

## *FRU Replacement*

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This chapter explains how to remove defective FRUs and install new ones. Part numbers for the FRUs are given in Appendix B. The following units are field-replaceable:

- Main logic board
- Power supply
- Diskette drive
- Hard disk drives
- Single Inline Memory Modules (SIMMs)
- SBus boards
- Speaker assembly
- Video monitor
- Keyboard
- Mouse, mouse pad, and cable
- Latch button assemblies
- LED light pipe

In addition, the following cables are field-replaceable:

- Diskette drive data cable
- Hard disk drive data cable
- Video cable
- AC power cable for the system unit
- AC power cable for the video monitor
- Audio cable
- Keyboard cables
- Serial port adapter cable

How to replace FRUs in the Desktop Storage Pack and in the External Storage Module are not covered in this manual.

## *Before You Begin*

Before you replace FRUs, make sure you have done the following:

- Halted your system
- Verified that you have the proper tools
- Removed the expansion units (if any)
- Opened the system unit
- Attached a wrist strap

Chapter 3 describes these instructions.

## *Removing and Replacing FRUs*

This section describes how to remove and replace FRUs. Please read through the entire set of instructions before removing and replacing a FRU.



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**Caution** – Make sure your system is shut off. The green LED should not be lit and the fan in the power supply should not be running. Do not disconnect the power cord from the system unit's power outlet or from the wall socket. This connection provides the ground path necessary to safely remove and install the printed circuit boards and components.

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## *FRU Identification*

Before you attempt to replace or install a new board or module, make sure that you have the right unit. Figure 4-1 shows a top view of the open system unit. Part identification is printed on the part being replaced. Part Numbers are presented in Appendix B.



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**Caution** – Printed circuit boards and cards are made of delicate electronic components that are extremely sensitive to static electricity. Ordinary amounts of static from your clothes or work environment can destroy them.

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**Caution** – Handle cards only by the non-conducting edges. Do not touch the components themselves or any metal parts. Wear a grounding (wrist) strap when handling the cards. Attach the wrist strap to the metal casing of the power supply at the rear of the unit top.

Do not disconnect the power cord from the system unit's power outlet or from the wall socket. This connection provides the ground path necessary to safely remove and install the printed circuit cards and components. In addition, keep the internal power supply cable connected to the main logic board.

Make sure that the system unit's power is turned OFF by checking to make sure that the green light-emitting diode (LED) at the front of the chassis is not lit and the fan in the power supply is not running.

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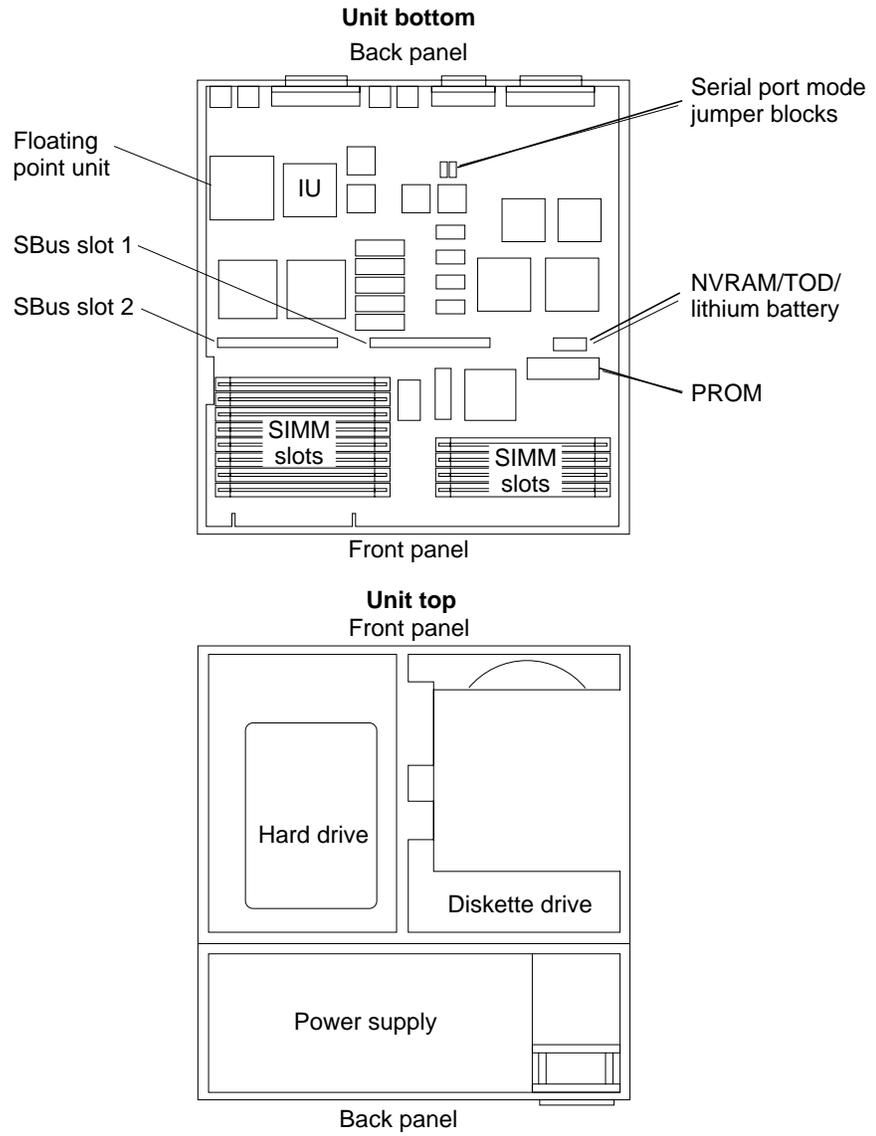


Figure 4-1 Top View of the Unit

## *Single Inline Memory Modules (SIMMs)*

The system comes equipped with eight megabytes of Dynamic Random Access Memory (DRAM) in eight 1-megabyte SIMMs. Physically, DRAM chips are grouped together in Single Inline Memory Modules (SIMMs). Each 1-megabyte SIMM plugs into one of the 12 SIMM slots on the system unit's main logic board. Additional SIMMs may be added to the system unit as needed, up to a maximum of 12 SIMMs. In addition, 4-megabyte SIMMs may be substituted for a maximum of 48 megabytes of Dynamic Random Access Memory. Although 1-megabyte SIMMs may be mixed with 4-megabyte SIMMs, each slot group (see Figure 4-4) must contain the same kind of SIMMs.

If you are installing additional memory, you should have an upgrade kit that contains additional SIMMs in sets of four. Memory must be added in increments of four SIMMs, either four 1-megabyte SIMMs or four 4-megabyte SIMMs.

### *Determining Faulty SIMM Locations*

Sun OS, the Sundiagnostic System Exerciser, Sun Diagnostic Executive, and POST diagnostics can report memory errors encountered during program execution. Memory error messages on the system monitor display usually include a physical memory address of the error.

Depending on the diagnostic program you are running and the Sun OS release loaded, a SIMM location number ("U" number) may be displayed. If the location number is present in the error message, follow the instructions later in this chapter for removing the defective SIMM at that location and installing a replacement (see Figure 4-4 for SIMM location numbers).

If no location number is displayed but a physical memory address is shown, refer to the following table to locate the SIMM group in which the defective SIMM is installed.

For example, if an error is detected at physical memory address 12fe958, the defective SIMM is in slot group 2. If you also know the failing byte at that address, the table shows the "U" number location of the failing SIMM. Follow the instructions later in this chapter for removing the defective SIMM at that location and installing a replacement (see Figure 4-4 for SIMM location numbers).

SIMM Slot Group	Physical Memory Address Ranges		SIMM Location	
	with 1 MB SIMMs	with 4MB SIMMs	Byte	SIMM #
1	00000 through 3ffffff	00000 through ffffff	3	U0585
			2	U0586
			1	U0587
			0	U0588
2	1000000 through 13ffffff	1000000 through 1ffffff	3	U0589
			2	U0590
			1	U0591
			0	U0584
3	2000000 through 23ffffff	2000000 through 2ffffff	3	U0677
			2	U0683
			1	U0676
			0	U0678

Memory Word

Byte 0	Byte 1	Byte 2	Byte 3
Bits 31 to 24	Bits 23 to 16	Bits 15 to 8	Bits 7 to 0
Most significant			Least Significant

A memory word is 4 bytes (32 bits) long. Byte 3 is the least significant byte and Byte 0 is the most significant.



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**Caution** – SIMMs are made of delicate electronic components that are extremely sensitive to static electricity. Ordinary amounts of static from your clothes or work environment can destroy the modules.

Handle boards only by the edges. Do not touch components themselves or any metal parts. Always wear a grounding strap when handling the modules. To replace SIMMs (or any of the components in the unit bottom) attach the wrist strap to the metal casing of the power supply in the unit top.

Do not disconnect the power cord from the system unit's power outlet or from the wall socket. This connection provides the ground path necessary to safely remove and install the modules. In addition, be sure the internal power cable from the power supply in the unit top is plugged into the main logic board to complete the ground.

Make sure that the system unit's power is turned OFF by checking to make sure that the green light-emitting diode (LED) at the front of the chassis is not lit and that the fan in the power supply is not running.

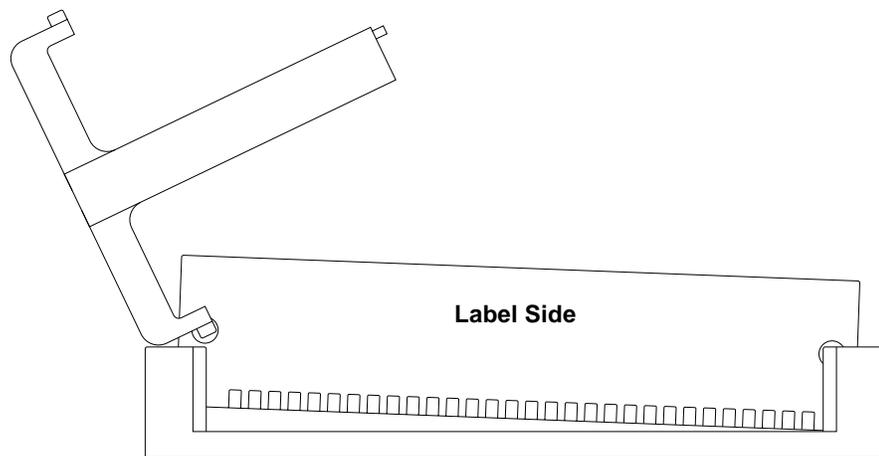
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## *Removing a SIMM*

To remove a SIMM, follow these steps:

- 1. See and follow Chapter 3 instructions on halting your system, tools needed, removing expansion units, opening the system unit, and attaching a wrist strap.**
- 2. Make sure that the system unit's power is turned off by checking to make sure that the green LED at the front of the chassis is not lit and that the fan in the power supply is not running.**  
Do not disconnect the power cord from the system unit or from the wall outlet.

3. **Locate the SIMM slots on the main logic board (see Figure 4-1).**
4. **Orient the board with the label side of the SIMMs facing you.**
5. **Use the tool to lift the edge of the SIMM closest to the center of the main logic board first.**
6. **Position the tool with the crossbar section vertical to the SIMM.**



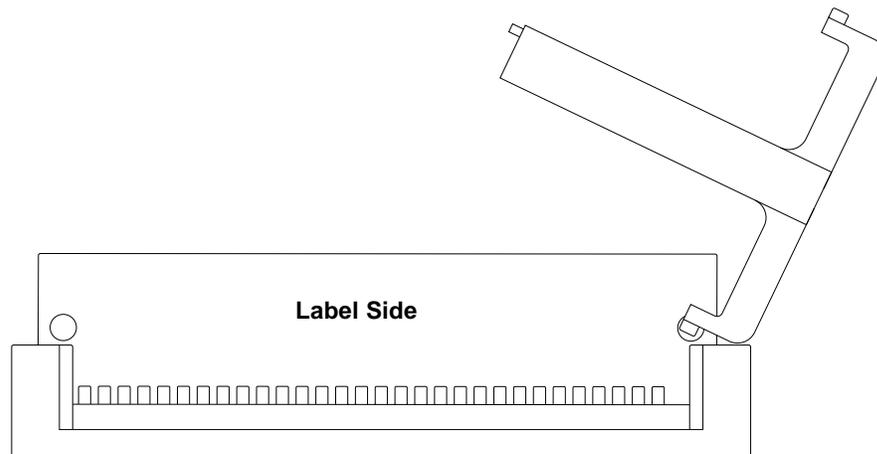
*Figure 4-2* Inserting the SIMM extraction tool on the left side

7. **Insert the hook on the end of the crossbar into the left edge of the label side of the SIMM.**
8. **Rotate the tool away from the socket to lift the SIMM.**

**9. Insert the hook on the other end of the crossbar into the hole on the right edge of the SIMM.**

**10. Rotate the tool away from the socket to lift the SIMM.**

You will hear a click when the SIMM has disengaged from the socket.



*Figure 4-3* Inserting the SIMM Extraction Tool on the right side

**11. Remove the tool.**

**12. Holding the SIMM by the left and right edges, continue to lift the SIMM until it is free of the socket.**

Place the SIMM on an antistatic mat.

## Installing SIMMs

To install a SIMM, follow these steps:

If you have removed a SIMM because it was defective (causing parity errors, and so on), install the replacement SIMM into the same slot from which the defective one was removed.

You must install additional SIMMs in unoccupied slots so that the slots are filled by groups: 0-3, 4-7, and 8-B (see Figure 4-4). Slots 0-3 (Group 1) and 8-B (Group 3) should be filled first.

For example, slots 0-3 and 8-B are already filled. Slots 4-7 do not have SIMMs installed (factory configuration). You want to add four SIMMs. You must install the additional SIMMs in slots 4-7.

In another example, you want to replace the eight 1-megabyte SIMMs with eight 4-megabyte SIMMs and retain four 1-megabyte SIMMs (for a total of 36 megabytes). Replace the 1-megabyte SIMMs in Group 1 and Group 3 and plug four of the 1-megabyte SIMMs into the remaining Group 2 slots. **Do not mix 1-megabyte SIMMs and 4-megabyte SIMMs in the same group.**

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**Note** – In a system with a mixture of 4-megabyte SIMM groups and 1-megabyte SIMM groups, Group 1 must be filled with 4-megabyte SIMMs.

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**Caution** – SIMMs are made of delicate electronic components that are extremely sensitive to static electricity. Ordinary amounts of static from your clothes or work environment can destroy the modules.

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Do not remove the SIMMs from the antistatic envelope until told to do so. Handle the modules only by the edges. Do not touch components themselves or any metal parts. Always wear a grounding strap when handling the modules.

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1. See and follow instructions in Chapter 3 on halting your system, tools needed, removing expansion units, opening the system unit, and attaching a wrist strap.
2. Make sure that the system unit's power is turned off by checking to make sure that the green LED at the front of the chassis is not lit and that the fan in the power supply is not running.  
Do not disconnect the power cord from the system unit or from the wall outlet. Make sure the internal power cable from the power supply in the unit top is connected to the main logic board to complete the ground.
3. Locate the SIMM slots on the main logic board (see Figure 4-1).

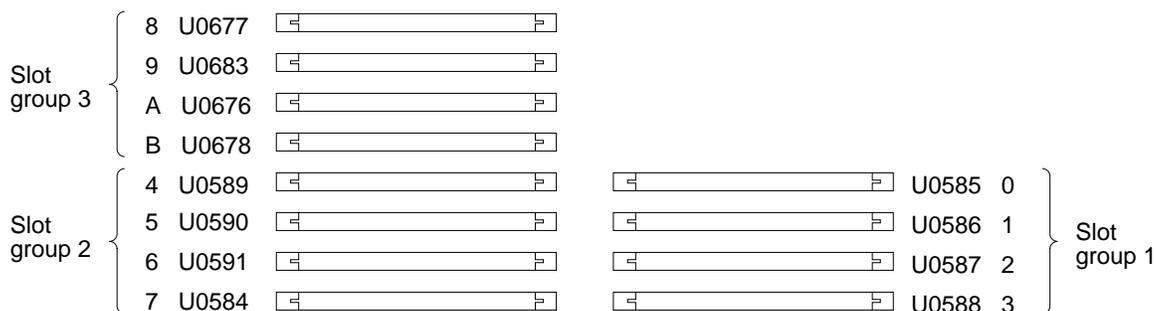
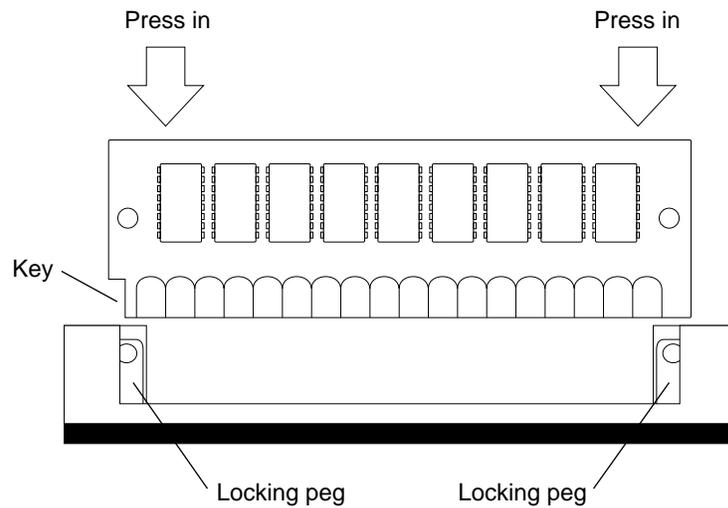


Figure 4-4 SIMM Slots

4. Place an antistatic mat, shiny side up, next to the system unit.
5. Make sure the wrist strap is securely attached to your wrist and to the metal casing of the power supply in the unit top.  
See Chapter 3 for instructions describing how to attach a wrist strap.
6. Open the antistatic envelope and take out the SIMMs.
7. Place the SIMMs on the antistatic mat.
8. Holding a SIMM at its edges, insert it into the plastic guides.  
The SIMM should rest loosely in the slot. The SIMMs are keyed to allow installation in only one direction. The SIMM is oriented correctly when the DRAM components on the SIMM face the back panel of the system. (The SIMM shown in the following figure is a one megabyte SIMM.)

9. Place your thumbs on opposite corners of the SIMM and press firmly until the SIMM snaps into place.



10. Close the system unit. See "Closing the System Unit" near the end of this chapter.
11. Turn the system unit's power on and check for proper operation of the system unit and the installed SIMMs.  
See "How to Turn the Power Back On" at the end of this chapter.

## *SBus Cards*

The system can be equipped with a variety of optional printed circuit cards. The following are examples of cards that plug into the SBus slots on the system's main logic board.

- **Color Frame Buffer Card**  
This card controls the video output from the system unit to a color or grayscale monitor.
- **Analog Monochrome Frame Buffer Card**  
This card controls the video output from the system unit to a 19-inch monochrome monitor.
- **Ethernet Card**  
This card provides you with an extra Ethernet port. The Ethernet card is used in applications in which your SPARCstation IPC acts as a gateway between two physically distinct Ethernet networks.

This card has two connectors to connect either the standard (thick) Ethernet or the thin Ethernet.

SBus cards may be installed in either SBus slot.

## *Removing SBus Cards*

To remove an SBus card from the system unit:

- 1. See and follow the instructions in Chapter 3 on halting your system, tools needed, removing expansion units, opening the system unit, and attaching a wrist strap.**
- 2. Make sure that the system unit's power is turned off by checking to make sure that the green LED at the front of the chassis is not lit and that the fan in the power supply is not running.**

The power cord should be attached to the system unit and to the wall outlet. The internal power cable to the power supply in the unit top should be connected to the main logic board to complete the ground.

3. **Locate the SBus card you want to remove.**
4. **Remove the external connectors attached to the SBus card.**
5. **Put your index fingers or thumbs underneath the corners of the SBus card where it is plugged into the slot.**  
Pull up on the card (see Figure 4-5).



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**Caution** - The plastic SBus card retainer is *not* a handle. Pulling on the SBus card retainer can cause it to break.

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This action releases the SBus card from the SBus slot.

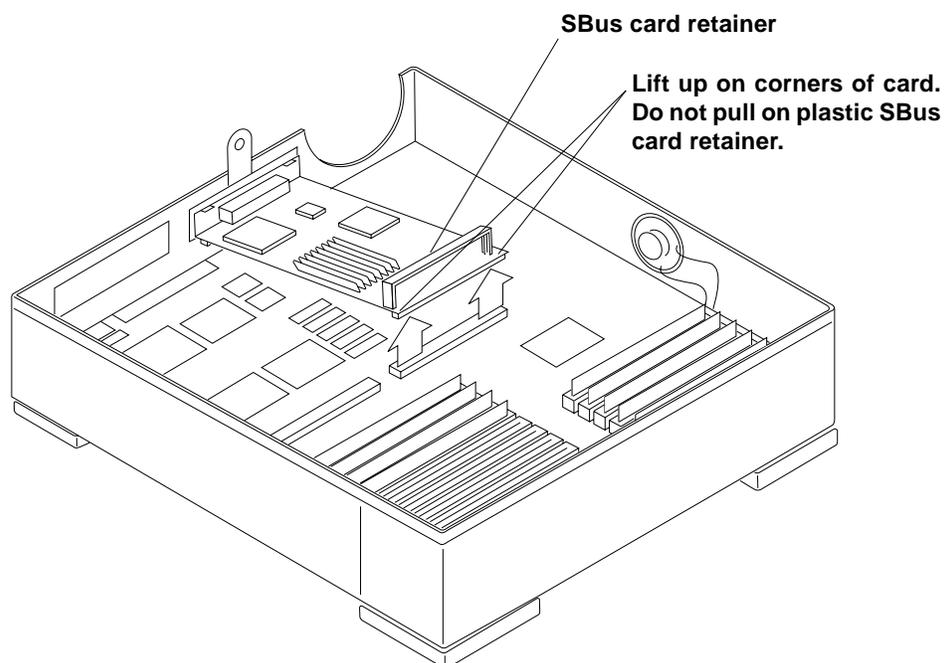
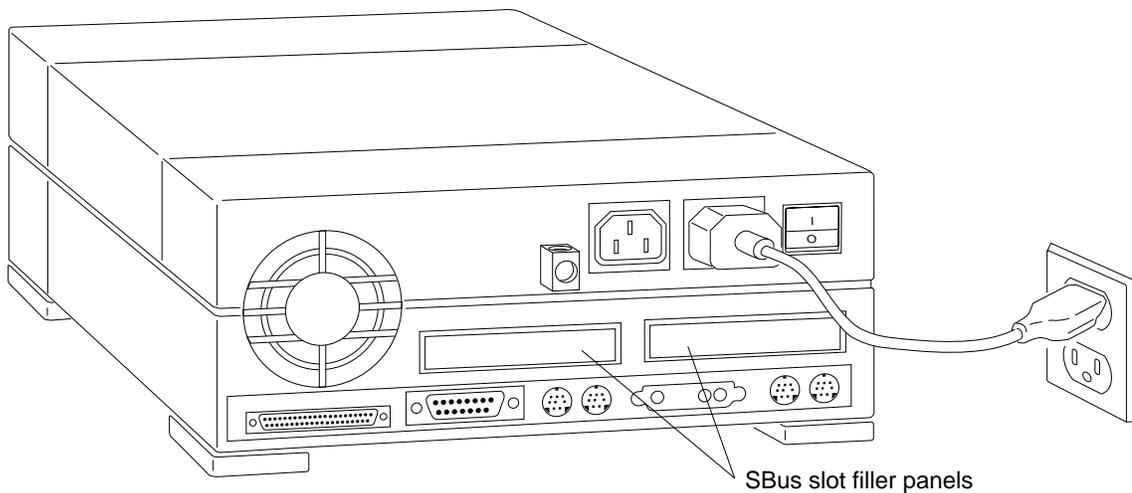


Figure 4-5 Removing an SBus Card

## *Installing SBus Cards*

To install an SBus card in the system unit:

- 1. See and follow the instructions in Chapter 3 on halting your system, tools needed, removing expansion units, opening the system unit, and attaching a wrist strap.**
- 2. Make sure that the system unit's power is turned off by checking to make sure that the green LED at the front of the chassis is not lit and that the fan in the power supply is not running.**  
The power cord should be attached to the system unit and to the wall outlet. The internal power cable to the power supply should remain connected to the main logic board to complete the ground.
- 3. Remove the sheetmetal SBus slot filler panel(s) for the desired slot(s) from the inner surface of the back panel of the system unit.**  
If you are replacing a defective SBus card, of course, the filler panel will not be present.



**4. Slide the SBus card at an angle into the back panel of the system unit (see the Figure 4-6).**

The mounting slots are above the rectangular opening for the connector in the back panel.

Make sure that the mounting plate on the SBus card hooks upward into the holes at the back panel of the system unit.



**Caution** – When replacing the SBus card, do not press down on the SBus card retainer. The SBus card retainer is *not* a handle. Pressing down on it may break the retainer.

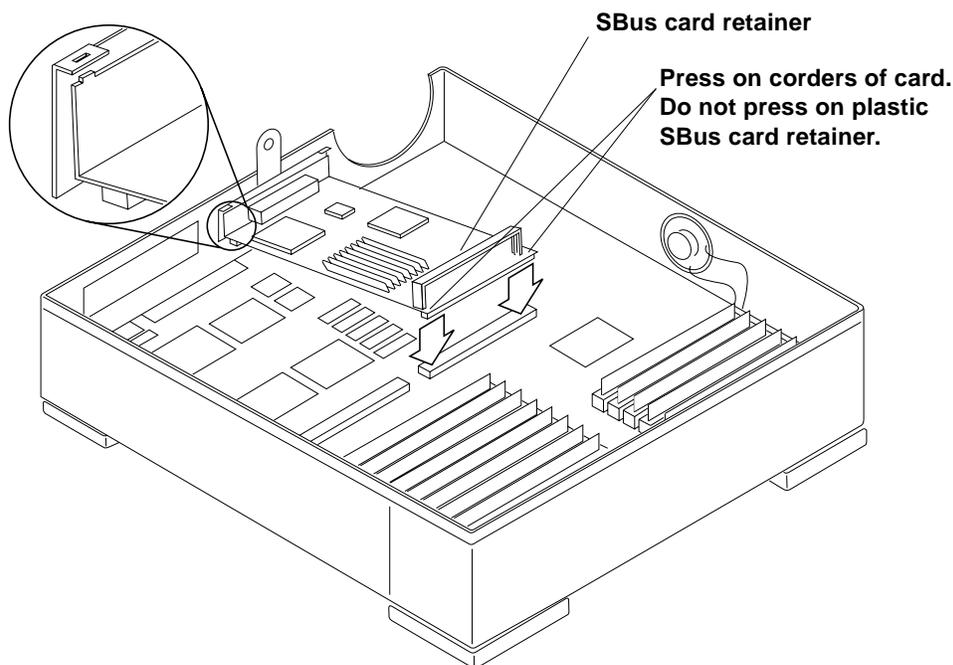


Figure 4-6 Installing an SBus Card

**5. Push the SBus card against the back panel.**

Align the plug with the socket of the SBus slot and gently press the plug into the socket by pressing with your fingers on the corners of the SBus card.



**Caution** – Using excessive force may bend or damage the pins.

**6. Close the system unit.**

To do this, see “Closing the System Unit” near the end of this chapter.

**7. Replace the external cables to the SBus cards.**

**8. Turn the system unit’s power on, and check for proper operation of the system unit and the installed SBus card.**

See “How to Turn the Power Back On” at the end of this chapter.

## *Disk Drive Bracket*

The disk drive bracket resides in the top part of the system unit in front of the power supply (see Figure 4-7). It houses the diskette drive supplied with the unit and has space for an optional hard disk drive. You *must* remove the disk drive mounting bracket before removing either the diskette drive or hard drive. Refer to Figures 4-7, 4-8, and 4-9 for the location of the disk drive mounting bracket and the screw securing it to the system.

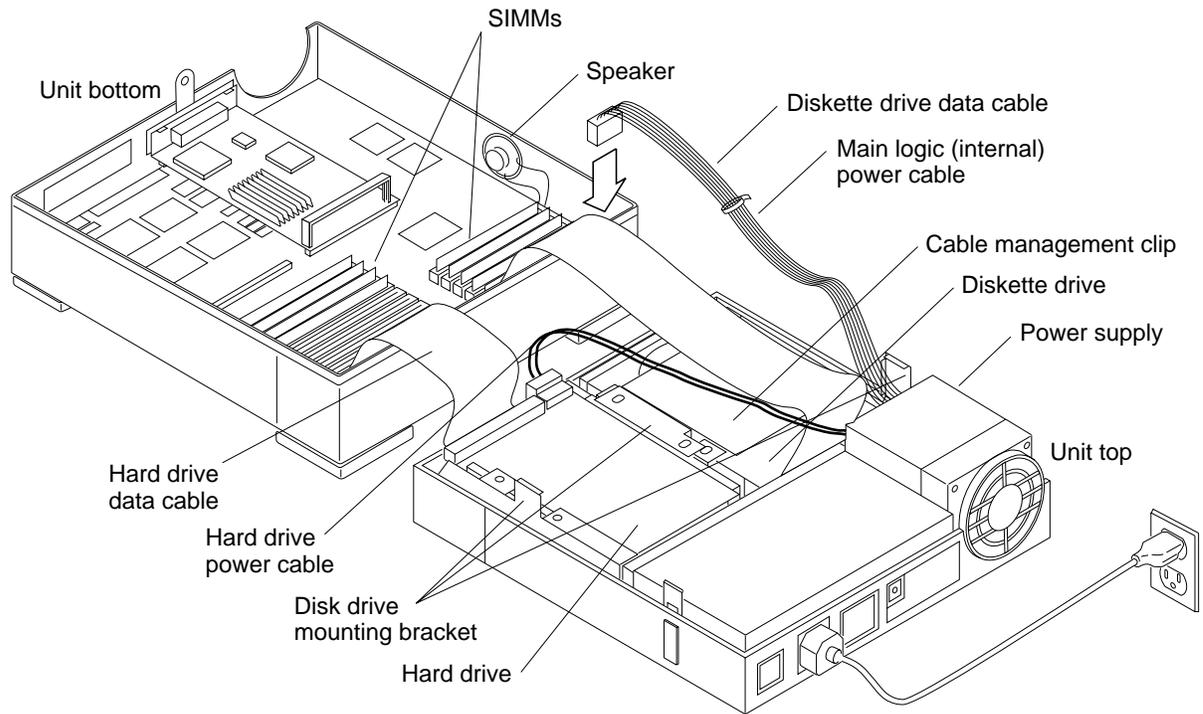


Figure 4-7 Open View of the Unit

## Removing the Disk Drive Mounting Bracket

To remove the disk drive mounting bracket, follow these steps:

- 1. See and follow the instructions in Chapter 3 on halting your system, tools needed, removing expansion units, opening the system unit, and attaching a wrist strap.**

When removing the disk drive bracket, the wrist strap should be attached to the metal casing of the power supply.

- 2. Make sure that the system unit's power is turned off by checking to make sure that the green LED at the front of the chassis is not lit and that the fan in the power supply is not running.**

The power cord should be attached to the system unit and to the wall outlet.

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3. **Place an antistatic mat, shiny side up, near the unit.**
  4. **Detach the cables from the cable securing guides on the cable management clip over the diskette drive (see Figure 4-8).**
  5. **Disconnect the power cable leading from the hard disk (if a hard disk is present).**
  6. **Disconnect the internal power cable leading from the main logic board.**  
Press the clip on the plug to release it from the main logic board.
  7. **Disconnect the diskette drive data cable and the hard disk data cable (if a hard disk is present) from their connectors on the main logic board. (See Figures 4-7 and 4-10).**

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**Note** – When pulling up on pull tabs, brace the main logic board near the socket to minimize board flex.

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8. **Back off the captive Phillips head screw in the center rear of the bracket (closest to the power supply). See Figures 4-8 and 4-9.**
9. **Tilt the bracket toward the front of the unit and disconnect the power cable from the diskette drive.**
10. **Lift the bracket out of the system unit and place it on an antistatic mat.**  
The data cables can remain connected to the hard drives.

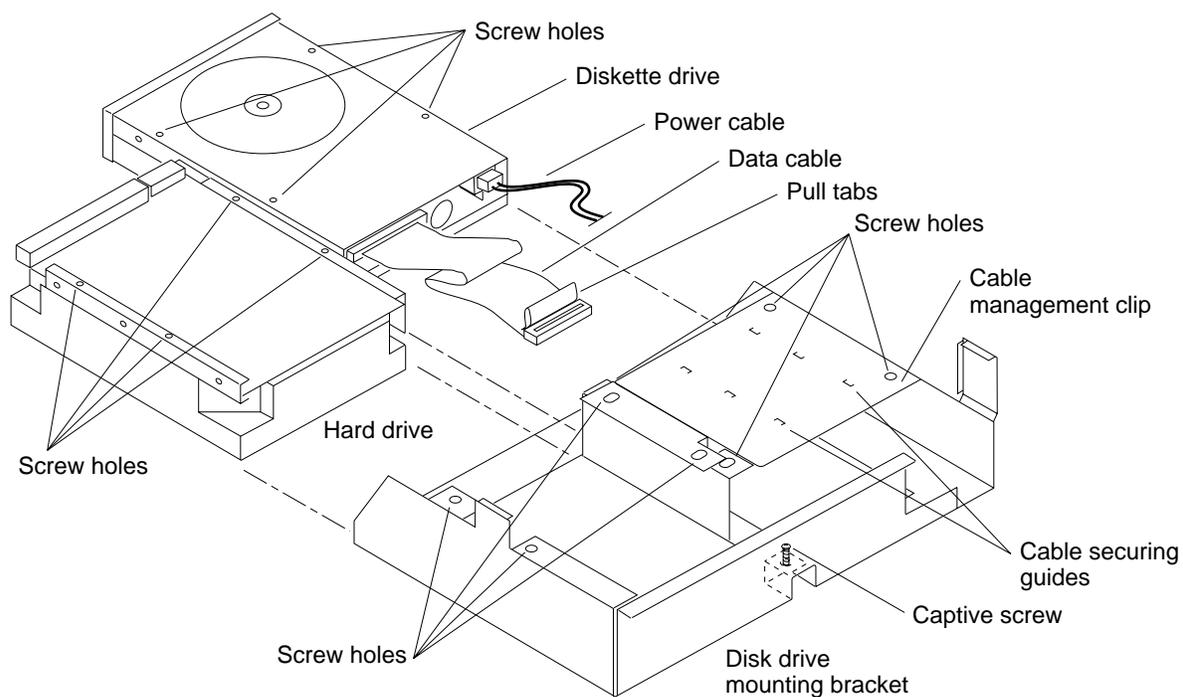


Figure 4-8 Disk Drive Mounting Bracket

### *Replacing the Disk Drive Mounting Bracket*

To replace the disk drive mounting bracket follow these steps:

1. **Before setting the disk drive bracket flat in the unit top, connect the power and data cables to the diskette drive and the data cable to the hard drive, if one is present.**
2. **Tilt the disk drive bracket toward the front of the unit. Gently lower the bracket into position in front of the power supply. (See Figure 4-10).**

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**Note** – The disk drive bracket must engage a securing ridge at the inside front of the unit top. If installed incorrectly, you will not be able to insert diskettes into the diskette drive.

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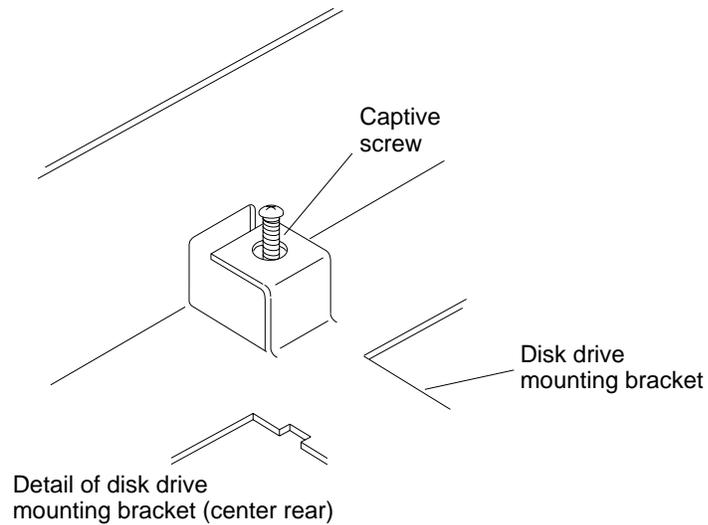


Figure 4-9 Detail of Disk Drive Mounting Bracket

3. **Tighten the captive Phillips head screw at the center rear of the bracket it to secure the bracket to the chassis.**
4. **If a hard drive is present, connect the power cable to it.**
5. **Secure the cables to the cable management clip over the diskette drive (see Figure 4-8 for the location of the clip and the cable securing guides).**
6. **Connect the diskette drive data cable and the hard disk data cable (if a hard disk is present) to their respective connectors on the main logic board. (See Figure 4-15).**
7. **Connect the internal power cable to its connection on the main logic board.**
8. **Close the system unit.**  
To do this, see “Closing the System Unit” near the end of Chapter 4.

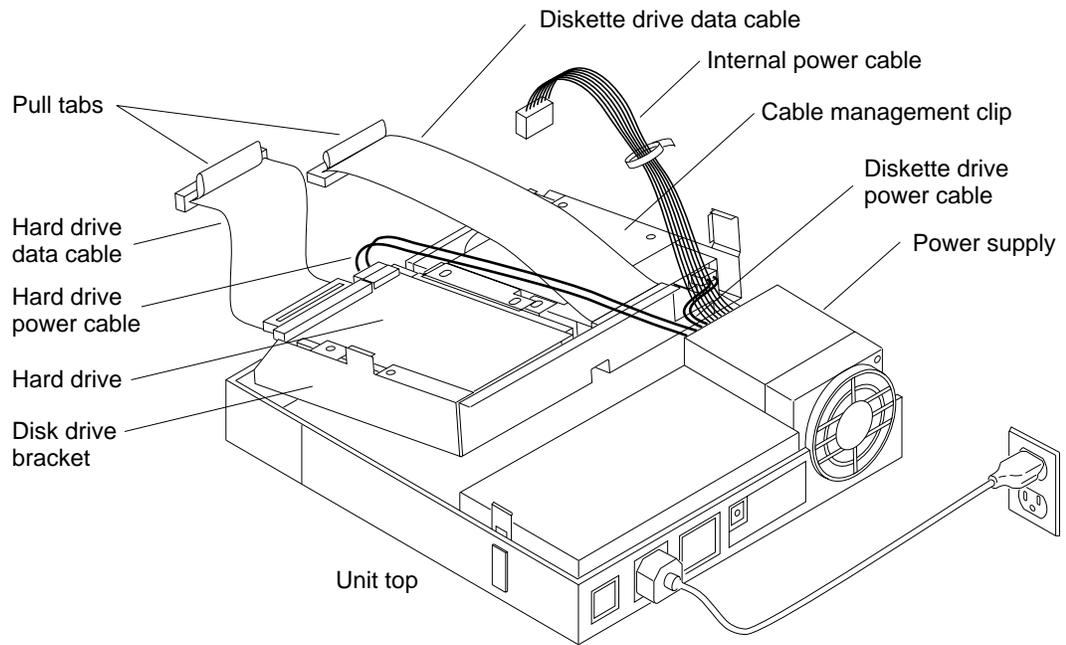


Figure 4-10 Removing and Replacing the Disk Drive Mounting Bracket

## Hard Disk Drive

One 3 1/2-inch half-height hard disk drive can be installed in the top section of the system chassis. A 50-pin SCSI data cable and a 4-pin power cable connect to the rear of the drive. The hard disk drive is mounted beside the diskette drive in the system top.



**Caution** – The hard disk drive contains electronic components that are extremely sensitive to static electricity. Ordinary amounts of static from your clothes or work environment can destroy the components.

Do not touch the components themselves or any metal parts. Wear a grounding strap when handling the drive. See “Attaching a Wrist Strap” in Chapter 3. Attach the wrist strap to the metal casing of the power supply.

Do not disconnect the power cord from the system unit’s power outlet or from the wall outlet. This connection provides the ground path necessary to safely remove and install the hard disk drive.

Make sure that the system unit’s power is turned OFF by checking to make sure that the green light-emitting diode (LED) at the front of the chassis is not lit and that the fan in the power supply is not running.

## Removing the Hard Disk Drive

To remove a hard disk drive:

- 1. See and follow the instructions in Chapter 3 on halting your system, tools needed, removing expansion units, opening the system unit, and attaching a wrist strap.**

When working with the disk drives, attach the wrist strap to the metal casing of the power supply.

- 2. Make sure that the system unit’s power is turned off by checking to make sure that the green LED at the front of the chassis is not lit and that the fan in the power supply is not running.**

The power cord should be attached to the system unit and to the wall outlet.

**3. Follow the instructions for removing the disk drive mounting bracket earlier in this chapter.**

The power cables leading from the hard disk and the diskette drive should already be disconnected.

**4. Remove the four Phillips head screws securing the hard drive to the bracket (see Figure 4-8).**

**5. Slide the hard disk drive out of the bracket and set it on the anti-static mat.**

**6. Remove the data cable from the hard drive and set it aside for use with another drive.**

This completes the hard disk drive removal process.

### *Preparing the Hard Disk Drive*

To prepare a hard disk drive for replacement:

Before replacing a hard disk drive, you must verify that the jumpers on the drive controller board are set correctly.

To gain access to the hard drive's controller board, turn the hard driver over gently on the antistatic mat. The drive controller board and the jumpers are on the bottom.

The number of jumpers and their location on the drive's controller board depends on the drive shipped with your system. Use Figures 4-11 through 4-14 to verify the jumper settings on your hard drive.

The drive shown in Figure 4-11 has six jumpers located near the lower right corner of the drive. The jumpers are in two blocks of three jumpers, separated by an empty jumper slot (no pins).

The drive shown in Figure 4-12 has five jumpers located in one block near the lower left corner of the drive.

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**Note** – The labels for the jumpers on the drive shown in Figure 4-11 are etched onto the drive's controller board. The jumpers on the drive shown in Figure 4-12 are not labeled.

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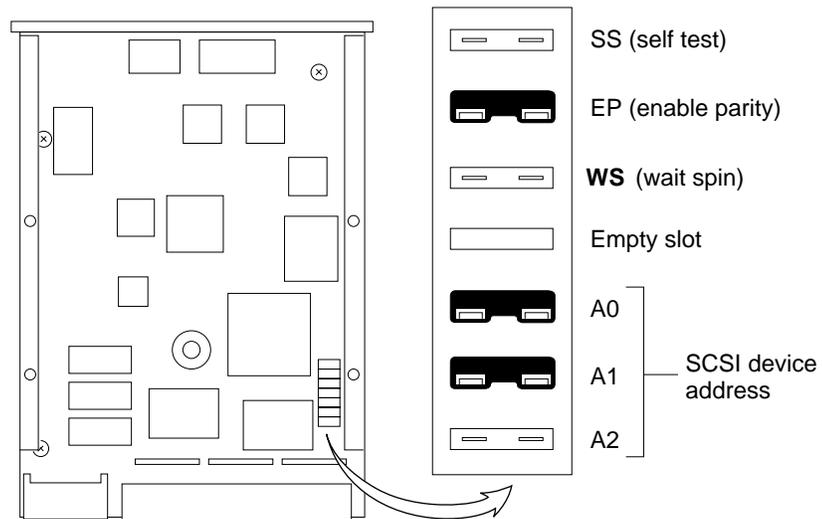


Figure 4-11 Jumper Settings for Hard Drives with Six Jumpers (settings labeled)

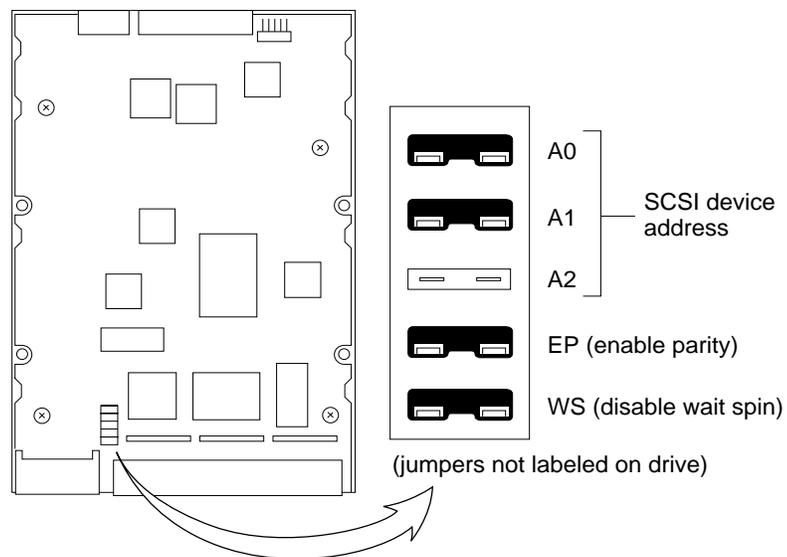


Figure 4-12 Jumper Settings for Hard Drives with Jumpers Near the Lower Left Corner (settings not labeled)

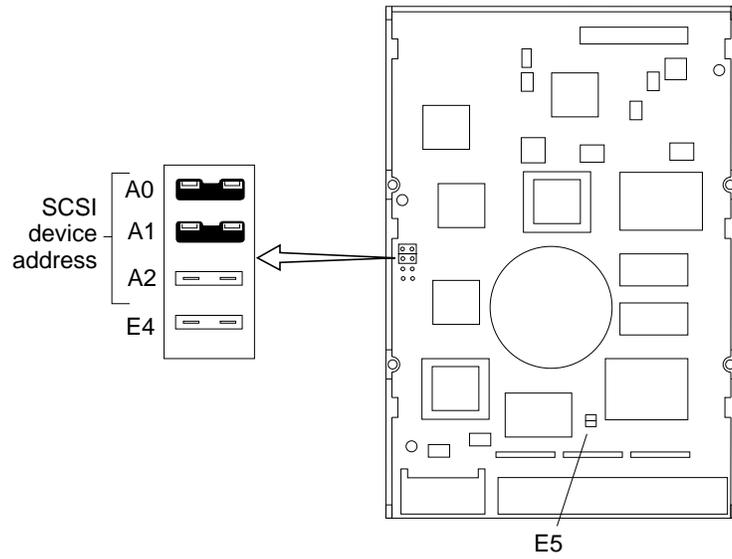


Figure 4-13 Low Profile 207 MB Drive —Jumper Settings (on the left)

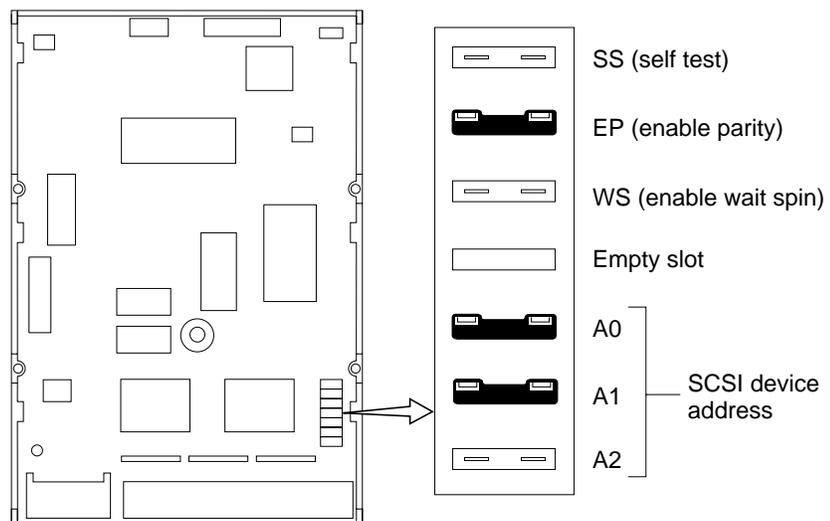


Figure 4-14 Low Profile 207 MB Hard Disk Drive—Jumper Settings (on the right)

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## *Installing the Hard Disk Drive*

To install a hard disk drive:

- 1. Make sure you have followed the previous procedure on preparing the hard disk drive for replacement.**
- 2. If you have not already done so, remove the disk drive mounting bracket as instructed earlier in this appendix.**
- 3. Slide the hard disk drive into the bracket with the power and data cable connections facing the front of the unit.**
- 4. Align the four screw holes in the hard drive with those in the bracket. Insert the screws and tighten them with a Phillips head screwdriver.**
- 5. Connect the data cable leading to the hard drive.**
- 6. Follow the directions earlier in the appendix for replacing the disk drive mounting bracket.**
- 7. If you have not already reconnected the data cable to the main logic board, do so now.**
- 8. Close the system unit.**  
See “Closing the System Unit” near the end of Chapter 4.
- 1. Turn the system unit’s power on, and check for proper operation of the system unit and the installed hard disk drive.**  
See “How to Turn the Power Back On” in Chapter 4.

## Diskette Drive

The diskette drive is in the unit top at the front right side (see Figure 4-8). A 34-pin data cable and a 4-pin power cable connect to the rear of the drive. Four Phillips head screws attach the diskette drive to the mounting bracket. The drive and the mounting bracket (described above) are secured to the chassis by a single captive Phillips head screw at the center rear of the bracket. See Figures 4-8 and 4-9.



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**Caution** – The diskette drive contains electronic components that are extremely sensitive to static electricity. Ordinary amounts of static from your clothes or work environment can destroy the components

Do not touch the components themselves or any metal parts. Wear a grounding strap attached to the metal casing of the power supply when handling the drive. See “Attaching a Wrist Strap” in Chapter 3.

**Do not disconnect the power cord from the system unit’s power outlet or from the wall socket. This connection provides the ground path necessary to safely remove and install the diskette drive.**

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## Removing the Diskette Drive

To remove the diskette drive:

1. See and follow the instructions earlier in this chapter for removing the disk drive mounting bracket.
2. Remove the four Phillips head screws holding the diskette drive to the disk drive mounting bracket.  
(See Figure 4-8.)
3. Slide the diskette drive out of the bracket as shown in Figure 4-8 and place it on an antistatic mat.
4. Remove the data cable from the diskette drive and set it aside for use with the replacement drive.

This completes the diskette drive removal process.

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## *Replacing the Diskette Drive*

To replace the diskette drive:

- 1. Follow the instructions earlier in the chapter for removing the disk drive bracket if you have not already done so.**
- 2. Remove the defective diskette drive as instructed earlier in this chapter.**
- 3. Connect the data cable to the replacement diskette drive.**
- 4. Thread the data cable under the cable management clip so that it can be folded back over the clip for connection to the main logic board.**
- 5. Slide the replacement drive under the cable management clip into the disk drive mounting bracket.**
- 6. Align the four screw holes in the mounting bracket with the holes in the diskette drive, insert the screws, and fasten the diskette drive securely in the bracket.**
- 7. Replace the disk drive mounting bracket in the unit top.**  
See “Replacing the Disk Drive Mounting Bracket” earlier in this chapter.
- 8. Secure the cables in the cable management clip over the diskette drive.**
- 9. Close the system unit.**  
To do this, see “Closing the System Unit” near the end of in this chapter.
- 10. Turn the system unit’s power on, and check for proper operation of the system unit and the installed diskette drive.**  
See “How to Turn the Power Back On” at the end of this chapter.

## Power Supply

The power supply is a self-contained metal assembly in the system unit top just behind the disk drive mounting bracket (see Figures 4-1 and 4-7).

The power supply is held in place by four hooks in the unit top that mate with four holes in the power supply, and a PEM screw. The PEM screw is inserted through the rear of the system unit after it engages the lock block on the outside of the unit.

A 12-pin power cable connects the power supply to the main logic board just in front of the SIMM slots in the right front corner. (See Figure 4-17). Four-pin power cables connect the diskette drive and hard drive to the power supply for DC power.

The power supply is auto sensing and will operate with input voltage 100-120 Vac or 200-240 Vac without adjustment. If the power supply fails to operate, replace it.



---

**Warning** – Make sure that the system unit is *unplugged* from the AC power outlet and the power switch is in the off position before you remove, replace, or install the power supply in the system unit. Failure to take this precaution may result in severe electrical shock.

---

Figure 4-15 shows how to remove and replace the power supply.

### Removing the Power Supply

To remove the power supply follow these steps:

- 1. See and follow the instructions in Chapter 3 on halting your system, tools needed, removing expansion units, opening the system unit, and attaching a wrist strap.**
- 2. Make sure that the system unit's power is turned off by checking to make sure that the green LED at the front of the chassis is not lit and that the fan in the power supply is not running.**

The power cord should **NOT** be attached to the system unit and to the wall outlet. The monitor power cable should also be disconnected from the system unit.

**3. The disk drive mounting bracket must be removed before the power supply can be lifted out of the system unit.**

Follow the directions earlier in this chapter for removing the disk drive mounting bracket.

**4. Disconnect the internal power cable from the 12-pin connector on the main logic board.**

**5. Grasp the power supply firmly and slide it about 1/4 inch toward the front of the unit to disengage it from the four hooks in the bottom of the system unit.**

Lift the power supply straight up and out. If the power supply does not lift easily, be sure that it has cleared the hooks.

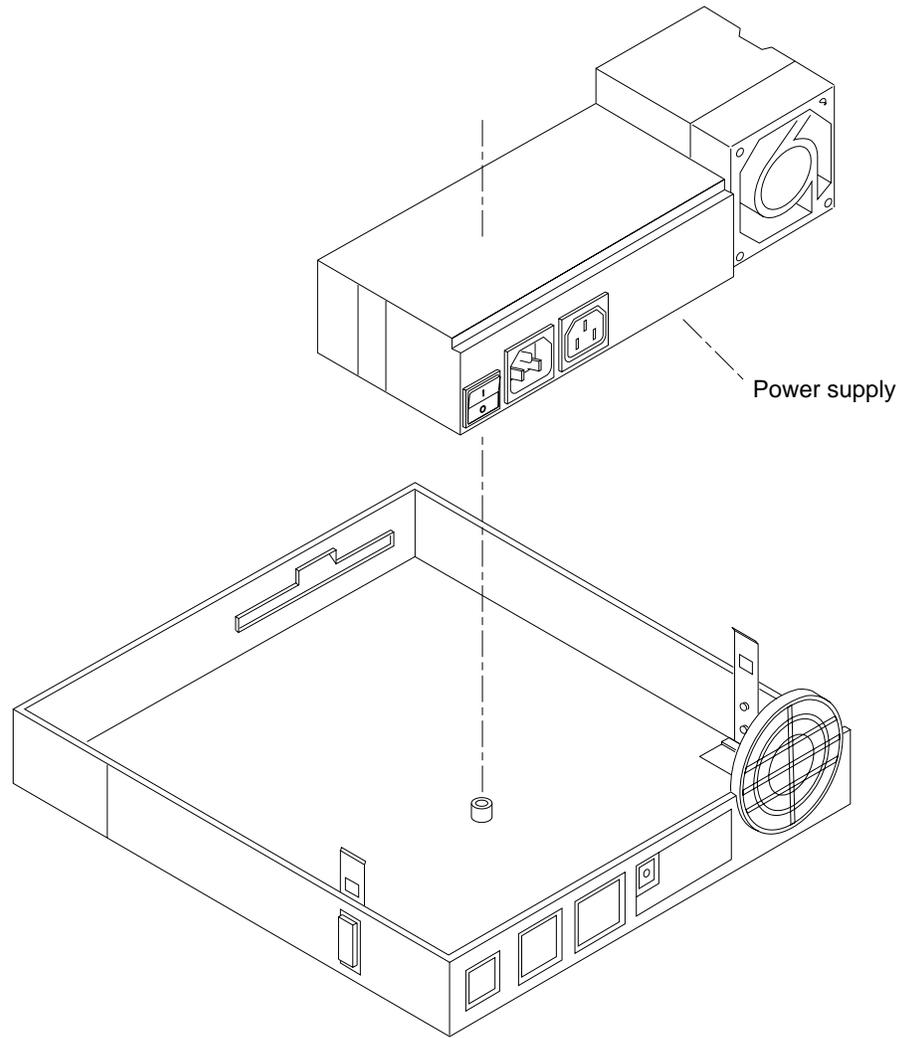


Figure 4-15 Removing and Replacing the Power Supply

## *Replacing the Power Supply*

To install a new power supply follow these steps:

- 1. Make sure that the power cord is NOT attached to the system unit or to the wall outlet.**
- 2. See Figure 4-7 for the position of the power supply.**  
Align the holes in the bottom of the power supply with the hooks in the system unit top.
- 3. Lower the power supply into the unit top as shown in Figure 4-15.**
- 4. Properly position the power supply by pushing it firmly toward the rear of the unit (about 1/4 inch) until it engages with the hooks.**
- 5. Be sure the power switch is in the OFF (O) position and connect the system power cord to the AC power outlet.**  
The power cord provides the necessary ground path for the wrist strap.
- 6. Reattach the wrist strap to the metal casing of the new power supply.**
- 7. Reinstall the disk drive mounting bracket in front of the power supply.**  
To do this follow the directions for replacing the disk drive mounting bracket earlier in this chapter.
- 8. Connect the internal power cable to the white 12-pin connector on the main logic board.**  
The connector is keyed so that the power cable will fit only one way.
- 9. Close the system unit.**  
See “Closing the System Unit” near the end of this chapter.
- 10. Connect monitor power cord to the AC power outlet.**
- 11. Turn the system unit’s power on, and check for proper operation of the system unit and the newly installed power supply.**  
See “How to Turn the Power Back On” towards the end of this chapter.

- 12. If the newly installed power supply still does not work properly, a problem exists in the system unit, such as a blown component or a short circuit.**

---

**Note** – Make sure the power supply is connected to the main logic board before making any voltage measurements.

---

## *Main Logic Board*

The main logic board contains the IU, the floating point coprocessor, the boot PROM, the NVRAM, SIMMs, SBus boards, two RS423/232 ports, an Ethernet port, a SCSI port, an audio in/audio out connector, and keyboard/mouse, as well as many other ICs and 3 fuses (see Figure 4-17). See Chapter 1 for an overview of the main logic board.

In addition, a 12-pin connector terminates the power cable for the main logic board and the disk drives. The 34-line diskette drive data cable connects to the main logic board to the left of the white 12-pin connector. The 50-line SCSI data cable power cable connects along the front of the main logic board to the left of the diskette data cable connections.

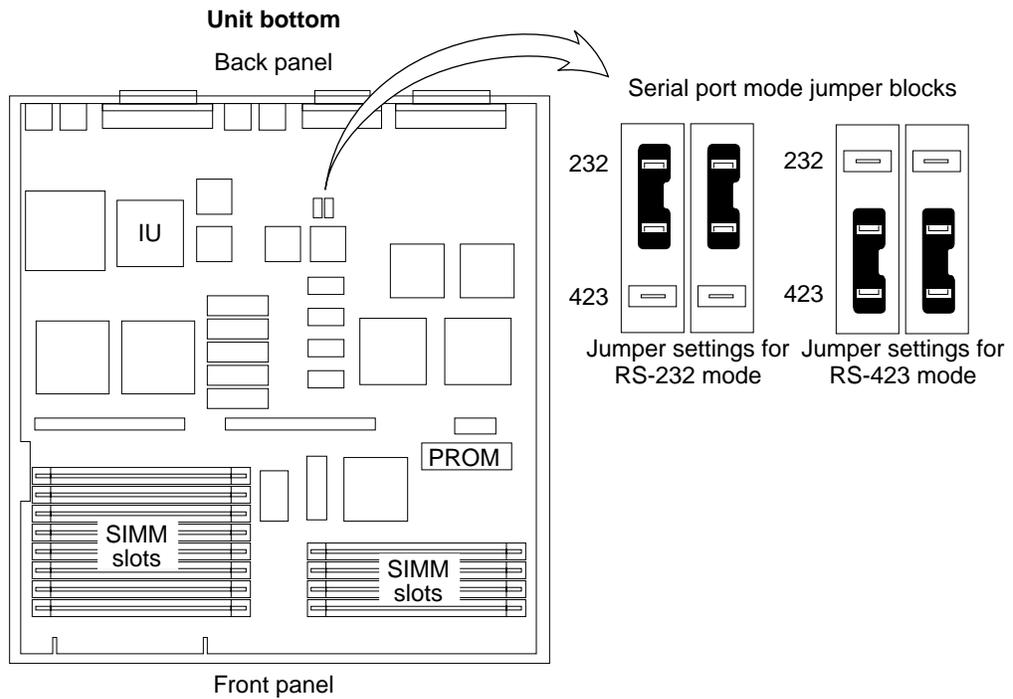


Figure 4-16 Serial Port Jumpers on the Main Logic Board

### *Serial Port Jumpers on the Main Logic Board*

There are two serial port jumpers to set on the main logic board (see Figures 4-1 and 4-16). They reside in front of the Ethernet connector behind one of the SCC chips. The ports can be set either as RS-232 ports or as RS-423 ports, but both must be set the same. The jumpers are preset from the factory in asynchronous 423 mode, with the shunt between posts 1 and 2 on both jumpers. To change them to 232 ports, change the shunts on both jumpers to the position between posts 2 and 3.

## *Main Logic Board Voltage Test Points*

There are no voltage test points on the main logic board. If you need to measure voltages, the safest place is at the power connector on the main logic board (see Figure 4-15). See “Before Replacing the Main Logic Board” later in this chapter for the connector wiring and voltages.



---

**Caution** – Printed circuit boards are made of delicate electronic components that are extremely sensitive to static electricity. Ordinary amounts of static from your clothes or work environment can destroy the boards.

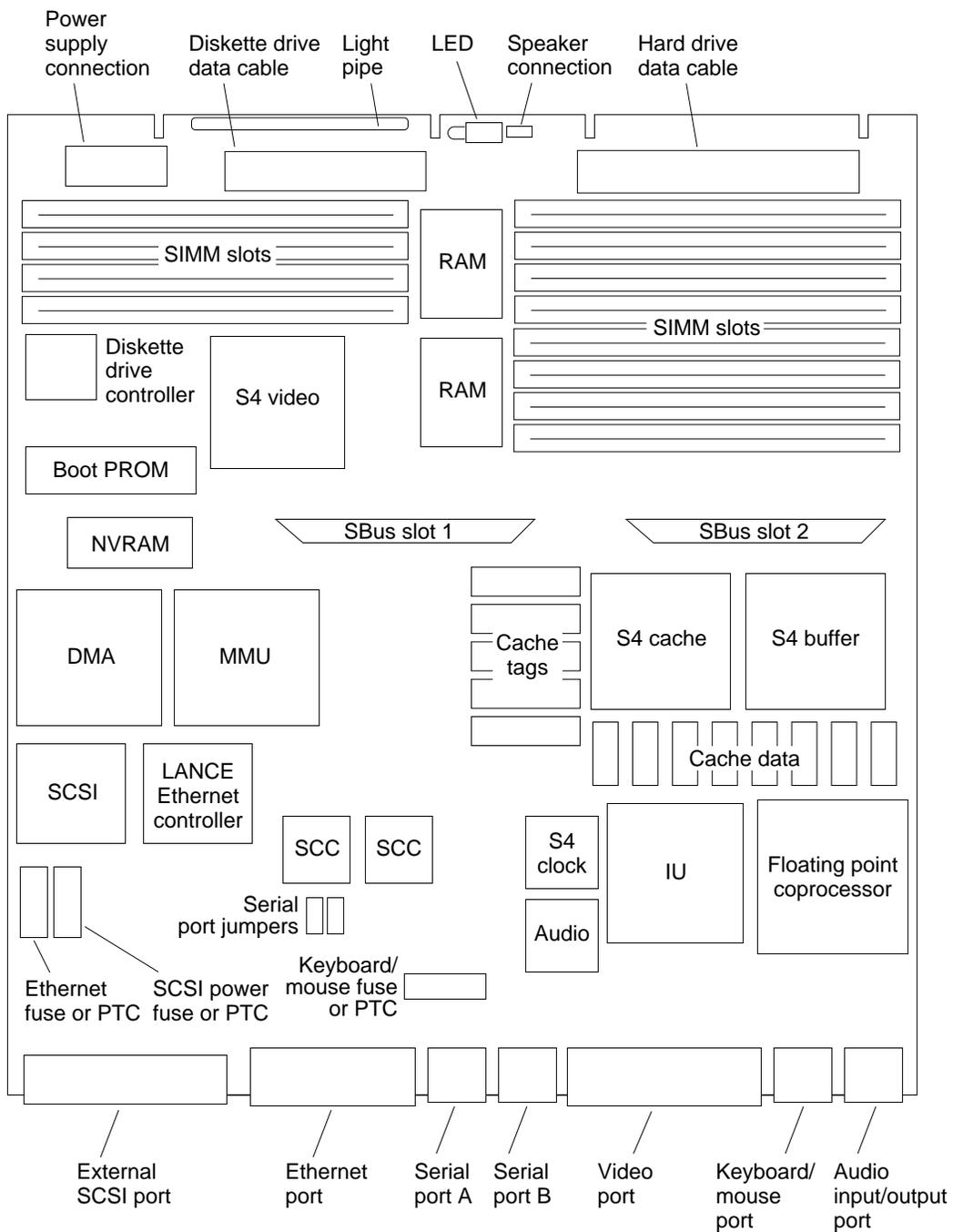
Handle boards only by the non-conducting edges. Do not touch components themselves or any metal parts. Always wear a grounding strap when handling the boards.

Do not disconnect the power cord from the system unit’s power outlet. This connection provides the ground path necessary to safely remove and install the boards. **In addition, the internal power cable from the power supply in the unit top should be plugged in to complete the ground.**

Make sure that the system unit’s power is turned OFF by checking to make sure that the green light-emitting diode (LED) at the front of the chassis is not lit and that the fan in the power supply is not running.

---

*Figure 4-17 Main Logic Board Layout*





- the connection on the Ethernet cable may be bad
- the Ethernet cable or transceiver may have a problem such as a bad connection, shorted center conductor to the shield, or a broken cable segment.

The SCSI termination fuse, located next to the Ethernet fuse by the external SCSI connector, protects an external SCSI device from overvoltages. To determine if the SCSI termination fuse is bad, use a VOM and test the fuse using an open test for lack of continuity.

### *Checking the Fuses*

To check the fuses, follow these steps:

- 1. See and follow the instructions in Chapter 3 on halting your system, tools needed, removing expansion units, opening the system unit, and attaching a wrist strap.**

The wrist strap should be attached to the metal casing of the power supply in the unit top.

- 2. Make sure that the system unit's power is turned off by checking to make sure that the green LED at the front of the chassis is not lit and that the fan in the power supply is not running.**

The power cord should be attached to the system unit and to the wall outlet. Be sure the power cord from the power supply in the unit top is still connected to the main logic board to complete the ground.

- 3. Remove the SBus card from SBus slot 1. Figure 4-17 illustrates the location of the SBus slots.**

See "SBus Cards" earlier in this chapter for details on removal.

- 4. Attach a VOM probe to the leads from the fuse holder. Check each of the fuses for continuity.**

Figure 4-17 illustrates the fuse locations on the main logic board.

- 5. If the fuse is bad, remove the fuse from the board by prying it loose from the socket with a small, flat-blade screwdriver.**

The fuses are not soldered in.

- 6. Insert a new fuse into the fuse socket and press it in until it is fully seated.**
- 7. Replace the SBus card.**  
See “SBus Cards” earlier in this chapter.
- 8. Close the system unit.**  
See “Closing the System Unit” later in this chapter.
- 9. Turn the system unit’s power on, and check for proper operation of the system unit and the installed fuse.**  
See “How to Turn the Power Back On” at the end of this chapter.
  - If the fuse blows again, the associated cable might be bad. Disconnect the cable and check for shorts between the power pin and any of the other pins.
  - If the fuse blows with just the cable plugged in (no device connected at the other end), replace the cable.
  - If the fuse blows only when a device is plugged in to the far end of the cable, replace that device.

### *Before Replacing the Main Logic Board*

This section explains what steps to perform before removing and replacing the main logic board. Removing and replacing the main logic board is a drastic step to take. Therefore, it is important to try to troubleshoot all other possibilities before removing and replacing the main logic board.

#### **To check for and eliminate other possible problems before you replace the main logic board:**

- 1. See and follow the instructions in Chapter 3 on halting your system, tools needed, removing expansion units, opening the system unit, and attaching a wrist strap.**

The wrist strap should be attached to the metal casing of the power supply in the unit top.

2. **Make sure that the system unit's power is turned off by checking to make sure that the green LED at the front of the chassis is not lit and that the fan in the power supply is not running.**

The power cord should be attached to the system unit and to the wall outlet. The internal power cable from the power supply in the unit top should also be connected to complete the ground.

3. **Attach a terminal to the system unit.**

For details, see the *SPARCstation IPC Installation Guide*. This enables you to view output of the POST test results as they are run.

4. **Disconnect the graphics monitor, the keyboard, and the Ethernet connector.**

5. **Remove the SBus cards from the system.**

To do this see "SBus Cards" in this chapter.

6. **Unplug the hard disk drives and the diskette drive from their data and power cables.**

See Figures 4-7 and 4-17 in this chapter for the location of the data and power cables.

7. **Make sure all SIMMs are correctly seated (see Figure 4-17 for the location of the SIMM slots), the power supply cable is attached, and all chips on the main logic board correctly seated in their sockets.**

8. **Follow the directions later in this chapter for turning the power on.**

9. **With a VOM, measure the power supply voltages.**



---

**Caution** – Measuring voltages without connecting the DC cable will result in inaccurate readings. Without load, the power supply will not regulate.

---

The wire colors are the following:

Red	+5V
Blue	+12V
Brown	-12V
Gray	Por (Power on reset)
Black	Return

---

**Note** – The Por Signal is a TTL open collector and pull up is on the main logic board.

---

The limits for the voltages are:

+5V	4.90 to 5.10
+12V	11.16 to 12.84
-12V	-11.6 to -13.20 with a hard drive
-12V	-10.2 to -13.8 without a hard drive

If the voltages are correct, you have ruled out that the power supply is defective.

**10. Close the system unit.**

To do this see “Closing the System Unit” towards the end of this chapter.

**11. Turn on the system and the terminal.**

The system will start to boot. To interrupt the boot sequence, press Break on the terminal keyboard.

The default prompt is the `>` prompt. You can reset the default prompt to be the `ok` prompt. To make the default prompt the `ok` prompt, see the *Open Boot PROM Toolkit User’s Guide* or the *Introduction to Open Boot 2.0*.

If you see the `ok` prompt, go to step 12. If you see the `>` prompt, go to the next step.

**12. At the `>` prompt, enter `n`.**

This enters the Forth Toolkit and displays its `ok` prompt.

**13. Use the commands shown below to set the diagnostic switch to true, set the autoboot switch to false, and reset the system.**

```
ok setenv diag-switch? true
ok setenv auto-boot? false
ok reset
```

As POST tests run, view the results on the terminal screen.

**14. If all POST tests pass, go to the next step.**

If one or more of the following POST tests fails, take one of the following actions:

- If the EPROM Checksum Test fails, replace the main logic board.  
See “Removing the Main Logic Board” and “Replacing the Main Logic Board” later in this chapter.
- If the Limited Main Memory Address Test fails, numbers of Single Inline Memory Modules (SIMMs) are displayed on the terminal (see Figure 4-4). Replace the defective SIMM.  
See “Single Inline Memory Modules (SIMMs)” earlier in this chapter.
- If any other test fails, replace the main logic board.  
See “Removing the Main Logic Board” and “Replacing the Main Logic Board” later in this chapter.
- If you see nothing on the display, and the system appears dead, replace the main logic board.  
See “Removing the Main Logic Board” and “Replacing the Main Logic Board” later in this chapter.

**15. At the > or ok prompt, turn off the system’s power switch.****16. Open the system unit.**

See “Opening the System Unit” in Chapter 3.

**17. Replace the SBus cards. See “SBus Cards” earlier in this chapter.****18. Reconnect the power and data cables to the hard disk drives and the diskette drive.**

See Figures 4-7 and 4-17 in this chapter for the location of the data and power cables.

**19. Close the system unit.**

See “Closing the System Unit” towards the end of this chapter.

If you have identified the problem, go to the next step. If you have not identified the problem, go to Step 21.

**20. Disconnect the terminal and reconnect the graphics monitor, the keyboard, and the Ethernet connector.**

To reconnect the graphics monitor see “Installing Your Monitor” in Chapter 2 of the *SPARCstation IPC Installation Guide*.

This completes the procedure.

**21. Turn the system and the terminal on and run the Sun Diagnostic Executive with the cache disabled *only if all POST tests passed.***

The Sun Diagnostic Executive is an independent operating system. It runs exhaustive subsystem tests independent of the SunOS Operating System. See the *SunDiagnostic Executive User's Guide for the Desktop SPARCstations*.

**22. At the > or ok prompts, turn off the system's power switch.**

**23. Disconnect the terminal and reconnect the graphics monitor, the keyboard, and the Ethernet connector.**

To reconnect the graphics monitor see the *SPARCstation IPC Installation Guide*.

## *Removing the Main Logic Board*

This section explains how to remove the main logic board from the system unit.

Figure 4-16 shows how to replace the main logic board.

To remove the main logic board:

**1. Removing and replacing the main logic board is a drastic step to take.** See "Before Replacing the Main Logic Board" for troubleshooting information.

**2. See and follow the instructions in Chapter 3 on halting your system, tools needed, removing expansion units, opening the system unit, and attaching a wrist strap.**

Attach the wrist strap to the metal casing of the power supply in the unit top.

**3. Make sure that the system unit's power is turned off by checking to make sure that the green LED at the front of the chassis is not lit and that the fan in the power supply is not running.**

The power cord should be attached to the system unit and to the wall outlet.

4. **Disconnect all of the cables from the connectors at the rear of the system unit.**
5. **Place an antistatic mat next to the system unit.**
6. **Remove the SBus cards.**  
See “SBus Cards” earlier in this chapter.
7. **Remove the SIMMs from the main logic board.**  
Note carefully the slots in which the individual SIMMs were installed so that they may be installed properly in the replacement main logic board.
8. **Disconnect the 12-pin power supply cable from the connector in the right front corner of the main logic board by squeezing the clip at the end of the cable and pulling straight up.**  
See Figure 4-17 for the connector’s location.
9. **Disconnect the speaker cable from the connector in the center front of the main logic board.**  
Remove the speaker from the channels securing it to the side of the system enclosure.



---

**Caution** – Do not touch or press on the speaker cone. You may damage the speaker or the sound quality.

---

10. **Disconnect the 34-line diskette data cable from the connector on the main logic board by pulling firmly on the tabs attached to the cable.**  
See Figure 4-17 for the connector’s location. Fold them out of the way.
11. **Disconnect the hard disk drive data cable from the data connectors on the main logic board.**  
Fold them out of the way.

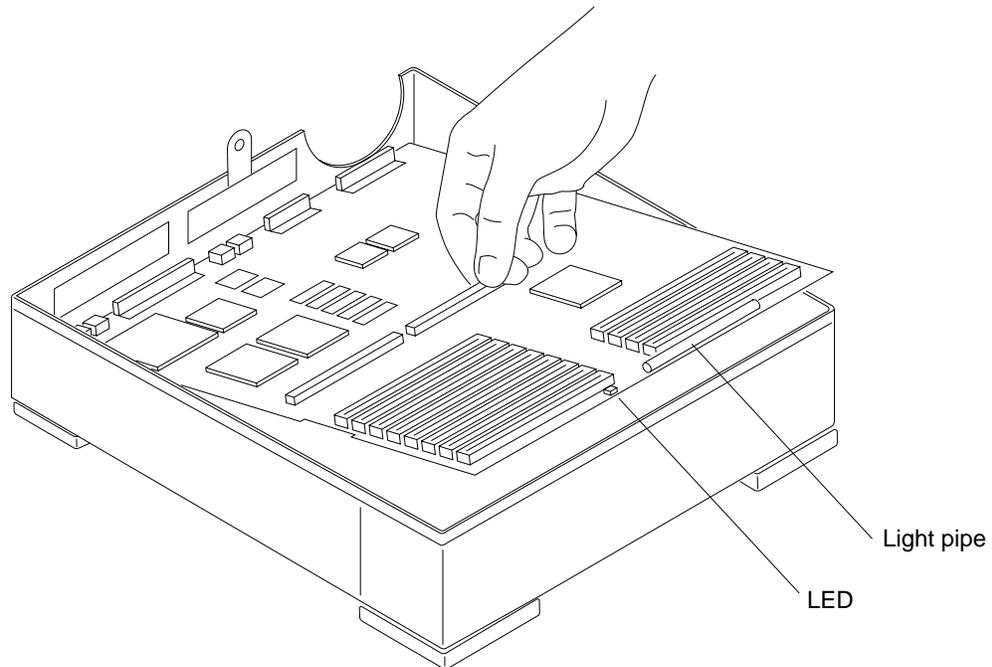


Figure 4-18 Removing and Replacing the Main Logic Board

---

**Note** – Steps 12 and 13 are optional, subject to the customer's request.

---

- 12. With an IC extractor, remove the NVRAM chip from its socket slowly and evenly.**  
See Figure 4-17 for the location of the NVRAM chip.
- 13. Store the NVRAM chip in conductive foam to prevent damage from electrostatic discharge.**  
Save the NVRAM chip for re-use.

14. Remove the two Phillips head screws from the SCSI connector with a small Phillips head screwdriver.
15. Remove the slide lock from the Ethernet connector with a small flat blade screwdriver.
16. Remove the two hexhead screws from the video connector with a 3/16 inch hex head nutdriver.
17. Slide the main logic board toward the front of the chassis to release it from the three hooks in the bottom of the chassis.
18. Grasp the board by the SBus connectors with both hands. Raise the front of the board and lift it out toward the front of the unit (see Figure 4-18). Avoid handling any of the delicate electronic components or touching any of the main logic board's traces.
19. Remove the LED light pipe located at the front of the main logic board for reinstallation on the replacement board (see Figure 4-16).
20. Place the main logic board on an antistatic mat.

## Replacing the Main Logic Board

This section explains how to replace the main logic board into the system unit.

To replace the main logic board:

---

**Note** – If it is necessary to reuse of the NVRAM chip from the defective main logic board, be sure you have removed the NVRAM chip from the defective board. Insert it in the new board at the same location. Be sure to match the pin 1 indicator on the NVRAM chip with the indicator on the socket.

---

- 1. Follow the instructions for installing the LED light pipe later in the chapter.**
- 2. Insert the connectors on the rear of the replacement board into the back panel.**
- 3. Align the board so that the three mounting holes align with the hooks in the bottom of the chassis.**

After the board is properly positioned, slide it toward the rear bezel until the hooks lock into the mounting holes.
- 4. Install the screws for the Ethernet, Video, and SCSI in the back panel of the system.**

See Figure 4-17 in this chapter and Figure B-1 in Appendix B for their locations.
- 5. If the NVRAM chip has been removed for reuse, install the NVRAM chip removed from the old main logic board on the new main logic board.**

Match the pin 1 indicator on the NVRAM chip with the indicator on the socket. Holding the NVRAM chip at the edges, carefully align the pins and insert the NVRAM chip in the socket. Figure 4-17 shows the location of the NVRAM chip.
- 6. Remove SIMMs taken from the old main logic board and install them in the corresponding SIMM slots of the new logic board.**

See instructions earlier in this chapter for removing and replacing SIMMs.
- 7. Connect the 12-pin power cable from the power supply to the white connector (see Figure 4-17) in the right front corner of the main logic board.**

The connector is keyed so that the power cable will fit only one way.

**8. Connect the 34-line diskette drive data cable to the connector on the main logic board (see Figure 4-17).**

The connector is keyed so it will fit only one way.

**9. Connect the hard disk drive data cable to the data connector on the main logic board (see Figure 4-17).**

The connector is keyed so that it will only fit one way.

**10. Re-install the SBus cards as directed in “SBus Cards” earlier in this chapter.**

**11. Install the speaker into the channels in the side of the system enclosure and connect the speaker cable to the plug on the main logic board (see Figure 4-17).**



---

**Caution** – Do not touch or press on the speaker cone. You may damage the speaker or the sound quality.

---

**12. Connect all of the cables to the ports at the rear of the system unit.**

**13. Close the system unit. See “Closing the System Unit” later in this chapter.**

Turn the system unit’s power on, and check for proper system operation. See “How to Turn the Power Back On” at the end of this chapter.

## *LED Light Pipe*

The LED light pipe clips onto the front of the main logic board between the power supply connection and the LED (see Figures 4-17 and 4-18). First, follow the instructions for removing the main logic board earlier in this chapter. Pull the light pipe gently from the edge of the main logic board. Replace the light pipe by aligning its locating tabs with the edge of the board and pushing it gently into place. When it is properly installed inside the system enclosure, one end of the light pipe should extend up to the small indicator hole in the system unit front panel. The other end should sit next to the LED.

## Speaker

The speaker is mounted at the right side of the system on the right hand side (see Figure 4-7).

### Testing the Speaker

To test if the speaker assembly needs to be replaced:

- 1. Locate the speaker assembly (see Figure 4-7).**
- 2. To test if sound is heard when sound is being sent to the speaker, first close the system unit.**  
To do this see “Closing the System Unit” later in this chapter.
- 3. Bring up the system and boot SunOS.**  
To do this, see “Booting Your System” in Chapter 1 of the *Sun System & Network Manager’s Guide*.
- 4. To generate sound enter either of the following:**

```
% cat /usr/demo/SOUND/sounds/sample.au > /dev/audio The system plays back a spoken message  
or  
  
% cat /vmunix > /dev/audio The system plays back garbage, which is  
louder  
  
Press Control-C to abort the message
```

- 5. If either of the sound tests fails, replace the speaker assembly as directed in the following procedures.**  
If either of the sound tests passes, do not replace the speaker.

## Removing the Speaker

To remove the speaker, follow these steps:

1. **See and follow the instructions in Chapter 3 on halting your system, tools needed, removing expansion units, opening the system unit, and attaching a wrist strap.**

The wrist strap should be attached to the metal casing of the power supply in the unit top.

2. **Make sure that the system unit's power is turned off by checking to make sure that the green LED at the front of the chassis is not lit and that the fan in the power supply is not running.**

The power cord should be attached to the system unit and to the wall outlet. The internal power cable from the power supply in the unit top should be connected to the main logic board to complete the necessary ground.

3. **Locate the speaker assembly on the right side of the open unit bottom and its 2-pin connector at the center front of the main logic board near the LED (see Figures 4-7 and 4-17).**

4. **Unplug the 2-pin connector from the main logic board.**

5. **Slide the speaker up and out of the mounting slots.**



---

**Caution** – Do not touch or press on the speaker cone. You may damage the speaker or the sound quality.

---

## Replacing the Speaker

To replace the speaker, follow these steps:

1. **Slide the speaker into the mounting slots and push it down.**

2. **Plug the 2-pin connector onto the main logic board.**

The connector is keyed so it will fit only one way.

3. **Close the system unit.**

See “Closing the System Unit” later in this chapter.

---

**4. Turn the system unit's power on, and check for proper operation of the system unit and the installed speaker.**

See "How to Turn the Power Back On" towards the end of this chapter.

## *Latch Button Assemblies*

The latch button assemblies attach to the inner sides of the unit top near the rear and directly adjacent to the power supply. A latch button assembly consists of a corrugated white plastic latch button and a metal latch spring. (See Figure 4-19). The button itself fits into the latch spring holes by the molded plastic tabs projecting from the inner, non-corrugated side of the button. The latch button and metal latch spring are shipped assembled.

Figure 4-19 shows how to replace the latch button assemblies.

---

**Note** – In order to reach the latch button assemblies, the components in the unit top must be removed. It is best to replace them, if needed, when operations are to be performed on the disk drives or power supply.

---

## *Removing the Latch Button Assemblies*

To remove the latch button assemblies:

See and follow the instructions in Chapter 3 on halting your system, tools needed, removing expansion units, opening the system unit, and attaching a wrist strap. The wrist strap should be attached to the metal casing of the power supply in the unit top to complete the ground.

**1. To remove the latch button assemblies, first follow the instructions earlier in this chapter for removing the disk drive mounting bracket and the power supply.**

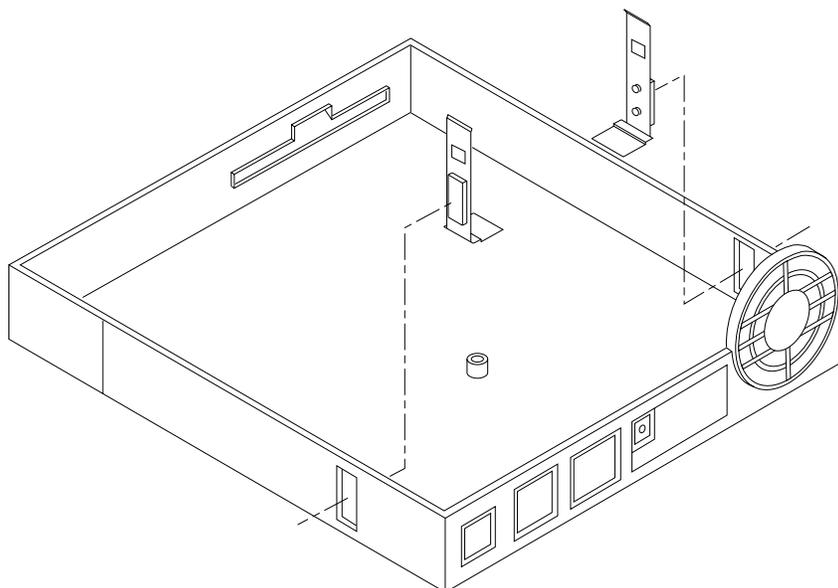
**2. Press on the latch button at the top.**

With the unit top inverted, of course, this will appear to be the lowermost portion. The assembly should detach from the unit side panel on the inside.

## *Replacing the Latch Button Assemblies*

To replace the latch button assemblies:

- 1. Place the pre-assembled latch button and latch spring in the empty, inverted unit top next to the rectangular holes in the unit side panels; fit the latch button loosely into the opening.**
- 2. With your finger press the latch spring firmly into the corner angle of the unit top. Then push down.**  
You will hear it click when it snaps into place.



*Figure 4-19* Installing the Latch Button Assemblies

---

## Closing the System Unit

To close the system unit:

**1. Grasp the unit top (see Figure 4-18).**

Rotate the unit top at a 15 degree angle and rotate your hand position so that thumbs and fingers point up and the five interlock hooks can be lined up.

---

**Note** – The interlock hooks do not engage until the unit is lowered to a 45 degree angle. Continue to hold the cover with your hands.

---

**2. Rest the front edges together to connect the interlock hooks by pushing gently toward the back of the unit.**

As you lower the unit top, continue to push back to secure the connection. The unit top will rest slightly forward. Push it gently back a few millimeters. As the unit top moves back, the latch buttons should click, securing the unit top to the unit bottom.

**3. Attach the lock block by inserting the PEM screw through the block on the outside, the security loop on the inside, and into the power supply (see Figure 3-1).**

Tighten the screw with a screwdriver. Be careful not to overtighten the screw.

**4. Power up the system.**

See “How to Turn the Power Back On” later in this chapter.



---

**Warning** – Do not power up the system unit without closing it. Failure to do so may result in personal injury and system damage.

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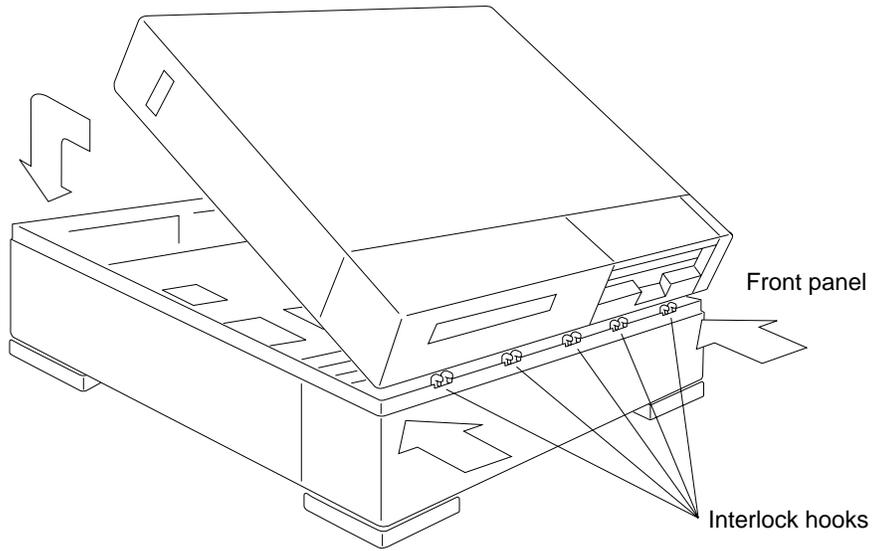


Figure 4-20 Closing the System Unit

---

## Connecting the Ethernet Cable

To connect the Ethernet cable to the system unit:

1. **Connect the Ethernet cable to the port at the rear of the system unit (see Figure 4-17 for location).**
2. **Push the slide lock on the system unit to lock the cable to the system.**

## Connecting the Desktop Storage Pack

To connect the Desktop Storage Pack (DSP) to the system unit:

- ◆ **Connect the connector on the SCSI cable to the SCSI port on the system unit's back panel.**  
See *The Desktop Storage Pack Installation Guide* for further instructions.

## Connecting the External Storage Module

To connect the External Storage Module (ESM) to the system unit, follow these steps:

- ◆ **Connect the SCSI connector on the SCSI adapter cable to the SCSI port on the system unit's back panel.**  
See "Installing an ESM" in the manual provided with it.

## Video Monitors

There are several different types of monitors and cabling. The monitors have 13W3 connectors. See the *SPARCstation IPC Installation Guide* for more specific information on monitors and monitor cables. Part numbers for the various monitors are listed in Appendix B.



---

**Caution** – Monitors with bases the same size or smaller than the system unit can be placed safely on top of the unit. Monitors with larger bases may be unstable. For example, the 17-inch grayscale monitor is stable on top, but the 19-inch monitor is not.

---

*Table 4-1* Video Monitors

<b>Monitor Type</b>	<b>Voltage</b>
16-inch color monitor (407mm)	240V
16-inch color monitor (407mm)	115V
17-inch grayscale monitor (432mm)	115V
19-inch grayscale monitor (483mm)	115V

## *Mouse*

The optical mouse connects to one of two jacks in the back of the keyboard. The mouse can be connected on either the left or right side to accommodate either left-handed or right-handed users. Connect the mouse to the keyboard before you connect the keyboard to the system unit.

## *Keyboard*

A cable connects the keyboard to the system unit. The keyboard port is located at the left rear of the system unit. Connect the keyboard cable on either the left or right side of the keyboard, then to the port on the back of the system unit.

## *Audio*

An audio cable may be connected to the Audio input/output port next to the keyboard/mouse port (see Figure 4-17).

## How to Turn the Power Back On

After turning off the power to replace FRUs, turning the power on again is relatively simple.



**Warning** – This device is equipped with two 3-wire grounded power cords. To reduce the risk of electrical shock, always plug the power cords into a properly grounded power outlet.



**Caution** – Always allow 10 seconds between turning off the power and turning it back on again to prevent possible damage to power supply components in your system unit.

Turn the power switches on in this order:

- Monitor
- External drive (if you have one)
- System Unit

After a minute or so, you should see the login prompt.

```
system messages
system messages
system messages
system messages
system messages
hostname login:
```

When you see the login screen, you can log in to the system. For more information on logging in, see Chapter 2 of the *Sun System User's Guide*.

