SGI™ 1400 Server Family Maintenance and Upgrades Guide

Document Number 007-3948-001

CONTRIBUTORS

Writing contributions by Mark Schwenden
Illustrated by Cheri Brown
Production by Heather Hermstad and David Clarke
Engineering contributions by Jim Oliver, Courtney Carr, Joan Eslinger, and Chander Kant
St. Peter's Basilica image courtesy of ENEL SpA and InfoByte SpA. Disk Thrower image courtesy of Xavier Berenguer, Animatica.

SGI™ 1400 Server Family Maintenance and Upgrades Guide
Document Number 007-3948-001

Contents

List of Figures

List of Tables

About This Guide

This guide tells you how to remove and install field replaceable units (FRUs) internal to the server. Only trained or qualified technical personnel should work inside the chassis.

Note: Information on the server's system setup utility (SSU) and replacement of external devices are covered in the *SGI 1400 Server Family User's Guide*.

The following topics are covered in this manual:

- Chapter 1, "Working Inside the System," contains all the power and ESD warnings applicable to working inside the system. The chapter introduces proper access procedure, how to install option boards, and understand internal SCSI and IDE cabling.
- Chapter 2, "Upgrading Baseboard Components," covers removing and installing the baseboard, processors, memory DIMMs, and VRMs.
- Chapter 3, "SGI 1400 Server SCSI Backplane Installation," details the steps for replacing the server system SCSI backplane.
- Chapter 4, "Technical Reference," lists information on connector pinouts and baseboard locations, baseboard jumpers, I/O addresses, memory map addresses, baseboard interrupts, and video modes.
- Appendix A contains a group of equipment logs and worksheets that should be used when maintaining or upgrading the server.
- Appendix B lists the server's basic environmental specifications.
- Appendix C provides additional basic chassis warnings and voltage related cautions.

Working Inside the System

Tools and Supplies Needed

- Phillips (cross-head) screwdriver (#1 and #2 bit).
- Small flat-bladed screwdriver.
- Jumper removal tool or needle-nosed pliers.
- Antistatic wrist strap and conductive foam pad (recommended).
- Pen or pencil.
- Equipment log: as you integrate new parts into the system, add information about them to your equipment log, see Appendix A. Record the model and serial number of the system, all installed options, and any other pertinent information specific to the system. You will need this information when running the SSU.

Safety: Before You Remove the Access Cover

Before removing the access cover at any time to work inside the system, observe these safety guidelines.

1. Turn off all peripheral devices connected to the system.
2. Turn off the system by using the push-button on/off power switch on the front of the system.
3. Unplug the AC power cords from the system or wall outlet.
4. Label and disconnect all peripheral cables and all telecommunication lines connected to I/O connectors or ports on the back of the system.
5. Provide some electrostatic discharge (ESD) protection by wearing an antistatic wrist strap attached to chassis ground of the system—any unpainted metal surface—when handling components.

Warnings and Cautions

These warnings and cautions apply whenever you remove the access cover of the system. Only a technically qualified person should integrate and configure the system.

Warning: SYSTEM POWER ON/OFF: The on/off button on the front panel DOES NOT turn off the system AC power. To remove power from system, you must unplug the AC power cords from the wall outlet or the system.

Hazardous voltage, current, and energy levels are present inside the power supply. There are no user-serviceable parts inside it; servicing should be done by technically qualified personnel.

Hazardous electrical conditions may be present on power, telephone, and communication cables. Turn off the system and disconnect the power cords, telecommunications systems, networks, and modems attached to the system before opening it. Otherwise, personal injury or equipment damage can result.

Caution: Electrostatic discharge (ESD) and ESD protection: ESD can damage disk drives, boards, and other parts. We recommend that you do all procedures in this chapter only at an ESD-protected workstation. If one is not available, provide some ESD protection by wearing an antistatic wrist strap attached to chassis ground—any unpainted metal surface—on your system when handling parts.

Always handle boards carefully. They can be extremely sensitive to ESD. Hold boards only by their edges. After removing a board from its protective wrapper or from the system, place it component-side UP on a grounded, static-free surface. If you place the baseboard on a conductive surface, the battery leads may short out. If they do, this will result in a loss of CMOS data and will drain the battery. Use a conductive foam pad if available but NOT the board wrapper. Do not slide board over any surface.

For proper cooling and airflow, always install the chassis access cover before turning on the system. Operating the system without the cover in place can damage system parts.

Removing the System Access Cover

You need to remove the system access cover, and in some cases the front bezel, to reach components inside the system. Facing the front of the system, the access cover is on the right side for pedestal-mounted (tower) servers, and on the top for rack-mounted servers.

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Turn off all peripheral devices connected to the system.
3. If you have not already done so, turn off the system by using the power on/off switch on the front panel AND unplug all AC power cords.
4. Label and disconnect all peripheral cables attached to the I/O panel on the back of the system.
5. Remove and save the three screws from the back of the access cover; you will need them later to reattach the cover.

   Note: Be sure the chassis key lock on the front of the system is in the unlocked position. Otherwise, you will be unable to remove the cover. The chassis keys are *not* all the same, you cannot use one key to open multiple units.
6. Place the fingertips of your right hand under the built-in handle on the back of the cover. A rounded, rectangular depression in the front middle of the access cover serves as another handle.
7. Using an even pull, slide the cover backward, about an inch, until it stops.
8. Pull the entire cover outward, straight away from the chassis, to disengage the tabs from the notches in the top and bottom edges of the chassis. Set the cover aside.

Installing the Access Cover

1. Before replacing the access cover, check that you have not left loose tools or parts inside the system.
2. Check that cables, PCI option boards, and other components are properly installed.
3. Position the cover over the chassis so that the rows of tabs align with slots in the chassis. Slide the cover toward the front of the system until the tabs on the cover firmly engage in the chassis.
4. Attach the cover to the chassis with the three screws you removed earlier, and tighten them firmly (6.0 inch-pounds).

5. Connect all external cables and the power cords to the system.

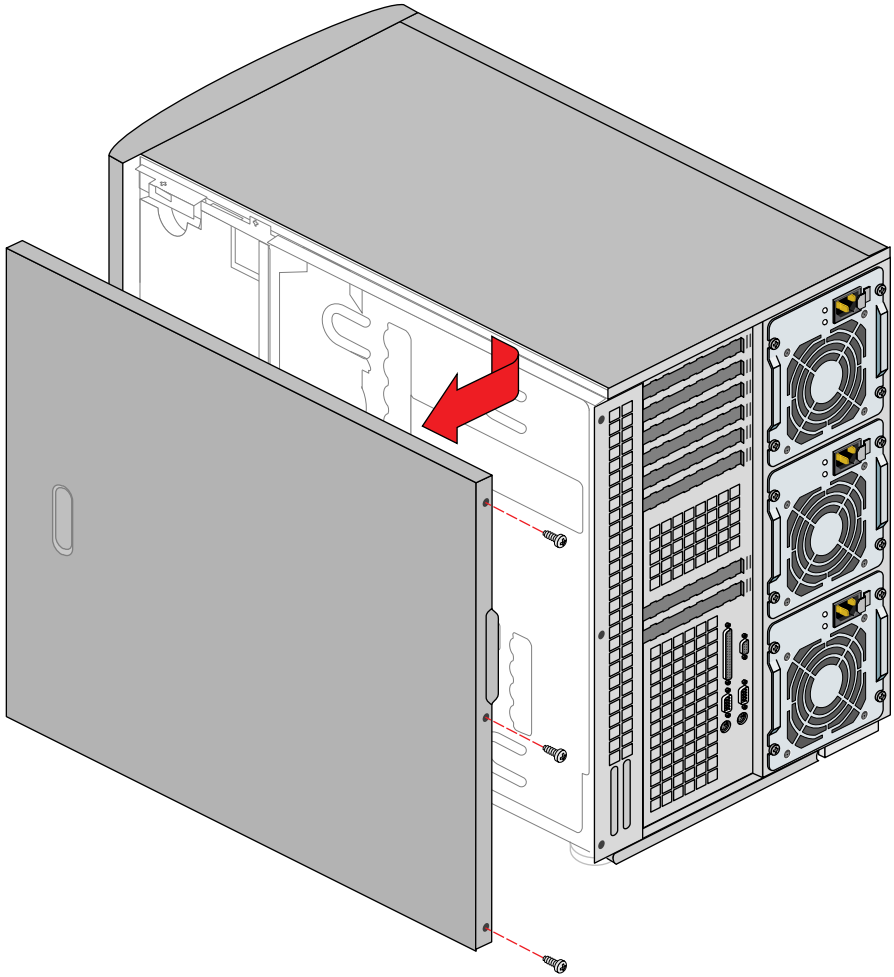

Figure 1-1 Removing the Access Cover

Working in the Subchassis and Electronics Bay

The chassis is comprised of three parts:

- the main chassis
- a swing-out subchassis at the front
- a swing-out subchassis, called the electronics bay, at the rear

To access components in some instances, you must swing away and/or completely remove the subchassis and electronics bay.

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Turn off all peripheral devices connected to the system.
3. Turn off the system power by using the power on/off switch on the front panel AND unplug all AC power cords.
4. Label and disconnect all peripheral cables attached to the I/O panel on the back of the system.
5. Remove and save the three screws from the back of the access cover; you will need them later to reattach the cover.
6. Remove the access cover.
7. Remove the two screws on the top and bottom edges of the chassis (see Figure 1-2). These screws attach the front subchassis and the electronics bay to the main chassis.

   Caution: You must disconnect all cabling to the electronics bay before rotating or removing the bay. Failure to do so can result in serious damage to system components. The location of the main connectors in the electronics bay is also shown in Figure 1-2.
8. Rotate the front subchassis left, away from the main chassis, until it stops.
9. Disconnect and label all cabling to the electronics bay.

10. Using the vertical edge of the electronics bay as a handle, rotate the bay right, away from the main chassis, until it stops.
11. If necessary, completely remove the subchassis and electronics bay: this requires rotating the bays outward until the two pins that function as hinges for the bays slide out of their slots. Set the bays aside.

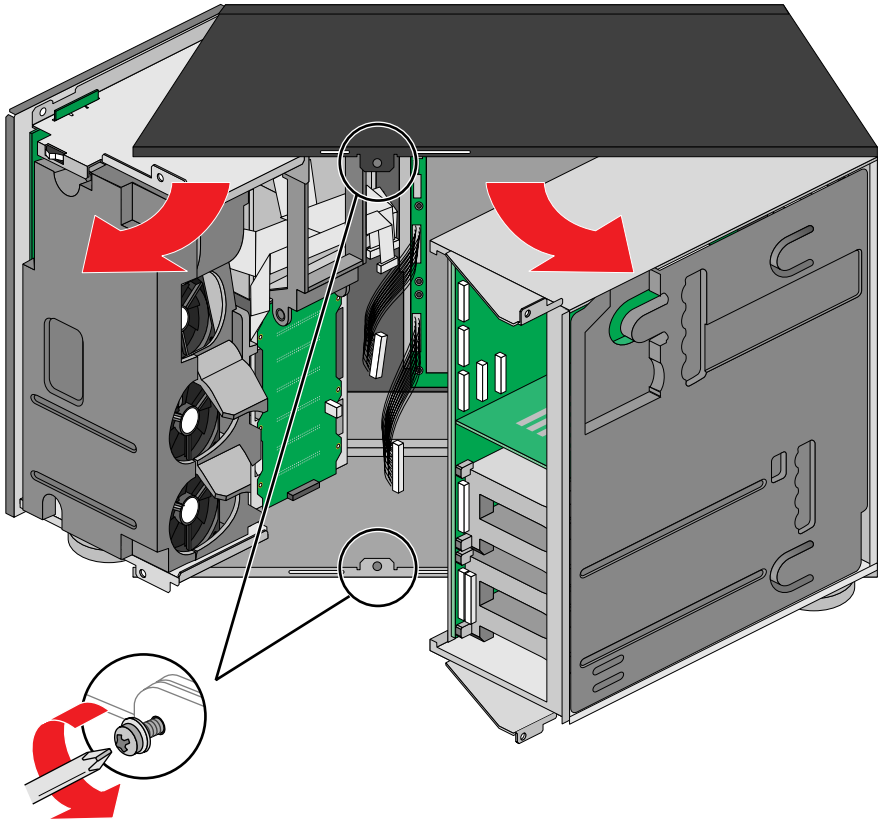

Figure 1-2 Opening the Subchassis and Electronics Bay

Installing PCI Boards

The information in this section covers installation of optional PCI boards.

Caution: Do not overload baseboard: Do not overload the baseboard by installing optional PCI boards that draw excessive current. Contact your sales or service representative if you are uncertain that a board is approved for installation in the server. PCI boards can be extremely sensitive to ESD and always require careful handling. After removing the board from its protective wrapper or from the baseboard, place it component-side up on a grounded, static-free surface or conductive foam pad—if available. Do not slide the board over any surface.

Use the following steps to properly install a PCI option board:

1. Remove access cover.
2. Remove the PCI option board from its protective wrapper. Be careful not to touch the components or gold edge connectors. Place board component-side up on an antistatic surface.
3. Record the serial number of the PCI option board in your equipment log.
4. Set jumpers or switches according to the manufacturer's instructions.
5. Remove and save the screw that attaches the existing board or expansion slot cover to the chassis.
6. Remove and save the expansion slot cover.
7. Hold the PCI option board by its top edge or upper corners. Firmly press it into an expansion slot on the baseboard. The tapered foot of the board retaining bracket must fit into the mating slot in the expansion slot frame. See Figure 1-3 for an example.
   - Install an ISA board component-side UP.
   - Install a PCI board component-side DOWN.
8. Use the screw removed earlier to fasten the new board retaining bracket to the chassis. Tighten the screw firmly (6.0 inch-pounds). Attach cables if necessary.
9. Reinstall the access cover using the original screws.

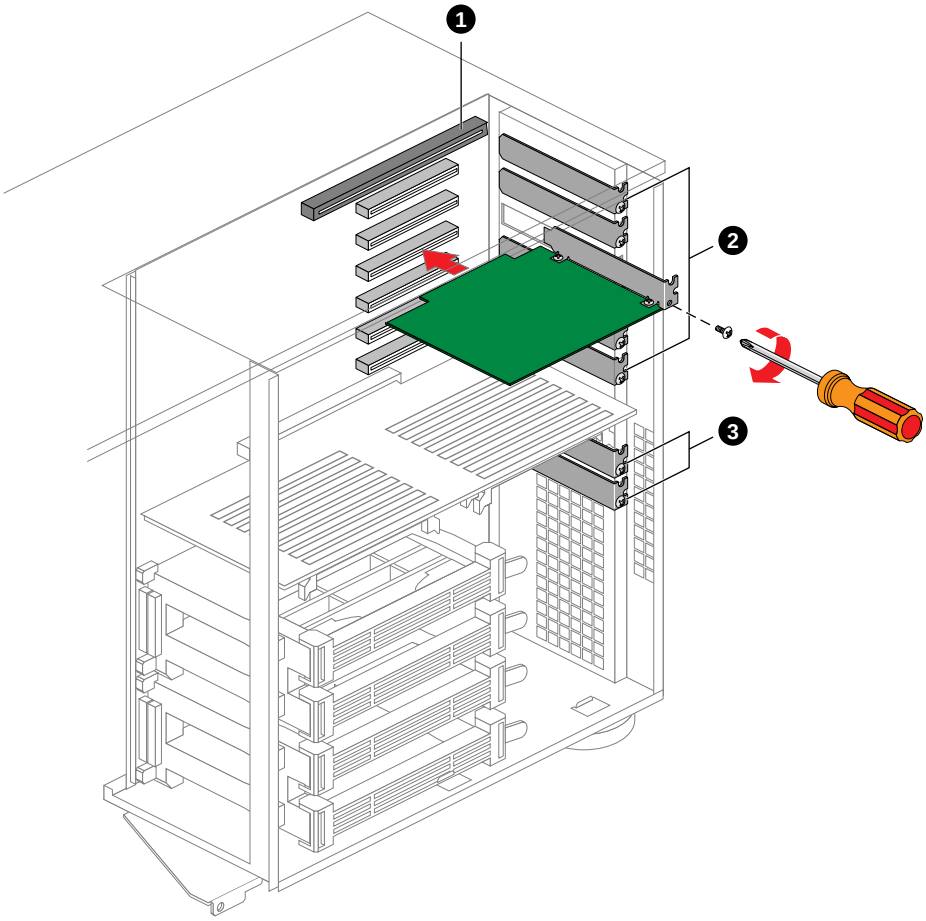

Figure 1-3 Installing a PCI option Board

Components shown in Figure 1-3 are:

1. PCI or ISA slot
2. Six PCI slots (top to bottom in figure = PCI B4, B3, B2, B1, A3, and A2)
3. PCI slot A1 (Use *five inch-length* (12.7 cm) board only)

Removing a PCI option Board

Note: Slot covers must be installed on all vacant expansion slots. This maintains the electromagnetic emissions characteristics of the system and ensures proper cooling of system components.

1. Read and observe the safety and ESD precautions listed at the beginning of this chapter.
2. Disconnect any cables attached to the board you are removing.
3. Remove and save the screw that attaches the existing board retaining bracket to the chassis.
4. Holding the board by its top edge or upper corners, carefully pull it out. Do not scrape the board against other components.
5. Store board in an antistatic protective wrapper.
6. If you are not reinstalling a board in the same slot, install a slot cover over the vacant slot. The tapered foot of the cover must fit into the mating slot in the expansion slot frame.
7. Use the screw removed earlier to fasten the new board to the chassis. Tighten the screw firmly (6.0 inch-pounds).
8. Running the SSU is optional after you remove a PCI or ISA board.

Removing the Front Panel Board

The front panel board contains the system controls and indicators. It is mounted on a snap-on standoff and a threaded standoff inside the chassis.

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Remove the access cover.
3. Disconnect the fan cables and remove the fan housing assembly, see Figure 1-4.
4. Disconnect the 3.5-inch diskette drive cables. Remove the diskette drive carrier from the chassis. Save the screw to use later.
5. On the front panel board, remove and save the screw from the threaded standoff to use later.

6. Grasp the front panel board. Carefully pull it toward the back of the system until it pops off the snap-on standoff.
7. Disconnect the front panel board signal cable from the front panel board.
8. Remove the front panel board from the system. Place it on an antistatic foam pad or a grounded work surface.

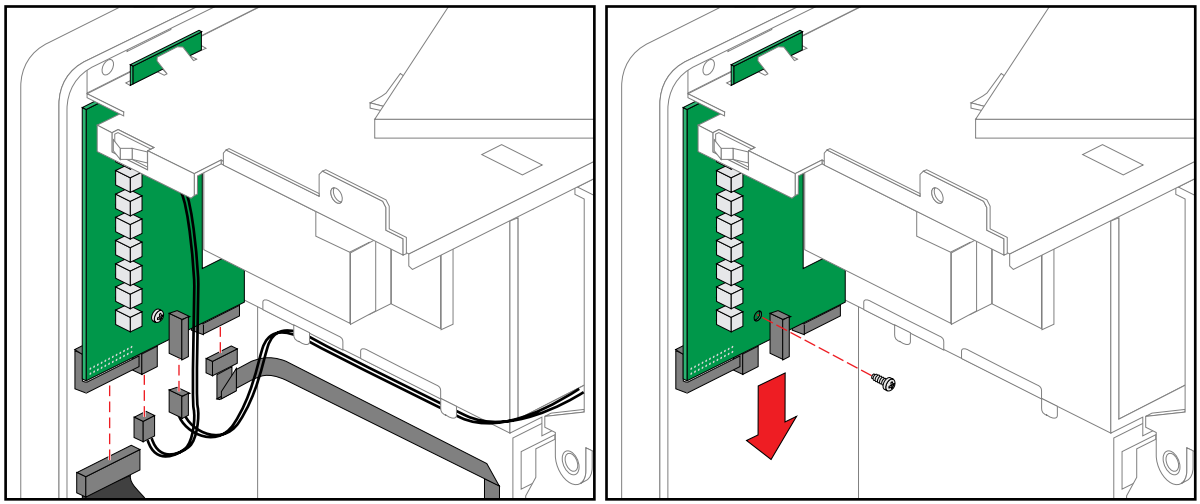

Figure 1-4 Removing the Front Panel Board

Installing the Front Panel Board

1. Reconnect the front panel board signal cable to the front panel board.
2. Position the front panel board over the snap-on standoff and the threaded standoff inside the chassis.
3. Carefully press the board onto the snap-on standoff until it snaps in place.
4. Reinstall and firmly tighten (6.0 inch-pounds) the screw that secures the board to the chassis.
5. Reinstall the 3.5-inch diskette drive carrier. Connect the drive cables.
6. Reinstall the access cover using the original screws.

Removing the Diskette Drive

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Remove the access cover.
3. Disconnect the power and signal cables from the diskette drive. The connectors are keyed for ease in reconnecting them to the drive, see Figure 1-5.
4. Remove and save the screw that secures the diskette drive carrier to the 5.25-inch drive bay.
5. Slide the carrier toward the back of the chassis to disengage the tabs from the slots in the bottom of the 5.25-inch drive bay.
6. Remove the carrier and drive assembly from the chassis, and place it component-side up on an antistatic surface.
7. Remove the drive from the carrier by sliding the drive forward, toward (and out of) the front of the carrier. Set the carrier aside.
8. Place the drive in an antistatic protective wrapper if you are not reinstalling the same drive.
9. Reinstall the access cover using the original screws.

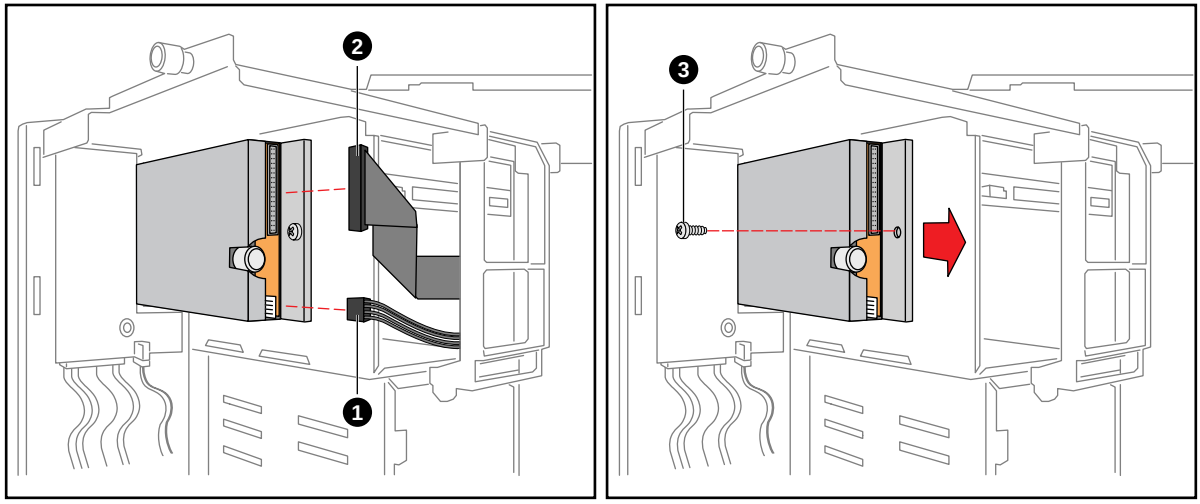

Figure 1-5 Removing the Diskette Drive from the Chassis

Components shown in Figure 1-5 are:

1. Power cable
2. Signal cable
3. Securing screw

Installing the Diskette Drive

1. Remove the new 3.5-inch diskette drive from its protective wrapper, and place it component-side up on an antistatic surface. Record the drive model and serial numbers in your equipment log.
2. Set any jumpers or switches according to the drive manufacturer's instructions.
3. Place the drive carrier on the component-side of the drive.
4. Attach the carrier to the drive by sliding the drive toward the closed / back end of the carrier. The drive is fully seated when it rests against the square brackets that form the back of the carrier.
5. Position the carrier so that the two protruding notches fit into the corresponding slits in the frame. Slide the assembly toward the front of the system to engage the notches. Make sure the front of the drive fits correctly in the front opening of the system. When properly positioned, the carrier notches extend slightly into the interior of the 5.25-inch drive bays and the threaded hole in the carrier aligns with the threaded hole in the frame.
6. Secure the assembly to the 5.25-inch bay with the screw you removed earlier; tighten the screw firmly (6.0 inch-pounds).
7. Connect the signal and power cables to the drive. The red stripe on the signal cable must face toward the center of the drive.
8. Reinstall the access cover using the original screws.
9. Run the SSU to specify that the diskette drive is installed in the system.

Peripheral Drives

The following sections provide information on internally mounted drives and cables.

Drive Cabling Considerations

This section summarizes device cabling requirements and constraints. The number of devices you can install internally depends on:

- The number supported by the bus
- The number of physical drive bays available
- The height of drives in the internal bays (1-inch or 1.6-inch high)
- The combination of SCSI and IDE devices

IDE Requirements

An 18-inch (45.7 cm) long IDE cable that supports two drives is standard in the system. If you install an IDE drive, we recommend placing it in the lowest 5.25-inch drive bay to make cabling easier.

For proper IDE operation, note the cable length specified in Figure 1-6. If no drives are present on an IDE channel, the cable must be removed. If only one drive is installed, it must be connected at the end of the cable.

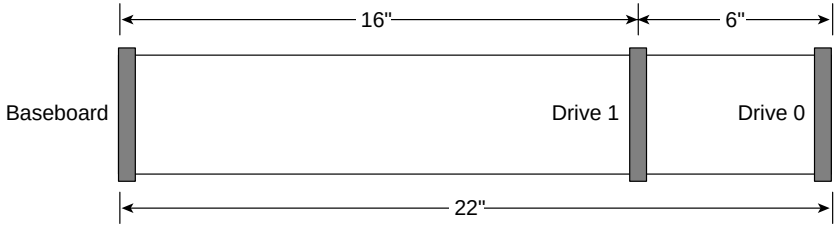

Figure 1-6 IDE Cable Dimensions

Note: If you plan to disable the IDE controller to reuse the interrupt for that controller, you must physically unplug the IDE cable from the board connector if a cable is present. Simply disabling the drive by configuring the SSU option does not make the interrupt available.

SCSI Requirements

One narrow and two wide SCSI cables are standard in the system.

All SCSI devices must be unterminated except the peripheral at the end of the SCSI cable. Hard drives usually provide an active termination, while CD-ROM drives do not. Because we recommend putting hard drives only in the internal bays, this means that you should route the SCSI cable so that the last device on the cable is a hard drive in the internal bay.

Installing 5.25-inch Peripherals in the Front Bays

Three 5.25-inch half-height bays provide space for tape backup, CD-ROM, or other removable media drives. Note that system EMI integrity and cooling are both protected by having drives installed in the bays or filler panels and EMI shields covering the bays. When you install a drive, save the panel and shield to reinstall in case you should later remove the drive and not reinstall one in the same bay.

To maintain compliance with electromagnetic compatibility (EMC) regulations, the 5.25-inch bays *must* be configured with either:

- An EMC-compliant 5.25-inch peripheral device, OR
- A metal cover plate

Caution: The internal SCSI interface in this system supports only single-ended SCSI devices on the narrow SCSI channel. Connecting differential SCSI drive types to this interface can result in electrical damage to the baseboard and peripherals.

We recommend that you do NOT install any hard disk drives in the 5.25-inch bays. The drives cannot be properly cooled in these locations.

It is important that your cabling and connections meet the SCSI bus specification. Otherwise, the bus could be unreliable and data corruption could occur or devices might not work at all. The SCSI bus needs to be terminated at the end of the cable; this is usually provided by the last SCSI device on the cable.

Use the following steps when installing a 5.25-inch peripheral:

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Open the front bezel by rotating its right side out and to the left.

   Caution: To avoid damage to a 5.25-inch peripheral device, ensure the EMI gasketing provided in the lower bay does not bridge or short any open circuits of the exposed peripheral device. If the 5.25-inch device has open circuits, install it in one of the two upper bays.
3. Put a finger in the hole and pull the EMI metal shield out to disengage it from the chassis, see Figure 1-7. Save the shield.
4. Remove the drive from its protective wrapper, and place it on an antistatic surface.
5. Record the drive model and serial numbers in your equipment log.
6. Set any jumpers or switches on the drive according to the drive manufacturer's instructions.
7. Using two screws of the appropriate size and length (not supplied), attach each plastic slide rail with its metal grounding plate to the drive, see Figure 1-8.

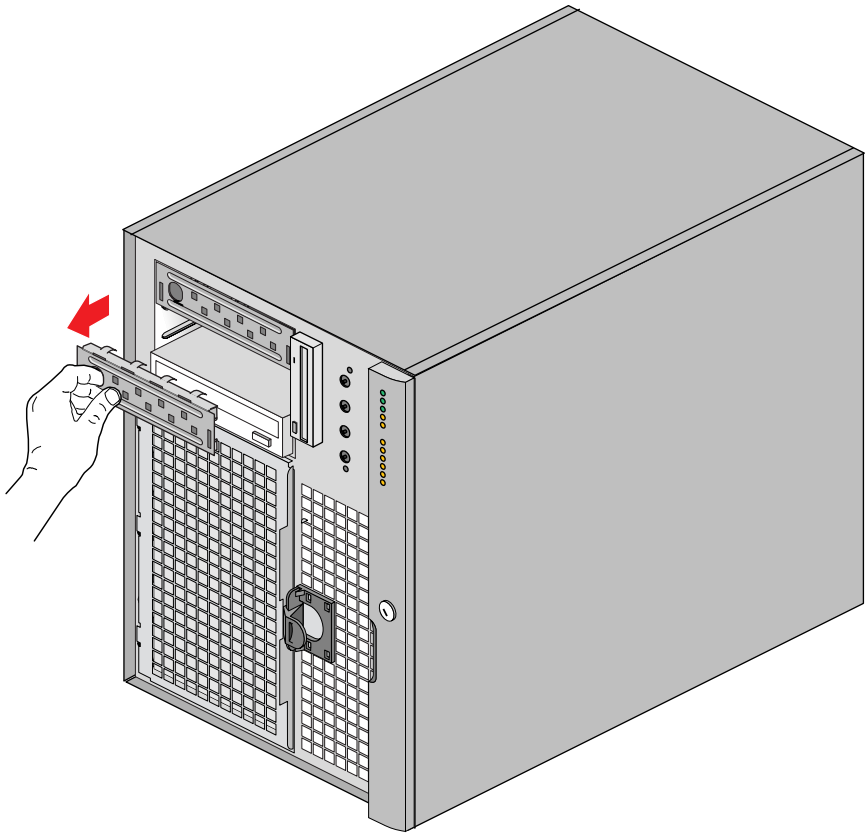

Figure 1-7 Removing EMI Shields

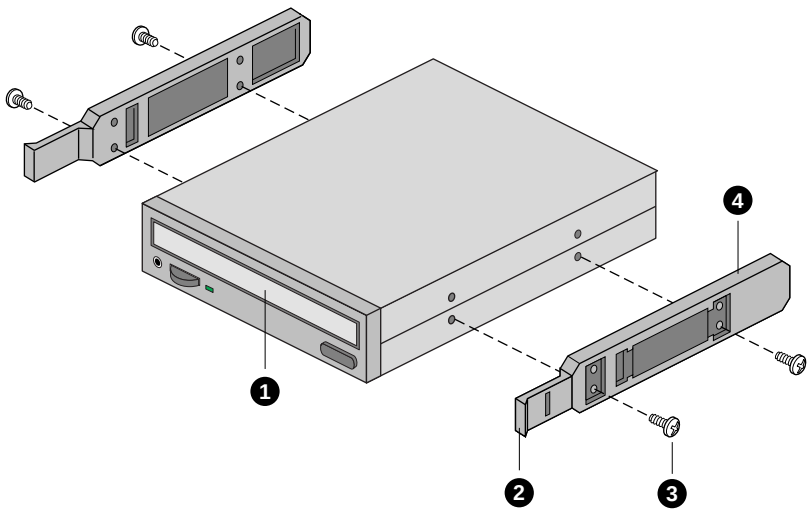

Figure 1-8 Snap-in Plastic Slide Rails

The components shown in Figure 1-8 are:

1. Tape drive or other removable media device
2. Tab on slide rail
3. Screws (quantity 4)
4. Slide rails (quantity 2)

Complete the installation of the new 5.25-inch drive using the following steps:

1. Position the drive so the plastic slide rails engage in the bay guide rails. Push the drive into the bay until the slide rails lock in place.
2. Connect a power cable to the drive. The connectors are keyed and can be inserted in only one way.

3. Connect a signal cable to the drive. The connectors are keyed and can be inserted in only one way.
   - **SCSI drive:** Attach connectors on the cable to the SCSI device or devices you are installing.
   - **IDE drive:** The baseboard has one IDE connector. It can support an IDE signal cable up to 22 inches long. See "Drive Cabling Considerations" on page 13 for the cable dimensions.
4. Close the front bezel.

Removing a 5.25-inch Peripheral from the Front Bay

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Open the front bezel by rotating its right side out and to the left.
3. Disconnect the power and signal cables from the drive.
4. The drive has two protruding plastic, snap-in rails attached. Squeeze the rail tabs toward each other as you carefully slide the drive forward out of the bay, and place it on an antistatic surface.
5. Remove and save the four screws and two slide rails.
6. If you leave the bay empty, install a stainless steel EMI shield on the bay for proper cooling and airflow.
7. If you do not replace the device with another SCSI device, and it was installed at the end of the SCSI signal cable, modify the cable and termination arrangement so that a proper termination exists at the end of the cable (it can be a termination device only, not necessarily a SCSI peripheral).
8. Close the front bezel.

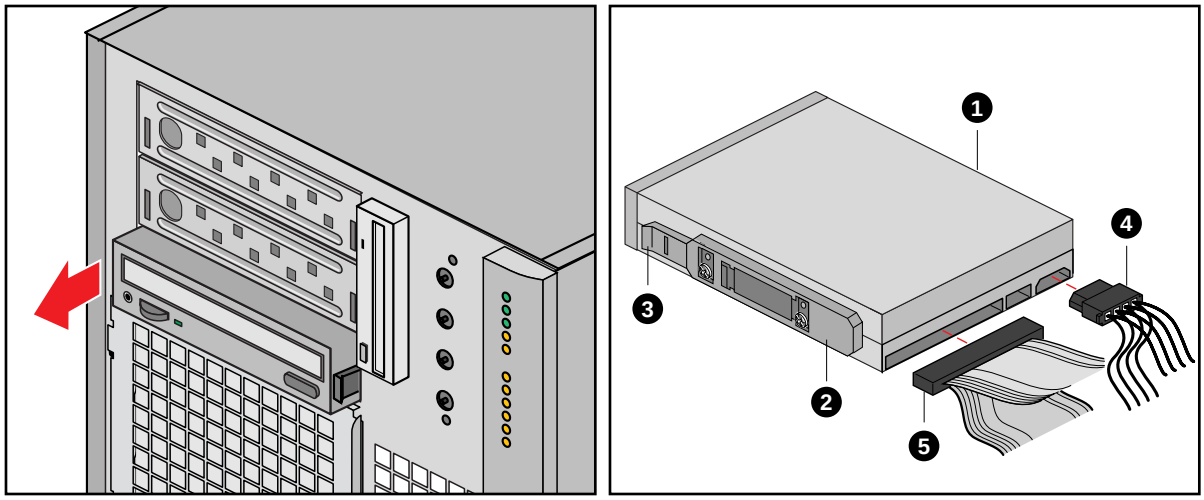

Figure 1-9 Removing a Removable Media Device

Components shown in Figure 1-9 are:

1. Removable media device
2. Drive rail
3. Rail tab
4. Power cable
5. Typical SCSI signal cable

Installing or Replacing the SCSI-B Cable

The cable for channel B has two labels. The channel B cable connects from the SCSI-B connector on the baseboard to one of the external ports at the back of the server. If you are uncertain which connector on the baseboard is SCSI B, see Figure 4-1 in Chapter 4, "Technical Reference."

Before you install or replace the SCSI-B cable, read and heed all the safety warnings at the beginning of this chapter. After you shutdown the system, unplug all AC power cords from the system power supplies or the wall outlets. You may also need to disconnect all peripheral cables and telecommunication lines connected to I/O connectors or ports on the back of the system (especially in rackmount units). Use the following steps to install or replace the cable:

1. Remove the system access cover and carefully take out the rear foam cover.
2. If desired, you can remove the front foam cover and unscrew and swing out the front subchassis.
3. Remove the memory module.
4. Remove any existing SCSI-B cable if it is defective or damaged.
5. Attach the new or replacement SCSI-B cable to the SCSI-B connector on the baseboard. Leave the cable unconnected at the other end.
6. Reinstall the memory module.
7. Remove one of the two knock-out covers, or remove the existing external SCSI-B connection if installed. See Figure 1-10 at the back of the system. If the server is upright in pedestal mode, the two covers are at the bottom left, to the left of the I/O panel.
   - Place the tip of a flat-blade screwdriver, or the end of another suitable tool, in the slot in the center of the knock-out cover.
   - Rotate, twist, etc., the screwdriver until you free the cover by breaking the small metal tab that holds the cover to the chassis. Be sure to remove covers that fall into the chassis.
8. Attach the cable connector to one of the ports at the back of the system as indicated in Figure 1-10; note where the cable exits the foam and in the expanded detail, where the cable attaches to one of the ports.
9. Use two screws (included) to secure the connector.

10. Reinstall the back foam cover. As you do, position the SCSI cable so that it routes to the electronics bay through the cutout in the back foam cover. The dotted arrow in Figure 1-10 shows where the cable must go.
11. Position the cable along the recess in the back foam cover.
12. Reinstall the access cover using the original screws.
13. Connect all AC power and peripheral device cables to the back of the system.

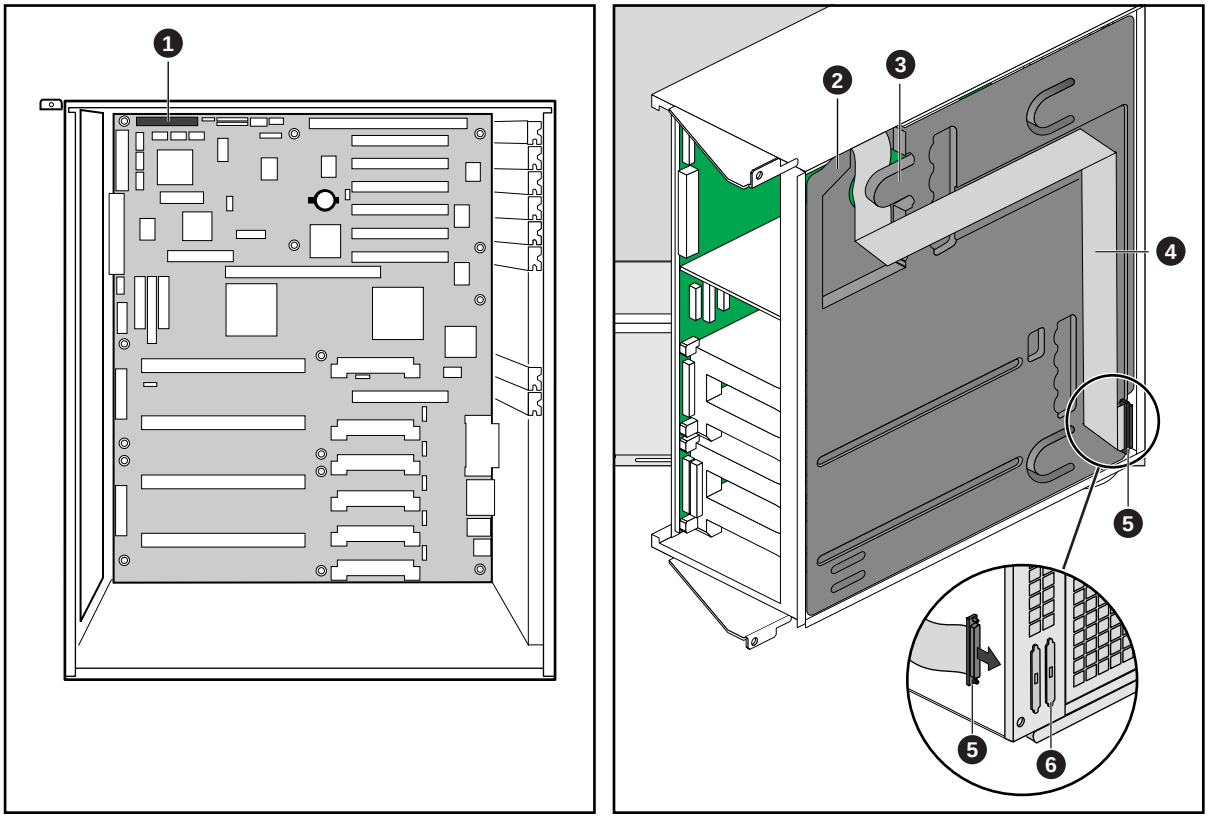

Figure 1-10 SCSI-B Cable Installation

The components shown in Figure 1-10 are:

1. SCSI-B connector on the baseboard
2. Rear foam cover
3. Foam tab
4. SCSI-B cable (fit along recess in foam cover)
5. External SCSI-B connection
6. SCSI knockout cover

System Fans

The SGI 1400 server contains eight removable chassis fans that cool the boards and removable media drives. These chassis fans connect to the front panel board and are enclosed in a removable foam assembly. The three integrated power supply fan(s) provide more cooling and airflow.

Removing the System Fan Assembly

Use the following steps and Figure 1-11 to remove the system fan assembly:

1. Observe the safety and ESD precautions at the beginning this chapter.
2. Remove the access cover.
3. Remove the foam cover from the front subchassis by pulling it straight out.
4. For better access to the individual fan cables on the front panel board, carefully rotate the right edge of the foam fan assembly outward into the opening where the foam cover was.

5. Label and disconnect the individual fan cables from the front panel board.
6. Remove the fan assembly from the chassis.

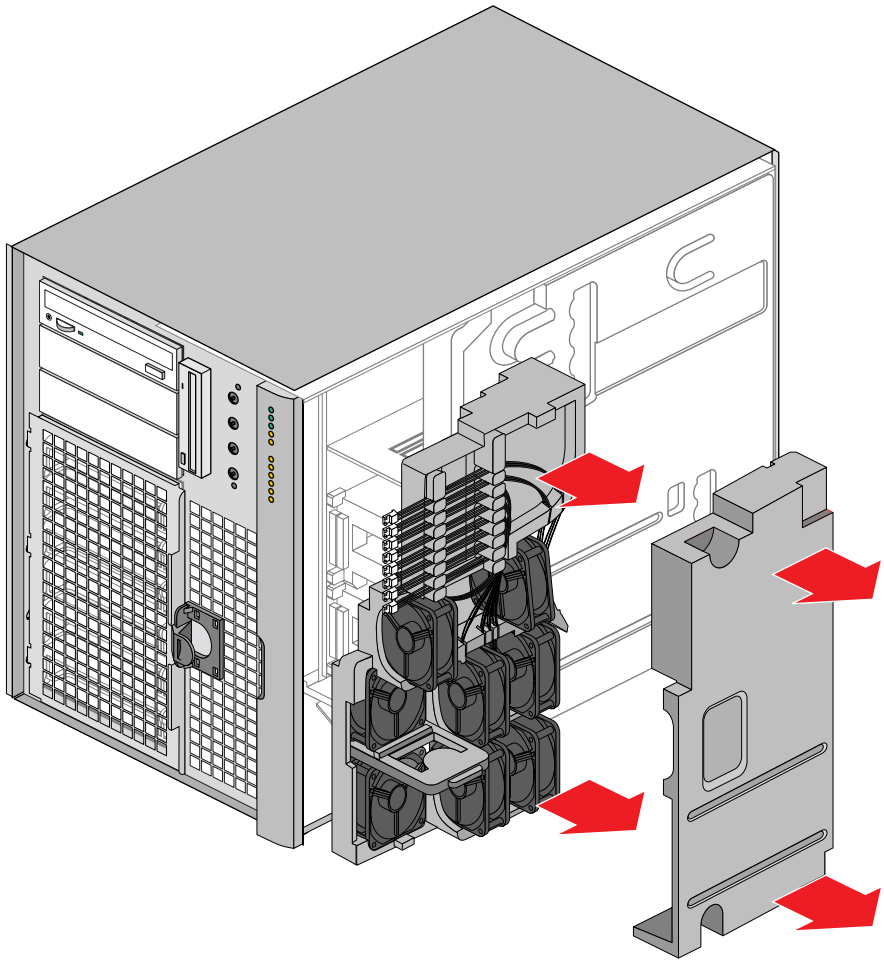

Figure 1-11 Removing the Fan Assembly

Installing the System Fan Assembly

1. Observe the safety and ESD precautions at the beginning this chapter.
2. Position the fan assembly inside the chassis so that the individual fan cables can easily reach their connectors on the front panel board.
3. Reconnect the individual fan cables, being careful to match each cable with its correct connector on the front panel board.
4. Position the fan assembly as it was inside the chassis prior to removal, so that it rests firmly against the diskette drive at the top and the 5.25-inch bays at the middle and bottom.
5. Reinstall the foam cover. It is molded to match the position of the fans and fits in only one way.
6. Reinstall the access cover using the original screws.

Removing an Individual System Fan

Note: Correct airflow direction: The side of each fan is embossed with directional arrows indicating airflow direction. Always note the direction of the arrows on a fan before removing it. You will need this information later when you install a different fan.

1. Observe the safety and ESD precautions at the beginning this chapter.
2. Remove the access cover.
3. Remove the foam cover from the front subchassis by pulling it straight out. Be careful not to break the foam.
4. For better access to the individual fan cables on the front panel board, carefully rotate the right edge of the foam fan assembly outward into the opening where the foam cover was.
5. Label and disconnect the desired fan cable from the front panel board. Be sure to note the position of the cable where it is held in place in the foam fan assembly.
6. Remove the fan cable from the foam assembly, being careful not to break the foam.
7. Remove the fan from the foam assembly. All systems fans sit differently in the assembly, but in general, each fan can slide in and out of the foam in only one way.

Note: The two installed fans nearest the 5.25-inch drive bays (fans 6 and 7) are separated by a square piece of foam (the piece with a crescent-shaped hole) that extends perpendicularly from the front of the fans (it is the rectangle between the round faces of fans 6 and 7). You must remove this piece to access the two fans it separates (pull it straight out).

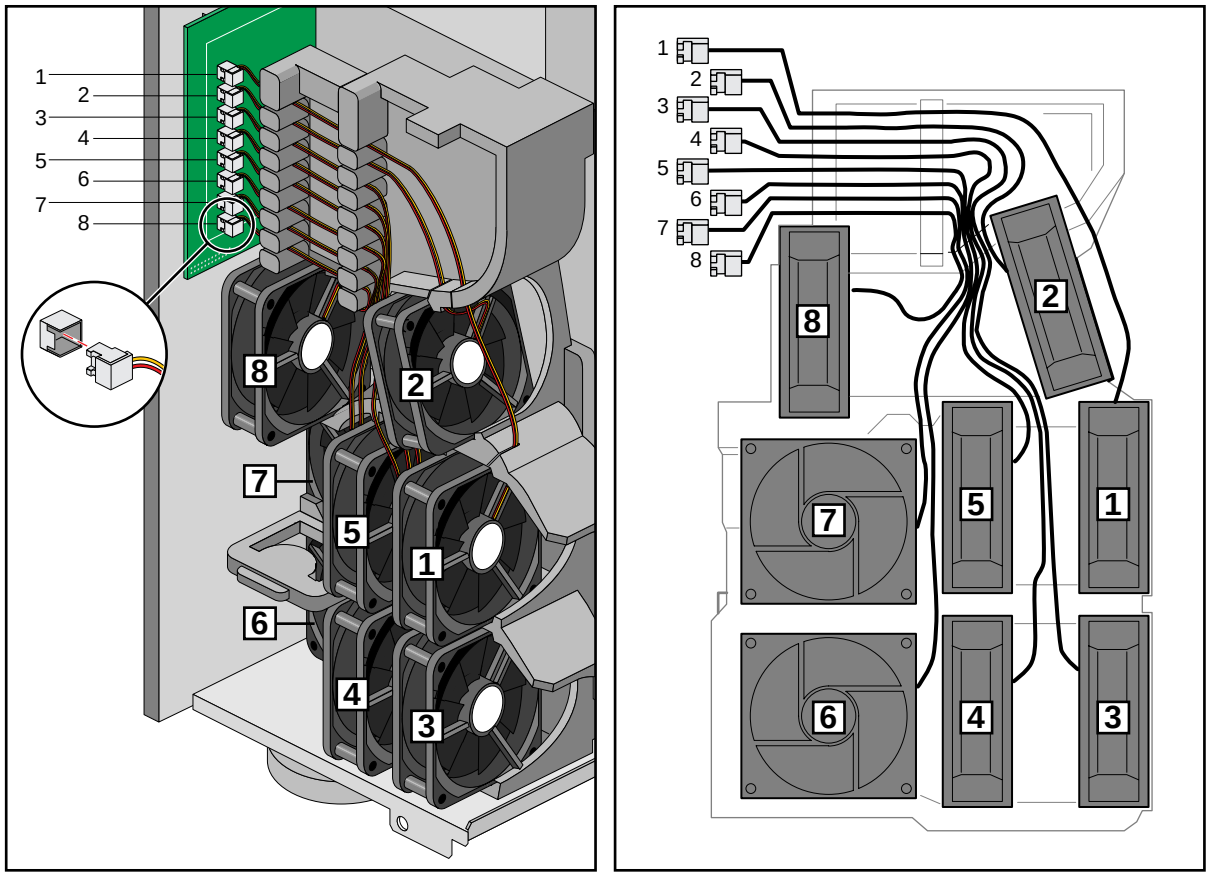

Figure 1-12 Fan Cabling

Installing an Individual System Fan

Note: A general rule about correct airflow direction: The removable fan pulls air from in front of the chassis so that it flows across the boards and out the back. Thus, the fan must be oriented for the correct airflow direction. In general, the fan's label is on the side from which air EXITS the fan. You can confirm correct orientation by checking the embossed arrows on the side of the fan:

- The ⇒ Arrow points horizontally toward the back of the chassis
- The ⇑ Arrow points vertically up

Always note the direction of the arrows on the existing fan before you remove it. Replace a failed fan with the same type as the one removed, with a tachometer signal, or an approved fan. For a list of approved fans, contact your customer service representative.

1. See "Removing an Individual System Fan" on page 24, as necessary.
2. Observe the safety and ESD precautions at the beginning this chapter.
3. Slide the fan into its correct receptacle in the foam fan assembly.
4. Attach the cable to the foam at the correct places (when REPLACING a bad fan, you should have recorded where each cable attaches to the foam).
5. Position the fan assembly inside the chassis so that the individual fan cables can easily reach their connectors on the front panel board.
6. Attach the cable to the front panel at the correct connector (when REPLACING a bad fan, you should have recorded where each cable connects to the front panel).
7. Position the fan assembly as it was inside the chassis prior to removal, so that it rests firmly against the diskette drive at the top and the 5.25-inch bays at the middle and bottom.
8. Reinstall the foam cover. It is molded to match the position of the fans and fits in only one way.
9. Reinstall the access cover using the original screws.

The Power Share Board

The server comes with three power supplies already installed for highest power availability. If one supply fails, the system can operate using two until a replacement is installed. Your SGI 1400 system has a power share board (PSB). The PSB supports one to three supplies.

You can replace an existing power share board by purchasing a kit through your SGI 1400 customer sales or service representative. The following sections describe how to replace a PSB.

Replacing the Power Share Board (PSB)

1. Observe the safety and ESD precautions at the beginning this chapter.
2. Label and disconnect all peripheral cables and all telecommunication lines connected to I/O connectors or ports on the back of the system, and unplug all AC power cords from the system and wall outlet.
3. Remove all the power supplies, see the *SGI 1400 Server Family User's Guide* if necessary.
4. Remove the access cover.
5. Open the front subchassis.
6. Remove the memory module.
7. Label and disconnect all cables to the baseboard.
8. Remove the electronics bay.
9. Disconnect the cables from the existing power share board (PSB). The board is behind the electronics bay, see Figure 1-13.
10. Remove and save the two screws (see Figure 1-14) that attach the bracket to the chassis.
11. To remove the board, lift the BRACKET END first; when you have freed the bracket from the tabs on the chassis, lift out the entire board.
12. Remove the screws that attach the bracket to the board, see Figure 1-15. Set the board aside on an antistatic surface or conductive foam pad.
13. Attach the bracket to the new PSB using the correct number of screws.

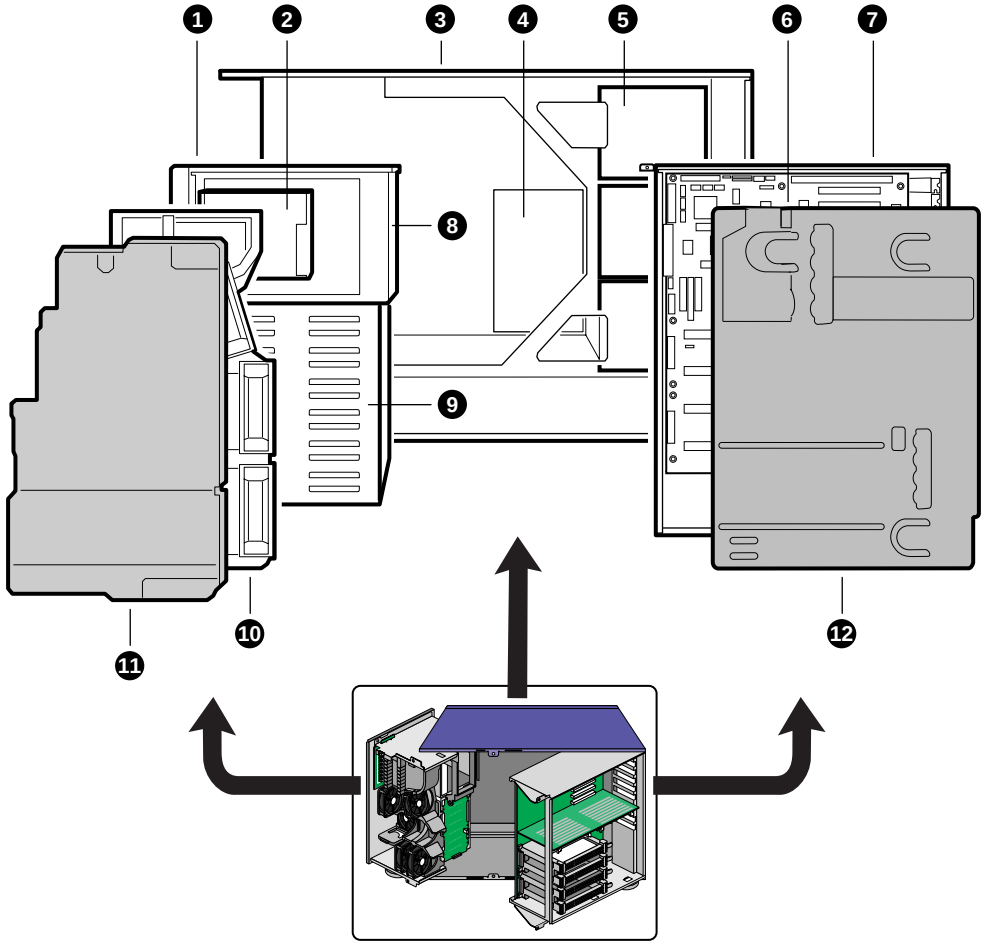

Figure 1-13 Chassis Side View

The components shown in Figure 1-13 are:

1. Front swing-out subchassis
2. Diskette drive
3. Main chassis
4. PSB
5. Power supplies

6. Baseboard (processor board)
7. Lift-out electronics bay
8. 5.25-inch device bay
9. SCSI hard drive bay
10. Foam fan housing
11. Front foam cover
12. Rear foam cover

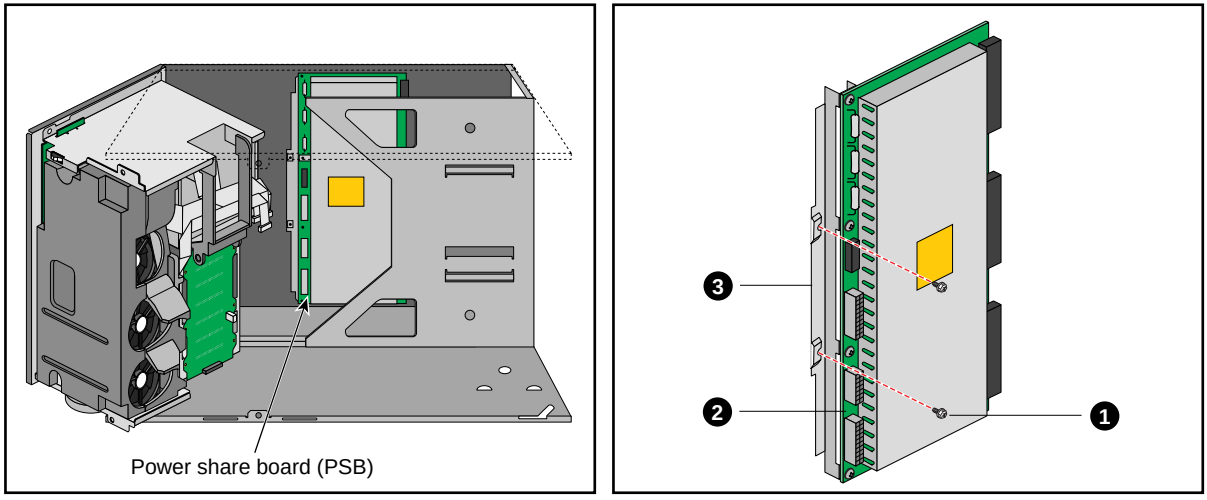

Figure 1-14 Removing the Existing Board and Bracket Assembly

The components shown in Figure 1-14 are:

1. Screws that attach the bracket to the chassis
2. Existing PSB
3. Bracket

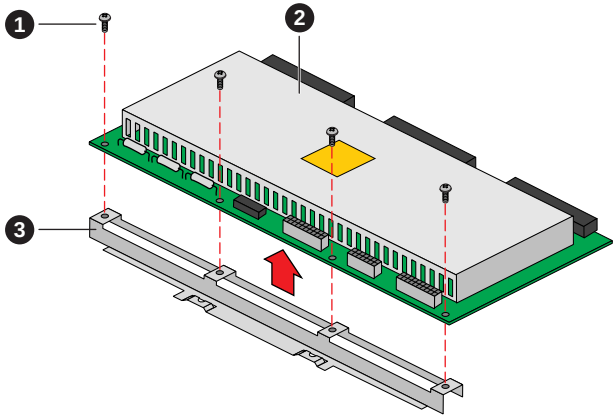

Figure 1-15 Removing the Existing Board from its Bracket

The components shown in Figure 1-15 are:

1. Screws that attach the existing board to the bracket
2. Existing PSB
3. Bracket

To correctly position the new board inside the chassis:

1. Insert the NON-BRACKET END, then push the other end down so that the two slots in the bracket slide over the corresponding tabs on the chassis wall. Figure 1-16 shows an example.
2. Use the two screws you removed earlier to attach the bracket to the chassis.

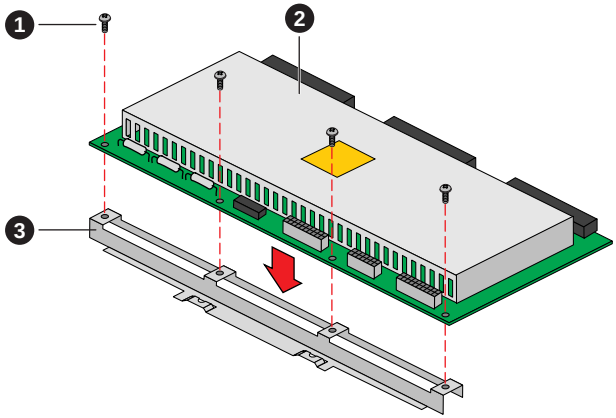

Figure 1-16 Attaching the New Board to its Bracket

The components shown in Figure 1-16 are:

1. Screws that attach the new board to the bracket
2. New PSB
3. Bracket

To reinstall the board and bracket assembly in the chassis:

1. Connect the cables to the new PSB.
2. Reattach the electronics bay.
3. Connect the new PSB cables to the baseboard.
4. Reconnect the memory module.
5. Reinstall the front and rear foam covers.
6. Reinstall the access cover using the original screws.
7. Reinstall the power supplies.
8. Connect all AC power and peripheral device cables to the rear of the system.
9. Run the FRUSDR load utility to properly configure the upgraded system.

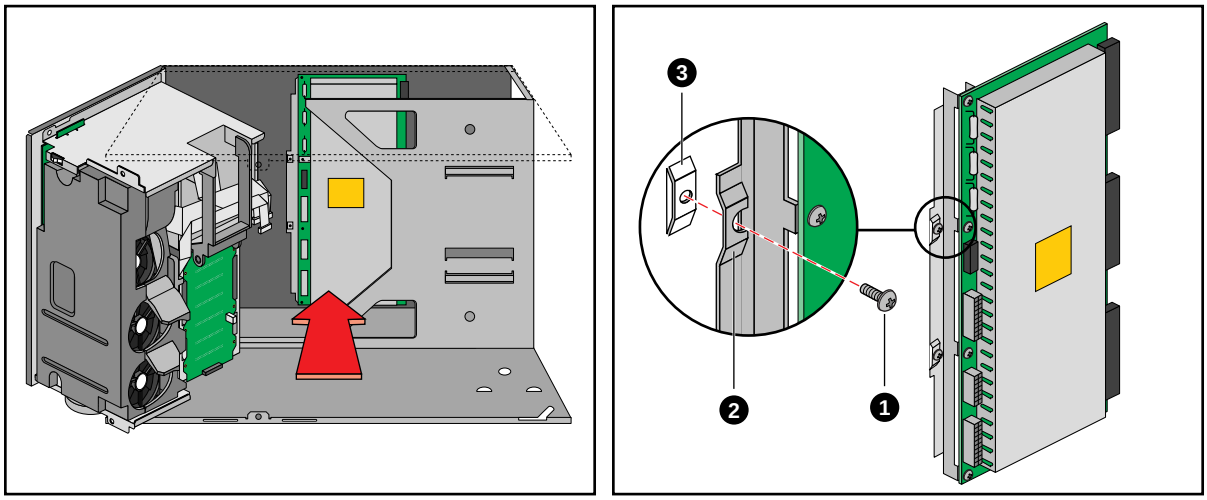

Figure 1-17 Installing the New Board and Bracket Assembly

Components shown in Figure 1-17 are:

1. Two screws that attach the bracket to the chassis
2. Two slots in the bracket that fit over two tabs on the chassis wall
3. Two tabs on the chassis wall that force correct alignment of the board and bracket assembly

Upgrading Baseboard Components

Use the information in this chapter to upgrade or replace components on the system baseboard (processor board). For information on tools needed, see Chapter 1. For a list of safety related information see “Safety: Before You Remove the Access Cover” on page 1.

For a complete list of warnings and cautions regarding internal power, ESD, and proper system cooling, be sure to read “Warnings and Cautions” in Chapter 1.

Caution: Installing or removing jumpers: A jumper is a small, plastic-encased conductor that slips over two jumper pins. Newer jumpers have a small tab on top that you can grip with your fingertips or with a pair of fine, needle-nosed pliers. If your jumpers do not have such a tab, take care when using needle-nosed pliers to remove or install a jumper; grip the narrow sides of the jumper with the pliers, never the wide sides. Gripping the wide sides can damage the contacts inside the jumper, causing intermittent problems with the function controlled by that jumper. Take care to gently grip, but not squeeze, with the pliers or other tool you use to remove a jumper; you might bend or break the stake pins on the board.

Baseboard

Use the information in the following sections to remove or install the baseboard.

Removing the Baseboard

Caution: The baseboard can be extremely sensitive to ESD and always requires careful handling. After removing it from the system, place it component-side UP on a nonconductive, static-free surface to prevent shorting out the battery leads. If you place the board on a conductive surface, the battery leads may short out. This will result in a loss of CMOS data and will drain the battery. Do not slide the baseboard over any surface.

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Remove the access cover.
3. Remove the front and rear foam covers.
4. Label and disconnect all internal cables connected to add-in boards.
5. Remove all add-in boards.
6. Label and disconnect all internal cables connected to the baseboard.

Note: The baseboard is attached to the electronics bay. In general, the best method for removing the baseboard is to remove the electronics bay first, particularly in servers mounted in a pedestal (tower) orientation, though this is not a requirement.

1. Open the front subchassis and, if necessary, remove the electronics bay.
2. Remove the processors and processor retention module.
3. Remove and save the two screws that secure the baseboard to the chassis.
4. Slide the baseboard toward the front of the server until the board's I/O connectors clear the rear of the chassis.
5. See Figure 2-1 for an example of removing the baseboard.
   - The edge of the baseboard at the TOP of the figure (NEAREST and parallel to the ISA slot) fits into a groove along the edge of the chassis.
   - The edge at the BOTTOM of the figure (OPPOSITE and parallel to the ISA slot) is free.
6. Place your fingers under the edge of the baseboard OPPOSITE the ISA slot (the edge at the bottom). Lift the edge a few inches.
7. Slide the baseboard out, toward the edge you just lifted. This will free the opposite edge (nearest the ISA slot) from the groove that secures it to the chassis.
8. Remove the baseboard and place it component-side up on a nonconductive, static-free surface or in an antistatic bag.
9. Remove and save the EMI gasket that covers the I/O connectors on the board.

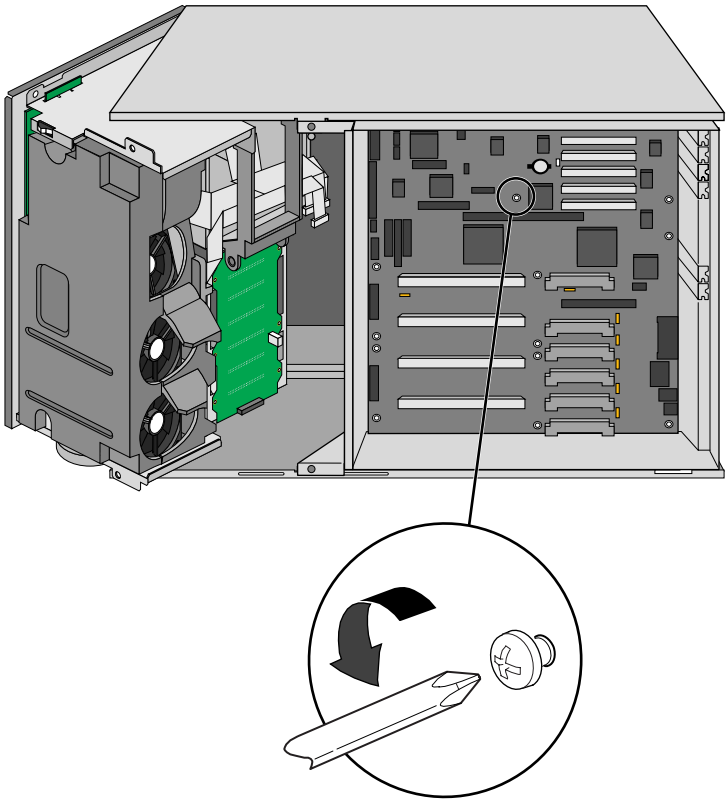

Figure 2-1 Removing the Baseboard

Installing the Baseboard

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Place the EMI gasket over the I/O connectors on the baseboard.
3. Position the board over the two snap-in standoffs and threaded standoffs inside the chassis; slide it carefully toward the rear of the system until the I/O connectors protrude through the back panel.
4. Press the board onto the snap-in standoffs, then insert one screw through one of the mounting holes of the board and into a threaded standoff. Do not tighten the screw until the next step.

5. Insert the remaining screws through the mounting holes and into the threaded standoffs. Make sure the board is properly seated, then tighten all the screws firmly (6.0 inch-pounds).
6. Connect all internal cables to the baseboard.
7. Reinstall the add-in boards as applicable.
8. Connect all internal cables to add-in boards.
9. Reinstall the electronics bay if you removed it and close the front subchassis.
10. Reinstall the front and rear foam covers.
11. Reinstall the access cover using the original screws.
12. Connect all peripheral device cables to the I/O panel on the rear of the system.
13. Run the SSU to configure the system.

Memory

Use the following sections to remove or install the memory module or DIMMs.

Removing the Memory Module

Note: Make sure you run the SSU to configure ECC memory. Failure to do so might degrade the performance of the server.

See the *SGI 1400 Server Family User's Guide* if you need more information on memory size and requirements. Use the following steps to remove a memory module:

1. Read and observe all safety and ESD precautions listed at the beginning of Chapter 1.
2. Remove the access cover.
3. Remove the rear foam cover over the electronics bay. It might be easier to do this if you also remove the front foam cover over the front subchassis, see Figure 2-2.

4. Remove the memory module from the baseboard:
   - Pull the module toward you slightly to disengage it from the baseboard connector.
   - Slide the module straight away from the baseboard until it clears the guide rails.
   - Place the module component-side up on a nonconductive, static-free surface.

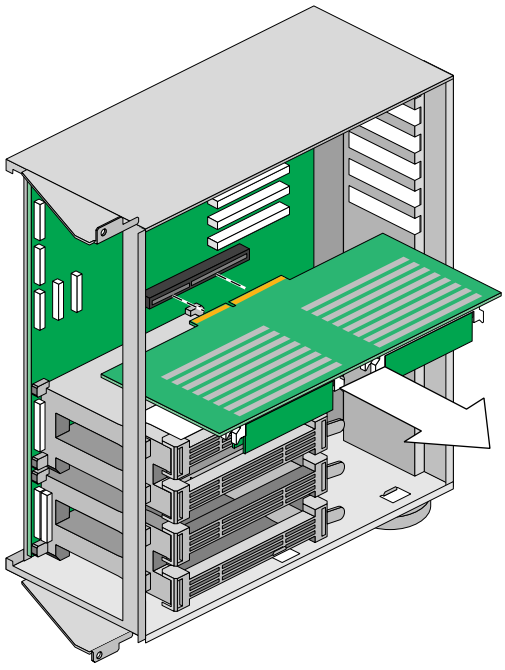

Figure 2-2 Removing the Memory Module

Installing the Memory Module

Use the following steps to install or replace a memory module:

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Holding the memory module by its edges, align the module so its edge engages in the guide rail at the back of the electronics bay.

   Note: The memory module is held in place by the 242-pin connector on the baseboard, the guide rail at the back of the electronics bay, and a plastic guide at the front of the electronics bay. You *must* support the module until it is fully seated in the connector.
3. Push the memory module toward the baseboard until it fully engages its connector.

Removing DIMMs

Caution: Use extreme care when removing a DIMM. Too much pressure can damage the socket slot. Apply only enough pressure on the plastic ejector levers to release the DIMM.

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Remove the memory module and place it component-side up on a nonconductive, static-free surface (see “Removing the Memory Module” on page 36 if you have not yet done this).
3. Gently push the plastic ejector levers out and down to eject a DIMM from its socket.
4. Hold the DIMM only by its edges, being careful not to touch its components or gold edge connectors. Carefully lift it away from the socket and store it in an antistatic package.
5. Repeat to remove other DIMMs as necessary.
   - If you are REPLACING DIMMs, proceed to “Installing DIMMs” on page 39.
   - If you are simply REMOVING DIMMs, continue the procedure with the following steps.
6. Reinstall the memory module.
7. Reinstall the foam cover(s).
8. Connect all external cables and power cords to the system.
9. Reinstall the access cover using the original screws.

10. Turn on the monitor and then the system.
11. Run the SSU / BIOS Setup to configure the system and to properly set up advanced memory attributes as required.

Installing DIMMs

DIMMs are keyed and can be inserted in only one way.

Caution: Use extreme care when installing a DIMM. Applying too much pressure can damage the socket. Mixing dissimilar metals might cause memory failures later, resulting in data corruption. Install DIMMs with gold-plated edge connectors only in gold-plated sockets.

Note: DIMM slots on the memory module must be installed only in certain configurations. See the *SGI 1400 Server Family User's Guide* if you are uncertain of the configuration requirements. Use the following steps to install new DIMMs:

1. Holding the DIMM only by its edges, remove it from its antistatic package.
2. Orient the DIMM so that the two notches in the bottom edge of the DIMM align with the keyed socket on the memory module.
3. Insert the bottom edge of the DIMM into the socket, then press down firmly on the DIMM until it seats correctly.
4. Gently push the plastic ejector levers on the socket ends to the upright position.
5. Repeat the steps to install each DIMM.
6. Reinstall the memory module.
7. Reinstall the foam cover(s).
8. Reinstall the access cover using the original screws.
9. Connect all external cables and the power cords to the system.

10. Turn on the monitor and then the system.
11. Run the SSU to configure the system and to properly attribute ECC memory.

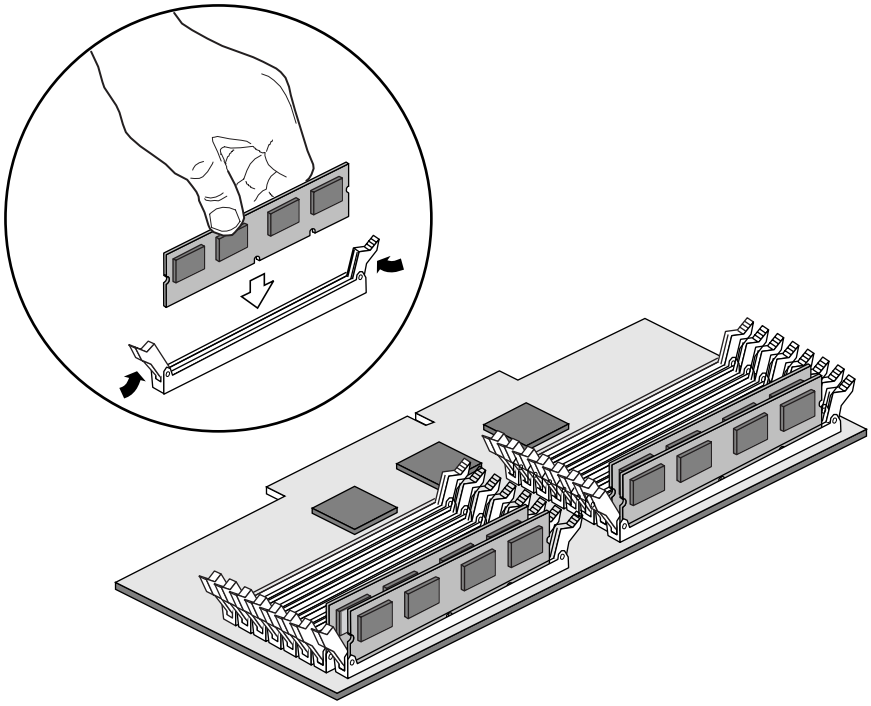

Figure 2-3 Installing a DIMM

Processors

Use the information in the following sections to remove or install a processor in the server system.

Caution: Processor must be appropriate: You might damage the system if you install a processor that is inappropriate for your system. Make sure your system can handle a newer, faster processor (thermal and power considerations). For exact information about processor interchangeability, contact your customer service representative.

Reduce the risk of electrostatic discharge (ESD) damage to the processor by doing the following:

- Touch the metal chassis before touching the processor or baseboard.
- Keep part of your body in contact with the metal chassis to dissipate the static charge while handling the processor.
- Avoid moving around unnecessarily.

Removing a Processor

1. Observe the safety and ESD precautions at the beginning of Chapter 1 and the additional cautions given here.
2. Remove the access cover and the rear foam cover over the electronics bay.
3. As you work, place processors on a grounded, static-free surface or conductive foam pad.
4. With your right thumb on the face of the retention module bracket, wrap your right index finger around the tab protruding from the right edge of the bracket. See Figure 2-4 for an example.
5. Use your index finger to slightly pull the tab outward and to the left. You should not try to pull the entire bracket; rather, the back of the tab has a latch that releases when the TAB is pulled slightly.
6. When you have released the right edge of the bracket, rotate it 90° to the left until it is perpendicular to the front of the retention module. The left edge of the bracket has an open hinge that can release from the module when you rotate the bracket to the left.
7. Disengage the open hinge by moving (not rotating) the entire bracket to the right. Remove the bracket and set it aside.
8. Pull the two tabs attached to the S.E.C. cartridge (see Figure 2-5) straight away from the baseboard. As you do, the cartridge disengages from its connector on the baseboard.
9. Slide the S.E.C. cartridge straight away from the baseboard, out of the retention module. Put it on a piece of conductive foam and store it in an antistatic package.

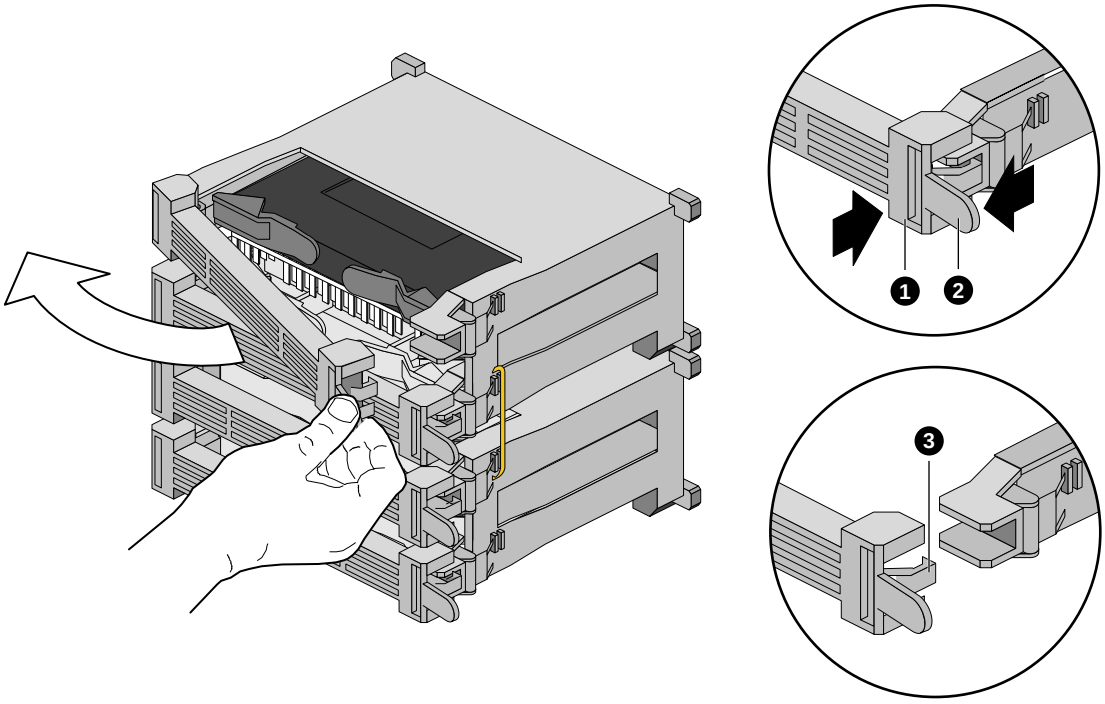

Figure 2-4 Releasing the Retention Module Bracket

Components shown in Figure 2-4 are:

1. Retention module bracket
2. Bracket tab
3. Latch

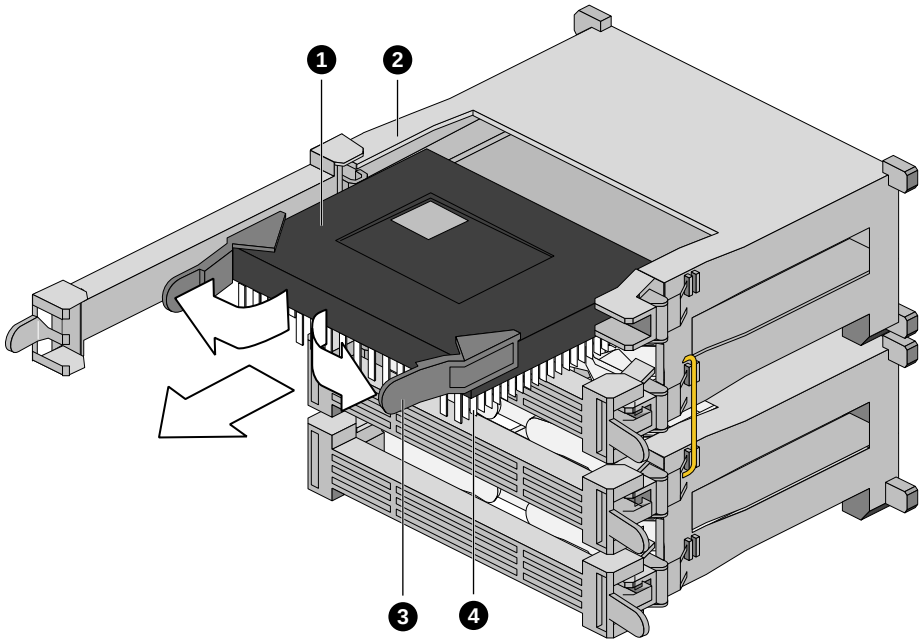

Figure 2-5 Removing a Processor

Components shown in Figure 2-5 are:

1. An S.E.C. cartridge
2. Retention module guide rails
3. Tabs on the S.E.C. cartridge
4. Processor heat sink

Installing a Processor

Use Figure 2-6 and the following steps when installing a new or additional processor.

Note: If your system has less than four processors and you are adding one, then you must remove the termination board in the empty Slot 2 connector. The procedure for removing a termination board is the same as for removing a processor.

If you plan to reduce the number of processors in your system, then you must replace a processor with a termination board. The procedure for installing a termination board is the same for installing a processor.

1. Read and observe all the safety and ESD precautions at the beginning of Chapter 1.
2. Remove the new processor from its antistatic package and place it on a grounded, static-free surface or conductive foam pad.
3. Orient the S.E.C. cartridge so that the heat sink faces away from the center of the baseboard.

   If you are installing a termination board, orient it so that the side with the white bar-code label faces away from the center of the baseboard.
4. With the tabs at the top of the S.E.C. cartridge completely open (pulled outward, away from the center of the cartridge), slide the cartridge into the guide rails of the retention module. When done properly, the triangular ends of the tabs (with two round pegs on each) fit into the entrance to the guide rails.
5. When the cartridge meets resistance, push the two tabs toward each other until the processor is fully seated.
6. Reattach the retention module bracket:
   - With the bracket in an open position (perpendicular to the front of the retention module), slide the open hinge at the left of the bracket into its receptacle at the left of the retention module.
   - Rotate the bracket to the right until it reaches the retention module. With your right thumb on the face of the bracket and your right index finger around the tab at the right of the bracket, slightly pull the tab outward and to the left to open the latch at the back of the tab.
   - As you open the latch on the back of the tab, slide the right edge of the bracket onto the retention module and release the tab. If done correctly, the bracket will be securely latched.

7. Reinstall the foam cover.
8. Reinstall the access cover using the original screws.

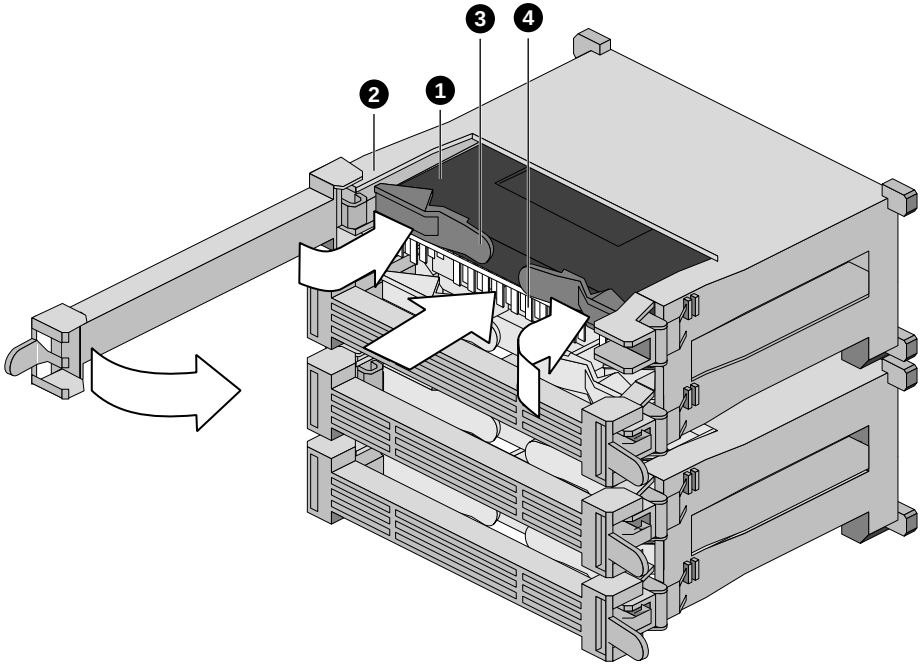

Figure 2-6 Installing a Processor

Figure 2-6 shows the following components:

1. S.E.C cartridge
2. Retention module guide rails
3. Tabs on the S.E.C. cartridge
4. Processor heat sink (must face away from center of baseboard)

Installing the Processor Tabs

Depending on your configuration, the tabs for the processor's S.E.C. cartridge might not be attached to the cartridge. In this case, you must attach two tabs to each S.E.C. cartridge as directed in the following steps:

1. Orient the tab as shown in Figure 2-7.
2. Two small round pegs at the center of the tab correspond with two round holes at each corner of the S.E.C. cartridge, see Figure 2-7. Spread the tab open slightly to get the pegs into the holes, being careful not to use too much force and break the tab.

   If done properly, the tab will rotate freely with its axis near the center of the tab, at the base of the triangular section.
3. Repeat to install the second tab to the S.E.C. cartridge.

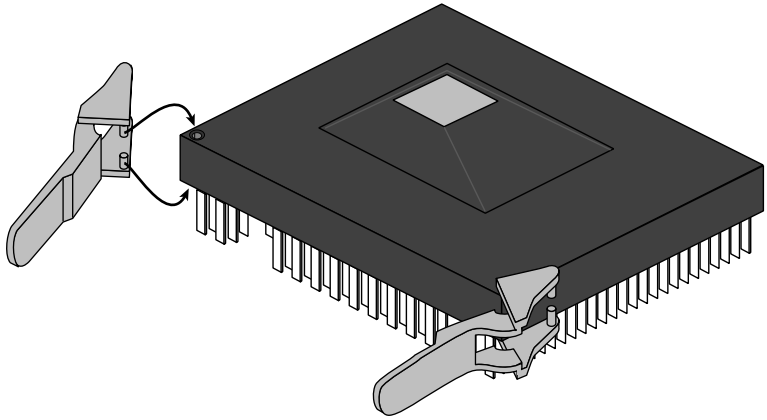

Figure 2-7 Installing Tabs on a Processor S.E.C. Cartridge

Installing Processor Heatsinks

Depending on your configuration, the heatsink for each processor's S.E.C. cartridge might not be attached to the cartridge. In this case, you must attach one heatsink to each S.E.C. cartridge. Use Figure 2-8 and the following steps:

1. Remove the heatsink from its protective cover.
2. Pull the tab on the bottom of the heatsink to remove the plastic film and expose the square of adhesive thermal grease that will help attach the heatsink to the S.E.C. cartridge. This square is offset, so that more of it is on one side of the center screw hole than on the other side. This offset side (see Figure 2-8) *must* point toward the connector end of the S.E.C. cartridge.
3. Orient the heatsink on the silver metal side of the processor so that:
   - The side with more of the grease square points toward the S.E.C. cartridge connector
   - The side with less of the grease square points toward the processor tabs
   - All five screw holes align correctly with the holes in the S.E.C. cartridge
4. Because of the adhesive grease on the heatsink, be careful to orient the heatsink properly before placing it against the S.E.C. cartridge.
5. Attach the heatsink to the S.E.C. cartridge with five 6-32 x 1/4 screws, and tighten to 8-10 inch-pounds.

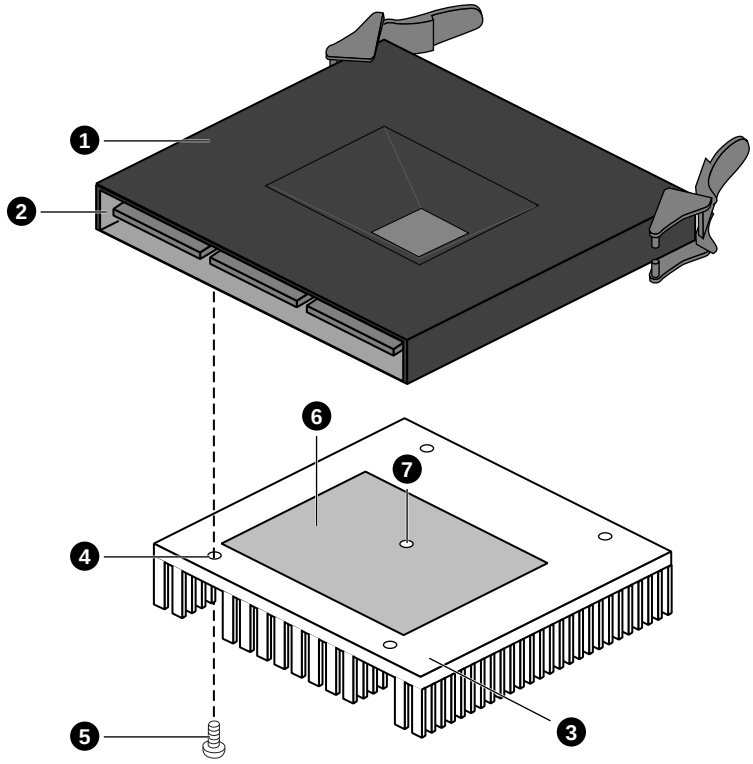

Figure 2-8 Installing a Heatsink on a Processor S.E.C. Cartridge

The locations shown in Figure 2-8 are:

1. Processor S.E.C. Cartridge
2. Processor Connector
3. The heatsink edge that goes TOWARD the connector on the S.E.C. cartridge (the grease square is off-centered toward this edge)
4. Screw hole (five total attach the heatsink to a cartridge)
5. Example screw
6. Grease square (adhesive film must be removed before mounting)
7. Center screw hole: note that the grease square is off-centered from this screw hole toward the edge (as indicated in callout 3)

Voltage Regulator Modules (VRMs)

Up to six voltage regulator modules provide power for processors. Every processor requires 1.5 VRMs, so with four processors, you must use six VRMs. Table 2-1 shows this relationship.

You must use a specific number and connector population sequence of VRMs for each combination of processors and termination boards. Table 2-2 lists the required number and location of VRMs for each potential processor. Figure 2-9 shows this information graphically.

Table 2-1 VRM and Processor Power Sequence

VRM #	VRM provides power for	Description
1	Processor #1	Processor core power only
2	Processor #1 and #2	L2 cache power only
3	Processor #2	Processor core power only
4	Processor #3	Processor core power only
5	Processor #3 and #4	L2 cache power only
6	Processor #4	Processor core power only

Table 2-2 Processor and VRM Population Sequencing

If you have a processor in connector #	You must have a VRM in connector #
1	1 and 2
1 and 2	1, 2, and 3
1, 2, and 3	1, 2, 3, 4 and 5
1, 2, 3, and 4	1, 2, 3, 4, 5, and 6

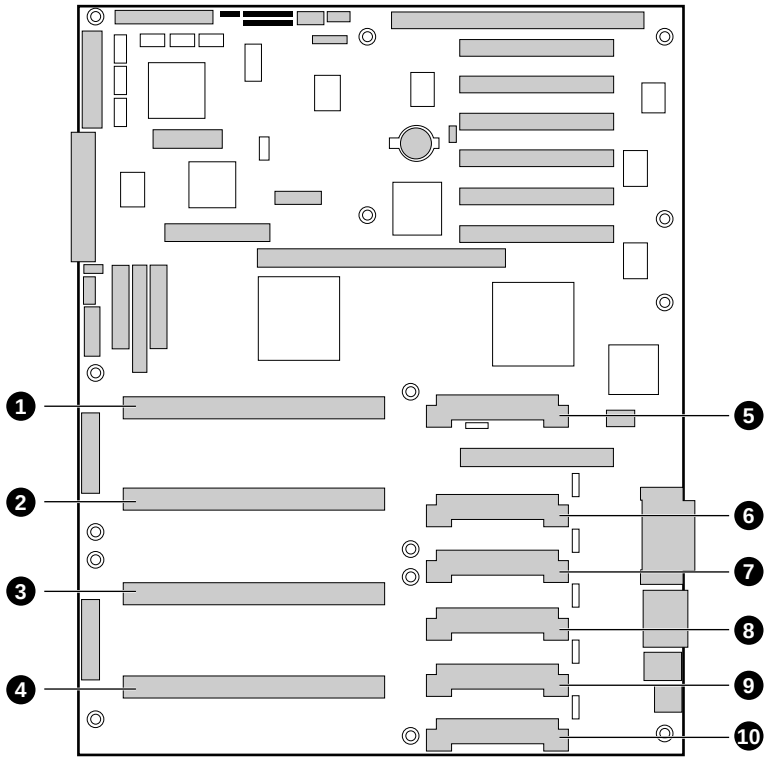

Figure 2-9 Processor and Corresponding VRM Locations

Components listed in Figure 2-9 are:

1. Processor connector #4
2. Processor connector #3
3. Processor connector #2
4. Processor connector #1
5. VRM connector #6 (used for processor #4)
6. VRM connector #5 (used for processors #3 and #4)
7. VRM connector #4 (used for processor #3)
8. VRM connector #3 (used for processor #2)

9. VRM connector #2 (used for processors #2 and #1)
10. VRM connector #1 (used for processor #1)

Removing a VRM

Use the following information and steps when removing a VRM.

Caution: VRM must be appropriate: You might damage the system if you install a VRM that is inappropriate for your system. For exact information about VRM and processor interchangeability, contact your customer service representative.

Note: Reduce the risk of electrostatic discharge (ESD) damage to the VRM by doing the following:

- Touch the metal chassis before touching the VRM or baseboard.
- Keep part of your body in contact with the metal chassis to dissipate the static charge while handling the VRM.
- Avoid moving around unnecessarily.

1. Read and observe the safety and ESD precautions at the beginning of Chapter 1 and the additional cautions given here.
2. Remove the access cover and the rear foam cover over the electronics bay.
3. As you work, place VRMs on a grounded, static-free surface or conductive foam pad.
4. Using a small flat-bladed screwdriver, push the plastic ejector levers on each end of the connector away from the VRM to eject it out of the connector.
5. Place the VRM on a nonconductive, static-free surface, or store it in an antistatic protective wrapper.

Installing a VRM

Use Figure 2-10 and the following steps to install a VRM on the system baseboard:

1. Read and observe the ESD and other warnings listed in the previous section “Removing a VRM” on page 51.
2. Remove the VRM from its protective package.
3. Carefully insert the VRM in the connector on the baseboard. See Figure 2-10 for an example.

   Note: Make sure you do not bend the connector pins.
4. Push down firmly on both ends of the VRM until the ejector levers of the connector snap into place, locking the VRM in the connector.
5. Reinstall the rear foam cover over the electronics bay.
6. Reinstall the access cover using the original screws.

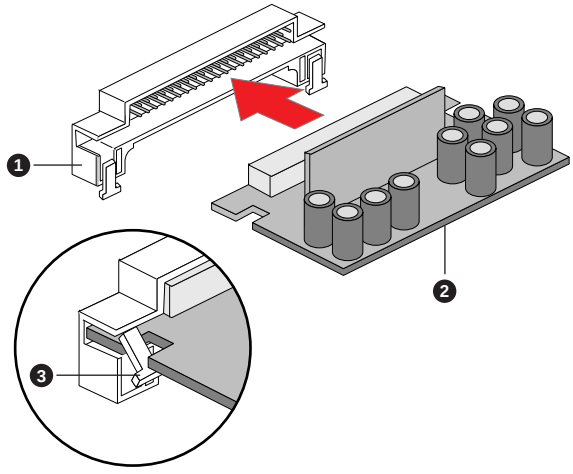

Figure 2-10 Installing a VRM

The components shown in Figure 2-10 are:

1. VRM connector on baseboard
2. VRM
3. Ejector lever

Replacing the Backup Battery

The lithium battery on the baseboard (Figure 2-11) powers the real-time clock (RTC) for three to four years in the absence of power. When the battery weakens, it loses voltage and the system settings stored in CMOS RAM in the RTC (e.g., the date and time) may be wrong. Contact your customer service representative or dealer for a list of approved devices.

Warning: If the system has been running, any installed processor and heat sink on the processor board(s) will be hot. To avoid the possibility of a burn, be careful when removing or installing baseboard components that are located near processors.

The following warning and translations of the warning are required by specific certifying agencies to be printed immediately adjacent to the procedure for removing the RTC.

Warning: There is a danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the equipment manufacturer. Discard used batteries according to manufacturer's instructions.

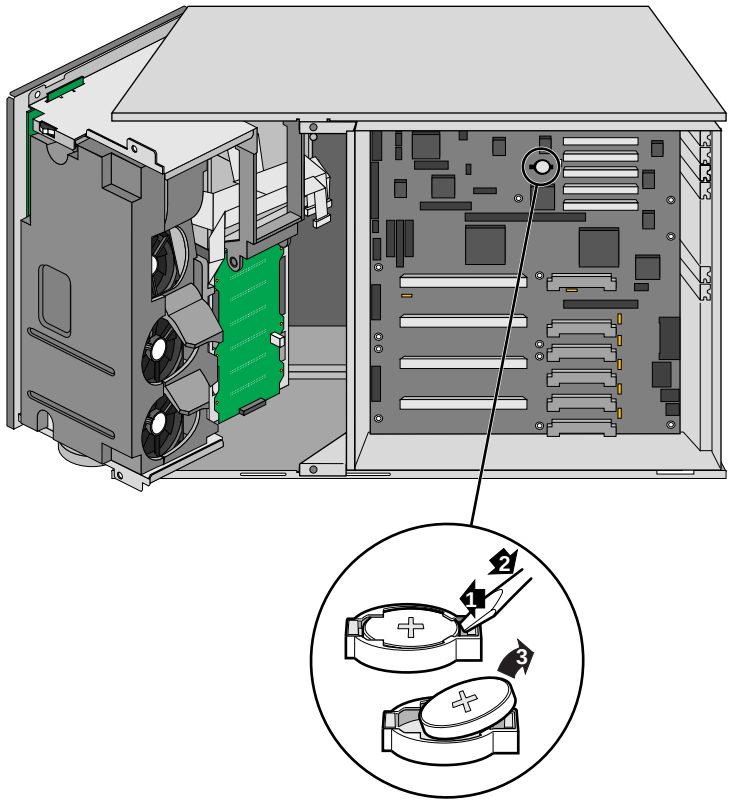

Figure 2-11 Replacing the Lithium Battery

1. Observe all the safety and ESD precautions at the beginning of Chapter 1 as well as the warnings given at the beginning of this section.
2. Remove the access cover.
3. Insert the tip of a small flat-bladed screwdriver or equivalent under the plastic tab on the snap-on plastic retainer.
4. Gently push down on the screwdriver to lift the battery.
5. Remove the battery from its socket.

6. Dispose of the battery according to local ordinance.
7. Remove the new lithium battery from its package and, being careful to observe the correct polarity, insert it in the battery socket.
8. Reinstall the plastic retainer on the lithium battery socket.
9. Reinstall the access cover using the original screws.
10. Run the SSU to restore the configuration settings to the RTC.

SGI 1400 Server SCSI Backplane Installation

SCSI Backplane Warnings and Cautions

The warnings and cautions listed a the beginning of Chapter 1 apply whenever you remove the access cover of the system. Only a technically qualified person should perform the upgrade installation described in the following sections. Also see Chapter 1 for a list of tools to use.

Safety: Before You Remove the Access Cover

Before removing the access cover at any time to work inside the system, observe these safety guidelines.

1. Turn off all peripheral devices connected to the system.
2. Turn off the system by using the push-button on/off power switch on the front of the system.
3. Unplug all AC power cords from the system or wall outlet.
4. Label and disconnect all peripheral cables and all telecommunication lines connected to I/O connectors or ports on the back of the system.
5. Provide some ESD protection by wearing an antistatic wrist strap attached to chassis ground of the system—any unpainted metal surface—when handling components.

General Procedure to Open the Chassis

1. Label and disconnect all peripheral cables and all telecommunication lines connected to I/O connectors or ports on the back of the system. Unplug all AC power cords from the system and wall outlet.
2. Remove the access cover, see Figure 3-1.

3. Remove the front foam / fan assembly and rear foam cover.
4. Open the front subchassis.
5. Proceed to the next section to replace the SCSI backplane.

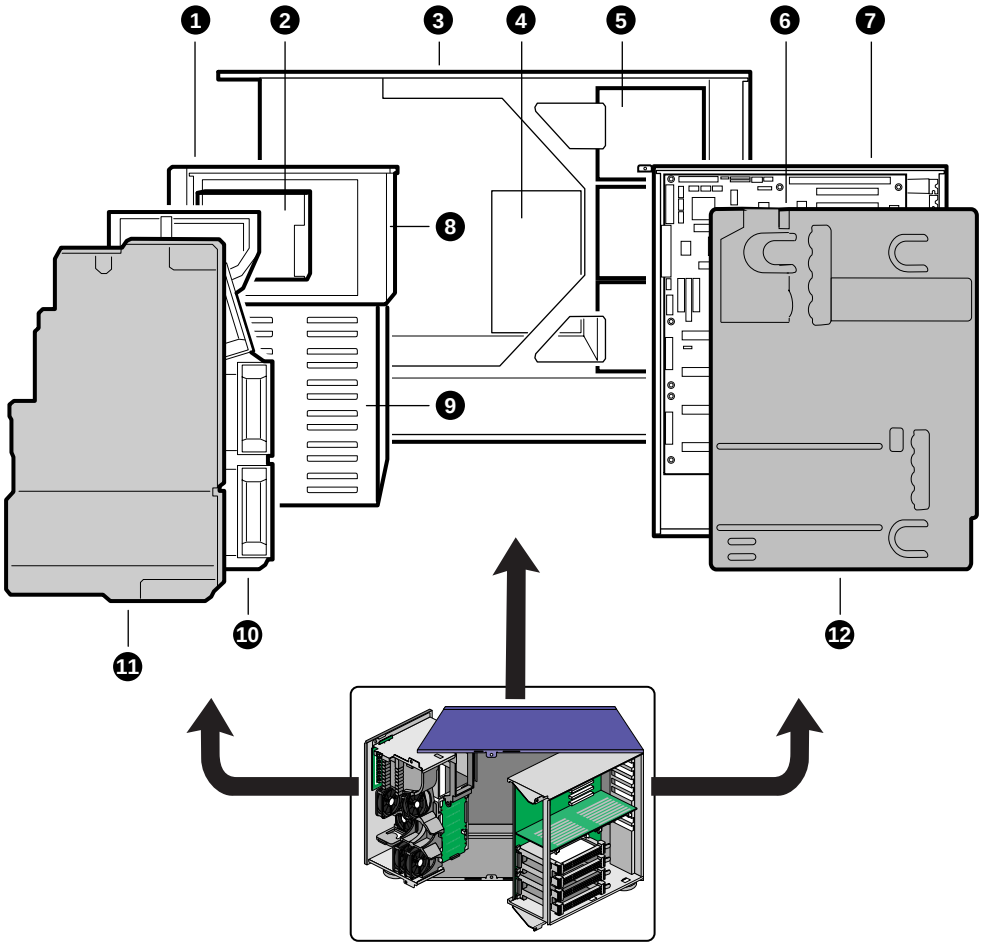

Figure 3-1 Chassis Side View

Components listed in Figure 3-1 are:

1. Front swing-out subchassis
2. Diskette drive
3. Main chassis
4. Power share board
5. Power supplies
6. Baseboard
7. Lift-out electronics bay
8. 5.25-inch device bay
9. SCSI hard drive bay: backplane mounts to rear of bay
10. Foam cover
11. Foam fan housing
12. Foam fan housing cover

Replacing an Existing Backplane

1. Remove the existing SCSI hard drive(s) from the hot-docking bay.

   Note: If the backplane has optional RAID support you must label and return all drives to their original locations.

2. Undo the three screws that hold the chassis access cover in place and remove it.
3. Label and disconnect all cables attached to the existing backplane.
4. Remove and save the three screws that attach the upper edge of the backplane to the chassis.
5. Slide the backplane out from the three clips that attach its lower end to the chassis.
6. Remove the backplane and set it aside on an antistatic surface or conductive foam pad.
7. Attach the new backplane to the chassis by first sliding the lower end into the three clips, then using the three screws you removed earlier to attach the upper end.
8. Reconnect cables (removed in step 3) to the new backplane.

9. Replace all screws and covers.
10. Plug all drives back into the bay before powering the system on.

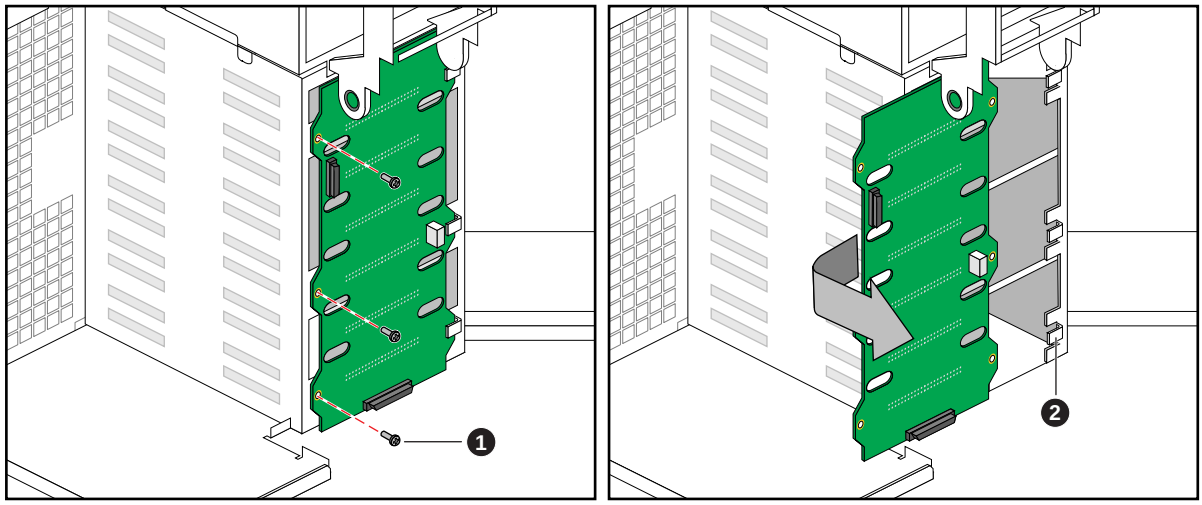

Figure 3-2 Removing the Backplane from the Chassis

Components shown in Figure 3-2 are:

1. Attachment screw locations
2. Backplane mounting notches

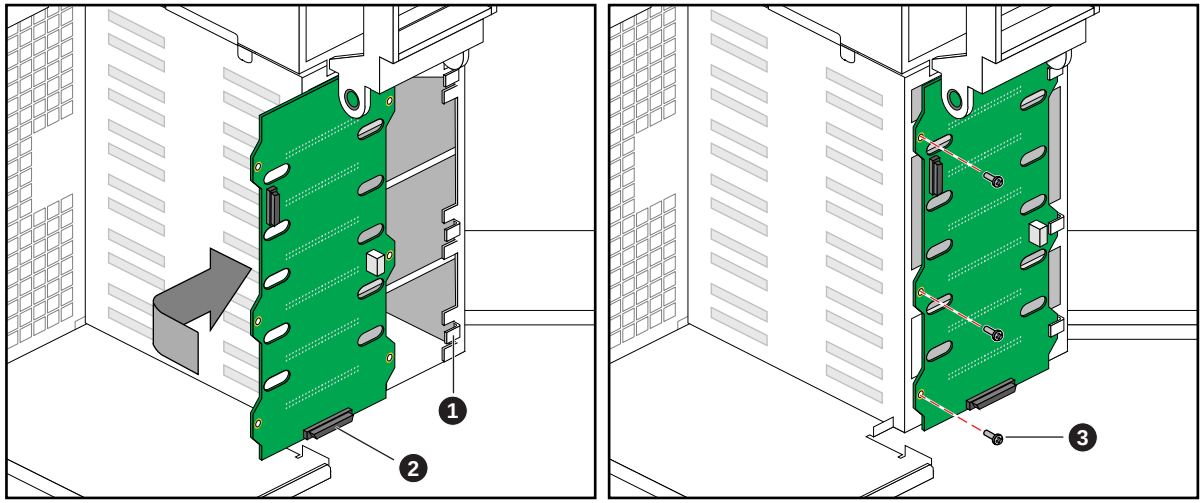

Figure 3-3 Aligning and Attaching the Backplane

Components shown in Figure 3-3 are:

1. Backplane mounting notches
2. Backplane SCSI connector
3. Attachment screw locations

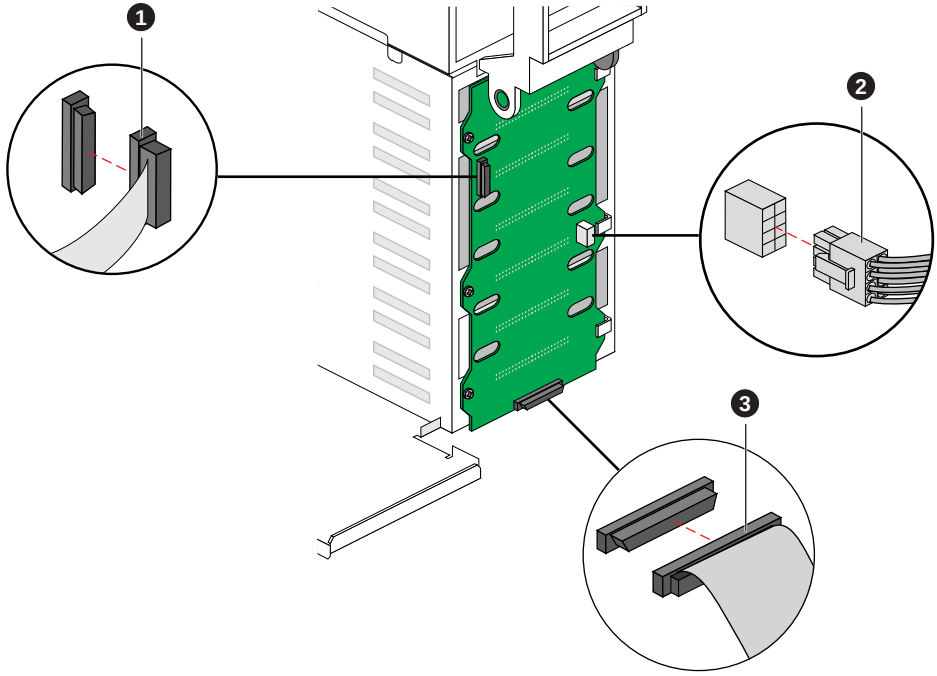

Figure 3-4 Reconnecting Cables to the New Backplane

Locations shown in Figure 3-4 are:

1. Front panel cable
2. Peripheral power cable
3. SCSI Cable

General Procedure to Close the Chassis

Follow these steps after you have finished the procedure described in the previous sections.

1. Close the front subchassis.
2. Reinstall the front and rear foam covers.
3. Reinstall the access cover using the original screws.
4. Reinstall the existing and/or new power supplies.
5. Reconnect all AC power and peripheral device cables to the rear of the system and to wall outlets.
6. Run the FRUSDR load utility to properly configure the system after adding new components. See Chapter 3 of the *SGI 1400 Server Family User's Guide.*

Technical Reference

This section includes:

- Connectors' pinouts and baseboard locations
- Information on baseboard jumpers
- System I/O Addresses
- System memory map addresses
- Baseboard interrupts
- Video modes

Baseboard Connectors

Figure 4-1 shows connector locations on the baseboard. This section provides pin information about the connectors.

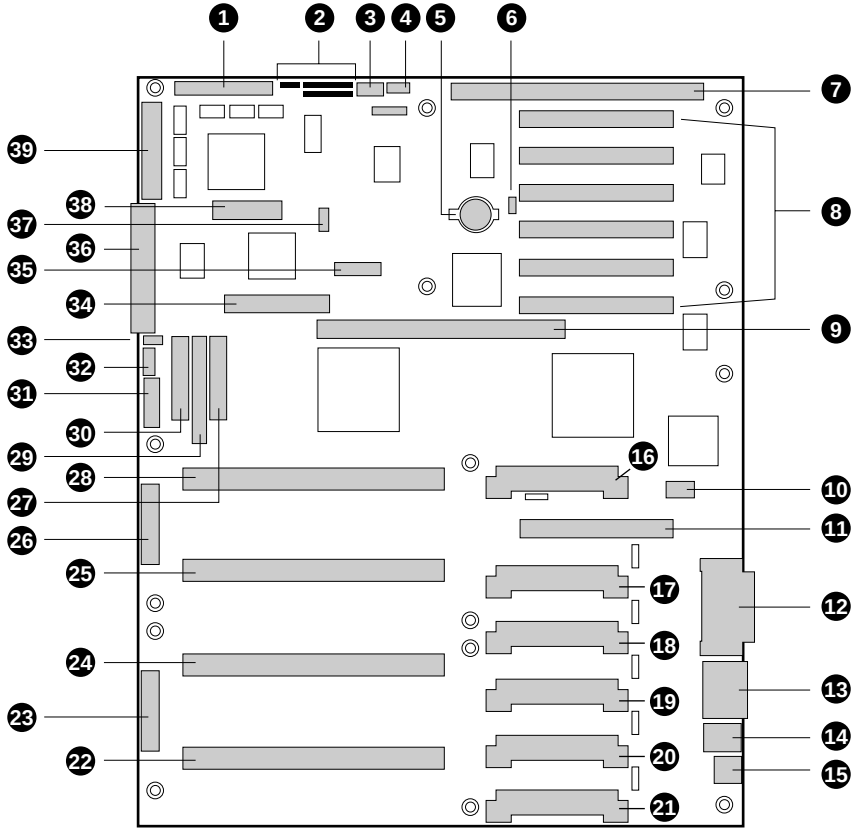

Figure 4-1 Baseboard Layout

The baseboard (processor board) components are:

1. Wide SCSI B connector (J9J1)
2. System jumpers (J6J1)
3. Hard drive input LED connector (J6J3)
4. System speaker connector (J6J2)
5. Lithium battery (B4H1)
6. Wake on LAN technology connector (J4H1)
7. ISA slot (J1J1)

8. PCI slots B4 (closest to ISA), B3, B2, B1, A3, and A2 (farthest from ISA)
9. Memory module connector (J3G1)
10. ICMB connector (J1E1)
11. PCI slot A1 (J2D1)
12. Video and parallel port connectors (J1C1)
13. Serial port connector (J1B2)
14. Keyboard and mouse connectors (J1B1)
15. USB external connector (J1A1)
16. VRM connector for processor 4 (J4E1)
17. VRM connector for processors 4 and 3 (J4C2)
18. VRM connector for processor 3 (J4C1)
19. VRM connector for processor 2 (J4B1)
20. VRM connector for processors 2 and 1 (J4A2)
21. VRM connector for processor 1 (J4A1)
22. Processor 1 Slot 2 connector (J9A1)
23. Main power connector, primary (J9B1)
24. Processor 2 Slot 2 connector (J9B2)
25. Processor 3 Slot 2 connector (J9D1)
26. Main power connector, secondary (J9D2)
27. Front panel connector (J8E1)
28. Processor 4 Slot 2 connector (J9E1)
29. IDE connector (J9E2)
30. Diskette drive connector (J9E3)
31. Auxiliary power connector (J9E4)
32. USB internal header (JC9F14)
33. SMBus connector (J9F2)
34. F16 expansion connector (J7G1)

35. ITP connector (J6G1)
36. Narrow SCSI connector (J9H1)
37. External IPMB connector (J7H1)
38. SMM connector (J8H1)
39. Wide SCSI A connector (J9H2)

Main Power Connector

Figure 4-2 shows the pins on the main power connector. Table 4-1 lists the pin signal and color.

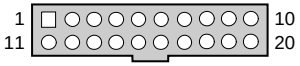

Figure 4-2 Main Power Connector Pins

Table 4-1 Main Power Connector Pinouts

Pin	Signal	Wire Color
1	+3.3 VDC	Orange
2	+3.3 VDC	Orange
3	+3.3 VDC	Orange
4	COM	Black
5	COM	Black
6	COM	Black
7	COM	Black
8	+12 VDC	Yellow
9	+12 VDC	Yellow
10	+12 VDC	Yellow
11	+3.3 VDC	Orange
12	+3.3 VDC	Orange

Table 4-1 (continued) Main Power Connector Pinouts

Pin	Signal	Wire Color
13	+3.3 VDC	Orange
14	COM	Black
15	COM	Black
16	COM	Black
17	+5V Standby	Purple
18	+5 VDC	Red
19	+5 VDC	Red
20	+5 VDC	Red

Auxiliary Power

Figure 4-3 shows the auxiliary power connector. Table 4-2 lists the pin number and signal for each pin.

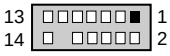

Figure 4-3 Auxiliary Power Connector

Table 4-2 Auxiliary Power Connector Pinouts

Pin	Signal
1	RTN_RS
2	5V_RS
3	3.3V_RS
4	FAN_SPEED
5	I2CSCL
6	I2CSDA
7	GND

Table 4-2 (continued) Auxiliary Power Connector Pinouts

Pin	Signal
8	SYS_PGOOD
9	PS_ON
10	GND
11	-12VCC
12	Key
13	12V_RS
14	GND

Diskette Drive

Figure 4-4 shows the diskette drive connector. Table 4-3 lists the diskette drive connector pinouts.

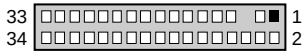

Figure 4-4 Diskette Drive Connector

Table 4-3 Diskette Drive Connector Pinouts

Pin	Signal
1	GND
2	FD_DENSEL
3	GND
4	N/C
5	Key
6	FD_DRATE0
7	GND
8	FD_INDEX_L

Table 4-3 (continued) Diskette Drive Connector Pinouts

Pin	Signal
9	GND
10	FD_MTR0_L
11	GND
12	FD_DR1_L
13	GND
14	FD_DR0_L
15	GND
16	FD_MTR1_L
17	FD_MSEN1
18	FD_DIR_L
19	GND
20	FD_STEP_L
21	GND
22	FD_WDATA_L
23	GND
24	FD_WGATE_L
25	GND
26	FD_TRK0_L
27	FD_MSEN0
28	FD_WPROT_L
29	GND
30	FD_RDATA_L
31	GND
32	FD_HDSEL_L

Table 4-3 (continued) Diskette Drive Connector Pinouts

Pin	Signal
33	GND
34	FD_DSKCHG_L

Front Panel Connector

A 30-pin connector attaches to the chassis front panel containing reset, NMI, sleep, and power control switches, LED indicators, and IPMB connection. Figure 4-5 shows the front panel connector. Table 4-4 lists the front panel connector pins and signals.

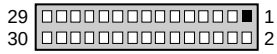

Figure 4-5 Front Panel Connector

Table 4-4 Front Panel Connector Pinouts

Pin	Signal
1	SPEAKER_OUT
2	GND
3	CHASSIS_INTRUSION
4	FP_HD_ACT_L
5	+5V
6	SLEEP_CNTRL_l
7	FAN_FAILED_L
8	POWER_LED_L
9	POWER_FAULT_L
10	GND
11	I2C_SDA

Table 4-4 (continued) Front Panel Connector Pinouts

Pin	Signal
12	NMI_FP_L
13	I2C_SCL
14	RST_FP_L
15	+5V standby
16	PWR_CNTRL_FP_L
17	FP_ISOL
18	GND
19	FAN_TACH(0)
20	FAN_TACH(1)
21	FAN_TACH(2)
22	FAN_TACH(3)
23	FAN_TACH(4)
24	FAN_TACH(5)
25	FAN_TACH(6)
26	FAN_TACH(7)
27	CLUSTER_LED
28	reserved
29	reserved
30	reserved

The SMM Connector

Figure 4-6 shows the server management module (SMM) connector. Table 4-5 lists the SMM connector pinouts.

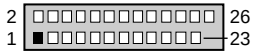

Figure 4-6 Server Management Module (SMM) Connector

Table 4-5 Server Management Module Connector Pinouts

Pin	Signal	Description
1	CPU_SMI_L	System Management Interrupt
2	LOCAL_I2C_SCL	IPMB clock line
3	GND	Ground
4	Reserved	N / A
5	PWR_CNTRL_SFC_L	Host power supply on / off control
6	LOCAL_I2C_SDA	IPMB serial data line
7	5VSTNDBY	+5V standby indication (power OK)
8	KEYLOCK_SFC_L	Keyboard lock signal
9	CPU_NMI	Nonmaskable interrupt indication
10	VCC3	3.3V power supply status input
11	RST_SFC_L	Baseboard reset signal from Server Monitor Module
12	GND	Ground
13	GND	Ground
14	Reserved	N / A
15	SECURE_MODE_BMC	Secure mode indication
16	GND	Ground
17	SFC_CHASSIS_INSTRUSION_L	Chassis intrusion indication

Table 4-5 (continued) Server Management Module Connector Pinouts

Pin	Signal	Description
18	Reserved	N / A
19	Reserved	N / A
20	GND	Ground
21	Reserved	N / A
22	Reserved	N / A
23	Reserved	Not used
24	Reserved	N / A
25	Key pin (N / C)	Connector key
26	Reserved	N / A

The IPMB Connector

Figure 4-7 shows the IPMB connector. Table 4-6 lists the IPMB pins and signals.

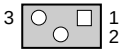

Figure 4-7 The IPMB Connector

Table 4-6 IPMB Connector Pinouts

Pin	Signal
1	LOCAL_I2C_SCL
2	GND
3	LOCAL_I2C_SDA

VGA Video Port Connector

Figure 4-8 shows the system's VGA connector. Table 4-7 lists the pinouts for the VGA connector.

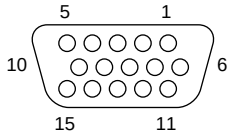

Figure 4-8 VGA Video Port Connector

Table 4-7 Video Port Connector Pinouts

Pin	Signal
1	Red
2	Green
3	Blue
4	N/C
5	GND
6	GND
7	GND
8	GND
10	GND
11	NC
12	DDCDAT
13	HSYNC
14	VSYNC
15	DDCCLK

Keyboard and Mouse

Figure 4-9 shows the keyboard and mouse connector. Table 4-8 lists the connector pinouts for the keyboard and mouse connectors.

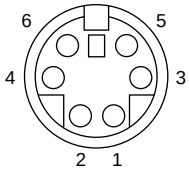

Figure 4-9 Keyboard and Mouse Connector

The PS/2-compatible connectors share a common housing, but they are functionally equivalent.

Table 4-8 Keyboard and Mouse Connector Pinouts

Pin	Keyboard signal	Mouse signal
1	KEYDAT	MSEDAT
2	NC	NC
3	GND	GND
4	FUSED_VCC (+5 V)	FUSED_VCC (+5 V)
5	KEYCLK	MSECLK
6	NC	NC

Parallel Port

Figure 4-10 shows the parallel port connection. Table 4-9 describes the parallel port connector pin signals.

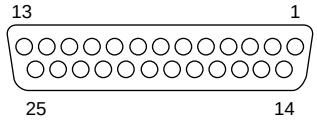

Figure 4-10 Parallel Port Connector

Table 4-9 Parallel Port Connector Pinout

Pin	Signal
1	STROBE_L
2	Data bit 0
3	Data bit 1
4	Data bit 2
5	Data bit 3
6	Data bit 4
7	Data bit 5
8	Data bit 6
9	Data bit 7
10	ACK_L
11	Busy
12	PE
13	SLCT
14	AUFDXT_L
15	ERROR_L

Table 4-9 (continued) Parallel Port Connector Pinout

Pin	Signal
16	INIT_L
17	SLCTIN_L
18–25	GND

Serial Ports A and B

Figure 4-11 shows the external serial port connector. Table 4-10 lists the serial port connector pin signals and functional descriptions.

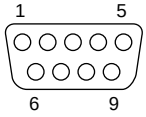

Figure 4-11 Serial Port A (External) Connector

Table 4-10 Serial Port A (External) Connector Pinout

Pin	Signal	Description
1	DCD	Data carrier detected
2	RXD	Receive data
3	TXD	Transmit data
4	DTR	Data terminal ready
5	GND	Ground
6	DSR	Data set ready
7	RTS	Request to send
8	CTS	Clear to send
9	RIA	Ring indication active

Universal Serial Bus

The server provides a single, external Universal Serial Bus (USB) connector at the back panel (see Figure 4-12) and an internal header to be used with device bay expansion. Table 4-11 lists the pinouts for the external USB connector. Table 4-12 lists the pinouts for the internal USB header.

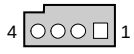

Figure 4-12 USB External Connector

Table 4-11 USB External Connector Pinout

Pin	Signal	Notes
1	VCC	Cable power
2	Data -	Data (differential pair negative)
3	Data +	Data (differential pair positive)
4	GND	Cable ground

Table 4-12 USB Internal Header Pinout

Pin	Signal	Notes
1		N/C
2	Data -	Data (differential pair negative)
3	Data +	Data (differential pair positive)
4	GND	Cable ground

Narrow SCSI Connector

Figure 4-13 shows the server's narrow SCSI connector. Table 4-13 lists the narrow SCSI connection pinouts.

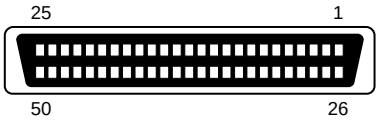

Figure 4-13 Narrow SCSI Connector

Table 4-13 Narrow SCSI Connector Pinouts

Pin	Signal
1	GND
2	SCD0_L
3	GND
4	SCD1_L
5	GND
6	SCD2_L
7	GND
8	SCD3_L
9	GND
10	SCD4_L
11	GND
12	SCD5_L
13	GND
14	SCD6_L
15	GND

Table 4-13 (continued) Narrow SCSI Connector Pinouts

Pin	Signal
16	SCD7_L
17	GND
18	SCDP_L
19	GND
20	GND
21	GND
22	GND
23	RESERVED
24	RESERVED
25	NC
26	TERMPWR
27	RESERVED
28	RESERVED
29	GND
30	GND
31	GND
32	SATN_L
33	GND
34	GND
35	GND
36	SBSY_L
37	GND
38	SACK_L
39	GND

Table 4-13 (continued) Narrow SCSI Connector Pinouts

Pin	Signal
40	SRESET_L
41	GND
42	SMSG_L
43	GND
44	SSEL_L
45	GND
46	SCD_L
47	GND
48	SREQ_L
49	GND
50	SIO_L

Wide SCSI Connector

Figure 4-14 shows the wide SCSI connector. Table 4-14 lists the wide SCSI pinouts and signal descriptions.

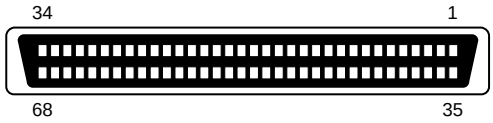

Figure 4-14 Wide SCSI Connector

Table 4-14 Wide SCSI Connector Pinouts

Pin	Signal
1-16	GND
17	TERMPWR
18	TERMPWR
19	Reserved
20-34	GND
35	DB12_L
36	DB13_L
37	DB14_L
38	DB15_L
39	DBP1_L
40	DB0_L
41	DB1_L
42	DB2_L
43	DB3_L
44	DB4_L
45	DB5_L

Table 4-14 (continued) Wide SCSI Connector Pinouts

Pin	Signal
46	DB6_L
47	DB7_L
48	DBP _L
49-50	GND
51	TERMPWR
52	TERMPWR
53	Reserved
54	GND
55	ATN_L
56	GND
57	BSY_L
58	ACK_L
59	RST_L
60	MSG_L
61	SEL_L
62	C / D_L
63	REQ_L
64	I / O_L
65	DB8_L
66	DB9_L
67	DB10_L
68	DB11_L

Internal IDE Connector

Figure 4-15 shows the server's internal IDE connector. Table 4-15 lists the connectors and signals for the internal IDE connector. If no IDE drives are present, no IDE cable should be connected. If only one IDE drive is installed, it must be connected at the end of the cable.

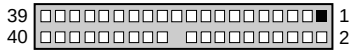

Figure 4-15 Internal IDE Connector

Table 4-15 IDE Connector Pinouts

Pin	Signal
1	RESET_L
2	GND
3	DD7
4	DD8
5	DD6
6	DD9
7	DD5
8	DD10
9	DD4
10	DD11
11	DD3
12	DD12
13	DD2
14	DD13
15	DD1
16	DD14

Table 4-15 (continued) IDE Connector Pinouts

Pin	Signal
17	DD0
18	DD15
19	GND
20	Keyed
21	IDEDRQ
22	GND
23	DIOW_L
24	GND
25	DIOR_L
26	GND
27	IORDY
28	CSEL (1 KΩ p / d)
29	IDEDAK_L
30	GND
31	IDEIRQ
32	Reserved (N / C)
33	IDESA1
34	PDIAG_L (tied to GND)
35	IDESA0
36	IDESA2
37	IDECS1_L
38	IDECS3_L

Table 4-15 (continued) IDE Connector Pinouts

Pin	Signal
39	IDEHDACT_L
40	GND

The Hard Drive LED Connector

Figure 4-16 shows the hard drive LED connector. Table 4-16 lists the pins and signals for the hard drive LED connector.

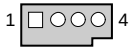

Figure 4-16 Hard Drive LED Connector

Table 4-16 Hard Drive LED Connector Pinouts

Pin	Signal
1	N/C
2	HD_LED_HDR_L
3	HD_LED_HDR_L
4	N/C

ISA Connector Pinouts

Table 4-17 lists the ISA connector pinouts and signal names.

Table 4-17 ISA Connector Pinouts

Pin	Signal
A1	IOCHK_L
A2	SD7
A3	SD6
A4	SD5
A5	SD4
A6	SD3
A7	SD2
A8	SD1
A9	SD0
A10	IOCHRDY
A11	AEN
A12	SA19
A13	SA18
A14	SA17
A15	SA16
A16	SA15
A17	SA14
A18	SA13
A19	SA12
A20	SA11
A21	SA10

Table 4-17 (continued) ISA Connector Pinouts

Pin	Signal
A22	SA9
A23	SA8
A24	SA7
A25	SA6
A26	SA5
A27	SA4
A28	SA3
A29	SA2
A30	SA1
A31	SA0
B1	GND
B2	RESET
B3	+5V
B4	IRQ9
B5	-5V
B6	DRQ2
B7	-12V
B8	SRDY_L
B9	+12V
B10	GND
B11	SMEMW_L
B12	SMEMR_L
B13	IOW_L
B14	IOR_L

Table 4-17 (continued) ISA Connector Pinouts

Pin	Signal
B15	DACK3_L
B16	DRQ3
B17	DACK1_L
B18	DRQ1
B19	REFRESH_L
B20	BCLK
B21	IRQ7
B22	IRQ6
B23	IRQ5
B24	IRQ4
B25	IRQ3
B26	DACK2_L
B27	TC
B28	BALE
B29	+5V
B30	OSC
B31	GND
Connector key	
C1	SBHE_L
C2	LA23
C3	LA22
C4	LA21
C5	LA20

Table 4-17 (continued) ISA Connector Pinouts

Pin	Signal
C6	LA19
C7	LA18
C8	LA17
C9	MEMR_L
C10	MEMW_L
C11	SD8
C12	SD9
C13	SD10
C14	SD11
C15	SD12
C16	SD13
C17	SD14
C18	SD15
Connector key	
D1	MEMCS16_L
D2	IOCS16_L
D3	IRQ10
D4	IRQ11
D5	IRQ12
D6	IRQ15
D7	IRQ14
D8	DACK0_L
D9	DRQ0

Table 4-17 (continued) ISA Connector Pinouts

Pin	Signal
D10	DACK5_L
D11	DRQ5
D12	DACK6_L
D13	DRQ6
D14	DACK7_L
D15	DRQ7
D16	+5V
D17	MASTER16_L
D18	GND

The PCI Connectors

Table 4-18 provides the PCI connector pinouts and lists the signal value.

Note: The baseboard does not provide a PCI 3.3 V power connector. Only the 5 V PCI signaling environment is supported, and no power is available at the 3.3 V signal pins in expansion slots.

Table 4-18 PCI Connector Pinouts

Pin	Signal
A1	TRST_L
A2	+12 V
A3	TMS
A4	TDI
A5	+5 V
A6	INTA_L
A7	INTC_L

Table 4-18 (continued) PCI Connector Pinouts

Pin	Signal
A8	+5 V
A9	Reserved
A10	+5 V
A11	Reserved
A12	GND
A13	GND
A14	Reserved
A15	RST_L
A16	+5 V
A17	GNT_L
A18	GND
A19	Reserved
A20	AD30
A21	+3.3 V *
A22	AD28
A23	AD26
A24	GND
A25	AD24
A26	IDSEL
A27	+3.3 V *
A28	AD22
A29	AD20
A30	GND
A31	AD18

Table 4-18 (continued) PCI Connector Pinouts

Pin	Signal
A32	AD16
A33	+3.3 V *
A34	FRAME_L
A35	GND
A36	TRDY_L
A37	GND
A38	STOP_L
A39	+3.3 V *
A40	SDONE
A41	SBO_L
A42	GND
A43	PAR
A44	AD15
A45	+3.3 V *
A46	AD13
A47	AD11
A48	GND
A49	AD9
A50	KEY
A51	KEY
A52	C/BE0_L
A53	+3.3 V *
A54	AD6
A55	AD4

Table 4-18 (continued) PCI Connector Pinouts

Pin	Signal
A56	GND
A57	AD2
A58	AD0
A59	+5 V
A60	REQ64_L
A61	+5 V
A62	+5 V
B1	-12 V
B2	TCK
B3	GND
B4	TD0 (NC)
B5	+5 V
B6	+5 V
B7	INTB_L
B8	INTD_L
B9	PRSNT1_L
B10	Reserved
B11	PRSNT2_L
B12	GND
B13	GND
B14	Reserved
B15	GND
B16	PCICLK
B17	GND

Table 4-18 (continued) PCI Connector Pinouts

Pin	Signal
B18	REQ_L
B19	+5 V
B20	AD31
B21	AD29
B22	GND
B23	AD27
B24	AD25
B25	+3.3 V *
B26	C / BE3_L
B27	AD23
B28	GND
B29	AD21
B30	AD19
B31	+3.3 V *
B32	AD17
B33	C / BE2_L
B34	GND
B35	IRDY_L
B36	+3.3 V *
B37	DEVSEL_L
B38	GND
B39	LOCK_L
B40	PERR_L
B41	+3.3 V *

Table 4-18 (continued) PCI Connector Pinouts

Pin	Signal
B42	SERR_L
B43	+3.3 V *
B44	C / BE1_L
B45	AD14
B46	GND
B47	AD12
B48	AD10
B49	GND
B50	KEY
B51	KEY
B52	AD8
B53	AD7
B54	+3.3 V *
B55	AD5
B56	AD3
B57	GND
B58	AD1
B59	+5 V
B60	ACK64_L
B61	+5 V
B62	+5 V

Baseboard Jumpers

One 11-pin single inline header provides three 3-pin jumper blocks that control various configuration options. Figure 4-17 shows the location. Items shown in **bold** in Table 4-19 show default placement for each configurable option.

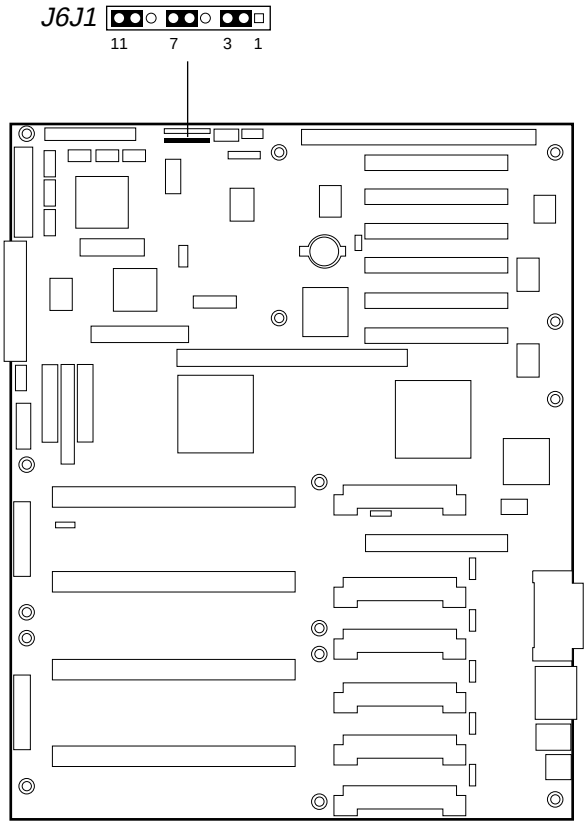

Figure 4-17 Baseboard Jumpers

Table 4-19 Baseboard Jumper Summary

Function	Pins (default in bold)	What it does at system reset
CMOS clear	**1-2, BMC Control**	Preserves the contents of NVRAM.
	2-3, Force Erase	Replaces the contents of NVRAM with the manufacturing default settings.
Password clear	**5-6, Protect**	Maintains the current system password.
	6-7, Erase	Clears the password.
Recovery Boot	**9-10, Normal**	System attempts to boot using the BIOS stored in flash memory.
	10-11, Recovery	BIOS attempts a recovery boot, loading BIOS code from a diskette into the flash device. This is typically used when the BIOS code has been corrupted.

General Procedure to Change a Jumper Setting

The short general procedure for changing a configuration setting is the same for most of the jumper functions, and is described in the following steps.

1. Read and observe the safety and ESD precautions at the beginning of Chapter 1.
2. Turn off all connected peripherals, turn off system power, and disconnect all AC power cords.
3. Remove the access cover. You do not need to remove the baseboard from the chassis, and you probably do not need to remove any add-in boards.
4. Locate the configuration jumpers at the edge of the baseboard toward the front of the system, near the narrow SCSI connector.
5. Move jumper to pins specified for the desired setting.
6. Reinstall the access cover using the original screws, connect the power cords, and turn on the system for the change to take effect.
7. You may need to repeat these steps to move the jumper back to its original setting, depending on the jumper function.

CMOS Clear Jumper

The jumper at pins 1, 2, and 3 controls whether settings stored in CMOS nonvolatile memory (NVRAM) are retained during a system reset.

Procedure to restore the system's CMOS and RTC to default values:

1. See "General Procedure to Change a Jumper Setting" on page 100.
2. Move the CMOS jumper from pins 1 and 2 to pins 2 and 3 (the Clear CMOS memory position).
3. Reinstall the access cover for your safety (using the original screws), and connect the power cords to the system.
4. Turn the system on. Wait for POST to complete and for the messages "NVRAM cleared by jumper" and "Press F2 to enter Setup" to appear. This automatically reprograms CMOS and RTC to their default settings, except for the password.
5. Enter Setup and make any changes necessary (for example, changing the boot device). Press F10 to save the new Setup configuration and exit Setup.
6. Turn off the system, and disconnect all AC power cords from the system.
7. Again remove the access cover.
8. Move the jumper from pins 2 and 3 back to pins 1 and 2 (the Protect CMOS memory position).
9. Reinstall the access cover using the original screws, and connect the power cords to the system.
10. Run BIOS Setup or the SSU to verify the correct settings. See Chapter 3 in the *SGI 1400 Server Family User's Guide*.

Password Clear Jumper

The jumper at pins 5, 6, and 7 controls whether a stored password is retained or cleared during a system reset.

Procedure to clear the current password and then enter a new one:

1. See "General Procedure to Change a Jumper Setting" on page 100.
2. Move the Password jumper from pins 5 and 6 to pins 6 and 7.

3. Reinstall the access cover for your safety (using the original screws), and connect the power cords to the system.
4. Turn the system on, and wait for POST to complete. This automatically clears the password.
5. Turn off the system, and disconnect all AC power cords.
6. Again remove the access cover.
7. Move the jumper from pins 6 and 7 back to pins 5 and 6.
8. Reinstall the access cover using the original screws, and connect the power cords to the system.
9. Run the SSU to specify a new password. See Chapter 3 in the *SGI 1400 Server Family User's Guide.*

Recovery Boot Jumper

The jumper at pins 9, 10, and 11 controls whether the system attempts to boot using the BIOS programmed in flash memory.

The following steps disable recovery booting:

1. See "General Procedure to Change a Jumper Setting" on page 100.
2. Move the recovery boot jumper from pins 9 and 10 to pins 10 and 11.
3. Reinstall the access cover for your safety (using the original screws), then connect the power cords to the system.
4. Turn the system on, and insert the Flash Memory Update Utility diskette in drive A. After the system boots, the speaker emits a single beep and the recovery process starts. This takes about three minutes. When the recovery process completes, the speaker emits two beeps.

While in the recovery mode, there is no screen display on the monitor. The keyboard is disabled as the system automatically recovers the BIOS. The beep codes listed in Table 4-20 describe the recovery status.

Table 4-20 BIOS Recovery Beep Codes

Beep Code	Message
2	Successful completion, no errors.
4	The system could not boot from the diskette. The diskette may not be bootable.
Continuous series of low beeps	The wrong BIOS recovery files are being used and / or the flash memory jumper is in the wrong position.

1. Turn the system off, disconnect all AC power cords from the system, and remove the access cover.
2. Move the jumper from pins 10 and 11 back to pins 9 and 10 to enable the normal boot mode.
3. Replace the access cover, remove the diskette from drive A, and connect the power cords to the system.
4. After running the special recovery mode, run the SSU to specify a new password. See Chapter 3 in the *SGI 1400 Server Family User's Guide*.

System I/O Addresses

Table 4-21 shows the location in I/O space of all directly I/O-accessible registers.

Table 4-21 System I/O Addresses

Address(es)	Resource	Device	Notes
0000h - 000Fh	DMA Controller 1	PIIX4E	
0010h - 001Fh	DMA Controller 1	PIIX4E	Aliased from 0000h - 000Fh
0020h - 0021h	Interrupt Controller 1	PIIX4E	
0022h - 0023h			
0024h - 0025h	Interrupt Controller 1	PIIX4E	Aliased from 0020h - 0021h
0026h - 0027h			
0028h - 0029h	Interrupt Controller 1	PIIX4E	Aliased from 0020h - 0021h
002Ah - 002Bh			
002Ch - 002Dh	Interrupt Controller 1	PIIX4E	Aliased from 0020h - 0021h
002Eh - 002Fh	Super I/O Index and Data Ports		
0030h - 0031h	Interrupt Controller 1	PIIX4E	Aliased from 0020h - 0021h
0032h - 0033h			
0034h - 0035h	Interrupt Controller 1	PIIX4E	Aliased from 0020h - 0021h
0036h - 0037h			
0038h - 0039h	Interrupt Controller 1	PIIX4E	Aliased from 0020h - 0021h
003Ah - 003Bh			
003Ch - 003Dh	Interrupt Controller 1	PIIX4E	Aliased from 0020h - 0021h
003Eh - 003Fh			
0040h - 0043h	Programmable Timers	PIIX4E	
0044h - 004Fh			
0050h - 0053h	Programmable Timers	PIIX4E	Aliased from 0040h - 0043h

Table 4-21 (continued) System I/O Addresses

Address(es)	Resource	Device	Notes
0054h - 005Fh			
0060h, 0064h	Keyboard Controller		Keyboard chip select from 87307
0061h	NMI Status & Control Register	PIIX4E	
0063h	NMI Status & Control Register	PIIX4E	Aliased
0065h	NMI Status & Control Register	PIIX4E	Aliased
0067h	NMI Status & Control Register	PIIX4E	Aliased
0070h	NMI Mask (bit 7) & RTC Address (bits 6::0)	PIIX4E	
0072h	NMI Mask (bit 7) & RTC Address (bits 6::0)	PIIX4E	Aliased from 0070h
0074h	NMI Mask (bit 7) & RTC Address (bits 6::0)	PIIX4E	Aliased from 0070h
0076h	NMI Mask (bit 7) & RTC Address (bits 6::0)	PIIX4E	Aliased from 0070h
0071h	RTC Data	PIIX4E	
0073h	RTC Data	PIIX4E	Aliased from 0071h
0075h	RTC Data	PIIX4E	Aliased from 0071h
0077h	RTC Data	PIIX4E	Aliased from 0071h
0080h - 008Fh	DMA Low Page Register	PIIX4E	
0090h - 0091h	DMA Low Page Register (aliased)	PIIX4E	
0092h	System Control Port A (PC-AT control Port) (this port not aliased in DMA range)	PIIX4E	

Table 4-21 (continued) System I/O Addresses

Address(es)	Resource	Device	Notes
0093h - 009Fh	DMA Low Page Register (aliased)	PIIX4E	
0094h	Video Display Controller		
00A0h - 00A1h	Interrupt Controller 2	PIIX4E	
00A4h - 00A15	Interrupt Controller 2 (aliased)	PIIX4E	
00A8h - 00A19	Interrupt Controller 2 (aliased)	PIIX4E	
00Ach - 00Adh	Interrupt Controller 2 (aliased)	PIIX4E	
00B0h - 00B1h	Interrupt Controller 2 (aliased)	PIIX4E	
00B2h	Advanced Power Management Control	PIIX4E	
00B3h	Advanced Power Management Status	PIIX4E	
00B4h - 00B5h	Interrupt Controller 2 (aliased)	PIIX4E	
00B8h - 00B9h	Interrupt Controller 2 (aliased)	PIIX4E	
00BCh - 00BDh	Interrupt Controller 2 (aliased)	PIIX4E	
00C0h - 00DFh	DMA Controller 2	PIIX4E	
00F0h	Clear NPX error		Resets IRQ13
00F8h - 00FFh	x87 Numeric Coprocessor		
0102h	Video Display Controller		
0170h - 0177h	Secondary Fixed Disk Controller (IDE)	PIIX4E	Not used

Table 4-21 (continued) System I/O Addresses

Address(es)	Resource	Device	Notes
01F0h - 01F7h	Primary Fixed Disk Controller (IDE)	PIIX4E	
0200h - 0207h	Game I/O Port		Not used
0220h - 022Fh	Serial Port A		
0238h - 023Fh	Serial Port B		
0278h - 027Fh	Parallel Port 3		
02E8h - 02Efh	Serial Port B		
02F8h - 02FFh	Serial Port B		
0338h - 033Fh	Serial Port B		
0370h - 0375h	Secondary Diskette		
0376h	Secondary IDE		
0377h	Secondary IDE / Diskette		
0378h - 037Fh	Parallel Port 2		
03B4h - 03Bah	Monochrome Display Port		
03BCh - 03BFh	Parallel Port 1 (Primary)		
03C0h - 03CFh	Video Display Controller		
03D4h - 03DAh	Color Graphics Controller		
03E8h - 03EFh	Serial Port A		
03F0h - 03F5h	Diskette Controller		
03F6h - 03F7h	Primary IDE - Sec. Diskette		
03F8h - 03FFh	Serial Port A (Primary)		
0400h - 043Fh	DMA Controller 1, Extended Mode Registers	PIIX4E	
04D0h - 04D1h	Interrupt Controllers 1 and 2 Control Register		

Table 4-21 (continued) System I/O Addresses

Address(es)	Resource	Device	Notes
0678h - 067Ah	Parallel Port (ECP)		
0778h - 077Ah	Parallel Port (ECP)		
07BCh - 07BEh	Parallel Port (ECP)		
0CA0 - CA3h	BMC Registers		
0CF8h	PCI CONFIG_ADDRESS Register		Located in 450NX
0CF9h	NBX Turbo and Reset control	PIIX4E	
0CFCh	PCI CONFIG_DATA Register		Located in 450NX
46E8h	Video Display Controller		

Memory Map Address Range

Table 4-22 lists the memory map address ranges and the functions they support.

Table 4-22 Memory Map Address Range

Address Range (hex)	Amount	Function
0 to 07FFFFh	640 KB	DOS region, base system memory
0A0000h to 0BFFFFh	128 KB	Video or SMM memory
0C0000h and 0DFFFFh	128 KB	Add-in board BIOS and buffer area
0E0000h to 0FFFFFh	128 KB	System BIOS
0E0000h to 0EFFFFh	2 MB	Extended system BIOS
FC000000h to FFFFFFFFh	64 MB	PCI memory space

Interrupts

Table 4-23 recommends the logical interrupt mapping of interrupt sources; it reflects a typical configuration, but these interrupts can be changed by the user. Use the information to determine how to program each interrupt. The actual interrupt map is defined using configuration registers in the PIIX4E and the I/O controller. I/O Redirection Registers in the I/O APIC are provided for each interrupt signal; the signals define hardware interrupt signal characteristics for APIC messages sent to local APIC(s).

Note: To disable either IDE controller and reuse the interrupt: if you plan to disable either IDE controller to reuse the interrupt for that controller, you must physically unplug the IDE cable from the board connector (IDE0) if a cable is present. Simply disabling the drive by configuring the SSU option does not make the interrupt available.

Table 4-23 Interrupt I/O Descriptions

Interrupt	I/O APIC level	Description
INTR	INT0	Processor interrupt
NMI	N/A	NMI from PIC to processor
IRQ1	INT1	Keyboard interrupt
Cascade	INT2	Interrupt signal from second 8259 in PIIX4E
IRQ3	INT3	Serial port A or B interrupt from SIO device (user can configure)
IRQ4	INT4	Serial port A or B interrupt from SIO device (user can configure)
IRQ5	INT5	Parallel port II
IRQ6	INT6	Diskette port
IRQ7	INT7	Parallel port
IRQ8_L	INT8	RTC interrupt
IRQ9	INT9	Signal control interrupt (SCI) used by ACPI-compliant OS
IRQ10	INT10	
IRQ11	INT11	

Table 4-23 (continued) Interrupt I/O Descriptions

Interrupt	I/O APIC level	Description
IRQ12	INT12	Mouse interrupt
	INT13	
IRQ14	INT14	Compatibility IDE interrupt from primary channel IDE devices 0 and 1
IRQ15	INT15	
SMI_L		System management interrupt—general purpose indicator sourced by the PIIX4E and BMC through the PID to the processors

Video Modes

The CL-GD5480 integrated video controller provides all standard IBM VGA modes. With 2 MB of SGRAM standard, the system supports special Cirrus Logic extended modes. Table 4-24 and Table 4-25 list the standard and extended modes that this implementation supports, including the number of colors and palette size (e.g., 16 colors out of 256 K colors), resolution, pixel frequency, and scan frequencies.

Table 4-24 Standard VGA Modes

Mode(s) in Hex	Bits per pixel	Colors (no per palette size)	Resolution	Pixel Freq. (MHz)	Horizontal Freq. (kHz)	Vertical Freq. (Hz)
0, 1	4	16/256K	360 X 400	14	31.5	70
2, 3	4	16/256K	720 X 400	28	31.5	70
4, 5	4	4/256K	320 X 200	12.5	31.5	70
6	4	2/256K	640 X 200	25	31.5	70
7	4	Mono	720 X 400	28	31.5	70
D	4	16/256K	320 X 200	12.5	31.5	70
E	4	16/256K	640 X 200	25	31.5	70
F	4	Mono	640 X 350	25	31.5	70

Table 4-24 (continued) Standard VGA Modes

Mode(s) in Hex	Bits per pixel	Colors (no per palette size)	Resolution	Pixel Freq. (MHz)	Horizontal Freq. (kHz)	Vertical Freq. (Hz)
10	4	16 / 256K	640 X 350	25	31.5	70
11	4	2 / 256K	640 X 480	25	31.5	60
12	4	16 / 256K	640 X 480	25	31.5	60
12+	4	16 / 256K	640 X 480	31.5	37.5	75
13	8	256 / 256K	320 X 200	12.5	31.5	70

Table 4-25 Extended VGA Modes

Mode(s) in Hex	Bits per pixel	Colors	Resolution	Pixel Freq. (MHz)	Horiz. Freq. (KHz)	Vert. Freq. (Hz)	Memory
58, 6A	8	16 / 256K	800 X 600	36	35.2	56	1MB
58, 6A	8	16 / 256K	800 X 600	40	37.8	60	1MB
58, 6A	8	16 / 256K	800 X 600	50	48.1	72	1MB
58, 6A	8	16 / 256K	800 X 600	49.5	46.9	75	1MB
5C	8	256 / 256K	800 X 600	36	35.2	56	1MB
5C	8	256 / 256K	800 X 600	40	37.9	60	1MB
5C	8	256 / 256K	800 X 600	50	48.1	72	1MB
5C	8	256 / 256K	800 X 600	49.5	46.9	75	1MB
5C	8	256 / 256K	800 X 600	56.25	53.7	85	1MB
5C	8	256 / 256K	800 X 600	68.2	63.6	100	1MB
5D	8	16 / 256K (interlaced)	1024 X 768	44.9	35.5	43	1MB
5D	8	16 / 256K	1024 X 768	65	48.3	60	1MB
5D	8	16 / 256K	1024 X 768	75	56	70	1MB

Table 4-25 (continued) Extended VGA Modes

Mode(s) in Hex	Bits per pixel	Colors	Resolution	Pixel Freq. (MHz)	Horiz. Freq. (KHz)	Vert. Freq. (Hz)	Memory
5D	8	16 / 256K	1024 X 768	78.7	60	75	1MB
5E	8	256 / 256K	640 X 400	25	31.5	70	1MB
5F	8	256 / 256K	640 X 480	25	31.5	60	1MB
5F	8	256 / 256K	640 X 480	31.5	37.9	72	1MB
5F	8	256 / 256K	640 X 480	31.5	37.5	75	1MB
5F	8	256 / 256K	640 X 480	36	43.3	85	1MB
5F	8	256 / 256K	640 X 480	43.2	50.9	100	1MB
60	8	256 / 256K (interlaced)	1024 X 768	44.9	35.5	43	1MB
60	8	256 / 256K	1024 X 768	65	48.3	60	1MB
60	8	256 / 256K	1024 X 768	75	56	70	1MB
60	8	256 / 256K	1024 X 768	78.7	60	75	1MB
60	8	256 / 256K	1024 X 768	94.5	68.3	85	1MB
60	8	256 / 256K	1024 X 768	113.3	81.4	100	1MB
64	16	64K	640 X 480	25	31.5	60	1MB
64	16	64K	640 X 480	31.5	37.9	72	1MB
64	16	64K	640 X 480	31.5	37.5	75	1MB
64	16	64K	640 X 480	36	43.3	85	1MB
64	16	64K	640 X 480	43.2	50.9	100	1MB
65	16	64K	800 X 600	36	35.2	56	1MB
65	16	64K	800 X 600	40	37.8	60	1MB
65	16	64K	800 X 600	50	48.1	72	1MB
65	16	64K	800 X 600	49.5	46.9	75	1MB
65	16	64K	800 X 600	56.25	53.7	85	1MB

Table 4-25 (continued) Extended VGA Modes

Mode(s) in Hex	Bits per pixel	Colors	Resolution	Pixel Freq. (MHz)	Horiz. Freq. (KHz)	Vert. Freq. (Hz)	Memory
65	16	64K	800 X 600	68.2	63.6	100	1MB
66	16	32K	640 X 480	25	31.5	60	1MB
66	16	32K	640 X 480	31.5	37.9	72	1MB
66	16	32K	640 X 480	31.5	37.5	75	1MB
66	16	32K	640 X 480	36	43.3	85	1MB
66	16	32K	640 X 480	43.2	50.9	100	1MB
67	16	32K	800 X 600	36	35.2	56	1MB
67	16	32K	800 X 600	40	37.8	60	1MB
67	16	32K	800 X 600	50	48.1	72	1MB
67	16	32K	800 X 600	49.5	46.9	75	1MB
67	16	32K	800 X 600	56.25	53.7	85	1MB
67	16	32K	800 X 600	68.2	63.6	100	1MB
68	16	32K (interlaced)	1024 X 768	44.9	35.5	43	2MB
68	16	32K	1024 X 768	65	48.3	60	2MB
68	16	32K	1024 X 768	75	56	70	2MB
68	16	32K	1024 X 768	78.7	60	75	2MB
68	16	32K	1024 X 768	94.5	68.3	85	2MB
68	16	32K	1024 X 768	113.3	81.4	100	2MB
6C	8	16/256K (interlaced)	1280 X 1024	75	48	43	1MB
6D	8	256/256K (interlaced)	1280 X 1024	75	48	43	2MB
6D	8	256/256K	1280 X 1024	108	65	60	2MB
6D	8	256/256K	1280 X 1024	135	80	75	2MB

Table 4-25 (continued) Extended VGA Modes

Mode(s) in Hex	Bits per pixel	Colors	Resolution	Pixel Freq. (MHz)	Horiz. Freq. (KHz)	Vert. Freq. (Hz)	Memory
6D	8	256 / 256K	1280 X 1024	157.5	91	85	2MB
6E	16	32K	1152 X 864	94.5	63.9	70	2MB
6E	16	32K	1152 X 864	108	67.5	75	2MB
6E	16	32K	1152 X 864	121.5	76.7	85	2MB
6E	16	32K	1152 X 864	143.5	91.5	100	2MB
71	24	16M	640 X 480	25	31.5	60	1MB
71	24	16M	640 X 480	31.5	37.9	72	1MB
71	24	16M	640 X 480	31.5	37.5	75	1MB
71	24	16M	640 X 480	36	43.3	85	1MB
71	24	16M	640 X 480	43.2	50.9	100	1MB
74	16	64K (interlaced)	1024 X 768	44.9	35.5	43	2MB
74	16	64K	1024 X 768	65	48.3	60	2MB
74	16	64K	1024 X 768	75	56	70	2MB
74	16	64K	1024 X 768	78.7	60	75	2MB
74	16	64K	1024 X 768	94.5	68.3	85	2MB
74	16	64K	1024 X 768	113.3	81.4	100	2MB
78	16	32K	800 X 600	36	35.2	56	1MB
78	24	16M	800 X 600	40	37.8	60	2MB
78	24	16M	800 X 600	50	48.1	72	2MB
78	24	16M	800 X 600	49.5	46.9	75	2MB
78	24	16M	800 X 600	56.25	53.7	85	2MB
78	24	16M	800 X 600	68.2	63.6	100	2MB

Table 4-25 (continued) Extended VGA Modes

Mode(s) in Hex	Bits per pixel	Colors	Resolution	Pixel Freq. (MHz)	Horiz. Freq. (KHz)	Vert. Freq. (Hz)	Memory
7B	8	256 / 256K (interlaced)	1600 X 1200	135	62.5	48	2MB
7B	8	256 / 256K	1600 X 1200	162	75	60	2MB
7C	8	256 / 256K	1152 X 864	94.5	63.9	70	1MB
7C	8	256 / 256K	1152 X 864	108	67.5	75	1MB
7C	8	256 / 256K	1152 X 864	121.5	76.7	85	1MB
7C	8	256 / 256K	1152 X 864	143.5	91.5	100	1MB
7D	16	64K	1152 X 864	94.5	63.9	70	2MB
7D	16	64K	1152 X 864	108	67.5	75	2MB
7D	16	64K	1152 X 864	121.5	76.7	85	2MB
7D	16	64K	1152 X 864	143.5	91.5	100	2MB

Equipment Log

Use the blank equipment log provided here (Table A-1) to record information about your system. You will need some of this information when you run the SSU.

Table A-1 Equipment Log

Item	Manufacturer Name and Model Number	Serial Number	Date Installed
System			
Baseboard			
Processor speed and cache			
Video display			
Keyboard			
Mouse			
Diskette drive A			
Diskette drive B			
Tape drive			
CD-ROM drive			

Table A-1 (continued) Equipment Log

Item	Manufacturer Name and Model Number	Serial Number	Date Installed
Hard disk drive 1			
Hard disk drive 2			
Hard disk drive 3			
Hard disk drive 4			
Hard disk drive 5			
SCSI host adapter board 1			

Table A-1 (continued) Equipment Log

Item	Manufacturer Name and Model Number	Serial Number	Date Installed

Configuration Worksheets

The rest of this chapter consists of worksheets to record the settings you make when configuring the system using the SSU, BIOS Setup, and the Symbios SCSI Utility. If default values ever need to be restored to CMOS (e.g., after a CMOS-clear), you must reconfigure the system. Referring to the filled-in worksheets could make your task easier.

Circle or write in your selections or the values that are displayed onscreen.

Current Usage

As all SGI 1400 servers come equipped with three power supplies standard, power usage is not generally a critical consideration. The system administrator or service person may wish to calculate system power usage for other reasons.

As an overall current usage limitation on the power supply, do not exceed a combined power output of 195 watts for the +5 and +3.3 volt outputs.

Calculating Power Usage

The total combined wattage for the system configuration **must be less than 400 watts**. Use the two worksheets in this section to calculate the total used by your system. For current and voltage requirements of add-in boards and peripherals, see your vendor documents.

Worksheet, Calculating DC Power Usage

1. List the current for each board and device in the appropriate voltage level column of Table A-2.
2. Add the currents in each column. Then go to the next worksheet.

Table A-2 Power Usage Worksheet

Device, by Current (maximum) at voltage level:	+3.3 V	+5 V	–5 V	+12 V	–12 V
Boards, processors, and memory (get totals from your board manual)					
SCSI backplane					
Front panel board					
3.5-inch diskette drive		0.3 A			
CD-ROM drive		0.4 A		1.0 A	
Second 5.25-inch device					
1st hot-swap hard drive					
2nd hot-swap hard drive					
3rd hot-swap hard drive					
4th hot-swap hard drive					
5th hot-swap hard drive					
Cooling fan 1, 120 mm				0.6 A	
Cooling fan 2, 120 mm				0.6 A	
Cooling fan 3, 120 mm				0.6 A	
Total Current					

Worksheet, Total Combined Power Used by the System

1. From the previous worksheet, enter the total current for each column.
2. Multiply the voltage by the total current to get the total wattage for each voltage level as indicated in Table A-3.
3. Add the total wattage for each voltage level to arrive at a total combined power usage on the power supply.

Table A-3 Power Usage Worksheet (Total Watts)

Voltage level and total current (V X A = W)	Total Watts for each voltage level
(+3.3 V) X (_____ A)	_____ W
(+5 V) X (_____ A)	_____ W
(–5 V) X (_____ A)	_____ W
(+12 V) X (_____ A)	_____ W
(–12 V) X (_____ A)	_____ W
Total Combined Wattage	_____ W

System Setup Utility (SSU) Worksheets

This section provides worksheets for tracking changes made using the SSU.

Adding and Removing Boards

Table A-4 provides PCI board information.

Table A-4 Add or Remove PCI Boards

Baseboard	
PCI Host Bridge Device	Bus 0 Dev 0
PCI SCSI Device	Bus 0 Dev B
PCI Ethernet Device	Bus 0 Dev 10
PCI VGA Device	Bus 0 Dev 12
PCI Multifunction Device	Bus 0 Dev 14

ISA Board Definition

If you have an ISA board with no.CFG file, you can define the board by using the SSU. It is necessary to define an ISA board only when you want to prevent other boards in the system from using the same IRQ levels, DMA channels, I/O Port addresses, or Memory addresses that your ISA board uses. Table A-5 provides some ISA board definitions.

Table A-5 ISA Board Definition

(ISA) Board Name	
Manufacturer	
Board Type	Video Board Memory Board Multifunction Board Keyboard Mass Storage Device Numeric Coprocessor Network Board Operating System Communications Board CPU Board Parallel Port Joystick Board Pointing Device Other
Board Slot	16 Bit / 8 Bit / 8 or 16 Bit
DMA	Channel: Size: Byte / Word Timing: Default / Type A / Type B
IRQ	Level: Trigger: Edge / Level
Ports ISA Port Definition	Start: End: Size: Byte / Word
Memory ISA Memory Definition	Size: KB Address: h RAM / ROM Don't Cache / Cache Use: System / Expanded / Virtual / Other Width: Byte / Word Decode: 24 Bit / 20 Bit

Baseboard (SSU, Change Configuration Settings)

Table A-6 Systems Group

System Identification and Version Information	
SSU Configuration File Version	
MP Spec. Version	1.1 / 1.4
Processor Speed Setting	

Table A-7 Memory Subsystem Group

Onboard Disk Controllers	
Onboard Communication Devices	Enable / Disable

Table A-8 Onboard Disk Controllers

Onboard Diskette Controller	Enable / Disable
Primary Onboard IDE Controller	Enable / Disable
Secondary Onboard IDE Controller	Enable / Disable

Table A-9 Onboard Communications Devices

Serial Port 1 Configuration
Serial Port 2 Configuration
Serial Port 2 Mode
Parallel Port Configuration
Parallel Port Mode

Table A-10 Diskette Drive Subsystems Group

Diskette drive A Options
Diskette drive B Options

Table A-11 IDE Subsystem Group

IDE Configuration **Primary Master**	(drive name) None / User / Auto / CD
IDE Drive Options **Primary Master**	2 Sector / Block / 4 Sector / Block 8 Sector / Block / 16 Sector / Block / Disable
Transfer Mode **Primary Master**	PIO 1 / PIO 2 / PIO 3 / PIO 4
IDE Configuration **Primary Slave**	(drive name) None / User / Auto / CD
IDE Drive Options **Primary Slave**	2 Sector / Block / 4 Sector / Block / 8 Sector / Block / 16 Sector / Block / Disable
Translation Mode **Primary Slave**	Standard CHS Logical Block Addressing
Transfer Mode **Primary Slave**	PIO 1 / PIO 2 / PIO 3 / PIO 4

Table A-12 Multiboot Group

Boot Device Priority	Diskette Drive Removable Devices Hard Drive ATAPI CD-ROM Drive Diagnostic Boot

Table A-13 Keyboard and Mouse Subsystem Group

Typematic Delay	250 ms delay / 500 ms delay 750 ms delay / 1000 ms delay
Typematic Speed	30 CPS / (other)
Mouse Control option	Mouse Enabled / Disabled

Table A-14 Console Redirection

COM Port for Redirection	Port 3F8 / IRQ4 / Port 2F8 / IRQ3 Port 3E8h / IRQ 3 / Disable
Serial Port baud rate	9600 / 19.2k / 38.4k / 115.2k
Hardware Flow Control	None / CTS / RTS / CTS / RTS + CD / Xoff / Xon
Terminal Type	PC - ANSI / VT 100

Table A-15 Security Subsystems Worksheet

Administrative Password	Disable / Enable
User Password	Disable / Enable
Secure Mode Hot-Key	None / Ctrl-Alt-{ }
Lockout Timer	Disable / { } minutes
Secure Boot Mode	Disable / Enable
Video Blanking	Disable / Enable
Diskette Writes	Disable / Enable
Reset / Power Switch Locking	Disable / Enable

Table A-16 SCSI ROM BIOS Options Group

Onboard SCSI ROM BIOS scan	Enable / Disable

Table A-17 Management Subsystem Group

System Sensor Control	Write your selections on a separate page.
SMM Enable	Enable / Disable
Event Logging	Enable / Disable
PCI System Error Detection	Enable / Disable

Management Subsystem, System Sensor Control Worksheet

For each sensor control, the display includes the choices shown below, with blanks for entering values. Write in both the sensor control and the values you select. This group of tabular worksheets provides space for a number of sensor controls; if you need more space, copy these pages to extend your worksheet.

Table A-18 Sensor Control Values

Item:
Disable / Enable
Upper Fatal:
Upper Warning:
Lower Warning:
Lower Fatal:

BIOS Setup Worksheets

Table A-19 Main Menu

System Date	
System Time	
Legacy Diskette A	Disabled 360 KB 720 KB 1.44 MB 2.88 MB
Legacy Diskette B	Disabled 360 KB 720 KB 1.44 MB 2.88 MB

Table A-19 (continued) Main Menu

Hard Disk Pre-delay	Disabled / 3 / 6 / 9 / 12 / 15 / 21 / 30
Language	English Spanish Italian French German

Table A-20 Primary Master and Slave Submenu

Type	Auto / None / CD-ROM / IDE Removable ATAPI Removable / User
Cylinders	
Heads	
Sectors	
Maximum Capacity	
Multi-Sector Transfer	Disabled / 2 / 4 / 8 / 16
LBA Mode Control	Disabled / Enabled
32 Bit I/O	Disabled / Enabled
Transfer Mode	Standard / Fast PIO 1 / Fast PIO 2 / Fast PIO 3 Fast PIO 4
Ultra DMA	Disabled / Enabled

Table A-21 Keyboard Features Submenu

Num Lock	Auto / On / Off
Key Click	Disabled / Enabled
Keyboard auto-repeat rate	30 / 26.7 / 21.8 / 18.5 / 13.3 / 10 / 6 / 2
Keyboard auto-repeat delay	0.25 / 0.5 / 0.75 / 1

Table A-22 Advanced Menu

Plug and Play OS	Yes / No
Reset Configuration Data	Yes / No
Use Multiprocessor Specification	1.1 / 1.4
Large Disk Access Mode	LBA / CHS
Pause Before Boot	Enabled / Disabled

Table A-23 PCI Device, Embedded SCSI Submenu

Option ROM Scan	Disabled / Enabled
Enable Master	Disabled / Enabled
Latency Timer	Default / <time>

Table A-24 PCI Devices Submenu

Option ROM Scan	Disabled / Enabled
Enable Master	Enabled / Disabled
Latency Timer	Default / <time>

Table A-25 I/O Device Configuration Submenu

Serial Port A	Disabled / Enabled / Auto / OS Controlled
Base I/O Address	3F8h / 2F8h / 3E8h / 2E8h
Interrupt	4 / 3
Serial Port B	Disabled / Enabled / Auto / OS Controlled
Mode	Normal / IrDA / ASK-IR
Base I/O Address	3F8h / 2F8h / 3E8h / 2E8h
Interrupt	4 / 3
Parallel Port	Disabled / Enabled / Auto / OS Controlled
Mode	Output only / Bidirectional / EPP / ECP
Base I/O Address	378 / 278
Interrupt	5 / 7
DMA channel	1 / 3
Floppy disk controller	Disabled / Enabled
Base I/O Address	Primary / Secondary
PS/2 Mouse	Disabled / Enabled

Table A-26 Advanced Chipset Control Submenu

Address Bit Permuting	Disabled / Auto
Base RAM Step	1 MB / 1 KB / Every location
Extended RAM Step	1 MB / 1 KB / Every location
L2 Cache	Enabled / Disabled
ISA Expansion Aliasing	Enabled / Disabled
Memory Scrubbing	Enabled / Disabled
Restreaming Buffer	Enabled / Disabled

Table A-27 Security Menu

Administrator Password is	Clear / Set
User Password is	Clear / Set
Password on Boot	Disabled / Enabled
Fixed Disk Boot Sector	Normal / Write Protect
System Backup Reminder	Disabled / Daily / Weekly / Monthly
Virus Check Reminder	Disabled / Daily / Weekly / Monthly
Secure Mode Timer	Disabled / <time>
Secure Mode Hot Key	<key stroke>
Secure Mode Boot	Disabled / Enabled
Video Blanking	Disabled / Enabled
Floppy Write Protect	Disabled / Enabled

Table A-28 Server Menu

Processor Retest	No / Yes

Table A-29 System Management Submenu

Server Management Mode	Disabled / Enabled
System Event Logging	Disabled / Enabled
Clear Event Log	Disabled / Enabled
Assert NMI on AERR	Disabled / Enabled
Assert NMI on BERR Interrupt Routing	Disabled / Enabled
Assert NMI on PERR Interrupt Routing	Disabled / Enabled
Assert NMI on SERR Interrupt Routing	Disabled / Enabled
Enabled Host Bus Error	Disabled / Enabled

Table A-30 Console Redirection Submenu

COM Port Address	Disabled / 3F8 / 2F8 / 3E8
IRQ#	None / 3 / 4
Baud Rate	9600 / 19.2k / 38.4k / 115.2k
Flow Control	None / CTS/RTS / XON/XOFF / CTS/RTS + CD

Table A-31 Boot Menu

Floppy Check	Disabled / Enabled
Multi-boot Support	Disabled / Enabled
Maximum No. of I2O Drives	1 / 4
Message Timeout Multiplier	1 / 2 / 8 / 10 / 50 / 100 / 1000

Table A-32 Boot Device Priority Submenu

Boot Priority 1	Diskette Drive / <other>
Boot Priority 2	Removable Devices / <other>
Boot Priority 3	Hard Drive / <other>
Boot Priority 4	I2O Block Storage Device / <other>
Boot Priority 5	ATAPI CD-ROM Drive / <other>
Boot Priority 6	Any SCSI CD-ROM Drive / <other>

Table A-33 Hard Drive Submenu

Drive 1
Other Bootable Cards
Additional Entries

Environmental Specifications

Environmental Specifications

Table B-1 lists the server's environmental specifications.

Table B-1 Environmental Specifications

Temperature	
Nonoperating	–40 ˚C to 70 ˚C (–55 ˚F to 150 ˚F)
Operating	10 ˚C to 35 ˚C (41 ˚F to 95 ˚F); derated 0.5 ˚C for every 1000 ft (305 m) Altitude to 10,000 ft max; maximum rate of change = 10 ˚C per hour
Humidity	
Nonoperating	95% relative humidity (noncondensing) at 30 ˚C (86 ˚F)
Operating wet bulb	Not to exceed 33 ˚C (91.4 ˚F) (with diskette drive or hard disk drive)
Shock	
Operating	2.0 g, 11 msec, 1/2 sine
Packaged	Operational after 30-inch (76.2 cm) free fall (cosmetic damage might occur)
Acoustic noise	< 55 dBA with three power supplies at 28 ˚C +/- 2 ˚C
Electrostatic discharge (ESD)	Tested to 20 kilovolts (kV) per Intel environmental test specifications; no component damage
AC Input Power	
100-120 V~	100-120 V~, 7.6 A, 50/60 Hz
200-240 V~	200-240 V~, 3.8 A, 50/60 Hz

Chassis Warnings and Safety

The following sections contain general chassis and power related safety warnings.

Power Warnings

The power supply in this product contains no user-serviceable parts. There may be more than one supply in this product. Servicing is done only by qualified personnel.

Do not attempt to modify or use the supplied AC power cord if it is not the exact type required. A product with more than one power supply will have a separate AC power cord for each supply.

The DC push-button on / off switch on the system does not turn off system AC power. To remove AC power from the system, you must unplug each AC power cord from the wall outlet or power supply.

Cautions When Removing the Chassis Covers

Whenever you remove the chassis covers to access the inside of the system, follow these steps:

1. Turn off all peripheral devices connected to the system.
2. Turn off the system by using the push-button on / off power switch on the system.
3. Unplug all AC power cords from the system or from wall outlets.
4. Label and disconnect all cables connected to I / O connectors or ports on the back of the system.

5. Provide some electrostatic discharge (ESD) protection by wearing an antistatic wrist strap attached to chassis ground of the system—any unpainted metal surface—when handling components.
6. Do not operate the system with the chassis covers removed.

After you have completed the six safety steps above, you can remove the system covers. To do this:

1. Unlock and remove the padlock from the back of the system if a padlock has been installed.
2. Remove and save all screws from the covers.
3. Remove the covers.

   Caution: A microprocessor or heat sink may be hot if the system has been running. Also, there may be sharp pins and edges on some board and chassis parts. Contact should be made with care. Consider wearing protective gloves.

For proper cooling and airflow, always reinstall the chassis covers before turning on the system. Operating the system without the covers in place can damage system parts. To install the covers:

1. Check first to make sure you have not left loose tools or parts inside the system.
2. Check that cables, add-in boards, and other components are properly installed.
3. Attach the covers to the chassis with the screws removed earlier, and tighten them firmly.
4. Insert and lock the padlock to the system to prevent unauthorized access inside the system.
5. Connect all external cables and the AC power cord(s) to the system.

Warning: There is a danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the equipment manufacturer. Discard used batteries according to manufacturer's instructions.

The system is designed to operate in a typical lab, server room, or office environment. Choose a site that is:

- Clean and free of airborne particles (other than normal room dust).
- Well ventilated and away from sources of heat including direct sunlight.
- Away from sources of vibration or physical shock.
- Isolated from strong electromagnetic fields produced by electrical devices.
- In regions that are susceptible to electrical storms, we recommend you plug your system into a surge suppressor and disconnect telecommunication lines to your modem during an electrical storm.
- Provided with a properly grounded wall outlet.
- Provided with sufficient space to access the power supply cords, because they serve as the product's main power disconnect.

Index

D

E

F

G

H

I

J

L

M

P

R

S

T

V

W