



# Setting Up Your Workgroup Server 8550

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*Includes information about setting up and expanding  
your server system; also includes technical specifications*

 Apple Computer, Inc.

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Apple Computer, Inc.  
1 Infinite Loop  
Cupertino, CA 95014-2084  
(408) 996-1010

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# Contents

*Communications regulation information / viii*

*Laser information / ix*

## **About This Guide / 1**

About your Workgroup Server 8550 and  
Power Macintosh software / 1

Who should read this guide / 2

What this guide contains / 2

How to use this guide / 2

Other reference material / 3

Where to find answers / 4

## **1 Setting Up Your Server / 5**

Your server at a glance / 6

Security issues / 8

    Physically isolating the system / 8

    Using a locking cable / 8

Installing internal devices / 9

Connecting a monitor / 9

    Connecting the monitor's power cord / 9

    Connecting the monitor cable / 11

- Connecting the mouse and keyboard / 12
  - Connecting a keyboard with a built-in cable / 12
  - Connecting a keyboard with a separate cable / 13
- Connecting other external devices / 13
- Plugging in the server / 14
- Turning the server on / 15
  - Problems turning on your server? / 17
- Turning the server off / 18
  - Using the Shut Down command / 18

## **2 Connecting to the Network / 19**

- Connecting to an Ethernet network / 20
  - Connecting to twisted-pair Ethernet / 21
  - Connecting to a thin coaxial Ethernet / 22
  - Connecting to other types of Ethernet / 23
- Connecting to a LocalTalk network / 24
- Building a high-performance network / 25
  - Creating a high-performance Ethernet segment / 26
  - Using multiple network segments / 27
    - Setting up multihoming / 28
    - Use a router to connect each network segment / 28
    - Have users select the server in their own zone / 29

## **3 Expanding Your Server and Connecting Other Equipment / 31**

- Opening the server safely / 32
- Installing an expansion card / 34
  - Power requirements / 34
  - Installing a PCI expansion card / 35
- Upgrading the processor / 40

Expanding memory /	41
Connecting hard disks and other SCSI devices /	42
Setting the SCSI ID number /	43
Installing an additional hard disk in the internal disk drive bracket /	45
Installing a drive in the auxiliary bay /	54
Connecting an external SCSI drive /	60
Installing a device driver /	62
Do you need to initialize a hard disk? /	62
Connecting a printer /	63
Connecting an additional monitor /	64
Connecting a trackball or other input device /	64
Connecting a modem or GeoPort Telecom Adapter /	65
Connecting audio equipment /	65
About your server's sound ports /	66
Connecting most audio equipment /	67
Connecting and positioning a microphone /	68
Connecting external stereo speakers /	69

## **Appendix A Safety, Maintenance, and Health Information / 71**

Important server safety instructions /	71
Handling your computer equipment /	72
Handling the monitor /	73
Handling the keyboard /	74
Handling floppy disks /	74
Handling CD-ROM discs /	75
Ejecting a disk /	76
If you can't eject a floppy disk /	76
Power supply /	77

Cleaning your equipment / 77
Cleaning the server case / 77
Cleaning the monitor / 77
Cleaning the mouse / 77
Locking and unlocking the mouse / 79
Health-related information about computer use / 81
Musculoskeletal discomfort / 81
Eye fatigue / 82
Arranging your office / 83
Avoiding fatigue / 84
What about electromagnetic emissions? / 85

## **Appendix B Technical Information / 87**

Expanding your Workgroup Server 8550 / 88
Specifications / 89
Main unit / 89
Processor / 89
Memory / 89
DRAM, VRAM, and cache configurations / 89
DRAM configurations / 90
VRAM configurations / 91
Cache configurations / 91
Adding DRAM / 91
Graphics modes / 92
Internal disk drives / 94
Clock/calendar / 94
Keyboard / 94

Mouse / 94
Interfaces / 94
Audio system / 96
Typical specifications / 96
AC line input / 98
AC line output / 98
DC power / 98
Power requirements for devices you can connect / 98
Apple Desktop Bus (ADB) / 98
Audio and telecommunications devices / 99
Expansion cards and devices / 99
Assigning SCSI ID numbers / 100
Size and Weight / 101
Environment / 101
Operating temperature / 101
Storage temperature / 101
Relative humidity / 101
Altitude / 101
Specifications for the 600i CD-ROM drive / 102
Data / 102
Audio capacity / 102
Modes supported / 103
Data streaming and transfer rates / 103
Power consumption (typical) / 103
Laser / 103

<i>Index / 105</i>
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## Communications regulation information

### FCC statement

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the Federal Communications Commission (FCC) rules. These limits are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio-frequency energy and, if not installed and used in accordance with the instructions in this manual, may cause interference to radio communications. Operation of this equipment in a residential area is likely to cause interference, in which case the user, at the user's own expense, will be required to correct the interference.

**IMPORTANT** Changes or modifications to this product are not authorized by Apple Computer, Inc., and could void the FCC certification and negate your authority to operate the product. This product was tested for FCC compliance under conditions that included the use of shielded cables and connectors between system components. It is important that you use shielded cables and connectors to reduce the possibility of causing interference to radios, television sets, and other electronic devices. For Apple peripheral devices, you can obtain the proper shielded cables through an Apple-authorized dealer. For non-Apple peripheral devices, contact the manufacturer or dealer for assistance.

### DOC statement

#### *DOC Class A Compliance*

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the radio interference regulations of the Canadian Department of Communications.

*Observation des normes—Classe B* Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la Classe A prescrites dans les règlements sur le brouillage radioélectrique édictés par le Ministère des Communications du Canada.

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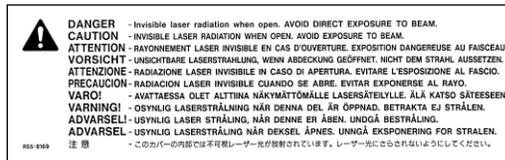
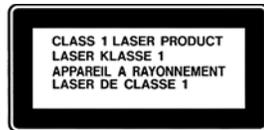
This equipment generates, uses, and may radiate radio-frequency energy and, if not properly installed and used in accordance with the instruction manual, may result in interference to radio communications. Operation of this equipment in a residential area may cause radio interference, in which case the user will be required to correct the interference at his own expense.

## Laser information

**WARNING** Making adjustments or performing procedures other than those specified in your equipment's manual may result in hazardous radiation exposure.

**WARNING** Do not attempt to disassemble the cabinet containing the laser. The laser beam used in this product is harmful to the eyes. The use of optical instruments, such as magnifying lenses, with this product increases the potential hazard to your eyes. For your safety, have this equipment serviced only by an Apple-authorized service provider.

If you have an internal Apple CD-ROM drive in your computer, your computer is a Class 1 laser product. The Class 1 label, located in a user-accessible area, indicates that the drive meets minimum safety requirements. A service warning label is located in a service-accessible area. The labels on your product may differ slightly from the ones shown here.



## About This Guide

This guide tells you how to set up your Workgroup Server 8550 and connect it to a network. It also provides technical specifications for your server and information about adding internal and external devices to your server. This setup guide is a companion to the *Workgroup Server Administrator's Guide*, which tells you how to configure the system software for use with your Workgroup Server, use application software programs, use your server's built-in CD-ROM drive and tape backup unit, and troubleshoot hardware and software problems that you may encounter while using your server.

### About your Workgroup Server 8550 and Power Macintosh software

Your Workgroup Server 8550 is powered by the PowerPC™ microprocessor (or “chip”). This microprocessor was designed by Apple Computer, Inc., Motorola, Inc., and IBM Corporation. The PowerPC microprocessor uses Reduced Instruction Set Computer (RISC) technology to deliver very high performance at the lowest possible cost. The PowerPC RISC microprocessor represents the state of the art in microprocessor design.

Your Workgroup Server 8550 will run almost all of your existing Macintosh software, but for best performance and greatest speed, look for software programs designed especially for Power Macintosh computers. You'll find Power Macintosh programs at any software store that carries products for Macintosh.

## Who should read this guide

This guide is intended for the person who sets up the server and connects it to an existing network. You need to know some details of your existing network in order to choose the appropriate procedures for connecting the server to your network.

## What this guide contains

Here's a brief summary of what you'll find in this guide:

- Chapter 1, "Setting Up Your Server," provides a graphic overview of the Workgroup Server 8550, and explains how to connect the monitor, keyboard, and mouse, and how to start up your server for the first time.
- Chapter 2, "Connecting to the Network," describes how to connect the server to an Ethernet or LocalTalk network, and provides information about setting up a high-performance network.
- Chapter 3, "Expanding Your Server and Connecting Other Equipment," describes how to install expansion cards and additional internal drives in your server, and connect additional external devices to the server.
- Appendix A, "Safety, Maintenance, and Health Information," suggests how you can create a healthful and safe server environment and keep your server equipment in good working order.
- Appendix B, "Technical Information," contains technical specifications for your server.

## How to use this guide

*Familiarize yourself with your server's basic components.* See the section "Your Server at a Glance" in Chapter 1.

*Consider security issues and placement of your server.* Read the section "Security Issues" in Chapter 1 for important information about protecting your server from unauthorized access.

*If you want to add an expansion card or internal drive to the server:* Install the card or internal device according to the instructions in Chapter 3, "Expanding Your Server and Connecting Other Equipment." Then return to Chapter 1 to connect the monitor and keyboard.

*If you want to connect external peripheral devices to your server:* After you connect the monitor and keyboard to the server, as described in Chapter 1, turn to the appropriate instructions in Chapter 3, then return to Chapter 1.

*Connect to the network to complete the setup process.* See Chapter 2, “Connecting to the Network,” for details.

## Other reference material

In addition to this guide, you may need to consult the following sources of information.

- After setting up your server’s hardware, see the *Workgroup Server Administrator’s Guide* for details on configuring and using the features of the Mac OS and Macintosh application programs. The *Administrator’s Guide* also contains information about using your server’s DAT and CD-ROM drives, as well as important troubleshooting information for help with problems you may experience while using your server.
- For important late-breaking information about your server and system software, see the Workgroup Server Read Me file, located on the server’s hard disk and on the *Workgroup Server Software* CD-ROM disc.
- For information about server application programs included with your Workgroup Server 8550, such as Apple RAID Software and Retrospect Remote, refer to the documentation for those programs included in the server accessory kit.
- There are a number of network services, such as AppleShare, AppleSearch, and Apple Remote Access, that can be installed on your Workgroup Server 8550. Refer to the documentation included with those services for installation and operation information.
- If you purchased an Apple Internet Server, see the setup booklet included in the Apple Internet Server Solution for the World Wide Web package.
- If you need a better understanding of how to configure your network, the following books from Apple Computer, published by Addison-Wesley, are available at computer bookstores:
  - Understanding Computer Networks* gives an overview of networking basics.
  - Planning and Managing AppleTalk Networks* provides in-depth information on setting up, maintaining, and troubleshooting AppleTalk networks.

## Where to find answers

When you have questions about using your server, there are several places you can look for answers.



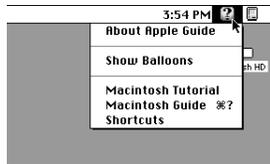
### In this book

Use this book to help you set up and expand your server system, and to connect it to a network. Also use this book to check your server's technical specifications.



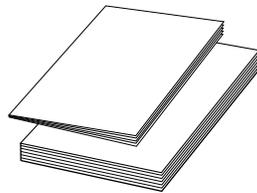
### In the *Workgroup Server Administrator's Guide*

Use this book to configure the operating system for your server, to learn about the Mac OS, for troubleshooting information if you experience problems with your server, and to learn about your server's DAT and CD-ROM drives.



### In the Guide menu

The Guide menu (marked with the  icon) is your main source of information about the Mac OS. To learn how to get different kinds of help from the Guide menu, see Appendix A in the *Workgroup Server Administrator's Guide*.



### In other manuals

For answers to questions about other equipment or about application programs you have purchased, see the manuals that came with the equipment or programs.



### From Apple's customer support hotline

If you can't find an answer in any of the materials provided, call the customer support hotline. (The phone number for the hotline is in the service and support information that came with your server.)

# 1

## Setting Up Your Server

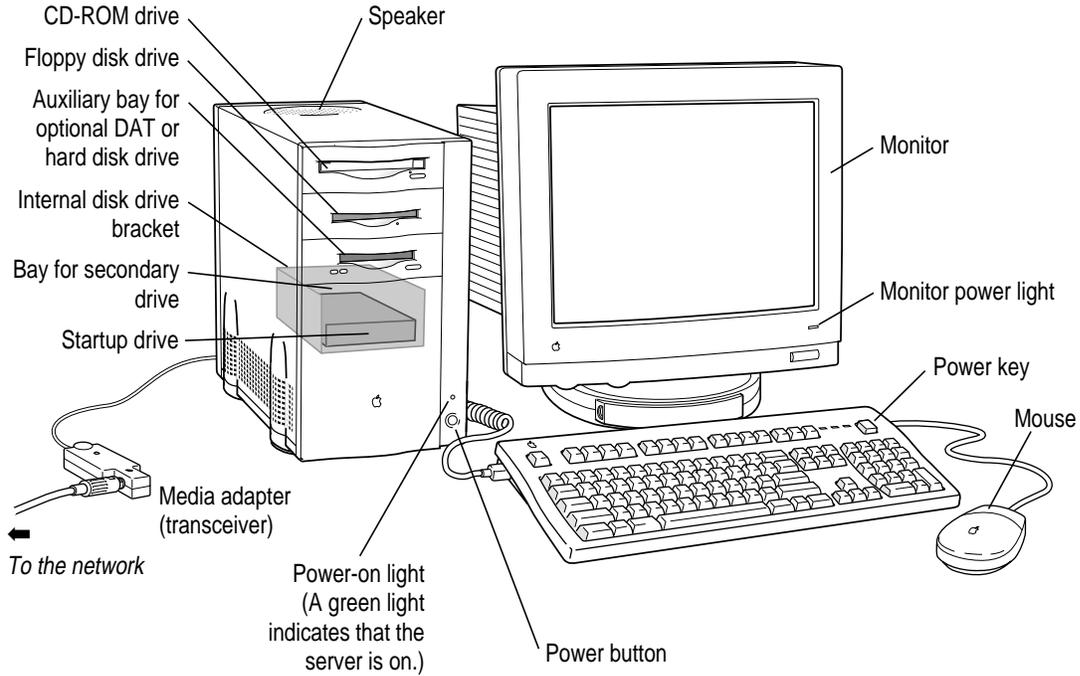
Setting up your server involves connecting a monitor, mouse, and keyboard, expanding your system to suit your needs, and connecting to the network.

First, acquaint yourself with your server's features, as shown in the next section, "Your Server at a Glance." Also, be sure to read the section "Security Issues" for important information about protecting your server from unauthorized access. Then, if you want to install an expansion card or install other internal devices, see the appropriate sections in Chapter 3 before returning to the setup procedures in this chapter. Once you've connected the monitor, mouse, and keyboard, you may need to refer to Chapter 3 again if you're connecting external devices.

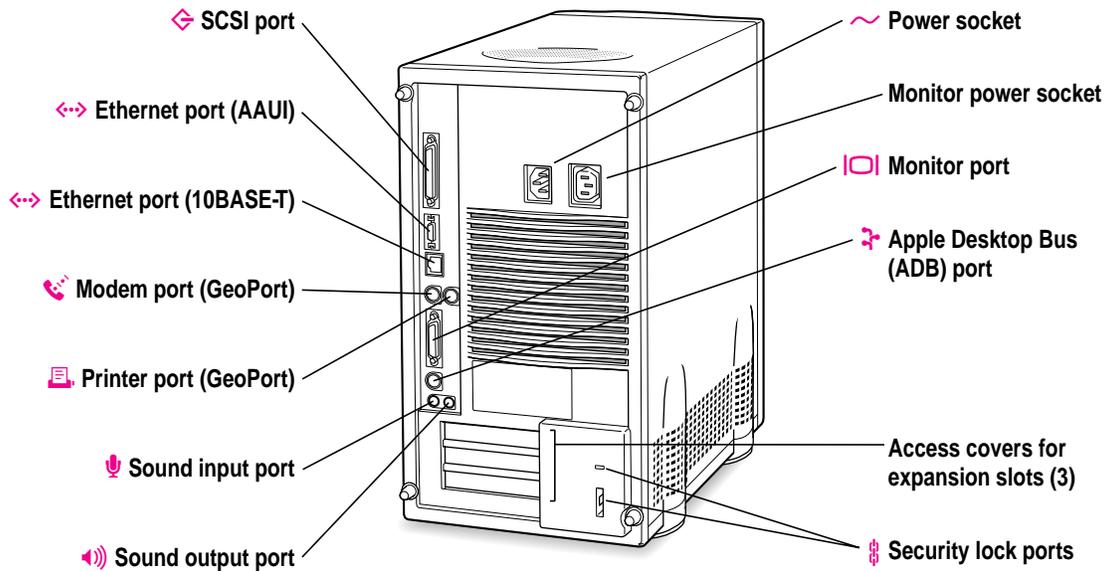
You complete the setup process by connecting your server to the network, as described in Chapter 2. Once your server is connected to the network, see the *Workgroup Server Administrator's Guide* for instructions on configuring your server's system software.

## Your server at a glance

The following figure shows the basic components of your Workgroup Server 8550 assembled and connected to a network.



The ports on the back of the Workgroup Server 8550 and the icons that identify them are shown in the following figure. During setup, you'll connect hardware to some of these ports.




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#### Your server's ports and connectors

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SCSI port	◇	Connects your server to SCSI equipment such as external hard disk drives and scanners.
Ethernet port (AAUI)	↔	Connects your server to an Ethernet network using an adapter.
Ethernet port (10BASE-T)	↔	Connects your server to an Ethernet network using a 10BASE-T connector.
Modem port (GeoPort)	☎	Connects your server to an external modem, LocalTalk network, or GeoPort Adapter.
Printer port (GeoPort)	🖨	Connects your server to a printer, LocalTalk network, or GeoPort Adapter.
Sound input port	🎤	Connects your server to an Apple PlainTalk microphone or other audio input equipment.
Sound output port	🔊	Connects your server to headphones, externally powered (amplified) speakers, or other audio output equipment.
Monitor port	🖥	Connects your server to a monitor.
Apple Desktop Bus (ADB) port	🗑	Connects your server to an input device, such as a keyboard or a trackball.
Access covers for slots (3)		Your server supports up to three Peripheral Component Interconnect (PCI) expansion cards.
Security lock ports	🔒	You can attach a security lock to your server. See your computer products retailer for security lock devices that work with your server.

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## Security issues

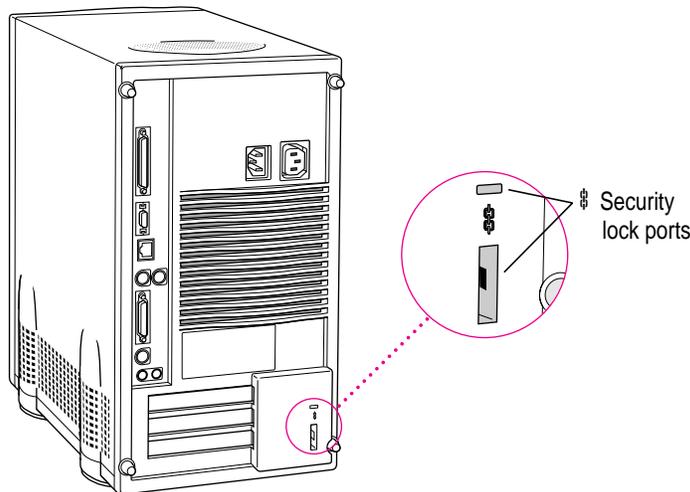
The Workgroup Server 8550 lets you concentrate valuable or sensitive information on one system that can be physically isolated and more carefully monitored than would be possible if that information were stored on personal computers. Before you set up the server, you may want to consider two measures that you can take to secure the hardware components: physically isolating the system and using a locking cable to secure the system.

### Physically isolating the system

It is important to note that even if software security features (such as password protection or locking screen savers) are in use on the server, it is still possible to disconnect peripheral devices from your server. There is no better way to protect hardware components than by physically isolating the server system—locking it either in a well-ventilated cabinet or in a room with controlled access. Depending on your security needs, the nature of the data stored on the server and its external drives may warrant the effort.

### Using a locking cable

As an alternative to isolating the system completely in an area of controlled access, you can purchase a locking cable and attach it to your server. The back panel has a built-in port for a locking cable. Follow the instructions supplied with the locking cable to secure it to your server.



By itself, a locking cable cannot prevent unauthorized use of the server, but it can prevent the server (and its peripheral devices if they are also secured by locking cables) from being removed.

## Installing internal devices

If you purchased additional internal drives or expansion cards for your server, install them now (see Chapter 3 for instructions). If you don't have internal devices to install, go on to the next section, "Connecting a Monitor."

## Connecting a monitor

You can connect many types of monitors (often called displays) to your server, including most standard monitors. See Appendix B, "Technical Information," for a complete list.

This section contains instructions for connecting most types of monitor. To connect a monitor from a manufacturer other than Apple, refer also to the instructions that came with the monitor.

### Connecting the monitor's power cord

Monitors have two cords to connect: a power cord and a monitor cable. To connect the monitor power cord:

**1 Place the monitor where you will be using it.**

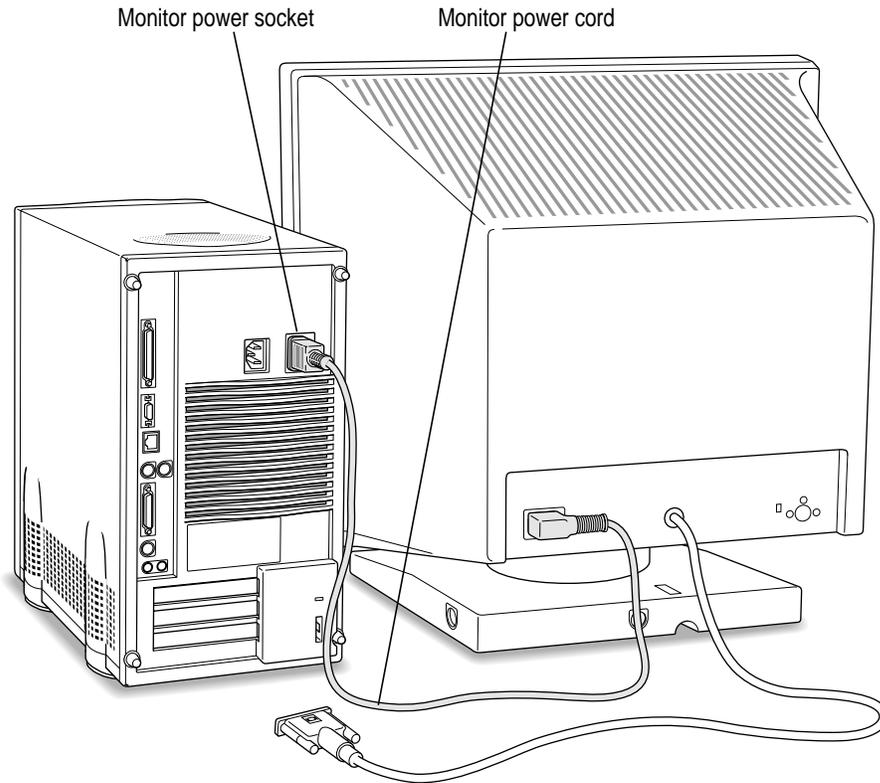
Keep in mind these considerations:

- Allow a few inches for air circulation around the server and monitor.
- Make sure the top of the screen is slightly below eye level when you're sitting at the keyboard.
- Position the monitor to minimize glare and reflections on the screen from overhead lights and windows.
- Consult "Arranging Your Office" in Appendix A for suggestions about locating your server equipment.

**2 Connect the monitor's power cord to the monitor.**

On some monitors, the cord is already attached.

**3 Plug in the monitor's power cord to the server or grounded electrical outlet.**



Some power cords are designed to plug into the back of your server. You can also plug the power cord into a grounded electrical outlet (an adapter may be needed).

*Note:* If you have an Apple AudioVision monitor, plug the monitor's power cord into the back of the server, not into an outlet.

Some monitors have to be connected to a grounded power outlet, not to the server's power socket. Check the information that came with the monitor.

## Connecting the monitor cable

After you plug in the monitor's power cord, connect the monitor cable to the server's monitor port.

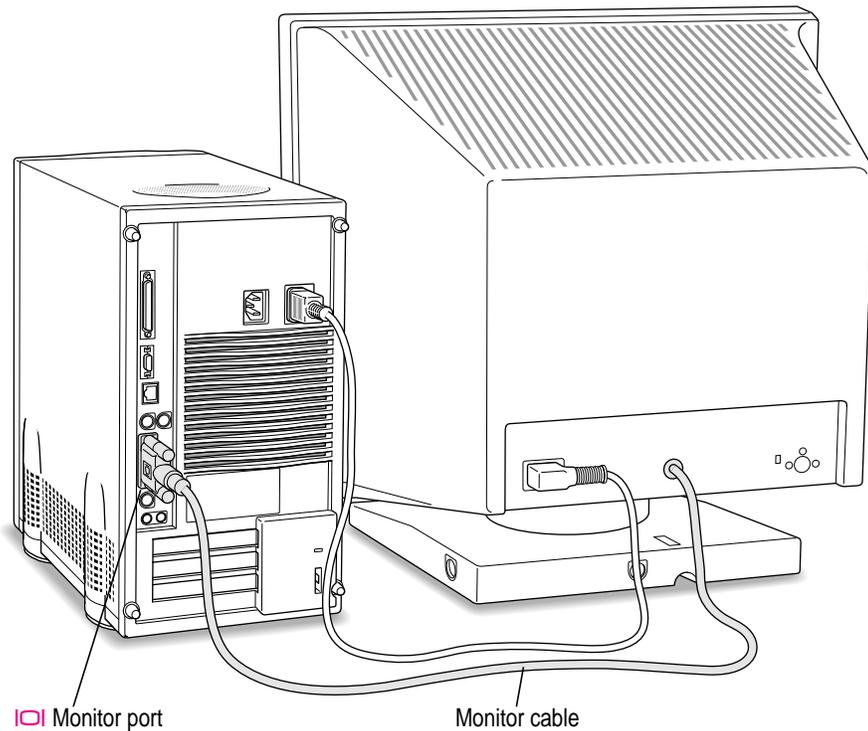
To connect the monitor cable:

- 1 Attach the monitor cable to the monitor.**

On some monitors, the cable is already attached.

- 2 Attach the monitor cable to the server's monitor port.**

The monitor port is marked with the icon . To connect the cable, firmly push it into the connector and then use the thumbscrews to secure the connection.



If you have an AudioVision monitor, see the information that came with the monitor to use its special features.

## Connecting the mouse and keyboard

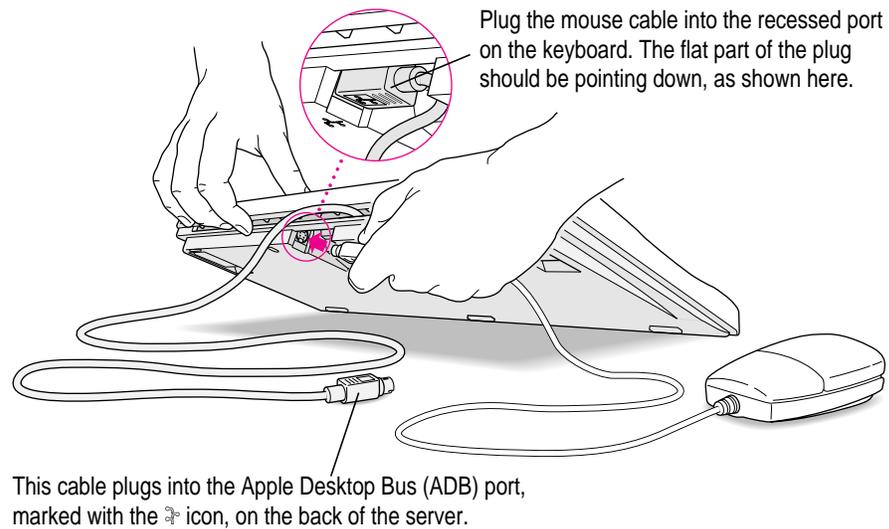
You have a choice of several keyboards for your server. The way you connect the mouse and keyboard depends on whether the keyboard has a separate cable or a built-in cable.

### Connecting a keyboard with a built-in cable

- 1 **Plug the mouse cable into the recessed port on the back of the keyboard.**

The plug and the port are marked with the  icon symbol. The positions of the port and icon on your keyboard may be different from those pictured.

*Note:* A port marked with the  icon is called an Apple Desktop Bus (ADB) port.

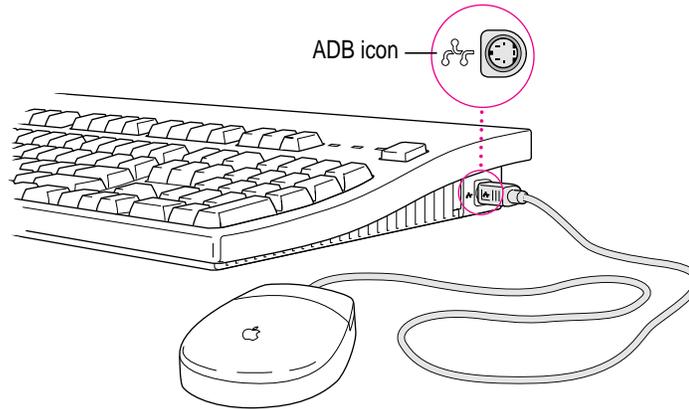


- 2 **Plug the keyboard cable into the port on the back of the server marked with the  icon.**

Some monitors have a  port to which you can connect the keyboard or mouse. See the information that came with your monitor.

## Connecting a keyboard with a separate cable

- 1 Plug the mouse cable into the port on either side of the keyboard.



Most right-handed people prefer to use the mouse with their right hand; most left-handed people prefer to use the mouse with their left hand. Plug the mouse into the port on the side you prefer.

The plug and the port are marked with the same icon (⌘). Align the icons before you insert the plug. The positions of the port and icon on your keyboard may be different from those pictured.

*Note:* The ⌘ port is called the Apple Desktop Bus (ADB) port.

- 2 Plug the keyboard cable (both ends are the same) into the other port on the keyboard.
- 3 Plug the keyboard cable into the port on the back of the server marked with the ⌘ icon.

Some monitors have a ⌘ port to which you can connect the keyboard or mouse. See the information that came with your monitor.

## Connecting other external devices

If you want to connect other devices to your server, such as an external hard disk or a printer, follow the instructions in Chapter 3.

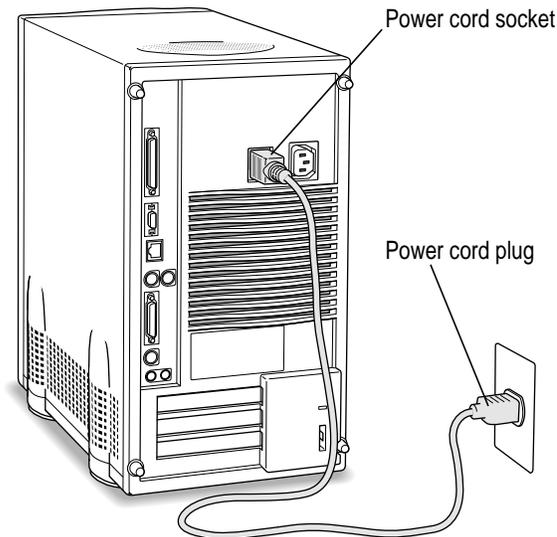
## Plugging in the server

To plug in the server:

- 1 Plug the socket end of the server's power cord into the recessed power plug (marked with the symbol ~) on the back of the server.
- 2 Plug the other end of the power cord into a three-hole grounded outlet or power strip.

Choose a power outlet to which you have easy access.

**WARNING** This equipment is intended to be electrically grounded. Your server is equipped with a three-wire grounding plug—a plug that has a third (grounding) pin. This plug will fit only a grounded AC outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact a licensed electrician to replace the outlet with a properly grounded outlet. Do not defeat the purpose of the grounding plug!



**IMPORTANT** The only way to disconnect power completely is to unplug the power cord. Make sure at least one end of the power cord is within easy reach so that you can unplug the server when you need to.

## Turning the server on

Before turning the server on, make sure it is in its upright position; the Workgroup Server 8550 is not designed to run on its side.

To turn on the server for the first time, follow these steps.

**1 Turn on the monitor.**

See the information that came with your monitor for the location of the power switch. On Apple monitors, the power switch has this icon: ⓪.

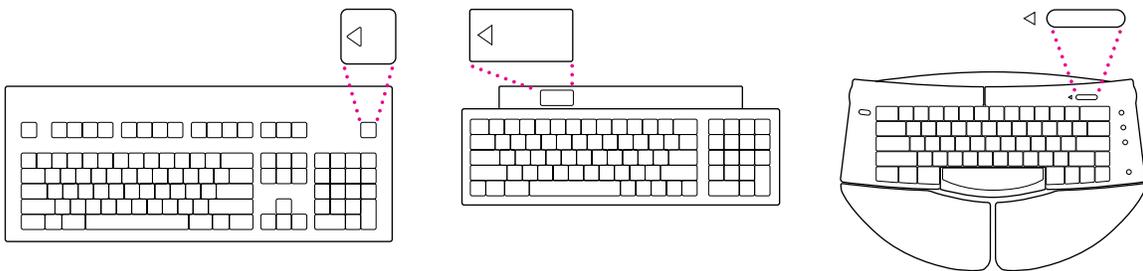
*Note:* You only need to turn on the monitor once if its power cord is plugged into the server. From now on, the monitor will turn off automatically when you shut down the server, and it will turn on automatically when you start up the server. (If the monitor's power cord is not plugged into the server, it must be turned on separately each time you turn on the server.)

**2 Turn on all external devices.**

External devices may include hard disk drives, CD-ROM drives, or tape-backup drives. The server checks only once—at startup—for the presence of external devices, so you need to turn on the devices *before* you turn on the server.

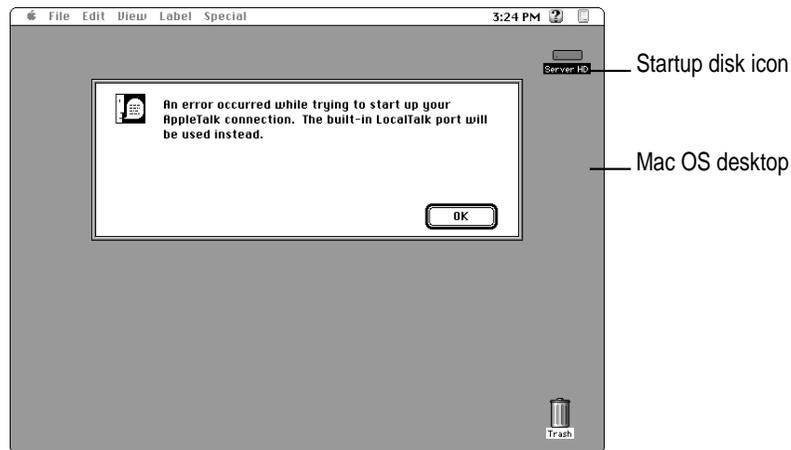
**3 Turn on your server by pressing the Power key on the keyboard or pressing the Power button on the front panel of the server.**

You'll find the Power key at the top of the keyboard. You can recognize this key by the triangle outline.



**4 Check to see what's on your screen.**

- If you see a system message on the desktop, as shown in the following figure, your Mac OS is already set up correctly. Click the OK button to dismiss the dialog box.



*Why the message about your network connection?* The Workgroup Server is preset for a connection to an Ethernet network. When you start up your server for the first time (before connecting a network cable), you'll see the dialog box shown above alerting you that the system temporarily switched the network connection from built-in EtherTalk (software for Ethernet) to LocalTalk. However, if you shut down the server and connect to an Ethernet network later (as described in Chapter 2), the next time you start up, the system will automatically make the correct network connection for you.

See the *Workgroup Server Administrator's Guide* for information on configuring your server's software.

- If you see a blinking question mark, you need to install system software on the server's hard disk.



To install the Mac OS, see “Installing System Software” in Chapter 4, “Managing Hard Disks,” of the *Workgroup Server Administrator's Guide*.

- If you see anything else on your screen, or if you see nothing at all, see the next section, “Problems Turning On Your Server?”

### Problems turning on your server?

If you don't see anything on the screen, check these items to see if you can identify the problem:

- Is the server plugged into a power source? If it is plugged into a power strip, is the power strip turned on?
- Is the power light on the front panel on?
- Are the keyboard and mouse cables connected correctly? (Don't disconnect the keyboard or mouse cables while your server is on. You could damage your equipment.)
- Is the monitor power cord plugged in?
- Is the monitor turned on? (Check the power light on the front of the monitor.)
- Is the monitor's cable attached firmly to both the monitor and server?
- Are the brightness and contrast controls on the monitor adjusted correctly? (On Apple monitors, the brightness control is marked with the symbol ☼ and the contrast control is marked with the symbol ●.)

## Turning the server off

You need to turn off (shut down) the server to perform the tasks in Chapter 2, “Connecting to the Network.”

**IMPORTANT** Be sure to turn off the server if you need to do any of the following:

- move the server
- connect other equipment to the server
- unplug the server

You can turn off the server by pressing the Power button (located at the front of the server) or you can use the Shut Down command. Both procedures ready the startup disk for a fast restart the next time you turn on the server.

### Using the Shut Down command

- 1 Choose Shut Down from the Special menu.



- 2 Respond to the dialog boxes that may appear.

Applications that are running may display dialog boxes that prompt you to save open files or that ask you to enter a message that is to be displayed to users who are logged in to your server.

# 2

## Connecting to the Network

The Workgroup Server 8550 contains built-in hardware and software for connecting the server to two types of networks: LocalTalk and Ethernet. With the appropriate Peripheral Component Interconnect (PCI) card and software, you can also connect your server to additional networks, including other network types, such as Token Ring, Integrated Services Digital Network (ISDN), Fiber Distributed Data Interface (FDDI), and Fast Ethernet (100BASE-T) networks.

You connect the server to a LocalTalk network through the printer port. The built-in Ethernet ports on the Workgroup Server 8550 let you connect the server to an Ethernet network through either the AAUI (Apple Attachment Unit Interface) Ethernet connector or the 10BASE-T Ethernet interface connector. (Although you can connect cables to both of these Ethernet ports at the same time, you can use only one of these built-in Ethernet connections at a time.)

The Workgroup Server 8550 is preconfigured to use the built-in Ethernet connection. If both 10BASE-T and AAUI networks are connected to the built-in Ethernet ports, your server automatically uses the 10BASE-T connection. See Chapter 2, “Configuring Your Network Connection,” in the *Workgroup Server Administrator’s Guide* for instructions on changing the default network connection for your server.

Although your server is preconfigured to access one network segment at a time, with network server software (such as AppleShare 4.2.1) that supports the multihoming capabilities of Open Transport 1.1 (new communications software that is part of the Mac OS included with your server), you can set up your server to access multiple network segments at the same time. See the section “Building a High-Performance Network” later in this chapter for more information on multihoming.

## Connecting to an Ethernet network

The built-in Ethernet capabilities of your Workgroup Server 8550 allow you to connect to any standard Ethernet network using thin coaxial (or “coax”), 10BASE-T twisted-pair, or thick coaxial cables; fiber-optic media; or other standard Ethernet cables.

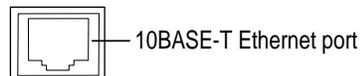
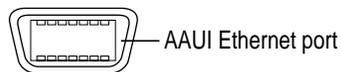
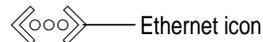
You can connect your server *directly* to an Ethernet network using a 10BASE-T twisted-pair cable. To connect the server to an Ethernet network using coaxial cables, you need one of the following Ethernet media adapters:

- Apple Ethernet Thin Coax Transceiver
- Apple Ethernet AUI Adapter

See your Apple-authorized dealer for more information on Apple Ethernet media adapters for your Workgroup Server 8550.

**WARNING** Do not connect cables to the back of the server when the power is on or you may damage your system.

You can connect an adapter and cable for an Ethernet network directly to the server without installing an expansion card. You can find the Ethernet ports on the back of your server by looking for the Ethernet icon:



Although you can connect cables to both of these Ethernet ports at the same time, you can use only one of these built-in Ethernet connections at a time.

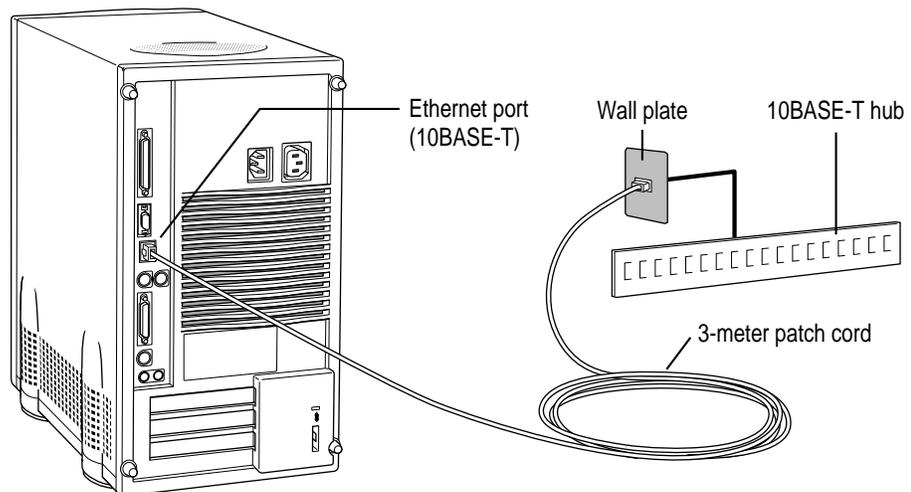
The following sections provide basic instructions for connecting your server to an Ethernet network.

## Connecting to twisted-pair Ethernet

Follow this procedure to connect the server to a network that implements Ethernet over twisted-pair cable. The hardware connection requires a twisted-pair patch cord with an RJ-45 telephone-style connector jack. You plug the patch cord into a standard wall plate that is connected to a centralized 10BASE-T hub.

To connect the server to a twisted-pair network:

- 1 **Make sure that the server is turned off.**
- 2 **Plug one end of the twisted-pair patch cord into an RJ-45 wall outlet that supports twisted-pair Ethernet.**



- 3 **Plug the other end of the twisted-pair patch cord into the 10BASE-T Ethernet port on the server.**

The server is preset to use the network software connection for Ethernet. You can use network services as soon as you start up the server.

## Connecting to thin coaxial Ethernet

Follow this procedure to connect the server to an Ethernet network that uses thin coaxial cable. The hardware connection requires an Apple (or Apple-compatible) thin coaxial transceiver and a thin coaxial cable.

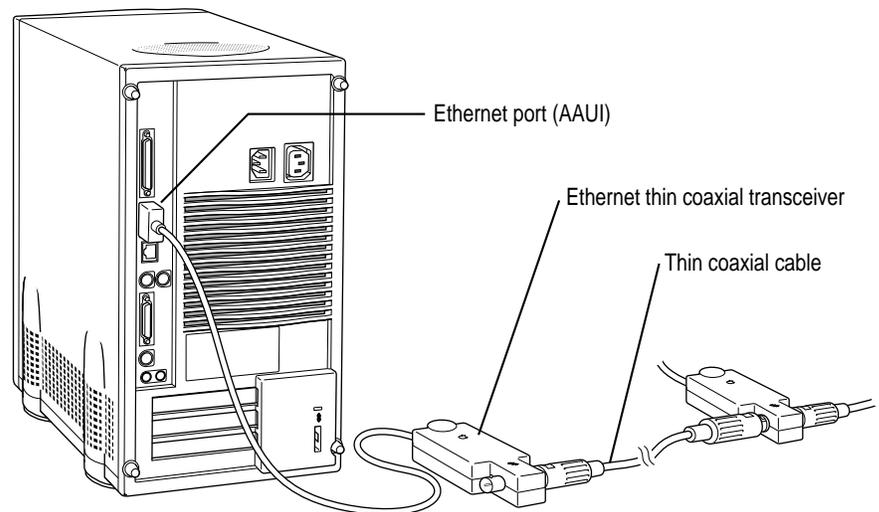
To connect the server to a thin coaxial network:

- 1 Make sure that the server is turned off.**
- 2 Attach one end of a thin coaxial cable to one of the posts on the thin coaxial transceiver.**
- 3 Attach the other end of the cable to the last thin coaxial transceiver on the network.**

A thin coaxial network must be terminated at the endpoints to function. An Apple transceiver is self-terminating. A non-Apple transceiver may require a terminator; check the documentation that came with the transceiver.

*Note:* You can connect the server anywhere along a network; however, to do so requires that you temporarily disconnect the network, which could disrupt existing network services.

- 4 Plug the connector on the transceiver into the AAUI Ethernet port on the server.**



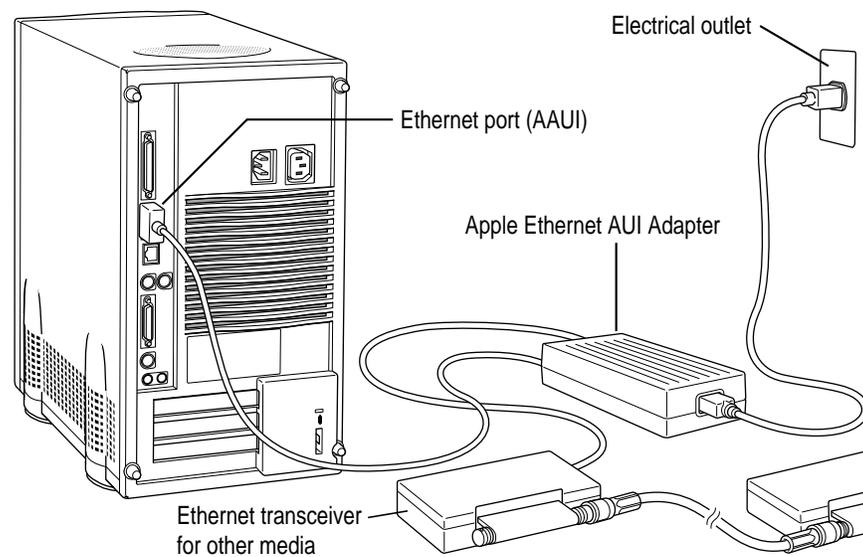
The server is preset to use the network software connection for Ethernet. You can use network services as soon as you start up the server.

## Connecting to other types of Ethernet

The Apple Ethernet AUI Adapter is a universal adapter that lets you connect the server to less-common types of industry-standard Ethernet media, such as thick coaxial or fiber-optic cable. If you are using the Apple Ethernet AUI Adapter, you also need an Ethernet transceiver for your specific media type, and the transceiver must have a standard AUI port on it.

To connect the server to an Ethernet transceiver for other types of Ethernet media:

- 1 **Make sure that the server is turned off.**
- 2 **Connect the Ethernet transceiver to the network following the instructions in the documentation that came with the transceiver.**
- 3 **Plug the transceiver cable from the Ethernet transceiver into the standard AUI port on the Apple Ethernet AUI Adapter.**

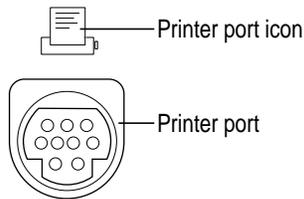


- 4 **Plug the adapter's power cord into a power outlet.**
- 5 **Plug the connector on the Apple Ethernet AUI Adapter into the AAUI Ethernet port on the server.**

The server is preset to use the network software connection for Ethernet. You can use network services as soon as you start up the server.

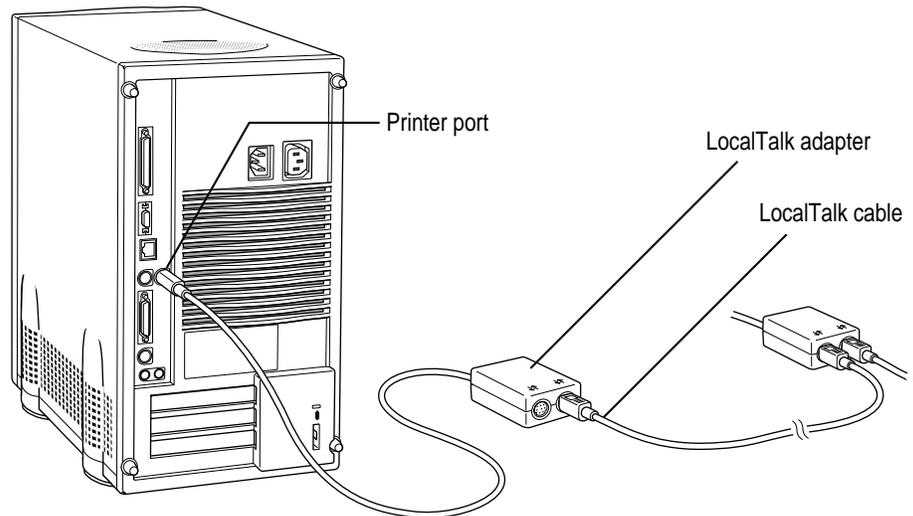
## Connecting to a LocalTalk network

To connect your server to a LocalTalk network, you will need LocalTalk cables and a LocalTalk adapter. The Apple LocalTalk Locking Connector Kit DIN-8, available from your Apple-authorized dealer, contains the components you need to connect the server to an existing LocalTalk network by means of the printer port.



To connect the server to a LocalTalk network:

- 1 Make sure that the server is turned off.**
- 2 Attach the LocalTalk adapter to the printer port.**
- 3 Plug one end of a LocalTalk cable into the LocalTalk adapter.**
- 4 Plug the other end of the cable into the last LocalTalk adapter on the network.**



Now that you have made the server's physical connection to LocalTalk, you can start up the server.

**IMPORTANT** After connecting to a LocalTalk network (if you have not also connected to Ethernet), each time you start up the server you'll see a dialog box that indicates an error condition. This dialog box informs you that the system has made a temporary switch from EtherTalk (its preset network software connection) to LocalTalk. You will see this message until you change the default setting in the AppleTalk control panel. Turn to Chapter 2, "Configuring Your Network Connection" in the *Workgroup Server Administrator's Guide* to learn how to switch the setting in the AppleTalk control panel.

## Building a high-performance network

Your Workgroup Server 8550 is designed to support a multisegment, high-performance network. Connection devices such as repeaters, bridges, routers, and gateways extend network segments and provide efficient links between a variety of network segments. For information about extending and connecting AppleTalk networks, see *Planning and Managing AppleTalk Networks* (an Apple book published by Addison-Wesley that is available at computer bookstores).

In addition to its built-in Local Talk and Ethernet ports, your server has three expansion slots where you can install PCI cards for connecting additional network segments, including different network types such as Token Ring, Integrated Services Digital Network (ISDN), Fiber Distributed Data Interface (FDDI), and Fast Ethernet (100BASE-T) networks. The multihoming capabilities of Open Transport 1.1, the new networking and communications software that is part of the Mac OS, make it possible for your server to access multiple network segments at the same time.

## Creating a high-performance Ethernet segment

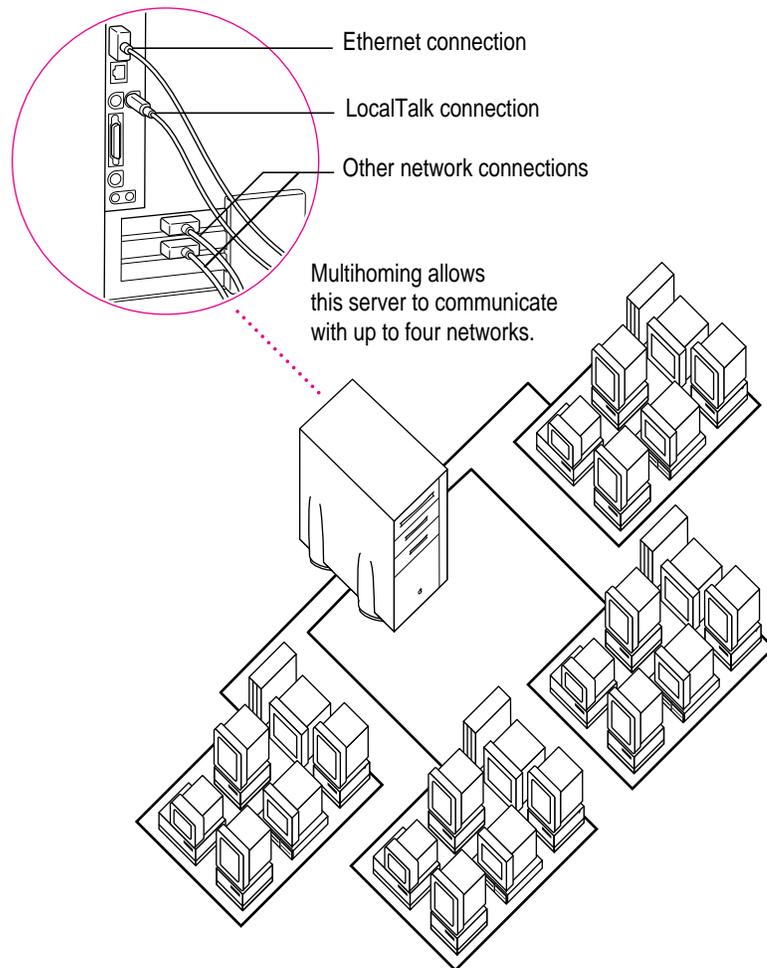
You can increase performance in Ethernet networks by creating subnetworks of devices connected by 10BASE-T Ethernet hubs (repeaters that regenerate signals from one device to another). The Apple Ethernet 10T/5 Workgroup Hub provides a modular, plug-and-play approach to creating and expanding high-performance Ethernet networks. This hub gives you a simple, cost-effective means of connecting together a wide variety of Macintosh and other personal computers, Workgroup Servers, and Ethernet-capable printers.

One of the easiest and most cost-effective ways to increase bandwidth is to connect network devices with *switched Ethernet hubs*. A switched hub connects devices on a 10BASE-T network, but it switches packets between ports, instead of passing them across a shared backbone, allowing each device that is connected to the switched hub to use the entire capacity of the link. In a 10BASE-T network, you may want to dedicate switched hubs to devices that require extra bandwidth, such as file servers. You can create a high-speed (100BASE-T) Ethernet segment by installing a 100MB Ethernet PCI expansion card in your server (see Chapter 3 for card installation instructions) and using high-performance switched hubs to connect the network devices.

Contact your Apple-authorized dealer for help selecting PCI expansion cards and hubs to optimize performance on your Ethernet networks.

## Using multiple network segments

By installing additional PCI network cards (and associated software), you can connect your server to a variety of networks. To use more than one network segment at the same time, you will also need network server software that supports multihoming on PCI-based systems (such as AppleShare 4.2.1). The following illustration is an example of a server that has multihoming enabled on the built-in Ethernet and LocalTalk connections, as well as on two additional network connections provided by PCI network cards.



## Setting up multihoming

Follow these steps to set up multihoming capabilities on your server:

- 1 Install PCI network cards (and associated software) for additional network segments that you want to connect to your server.**

Follow the instructions in Chapter 3 of this setup guide.

*Note:* This step is optional, as you can take advantage of multihoming capabilities even when network segments are connected only to the built-in LocalTalk and Ethernet ports on your server.

- 2 Configure the Open Transport options for your server.**

Follow the instructions for configuring your AppleTalk network connection in Chapter 2, “Configuring Your Network Connection,” of the *Workgroup Server Administrator’s Guide*.

**IMPORTANT** Each port must be assigned to a different zone.

- 3 Configure your network server software to enable multihoming on your server.**

See the documentation that accompanied your network server software. (For AppleShare version 4.2.1, see the *Addendum to AppleShare Administrator’s Guide*.)

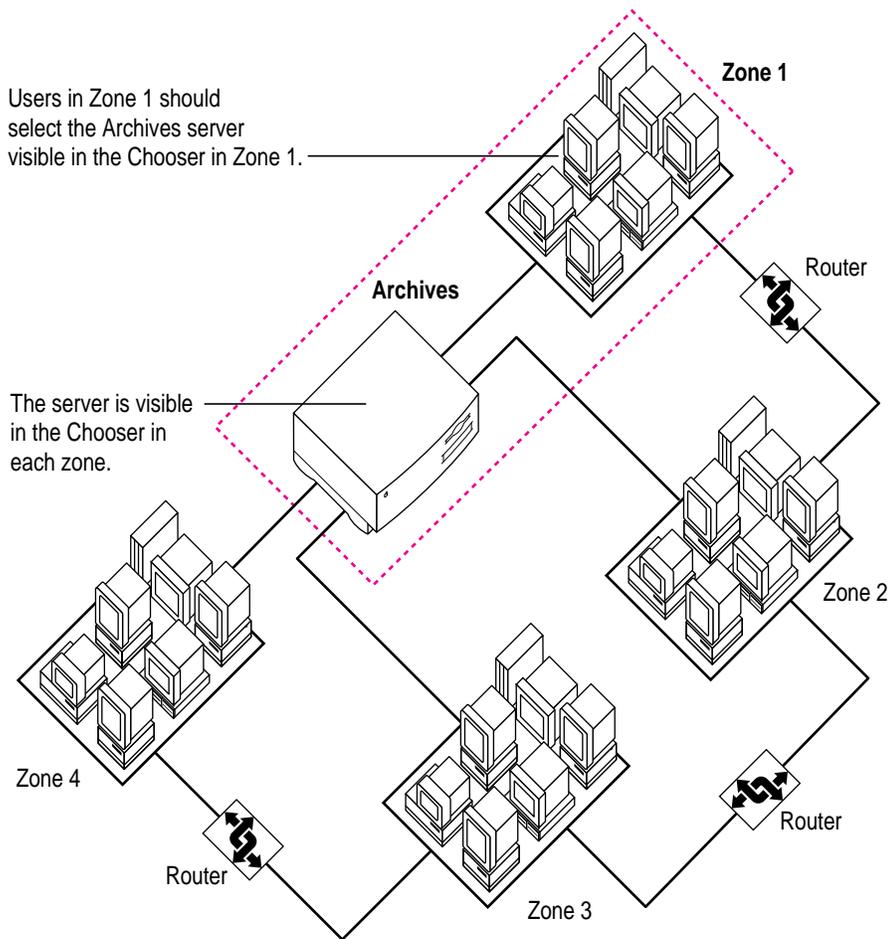
## Use a router to connect each network segment

Although users on different multihomed network segments can share and exchange files by using the server as a common storage area, each multihomed network segment is not visible to the other segments without use of a router. For example, suppose you have four multihomed network segments connected to your server (A, B, C, and D). Computers and other network devices such as LaserWriter printers on segment A are not visible to segments B, C, or D unless there’s a router between A and the other three segments.

### Have users select the server in their own zone

If network segments connected to your server are connected to each other through routers, users will see the server in all the connected zones (in the Chooser). For best performance, make sure that users select in the Chooser the server that resides in the same zone as their own computer.

For instance, in the following illustration, users will be able to see the Archives server in Zones 1, 2, 3 and 4. Users in Zone 1 should log on to the Archives server in Zone 1.



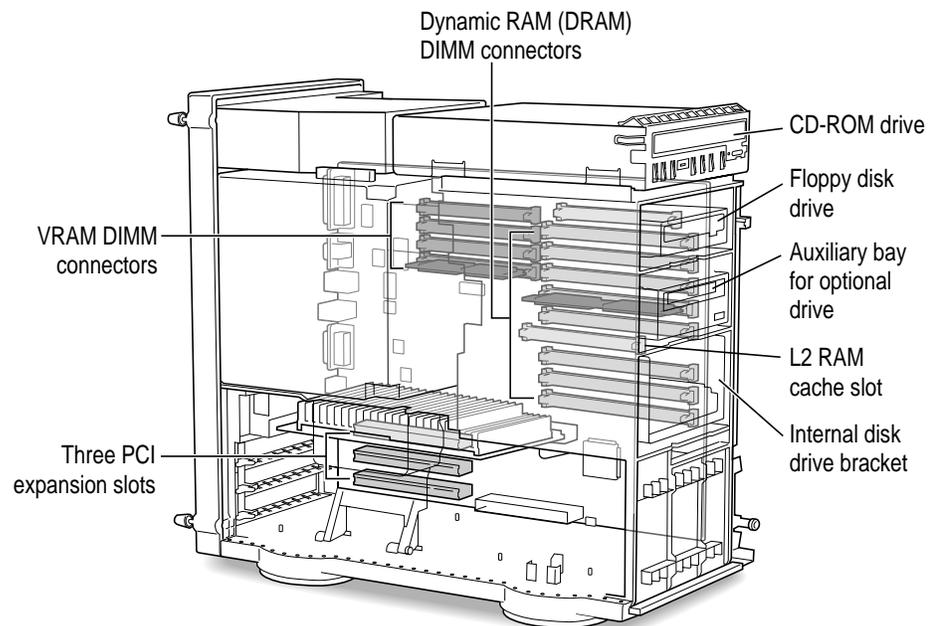


# 3

## Expanding Your Server and Connecting Other Equipment

You can expand the capabilities of your server by installing items internally and by connecting external devices. The following figure shows you the location of the Workgroup Server 8550's internal components. An external view of the server, depicting the ports to which you connect other devices, is shown in the section "Your Server at a Glance" in Chapter 1.

**IMPORTANT** Make sure each device you add is compatible with your server and does not exceed the maximum power allowance for that device. If it is a SCSI, ADB, or internal device, make sure to turn off your server before connecting the device. For further information, consult your Apple-authorized dealer, the manufacturer of the component you want to add, or Appendix B, "Technical Information."

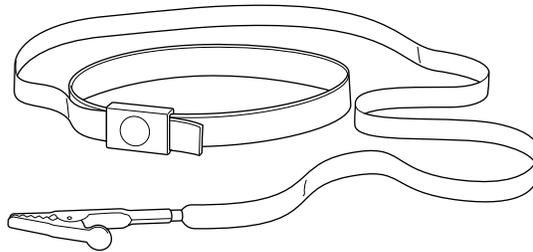


## Opening the server safely

**WARNING** The components in your server, as well as the internal devices that you may install in your server, are very susceptible to damage from electrostatic discharge. When opening your server and while installing internal devices in the server, it is very important to take precautions to protect the server's components from static electricity damage.

You can take the following preventative measures to avoid electrostatic discharge while you are installing internal devices in your server:

- Wear a grounded wriststrap (like the one shown below) while installing internal devices in the server.



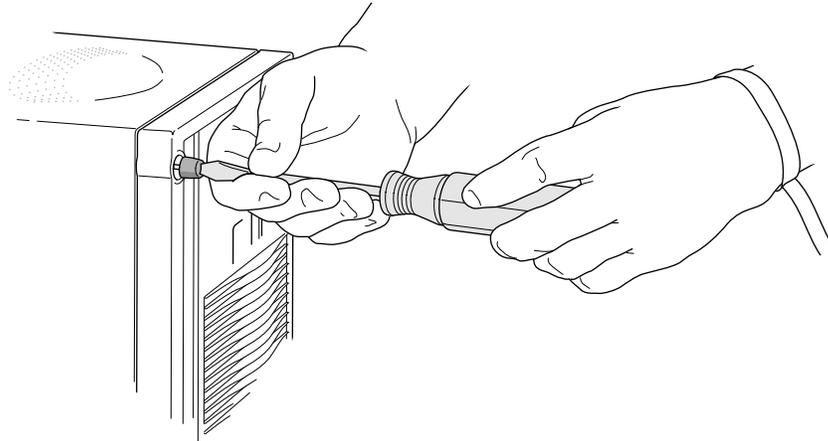
- Carefully follow all instructions for discharging static electricity included in the procedures in this chapter.

Follow these steps to open the server:

- 1** Make sure that the server is shut down and that any cables (including the power cord) are disconnected from the server.
- 2** Press the Power button to discharge static electricity.

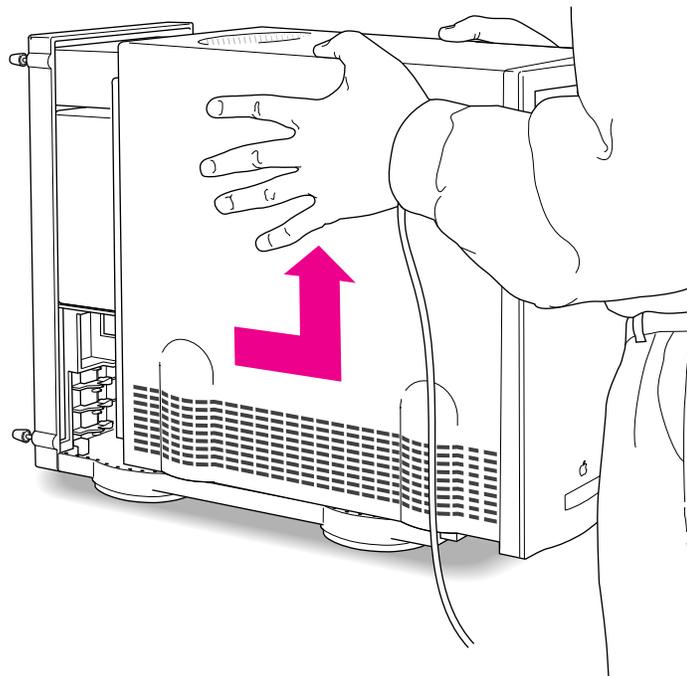
**3 Loosen the four large screws at the corners of the back panel.**

Do not remove the screws or the back panel.



**4 Remove the cover from the server.**

Slide the cover away from the back panel an inch or two. Then raise the cover straight up and off the server.



## Installing an expansion card

You can install printed circuit boards (called *cards*) for networking and communications, SCSI acceleration, video and graphics applications, or other purposes. The cards fit into connectors, called *expansion slots*, inside the server.

Your Workgroup Server 8550 has three expansion slots, each designed to accept a Peripheral Component Interconnect (PCI) card. Install only expansion cards that come with Mac OS drivers and are compliant with the PCI 2.0 standard. NuBus cards cannot be used in your server's expansion slots. There is also an expansion slot that contains the server's processor card. (The processor card can be upgraded by replacing it with a more powerful processor card.)

**WARNING** To avoid damaging your server and expansion card, do not attempt to install any expansion card without first checking the documentation for that card. If the documentation specifies that an Apple-certified technician must install the card (usually because the installation requires special training or tools), consult the service and support information that came with your server for instructions on how to contact an Apple-authorized service provider or Apple for assistance. If you attempt to install the card yourself, any damage you may cause to the server or card will not be covered by the limited warranty on your server. If the card is not an Apple-labeled product, check with an Apple-authorized dealer or service provider to see if you can install it yourself.

### Power requirements

The combined power consumption of expansion cards must not exceed the limits specified for your Workgroup Server 8550. If you have more than one expansion card installed, check the information that came with your cards to make sure that their power consumption is within the limits specified in Appendix B, "Technical Information."

## Installing a PCI expansion card

**IMPORTANT** Some cards may need to be installed by an Apple-authorized service provider. Check the information that came with the card.

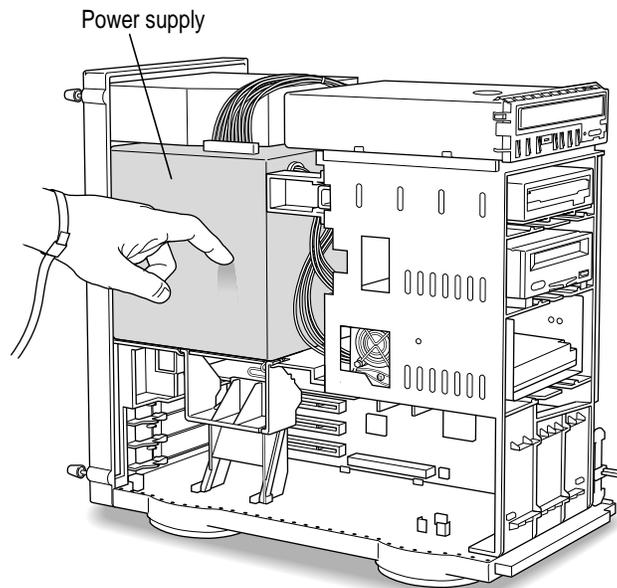
Follow these steps to install an expansion card.

- 1 Carefully follow the instructions provided earlier in this chapter for opening the server safely.**

Remember to wear a grounded wriststrap while installing an expansion card.

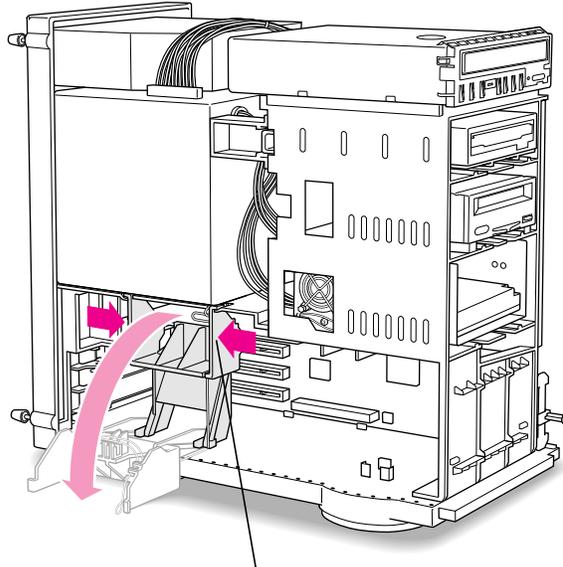
- 2 Touch the metal part of the power supply case inside the server to discharge static electricity.**

Always do this before you touch any parts or install components inside the server.



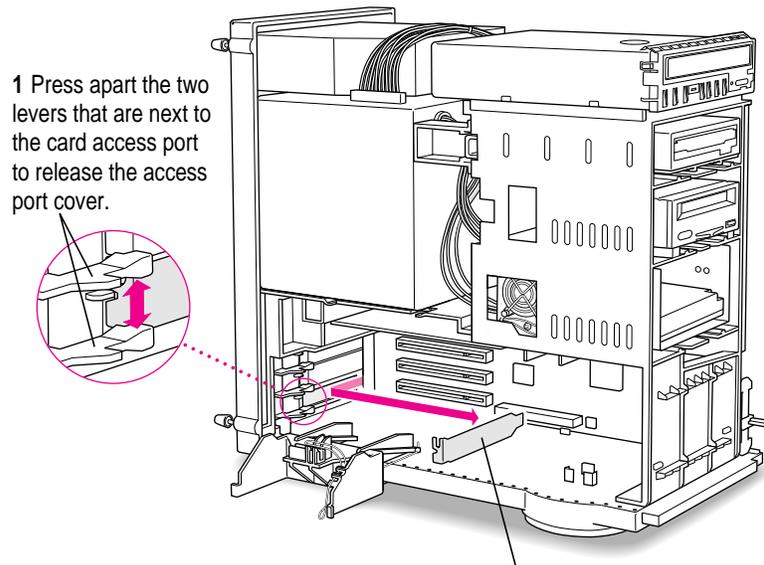
**3 Lower the retainer.**

Squeeze the sides of the retainer and pull down.



To lower the retainer, squeeze the sides to unlatch it.

**4 Being careful not to touch the sharp edges, pull out the metal access port cover behind the expansion slot you want to use, and set the access port cover aside.**

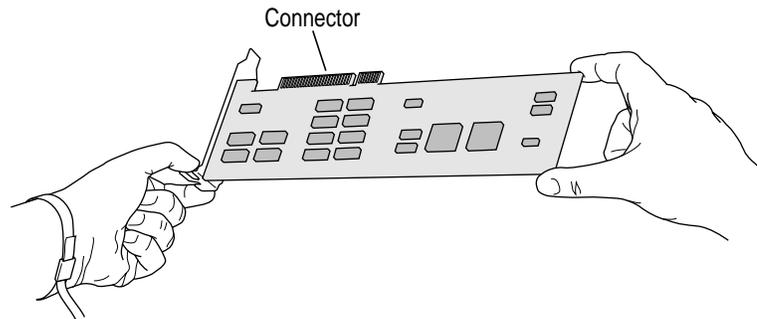


1 Press apart the two levers that are next to the card access port to release the access port cover.

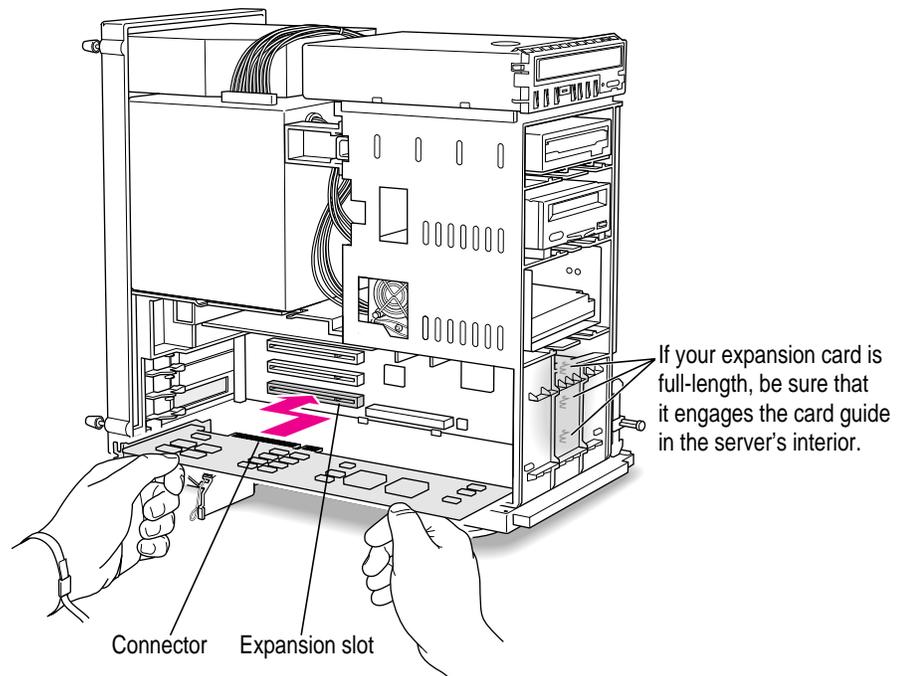
2 Slide the access port cover out and away from the access port.

- 5** To protect your card, touch the metal part of the power supply case to discharge static electricity again, as in step 2, and then remove the card from its static-proof bag.

Hold the card by its edges to avoid touching the connector.



- 6** Align the connector end of the card with the expansion slot.

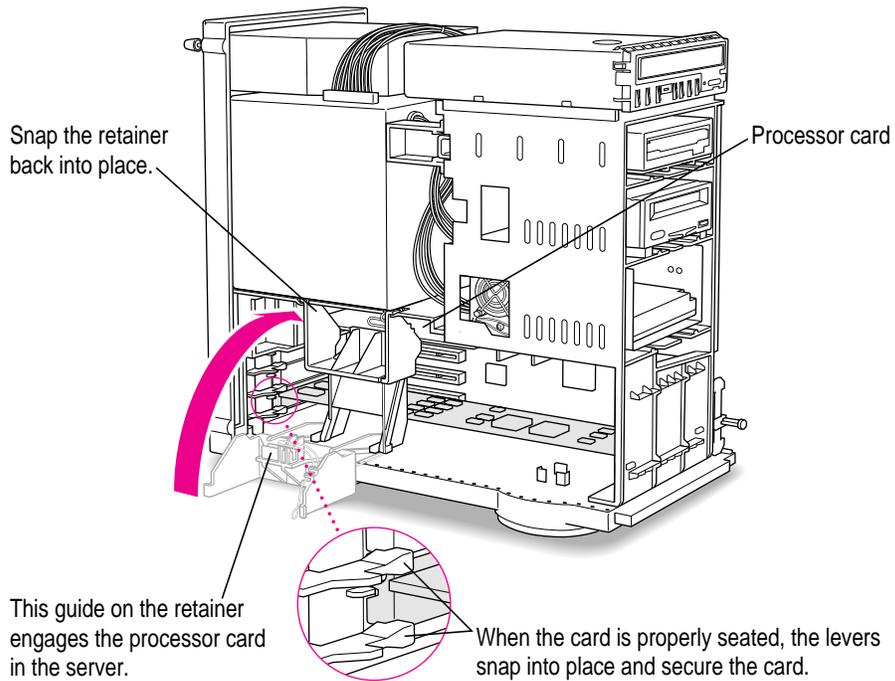


**7 Press the card firmly until the connector is seated.**

- Slide the card between the two levers that held the access port cover you removed earlier. You may need to press the levers apart slightly to guide the card between them.
- Don't force the card. If you meet a lot of resistance, pull the card out and try again.
- To see if the card is properly connected, pull it gently. If it resists and stays in place, it's connected. (Make sure you don't pull the card so much that you accidentally disconnect it.)

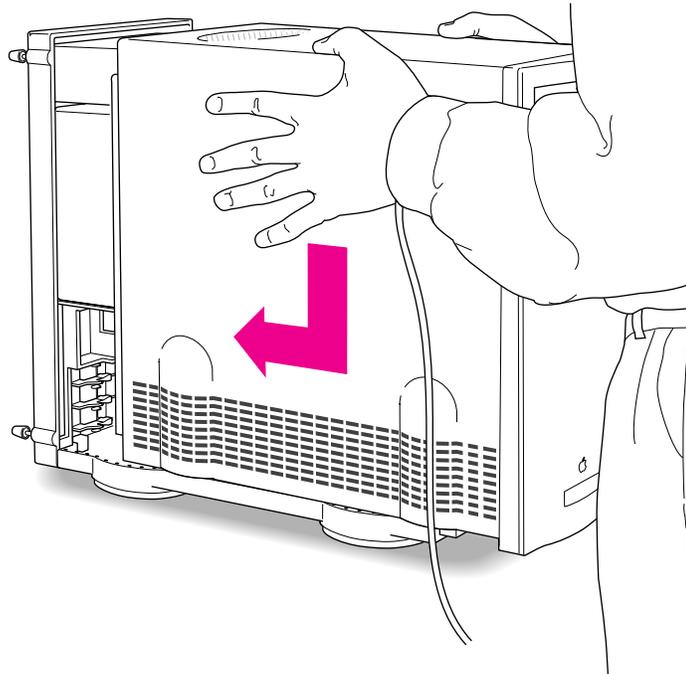
If you have other cards to install, put them in now by repeating steps 4 through 7.

**8 Replace the retainer.**



**9 Replace the cover on the server.**

Lower the cover all the way down onto the case. Push the cover toward the back until it touches the back panel.



**10 Tighten the screws on the back panel.**

You are now finished installing the card. If a software driver was included with your expansion card (on a floppy disk), after you finish setting up your server and turn it on, you will need to install the driver.

Return to Chapter 1 to complete the steps for setting up and turning on your server, and then, if you need to install driver software, refer to the documentation that accompanied the expansion card and to “Installing Device Drivers” in Chapter 1 of the *Workgroup Server Administrator’s Guide*.

**WARNING** Never turn on your server unless all of its internal and external parts are in place. Operating the server when it is open or missing parts can be dangerous, and can damage your server.

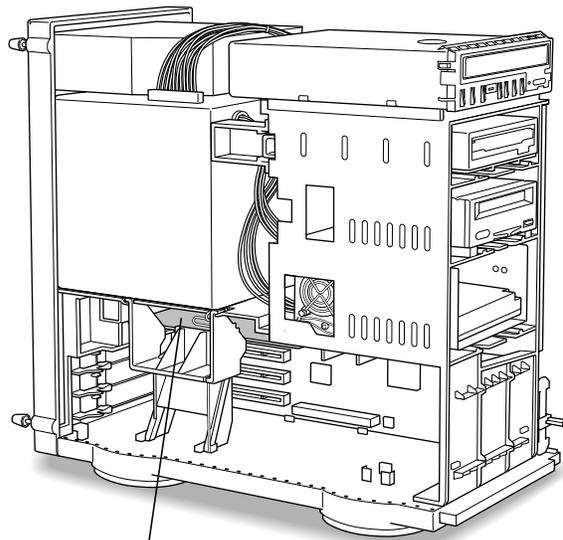
## Upgrading the processor

Your server's processor can be upgraded with the installation of a processor upgrade card.

To upgrade the processor, remove the old processor card following the instructions earlier in this chapter for opening the server safely. Then, the new processor card can be installed following the procedure in this chapter for installing expansion cards. (Note that an access port cover does not need to be removed as described in step 4 of “Installing a PCI Expansion Card” earlier in this chapter.)

**IMPORTANT** The processor card can be damaged by static electricity. To avoid damaging the card, hold it only by the edges—do not touch the connectors or the components on the card.

Refer to the documentation that came with the processor upgrade card for important installation instructions specific to the card.



Processor card (behind retainer)

## Expanding memory

Additional memory can be installed in your server. Memory for your server is provided in packages called Dual Inline Memory Modules (DIMMs). Appendix B, “Technical Information,” describes how much additional memory can be installed in the server.

Adding dynamic random-access memory (DRAM) DIMMs increases your server’s memory. The DRAM DIMMs must be the correct type for your server, and can be installed one at a time. For the best performance, however, the DRAM DIMMs should be installed in pairs of the same size into paired slots in your server.

You can also improve your server’s performance by upgrading the Level 2 (L2) cache with a higher-capacity cache DIMM. (The L2 cache stores the most frequently used portions of memory in high-speed RAM.)

The memory used to display images on the screen (called video RAM, or VRAM) can also be expanded by installing DIMMs. VRAM DIMMs must be installed in pairs.

It is very important that the DIMMs be correctly installed in your Workgroup Server 8550. Incorrect installation can result in errors, unpredictable results, and damage to your equipment and data.

**WARNING** To avoid damage to your server, Apple recommends that only an Apple-certified technician install additional DIMMs. Consult the service and support information that came with your server for instructions on how to contact an Apple-authorized service provider or Apple for service. If you attempt to install additional DIMMs yourself, any damage you may cause to your equipment will not be covered by the limited warranty on your server. See an Apple-authorized dealer or service provider for additional information about this or any other warranty question.

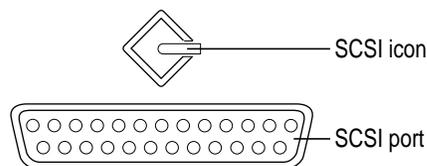
## Connecting hard disks and other SCSI devices

Your Workgroup Server 8550 has two buses for connecting devices that use the Small Computer System Interface (SCSI, pronounced “skuh-zee”). The SCSI connections permit high-speed communication between the server and the devices. SCSI devices commonly attached to the Workgroup Server 8550 include hard disks, CD-ROM drives, scanners, printers, and tape-backup drives.

**IMPORTANT** Before connecting a device to your server, be sure that the server (and any other device already connected to it) is turned off. Read the instructions in this section and the instructions that came with your hard disk or other SCSI device before connecting it to your server.

*Bus A* is the internal Fast SCSI-2 bus (10 MB per second) that connects your server’s CPU to the built-in disk drive in the bottom bay of the internal disk drive bracket. Additional devices cannot be connected to the internal SCSI bus (unless the cabling for this bus is modified by an Apple-authorized service provider).

*Bus B* is an internal/external SCSI-1 bus (5 MB per second) to which a total of seven devices can be connected. The CD-ROM drive that is built into your server is connected to the internal/external SCSI bus. The optional internal hard disk (which can be installed in the top bay of the internal disk drive bracket) and the optional built-in DAT drive (or any other drive in your server’s auxiliary bay) are also connected to this internal/external SCSI bus when installed. Your server has a port for connecting additional external SCSI devices to the internal/external SCSI bus. The SCSI icon appears above the port on the server’s back panel.



You can connect SCSI devices to the SCSI port in a chain. The first device in the chain plugs into the SCSI port; the second device plugs into the first device, and so on. If the only device connected to your server’s internal/external SCSI bus is its built-in CD-ROM drive, you can attach up to six external SCSI devices. However, if you have a built-in DAT drive and a second internal hard disk connected to this SCSI bus, you can attach only four external SCSI devices to the port.

Devices on the same SCSI bus must have unique ID numbers (however, devices on different SCSI buses may use the same SCSI ID number).

Setting up a SCSI device to use with your server involves:

- setting the device's SCSI ID number
- physically connecting the device to your server (including appropriate termination)
- installing any necessary device drivers (and restarting your system)

### Setting the SCSI ID number

If you have a SCSI device not sold by Apple, see the instructions that came with that device for information on setting its SCSI ID number.

**WARNING** Each SCSI device connected to your server must have its own, unique SCSI ID number. Using two or more devices with the same ID number (on the same SCSI bus) can cause your equipment to malfunction.

If you have an Apple SCSI device, set the SCSI ID number as follows:

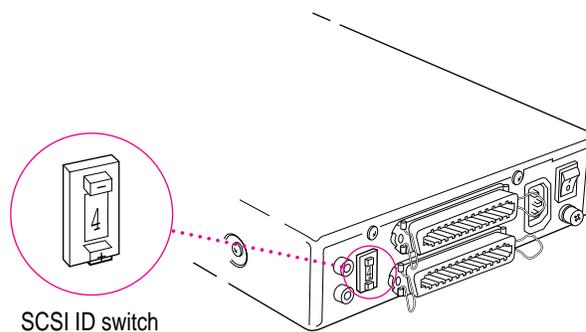
- 1 **Make sure your server is shut down and the SCSI device is turned off.**
- 2 **Choose a number between 0 and 6 that doesn't duplicate the ID of any other SCSI device connected to your server on the same SCSI bus.**

The following table shows the server's default SCSI ID numbers as well as the SCSI ID numbers available for you to use on the internal/external bus.

SCSI ID #	0	1	2	3	4	5	6	7
<b>Internal SCSI Bus A</b> (Fast SCSI-2, 10 MB/sec)	 Hard disk #1 (startup disk)	Not available	Not available	Not available	Not available	Not available	Not available	 Server CPU
<b>Internal/ External SCSI Bus B</b> (SCSI-1, 5 MB/sec)	Available	 Internal hard disk #2 (Optional)	 Internal DAT drive (Optional)	 Built-in CD-ROM drive	Available	Available	Available	 Server CPU

On the internal/external bus, you can use SCSI ID numbers 0, 4, 5, 6. The secondary hard disk (in the top bay of the internal disk drive bracket), the optional built-in DAT drive (or any other drive in your server's auxiliary bay), and the built-in CD-ROM drive reserve SCSI IDs 1, 2, and 3, respectively, on the internal/external bus. If you do not have a secondary hard disk in the internal disk drive bracket, you can also use SCSI ID 1 for this bus; if you do not have a DAT or other drive in the auxiliary bay, you can use SCSI ID 2 on this bus.

- 3** Locate the ID number switch on the back of your SCSI device.



- 4** Push the ID switch repeatedly until the number you want appears.

On some SCSI devices, the ID number switch is inside a small hole. Insert a straightened paper clip to push the switch.

Follow the instructions in the next section to install an additional hard disk in the internal disk drive bracket. To replace or install a drive in the server's auxiliary bay, see "Installing a Drive in the Auxiliary Bay." To connect external devices to your server, see "Connecting an External SCSI Device."

## Installing an additional hard disk in the internal disk drive bracket

You can add a secondary internal hard disk in the top bay of the server's internal disk drive bracket (shown in the external view of the server in the section "Your Server at a Glance" in Chapter 1).

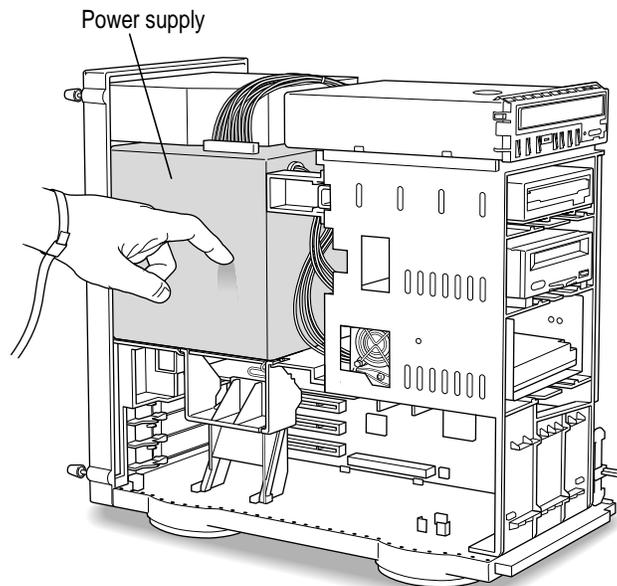
Follow these steps to install an additional internal hard disk.

- 1 Open the server by following the instructions in the section "Opening the Server Safely" earlier in this chapter.**

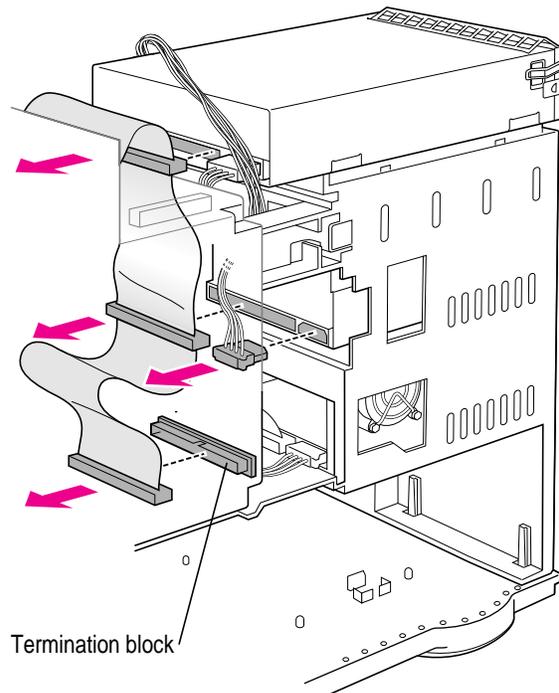
Remember to wear a grounded wriststrap while installing an internal hard disk.

- 2 Touch the metal part of the power supply case inside the server to discharge static electricity.**

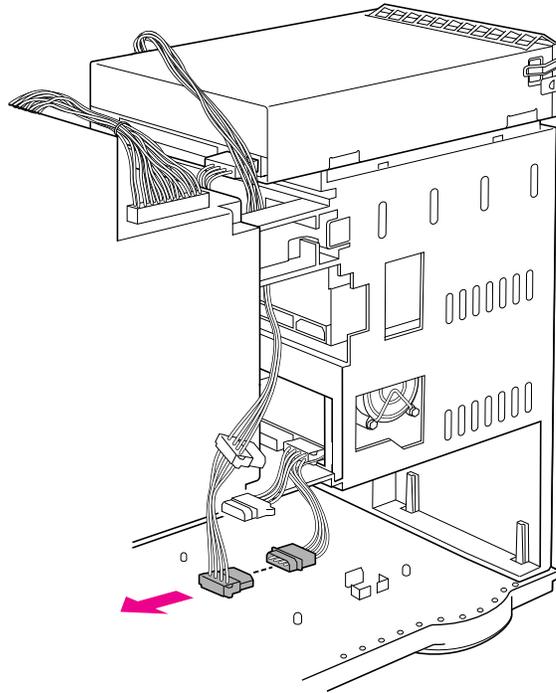
Always do this before you touch any parts or install components inside the server.



- 3 Disconnect the SCSI ribbon cable and power cable from the CD-ROM drive and from any DAT or other drive in the server's auxiliary bay, and remove the termination block from the end of the SCSI ribbon cable.

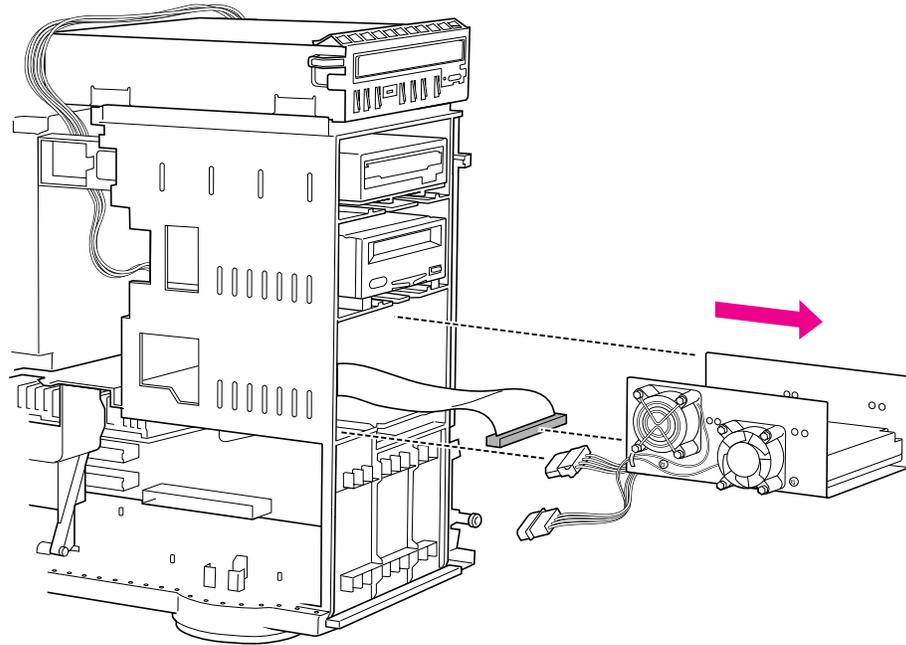


- 4 Disconnect the power cable from the disk drive bracket.



- 5 Slide the disk drive bracket out and disconnect the SCSI ribbon cable from the bottom drive.**

To release the bracket, push down the plastic tab just below the bracket.

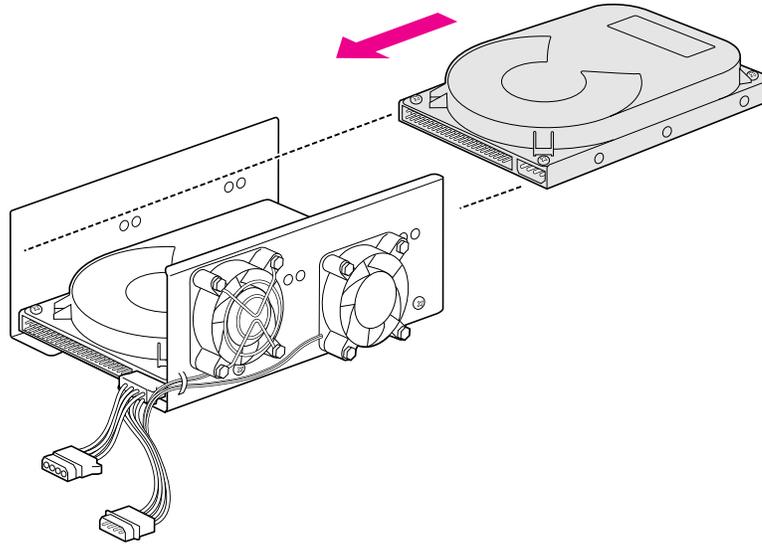


- 6 Confirm that the new disk drive is terminated and has its own, unique ID number between 0 and 6.**

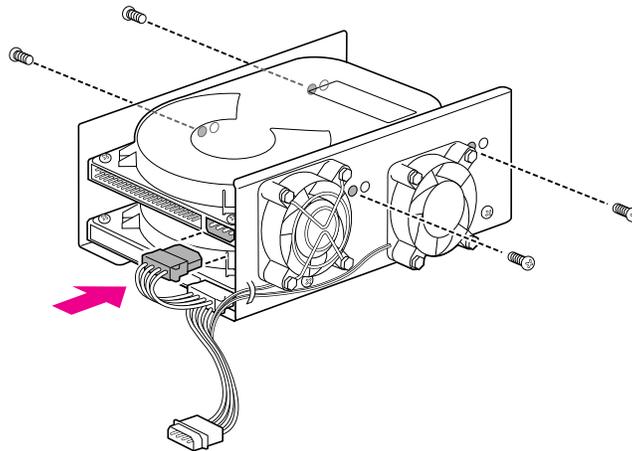
Since the new disk drive you are installing will be the last internal device on the internal/external SCSI bus, you must make sure that the drive is terminated. To terminate the drive, follow the drive manufacturer's specifications.

See the previous section, "Setting the SCSI ID Number," for details on selecting and setting ID numbers.

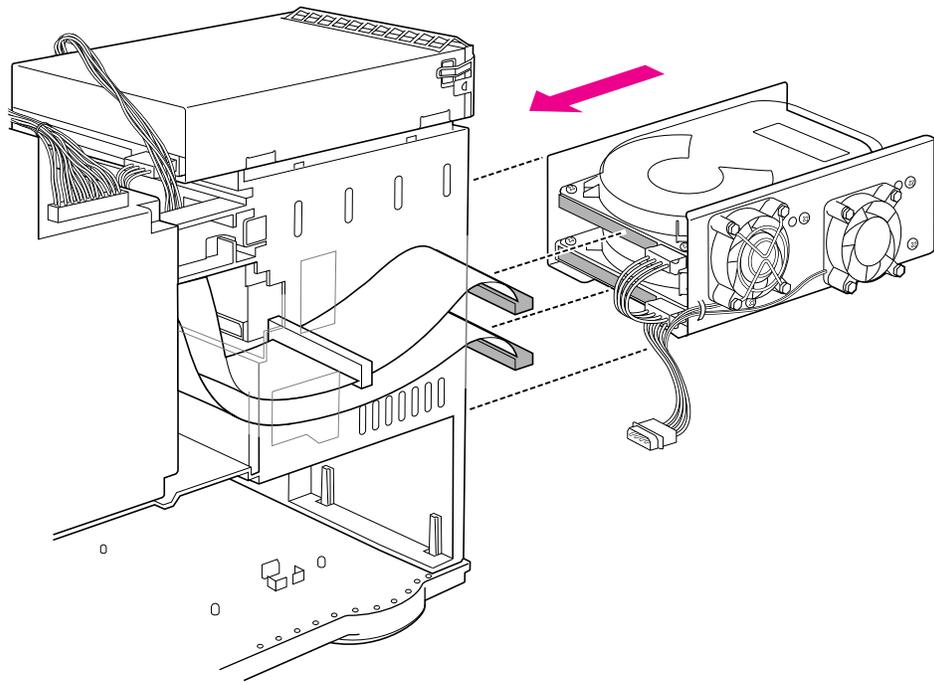
- 7** Slide the new disk drive into the upper bay of the disk drive bracket.  
Align the connections on the drive with the back of the bracket.



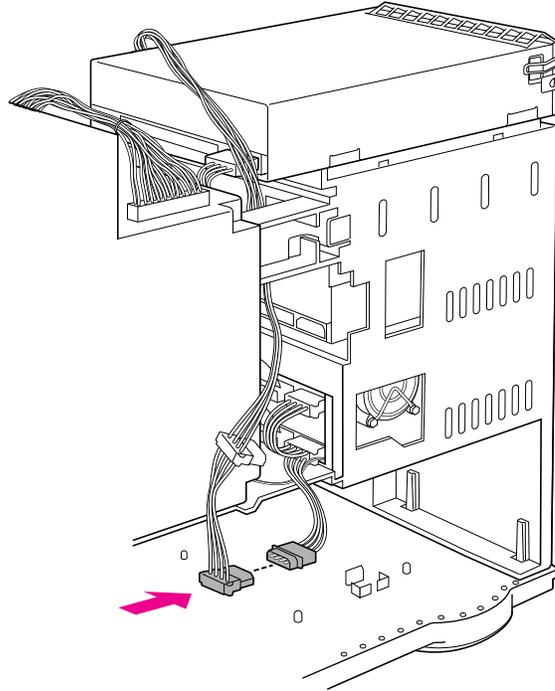
- 8** Install the four screws in the sides of the bracket and connect the power cable to the upper drive.



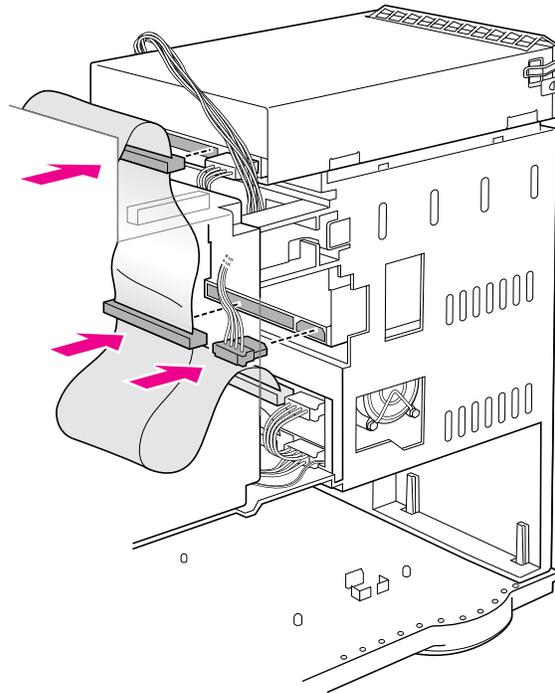
- 9 Connect the SCSI ribbon cables to the two drives and slide the disk drive bracket back into place.



- 10** Reconnect the power cable to the disk drive bracket.

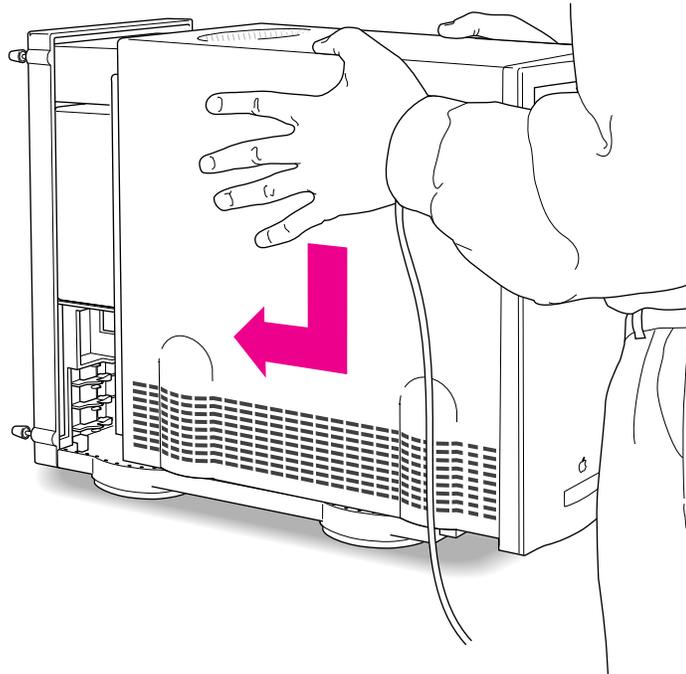


- 11 Reconnect the power cable and the SCSI ribbon cable to the CD-ROM drive and to any DAT or other drive in the server's auxiliary bay.



**12 Replace the cover on the server.**

Lower the cover all the way down onto the case. Push the cover toward the back until it touches the back panel.



**13 Tighten the screws on the back panel.**

If a software driver was included (on a floppy disk) with your new hard disk, after you finish setting up your server and turn it on, you will need to install the driver. You may also need to initialize the new hard disk. See the sections “Installing a Device Driver” and “Do You Need to Initialize a Hard Disk?” later in this chapter.

Return to Chapter 1 to complete the steps for setting up and turning on your server.

**WARNING** Never turn on your server unless all of its internal and external parts are in place. Operating the server when it is open or missing parts can be dangerous, and can damage your server.

## Installing a drive in the auxiliary bay

You can install a digital audio tape (DAT) drive or an additional internal hard disk in your server's auxiliary bay (shown in the external view of the server in the section "Your Server at a Glance" in Chapter 1).

*Note:* Your server may have come with a DAT drive already installed in the auxiliary bay.

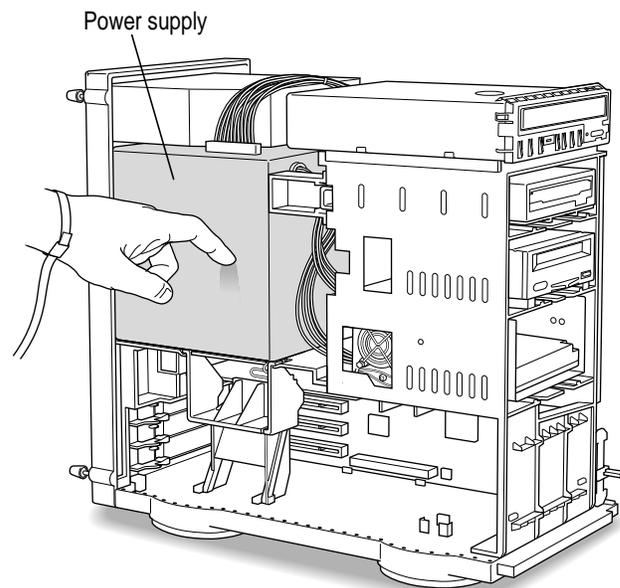
Follow these steps to install (or replace) a drive in your server's auxiliary bay.

- 1** Open the server by following the instructions in the section "Opening the Server Safely" earlier in this chapter.

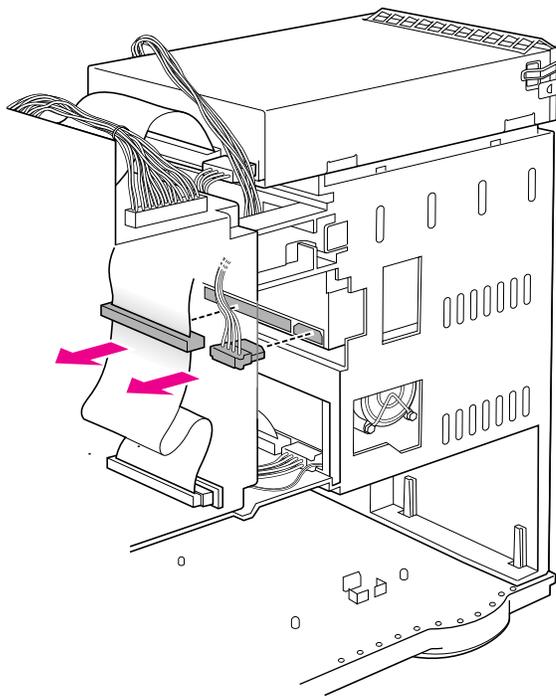
Remember to wear a grounded wriststrap while installing an internal drive.

- 2** Touch the metal part of the power supply case inside the server to discharge static electricity.

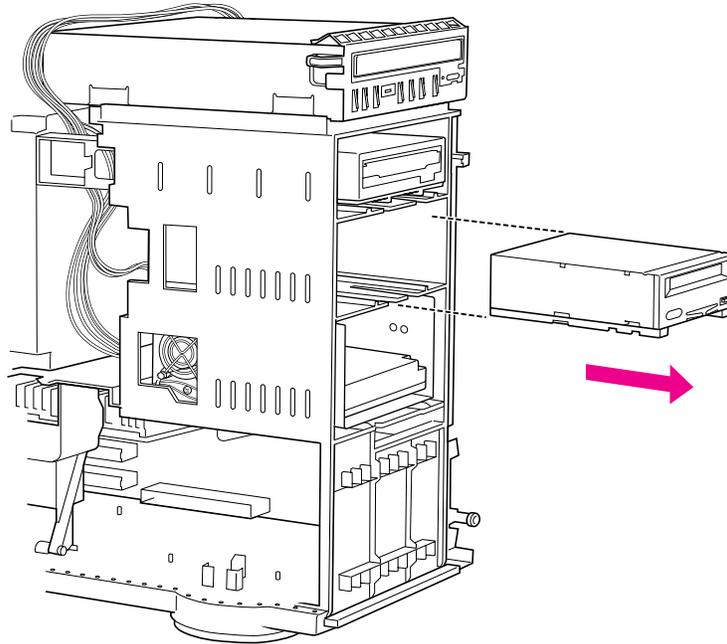
Always do this before you touch any parts or install components inside the server.



- 3 If you are replacing a DAT or other drive already in the server's auxiliary bay, disconnect the SCSI ribbon cable and power cable from the drive in the auxiliary bay.



- 4 If you are replacing a drive, slide the drive out of the bay.



- 5 Confirm that the new drive has its own, unique ID number between 0 and 6.

SCSI ID 2 is recommended for a device in the auxiliary bay. See the section “Setting the SCSI ID Number” earlier in this chapter for details.

- 6 Check the termination status of the new drive.

You do *not* need to terminate a drive installed in the auxiliary bay. The internal end of internal/external SCSI bus should be terminated already, either by the termination block at the end of the SCSI ribbon cable or by a terminated disk drive in the upper bay of the internal disk drive bracket.

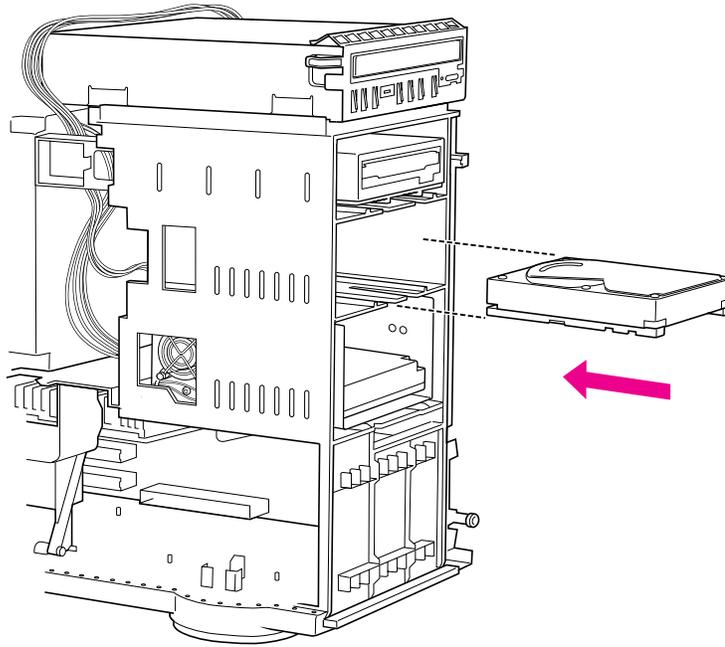
Only one internal terminator is allowed on the internal/external SCSI bus. If the drive that you are installing in the auxiliary bay has a built-in terminator, and there is no disk drive in the upper bay of the internal disk drive bracket, you can remove the termination block at the end of the SCSI ribbon cable and allow the device you are installing to terminate the bus. However, if there is a disk drive in the upper bay of the internal disk drive bracket, this device is at the end of the internal SCSI chain and must terminate the bus. In this case, you should have an Apple-authorized service provider remove any built-in terminator from the drive that you want to install in the auxiliary bay.

**7 If necessary, attach the new drive to its bracket.**

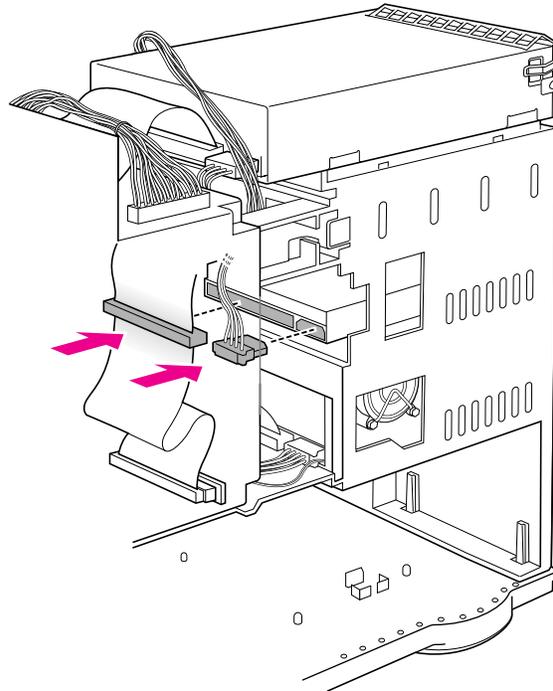
Follow the instructions that came with the new drive and bracket.

*Note:* If your new drive did not come with a bracket, see your Apple-authorized dealer for assistance selecting an appropriate bracket for use in the auxiliary bay of your Workgroup Server 8550.

**8 Slide the new drive assembly into the auxiliary bay.**

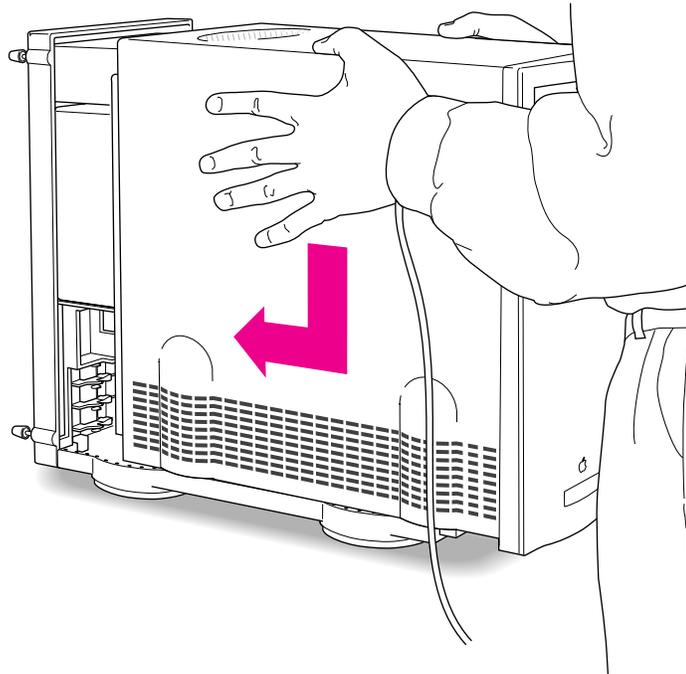


- 9 Connect the power cable and the SCSI ribbon cable to the new drive in the auxiliary bay.



**10 Replace the cover on the server.**

Lower the cover all the way down onto the case. Push the cover toward the back until it touches the back panel.



**11 Tighten the screws on the back panel.**

If a software driver was included (on a floppy disk) with your new drive, after you finish setting up your server and turn it on, you will need to install the driver. You may also need to initialize a newly installed hard disk. See the sections “Installing a Device Driver” and “Do You Need to Initialize a Hard Disk?” later in this chapter.

Return to Chapter 1 to complete the steps for setting up and turning on your server.

**WARNING** Never turn on your server unless all of its internal and external parts are in place. Operating the server when it is open or missing parts can be dangerous, and can damage your server.

## Connecting an external SCSI device

To connect a SCSI device to the port on your server's back panel:

- 1 **Make sure that the server and SCSI device are turned off.**

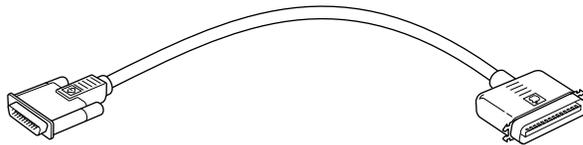
**WARNING** Do not connect or disconnect any device while the device or your server is turned on. Doing so could damage the device, your server, or both.

- 2 **Check that the device has its own, unique ID number between 0 and 6.**

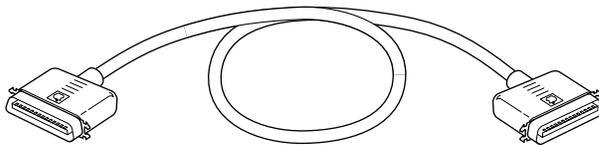
See the section “Setting the SCSI ID Number” earlier in this chapter for details.

- 3 **Use a SCSI cable to connect the device either to the server's SCSI port or to the last SCSI device already in the chain.**

If the device is the first or only one you're connecting, use a SCSI system cable to connect it to the server's SCSI port.



If the device is not the first one, use a SCSI peripheral interface cable to connect it to the last device in the chain.

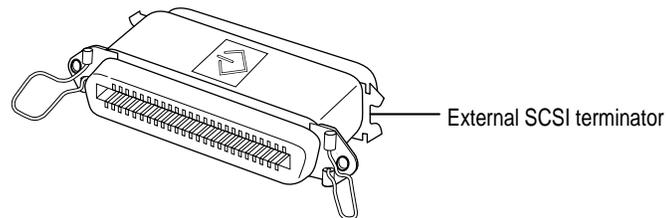


**IMPORTANT** To get the best results with SCSI devices, be sure to use high-quality SCSI cables and check that the total length of the cables in a SCSI chain does not exceed 6 meters (20 feet). Use SCSI cables manufactured by Apple Computer or those of similar quality.

- 4 **Make sure that only the last device in the SCSI chain has a terminator and that no other external SCSI device has a terminator.**

To ensure accurate transmission of information, a terminator must be at each end of a SCSI chain.

Some external SCSI devices from manufacturers other than Apple have a built-in terminator. (Check the information that came with the device.) If the device at the end of the SCSI chain does not have a built-in terminator, you need to attach an external terminator.



If your SCSI device has a built-in terminator, you may choose to use it as either the only device or the last device in the chain, or you may have your Apple-authorized service provider remove any extra built-in terminators. You can attach or remove external terminators yourself.

*Note:* If only one external device has a built-in terminator, rearrange the SCSI chain so that device is at the end.

**IMPORTANT** Always turn on any external SCSI devices connected to your server before turning on the server itself. Otherwise, your server cannot recognize the SCSI devices.

Before using the newly installed SCSI device, you may need to install associated software; see the following section, “Installing a Device Driver.” If you installed a hard disk, see also the subsequent section, “Do You Need to Initialize a Hard Disk?”

## Installing a device driver

A SCSI device driver is software that lets the server communicate with a particular SCSI device.

*Note:* If you have set up your server and connected additional devices, but not yet turned the server on, return to the section “Plugging In the Server” in Chapter 1 before installing a device driver.

To install a driver:

- **Start up your server, if necessary, and drag the driver icon to the System Folder icon on your startup disk.**

Any drivers needed for a SCSI device are usually on a floppy disk that comes with the device. (If no drivers come with the device, then it doesn't need any.) You may have to restart your server to activate the driver.

## Do you need to initialize a hard disk?

You need to initialize a hard disk only in the following cases:

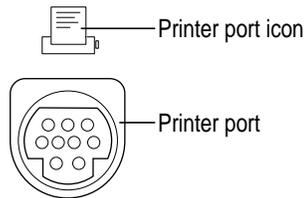
- *The disk is new and uninitialized.* Your internal hard disk and most external hard disks are initialized at the factory and do not have to be initialized again. If you are adding a new non-Apple hard disk to your server, check your owner's manual to see if it needs to be initialized.
- *You've experienced repeated errors using this disk.* If problems persist after you reinitialize the disk, the disk is in need of servicing.

You use the Apple Drive Setup program to initialize and name a hard disk. Apple Drive Setup is provided as part of your system software and can be found in the Utilities folder on the server's hard disk as well as on the *Workgroup Server Software* CD-ROM disc. See Chapter 4, “Managing Hard Disks,” in the *Workgroup Server Administrator's Guide* and the instructions for preparing a disk for use in the “Disks” topic in Macintosh Guide, available in the Guide (Ⓜ) menu.

If you are using the Apple RAID Software that accompanied your Workgroup Server, you may want to use the Apple RAID Setup program to reinitialize your hard disk(s) to optimize your server's performance. See the *Apple RAID Administrator's Guide* for instructions.

## Connecting a printer

Your server has a printer port, which you use to connect a printer to your server.



The printer port accepts either a direct cable connection (to printers such as the StyleWriter II) or a network cable connection (to printers such as a LaserWriter Pro or LaserWriter Select).

Follow the instructions that came with your printer when connecting it to your server.

A printer can also be connected to the modem port.

*Note:* You use the Chooser program to indicate the port you used to connect your printer. (For more information on using the Chooser and printing, see “Choosing a Printer” in Chapter 1, “Configuring Your Server,” in the *Workgroup Server Administrator’s Guide* and the “Printing and Fonts” topic in Macintosh Guide, available in the Guide (🔍) menu.)

A GeoPort Telecom Adapter, or similar device, can also be connected to the printer port.

## Connecting an additional monitor

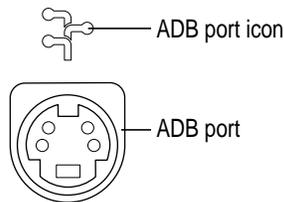
You can use an additional monitor with your server if you install a video expansion card. See “Installing an Expansion Card” earlier in this chapter for instructions.

When you connect an additional monitor:

- Make sure that the ventilation openings on the server and the monitors are clear and unobstructed.
- If necessary, configure the monitor options. See the documentation that accompanied the monitor and “Configuring Your Monitor” in Chapter 1 of the *Workgroup Server Administrator’s Guide*.
- If there is interference on your screens or on a television or radio near your server, reposition or separate the affected equipment.

## Connecting a trackball or other input device

Your server has an Apple Desktop Bus (ADB) port, which you use to connect the mouse, the keyboard, and other input devices such as a trackball, a bar-code reader, or a graphics tablet.

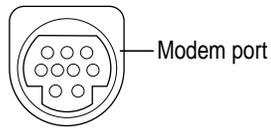


You can usually connect up to three ADB devices in a chain to a single port. The exact number depends on how much power the devices require.

**IMPORTANT** The total power used by all ADB devices connected to your server must not exceed 500 milliamperes (mA). Information about the power requirements of the mouse and keyboard are in Appendix B, “Technical Information.” Check the information that came with your other ADB devices for power requirements.

## Connecting a modem or GeoPort Telecom Adapter

Your server has a port, called the modem port, which is a serial port designed for use with modems and devices such as the GeoPort Telecom Adapter. These devices, when used with appropriate telecommunications software, take advantage of the server's built-in modem capabilities. The GeoPort Telecom Adapter comes with communications and fax software and can be purchased from Apple-authorized dealers.



You can connect a standard modem to the modem port, using a standard modem cable. To connect an adapter or modem to your server, follow the instructions that came with your adapter or modem.

A GeoPort Telecom Adapter can also be connected to the printer port.

You can also connect a printer to the modem port.

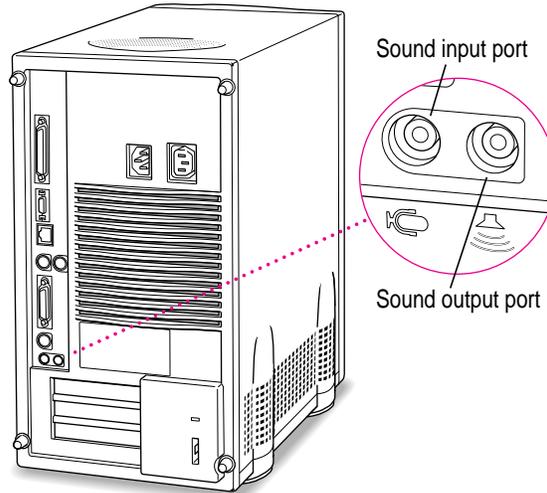
## Connecting audio equipment

Your server can play and record stereo sound from a variety of sources. You can listen to or reproduce stereo sound by connecting audio equipment to the sound input and output ports on the server. You can use your internal CD-ROM drive to play and record sound from audio compact discs (CDs).

For information on using the Mac OS to choose sound input and output options, to record an alert sound, or to play audio CDs, see "Choosing Sound Devices and Alert Sounds" in Chapter 1 of the *Workgroup Server Administrator's Guide* and the "Sound" topic of Macintosh Guide, available in the Guide (⌘) menu.

## About your server's sound ports

The sound input port is marked with an icon of a microphone. The sound output port is marked with an icon of a speaker.



The server's sound ports accept these 3.5 mm connectors:



Stereo miniplug



Extended miniplug

The smaller connector (a “stereo miniplug”) is found most often on stereo equipment. The slightly longer connector is found on the Apple PlainTalk Microphone and other voice quality microphones. If your equipment has a different type of connector, you can purchase an adapter at an electronics supply store.

## Connecting most audio equipment

To play or record sound with your server, you can attach a microphone, amplifier, tape recorder, headphones, or a pair of speakers. (When you have headphones connected, you don't hear beeps or other server sounds through the built-in speaker.)

For specific instructions on connecting a microphone, skip to the next section, "Connecting and Positioning a Microphone." For specific instructions on connecting speakers, see "Connecting External Stereo Speakers" later in this chapter.

Follow these steps to connect most audio equipment to the server:

- 1 **Make sure that the audio equipment has a cable with a stereo miniplug (or extended miniplug) connector.**



- 2 **Place the audio equipment near the server.**
- 3 **Shut down the server and turn off the audio equipment.**
- 4 **Attach the cable to the audio equipment and to the appropriate sound port on the server.**

To hear or record incoming sound on the server using a cable with a stereo miniplug, connect the audio equipment to the sound input port (Ⓜ).

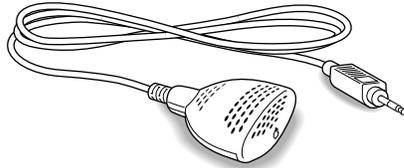
To record the sound produced by the server or play that sound through external speakers using a cable with a stereo miniplug, connect the audio equipment to the sound output port (Ⓜ).

- 5 **Turn on the server and the audio equipment.**

You're now ready to begin listening to and working with sound. For more information on setting sound options and working with sound, see "Choosing Sound Devices and Alert Sounds" in Chapter 1 of the *Workgroup Server Administrator's Guide* and the "Sound" topic of Macintosh Guide, available in the Guide (Ⓜ) menu.

## Connecting and positioning a microphone

With appropriate software, you can use an Apple PlainTalk Microphone (or a compatible line-level microphone) to give spoken commands to your server and to record your voice or other sounds.

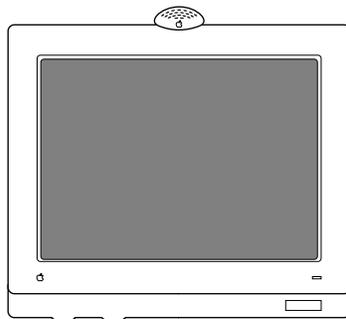


Apple PlainTalk Microphone

Do not use the round omnidirectional microphone supplied with some other Macintosh models.

Follow these steps to connect and position the microphone:

- 1 Shut down the server.**
- 2 Plug the microphone's connector into the sound input port (🔊) on the back of the server.**
- 3 Place the microphone at the top center of the monitor, so that the microphone's Apple (🍏) icon is facing you.**



If you can't place the microphone on top of the monitor, position the microphone according to these guidelines:

- The microphone should be between 1 and 3 feet away from you.
- The microphone should be directly in front of you to minimize the effect of background noises.

**4 Turn on the server.**

You're now ready to begin using your microphone.

You may want to install software that enables you to give spoken commands to the server, get computer-voice feedback to your spoken commands, and have the server read text to you. For information about installing software on your server, see Chapter 3, "Using Application Software," in the *Workgroup Server Administrator's Guide*. To set the sound options for your microphone, see "Choosing Sound Devices and Alert Sounds" in Chapter 1 of the *Workgroup Server Administrator's Guide*. For further instructions on how to use speech software, see the "Speech" topic of Macintosh Guide, available in the Guide (⌘) menu.

### Connecting external stereo speakers

You can take advantage of your server's stereo sound output by attaching externally powered (amplified) speakers.

**1 Assemble the speakers and the cable you need.**

You need a cable with stereo miniplugs at each end to connect one or both speakers to the server. (Some speakers require a dual-plug adapter. Others, like those shown in the next illustration, accept a single stereo miniplug and are joined by standard speaker wires.)

**2 Turn off the server.**

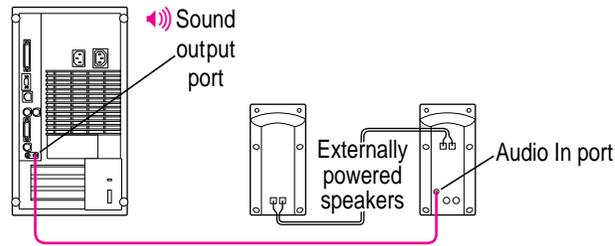
**3 Plug a stereo miniplug into the sound output port (⦿) on the server.**

**4 Plug a stereo miniplug into the Audio In port on one of the speakers.**

If the speakers take a dual-plug cable, connect both plugs.

**5 Connect the speakers together with speaker wires, if necessary.**

Your finished connections should look something like this:



**6 Turn on the server.**

Now you hear the server's sound through the external speakers. (You may also need to set options in the Sound & Displays control panel in order to hear sound through your speakers. To set sound options, see "Choosing Sound Devices and Alert Sounds" in Chapter 1 of the *Workgroup Server Administrator's Guide*. Refer to the "Sound" topic of Macintosh Guide, available in the Guide [?] menu, for more information.)

*Note:* Use the Sound & Displays control panel to control volume and to set other options for playing sound through the external speakers. If you are playing an audio CD, you may also need to adjust the volume control in the program you're using to play CDs.

## Appendix A Safety, Maintenance, and Health Information

### Important server safety instructions

For your own safety and that of your equipment, always take the following precautions.

Turn off the server and disconnect the power plug (by pulling the plug, not the cord) if any of the following conditions exists:

- The power cord or plug becomes frayed or otherwise damaged.
- You spill something into the case.
- Your server is exposed to rain or any other excess moisture.
- Your server has been dropped or the case has otherwise been damaged.
- You suspect that your server needs service or repair.
- You want to clean the case (use only the recommended procedure described later in this section).

For additional safety:

- If you ever need to remove the cover of your server, replace it before you use the server.
- Never turn on your server with any of the internal parts removed.
- Never turn on your server with any parts of the external closure removed.

Be sure that you always do the following:

- Keep your server away from sources of liquids, such as wash basins, bathtubs, shower stalls, and so on.
- Protect your server from dampness or wet weather, such as rain, snow, and so on.
- Read all the installation instructions carefully before you plug your server into a wall socket.
- Keep these instructions handy for reference by you and others.
- Follow all instructions and warnings dealing with your system.

**WARNING** Electrical equipment may be hazardous if misused. Operation of this product, or similar products, must always be supervised by an adult. Do not allow children access to the interior of any electrical product and do not permit them to handle any cables.

To clean the case, do the following:

- 1 Turn off the server and then disconnect the power plug. (Pull the plug, not the cord.)**
- 2 Wipe the surfaces lightly with a clean, soft cloth dampened with water.**

**IMPORTANT** If you have a problem with your server and nothing in the manuals that came with the server solves the problem, consult the service and support information that came with your server for information on how to contact an Apple-authorized service provider or Apple for assistance.

## Handling your computer equipment

Follow these guidelines for handling your server and its components:

- When setting up your server, place components on a sturdy, flat surface, and carefully follow all setup instructions.
- When connecting or disconnecting a cable, always hold the cable by its connector (the plug, not the cord).

- Turn off your server and all its components before connecting or disconnecting any cables to add or remove any component. Failure to do so could seriously damage your equipment.
- Never force a connector into a port. If the connector and port do not join with reasonable ease, they probably don't match. Make sure that the connector matches the port and that you have positioned the connector correctly in relation to the port.
- Take care not to spill any food or liquid on the server, keyboard, mouse, or other components. If you do, turn your server off immediately and unplug it before cleaning up the spill. Depending on what you spilled and how much of it got into your equipment, you may have to bring your equipment to an Apple-authorized service provider.
- Protect the server and its components from direct sunlight and rain or other moisture.
- Keep all ventilation openings clear and unobstructed. Without proper air circulation, components can overheat, causing damage or unreliable operation.

### Handling the monitor

Follow these procedures for handling a monitor:

- Turn down the screen brightness control if you leave the server turned on for extended periods. If the brightness is not turned down, the image on the screen could “burn in” and damage the screen.

You can also use a “screen-saver” program, which dims or varies the image on the screen when the server has been idle for a specified period of time. These programs are available from independent suppliers and user groups.

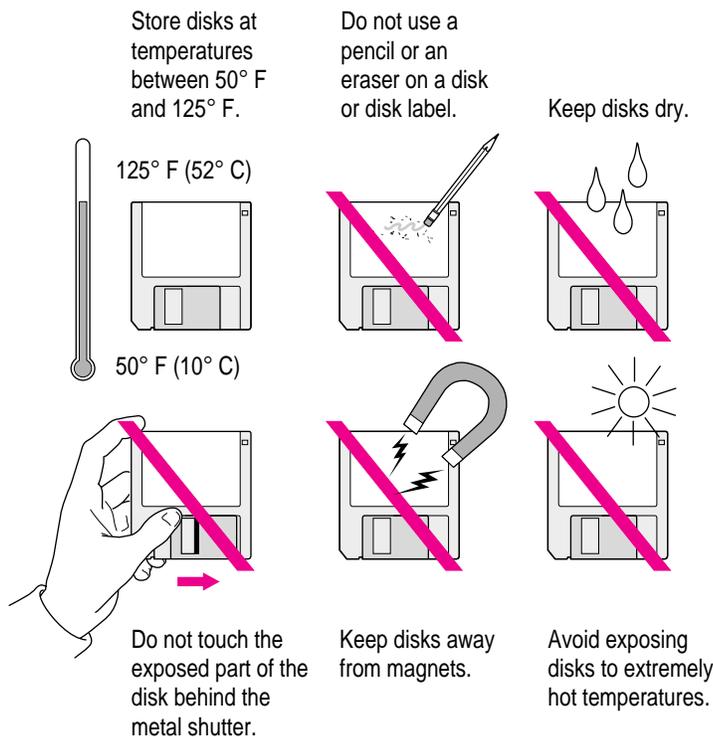
- Make sure that the ventilation openings on the server and the monitor are clear and unobstructed.
- If there is interference on the monitor's screen or on a television or radio near your server, move the affected equipment farther away.

## Handling the keyboard

Take care not to spill any liquid on the keyboard. If you do, turn off your server immediately.

- If you spill liquid that is thin and clear, unplug the keyboard, turn it upside down to let the liquid drain out, and let it dry for 24 hours at room temperature. If, after you take these steps, the keyboard doesn't work, take it to an Apple-authorized service provider for repair.
- If you spill liquid that is greasy, sweet, or sticky, unplug the keyboard and take it to an Apple-authorized service provider for repair.

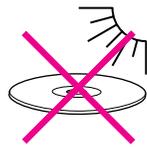
## Handling floppy disks



## Handling CD-ROM discs

Keep these important safety instructions in mind as you use CD-ROM discs:

- Hold a disc by the edges or by one edge and the center hole. Do not touch the disc surface.
- To clean discs, wipe the shiny surface with a soft damp cloth, working in straight lines from center to edge. Do not use any form of cleaning agent.
- To avoid damage to your discs, keep these points in mind:



Do not expose discs to direct sunlight.



Do not write on discs.



Do not spill liquids on discs.



Do not put tape on discs.



Do not scratch discs.



Do not get dust on discs.

Other important safety instructions to keep in mind as you use your CD-ROM drive.

- Position your server so that when the tray opens, it doesn't bump into anything.
- Do not leave the disc tray open. If dust gets on the lens of the CD-ROM drive, the drive may have problems reading your compact discs.
- Do not put anything (for instance, a cup) on top of the tray when it is open.
- Do not force the tray open by hand.
- Do not wipe the lens with a paper towel or other abrasive surface. If you need to clean the lens, see an Apple-authorized service provider for a lens cleaner.
- Never transport your server with a disc inside the CD-ROM drive.

- Keep your computer equipment away from any source of liquid (such as wash basins, bathtubs, and shower stalls). If you drink coffee or other beverages while you're at your server, take care not to spill.
- Avoid exposing your equipment to damp or wet weather. If your system is near a window, be sure the window is closed in rainy weather.

The tray on your CD-ROM drive automatically closes when you shut down your server. You may want to open the tray and take out your CD-ROM disc before shutting down.

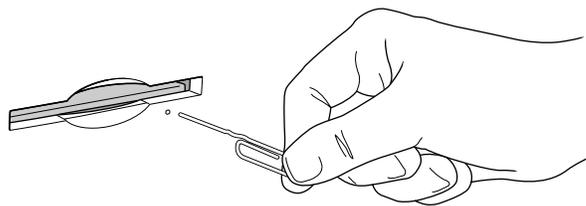
### Ejecting a disk

For instructions on ejecting a floppy disk, a CD-ROM disc, or a removable media disk, see the “Disks” topic of Macintosh Guide, available in the Guide (🔍) menu.

### If you can't eject a floppy disk

If you can't eject a floppy disk in the usual way, try the following in order:

- Hold down the ⌘ (Command) and Shift keys and press the number 1 key on your keyboard to eject a disk in the internal disk drive.
- Shut down the server. If the disk isn't ejected, then hold down the button on your mouse or other pointing device while you restart the server.
- Locate the small hole near the disk drive's opening, and carefully insert the end of a large straightened paper clip into it. Push gently until the disk is ejected. Do not use excessive force.



If nothing works, take the server or disk drive to your Apple-authorized service provider to have the disk removed.

## Power supply

The power supply in your server is a high-voltage component and should not be opened for any reason, even when the server is off. If the power supply needs service, contact your Apple-authorized dealer or service provider.

## Cleaning your equipment

Follow these general rules when cleaning the outside of your server and its components:

- Use a damp, soft, lint-free cloth to clean the server's exterior. Avoid getting moisture in any openings.
- Don't use aerosol sprays, solvents, or abrasives.

### Cleaning the server case

To clean the case, do the following:

- 1 **Turn off the server and disconnect the power plug. (Pull the plug, not the cord.)**
- 2 **Wipe the surfaces lightly with a clean, soft cloth dampened with water.**

### Cleaning the monitor

To clean the screen, put household glass cleaner on a soft cloth and wipe the screen. Don't spray the cleaner directly on the screen, because the liquid might drip into the monitor or server.

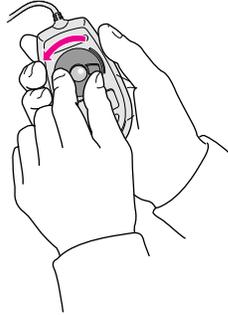
### Cleaning the mouse

The mouse contains a small ball that must roll smoothly for the mouse to work properly. You can keep this ball free of dirt and grease by using the mouse on a clean, lint-free surface and cleaning it occasionally.

You need a few cotton swabs and a clean, soft, lint-free cloth.

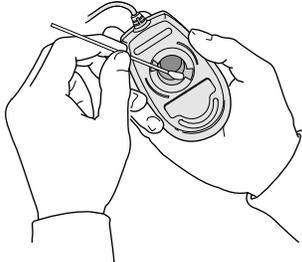
- 1 **Turn off your server.**

- 2 Turn the mouse upside down and turn the plastic ring on the bottom counterclockwise to disengage it.**



If you have an older mouse, you may need to press the plastic ring (rather than turn it) to disengage it.

- 3 Turn the mouse right side up with one hand and catch the ring and the ball with your other hand.**
- 4 Clean the three small rollers inside the mouse with a cotton swab moistened with water. Rotate the rollers to clean all around them.**



- 5 Wipe the mouse ball with a clean, soft, dry, and lint-free cloth.**
- 6 If necessary, wash the mouse ball with warm soapy water (use a mild soap such as a dishwashing liquid) and then dry the mouse ball thoroughly.**
- 7 Gently blow into the mouse case to remove any dust that has collected there.**
- 8 Put the ball and the ring back in place.**

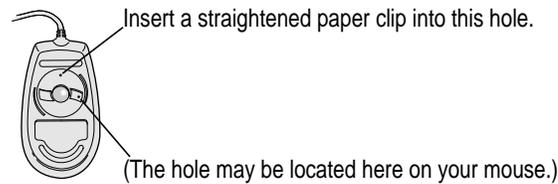
Your mouse should roll smoothly across your mouse pad or desk. If it doesn't, repeat these instructions carefully.

## Locking and unlocking the mouse

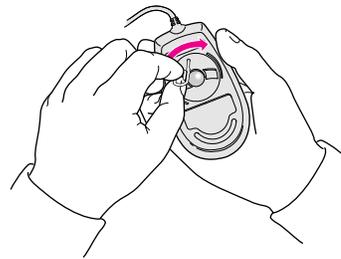
Some mouse devices can be locked so that the ball can't be removed. A locking mouse has a small hole on the plastic ring.

To lock the mouse, follow these steps:

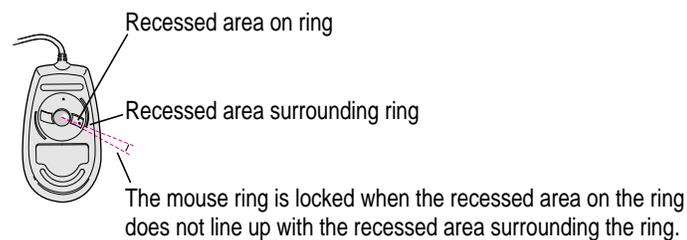
- 1 **Insert a straightened paper clip into the hole on the plastic ring.**



- 2 **Press down on the paper clip while you turn the ring clockwise.**

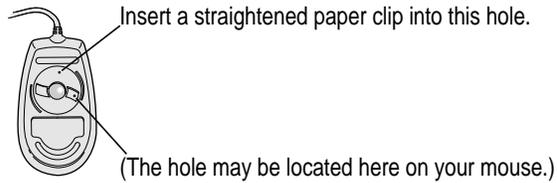


Turn the ring a very short distance, until it stops. When the recessed area on the ring is *not* lined up with the recessed area surrounding the ring, the mouse is locked.

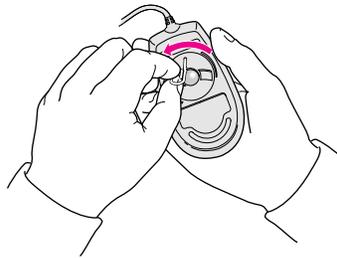


To unlock the mouse, follow these steps:

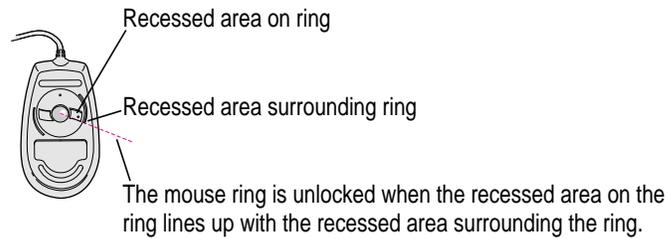
- 1 Insert a straightened paper clip into the hole on the plastic ring.**



- 2 Press down on the paper clip while you turn the ring counterclockwise.**



Turn the ring a very short distance. When the recessed area on the ring is lined up with the recessed area surrounding the ring, the mouse is unlocked.



## Health-related information about computer use

Muscle soreness, eye fatigue, and other discomforts and injuries sometimes associated with using computers can occur from performing any number of activities. In fact, misuse of the same muscles during multiple activities can create a problem that might not otherwise exist. For example, if you engage in nonwork activities that involve repetitive stress on the wrist—such as bicycling—and also use your computer keyboard improperly, you may increase your likelihood of developing wrist problems. Some individuals are at greater risk of developing these problems because of their health, physiology, lifestyle, and general exposure to stress. Work organization and conditions, such as workstation setup and lighting, also play a part in your overall health and comfort. Preventing health problems is a multifaceted task that requires careful attention to the way you use your body every hour of every day.

The most common health effects associated with using a computer are musculoskeletal discomfort and eye fatigue. We'll discuss each area of concern below. For information about electric and magnetic emissions, look in the reference material that came with your server.

### Musculoskeletal discomfort

As with any activity that involves sitting for long periods of time, using a computer can make your muscles sore and stiff. To minimize these effects, set up your work environment carefully, using the guidelines that follow, and take frequent breaks to rest tired muscles. To make working with your computer more comfortable, allow enough space in your work area so that you can change position frequently and maintain a relaxed posture.

Another type of musculoskeletal concern is repetitive stress injuries (RSIs), also known as cumulative trauma disorders (CTDs). These problems can occur when a certain muscle or tendon is repeatedly overused and forced into an unnatural position. The exact causes of RSIs are not totally understood, but in addition to awkward posture, such factors as the amount of repetition, the force used in the activity, the individual's physiology, workplace stress level, and lifestyle may affect the likelihood of experiencing an RSI.

RSIs did not suddenly arise when computers were invented; tennis elbow and writer's cramp, for example, are two RSIs that have been with us for a long time. Although less common than other RSIs, one serious RSI discussed more often today is a wrist problem called carpal tunnel syndrome, which may be aggravated by improper use of computer keyboards. This nerve disorder results from excessive pressure on the median nerve as it passes through the wrist to the hand.

This section offers advice on setting up your work area to enhance your comfort while you use your computer. Since the effects of repetitive movements associated with using a computer can be compounded by those of other work and leisure activities to produce or aggravate physical problems, proper use of your computer system must be considered as just one element of a healthy lifestyle.

No one, of course, can guarantee that you won't have problems even when you follow the most expert advice on using computer equipment. You should always check with a qualified health specialist if muscle, joint, or eye problems occur.

### Eye fatigue

Eye fatigue can occur whenever the eyes are focused on a nearby object for a long time. This problem occurs because the eye muscles must work harder to view an object that's closer than about 20 feet (6 meters). Improper lighting can hasten the development of eye fatigue. Although eye fatigue is annoying, there's no evidence that it leads to permanent damage.

Whenever you're engaged in an activity that involves close-up work—such as reading a magazine, doing craft work, or using a computer—be sure to have sufficient glare-free lighting and give your eyes frequent rest breaks by looking up and focusing on distant objects. Remember to have your eyes examined regularly.

To prevent discomfort and eye fatigue:

- Arrange your workspace so that the furniture is properly adjusted for you and doesn't contribute to an awkward working posture.
- Take frequent short breaks to give your muscles and eyes a chance to rest.

## Arranging your office

Here are some guidelines for adjusting the furniture in your office to accommodate your physical size and shape.

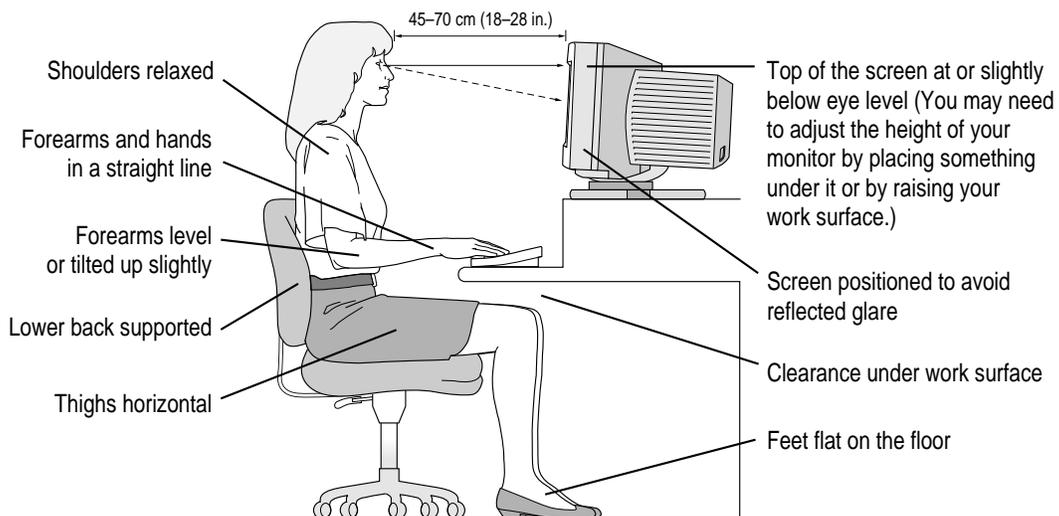
- An adjustable chair that provides firm, comfortable support is best. Adjust the height of the chair so that your thighs are horizontal and your feet flat on the floor.

The back of the chair should support your lower back (lumbar region). Follow the manufacturer's instructions for adjusting the backrest to fit your body properly.

- When you use the computer keyboard, your shoulders should be relaxed. Your upper arm and forearm should form an approximate right angle, with your wrist and hand in roughly a straight line.

You may have to raise your chair so that your forearms and hands are at the proper angle to the keyboard. If this makes it impossible to rest your feet flat on the floor, you can use a footrest with adjustable height and tilt to make up for any gap between the floor and your feet. Or you may lower the desktop to eliminate the need for a footrest. Another option is to use a desk with a keyboard tray that's lower than the regular work surface.

- Position the mouse at the same height as your keyboard. Allow adequate space to use the mouse comfortably.



- Arrange the monitor so that the top of the screen is slightly below your eye level when you're sitting at the keyboard. The best distance from your eyes to the screen is up to you, although most people seem to prefer 18 to 28 inches (45 to 70 cm).
- Position the monitor to minimize glare and reflections on the screen from overhead lights and windows. You may want to use a tiltable monitor stand. The stand lets you set the monitor at the best angle for viewing, helping to reduce or eliminate glare from lighting sources you can't move.

### Avoiding fatigue

- Change your seated position, stand up, or stretch whenever you start to feel tired. Frequent short breaks are helpful in reducing fatigue.
- Use a light touch when typing or using a mouse and keep your hands and fingers relaxed.
- Some computer users may develop discomfort in their hands, wrists, or arms after intensive work without breaks. If you begin to develop chronic pain or discomfort in your hands, wrists, or arms, consult a qualified health specialist.
- Allow adequate workspace so that you can use your keyboard and mouse comfortably. Place papers or other items so that you can view them easily while using your computer. A document stand may make reading papers more comfortable.
- Eye muscles must work harder to focus on nearby objects. Occasionally focus your eyes on a distant object, and blink often while you work.
- Clean your screen regularly. Keeping the screen clean helps reduce unwanted reflections.

## What about electromagnetic emissions?

There has been recent public discussion of the possible health effects of prolonged exposure to extremely low frequency (ELF) and very low frequency (VLF) electromagnetic fields. Such fields are associated with electromagnetic sources such as television sets, electrical wiring, and some household appliances—as well as computer monitors.

Apple has reviewed scientific reports and sought the counsel of government regulatory agencies and respected health organizations. Based on the prevailing evidence and opinions, Apple believes that the electric and magnetic fields produced by computer monitors do not pose a health risk.

In response to those customers who wish to reduce their exposure to electromagnetic fields, Apple has lowered the emission levels of our products. We are also actively encouraging further scientific research so we can continue to promote the health and safety of our customers and employees.



## Appendix B Technical Information

This appendix contains the following technical information about your Workgroup Server 8550:

- Expanding your server
- Specifications

## Expanding your Workgroup Server 8550

Your Workgroup Server 8550 was designed to grow with your needs—you can add new capabilities or improve its performance as you wish. You can plug in a number of external devices into its ports. You or your dealer can also install a number of enhancements within the case that houses the computer.

However, you must make sure that each component you add is compatible with your server and does not exceed its maximum power allowance. Follow the specifications in this appendix carefully. Your dealer or the manufacturer of a component can also provide compatibility details.

Apple recommends that you have the following equipment installed by an Apple-authorized dealer:

- additional dynamic random-access memory (DRAM), up to a total of 512 megabytes (MB)
- additional video RAM (VRAM), up to a total of 4 MB
- additional L2 cache memory, up to a total of 4 MB

You can install the following yourself:

- up to three PCI cards, such as a specialized communications card
- any additional internal 3.5- or 5.25-inch device, such as a digital audio tape (DAT) drive or hard disk

See Chapter 3, “Expanding Your Server and Connecting Other Equipment,” for instructions on adding components to your server.

## Specifications

This section lists the hardware specifications for the Workgroup Server 8550.

### Main unit

#### Processor

A PowerPC 604 processor with the following features:

- 132 megahertz (MHz) clock speed
- built-in floating point unit (FPU)
- 44 MHz system bus
- fully upgradable (with a processor card upgrade)

#### Memory

- 24 MB of DRAM supplied in removable DIMMs, expandable to a maximum of 512 MB
- 2 MB of built-in VRAM supplied in removable DIMMs, expandable to a maximum of 4 MB
- 4 MB of read-only memory (ROM)
- 8 kilobytes (K) of nonvolatile parameter memory
- one 512K DIMM of static RAM (SRAM) used as an L2 cache, upgradable to 4 MB

### DRAM, VRAM, and cache configurations

You can have memory—dynamic random-access memory (DRAM) or video random-access memory (VRAM)—added to your server in packages called Dual Inline Memory Modules, or DIMMs. You can also upgrade your server's L2 cache by installing a DIMM.

**WARNING** To avoid damage to your server, Apple Computer recommends that only an Apple-certified technician install additional DIMMs. Consult the service and support information that came with your server for instructions on how to contact an Apple-authorized service provider or Apple for service. If you attempt to install additional DIMMs yourself, any damage you may cause to your equipment will not be covered by the limited warranty on your server. See an Apple-authorized dealer or service provider for additional information about this or any other warranty question.

### DRAM configurations

Your server can use any DRAM configuration with DIMMs of these sizes: 8, 16, 32, or 64 MB. The exact configuration depends on the density of the DRAM chips that are mounted on the DIMMs.

You can increase your server's DRAM to up to 512 MB. The main logic board has eight slots where DIMMs can be installed. To increase DRAM to the maximum of 512 MB, have an Apple-authorized dealer or service provider fill all eight slots with 64 MB DIMMs. You can also fill slots with 8, 16, or 32 MB DIMMs.

*Note:* 128 MB DIMMs can fit in the server's memory slots to increase DRAM to as much as 1 gigabyte (GB). These DIMMs have not been tested for use with Workgroup Server 8550 systems, however.

**IMPORTANT** The DIMMs should be 64-bit-wide, 168-pin fast-paged mode, with 70-nanosecond (ns) RAM access time or faster. The Single Inline Memory Modules (SIMMs) from older Macintosh computers are not compatible with your server and should not be used.

### VRAM configurations

VRAM, like standard DRAM, is also provided in DIMMs. Your server comes with 2 MB of VRAM installed in two 1 MB DIMMs. (These DIMMs are installed in bank 1.) Your server's VRAM can be expanded to a maximum of 4 MB by adding two 1 MB DIMMs to bank 2. Both DIMMs must be added at the same time.

**IMPORTANT** The VRAM DIMMs must be 32-bit-wide, 112-pin fast-paged mode with 70-ns RAM access time or faster. Do not use the 256K or 512K VRAM SIMMs used in older Macintosh computers.

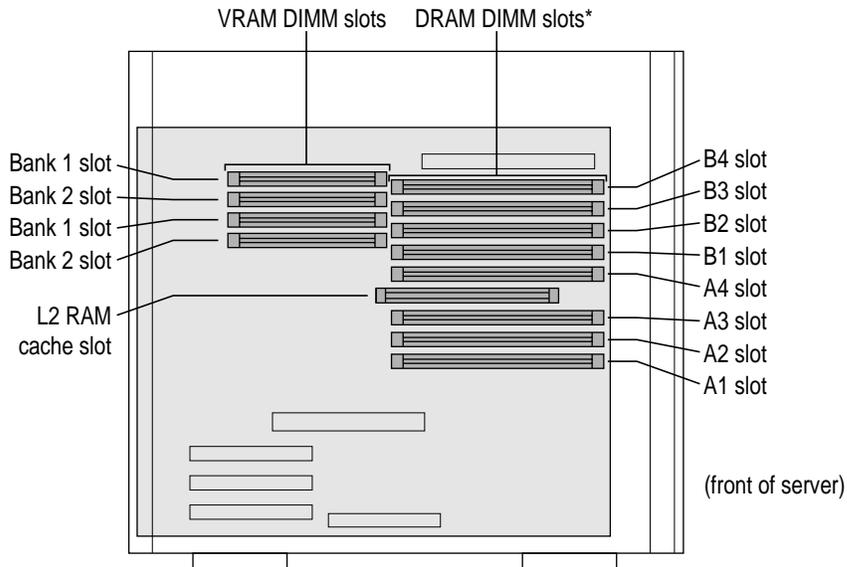
### Cache configurations

Your server has a 512K L2 cache. You can upgrade the L2 cache to a maximum of 4 MB by replacing the existing 512K cache DIMM with a higher-capacity cache DIMM.

### Adding DRAM

If you decide to have additional DRAM installed in your server, the DIMMs can be installed one at a time in any order in any of the memory slots.

However, if you wish to take advantage of your server's memory interleaving capability, which provides maximum performance, you must have the DIMMs installed in pairs and in paired slots. (A1 and B1 are the first pair of slots, A2 and B2 are the second, and so on.) Memory interleaving allows the server to read or write to its memory at the same time that other memory reads or writes are occurring, thus providing faster performance.



\*When installing DRAM, for best performance, fill slots A1 and B1, then A2 and B2, then A3 and B3, and so forth.

## Graphics modes

The table on the following page shows the image sizes for monitors that can be connected to the monitor port, along with the number of colors or grays supported with 2 MB of VRAM and with the optional expansion to 4 MB of VRAM.

There are also many special PCI monitor cards available from other manufacturers that can support other monitors and special video requirements. See your Apple-authorized dealer for information.

*Note:* On some monitors from manufacturers other than Apple, the connector pinout designates one pin for both green video and timing synchronization. These “sync on green” monitors are not compatible with Workgroup Server 8550 systems. If you’re not sure what type of monitor you have, check with your dealer.

Colors or grays supported

Monitor	VIS*	Resolution	2 MB VRAM maximum colors**	4 MB VRAM maximum colors**	Screen refresh rates	
					Vertical	Horizontal
12" RGB	N/A	512 by 384	Millions	Millions	60 Hz	24.48 kHz
12" Monochrome	N/A	640 by 480	256	256	67 Hz	34.971 kHz
13" RGB Hi-Res	N/A	640 by 480	Millions	Millions	67 Hz	34.971 kHz
14" RGB Hi-Res	11.5"	640 by 480	Millions	Millions	67 Hz	34.971 kHz
14" AudioVision	11.5"	640 by 480	Millions	Millions	67 Hz	35 kHz
VGA	***	640 by 480	Millions	Millions	60 Hz	31.505 kHz
		800 by 600	Millions	Millions	60 Hz	39.921 kHz
		800 by 600	Millions	Millions	72 Hz	48.1 kHz
		800 by 600	Millions	Millions	75 Hz	47.933 kHz
		1024 by 768	Thousands	Millions	60 Hz	48.294 kHz
		1024 by 768	Thousands	Millions	72 Hz	58.286 kHz
Full-page Monochrome	N/A	640 by 480	Thousands	Millions	75 Hz	68.773 kHz
		640 by 870	256	256	75 Hz	68.773 kHz
		640 by 870	Thousands	Millions	75 Hz	68.773 kHz
16" color	14.8"	832 by 624	Millions	Millions	75 Hz	49.670 kHz
19" color	***	1024 by 768	Thousands	Millions	75 Hz	60.060 kHz
Two-page Monochrome	N/A	1152 by 870	256	256	75 Hz	68.476 kHz
Two-page RGB	11.5"	1152 by 870	Thousands	Millions	75 Hz	68.476 kHz
Multiple Scan 15	13.3"	640 by 480	Millions	Millions	67 Hz	34.971 kHz
		832 by 624	Millions	Millions	75 Hz	49.670 kHz
Multiple Scan 17	16.1"	640 by 480	Millions	Millions	67 Hz	34.971 kHz
		832 by 624	Millions	Millions	75 Hz	49.670 kHz
		1024 by 768	Thousands	Millions	75 Hz	60.060 kHz
Multiple Scan 20	19.1"	640 by 480	Millions	Millions	67 Hz	34.971 kHz
		832 by 624	Millions	Millions	75 Hz	49.670 kHz
		1024 by 768	Thousands	Millions	75 Hz	60.060 kHz
		1152 by 870	Thousands	Millions	75 Hz	68.476 kHz
		1280 by 1024	256	Thousands	75 Hz	79.964 kHz

\*Viewable Image Size

\*\*256=image depth of 8 bits, thousands=image depth of 16 bits, millions=image depth of 32 bits.

\*\*\*Refer to the manual that came with your monitor to determine VIS.

N/A=not available

## Internal disk drives

- Apple SuperDrive 1.4 MB high-density floppy disk drive.
- Internal Apple SCSI hard disk drive bracket, which accommodates two 1-inch-high SCSI drives. Location 1 of the drive array houses the primary hard drive (which may be supplied with your Workgroup Server 8550). Location 2 houses a secondary user-installable hard drive.
- Internal 5.25-inch quadruple-speed CD-ROM player (600 kilobytes-per-second transfer rate).
- Optional internal 3.5-inch DAT drive or second Apple SCSI hard disk drive (1/3- or 1/2-height).

A combination of up to eight internal and external SCSI devices can be used.

## Clock/calendar

- CMOS custom circuitry with long-life lithium battery.

## Keyboard

- Supports all Apple Desktop Bus (ADB) keyboards.

## Mouse

- Supports all models of the ADB mouse.

## Interfaces

- One Apple Desktop Bus (ADB) port supporting up to three ADB input devices (such as a trackball, keyboard, or mouse) daisy-chained through a low-speed, synchronous serial bus.
- Monitor port supporting color and grayscale monitors of various sizes and resolutions. (See “Graphics Modes” earlier in this appendix.)
- Three internal expansion slots supporting Peripheral Component Interconnect (PCI) expansion cards. Install only expansion cards that come with Mac OS drivers and that are compliant with the PCI 2.0 standard. NuBus cards cannot be used in these expansion slots.

- Two RS-232/RS-422 serial GeoPort-compatible serial ports, 230.4 Kbits per second maximum (up to 2.048 Mbits per second if clocked externally).
- One built-in Ethernet 10BASE-T port for direct connection to 10BASE-T networks. (If both AAUI and 10BASE-T connectors are plugged in, the server uses the 10BASE-T connector by default.)
- One built-in Apple Ethernet AAUI port for connecting to high-speed Ethernet networks. Requires the appropriate AAUI transceiver adapter (10BASE-T, thin coaxial, or thick coaxial).
- One 3.5 mm sound output port for headphones or line-level devices.
- One 3.5 mm sound input port for stereo sound input. The sound input port supports the Apple PlainTalk Microphone that comes with some Macintosh computers. The sound input port also supports a standard stereo (miniplug-to-RCA) cable adapter for connecting stereo equipment to your server. It does not support the omnidirectional microphone (the round microphone shipped with some earlier models of Macintosh) or the attenuated RCA adapter provided with some models of Macintosh.
- One internal/external SCSI interface that supports up to six external SCSI devices, or one internal device plus five external SCSI devices (the built-in CD-ROM drive is also connected to this interface). If you have a built-in DAT drive and a second internal hard disk, you can attach up to four additional external SCSI devices to this interface. This interface operates at 5 MB per second.

**IMPORTANT** Some older SCSI devices may require updated drivers. (A “driver” is special software that is installed in your System Folder.) Contact the device manufacturer for information on obtaining driver software.

- One internal Fast SCSI-2 interface that supports the built-in hard disk located in the lower bay of the internal disk drive. This interface operates at 10 MB per second.

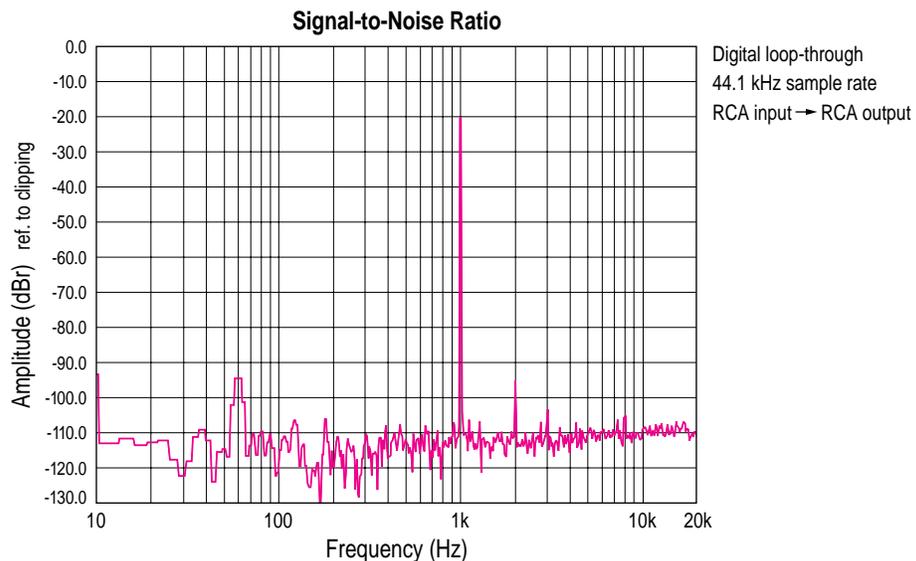
## Audio system

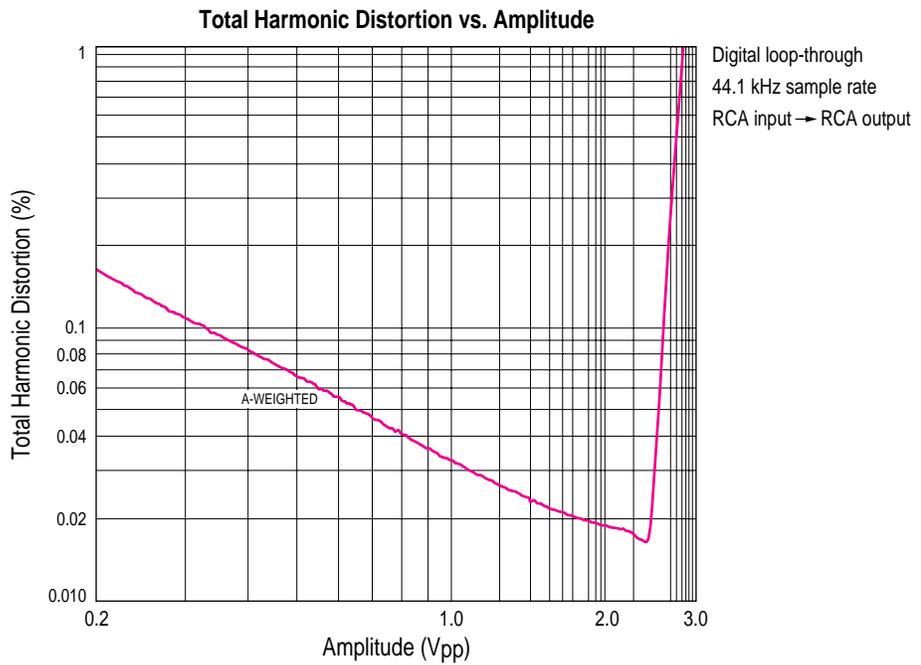
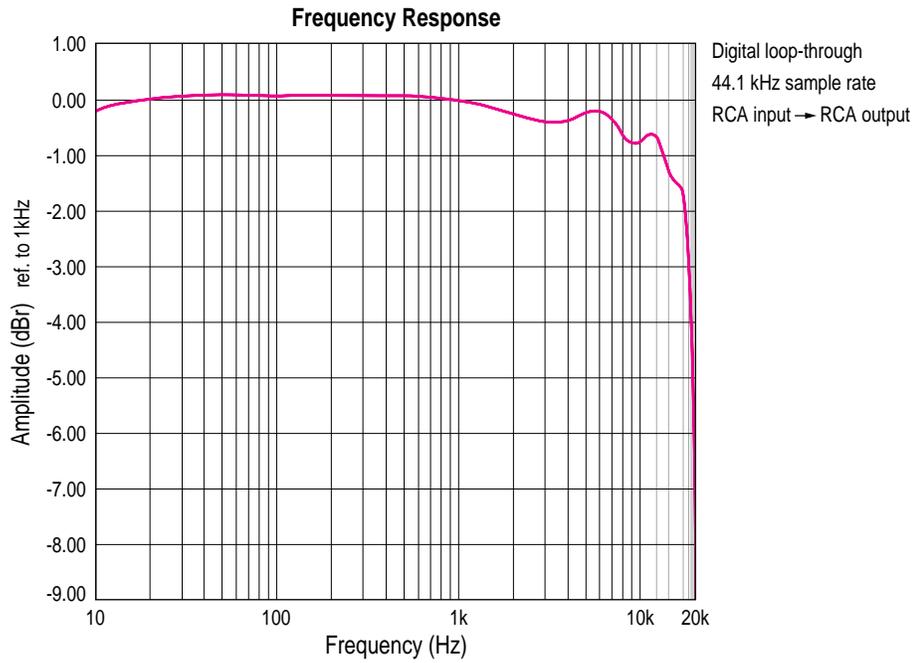
- Custom sound circuitry, including stereo generator (digital-to-analog converter, or DAC)—capable of driving stereo miniplug headphones or audio equipment—and stereo sampling hardware (analog-to-digital converter, or ADC) for recording stereo sound.
- 16-bit stereo input and output.
- Sample rates of 44.1 and 22.05 kilohertz (kHz).

## Typical specifications

- Sound input connector line level: 2.8 volts peak-to-peak ( $V_{pp}$ ) nominal, into 3.0-kilohm ( $k\Omega$ ) impedance (minimum).
- Sound output connector line level: 2.7  $V_{pp}$  nominal, into 32- $k\Omega$  impedance.
- Sound input signal-to-noise ratio (SNR): >83 decibels (dB) A-weighted with no audible discrete tones.
- Sound output SNR: >84 dB A-weighted with no audible discrete tones.
- Bandwidth: 10 Hz to 18 kHz (+0.1 dB, -3.0 dB) at 44.1-kHz sample rate.

The following graphs show typical data for the Workgroup Server 8550. (Your server's data may vary, depending on the equipment you have connected.)





### AC line input

- Line voltage: 100–240 V alternating current (AC), RMS single phase, automatically configured.
- Frequency: 50–60 Hz.
- Power: 340 watts maximum continuous; 520 watts peak input.

### AC line output

- Output receptacle: 100–120 V, 3 amperes (A) AC, 220–240 V, 1.5 A AC RMS (determined by actual input voltage); 3 A maximum at 100 V.

### DC power

- Continuous output: 225 watts.

---

Current type	Total*
+3.3 V	20 A
+5 V	35 A
+5 V (trickle)	0.10 A
+12 V	5 A
-12 V	0.75 A

---

\*Total power output cannot exceed 225 W.

### Power requirements for devices you can connect

#### Apple Desktop Bus (ADB)

- Mouse draws up to 10 milliamperes (mA).
- Keyboard draws 25–80 mA (varies with keyboard model used).
- Maximum current available for all ADB devices: 500 mA.

*Note:* The ADB port can support up to three daisy-chained ADB devices.

### Audio and telecommunications devices

The following table shows power allowances for external devices connected to input ports.

Device	Voltage	Current	Power
Microphone	+5 V	20 mA	100 mW
GeoPort telecom adapter	+5 V	500 mA	2.5 W

### Expansion cards and devices

If you add a PCI expansion card, a 5.25-inch storage device, or a 3.5-inch storage device to your server, make sure the component's power requirements don't exceed the maximum power allowances allocated to it by the server.

The maximum power allowances for expansion cards in your server can accommodate three 15-watt or two 25-watt cards. Detailed guidelines are presented in the following table.

Device	Voltage	Current	Power
Expansion card (15 watts)* (PCI)	+5 V	3 A	15 W
	+12 V	0.500 A	6 W
	-12 V	0.100 A	1.2 W
	+3.3 V	2 A	6.6 W
Expansion card (25 watts)** (PCI)	+5 V	5 A	25 W
	+12 V	0.500 A	6 W
	-12 V	0.100 A	1.2 W
	+3.3 V	2 A	6.6 W
Storage device (such as a CD-ROM drive)	+5 V	9 A	45 W
	+12 V	3 A	36 W
	+12 V	7.5 A peak***	—

\*15-watt expansion cards should not consume more than 15 watts of power total.

\*\*25-watt cards should not consume more than 25 watts of power total.

\*\*\*Peak power is for startup only and must not occur in normal operation.

## Assigning SCSI ID numbers

The two SCSI buses can connect up to eight SCSI devices.

Bus A, the internal Fast SCSI-2 bus, is designed to connect one internal hard disk drive (the built-in startup drive) to the server (CPU).

Bus B, the internal/external SCSI-1 bus, is designed to connect an optional secondary internal hard disk (in the upper bay of the internal disk drive bracket), an optional built-in DAT drive (or other internal drive in the server's auxiliary bay), the built-in CD-ROM drive, and up to four additional external SCSI devices to the server (CPU).

The drives that were installed in your server at the factory, as well as the server itself, have already reserved certain SCSI ID numbers. Other ID numbers are available for assignment to SCSI devices that are added after you buy your server as described in the following table.

SCSI bus	SCSI ID number	Device
Bus A—Internal (10 MB/sec)	0	internal hard disk #1 (startup disk)
	1	not available
	2	not available
	3	not available
	4	not available
	5	not available
	6	not available
	7	server CPU
Bus B—Internal/External (5 MB/sec)	0	available
	1	optional internal hard disk #2
	2	optional internal drive (DAT)
	3	built-in CD-ROM drive
	4	available
	5	available
	6	available
	7	server CPU

## Size and weight

The following table shows size and weight information for your server and mouse.

Weight	Height	Width	Depth
<b>Main unit</b>			
12.7 kg*	355.6 mm	196 mm	400 mm
28 lb.*	14 in.	7.7 in.	15.75 in.
<b>Mouse</b>			
0.11 kg	33 mm	61 mm	107 mm
4 oz.	1.3 in.	2.4 in.	4.2 in.

\*Weight varies depending on type of hard disk and may be greater if a 5.25-inch device, such as a CD-ROM drive, is installed.

## Environment

### Operating temperature

- 10° C to 40° C (50° F to 104° F)

### Storage temperature

- -40° C to 47° C (-40° F to 116.6° F)

### Relative humidity

- 5 percent to 95 percent (noncondensing)

### Altitude

- 0 to 3048 m (0 to 10,000 ft.)

## Specifications for the 600i CD-ROM drive

- Disc diameter 120 millimeters (mm)  
(5.25 inches) and 80 mm
- Scanning velocity 1.2–1.4 meters per second
- Rotation speed Varies over radius
  - Normal speed ~530 to 230 revolutions per minute (rpm)
  - Double speed ~1060 to 460 rpm
  - Quadruple speed ~2120 to 920 rpm
- Latency (average) Varies over radius
  - Normal speed ~55 to 130 milliseconds (ms)
  - Double speed ~27.5 to 65 ms
  - Quadruple speed ~13.75 to 32.5 ms
- Blocks per rotation ~8.4 to 19.5 variable
- Average access time (typical)
  - Normal speed 380 ms
  - Double speed 270 ms
  - Quadruple speed 200 ms

## Data

- Data capacity 656 megabytes (MB), Mode 1  
748 MB, Mode 2
- Number of blocks per disc 336,150
- Data per block 2048 bytes, Mode 1  
2336 bytes, Mode 2
- Address description Minutes, seconds, blocks

## Audio capacity

- Playing time 74 minutes, 42 seconds

### Modes supported

- Audio CD
- CD-ROM Modes 1 and 2
- CD-ROM XA Mode 2, Forms 1 and 2
- CD-I Mode 2, Forms 1 and 2
- Photo CD Single-session and multi-session
- Video CD

### Data streaming and transfer rates

- Blocks per second
  - Normal speed 75
  - Double speed 150
  - Quadruple speed 300
- User kilobytes (K) per second
  - Normal speed 150K, Mode 1  
171.1K, Mode 2
  - Double speed 300K, Mode 1  
342.2K, Mode 2
  - Quadruple speed 600K, Mode 1  
684.4K, Mode 2
- SCSI bus burst rate (typical)
  - Asynchronous 5.0 MB per second
  - Synchronous 5.0 MB per second

### Power consumption (typical)

- +5 V DC 360 milliamperes (mA)
- +12 V DC 620 mA

### Laser

- Type: Semiconductor GaAlAs laser
- Wavelength:  $790 \pm 25$  nanometers
- Output power: 0.2 to 0.6 milliwatts
- Beam divergence:  $55^\circ$



# Index

10BASE-T connection 19  
10BASE-T Ethernet hub 21, 26  
10BASE-T network 19, 26  
10BASE-T twisted-pair cables 20  
100BASE-T (Fast Ethernet) network 19, 25

## A

AAUI  
    connector 19  
    Ethernet port 22  
AC line input, specifications for 98  
AC line output, specifications for 98  
ADB devices  
    connecting 12–13, 64  
    power consumption of 31, 64, 98  
adding internal components 9, 31–59, 88  
air circulation 9, 73  
Apple Attachment Unit Interface. *See* AAUI  
Apple AudioVision monitor, plugging in 10, 11  
Apple customer support hotline 4  
Apple Desktop Bus. *See* ADB  
Apple Drive Setup program 62  
Apple Ethernet AUI Adapter 20, 23  
Apple Ethernet media adapters 20  
Apple Ethernet 10T/5 Workgroup Hub 26  
Apple Ethernet Thin Coax Transceiver 20  
Apple Guide 4  
Apple Internet Server, setting up 3  
Apple LocalTalk Locking Connector Kit 24

Apple PlainTalk Microphone 66, 68–69  
*Apple RAID Administrator's Guide* 62  
Apple RAID Software 62  
Apple Remote Access network service, installing 3  
AppleSearch, installing 3  
*AppleShare Administrator's Guide*,  
    *Addendum to* 28  
AppleShare  
    installing 3  
    multiple network segments 27  
AppleTalk control panel, default setting for 25  
AppleTalk network, extending 25  
application programs and software. *See* programs  
audio devices  
    connecting 65–70  
    power requirements for 99  
Audio In port 69  
audio system, specifications for 96  
AUI port 23  
auxiliary bay, installing drive in 54–59

## B

bandwidth 26  
bar-code reader, connecting 64  
blinking question mark 17  
books, reference 3  
brightness control 17, 73  
Bus A SCSI bus 42  
Bus B SCSI bus 42

## C

### cables

- connecting to Ethernet network 20–23
  - handling 72
  - keyboard 12–13
  - locking 8–9
  - monitor 11
  - mouse 12–13
  - SCSI 60
- cache DIMMs 31, 41, 89–92
- calendar, specifications for 94
- cards. *See* expansion cards
- carpal tunnel syndrome 82
- CD-ROM discs
- cleaning 75
  - ejecting 76
  - handling 75
  - server documentation on 3
- CD-ROM drives
- specifications for 102–103
  - turning on 15
- Chooser
- changing zones 29
  - choosing printer 63
- cleaning
- CD-ROM discs 75
  - keyboard 74
  - monitor 77
  - mouse 77–78
  - server case 77
  - spills 73–74
- clock, specifications for 94
- coaxial cables 20
- connecting
- AppleTalk networks 25
  - audio equipment 65–70
  - to Ethernet network 20–23
  - external devices 31, 42–44, 60–70
  - GeoPort Telecom Adapter 65
  - hard disk drives, external 31, 60–63
  - hard disk drives, internal 9, 31, 42–59, 88
  - input devices 64
  - keyboard 12–13
  - to LocalTalk network 24–25
  - microphone 68–69

- modem 65
  - monitor 9–11
  - monitor, additional 64
  - monitor cable 11
  - monitor power cord 9–10
  - mouse 12–13
  - to network 19–20
  - network segments 27–28
  - to other types of Ethernet networks 23
  - printer 63
  - SCSI devices 42–63
  - speakers 69–70
  - to thin coaxial Ethernet network 22
  - to twisted-pair Ethernet network 21
- cumulative trauma disorders (CTDs) 81–82
- customer support hotline 4

## D

- damage, to power cord 71
- DAT (digital audio tape) drive
- installing 54–59, 88
  - limit on external SCSI devices 42
  - SCSI ID numbers 44
- DC power, specifications for 98
- device driver. *See* driver
- devices, power consumption of 31
- dialog boxes
- during shutdown 18
  - during startup 16, 25
- digital audio tape drive. *See* DAT (digital audio tape) drive
- DIMMs (Dual Inline Memory Modules)
- installing 31, 41, 88, 91–92
  - specifications for 89–92
- direct cable connection, for printer port 63
- disk errors, on hard disk drive 62
- diskettes. *See* floppy disks
- disks. *See* floppy disks; hard disk drives
- display. *See* monitors
- DRAM DIMMs
- installing 31, 41, 88, 91–92
  - specifications for 89–90
- driver
- included with expansion card 39
  - installing 62

Dual Inline Memory Modules. *See* DIMMs  
dual-plug adapters 69  
dynamic random-access memory. *See* DRAM  
DIMMs

**E**

ejecting floppy disks 76  
electrical safety 71–73  
electromagnetic emissions 85  
electrostatic discharge, avoiding 32  
ELF (extremely low frequency) electromagnetic fields 85  
environmental specifications 101  
equipment  
    cleaning 77–78  
    handling 72–77  
error condition dialog box 16, 25  
Ethernet cables 20  
Ethernet icon 20  
Ethernet interface 19  
Ethernet media adapters 20  
Ethernet network  
    building a high-performance 26–29  
    connecting to 19, 20–23  
    using thin coaxial cables in 22  
Ethernet ports 20  
Ethernet segments, high-performance 26  
Ethernet transceiver 23  
expanding  
    memory 41  
    server 31–70  
expansion cards  
    installing 9, 34–39, 40  
    power requirements for 34, 99  
expansion devices, power requirements for 99  
expansion slots 25, 34  
external devices  
    connecting 31, 42–44, 60–70  
    power consumption of 31  
    turning on 15  
external speakers, connecting 69–70  
extremely low frequency (ELF) electromagnetic fields 85  
eye fatigue 82, 84

**F**

Fast Ethernet (100BASE-T) network 19, 25  
Fiber Distributed Data Interface (FDDI) 19, 25  
fiber-optic media 20  
floppy disks  
    ejecting 76  
    handling 74

**G**

GeoPort Telecom Adapter 63, 65  
glare on screen 9, 83–84  
graphics modes, specifications for 92–93  
graphics tablet, connecting 64  
grounded equipment 14  
grounded wriststrap, using 32, 45  
Guide (🔍) menu 4

**H**

hard disk drives  
    connecting 31, 42–63  
    documentation on 3  
    external 31, 60–63  
    initializing 62  
    installing in auxiliary bay 54–59  
    installing in internal disk drive bracket 45–53  
    internal 31, 42–59, 88, 94  
    reinitializing 62  
    repeated errors on 62  
    turning on 15  
    using Apple Drive Setup program 62  
    using Apple RAID Software 63  
hardware components, securing 8–9  
hardware specifications 89–103  
health-related information, and computer use 81–85  
help  
    getting 4  
    Guide (🔍) menu 4  
    reference material 3  
high-performance Ethernet segment, creating 26  
high-performance network, building 25–29  
hotline, customer support 4

## I, J

### icons

- ADB port 12, 13, 64
- Ethernet 20
- microphone 66
- modem port icon 65
- monitor port 11
- power switch 15
- printer port 63
- question mark 16–17
- SCSI 42
- speaker 66

### information

- customer support 4
- technical 87–103

### initializing a hard disk drive 62

### input devices, connecting 64

### installing

- DAT drive 54–59, 88
- device drivers 62
- drives in auxiliary bays 54–59
- expansion cards 9, 34–39, 40
- external devices 31, 42–44, 60–70
- hard disks in internal disk drive bracket 45–53
- internal components 9, 31–59, 88
- memory 41
- network services 3
- PCI expansion cards 34–39, 40
- processor upgrade card 40

### Integrated Services Digital Network (ISDN) 19, 25

### interfaces, specifications for 94–95

### internal components

- installing 9, 31–59, 88
- power consumption of 31

### internal hard disk

- adding 9, 31, 42–59, 88
- specifications for 94

### ISDN (Integrated Services Digital Network) 19, 25

### isolating the server system 8

## K, L

### keyboard

- connecting 12–13, 64
- handling spills on 74
- specifications for 94

### L2 cache

- installing DIMMs 31, 41, 88, 91–92
- specifications for 89–91

### LocalTalk network, connecting to 19, 24–25

### locking cable, using 8–9

### locking mouse 79–80

## M

### maintenance

- cleaning equipment 77–78
- handling equipment 72–77

### main unit, specifications for 89

### memory

- expanding 41
- installing 9
- specifications for 89

### microphone 66

- connecting 68–69
- positioning 68

### modem, connecting 65

### modem port 63, 65

### modem port icon 65

### moisture, avoiding 71–73, 76

### monitor cable, connecting 11

### monitors

- Apple AudioVision monitor, plugging in 10, 11
- brightness control 17, 73
- cleaning 77
- connecting 9–11
- connecting additional 64
- glare on screen 9, 83–84
- interference on screen 73
- power cord, connecting 9–10
- screen damage prevention 73
- specifications for 92–93
- turning on automatically 15

- mouse
  - cleaning 77–78
  - connecting 12–13, 64
  - locking and unlocking 79–80
  - specifications for 94
- multihoming 25, 27
  - Open Transport and 19
  - setting up 28
- multiple network segments, connecting 27–29

## N

- network connection dialog box 16
- networks
  - AppleTalk 25
  - cable connection for printer port 63
  - connecting to 19–20
  - Ethernet 19–23
  - Fast Ethernet (100BASE-T) 19, 25
  - Fiber Distributed Data Interface (FDDI) 25
  - high-performance 25–29
  - installing services 3
  - Integrated Services Digital Network (ISDN) 19, 25
  - LocalTalk 19, 24–25
  - 100BASE-T (Fast Ethernet) 19, 25
  - server software for 19
  - 10BASE-T 19, 26
  - Token Ring 19, 25
  - twisted-pair Ethernet 21
- network segments, connecting 28–29
- NuBus expansion cards 34

## O

- 100BASE-T (Fast Ethernet) network 19, 25
- opening the server 32–33
- Open Transport 19, 25

## P, Q

- PCI 2.0 standard 34
- PCI expansion cards, installing 19, 25, 27–28, 34–40, 88
- performance, increasing in Ethernet networks 26

- Peripheral Component Interconnect cards.
  - See* PCI expansion cards
- PlainTalk microphone 66, 68–69
- Planning and Managing AppleTalk Networks*, reference book 3

- plugging in the server 14
- ports

- AAUI Ethernet 23
- ADB 12–13, 64
- Audio In 69
- AUI 23
- Ethernet 20
- modem 63, 65
- monitor 11
- printer 63
- SCSI 42
- security lock 8
- server 6–7
- sound input 65, 66
- sound output 65, 66, 69
- posture, while using equipment 81–84
- Power button 15, 18

- power cord
  - frayed or damaged 71
  - unplugging 14
- Power key 15
- PowerPC RISC microprocessor 1
- power requirements
  - Apple Desktop Bus 98
  - audio devices 99
  - expansion cards 34, 99
  - expansion devices 99
  - telecommunications devices 99

- power supply, computer 77

- power usage
  - ADB devices 31, 64
  - internal devices 31
  - SCSI devices 31

- printer port
  - connecting to existing LocalTalk network 24–25
  - connecting to GeoPort Telecom Adapter 63
- printer port icon 63
- printer port interface 19

- printing 63
- problems. *See* troubleshooting
- processor
  - specifications for 89
  - upgrading 40
- processor card 34, 40
- programs. *See also individual program names*
  - for performance and speed 1
  - screen saver 73
  - speech software 69
- question mark disk icon 16–17

## R

- RAID. *See* Apple RAID Software
- Reduced Instruction Set Computer (RISC)
  - technology 1
- reference books 3
- reinitializing a hard disk 62
- removing server cover 33
- repetitive stress injuries (RSIs) 81–82
- replacing server cover 39
- RISC (Reduced Instruction Set Computer)
  - technology 1
- RJ-45 connector jack 21
- routers, connecting to network segments 28–29
- RSIs (repetitive stress injuries) 81–82

## S

- safety instructions 71–72
- screen, glare on 9, 83–84
- screen savers 73
- SCSI devices
  - connecting 42–63
  - limit on 42
  - power consumption of 31
  - terminators for 61
- SCSI icon 42
- SCSI ID number, setting 43–44, 100
- SCSI port 42
- securing hardware components 8–9
- security lock ports 8
- server components, handling 72–77

- server cover
  - removing 33
  - replacing 39
- servers
  - cleaning case 77
  - components, diagram of 6
  - configuring 4
  - expanding 9, 31–70, 88
  - handling 72–73
  - hardware specifications for 89–103
  - isolating 8
  - locking 8–9
  - opening 32–33
  - overheated 73
  - plugging in 14
  - ports 6–7
  - power cord 14
  - power supply 77
  - problems turning on 17
  - processor card 34
  - processor, upgrading 40
  - removing cover 33
  - replacing cover 39
  - safety instructions 71–72
  - securing 8–9
  - setting up 5–18
  - size of 101
  - troubleshooting 17
  - turning off 18
  - turning on 15–17
  - weight of 101
- service, customer 4
- setting
  - SCSI ID numbers 43–44, 100
  - sound options 70
- setting up
  - Apple Internet Server 3
  - multihoming 28
  - server 5–18. *See also* securing hardware components
- Shut Down command (Special menu) 18
- Small Computer System Interface. *See* SCSI
- software. *See* programs

- software driver. *See* driver
- Sound & Displays control panel, setting sound options 70
- sound options, setting 70
- sound ports 65–70
- speakers, connecting 69–70
- specifications 89–103
- speech software 69
- spills 71–76
- static electricity. *See* electrostatic discharge
- stereo miniplugs 69
- stereo speakers, connecting 69–70
- support, from Apple 4
- switched Ethernet hubs 26

## T

- tape-backup drives, turning on 15
- technical information 87–103
- technical support, from Apple 4
- telecommunications devices, power requirements for 99
- 10BASE-T connection 19
- 10BASE-T Ethernet hub 21, 26
- 10BASE-T network 19, 26
- 10BASE-T twisted-pair cables 20
- terminators
  - for external SCSI devices 61
  - for internal SCSI devices 48, 56
  - for non-Apple transceivers 22
- thin coaxial Ethernet network, connecting to 22
- Token Ring networks 19, 25
- trackball, connecting 64
- troubleshooting
  - blinking question mark 16–17
  - ejecting floppy disks 76
  - hard disk drive 62
  - keyboard, spills on 74
  - monitor 73
  - network connection message 16, 25
  - screen 73
  - server 17
  - in *Workgroup Server Administrator's Guide* 4

- turning off the server 18
- turning on external devices 15
- turning on the server 15–17
- twisted-pair Ethernet network, connecting to 21
- twisted-pair patch cord 21

## U

- Understanding Computer Networks*, reference book 3
- unlocking mouse 79–80
- unplugging power cord 14
- upgrading processor 40
- using a locking cable 8–9

## V

- ventilation, equipment 73
- very low frequency (VLF) electromagnetic fields 85
- video expansion cards 64
- video random-access memory. *See* VRAM DIMMs
- VLF (very low frequency) electromagnetic fields 85
- VRAM DIMMs
  - installing 31, 41, 88, 91–92
  - specifications for 89–91

## W, X, Y, Z

- work area, arranging 81–84
- Workgroup Server Administrator's Guide* 3, 4
- Workgroup Server Read Me file 3
- Workgroup Server Software* CD-ROM disc, documentation on 3, 62
- wrist problems 81–82
- wriststrap, grounded 32, 45
- zones, changing 29



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