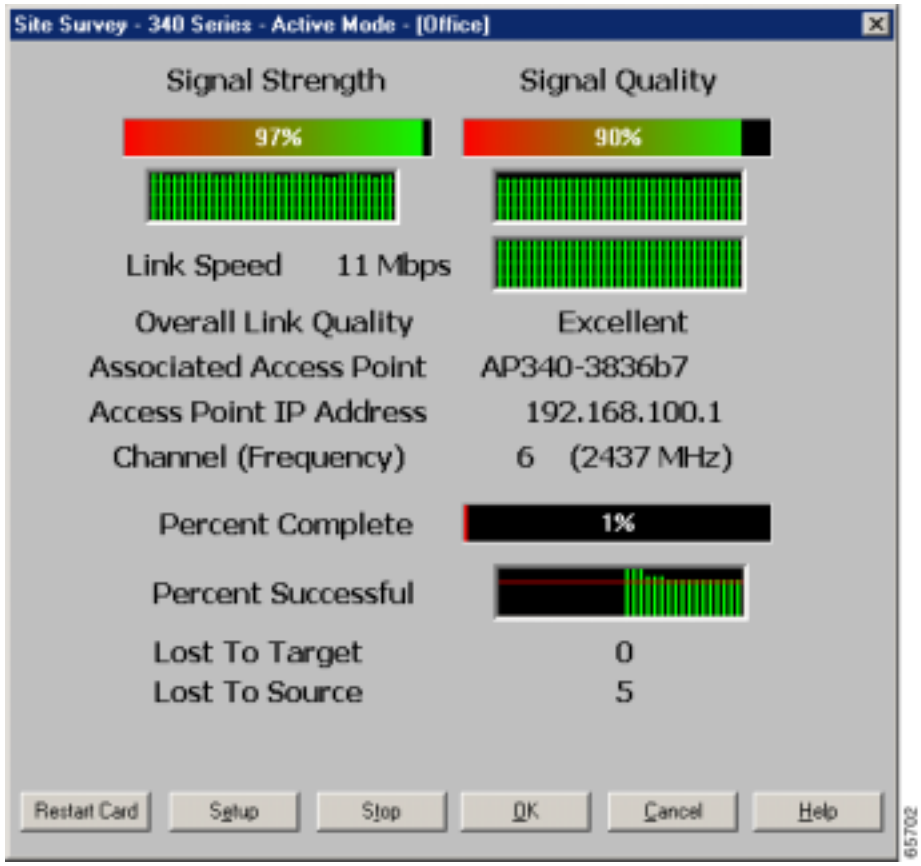


Figure F-5 Top of Site Survey - Active Mode Screen (with Signal Strength in dBm)

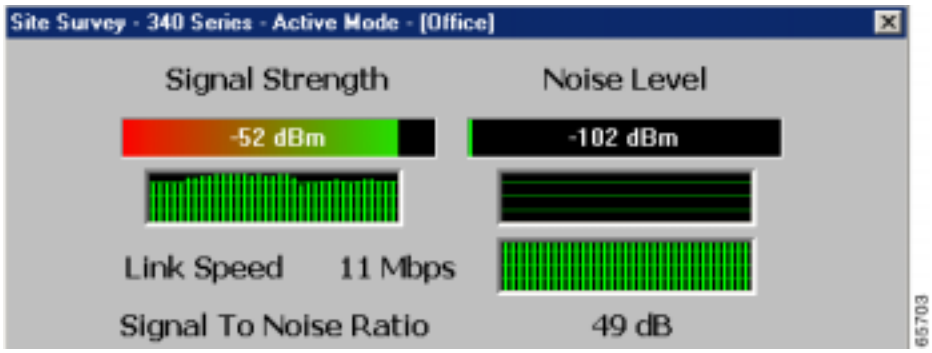


Table F-3 interprets the information that is displayed on the Site Survey - Active Mode screen while the site survey test is running.

Table F-3 Site Survey Active Mode Statistics

Statistic	Description
Signal Strength	The signal strength for all received packets. The higher the value and the more green the bar graph is, the stronger the signal. The histogram below the bar graph provides a visual interpretation of the current signal strength. Differences in signal strength are indicated by the following colors: green (strongest), yellow (middle of the range), and red (weakest). **Range:** 0 to 100% or –95 to –45 dBm
Signal Quality (2.4-GHz client adapters)	The signal quality for all received packets. The higher the value and the more green the bar graph is, the better the quality of the signal. The histogram below the bar graph provides a visual interpretation of the current signal quality. Differences in signal quality are indicated by the following colors: green (highest quality), yellow (average), and red (lowest quality). **Range:** 0 to 100% **Note** This setting appears only for 2.4-GHz client adapters and only if you selected signal strength to be displayed as a percentage. See the "Specifying Signal Strength Units" section on page F-3 for information.
Current Beacons Received (5-GHz client adapters)	The percentage of beacon packets received versus those expected to be received. The higher the value and the more green the bar graph is, the clearer the signal. **Example:** The access point sends out 10 beacons per second, so you would expect the client adapter to receive 50 beacon packets in 5 seconds. If it receives only 40 packets, the percentage of beacons received would be 80%. **Range:** 0 to 100% **Note** This setting appears only for 5-GHz client adapters (or for 2.4-GHz client adapters using firmware version less than 4.05) and only if you selected signal strength to be displayed as a percentage. See the "Specifying Signal Strength Units" section on page F-3 for information.
Link Speed	The rate at which your client adapter is transmitting packets to or from its associated access point. The Link Speed histogram provides a visual interpretation of the current rate at which your client adapter is transmitting packets. Differences in link speed are indicated by the following colors: green (fastest), yellow (middle of the range), and red (slowest). **Value:** 1, 2, 5.5, or 11 Mbps (2.4-GHz client adapters); 6, 9, 12, 18, 24, 36, 48, or 54 Mbps (5-GHz client adapters)

Table F-3 Site Survey Active Mode Statistics (continued)

Statistic	Description
Overall Link Quality	The client adapter's ability to communicate with the access point. **Value:** Not Associated, Poor, Fair, Good, Excellent **Note** This setting appears only if you selected signal strength to be displayed as a percentage. See the "Specifying Signal Strength Units" section on page F-3 for information.
Signal To Noise Ratio	The difference between the signal strength and the noise level. The higher the value, the better the client adapter's ability to communicate with the access point. **Range:** 0 to 90 dB **Note** This setting appears only if you selected signal strength to be displayed in dBm. See the "Specifying Signal Strength Units" section on page F-3 for information.
Associated Access Point	The access point to which your client adapter is associated. It is shown only if the access point was configured with a name and the client adapter is in infrastructure mode.
Access Point IP Address	The IP address of the access point to which your client adapter is associated. It is shown only if the access point was configured with an IP address and the client adapter is in infrastructure mode.
Channel (Frequency)	The frequency that your client adapter is currently using as the channel for communications. **Value:** Dependent on client adapter radio and regulatory domain
Percent Complete	The percentage of packets that have been transmitted based on the number specified in the Number of Packets field.
Percent Successful	The percentage of packets that were transmitted successfully. The Percent Successful histogram provides a visual interpretation of the percentage of packets that are not lost. The value you set for the Percent Success Threshold is indicated by the red line. Percentages greater than or equal to this value are displayed as green bars; percentages below this value are displayed as yellow bars. **Note** Refer to the Percent Success Threshold parameter in Table F-2 for more information.
Lost To Target	The number of packets that were not transmitted successfully to the access point.
Lost To Source	The number of packets that were not received successfully from the access point.

Step 4 When you click the **Stop** button or when the Percent Complete reaches 100%, the active mode changes back to the passive mode.

Step 5 Click **OK** or **Cancel** to exit the site survey application.

Forcing the Client Adapter To Reassociate

The client adapter will attempt to maintain its association to an access point for as long as it can. Therefore if you are on a fringe area while conducting a site survey, you may want to reinitialize (or restart) the client adapter in an attempt to force it to disassociate from the access point to which it is currently associated and reassociate to another access point.

Note Restarting the client adapter may cause you to lose your wireless network connection.

Follow the steps below to attempt to force the client adapter to disassociate from its current access point and reassociate to another during a site survey.

Step 1 Click the **Restart Card** button on the bottom of the Site Survey screen.

Step 2 When prompted to confirm your decision, click **Yes**. The driver stops the client adapter's radio, writes the configuration (although no parameter settings have been changed), and restarts the radio.

802.1X Also called *802.1X for 802.11*. 802.1X is the new standard for wireless LAN security, as defined by the Institute of Electrical and Electronics Engineers (IEEE). An access point that supports 802.1X and its protocol, Extensible Authentication Protocol (EAP), acts as the interface between a wireless client and an authentication server, such as a Remote Authentication Dial-In User Service (RADIUS) server, to which the access point communicates over the wired network.

802.11 The IEEE standard that specifies carrier sense media access control and physical layer specifications for 1- and 2-megabit-per-second (Mbps) 2.4-GHz wireless LANs.

802.11a The IEEE standard that governs the deployment of 5-GHz OFDM systems. It specifies the implementation of the physical layer for wireless UNII bands (see UNII, UNII 1, and UNII 2) and provides four channels per 100 MHz of bandwidth.

802.11b The IEEE standard that specifies carrier sense media access control and physical layer specifications for 5.5- and 11-Mbps 2.4-GHz 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.

Alphanumeric A set of characters that contains both letters and numbers.

Associated A station is configured properly to allow it to wirelessly communicate with an access point.

B

Bandwidth Specifies the amount of the frequency spectrum that is usable for data transfer. It identifies the maximum data rate that a signal can attain on the medium without encountering significant power loss.

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

Broadcast key rotation A security feature for use with dynamic WEP keys. If your client adapter uses LEAP or EAP-TLS authentication and you enable this feature, the access point changes the dynamic broadcast WEP key that it provides at the interval you select.

C

CCK Complementary code keying. A modulation technique used by IEEE 802.11b-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.

Cyclic Redundancy Check (CRC) A method of checking for errors in a received packet.

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.

Duplicate Packets Packets that were received twice because an acknowledgement got lost and the sender retransmitted the packet.

E

EAP Extensible Authentication Protocol. EAP is the protocol for the optional IEEE 802.1X wireless LAN security feature. An access point that supports 802.1X and EAP acts as the interface between a wireless client and an authentication server, such as a Remote Authentication Dial-In User Service (RADIUS) server, to which the access point communicates over the wired network.

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 megabits per second (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.

Firmware — Software that is programmed on a memory chip and kept in a computer's semi-permanent memory.

Fragmentation Threshold — The size at which packets will be fragmented and transmitted a piece at a time instead of all at once. The setting must be within the range of 64 to 2312 bytes.

Full Duplex — A means of communication whereby each node receives and transmits simultaneously (two-way). See also Half Duplex.

G

Gateway — A device that connects two otherwise incompatible networks together.

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

H

Half Duplex — A means of communication whereby each node receives and transmits in turn (one-way). See also Full Duplex.

Hexadecimal — A set of characters consisting of ten numbers and six letters (0-9, A-F, and a-f).

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.

Infrastructure Device — A device that connects client adapters to a wired LAN, such as an access point, bridge, or base station.

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.

L

LEAP LEAP, or *EAP-Cisco Wireless*, is the 802.1X authentication type that is available for use with operating systems that do not have built-in EAP support. Support for LEAP is provided in the client adapter's firmware and the Cisco software that supports it, rather than in the operating system. With LEAP, a username and password are used by the client adapter to perform mutual authentication with the RADIUS server through an access point.

M

MAC Address The Media Access Control (MAC) address is a unique serial number assigned to a networking device by the manufacturer.

MIC Message integrity check. MIC prevents bit-flip attacks on encrypted packets. During a bit-flip attack, an intruder intercepts an encrypted message, alters it slightly, and retransmits it, and the receiver accepts the retransmitted message as legitimate. The client adapter's driver and firmware must support MIC functionality, and MIC must be enabled on the access point.

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

Multicast Packets Packets transmitted to multiple stations.

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

O

OFDM Orthogonal frequency division multiplexing. A multicarrier modulation method for broadband wireless communications.

Overrun Packets Packets that were discarded because the access point had a temporary overload of packets to handle.

P

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

Q

QPSK Quadruple phase shift keying. A modulation technique used by IEEE 802.11-compliant wireless LANs for transmission at 2 Mbps.

R

Radio Channel The frequency at which a radio operates.

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.

RTS Threshold The packet size at which an access point will issue a request to send (RTS) before sending the packet.

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

TKIP Temporal Key Integrity Protocol. Also referred to as *WEP key hashing*. A security feature that defends against an attack on WEP in which the intruder uses the initialization vector (IV) in encrypted packets to calculate the WEP key. TKIP removes the predictability that an intruder relies on to determine the WEP key by exploiting IVs.

Transmit Power The power level of radio transmission.

U

Unicast Packets Packets transmitted in point-to-point communication.

UNII Unlicensed National Information Infrastructure. An FCC regulatory domain for 5-GHz wireless devices. UNII bands are 100 MHz wide and divided into four channels when using 802.11a OFDM modulation.

UNII 1 A UNII band dedicated to in-building wireless LAN applications. UNII 1 is located at 5.15 to 5.25 GHz and allows for a maximum transmit power of 40 mW (or 16 dBm) with an antenna up to 6 dBi. UNII 1 regulations require a nonremovable, integrated antenna.

UNII 2 A UNII band dedicated to in-building wireless LAN applications. UNII 2 is located at 5.25 to 5.35 GHz and allows for a maximum transmit power of 200 mW (or 23 dBm) with an antenna up to 6 dBi. UNII 2 regulations allow for an auxiliary, user-installable antenna.

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

A

B

C

D

E

F

H

I

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L

M

N

R

S

T

U

W