Setting Up
the Network Server

Installing and expanding the hardware

Contents

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.

Industry Canada

DOC Class A Compliance
This class A digital device meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Réglement sur le matériel brouilleur du Canada..

VCCI statement

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EU statement

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.

This equipment has been designed, tested, and found compliant with the Class A limits for Information Technology Equipment of EN55022. These limits are designed to provide reasonable protection against radio interference when the equipment is operated in a commercial environment.

Laser information

WARNING Making adjustments or performing procedures other than those specified in your equipment's documentation may result in hazardous 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.

Your computer is a Class 1 laser product. The following Class 1 and service warning labels are on the CD-ROM drive inside the computer. The Class 1 label indicates that the drive meets minimum safety requirements.

```
CLASS 1 LASER PRODUCT
LASER KLASSE 1
LUOKAN 1 LASERLAITE
APPAREIL A LASER DE CLASSE 1
EN60825
```
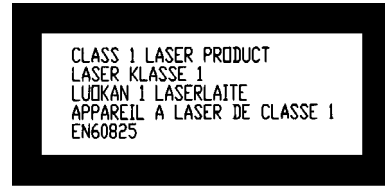
Class 1 label

Preface   About This Guide

This guide tells you how to set up your Network Server and connect it to an Ethernet network. The guide also provides information about expanding your server, using software, and troubleshooting problems that may arise.

About your Network Server

Your Network Server is powered by the PowerPC™ microprocessor. 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 Network Server runs IBM's AIX operating system, enabling you to use the wide range of software applications available on AIX.

What you need to know

This guide is intended for the person, generally a system administrator or network administrator, who sets up the server and connects it to an existing network. Before you set up your Network Server and install the operating system, you should be familiar with AIX. If you're new to administering AIX, see *Using AIX, AppleTalk Services, and Mac OS Utilities on the Network Server* in your server accessory kit for additional information. You need to know some details of your existing network 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, "Overview of Your Server," gives server specifications and highlights the Network Server's features.

- Chapter 2, "Installing Internal Server Components," describes how to add memory to the server, install an expansion card, install additional SCSI devices, such as hard drives, and replace or add a power supply.

- Chapter 3, "Setting Up Your Server and Connecting External Devices," describes site preparation, shows how to mount the server in a rack, describes how to connect external SCSI devices, and explains how to connect the monitor and keyboard.

- Chapter 4, "Connecting Your Server to the Network," describes how to install Apple Ethernet cards and physically connect the server to a network.

- Chapter 5, "Starting Up Your Server," describes how to power up your server and outlines the normal startup process. This chapter also suggests solutions for problems that you might encounter during the startup process.

- Chapter 6, "Using CD-ROM and Tape Drives," explains how to use the drives and describes the compatible media.

- Appendix A, "Safety, Maintenance, and Health Information," suggests how you can set up your server as part of a healthful and safe work environment and how you can care for your equipment.

- Appendix B, "Technical Information," gives the server specifications.

- Appendix C, "Configuring the SCSI ID Cable," describes SCSI ID cable wiring for hard drives.

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 and safety issues and placement of your server. Read the sections "Important Site Considerations" and "Security and Safety Issues" in Chapter 3 for important safety guidelines and 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 2, "Installing Internal Server Components."

If you want to connect external peripheral devices to your server: Turn to the appropriate instructions in Chapter 3.

Connect to the network to complete the setup process. See the section "Connecting to the Network" in Chapter 4 for details.

Be sure to read other sections of this guide that are relevant to your work environment. Also, be sure to keep this guide in a handy location; if you experience problems while using your server, you may need to refer to the troubleshooting information interspersed throughout this guide.

For more information

In addition to this guide, you may need to consult these sources
of information:

- *Using AIX, AppleTalk Services, and Mac OS Utilities on the Network Server.*
  See this guide for information about the AIX operating system, including
  software installation, administration, and network configuration.

- *Network Server PCI RAID Disk Array Card Set Up and Administration Guide.*
  See this guide for information about the redundant array of independent
  disks (RAID) controller.

- Related software and hardware guides. Your Network Server may come
  with a variety of file and print services, backup utilities, and other
  software. See the accompanying manuals for information about the
  software that you're using on the server.

See also the file `/usr/lpp/bos/README` which is described in the next
section.

On-screen help and information

There are several valuable sources of help and information that you can view
directly on the screen of your server's monitor.

`/usr/lpp/bos/README` file

It is important that you read the file `/usr/lpp/bos/README`, which contains
late-breaking information about your server. This file is located on the
Installation CD in your server accessory kit. You may want to print this file for
future reference.

AIX documentation through InfoExplorer™

When you are working with the AIX operating system, the InfoExplorer
navigation tool enables you to look up information available in over 100 IBM
books, including user's guides and other reference material. The manual
Using AIX, AppleTalk Services, and Mac OS Utilities on the Network Server
provides details on how to use the on-screen IBM documentation.

1 Overview of Your Server

Components and features

The Network Server is a PowerPC™-based server that offers high performance to medium and large workgroups running AIX-based applications. The Network Server simplifies hardware service and expansion, with an innovative design that enables you to replace or add hardware components quickly and easily. Some Network Server models also offer redundant power supplies that enable the server to continue running even if one of the power supplies fails.

Note: The technical specifications in this chapter were accurate at the time of printing, but may have changed by the time your server shipped. See the file /usr/lpp/bos/README for the latest information.
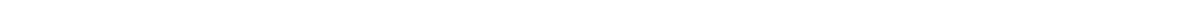
Your server at a glance

The following figure shows the basic components of your Network Server. Note that the monitor and keyboard need to be purchased separately.

Front key switch locks sliding security door and base cover.

Interrupt button ⊘

Reset button ◁

LCD displays system diagnostics and status messages.

Front internal drive bays

Release buttons to remove base cover.

Power button

Floppy disk drive

CD-ROM drive

Optional DDS-2 DAT drive

Sliding security door

Power supplies 500 model includes a single power supply. 700 model offers an optional second power supply.

As shown here, these are the key components accessible from the back of the Network Server.

Replaceable, hot-swappable fans

Rear drawer lock
Warning: Unlocking this panel causes power shutdown.

Optional rear bracket-mounted drives
(700 model only)

PCI card connection ports
(I/O slots)

Power cord protector

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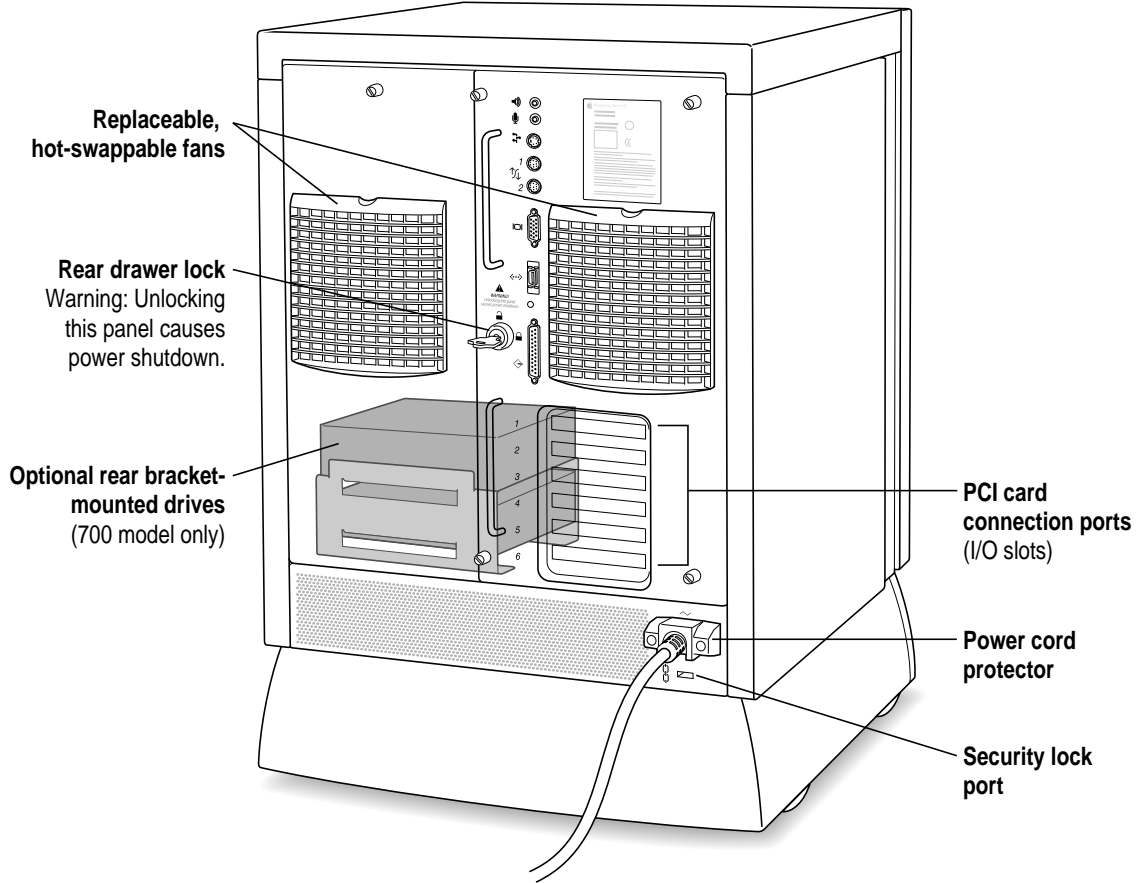
The ports on the back of the Network Server and the icons that identify them are shown in the following figure. During setup, you'll connect hardware to some of these ports.

Sound input port
Connects your server to a microphone

ADB port
Connects your server to input devices, such as a keyboard or trackball

Sound output port
Connects your server to sound output devices, such as a pair of headphones or speakers

Serial connection ports

1
2

Monitor port
VGA HDI-I5 video connects your monitor to your server.

AAUI Ethernet port
Connects your server to a 10 Mbps network

WARNING!
Unlocking this panel
causes power shutdown

Status light
Illuminates to indicate power on, blinks to indicate system activity

SCSI-1 port
Connects your server to SCSI devices, such as hard drives, tape drives, and CD-ROM drives

Technical overview

This section contains an overview of the Network Server's features and specifications. For more detailed specifications, see Appendix B.

Software

- AIX version 4.1.4 or later
- AppleTalk protocol stack
- Mac OS administration utilities
- RAID controller software (optional)

Hardware

- Specially designed serviceable enclosure, including seven front-access SCSI drive trays
- Optional 19-inch rack mount
- PowerPC 604 processor on an upgradable card
- L2 cache: 512 KB on the 500 model, 1 MB on the 700 model
- 32 to 512 megabytes (MB) parity main memory
- Six PCI expansion slots
- Up to seven hot-swappable internal drives (hot-swapping requires procedures specific to the operating system in order to protect data); the 700 model capable of supporting an additional two fixed, bracket-mounted drives in the rear drive bay
- Two built-in Fast and Wide SCSI-2 channels, which support internal devices
- One SCSI-1 channel, which supports external devices and is compatible with most 50-pin SCSI drives such as those used with the Apple Workgroup Server 95, 6150, 8150, and 9150
- Total approximate disk capacity: 340 gigabytes (GB), which varies according to capacity of the disk drives and SCSI expansion cards used
- Built-in Ethernet (AAUI port)
- Built-in 1024 x 768, 800 x 600, 640 x 480 video support for 14-inch, 15-inch, 17-inch, and 20-inch monitors, 8-bit depth

- Power supply: 325 watts on the 500 model (one supply), 425 watts on the 700 model (one or two supplies; power supply is hot-swappable on the 700 model when a second power supply is installed)

- Hot-swappable, interchangeable fans

- Locking front door to protect SCSI drives and power supplies, and a security lock for the rear panel

- Liquid crystal display (LCD) for system status and diagnostic messages

- Internal speaker

- Wheels with locking mechanism

Expanding the Network Server

Your Network Server was designed to grow with your needs—new capabilities can be added to improve its performance as you wish. You can plug in a number of external devices into its ports.

These are among the components that can be installed in the Network Server:

- additional dynamic random access memory (DRAM), up to a total of 512 MB

- up to six PCI cards, such as additional Ethernet cards, RAID controllers, or other PCI cards provided by Apple or other companies

- any additional internal 3.5-inch or 5.25-inch SCSI device, such as a DDS-2 DAT drive (digital audio tape drive with digital data storage-2 format) that has been tested with the Network Servers

Choosing the right components

As explained in the next two sections, you must make sure each component you add is compatible with your server and does not exceed its maximum power allowance.

Compatibility

Your dealer or the manufacturer of a component can provide compatibility details. However, you might find these points useful:

- The Network Server uses 72-bit-wide, 168-pin parity DRAM Dual Inline Memory Modules (DIMMs), which should be installed in matched pairs (for example, two 8 MB DIMMs). Your server's DIMMs are fast-paged mode, parity DRAM, with an access time of 60-nanoseconds or faster. Nonparity DIMMs with 70-nanosecond or faster access time DRAM will work; however, if there is any nonparity DRAM installed, all server parity checking is disabled.

  Some DIMMs and all Single Inline Memory Modules (SIMMs) from older Macintosh computers are not compatible. For more detailed information, see "DRAM Configurations" in Appendix B.

- The Network Server uses cards designed according to the Peripheral Component Interconnect (PCI) standard. Your server cannot accommodate NuBus™ cards, which were designed for older Macintosh computers.

Power allowances

The Network Server meets Apple's PCI power specifications. Check the information that came with your expansion card to make sure the card does not exceed these specifications.

For more detailed information, see "Expansion Cards and Devices" in Appendix B.

Optimizing Network Server performance

As you expand the Network Server by adding cards and devices such as hard drives, CD-ROM drives, tape drives, and the like, you can ensure best server performance by following these guidelines:

- When installing additional memory, use the correct type of parity DRAM DIMMs, and install DIMMs in pairs of the same size into paired slots (for example, 1A and 1B) in your server.

- When installing PCI cards, such as additional Ethernet cards or other PCI cards provided by Apple or other companies, use the lowest available slot position (bottom slot first). Check the RAID documentation for information regarding slot placement for the RAID controller.

- When installing additional internal SCSI devices, balance the load between the buses by matching the number of devices on each internal bus as closely as possible.

For details on how to implement these performance guidelines, see the sections of this guide that describe procedures for installing and expanding your server.

2 Installing Internal Server Components

This chapter describes how to expand your Network Server by installing additional memory, PCI cards, and internal drives. If you are installing a RAID card, see the instructions that came with that product. For information about connecting external components, see the next chapter.

Dynamic RAM (DRAM) DIMM connectors

ROM and L2 cache slots
To be replaced only by an Apple-authorized service provider

PowerPC 604 processor card

Floppy disk drive

CD drive

Optional DDS-2 DAT drive

Bus 0 — 1 2

Bus 1 — 3 4 5 6

Front drive bays

Six PCI expansion slots

Rear internal bracket-mounted hard drives
(available on 700 model only)
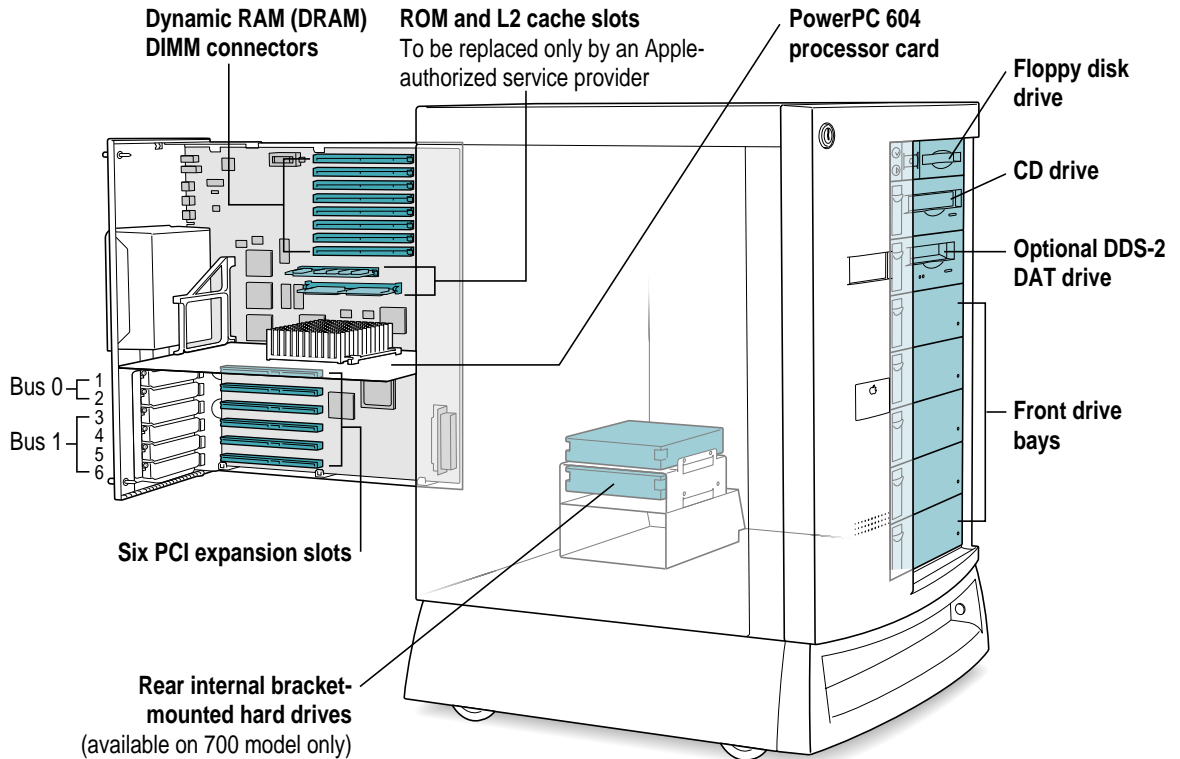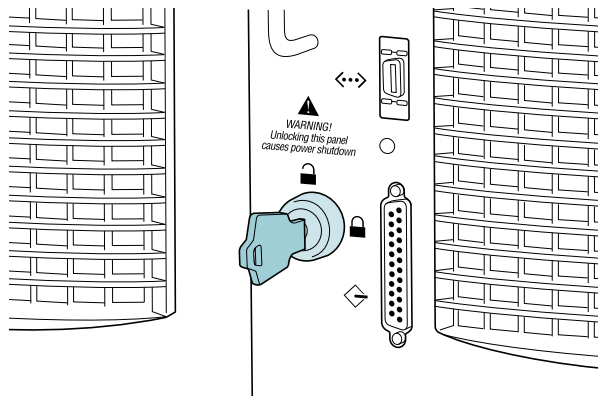
Installing additional memory

Additional dynamic random-access memory (DRAM) can be installed in your Network Server. Memory for your server is provided in packages called *DRAM DIMMs*. The DIMMs must be the correct type for your server. They should be installed in matched pairs of the same size into paired slots (for example, 1A and 1B) in your server in order to allow the memory interleaving that provides optimal system performance. It is very important that the DRAM DIMMs be correctly installed. Incorrect installation can result in errors, unpredictable results, and damage to your equipment and data.

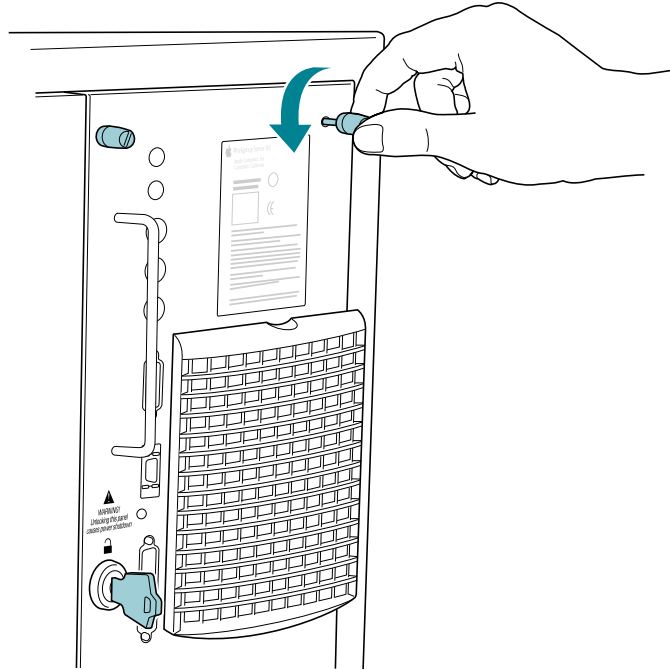In addition to the DRAM DIMM kit, you'll also need these items:

- a grounding wrist strap
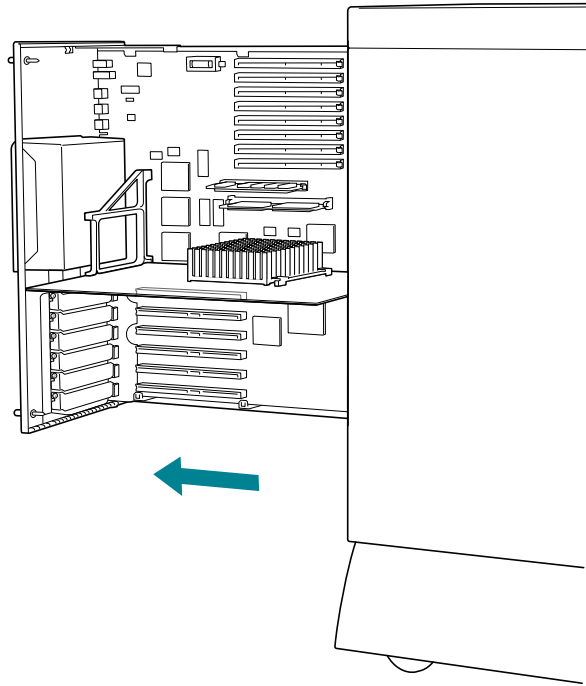- an antistatic mat

To install DRAM DIMMs:

1   **If the server is running, shut down the operating system, turn the server off, and unplug it.**

2   **Unlock the rear drawer by turning the key to the upright (unlocked) position.**

3 **Unscrew the four thumbscrews on the right rear panel.**

4   **Slide open the drawer.**

IMPORTANT The rear drawer containing the logic module (including expansion cards, the processor card, and memory) is not grounded when it's in the open position. Before handling any components that you're installing in the rear drawer, and before touching any of the logic module components within the drawer, be sure to use an antistatic mat, wear a grounding wrist strap, and touch an unpainted metal surface on the server cabinet to discharge any static electricity.

5 **Align the DRAM DIMMs in the DRAM sockets as pictured.**

For best performance, be sure to install the DIMMs in pairs, filling two sockets at a time.

IMPORTANT As you insert the DIMMs, be sure to support the back side of the drawer with your free hand so the drawer and guide rails stay in position.

The DRAM DIMM is designed to fit into the socket only one way. Be sure to align the notches in the DIMM with the small ribs inside the socket. With the ejector(s) in the "open" position (as shown), push on the DIMM until it snaps into place. The ejector(s) will automatically "close."

DRAM socket (1 of 8)   Ribs (inside socket)

Connectors

Ejector (Your socket may have one or two ejectors. They should be pushed outward and down to be in the "open" position, as shown.)

DRAM DIMM
(Your DIMM's shape and components may vary.)

Notches
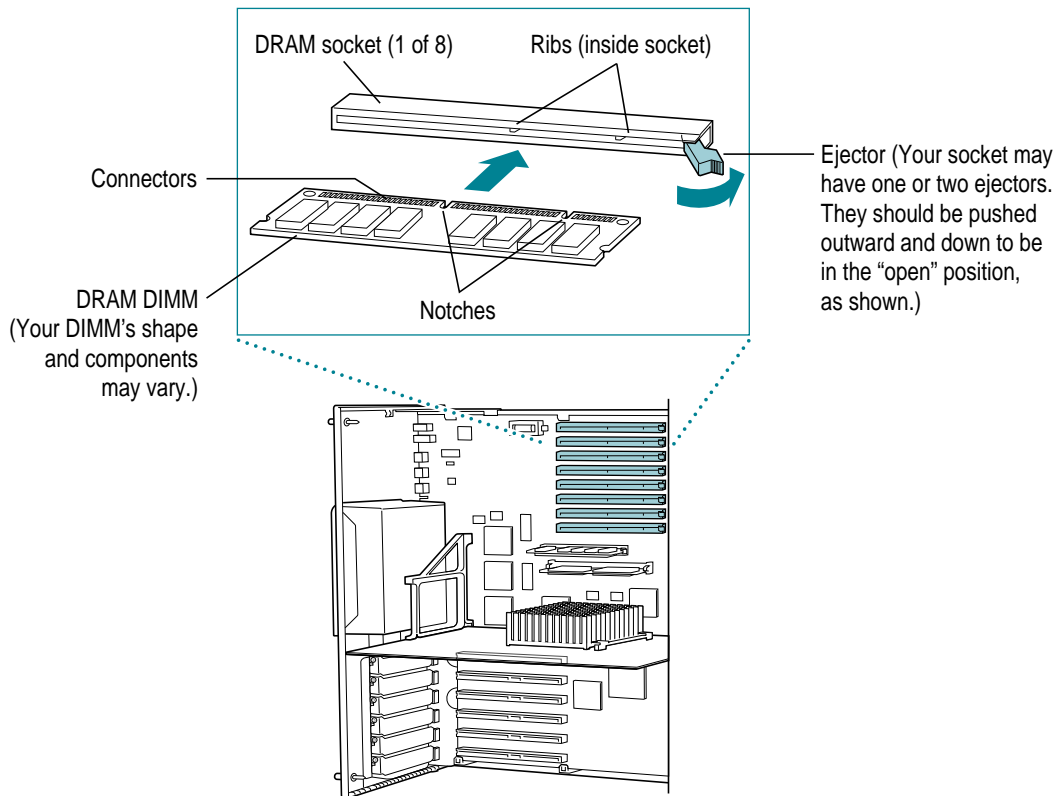
6 Firmly slide the drawer back to its closed position and tighten the thumbscrews.

7 Turn the key back to the horizontal (locked) position.

If the key doesn't turn, push the drawer in further and tighten the thumbscrews to ensure that the drawer is correctly seated.
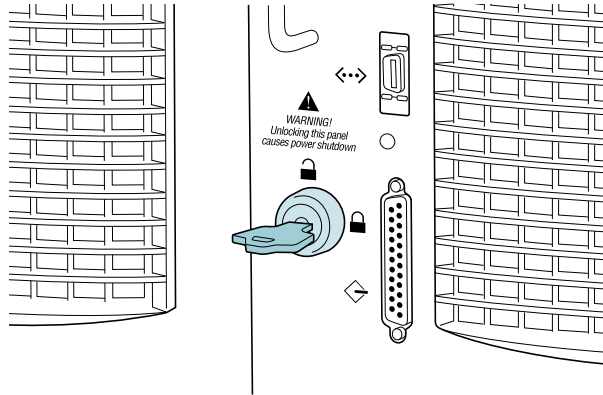
8 Continue on to the appropriate sections of this chapter to install any additional internal server components.

Installing PCI cards

You can install printed-circuit boards (called *cards or PCI adapters or I/O boards*) for networking and communications, RAID capabilities, or other purposes. The cards fit into connectors, called *expansion slots,* inside the server.

Your server has six expansion slots designed to accept PCI cards. All slots can be used simultaneously.

Power requirements

Make sure that the combined power consumption of the cards is within the limits given in Appendix B.
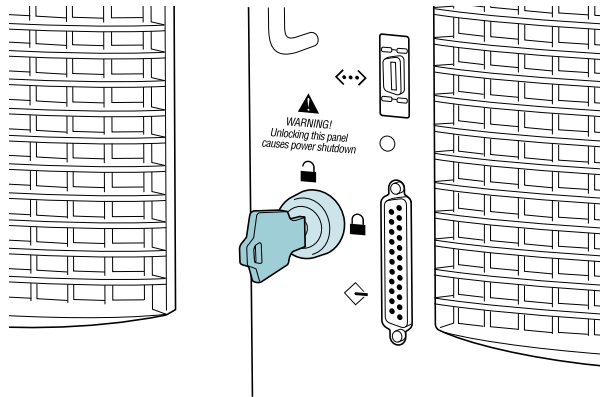
Installing the card

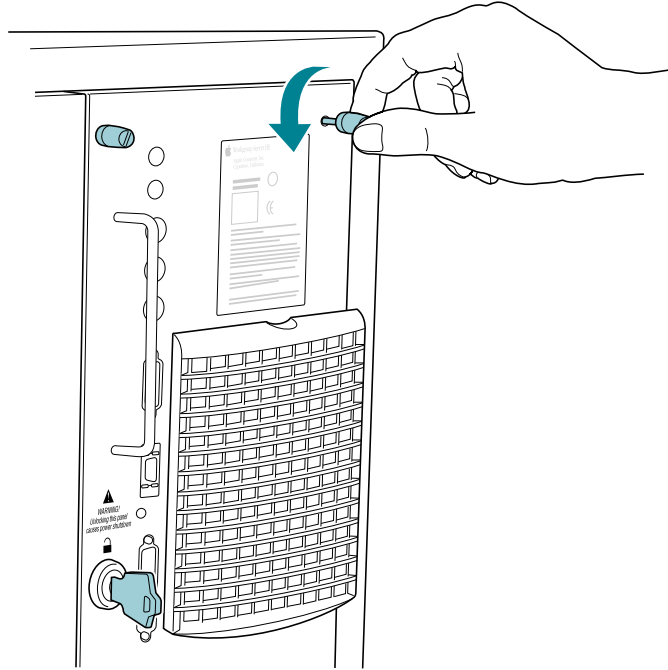In addition to the card, you'll also need these items:

- a screwdriver
- a grounding wrist strap
- an antistatic mat

To install an expansion card:

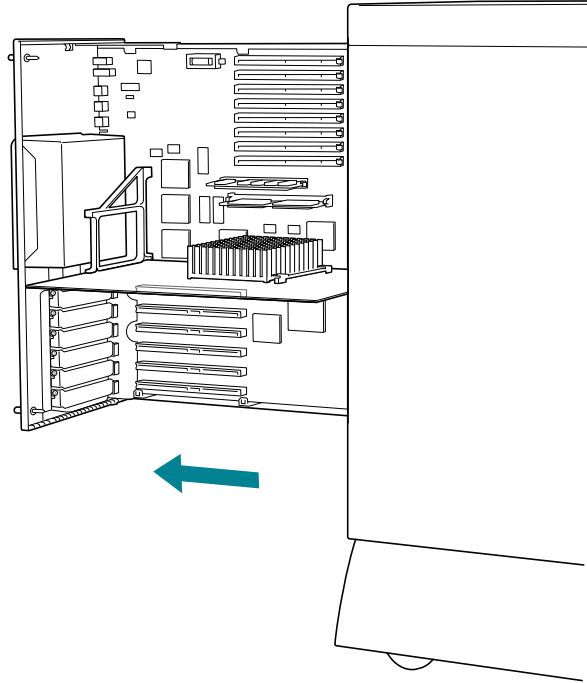**1** **If the server is running, shut down the operating system, turn the server off, and unplug it.**

2 **Unlock the rear drawer by turning the key to the upright (unlocked) position.**

3 **Unscrew the four thumbscrews on the right rear panel.**

4 **Slide open the drawer.**

IMPORTANT The rear drawer containing the logic module (including expansion cards, the processor card, and memory) is not grounded when it's in the open position. Before handling any components that you're installing in the rear drawer, and before touching any of the logic module components within the drawer, be sure to use an antistatic mat, wear a grounding wrist strap, and touch an unpainted metal surface on the server cabinet to discharge any static electricity.

5 **Remove the metal cover plate (also known as a *fence*) that corresponds to the expansion slot you want to use.**

For best performance, put the card in the lowest available slot position; for example, fill slot 6 before you fill slot 5.

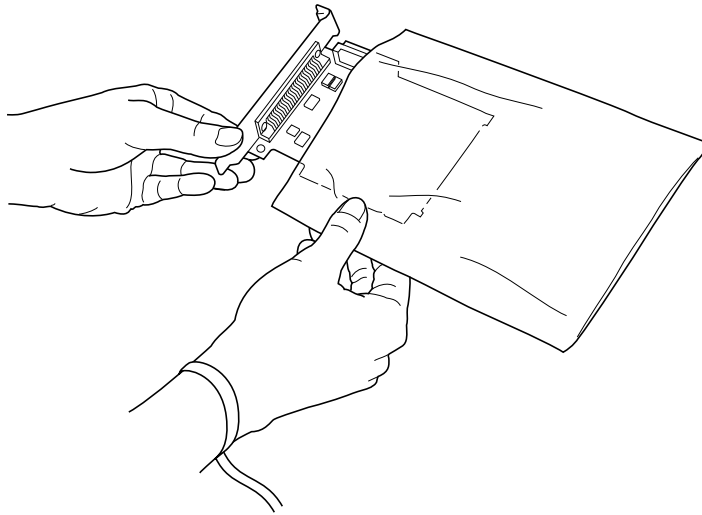Store the cover in a safe place in case you remove the card later.
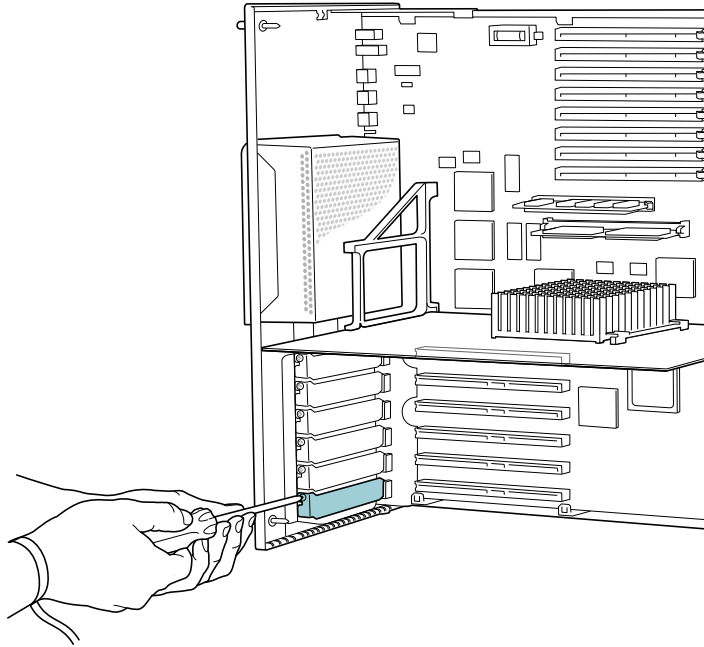
6 Remove the card from its static-proof bag.

Hold the card by its edges to avoid touching the connector on the bottom of the card.

7 **Align the card with the expansion slot and press in firmly until the connector is seated.**

Be sure to support the back side of the drawer with your free hand so that the drawer stays in position as you insert the card.

As you insert the card, be sure to support the drawer with your free hand.
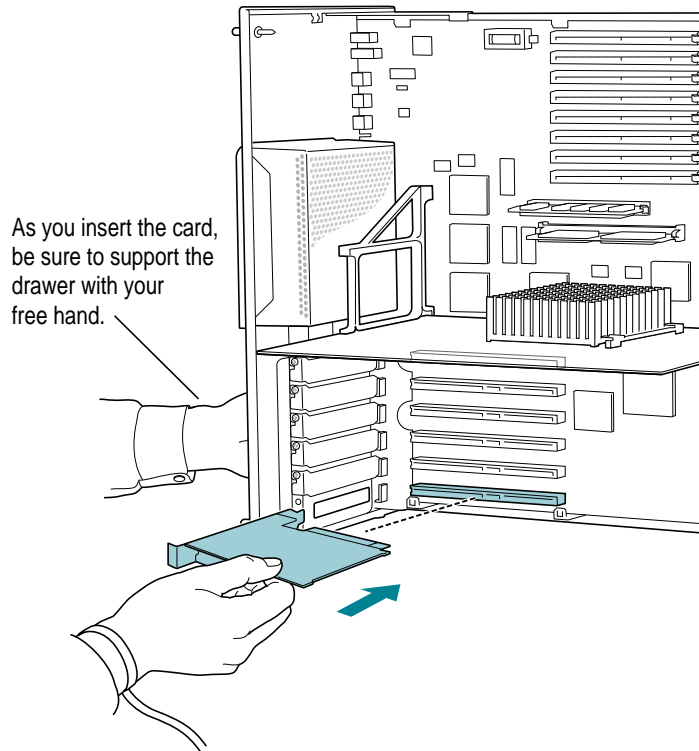
8 **Replace the screw to fasten the card into position.**

9 **Slide the drawer back to its closed position and tighten the thumbscrews.**

10 **Turn the key back to the horizontal (locked) position.**
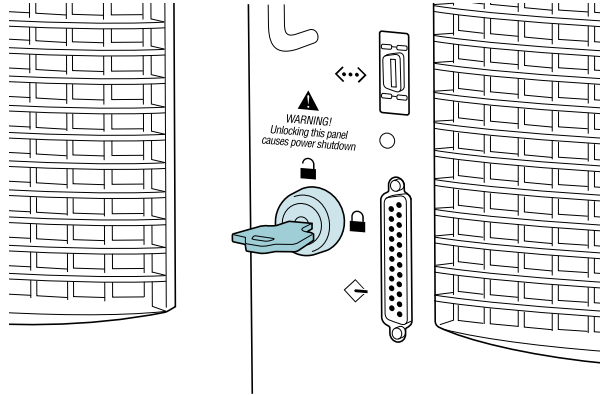
11 **Continue on to the appropriate sections of this chapter to install any additional internal server components.**

Installing internal SCSI drives

This section describes how to install internal SCSI drives in the Network Server's front drive bays and, for the 700 model, in an internal drive bracket. For instructions on connecting external drives, see Chapter 3.

The server has three separate built-in SCSI buses: two internal buses and an external bus. On the 500 model, the buses accommodate 4, 3, and 7 SCSI devices, respectively; thus, without adding any PCI expansion cards, you can connect a total of 14 SCSI devices to the Network Server 500. On the 700 model, the buses accommodate 4, 5, and 7 SCSI devices, respectively; thus, without adding any PCI expansion cards, you can connect a total of 16 SCSI devices to the Network Server 700.

The internal buses handle the built-in hard disk drive, CD-ROM drive, optional DDS-2 DAT drive, and up to six additional internal SCSI drives. The external bus accommodates up to seven external SCSI devices in a chain (such as disk drives, CD-ROM drives, and tape drives). The internal buses are the SCSI-2 Fast and Wide type, which at about 20 megabytes per second (MBps) provide faster performance than the external bus, which is the SCSI-1 type and provides speeds of approximately 5 MBps.

For best performance, balance the load between the two internal buses. In other words, keep the number of devices on each internal bus approximately the same.

Setting up a SCSI device to use with your server involves

- installing any necessary device drivers
- physically connecting the device to your server

When setting up a SCSI device to use with your server, refer to the instructions that came with the device, as well as the instructions in this section.

Installing a device driver

A *device driver* is software that lets the server communicate with a particular SCSI device. Any drivers needed for a SCSI device are usually on a floppy disk that comes with the device. For information about any necessary drivers, check your AIX documentation and the information that came with the device. You may have to restart your server to activate the driver.

Setting the SCSI ID number

The Network Server automatically assigns SCSI ID numbers to internal drives as shown here.
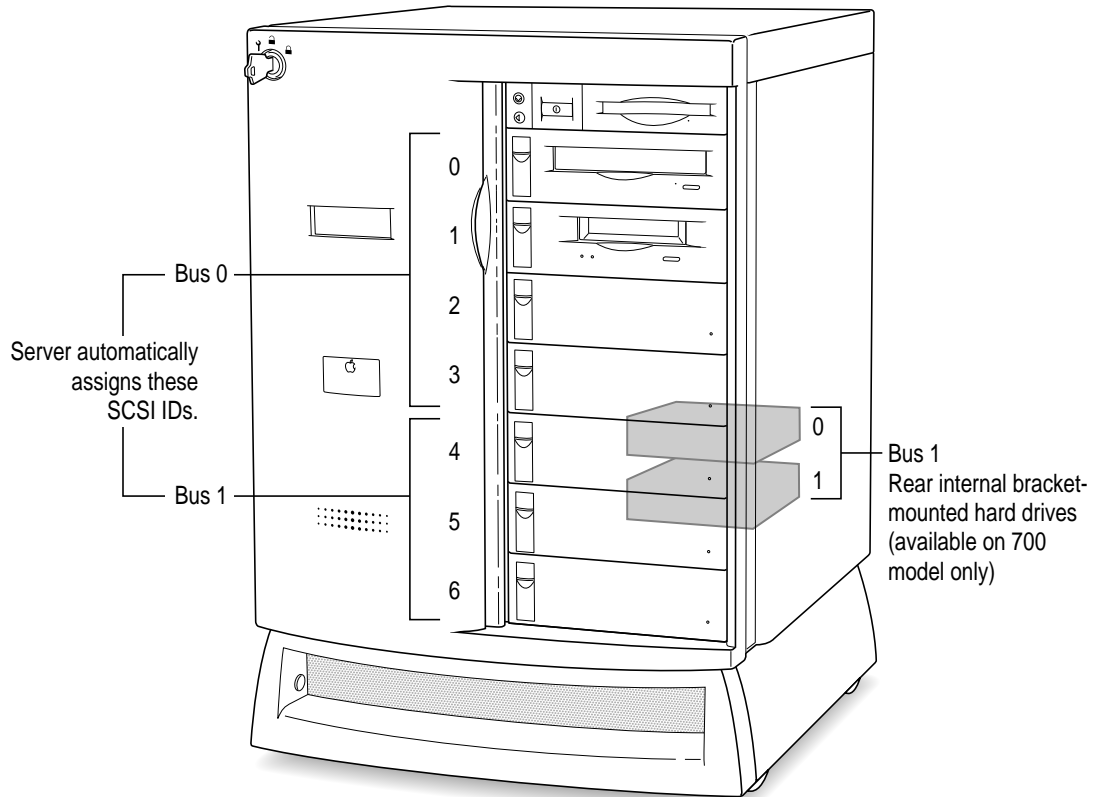
Bus 0

Server automatically assigns these SCSI IDs.

Bus 1

0

1

2

3

4

5

6

0

1

Bus 1
Rear internal bracket-mounted hard drives (available on 700 model only)

Installing Network Server SCSI drives in the front drive bays

This section describes how to install the Network Server DAT-2 4mm tape drive, CD-ROM drive, or hard drives in the front drive bays of your server. These kits, which you order from Apple for the Network Server, come with the drive already attached to a drive tray, and with all the appropriate cables connected.

If you are installing a drive that's not yet mounted in a drive tray, skip to the next section, "Installing Drives Not From Kits in the Front Drive Bays."

To install a drive kit:

1 **If AIX is installed and running, shut down the operating system and turn the server power off.**

You may be able to use procedures specific to AIX or RAID to hot-swap or add drives while protecting your data. For details, see the information that comes with AIX and RAID.

2 **Slide the front door to the fully open position.**

If the door is locked in a partially open position, turn the key in the front lock to the upright (unlocked) position, then slide the door open.

3 **Release the drive tray eject lever, and slide the tray you are replacing out of the drive bay.**

For best performance, keep the number of devices on each internal bus approximately the same. See the section "Setting the SCSI ID Number," earlier in this chapter, for information about which drives bays are on which bus.

If you are replacing the drive while the server is running (hot-swapping), allow the drive to spin down before removing it. Do not leave the drive tray open for more than a couple of minutes, as the open tray interrupts the airflow and can disrupt cooling.
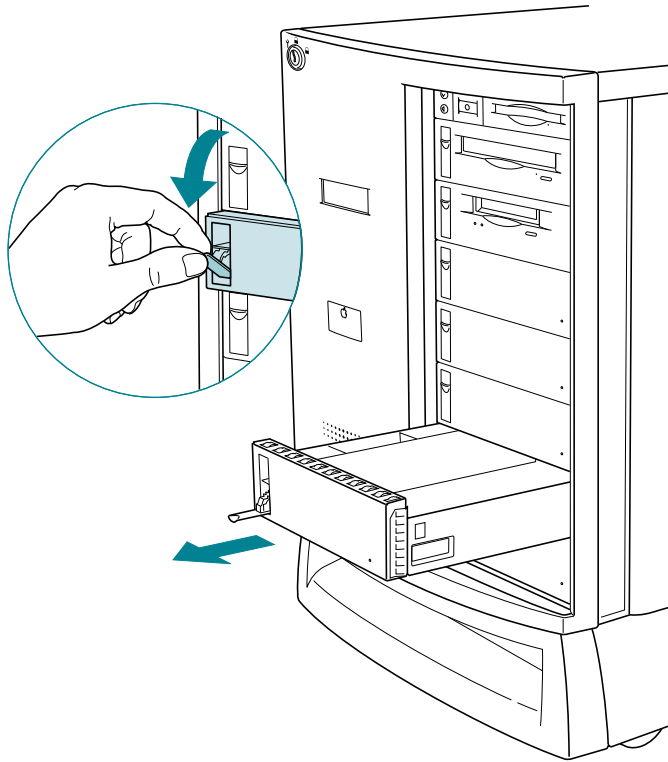
4 **With the drive eject lever fully released (down), slide the replacement drive tray into the drive bay until the drive tray lever returns to its upright and locked position.**

When the tray is fully inserted, the drive tray connectors are securely attached to the appropriate sockets within the server, and the drive tray lever automatically returns to the upright and locked position.

Installing drives not from kits in the front drive bays

This section describes how to install additional free-standing tape drives, CD-ROM drives, or hard drives in the front drive bays of your server. If you are installing a Network Server drive kit, which comes already cabled and attached to a drive tray, see the previous section, "Installing Network Server SCSI Drives in the Front Drive Bays," for installation instructions.

In addition to the 3.5-inch, half-height drive(s) that you're installing, you'll also need these items:

■ a grounding wrist strap

■ an antistatic mat

■ a screwdriver

■ four screws to attach the drive to the drive tray

■ SCSI drive adapter kit (50-pin or 68-pin) for cabling the drive to the server

■ if you are installing a full-height disk drive, a tape drive, or a CD-ROM drive, a drive tray bezel (faceplate) appropriate to the device–for example, one that has an opening for inserting a tape

Note: The Network Server has built-in SCSI termination in the front drive bays, so be sure that termination is disabled on the drive(s) you are installing in the drive trays.

To install a drive:

1 **If AIX is installed and running, shut down the operating system and turn the server power off.**

You may be able to use procedures specific to AIX or RAID to hot-swap or add drives while protecting your data. For details, see the information that comes with AIX and RAID.

2 Slide the front door to the fully open position.

If the door is locked in a partially open position, turn the key in the front lock to the upright (unlocked) position, then slide the door open.
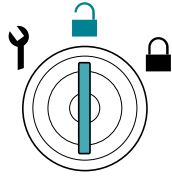

**3 Release the drive tray eject lever, and slide the tray out of the drive bay.**

If you are replacing the drive while the server is running (hot-swapping), don't leave the drive tray open for more than a couple of minutes. The open tray interrupts the airflow and can disrupt cooling.
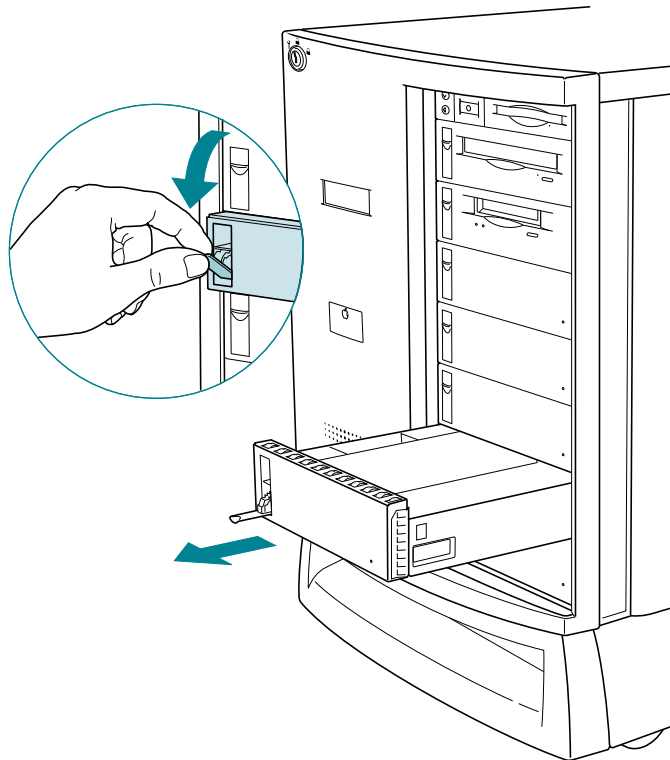
4 **If there is an existing drive in the tray where you are installing the new drive, disconnect the cables from the inside of the tray, remove the four mounting screws from the bottom of the tray, and then remove the drive from the tray.**
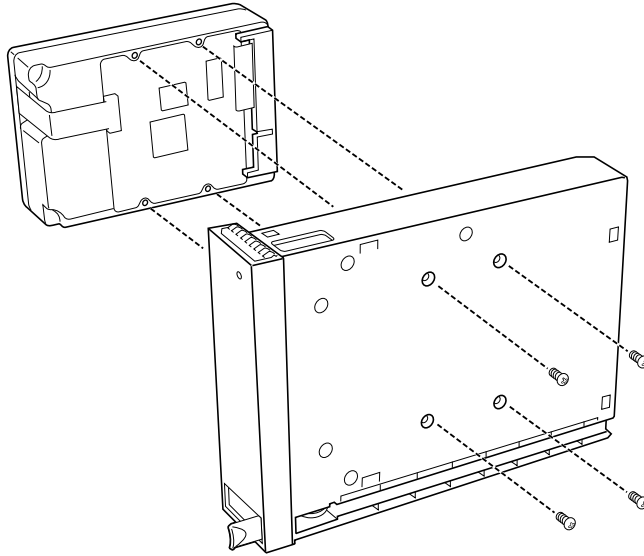
5 **If you are installing a drive that requires a different bezel—such as a CD-ROM drive which has a slot to accommodate inserting and removing a disc—replace the bezel.**

Push in the two latches located on the inside of the bezel to remove it.
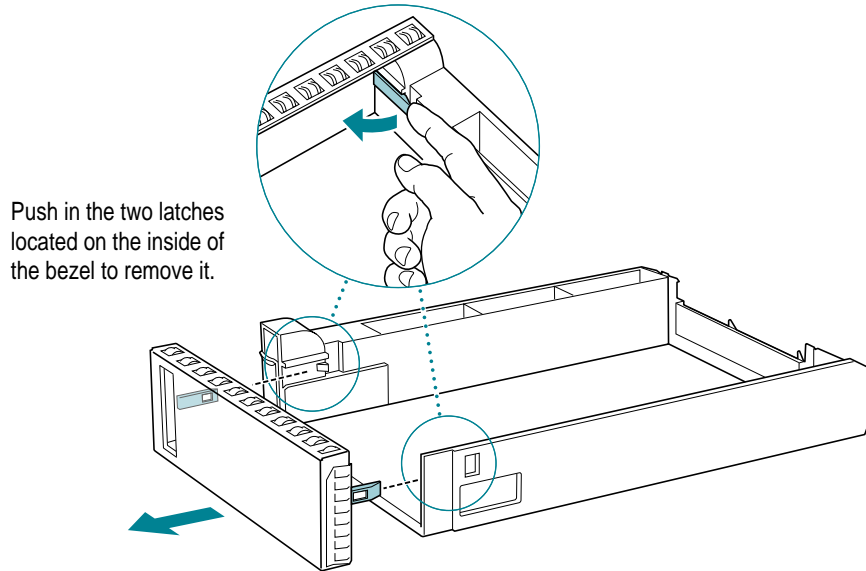
6 **Attach the SCSI adapter, power connector, LED, and SCSI ID cable.**

You may need to change the SCSI ID cable. See Appendix C for details.

Power cable

SCSI ID cable

SCSI adapter cable
(50-pin or 68-pin)

Light-emitting diode
(LED) cable
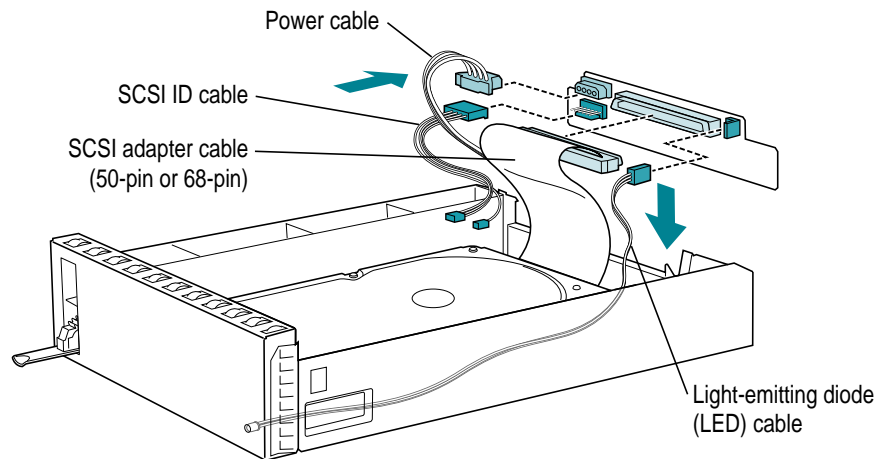
7   Use the mounting screws to secure the drive you're installing in the tray.

8   With the drive eject lever fully released (down), slide the replacement drive tray into the drive bay until the drive tray lever returns to its upright and locked position.

When the tray is fully inserted, the drive tray connectors are securely attached to the appropriate sockets within the server, and the drive tray lever automatically returns to the upright and locked position.
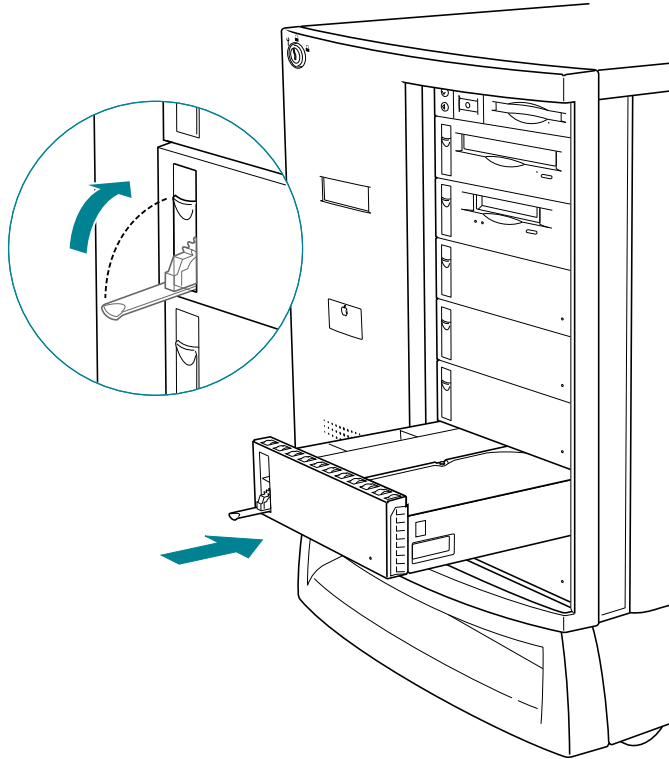
Installing drives in the rear-mounted bracket (700 model only)

If you have the Network Server 700 model, you can install up to two drives in a drive bracket at the rear of the cabinet, behind the front drive bays. This section describes how to install those internal disk drives.

Note: The rear drive bracket comes as part of the hard drive kit that you order from Apple.

These are the items you'll need to install a rear-mounted drive in the server:

- a drive kit from Apple, which includes a bracket and the necessary cables (If you're replacing an existing bracket-mounted drive, you just need a 3.5-inch half-height drive; the cables and bracket are already in place.)

- a grounding wrist strap

- an antistatic mat

- a Phillips screwdriver

If you are replacing a bracket-mounted drive with one that you purchased from a supplier other than Apple, you'll also need these items:

- a Fast and Wide drive with a 68-pin connector

- switches or jumpers as needed to set SCSI IDs for the drives you are installing

Note: The last bracket-mounted drive on the SCSI cable must have termination enabled.
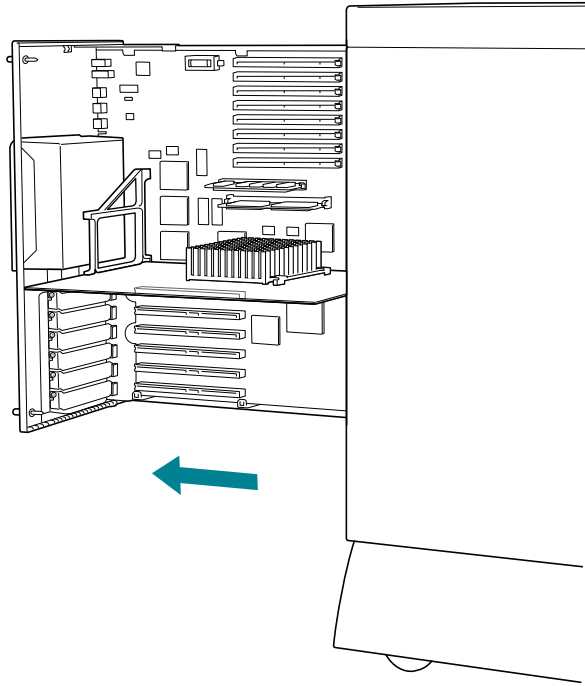
To install a drive in the rear-mounted bracket:

1   **If the server is running, shut down operating system, turn the server off, and unplug it.**

2   **Unscrew the four thumbscrews on the right rear panel, which houses the drawer containing the logic module.**
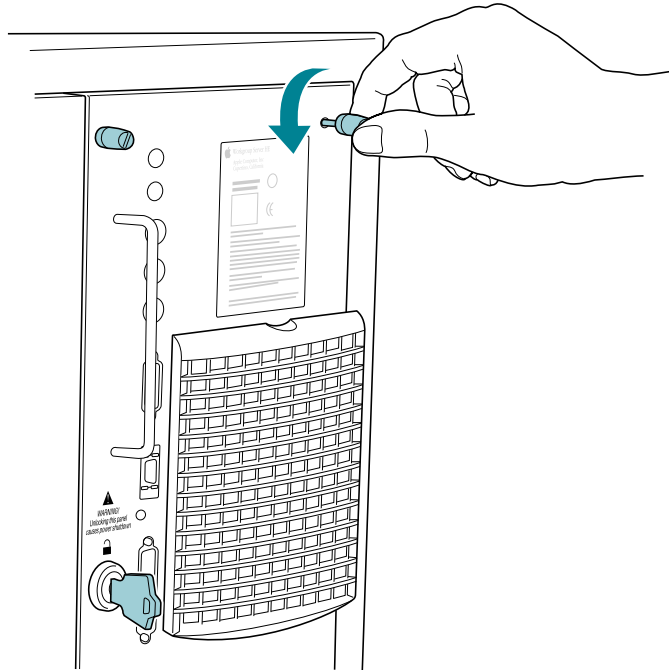
3   **Unlock the rear drawer by turning the key to the upright (unlocked) position.**
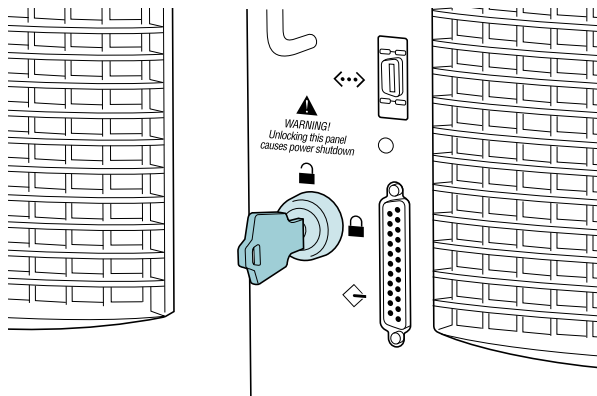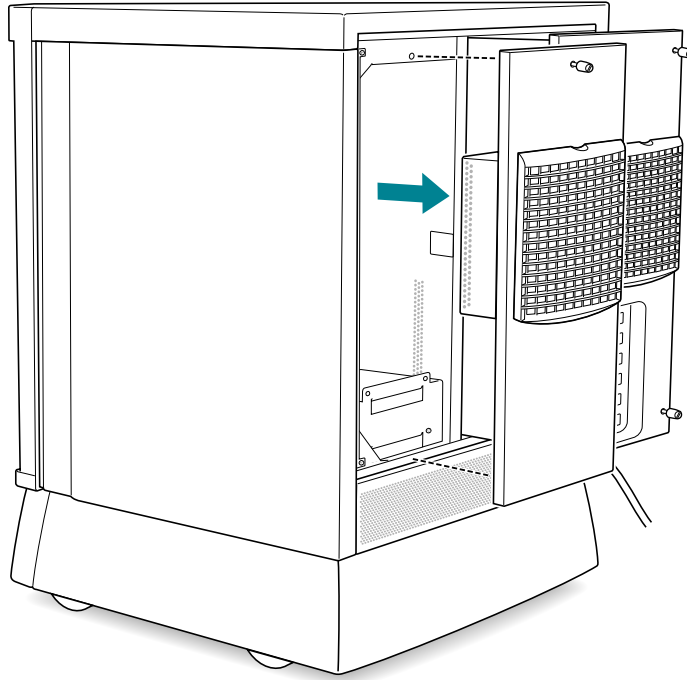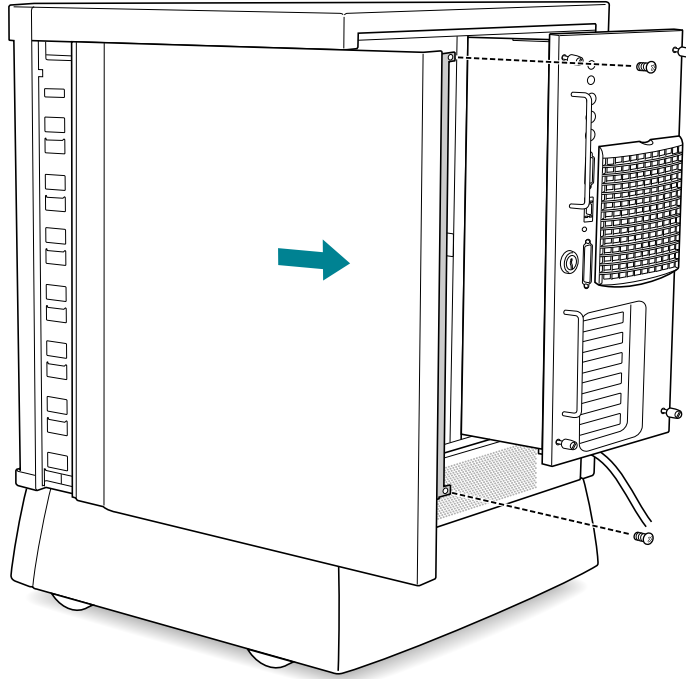
4   Slide open the drawer.

WARNING Be sure to leave the rear drawer open until you complete the drive installation process.

5 **Remove the left rear panel.**

6 **Remove the side panel by removing the two screws from the rear edge and sliding the panel back.**

If there's no drive installed, skip to step 9.

7 **If there's already a drive installed, remove the drive bracket from the server enclosure.**

To remove the drive and bracket, disconnect the SCSI and power cables, and remove the screw that connects the bracket to the server enclosure.
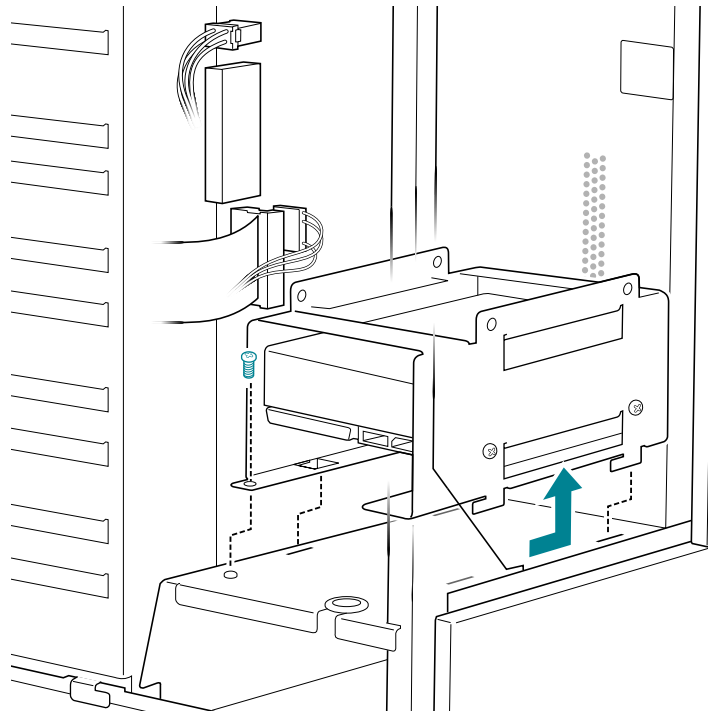
8   **Use the four mounting screws to attach the drive to the drive bracket.**
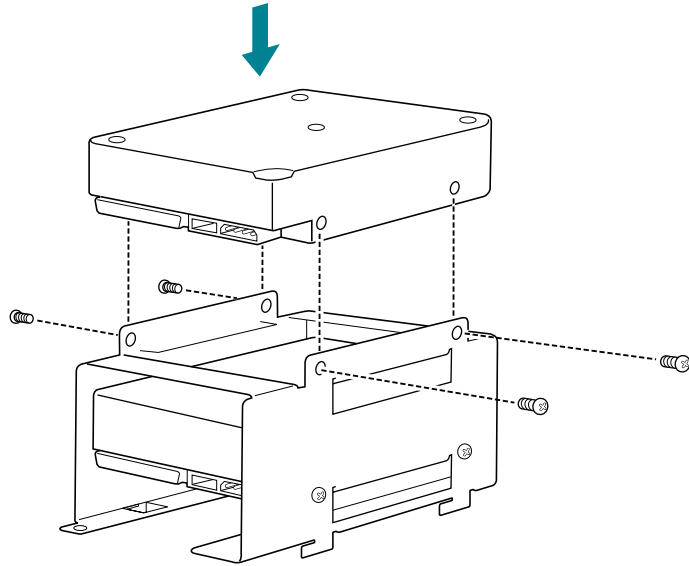
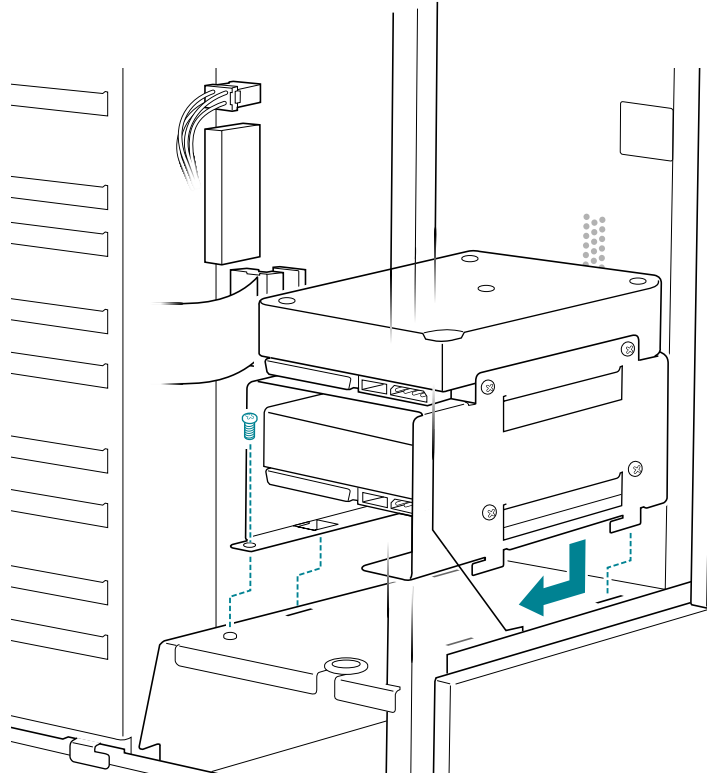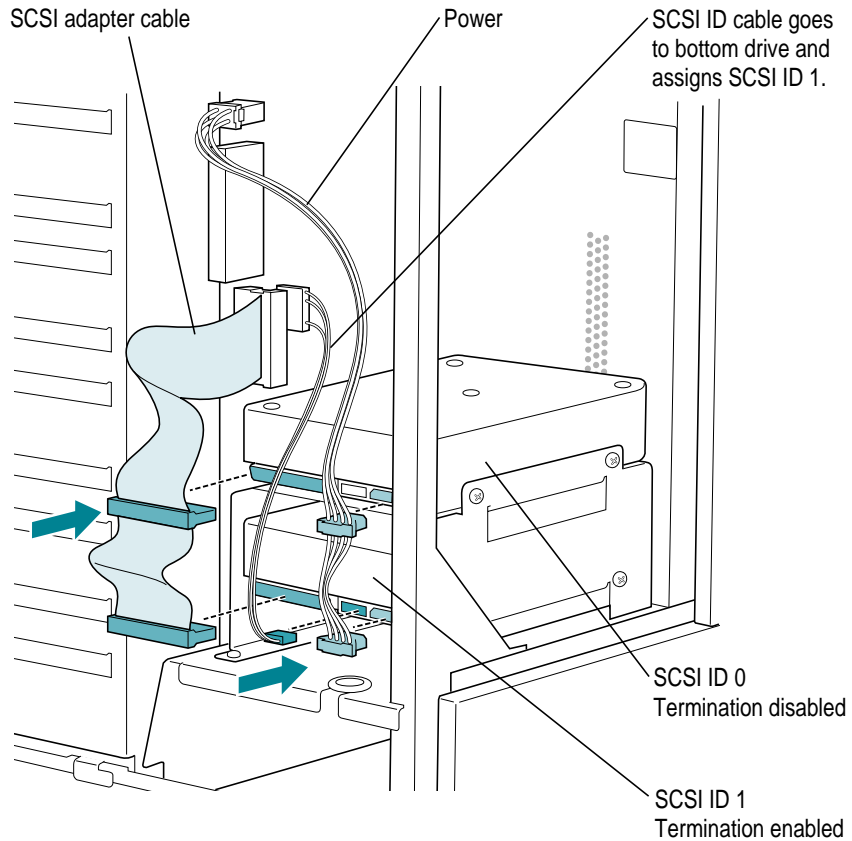**9** **Place the drive bracket in the Network Server and attach the mounting screw.**

10   Attach the SCSI adapter, power connector, and SCSI ID cable.

You must terminate the bottom drive in the bracket by attaching the ID cable and connecting the drive to the last connector on the adapter cable. Or you can set termination by a jumper or switch on the drive. (For non-Apple drives, check the instructions that came with the drive.) If the rear bracket contains just one drive, you must connect it to the last connector on the adapter cable.

SCSI adapter cable

Power

SCSI ID cable goes to bottom drive and assigns SCSI ID 1.

SCSI ID 0
Termination disabled

SCSI ID 1
Termination enabled

11   Replace the side panel.

12   Replace the left rear panel.

13   Close the rear drawer, tighten the thumbscrews, and lock the rear drawer.

Preparing a hard disk for use

For information on configuring a disk for use with the operating system, see the chapter "Managing File Storage With the Disk Management Utility" in *Using AIX, AppleTalk Services, and Mac OS Utilities on the Network Server.*

Verifying internal SCSI devices

After you install one or more drives and turn on your server, you can use Open Firmware commands to display information regarding which SCSI devices are currently recognized by the server.

1   **Turn the front key to the upright (unlocked) position.**

2   **Turn the server on.**

If AIX is running, enter the shutdown -r command. If the server is already turned on, press the reset ◁ button.

3   **While the system is resetting, or starting up, hold down these keys:**

   Command-Option-O-F

   Continue holding down these keys until the 0> prompt appears. If AIX is installed and a root password is set, a Security > prompt appears.

4   **Enter (type and press Return) the following command:**

   login

   The system displays ok followed by the 0> prompt. If AIX is installed and a root password is set, the OF Password: prompt appears, and you need to enter the root password.

5 **Enter the following command:**

```
probe-scsi1
```

This command displays the devices on the first internal bus. To display SCSI ID information for the devices on the second internal bus, use this command:

```
probe-scsi2
```

The system displays SCSI ID information similar to this:

```
            Logical               Device                                        Firmware
  SCSI ID    unit                  type                    Manufacturer   Model   version
     |         |                     |                          |           |        |
  Target 0 Unit 0 Removable Read Only device MATSHITACD-ROM CR8005A 4.01

  Target 1 Unit 0 Disk IBM OEMDFHSS2W4141
```

## Replacing or adding a power supply (700 model only)

The Network Server 500 comes equipped with a single fixed power supply, while the Network Server 700 model can accommodate two power supplies. To replace a Network Server 500 power supply, contact your service provider.

To replace a Network Server 700 power supply or to add a second power supply:

**1** **Turn the front key to the unlocked position.**

2 **Remove the base cover by pressing the buttons on the left and right inside edges of the base cover opening. Then pull the base cover out.**
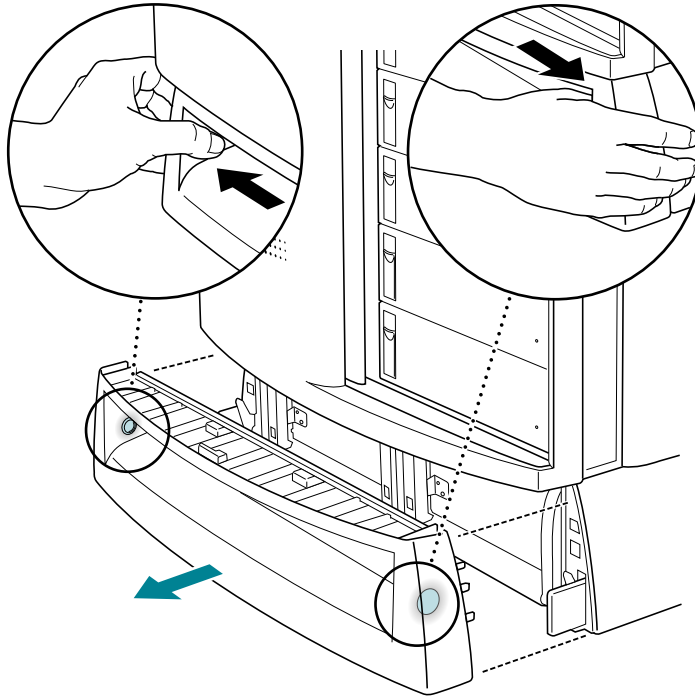
If you're adding a power supply to an already empty slot, skip to step 4.

3 If you're replacing an existing power supply, remove it by pulling down on the handle and sliding out the power supply unit. If one of the installed power supplies has failed, its LED will be off.
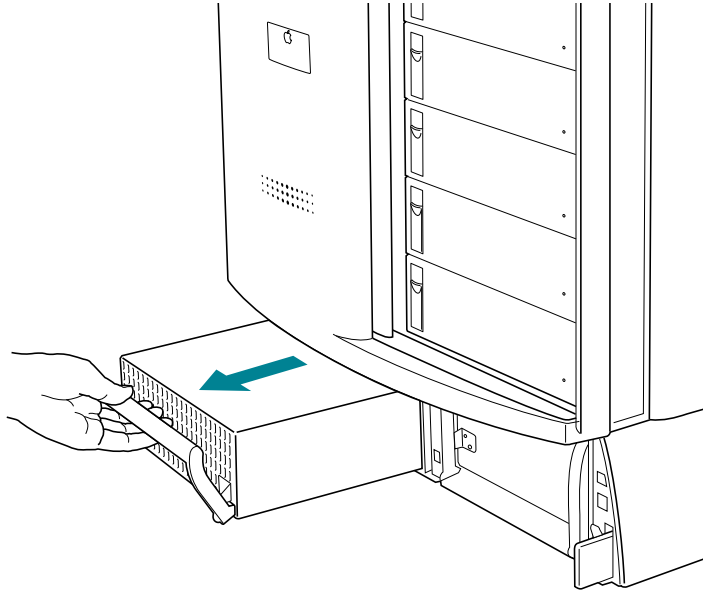

4 Install the new power supply by sliding it in and raising the handle to the upright (locked) position until you hear it snap into place.

5 Replace the base cover.

Replacing a fan

You can replace either fan while the Network Server is running. The AIX operating system will automatically broadcast an error message to users when you remove the fan, and will notify users again after the fan has been replaced.

1 **Remove the fan you are replacing.**

Press in on the indentation at the top of the fan unit, and pull down and out.
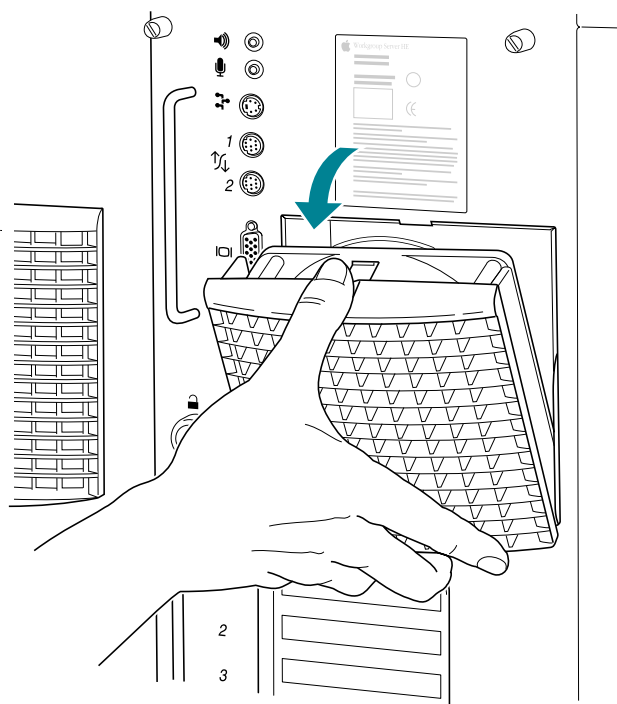
2 **Insert the replacement fan.**

Place the bottom edge into position first, then snap the top edge into place.

3

Setting Up Your Server and Connecting External Devices

After you've installed any internal components as described in the previous chapter, read the information in this chapter about physically protecting your server from unauthorized access. This chapter also covers installing the Network Server in a rack, connecting external components such as disk drives, and connecting a monitor or serial terminal, keyboard, and mouse.

After you've connected the external devices, the next step is to connect the server to the network, as described in Chapter 4.

Important site considerations

When determining the location and placement of your Network Server, be sure that the environmental conditions are appropriate, electrical service is adequate, and the server is positioned safely.

Electrical requirements

Check the information on the server nameplate and for the other equipment that share the same circuit. Based on the electrical service to your site, you may decide to connect each server to its own branch circuit. Apple recommends that you use an external AC surge protector to minimize possible degradation of Network Server performance due to powerline surges.

The Network Server uses a grounded plug. For safe operation, be sure to connect the server to a grounded outlet. Be sure to leave one end of the power cord free in case you need to unplug your server. If you connect to an extension cord or outlet strip, be sure those components are grounded too.

Temperature and airflow

The maximum ambient operating temperature for the server is 40° C (104° F). If you install the server in a closed or multi-unit rack assembly, that environment may have a temperature greater than the ambient room temperature. Be sure that there is adequate cooling and airflow to maintain the temperature within a safe operating level.

In order to ensure adequate airflow around the server, provide one inch of clearance on the sides, four inches on the back, and leave the front unobstructed. Other than the few minutes that might be required to swap a drive, don't operate the server with any of the front drive trays open. Drive trays must be closed in order to provide optimal cooling.

Security and safety issues

The Network Server 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 three measures that you can take to secure the hardware components: physically isolating the system, using a locking cable to secure the system, and using the server's locks on the front and rear panels.

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, such as hard disks that may contain confidential information. There is no better way to protect hardware and components than by physically isolating the server–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 may warrant the effort.

> **WARNING** The Network Server contains components and circuitry that operate at high energy levels. Lock the server cabinet and keep the server in a locked area in order to prevent access by people unfamiliar with the safe operation and use of the equipment.

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 security slot for a locking cable. Follow the instructions supplied with the locking cable to attach it to your server.
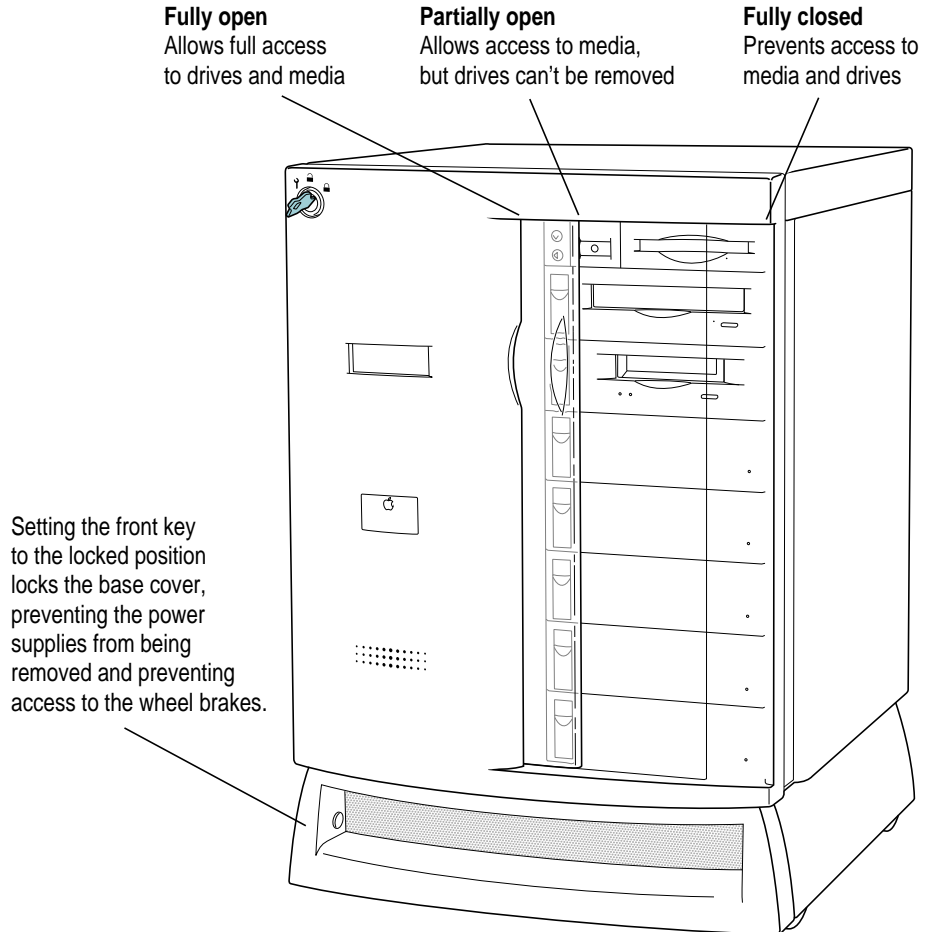
By itself, a locking cable cannot prevent unauthorized *use* of the server, but it can prevent the server (and its peripheral devices if they are also secured by locking cables) from being removed.

In combination with the locks on the front and rear panels, a locking cable ensures that the system is secure physically and that only the person with the key can operate it locally.

Security lock port
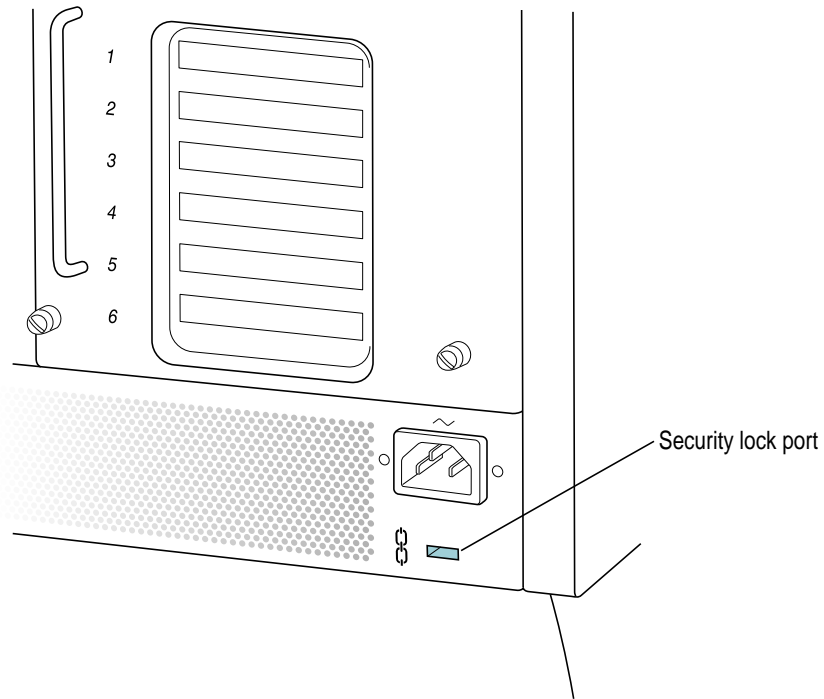
Locking the door and rear drawer

Use the physical lock on the front panel of the Network Server to secure the sliding door that gives access to the front drive bays. You can lock the door closed to prevent any access to the drives, or you can lock the door in the partially open position to allow access to the media (tapes, floppy disks, and the like), while preventing the drives from being removed.

Fully open
Allows full access to drives and media

Partially open
Allows access to media, but drives can't be removed

Fully closed
Prevents access to media and drives

Setting the front key to the locked position locks the base cover, preventing the power supplies from being removed and preventing access to the wheel brakes.

See "Turning the Server On" in Chapter 5 for more details about using the front panel lock.

The front and rear locks use matching keys, so the same key that works the front lock also fits the lock for the rear panel drawer. This rear drawer must be locked in order for you to turn on server power. Locking the rear drawer prevents access to high-energy areas and also protects the cards, memory components, and other expensive internal parts.

After locking the server, be sure to remove the keys and store them in a safe place.

Replacing lost keys

The Network Server comes with three keys. Because lost keys are difficult to replace, you may want to make duplicates of your keys. If you lose all three keys, the following solutions are available:

- Contact a locksmith. Most locksmiths can create a new set of keys directly from the key lock.

- Contact your Apple-authorized service provider for assistance. The service provider can order additional keys from the lock manufacturer. (The lock manufacturer will accept calls only from Apple-authorized service providers.)

- As an alternative to ordering new keys, the service provider can replace the front panel lock and rear drawer lock on your Network Server and provide new keys.

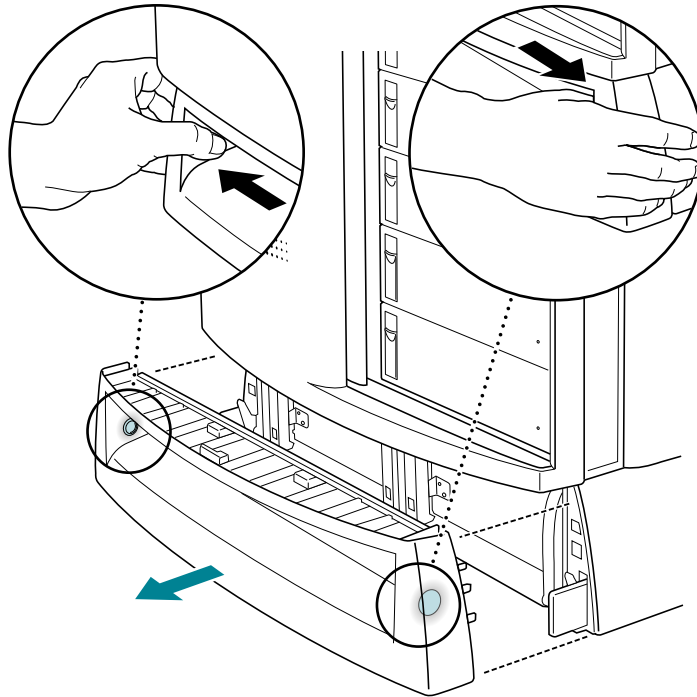## Locking and unlocking the wheels

You can set a locking brake on the Network Server wheels to prevent it from rolling.

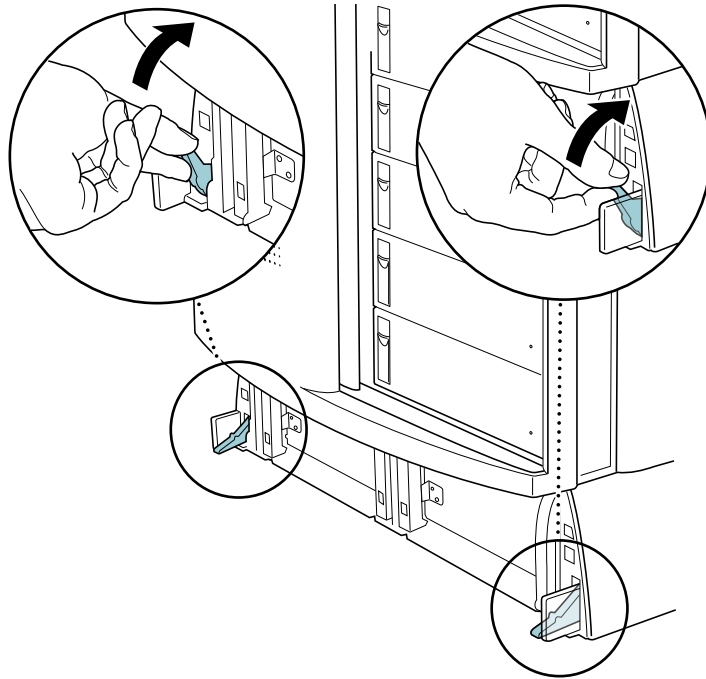To set or release the locking brake:

1 Turn the front key to the unlocked position.
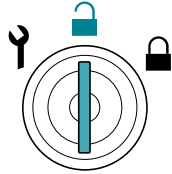
2 Remove the base cover by pressing the two buttons on the inside edges of each end of the base cover opening. Then pull the base cover out.

3 **Flip both locking levers up to release the wheel brake, or push both levers down to set the wheel brake.**

4 **Replace the base cover.**

Installing the server in a rack

You can mount the Network Server in a standard 19-inch rack by ordering the optional kit from Apple. Note that, despite its spare appearance and the relatively few screws to install, the rack mount kit has been optimized to safely support the Network Server's weight.

> **WARNING** Be sure to allow for adequate airflow around the server (see the previous section "Important Site Considerations" for details). Also, take precautions to ensure the physical stability of the rack by mounting equipment at the bottom first, and by installing the heaviest component at the bottom.

To install the Network Server in a rack:

1 Attach the shelf using eight screws, two for each set of holes in the shelf braces.

If the rack holes aren't threaded, slide a nut retainer over each hole you're using on the rack before attaching the shelf.

The extra holes in the shelf braces allow you to adjust the shelf height by smaller increments.
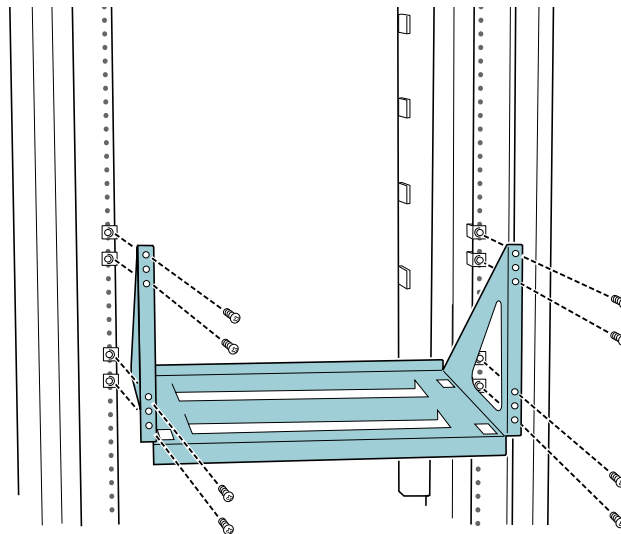
2 **With two people, one on each side of the server, lift the unit onto the shelf, moving it into position so that the wheels fit securely in the wheel holes of the shelf.**

> **WARNING** Depending on the number of devices installed, the Network Server can weigh over 90 pounds. Do not attempt to lift the unit with fewer than two people.
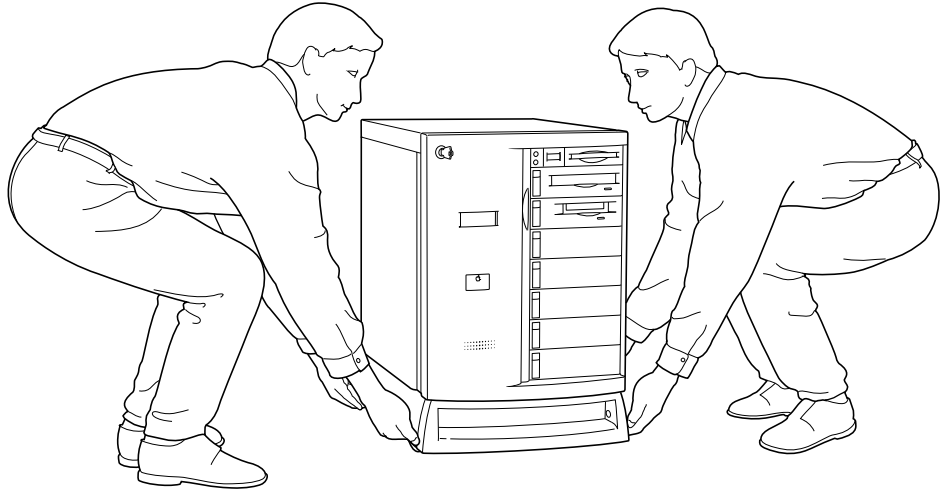
3 **Attach the top retaining bar using two screws for each side of the bar.**

If the rack holes aren't threaded, slide a nut retainer over each hole you're using on the rack before attaching the retaining bar.

The extra hole in each bank remains empty; those extra spots allow you to adjust the retaining bar to its most secure position.
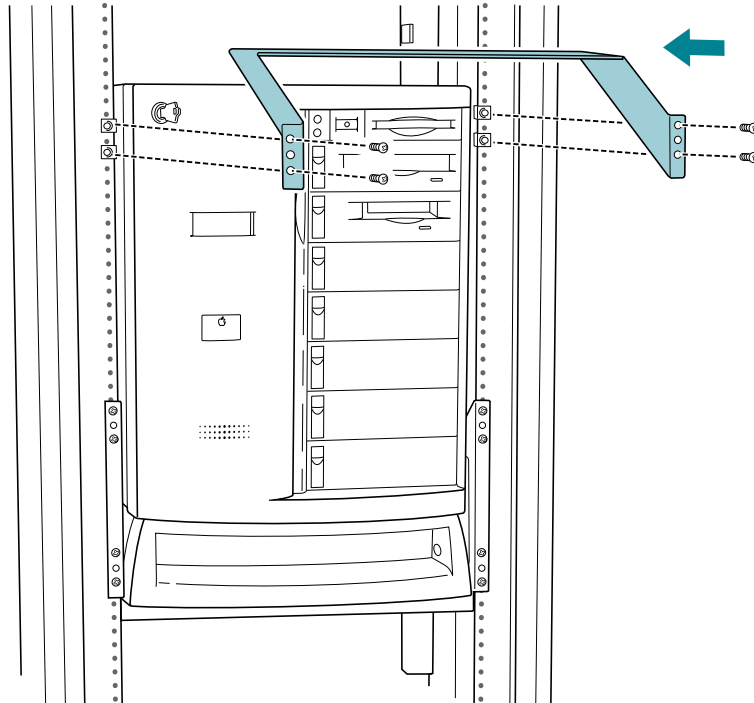
At this point, the Network Server is securely mounted in the rack, and you can connect the peripherals, monitor, network cables, and power cord.

Adding disk drives and other external SCSI devices

This section describes how to connect external SCSI devices to the Network Server. See Chapter 2 for information on installing internal SCSI devices.

The server has three separate built-in SCSI buses: two internal buses and an external bus. The external bus accommodates up to seven external SCSI devices in a chain (such as hard disks, CD-ROM drives, and tape drives) and is the SCSI-1 type, which provides speeds of approximately 5 megabytes per second (MBps).

Setting up a SCSI device to use with your server involves

- installing any necessary device drivers
- setting the device's SCSI ID number
- physically connecting the device to your server

When setting up a SCSI device to use with your server, refer to the instructions that came with the device, as well as the instructions in this section.

Installing a device driver

A *device driver* is software that lets the server communicate with a particular SCSI device. Any drivers needed for a SCSI device are usually on a floppy disk that comes with the device. For information about any necessary drivers, check your AIX documentation and the information that came with the device. You may have to restart your server to activate the driver.

Setting the SCSI ID number

As discussed previously, the Network Server contains three built-in SCSI buses: two internal buses and an external bus. The Network Server automatically assigns SCSI ID numbers to internal drives, as described in Chapter 2.

This section tells you how to set the ID number for an external Apple SCSI device. When setting a SCSI ID for another manufacturer's device, refer to the instructions included with that device.

To set the SCSI ID number for an Apple SCSI device that you are attaching externally:

1   **Make sure the device is switched off.**

2   **Choose a number that doesn't duplicate the ID of any other *external* SCSI device connected to your server.**

    You can assign any number between 0 and 6, provided that each external SCSI device is uniquely identified.

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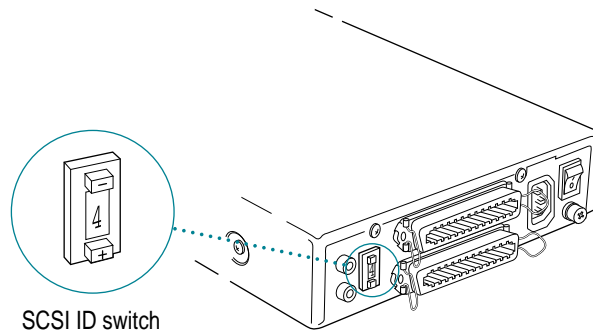
SCSI ID switch

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.

Connecting an external SCSI device

The SCSI port for connecting external devices to the server is located on the server's back panel.

SCSI port

SCSI icon
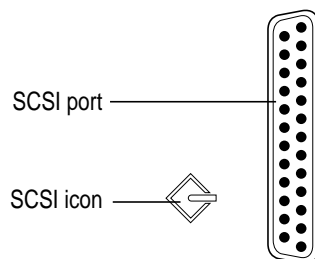
To connect a SCSI device to your server:

1 **Turn off your server.**

2 **Make sure the SCSI device is switched off.**

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

3 **Make sure the device has a unique ID number between 0 and 6.**

See the earlier section "Setting the SCSI ID Number" for details.

4 **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.
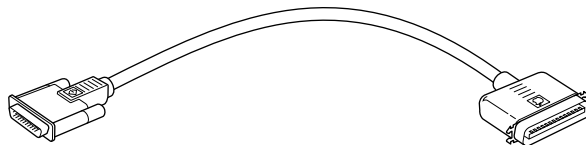
If the device is not the first one, use a SCSI peripheral interface cable to connect it to the last device in the chain.
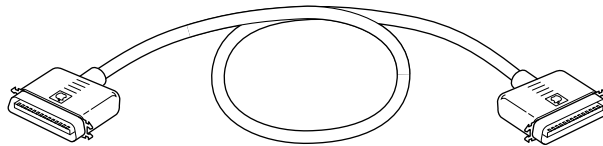
IMPORTANT The total length of the cables in a SCSI chain should not exceed 6 meters (20 feet). SCSI cables must have a 110-ohm impedance. For best results, use SCSI cables manufactured by Apple Computer.

5 Make sure that only the last device in the SCSI chain has a terminator.

To ensure accurate transmission of information, a terminator must be at each end of a SCSI chain. Your server, which is the first device in the external SCSI chain, has a built-in terminator.

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.

External SCSI terminator
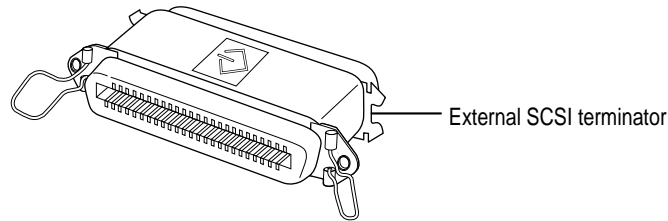
Have your Apple-authorized service provider remove any extra built-in terminators. You can attach or remove external terminators yourself.

Note: If only one external device has a built-in terminator, arrange the SCSI chain so that this 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.

Preparing a hard disk for use

For information on configuring a disk for use with the operating system, see the chapter "Managing File Storage With the Disk Management Utility" in *Using AIX, AppleTalk Services, and Mac OS Utilities on the Network Server.*

Verifying external SCSI devices

After you install one or more drives and turn on your system, you can use Open Firmware commands to display information regarding which SCSI devices are currently recognized by the server.

1   **Turn the front key to the upright (unlocked) position.**

2   **Turn the server on.**

If AIX is running, enter the shutdown -r command. If the server is already turned on, press the reset ◁ button.

3   **While the system is resetting, or starting up, hold down these keys:**

Command-Option-O-F

Continue holding down these keys until the 0> prompt appears. If AIX is installed and a root password is set, a Security > prompt appears.

4   **Enter (type and press Return) the following command:**

login

The system displays ok followed by the 0> prompt. If AIX is installed and a root password is set, the OF Password: prompt appears, and you need to enter the root password.

5 Enter the following command:

```
probe-scsi0
```

This command displays the devices on the built-in external SCSI bus.

The system displays SCSI ID information similar to this (these devices were used in the Apple Workgroup Server 95):

```
          Logical  Device                    Firmware
SCSI ID    unit    type  Manufacturer Model  version
   |        |       |         |         |       |
Target 1 Unit 0 Disk SEAGATE ST12550N 0010

Target 4 Unit 0 Disk SEAGATE ST11200N 9494
```

Connecting a monitor

Your server has one video port that accepts a monitor with a screen 21 inches or smaller (measured diagonally).

This section contains instructions for connecting a monitor to your server. You can connect most SVGA-compatible, multiple-scan monitors to your server. These Apple monitors are compatible with the Network Server:

- Apple Multiple Scan 14 Display (Order No. M3935)
- Apple Multiple Scan 15 Display (Order No. M3089)
- Apple Multiple Scan 17 Display (Order No. M2611)
- Apple Multiple Scan 20 Display (Order No. M2612)

Note: The Network Server requires a monitor that supports multiple-scan technology, so older Apple monitors, such as 13-inch RGB, the portrait and two-page monochrome monitors, don't work with the Network Server.

To connect a monitor from a manufacturer other than Apple, refer to the instructions that came with the monitor.

Connecting the monitor's power cord

Monitors have two cords you connect—a power cord and a monitor cable.

To connect the monitor's power cord:

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

Keep in mind these considerations:

- Make sure that the ventilation openings on the server and the monitors are clear and unobstructed.
- 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 **Check that the server and all connected devices are turned off.**

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

On some monitors, the cord is already attached.

4 **Plug in the monitor's power cord.**

Plug the power cord into a grounded electrical outlet.

Connecting the monitor cable

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

Note: You may need to extend the length of your monitor cable, for example, if you installed your Network Server in a rack so that the distance between the server and the monitor is greater than the reach of the standard cable. Be sure to use only an approved video extender cable rated for use with multiple-scan monitors. Do not use CPU-to-video monitor cables that may have been supplied with older RGB displays; not all the pins are "wired through" on those cables.

To connect the monitor cable:

1   Check that the monitor and server are both turned off.

2   Attach the monitor cable to the monitor.

On some monitors, the cable is already attached.

3   Attach the monitor cable to the adapter, and the adapter to the server's monitor port.

The monitor port is marked with the icon ❘▢❘. If you are using an Apple monitor, be sure to only use the multiple-scan models. If you are connecting a monitor from another company, be sure it's SVGA and multiple scan. The default resolution for AIX is 640 by 480 at 60 Hz.
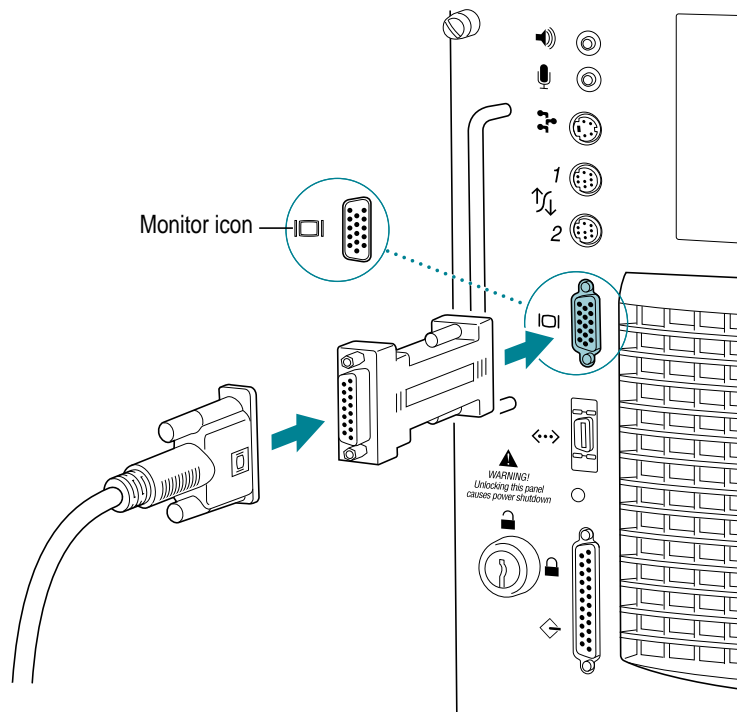
Connecting a system console

To connect the Network Server to a Macintosh or PC as a system console, you need these items:

- an 8-pin DIN to 8-pin DIN serial cable (number M0197)

- a terminal emulation program, such as MacTerminal 3.0 or greater, or some other suitable terminal emulation program running on a computer that you're using as the terminal

1   **Configure the terminal emulation software.**

Set the terminal interface protocols to 8 bit, no parity, and stop bits equal to one. Set any baud rate between 9600 and 57600.

2   **Connect one end of the serial cable to serial connection port 2 on the server, and the other end to the modem port on the computer that you're using as the terminal.**

3   **Turn the front key on the server to the upright (unlocked) position.**
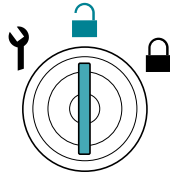
4   **Turn the server on.**

If AIX is running, enter the shutdown -r command. If the server is already turned on, press the reset ◁ button.

5   **While the system is resetting, or starting up, hold down these keys:**

Command-Option-O-F

Continue holding down these keys until the 0> prompt appears. If AIX is installed and a root password is set, a Security > prompt appears.

6 **Enter (type and press Return) the following command:**

`login`

The system displays `ok` followed by the `0>` prompt. If AIX is installed and a root password is set, the `OF Password:` prompt appears, and you need to enter the root password.

7 **Use the `setenv` command to specify serial port 2 for video output and keyboard input.**

Use the same baud rate as you specified in your terminal emulation program setup. These commands assume a baud rate of 9600:

`setenv input-device ttya:9600`

`setenv output-device ttya:9600`

To reset the input to the ADB port and output to the monitor port, enter these commands:

`setenv input-device kbd`

`setenv output-device screen`

Connecting the mouse and keyboard

In order to run your Network Server with AIX and a monitor, you need to connect an ADB-compatible extended keyboard. You have a choice of several keyboards for your server. You may also choose from among several mouse options. AIX supports both a one-button mouse and a three-button mouse. If you frequently work at the server using graphical displays, you may find that a three-button mouse makes it easier to use AIX.

Regardless of which type of keyboard or mouse you use, you connect each one in the same way:

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.

ADB icon
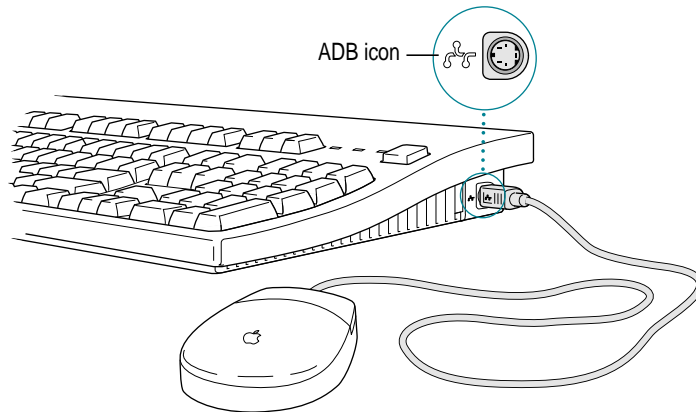
Note: The ⌖ port is called the Apple Desktop Bus (ADB) port.

2 Plug the keyboard cable (both ends are the same) into the port on the other side of the keyboard.

3 Plug the keyboard cable into the port on the back of the server marked with the ⌖ icon.

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

4 Connecting Your Server to the Network

This chapter describes how to connect your server to the network through the built-in Ethernet interface as well as through additional network interface cards that you may choose to install to expand the Network Server's capabilities. It gives specific instructions for connecting with the Apple PCI Ethernet Card and the Apple PCI Ethernet 100BASE-TX Card. After you connect your server to the network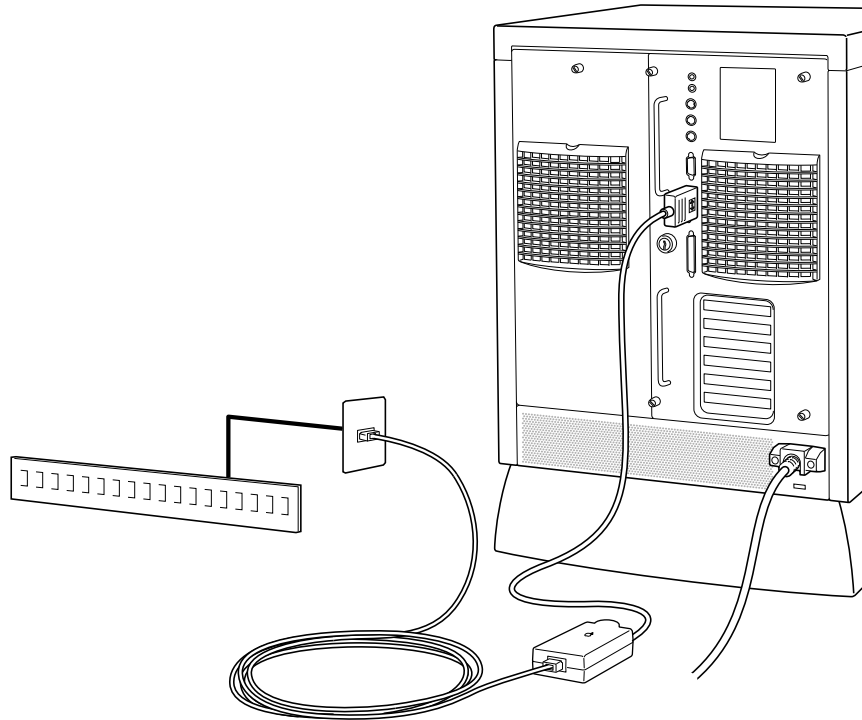, see *Using AIX, AppleTalk Services, and Mac OS Utilities on the Network Server* for information on configuring the network.

Note: With the appropriate communications card and software, you can also connect your server to other network types, such as a token ring or an FDDI network. See your Apple-authorized dealer for more information.

Installing a networking card

Your server has six expansion slots designed to accept PCI cards. All slots can be used simultaneously. See "Installing PCI Cards" in Chapter 2 for instructions on how to install networking cards in your system. After the card is installed, follow the steps in this chapter to connect the server to the network.

Connecting the built-in Ethernet (AAUI) port to the network

The Network Server contains built-in hardware for connecting to a 10 megabits per second (Mbps) Ethernet network. Connecting to the network requires a piece of hardware called a *transceiver* or *media adapter.* You must purchase this adapter separately for the type of network cables that your network uses.

The built-in (on-board) Ethernet capabilities of your Network Server allow you to connect to any standard Ethernet network using thin coaxial (or "coax"), twisted-pair, or thick coaxial cables. You can also use fiber-optic media or other standard Ethernet cables.

To connect the server to an Ethernet network, you need one of these Ethernet media adapters for the type of cables that your network uses:

- Apple Ethernet Thin Coax Transceiver
- Apple Ethernet Twisted-Pair Transceiver
- Apple Ethernet AUI Adapter and AUI media adapter appropriate for your network cable

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

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 port on the back of your server by looking for the Ethernet icon.
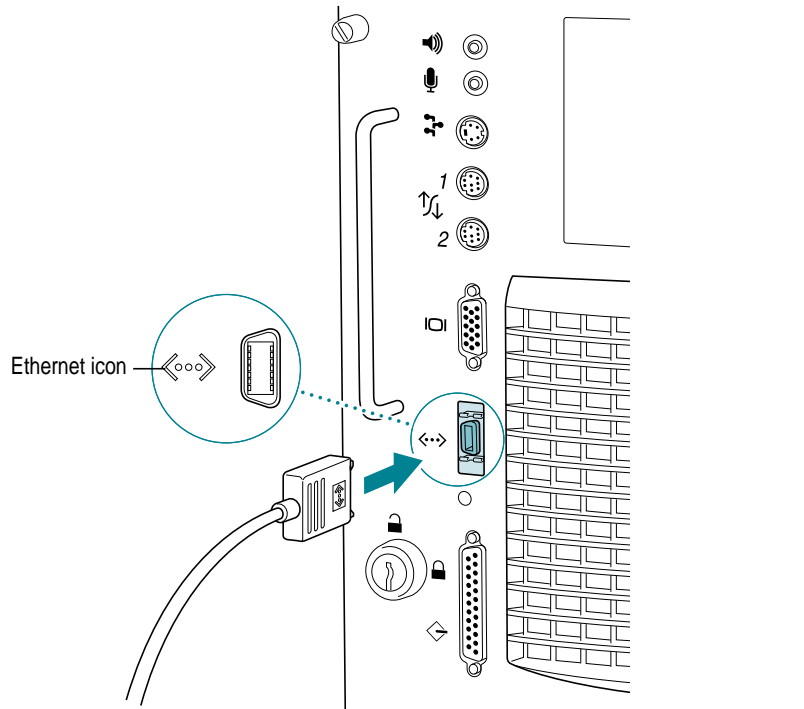
The following sections provide the basic instructions for connecting your server at the end of an Ethernet network. However, your server can be connected anywhere along a network; to do so, though, requires that you temporarily disconnect the network, which could disrupt existing network services. See the documentation that came with your media adapter for additional information about connecting to Ethernet networks.

The green LED next to the Ethernet port primarily indicates that the server is turned on. However, when the server is connected to a functioning Ethernet network and the Ethernet controller is initialized, the light flickers to indicate Ethernet activity. The flickering LED confirms a proper physical connection to a valid Ethernet network.

Connecting to thin coaxial Ethernet

To connect the server to an Ethernet network that uses thin coaxial (10BASE2) cable, you need an Apple Thin Coax Transceiver (or compatible transceiver) and a thin coaxial cable.

1 Attach one end of a thin coaxial cable to one of the posts on the thin coaxial transceiver.

2 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.

3 Plug the connector on the transceiver into the Ethernet port on the server.
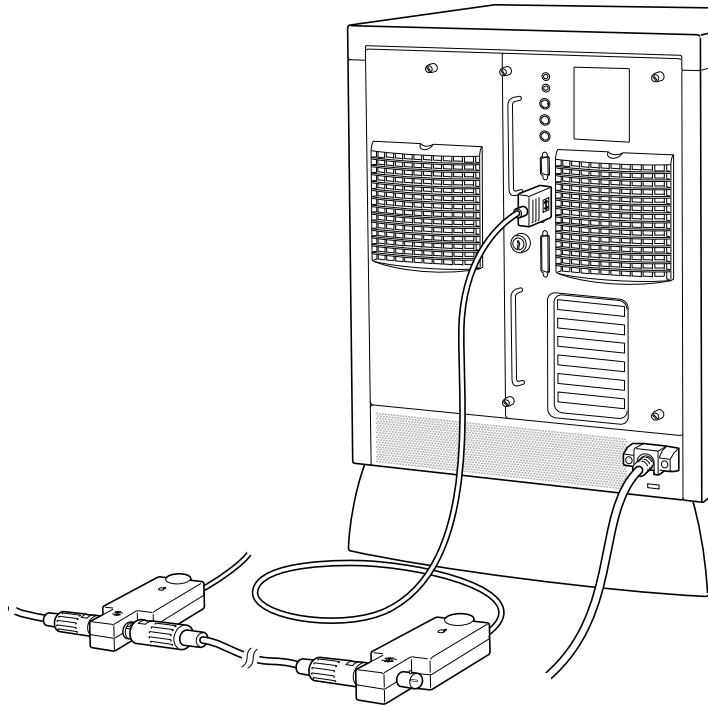
4 See *Using AIX, AppleTalk Services, and Mac OS Utilities on the Network Server* for additional information about configuring network software.

Connecting to twisted-pair Ethernet

To connect the server to a network that implements Ethernet over twisted-pair cable, you need an Apple Ethernet Twisted-Pair Transceiver (or compatible transceiver) and a twisted-pair patch cord with an RJ-45 telephone-style connector jack.

1   Plug one end of the twisted-pair patch cord into the transceiver.

2   Plug the other end of the patch cord into an RJ-45 wall outlet that connects to a centralized 10BASE-T hub.

3   Plug the connector on the transceiver into the Ethernet port on the server.

Note: After you start up the server, check that the green light-emitting diode (LED) on the twisted-pair transceiver is lit. The LED confirms that the server is properly connected to the hub.

4   See *Using AIX, AppleTalk Services, and Mac OS Utilities on the Network Server* for additional information about configuring network software.

Connecting to other types of Ethernet

The Apple Ethernet AUI (Attachment Unit Interface) 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. When you use 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.

1   **Connect the Ethernet transceiver to the network.**

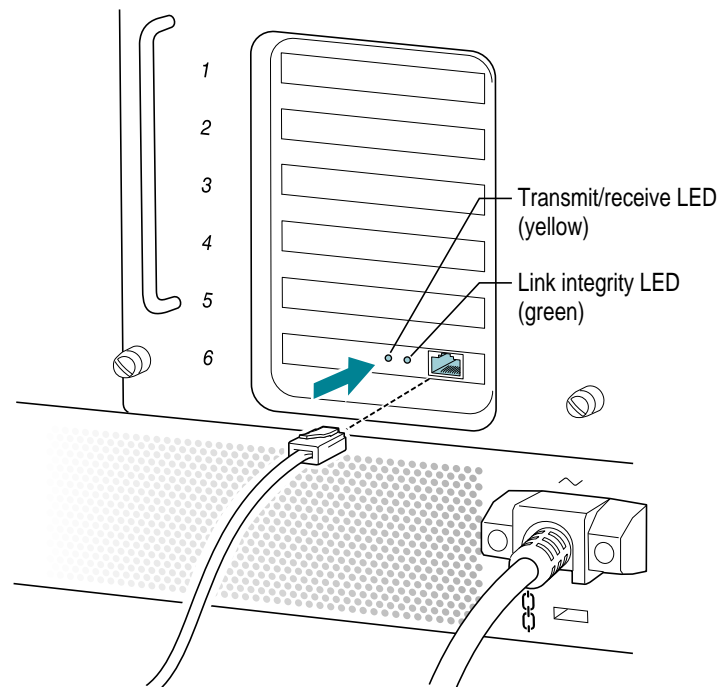2   **Plug the connector on the transceiver into the Ethernet port on the server.**

3   **See *Using AIX, AppleTalk Services, and Mac OS Utilities on the Network Server* for additional information about configuring network software.**

Connecting the Apple PCI Ethernet Card to the network

You can connect the Apple PCI Ethernet Card to any one of three available connection options: a BNC connector, which enables you to attach a thin coaxial cable; an AAUI connector, which you connect to a tranceiver that allows you to attach a variety of different network cable types; and an RJ-45 connector, through which you can attach twisted-pair cable.
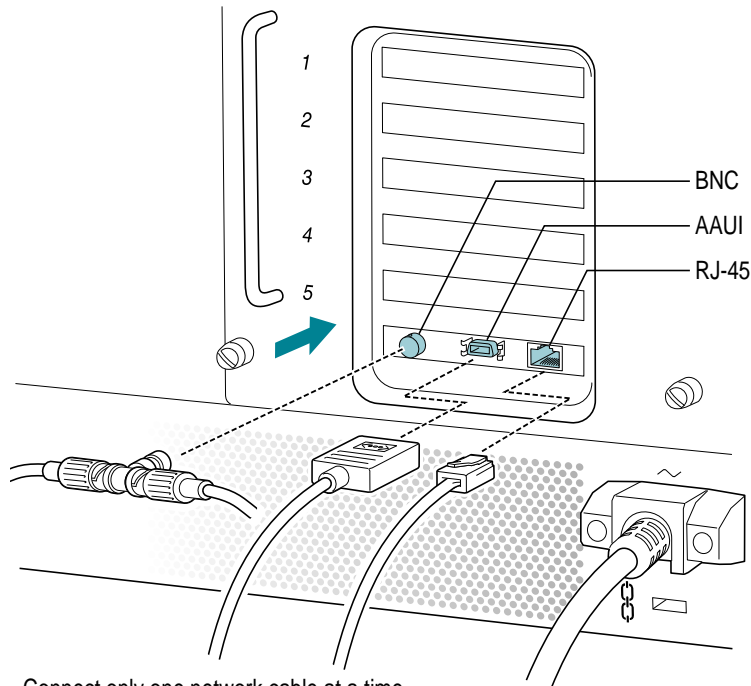
Connect only one network cable at a time.

After you've installed the card according to the instructions in "Installing PCI Cards" in Chapter 2, follow the steps in one of the next three sections to connect the server to the network.

Connecting the Apple PCI Ethernet Card to a thin coaxial network

To use the Apple PCI Ethernet Card to connect the server to an Ethernet network that uses thin coaxial cable, you need an Apple Thin Coax Transceiver (or compatible transceiver) and a thin coaxial cable.

1 **Attach one end of a thin coaxial 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.

2 **Attach the other end of the cable to the BNC connector on the Apple PCI Ethernet Card.**
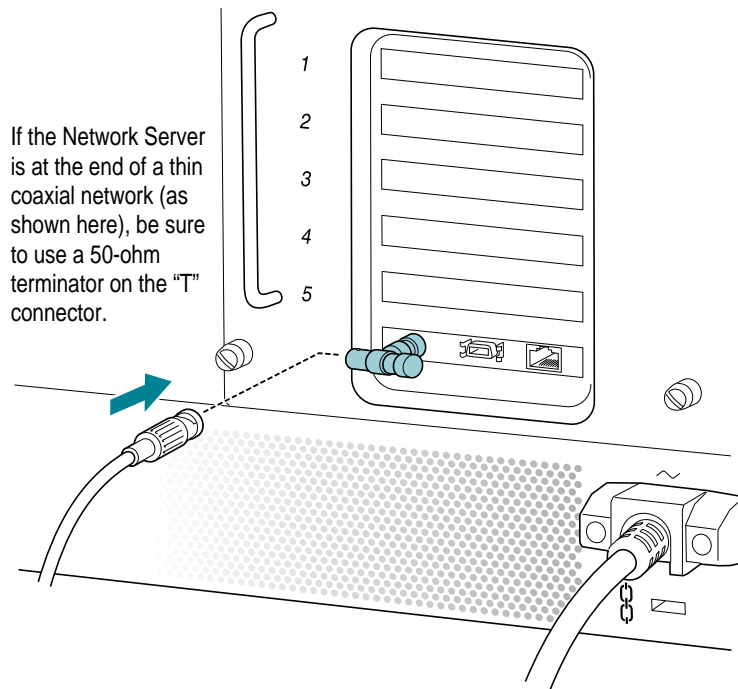
If the Network Server is at the end of a thin coaxial network (as shown here), be sure to use a 50-ohm terminator on the "T" connector.

3 **If AIX is already installed on your server, see "Installing Drivers for Apple PCI Ethernet Cards," later in this chapter, for information about installing the necessary software drivers.**

If you install the Ethernet cards before you install AIX, the operating system installation process automatically loads the necessary drivers.

4 **See *Using AIX, AppleTalk Services, and Mac OS Utilities on the Network Server* for additional information about configuring network software.**

Connecting the Apple PCI Ethernet Card to a twisted-pair network

To connect the server to a network that implements Ethernet over twisted-pair cable, you need a twisted-pair patch cord with an RJ-45 telephone-style connector jack.

1 **Plug one end of the patch cord into an RJ-45 wall outlet that connects to a centralized 10BASE-T hub.**

2 **Plug the other end of the twisted-pair cable into the RJ-45 connector on the Apple PCI Ethernet Card.**

3 **If AIX is already installed on your server, see "Installing Drivers for Apple PCI Ethernet Cards," later in this chapter, for information about installing the necessary software drivers.**

If you install the Ethernet cards before you install AIX, the operating system installation process automatically loads the necessary drivers.

4 **See *Using AIX, AppleTalk Services, and Mac OS Utilities on the Network Server* for additional information about configuring network software.**

Connecting the Apple PCI Ethernet Card to other types of Ethernet

The Apple Ethernet (Attachment Unit Interface) 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. When you use 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.

1   **Connect the Ethernet transceiver to the network.**

2   **Plug the connector on the transceiver into the AAUI connector on the Apple PCI Ethernet Card.**
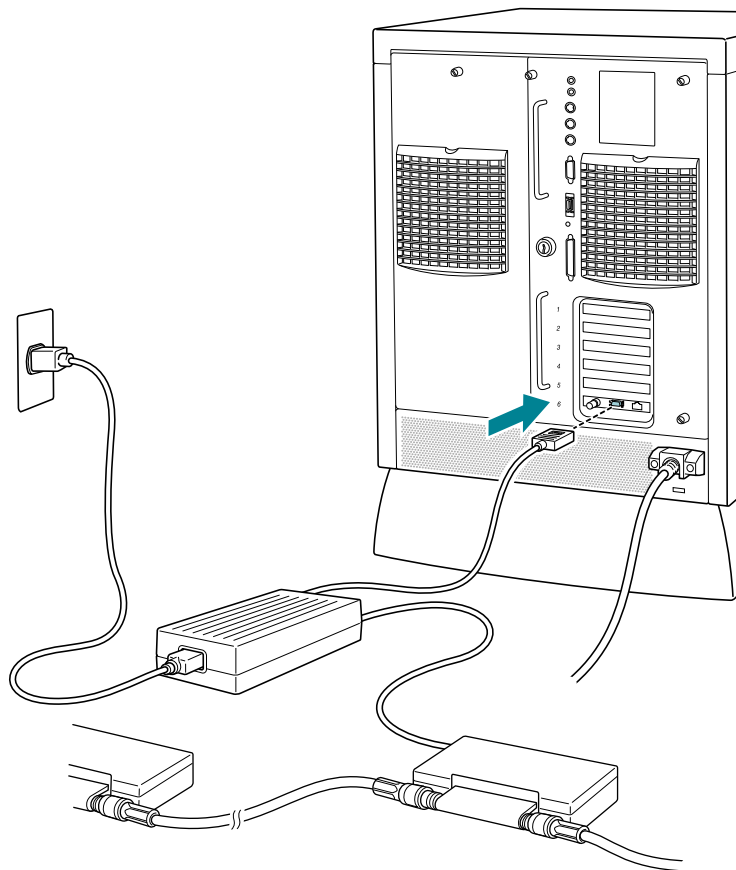
3   **See *Using AIX, AppleTalk Services, and Mac OS Utilities on the Network Server* for additional information about configuring network software.**

Connecting the Apple PCI Ethernet 100BASE-TX Card to the network

To use an Apple PCI Ethernet 100BASE-TX Card to connect the server to a network that implements Ethernet over twisted-pair cable, you need a twisted-pair patch cord with an RJ-45 telephone-style connector jack.

1 **Plug one end of the patch cord into an RJ-45 wall outlet that connects to a centralized 100BASE-TX hub.**

2 **Plug the other end of the twisted-pair cable into the RJ-45 connector on the Apple PCI Ethernet 100BASE-TX Card.**

3 **If AIX is already installed on your server, see the next section, "Installing Drivers for Apple PCI Ethernet Cards," for information about installing the necessary software drivers.**

If you install the Ethernet cards before you install AIX, the operating system installation process automatically loads the necessary drivers.

4 **See *Using AIX, AppleTalk Services, and Mac OS Utilities on the Network Server* for additional information about configuring network software.**

Installing drivers for Apple PCI Ethernet Cards

After you install the Apple PCI Ethernet Card or the Apple PCI Ethernet 100BASE-TX Card, you need to install software drivers in order for the cards to work with AIX. These drivers automatically load during the AIX installation process, so if you install AIX after installing the cards, you don't need to go through any special steps to load the necessary drivers.

If you install one of the Apple PCI Ethernet Cards after AIX is already installed on the server, follow these steps to install the appropriate drivers.

1   Log in as root.

2   Insert the *Installation CD*.

3   Start SMIT.

Enter this on the command line:

```
smit devinst
```

Or, go directly to the Install Additional Software menu, or use the SMIT path Devices/Install Additional Device Software.

A dialog box appears prompting you to specify your input device.

4   Select CD-ROM as your input device and click OK.

To display the available input devices, use the List button.

After you specify an input device, the Install Additional Device Software dialog box appears.
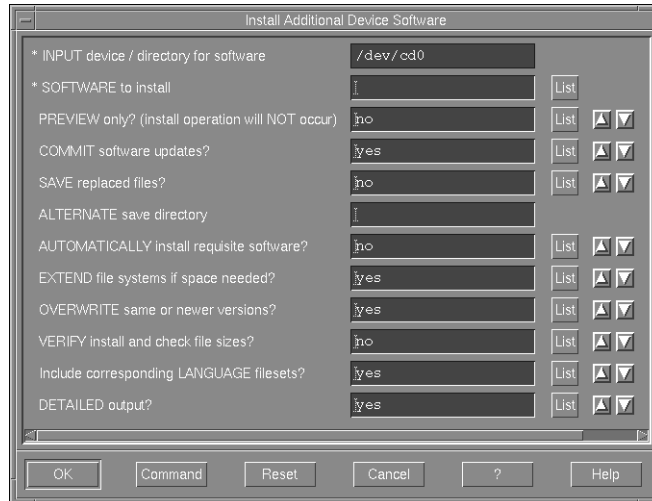
5 **In the Install Additional Device Software dialog box, modify the following fields.**

In the Software to Install field, choose the software package for the card you want to install. Click the List button to see the available packages. In the list of available packages, select the appropriate entry for your card.

For the Apple PCI Ethernet Card:

```
4.1.4.0 devices.pci.pci1011+14    @@devices.pci.pci1011+14
```

or, for the Apple PCI Ethernet 100BASE-TX Card:

```
4.1.4.0 devices.pci.pci1011+9     @@devices.pci.pci1011+9
```

IMPORTANT Do not select individual components within the package.

For the Automatically Install Requisite Software field, specify NO.

For the Overwrite Same or New Versions field, specify YES.

For the Detailed Output? field, specify YES.

6 **Press Enter or click OK to begin installation.**

7   Restart your system.

Your driver is now installed. The next time you log in to AIX, enter this command to ensure that the driver is installed and the card is recognized:

```
lsdev -C | grep -i ether
```

This command lists the known Ethernet devices and displays their status, as in this example:

```
ent0      Available    00-00-0E      Apple on-board Ethernet

ent1      Available    00-14         Apple 10Mbit PCI Ethernet
```

8   See *Using AIX, AppleTalk Services, and Mac OS Utilities on the Network Server* for additional information about configuring network software.

5 Starting Up Your Server

This chapter describes how to start up your server and covers the normal startup process, as well as how to solve problems that you might encounter during the startup process.

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   **If you like, attach the power cord lock.**
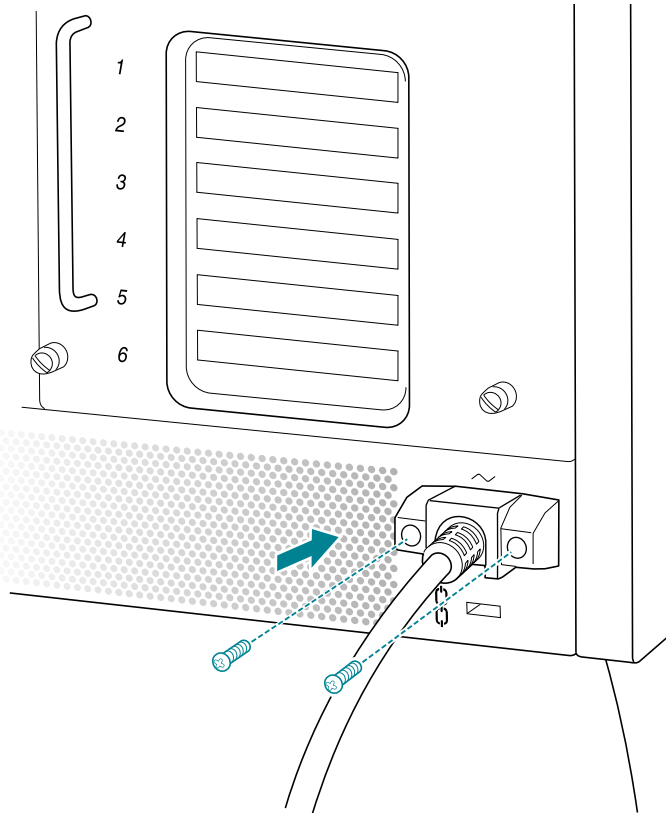
3 **Plug the other end of the power cord into a three-hole grounded outlet or power strip.**

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!

Surge protector is recommended.
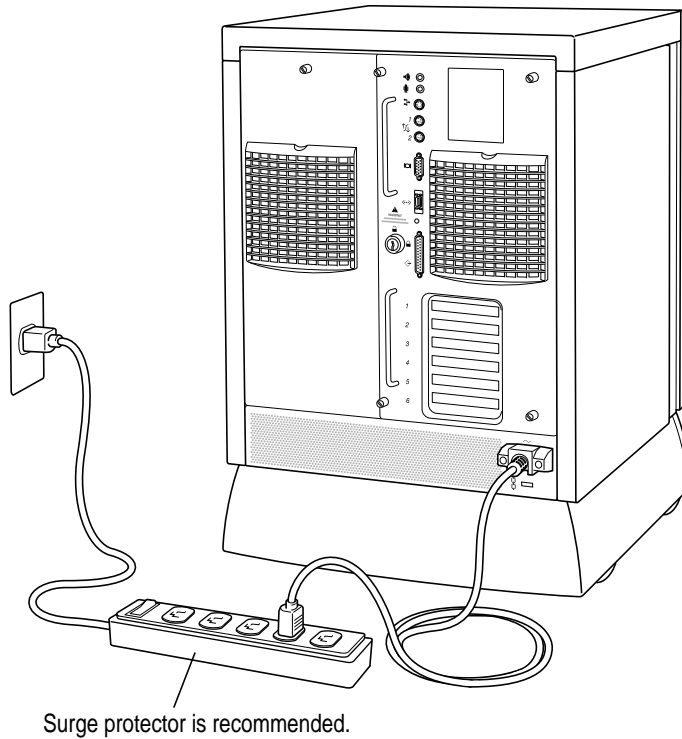
IMPORTANT Be sure at least one end of the power cord is within easy reach so that you can quickly unplug the server if necessary.

Turning the server on

IMPORTANT Before turning on your server, be sure that all panels and components are in place. Never operate your server while drive trays, drive bezels, fans, panels, or other parts of the server are missing or open.

To turn on the server for the first time:

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: ①.

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—during operating system startup (booting)—for the presence of external devices, so you need to turn on the devices *before* you turn on the server.

3   Check that the key on the rear panel of the Network Server is in the horizontal (locked) position.

4   Turn the front key to the left (service) position.

During normal operation after AIX is installed, you turn the server on with the key set to the upright (unlocked) position. See *Using AIX, AppleTalk Services, and Mac OS Utilities on the Network Server* for information about using the server with AIX installed.

5   Turn on your server by pressing the power button.

The power button is next to the floppy drive. If the power doesn't come on right away, press and hold the button for a few seconds.

Power button
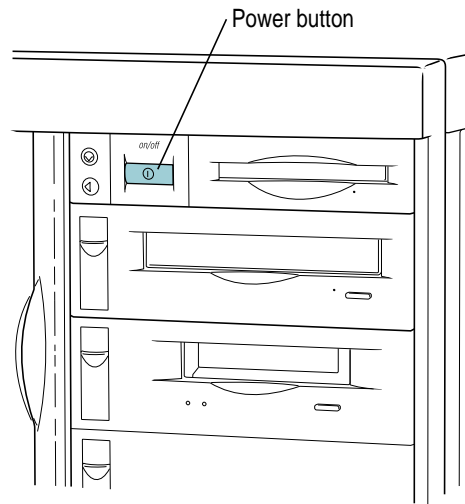
The Network Server starts the power-on self test, and displays the ROM version and copyright information. It then starts a series of tests, during which time the ROM version and parity DRAM size remain on the LCD.

During the test phase of the startup process, the system displays messages on the third line of the LCD. Under normal circumstances, these messages clear too quickly for you to read, but if there is a startup problem, one of these might remain on the display:

■ "DRAM Test #1 Begins"

■ "ROM SIMM Test Begins"

■ "DRAM Test #2 Begins"

The next test takes some time to complete, depending on the amount of memory in the server. This message appears at the beginning of the test:

■ "LONG DRAM Test Begins"

Dashes appear to indicate the progress of DRAM testing. Depending on memory size, there may be as much as 60 seconds between dashes. If the server stops ("freezes" or "hangs") with dashes displayed on the LCD, see the next section for information about which memory component was being tested at the time.

If the server stops ("freezes" or "hangs") with one of the following messages displayed, that information may indicate a problem with the component identified in the message. The component may have failed, or be incorrectly installed, or be incompatible.

■ "Turning on Caches"

■ "Testing Parity DIMMs"

Check to see if parity DIMMs are installed. If any DIMM does not support parity, the server treats all memory as nonparity.

■ "MainLBU Enet Setup"

■ "Sounding Boot Beep"

■ "Sizing RAM DIMMs"

■ "ROM SIMM Data Access"

■ "Allocating RAM DIMMs"

■ "MainLBU NVRAM Setup"

■ "CPU Card Info Setup"

■ "L2 Cache SIMM Setup"

■ "Testing L2Cache SIMM"

■ "RAM/ROM/NVRAM:PASSED"

For information about problem messages that may appear, see the next section.

After all the tests are complete, the LCD displays something similar to this:

```
ROM ver.1.1.22
0048 MB Parity DRAM
150 MHz 604, 50 MHz Bus
1024 KB Level 2 Cache
```

■ See *Using AIX, AppleTalk Services, and Mac OS Utilities on the Network Server* for information about installing and using the operating system.

IMPORTANT If you need to turn off your server at any point, see "Turning the Server Off" later in this chapter. It is very important to use the correct procedure for shutting down your server before turning it off.

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 key on the rear panel in the horizontal (locked) position, and are the back panel thumbscrews fully tightened?

■ Is the server turned on? The green power indicator should be lighted. If power doesn't come on immediately after you press the power button, press and hold the button for a few seconds.

■ Is the server plugged into a power source? If it is plugged into a power strip, is the power strip turned on?

■ Has output been redirected to a serial port?

■ Is the monitor turned on? (If the monitor has a power-on light on the front, check that it's on.) Try turning the monitor off and then on again.

■ Is the monitor power cord plugged in?

■ 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 ◖.)

■ Is the processor card firmly seated? See Chapter 2 for information on how to open the rear drawer that contains the processor card, and check that the processor card is securely placed in its socket.

■ Does the long DRAM test never complete? Check to make sure each DRAM DIMM is properly seated.

■ Does the system fail to boot and is a memory failure indicated at address ECCBEBAD? Check your DRAM DIMM specifications. ECC memory DIMMs with non-quad CAS logic are not supported.

If there is a problem message displayed on the LCD on the front of the server, the component identified in the message may have failed, or be incorrectly installed, or be incompatible. These are among the possible problem messages:

- "L2 Cache SIMM Failed"
  Contact your service provider for replacement. The server can operate with the L2 Cache SIMM removed.

- "ROM SIMM Failed"

- "MainLBU NVRAM Failed"
  The ROM, which is located on the main logic board unit, has failed. Contact your service provider for replacement. The server cannot operate with the ROM SIMM removed.

- "RAM DIMM 1A Failed at Address *xxxxxxxx*"
  RAM DIMMs are identified as 1A through 4A, and 1B through 4B. Addresses are in hexadecimal. Remove the failed DRAM DIMM and restart.

- "MainLBU Video ID Bad"
  The video subsystem is located on main logic board unit.

- "MainLBU 825#*x* Failed"
  The number indicates either SCSI controller 1 or 2, which are located on the main logic board unit.

- "Drive Fan Failed!"
  This fan is located on the left side of the server rear panel, behind the drives.

- "Processor Fan Failed"
  This fan is on the right side of the server's rear panel, on the rear drawer.

- "Temperature Too Hot!"
  The internal cabinet temperature is unsafe. Turn off the server immediately.

- "Temperature Warning!"
  The internal cabinet temperature is becoming unsafe. Check that both fans are operating and that server air vents are clear.

- "Left *(or Right)* Power Fail!"
  The power supply on the left (or right) side as you're facing the front of the server has failed.

- "Left *(or Right)* Power Hot!"
  Power supply thermal warning requires checking that server air vents are clear.

- "CudaNotResponding!!!"
  Battery backed-up power management chip is not responding. Try pressing the small red button on the top left of the main logic board unit.

- "ParityAddrAtAddrFail"
  A probable DRAM failure is indicated. This message will be accompanied by either a RAM DIMM failure or an incomplete LONG DRAM test with dashes as specified below.

Are there dashes displayed on the LCD on the front of the server? Based on the number of dashes, you can identify the DIMM causing the boot failure.

Number of dashes displayed	DIMM slot
1	Main logic board unit DRAM (reserved for future use)
2	Main logic board unit DRAM (reserved for future use)
3	1A
4	1B
5	1A
6	1B
7	2A
8	2B
9	2A
10	2B
11	3A
12	3B
13	3A
14	3B
15	4A
16	4B
17	4A
18	4B

Turning the server off under normal circumstances

To turn the server off:

■ **If AIX is running, enter the command**

```
shutdown -h
```

■ **If the Open Firmware prompt is displayed, enter the command**

```
shut-down
```

Note that you need to include the hyphen in the `shut-down` command. To turn on the server again, just press the power button on the front of the server.

IMPORTANT Be sure to shut down the server if you need to

■ move the server

■ connect other equipment to the server

■ unplug the server

Restarting the server following a power interruption

The Network Server's power control circuits operate in "file server mode." This means that the server automatically powers up and restarts the operating system ("boots") if power is interrupted and then restored. For example, if a power outage occurs while the server is running, the server will automatically reboot itself when power is restored.

If you don't want the Network Server to restart after a power interruption, disconnect the power cord or turn the key on the rear panel to the upright (unlocked) position before power is restored.

Turning the server off in an emergency

If the server shutdown doesn't work, or if you need to shut down the server for emergency reasons, follow these steps.

IMPORTANT This procedure will cause the server to lose any data that wasn't saved at the time of shutdown.

■ **If AIX is running, enter the command**

    sync;sync;sync;halt -q

■ **If the Open Firmware prompt** 0> **is displayed, enter the command**

    shut-down

If the above commands don't work:

■ **Turn the front key to the service position and press the power button.**

Or you can do the following:

■ **Turn the key on the rear panel to the upright (unlocked) position.**

If the rear panel key doesn't turn off your server:

■ **Unplug the server's power cord.**

Remember that if the front key is in the unlocked or locked position, the server will automatically restart when the power cord is plugged back in.

6 Using CD-ROM and Tape Drives

Read this chapter for information on using your server's internal CD-ROM drive and DDS-2 DAT drive.

Using the CD-ROM drive

The instructions in this section describe how to insert and eject a CD-ROM disc.

Inserting a CD-ROM disc

Follow these instructions to insert a CD-ROM disc into your CD-ROM drive. Then follow the instructions provided with your disc.

1 Turn on your server, if it's not already on.

2 Press the Open/Close button to open the tray of the CD-ROM drive.

Manual eject   Open/Close button
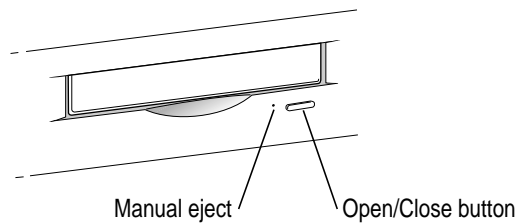
The tray opens.

3 Place a CD-ROM disc in the tray, with the disc label facing up.

Make sure the disc is lying flat and centered in the tray.
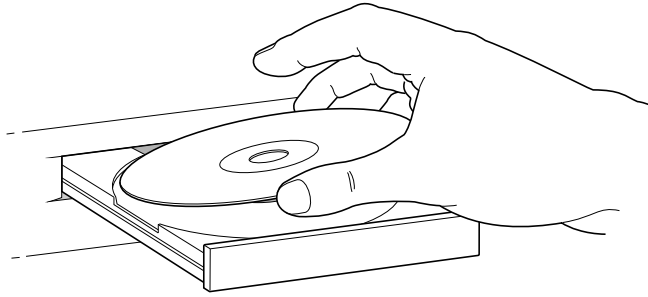
4 Push the tray in, or press the Open/Close button, to close the tray.
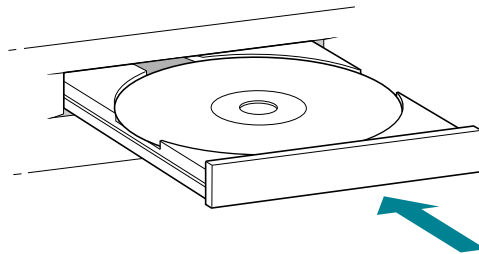
The CD-ROM disc is ready to use.

Ejecting a CD-ROM disc

Follow these instructions to open the tray and eject a CD-ROM disc from your computer. If these instructions don't work, insert a straightened paper clip into the manual eject hole. The manual eject works regardless of whether the server is turned on or turned off.

IMPORTANT You may not be able to eject a disc if it is being used. Quit any applications that are using the CD and unmount any file systems from it.

1   Open the tray.

Press the Open/Close button for your CD-ROM drive.

2   Take the CD-ROM disc out of the tray.

Store your disc in a safe place, away from heat, dust, and moisture.

3   Push the tray in, or press the Open/Close button to close the tray.

To avoid possible damage to the tray or the CD-ROM drive, keep the tray closed when you are not using it.

Using the tape drive

The internal DDS-2 DAT drive and accompanying software can perform full or partial backup and restore procedures for all of the data on your hard disks. In addition, the drive automatically performs error correction and data compression of the files that you back up and restore. The error-correction feature helps ensure a high level of data integrity. The data-compression feature allows more data to fit on a cassette than do conventional backup mechanisms.

You can use AIX or software products from other companies to back up and restore data. For information, see *Using AIX, AppleTalk Services, and Mac OS Utilities on the Network Server* or the backup utility's documentation.

Compatible tapes

Your internal DAT drive is compatible with MRS-quality DDS (digital data storage) tape cassettes. MRS (Media Recognition System) cassettes are the highest-quality digital data tape available. Your internal tape drive requires this level of quality to perform backup operations successfully. See your Apple-authorized service provider for more MRS-quality DDS tape cassettes or their compatible substitutes. When selecting media, be sure the cassettes are stamped with these logos:

DDS Digital Data Storage

Media Recognition System

If you use cassettes not approved by your Apple-authorized service provider, you void the warranty on your tape drive.

Note: Some vendors of computer products may refer to DDS cassettes as *digital audio tape* (DAT) cassettes. However, DAT cassettes have a different mechanical specification from DDS cassettes. Certain DAT cassettes may work with your tape drive; your Apple-authorized service provider can tell you which ones will work.

Starting up the tape drive

The tape drive receives power and performs a self-test when you start up your server. During the test, both status lights next to the tape drive opening are solid green, then the light on the left flashes green and the light on the right turns off. If no tape is loaded in the tape drive, both status lights turn off. If a tape is loaded in the tape drive, the light on the left becomes solid green.

There are two conditions that indicate the self-test has failed. If the light on the right flashes amber, you may need to clean the tape-drive head as described in the section "Cleaning the Tape-Drive Heads" later in this chapter. Or if a tape is loaded in the tape drive, a flashing amber light may indicate that the tape is worn and needs to be replaced. If the light on the right becomes solid amber, the tape drive did not successfully complete its self-test and should not be used; consult an Apple-authorized service provider.

The status lights are discussed in greater detail later in this chapter.

Inserting tape cassettes

To use a cassette:

■ **Insert it into the tape slot in the front panel of the server, as shown in this figure.**
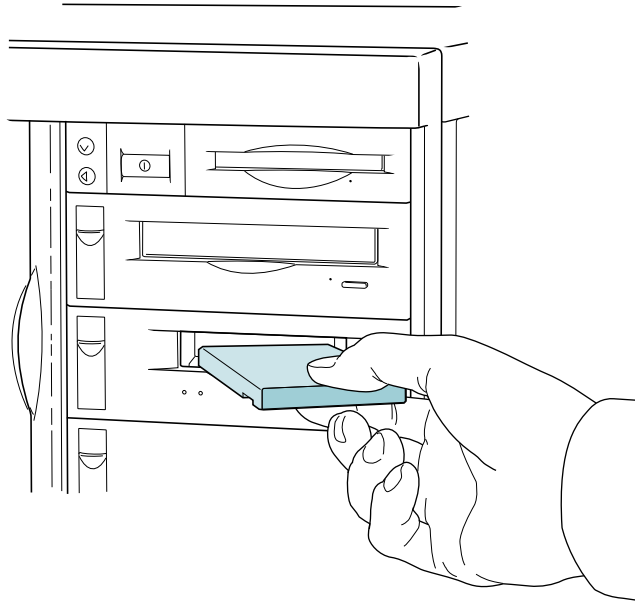
As you insert the cassette, the drive pulls it into place and performs a loading sequence, which includes threading and rewinding the tape and checking for error conditions. The loading procedure takes about 30 seconds.

Status lights

Located next to the tape drive opening are two lights that inform you of the status of tape operations. The light on the left is the tape light, and the light on the right is the clean light. A solid green tape light indicates normal operation; a solid amber clean light indicates a warning condition. A flashing green tape light indicates activity between the tape drive and the SCSI bus. A flashing amber clean light indicates that the tape in the drive is worn or the tape-drive head needs to be cleaned.

The following table lists all the possible meanings of the status lights.

Tape light (left side)	Clean light (right side)	Meaning
Normal operation		
Flash green*	Off	Cassette loading or unloading, or self-test in progress
Fast flash green[†]	Off	Cassette loaded/read or write activity
Green	Off	Cassette loading/drive online
Error states		
Any	Flash amber*	Media wear (caution), or clean required
Any	Amber	Error condition

*Flash means the light flashes 1/2 second on, 1/2 second off.
[†]Fast flash means the light flashes 1/4 second on, 1/4 second off.

The caution signal

If your tape drive detects problems, it displays a caution signal: the clean light flashes amber. You can clear the caution signal by ejecting the cassette.

The caution signal may be caused by dirty tape-drive heads, so if this signal appears, clean the heads and insert the tape again. (Head-cleaning instructions are given in "Cleaning the Tape-Drive Heads," later in this chapter.) The caution signal may also indicate a worn-out tape. If the tape is old or worn, you should copy its data to a new tape and discard it. If you're trying to restore data from a worn tape and the caution signal appears, clean the tape-drive heads, then try the restore operation again.

Removing tape cassettes

You can remove a tape cassette at any time by pressing the eject button located under the tape slot on the right side. You should not press the eject button while the tape is in use.

Check the backup utility's documentation to learn about additional methods for ejecting cassettes while using the backup software.

Forcing the ejection of a tape cassette

If you need to force the ejection of a tape cassette:

■ **Hold the eject button down for at least 5 seconds (perform this step after the server has started up).**

The drive waits 35 seconds for the normal eject procedure to occur, and if it does not occur, unthreads the tape and ejects the cartridge.

> **WARNING** If you force an eject while the drive is busy, you may lose data or cause the tape to be invalidly formatted.

Locking a cassette

You can lock a DDS cassette by sliding the tab on the back of the cassette so that the hole is visible. When a tape cassette is locked, data can be read from the cassette but not written to it.

Avoiding high humidity

Whenever your tape drive detects water condensation, both status lights glow solid amber. This warning signal cancels any commands in progress. Furthermore, any commands that access the tape are rejected. The tape drive then unthreads the tape to prevent tape and tape-head damage.

To minimize the chance of condensation, adhere to the environmental requirements described in Appendix B, and follow these general cassette guidelines:

■ Use tape cassettes at temperatures between 10° C (50° F) and 40° C (104° F).

■ If you expose the tape cassettes to temperatures outside the operating limits, you can stabilize them by leaving them in the proper operating temperature for a minimum of two hours.

Follow these guidelines to avoid temperature problems:

- Avoid exposing cassettes to severe temperature conditions. For example, don't store a cassette in a car in bright sunlight.
- Avoid transferring data to or from a tape cassette when the temperature is changing by more than 10° F per hour (roughly 5° C per hour).

Cleaning the tape-drive heads

The most common reason for the display of a caution signal on the front panel is that the tape-drive heads are dirty. Although your tape drive has a built-in roller for cleaning the heads during normal operation, you still need to perform a separate cleaning step as part of preventive maintenance.

Your system comes with a cleaning cassette that you should use to clean the tape-drive heads after every 25 hours of running time.

Use only a DDS cleaning cassette. When you insert the cleaning cassette into the drive, the drive automatically loads it and cleans the heads. When the cleaning process is completed, the drive automatically ejects the cassette. Keep a record of how many times you use the cleaning cassette. After 25 uses, replace it.

The interval at which you clean the tape drive depends on how often you use it. In general, if you back up daily, you should clean the drive weekly. If you back up weekly, you should clean the tape drive once a month.

For more information about using the cleaning cassette, refer to the instructions that came with it. For additional cleaning cassettes, see your Apple-authorized service provider.

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.

Keep the front sliding door and rear drawer locked to prevent access by untrained personnel. Access to the inside of the server should be limited to those who are familiar with the hazards posed by the high energy levels within the server and who have the background and experience to safely work with the components inside the system.

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).

> **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.

For additional safety:

- If you ever need to remove a side panel or front drive tray of your server, replace it before you use the server.
- Never turn on your server with any of the external enclosure, including cabinet panels or drive trays, removed.

Be sure that you always do the following:

- Keep the server locked during normal operation, and if possible, keep the server in a locked and unused room or closet with limited access.
- 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** 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 for repair.

- 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 the 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

Store disks at temperatures between 50° F and 125° F.
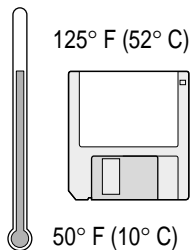
Do not use a pencil or an eraser on a disk or disk label.

Keep disks dry.

125° F (52° C)

50° F (10° C)
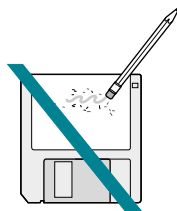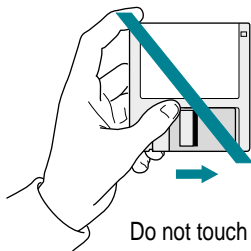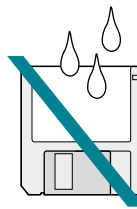
Do not touch the exposed part of the disk behind the metal shutter.
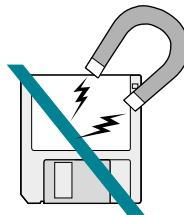
Keep disks away from magnets.
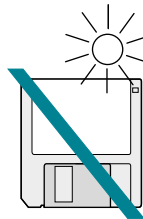
Avoid exposing disks to extremely hot temperatures.

If you can't eject a floppy disk

If you can't eject a floppy disk in the usual way, 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.
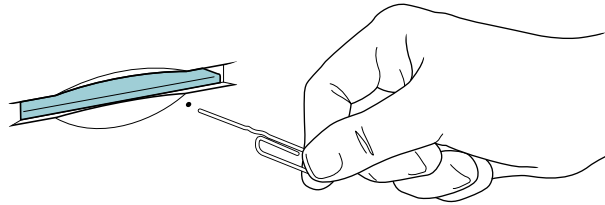
If nothing works, take the server or disk drive to your Apple-authorized service provider to have the disk removed.

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 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 server case:

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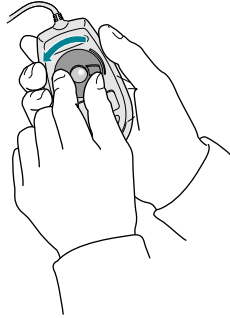
If you have an older mouse, you may need to press the plastic ring (rather than turn it) to disengage it.

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.
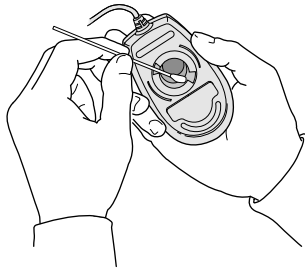
5 **Wipe the mouse ball with a clean, soft, dry, and lint-free cloth.**

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.

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.

45–70 cm (18–28 in.)

Shoulders relaxed

Forearms and hands in a straight line

Forearms level or tilted up slightly

Lower back supported

Thighs horizontal

Top of the screen at or slightly below eye level (You may need to adjust the height of your monitor by placing something under it or by raising your work surface.)

Screen positioned to avoid reflected glare

Clearance under work surface

Feet flat on the floor

- 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

The technical specifications in this chapter were accurate at the time of printing, but may have changed by the time your server shipped. See the file `/usr/lpp/bos/README` for the latest information.

Specifications

Processor

- PowerPC 604 at 132 megahertz (MHz) on the 500 model, 150 MHz on the 700 model

- 32 kilobytes (KB) of on-chip cache

Memory

- A minimum of 32 megabytes (MB) of 60ns parity DRAM, expandable to a maximum of 512 MB through 8 DIMM sockets

- 4 MB read-only memory (ROM)

- 8 KB of nonvolatile parameter memory

- 512 KB of static RAM used as a Level 2 cache for the PowerPC processor on the 500 model; 1 MB on the 700 model

Disk drives

- Apple SuperDrive 1.4 MB high-density floppy disk drive

- Optional internal Apple SCSI-2 Fast and Wide hard disk drive

- Internal 5.25-inch quadruple-speed (600 kilobyte per second) CD-ROM player

- Optional internal 3.5-inch DDS-2 DAT drive

- Up to nine half-height or smaller SCSI devices (seven on the 500 model) may be connected internally (seven drives through the front drive bays, and on the 700 model, two drives in the rear-mounted internal bracket)

Full-height devices can be accommodated by using two of the front drive bays.

Monitors

This table shows the image size for monitors connected to the monitor port, along with the number of colors or grays supported:

Hz	Resolution	Colors or grays
60	640 x 480	256
70	640 x 480	256
72	640 x 480	256
60	800 x 600	256
72	800 x 600	256
75	800 x 600	256
60	1024 x 768	256
72	1024 x 768	256

Interfaces

- One Apple Desktop Bus (ADB) port that supports a keyboard and mouse

- One video port that supports color and monochrome monitors of various resolutions, up to 1024 by 768

- Internal expansion slots that support six PCI expansion cards

- Built-in Apple Ethernet AAUI connector for connecting to 10 megabits per second (Mbps) Ethernet networks

- Three SCSI interfaces that support up to 16 SCSI devices (7 internal and 7 external on the 500 model, 9 internal and 7 external on the 700 model; internal buses are SCSI-2 fast-and-wide, external bus is SCSI-1)

- Two serial ports

- Microphone (in) port
- Speaker (out) port

A/C line input

- *Line voltage:* 100–240 volts AC, RMS single phase, automatically configured
- *Frequency:* 50–60 Hz
- *Power:* 708 watts maximum

Power supply

- Single 325-watt on the 500 model; one or two 425-watt, hot-swappable, supplies on the 700 model

Current type	500 model	700 model
+ 3.3 V*	25.0 A	50.0 A
+ 5 V*	28.0 A	44.0 A
+12 V (normal)	11.0 A	13.0 A
+12 V (start up)	18.0 A (12 seconds maximum)	
−12 V	100 mA	100 mA

*+3.3 and +5.5 power outputs are traded off; total power for both not to exceed 180 watts for the 500 model, 260 watts for the 700 model

Clock/Calendar

- CMOS custom circuitry with long-life lithium battery

Keyboard

- Supports Apple ADB keyboards (an extended keyboard is recommended)

Mouse

- Supports all models of the ADB mouse
- Supports true hardware three-button mouse

DRAM configurations

DRAM is provided in packages called *Dual Inline Memory Modules,* or *DIMMs.*

Your server can work with any of several DRAM configurations, depending on the density of the DRAM chips that are mounted on the DIMMs. The 168-pin parity DIMMs used in the Network Server are available from Apple in sizes of 8, 16, and 32 MB pairs, enabling you to increase Network Server memory by 16, 32, and 64 MB, respectively. Your server can have a maximum of 512 MB of memory.

IMPORTANT The DIMMs should be 72-bit-wide 168-pin fast-paged mode, 60-nanosecond (ns) RAM access time or faster. DRAM must support byte writes. SIMMs and some DIMMs from older Macintosh computers will not work in the Network Server. The parity DIMMS should be installed in matched pairs (for example, two 16 MB DIMMs, one in slot 1A, the other in slot 1B). Nonparity DRAM with 70-nanosecond DRAM access time or faster will work; however, if there is any nonparity DRAM installed, all server parity checking is disabled. Consult an Apple-authorized dealer or service provider for information and upgrades.

Power requirements

Apple Desktop Bus

- Maximum power draw for all ADB devices: 500 milliampere (mA)
- Apple mouse draws up to 10 mA
- Keyboard draws 25–80 mA (varies with keyboard model used)

Note: It is recommended that you connect no more than three ADB devices to the Network Server.

Expansion cards and devices

If you add a PCI expansion card, or an internal SCSI device to your server, make sure the component doesn't exceed its maximum power allowance from the different voltage sources. Note that no single PCI card should exceed the 25 watt limit of the PCI Revision 2.1 specification. Follow these guidelines.

Network Server	Voltage	Current	Total power
500 model	+3.3 V	10.0 A	Not to exceed 50.0 watts in any combination
	+5 V	10.0 A	
	+12 V	2.0 A	
700 model	+3.3 V	18.0 A	Not to exceed 90.0 watts in any combination
	+5 V	18.0 A	
	+12 V	2.0 A	

For SCSI devices, the average (thermal) power consumption per drive bay is 1.1 amps at +5 volts and 1.3 amps at +12 volts. Apple reccomends that drives be configured for spin-up on command or delay.

Size and weight

Weight	Height	Width	Depth
Main unit			
40 – 44kg*	622 mm	419 mm	257 mm
84 – 92 lbs.*	24.5 in.	16.5 in.	18 in.
Mouse			
0.10 kg	33 mm	61.7 mm	107.3 mm
4 oz.	1.3 in.	2.4 in.	4.2 in.

*Exact weight varies depending on number and type of internal SCSI devices installed.

Environment

Ambient 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

- With a DAT drive: 20% to 80% (noncondensing)

- Without a DAT drive: 5% to 95% (noncondensing)

Altitude

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

Appendix C   Configuring the SCSI ID Cable

When you install a hard disk in a drive tray, the way you connect the SCSI ID cable to the drive depends on which type of drive you're installing. This Appendix describes how to connect the SCSI ID cable for the 2 gigabyte (GB) and 4 GB IBM and Seagate hard drives, which are provided by Apple for the Network Server. If you install a Quantum drive or other drive with an active high LED signal, you need to rewire the SCSI cable; that procedure is described also.

Connecting the SCSI ID cable for IBM and Seagate drives (2 GB and 4 GB)

The SCSI ID cable connects to the back of the drive tray as shown in Chapter 2, in the section "Installing Drives Not From Kits in their Front Drive Bays," step 6. The other end of the cable, which connects to the drive, has two parts: a four-pin connector and a six-pin connector. Check which kind of drive you have, then connect the cable to the drive according to the applicable diagram. If you have a Quantum drive or other drive with an active high LED signal, change the cable wiring as described in the next section, then connect it as shown here.

● Indicates wire
○ Indicates open connector
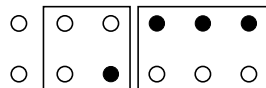
IBM 2 GB and 4 GB and
Quantum or other drives
with active high LED signal
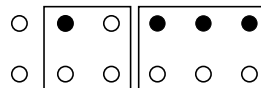
Seagate 2 GB and 4 GB

Rewiring the SCSI ID cable for Quantum drives and drives with active high LED

To install a Quantum drive or other drive with an active high light-emitting diode (LED), you need to remove the wire that connects to pin 3 on the drive tray connector, then insert the wire at pin 1.
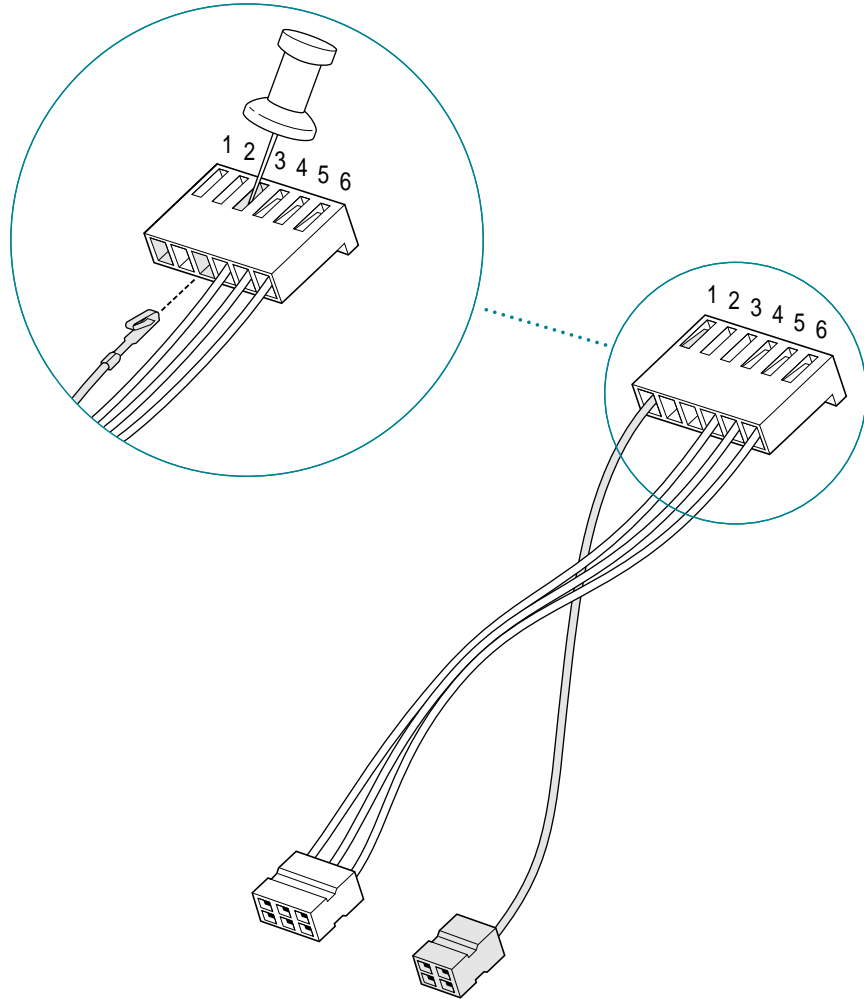
After you rewire the SCSI ID cable, see the diagram on the previous page to connect the cable to the drive.

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